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New York Power Authority

James Knubel
Senior Vice President and
Chief Nuclear Officer

September 26, 1997
IPN-97-132

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Stop P1-137
Washington, DC 20555

SUBJECT: Indian Point 3 Nuclear Power Plant
Docket No. 50-286
Individual Plant Examination of External Events (IPEEE)

REFERENCES: See below.

Dear Sir:

This letter transmits the results of the Individual Plant Examination of External Events for the Indian Point 3 Nuclear Power Plant and fulfills the requirements of Generic Letter (GL) 88-20, Supplement 4 (Reference 1). The IPEEE was performed using methodologies developed for, or approved by, the NRC and has been subjected to peer review by Authority staff and an external team of experts.

In summary, the seismic probabilistic risk assessment (PRA) concluded that the estimated Core Damage Frequency (CDF) resulting from seismic-induced accident sequences at Indian Point 3 is 4.4×10^{-5} per year. The CDF resulting from fire-initiated accident sequences at Indian Point 3 is 5.64×10^{-5} per year. No risks to the plant occasioned by high wind or tornadoes, external floods, or hazardous chemical transportation were identified that might lead to core damage with a predicted frequency in excess of 10^{-6} per year. No risks due to nearby facilities were identified that might lead to core damage with a predicted frequency in excess of 10^{-6} per year. The conclusions drawn from the containment analyses are very similar to those derived for the Individual Plant Examination (IPE) study (Reference 2), and no unique containment failure mechanisms were identified.

As a result of this IPEEE, the Authority has gained insights into the relative risks associated with structures, systems, and components at Indian Point 3. These insights do not affect operability, but do however, form the basis for the recommended improvements presented in Section 8.3 of the IPEEE report.

This IPEEE submittal, together with References 3 and 4, provide the basis for resolution of the following nine issues at Indian Point 3:

- Unresolved Safety Issue (USI) A-17, System Interactions in Nuclear Plants
- USI A-40, Seismic capacity of safety-related above ground tanks at the safe shutdown earthquake level
- USI A-45, Decay Heat Removal
- USI A-46, Verification of Seismic Adequacy of Equipment in Operating Plants
- Generic Issue (GI) 57, concerning the effects of inadvertent suppression
- GI-103, Design for Probable Maximum Precipitation
- GI-106, addressing piping and use of highly combustible gases
- GI-131, Potential Seismic Interaction involving the movable in-core Flux Mapping System used in Westinghouse plants
- The Eastern U.S. Seismicity Issue.

Attachment 1 provides the IPEEE report. The Authority committed to submit this report by September 30, 1997 (Reference 5). There are no new commitments in this letter. If you have any questions, please contact Ms. C. Faison.

Very truly yours,

J. Knubel
Senior Vice President &
Chief Nuclear Officer

STATE OF NEW YORK
COUNTY OF WESTCHESTER
Subscribed and Sworn to before me
this 26th day of September 1997

Notary Public

EILEEN E. O'CONNOR
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Attachment: As stated

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REFERENCES:

1. NRC Generic Letter 88-20, Supplement 4, "Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities", dated June 28, 1991.
2. NYPA Letter to NRC (IPN-94-079), "Individual Plant Examination for Internal Events", dated June 30, 1994.
3. NYPA Letter to NRC (IPN-95-118) "Summary Reports for Resolution of Unresolved Safety Issue A-46, Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors", dated November 16, 1995.
4. NYPA Letter to NRC (IPN-97-041), "Response to Request for Additional Information, Resolution of Unresolved Safety Issue A-46", dated March 20, 1997.
5. NYPA letter to NRC (IPN-97-028), "Revised Schedule for the Submittal of the Indian Point 3 Individual Plant Examination of External Events (IPEEE) Report", dated March 4, 1997.

Attachment 1 to IPN-97-132

Individual Plant Examination of External Events (IPEEE)

Report

New York Power Authority

INDIAN POINT 3 NUCLEAR POWER PLANT
Docket No. 50-286
DPR-64

NewYork Power Authority

Indian Point Three Nuclear Power Plant

Individual Plant Examination of External Events

IP3-RPT-UNSPEC-02182

New York Power Authority
Reactor Engineering
Nuclear Systems Analysis Group

September 1997

Approved By: ______________________ Date: 9/29/97

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Acronyms and Abbreviations

ABFP	Auxiliary Boiler Feed Pump
ADV	Atmospheric Dump Valve
AFW	Auxiliary Feedwater
ALARA	As Low As Reasonably Achievable
AMSAC	ATWS Mitigation System Actuation Circuitry
AOV	Air-Operated Valve
ATWS	Anticipated Transient Without Scram
BLCBE	Boiling Liquid Compressed Bubble Explosion
BLEVE	Boiling Liquid Expanding Vapor Explosion
CCDP	Conditional Core Damage Probability
CCR	Central Control Room
CCW	Component Cooling Water
CDF	Core Damage Frequency
CFC	Containment Air Recirculation Cooling and Filtration
CRS	Control Room Supervisor
CSS	Containment Spray System
CST	Condensate Storage Tank
CVCS	Chemical and Volume Control System
CWS	Circulating Water System
DBD	Design Basis Document
DBE	Design Basis Earthquake
DHR	Decay Heat Removal
ECCS	Emergency Core Cooling System
ECRIS	Electrical Cable and Raceway Information System
EDG	Emergency Diesel Generator
EHC	Electro-Hydraulic Control
EOP	Emergency Operating Procedure
EPCRA	Emergency Planning and Community Right-to-Know Act
EPRI	Electric Power Research Institute
FCU	Fan Cooler Unit
FCV	Flow Control Valve
FHA	Fire Hazard Analysis
FIVE	Fire Induced Vulnerability Evaluation
FRSS	Fire Risk Scoping Study
FSAR	Final Safety Analysis Report
GERS	Generic Equipment Response Spectrum
GI	Generic Issue
GIP	Generic Implementation Procedure
HCLPF	High Confidence of a Low Probability of Failure
HCR	Human Cognitive Reliability
HEP	Human Error Probability
HRA	Human Reliability Analysis

HRR	Heat Release Rate
HVAC	Heating, Ventilation and Air Conditioning
IACCW	Instrument Air Closed Cooling Water
IAS	Instrument Air System
IGSCC	Inter-granular Stress Corrosion Cracking
INPO	Institute of Nuclear Power Operations
IP2	Indian Point Unit 2 Nuclear Power Plant
IP3	Indian Point Unit 3 Nuclear Power Plant
IPE	Individual Plant Examination (for Internal Events)
IPEEE	Individual Plant Examination of External Events
IPPSS	Indian Point Probabilistic Safety Study
ISLOCA	Inter-System Loss of Cooling Accident
JAF	James A. FitzPatrick Nuclear Power Plant
LOCA	Loss of Coolant Accident
LOSP	Loss of Offsite Power
LHSI	Low-Head Safety Injection
MBFP	Main Boiler Feed Pump
MCC	Motor Control Center
MFW	Main Feedwater
MG	Motor Generator
MMRAS	Meteorological Monitoring and Radiological Assessment System
MOV	Motor-Operated Valve
MSIV	Main Steam Isolation Valve
MSS	Main Steam System
NPO	Nuclear Plant Operator
NRC	U.S. Nuclear Regulatory Commission
NSP	Non-Suppression Probability
NSSS	Nuclear Steam Supply System
NYPA	New York Power Authority
OBE	Operating Basis Earthquake
ONOP	Off-Normal Operating Procedure
PAB	Primary Auxiliary Building
PCS	Power Conversion System
PMP	Probable Maximum Precipitation
PORV	Power-Operated Relief Valve
PPR	Primary Pressure Relief
PRA	Probabilistic Risk Assessment
PWR	Pressurized Water Reactor
PWST	Primary Water Storage Tank
QA	Quality Assurance
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RHR	Residual Heat Removal
RLE	Review Level Earthquake
RO	Reactor Operator

RPS	Reactor Protection System
RWST	Refueling Water Storage Tank
SCBA	Self-contained Breathing Apparatus
SBO	Station Blackout
SET	Seismic Event Tree
SEWS	Screening Evaluation Worksheet
SF	Severity Factor
SGTR	Steam Generator Tube Rupture
SM	Shift Manager
SMA	Seismic Margin Assessment
SME	Seismic Margin Earthquake
SOP	System Operating Procedure
SRP	Standard Review Plan
SRSS	Square Root of the Sum of the Squares
SRV	Safety Relief Valve
SSCs	Systems, Structures and Components
SSD	Safe Shutdown
SSE	Safe-Shutdown Earthquake
STA	Shift Technical Advisor
SWS	Service Water System
TW	Loss of Containment Decay Heat Removal
USI	Unresolved Safety Issue
USLS	United States Land Survey
VCE	Vapor Cloud Explosion
VCT	Volume Control Tank
VSS	Vapor Suppression System

Section 1

EXECUTIVE SUMMARY

1.1 BACKGROUND AND OBJECTIVES

This document reports on the Individual Plant Examination of External Events (IPEEE) performed for the New York Power Authority's Indian Point Unit 3 Nuclear Power Plant (IP3). The objective of the IPEEE is to meet the requirements of the Nuclear Regulatory Commission's (NRC's) Generic Letter No. 88-20, Supplements 4 and 5 [1, 2], by conducting "an integrated systematic.... examination of each power plant ..... for possible risk contributors that might be plant specific and might be missed absent a systematic search" and by:

- Developing an appreciation of severe accident behavior.
- Understanding the most likely severe accident sequences initiated by external events that could occur at the plant under full power operating conditions.
- Gaining a qualitative understanding of the overall probabilities of core damage and fission product release.
- Reducing the overall probabilities of core damage and fission product release, if necessary, by making expeditious and appropriate modifications to hardware and procedures to prevent or mitigate severe accidents.

Further objectives of the IPEEE are to address other external events programs subsumed within the IPEEE and to ensure that the knowledge gained from the examination becomes an integral part of plant procedures and training programs, thereby maximizing the benefit that can be realized from the examination. This is to be achieved both through a commitment by the Authority to the intent of the IPEEE and the participation of Authority staff to the greatest extent possible in the examination. Specifically, the Nuclear Regulatory Commission (NRC) expects the Authority to:

- Have Authority engineers, who are familiar with the details of the design, control, procedures and system configurations, involved in the analysis as well as in the technical review.
- Perform an independent in-house review of the IPEEE.

It will be seen in this report that the Authority's commitment to the goals of the IPEEE and the involvement of Authority staff have met the NRC's requirements.

The IPEEE was comprised of separate studies evaluating the impact of seismic events, fires, and other external events such as high winds and tornadoes, external floods, and hazardous chemical, transportation and nearby facility incidents. The specific intent of the seismic analysis was to make a performance check on the design of the plant and estimate its seismic capacity beyond the design basis earthquake for which the plant was designed. The seismic study was also used to identify dominant contributors to seismic risk and the steps that can be taken to mitigate this risk.

The intent of the internal fire analysis performed in the IPEEE was to identify critical areas of vulnerability to fires and to ascertain if there is a significant likelihood that fire could compromise safety equipment. Of particular concern is the possibility of fire in areas in which redundant safe shutdown equipment is located, the potential for the cross-zone spread of fire, and the likelihood that transient fuels might supplement other fuels already present.

The objective of evaluating the impact of other external events was to identify plant-specific vulnerabilities to such events.

A final objective of the IPEEE was to help resolve several Generic Issues (GIs) and Unresolved Safety Issues (USIs). Accordingly, these issues were addressed in this study.

While the development of a severe accident management plan is not an integral part of the IPEEE, the results of the IPEEE will clearly be essential to the development of such a plan. Of particular importance are the results that concern the survivability of equipment and the actions operators take, or do not take, in a severe accident environment. Therefore, in performing the IPEEE, particular attention was paid to identifying actions that can substantially reduce the risk from severe accidents.

To derive continuing benefits from the IPEEE and to facilitate its review by the NRC, it is imperative that the IPEEE be documented fully, clearly, and in an easily traceable manner. This requires not only that the results of the examination, and in particular the identity of the severe accident sequences, be reported to the NRC but also that all documentation be retained, and that the assumptions and methodologies be specified.

The remainder of the report will demonstrate how the Authority has satisfied all the goals and requirements of the IPEEE process and presents the results of this IPEEE.

1.2 PLANT FAMILIARIZATION

To ensure the applicability and validity of the IPEEE and its conclusions, it is imperative that the analysis accurately depict IP3 as it is presently configured and operated. This was achieved by extensive efforts to ensure plant familiarization and an exhaustive review process. Plant familiarization comprised four elements:

- Extensive reliance on the team of analysts who performed the IP3 IPE and upon the models, data and results of that analysis.
- The compilation and review of numerous documents and databases describing the plant, systems and equipment of concern, and characterization of the external events.
- Site visits. The analysts made frequent visits to the site both to conduct plant walkdowns and to participate in formal reviews. In the walkdowns conducted for both the seismic and fire analyses, formal guidelines were followed and worksheets used where appropriate.
- Extensive communication among the parties involved and in particular between plant and engineering staff and the analysts.

Plant familiarization is an iterative process—as the analysis proceeds and the results of qualitative and quantitative analyses are reviewed, additional details or clarification are required.

The review process emphasized the role of plant staff and others familiar with the design and operation of the plant and with the external events of concern. Their reviews served to ensure that methodologies were appropriate and that the assumptions made and the results obtained were accurate.

1.3 METHODOLOGIES

The methodologies adopted by the New York Power Authority satisfy the requirements of the NRC for performing an IPEEE [3]. They comprised a seismic PRA, a fire PRA and a series of iterative analyses with which to evaluate the risks posed by external events other than earthquakes and fires. A feature common to all of these methodologies is the use, where appropriate, of the fault trees and event trees developed for the IP3 Individual Plant Examination (IPE) [4] to help identify accident sequences and estimate the resulting conditional core damage probabilities and core damage frequencies. The event trees created or adopted in the external events analysis depict the accident sequences that follow the occurrence of an initiating event. The subsequent responses of systems determine the final status of the core and containment--the delineation of each sequence terminates with a determination of whether the core is safe or damaged. Fault tree models were also developed or adopted for the systems depicted in the event trees and for their support systems. Failures induced by the external events, random failures and dependent and subtle failures were addressed. A plant-specific equipment failure database, human-error database and common-cause-failure database were used to quantify the event sequences that lead to core damage. Recovery actions were also evaluated.

The containment performance analysis performed for the IPE was also used, where appropriate, as the basis for evaluating the impact on the containment of accident sequences initiated by external events.

No quantitative analysis of uncertainty was performed in this IPEEE study. Rather, the Authority relied on the conservatism of the methodologies and assumptions used to mitigate the consequences of a failure to identify potential high risk scenarios.

The methodologies employed in the various portions of the IPEEE can be summarized as follows.

1.3.1 Seismic Events

Generic letter 88-20, Supplement 4, stated that a full-scope analysis with a 0.3g review level earthquake was adequate for the IP3 seismic evaluation. The seismic analysis methodology adopted by the New York Power Authority for IP3 to accomplish this evaluation comprises a seismic PRA [5] and a containment performance analysis. The seismic PRA can identify dominant contributors to seismic-induced risk and can estimate, with high confidence, the seismic fragility of the plant.

The seismic PRA involves the screening of components based on their importance and seismic capacity. The response of the plant to the seismic event was then characterized by determining a seismic core damage frequency for the plant. This determination entailed deciding upon the seismic fragility of individual components in terms of the peak ground acceleration associated with an earthquake and examining Boolean expressions for accident sequences initiated by a seismic event and ending in core damage.

The containment performance analysis had the primary purpose of identifying seismic-induced containment failure modes or timing that differ significantly from those found in the IPE internal events evaluation.

The adequacy of long-term decay heat removal (DHR) after seismic events that occur during full power operation was evaluated in the same fashion as core damage.

Risk issues raised in the Fire Risk Scoping Study [6] were also addressed in detail.

1.3.2 Fire

The Authority elected to use the EPRI Fire PRA methodology [7] for IP3. This methodology meets the requirements laid out by NUREG-1407 [3], identifying critical areas of vulnerability, calculating fire ignition frequencies, determining whether critical safety functions are disabled, and identifying fire-induced initiating events and their impact on systems. It is also capable of addressing seismic/fire interactions, the effects of fire suppression on safety equipment and control system interactions and provides a basis for the performance of a containment analysis.

The fire PRA utilizes the IPE internal event models to address fire-induced initiators and appropriate equipment failures, thus allowing fire-induced and random failures to be treated together at the level of detail employed in the IPE. This approach facilitates the use of the detailed internal events IPE model developed for IP3 and its associated computer codes and databases. Another advantage of the fire PRA is its comprehensive treatment of detection, suppression, and fire barrier performance. A final advantage of the fire PRA is that it lends itself to the development of a performance-based fire protection program to address emerging issues such as a reduction of fire surveillances, the evaluation of the need for and type of particular fire watches, and a more realistic assessment of proposed fire-related plant modifications.

1.3.3 High Winds and Tornadoes, External Floods and Hazardous Chemical, Transportation and Nearby Facility Incidents

The methodologies employed to evaluate the impact of external events such as high winds and tornadoes, external floods and hazardous chemical, transportation and nearby facility incidents were the iterative methodologies suggested by NUREG-1407 [3]. The first step common to all external events of concern was to review plant-specific hazard data and the licensing bases to ascertain how the events were addressed prior to issuance of the plant operating license. This review was scrutinized to ensure that data required for comparison with the 1975 Standard Review Plan (SRP) [8] were gathered. Significant changes to the plant and to the characterization of the external events and their impact on plant safety were then identified.

A determination was then made as to whether IP3 meets the 1975 SRP criteria with respect to high winds and tornadoes, external floods, ice, and hazardous chemical, transportation and nearby facility incidents, and whether there are particular susceptibilities that would result in a core damage frequency of 10^{-6}/year or more. In making this determination, the potential for damage to safety-related equipment consequent to the failure of non-safety related structures and equipment induced by external events was addressed. Where it could not be clearly demonstrated from existing studies that IP3 meets the SRP criteria, further analyses were conducted.

1.3.3.1 High Winds and Tornadoes

High winds and tornadoes can damage systems and structures within a nuclear power plant as a result of direct damage resulting from dynamic wind loadings, missiles generated by a tornado, and pressure differentials induced by a tornado. The evaluation of risks associated with tornadoes and high winds comprised determining the frequencies of tornadoes and high winds at IP3, characterizing tornadoes that meet the 10^{-6}/year frequency criterion of concern [3], identifying vulnerabilities to tornado-generated wind loadings, pressure differentials and missiles and identifying measures to reduce significant risks arising from tornadoes and strong winds.

1.3.3.2 External Floods

The risks associated with external flooding were characterized. First, potential risk scenarios not fully addressed in the design of the plant were identified. These scenarios were found to be associated with the impact of probable maximum levels of precipitation on roof drainage. In addition, more recent studies that characterize river levels as a function of their return period were also reviewed. The consequences of these scenarios on the plant were then determined, accounting, where appropriate, for mitigating features in place. Measures that could reduce the risk arising from external flooding would then have been identified should this risk have proved significant.

1.3.3.3 Hazardous Chemical, Transportation, and Nearby Facility Incidents

The assessment of hazardous chemical, transportation, and nearby facility incidents addressed the risk posed by toxic hazards, explosions, and aircraft impact. The characterization of on- and off-site toxic hazards was undertaken as a series of subtasks that built upon the control room habitability studies performed in response to NUREG-0737, Section III.D.3.4 [9]. Other hazards were characterized in new analyses.

1.4 MAJOR FINDINGS

The conclusions, major findings and insights of this study are presented here. In contrast to the IPE, it is difficult to calculate a total core damage frequency resulting from accident sequences initiated by all external events because many accident scenarios were screened out before the core damage frequency was quantified and thus no real statement can be made about the risk of core damage resulting from them other than to state that it is below the cut-off criteria. Estimates of the core damage frequency resulting from seismic events and fires were derived, however.

1.4.1 Seismic Events

The conclusions of the seismic PRA are:

- There are no unique plant vulnerabilities: the safety-related systems provide effective and reliable means for reactor reactivity control, electrical power, reactor coolant system pressure control, decay heat removal, and containment pressure control.

- The total mean seismic core damage frequency for IP3 is 4.4 x 10^{-5}/year. This frequency applies to the plant as it is currently configured and operated.

- Seismic-induced station blackout sequences contribute 43.5 percent of the seismic core damage frequency; sequences initiated by a seismic-induced loss of component cooling and subsequent reactor coolant pump seal LOCA contribute 23.1 percent; seismic-induced loss-of-offsite power (non-blackout) sequences contribute 20.6 percent; the surrogate element contributes 7.7 percent; seismic-induced anticipated transients without scram sequences contribute 4.9 percent; and seismic-induced small LOCA sequences contribute 0.2 percent.

- Key components that influence the seismic core damage frequency were concentrated in the electrical distribution system, component cooling water system, control room panels and the residual heat removal system.

- Seismic-induced flooding does not pose major risk.

- Seismic-induced fires do not pose major risk.

Evaluations were made to resolve unresolved safety issue USI-A45 (Decay Heat Removal) with respect to seismic events. No unique decay heat removal vulnerabilities to seismic events at full power operation were found. It was predicted that the loss of decay heat removal function contributes 21% (9.2 x 10^{-6}/year) of the total seismic core damage frequency.

Other unresolved safety issues were also addressed in the seismic IPEEE. It was judged that USI A-17 (system interactions in nuclear power plants), USI A-40 (the seismic capacity of safety-related above-ground tanks at the safe shutdown earthquake level), USI A-46 (verification of seismic adequacy of equipment in operating plants), and GI-131 (potential seismic interaction involving the movable in-core flux mapping system used in Westinghouse plants) can be considered resolved for IP3. The Eastern U. S. Earthquake Issue was also judged to be adequately addressed in the IPEEE.

The conclusions drawn from the seismic containment performance analyses are very similar to those derived for the IPE study, and no unique containment failure mechanisms were identified.

1.4.2 Fire

The fire analysis concluded that the core damage frequency (CDF) resulting from fire-initiated accident sequences at IP3 is 5.64 x 10^{-5}/year. The major contributions to the fire-induced CDF come from fires in the 480-V switchgear, cable spreading, control, and diesel generator rooms—the rooms containing the bulk of the control circuitry excepting remote shutdown circuitry. As fires in these four areas may require shutdown from outside the control room, human error and the random failure of safe shutdown components are the dominant active failure events. It should be stressed that the importance of fires in the 480-V switchgear, cable spreading, control, and diesel generator rooms is, to some extent, an artifact of the conservatism of the fire PRA methodology with regard to fire propagation and suppression. Accordingly, the CDF resulting from fires in the 480-V switchgear room may be reduced significantly if more realistic fire modeling techniques become available.

In the fire analysis, evaluations were also made to resolve unresolved safety issue USI-A45 (with respect to decay heat removal fire vulnerabilities), generic issue GI-57 (concerning the effects of inadvertent suppression) and generic issue GI-106 (addressing piping and the use of highly combustible gases). No significant vulnerabilities exist with respect to these issues.

The conclusions drawn from the fire containment performance analyses are very similar to those derived for the IPE study, and no unique containment failure mechanisms were identified.

1.4.3 High Winds and Tornadoes, External Floods and Hazardous Chemical, Transportation and Nearby Facility Incidents

No risks to the plant occasioned by high winds and tornadoes, external floods, ice, and transportation and nearby facility incidents were identified that might lead to core damage with a predicted frequency in excess of 10^{-6}/year. However, scenarios involving hydrogen explosions within the turbine building, the pipe trench between the PAB and containment, the hydrogen shed area in the containment access facility, and the pipe chase on the 73-ft elevation of the north-east corner of the PAB were identified that could result in core damage with a conservatively estimated frequency slightly above 10^{-6}/year.

Given the conclusion that external floods pose no significant risk, Generic Issue 103 (Design for Probable Maximum Precipitation) was judged to be resolved for IP3.

1.4.4 Insights and Recommendations

1.4.4.1 Seismic Events

Although no low ruggedness relays were found, no seismic documentation exists for some relays in the emergency diesel generator system. Because the seismic-induced chatter of these relays may result in the failure of the EDGs, a seismic event might result in the common-cause failure of all EDGs should the relays be of low seismic capacity. This issue is part of the A-46 program.

A number of other seismic insights were also noted in the study. Specifically:

- The CO_2 tanks are unanchored, and could shift and fracture the attached threaded piping, during a seismic event.

- The piping carrying the CO_2 from the tanks to the protected areas is threaded, and runs adjacent to (and through) masonry block walls in the administration service and turbine buildings. These walls were not evaluated in the 80-11 program, so their seismic fragility levels may be low. Collapse of these walls could fracture any nearby CO_2 piping.

- A pair of 350,000-gallon fire water tanks supplies the fire protection water system. The tanks are large, vertical, flat-bottom atmospheric storage tanks. Tanks of this type have low seismic fragility levels.

However, these deficiencies do not pose an increased risk.

Another seismic deficiency has already been addressed by a temporary modification that prevents a seismic event inducing the spurious operation of the EDG room CO_2 system and subsequent shutdown of the EDG ventilation system. A proposed permanent modification to install a QA category I, seismic class I, actuation permissive auxiliary control panel for CO_2 discharge into the EDG building is now under evaluation.

1.4.4.2 Fire

The risks posed by fire at IP3 are mitigated by the Appendix R dedicated shutdown path that is independent of control circuitry susceptible to fire damage and by fire-related operating procedures that address control room evacuation and shutdown from outside the control room. In addition, procedures exist which address the inspection and maintenance of fire barriers. A proposed minor modification would eliminate the susceptibility of multiple EDG exhaust fans (and thus multiple EDGs) to fire within a single fire zone by realigning the power feeds to the EDG exhaust fans and auxiliaries. Finally, to reduce the susceptibility of the plant to switchgear room fires, we recommend that the area-wide, total flooding CO_2 fire suppression system within the switchgear room be restored to automatic actuation. This recommendation is also currently being evaluated in a proposed modification.

No additional recommendations are made to further reduce fire-induced risk at IP3.

1.4.4.3 High Winds and Tornadoes, External Floods and Hazardous Chemical, Transportation and Nearby Facility Incidents

The risk associated with hydrogen explosions could be reduced by installing an excess flow valve at the outside hydrogen storage facility to stop flow in the event of a hydrogen line rupture inside the turbine building or PAB. A proposal has been made by fire protection engineering to implement this modification.

1.5 REFERENCES

1. Nuclear Regulatory Commission, "Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities - 10CFR50.54(f)", Generic Letter No. 88-20, Supplement 4, June 28, 1991.

2. Nuclear Regulatory Commission, "Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities - 10CFR50.54(f)", Generic Letter No. 88-20, Supplement 5, September 8, 1995.

3. United States Nuclear Regulatory Commission, "Procedural and Submittal Guidance for the Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities", NUREG-1407, June 1991.

4. New York Power Authority, "Indian Point 3 Nuclear Power Plant, Individual Plant Examination for Severe Vulnerabilities", June 1994.

5. Nuclear Regulatory Commission, "PRA Procedures Guide", NUREG/CR-2300, January 1983.

6. Lambright, J.A., et al. "Fire Risk Scoping Study: Investigation of Nuclear Plant Fire Risk Including previously Unaddressed Issues", Prepared by Sandia National Laboratories, Albuquerque, for the U. S. Nuclear Regulatory Commission, NUREG/CR-5088, January 1989.

7. Parkinson, W. J., "EPRI Fire PRA Implementation Guide", prepared by Science Applications International Corporation for Electric Power Research Institute, EPRI TR-105928. December 1995.

8. Nuclear Regulatory Commission, Standard Review Plan, NUREG-0800, Rev. 2, July 1981.

9. Nuclear Regulatory Commission, "Clarification of TMI Action Plan Requirements," NUREG-0737, Section III.D.3.4, November 1980.

Section 2

EXAMINATION DESCRIPTION

2.1 INTRODUCTION

This Individual Plant Examination of External Events (IPEEE) was performed to meet the requirements of the Nuclear Regulatory Commission's Generic Letter No. 88-20, Supplements 4 and 5 [1,2]. It did so by employing state-of-the-art methodologies prepared for or accepted by the NRC. These methodologies and the procedures followed in conducting the examination will now be described.

2.2 CONFORMANCE WITH GENERIC LETTER AND SUPPORTING MATERIAL

This IPEEE conforms fully with the Generic Letter [1, 2] and the IPEEE submittal guidance issued by the NRC [3]. It has also made extensive use of the methodologies and data prepared or reviewed by or for the NRC. Conformance with the Generic Letter is demonstrated by this submittal, by the dominant role played in its preparation by the staff of the New York Power Authority, by the changes to plant hardware and procedures proposed as a result of this IPEEE to help prevent or mitigate severe accidents, and by the future applications that the New York Power Authority envision for this IPEEE in supporting licensing actions and renewal, in severe accident management, and in integrated safety assessment.

2.3 GENERAL METHODOLOGY

The methodologies adopted by the New York Power Authority satisfy the requirements of the NRC for performing an IPEEE. These methodologies are comprised of a seismic PRA [4], a fire PRA [5] and a review of other external events that follows the guidelines for such analyses presented in NUREG-1407 [3]. These methodologies are summarized in Section 1 of this report and described in detail in Sections 3 to 5.

2.4 INFORMATION ASSEMBLY

The information collected and used in the IPEEE is described in the following subsections.

2.4.1 Plant Layout and Containment Building Information

The bulk of the plant layout and containment information used in this IPEEE is contained within system descriptions, design drawings and documentation, and the Final Safety Analysis Report (FSAR) [6]. Safety-related aspects of recent modifications are described in the safety evaluation reports included in the modification packages.

2.4.2 Previously Performed Analyses

The risk posed by external events was evaluated previously as part of Indian Point Probabilistic Safety Study published in 1982 [7]. In addition, the IPE [8] provided fault and event tree models, system descriptions, and failure and containment performance data that were used in this study.

2.4.3 Description of Plant Documentation

The plant documentation used in this IPEEE is listed in Table 2.4.3.1. This documentation is the most recent available. Where documentation was revised or issued while this IPEEE was being prepared (ie, prior to December 1996), the analyses were updated to reflect changes affecting the models or the results of this IPEEE. This update was accomplished by reviewing all plant documentation and modification packages issued prior to December 1996.

2.4.4 Plant Walkdowns

Extensive plant walkdowns were performed as an integral part of the IPEEE evaluations of earthquakes, fires and other external events. Formal guidelines and worksheets were used where appropriate in the seismic and fire evaluation walkdowns. These walkdowns are described in detail in Sections 3 to 5.

Table 2.4.3.1

Plant Documentation

IPE Report [8]
Fire Hazards Analysis [9]
Final Safety Analysis Report [6]
Design Basis Documentation for Fire Protection [10]
Fire Protection Procedures
10 CFR-50 Appendix R Analyses
Details of Appendix R Exemptions
Electrical Cable and Raceway Information System (ECRIS) Database
System Operating Procedures
Emergency Operating Procedures
Off-Normal Operating Procedures
Structural Drawings
USI A-46 Seismic Evaluation Report [11]
HVAC Calculations
Conduit and Tray Arrangement Drawings
Electrical One Line Diagrams
Electric Schematic Diagrams
Wiring Diagrams
Flow Diagrams
Pre-Fire Plans
Fire Area/Zone Arrangement Drawings
Administrative Procedures
Performance Test Procedures
Modification Packages

2.5 REFERENCES

1. Nuclear Regulatory Commission, "Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities - 10CFR50.54(f)", Generic Letter No. 88-20, Supplement 4, June 28, 1991.

2. Nuclear Regulatory Commission, "Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities - 10CFR50.54(f)", Generic Letter No. 88-20, Supplement 5, September 8, 1995.

3. Nuclear Regulatory Commission, "Procedural and Submittal Guidance for the Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities", NUREG-1407, June 1991.

4. Nuclear Regulatory Commission, "PRA Procedures Guide", NUREG/CR-2300, January 1983.

5. Parkinson, W. J., "EPRI Fire PRA Implementation Guide", prepared by Science Applications International Corporation for Electric Power Research Institute, EPRI TR-105928, December 1995.

6. New York Power Authority, Indian Point 3 Final Safety Analysis Report.

7. Power Authority of the State of New York and Consolidated Edison Co. "Indian Point Probabilistic Safety Study" , 1982, Amendment 1 (1982), Amendment 2 (1983).

8. New York Power Authority, "Indian Point 3 Nuclear Power Plant, Individual Plant Examination for Severe Accident Vulnerabilities", June 1994.

9. "Indian Point 3 Nuclear Power Plant: Fire Hazards Analysis, Rev.0, November 1994.

10. New York Power Authority, Indian Point 3 Nuclear Power Plant Design Basis Documentation for Fire Protection DBD-321, Rev. 0, December 1995.

11. Atometrics, Inc., Indian Point Unit 3, "Seismic Evaluation Report Verification of the Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors in Response to NRC Generic Letter 87-02/Unresolves Safety Issue (USI) A-46," November 1995.

Section 3

SEISMIC ANALYSIS

3.1 SEISMIC PROBABLISTIC RISK ASSESSMENT

3.1.1 Methodology Selection

The Indian Point Unit 3 Nuclear Power Plant (IP3) was designed to accommodate a design basis earthquake (DBE) with 0.15g peak ground acceleration in the horizontal direction and 0.10 g in the vertical direction. The seismic analysis performed in this study is intended to act as a performance check on the design, estimating seismic capacity beyond the DBE.

The seismic analysis methodology adopted by the New York Power Authority for IP3 satisfies the requirements of the Nuclear Regulatory Commission (NRC) for a seismic IPEEE as presented in Generic Letter 88-20, Supplement 4 [1] and its accompanying guidance document, NUREG-1407 [4]. The methodology comprises a seismic probabilistic risk assessment (seismic PRA) [2] and a containment performance analysis.

A seismic PRA presents information on seismic capacity and risk in a probabilistic fashion; the random unavailability of components is treated directly. The seismic PRA can identify dominant contributors to seismic-induced risk and can estimate, with high confidence, the seismic capacity of the plant. Accordingly, the seismic PRA approach was deemed adequate for this study.

The seismic PRA involves the screening of components based on their importance and seismic capacity about the peak ground acceleration associated with an earthquake, and the examination of Boolean expressions for accident sequences initiated by a seismic event and ending in core damage. The seismic PRA thus entails:

- Seismic hazard analysis.
- Systems analysis to identify components required for safe shutdown and those responsible for or involved in seismic-induced initiating events.
- Seismic response analysis and the evaluation of the seismic capacity of selected components (including relay chatter evaluations).
- The development and evaluation of event sequences initiated by seismic events.
- The analysis of containment performance.

The containment performance analysis has the primary purpose of identifying seismic-induced containment failure modes or timing that differ significantly from those found in the IPE internal events evaluation [4].

3.1.2 Seismic Hazard Analysis

The seismic hazard defines the annual probability that specified levels of ground motion will be exceeded at the plant site. The site-specific seismic hazard curves used in the seismic PRA were taken from two sources. The first set of curves was obtained from the NRC-sponsored Lawrence Livermore National Laboratories (LLNL) revised hazard estimates, documented in NUREG-1488 [5]. These are shown in Figure 3.1.2.1.

The second set of hazard curves was obtained from the industry-sponsored Electric Power Research Institute's (EPRI) seismic hazard methodology program, documented in EPRI NP-6395-D [6]. The corresponding curves are shown in Figure 3.1.2.2.

The seismic hazard information used for the baseline seismic core damage frequency analysis was developed from the LLNL revised hazard estimates. This seismic hazard acceleration and frequency information is depicted in Table 3.1.2.1. For comparison, the EPRI seismic hazard information is presented in Table 3.1.2.2. As can be seen, very little difference exists between the curves over the complete range of accelerations depicted. Figure 3.1.2.3 depicts the mean LLNL and EPRI seismic hazard curves.

As will be noted in Section 3.1.5.6, a sensitivity study was performed to compare the effect of using the EPRI hazard curve instead of the baseline LLNL hazard curve. The results show a 16 percent increase in the overall seismic-induced core damage frequency if the EPRI hazard curve is used.

NUREG-1407 [2] also requests an explanation if the hazard is truncated before 1.5g. This evaluation of IP3 used the LLNL hazard curves, which extend to 1.0g as shown in Figure 3.1.2.1. Extensions of the nonlinear, composite curves into low frequency and high acceleration regions of the earthquake hazard would provide incomplete estimates at best that could easily be upper bounds on the magnitudes of the earthquake hazards as the hazard curve may decrease very quickly. Because simple extrapolation with no geotechnical basis may misrepresent the actual hazard, it was concluded that hazard curve extrapolation would provide no additional insights into the seismic risk at IP3.

Figure 3.1.2.1

IP3 Revised 1993 LLNL Site Hazard Curves

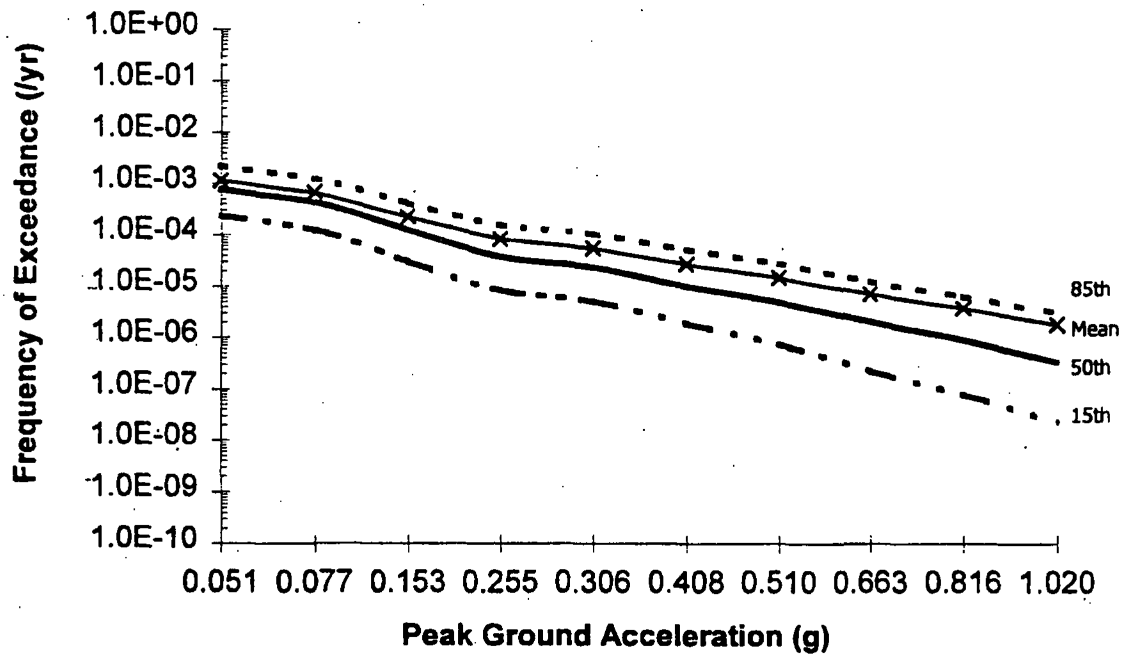


Figure 3.1.2.2

IP3 EPRI 1989 Site Hazard Curves

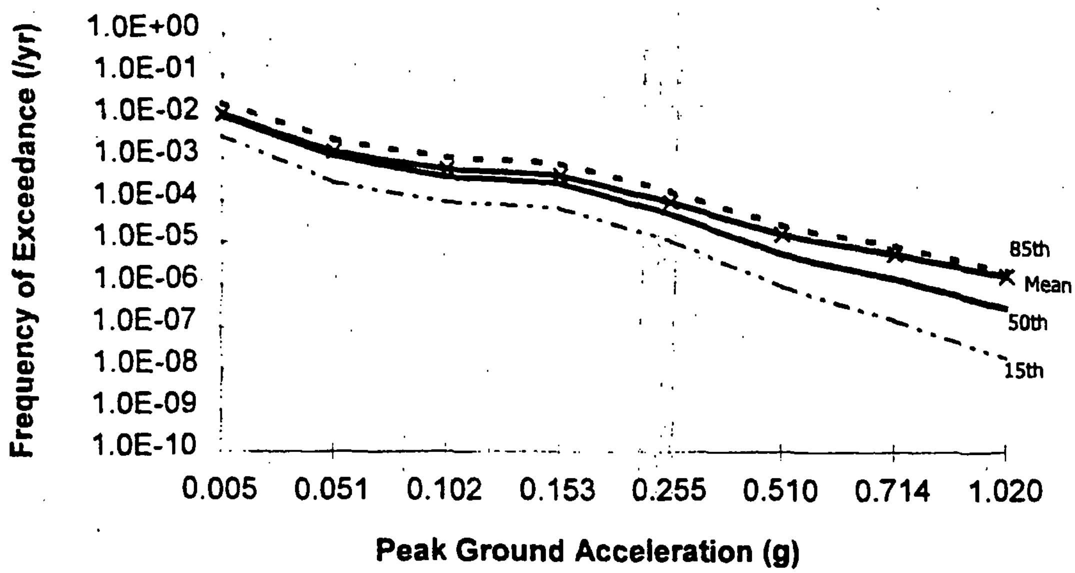


Table 3.1.2.1

LLNL Hazard Curves Values

Acceleration	**Frequency of Exceedance (/yr)**			
(g)	**15%**	**50%**	**85%**	**Mean**
0.051	2.320E-04	7.650E-04	2.170E-03	1.152E-03
0.077	1.200E-04	4.170E-04	1.210E-03	6.552E-04
0.153	2.930E-05	1.200E-04	4.000E-04	2.123E-04
0.255	8.200E-06	3.630E-05	1.470E-04	7.736E-05
0.306	4.850E-06	2.260E-05	9.720E-05	5.148E-05
0.408	1.810E-06	9.670E-06	4.910E-05	2.562E-05
0.510	7.340E-07	4.770E-06	2.640E-05	1.421E-05
0.663	2.220E-07	1.970E-06	1.210E-05	6.738E-06
0.816	7.780E-08	8.750E-07	6.090E-06	3.583E-06
1.020	2.230E-08	3.330E-07	2.970E-06	1.749E-06

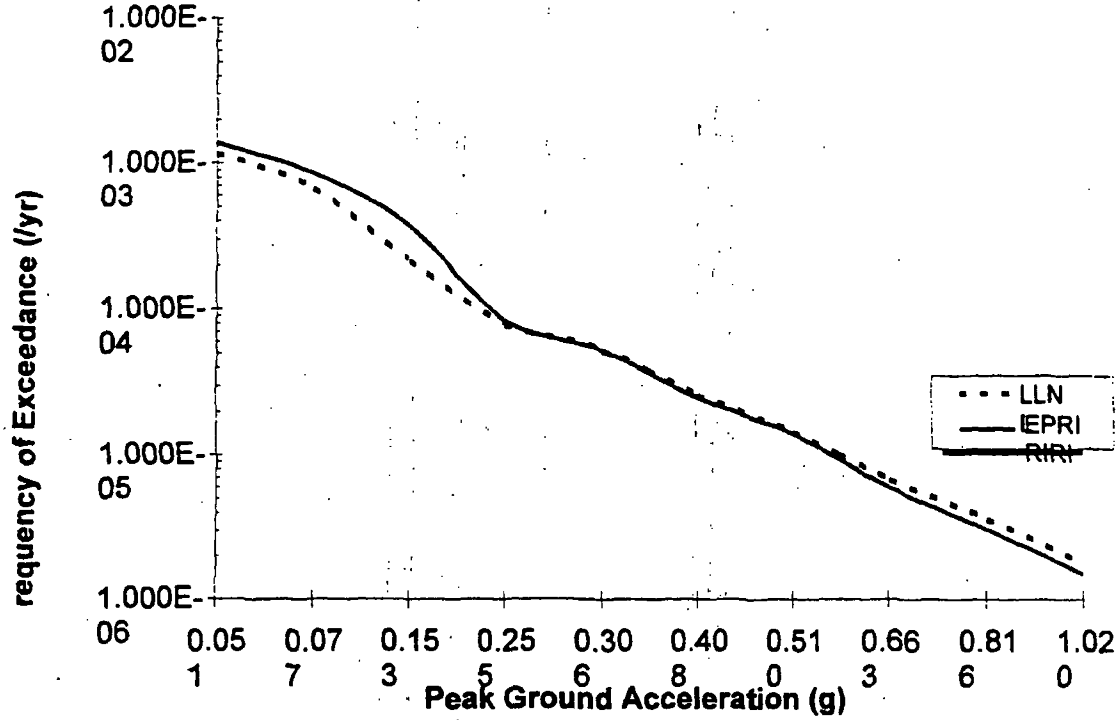
Table 3.1.2.2

EPRI Hazard Curves Values

Acceleration	**Frequency of Exceedance (/yr)**			
(g)	**15%**	**50%**	**85%**	**Mean**
0.005	3.3E-03	9.7E-03	2.0E-02	1.1E-02
0.051	2.6E-04	1.1E-03	2.7E-03	1.4E-03
0.102	8.4E-05	3.3E-04	9.6E-04	5.0E-04
0.153	6.1E-05	2.4E-04	7.1E-04	3.7E-04
0.255	1.0E-05	4.4E-05	1.5E-04	8.3E-05
0.510	8.4E-07	4.8E-06	2.3E-05	1.4E-05
0.714	1.4E-07	1.3E-06	7.7E-06	5.0E-06
1.020	1.7E-08	2.7E-07	2.0E-06	1.5E-06

Figure 3.1.2.3

Comparison of IP3 Revised 1993 LLNL and EPRI Mean Site Hazard Curves



Besides the mean LLNL hazard curve used for the baseline core damage frequency analysis, the LLNL study also provides Uniform Hazard Response Spectra (UHS). NUREG-1407 [2] recommends that the median spectral shape for the 10,000-year return period be used for the evaluation of structures and components (discussed in Section 3.1.4.4). Frequency and acceleration data for this shape are shown in Table 3.1.2.3. The UHS defined in Table 3.1.2.3, normalized to the mean peak accelerations for return periods of 1000, 5000 and 10,000 years, are plotted in Figure 3.1.2.4 along with the design basis earthquake (DBE) response spectrum (Figure 16.1-4 in the FSAR Update[7]). Note that the 5000-year UHS has approximately the same peak spectral and peak ground accelerations as the DBE spectrum, though with more content in the higher frequency range (10 Hz - 25 Hz), and less in the low frequency range (5 Hz and below).

Table 3.1.2.3

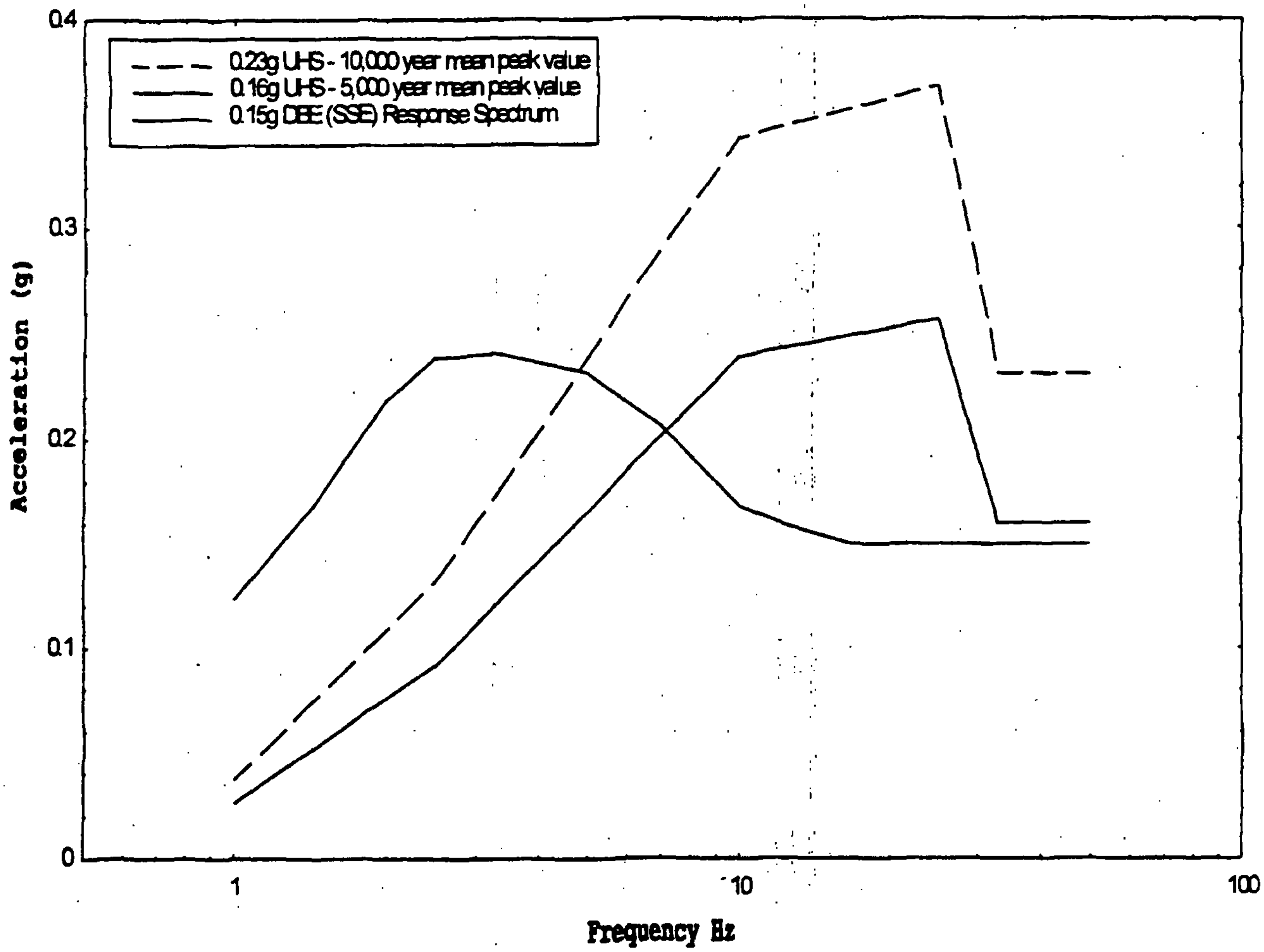
Revised LLNL 10,000 Year Uniform Hazard Response Spectrum

Frequency (Hz)	Spectral Value	Spectral Value (g)	Normalized Shape
1.0	4.25 cm/s	0.0272	0.162
2.5	6.03 cm/s	0.0966	0.575
5.0	5.39 cm/s	0.1730	1.03
10	3.92 cm/s	0.2510	1.49
25	1.68 cm/s	0.2690	1.60
ZPA*	165 cm/s	0.1680	1.00

* Semi-log interpolation of the median peak acceleration data: [150 cm/s^2, 1.20E-4], [250 cm/s^2, 3.63E-5]

Figure 3.1.2.4

Uniform Hazard Spectrum compared to the Design Basis Earthquake Spectrum



3.1.3 Analysis Of Plant Systems And Sequences

This section documents the evaluation performed to identify functions and structures, systems, and components (SSCs) to be addressed in the seismic PRA.

3.1.3.1 Approach

The seismic PRA involves the systematic screening of SSCs based on their seismic capacity and importance and the quantification of seismic-induced failures for components, systems, accident sequences and the overall plant. First, however, systems analysis is used to identify plant systems and components that are important contributors to plant seismic safety, thus identifying components requiring a seismic capacity evaluation.

A review of the plant safety functions described in the IP3 IPE [4] identified five plant functions of major importance to plant seismic safety: reactivity control, electrical power, reactor coolant system (RCS) pressure control (RCS integrity), decay heat removal, and containment pressure control. Consequently, the initial list of components for seismic assessment included those components that make up the systems that perform and support these five functions. Section 3.1.3.2 describes how functions and frontline systems were identified, Section 3.1.3.3 describes the evaluation of support systems, Section 3.1.3.4 describes a review of assumptions made in the IPE from a perspective of the seismic PRA, and Section 3.1.3.5 describes how to identify SSCs for inclusion in the seismic screening analysis.

Assumptions and characteristics of the fault tree models used to characterize risk are:

- The postulated seismic earthquakes occur with the plant operating at a 100 percent power level.
- As suggested in the IPEEE procedural guidance [2], the seismic PRA entailed the use of the LLNL [5] seismic hazard curves.
- As recommended in Generic Letter 88-20, Supplement 5 [8], the seismic capacities for reactor vessel internals were not evaluated.
- Subsequent to the earthquake, offsite power will be lost for 72 hours because of the failure of ceramic insulators in the 6.9-kVac switchyards.
- The earthquake may also induce a small loss of coolant accident (LOCA) in addition to the probable loss of offsite power.
- Success in responding to the seismic initiators is defined as maintaining cold shutdown conditions for 72 hours. It should be noted that in the internal events IPE, success was defined as maintaining hot shutdown conditions for 24 hours.

- Seismic component/equipment screening followed the EPRI methodology [9] for various categories of equipment.

- Screening of non-seismic events and human actions are based on screening guidelines described in NUREG/CR-4826 [10].

The seismic PRA methodology [2] and the IP3 IPE [4] were used as guidance. The end products for this section are:

- A list of plant functions, identifying plant systems required to perform those functions necessary for safe shutdown during a seismic event.

- A list of SSCs identified for seismic capacity screening and non-seismic failure importance analysis.

3.1.3.2 Identification of Functions and Frontline Systems

This section describes the process by which functions and frontline systems operate to safely shut down the reactor and maintain a safe stable state following an earthquake were identified.

As noted in section 3.1.3.1, five functions are necessary to achieve safe shutdown: reactivity control, electrical power, reactor coolant system (RCS) pressure control, decay heat removal, and containment pressure control. The systems employed to achieve these functions will now be described.

Reactor Reactivity Control. Reactor reactivity control entails the automatic initiation of a reactor shutdown to reduce power production and prevent fuel damage when specified operating limits have been reached. Reactor reactivity control relies on the electrical and mechanical portions of the reactor protection system (RPS). In evaluating the mechanical portion of the RPS, the physical movement of control rods and opening of the reactor trip breakers is considered; in evaluating the electrical portion, electrical components and the operators' ability to manually induce a reactor scram are considered.

Failure of the mechanical portion of RPS implies that some or all control rods are "physically damaged" and thus cannot be inserted or that the reactor trip breakers fall to open. Should this occur, however, reactor subcriticality can be achieved using emergency boration to inject highly concentrated boric acid solution drawn from the boric acid storage tanks (BASTs). Emergency boration involves the use of the chemical and volume control system (CVCS) charging pumps, boric acid transfer pumps, valves, piping, instrumentation and controls. Borated water is pumped from the BAST through the CVCS normal charging pump flow path to the RCS.

The success criterion for emergency boration involves the injection of boric acid through the primary emergency boration path presented in EOP FR-S-1 (through motor-operated valve

CH-333), one of two alternative emergency boration paths, or the normal boration path presented in SOP-CVCS-3.

Electrical Power. The electrical power function for a safe shutdown comprises the 6.9-kVac and emergency 480V-ac power sources. Both the 6.9-kVac and emergency 480V-ac power sources (emergency diesel generators) provide ac power to engineered safeguard loads upon a plant transient. However, because the seismic event is expected to result in a loss of offsite power, the 6.9-kVac power system will not provide electrical power to meet engineered safeguard loads and the emergency diesel generators (EDGs) must power required safe shutdown equipment.

The emergency diesel generator power system comprises three independent Alco 16 cylinder diesel generators, each providing a maximum of 1750-kW of continuous power (with a two-hour maximum of 1950-kW) to their associated buses. Diesel generator 31 provides power to 480-Vac buses 2A/3A, diesel generator 32 provides power to bus 6A, and diesel generator 33 provides power to bus 5A. The plant can safely shut down with power from two emergency diesel generators.

Each diesel engine has its own air start system consisting of an air receiver, a 480-Vac powered air compressor, and two redundant air start solenoids and motors. Air pressure in each receiver is maintained at between 275 and 300 psig. Although each receiver has enough capacity for four engine starts, the system will lock out after an unsuccessful start attempt and require manual action to reset. Each engine also has its own jacket water cooling system to reject heat to the plant service water system.

Fuel oil is fed to each engine from its own 175-gallon day tank. Fuel to injectors during starting is provided by gravity feed from the day tank. Because the day tanks contain fuel for less than two hours, continued operation requires fuel makeup from buried 7700-gallon fuel oil storage tanks using transfer pumps. Additional emergency supplies of fuel oil are available both on- and off-site.

Upon receipt of a safety injection signal or a signal indicating an undervoltage on its safeguard bus, air start solenoids on each diesel generator will energize for about 15 seconds. After an engine start and undervoltage condition, bus loading will commence within ten seconds and all safeguards equipment will be loaded within thirty seconds.

The success criterion for each emergency diesel generator is that it can supply sufficient power to its 480-Vac safeguard bus to power designed loads from that bus under all conditions following a loss of offsite power.

Reactor Coolant System Pressure Control. The reactor coolant system (RCS) pressure control function is to protect the RCS from overpressurization and so ensure RCS integrity during normal plant operations or shutdown transients. The RCS pressure control function is comprised of two power-operated relief valves (PORVs), three code safety relief valves (SRVs), and two pressurizer spray valves. (However, because offsite power is likely to lost in the earthquake, and components associated with the pressurizer spray valves depend on 6.9-kVac power, RCS pressure control using the pressurizer spray valves was considered no further). The SRVs are important only in anticipated transient without scram (ATWS) events.

The PORVs provide RCS pressure relief at a 2335-psig set point (i.e., at a pressure below the SRV set point), discharging to the pressurizer relief tank. The normal relief flow through each valve is 179,000 lb/hr; the maximum flow is 210,000 lb/hr.

The three code safety valves PCV-464, PCV-466, and PCV-468 are 6 in., spring-loaded, enclosed pop type, angle relief valves with backpressure compensation. Each safety valve is set to lift at 2485 psig and has a relief capacity of 408,000 lb/hr of saturated steam.

The success criteria for the RCS pressure control function vary according to the application. The success criterion for the RCS pressure control function following a steam generator tube rupture is the opening on demand of both pressurizer spray valves or one PORV. The success criterion following a small-break LOCA event is the opening on demand of one PORV. The success criterion for the RCS pressure control function following a transient is the opening on demand of both PORVs to support bleed-and-feed operation. The success criterion following an ATWS event is the opening of three SRVs and, depending on core burnup, control rod insertion, AFW flow, and opening of one or both PORVs. There are also brief periods of time, early in core life, when RCS pressure relief capacity is inadequate to prevent RCS overpressurization unless control rods are inserted and periods of time, later in core life, in which adequate RCS pressure relief capacity can be provided by the SRVs alone.

If PORVs open following ATWS, station blackout, or transient events, PORVs or their block valves must reclose to preserve RCS integrity; if SRVs open following ATWS events, they must reclose to preserve RCS integrity.

Decay Heat Removal. The decay heat removal function maintains fuel temperature limits by transferring heat from fuel to coolant and ultimately outside the primary system boundary.

For seismic-induced transients and small LOCAs, decay heat removal is achieved in two phases. The initial phase (hot shutdown) involves using the steam generators with makeup feedwater supplied by the auxiliary feedwater system (main feedwater is unavailable due to the seismic-induced loss-of-offsite power). The second phase (leading to cold shutdown) involves the use of the residual heat removal system, with the decay heat transferred to the service water system via the component cooling water system.

For large and medium LOCAs, decay heat is transferred from the reactor core to the containment using the high-head safety injection pumps or low-head RHR pumps. Upon depletion of the refueling water storage tank inventory, decay heat is removed from the reactor core and containment by low-head recirculation cooling.

The decay heat removal function can be achieved using the auxiliary feedwater system, high-head safety injection, low-head safety injection, recirculation system and residual heat removal shutdown cooling.

Auxiliary Feedwater System. The auxiliary feedwater (AFW) system provides feedwater to the steam generators when the main feedwater system is unavailable. Auxiliary feedwater is supplied to four steam generators during startup, shutdown, intermediate, small, and small-small loss of coolant accidents, steam generator tube ruptures, main steam line breaks and transients that entail a loss of the main feedwater system.

The AFW system consists of two subsystems each capable of supplying the required flow. One subsystem comprises two motor-driven, nine-stage, horizontal, split-case centrifugal pumps. Each pump supplies 400 gpm of water at a head of 1,350 psi to two steam generators. The second subsystem comprises a steam turbine-driven, multistage, centrifugal pump with a capacity of 800 gpm at 1,350 psi. The turbine driven pump is a horizontal axial flow, non-condensing unit rated at 970 hp at 3,570 rpm. It supplies a total of 800 gpm of feedwater to all four steam generators. Steam is supplied to the steam turbine by steam generators 32 and 33 from a tap upstream of the main steam isolation valves.

Redundant water supplies are available to the AFW system. The primary source is gravity feed from the 600,000 gallons. condensate storage tank (CST). Of this volume, 360,000 gallons are dedicated for AFW system use, which is sufficient to remove the residual heat generated by the reactor for 24 hours at hot shutdown conditions. The emergency water supply for the AFW pumps is the 1,500,000 gallons city water storage tank shared with IP2. However, this tank is assumed to have a low seismic capacity and therefore is unavailable after a seismic event

The success criteria for the AFW system depend on the event sequence. The success criterion for transients, and intermediate and small LOCAs is flow from one AFW pump to one of four steam generators. The success criterion for the system during an ATWS event is flow to two of four steam generators from both motor-driven pumps and the steam-turbine-driven pump. The success criterion following a steam generator tube rupture or main steam line break is flow from an AFW pump to any one of the three intact steam generators.

High-Head Safety Injection System. The high-head safety injection (HHSI) system is used to:

- Mitigate the consequences of LOCAs and steam generator tube ruptures by maintaining the RCS water inventory until the RCS is depressurized to the point at which the low-head safety injection system can operate.
- Mitigate the consequences of main steam line break accidents by injecting a highly concentrated boric acid solution to prevent recriticality caused by excessive cooling of the RCS.

- Perform, in conjunction with the power-operated relief valves, bleed-and-feed core cooling in response to transient initiating events if all secondary cooling systems fail.

The HHSI system consists of a boron injection tank (BIT), the refueling water storage tank (RWST), three motor-driven horizontal centrifugal high-head safety injection pumps, and valves, piping, and associated control and instrumentation. Each pump can deliver 400 gpm at 1100 psig. Three HHSI pumps take suction from the RWST and discharge into all the RCS cold legs through two high-pressure discharge headers. The safety injection signal activates the HHSI pumps; no borated water is delivered until the RCS pressure falls below the 1500-psig HHSI pump minimum shut off head.

The success criteria for the HHSI system are:

- At least one of the three HHSI pumps delivers borated water from the RWST into the reactor core through at least one RCS cold leg during bleed-and-feed, transients and small LOCAs.

- At least one HHSI pump delivers borated water from the RWST to the reactor core through at least two RCS cold legs during intermediate LOCAs.

- In conjunction with the operation of accumulators, at least two HHSI pumps deliver borated water from the RWST into the reactor core through at least two RCS cold legs during large LOCAs.

Low-Head Safety Injection. The low-head safety injection (LHSI) system is used to mitigate the consequences of LOCAs by injecting borated water from the (RWST) into the reactor vessel. In small LOCAs, the RCS must be depressurized before using the LHSI system to inject borated water. In large and intermediate LOCAs, the LOCA itself will rapidly depressurize the RCS.

The LHSI system comprises two independent subsystems. Each subsystem consists of an RHR pump and heat exchanger, valves, piping, instrumentation and controls. Each RHR pump can deliver 3000 gpm to the RCS through an RHR heat exchanger at a 150-psig discharge pressure. The RHR pumps draw water from the RWST and discharge it through the tube side of RHR heat exchangers 31 and 32. Discharge from the heat exchangers is directed to the four RCS cold legs through the accumulator connection lines.

The system is in standby during normal plant operation. The borated water required is contained in the RWST. Operation of LHSI is automatically initiated and controlled--operator intervention is required to start the system manually only if it fails to start automatically.

The success criterion for the LHSI system is that at least one RHR pump must deliver borated water from the RWST into the reactor core through at least one RCS cold leg during various LOCAs.

Recirculation System. The recirculation system provides long-term core cooling after the occurrence of transients and LOCAs. The system recirculates sump water into the reactor core after cooling it in the RHR heat exchangers. The recirculation system is operated in high-pressure modes in transients and small LOCAs, in low-pressure modes in intermediate and large LOCAs, and in hot leg recirculation modes in large LOCAs.

The recirculation system is a combination of several systems and components including the RHR system, containment and recirculation sump and pumps, the high-head safety injection system, valves, piping, and associated controls and instrumentation.

The recirculation sump is located inside the containment and is separate from the containment sump. It collects and retains water for the two recirculation pumps. These pumps operate in the low-head internal recirculation mode. They are vertical, centrifugal, motor-driven pumps with 3,000 gpm capacity at a discharge pressure of ~ 150 psig. The recirculation pumps take suction from the recirculation sump and discharge through the RHR heat exchangers into the RCS cold legs via the accumulator feed lines. Either recirculation pump can supply the necessary long-term flow needed for continued core cooling. The RHR heat exchangers serve as the heat sink for the circulating water. The low-head internal recirculation mode of operation is used when RCS pressure is less than 150 psig. For high-head recirculation, either the recirculation or RHR pumps provides sufficient flow to one of the three high-head safety injection pumps located in the PAB to supply the flow needed for long-term core cooling. In the low-head external recirculation mode of operation, the two RHR pumps provide an alternative to the recirculation pumps should the latter be unavailable. The RHR pumps take suction from the containment sump and discharge through the RHR heat exchangers into the RCS cold legs via the accumulator feed lines. Either RHR pump can supply the necessary long-term flow needed for continued core cooling.

The recirculation system operates after manual switchover from the injection phase of operation, when the water level in the RWST falls to the low-level (11.5 ft) alarm setpoint. Core cooling is achieved by the recirculation system in six modes of operation. Different systems and components run in each.

The success criterion for the recirculation system of operation is that at least one of two recirculation pumps or one of two RHR pumps delivers borated water from the recirculation/containment sump into the reactor core through at least one RCS cold leg.

Residual Heat Removal System - Shutdown Cooling. The residual heat removal (RHR) system in its shutdown cooling mode is a front-line system designed to provide long-term decay heat removal to achieve cold shutdown. The RHR system provides shutdown cooling when the pressure and temperature of the RCS fall below 450 psig and 350°F, respectively.

The RHR system comprises two independent subsystems. Each subsystem consists of a RHR pump and heat exchanger, valves, piping, instrumentation and controls. Each RHR pump is capable of delivering 3000 gpm to the RCS through an RHR heat exchanger when the RCS pressure is reduced to 450 psig. The RHR heat exchangers have a vertical shell and U-tube design. The shell side contains component cooling water, the tube side contains the reactor coolant.

The RHR system draws water for shutdown cooling from RCS hot leg loop 32. Reactor coolant flows through two motor-operated valves to the suction of the RHR pumps. The pumps discharge through the tube side of RHR heat exchangers 31 and 32 from where the flow is directed to the four RCS cold legs through the accumulator connection lines.

The success criterion for the RHR system is that at least one RHR pump delivers water to the RCS through one of the RHR heat exchangers during plant transients once reactor shutdown and a RCS pressure of 450 psig and temperature of 350°F have been achieved.

Containment Pressure Control. The primary containment control function entails the maintenance of containment integrity when subjected to energy release during a LOCA blowdown or the heat discharged from the primary system in other scenarios. Primary containment control can be achieved using the containment air recirculation cooling and filtration system (containment fan coolers), containment sprays and containment recirculation sprays.

Containment Air Recirculation Cooling and Filtration System. The containment air recirculation cooling and filtration (CFC) system is used to:

- Remove the heat generated by all equipment and piping in the containment during normal operation and maintain an ambient temperature of 120°F or less
- Remove heat from the containment and reduce containment pressure following LOCAs or steam line break accidents inside containment
- Remove fission products from the containment atmosphere should they be released during an accident.

The CFC system comprises five identical air handling fan cooler units, 31-35. Each unit consists of a motor, a fan, cooling coils, moisture separators, high efficiency particulate air (HEPA) filters, charcoal filters, roughing filters, dampers, moisture separators, air distribution system, instrumentation and controls. The five containment fan cooler units are located between the containment and the crane walls at the 68-ft elevation. These fan coolers discharge recirculated cooled containment air to the upper, lower, and annular regions of the containment. Steam condensed by the fan cooler units flows to the lower portions of the containment building. The fan cooler units are designed to control containment temperature and pressure by removing heat generated by all equipment and piping in the containment during normal and abnormal operation.

Heat removed by the fan coolers is transferred to the ultimate heat sink by the service water system through an air-water heat exchanger.

The success criterion for the CFC system is that at least three fan cooler units remove heat and water vapor from containment following various LOCAs and steam line break accidents.

Containment Sprays. The containment spray system (CSS) is designed to depressurize and remove heat from the containment following a LOCA or main steam line break (MSLB) inside containment. The containment spray system takes water from the RWST to condense steam in the containment. Once the RWST is exhausted, containment sprays are aligned for containment recirculation sprays.

The CSS comprises two independent subsystems each consisting of a horizontal, single stage, centrifugal pump, two spray headers and nozzles, valves, piping, instrumentation and control. Each pump can deliver 2600 gpm at a discharge head of 427 ft. The RWST supplies injection water to the CSS. In its injection mode, the system is in standby during normal plant operation. The pumps are idle and are open to the RWST by locked-open suction valves SI-865A/B. Each pump automatically starts on receipt of a high-high containment pressure (22 psig) signal. The signal also opens the pump outlet motor-operated discharge valves SI-866A/B. The CSS flow discharges through check valves SI-867A/B and locked-open discharge header containment isolation valves SI-869A/B to the associated containment spray headers and nozzles. The spray nozzles are supplied from four 360-degree ring headers located in the containment dome area. Each spray pump supplies two ring headers.

The CSS functions successfully if, following a LOCA or MSLB inside containment, one of two containment spray pumps delivers borated water through its set of spray nozzles and maintains containment pressure below the design pressure.

Containment Spray Recirculation. Containment spray recirculation (CSR) provides long-term containment pressure control in response to transients and LOCAs—CSR is capable of removing all the decay heat. CSR uses the containment spray headers to recirculate containment or recirculation sump water into the containment spray nozzles after cooling it in the RHR heat exchangers.

CSR may operate after manual switchover from the injection phase of operation when the water level in the RWST falls to the low-level (11.5-ft) alarm setpoint. In the containment spray recirculation mode, containment spray can be provided by internal or external operation. Containment sprays internal recirculation uses the recirculation pumps (located inside containment) to draw water from the recirculation sump and discharge it through the containment spray nozzles. External recirculation uses the RHR pumps (located outside containment) to draw the water from the containment sump.

In both internal and external recirculation, containment spray recirculation flow passes through the RHR heat exchangers located inside containment. In these heat exchangers, heat is removed by the component cooling water (CCW) system and transferred to the service water system via the CCW heat exchangers.

The success criterion for both the internal and external containment spray recirculation modes of operation is that at least one recirculation/RHR pump delivers borated water from the recirculation/containment sump into the containment through at least one containment spray header. A minimum spray flow of 1300 gpm is required for the first 24 hours after an accident.

3.1.3.3 Identification of Support Systems

Based on the review of IPE systems, the following support systems were determined to be required for a safe shutdown:

- Auxiliary boiler feedpump building ventilation system
- Control building ventilation system
- Component cooling water system
- Diesel generator building ventilation system
- Instrument air system
- Main steam system
- City water system
- Primary auxiliary building ventilation system
- Safeguards actuation system
- Service water system
- 118-Vac
- 480-Vac
- 125-Vdc.

Each of these systems supports components needed for safe shutdown by providing electrical power, engineered safety features actuation, cooling water, air supply, ventilation and air conditioning.

Auxiliary Boiler Feedpump Building Ventilation System. The auxiliary boiler feedpump building (ABFPB) ventilation system removes heat generated by piping and components in the building.

The 18-ft elevation ABFPB pump room is ventilated by wall exhaust fans 311 and 312 with their associated outlet dampers, motor-operated inlet louver 314, and associated thermostats. The capacity of each fan is 5000 cfm.

When the ABFPB pump room temperature reaches 90°F, the outlet damper for wall exhaust fan 311 will open, starting the fan. Louver L-314 will open upon fan start. Exhaust fan 311 will stop when the room temperature falls to 85° F. Outlet damper and wall exhaust fan 312 will open and start, respectively, when the temperature reaches 100° F. Exhaust fan 312 will stop when the temperature falls to 95° F. When an exhaust fan stops, its associated louver closes.

The success criterion for the ventilation system is that ample ventilation is provided to maintain operability of the three auxiliary feedwater pumps. Given that motor-driven pumps 31 and 33 are qualified for temperatures up to 160° F and that the steam line isolation valves for turbine-driven pump 32 will close at 130°F, this success criterion is equivalent to a requirement that pump room temperature be maintained below 130°F.

Control Building Heating and Ventilation System. The control building heating and ventilation system provides heating and ventilation in three control building areas; the 15-ft and 33-ft elevations, and the central control room (CCR) on the 53-ft elevation. Major equipment located in the switchgear room includes the 6.9-kV/480-V station service transformers, 480-V switchgear 31 and 32, battery charger 33, and instrument air compressors 31 and 32.

Exhaust fans 33 and 34 ventilate the switchgear room, drawing in supply air through a fire damper and a motor-operated louver. The fans are each rated for 25,000 cfm.

The capacity of each exhaust fan is sufficient to remove 50 percent of the design heat load while limiting the bulk average air temperature increase to 10°F. Fire damper FD-9, above the doors between the turbine generator and the control buildings, is the primary source of supply air when exhaust fan 34 is started. Outside air drawn through motor-operated louver L-319 provides a second source of supply air when the louver opens and exhaust fan 33 is started.

The success criterion for switchgear room ventilation is that ample cooling is provided to maintain operability of the modeled components--conservatively this criterion implies that both exhaust fans function.

Component Cooling Water System. The component cooling water (CCW) system is a support system that transfers heat from radioactive systems to the service water system.

The CCW system is a closed loop system comprising three pumps (31, 32, and 33) and two surge tanks that feed two main supply headers (31 and 32) and two heat exchangers, one on each supply header. The headers form closed loops, with the return header feeding the pump suction header. The surge tanks are also connected to the pump suction header. They compensate for changes in CCW inventory and ensure adequate net positive suction head for the pumps. The heat exchangers are cooled by service water. The components served by the CCW system are connected to both the supply and return headers.

The configuration of the CCW system operation depends upon the heat load. Usually however, two pumps and two heat exchangers are in operation with the third pump in standby. The standby pump will start automatically on low supply header pressure.

The purpose of the auxiliary component cooling water (ACCW) pumps, which are listed as a CCW load, is to cool the recirculation pump motors. Under accident conditions, operation of the recirculation pumps cannot be assured without adequate CCW flow (40 gpm) because of the harsh containment environment that could exist.

The success criterion for the CCW system supports essential front line components. Therefore system success criteria are defined as the delivery of adequate flow at specified temperatures to the components supported. Because not every front line component is required in each accident sequence, CCW system success criteria will vary. In general though, success requires that one of three CCW pumps operate. However, adequate cooling of the RHR heat exchangers requires two CCW pumps to operate if the operators fail to isolate the non-regenerative heat exchanger.

Emergency Diesel Generator Building Ventilation System. The emergency diesel generator building heating and ventilation system provides an independent source of heating, ventilation and combustion air for the three emergency diesel generators.

Each emergency diesel generator room contains two 100-percent capacity, 35,000 cfm exhaust fans mounted on the south wall along with associated pneumatically-operated exhaust dampers. The north wall of each room has one large, three-section louver with separate pneumatic operators for each section. Each room also has two electric heaters for heating.

When a diesel generator starts, the center inlet louver section will automatically open to provide a supply of combustion air for the engine. This center section will fail open on loss of diesel generator starting air or electrical power to the actuator. When room temperature increases to 95°F, its even-numbered fan will start and the associated exhaust damper will open. This fan will stop and its damper will close when the temperature falls below 85°F. The odd numbered fan and its damper will start/open and stop/close at 102°F and 97°F, respectively. Left and right section inlet louvers will open upon fan start.

The success criterion for diesel generator ventilation is for each room in which the diesel generator is running, one inlet louver section is open with at least one exhaust fan running and its associated damper open.

Instrument Air System. The instrument air system (IAS) is a support system whose function is to provide high quality (i.e., oil and moisture free) compressed air to instruments, controls and actuators required for plant operation and shutdown. Components that require compressed gas for their intended safety-related functions have back-up nitrogen supplies.

Typically, system operation depends upon plant air demand. Two compressors and one heatless desiccant dryer tower train are usually in operation, one compressor running continuously and the other cycling on demand. The third compressor operates to supply the conventional instrument air header. The standby compressor will start automatically on low supply header pressure.

The instrument air system consists of three compressors (31, 32, and 33). Air enters the two single stage essential compressors through an inlet filter and silencer. It discharges through an aftercooler moisture separator to the instrument air receiver. Normally one compressor runs continuously, loading and unloading to maintain receiver pressure between 100 and 110 psig. The stand-by compressor will cycle to maintain the receiver pressure between 95 and 105 psig. From the instrument air receiver, air passes through one of two heatless desiccant dryer prefilters, dryer towers, and afterfilters. The standby dryer set is maintained operational but is valved out.

Should all three instrument air compressors be unavailable, emergency make-up air is automatically supplied from the station air system through IA-PCV-1142 using either the normal station air compressor or the backup diesel-driven station compressor. The IAS supports operation of essential front line components. Therefore the system success criteria are defined as the delivery of adequate flow of clean dry air at the required pressure to the supported components. Because the front line components required for each accident sequence vary, so also will the success criteria for the IAS.

Main Steam System. The main steam system (MSS) has dual safety functions: it removes reactor decay heat and rejects it via the condenser or atmospheric dump valves or main steam code safety relief valves; and it isolates a faulted steam generator should a steam line break (to limit steam generator blowdown and the subsequent RCS cool down rate) or a steam generator tube rupture (to limit RCS inventory loss and radioactive releases).

The MSS consists of four steam generators. Each discharges to a 28-inch main steam header. Each header is equipped with an atmospheric dump valve, five code safety relief valves, a main steam isolation valve, an MSIV bypass valve, a non-return valve, a steam generator blowdown isolation valve, and main steam trap isolation valves.

In addition, the headers from steam generators 32 and 33 have auxiliary feedwater pump turbine steam supply isolation valves. Only steam generators 32 and 33 provide steam to the auxiliary feedwater pump turbine.

The atmospheric dump valves (ADVs) are normally closed, air-operated valves designed to fail closed on loss of power or instrument air. They are normally operated in the automatic mode, set to open at 1055 psig. At their set pressure, the ADVs have a combined relief capacity of 10 percent of maximum steam flow. The ADVs may also be manually operated from the CCR by placing their individual MANUAL/AUTO (M/A) station in MANUAL. The ADVs can also be operated from the local stations on the 65-ft elevation of the auxiliary boiler feed pump (ABFP) building. A hard-piped nitrogen gas supply is provided to each ADV. Should normal instrument air be unavailable, this back-up nitrogen supply can be used after making the necessary valve alignments. Should both instrument air and the hard-piped nitrogen gas supplies be unavailable, manually connected back-up compressed gas bottles are provided at the local station to permit ADV operation.

The MSIVs are swing type stop check valves mounted reverse to steam flow such that the process flow will assist in closing the valve. Valve movement is also facilitated by an integral spring. The MSIVs will close automatically upon receipt of a main steam isolation signal. The MSIVs can also be closed manually in accordance with emergency operating procedures should the auto signal fail. Control room switches are located on panel SBF-1. The valves may also be closed by venting the valve actuator at the local stations on the 65- and 77-ft elevations of the ABFP building. Energizing solenoid valves to isolate supply air to, and exhaust air from, the actuator closes the valves. The code safety relief valves and non-return valves are purely mechanical. The safety valves will lift when SG pressure exceeds the valve spring tension. The non-return valves will seat against reverse flow.

The turbine-driven ABFP steam supply valves are stop check valves that seat against reverse flow. They are also equipped with hand wheels to permit manual closure.

The MSIV bypass valves and the main steam trap isolation valves are manually operated.

The success criteria for the MSS are event dependent. For sequences that result in a loss of the main condenser as a heat sink, at least one SG atmospheric dump valve or one main steam code safety relief valve must open to reject decay heat to atmosphere. Should an MSLB occur upstream of the MSIV, the auxiliary feedwater supply to the faulted steam generator must be isolated and the MSIV or non-return valve of the faulted SG or the MSIVs of all the intact steam generators must close to preclude uncontrolled RCS cooldown that would result from depressurization of multiple steam generators through the break. Should SG depressurization be required, two of four ADVs must be available.

Should an MSLB occur downstream of the MSIV, the main steam isolation valves on at least three steam generators must close to limit uncontrolled RCS cooldown. For SGTR events, feedwater flow to the faulted SG must be stopped to prevent steam generator overfilling and steam flow from the steam generator must be stopped to prevent or limit radionuclide releases to the environment.

City Water System. The city water system is a non-seismically designed system. Therefore, the use of the city water system to provide emergency water supply for the AFW pumps for secondary-side cooling was not considered.

Primary Auxiliary Building Heating and Ventilation System. The primary auxiliary building (PAB) heating and ventilation system maintains an environment suitable for optimal machinery performance and instrument reliability. The PAB heating and ventilation provides adequate ventilation for enclosed spaces in the PAB. These include pumps for the component cooling water system, charging system, residual heat removal system, safety injection system, containment sprays, and motor control centers 36A and 36B.

The success criterion for the PAB ventilation system in cooling the PAB enclosure spaces is operation of one-of-two exhaust fans and one supply fan.

Safeguards Actuation System. The purpose of the safeguards actuation system is to start systems to mitigate the consequences of, and protect the public from, fission product release occasioned by core damage or containment breach.

The safeguards actuation system is installed on four racks in the central control room (CCR). Redundant multiple-channel transmitters in the plant monitor such parameters as pressurizer pressure, containment pressure, steam generator level, main steam pressure, and reactor coolant temperature. Transmitter output signals are fed to the safeguards actuation racks in the CCR for processing. The processed signals are then applied to bistable relays that actuate output relays. The contacts of these output relays interface with plant control logic to align plant systems and components to achieve safe shutdown and start such engineered safety feature systems as high head/low head injection, auxiliary feedwater, and containment spray. The major safeguard actuation signals are safety injection (SI), containment isolation phases A and B, main steam isolation, containment spray, and auxiliary feedwater.

The safeguards actuation system is considered successful if its output relays operate properly when required.

Service Water System. The service water system (SWS) is a raw water system that removes heat from specific systems and components. The SWS must also remove reactor and containment heat and reject it to the ultimate heat sink (the Hudson River) during postulated accident sequences.

The SWS consists of essential and non-essential supply headers, with three service water pumps supplying each header. Three back-up service water pumps are available. They are normally aligned to the essential header. System loads can be supplied from either header, interchangeably, but the system is maintained and operated as a split system when the reactor is above cold shutdown. The following essential header loads were considered: containment building fan recirculation units, diesel generator lube oil and jacket water coolers, and instrument air closed loop cooling water heat exchangers.

The non-essential header loads modeled were the component cooling water heat exchangers. Service water flow to the heat exchangers must be manually initiated following a loss of offsite power or receipt of a safety injection signal.

Success criteria for the SWS are header dependent. For the essential header, success is defined as adequate flow from at least two of three pumps. This is based on the assumption that single pump operations with containment fan cooler temperature control valves TCV-1103/1104/1105 open may result in pump run-out and failure.

Success for the non-essential header was defined as adequate flow from two of three non-essential SW pumps or adequate flow from one non-essential service water pump provided the operator closes valve FCV-1112. These criteria avoid pump run-out and failure.

<u>118-Vac</u>. The 118-Vac electric power system provides an uninterruptible source of power to the reactor protection system, safeguards equipment, transmitters, instrument controllers, and other plant auxiliary systems that require low voltage ac power.

The 118-Vac electric power system consists of eight instrument buses and associated load circuit breakers housed in eight individual distribution cabinets in the central control room (CCR). A pair of buses is normally fed by a static inverter that takes an input from a 125-Vdc power panel and converts it to a single-phase output of 118-Vac. In addition, each instrument bus can also be fed from a back-up 480-Vac MCC through a 480:118-V transformer. Each inverter has an external, manually operated maintenance bypass switch that can bypass the inverter and allow the back up MCC and transformer to feed the instrument buses directly. Inverter 31 feeds instrument buses 31 and 31A; inverter 32 feeds buses 32 and 32A; inverter 33 feeds buses 33 and 33A; inverter 34 feeds buses 34 and 34A.

Inverters 31, 32, and 33 each contain an additional internal static transfer switch that can automatically bypass the dc-fed inverter section with ac output from the back-up MCC and transformer to maintain power to the buses should the inverter section fail. Instead of an internal static transfer switch, inverter 34 and its associated instrument buses 34 and 34A have an alternative set of circuit breakers that are interlocked with the normal inverter output breakers. Should these circuit breakers trip, alternate circuit breakers can be closed allowing another MCC and transformer to supply the buses. Inverters 31, 32, and 33 are each rated at 25-kVA; inverter 34 is rated at 7.5-kVA.

The success criterion for each 118-Vac system bus is that it supplied power at rated voltage to design loads.

<u>480-Vac</u>. The 480-Vac electric power system provides power to most safety and non-safety related loads in the plant.

The 480-Vac electric power distribution system is the lower-voltage plant electrical power distribution system. It consists of six buses. Four main buses provide power under normal and accident conditions. Larger motors are powered and controlled by 480-V switchgear circuit breakers; smaller motors, lighting, and other ac loads are powered and controlled by 480-V MCCs fed from the switchgear buses. The other two 480-V buses provide power to shutdown loads should the main buses be unavailable in fires. The four main buses, their circuit breakers, and station service transformers are located in two sets of 480-V switchgear in the control building at the 15-ft elevation. Switchgear 31 contains 480-V buses 2A and 5A and switchgear 32 contains 480-V buses 3A and 6A. Power to the main 480-V ac buses is provided by the 6.9-kV electric power system through station service transformers under normal and shutdown conditions or by emergency diesel generators during a loss of offsite power.

Following a loss of offsite power, emergency diesel generators feed each buses 2A, 5A, and 6A and bus 3A is fed from bus 2A through the automatically closing transfer breaker 2AT3A. Power to fire-safe shutdown buses 312 and 313 is provided by the "Appendix R" diesel generator via 6.9-kV buses 1 and 3 and station service transformers 312 and 313.

During normal operation and shutdown with offsite power available, the circuit breakers isolating the 6.9-kV buses from the station service transformers are closed. An electrical fault or under- or degraded-voltage on a 480-V bus or its 6.9-kV feeder will cause its station service transformer isolation breakers to trip. The corresponding independent emergency diesel generator will automatically start and provide power to its 480-V bus. Loss of voltage on bus 3A will cause bus 2A tie circuit breaker 2AT3A to automatically close. The other 480-V bus tie breakers will remain tripped. Most MCC loads are automatically shed by tripping the supply breakers if a bus is being fed by emergency diesel generators or when a safety injection (SI) signal is present.

The success criterion for a 480-V bus or MCC is that it supplied power at rated voltage to design loads.

<u>125-Vdc</u>. The 125-Vdc electric power system provides an uninterruptible source of power to operate switchgear controls, safeguard actuation logic, instrumentation systems, and other plant auxiliary systems that require dc power.

The system consists of four independent 125-Vdc power panels, each fed by a station battery and battery charger. Should a single battery charger fail, a spare battery charger 35 is available to charge any of the four station batteries through plug and socket connectors. Three of the 125-Vdc power panels feed distribution panels that, in turn, provide power to dc loads. The 125-Vdc power system is the primary source of power to the 118-Vac instrument buses through static inverters. Power panels 31 to 32 and 33 to 34 are cross-tied through normally open circuit breakers to allow for battery and charger maintenance. Since dc buses are bipolar and above ground, a single ground fault on a conductor will not cause a catastrophic loss of the entire bus. The 125-Vdc power panels, station batteries, and battery chargers are located in the control building (battery 33 is located in the diesel generator building).

Battery chargers are initially placed in the "equalize" mode to charge their respective batteries. After the batteries are charged, the chargers are then placed in the "float" mode which allows them to supply dc loads directly and maintain a charge on their batteries. Should ac power to the chargers be lost, the batteries become the sole source of supply of 125-Vdc power to the power and distribution panels. Each 125-Vdc power and distribution panel contains two-pole circuit breakers and fuses to the various dc loads.

The success criterion for the 125-Vdc system power or distribution panel buses are considered successful if they can supply power at rated voltage to design loads.

3.1.3.4 Review of Individual Plant Examination (IPE) Assumptions

Should a review level earthquake occur, it is assumed that safe shutdown conditions are required for 72 hours rather than 24 hours, because offsite power is likely to be lost for 72 hours after the earthquake. Therefore, assumptions made in the IPE about the requirements for various support systems were reviewed in the seismic IPEEE for potential susceptibilities to this longer time period. Similarly, systems considered in the IPE, but eliminated because of negligible impact on the IPE model (i.e., primary auxiliary building ventilation) were re-examined.

The following summarizes the review of IPE models and assumptions:

<u>Room cooling</u>. The Generation of Thermal Hydraulic Information in Containments (GOTHIC) [11] computer code was used to examine room cooling for various plant locations. Adequate room cooling is required beyond 24 hours in the safety injection pump room [12], charging pump room [13], residual heat removal pump room [14], and upper and lower electrical tunnels [15]. Therefore, components associated with room cooling for these areas were also examined in the IPEEE. In contrast, inadequate room cooling was not found to affect equipment operation in the area surrounding motor control centers 36A and 36B inside the primary auxiliary building [16].

<u>Condensate Storage Tank</u>. The seismic-induced failure of the condensate storage tank was included, because failure of this tank leads to the loss of auxiliary feedwater system secondary-side, and the subsequent need for bleed-and-feed core cooling. The condensate storage tank was found to have a mean seismic capacity of 0.88g. Furthermore, because condensate storage tank water inventory will not last 72 hours, the residual heat removal shutdown cooling mode is required to achieved cold shutdown.

<u>Refueling Water Storage Tank</u>. The seismic-induced failure of the refueling water storage tank was included because failure of this tank leads to a potential loss of emergency core cooling systems for seismic-induced LOCA's and bleed-and-feed events. The refueling water storage tank was found to have a mean seismic capacity of 1.03g.

__System Pipe Failure__. The probability of piping ruptures was considered insignificant compared to other component failures in the IPE. However, in the IPEEE, because the seismic-induced pipe failure may potentially disable multiple system functions, this failure was considered.

__Emergency Diesel Generator Air Receiver Tanks__. Air compressor failures were not modeled in the IPE because sufficient air volume and pressure is available in each air receiver tank for four engine start attempts. However, because the seismic event may fail all emergency diesel generator air receiver tanks, this failure was considered.

__125-Vdc Power__. Station batteries 31 to 34 cannot supply dc loads for 72 hours without ac power support.

3.1.3.5 Identification of Structures, Systems, and Components

This section describes the methodology used to develop a list of structures, systems and components (SSCs) that are sufficient to ensure safe shutdown of the reactor and maintain it in a safe stable state following a beyond design-basis earthquake.

__Passive Structure Development__. The development of the list of passive structures--buildings, piping, and tanks--vulnerable to different ground accelerations is described in Section 3.1.4.

__Seismic Shutdown Equipment List Development__

The development of the seismic shutdown equipment list entailed:

- Generating an initial equipment list from the IPE [4] component database, considering the safety functions required for safe shutdown should a seismic event occur.
- Removing from the initial component list balance of plant systems and components dependent on offsite power--offsite power is assumed to be unavailable for 72 hours after the earthquake.
- Removing from the initial component list those plant systems and components associated with a non-seismic ATWS event (i.e., the reactor protection system). Because offsite electrical power is likely to be unavailable, the primary non-seismic failure mechanism of the rods failing to insert is mechanical.
- Verifying that assumptions made in IPE models are consistent with a seismic event and the extended loss of offsite power.

- Adding to the list systems, structures and components identified in the design basis earthquake safe shutdown equipment list included in the IP3 USI A-46, "Verification of Seismic Adequacy of Equipment in Operating Plants" submittal [6] but not found in the IPE equipment list.

- Adding to the list passive components excluded from the IPE because of low random failure probabilities: tanks, heat exchangers, filters, strainers, air receivers, and instrument air and nitrogen accumulators

- Screening out components that do not require an anchorage evaluation with a mean seismic capacity of 0.75g and HCLPF capacity calculated to exceed 0.38g. For equipment that required an anchorage evaluation, a mean seismic capacity of 1.13g was used for screening purposes. The different screening values can be attributed to the different β_c values. For equipment (no anchorages) β_c is 0.30. For anchorage β_c is 0.46 or 1.5 times greater. Hence, the mean seismic capacity is 0.75g x 1.5 or 1.13g. The seismic screening methodology is described in Section 3.1.4.

3.1.4 Evaluation of the Seismic Capacity of Structures, Systems and Components

The evaluation of the seismic capacity of structures, systems and components entailed a fragility analysis, the review of plant information and walkdowns and the analysis of plant system and structure response.

3.1.4.1 Fragility Analysis

The fragility data required for the seismic PRA were developed using the approach outlined in Section 5 of EPRI TR-103959 [17]. This approach recognized that it is impractical to perform a detailed fragility analysis for every component in the PRA model and that, in previous seismic PRAs, only a few components were found to control the core damage frequency, the other components being either relatively strong or screened out by systems considerations. Fragilities were therefore developed as follows:

- Components were screened using the criteria contained in Tables 2-3 and 2-4 of EPRI NP-6041 [9]. Components that meet the screening criteria were modeled by a single surrogate element with a median capacity of 1.2 g peak spectral acceleration and a composite uncertainty (βc) of 0.3.

  Tables 2-3 and 2-4 of EPRI NP-6041 [9] contain screening criteria for three ranges of peak spectral acceleration. For IP3, the least severe criteria for a peak spectral acceleration < 0.8 g were used.

- A component that meets these criteria has a HCLPF (High Confidence Low Probability of Failure) capacity of 0.8g peak spectral acceleration (psa). Two factors are required to convert this capacity to a median capacity. The first factor adjusts for the difference between a HCLPF capacity and a median capacity. Based on experience, the median capacity is calculated as 2 x the HCLPF capacity [17]. The second factor adjusts for the fact that the 0.8g psa value in EPRI NP-6041 corresponds to an 84% probability of non-exceedance (NEP) spectral shape, while the median capacity is based on a 50% probability of non-exceedance spectral shape. For an eastern United States site, the 84% psa is 1.3 x the 50% psa [17]. The resulting median capacity is 0.8g psa x 2/1.3 = 1.2g. The 0.3 value of the composite uncertainty (βc) is derived from the mathematical relationship between the HCLPF and the median capacity:

$$HCLPF = MEDIAN \times e^{-2.33\beta_c} \Rightarrow \beta_c = -\log_e(HCLPF / MEDIAN) / 2.33 = \log_e(0.5) / -2.33 = 0.30$$

The above capacities are expressed in terms of the peak spectral acceleration (psa), assuming a 5% damped response spectrum. The capacities can also be expressed in terms of peak ground acceleration (pga), which is independent of damping, by using the Uniform Hazard Spectrum (UHS) shown in Figure 3.1.2.4. Because the ratio of the peak spectral acceleration to peak ground acceleration for this shape is 1.60, the surrogate element's median capacity is 1.2g psa or 1.2g / 1.6 = 0.75g pga, and its HCLPF capacity is 0.6g psa or 0.6g / 1.6 = 0.38g pga.

- HCLPF capacities were calculated for components that did not meet the screening criteria using the CDFM (Conservative Deterministic Failure Margin) procedures described in EPRI NP-6041 [9]. CDFM HCLPF capacities were converted to median capacities by multiplying by a factor of 2.15. If the resulting median capacity was less than 1.13g pga (150% of the surrogate element's median capacity of 0.75g pga), that component was included in the PRA model with $\beta_c = 0.46$. Components with higher capacities were encompassed by the surrogate element.

  CFDM HCLPF capacity calculations were typically required for equipment anchorages, large tanks, and air-handling equipment mounted on vibration isolators. Details are provided in Section 3.1.4.4.

- The PRA model was used to identify the components that dominate the seismic risk. More accurate fragility capacities were then calculated for these components.

The application of this fragility analysis to the evaluation of the seismic capacities of components and structures is described in Section 3.1.4.4.

3.1.4.2 Review Of Plant Information, Screening, and Walkdowns

Overall Approach. The components addressed in this assessment are the structures, equipment, and distribution systems identified through the systems analysis presented in Section

3.1.3 that failed to satisfy the fragility analysis screening criteria presented in Section 3.1.4.1.

Major structures were evaluated primarily by a review of the design bases, augmented by a walk down to identify any anomalous conditions.

Distribution systems include piping, electrical raceways, and ductwork. The seismic capacity of the raceways was based on the A-46 raceway evaluation [6]. Piping and ductwork were evaluated based on a review of the design bases, augmented by walk downs.

Most mechanical and electrical equipment to be addressed in the IPEEE scope was included in the USI A-46 evaluation [27]. Except for the issue of equipment anchorage, an item of equipment that passed the USI A-46 evaluation was screened out because the peak spectral acceleration of the GIPs [28] bounding spectrum is 0.8g. Anchorage is an exception because the GIP [28] allows equipment anchorage to be evaluated for a plant's DBE (design basis earthquake), which, for eastern sites, is usually significantly lower than 0.8g psa (for IP3 the DBE is 0.23g psa and 0.15g pga). Therefore, an item of equipment was screened if it met A-46 evaluation criteria, and either did not require an anchorage evaluation (i.e., valves and temperature elements), had an obviously robust anchorage (i.e., wall mounted distribution panels and individually anchored pressure transmitters), or had a very large factor of safety as demonstrated by A-46 anchorage calculations. If an item of equipment passed the A-46 evaluations but had an anchorage that could control its capacity (i.e., large floor mounted equipment), an anchorage capacity was calculated based on the spectra described in Section 3.1.4.3. More information on these evaluations and A-46 outliers is included in Section 3.1.4.4.

IPEEE equipment that was not on the A-46 equipment list was walked down by the IPEEE Seismic Review Team (SRT) and evaluated using the GIP criteria. Anchorage capacities were calculated using the spectra described in Section 3.1.5. More information on these evaluations is included in Section 3.1.4.

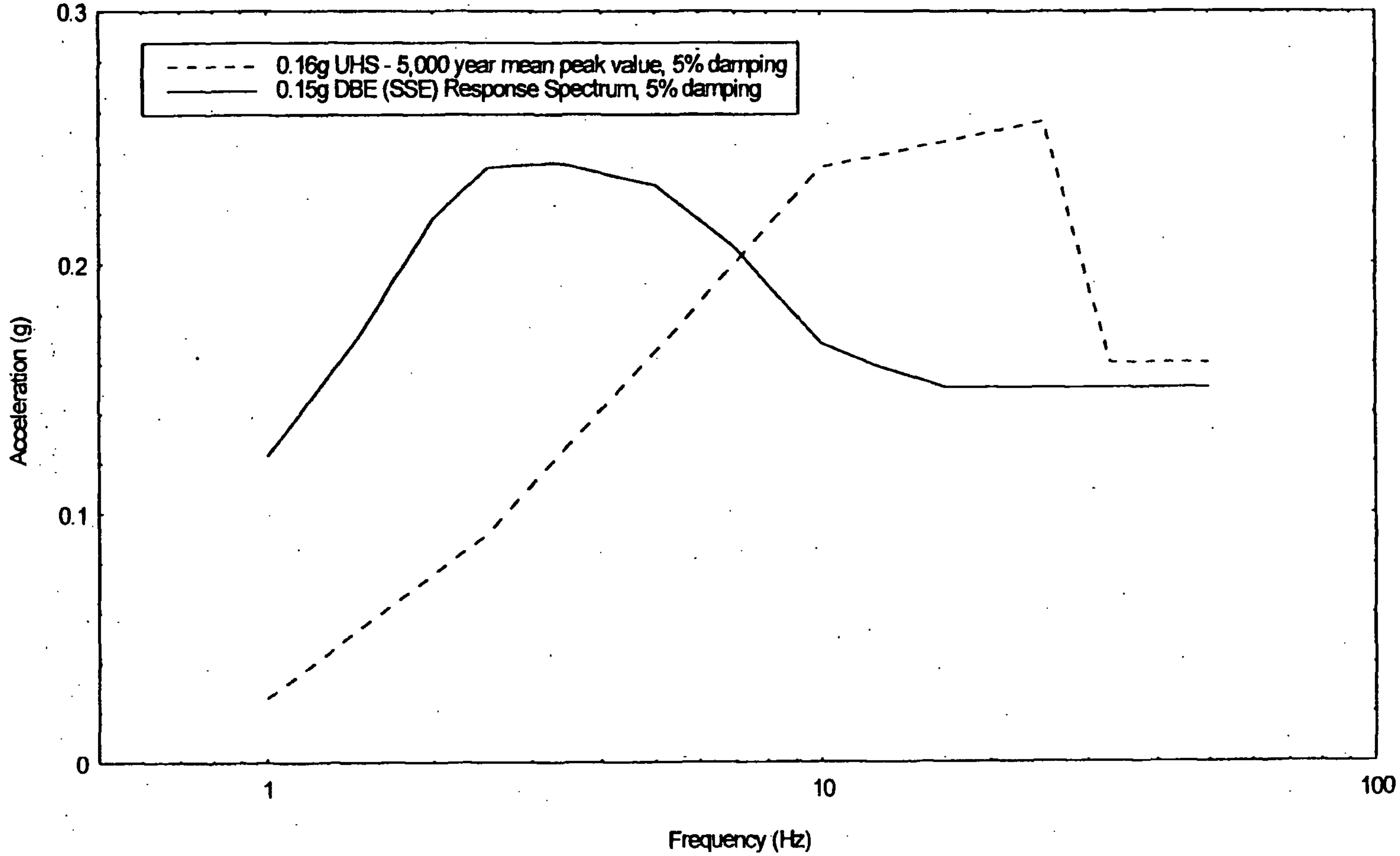
Seismic Review Team. The IPEEE Seismic Review Team consisted of Mr. Stephen Anagnostis and Mr. Walter Djordjevic of Stevenson & Associates, assisted by Mr. Ahmet Unsal and Ms. Mara Lakis of the New York Power Authority. All members of the SRT are SQUG-certified Seismic Capability Engineers.

Plant Seismic Design Basis. The design basis earthquake (DBE) for IP3 is represented by a response spectrum with peak ground acceleration (pga) of 0.15g in the horizontal direction and 0.10g in the vertical direction. The horizontal response spectrum is shown in Figure 3.1.4.1. For comparison, Figure 3.1.4.1 also contains the uniform hazard spectrum (UHS) scaled to an approximately equal level, which corresponds to the 5000-year mean return period (Section 3.1.4.3). IP3 design criteria also considered an operating basis earthquake (OBE) with horizontal and vertical peak ground accelerations of 0.10g and 0.05g, respectively.

In the original design, all equipment and structures were classified as seismic Class I, II, or III, in accordance with the following definitions (Section 16.1.1 of the FSAR [7]):

Figure 3.1.4.1.

Comparison of the DBE and the 5000 Year Return Period UHS Ground Response Spectra



Class I. Structures and components, including instruments and controls, whose failure might cause or increase the severity of a loss-of-coolant accident or result in an uncontrolled release of radioactivity causing more than 10 rem to the thyroid or 10 rem whole body to the average adult beyond the nearest site boundary. Also included are structures and components vital to safe shutdown and isolation of the reactor.

Class II. Structures and components which are important to reactor operation but not essential to safe shutdown and isolation of the reactor, and whose failure could result in the release of radioactivity causing more than 1.0 rem to the thyroid or 0.5 rem whole body dose to the average adult beyond the nearest site boundary.

Class III. Structures and components which are not directly related to reactor operation and containment.

The seismic design criteria were as follows (Section 16.1.3 of the FSAR [7):

Class I. Primary steady state stresses plus OBE seismic stresses are maintained within the allowable stresses accepted as good practice, and where applicable, set forth in the appropriate design standards (ASME Boiler & Pressure Vessel Code, USAS B31.1 Code for Pressure Piping, ACI 318 Building Code Requirements for Concrete, and AISC Specifications for the Design and Erection of Structural Steel for Buildings).

Primary steady state stresses plus DBE seismic stresses are limited so that the function of the component, system or structure shall not be impaired as to prevent a safe and orderly shutdown of the plant. Specifically, the criteria requires that rotating equipment will not freeze, pressure vessels will not rupture, supports will not collapse, systems required to be leak tight will remain leak tight, and components required to respond actively will do so. Structural stresses will not exceed yield.

Equipment associated with the primary reactor coolant loop was designed in accordance with Section III of the ASME BP&V code for nuclear vessels. Piping was designed in accordance with the USAS Code B31.1.0.

Class II. Structures and components were designed on the basis of a static analysis for a ground acceleration of 0.1g in the horizontal directions and 0.05g in the vertical directions acting simultaneously.

Class III. Structures meet the requirements of the "State Building Construction Code", State of New York, 1961.

The seismic analysis procedures for Class I structures and components are outlined below:

Structures. A multi-degree-of-freedom modal analysis was performed on all Class I building, structural models for the containment, inner containment structures, primary auxiliary building, control and diesel generator building, fan house building, intake structure, spent fuel pit, and shield wall are documented [18]. All of the these structures are reinforced concrete; 5% damping was used for both the OBE and DBE analyses, except for the containment structure for which 2% damping was used in the OBE analysis.

Piping. The reactor coolant piping, and main steam and main feedwater piping inside containment, were analyzed dynamically using the computer code WESTDYN (Section 16.1.3 of the FSAR [7]). Other Class I piping having a diameter of 6 in. or more and the high head safety injection piping was initially statically analyzed using spacing tables based on the simultaneous application in the horizontal and vertical directions of 0.67 and 0.50 times the peak of the corresponding 0.5% damped floor response spectra. Subsequent dynamic analyses using ADLPIPE (Section 16.1.3 of the FSAR [7]) confirmed the conservatism of the original static analysis. Other Class I piping having a diameter of less than 6 in. was statically analyzed using spacing tables based on the simultaneous application in the horizontal and vertical directions of 2.0 and 1.33 times the peak of the corresponding 0.5% damped floor response spectra. The conservatism of this procedure relative to dynamic analysis had been previously established by comparative analyses for the Ginna, Robinson, and Indian Point Unit 2 plants (Section 16.1.3 of the FSAR [7]).

Equipment. Depending on the equipment's rigidity, seismic analysis consisted of a static analysis using the acceleration of the supporting structure at the appropriate elevation, a static analysis using the peak of the appropriate floor response spectra, or a response spectrum analysis using the appropriate floor response spectra. Damping values of 2.5% for bolted assemblies and 1% for welded assemblies were used.

3.1.4.3 Analysis Of Plant System And Structure Response

Uniform Hazard Spectrum (UHS) for IP3. In Section 3.1.1.2 of NUREG-1407 [4], the NRC recommended that the median spectral shape for the 10,000-year return period provided in NUREG/CR-5250 [19] be used for the evaluation. In Supplement 5 to Generic Letter 88-20 [18], the NRC concluded that the revised spectra in NUREG-1488 [5] could also be used.

The revised spectra in NUREG-1488 [5] were used in this study. The Uniform Hazard Spectrum (UHS) shape was developed by using the IP3, 10000-year return period, 50th percentile values in Appendix B of NUREG-1488 [5] for the spectral shape at frequencies of 25 Hz and below. The Indian Point 50th percentile peak ground acceleration data in Appendix A of NUREG-1488 [5] was interpolated to obtain the corresponding peak ground acceleration (probability of exceedance of 10^{-4}/year). The spectral values are shown in Table 3.1.2.3. The peak ground acceleration was assumed to apply for frequencies equal to or greater than 33 Hz. The resulting shape is shown in Figure 3.1.2.4 for several peak ground acceleration values. For comparison, the DBE spectrum is also shown.

Development of UHS Floor Response Spectra. UHS floor response spectra were generated using a direct generation methodology. This is one the two methods deemed acceptable in NP-6041 ([9], page 4-25) for development of floor response spectra; the other method is time history analysis. The UHS was converted to a power spectral density (PSD) and that PSD was applied to the existing design basis structural dynamic models. Random vibration analysis techniques were then used to obtain floor PSDs, and the floor PSDs were converted to floor response spectra (FRS).

The existing design basis dynamic structural models consisted of the frequencies, mode shapes, and participation factors contained in the Westinghouse summary of seismic response spectra [18]. These data were developed during the original design of the plant by modeling the Class I structures using lumped mass models, and then performing a modal extraction. As the structures are founded on bedrock, no soil-structure effects were modeled in the original analyses, and none were included in this evaluation.

The analyzed structures are primarily reinforced concrete structures. A damping value of 5% was used in the original DBE evaluations. For margin evaluations, Table 4-1 of EPRI NP-6041 [9] recommends a range from 5% to 10% for structural stresses from ½ yield stress to near yield. A damping value of 5% was selected for developing the UHS floor response spectra.

The fundamental frequencies for Class I structures [18] are listed in Table 3.1.4.1. Figures 3.1.4.2 through 3.1.4.6 compare the original DBE floor response spectra [20] to the UHS floor response spectra computed for this evaluation.

The UHS FRS in Figures 3.1.4.2 through 3.1.4.6 are scaled to a 0.15g peak ground acceleration so that they are directly comparable to the DBE FRS. In general, the peaks of the UHS FRS are higher than those of the DBE FRS. The reason for this is that the major frequency content of the UHS ground response (10 Hz to 20 Hz) is in the range of the fundamental frequency of most of the structures, while the major frequency content of the DBE (2 Hz to 5 Hz) is generally below the fundamental structural frequencies.

Table 3.1.4.1

Fundamental Frequencies of Class I Structures

Building	Fundamental Frequency (Hz)
Containment Structure	4.19
Interior Containment Structure	32.8 EW / 17.1 NS
Primary Auxiliary Building	14.7 EW / 14.3 NS
Control and Diesel Generator Building	13.2 EW / 11.7 NS
Fan House Building	2.7 NS / 4.2EW
Intake Structure	18.4 EW / 12.3 NS
Spent Fuel Pit	23.5 EW / 24.1 NS
Shield Wall	3.4 EW / 15.0 NS

Figure 3.1.4.2

Comparison Of UHS And DBE Floor Response Spectra For Selected Elevations Of The Control / Diesel Generator Building

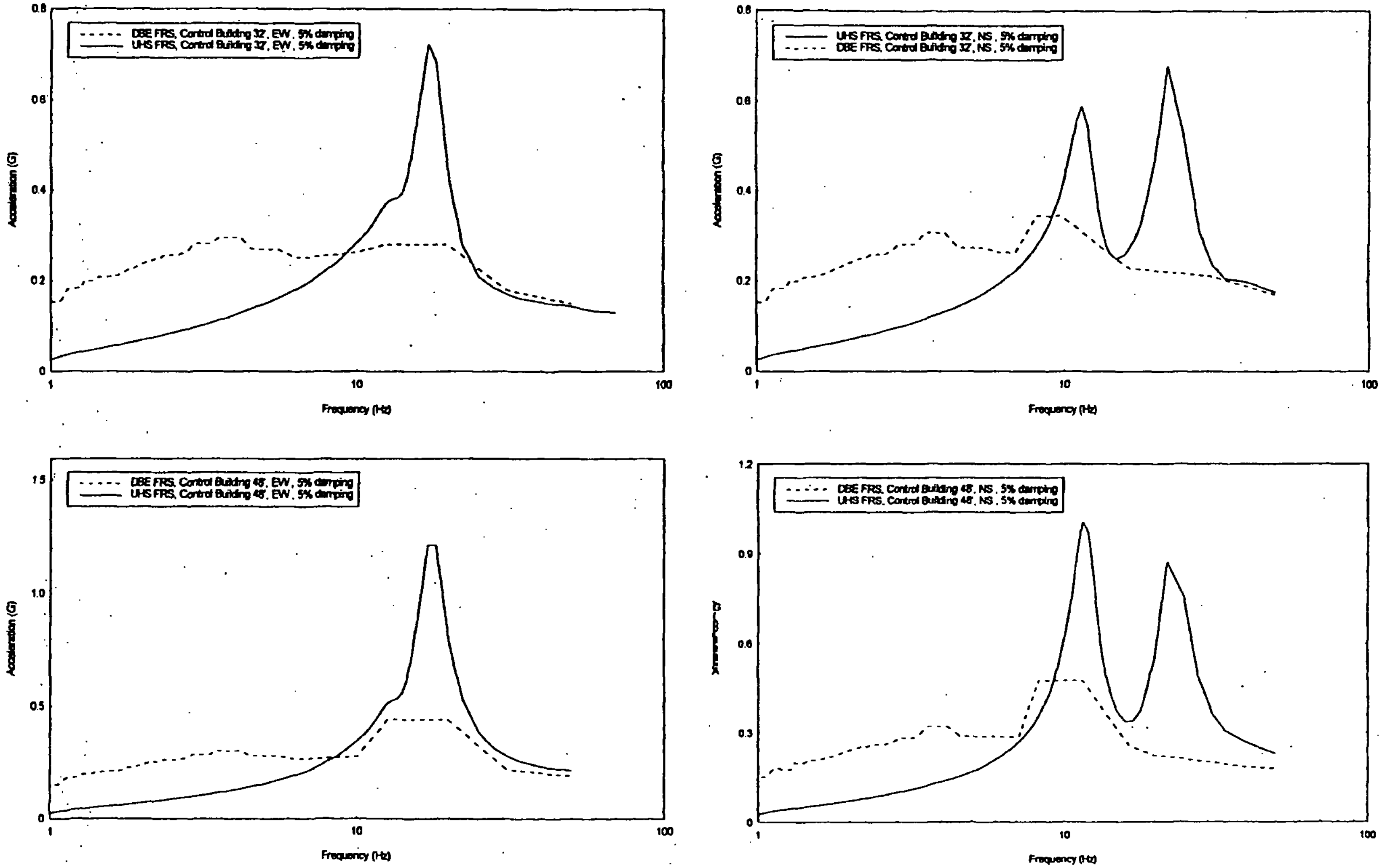


Figure 3.1.4.3

Comparison Of UHS And DBE Floor Response Spectra For Selected Elevations Of The Primary Auxiliary Building

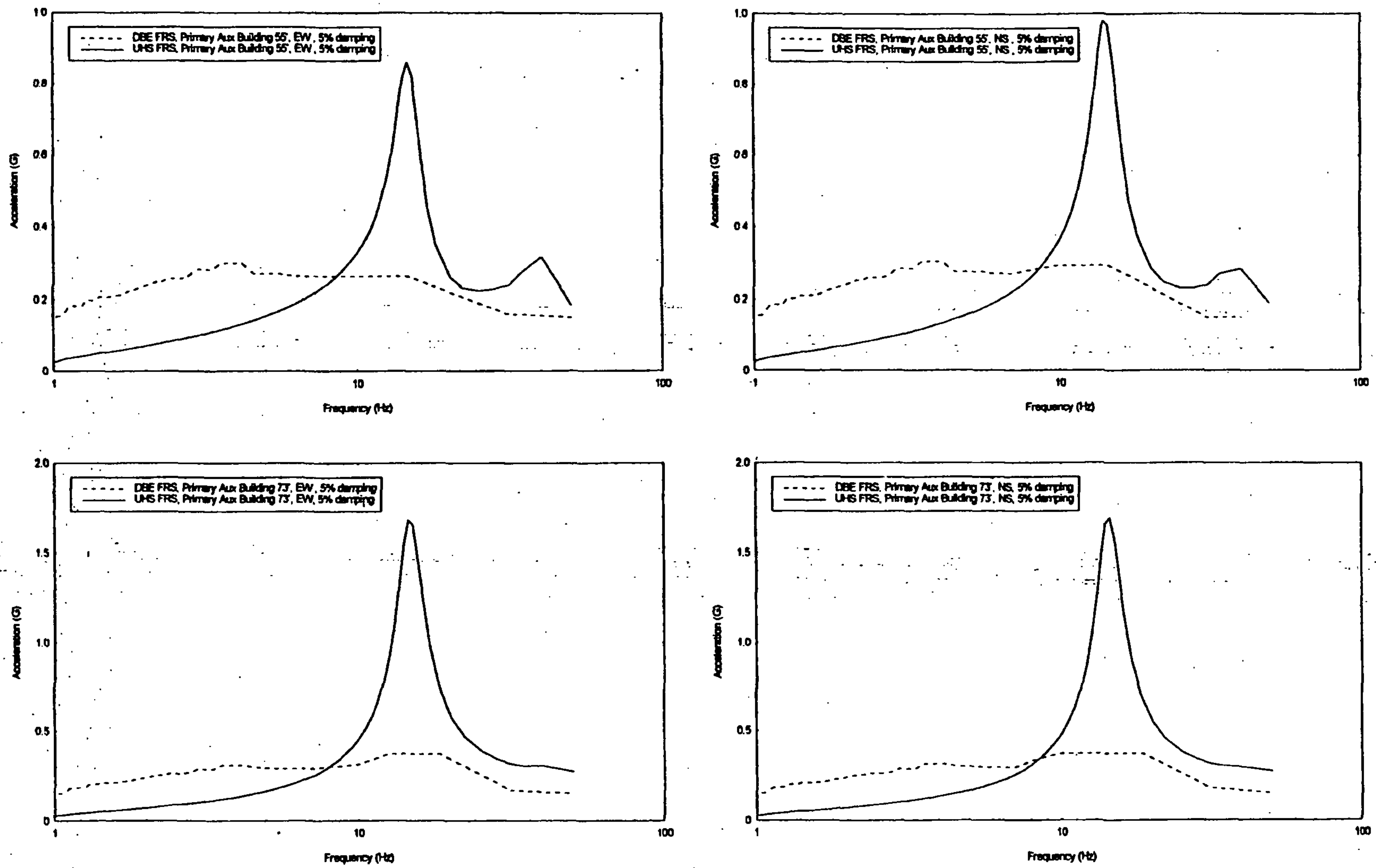


Figure 3.1.4.4

Comparison Of UHS And DBE Floor Response Spectra For Selected Elevations Of The Inner Containment Structure

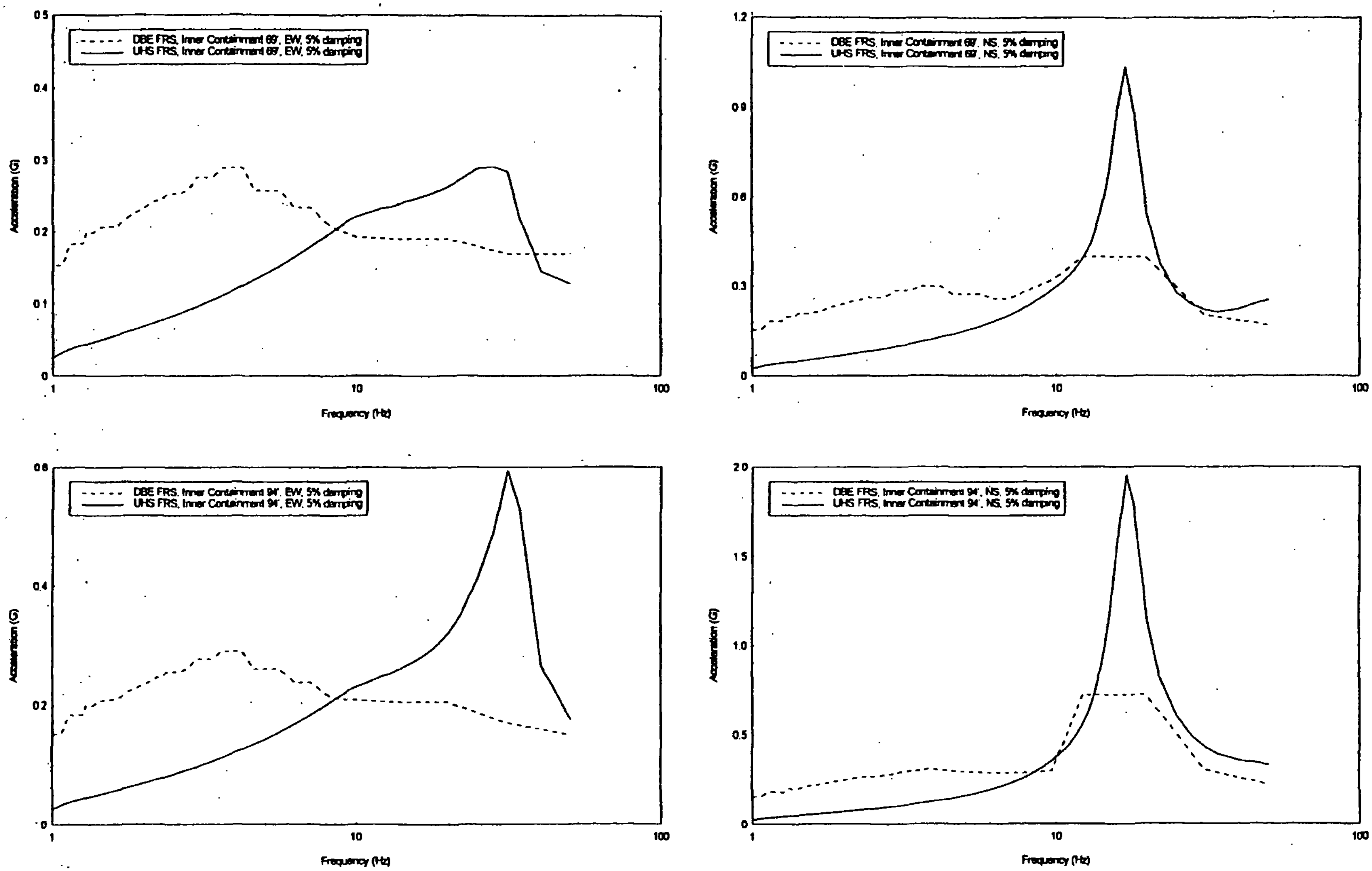


Figure 3.1.4.5

Comparison Of UHS And DBE Floor Response Spectra For Selected Elevations Of The Fan House

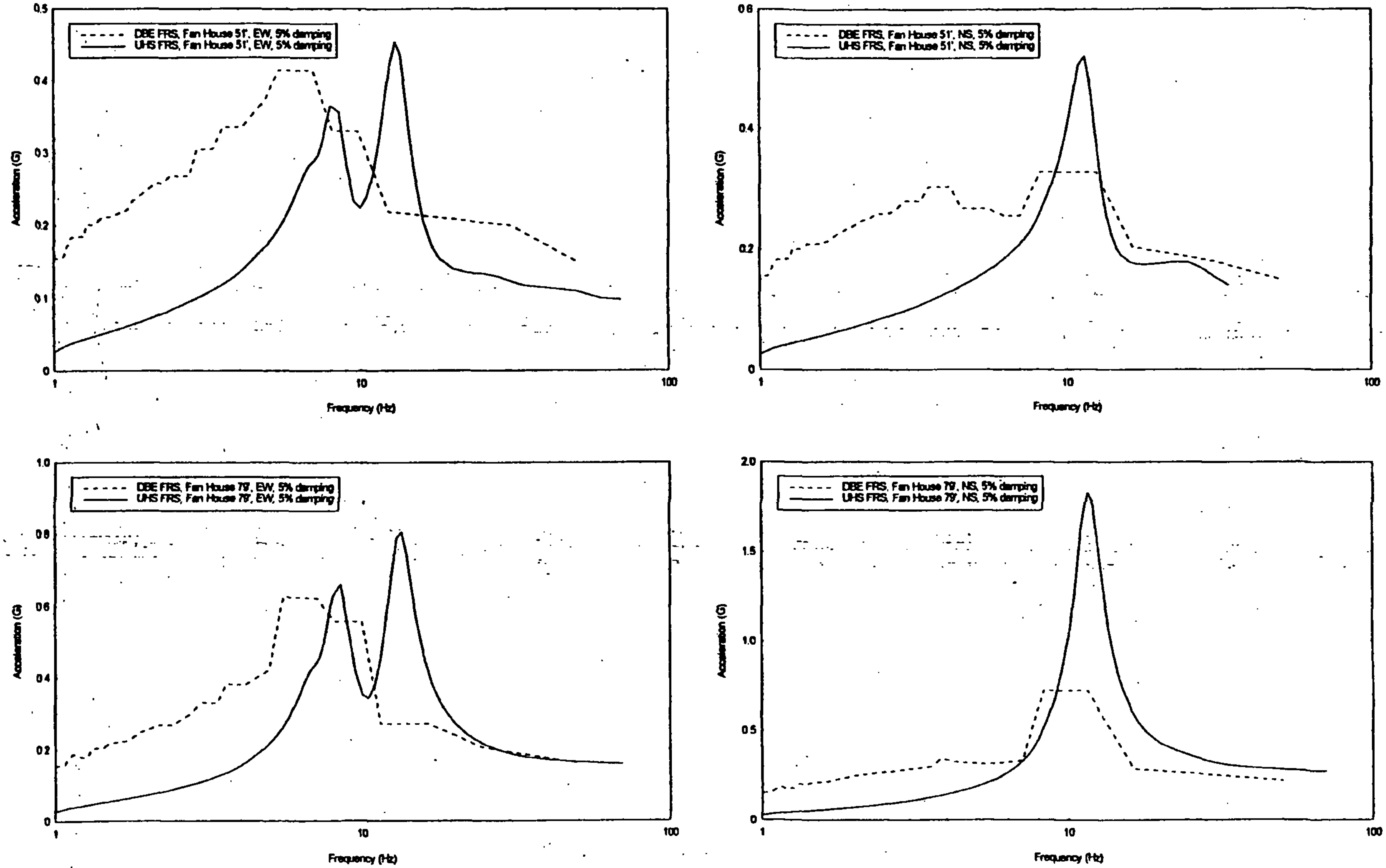
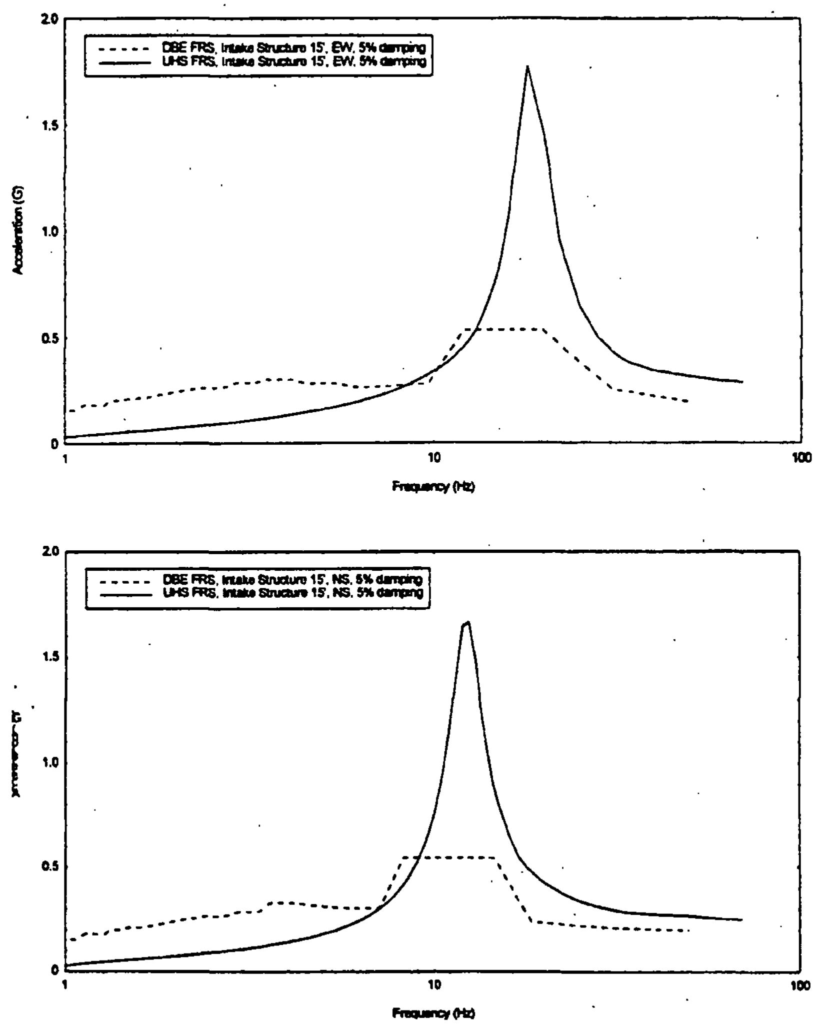


Figure 3.1.4.6

Comparison Of UHS And DBE Floor Response Spectra For Selected Elevations Of The Intake Structure



3.1.4.4 Seismic Capacities Of Components And Structures

Civil Structures

Auxiliary Feedwater System Enclosure. The auxiliary feedwater enclosure is also referred to as the shield wall area. It is located outside the west side of the containment and consists of a 4-ft thick reinforced concrete wall (the shield wall), founded on rock at elevation 7-ft, and rising up to elevation 80-ft. There is a slab on grade at elevation 18-ft 6 in. and floor slabs that span between the shield wall and the containment foundation at elevations 32 ft 6 in. and 43 ft.

Table 2-3 of EPRI NP-6041 [9] states that Category I concrete frame structures can be screened if they were designed for a DBE of 0.1g pga or greater. Given the auxiliary feedwater system enclosure is seismic Class I and was designed for a 0.15g pga DBE (Section 16.1 of the FSAR [7]), the auxiliary feedwater system enclosure was screened, and represented in the seismic PRA model by the surrogate element.

Containment. The IP3 containment is a reinforced concrete cylinder with a hemispherical dome atop a concrete basemat founded on rock. The cylinder is 135 ft in diameter and 148 ft high. The cylinder wall is 4 ft 6 in. thick, the dome is 3 ft 6 in. thick, and the base mat is 9 ft thick. The interior is lined with a steel liner secured to the concrete with cast-in-place studs. The liner is ½ in. thick in the dome, 3/8 in. thick in the cylinder, and ¼ in. thick on the base mat. There is an additional 3-ft of concrete on top of the basemat liner. The containment is designed for a basic wind load of 30 psi, a 300 mph tangential wind speed tornado with a 3.0 psi pressure drop, design basis and operating basis earthquake loads, and an internal pressure and temperature due to a loss-of-coolant accident of 47 psig and 247°F. Given the design, gross failure of the containment is not a credible concern.

Table 2-3 of EPRI NP-6041 [9] states that reinforced concrete containments can be screened without additional evaluation. Therefore the containment was screened and represented in the seismic PRA model by the surrogate element.

Containment Internal Structures. Containment internal structures include equipment supports, shielding, the reactor cavity and fuel transfer canal, and miscellaneous concrete and steel for floors and stairs. All internal structures are supported off the basemat. The primary internal structure is a 3-ft thick concrete ring wall serving as a shield for the reactor coolant components and as the support for the polar crane. A 2-ft thick concrete floor slab atop the ring wall forms the operating floor. A concrete shield surrounds the portion of the pressurizer that protrudes above the operating floor.

Table 2-3 of EPRI NP-6041 [9] states that containment internal structures can be screened if they were designed for a DBE of 0.1g pga or greater. Given that the containment internal structures are seismic Class I and were designed for a 0.15g pga DBE (Section 16.1 of the FSAR [7]), the containment internal structures were screened and represented in the seismic PRA model by the surrogate element.

Control and Diesel Generator Building. The control and diesel generator building is a reinforced concrete structure. The structure is founded on rock at the 10-ft elevation. The control building portion has reinforced concrete floor slabs at the 15, 33 and 53-ft elevations, and a reinforced concrete roof slab at elevation 73 ft 7 in. The diesel generator building portion has a single reinforced concrete slab at elevation 10 ft, and a roof slab at elevation 46 ft 6 in.

Table 2-3 of EPRI NP-6041 [9] states that Category I reinforced concrete structures (including shear walls, footings diaphragms and concrete frames) can be screened if they were designed for a DBE of 0.1g pga or greater. The control and diesel generator building is seismic Class I and was designed for a 0.15g pga DBE (Section 16.1 of the FSAR [7]). Therefore the control and diesel generator building was screened, and is represented in the seismic PRA model by the surrogate element.

Electrical Tunnels. The electrical tunnels contain cable trays and conduit. The tunnels start at the east-end of the control building, connect to the west side of the primary auxiliary building, and end in the electrical penetration area outside the southwest quadrant of the containment. The electrical tunnel is a reinforced concrete shear wall/frame structure, founded on rock on about the 15-ft elevation (the foundation elevation varies along its length), and has reinforced concrete floor slabs at the 33- and 43-ft elevations, and a roof slab at the 55-ft elevation. The tunnels are freestanding structures between the control and primary auxiliary buildings, but are, alongside the containment and integral with the primary auxiliary building. There is 1-1/2 in. gap between the tunnels and the containment.

Table 2-3 of EPRI NP-6041 [9] states that Category I reinforced concrete structures can be screened if they were designed for a DBE of 0.1g pga or greater. Given that the electrical tunnels are seismic Class I and were designed for a 0.15g pga DBE (Section 16.1 of the FSAR [7]), the tunnels were screened and represented in the seismic PRA model by the surrogate element.

Fan House. The fan house is a reinforced concrete structure located outside the southeast quadrant of the containment. It is founded on rock at an approximate elevation of 35 ft, and has concrete floor slabs at the 55, 72 and 92-ft elevations. There is 1 ½ in. gap between the fan house and the containment.

Table 2-3 of EPRI NP-6041 [9] states that Category I reinforced concrete structures can be screened if they were designed for a DBE of 0.1g pga or greater. Given that the electrical tunnels are seismic Class I and were designed for a 0.15g pga DBE (Section 16.1 of the FSAR [7]), the tunnels were screened and represented in the seismic PRA model by the surrogate element.

Intake Structure. The intake structure consists of a reinforced concrete structure founded on rock at the –27 ft elevation, with a reinforced concrete floor slab at the 15-ft operating elevation covered by a steel frame superstructure.

Table 2-3 of EPRI NP-6041 [9] states that Category I reinforced concrete and steel frame structures can be screened if they were designed for a DBE of 0.1g pga or greater. Given that the intake structure is seismic Class I and was designed for a 0.15g pga DBE (Section 16.1 of the FSAR [7]), the intake structure was screened and represented in the seismic PRA model by the surrogate element.

Primary Auxiliary Building (PAB). The PAB is a reinforced concrete shear wall structure founded on rock at elevations ranging from 15 to 41 ft. There are concrete floor slabs at the 15, 34, 41, 55 and 73-ft elevations, and a concrete roof slab at the 90-ft elevation.

Table 2-3 of EPRI NP-6041 [9] states that Category I reinforced concrete shear wall structures can be screened if they were designed for a DBE of 0.1g pga or greater. Given that the PAB is seismic Class I and was designed for a 0.15g pga DBE (Section 16.1 of the FSAR [7]), the PAB was screened and represented in the seismic PRA model by the surrogate element.

Spent Fuel Pit/Fuel Storage Building. The spent fuel pit and the fuel storage building are parts of the same structure. The spent fuel pit is the lower part of the structure and comprises a reinforced concrete shear wall structure founded on rock at approximately the 51-ft elevation and rising up to the 95-ft elevation. The fuel storage building is the upper part of the structure and comprises a steel frame structure that acts as enclosure and also supports the fuel storage crane.

While spent fuel pit is a seismic Class I structure and was designed for the 0.15g pga DBE, the fuel storage building is a seismic Class III structure and did not originally require an explicit seismic evaluation (Section 16.1 of the FSAR [7]). However, Section 16.4.2 FSAR [7] states the fuel storage crane bridge, trolley, and building supports were subsequently dynamically analyzed for the 0.15g DBE as part of a seismic interaction study and proved to be adequate. The superstructure was also evaluated in a previous seismic PRA [21], a median seismic fragility of 0.92g pga being calculated.

Table 2-3 of EPRI NP-6041 [9] states that Category I concrete and steel structures can be screened if they were designed for a DBE of 0.1g pga or greater. The spent fuel pit clearly meets this criterion. The fuel storage building is not classified as Category I, but was subjected a Category I seismic analysis and found adequate. Accordingly, both structures were screened and are represented in the seismic PRA model by the surrogate element.

Non-Class I Structures with the Potential to Fail Class I Structures. Non-Class I structures that could fail and potentially affect Class I structures are:

- The turbine building, which is adjacent to the west end of the control building
- The containment access facility (CAF), which is on top of the west end of the primary

auxiliary building (PAB)

- The fuel storage building superstructure, which is above the spent fuel pool
- The Indian Point 1 stack, which could fall on the condensate storage tank.

The potential for these structures to affect Class I structures was addressed as part of a seismic interaction study performed in 1983 - 1984 (Section 16.4.2 of the FSAR [7]). The turbine building, fuel storage building superstructure, and the Indian Point 1 stack were dynamically analyzed for the 0.15g pga DBE and found adequate. The CAF, while classified as a non-safety structure, was procured and installed as a Class I structure, and was included in the seismic analysis of the Class I PAB.

These structures were also evaluated in earlier seismic PRA studies [21, 22]. These studies documented median capacities of 1.4g pga for the turbine building, 0.92g pga for the fuel storage building, and 0.72g pga for the Indian Point 1 stack. These capacities are approximately equal to or above the surrogate element's median capacity of 0.75g pga.

Based on the above analysis, non-Class I structures that could fail and potentially affect Class I structures were specifically addressed in the seismic PRA model as part of the surrogate element.

Control Room Ceiling. Control room lighting is suspended from embedded Unistrut cast into the underside of the control building's reinforced concrete roof slab by bolted Unistrut framing members. The diffuser grid is suspended from the Unistrut framing members by ¼ in. threaded rods.

Dams, Levees, Dikes. The hydrology of IP3 is discussed in Section 2.5 of the FSAR [7]. The plant is located on the eastern shore of the Hudson River, approximately 40 miles north of the river's mouth at the southern end of Manhattan. Normal river level is within a few feet of mean sea level; the highest recorded river level at the site of 7.4 ft occurred during a severe hurricane in 1950. The water level has to reach 15.25 ft to affect the site.

Hydrology studies undertaken during the original design concluded that the simultaneous occurrence of a hurricane, flood, and failure of the Ashokan Reservoir (the largest volume of stored water within 100 miles of the site) would result in a river elevation at the site of 14 ft, of which the dam failure would contribute 1 ft of elevation.

Based on the above, seismic-induced external flooding is not a credible concern. The same conclusion was reached in earlier PRA studies (Section 5.3.3 of Reference [23]) and in Section 5 of this study.

Soil Failure. IP3 is a rock site. Some of the piping (Section 16.3.4 of the FSAR specifically discusses two 24-inches service water lines) is buried in trenches which have been backfilled. Seismically induced failure of this soil is not credible because the surrounding bedrock contains it. Seismic shaking could induce some compaction, but if the soil was compacted during the backfilling (as normally would be done) the additional compaction should not be significant. Therefore, soil failure is not a credible concern.

Masonry Block Walls. All block walls that could affect safety equipment were identified and seismically qualified in response to IE Bulletin 80-11 [25, 26]. The walls are listed in Table 3.1.4.2. The walls in the control building and the fan house are single wythe, 8 in. thick, hollow block, and unreinforced. The walls in the PAB are "removable" panels that allow access into equipment cubicles. They are unreinforced, but are solid concrete block with mortar joints that have been keyed into the edges of the openings, and range in thickness from 24 in. to 42in. It is not known if these are single- or multi-wythe walls

For this evaluation, the block walls are evaluated based on the rocking model shown in Figure 3.1.4.7. This model assumes the wall spans vertically and is restrained along the top and bottom edges–the edge restraint assumptions were verified during the 80-11 evaluations. The wall is assumed to crack at mid-height and then rock. The wall's frequency, mode shape, and peak displacement can be calculated as shown in the figure.

The rocking frequencies calculated using this model are shown in Table 3.1.4.1. Because the frequencies are low (ranging between 0.5 Hz and 1.5 Hz), the displacements can be calculated using the ground response spectrum: the dynamic response of the buildings will not amplify the ground spectrum in this range.

The UHS ground response spectrum is specified in Table 3.1.2.3. The lowest frequency specified is 1 Hz, and the 1.0g pga spectral acceleration at this frequency is 0.162g, which is equal to a spectral displacement of 1.58 in. ($d = a / (2\pi f)^2$). A constant velocity can approximate this area of the spectrum, so the spectral displacement, in inches, is (1.58/f) for a 1g pga. As noted in the figure, the mid-height wall displacement is 1.5 x the spectral displacement or (2.37/f) for a 1g pga. The resulting displacements for each wall are listed in the table.

Failure occurs when the wall's mid-height displacement equals the wall thickness—beyond that point the center of gravity of the wall passes the edge of the wall and the wall becomes unstable. The peak ground acceleration at which this occurs is calculated by dividing the wall thickness by the 1g pga displacement. This value is listed in the table as the median capacity (note that the median capacity for the PAB walls is conservatively based on a 12-in. wall thickness). The capacity is interpreted as median, rather than as HCLPF, because the failure mode has no margin.

The calculated median capacities are well above the surrogate element's median capacity of 0.75g pga. Accordingly, the masonry block walls were screened.

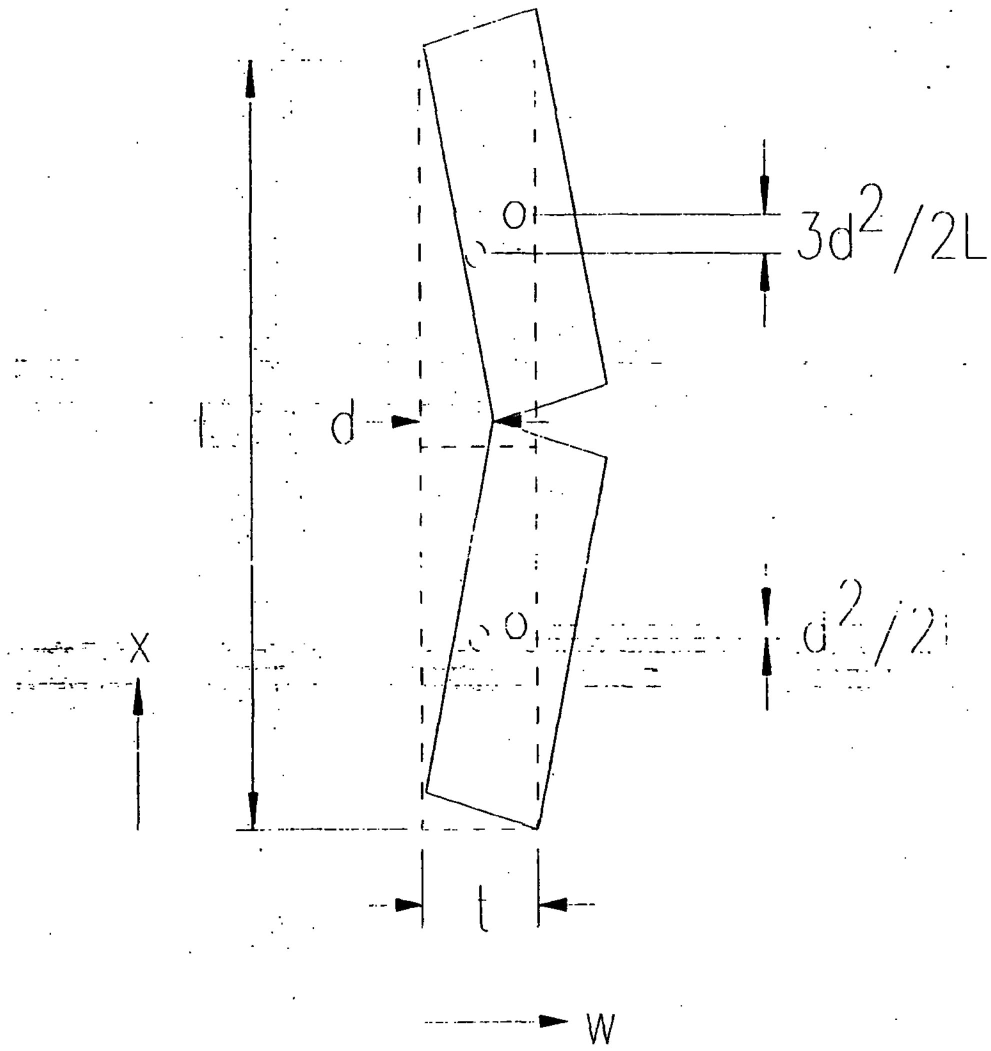
Table 3.1.4.2

Masonry Block Walls

Wall #	Location	Height	Thickness (in.)	Rocking Frequency (Hz)	1g pga Rocking Displacement (in.)	Median Capacity (pga) (g)
6	PAB 15 ft	11 ft	42	0.67	3.54	3.39
7	PAB 15 ft	8 ft	24	0.78	3.04	3.95
8	PAB 15 ft	2 ft 4 in.	24	1.45	1.63	7.36
9	PAB 15 ft.	2 ft 4 in.	24	1.45	1.63	7.36
18	PAB 55 ft	16 ft	30	0.55	4.31	2.78
19	PAB 55 ft	16 ft	30	0.55	4.31	2.78
20	PAB 55 ft	10 ft	30	0.70	3.39	3.54
22	PAB 55 ft	15 ft 6 in.	30	0.56	4.23	2.84
23	PAB 55 ft	15 ft 6 in.	30	0.56	4.23	2.84
24	PAB 55 ft	15 ft 6 in.	30	0.56	4.23	2.84
46	FH 102 ft	9 ft 4 in.	8	0.72	3.29	2.43
51A, B	CB 15 ft Deluge Station Cubicle	10 ft	8	0.70	3.39	2.36
52A, D	CB 33 ft Battery Rooms	11 ft 4 in.	8	0.66	3.59	2.23
53, 54 (lower)	CB 15 ft East end	8 ft	8	0.78	3.04	2.63
53, 54 (upper)	CB 25 ft East end	6 ft	8	0.90	2.63	3.04
55, 56	CB 33 ft East stairwell	18 ft	8	0.52	4.56	1.75
57A, B	CB 53 ft East stairwell	12 ft 1 in.	8	0.64	3.70	2.16
58	CB 53 ft East end	12 ft 1 in.	8	0.64	3.70	2.16

Figure 3.1.4.7 Masonry Block Wall Rocking Model

Compute the kinetic energy:



$$KE = 2\left(\frac{1}{2}\int_0^{L/2} mw^2(x)dx\right) = m\omega^2\int_0^{L/2} w^2(x)dx$$

$$= m\omega^2\int_0^{L/2}\frac{2dx}{L}dx = m\omega^2 d^2 L/6$$

Compute the potential energy:

$$PE = \frac{mgL}{2}\left(\frac{d^2}{2L}+\frac{3d^2}{2L}\right) = mgd^2$$

Compute the frequency by equating PE to KE :

$$\frac{m\omega^2 d^2 L}{6} = mgd^2 \rightarrow \omega^2 = \frac{6g}{L}$$

Mode Shape: $\phi(x) = 2x/L$

Participation Factor:

$$\Gamma = \frac{\int_0^{L/2}\phi(x)dx}{\int_0^{L/2}\phi^2(x)dx} = \frac{\int_0^{L/2}\frac{2x}{L}dx}{\int_0^{L/2}\frac{4x^2}{L^2}dx} = \frac{L/4}{L/6} = 1.5$$

Mid-Height Displacement: $w_{max} = \phi(L/2)\Gamma S_d = 1.5S_d$

Failure occurs when. $w_{max} \geq t$

Mechanical and Electrical Equipment. Most mechanical and electrical equipment in the IPEEE scope was included in the USI A-46 evaluation [27]. Except where equipment anchorage is of concern, an item of equipment that passed the USI A-46 evaluation could be screened because the 0.8g peak spectral acceleration of the GIP's [28] bounding spectrum is equal to that for the first screening lane in Tables 2-3 and 2-4 of EPRI NP-6041 [9]. Anchorage is an exception because the GIP [28] allows equipment anchorage to be evaluated for a plant's DBE (design basis earthquake), which, for eastern sites, is usually significantly lower than 0.8g psa (for IP3 the DBE is 0.23g psa and 0.15g pga).

Accordingly, an item of A-46 equipment was screened if it passed the A-46 evaluations and either did not require an anchorage evaluation (i.e., valves and temperature elements) or had obviously robust anchorage (i.e., wall mounted distribution panels, individually anchored pressure transmitters) or if the A-46 anchorage calculations showed a very large factor of safety. If an item of equipment passed the A-46 evaluations but had an anchorage that could control its capacity (e.g., large floor mounted equipment), an anchorage capacity was calculated based on the spectra described in Section 3.1.4.3.

A-46 outliers were evaluated on a case-by-case basis. Outliers that have been resolved (or are being resolved) by maintenance activities or modifications, were evaluated assuming the as-resolved condition. Outliers that have been analytically resolved were evaluated for the as-is condition. Unresolved outliers were assigned a nominal capacity of 0.10g pga HCLPF (0.22g median) – these outliers are noted in Table 3.1.4.3.

Equipment that was not on the A-46 equipment list was walked down by the IPEEE Seismic Review Team (SRT) and evaluated using the GIP criteria. Anchorage capacities were calculated using the spectra described in Section 3.1.4.3.

The anchorage calculations followed GIP procedures (Section II.4.4 and Appendix C [28]) with the following exceptions:

- The UHS floor response spectra were used. These are what the GIP calls "realistic (and) median-centered". The 1.25 factor of conservatism specified in GIP Table 4-3 was not applied, however. The GIP allows the use of either "conservative, design" or "realistic, median-centered" floor response spectra, and requires that the "realistic, median-centered" be multiplied by 1.25 because they are less conservative. The UHS floor response spectra are the required input for the seismic PRA–the design basis floor response spectra do not apply–and therefore the 1.25 factor was not required.

- The GIP allows the use of 1.5 x the ground response spectrum as the floor response spectrum under certain conditions. This option was not used in these calculations; only the UHS floor response spectra were used (the unfactored ground response spectra was used as the floor response spectrum for the base elevations of all buildings).

- The GIP requires that reduction factors be applied to anchor bolt capacities under certain conditions. All of these reduction factors were applied, where needed, except for the essential relay reduction factor for concrete expansion anchors. This additional factor of conservatism is specific to GIP requirements for essential relays, and does not apply to seismic fragility calculations.

- The GIP requirements for bolt tightness checks were not applied. This additional factor of conservatism is not required for seismic fragility calculations.

- Reduction factors on cast-in-place bolts for embedment and edge distance were based on ACI-349 rather than the GIP [28]. This is as recommended in Section 6 of EPRI NP-6041 [9]. The GIP reduction factors are approximately a factor of 1.5 more conservative than ACI-349.

The results of the mechanical and electrical equipment evaluations are summarized in Table 3A.10 in Appendix 3A. Table 3A.10 lists all of the equipment reviewed, ordered by equipment ID:

- The first column is a counter.

- The next four columns list the equipment ID, description, building and elevation.

- The column labeled "Scr'n" (screened) contains either a Y or N. A Y indicates that the equipment met the screening requirements specified in Table 2-3 of EPRI NP-6041 [9], an N indicates that it did not; equipment that did not screen is discussed in more detail below.

- The column labeled "Anch" (anchorage) contains a numerical value, R, or n/a. The numerical value is the calculated median anchorage capacity in terms of the peak ground acceleration (pga). An R indicates "rugged": the SRT screened the anchorage, as having obviously high capacity, with no calculation required. An "n/a" indicates "not applicable": in-line equipment such as valves and temperature elements do not require an anchorage evaluation.

- The column labeled "A-46" indicates if an item of equipment was included in the A-46 evaluation [27].

The equipment for which a median anchorage capacity was calculated is presented in Table 3.1.4.3. This table is ordered by ascending capacity values:

- The first column is a counter.

- The next two columns list the equipment ID and description.

- The last two columns list the median capacity in terms of the peak ground acceleration (pga) and give a brief description of the item and its' evaluation.

As discussed above, items whose median anchorage capacity are less than 1.13g pga (1.5 x the capacity of the surrogate element) were explicitly modeled in the PRA.

Note that some of the median capacities listed in Table 3.1.4.3 are relatively low, particularly when compared to the DBE pga of 0.15g (an item of equipment designed for a 0.15g pga event would typically be expected to have a median capacity of at least two to three times that value).

As shown in Figure 3.1.2.4, the Uniform Hazard Spectrum (UHS) and the Design Basis Earthquake (DBE) are quite different in frequency content. The peak content of the UHS occurs between 2 Hz and 8 Hz. The majority of the structures at Indian Point 3 are stiff – the control building, primary auxiliary building, intake structure, and interior containment structure all have fundamental frequencies between 12 Hz and 18 Hz. As a result, they amplify the UHS ground motion much more than the DBE ground motion – this is apparent in the high frequency peaks in the floor response spectra shown in Figures 3.1.4.2 through 3.1.4.6.

Due to the high frequency peaks in the UHS floor response spectra, relatively stiff equipment – pumps, squat tanks, heat exchangers – which could normally be evaluated using the ZPA of the floor response spectra, were instead evaluated using the peak of the UHS floor response spectra. This resulted in relatively low median capacities for some of the equipment, particularly for equipment high up in the structures. If these low capacities had a significant effect on the frequency of core damage, a more detailed (and less conservative) capacity analysis would be performed.

Due to the above, the median capacities calculated for the UHS spectrum are not representative of the DBE capacities.

Table 3.1.4.3

Mechanical and Electrical Equipment—Screening Details

	ID	Description	Anchorage (median pga)	Comments
1	CSATBA1, 2	Boric acid storage tanks 31, 32	0.15	Vertical vessel, 12 ft diameter and 12 ft high, weighs 65.8 kips, is suspended in a cutout in the PAB 73 ft floor slab, and is anchored with eight in. CIP bolts. Evaluated using the peak of the 4% damped FRS (12.6g for a 1g pga). Capacity controlled by shear in the anchor bolts.
4	TSC UPS BUS	AMSAC bus	0.22	Located in the Administration Building adjacent to a block wall. The Administration Building is a non-safety related structure, and the block wall was not included in the 80-11 evaluations. Assigned a nominal capacity of 0.10g pga HCLPF (0.22g median).
3	CSATVC1	Volume control tank 31	0.27	Vertical vessel, weighs 28.8 kips, 8 ft diameter, 12 ft high, supported on four short legs. Each leg is anchored with two 1 in. CIP bolts. Located on PAB 73 ft - evaluated using the peak of the 5% damped PAB 73 FRS (11.3g for a 1g pga); capacity limited by the anchorage.
4	ACATCC1, 2	CC surge tanks 31, 32	0.41	Horizontal tanks, each 4 ft diameter and 14 ft long, and weighs 21.6 k. The tanks sit on a pair of W10x33s, spaced 10 ft apart. Each W10x33 spans 12 ft, is anchored at one end into a concrete wall, and is supported at the other end by a short (4 ft tall) 8Wx31 anchored to a concrete floor slab. Located on PAB 73 ft elevation - evaluated using the peak of the 5% damped PAB 73 FRS (11.3g for a 1g pga); capacity limited by bending capacity of the W10x33s.
5	CSAPCH1, 2, 3	Charging pumps 31, 32, 33	0.47	Horizontal pumps, each weighing 17.8 kips and anchored by eight ¾ in. CIP bolts. Located on PAB 55 ft–evaluated using the peak of the 5% damped PAB 55 FRS (6.5g for a 1g pga); capacity limited by the anchorage.
6	ACAHRS1, 2	RHR heat exchanger 31, 32	0.49	Approximately 3 ft diameter x 26 ft long vertical heat exchanger, flooded weight of 22.9 k. The heat exchanger is anchored near the bottom (containment elevation 66 ft) to building steel with four 1-1/4 in. bolts, and at the top (containment elevation 92 ft) to concrete with four 7/8 in. diameter tie rods. Evaluated using the average of the peak of the FRS at the top and bottom elevations (10g in the NS direction for a 1g pga); capacity controlled by the tie rods.
7	CSAHNRT	Non-regenerative heat exchanger 31	0.49	Horizontal heat exchanger on two saddles, 1.8 ft diameter x 18 ft long, 6.4 kip flooded weight. Each saddle is anchored with two ¾ in. CIP bolts. Evaluated using the 4% damped PAB 73 FRS at the calculated fundamental frequency of 27 Hz ±20% (2.9g for 1g pga). Capacity controlled by the anchorage.

	ID	Description	Anchorage (median pga)	Comments
8	31 BK-UP HTR XFMR 32 BK-UP HTR XFMR 33 BK-UP HTR XFMR	Pressurizer heater back up group 31, 32, 33 transformers	0.52	2800 lb transformer anchored with four ½ in. concrete expansion anchors. Evaluated using the peak of the 5% damped control building 33 ft FRS (4.8g for a 1g pga). Capacity controlled by the expansion anchors.
9	31CHGR (GE3) 32CHGR (GE4)	Battery chargers 31, 32	0.52	3400 lb transformer anchored with four 7/8 in. concrete expansion anchors. Evaluated using the peak of the 5% damped control building 33 ft FRS (4.8g for a 1g pga). Capacity controlled by the expansion anchors.
10	ACAHCC1, 2	CCW heat exchanger 31, 32	0.52	Vertical heat exchanger, 47 in. diameter, 28 ft long, 51 kip flooded weight. Supported on a concrete curb at PAB 73 ft by a pair of brackets, each anchored by two ¾ in. CIP bolts. Laterally braced at PAB 56 ft by a pair of rigid struts (90 deg apart), each anchored by four 1 in. concrete expansion anchors. Evaluated using the average of the 5% damped FRS at the calculated fundamental frequency of 36 Hz ±20% (2.1g for 1g pga). Capacity controlled by the CIP bolts at the upper support.
11	SUPERVISORY PANEL	Supervisory panel	0.52	Control room electrical cabinets anchored with concrete expansion anchors. A-46 outlier due to anchorage - new anchorage installed per Type 1 Change No. 94-3-163 CPR, completed 11/15/94. Evaluated using the peak of the 5% damped control building 53 ft FRS (8.1g for 1g pga). Capacity controlled by the expansion anchors.
12	PNL PF6	Gas analyzing panel	0.56	Electrical cabinet anchored with 3/8 in. concrete expansion anchors. Evaluated using the peak of the 5% damped PAB 55 ft FRS (6.5g for 1g pga). Capacity controlled by the expansion anchors.
13	ACAPRH1, 2	31, 32 RHR pumps	0.62	Horizontal pump, each weighs 2.3 k and is secured to a 4 in. grout pad by four 3/4 in. CIP bolts; the bolts do not attach the pump to the underlying floor slab. The grout pad is framed by a welded steel frame anchored with four ¾ in. expansion anchors. The frame and anchors will resist shear loads. Overturning is resisted only by the dead weight. Evaluated using the peak of the 5% damped ground spectrum (1.6g for a 1g pga). Capacity controlled by overturning.
14	MCC-36A, 36B, 37 MCC-36A/B extension	480-Vac MCCS	0.62	90 in. MCCs welded to a steel skid, which is anchored to Unistruts embedded in the floor slab. Evaluated using the peak of the 5% damped PAB 55 FRS (6.5g for a 1g pga); capacity controlled by the anchorage.

	ID	Description	Anchorage (median pga)	Comments
15	GF2	25-kVA static inverter 34	0.65	1800 lb static inverter anchored with ½ in. concrete expansion anchors. Evaluated using the peak of the 5% damped control building 33 ft FRS (4.8g for a 1g pga). Capacity controlled by the expansion anchors.
16	PWST 21	Primary water storage tank	0.65	Flat bottom vertical tank, 35 ft tall, 30 ft diameter, anchored with eighteen 1.75 in. cast-in-place bolts. Evaluated using the procedures in EPRI NP-6041 Appendix H; seismic input based on the 5% damped ground response spectrum at the calculated impulsive mode frequency of 7.2 Hz ±20%.
17	FLIGHT PANEL RACK A-1 to A-10 RACK B-1 to B-11 RACK C-1 to C-10 RACK D-1 to D-11 RACK E-1 to E-7 RACK F-1 to F-7 RACK G-1 to G-6 RACK H-1 to H-5	Flight panel	0.67	90 in. tall electrical cabinets welded to embedded steel; embedded steel is anchored with CIP steel straps. Evaluated using the peak of the 5% damped control building 53 ft FRS (8.1g for 1g pga). Capacity controlled by the anchorage.
18	SWGR31, 32	480-Vac Switchgear 31, 32	0.67	88 in. tall x 66 in. deep switchgear anchored with ½ in. concrete expansion anchors. Anchors assumed to resist only shear; overturning resisted by deadweight. Evaluated using the peak of the 5% damped ground response spectrum (1.6g for 1.0g pga). Capacity controlled by deadweight.
19	31 thru 36 SW PUMP (M)	Service water pumps 31-36	0.69	Vertical pumps with 350 HP motor and 27 ft long shaft. The motor weighs 3450 lbs; the flooded pump weight is 9450 lbs. The pump and motor are anchored at elevation 15 ft with four 1.25 in. CIP bolts. The shaft is laterally restrained at the 6 and 12-ft elevations. Evaluation based on the peak of the 5% damped elevation 0 ft FRS (9.2g for 1g pga). Capacity controlled by lateral restraint at elevation -12 ft.
20	CAB JO1, 2	Containment monitoring cabinets	0.69	90 in. tall electrical cabinets anchored with concrete expansion anchors. Evaluated using the peak of the 5% damped control building 53 ft FRS (8.1g for 1g pga). Capacity controlled by

	ID	Description	Anchorage (median pga)	Comments
				the anchorage.
21	RACK 20	Instrument rack	0.69	84 in. tall instrument rack anchored with concrete expansion anchors. Evaluated using the peak of the 3% damped inner containment 68 ft FRS (9.3g for 1g pga). Capacity controlled by the anchorage.
22	31, 32, 33, 34 CRDF	CRD cooling fans	0.71	1100 lb fans each anchored with four 1 in. concrete expansion anchors. Evaluated using the peak of the 5% damped inner containment 94 ft FRS (13g for 1g pga). Capacity controlled by the anchorage.
23	31PWMUP 32PMWUP	Primary water makeup pumps	0.71	4000 lb horizontal pump anchored with four ½ in. CIP bolts. Evaluated using the peak of the 5% damped ground response spectrum (1.6g for 1g pga). Capacity controlled by the anchorage.
24	BATT CHGR 35	Battery charger 35	0.75	80 in. high battery charger anchored with six ¾ in. concrete expansion anchors. Evaluated using the peak of the 5% damped control building 33 ft FRS (4.8g for 1g pga). Capacity controlled by the anchorage.
25	0031 IAC 0032 IAC	Instrument air compressor 31, 32	0.82	5250 lb air compressor anchored with six 7/8 in. CIP bolts. Evaluated using the peak of the 5% damped ground response spectrum (1.6g for 1g pga). Capacity controlled by the anchorage.
26	CAB JR9	RVLIS cabinet	0.82	90 in. tall electrical cabinet anchored with eight ¾ in. concrete expansion anchors. Evaluated using the peak of the 5% damped control building 53 ft FRS (8.1g for 1g pga). Capacity controlled by the anchorage.
27	0031CLWP 0032CLWP	I/A compressor cooling water pumps	0.84	2000 lb horizontal pump anchored with four ½ in. CIP bolts. Evaluated using the peak of the 5% damped ground response spectrum (1.6g for 1g pga). Capacity controlled by the anchorage.
28	HC-1118A	Signal converter	0.84	Single instrument on pipe stand anchored with four ½ in. concrete expansion anchors. . Evaluated using the peak of the 3% damped ground response spectrum (2.1g for 1g pga). Capacity controlled by the anchorage.

	ID	Description	Anchorage (median pga)	Comments
29	0031CRFU - 0032CRFU	Containment recirculation fan units	0.86	Cooling coil section weighs 14.5 kips and is anchored with ¾ in. CIP bolts. The motor/fan unit weighs 16 kips and is mounted on vibration isolators anchored with concrete expansion anchors (isolators designed to take shear and uplift loads). The filter unit weighs 9.9 kips and is anchored with ¾ in. CIP bolts. The cooling coil unit and the filter unit were evaluated using the peak of the 5% damped inner containment FRS (6.9g for 1g pga). The motor/fan unit is on isolators, so it was evaluated using the peak below 10 Hz of the same FRS (2g for 1g pga). The capacity is controlled by the anchorage capacities of the cooling coil unit and the fan/motor unit, which are about equal; the anchorage capacity of the filter unit is about 2x higher.
30	MCC-36C	480-Vac MCC	0.86	90 in. high MCC anchored with concrete expansion anchors. Evaluated using the peak of the 5% damped ground response spectrum (1.6g for 1g pga). Capacity controlled by the anchorage.
31	RACK 4-A, B	Instrument racks	0.86	84 in. high instrument rack anchored with ½ in. concrete expansion anchors. Evaluated using the peak of the 3% damped inner containment 69 ft FRS (9.8g for 1g pga). Capacity controlled by the anchorage.
32	31 PABEF 32 PABEF	Primary auxiliary building exhaust fans	0.88	1560 lb fan, motor, and skid on 4 isolators; isolators are anchored with ½?in. concrete expansion anchors and can take shear and uplift loads. Evaluated using the peak below 8 Hz of the fan house 79 ft FRS (4g for 1g pga). Capacity controlled by the expansion anchors.
33	BATTERY 31, 32, 34	Battery bank 31	0.88	Two-step battery rack anchored using 3/8 in. concrete expansion anchors. Evaluated using the peak of the control building 32 ft FRS (4.8g for a 1g pga). Capacity controlled by the expansion anchors.
34	CST	Condensate storage tank	0.88	Flat bottom vertical tank, 40 ft tall, 57 ft diameter, anchored with twenty-four 2.25 in. cast-in-place bolts. Evaluated by scaling the A-46 evaluation; seismic input based on the 5% damped ground response spectrum at the calculated impulsive mode frequency of 7.0 Hz ±20%.
35	PNL PP9, PQ1, PQ2	EDG control panels 31, 32, 33	0.88	90 in. high electrical cabinet bolted to steel grating. Evaluated by scaling the A-46 evaluation using the peak of the 5% damped ground response spectrum (1.6g for 1g pga). Capacity controlled by the anchor bolts.
36	MCC-39	480-Vac MCC	0.90	90 in. tall MCC anchored to floor and wall with concrete expansion anchors. Evaluated using the peak of the control building 32 ft FRS (4.8g for a 1g pga). Capacity controlled by the expansion anchors.
37	RACK 19, 21	Instrument racks	0.90	84 in. high instrument rack anchored with ½ in, concrete expansion anchors. Evaluated using the peak of the 3% damped inner containment 69 ft FRS (9.8g for 1g pga). Capacity

	ID	Description	Anchorage (median pga)	Comments
				controlled by the anchorage.
38	MCC-32, 33, 34	480-Vac MCCS	0.92	90 in. tall MCC anchored to floor with concrete expansion anchors. Evaluated using the peak of the ground response spectrum (1.6g for 1g pga). Capacity controlled by the expansion anchors.
39	RACK 24A	Instrument rack	0.92	80 in. high instrument rack anchored with concrete expansion anchors. Evaluated using the peak of the 3% damped ground response spectra (2.1g for 1g pga). Capacity controlled by the anchorage.
40	BF4, 5, 6	D.G. current	0.99	Current transformer enclosure anchored with eight ½ in. CIP bolts. The bolts have an exposed length of 3.5 in. from the top of the concrete to the bottom of the enclosure. Evaluated using the peak of the 5% damped ground response spectrum (1.6g for 1g pga). Capacity controlled by bending in the anchor bolts.
41	INTSIATSAI	Spray additive tank 31	0.99	Horizontal tank on two saddles, 98 in. diameter, 181 in. long, 66.3 kips flooded weight. Each saddle is anchored with four 1 in. CIP bolts. Evaluated using the peak of the 5% damped ground response spectrum (1.6g for 1g pga). Capacity controlled by the anchor bolts.
42	RWST-31	Refueling water storage tank	1.03	Flat bottom vertical tank, 48 ft tall, 40 ft diameter, anchored with twenty-four 2 in. cast-in-place bolts. Evaluated using the procedures in EPRI NP-6041 Appendix H; seismic input based on the 5% damped ground response spectrum at the calculated impulsive mode frequency of 6.3 Hz ±20%.
43	B1G	480/120-Vac ELGAR Bus 33, manual by-pass switch	1.08	Electrical cabinet containing transformer and bypass switch, anchored with eight ¾ in. concrete expansion anchors. Evaluated using the peak of the control building 32 ft FRS (4.8g for a 1g pga). Capacity controlled by the expansion anchors.
44	GC9	25-kVA static inverter 33	1.08	Static inverter anchored with eight 5/8 in. concrete expansion anchors. Evaluated using the peak of the control building 32 ft FRS (4.8g for a 1g pga). Capacity controlled by the expansion anchors.
45	0031ETEF 0032ETEF 0033ETEF 0034ETEF	Electric tunnel exhaust fans Control building exhaust fans	1.16	1560 lb fan, motor, and skid on 4 isolators; isolators are anchored with 3/8 in. concrete expansion anchors and can take shear and uplift loads. Evaluated using the peak below 8 Hz of the control building 48 ft FRS (2g for 1g pga). Capacity controlled by the expansion anchors.

	ID	Description	Anchorage (median pga)	Comments
	CB EXHFAN 33, 34			
46	DG-31, 32, 33	Diesel generators	1.16	Emergency diesel generator, 72.5 kips weight, anchored with eight 1.25 in. CIP bolts. Evaluated using the peak of the 5% damped ground response spectrum (1.6g for 1g pga). Capacity controlled by the anchor bolts.
47	RACK 9	Instrument rack	1.18	84 in. high instrument rack anchored with ½ in. concrete expansion anchors. Evaluated using the peak of the 3% damped ground response spectra (2.1g for 1g pga). Capacity controlled by the anchorage.
48	BATTERY 33	Battery bank 33	1.20	Wall mounted battery rack anchored with ½ in. concrete expansion anchors. Evaluated using the peak of the control building 32 ft FRS (4.8g for a 1g pga). Capacity controlled by the expansion anchors.
49	CSAHSW1	Seal water heat exchanger 31	1.23	Horizontal heat exchanger on two saddles, 1.33 ft diameter, 13.6 ft long, 3.4 kip flooded weight. Each saddle is anchored with two ¾ in. CIP bolts. The A-46 evaluation showed a fundamental frequency of 54 Hz. This evaluation is based on the peak of the 4% damped PAB 73 ft FRS above 54 Hz (2.1g for 1g pga). The capacity is controlled by the anchorage.
50	PABSF	Primary auxiliary building supply fan	1.25	2850 lb fan, motor, and skid on 4 isolators; isolators are anchored with 3/8?in. concrete expansion anchors and can take shear and uplift loads. Evaluated using the peak below 8 Hz of the ground response spectrum (1.2g for 1g pga). Capacity controlled by the expansion anchors.
51	0031CHPS 0032CHPS 0033CHPS	Charging pump suction stabilizer separators	1.29	Vertically mounted 12 in. pipe, about 6 ft tall, anchored with four 3/4 in. concrete expansion anchors. Evaluation based on the peak of the 5% damped PAB 55 FRS (6.5g for a 1g pga). Capacity is controlled by the anchor bolts.
52	33CHGR (GE8) 34CHGR (GF3)	Battery charger 33, 34	1.29	Battery charger anchored with four ¾ in. concrete expansion anchors. Evaluated using the peak of the control building 32 ft FRS (4.8g for a 1g pga). Capacity controlled by the expansion anchors.
53	31 RECIRC PUMP 32 RECIRC PUMP	Recirculation pump 31, 32	1.42	Vertical pump and motor anchored to the containment base mat (elevation 46 ft) with four (4) 7/8 in. CIP bolts. The shaft extends 11 ft into the containment sump. The motor weighs 4.2 kips; the pump weighs 6.0 kips. Evaluated using the peak of the 5% damped ground response spectrum (1.6g for a 1g pga). Capacity controlled by the anchor bolts.

	ID	Description	Anchorage (median pga)	Comments
54	BORON INJECTION TANK	Boron injection tank	1.53	Pressure vessel on 4 legs, 48 in. diameter, 7.5 ft tall, 21 kip flooded weight. Each leg is anchored with two 1 in. CIP bolts. Evaluation based on the peak of the 5% damped ground response spectrum (1.6g for 1g pga). Capacity controlled by the anchor bolts.
55	RACK 26	Instrument rack	1.63	84 in. high instrument rack anchored with ½ in. concrete expansion anchors. Evaluated using the peak of the 3% damped ground response spectra (2.1g for 1g pga). Capacity controlled by the anchorage.
56	ABFP- 31, 32, 33	Auxiliary feedwater pumps	1.72	Horizontal pump and motor, 15 kips, anchored with eight ¾ in. CIP bolts. Evaluated using the peak of the 5% damped ground response spectrum (1.6g for a 1g pga). Capacity controlled by the anchor bolts.
57	0031EDSAT 0032EDSAT 0033EDSAT	DG start air tank 31, 32, 33	1.72	Air start tank, 116in. diameter, 98in. high, anchored with four 5/8 in. CIP bolts. Evaluated using the peak of the 4% damped ground response spectrum (1.8g for 1g pga). Capacity controlled by the anchor bolts.
58	ACAPCC1, 2, 3	CCW pumps	1.78	Horizontal pump and motor, 3 kips, anchored with six ¾ in. CIP bolts. Evaluated using the peak of the 5% damped ground response spectrum (1.6g for 1g pga). Capacity controlled by the anchor bolts.
59	CSAHEL1	31 excess letdown heat exchanger	1.91	Horizontal heat exchanger on two saddles, approximately 12 in. diameter, 144 in. long, 2.1 kip flooded weight. Each pedestal anchored with two ¾ in. CIP bolts. Evaluated using the peak of the 5% damped ground response spectrum (1.6g for 1g pga). Capacity controlled by the anchorage.
60	RACK 8	Instrument rack	1.94	84 in. high instrument rack anchored with ½ in. concrete expansion anchors. Evaluated using the peak of the 3% damped ground response spectra (2.1g for 1g pga). Capacity controlled by the anchorage.
61	ACU31, 32	Control room a/c units	2.04	Air handling unit, 25 in. wide x 84 in. deep x 78 in. high, 1675 lbs, mounted on four vibration isolators. Isolators are designed to carry shear and uplift loads. Each isolator is anchored with two ½ in. concrete expansion anchors. Evaluated using the peak of the 5% damped ground response spectrum (1.6g for 1g pga). Capacity controlled by the anchorage.
62	31 CS PUMP 32 CS PUMP	Containment spray pumps	2.15	Horizontal pump and motor, 6.7 kips, anchored with six 3/4 in. CIP bolts. Evaluated using the peak of the 5% damped ground response spectrum (1.6g for 1g pga). Capacity controlled by the anchorage.

	ID	Description	Anchorage (median pga)	Comments
63	CSAHRG1	Regenerative heat exchanger 31	2.15	Three small heat exchangers (12 in. diameter x 13 ft long) stacked on a rack which is welded to embedded steel plates in the crane wall. Assigned a capacity of 2.15g median (1g HCLPF) based on very large margin calculated in the A-46 evaluation.
64	CSAPBA1, 2	Boric acid transfer pumps	2.15	Small horizontal pump and motor, 621 lbs, anchored with four 5/8 in. CIP bolts. Evaluated using the peak of the 5% damped PAB 73 FRS (11.3g for a 1g pga); capacity limited by the anchorage.
65	0031CWHX 0032CWHX	IA compressor cooling water heat exchangers	2.80	A pair of small stacked heat exchangers, each weighing 836 lbs, supported on two saddles. Each saddle is anchored with two 7/8 in. CIP bolts. Evaluated using the peak of the 5% damped ground response spectrum (1.6g for 1g pga). Capacity controlled by the anchorage.
66	31 SI PUMP 32 SI PUMP 33 SI PUMP	Safety injection pumps	3.66	Horizontal pump and motor, 8.8 kips, anchored with 10 3/4 in. cast-in-place bolts. Evaluated using the peak of the 5% damped ground response spectrum (1.6g for 1g pga). Capacity controlled by the anchorage.
67	CSFLSI1, 2 CSFLSW1	Seal injection filters Seal water return filter 31	4.26	Steel vessel, 10.75 in. diameter, 5 ft tall, 1kip weight, anchored with four in. CIP bolts. Evaluated using the peak of the 5% damped ground response spectrum (1.6g for 1g pga). Capacity controlled by the anchorage.
68	IA-31-TK	IA receiver	4.73	Air receiver, 3.5 ft diameter, 7 ft tall, anchored with eight ¾ in. CIP bolts. Evaluated using the peak of the 5% damped ground response spectrum (1.6g for 1g pga). Capacity controlled by the anchorage.
69	IACCHT	IA compressor charging head tank	5.16	Vertical tank on 4 legs, 2.5 in. diameter, 5 ft tall, 1.65 kips, each leg anchored with one 7/8 in. CIP bolt. Frequency shown to be in the rigid range by calculation. Evaluated using the rigid range of the control building 33 ft FRS (1g for 1g pga). Capacity controlled by the anchor bolts.
70	EGA1, 2	25-kVA static inverters	6.24	Static inverter, 76 in. tall, 3.8 kips, anchored with 16 concrete expansion anchors. Evaluated using the peak of the control building 32 ft FRS (4.8g for a 1g pga). Capacity controlled by the expansion anchors.

Other Equipment

NSSS Primary Coolant System. Table 2-4 of EPRI NP-6041 [9] states that NSSS components (piping and vessels) can be screened without any evaluation except for BWR piping with intergranular stress corrosion cracking (IGSCC). As IP3 is a PWR, the IGSCC does not apply. Therefore, the NSSS primary coolant system was screened.

NSSS Supports. Table 2-4 of EPRI NP-6041 [9] states that the NSSS supports can be screened if they were designed for combined loadings of SSE and pipe break. Section 16.1.4 and Table 16.1-2 in the FSAR [7] state that the design criteria for NSSS supports included the faulted load condition, consisting of normal, SSE, and pipe break loads. Therefore the NSSS supports were screened.

Reactor Internals. Supplement 5 to Generic Letter 88-20 [8] removed the evaluation of reactor internals from the scope of the seismic IPEEE for both focused and full scope plants.

Control Rod Drive Housing and Mechanisms. Table 2-4 of EPRI NP-6041 [9] states that the control rod drive housing and mechanisms can be screened if they are laterally supported. IP3 is a Westinghouse PWR in which the control rods enter the vessel from above. During the containment walk down, the IPEEE Seismic Review Team observed that the top of the control rod drive housings are attached to a support structure which is secured to the cavity wall at four points. This provides the requisite lateral support. Accordingly, the control rod drive housing and mechanisms were screened.

Distribution Systems

Category I Piping. Table 2-4 of EPRI NP-6041 [9] states that Category I piping can be screened based on a walk down of safety related piping runs. This walk down sought to identify:

- Threaded or mechanically coupled (Victaulic type) connections
- Cast iron valve bodies
- Inflexible branch lines
- Long unsupported spans
- Insufficient "rattle space" and close proximity of valve operators to interferences
- "Unzipping" of threaded supports
- Shock isolators
- Insufficient flexibility of piping across structural joints (between buildings).

A walk down of the accessible piping runs in the primary auxiliary building and piping penetration area did not identify any of the items listed above. None of the valves in the observed piping were identified as cast iron, nor were any seismic interaction issues identified. In addition, all of the active valves on the IPEEE equipment list were specifically walked down for seismic interaction, and their documentation reviewed for cast iron construction—no concerns were identified. Accordingly, the Class I piping was screened.

While there are Victaulic connections on small diameter jacket water cooling lines on the diesel generators' skids, these connections were judged not to be seismically vulnerable by both the A-46 and IPEEE seismic review teams because the lines are well supported.

HVAC Ducting and Dampers. Table 2-4 and Appendix A of EPRI NP-6041 [9] state that HVAC ducting can be screened pending a walk down. The major concern is displacements that could be imposed on by air handling equipment mounted on vibration isolators.

The ductwork throughout the safety-related areas of the plant was walked down. No significant ducting was noted in the control building, diesel generator building, or intake structure. Ducting in the primary auxiliary building, fan house, and containment is supported on well-braced welded steel supports, typically 6 to 8 ft center-to-center. No credible potential for duct support failure was identified. There are a number of items of air handling equipment on vibration isolators (i.e., the control room air handling units, the control building, primary auxiliary building and electrical tunnel exhaust fans and the containment recirculation fans). This equipment was evaluated as discussed above for mechanical and electrical equipment; the lowest calculated median capacity is 0.86g pga.

Because no credible potential for duct support failure could be identified, and air-handling equipment on vibration isolators is specifically modeled, HVAC ducting was screened.

Cable Trays and Electrical Conduit. Table 2-4 and Appendix A of EPRI NP-6041 [9] state that rod-hung, braced and unbraced cantilevered, and unbraced trapeze strut supported raceways can be screened without evaluation. Raceway supports at IP3 are trapeze struts; they were evaluated as part of the A-46 program [27] and found to satisfy all requirements. Accordingly, raceways were screened.

3.1.5 Development and Evaluation of Event Sequences Initiated by Seismic Events

3.1.5.1 Development and Modeling of Seismic Failure Events

The development of a list of seismic failure events was based on the seismic event tree sequence analysis and insights learned from the A-46 and IPEEE plant walkdowns. The seismic event tree sequence analysis defined the structures, systems and components (SSCs) to be included in the seismic safe shutdown equipment list; the plant walkdown provided fragility (and HCLPFs) estimates for those SSCs.

The internal events IPE fault trees model random, common-cause and pre-accident human error failure events that contribute to core damage frequency. Seismic-induced failure events were added to the internal events IPE model by matching the effect of random events modeled in the internal events IPE with the seismic-induced events. The seismic-induced events represent equipment failures with a median seismic capacity of less than 0.75g pga and HCLPF value of less than 0.38g pga or seismic anchorage failures with a median seismic capacity of less than 1.1.3g pga. The mapping process entailed:

- Developing four distinct seismic-induced failure event types: equipment seismic failure; equipment anchorage failure; equipment block wall failure; and seismically correlated events. A standard coding scheme was established to describe these events and ensure that the different seismic failure events are properly accounted for when the IPEEE seismic failure events are added to the internal event IPE fault tree models. Each seismic-induced failure event description is composed of 4 parts and comprises 16 characters. The parts are: seismic-induced event (denoted by the letter 'Z'); component or system ID; seismic failure identifier, EQ (seismic failure), AN (seismic anchorage failure), BW (seismic-induced block wall failure) and SCF (seismic correlated failure); and mean seismic capacity value (i.e., 57G represents 0.57g pga). For example, an equipment seismic failure of auxiliary feedwater water (AFW) system pump 31 (ABFP 31) is represented as Z31-ABFP-EQ-57G.

- Defining new random events that correspond to the random events contained in the IPE model (i.e., same basic event, but having different names). For example, a new AFW pump AFW-MDP-FS-PM31 failure to start basic event was re-defined as AFW-MDP-FS-PM31Z, where the letter 'Z' in the last position, indicates that this is a new random basic event that will be used for seismic PRA sequence quantification.

- Matching each seismic-induced failure event with an internal event IPE random event. For example, a seismic-induced failure of AFW pump 31 was matched with AFW pump 31 ABFP failure to start (AFW-MDP-FS-PM31).

- Mapping seismic-induced events and the new random basic events to the original IPE random basic event. For example, the AFW pump 31 seismic event and the new AFW pump 31 fails to start event were mapped to the IPE AFW pump 31 fails to start event by the following fault tree logic model:

  AFW-MDP-FS-PM31 = Z31-ABFP-EQ-57G or Z31-ABFP-AN-1.21G or AFW-MDP-FS-PM31Z

Table 3A.1 in Appendix 3A lists all plant systems and components considered for the seismic margin assessment shutdown equipment list. Table 3A.2 in Appendix 3A lists components associated with the "rule-of-the-box" concept [5]. Table 3A.3 in Appendix 3A lists all seismic-induced system and component failures included in the IPEEE fault tree models. Table 3A.4 in Appendix 3A lists non-seismic events included in the IPEEE fault tree models.

<u>**Relay Screening**</u>. Relay screening was performed in a manner consistent with the NRC recommendations for relay chatter review presented in NUREG-1407 [2]. The recommended review for IP3, a full-scope A-46 plant, requires the evaluation of relays within the scope of USI A-46 [2] for the safe shutdown earthquake (SSE) and of other relays identified in the IPE but

outside the scope of USI A-46 [2]. These latter relays were examined to ascertain if they themselves could be impacted by chatter of other relays. A database was created including all relays and their associated control switches, trip units, transmitters, etc. Relay information (specifically, manufacturer and model number) were obtained to determine whether they were included in the list of low ruggedness ("bad actor") relays in Appendix E of EPRI-NP-7148 [29].

Bad actor relays modeled in the IPE were automatically included in the IPEEE. A relay functionality evaluation was performed for bad actor relays included in A-46 but not modeled in the IPE to determine whether the relays should be addressed in the IPEEE. The relay make and model numbers of relays not listed as low ruggedness relays in Appendix E of EPRI-NP-7148-SL [29] were compared with those listed in Appendix D of EPRI-NP-7147-SL [30] to ensure that the relays are covered by the generic equipment response spectrum (GERS). Any relays not covered by the GERS which impact components modeled in the IPE were included in the IPEEE.

Relays that are bad actor relays or not covered by the GERS were assumed to chatter during an earthquake. The potential functional impact of relay chatter on plant shutdown systems was determined by first identifying the components found, in the IPE [4], to be important for these functions. A review of the electrical elementary drawings of these components was then conducted to determine whether relays in the component circuitry were capable of causing the system to become inoperable or misalign. This review was accomplished by examining the effect of individual contact closure/opening on the plant shutdown components and the effects of the closure and opening of multiple contacts.

Table 3A.5 in Appendix 3A lists all relays selected for evaluation of seismic capability. Table 3A.6 in Appendix 3A lists relays found to have low seismic capacity.

Development and Modeling of Seismically Correlated Events. Correlations between component failures occur because of common seismic input. Because such correlations would negate the benefits of redundancies between safety systems and equipment, seismically correlated events were modeled. These events account for the seismic-induced failure of similar equipment based on equipment location, type of component and seismic fragility and are similar to the common-cause failures addressed in the IPE. The incorporation of these events is based on the belief that similar equipment on the same elevation and the same conditional failure probability (mean seismic capacity) will have the same seismic response during a seismic event, and therefore, have the same potential for seismic-induced failure. Table 3A.7 of Appendix 3A lists seismic correlated events included in the IPEEE model.

Development and Modeling of Seismic Human Failure Events. Human failure events *defined in the IP3 IPE were evaluated to ascertain their applicability to the IP3 seismic PRA* IPEEE model.

Human failure events that occur prior to an initiating event (e.g., human failure to restore a pump to service after maintenance) have the same probability as that used in the IPE. It is assumed that pre-initiator human failures occur independently of the initiating event. Pre-initiator human failure events are included in Table 3A.8 in Appendix 3A.

Human failures that occur after an initiating event were quantified as follows:

- For seismic hazard levels less than or equal to the seismic design basis earthquake (DBE), the human failure probability assumed was that used in the IPE. It was assumed that a seismic event less severe than the DBE will produce conditions similar to the events addressed in the IPE.
- For seismic hazard level exceeding the DBE (0.15g) but less than 0.5g, the human failure probability is assumed to be twice the IPE value, and ten times the IPE value at 0.5g. This assumption was based on 'engineering judgement' [31, 32].
- For seismic hazard levels exceeding 0.5g, the human failure probability is predicted to be 0.1 for in-control room human actions and 1.0 for action outside the control room. Again, this assumption is based on 'engineering judgement' [31].

The effect of adverse conditions during the seismic event is therefore addressed by increasing the post-initiator human failure probabilities as a function of seismic hazard level. Post-initiator human failure events are listed in Table 3A.9 in Appendix 3A.

3.1.5.2 Seismic-Induced Initiating Events

Seismic-induced initiating events are disruptions to normal plant operation induced by a seismic event that cause or require a rapid plant shutdown. During this event, there is an attendant need to remove heat from the reactor core to preclude accident sequences that might lead to core damage. For this study, seismic-induced initiators are divided into four classes: failures of major structures, transients, loss of coolant accidents (LOCAs) and special events.

Seismic-Induced Failure of Major Structures. The seismic event may result in a loss of structural integrity of the containment, control building, diesel generator building, fuel storage building, intake structure, primary auxiliary building (PAB), or turbine building or in a mechanical failure of the control rods to insert and achieve reactivity control.

Seismic-Induced Transients. The list of potential seismic-induced transient initiators is based on the transient initiators examined in the IP3 internal events IPE [4]. However, as noted in Section 3.1.5.1, the loss of offsite power and its unavailability for 72 hours after the seismic event is assumed to be most probable. Therefore, a seismic-induced loss of offsite power event is the only seismic-induced transient initiator considered in the seismic PRA. The restoration of power before 72 hours is expected to have no adverse effect. An evaluation focusing on containment isolation and the operation of fire protection system pumps was conducted to verify this.

Seismic-Induced Loss of Coolant Accidents. Seismic-induced initiating events in which a loss of reactor coolant system (RCS) integrity occurs are considered in this study. As with the loss of coolant (LOCA) initiators modeled in the internal events IPE [4], three break sizes are considered: small, medium and large.

Small Break LOCA. Seismic-induced small leaks may occur in the reactor coolant system from small diameter piping, instrument lines, reactor coolant pump seals and joints in threaded or flanged pipe lines being particularly susceptible.

These seismic-induced small LOCAs (labelled EQ_S2) are small breaks inside containment that slowly depressurizes the RCS. In a small LOCA, auxiliary feedwater (AFW) system operation is required because the break itself is insufficient to remove decay heat. Emergency core cooling is provided by high-head safety injection; should high-head safety injection fail, the RCS must be depressurized to enable low-head safety injection (RHR system) operation. Should the AFW system fail, "bleed and feed" cooling is required. Reactor coolant pump seal LOCAs and LOCAs within the core makeup capability of the charging system was analysed as small break LOCAs.

Large/Medium Break LOCA. Large/medium bore reactor coolant system piping is highly robust, and therefore unlikely to fail. The seismic capacity of the RCS major equipment such as, reactor vessel, steam generators, reactor coolant pumps, and pressurizer were reviewed and evaluated, and determined to have high seismic capacity (see Section 3.1.4). Based on these evaluations, and guidance in the EPRI seismic margin procedure [9], large/medium LOCAs were screened from further analysis. Main steam line breaks up to the main steam isolation valves (MSIVs) were similarly screened out, as was seismic-induced steam generator tube rupture (SGTR).

Seismic-Induced Special Events. Potential seismic-induced special events are: loss of support systems; seismic-induced flooding; seismic-induced fires, seismic-induced reactor vessel rupture and the interfacing system LOCAs (the "V sequence," or backflows of high pressure coolant from the reactor coolant system into low pressure injection system piping, causing breach of the piping or related components). Seismic-induced flooding and fires are addressed in Section 3.2; other seismic-induced special events are addressed as follows.

Loss of Support Systems. As with the seismic-induced transient events, the IP3 internal events IPE [4] was used to create a list of support systems for potential seismic-induced initiators. Those systems that do not rely on offsite power and are therefore potential seismic-induced initiators are as follows:

- Component cooling water (CCW)
- Service water system (SWS)
- Plant HVAC systems (control building, primary auxiliary building, and auxiliary feed pump building)
- 118-Vac instrumentation buses
- 125-Vdc power panels

- 480-Vac safeguard buses

Because these systems may fail at some seismic acceleration, they are considered in the seismic PRA. The seismic capacities of these systems are addressed in Section 3.1.4.3.

Seismic-Induced Reactor Vessel Rupture. A seismic-induced reactor vessel rupture was excluded as an initiating event because Generic Letter 88-20, Supplement 5 [8], waives the requirement for a seismic capacity evaluation on the reactor vessel internals for full scope plants.

Seismic-Induced Interfacing System LOCA ("V Sequence" or ISLOCA). V-sequences are initiated by the failure of isolation valves forming the pressure boundary between the reactor pressure vessel and low-pressure systems. In the worst case scenario, isolation valve failure results in a large-break LOCA outside containment. Such a failure can be occasioned by a seismic-induced loss of valve integrity or the opening of a valve because of seismic-induced relay chatter. To evaluate the latter, relays associated with the chemical and volume control, component cooling water, safety injection and residual heat removal systems were identified and their seismic capacity determined.

Chemical and Volume Control System. The chemical and volume control system (CVCS). The flow path for a CVCS normal letdown ISLOCA is shown in Figure 3.1.4.12 of the IPE [4].

The 3-in. diameter letdown line is normally open and penetrates the containment. Flow from RCS cold leg loop 31 discharges through letdown line 79 (3"-CH-2501R) to the regenerating heat exchanger and exits through line 27 (3"-CH-2501R). Line 27 splits into three lines, each of which contains an orifice that reduces the pressure of flowing reactor coolant from 2235 psig to 275 psig. In the absence of flow, the orifices will of course cause no pressure reduction. Flow then continues through air-operated valves CH-AOV-200A/B/C and out of the containment. The design pressure rating of the piping is 2580 psig upstream of the air-operated valves and 600 psig downstream.

An ISLOCA in the normal letdown line can be caused inside or outside containment by the spurious closure of containment isolation valves CH-201 or CH-202, or valve CH-PCV-135, downstream of the non-regenerative heat exchanger. The closure of one of these valves will increase pressure downstream of CH-AOV-200A/B/C and, if relief valve CH-203 fails to open, line 27 (2"-CH-601R) will fail on overpressure and reactor coolant will be discharged inside or outside containment until the pressurizer is isolated. If, however, relief valve CH-203 lifts, the pressure will be relieved and a pressure drop created across the orifices. Subsequently, as reactor coolant discharges to the primary relief tank (PRT), the pressurizer level drops until pressurizer isolation valves CH-LCV-459 and CH-LCV-460 close. An assessment of relays impacting valves CH-201, CH-202 and PCV-135 established that no relay chatter is expected.

The CVCS excess letdown line is used to maintain normal letdown when the normal letdown line is unavailable or during the final stages of plant heat-up. The CVCS excess letdown line is also used to increase the letdown rate when establishing a "bubble" in the pressurizer. Excess letdown line 97 (1"-CH-2501R) is normally closed. If used, letdown flows through two air-operated valves (CH-213A/B) to the excess letdown heat exchanger and exits through valve CH-HCV-123 to line 98 (1"-CH-151R). Valve HCV-123 serves as the high/low pressure boundary--the design pressure rating of the piping changes from 2580 psig to 600 psig across HCV-123. An ISLOCA in the excess letdown low pressure piping downstream of valve CH-HCV-123 is caused by the spurious opening of normally closed valves CH-AOV-213A/B and CH-HCV-123. An assessment of relays impacting valves CH-AOV-213A, CH-AOV-213B and CH-HCV-123 established that no relay chatter is expected.

<u>Component Cooling Water System.</u> The component cooling water system (CCWS) provides cooling water to various RCS components during normal operation and removes residual and decay heat from the RCS during plant shutdown.

CCW line 52A (14"-AC-152N, upstream of motor-operated valve AC-822B) is the cooling water return line from the reactor coolant pump thermal barrier heat exchangers, seal coolers, and the excess letdown heat exchanger. It would be exposed to 2250-psig pressures if the tube sides of any of these heat exchangers fail along with the subsequent failure of both AC-FCV-625 and AC-MOV-789 to isolate. The subsequent overpressurization of line 52A (and line 52) could cause an ISLOCA in the PAB. An assessment of relays impacting valves AC-FCV-625 and AC-MOV-789 established that no relay chatter is expected.

<u>Safety Injection System.</u> The safety injection system (SIS) can be exposed to RCS pressure upstream of motor operated valves SI-888A/B upon failure of:

- RCS cold leg loop 1 check valves SI-897A and SI-838A
- RCS cold leg loop 2 check valves SI-897B and SI-838B
- RCS cold leg loop 3 check valves SI-897C and SI-838C
- RCS cold leg loop 4 check valves SI-897D and SI-838D.

The failure of any of the above sets of check valves and inadvertent opening of CH-HCV-133 also pressurizes line 29 (2"-SI-601R). If motor-operated valve (MOV) SI-MOV-888A/B is open, low-pressure piping downstream of SI-MOV-888A/B and upstream of or at, the safety injection pumps may fail. Should an ISLOCA occur within the pump room, the SI pumps are likely to fail because of the harsh pump room environment. An ISLOCA can also occur upon rupture of line 29. An assessment of relays impacting valves SI-MOV-888A, SI-MOV-888B and CH-HCV-133 established that no relay chatter is expected.

<u>Residual Heat Removal System.</u> During normal operation the residual heat removal (RHR) system is aligned for safety injection. RHR line 9, bounded by normally-closed motor-operated valves SI-MOV-889A/B and SI-MOV-1802A/B, can thus be exposed to RCS pressure upon failure of:

- RCS cold leg loop 1 check valves SI-897A and SI-838A

- RCS cold leg loop 2 check valves SI-897B and SI-838B
- RCS cold leg loop 3 check valves SI-897C and SI-838C
- RCS cold leg loop 4 check valves SI-897D and SI-838D.

Overpressure of RHR line 9 piping will cause relief valves AC-733A/B to lift and discharge reactor coolant to the PRT. However, because the relief valves are unlikely to prevent failure of line 9, an ISLOCA results. This ISLOCA can occur inside containment or, if check valve AC-741 on line 9 (12"-AC-601R) also fails, in the RHR pump room. An ISLOCA inside the 15-ft elevation RHR pump room may cause all RHR pumps to fail because of the harsh pump room environment or pump room flooding. An assessment of relays impacting valves SI-MOV-889A, SI-MOV-889B, SI-MOV-1802A, and SI-MOV-1802B established that no relay chatter is expected.

Overpressure of line RHR line 10, the shutdown cooling line may result in an ISLOCA. During normal operation, the RHR shutdown cooling path is isolated: RHR shutdown cooling valves AC-731, AC-730 and AC-732 are closed and the motor control center breakers for motor-operated valves AC-730 and AC-731 (i.e., breaker 2FM on MCC-36A for AC-730 and 2FM on MCC-36B for AC-731) are opened. In addition, valves AC-731 and AC-730 are interlocked to prevent them from opening until RCS pressure is below 450 psig. The valves also close if RCS pressure exceeds 550 psig.

If the valves AC-731 and AC-730 become fully open, the subsequent overpressurization will fail line 10 outside containment at the 34-ft elevation inside the PAB and upstream of, or at, valve AC-732 or at the RHR pumps if the valve body of AC-732 survives. Should RHR line 10 fail, massive flooding in the PAB may result from the release of RCS and RWST inventories. However, an assessment of relays affecting valves, AC-730 and AC-731 established that no relay chatter is expected.

In summary, the spurious opening of a valve induced by relay chatter was evaluated and found not to be plausible. Based on this analysis, the likelihood of a seismic-induced interfacing LOCA at IP3 is considered an insignificant contribution to plant risk.

3.1.5.3 Seismic Event Trees

The seismic event tree (SET) analysis entailed the evaluation of event sequences initiated by seismic events. The successful or unsuccessful responses of functions or systems to the initiating events determine the status of the core and containment. Each unique set of responses to a seismic initiating event is called a seismic event sequence.

Accident Sequence Event Tree Assumptions and Limitations. The delineation of an event sequence ends with the determination of whether the core and containment are safe, vulnerable, or damaged. The core is defined to be safe (OK) if the sequence does not end in core damage, and no significant seismic changes have occurred at the plant. The core is vulnerable

(CV) if injection is initially successful but containment heat removal has failed--an inability to remove containment heat was assumed to lead to evaporation of water in the sumps and elimination of core recirculation cooling. The core is damaged (CD) when the allowable peak fuel-cladding temperature is exceeded. Following a seismic event, the containment is vulnerable (CtV) if the damaged core challenges the integrity of the otherwise intact containment. Loss of containment integrity results from either seismic-induced containment failure (CtF-S) or non-seismic induced failure (CtF).

In developing accident sequence event trees, it was also assumed that the seismic event occurs with the plant at an operating power level of 100 percent.

Seismic Event Tree Development. The seismic PRA was developed using seismic event tree models based on the IP3 IPE event trees [4]. The seismic event trees are used to delineate function and system successes and failures that could occur after a seismic event. The analysis tracked individual successes and failures until the final core state was determined. The analysis also determined the state of containment so as to facilitate the subsequent accident progression and consequence analysis. Therefore, the seismic event trees developed reflect system responses that can prevent or mitigate core damage and containment failure. Human responses were also reflected in the event trees should these responses apply to seismic accident sequences.

Seismic Event Trees. Seismic event trees were developed and analyzed for each of the seismic initiating events identified in Section 3.1.5.2. The seismic event trees, headings, and assumptions are described here. However, since the system success criteria used here (except for the surrogate element) do not differ from those used in IP3 IPE [4], they are not discussed here. A surrogate element comprises screened out, rugged components and structures. Failure of the surrogate will lead to core damage.

Seismic Event Tree Top Events. The seismic event tree is shown in Figure 3.1.5.1. The top events shown in the seismic event trees are defined as follows:

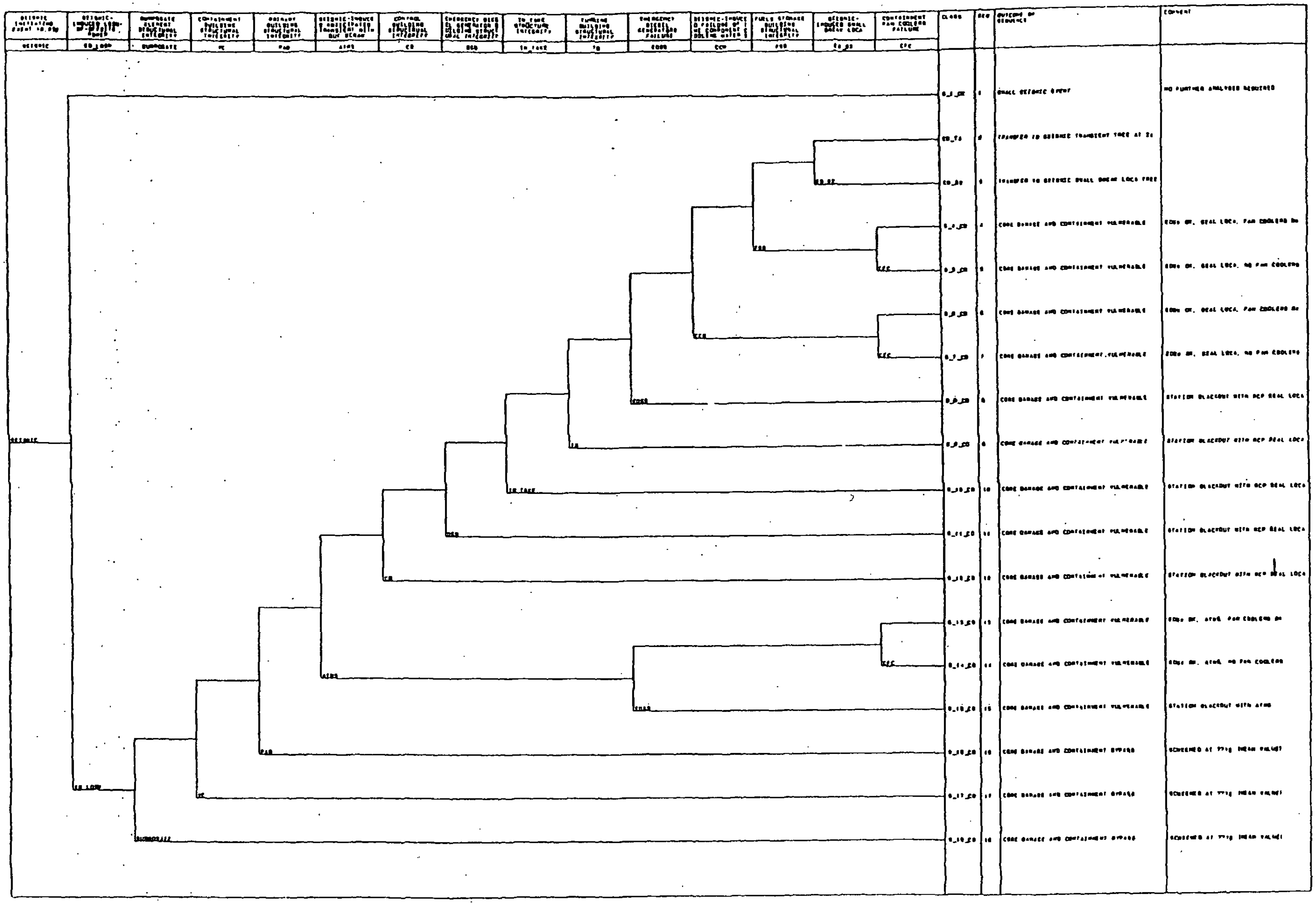
Seismic Initiating Event (SEISMIC). This event represents the occurrence of a seismic initiating event greater than 0.05g.

Seismic-Induced Loss-of-Offsite Power (EQ_LOSP). This event represents the unavailability of offsite power after the seismic event.

Surrogate Element Integrity (SURROGATE). This event represents the structural integrity of a surrogate element consisting of seismic failure of components/structures screened out at a median seismic capacity of 0.75g (HCLFP= 0.38g).

Containment Structural Integrity (VC). This event represents the structural integrity of the containment during the seismic event. This event was seismically screened at a median seismic capacity of 0.75g.

Figure 3.[illegible].1
IP3 Seismic Tree



Primary Auxiliary Building Structural Integrity (PAB). This event represents the structural integrity of the primary auxiliary building during the seismic event. Catastrophic failure of the primary auxiliary building was assumed to result in core damage. This event was seismically screened at a median seismic capacity of 0.75g.

Seismic-Induced Anticipated Transient Without Scram (ATWS). This event represents likelihood of a seismic-induced mechanical failure of the control rods to insert and the subsequent ATWS event.

Control Building Structural Integrity (CB). This event represents the structural integrity of the control building during the seismic event. Success implies no structural damage. Failure implies the catastrophic failure of the control building and consequential failure of all 480-Vac power safeguard buses. The ensuing plant station blackout will eventual lead to an RCP seal LOCA and result in core damage. This event was seismically screened at a median seismic capacity of 0.75g.

Diesel Generator Building Structural Integrity (DGB). This event represents the structural integrity of the diesel generator building during the seismic event. Success implies no structural damage. Failure implies the catastrophic failure of the diesel generator building and subsequent failure of all emergency diesel generators. The resulting plant station blackout leads to core damage. This event was seismically screened at a median seismic capacity of 0.75g.

Intake Structure Integrity (IN_TAKE). This event represents the structural integrity of the plant intake structure during the seismic event. Success implies no structural damage. Failure implies the catastrophic failure of the intake structure and loss of service water system cooling. With the loss of service water cooling, emergency diesel generators cooling is lost, leading to a plant station blackout and eventual core damage. This event was seismically screened at a median seismic capacity of 0.75g.

Turbine Building Structural Integrity (TB). This event represents the structural integrity of the turbine building during the seismic event. Success implies no structural damage. Failure implies the catastrophic failure of the turbine building and consequential failure of the control building. Because the plant 480-Vac safeguard buses are located inside the control building, a plant station blackout occurs, which eventually leads to core damage. This event was seismically screened at a median seismic capacity of 0.75g.

Emergency Diesel Generators Failure (EDGs). This event represents the unavailability of the plant emergency diesel generators after the seismic event. Success implies onsite ac power is available; failure leads to a plant station blackout event (SBO).

Seismic-Induced Failure of the Component Cooling Water System (CCW). The event represents the seismic-induced failure of the component cooling water system. Success implies adequate CCW cooling is provided to the RCP seal thermal barrier, and cooling to various safety-related pumps. Failure implies the loss of RCP seal cooling, charging pump cooling, safety injection pump cooling, residual heat removal pump cooling, and recirculation pump cooling. Core damage results due to an unmitigated RCP seal LOCA.

Fuels Storage Building Structural Integrity (FSB). This event represents the structural integrity of the fuels storage building during the seismic event. Success implies no structural damage. Failure implies the catastrophic failure of the fuels storage building and subsequent failure of the spent fuel pool heat exchanges and associated component cooling piping. This was assumed to fail the component cooling water system and result in core damage. This event was seismically screened at a median seismic capacity of 0.75g.

Seismic-Induced loss-of-coolant accident (EQ_S2). This event represents the seismic-induced breach of small-bore reactor coolant system piping.

Containment Fan Coolers (CFC). Success of the fan coolers in containment decay heat removal implies the operation of at least three fan coolers in their emergency mode and of two essential service water pumps. Failure requires alternative methods for containment decay heat removal. Furthermore, loss of service water precludes long-term decay heat removal by the containment fan coolers.

<u>Seismic Event Tree Core Damage Sequence Summary</u>. The following seismic event tree sequences result in core damage:

Sequence SEISMIC-4. This sequence comprises a seismic initiating event with a seismic-induced catastrophic failure of the fuels storage building and consequential lost of component cooling water. Although, the containment fan coolers are available for containment heat removal, the loss of component cooling fails all core cooling systems. Core damage and a vulnerable containment result.

Sequence SEISMIC-5. This sequence is the same as sequence SEISMIC-4, except that containment fan coolers fail (CFC). This sequence results in core damage and a vulnerable containment.

Sequence SEISMIC-6. This sequence comprises a seismic initiating event with seismic-induced failure of the component cooling water system. With loss of component cooling water and subsequently no charging pump flow to the RCP seals, seal degradation and RCP seal LOCA occur. Although the containment fan coolers are available, all core cooling systems eventually fail as a result of inadequate component cooling flow. Core damage and a vulnerable containment result, because of the unmitigated RCP seal LOCA.

Sequence SEISMIC-7. This sequence is the same as sequence SEISMIC-6, except that containment fan coolers fail (CFC). This sequence results in core damage and a vulnerable containment.

Sequence SEISMIC-8. This sequence comprises a seismic initiating event with a seismic-induced loss of all ac power--plant station blackout (SBO) occurs. Although, the auxiliary feedwater steam-turbine-driven pump may be available for secondary-side cooling, the loss of RCP seal cooling, leads to an unmitigated RCP seal LOCA. Core damage and a vulnerable containment result.

Sequence SEISMIC-9. This sequence comprises a seismic initiating event with a seismic-induced catastrophic failure of the turbine building and consequential failure of the control building. Because the plant 480-Vac safeguard buses are located inside the control building, a plant SBO occurs. As with sequence SEISMIC-8, core damage and a vulnerable containment result.

Sequence SEISMIC-10. This sequence comprises a seismic initiating event with a seismic-induced catastrophic failure of the intake structure and the consequential loss of service water system cooling. With the loss of service water cooling to the emergency diesel generators jacket coolers, a plant SBO occurs. As with sequence SEISMIC-8, core damage and a vulnerable containment result.

Sequence SEISMIC-11. This sequence comprises a seismic initiating event with a seismic-induced catastrophic failure of the diesel generator building. With the loss of three emergency diesel generators a plant SBO occurs. As with sequence SEISMIC-8, core damage and a vulnerable containment result.

Sequence SEISMIC-12. This sequence comprises a seismic initiating event with a seismic-induced catastrophic failure of the control building. The ensuing consequential failure of all 480-Vac power safeguard buses leads to a SBO and eventual RCP seal LOCA. Core damage and a vulnerable containment result.

Sequence SEISMIC-13. This sequence comprises a seismic initiating event and subsequent ATWS with emergency ac power available. However, because the seismic capacity of the boric acid storage tank is lower than the control rods, emergency boration is not available for ATWS mitigation. Although the containment fan coolers are available for containment heat removal, core damage and a vulnerable containment result.

Sequence SEISMIC-14. This sequence is the same as sequences SEISMIC-13, except that containment fan coolers fail (CFC). This sequence results in core damage and a vulnerable containment.

Sequence SEISMIC-15. This sequence comprises a seismic-induced loss of all ac power and a failure to successfully insert the control rods into the core. This sequence results in core damage and a vulnerable containment.

Sequence SEISMIC-16. This sequence comprises a seismic-induced catastrophic failure of the primary auxiliary building. Early core damage and a bypassed containment result.

Sequence SEISMIC-17. This sequence comprises a seismic-induced catastrophic failure of the containment building. Early core damage and a bypassed containment result.

Sequence SEISMIC-18. This sequence comprises a seismic initiating event with failure of the surrogate element. This sequence results in early core damage and bypassed containment failure.

Seismic Transient Event Tree. The seismic transient event tree addresses possible events that involve a loss of offsite power and successful activation of onsite emergency power to supply vital 480-Vac safeguard buses 2A, 3A, 5A, and 6A. This event tree is developed based on the transient initiators examined in the IP3 internal events IPE [4]. The seismic transient event tree assumes offsite power will likely be lost and unavailable for 72 hours after the seismic event. The following assumptions were made in developing the seismic transient event tree:

- Power conversion systems (balance of plant systems) are unavailable should offsite power be lost.
- Seismic sequence success is defined as maintaining cold shutdown conditions for 72 hours.
- Given AFW operation, and RHR shutdown cooling and RCS integrity, late core cooling and containment heat removal are not required.
- RCS pressure relief using the safety relief valves (SRVs) is not required provided a reactor scram occurs. However, RCS pressure may rise to the PORV setpoint, prompting PORV opening. Subsequently, the PORVs reclose (or are isolated) to maintain RCS integrity.
- Seismic transient sequences that involve a total loss of auxiliary feedwater require bleed-and-feed cooling.

Seismic Transient Event Tree Top Events. The seismic transient event tree is shown in Figure 3.1.5.2. The top events shown in the seismic transient event tree are defined as follows:

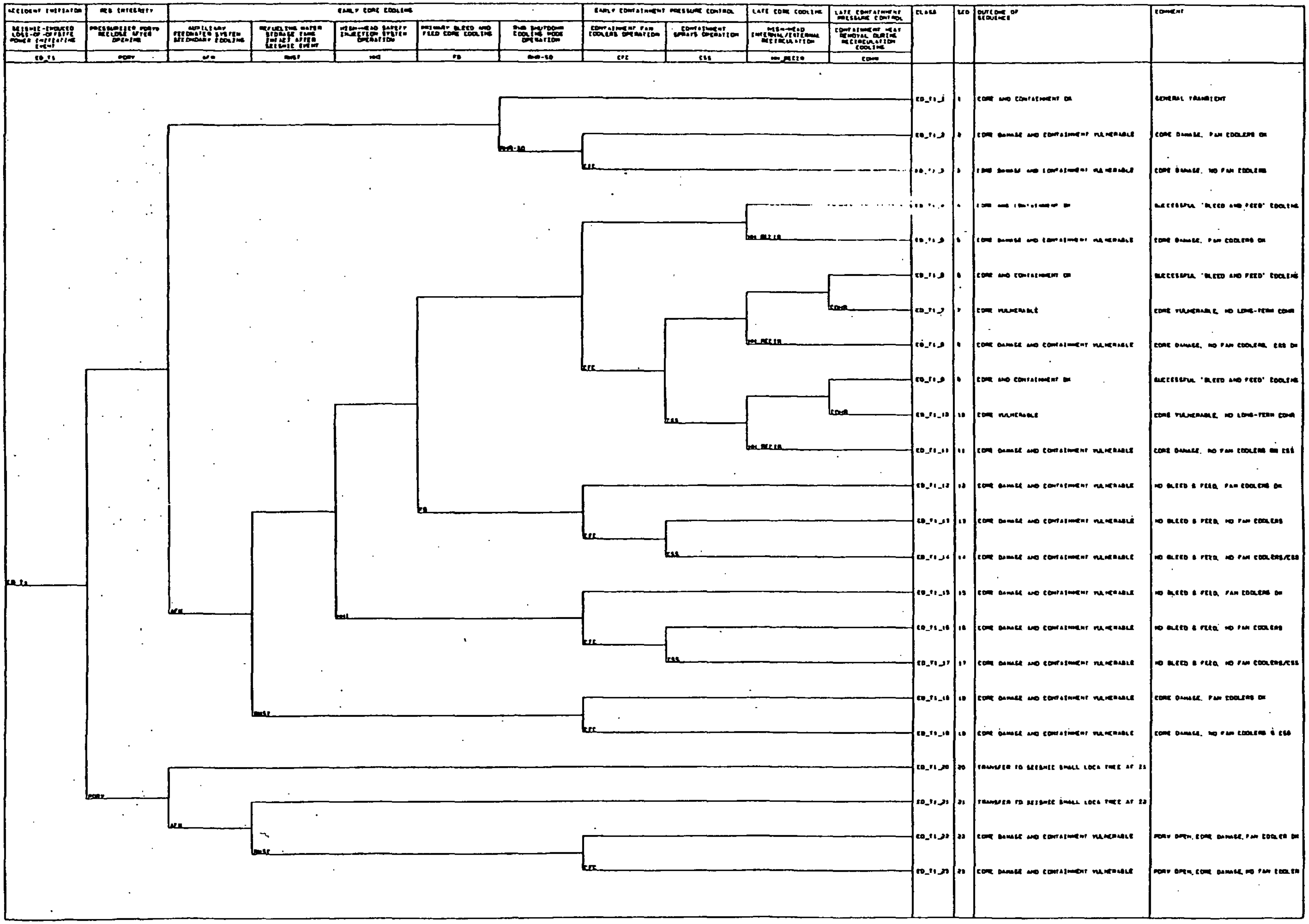
Seismic Initiating Event (EQ_T1). This event represents the occurrence of a seismic initiating event greater than 0.05g.

Pressurizer PORV Recloses After Opening (PORV). Success implies reclosure of open PORVs when RCS pressure drops below the closure setpoint. The failure of one or two PORVs to reclose is designated as a "PORV" event.

Auxiliary Feedwater System Secondary Cooling (AFW). Success of AFW in removing core decay heat implies the use of a motor- or steam-turbine-driven pump to provide feedwater to at least one steam generator. Failure implies the seismic-induced failure of the condensate storage tank or other seismic-induced/random faults and loss of secondary-side heat removal.

Refueling Water Storage Tank Availability (RWST). This event represents the structural integrity of the refueling water storage tank. Success implies the RWST is available to provide water for high and low-head safety injection systems and containment spray system to mitigate a seismic-induced bleed-and-feed cooling event. Failure implies the seismic-induced failure of the RWST and subsequent loss of safety injection and containment sprays.

IPE Seismic Transient Event Tree



High-Head Safety Injection (HHI). This event is considered for sequences entailing bleed-and-feed operation. Success implies that at least one high-head safety injection pump injects water into at least one 2-in. RCS cold leg. Failure requires that alternative core cooling be established.

Primary Cooling Bleed-and-Feed (FB). This event is considered for sequences that entail a loss of secondary cooling. Success implies the manual opening of both PORVs to reduce RCS pressure (bleed) and the injection of water via at least one high-head safety injection pump for core cooling (feed).

Residual Heat Removal Provided By Shutdown Cooling (RHR-SD). This event is considered for sequences in which auxiliary feedwater system is successful. The condensate storage tank water inventory will not last 72 hours; as a result, the auxiliary feedwater system cannot maintain the plant in a hot shutdown condition. Therefore, the residual heat removal shutdown-cooling mode is required to achieve cold shutdown.

Success implies that core cooling is provided by at least one RHR system pump aligned in its shutdown cooling mode, together with one RHR heat exchanger, one CCW system pump, and one non-essential service water pump. Failure implies (conservatively) the loss of core cooling and eventual core damage.

Containment Fan Coolers (CFC). Success of the fan coolers in containment decay heat removal implies the operation of at least three fan coolers, in their emergency mode, and two essential service water pumps. Failure requires alternative methods for containment decay heat removal.

Containment Spray System (CSS). Success implies adequate RWST inventory and use of at least one containment spray pump to provide early containment decay heat removal. Containment spray operation can continue after RWST depletion if a portion of the long-term recirculation core cooling flow is diverted to the containment spray headers using the recirculation or RHR pumps.

High-Head Internal/External Recirculation (HH_RECIR). This event is considered for sequences in which core cooling is provided by bleed-and-feed cooling. Success implies the manual initiation of long-term high-head recirculation cooling through the eight-switch sequence, and at least one recirculation or RHR pump supplies water to the high-head safety injection pump suction into one 2-in. RCS cold leg. Failure implies loss of recirculation cooling and core damage.

Containment Decay Heat Removal via Recirculation (CDHR). Containment decay heat removal via recirculation is considered in seismic transient sequences involving successful operation of long-term recirculation core cooling via recirculation or RHR pumps. Success implies the use of at least one CCW system pump, one RHR heat exchanger, and two non-essential service water pumps to remove containment decay heat.

__Seismic Transient Event Tree Core Damage Sequence Summary__. The following sequences result in core damage:

Sequence EQ_T1_2. This sequence comprises a seismic-induced loss-of-offsite power initiating event with successful auxiliary feedwater secondary-side cooling. On-site emergency power is established. However, because the CST water inventory will not last 72 hours (and the CST alternative supply from city water is seismically inadequate), plant cold shutdown cannot be achieved. Subsequently, the use of the residual heat removal shutdown cooling mode is required to achieve cold shutdown. However, seismic-induced failures or combinations of seismic-induced failures and random mechanical faults, fail RHR shutdown cooling (RHR-SD). Containment pressure control is provided by the containment fan coolers if required. This sequence results in core damage and a vulnerable containment.

Sequence EQ_T1_3. This sequence is the same as sequence EQ_T1_2, except that containment fan coolers fail (CFC). This sequence results in core damage and a vulnerable containment.

Sequence EQ_T1_5. This sequence comprises a seismic-induced loss-of-offsite power initiating event with the establishment of on-site emergency power, a subsequent loss of auxiliary feedwater secondary-side cooling (AFW), successful bleed-and-feed core cooling, and a failure of long-term recirculation core cooling (HH_RECIRC) as a result of seismic-induced failures or combinations of seismic-induced failures and random mechanical faults. Containment pressure control is provided by the containment fan coolers. This sequence results in core damage and a vulnerable containment.

Sequence EQ_T1_7. This sequence comprises a seismic-induced loss-of-offsite power initiating event with a subsequent loss of secondary-side cooling (AFW). Successful bleed-and-feed core cooling, and long-term recirculation core cooling occur. However, seismic-induced failures or combinations of seismic-induced failures and random mechanical faults fail both the containment fan coolers (CFC) and long-term containment decay heat removal during recirculation (CDHR) functions. Core damage and a vulnerable containment result.

Sequence EQ_T1_8. This sequence is the same as sequence EQ_T1_5, except that containment fan coolers fail (CFC). This sequence results in core damage and a vulnerable containment.

Sequence EQ_T1_10. This sequence is the same as sequence EQ_T1_7, except that in addition to the failure of the containment fan coolers (CFC) and long-term recirculation containment decay heat removal (CDHR), containment spray failure occurs (CSS). Core damage and a vulnerable containment result.

Sequence EQ_T1_11. This sequence comprises a seismic-induced loss-of-offsite power initiating event, loss of secondary-side cooling (AFW) and successful bleed-and-feed core cooling. Core damage and a vulnerable containment result because seismic-induced failures of both long-term recirculation core cooling (HH_RECIRC) and containment pressure control by the containment fan coolers (CFC) and containment sprays (CSS) occur.

Sequence EQ_T1_12. This sequence comprises a seismic-induced loss-of-offsite power initiating event, loss of secondary-side cooling (AFW) and failure to establish bleed-and-feed operation (FB). This prevents operation of the high-head safety injection system and precludes RCS depressurization and low-head safety injection. Containment pressure control is provided by the containment fan coolers. This sequence results in core damage and a vulnerable containment.

Sequence EQ_T1_13. This sequence is the same as sequence EQ_T1_12, except that containment fan coolers fail (CFC). This sequence results in core damage and a vulnerable containment.

Sequence EQ_T1_14. This sequence is the same as sequence EQ_T1_12, except that both containment fan coolers (CFC) and containment spray system (CSS) fails. This sequence results in core damage and a vulnerable containment.

Sequence EQ_T1_15. This sequence comprises a seismic-induced loss-of-offsite power initiating event, loss of secondary-side cooling (AFW) and failure of the high-head safety injection pumps (HHI) that precludes bleed-and-feed operation. Unable to depressurize the RCS for low-head injection, RCS boil-off occurs at the PORV setpoint. Containment pressure control is provided by the containment fan coolers. This sequence results in core damage and a vulnerable containment.

Sequence EQ_T1_16. This sequence is the same as sequence EQ_T1_15, except that containment fan coolers fail (CFC). This sequence results in core damage and a vulnerable containment.

Sequence EQ_T1_17. This sequence is the same as sequence EQ_T1_15, except that both containment fan coolers (CFC) and the containment spray system (CSS) fail. This sequence results in core damage and a vulnerable containment.

Sequence EQ_T1_18. This sequence comprises a seismic-induced loss-of-offsite power initiating event with a loss of secondary-side cooling (AFW) and subsequent seismic-induced failure of the refueling water storage tank (RWST). Unable to provide water for safety injection and containment spray, bleed-and-feed operation is precluded. Containment pressure control is provided by the containment fan coolers. This sequence results in core damage and a vulnerable containment.

Sequence EQ_T1_19. This sequence is the same as sequence EQ_T1_18, except that containment fan coolers fail (CFC). This sequence results in core damage and a vulnerable containment.

Sequence EQ_T1_22. This sequence comprises a seismic-induced loss-of-offsite power initiating event, with a stuck open pressurizer power operated relief valve (PORV) and subsequent loss of secondary-side cooling (AFW) and the refueling water storage tank (RWST) from seismic-induced failures or combinations of seismic-induced failures and random mechanical faults. Containment pressure control is provided by the containment fan coolers. This sequence results in core damage and a vulnerable containment.

Sequence EQ_T1_23. This sequence is the same as sequence EQ_T1_22, except that containment fan coolers fail (CFC). This sequence results in core damage and a vulnerable containment.

<u>Seismic Small LOCA Event Tree</u>. Small LOCA events exhibit less severe reactor depressurization and water inventory loss than large or medium LOCAs. As a result, the break size is insufficient to remove reactor decay heat and reactor coolant pump heat and the RCS pressure remains above the shut-off head for the high-head safety injection pumps. AFW operation is required to remove this heat and reduce RCS pressure to permit high-head safety injection pump operation. Failure of AFW would require bleed-and-feed cooling with both power-operated relief valves (PORVs) opened. For long-term cooling, there are several alternatives including RCS depressurization and low-head recirculation of cooling water and high-head recirculation of coolant. Long-term primary containment control is provided by containment fan coolers or the RHR heat exchangers.

In addition to the assumptions common to all seismic event trees, the following assumption was made in developing the seismic small LOCA event tree. In small LOCAs, shutdown cooling using the RHR system is impossible because the break was (conservatively) assumed to occur in # 32 hot-leg piping.

<u>Seismic Small LOCA Event Tree Top Events</u>. The seismic small LOCA event tree is shown in Figure 3.1.5.3. The top events shown in the seismic small LOCA event tree are defined as follows:

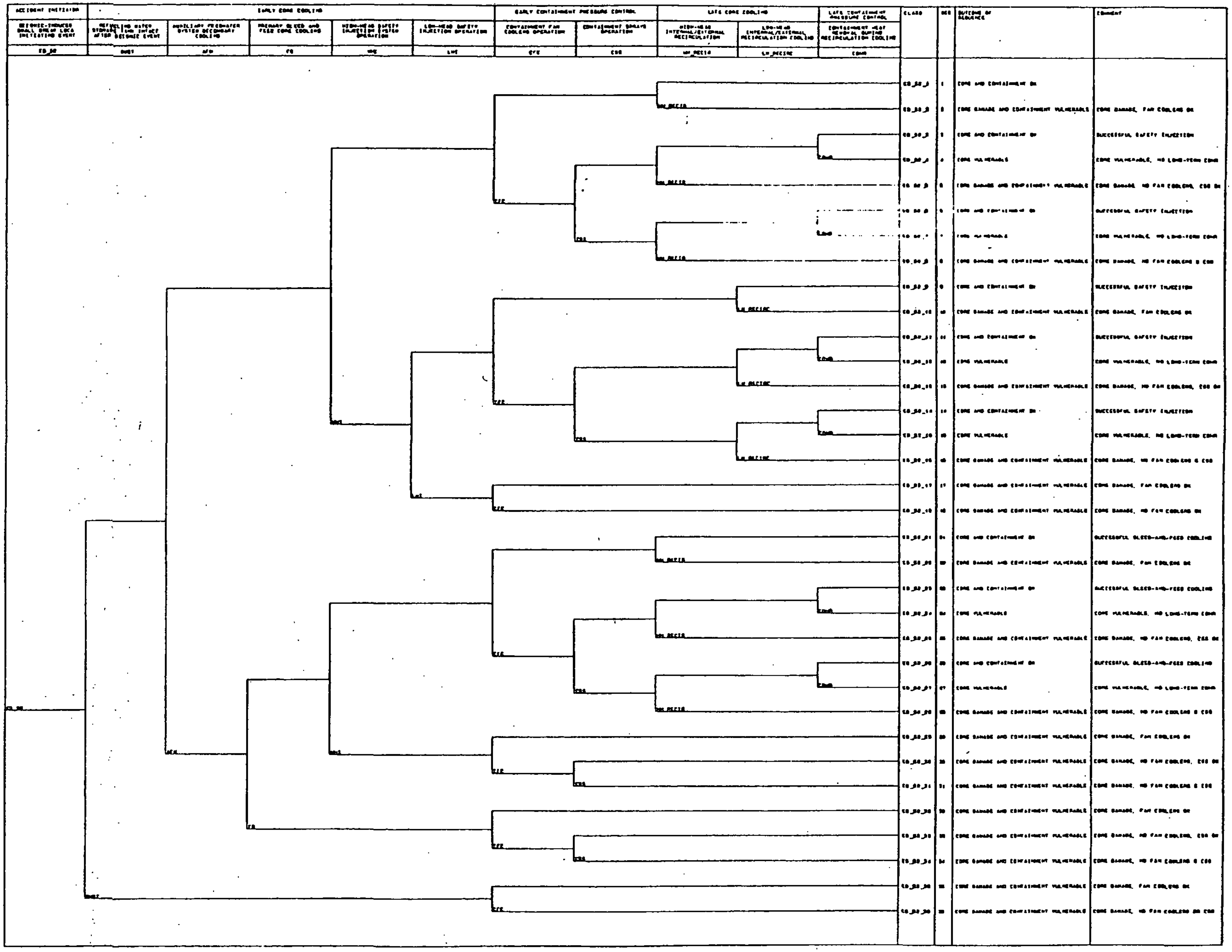
Seismic-Induced Small LOCA Initiating Event (EQ_S2). This event represents the occurrence of a seismic-induced small LOCA initiating event.

Auxiliary Feedwater System Secondary Cooling (AFW). Success of AFW in removing core decay heat implies the use of a motor- or steam-turbine-driven pump to provide feedwater to at least one steam generator. Failure implies the seismic-induced failure of the condensate storage tank or other seismic-induced/random faults and loss of secondary heat removal.

Refueling Water Storage Tank Availability (RWST). This event represents the structural integrity of the refueling water storage tank. Success implies the RWST is available to provide water for high and low-head safety injection systems and containment spray system to mitigate a seismic-induced small break LOCA, stuck-open PORV or bleed-and-feed cooling event. Failure implies the seismic-induced failure of the RWST and subsequent loss of safety injection and containment sprays.

Primary Cooling Bleed-and-Feed (FB). Primary bleed-and-feed core cooling is considered only for seismic-induced small break LOCA sequences involving failure of AFW secondary cooling. Success implies the manual opening of the PORVs to reduce RCS pressure (bleed) and the injection of water via high-head safety injection pumps for core cooling (feed).

IP3 Seismic Sm LOCA Event Tree



High-Head Safety Injection (HHI). This event is considered for sequences entailing either auxiliary feedwater success or bleed-and-feed operation. Success implies that at least one high-head safety injection pump injects water into at least one 2-in. RCS cold leg. Failure requires that alternative core cooling be established.

Low-Head Safety Injection (LHI). Success implies that sufficient reactor cooling is provided by at least one RHR pump, operating in the low-head safety injection mode, injecting water into at least one 10-in RCS cold leg. Failure requires that alternative core cooling be established.

Containment Fan Coolers (CFC). Success of the fan coolers in containment decay heat removal implies the operation of at least three fan coolers, in their emergency mode, and two essential service water pumps. Failure requires alternative methods for containment decay heat removal.

Containment Spray System (CSS). Success implies adequate RWST inventory and use of at least one containment spray pump to provide early containment decay heat removal. Containment spray operation can continue after RWST depletion if part of the long-term recirculation core cooling flow is diverted to the containment spray headers.

High-Head Internal/External Recirculation (HH_RECIR). This event is considered only for sequences that involve auxiliary feedwater secondary cooling or bleed-and-feed operation. Success implies the manual initiation of long-term high-head recirculation cooling through the eight-switch sequence, and at least one recirculation or RHR pump supplies water to the high-head safety injection pump suction into one 2-in. RCS cold leg. Failure implies loss of high-head recirculation and core damage.

Low-Head Internal/External Recirculation (LH_RECIR). This event is considered for successful auxiliary feedwater secondary cooling sequences in which high-head safety injection fails. Success implies RCS cooldown (by steam generator secondary-side depressurization) or a depressurization (through open PORVs), the manual initiation of long-term low-head recirculation cooling through the eight-switch sequence, and least one recirculation or RHR pump injects water into at least one 10-in. RCS cold leg to provide low-head long-term core cooling. Failure implies loss of low-head recirculation and core damage.

Containment Decay Heat Removal via Recirculation (CDHR). Containment decay heat removal via recirculation is considered in seismic-induced small break LOCA sequences involving successful operation of long-term recirculation core cooling via recirculation or RHR pumps. Success implies the use of at least one CCW system pump, one RHR heat exchanger, and two non-essential service water pumps to remove containment decay heat.

Seismic Small Break LOCA Event Tree Core Damage Sequence Summary. The following sequences result in core damage:

Sequence EQ_S2_2. This sequence comprises a seismic-induced loss-of-offsite power and small break LOCA initiating event. On-site emergency power is established. The auxiliary feedwater system removes core decay heat through the steam generators, allowing operation of the high-head safety injection system for core cooling. However, seismic-induced failures or combinations of seismic-induced and random mechanical failures result in a loss of long-term recirculation core cooling provided by the recirculation, RHR and safety injection systems (HH_RECIRC). Containment pressure control is provided by the containment fan coolers. This sequence results in core damage and a vulnerable containment.

Sequence EQ_S2_4. This sequence comprises a seismic-induced loss-of-offsite power and small break LOCA initiating event. On-site emergency power is established. Successful auxiliary feedwater system secondary-side cooling allows operation of the high-head safety injection pumps and long-term high-head recirculation cooling. However, seismic-induced failures or combinations of seismic-induced failures and random mechanical faults fail both the containment fan coolers (CFC) and long-term containment decay removal during recirculation cooling (CDHR) functions. Core damage and a vulnerable containment result.

Sequence EQ_S2_5. This sequence is the same as sequence EQ_S2_2, except that containment fan coolers fail (CFC). This sequence results in core damage and a vulnerable containment.

Sequence EQ_S2_7. This sequence is the same as sequence EQ_S2_4, except that in addition to the failure of the containment fan coolers (CFC) and long-term recirculation containment decay heat removal (CDHR), the containment spray fails (CSS). Core damage and a vulnerable containment result.

Sequence EQ_S2_8. This sequence comprises a seismic-induced loss-of-offsite power initiating event, small break LOCA, successful secondary-side cooling and high-head safety injection. Core damage and a vulnerable containment result because seismic-induced failures of both long-term recirculation core cooling (HH_RECIRC) and containment pressure control from the containment fan coolers (CFC) and containment sprays (CSS) occur.

Sequence EQ_S2_10. This sequence comprises a seismic-induced loss-of-offsite power and small break LOCA initiating event. On-site emergency power is established. Auxiliary feedwater and high-head safety injection are both initiated, but high-head safety injection fails (HHI). Subsequently, the reactor coolant system is depressurized using the steam generators or PORVs to allow low-head safety injection core cooling. However, seismic-induced failures or combinations of seismic-induced and random mechanical failures result in a loss of long-term low-head recirculation core cooling (LH_RECIRC). Containment pressure control is provided by the containment fan coolers. Core damage and a vulnerable containment result.

Sequence EQ_S2_12. This sequence is the same as sequence EQ_S2_10, except that although long-term low-head recirculation cooling is successful, seismic-induced failures or combinations of seismic-induced failures and random mechanical faults fail both the containment fan coolers (CFC) and long-term containment decay removal during recirculation cooling (CDHR) functions. Core damage and a vulnerable containment result.

Sequence EQ_S2_13. This sequence is the same as sequence EQ_S2_10, except that containment fan coolers fail (CFC). This sequence results in core damage and a vulnerable containment.

Sequence EQ_S2_15. This sequence is the same as sequence EQ_S2_12, except that besides the containment fan coolers (CFC), and long-term recirculation containment decay heat removal failure (CDHR), containment spray failure occurs (CSS). Core damage and a vulnerable containment result.

Sequence EQ_S2_16. This sequence comprises a seismic-induced loss-of-offsite power initiating event, small break LOCA, successful secondary-side cooling, high-head safety injection failure (HHI), and successful low-head safety injection. Core damage and a vulnerable containment result because seismic-induced failures of both long-term low-head recirculation core cooling (LH_RECIRC) and containment pressure control from the containment fan coolers (CFC) and containment sprays (CSS) occur.

Sequence EQ_S2_17. This sequence comprises a seismic-induced loss-of-offsite power and small break LOCA initiating event. On-site emergency power is established. Auxiliary feedwater secondary-side cooling is established. High and low-head safety injection are both initiated but fail (HHI, LHI) because of seismic-induced failures or combinations of seismic-induced and random mechanical failures. Containment pressure control is provided by the containment fan coolers. This sequence results in core damage and a vulnerable containment.

Sequence EQ_S2_18. This sequence is the same as sequence EQ_S2_17, except that containment fan coolers fail (CFC). This sequence results in core damage and a vulnerable containment.

Sequence EQ_S2_22. This sequence comprises a seismic-induced loss-of-offsite power initiating event, small break LOCA, loss of auxiliary feedwater secondary-side cooling (AFW), successful bleed-and-feed core cooling, and failure of long-term recirculation core cooling (HH_RECIRC) as a result of seismic-induced failures or combinations of seismic-induced failures and random mechanical faults occur. Containment pressure control is provided by the containment fan coolers. This sequence results in core damage and a vulnerable containment.

Sequence EQ_S2_24. This sequence comprises a seismic-induced loss-of-offsite power and small break initiating event with a subsequent loss of secondary-side cooling (AFW). Successful bleed-and-feed core cooling and long-term recirculation core cooling occur. However, seismic-induced failures or combinations of seismic-induced failures and random mechanical faults fail both the containment fan coolers (CFC) and long-term containment decay removal during recirculation (CDHR). Core damage and a vulnerable containment result.

Sequence EQ_S2_25. This sequence is the same as sequence EQ_S2_22, except that containment fan coolers fail (CFC). This sequence results in core damage and a vulnerable containment.

Sequence EQ_S2_27. This sequence is the same as sequence EQ_S2_24, except that in addition to the failure of the containment fan coolers (CFC), and long-term recirculation containment decay heat removal (CDHR), the containment spray fails (CSS). Core damage and a vulnerable containment result.

Sequence EQ_S2_28. This sequence comprises a seismic-induced loss-of-offsite power initiating event, small break LOCA, loss of secondary-side cooling (AFW) and successful bleed-and-feed core cooling. Core damage and a vulnerable containment result because seismic-induced failures of both long-term recirculation core cooling (HH_RECIRC) and containment pressure control from the containment fan coolers (CFC) and containment sprays (CSS) occur.

Sequence EQ_S2_29. This sequence comprises a seismic-induced loss-of-offsite power initiating event, small break LOCA, loss of secondary-side cooling (AFW) and failure of the high-head safety injection pumps (HHI) that precludes bleed-and-feed operation. Unable to depressurize the RCS for low-head injection, RCS boil-off occurs at the PORV setpoint. Containment pressure control is provided by the containment fan coolers. This sequence results in core damage and a vulnerable containment.

Sequence EQ_S2_30. This sequence is the same as sequence EQ_S2_29, except that containment fan coolers fail (CFC). This sequence results in core damage and a vulnerable containment.

Sequence EQ_S2_31. This sequence is the same as sequence EQ_S2_29, except that both containment fan coolers (CFC) and the containment spray system (CSS) fail. This sequence results in core damage and a vulnerable containment.

Sequence EQ_S2_32. This sequence comprises a seismic-induced loss-of-offsite power initiating event, small break LOCA, loss of secondary-side cooling (AFW) and failure to establish bleed-and-feed operation (FB). This occurrence prevents operation of the high-head safety injection system and precludes RCS depressurization and low-head safety injection. Containment pressure control is provided by the containment fan coolers. This sequence results in core damage and a vulnerable containment.

Sequence EQ_S2_33. This sequence is the same as sequence EQ_S2_32, except that containment fan coolers fail (CFC). This sequence results in core damage and a vulnerable containment.

Sequence EQ_S2_34. This sequence is the same as sequence EQ_S2_32, except that both containment fan coolers (CFC) and the containment spray system (CSS) fails. This sequence results in core damage and a vulnerable containment.

Sequence EQ_S2_35. This sequence comprises a seismic-induced loss-of-offsite power and small break LOCA initiating event and subsequent seismic-induced failure of the refueling water storage tank (RWST). Unable to provide water for safety injection core damage occurs. Containment pressure control is provided by the containment fan coolers. This sequence results in core damage and a vulnerable containment.

Sequence EQ_S2_36. This sequence is the same as sequence EQ_S2_35, except that containment fan coolers fail (CFC). This sequence results in core damage and a vulnerable containment.

3.1.5.4 Sequence Quantification

<u>Approach</u>. Seismic sequence quantification entails the integration of the seismic hazard curve, component fragilities, and the seismic system logic model to evaluate the frequency of system failure. The quantification was performed in three steps using seismic component fragilities listed in Table 3.1.5.1 and the Seismic Hazard Integration Package (SHIP) computer code [33] to determine the system, sequences and plant fragilities along with the seismic point estimate and mean core damage frequencies. The steps are:

- Quantifying the seismic system logic model fragility
- Quantifying seismic sequence fragility
- Combining the system and sequence fragility and seismic hazards.

<u>Quantification of the Seismic System Logic Model Fragility</u>. Seismic system fault tree models were developed by adding seismic-induced failure events to the internal event IPE models. The seismic-induced events added match the random events previously modeled in the IPE. The seismic fault tree model logic and data were then converted to SETS code input before quantification using the NURELMCS code [34]. The resulting minimal cut-sets are then used to generate the system fragility.

The system logic model is evaluated to determine the conditional probability of system failure for multiple levels of earthquake ground motion. For each system fault tree and level of earthquake ground motion, the system fragility was generated by combining seismic basic event and non-seismic random failures according to the system logic to calculate the conditional probability of failure. Repeating this over a full range of ground motion levels produces a system fragility curve that increases from 0.0 at low ground motion to 1.0 at high ground motions. System fragility curves are presented in Appendix 3A.

<u>Quantification of Seismic Sequence fragility</u>. After evaluating each seismic system fragility, the seismic event tree sequence fragility was determined by combining system successes and failures for each seismic event tree.

<u>Combination of the System and Sequence Fragility and Seismic Hazard</u>. The seismic hazard and sequence fragility curves were integrated to determine the frequency of failure.

Table 3.1.5.1

Seismic Component Fragilities

Component Description	Median Capacity (g)	B_R	B_U	B_C	$HCLFP_{84}$
Boric acid storage tanks	0.15	0.321	0.321	0.46	0.07
AMSAC UPS bus	0.22	0.213	0.213	0.30	0.10
Component cooling water surge tanks 31 and 32	0.41	0.321	0.321	0.46	0.19
Volume control tank 31	0.27	0.321	0.321	0.46	0.12
Switchyard	0.30	0.250	0.300	0.39	0.09
Charging pumps 31, 32 and 33	0.41	0.321	0.321	0.46	0.22
Non-regenerative heat exchanger 31	0.49	0.321	0.321	0.46	0.23
RHR heat exchangers 31 and 32	0.49	0.321	0.321	0.46	0.23
Battery chargers 31 and 32	0.51	0.321	0.321	0.46	0.24
Component cooling water heat exchangers 31 and 32	0.52	0.321	0.321	0.46	0.24
Supervisory panel	0.52	0.321	0.321	0.46	0.24
Motor control centers 36A, 36B and 37	0.62	0.321	0.321	0.46	0.24
RHR pumps 31 and 32	0.62	0.321	0.321	0.46	0.29
Static inverter 34	0.65	0.321	0.321	0.46	0.30
Primary water storage tank 31	0.6%	0.321	0.321	0.46	0.30
Central control room racks	0.67	0.321	0.321	0.46	0.31
Control room flight panel	0.67	0.321	0.321	0.46	0.31
Station transformers 2, 3, 5 and 6	0.67	0.321	0.321	0.46	0.31
Switchgear 31 and 32	0.67	0.321	0.321	0.46	0.31
Service water system pumps 31, 32, 33, 34, 35 and 36	0.69	0.321	0.321	0.46	0.31
Primary water makeup pumps 31 and 32	0.71	0.321	0.321	0.46	0.33
Unit One superheater stack	0.73	0.620	0.210	0.66	0.34
Surrogate element	0.75	0.213	0.213	0.30	0.50
Containment building	0.75	0.213	0.213	0.30	0.50
Primary auxiliary building	0.75	0.213	0.213	0.30	0.50
Control rod drives	0.75	0.213	0.213	0.30	0.50
Control building	0.75	0.213	0.213	0.30	0.50
Diesel generator building	0.75	0.213	0.213	0.30	0.50
Intake structure	0.75	0.213	0.213	0.30	0.50
Turbine building	0.75	0.213	0.213	0.30	0.50
Fuels storage building	0.75	0.213	0.213	0.30	0.50
ABFP SGs feed line low range flow transmitters	0.75	0.213	0.213	0.30	0.50
Wall exhaust fan for auxiliary feed pump building	0.75	0.213	0.213	0.30	0.50
1st stage turbine pressure transmitters	0.75	0.213	0.213	0.30	0.50
AFW pump discharge pressure transmitter	0.75	0.213	0.213	0.30	0.50
FCV-405A, B, C, D and 406 E, F, G, & H I/P transducers	0.75	0.213	0.213	0.30	0.50
Diesel generator building exhaust fan 314 air-operated damper	0.75	0.213	0.213	0.30	0.50
EDG day tanks 31, 32, and 33	0.75	0.213	0.213	0.30	0.50
EDG jacket Water tanks 31, 32 and 33	0.75	0.213	0.213	0.30	0.50
EDG fuel oil storage tanks 31, 32 and 33	0.75	0.213	0.213	0.30	0.50
EDG air receiver tanks	0.75	0.213	0.213	0.30	0.50
Instrument air component cooling water heat exchangers	0.75	0.213	0.213	0.30	0.50
Instrument air system air filters	0.75	0.213	0.213	0.30	0.50
Transformer alternate feed MCC 33 to bus 32 and MCC 36C	0.75	0.213	0.213	0.30	0.50

Table 3.1.5.1
Seismic Component Fragilities (continued)

Component Description	Median Capacity (g)	B_R	B_U	B_C	$HCLFP_{84}$
Motor-operated louver for the auxiliary feed pump building.	0.75	0.213	0.213	0.30	0.50
RWST level transmitter	0.75	0.213	0.213	0.30	0.50
Loop 31 & 34 hot leg pressure trans. (PT-402 & T-403)	0.75	0.213	0.213	0.30	0.50
Instrument air system compressors 31 and 32	0.82	0.321	0.321	0.46	0.38
I/P converter for AFWP 32 - CV-1118	0.84	0.321	0.321	0.46	0.39
Containment fan coolers 31, 32, 33, 34 and 35	0.86	0.321	0.321	0.46	0.40
PAB motor control center 36C	0.86	0.321	0.321	0.46	0.40
Battery banks 31, 32 and 34	0.88	0.321	0.321	0.46	0.41
Condensate storage tank 31	0.88	0.321	0.321	0.46	0.41
EDG 31, 32, and 33 control panels	0.88	0.321	0.321	0.46	0.41
Primary auxiliary building exhaust fans 31 and 32	0.88	0.321	0.321	0.46	0.41
Control building motor control center 39	0.90	0.321	0.321	0.46	0.42
VC instrument racks 19, 21, 4A/B	0.90	0.321	0.321	0.46	0.42
Turbine building motor control centers 32, 33 and 34	0.92	0.321	0.321	0.46	0.43
EDG current transformers 31, 32 and 33	0.99	0.321	0.321	0.46	0.46
Refueling water storage tank	1.03	0.321	0.321	0.46	0.58
Main feed from 33 inverter to MCC-39	1.08	0.321	0.321	0.46	0.50
Static inverter 33	1.08	0.321	0.321	0.46	0.50
Control building exhaust fan 33	1.16	0.321	0.321	0.46	0.54
EDG engines 31, 32 and 33	1.16	0.321	0.321	0.46	0.54
Battery bank 33	1.21	0.321	0.321	0.46	0.56
Seal water heat exchanger 31	1.23	0.321	0.321	0.46	0.57
Primary auxiliary building supply fan	1.26	0.321	0.321	0.46	0.58
Battery charger 33	1.29	0.321	0.321	0.46	0.60
Battery charger 34	1.29	0.321	0.321	0.46	0.60
Recirculation pumps 31 and 32	1.42	0.321	0.321	0.46	0.66
Boron injection tank	1.53	0.321	0.321	0.46	0.71

3.1.5.5 Seismic Core Damage Frequency Results

Three initiating events (seismic, loss-of-offsite power and small break LOCA) and 72 seismic sequences were identified and solved for the seismic PRA. The 72 seismic sequences were quantified using the LLNL hazard curves [5] and best estimate seismic fragilities and random failure frequencies.

The calculated point estimate core damage frequency is 4.9 x 10^{-5}/year; the mean core damage frequency is 4.4 x 10^{-5}/year. The plant-level fragility curve is given in Figure 3.1.5.4; the cumulative distribution for plant fragility is given in Figure 3.1.5.5. The plant fragility is presented in Table 3.1.5.2 in terms of the mean and the 0.05, 0.15, 0.50, 0.85, and 0.95 fractiles. The descriptive statistics for the internal mean core damage frequency is:

Sample Size	100
Mean	4.41 x 10^{-5}/yr
Lower 5 percent confidence limit	1.78 x 10^{-6}/yr
Median	1.96 x 10^{-5}/yr
Upper 5 percent confidence limit	1.64 x 10^{-4}/yr
Median capacity	0.34g
HCLPF	0.13g

Table 3.1.5.2
Plant Fragility Curve

PGA (g)	Mean	Conditional Probability of Failure Fractile				
		0.05	0.15	0.50	0.85	0.95
0.217	1.05 x 10^{-1}	2.13 x 10^{-4}	2.87 x 10^{-3}	5.00 x 10^{-2}	2.30 x 10^{-1}	4.15 x 10^{-1}
0.255	1.97 x 10^{-1}	2.16 x 10^{-3}	1.7[illegible] x 10^{-2}	1.51 x 10^{-1}	3.96 x 10^{-1}	5.55 x 10^{-1}
0.281	2.78 x 10^{-1}	7.41 x 10^{-3}	4.41 x 10^{-2}	2.48 x 10^{-1}	5.08 x 10^{-1}	6.60 x 10^{-1}
0.339	4.81 x 10^{-1}	5.18 x 10^{-2}	1.76 x 10^{-1}	5.00 x 10^{-1}	7.19 x 10^{-1}	8.62 x 10^{-1}
0.403	6.86 x 10^{-1}	1.80 x 10^{-1}	4.03 x 10^{-1}	7.52 x 10^{-1}	9.06 x 10^{-1}	9.67 x 10^{-1}
0.441	7.84 x 10^{-1}	2.91 x 10^{-1}	5.52 x 10^{-1}	8.50 x 10^{-1}	9.56 x 10^{-1}	9.87 x 10^{-1}
0.500	8.87 x 10^{-1}	4.83 x 10^{-1}	7.48 x 10^{-1}	9.50 x 10^{-1}	9.91 x 10^{-1}	9.98 x 10^{-1}

Of the 72 seismic-induced accident sequences, the ten dominant accident sequences leading to core damage contribute 99 percent of the total core damage frequency. All seismic sequences, ranked according to their contribution to core damage frequency, are listed in Table 3.1.5.3.

Figure 3.1.5.4
Total Plant Fragility

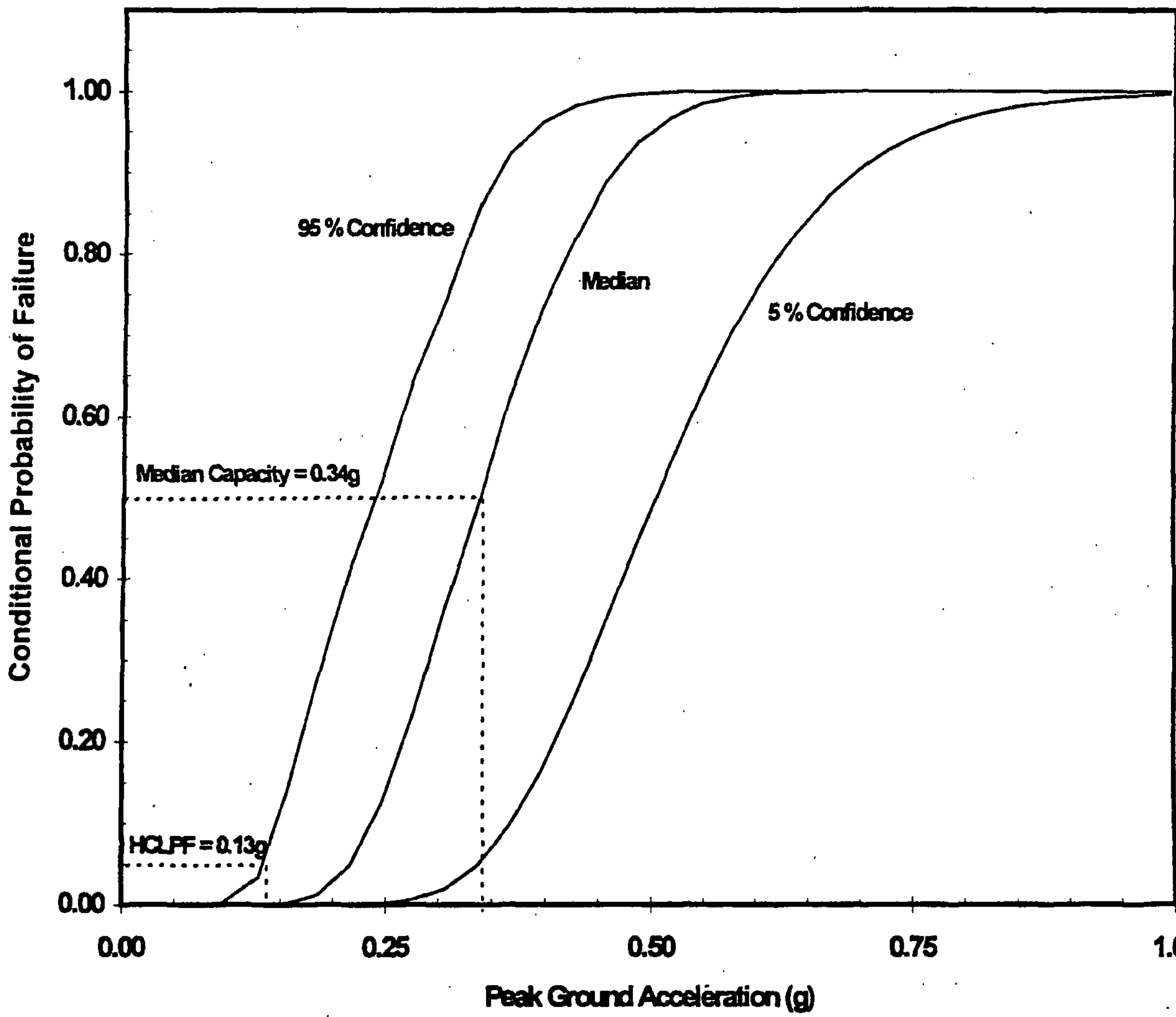
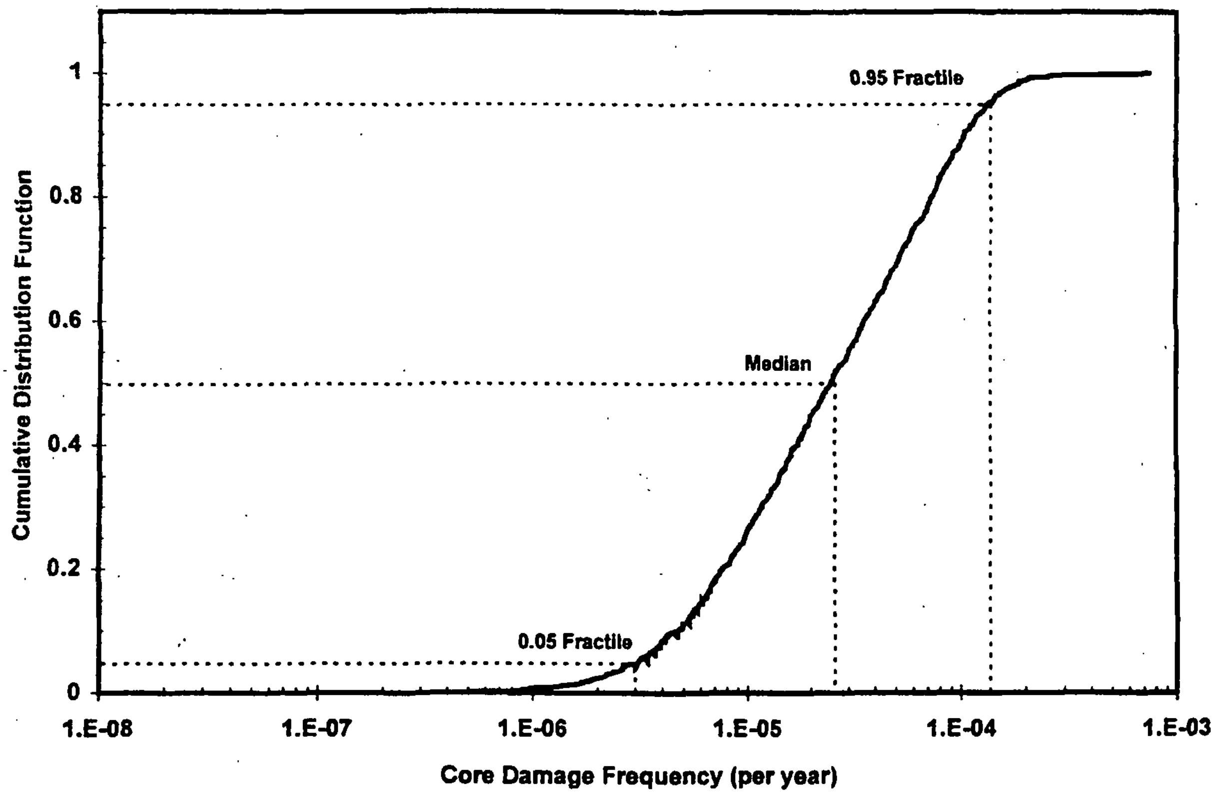


Figure 3.1.5.5
Cumulative Distribution Function On Core Damage Frequency



Six types of seismic-induced accidents dominate the seismic core damage frequency: station blackout (SBO), reactor coolant pump (RCP) seal loss-of-coolant accident, loss-of-offsite power (LOSP) transients, surrogate element, anticipated transient without scram (ATWS), and small break loss-of-coolant (LOCA) seismic accidents. Their mean contributions to the seismic core damage frequency are shown in Figure 3.1.5.6. The dominant accident sequences are discussed below, particular attention being paid to their most important cut sets and key failure events. The dominant internal core damage accident sequence cut sets are presented in Appendix 3B.

Other seismic-initiated accident sequences leading to loss of containment heat removal are described in Section 3.2, "USI A-45 and Other Seismic Issues."

Seismic Accident Sequence 1: S_8_CD (EQ_LOSP*EDG)

1.92 x 10^{-5}/year mean CDF, representing 43.5 percent of seismic CDF. This sequence comprises a seismic initiating event with a seismic-induced loss of all ac power--plant station blackout (SBO) occurs. Although, the auxiliary feedwater steam-turbine-driven pump may be available for secondary-side cooling, the loss of RCP seal cooling leads to an unmitigated RCP seal LOCA and core damage. The dominant core damage cut sets involve a seismic-induced loss-of-offsite power (LOSP) and the subsequent loss of on-site ac power from all three emergency diesel generators. Key contributors are seismic-induced failures of systems that support emergency diesel generator operations (switchgear 31 and 32 and service water system pumps 31-36). Other contributors are seismic-induced failures of emergency diesel generator components.

Seismic Accident Sequence 2: EQ_T1_2 (EQ_LOSP*/EDG*/CCW*/PORV*/AFW*RHR-SD*/CFC)

7.47 x 10^{-6}/year mean CDF, representing 16.9 percent of seismic CDF.

This sequence comprises a seismic-induced loss-of-offsite power-initiating event with successful auxiliary feedwater secondary-side cooling. On-site emergency power is established. However, because the CST water inventory will not last 72 hours (and the CST alternative supply from city water is seismically inadequate), a plant cold shutdown state cannot be achieve. Consequently, the residual heat removal shutdown-cooling mode must be used to achieve cold shutdown. However, seismic-induced failures or combinations of seismic-induced failures and random mechanical faults, fail RHR shutdown cooling (RHR-SD). Containment pressure control is provided by the containment fan coolers if required. This sequence results in core damage and a vulnerable containment.

The dominant core damage cut sets involve seismic-induced failures of offsite power and the residual heat removal (RHR) system. Key contributors are seismic-induced failures of RHR heat exchangers 31 and 32, the control room supervisory panel and RHR pumps 31 and 32. Other contributors are non-seismic failures of emergency diesel generator 32 or 33 components that affect the opening of RHR shutdown cooling suction valves AC-MOV-730 and AC-MOV-731.

Table 3.1.5.3

Seismic Sequence Frequency Distribution Percentile

Sequence Number	Sequence Designator	Core Damage Frequency				
		Mean	5^{th}	50^{th}	95^{th}	%
S_8_CD	EQ_LOSP*EDG	1.92×10^{-5}	1.44×10^{-6}	1.11×10^{-5}	6.05×10^{-5}	43.5
EQ_T1_2	EQ_LOSP*/EDG*/CCW*/PORV*/AFW*RHR-SD*/CFC	7.47×10^{-6}	2.04×10^{-8}	1.72×10^{-6}	3.08×10^{-5}	16.9
S_6_CD	EQ_LOSP*/EDG*CCW*/CFC	7.33×10^{-6}	1.47×10^{-7}	3.04×10^{-6}	3.19×10^{-5}	16.6
S_18_CD	EQ_LOSP*SURROGATE	3.41×10^{-6}	7.52×10^{-8}	1.39×10^{-6}	1.31×10^{-5}	7.7
S_7_CD	EQ_LOSP*/EDG*CCW*CFC	2.84×10^{-6}	8.22×10^{-8}	1.27×10^{-6}	1.08×10^{-5}	6.4
S_15_CD	EQ_LOSP*ATWS*EDG	1.96×10^{-6}	1.13×10^{-8}	6.18×10^{-7}	8.93×10^{-6}	4.4
EQ_T1_3	EQ_LOSP*/EDG*/CCW*/PORV*/AFW*RHR-SD*CFC	9.54×10^{-7}	4.29×10^{-9}	2.60×10^{-7}	3.57×10^{-6}	2.2
EQ_T1_12	EQ_LOSP*/EDG*/CCW*/PORV*AFW*/RWST*/HHI*FB*/CFC	2.65×10^{-7}	1.20×10^{-9}	7.15×10^{-8}	1.11×10^{-6}	0.6
S_14_CD	EQ_LOSP*ATWS*/EDG*CFC	1.16×10^{-7}	2.52×10^{-11}	1.20×10^{-8}	5.64×10^{-7}	0.26
S_13_CD	EQ_LOSP*ATWS*/EDG*/CFC	1.04×10^{-7}	6.21×10^{-12}	4.99×10^{-9}	4.56×10^{-7}	0.24
EQ_T1_5	EQ_LOSP*/EDG*/CCW*/PORV*AFW*/RWST*/HHI*/FB*/CFC*HH_RECIR	9.98×10^{-8}	4.02×10^{-10}	2.52×10^{-8}	4.43×10^{-7}	0.23
EQ_T1_15	EQ_LOSP*/EDG*/CCW*/PORV*AFW*/RWST*HHI*/CFC	9.70×10^{-8}	3.10×10^{-11}	7.29×10^{-9}	5.10×10^{-7}	0.22
EQ_T1_13	EQ_LOSP*/EDG*/CCW*/PORV*AFW*/RWST*/HHI*FB*CFC*/CSS	6.24×10^{-8}	1.78×10^{-10}	1.21×10^{-8}	3.07×10^{-7}	0.14
EQ_T1_17	EQ_LOSP*/EDG*/CCW*/PORV*AFW*/RWST*HHI*CFC*CSS	3.99×10^{-8}	5.98×10^{-13}	6.32×10^{-10}	2.53×10^{-7}	0.09
EQ_T1_16	EQ_LOSP*/EDG*/CCW*/PORV*AFW*/RWST*HHI*CFC*/CSS	3.97×10^{-8}	5.90×10^{-12}	1.89×10^{-9}	2.24×10^{-7}	0.09
EQ_T1_14	EQ_LOSP*/EDG*/CCW*/PORV*AFW*/RWST*/HHI*FB*CFC*CSS	3.20×10^{-8}	1.03×10^{-11}	1.82×10^{-9}	1.78×10^{-7}	0.07
EQ_S2_2	EQ_S2*/EDG*/CCW*/AFW*/RWST*/HHI*/CFC*HH_RECIR	3.08×10^{-8}	1.45×10^{-10}	8.87×10^{-9}	1.41×10^{-7}	0.07
EQ_T1_8	EQ_LOSP*/EDG*/CCW*/PORV*AFW*/RWST*/HHI*/FB*CFC*/CSS*HH_RECIR	2.16×10^{-8}	6.82×10^{-11}	4.73×10^{-9}	1.07×10^{-7}	0.05
EQ_T1_11	EQ_LOSP*/EDG*/CCW*/PORV*AFW*/RWST*/HHI*/FB*CFC*CSS*HH_RECIR	9.45×10^{-9}	3.69×10^{-12}	7.23×10^{-10}	5.33×10^{-8}	0.02
P1_Z1_2	TRANS_Z1*/EDG*/CCW*/AFW*/RWST*/HHI*/CFC*HH_RECIR	5.42×10^{-9}	5.78×10^{-12}	7.50×10^{-10}	2.11×10^{-8}	0.01
EQ_S2_5	EQ_S2*/EDG*/CCW*/AFW*/RWST*/HHI*CFC*/CSS*HH_RECIR	4.86×10^{-9}	3.11×10^{-11}	1.57×10^{-9}	2.06×10^{-8}	0.01
EQ_S2_32	EQ_S2*/EDG*/CCW*AFW*/RWST*FB*/CFC	4.59×10^{-9}	1.86×10^{-11}	1.18×10^{-9}	2.07×10^{-8}	0.01
EQ_T1_19	EQ_LOSP*/EDG*/CCW*/PORV*AFW*RWST*CFC	2.05×10^{-9}	1.23×10^{-16}	1.50×10^{-11}	3.26×10^{-9}	0.00

Table 3.1.5.3

Seismic Sequence Frequency Distribution Percentile (continued)

Sequence Number	Sequence Designator	Core Damage Frequency				
		Mean	5th	50th	95th	%
EQ_T1_19	EQ_LOSP*/EDG*/CCW*/PORV*AFW*RWST*CFC	2.05×10^{-9}	1.23×10^{-16}	1.50×10^{-11}	3.26×10^{-9}	0.00
EQ_S2_17	EQ_S2*/EDG*/CCW*/AFW*/RWST*HHI*LHI*/CFC	1.95×10^{-9}	2.19×10^{-12}	4.39×10^{-10}	7.95×10^{-9}	0.00
EQ_T1_18	EQ_LOSP*/EDG*/CCW*/PORV*AFW*RWST*/CFC	1.82×10^{-9}	1.54×10^{-16}	2.53×10^{-11}	5.65×10^{-9}	0.00
EQ_S2_33	EQ_S2*/EDG*/CCW*AFW*/RWST*FB*CFC*/CSS	1.66×10^{-9}	3.03×10^{-12}	3.08×10^{-10}	8.49×10^{-9}	0.00
EQ_S2_34	EQ_S2*/EDG*/CCW*AFW*/RWST*FB*CFC*CSS	1.58×10^{-9}	2.88×10^{-13}	8.77×10^{-11}	9.03×10^{-9}	0.00
EQ_S2_22	EQ_S2*/EDG*/CCW*AFW*/RWST*/FB*/HHI*/CFC*HH_RECIR	1.33×10^{-9}	5.21×10^{-12}	3.74×10^{-10}	5.79×10^{-9}	0.00
EQ_S2_18	EQ_S2*/EDG*/CCW*/AFW*/RWST*HHI*LHI*CFC	1.27×10^{-9}	4.83×10^{-13}	1.74×10^{-10}	6.58×10^{-9}	0.00
EQ_S2_8	EQ_S2*/EDG*/CCW*/AFW*/RWST*/HHI*CFC*CSS*HH_RECIR	1.19×10^{-9}	2.27×10^{-12}	2.60×10^{-10}	5.47×10^{-9}	0.00
EQ_S2_10	EQ_S2*/EDG*/CCW*/AFW*/RWST*HHI*/LHI*/CFC*LH_RECIR	9.47×10^{-10}	2.18×10^{-12}	2.35×10^{-10}	4.27×10^{-9}	0.00
EQ_S2_29	EQ_S2*/EDG*/CCW*AFW*/RWST*/FB*HHI*/CFC	5.27×10^{-10}	2.79×10^{-13}	7.97×10^{-11}	2.94×10^{-9}	0.00
P1_Z1_5	TRANS_Z1*/EDG*/CCW*/AFW*/RWST*/HHI*CFC*/CSS*HH_RECIR	5.10×10^{-10}	8.20×10^{-13}	7.89×10^{-11}	1.98×10^{-9}	0.00
EQ_S2_25	EQ_S2*/EDG*/CCW*AFW*/RWST*/FB*/HHI*CFC*/CSS*HH_RECIR	3.65×10^{-10}	9.32×10^{-13}	9.60×10^{-11}	1.65×10^{-9}	0.00
EQ_S2_13	EQ_S2*/EDG*/CCW*/AFW*/RWST*HHI*/LHI*CFC*/CSS*LH_RECIR	2.65×10^{-10}	4.15×10^{-13}	5.34×10^{-11}	1.39×10^{-9}	0.00
EQ_S2_30	EQ_S2*/EDG*/CCW*AFW*/RWST*/FB*HHI*CFC*/CSS	2.23×10^{-10}	6.24×10^{-14}	2.39×10^{-11}	1.17×10^{-9}	0.00
EQ_S2_31	EQ_S2*/EDG*/CCW*AFW*/RWST*/FB*HHI*CFC*CSS	2.22×10^{-10}	9.69×10^{-15}	9.81×10^{-12}	1.36×10^{-9}	0.00
EQ_S2_28	EQ_S2*/EDG*/CCW*AFW*/RWST*/FB*/HHI*CFC*CSS*HH_RECIR	1.98×10^{-10}	1.08×10^{-13}	2.47×10^{-11}	1.07×10^{-9}	0.00
EQ_S2_16	EQ_S2*/EDG*/CCW*/AFW*/RWST*HHI*/LHI*CFC*CSS*LH_RECIR	1.44×10^{-10}	3.09×10^{-14}	1.32×10^{-11}	8.66×10^{-10}	0.00
EQ_S2_36	EQ_S2*/EDG*/CCW*AFW*RWST*CFC	8.36×10^{-11}	1.08×10^{-17}	6.74×10^{-13}	1.55×10^{-10}	0.00
EQ_S2_35	EQ_S2*/EDG*/CCW*AFW*RWST*/CFC	5.64×10^{-11}	1.26×10^{-17}	9.38×10^{-13}	2.15×10^{-10}	0.00
P1_Z1_17	TRANS_Z1*/EDG*/CCW*/AFW*/RWST*HHI*LHI*/CFC	5.54×10^{-11}	1.69×10^{-14}	6.13×10^{-12}	2.73×10^{-10}	0.00
EQ_T1_7	EQ_LOSP*/EDG*/CCW*/PORV*AFW*/RWST*/HHI*/FB*CFC*/CSS*/HH_RECIR*CDHR	5.43×10^{-11}	5.60×10^{-14}	8.02×10^{-12}	2.60×10^{-10}	0.00
P1_Z1_10	TRANS_Z1*/EDG*/CCW*/AFW*/RWST*HHI*/LHI*/CFC*LH_RECIR	4.69×10^{-11}	2.62×10^{-14}	5.91×10^{-12}	2.39×10^{-10}	0.00
P1_Z2_32	TRANS_Z2*/EDG*/CCW*AFW*/RWST*FB*/CFC	3.79×10^{-11}	7.87×10^{-15}	2.22×10^{-12}	1.92×10^{-10}	0.00
P1_Z1_8	TRANS_Z1*/EDG*/CCW*/AFW*/RWST*/HHI*CFC*CSS*HH_RECIR	3.61×10^{-11}	2.88×10^{-14}	4.71×10^{-12}	1.81×10^{-10}	0.00
P1_Z1_18	TRANS_Z1*/EDG*/CCW*/AFW*/RWST*HHI*LHI*CFC	2.19×10^{-11}	1.89×10^{-15}	1.36×10^{-12}	1.12×10^{-10}	0.00

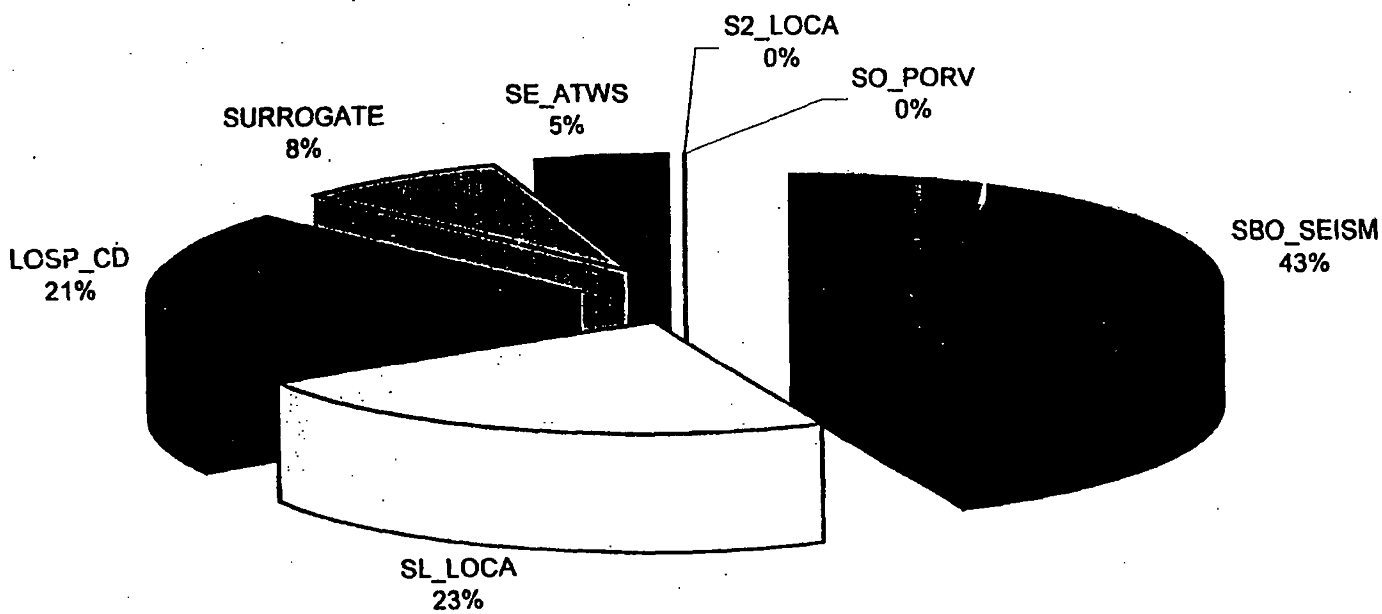
Table 3.1.5.3

Seismic Sequence Frequency Distribution Percentile (continued)

Sequence Number	Sequence Designator	Core Damage Frequency				
		Mean	5th	50th	95th	%
EQ_T1_10	EQ_LOSP*/EDG*/CCW*/PORV*AFW*/RWST*/HHI*/FB*CFC*CSS*/HH_RECIR*CDHR	2.00×10^{-11}	4.19×10^{-15}	1.05×10^{-12}	1.01×10^{-10}	0.00
P1_Z2_33	TRANS_Z2*/EDG*/CCW*AFW*/RWST*FB*CFC*/CSS	1.43×10^{-11}	1.25×10^{-15}	4.40×10^{-13}	7.91×10^{-11}	0.00
P1_Z2_34	TRANS_Z2*/EDG*/CCW*AFW*/RWST*FB*CFC*CSS	1.17×10^{-11}	6.76×10^{-17}	8.58×10^{-14}	6.83×10^{-11}	0.00
EQ_S2_4	EQ_S2*/EDG*/CCW*/AFW*/RWST*/HHI*/CFC*/HH_RECIR*CDHR	1.14×10^{-11}	3.66×10^{-14}	2.69×10^{-12}	4.93×10^{-11}	0.00
P1_Z1_13	TRANS_Z1*/EDG*/CCW*/AFW*/RWST*HHI*/LHI*CFC*/CSS*LH_RECIR	9.80×10^{-12}	3.53×10^{-15}	8.74×10^{-13}	5.32×10^{-11}	0.00
P1_Z2_22	TRANS_Z2*/EDG*/CCW*AFW*/RWST*/FB*/HHI*/CFC*HH_RECIR	9.06×10^{-12}	2.33×10^{-15}	7.68×10^{-13}	4.98×10^{-11}	0.00
P1_Z2_29	TRANS_Z2*/EDG*/CCW*AFW*/RWST*/FB*HHI*/CFC	5.19×10^{-12}	6.16×10^{-17}	1.05×10^{-13}	2.81×10^{-11}	0.00
P1_Z1_16	TRANS_Z1*/EDG*/CCW*/AFW*/RWST*HHI*/LHI*CFC*CSS*LH_RECIR*CDHR	2.95×10^{-12}	1.28×10^{-16}	9.46×10^{-14}	1.68×10^{-11}	0.00
P1_Z2_25	TRANS_Z2*/EDG*/CCW*AFW*/RWST*/FB*/HHI*CFC*/CSS*HH_RECIR	2.84×10^{-12}	3.46×10^{-16}	1.47×10^{-13}	1.59×10^{-11}	0.00
EQ_S2_7	EQ_S2*/EDG*/CCW*/AFW*/RWST*/HH CFC*CSS*/HH_RECIR*CDHR	2.28×10^{-12}	2.65×10^{-15}	3.81×10^{-13}	1.03×10^{-11}	0.00
P1_Z2_30	TRANS_Z2*/EDG*/CCW*AFW*/RWST*/FB*HHI*CFC*/CSS	2.16×10^{-12}	8.86×10^{-18}	2.68×10^{-14}	1.20×10^{-11}	0.00
P1_Z2_31	TRANS_Z2*/EDG*/CCW*AFW*/RWST*/FB*HHI*CFC*CSS	1.84×10^{-12}	9.90×10^{-19}	6.88×10^{-15}	1.08×10^{-11}	0.00
P1_Z1_4	TRANS_Z1*/EDG*/CCW*/AFW*/RWST*/HHI*CFC*/CSS*/HH_RECIR*CDHR	1.72×10^{-12}	1.45×10^{-15}	1.69×10^{-13}	7.56×10^{-12}	0.00
P1_Z2_28	TRANS_Z2*/EDG*/CCW*AFW*/RWST*/FB*/HHI*CFC*CSS*HH_RECIR	1.63×10^{-12}	1.88×10^{-17}	2.67×10^{-14}	9.00×10^{-12}	0.00
EQ_T1_23	EQ_LOSP*/EDG*/CCW*PORV*AFW*RWST*CFC	1.61×10^{-12}	8.40×10^{-20}	1.73×10^{-14}	3.78×10^{-12}	0.00
EQ_T1_22	EQ_LOSP*/EDG*/CCW*PORV*AFW*RWST*/CFC	1.30×10^{-12}	9.98×10^{-20}	2.86×10^{-14}	5.15×10^{-12}	0.00
EQ_S2_12	EQ_S2*/EDG*/CCW*/AFW*/RWST*HHI*/LHI*CFC*/CSS*/LH_RECIR*CDHR	9.58×10^{-13}	8.11×10^{-16}	1.45×10^{-13}	4.90×10^{-12}	0.00
EQ_S2_24	EQ_S2*/EDG*/CCW*AFW*/RWST*/FB*/HHI*CFC*/CSS*/HH_RECIR*CDHR	7.20×10^{-13}	1.13×10^{-15}	1.18×10^{-13}	3.32×10^{-12}	0.00
EQ_S2_15	EQ_S2*/EDG*/CCW*/AFW*/RWST*HHI*/LHI*CFC*CSS*/LH_RECIR*CDHR	4.28×10^{-13}	4.93×10^{-17}	2.73×10^{-13}	2.41×10^{-12}	0.00
EQ_S2_27	EQ_S2*/EDG*/CCW*AFW*/RWST*/FB*/HHI*CFC*CSS*/HH_RECIR*CDHR	3.23×10^{-13}	1.12×10^{-16}	2.67×10^{-13}	1.61×10^{-12}	0.00
P1_Z1_7	TRANS_Z1*/EDG*/CCW*/AFW*/RWST*/HHI*CFC*CSS*/HH_RECIR*CDHR	9.20×10^{-14}	3.22×10^{-17}	9.52×10^{-15}	4.88×10^{-13}	0.00
P1_Z1_12	TRANS_Z1*/EDG*/CCW*/AFW*/RWST*HHI*/LHI*CFC*/CSS*\LH_RECIR*CDHR	4.53×10^{-14}	1.16×10^{-17}	2.75×10^{-15}	2.30×10^{-13}	0.00
P1_Z1_15	TRANS_Z1*/EDG*/CCW*/AFW*/RWST*HHI*/LHI*CFC*CSS*\LH_RECIR*CDHR	1.08×10^{-14}	3.34×10^{-19}	2.52×10^{-16}	6.14×10^{-14}	0.00
P1_Z2_24	TRANS_Z2*/EDG*/CCW*AFW*/RWST*/FB*/HHI*CFC*/CSS*/HH_RECIR*CDHR	6.84×10^{-15}	5.31×10^{-19}	2.15×10^{-16}	3.71×10^{-14}	0.00
P1_Z2_27	TRANS_Z2*/EDG*/CCW*AFW*/RWST*/FB*/HHI*CFC*CSS*/HH_RECIR*CDHR	3.20×10^{-15}	3.30×10^{-20}	3.27×10^{-17}	1.73×10^{-14}	0.00

Figure 3.1.5.6

Contributions to Seismic Core Damage Frequency



Seismic Accident Sequence 3: S_6_CD (EQ_LOSP*/EDG*CCW*/CFC)

7.33 x 10^{-6}/year mean CDF, representing 16.6 percent of seismic CDF.

This sequence comprises a seismic initiating event with seismic-induced failure of the component cooling water system. With loss of component cooling water and no subsequent charging pump flow to the RCP seals, seal degradation and RCP seal LOCA occur. Although the containment fan coolers are available, all core cooling systems eventually fail as a result of inadequate component cooling flow. Core damage and a vulnerable containment result, because of the unmitigated RCP seal LOCA.

The dominant core damage cut sets involve seismic-induced failures of offsite power and loss of the component cooling water (CCW) system. Key contributors are seismic-induced failures of the CCW surge tank 31 or CCW heat exchangers 31 and 32.

Seismic Accident Sequence 4: S_18_CD (EQ_LOSP*SURROGATE)

3.41 x 10^{-6}/year mean CDF, representing 7.7 percent of seismic CDF.

This sequence comprises a seismic initiating event with failure of the surrogate element. A surrogate element represents screened out, rugged components and structures. By definition, failure of the surrogate will lead to core damage and a bypassed containment.

Seismic Accident Sequence 5: S_7_CD (EQ_LOSP*/EDG*CCW*CFC)

2.84 x 10^{-6}/year mean CDF, representing 6.4 percent of seismic CDF.

This sequence is the same as seismic accident sequence 3, except that containment fan coolers fail (CFC). The sequence results in core damage and a vulnerable containment.

The dominant core damage cut sets involve seismic-induced failures of offsite power, component cooling water, and the containment fan coolers. Key contributors are seismic-induced failures of the CCW system surge tank 31, CCW system heat exchangers 31 and 32, and the control room supervisory panel or containment fan coolers 31, 32, 33, 34 and 35.

Seismic Accident Sequence 6: S_15_CD (EQ_LOSP*ATWS*EDG)

1.96 x 10^{-6}/year mean CDF, representing 4.4 percent of seismic CDF.

This sequence comprises a seismic-induced loss of all ac power and a failure to successfully insert the control rods into the core. This sequence results in core damage and a vulnerable containment.

The dominant core damage cut sets involve control rods seismic-induced failures and loss all ac power. As with seismic accident sequence 1, the key contributors are seismic-induced failures of switchgear 31 and 32 or the service water system pumps.

Seismic Accident Sequence 7: EQ_T1_3 (EQ_LOSP*/EDG*/CCW*/PORV*/AFW* RHR-SD*CFC)

9.54×10^{-7}/year mean CDF, representing 2.2 percent of seismic CDF.

This sequence is the same as seismic accident sequence 2, except that containment fan coolers fail (CFC). This sequence results in core damage and a vulnerable containment.

The dominant core damage cut sets involve seismic-induced failures of offsite power and the RHR and containment fan coolers systems. Key contributors are seismic-induced failures of the control room supervisory panel, RHR heat exchangers or RHR pumps and all containment fan coolers.

Seismic Accident Sequence 8: EQ_T1_12 (EQ_LOSP*/EDG*/CCW*/PORV*AFW* /RWST*/HHI*FB*/CFC)

2.65×10^{-7}/ year mean CDF, representing 0.6 percent of seismic CDF.

This sequence comprises a seismic-induced loss-of-offsite power initiating event, loss of secondary-side cooling (AFW) and failure to establish bleed-and-feed operation (FB). This last failure prevents operation of the high-head safety injection system and precludes RCS depressurization and low-head safety injection. Containment pressure control is provided by the containment fan coolers. This sequence results in core damage and a vulnerable containment.

The dominant core damage cut sets involve seismic-induced failures of offsite power and secondary cooling. Key contributors are seismic-induced failures of the condensate storage tank and containment instrument racks that delay bleed-and-feed core cooling. Other contributors are seismic-induced failures of the AFW system and a failure to align bleed-and-feed cooling.

Seismic Accident Sequence 9: S_14_CD (EQ_LOSP*ATWS*/EDG*CFC)

1.16×10^{-7}/ year mean CDF, representing 0.26 percent of seismic CDF.

This sequence comprises a seismic initiating event and subsequent ATWS with emergency ac power available. However, because the seismic capacity of the boric acid storage tank is lower than the control rods, emergency boration is not available for ATWS mitigation. Core damage and a vulnerable containment result.

The dominant core damage cut sets involve seismic-induced failures of offsite power and the seismic-induced failure of the control rods and subsequent boration capabilities. Key contributors are the seismic-induced failure of control rods to insert, seismic failure of control room racks, and seismic failure of the boric acid storage tanks 31 and 32. Other contributors are seismic-induced failures of the charging pumps.

Seismic Accident Sequence 10: S_14_CD (EQ_LOSP*ATWS*/EDG*/CFC)

1.04×10^{-7}/ year mean CDF, representing 0.24 percent of seismic CDF.

This sequence is the same as seismic accident sequence 9, except that containment fan coolers are available for containment heat removal. This sequence results in core damage and a vulnerable containment.

The results described above were calculated using LLNL hazard curves. In particular, the point estimates are based on the mean values for all seismic and non-seismic events. The mean initiating event frequencies at different peak ground acceleration (pga) values are presented in Table 3.1.5.4. From these values, it was determined that, at lower earthquake levels, transient sequence initiating events dominate, and, as the earthquake acceleration level increases, the contribution of small LOCA events to the seismic-induced core damage frequency increases. The contributions of the dominant seismic accident sequences to mean core damage frequencies at various earthquake levels are presented in Table 3.1.5.5.

Figure 3.1.5.7 shows the contribution to plant risk from non-overlapping ground motion intervals between 0.05g and 1.0g. An important observation from Figure 3.1.5.7 is that the bulk of the seismic risk arises in the range of peak ground accelerations of 0.19g to 0.55g (which roughly corresponds to the range of 1-4 safe shutdown earthquakes). In addition, Figure 3.1.5.7 implies that integrating over the range of 0.05g to 1.0g captures the bulk of the risk.

Tables 3.1.5.6 and Figure 3.1.5.8 present similar results for the point estimate using the EPRI hazard curves. The predicted variation of accident frequencies and contributions to plant risk from ground motion intervals remain as described for the LLNL hazard curve.

Figure 3.1.5.9 compares the point estimate core damage frequencies as a function of ground motion for the LLNL and EPRI hazard curves. The results show a 16-percent increase in the overall core damage frequency with the EPRI hazard curve (the point estimate core damage frequencies are 5.9×10^{-5}/year and 4.9×10^{-5}/year for the EPRI and LLNL hazard curves, respectively). The difference can be attributed to the higher frequency of exceedance shown in the EPRI hazard curve for ground motion acceleration between 0.05g and 0.26g (Figure 3.1.2.3). There were, however, no qualitative differences in the dominant seismic sequences identified using the two curves.

Table 3.1.5.4

Mean Initiating Event Frequencies - LLNL Hazard

Initiating Event	0.1g	0.2g	0.3g	0.4g	0.5g	0.6g	0.7g	0.8g	0.9g	1.0g
	1.77×10^{-3}	1.52×10^{-1}	4.93×10^{-1}	7.30×10^{-1}	8.17×10^{-1}	7.99×10^{-1}	7.25×0^{-1}	6.15×10^{-1}	4.96×0^{-1}	3.66×10^{-1}
S2 LOCA	3.57×10^{-9}	2.57×10^{-4}	6.91×10^{-3}	3.18×10^{-2}	8.64×0^{-2}	1.63×10^{-1}	2.60×10^{-1}	3.79×10^{-1}	5.02×10^{-1}	6.33×10^{-1}
Transient	9.98×10^{-1}	8.47×10^{-1}	4.94×10^{-1}	2.29×10^{-1}	8.72×10^{-2}	3.18×10^{-2}	1.15×0^{-2}	3.77×10^{-3}	1.23×10^{-3}	3.90×10^{-4}

Table 3.1.5.5

Mean Dominant Seismic Accident Sequences Core Damage Frequencies - LLNL Hazard

Seismic Sequence	0.1g	0.2g	0.3g	0.4g	0.5g	0.6g	0.7g	0.8g	0.9g	1.0g
S_8_CD	2.73×10^{-8}	4.61×10^{-7}	1.39×10^{-6}	1.99×10^{-6}	1.54×10^{-6}	7.13×10^{-7}	2.68×10^{-7}	7.65×10^{-8}	2.10×10^{-8}	5.48×10^{-9}
EQ_T1_2	1.09×10^{-7}	1.22×10^{-6}	5.92×10^{-7}	3.24×10^{-8}	1.68×10^{-10}	7.79×10^{-14}	1.89×10^{-18}	1.80×10^{-23}	0.00	0.00
S_6_CD	7.38×10^{-9}	4.56×10^{-7}	1.35×10^{-6}	6.55×10^{-7}	8.30×10^{-8}	3.39×10^{-9}	5.66×10^{-11}	4.08×10^{-13}	0.00	0.00
S_18_CD	0.00	0.00	7.77×10^{-9}	6.63×10^{-8}	1.96×10^{-7}	2.81×10^{-7}	3.02×10^{-7}	2.55×10^{-7}	2.04×10^{-7}	1.51×10^{-7}
S_7_CD	2.16×10^{-10}	2.62×10^{-8}	3.01×10^{-7}	4.58×10^{-7}	1.57×10^{-7}	1.59×10^{-8}	6.73×10^{-10}	1.18×10^{-11}	0.00	0.00
S_15_CD	0.00	0.00	1.82×10^{-9}	3.45×10^{-8}	1.51×10^{-7}	2.11×10^{-7}	1.80×10^{-7}	1.06×10^{-7}	5.56×10^{-8}	2.62×10^{-8}
EQ_T1_3	3.19×10^{-9}	6.63×10^{-8}	1.27×10^{-7}	2.26×10^{-8}	3.00×10^{-10}	3.32×10^{-13}	2.26×10^{-17}	4.98×10^{-22}	0.00	0.00
EQ_T1_12	5.15×10^{-10}	3.92×10^{-8}	7.68×10^{-8}	9.74×10^{-9}	1.11×10^{-10}	1.27×10^{-13}	1.20×10^{-17}	4.28×10^{-22}	0.00	0.00
S_14_CD	0.00	0.00	1.12×10^{-9}	1.26×10^{-8}	1.79×10^{-8}	4.92×10^{-9}	4.67×10^{-10}	1.62×10^{-11}	0.00	0.00
S_13_CD	0.00	0.00	4.82×10^{-9}	1.81×10^{-8}	9.28×10^{-9}	1.03×10^{-9}	3.92×10^{-11}	5.52×10^{-13}	0.00	0.00

Figure 3.1.5.7

Point Estimate Analysis Ground Motion Contribution to Plant Risk - LLNL Hazard

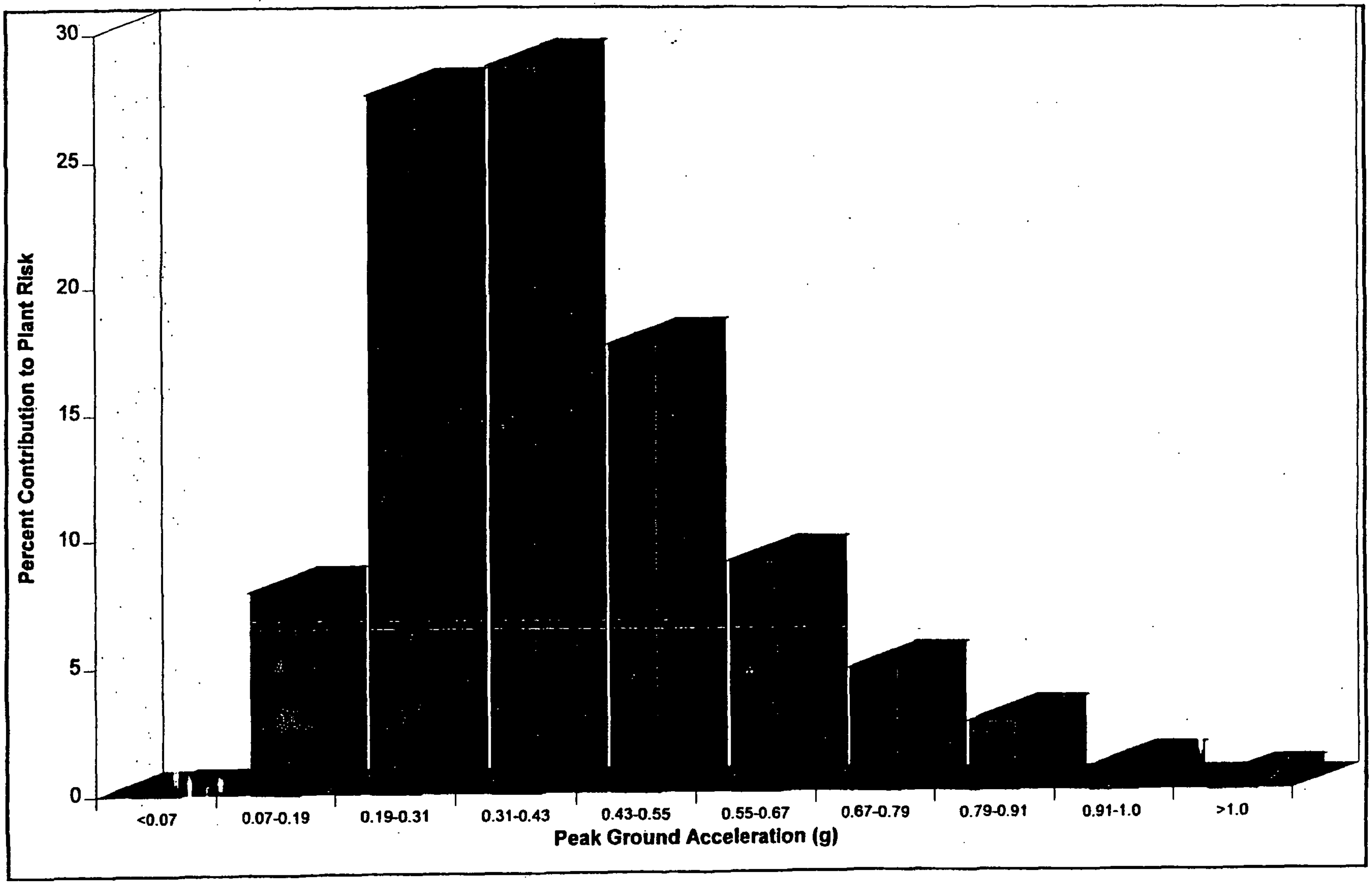


Table 3.1.5.6

Mean Dominant Seismic Accident Sequences Core Damage Frequencies - EPRI Hazard

Seismic Sequence	0.1g	0.2g	0.3g	0.4g	0.5g	0.6g	0.7g	0.8g	0.9g	1.0g
S_8_CD	2.84×10^{-8}	9.23×10^{-7}	1.61×10^{-6}	2.05×10^{-6}	1.47×10^{-6}	7.50×10^{-7}	2.50×10^{-7}	6.91×10^{-8}	1.82×10^{-8}	4.72×10^{-9}
EQ_T1_2	1.13×10^{-7}	2.46×10^{-6}	6.87×10^{-7}	3.33×10^{-8}	1.52×10^{-10}	8.28×10^{-14}	1.77×10^{-18}	1.65×10^{-23}	0.00	0.00
S_6_CD	7.69×10^{-9}	9.04×10^{-7}	1.56×10^{-6}	6.74×10^{-7}	7.76×10^{-8}	3.57×10^{-9}	5.27×10^{-11}	3.70×10^{-13}	0.00	0.00
S_18_CD	0.00	0.00	8.88×10^{-9}	6.82×10^{-8}	1.91×10^{-7}	2.95×10^{-7}	2.82×10^{-7}	2.30×10^{-7}	1.75×10^{-7}	1.30×10^{-7}
S_7_CD	2.26×10^{-10}	5.12×10^{-8}	3.47×10^{-7}	4.71×10^{-7}	1.48×10^{-7}	1.68×10^{-8}	6.28×10^{-10}	1.07×10^{-11}	0.00	0.00
S_15_CD	0.00	0.00	2.08×10^{-9}	3.55×10^{-8}	1.46×10^{-7}	2.21×10^{-7}	1.68×10^{-7}	9.57×10^{-8}	4.80×10^{-8}	2.25×10^{-8}
EQ_T1_3	3.32×10^{-9}	1.32×10^{-7}	1.47×10^{-7}	2.33×10^{-8}	2.74×10^{-10}	3.52×10^{-13}	2.10×10^{-17}	4.54×10^{-22}	0.00	0.00
EQ_T1_12	5.37×10^{-10}	7.75×10^{-8}	8.88×10^{-8}	1.00×10^{-8}	1.01×10^{-10}	1.35×10^{-13}	1.12×10^{-17}	3.90×10^{-22}	0.00	0.00
S_14_CD	0.00	0.00	1.28×10^{-9}	1.30×10^{-8}	1.72×10^{-8}	5.18×10^{-9}	4.35×10^{-10}	1.46×10^{-11}	0.00	0.00
S_13_CD	0.00	0.00	5.54×10^{-9}	1.86×10^{-8}	8.77×10^{-9}	1.08×10^{-9}	3.66×10^{-11}	5.01×10^{-13}	0.00	0.00

Figure 3.1.5.8
Point Estimate Analysis Ground Motion Contribution to Plant Risk - EPRI Hazard

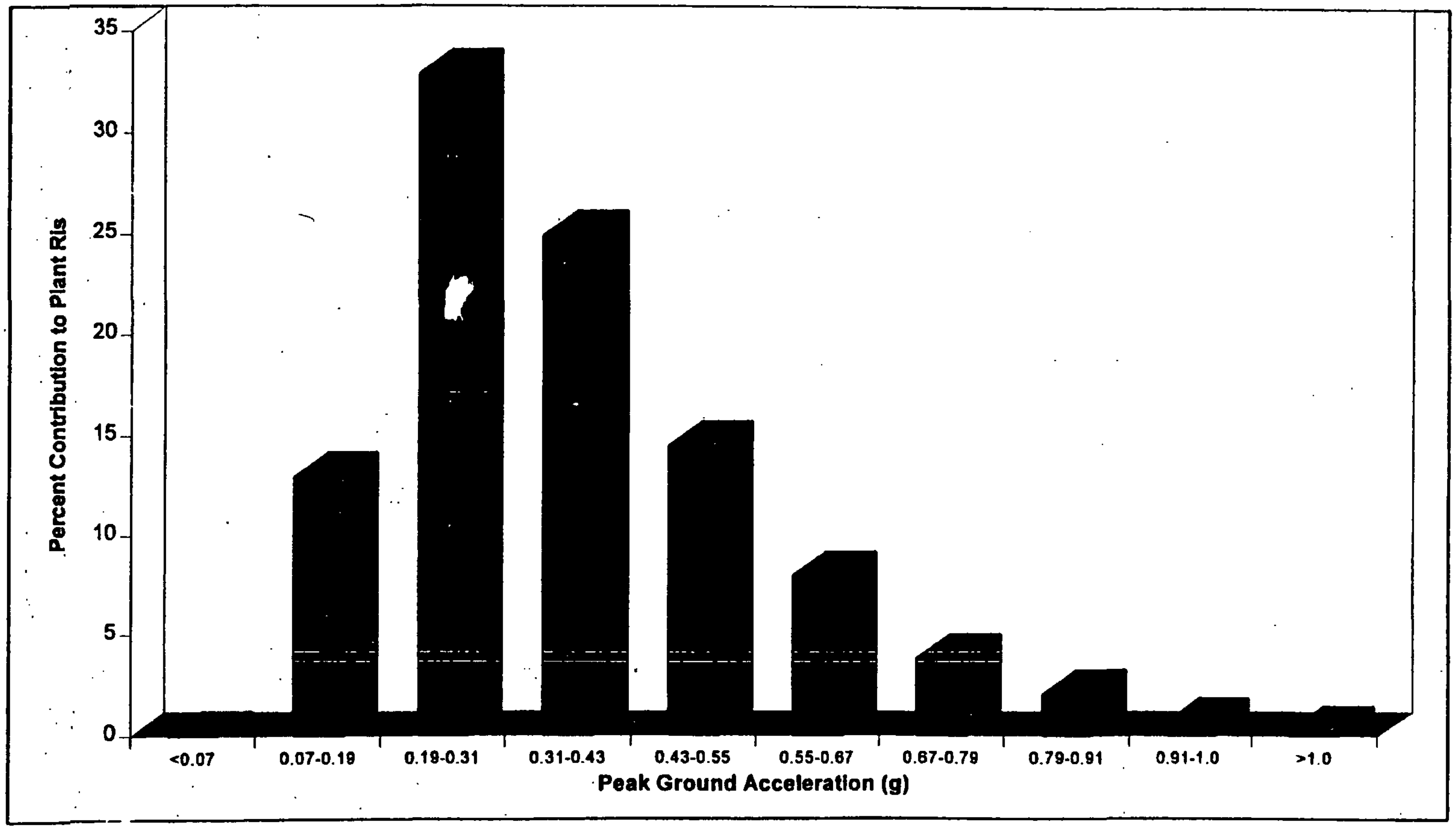
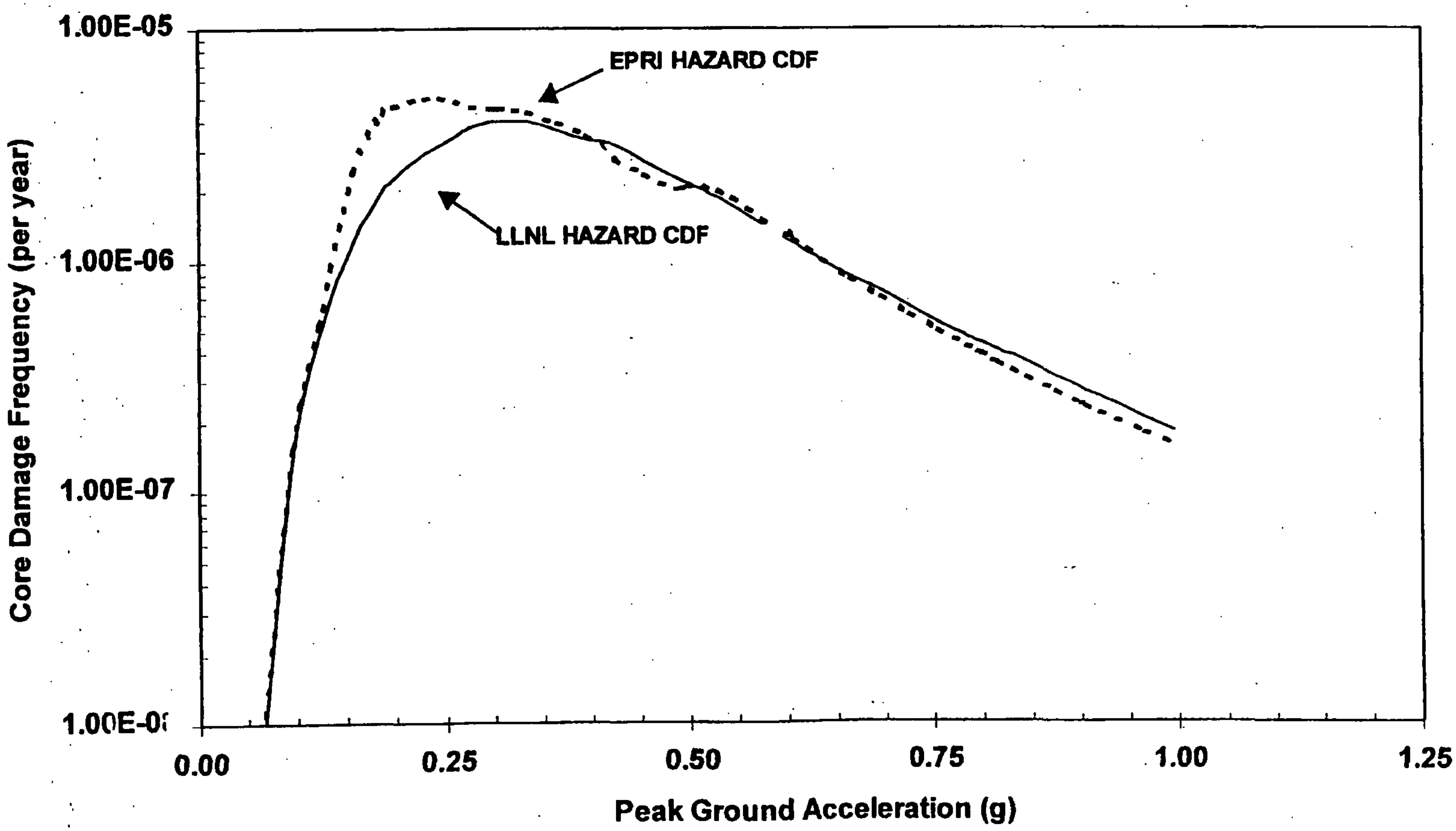


Figure 3.1.5.9

Core Damage Frequency Comparison of 1989 EPRI Seismic Hazard Curve with 1993 LLNL Seismic Hazard Curve for IP3



3.1.5.6 Seismic Importance Measures

The risk achievement worth measure of importance was evaluated by setting component seismic failure probabilities to one. The resulting core damage frequency gives a measure of the maximum risk increase that would occur if the component would always fail due to seismic shaking.

The risk reduction measure of importance was evaluated by setting seismic failure probabilities to zero. This gives a measure of the maximum reduction in seismic-induced core damage frequency that would occur if the component would never fail as a result of seismic shaking.

The results of the calculations of risk achievement worth and risk reduction are shown in Table 3.1.5.7. The seismic events with the greatest risk achievement worths are:

- Switchyard
- Battery banks 31, 32 and 34
- Central control room racks
- Component cooling water heat exchangers 31 and 32
- Component cooling water surge tanks 31 and 32
- EDG 31, 32, and 33 control panels
- EDG air receiver tanks
- EDG day tanks 31, 32, and 33
- EDG fuel storage tanks 31, 32, and 33
- EDG jacket water tanks 31, 32 and 33
- EDG engines 31, 32 and 33
- Service water pumps 31-36
- Switchgear 31 and 32

The seismic events with the highest risk reductions are:

- Component cooling water surge tanks 31 and 32
- Component cooling water heat exchangers 31 and 32

Table 3.1.5.7

Seismic Risk Importance Ranking (sorted Alphabetically)

Component Description	Risk Achievement Worth (CDF)	Risk Achievement Worth (%)	Risk Reduction Measure (CDF)	Risk Reduction Measure (%)
AFW pump discharge pressure transmitter	4.96×10^{-5}	0.81	4.92×10^{-5}	0.00
Battery bank 33	4.95×10^{-5}	0.61	4.92×10^{-5}	0.00
Battery banks 31, 32, & 34	7.08×10^{-5}	43.9	4.90×10^{-5}	0.41
Battery charger 33	4.92×10^{-5}	0.00	4.92×10^{-5}	0.00
Battery Chargers 31 and 32	5.05×10^{-5}	2.64	4.90×10^{-5}	0.41
Boric acid storage tanks	4.92×10^{-5}	0.00	4.92×10^{-5}	0.00
Boron injection tank	4.96×10^{-5}	0.81	4.92×10^{-5}	0.00
Central control room racks	7.08×10^{-5}	43.9	4.86×10^{-5}	1.22
Charging pumps 31, 32 and 33	4.92×10^{-5}	0.00	4.92×10^{-5}	0.00
Component cooling water heat exchangers 31 and 32	7.08×10^{-5}	43.9	4.78×10^{-5}	2.85
Component cooling water surge tanks 31 and 32	7.08×10^{-5}	43.9	4.62×10^{-5}	6.10
Condensate storage tank 31	5.45×10^{-5}	10.8	4.91×10^{-5}	0.20
Containment fan coolers 31, 32, 33, 34 and 35	4.92×10^{-5}	0.00	4.92×10^{-5}	0.00
Control building exhaust fan 33	5.06×10^{-5}	2.85	4.92×10^{-5}	0.00
Control building motor control center 39	5.05×10^{-5}	2.64	4.92×10^{-5}	0.00
Control rod drives	4.92×10^{-5}	0.00	4.92×10^{-5}	0.00
Control room flight panel	4.92×10^{-5}	0.00	4.92×10^{-5}	0.00
Diesel generator bldg. Exhaust fan 314 air-operated damper	5.05×10^{-5}	2.64	4.92×10^{-5}	0.00
EDG 31, 32 and 33 Control Panels	7.08×10^{-5}	43.90	4.91×10^{-5}	0.20

Component Description	Risk Achievement Worth (CDF)	Risk Achievement Worth (%)	Risk Reduction Measure (CDF)	Risk Reduction Measure (%)
EDG air receiver tanks	7.08×10^{-5}	43.90	4.91×10^{-5}	0.20
EDG current transformer 31, 32 and 33	7.08×10^{-5}	43.90	4.91×10^{-5}	0.20
EDG day tanks 31, 32, and 33	7.08×10^{-5}	43.90	4.91×10^{-5}	0.20
EDG fuel oil storage tanks 31, 32 and 33	7.08×10^{-5}	43.90	4.91×10^{-5}	0.20
EDG jacket water tanks 31, 32 and 33	7.08×10^{-5}	43.90	4.91×10^{-5}	0.20
EDG engines 31, 32 and 33	7.08×10^{-5}	43.90	4.91×10^{-5}	0.20
FCV-405A, B, C, D & 406 E, F, G, & H I/P transducers	4.92×10^{-5}	0.00	4.92×10^{-5}	0.00
I/P Converter for AFWP 32 - CV-1118	4.92×10^{-5}	0.00	4.92×10^{-5}	0.00
Instrument air component cooling water heat exchangers	4.96×10^{-5}	0.81	4.92×10^{-5}	0.00
Instrument air system air filters	4.96×10^{-5}	0.81	4.92×10^{-5}	0.00
Instrument air system compressors 31 and 32	4.96×10^{-5}	0.81	4.92×10^{-5}	0.00
Loop 31 & 34 hot leg pressure trans. (PT-402 and T-403)	6.07×10^{-5}	23.37	4.92×10^{-5}	0.00
Main feed from 33 inverter to MCC-39	4.92×10^{-5}	0.00	4.92×10^{-5}	0.00
Motor control centers 36A, 36B and 37	5.05×10^{-5}	2.64	4.91×10^{-5}	0.20
Motor operated louver for the auxiliary feed pump building	5.45×10^{-5}	10.77	4.92×10^{-5}	0.00
Non-regenerative heat exchanger 31	4.92×10^{-5}	0.00	4.92×10^{-5}	0.00
PAB motor control center 36C	5.33×10^{-5}	8.33	4.91×10^{-5}	0.20
Primary auxiliary building exhaust fans 31 and 32	6.11×10^{-5}	24.19	4.91×10^{-5}	0.20
Primary auxiliary building supply fan	6.11×10^{-5}	24.19	4.91×10^{-5}	0.20
Recirculation pumps 31 and 32	4.93×10^{-5}	0.20	4.92×10^{-5}	0.00
Refueling water storage tank	4.94×10^{-5}	0.41	4.92×10^{-5}	0.00
RHR heat exchangers 31 and 32	6.11×10^{-5}	24.19	4.85×10^{-5}	1.42

Component Description	Risk Achievement Worth (CDF)	Risk Achievement Worth (%)	Risk Reduction Measure (CDF)	Risk Reduction Measure (%)
RHR pumps 31 and 32	6.08×10^{-5}	23.58	4.90×10^{-5}	0.41
RWST level transmitter	4.95×10^{-5}	0.61	4.92×10^{-5}	0.00
Service water system pumps 31, 32, 33, 34, 35 and 36	7.08×10^{-5}	43.90	4.87×10^{-5}	1.02
Static inverter 34	4.92×10^{-5}	0.00	4.92×10^{-5}	0.00
Supervisory panel	5.95×10^{-5}	20.93	4.81×10^{-5}	2.24
Surrogate element	7.08×10^{-5}	43.90	4.91×10^{-5}	0.20
Switchgear 31 and 32	7.08×10^{-5}	43.90	4.87×10^{-5}	1.02
Switchyard	4.35×10^{-4}	784.15	Minor Quake	Minor Quake
Turbine building motor control center 32, 33 and 34	4.93×10^{-5}	0.20	4.92×10^{-5}	0.00
Unit one superheater stack	4.94×10^{-5}	0.41	4.92×10^{-5}	0.00
VC instrument racks 19, 21, 4A/B	4.94×10^{-5}	0.41	4.92×10^{-5}	0.00
Volume control tank 31	4.92×10^{-5}	0.00	4.92×10^{-5}	0.00
Wall exhaust fan for auxiliary feed pump building	5.45×10^{-5}	10.77	4.92×10^{-5}	0.00

- Supervisory panel
- RHR heat exchangers 31 and 32
- Central control room racks
- Service water system pumps 31-36
- Switchgear 31 and 32

3.1.5.7 Vulnerabilities and Insights

This seismic probabilistic risk assessment evaluated the adequacy of various plant systems and operations with respect to seismic events that occur during full power operation. The conclusions reached are:

- There are no unique plant vulnerabilities: the safety-related systems provide effective and reliable means for reactor reactivity control, electrical power, reactor coolant system pressure control, decay heat removal, and containment pressure control.

- The total mean seismic core damage frequency for IP3 is 4.4 x 10^{-5}/year. This frequency applies to the plant as it is currently configured and operated.

- Six types of seismic-induced accidents dominate the seismic core damage frequency: station blackout, reactor coolant pump seal loss-of-coolant accident, loss-of-offsite power transients, surrogate element, anticipated transient without scram, and small break loss-of-coolant (LOCA) seismic accidents.

- Seismic-induced station blackout sequences contribute 43.5 percent of the seismic core damage frequency; sequences initiated by a seismic-induced loss of component cooling and subsequent reactor coolant pump seal LOCA contribute 23.1 percent; seismic-induced loss-of-offsite power sequences contribute 20.6 percent; the surrogate element contribute 7.7 percent; seismic-induced anticipated transients without scram sequences contribute 4.9 percent; and seismic-induced small LOCA sequences contribute 0.2 percent.

- Key components that influence the seismic core damage frequency were concentrated in the electrical distribution system, component cooling water, control room panels and the residual heat removal system.

- Differences between the LLNL and EPRI hazard curves for IP3 result in a 16 percent difference in the computed point estimate core damage frequency (4.9 x 10^{-5} /year for the LLNL hazard curve and 5.9 x 10^{-5} /year for the EPRU hazard curve).

- No low ruggedness relays were found. However, no seismic capacity documentation exists for some relays in the emergency diesel generator system. Because seismic-induced chatter of relays WHSE M110, WHSE M101 and WHSE Z may result in a failure of EDGs 31, 32, and 33, respectively, should these relays be of low seismic capacity, a seismic event may cause the common-cause failure of all EDGs. This issue is part of the A-46 program [27].

3.1.5.8 Comparison to Indian Point Probabilistic Safety Study

The results of this study were also compared with those presented for IP3 in the Indian Point Probabilistic Safety Study (IPPSS) published in 1982 [21] and the differences between the two studies were investigated.

In this study, the total mean seismic core damage frequency (CDF) was estimated to be 4.4 x 10^{-5}/year. In the IPPSS, the total mean seismic CDF was estimated to be 3.1 x 10^{-6}, which is about a factor of 10 lower. The difference is mainly attributable to the difference in spectral shapes assumed for the ground motion.

In the current study, the critical components are the switchgear and service water pumps (sequence 1, 43.5% of the CDF), the RHR heat exchangers and pumps (sequence 2, 16.9% of the CDF), the component cooling water (CCW) heat exchangers and surge tank (sequence 3, 16.6% of the CDF), and the surrogate element (sequence 4, 7.7% of the CDF. In the current study, median capacities for these components ranged from 0.41g pga (CCW surge tank) to 0.75g pga (surrogate element). In the IPPSS, most of these components had significantly higher capacities – for example, the service water pumps had a capacity of 2.47g in the IPPSS as compared to 0.69g in the current study.

This difference is mainly attributable to the spectral shape assumed for the ground motion. The current study used the UHS shape, which peaks in the 10Hz - 25Hz range and the IPPSS used the NUREG-0098 shape, which peaks in the 2Hz – 8 Hz range. Most of the buildings at Indian Point 3 are stiff reinforced concrete structures founded on rock with fundamental frequencies around 15 Hz. As a result, these structures amplify the UHS shape ground motion much more than the NUREG-0098 shape ground motion, resulting in floor response spectra with high amplitude and high frequency peaks, and consequently higher demand on the components.

The IPPSS also did not use the surrogate element approach, whose capacity of 0.75g is based on the screening guidelines in EPRI NP-6041 – as these are the screening guidelines, they are conservative. The IPPSS either calculated specific capacities or relied on 'generic' data from other studies. In addition, the IPPSS did not consider the CCW surge tank.

The critical components in the IPPSS were the condensate storage tank (CST), city water tank, and the refueling storage water tank (RWST), all of which were assigned a median capacity of 0.83g pga. The current study calculated higher capacities – 0.88g pga for the CST and 1.03g pga for the RWST (city water storage tank was not considered). This difference is attributable to the difference in ground motion shapes. These tanks are relatively low frequency structure (about 7 Hz) – in this frequency range the UHS is lower than the NUREG-0098 shape. As results, these tanks were not significant contributors to the current study mean core damage frequency.

3.1.6 Containment Performance Analysis

In NUREG-1407 [4], the NRC explicitly requested that a seismic containment performance analysis be performed to identify seismic-induced containment vulnerabilities that involve early containment failure. Such an analysis must therefore address containment integrity, containment bypass, containment isolation, and containment decay heat removal systems (A-45). The IP3 IPE [4] was used to identify the systems to examine.

3.1.6.1 Structures and Major Components

A review of the containment design basis (Chapter 5 of the FSAR [7]), a walk down and seismic capacity calculations were performed to identify vulnerabilities that could result in early containment failure. In evaluating the major structures and systems whose failure may result in early containment failure, particular attention was paid to the adequacy of seismic gaps between the major structures. The major structures and systems evaluated included the containment, primary auxiliary building, and the reactor coolant system (reactor vessel internals, control rod drive mechanisms, steam generators, and other nuclear steam supply system components). Seismic evaluation predicted that all these structures and systems have high seismic capacities and could be screened from further analysis—no outstanding concerns relating to the potential seismic failure of these items were found during the seismic evaluation.

3.1.6.2 Containment Integrity

The IP3 containment is a reinforced concrete cylinder with a hemispherical dome atop a concrete basemat founded on rock. The cylinder is 135 ft in diameter and 148 ft high. The cylinder wall is 4 ft-6 in. thick, the dome is 3 ft-6 in. thick, and the base mat is 9 ft thick. The interior is lined with a steel liner secured to the concrete with cast-in-place studs. The liner is ½ in. thick in the dome, 3/8 in. thick in the cylinder, and ¼ in. thick on the base mat. The containment building was assigned a relatively conservative median capacity of 0.75g pga. Per Table 2-3 of NP-6041 [9], this capacity level can be assigned with no evaluation; it can be expected that a more detailed evaluation would produce a significantly higher median capacity.

Containment internal structures include equipment supports, shielding, the reactor cavity and fuel transfer canal, and miscellaneous concrete and steel for floors and stairs. All internal structures are supported off the basemat. The primary internal structure is a 3-ft thick concrete ring wall that serves as a shield for reactor coolant components and as the support for the polar crane. A 2-ft thick concrete floor slab atop the ring wall forms the operating floor. A concrete shield surrounds the portion of the pressurizer which protrudes above the operating floor. Table 2-3 of EPRI NP-6041 [9] states that containment internal structures can be screened if they were designed for a DBE of 0.1g pga or greater. Given that the containment internal structures are seismic Class I and were designed for a 0.15g pga DBE (Section 16.1 of the FSAR [7]), containment internal structures were screened.

Based on this seismic capacity analysis, we can conclude there are no seismic-induced containment vulnerabilities.

The primary auxiliary building (PAB) is a reinforced concrete shear wall structure founded on rock at elevations ranging from 15 to 41 ft. Table 2-3 of EPRI NP-6041 [9] states that Category I concrete shear wall structures can be screened if they were designed for a DBE of 0.1g pga or greater. Given that the PAB is seismic Class I and was designed for a 0.15g pga DBE (Section 16.1 of the FSAR [7]), the PAB was screened. Again, therefore, we can conclude there are no seismic-induced primary auxiliary building vulnerabilities.

3.1.6.3 Containment Isolation

Containment isolation valves isolate the containment during a postulated accident to prevent the release of fission products to the environment. Containment isolation is provided by two redundant barriers in piping that enters the RCS and penetrates the containment wall structure or that communicates directly with the containment atmosphere. These barriers may comprise a combination of motor or air-operated valves, check valves, manual valves or blank flanges in series.

To examine the potential for seismic-induced containment isolation failure, pathways that could significantly contribute to containment isolation failure were identified and the plant equipment required to automatically isolate the containment and the structural integrity of the containment penetrations were evaluated. The list of containment isolation valves presented Table in 3.1.6.1 was derived from the IPE analysis [4]. As no containment isolation valves rely on instrument air or nitrogen for closure, seismic-induced loss-of-offsite-power does not contribute to containment isolation vulnerabilities. In addition, all containment isolation valves were seismically screened with a median capacity of 1.13g pga. Finally, components that impact containment isolation signals (i.e., sensors, transmitters, logic and relay cabinets and power supplies) were also addressed in the walkdown and seismic evaluation and found not to exhibit seismic-induced vulnerabilities. Therefore based on walkdowns and seismic capacity analysis, we can conclude there are no seismic-induced vulnerabilities in the containment isolation function.

Seismic-induced failures of mechanical and electrical penetrations may also lead to containment isolation failure. These containment penetrations—electrical, piping, purge line, hatches, and the fuel transfer canal—comprise a steel sleeve embedded in the containment wall and welded to the containment liner. The penetrating element is inserted in the sleeve, and both ends of the resulting annulus are closed with either welded end plates or bolted flanges. No inflatable seals are used. Early failure of this type of penetration is not credible.

Hot pipe penetrations are cooled with air-to-air heat exchangers to prevent the surrounding concrete from heating. The heat exchangers are located in the penetration between the penetration sleeve and the insulated pipe. The coolant connections penetrate the sleeve where it protrudes from the outside of the containment wall and a centrifugal blower feeds the heat exchanger with low-pressure ambient air. In Section 5.1.4.2 of the FSAR [7], a heat transfer analysis of the hottest penetration (main steam line at 507°F) is described that showed that if the

Table 3.1.6.1
List of Containment Isolation Valves

(b)(7)(F)

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(6 pages)

cooling system failed, the surrounding concrete would take 100 hours to reach 200°F, and 1000 hours to reach 280°F. These temperatures are not high enough to substantially affect the concrete or the penetration. Accordingly, it was concluded that seismic-induced failure of the cooling system is not a credible source of early containment failure.

All containment penetrations and most liner weld seams are pressurized by the WCCPPS (Weld Channel and Containment Penetration Pressurization System). This system maintains the annulus between the penetration sleeve and penetrating element and the space between the liner weld seam and the member welded over the weld seam to form a sealed channel at a pressure of 54 psig, 115% of the LOCA design pressure. The WCCPPS has two functions: to detect any leaks that develop in the penetrations or weld seams during normal operation and to mitigate any leakage that might develop subsequent to a LOCA. However, as noted in Section 6.6.1 of the FSAR [7], while the WCCPPS is an engineered safety feature, no credit is taken for its operation in demonstrating the plant's ability to meet 10 CFR 100 requirements for radioactivity release. Similarly, while the WCCPPS is categorized as seismic Class I, it is not required for the maintenance of containment integrity, and a malfunction of the attached air supply system would not reduce containment integrity. Therefore, a seismic-induced failure of the WCCPPS is not a credible cause of early containment failure.

3.1.6.4 Containment Bypass

Seismic-induced intersystem loss-of-coolant-accidents (ISLOCAs) would require the failure of isolation valves forming the pressure boundary between the reactor pressure vessel and low pressure systems. The IPE [4] was used to identify the potential pathways leading to containment bypass for this seismic analysis. In Section 3.1.5.2 of this report, it was concluded that there are no seismic-induced vulnerabilities associated with these paths, valves or associated relays. However, seismic failure of the surrogate element at a median capacity of 0.75g was assumed to result in both core damage and a bypassed containment.

3.1.6.5 Containment Hatches

The containment personnel air-lock and equipment hatches were evaluated and found to be rugged with no credible seismic vulnerabilities. Based on the seismic capacity review, it was concluded that there are no seismic-induced vulnerabilities associated with these hatches.

3.1.6.6 Containment Heat Removal

The seismic probabilistic risk assessment addressed containment heat removal functions and systems, such as containment fan coolers and sprays. Most of the components in these systems were determined to have median seismic capacities exceeding 1.13g. Failures found to be important to containment performance were loss of control room instrumentation (median capacity of 0.52g) and containment fan coolers (median capacity of 0.86g). However, these failures were not significant contributors to the loss of containment performance or plant damages states—failures resulting from a loss of electrical power, loss of seal cooling to the reactor coolant pumps and loss of the RHR shutdown cooling function are more important.

3.1.6.7 Containment Failure Modes

The IPE noted that early containment failures are primarily the result of bypass sequences in which the accident initiator causes containment bypass. Based on the results of the seismic probabilistic risk assessment, only the failure of the surrogate element will lead to containment bypass—no other seismic initiators lead to early containment failure.

In the IPE, it was also determined that late containment failure is only likely if late containment heat removal does not operate or long-term core-concrete interactions melt through the containment basemat. Seismic-induced station blackout sequences and seismic sequences with loss of containment heat removal would lead to long-term containment overpressure failure.

To evaluate the conditional probabilities of early and late containment failure and therefore, the magnitude of an early or late radionuclide release, four seismic plant damage state groups were defined as in the internal IP3 IPE [4]. These four seismic plant damage state groups are station blackout, transients, LOCAs and containment bypass.

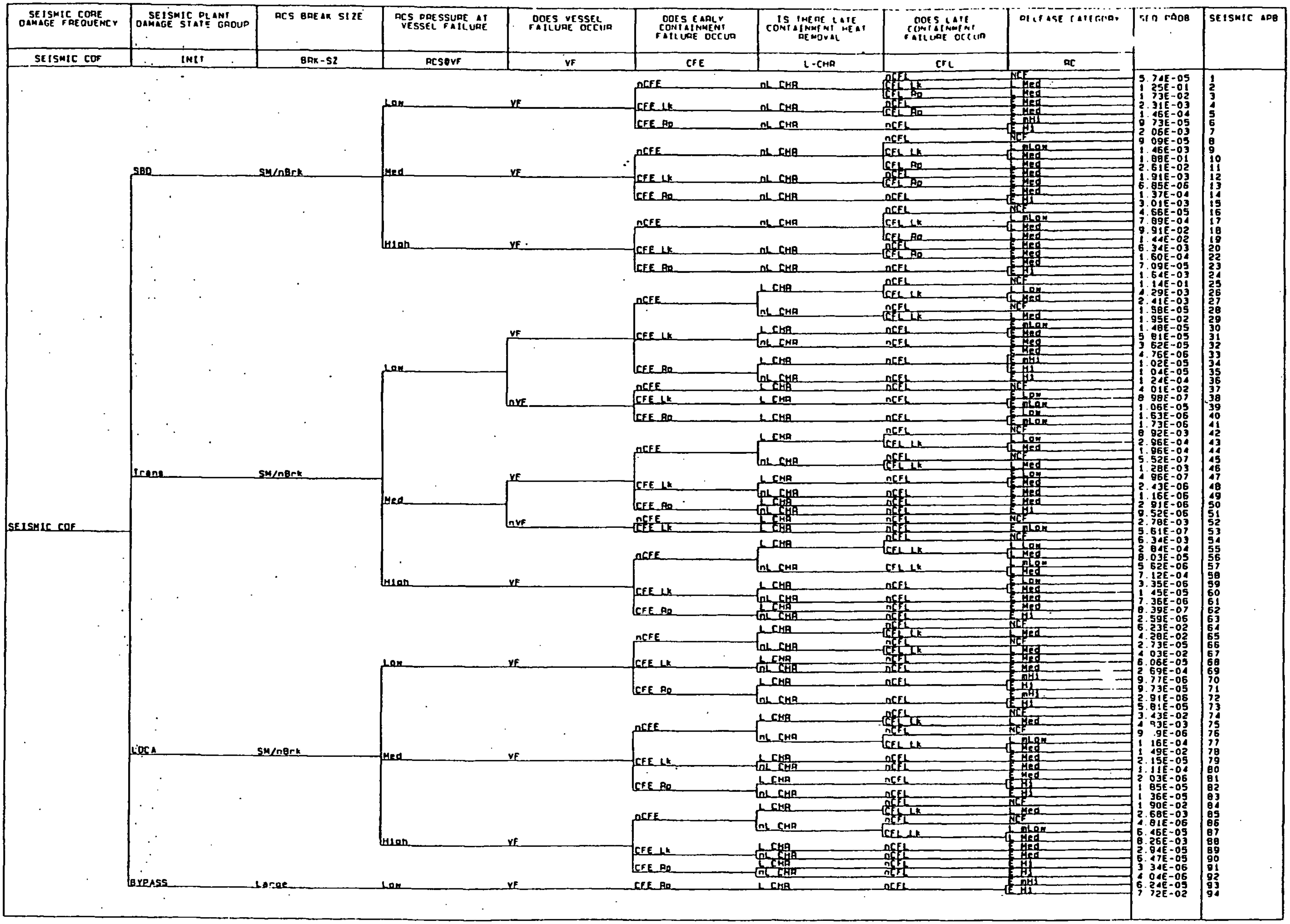
The seismic containment event tree was then used to assess seismic sequences that result in early and late releases, where an early release is defined as zero to two hours after vessel failure with a total integrated release of >10 percent of the initial core inventory of iodine and cesium. Figure 3.1.6.1 presents the containment event tree model results

3.1.6.8 Containment Performance Analysis Summary

The containment performance analysis considered systems, equipment and structures important for containment heat removal. The following conclusions were drawn from the containment performance analysis:

- The results are very similar to those derived for IPE study.
- No unique seismic containment failure mechanisms were identified.
- The containment performance analysis demonstrated that radionuclide releases were dominated by seismic-initiated long-term station blackout accident progression sequences.
- There are no seismic-induced vulnerabilities in the containment isolation function, or in the mechanical and electrical penetration assemblies, which would lead to containment bypass.

Fig[illegible].1.6.1
Seismic Containment



3.2 USI A-45, GI-131, AND OTHER SEISMIC SAFETY ISSUES

3.2.1 Seismic-Induced Flooding

A seismic event could induce external flooding (by failing a dam or levee) or internal flooding (by failing plant piping or storage vessels). Seismic-induced external flooding was addressed in Section 3.1; it was concluded that seismic-induced external floods are not a credible hazard for IP3.

Seismic-induced internal flooding was evaluated by first reviewing the internal flooding hazard analysis performed in the IPE [4], and then walking down and assessing the seismic vulnerability of the flooding hazards that the analysis identified as significant. The significant flooding hazards are listed in Table C4.3.1.1 of the IPE report [4]. The Seismic Review Team's assessment of each follows.

3.2.1.1 Non-Essential Service Water System In Flood Zone PAB55

The non-essential service water piping on the 55-ft elevation of the primary auxiliary building is of welded steel construction, approximately 10 in. in diameter and well supported. No seismic vulnerabilities were identified, and the Seismic Review Team screened this system.

3.2.1.2 Instrument Air Closed Cooling Water In Flood Zones CTL33 And CTL 15-1

The instrument air component cooling water lines on the 15-ft and 33-ft elevations of the control building are all welded steel lines, approximately 3 in. in diameter, and well supported. No seismic vulnerabilities were identified, and the Seismic Review Team screened this system.

3.2.1.3 Service Water In Flood Zone CTL 15-1

The service water lines on the 15-ft elevation of the control building are all welded steel lines, 3 in. or less in diameter, and well supported. No seismic vulnerabilities were identified, and the Seismic Review Team screened this system.

3.2.1.4 Fire Protection System Deluge Station In Flood Zone CTL 15-1

There is a masonry block enclosed cubicle in the northwest corner of the 15 ft elevation of the control building, which contains a fire piping deluge station. While some of the fire piping is fairly large diameter (approximately 10 in.), the SRT found it to be well supported. In discussing the "Effects of Failure of Class III Equipment on Safety-Related Equipment" in Section 16.1.3 of the FSAR [7], this portion of the fire protection system has been analyzed for the DBE seismic event, and six seismic supports were added. The masonry block walls were seismically qualified in response to IE Bulletin 80-11, and were screened per the discussion in Section 3.1.6

of this report. Accordingly, the Seismic Review Team screened this system.

3.2.1.5 City Water System In Flood Zone CTL 15-2

This piping is located in the northeast corner of the air conditioning equipment room at the east end of the 15-ft elevation of the control building. It consists of a 2-in. diameter threaded steel pipe running vertically from the floor (15-ft elevation) to the ceiling (33-ft elevation). The pipe is laterally restrained at the floor penetrations and at mid-height. While threaded joints can be a potential seismic vulnerability, the pipe is well supported and the Seismic Review Team screened this system.

3.2.1.6 Service Water System In Flood Zone CTL 15-2

This piping provides cooling for the air handling units in the air conditioning equipment room at the east-end of the 15-ft elevation of the control building. The piping is 3-in. diameter stainless steel with welded connections, and is well supported. No seismic vulnerabilities were identified, and the Seismic Review Team screened this system.

3.2.1.7 Fire Protection System In Flood Zone CTL 15-3

This piping is located in the stairwell in the southwest corner of the control building. It consists of 4-in. diameter threaded steel pipe running vertically from the 15-ft elevation to the 54-ft elevation. The pipe is supported by three-way supports (vertical and both horizontal directions) at the top, bottom and midheight, and by two additional deadweight supports. While threaded joints may represent a seismic vulnerability, the pipe is well supported and the Seismic Review Team screened this system.

3.2.1.8 Condensate Water Line In Flood Zone AFW18-1

The condensate water lines on the 18-ft elevation of the auxiliary feedwater pump building are all welded steel lines, approximately 8 in. in diameter or less, and well supported. No seismic vulnerabilities were identified, and the Seismic Review Team screened this system.

3.2.1.9 Fire Protection System In Flood Zone TBL 15

This system was identified as a flooding hazard for safety related equipment on the 15 ft elevation of the control building. The control building is protected from flooding in the turbine building by a 3 - 4 ft high barrier at the control building entrance. However, the rupture of some fire protection piping in the turbine building directly above the barrier could result in water entering the control building through the louver above and the gap below the control building door. This fire protection system piping comprises a large diameter main (approximately 10 in.

diameter) and smaller branch lines in the area; the piping is largely rod hung. The Seismic Review Team closely examined this area, looking in particular for locations where displacements imposed by the main could result in damage to branch lines. No seismic vulnerabilities were identified, and this system was screened.

3.2.2 Seismic/Fire Interaction

Seismic/fire interactions were addressed by first reviewing the plant fire plan [35] and Section 9.6.2 of the FSAR [7]. These documents identify the fire protection systems, fire barriers, and flammable sources at IP3. A walk down was then made to assess whether a seismic event could initiate a fire by releasing a flammable substance, fail a fire barrier, or induce an inadvertent actuation of a fire protection system. It should be noted that the effects of spray or flooding due to the rupture of fire protection piping was addressed by the internal flooding hazard analysis [4]; the seismic/flooding evaluation was discussed in Section 3.2.1.

3.2.2.1 Fire Barriers

The main fire barriers in the safety related areas of the plant are the reinforced concrete walls and floor slabs of the principal structures and the masonry block walls located in these structures. These structures were screened as noted in Section 3.1.6.

3.2.2.2 Flammables

The flammable sources and the Seismic Review Team's assessment of their vulnerability are listed in Table 3.2.2.1. All identified combustible sources were considered, whether in safety- or non-safety-related areas.

3.2.2.3 Fire Suppression Systems

The fire suppression systems and the Seismic Review Team's assessment of the potential for their inadvertent actuation are listed in Table 3.2.2.2. Only systems that might affect safety-related areas of the plant were considered.

There are basically two fire protection systems protecting safety-related equipment: a CO_2 system and a water system. As noted in Section 16.1.2 of the FSAR, the fire protection systems are seismic Class III (except for the portions in the diesel generator rooms and the electrical tunnels, which are Class I). The Seismic Review Team identified the following seismic vulnerabilities:

- Tanks located in the administration service building supply the CO2 system. This building is a seismic Class III structure; its seismic fragility level may be low.

Table 3.2.2.1

Seismic/Fire Interaction Assessment of Flammable Sources

(b)(7)(F)

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(2 pages)

Table 3.2.2.2

Seismic/Fire Interaction --Assessment of Inadvertent Actuation of Fire Protection Systems

Location	Description	Seismic Review Team (SRT) Assessment
CB 15 ft	Switchgear room: Total flooding CO_2 requires manual activation.	CO_2 piping is well supported and judged not seismically vulnerable. Therefore, seismic-induced CO_2 pipe failure for the control building 15 ft is not a concern.
CB 33 ft	Cable spreading and battery rooms: Total flooding CO_2, heat actuated by electric thermostats.	CO_2 piping is well supported and judged not seismically vulnerable. Therefore, seismic-induced CO_2 pipe failure for the control building 33 ft is not a concern.
CB 33 ft	Cable spreading room, cable trays at east wall: pre-action sprinkler system with closed heads. Deluge valves open on signal from heat detectors. Heads opened by heat.	The pre-action/closed head combination make inadvertent actuation unlikely. The fire piping and cable trays are well supported - no potential for damage to the heads due to relative displacement. Seismic-induced inadvertent actuation was judged not credible.
DGB 15 ft	Diesels: total flooding CO_2, heat actuated by electric thermostats. Wet pipe sprinklers for fuel tanks and area below grating. Sprinkler heads opened by heat.	CO_2 piping is well supported and judged not seismically vulnerable. Therefore, seismic-induced CO_2 pipe failure for the diesel building is not a concern. The fire piping is well supported (Section 16.1.2 of the FSAR states the fire piping in this area is seismic Class I) with no potential for damage to the heads due to seismic interaction. Seismic-induced inadvertent actuation was judged not credible.
ECT 33 ft, 43 ft	Electrical tunnels and penetration area: pre-action sprinkler system with closed heads. Deluge valves open on signal from heat detectors. Heads opened by heat.	The pre-action/closed heads combination make inadvertent actuation unlikely. The fire piping and cable trays are well supported with no potential for damage to the heads due to relative displacement (Section 16.1.2 of the FSAR states the fire piping in this area is seismic Class I). Seismic-induced inadvertent actuation was judged not credible.
FH 72 ft	Containment, PAB Exhaust Fans manually activated deluge system for exhaust filters.	This system requires manual activation, therefore inadvertent actuation is not a concern.

- The CO_2 tanks are unanchored. The tank geometry is squat, so overturning is not a concern, but the tanks could shift and fracture the attached threaded piping.

- The piping carrying the CO_2 from the tanks to the protected areas is threaded, and runs adjacent to (and through) masonry block walls in the administration service and turbine buildings. These walls were not evaluated in the 80-11 program, so their seismic fragility levels may be low. Collapse of these walls could fracture any nearby CO_2 piping.

- The water system is supplied by a pair of 350,000-gallon fire water tanks. The tanks are large, vertical, flat-bottom atmospheric storage tanks. Tanks of this type may have low seismic fragility levels.

- A 2500 gpm electric pump and a 2500 gpm diesel pump supply the water. Both pumps are housed in the fire pump house, a reinforced concrete frame with masonry block walls. This building is a seismic Class III structure; its seismic fragility level may be low. The electric pump is well anchored and is connected to the emergency power supply system (see FSAR Section 9.6.2.3); its seismic fragility level is controlled by the seismic fragility of the fire pump house. While the diesel pump is well anchored, the seismic fragility level of the tank may be less than that of the fire pump house because the fuel tank is supported on four unbraced legs, which have marginal lateral capacity.

It should be noted that although the CO_2 system shows seismic susceptibility, rupture of this system poses little risk (see Section 5.5.2)

3.2.2.4 Buried Gas Pipeline

Two natural gas transmission pipelines traverse the Indian Point site. These lines were evaluated in detail in the Indian Point 2 IPEEE seismic analysis [36,37]. The lines are 26– and 30-in. in diameter and are buried in a rock trench with a minimum burial depth of 3 ft. Within the trench, the pipes are supported on a sand pad. On slopes, sand bags are used to stabilize the soil around the pipes. Flow and pressure are constantly monitored, and the routes are surveyed for indications of leaks and potentially damaging construction activities.

The evaluation concluded that, in general, the pipelines have a relatively high seismic fragility level (greater than 0.3g pga HCLPF) and can be screened. The one area of concern was a slope about 1200 ft from the plant in which the lines drop about 40 ft in elevation in about 100 ft. No detailed information on the slope's configuration was available, so the evaluation conservatively assumed that the pipeline in this area would rupture at a HCLPF capacity of 0.2g pga. It was concluded that a fire at the pipeline would not be a threat to the plant due to the wide fire break around the plant. The major potential for damage to the plant was the formation of gas cloud traveling to the plant and then igniting. A hazard analysis for this scenario was performed and it was concluded that the probability of occurrence was low enough that the pipelines could be screened as seismic vulnerability.

The Indian Point 3 Seismic Review Team reviewed this evaluation and walked down the pipeline right-of-way. The team concurred with the evaluation.

3.2.3 USI A-45 DECAY HEAT REMOVAL EVALUATION AND UNRESOLVED SAFETY ISSUES

3.2.3.1 Introduction

USI A-45 concerns the adequacy of decay heat removal (DHR) systems and the various corrective actions taken to enhance DHR for both internal and external events.

A loss of decay heat removal during plant transients will ultimately result in reactor coolant system water boil-off and a subsequent challenge to core and containment integrity. Five means of DHR were examined to identify specific vulnerabilities that might lead to core damage:

- Reactor coolant system (RCS) cooldown

- Secondary heat removal

- Safety injection

- Recirculation cooling

- Bleed-and-feed.

At IP3 the operations required to support these five means of DHR can be summarized as follows. In transients and small LOCAs, the auxiliary feedwater (AFW) system provides secondary heat removal from the steam generators. Steam is generated and dumped to the atmosphere through the atmospheric steam dump valves or steam generator safety relief valves or to the main condenser through condenser steam dump valves. Failure of the AFW (and main feedwater and condensate systems) requires primary bleed-and-feed cooling to remove decay heat. For small LOCAs and transients in which bleed-and-feed core cooling occurs, long-term DHR is performed by high-head recirculation cooling because RCS pressure remains high. For small LOCAs with successful AFW operation, long-term DHR is performed by cooling the RCS using steam generator depressurization and depressurizing the RCS by opening pressurizer spray valves or PORVs. Subsequently, the RHR system is aligned in its shutdown cooling mode to bring the plant to cold shutdown.

The means of decay heat removal are described in the following section.

3.2.3.2 Decay Heat Removal Functions

Reactor Coolant System (RCS) Cooldown. After transients and small LOCAs, long-term decay heat removal entails a reduction in RCS temperature and pressure. The components used to achieve this reduction are:

- The atmospheric dump valves (ADVs). The ADVs are normally closed air-operated valves designed to fail closed on loss of power or instrument air. They are normally operated in the automatic mode and are set to open at 1055 psig. At their set pressure, the ADVs have a combined relief capacity of 10 percent of maximum steam flow. The ADVs have a median seismic capacity of 1.13g.

- The pressurizer PORVs. The function of the PORVs is to relieve RCS pressure at a set point below the set point of the SRVs, discharging steam to the pressurizer relief tank. The PORVs have a medium seismic capacity of 1.13g.

Secondary Heat Removal. The AFW system provides secondary heat removal from the steam generators in transients and small LOCAs by allowing the generation and dumping of steam to the atmosphere or to the main condenser.

With the exceptions of the wall exhaust fan for the auxiliary feed pump building (median seismic capacity of 0.75g) and condensate storage tank (median capacity of 0.88g), AFW system equipment was found to be seismically rugged.

Safety Injection. The high-head safety injection (HHSI) system removes decay heat from the core during small LOCAs and sequences that involve bleed-and-feed decay heat removal by injecting borated water from the RWST into the reactor vessel. Once the RWST inventory is exhausted, the HHSI system is manually switched to its high-head recirculation mode of operation.

While most HHSI equipment screens out of the seismic analysis, the HHSI may fail during a seismic event as a result of the seismic failure of the control room supervisory panel (median seismic capacity of 0.52g) or the PAB exhaust fan (median seismic capacity of 0.88g).

The low-head safety injection (LHSI) system also removes decay heat from the core during LOCAs by injecting borated water from the RWST into the reactor vessel. In small LOCAs, the RCS must be depressurized prior to using the LHSI system. Once the RWST inventory is exhausted, the LHSI system is manually switched to its recirculation mode of operation.

Dominant seismic contributors to the seismic-induced failure of the LHSI system are the RHR heat exchangers (median seismic capacity of 0.49g) and the RHR pumps (median seismic capacity of 0.62g).

Recirculation Cooling. The recirculation system provides long-term core cooling and containment spray after transients and LOCAs. The system recirculates sump water into the reactor core and through containment spray nozzles after cooling it in the RHR heat exchangers. All recirculation cooling equipment, excepting the RHR heat exchangers, screens.

Bleed-and-Feed. Emergency operating procedure FR-H.1, "Response to Loss of Secondary Heat Sink," provides specific instructions for the initiation of primary bleed-and-feed cooling upon a total loss of secondary heat removal. The front-line equipment associated with bleed-and-feed cooling has high seismic capacity.

3.2.3.3 Results

Approximately 20.7 percent of the calculated core damage frequency results from sequences that entail a loss of decay heat removal function. The dominant seismic failures (as discussed in Section 3.1.5.4) were station blackout (43.5% of the seismic-induced core damage frequency), RCP seal cooling (23.1%) and surrogate element (7.7%).

The dominant scenario (17.0%) involved a seismic-induced loss-of-offsite power initiating event with successful onsite emergency power generation and AFW secondary-side cooling. Because CST water inventory will not last 72 hours, (and the CST alternative supply from city water is seismically inadequate), a plant cold shutdown state must be achieved using the RHR shutdown cooling mode. However, seismic-induced failures or combinations of seismic-induced failures and random mechanical faults, fail RHR shutdown cooling.

3.2.3.4 Conclusions, Vulnerabilities and Insights

This evaluation sought to identify potential vulnerabilities in the decay heat removal systems to seismic events initiated during full power operation. It found no unique plant vulnerabilities—the safety-related systems provide effective and reliable means for decay heat removal. The insights gained from the evaluation of the seismic of vulnerability decay heat removal are:

- Loss of decay heat removal function contributes 21% (9.2 x 10^{-6} /year) of the total seismic core damage frequency.
- The dominant seismic sequence contributes 17.0% (or 7.47 x 10^{-6} /year).
- The loss of decay heat removal is controlled by the seismic-induced loss-of-offsite power and seismic-induced failures of both RHR heat exchangers.
- Other dominant contributors are seismic-induced failure of the RHR pumps, primary auxiliary building exhaust fan, and containment pressure transmitters (PT-402 & PT-403)

3.2.4 System Interactions in Nuclear Power Plants--Unresolved Safety Issue A-17 (USI A-17)

The resolution of USI A-17 was addressed by the Seismic Review Team during the plant A-46 walkdowns [27]. Seismic system interactions were evaluated using the methodology described in the GIP, Section 11.4.5 [28]. System interactions concerns for all IPEEE components were documented on Seismic Evaluation Worksheets (SEWS), and are presented in the IP3 A-46 submittal [27]. Seismic system interactions were modeled in the IP3 Seismic PRA model (i.e., block wall induced failure of the AMSAC bus).

We conclude that the concerns that comprise USI A-17 were adequately addressed by the IP3 A-46 program, the IPEEE seismic probabilistic risk assessment, and plant walkdowns. This issue is therefore considered resolved for IP3.

3.2.5 Seismic Design Criteria--Unresolved Safety Issue A-40 (USI A-40)

The resolution of USI A-40 involves the analysis of the seismic capacity of safety-related aboveground tanks at the safe shutdown earthquake level.

The tanks and heat exchangers reviewed as part of the A-46 and IPEEE programs are listed in Table 3.2.5.1. This table also contains a summary of the evaluation. The detailed tank evaluation, including field notes, sketches, photograph and calculations are included with the SEWS in the IP3 A-46 submittal [27].

Because the IP3 A-46 program, the IPEEE seismic PRA and plant walkdowns have adequately addressed the concerns raised in USI A-40, this issue is considered resolved for IP3.

3.2.6 Verification of Seismic Adequacy of Equipment in Operating Plants -- Unresolved Safety Issue A-46 (USI A-46)

The resolution of USI A-46 in plants with a construction permit docketed before 1972, such as IP3, involves the use of methods and acceptance criteria that differ from those defined in current licensing requirements to verify the seismic adequacy of equipment to withstand a postulated safe shutdown earthquake

As with USI A-17 and A-40, however, all A-46 issues have been adequately addressed by plant walkdowns, seismic evaluations and calculations [27]. This issue is therefore considered resolved for IP3.

3.2.7 Eastern US Seismicity (Charleston Earthquake) Issue

This issue, formerly the Charleston Earthquake Issue, concerns the potential for large damaging earthquakes. This issue pertains only to eight eastern plants identified as being outliers with respect to seismic hazard including IP3 [2]. However, as the methodology used and review level earthquakes assumed in this study are in full accord with NUREG-1407 [2], the issue is regarded as being resolved for IP3.

Table 3.2.5.1

USI A-40 -- Summary of Seismic Capacity of Above-Ground Tanks

ID	Description	Comments	Median seismic anchorage capacity (g)
CSATBA1, 2	Boric acid storage tanks 31, 32	Screening issue: atmospheric storage tank Vertical vessel, 12 ft diameter and 12 ft high, weighs 65.8 kips, is suspended in a cutout in the PAB 73 ft floor slab, and is anchored with eight CIP bolts. Seismic evaluation: evaluated using the peak of the 4% damped FRS (12.6g for a 1g pga). Capacity controlled by shear in the anchor bolts.	0.15
CSATVC1	Volume control tank 31	Screening issue: atmospheric storage tank Vertical vessel, weighs 28.8 kips, 8 ft diameter, 12 ft high, supported on four short legs. Each leg is anchored with two 1 in. CIP bolts. Seismic Evaluation: located on PAB 73 ft – evaluated using the peak of the 5% damped PAB 73 FRS (11.3g for a 1g pga); capacity limited by the anchorage.	0.27
ACATCC1, 2	Component cooling surge tank 31, 32	Screening issue: atmospheric storage tank Horizontal tanks, each 4 ft diameter and 14 ft long, and weighs 21.6 k. The tanks sit on a pair of W10x33s, spaced 10 ft apart. Each W10x33 spans 12 ft, is anchored at one end into a concrete wall, and is supported at the other end by a short (4 ft tall) 8Wx31 anchored to a concrete floor slab. Seismic evaluation: located on PAB 73 ft elevation - evaluated using the peak of the 5% damped PAB 73 FRS (11.3g for a 1g pga); capacity limited by bending capacity of the W10x33s.	0.41
CSAHNRT	Non-regenerative heat exchanger 31	Screening Issue: heat exchanger Horizontal heat exchanger on two saddles, 1.8 ft diameter x 18 ft long, 6.4 kip flooded weight. Each saddle is anchored with two ¾ in. CIP bolts. Seismic evaluation: evaluated using the 4% damped PAB 73 FRS at the calculated fundamental frequency of 27 Hz +20% (2.9g for 1g pga). Capacity controlled by the anchorage.	0.49
ACAHCC1, 2	Component cooling water heat exchanger 31, 32	Screening issue: heat exchanger Vertical heat exchanger, 47 in. diameter, 28 ft long, 51 kip flooded weight. Supported on a concrete curb at PAB 73 ft by a pair of brackets, each anchored by two ¾ in. CIP bolts. Laterally braced at PAB 56 ft by a pair of rigid struts (90 deg apart), each anchored by four 1 in. concrete expansion anchors. Seismic evaluation: evaluated using the average of the 5% damped FRS at the calculated fundamental frequency of 36 Hz +20% (2.1g for 1g pga). Capacity controlled by the CIP bolts at the upper support.	0.52
PWST 21	Primary water storage tank	Screening issue: atmospheric storage tank Flat bottom vertical tank, 35 ft tall, 30 ft diameter, anchored with eighteen 1.75 in. cast-in-place bolts. Seismic evaluation: evaluated using the procedures in EPRI NP-6041 Appendix H; seismic input based on the 5% damped ground response spectrum at the calculated impulsive mode frequency of 7.2 Hz +20%.	0.65

ID	Description	Comments	Median seismic anchorage capacity (g)
CST	Condensate storage tank 31	Screening issue: Atmospheric storage tank Flat bottom vertical tank, 40 ft tall, 57 ft diameter, anchored with twenty-four 2.25 in. cast-in-place bolts. Seismic Evaluation: Evaluated by scaling the A-46 evaluation; seismic input based on the 5% damped ground response spectrum at the calculated impulsive mode frequency of 7.0 Hz +20%.	0.88
INTSIATSAI	31 Spray Additive Tank	Screening Issue: Atmospheric Storgae Tank Horizontal tank on two saddles, 98 in. diameter, 181 in. long, 66.3 kips flooded weight. Each saddle is anchored with four 1 in. CIP bolts. Seismic Evaluation: Evaluated using the peak of the 5% damped ground response spectrum (1.6g for 1g pga). Capacity controlled by the anchor bolts.	0.99
RWST-31	Refueling water storage tank 31	Screening issue: atmospheric storage tank Flat bottom vertical tank, 48 ft tall, 40 ft diameter, anchored with twenty-four 2 in. cast-in-place bolts. Seismic evaluation: evaluated using the procedures in EPRI NP-6041 Appendix H; seismic input based on the 5% damped ground response spectrum at the calculated impulsive mode frequency of 6.3 Hz +20%.	1.03
CSAHSW1	Seal water heat exchanger 31	Screening issue: heat exchanger Horizontal heat exchanger on two saddles, 1.33 ft diameter, 13.6 ft long, 3.4 kip flooded weight. Each saddle is anchored with two ¾ in. CIP bolts. Seismic evaluation: the A-46 evaluation showed a fundamental frequency of 54 Hz. This evaluation is based on the peak of the 4% damped PAB 73 ft FRS above 54 Hz (2.1g for 1g pga). The anchorage controls the capacity.	1.23
BORON INJECTION TANK	Boron injection tank	Screening issue: atmospheric storage tank Pressure vessel on 4 legs, 48 in. diameter, 7.5 ft tall, 21 kip flooded weight. Each leg is anchored with two 1 in. CIP bolts. Seismic evaluation: evaluation based on the peak of the 5% damped ground response spectrum (1.6g for 1g pga). Capacity controlled by the anchorage	1.53
0031EDSAT 0032EDSAT 0033EDSAT	DG start air tanks 31, 32, 33	Screening issue: air receiver tank Air start tank, 116 in. diameter, 98 in. high, anchored with four 5/8 in. CIP bolts. Seismic evaluation: evaluated using the peak of the 4% damped ground response spectrum (1.8g for 1g pga). Capacity controlled by the anchor bolts.	1.72
CSAHEL1	31 excess letdown heat exchanger	Screening issue: heat exchanger Horizontal heat exchanger on two saddles, approximately 12 in. diameter, 144 in. long, 2.1 kip flooded weight. Each pedestal anchored with two ¾ in. CIP bolts. Seismic evaluation: evaluated using the peak of the 5% damped ground response spectrum (1.6g for 1g pga). Capacity controlled by the anchorage.	1.91

ID	Description	Comments	Median seismic anchorage capacity (g)
CSAHRGI	31 regenerative heat exchanger	Screening issue: heat exchanger Three small heat exchangers (12 in. diameter x 13 ft long) stacked on a rack which is welded to embedded steel plates in the crane wall. Seismic evaluation: assigned a capacity of 2.15g median (1g HCLPF) based on very large margin calculated in the A-46 evaluation	2.15
0031CWHX 0032CWHX	1A component cooling water heat exchangers	Screening issue: heat exchangers A pair of small stacked heat exchangers, each weighing 836 lbs, supported on two saddles. Each saddle is anchored with two 7/8 in. CIP bolts. Seismic evaluation: evaluated using the peak of the 5% damped ground response spectrum (1.6g for 1g pga). Capacity controlled by the anchorage.	2.80
IA-31-TK	Instrume ! air receiver	Screening issue: air receiver tank Air receiver, 3.5 ft diameter, 7 ft tall, anchored with eight ¾ in. CIP bolts. Seismic evaluation: evaluated using the peak of the 5% damped ground response spectrum (1.6g for 1g pga). Capacity controlled by the anchorage.	4.73

3.2.8 Potential Seismic Interaction Involving the Movable In-Core Flux Mapping System Used in Westinghouse Plants -- Generic Issue-131 (GI-131)

GI-131, "Potential Seismic Interaction Involving the Movable In-Core Flux Mapping System Used in Westinghouse Plants" [38,39], raises the concern that during a seismic event, moveable portions of the flux mapping system could relocate and cause the seal table to fail, resulting in the equivalent of a small break LOCA.

The IPEEE Seismic Review Team inspected the flux mapping system and seal table during the containment walk down. The moveable portion consists of a substantial welded steel frame approximately 4 ft wide x 15 ft long x 8 ft high mounted on four wheels on rails. Each bottom corner of the frame near the wheels is bolted to a bracket anchored to the floor slab. These supports prevent movement along the rail, horizontal movement perpendicular to the rail, and uplift. The top of the frame is laterally supported in the short direction, at both ends, by an 18-in. long steel angle. The angle is bolted to the frame at one end, and at the other end is bolted to a bracket, which is anchored to a reinforced concrete wall. Based on these observations, seismic-induced damage to the seal table was judged not credible. Therefore, this issue can be considered closed.

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APPENDIX 3A

IP3 SEISMIC PROBABLISTIC RISK ASSESSMENT TABLES

CONTENTS

CONTENTS (continued)

Table 3A.1

Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
CVCS	CSATBA1	TANK	BORIC ACID STG TANK 31	PAB	73'-0	0.15	0.46	0.05	Y
CVCS	CSATBA2	TANK	BORIC ACID STG TANK 32	PAB	73'-0"	0.15	0.46	0.05	Y
480 VAC	38MCC	MOTOR CONTROL CENTER	CONTAINMENT MOTOR CONTROL CENTER 38	VC	68'-0"	0.22	0.46	0.08	Y
AFW	TSC UPS BUS	BUS	AMSAC BUS	TB	15'-0"	0.22	0.30	0.11	N
CVCS	CSATVC1	TANK	VOLUME CONTROL TANK NO. 31	PAB	73'-0"	0.27	0.46	0.09	Y
CCW	ACATCC1	TANK	CC SURGE TANK #31	PAB	73'-0"	0.41	0.46	0.14	Y
CCW	ACATCC2	TANK	CC SURGE TANK #32	PAB	73'-0"	0.41	0.46	0.14	Y
CVCS	0033CHPD	PULSATION DAMPENER	33 CHP PULSATION DAMPENER	PAB	55'-0"	0.47	0.46	0.16	Y*
CVCS	CHRG PP31 CASING HTX	HEAT EXCHANGER	CHARGING PP31 FLUID DRIVE CASING OIL COOLER	PAB	55'-0"	0.47	0.46	0.16	Y*
CVCS	CHRG PP31 CRANK HTX	HEAT EXCHANGER	CHARGING PP31 PUMP CRANKCASE OIL COOLER	PAB	55'-0"	0.47	0.46	0.16	Y*
CVCS	CHRG PP32 CASING HTX	HEAT EXCHANGER	CHARGING PP32 FLUID DRIVE CASING OIL COOLER	PAB	55'-0"	0.47	0.46	0.16	Y*
CVCS	CHRG PP32 CRANK HTX	HEAT EXCHANGER	CHARGING PP32 PUMP CRANKCASE OIL COOLER	PAB	55'-0"	0.47	0.46	0.16	Y*
CVCS	CHRG PP33 CASING HTX	HEAT EXCHANGER	CHARGING PP33 FLUID DRIVE CASING OIL COOLER	PAB	55'-0"	0.47	0.46	0.16	Y*
CVCS	CHRG PP33 CRANK HTX	HEAT EXCHANGER	CHARGING PP33 PUMP CRANKCASE OIL COOLER	PAB	55'-0"	0.47	0.46	0.16	Y*
CVCS	CSAPCH1	MOTOR OPERATED PUMP	NO. 31 CHARGING PUMP	PAB	55'-0"	0.47	0.46	0.16	Y
CVCS	CSAPCH2	MOTOR OPERATED PUMP	NO. 32 CHARGING PUMP	PAB	55'-0"	0.47	0.46	0.16	Y
CVCS	CSAPCH3	MOTOR OPERATED PUMP	NO. 33 CHARGING PUMP	PAB	55'-0"	0.47	0.46	0.16	Y
CVCS	CSAHNRT	HEAT EXCHANGER	NON REGEN HEAT EXCH NO 31	PAB	73'-0	0.49	0.46	0.17	Y
RHR	ACAHRS1	HEAT EXCHANGER	RHR HTEXCH # 31	VC	66'-0"	0.49	0.46	0.17	Y
RHR	ACAHRS2	HEAT EXCHANGER	RHR HTEXCH # 32	VC	66'-0"	0.49	0.46	0.17	Y
EDG	ACV(GEN)-1	VOLTMETER	DG 31 SYNCHRONIZING PANEL AC VOLTMETER-INCOMING	CB	53'-0"	0.50	0.46	0.17	Y*
EDG	ACV(GEN)-2	VOLTMETER	DG 32 SYNCHRONIZING PANEL AC VOLTMETER-INCOMING	CB	53'-0"	0.50	0.46	0.17	Y*
EDG	ACV(GEN)-3	VOLTMETER	DG 33 SYNCHRONIZING PANEL AC VOLTMETER-INCOMING	CB	53'-0"	0.50	0.46	0.17	Y*
125VDC	BATT CHGR 31	BATTERY CHARGER	BATTERY CHARGER 31	CB	33'-0"	0.51	0.46	0.18	Y
125VDC	BATT CHGR 32	BATTERY CHARGER	BATTERY CHARGER 32	CB	33'-0"	0.51	0.46	0.18	Y
480 VAC	BUS 2A-VM	VOLTAGE MONITOR	VOLTAGE MONITOR	CB	53'-0"	0.51	0.46	0.18	Y
480 VAC	BUS 3A-VM	VOLTAGE MONITOR	VOLTAGE MONITOR	CB	53'-0"	0.51	0.46	0.18	Y
480 VAC	BUS 5A-VM	VOLTAGE MONITOR	VOLTAGE MONITOR	CB	53'-0"	0.51	0.46	0.18	Y
480 VAC	BUS 6A-VM	VOLTAGE MONITOR	VOLTAGE MONITOR	CB	53'-0"	0.51	0.46	0.18	Y
AFW	FI-1200	FLOW INDICATOR	AFW TO SG 31 FLOW INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y
AFW	FI-1201	FLOW INDICATOR	AFW TO SG 32 FLOW INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y
AFW	FI-1202	FLOW INDICATOR	AFW TO SG 33 FLOW INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y
AFW	FI-1203	FLOW INDICATOR	AFW TO SG 34 FLOW INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y
CCW	FI-601A	FLOW INDICATOR	CCW HEADER FLOW INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y
CCW	FI-601B	FLOW INDICATOR	CCW HEADER FLOW INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y
CCW	LI-628B	LEVEL INDICATOR	CCW SURGE TANK # 31 LEVEL INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y
CCW	LI-629B	LEVEL INDICATOR	CCW SURGE TANK # 32 LEVEL INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y
CVCS	FI-115A	FLOW INDICATOR	SEAL INJ. FLOW INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y*
CVCS	FI-116A	FLOW INDICATOR	SEAL INJ. FLOW INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y*
CVCS	FI-128B	FLOW INDICATOR	CHG FLOW TO REG HX INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y*
CVCS	FI-134	FLOW INDICATOR	LETDOWN FLOW INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y*
CVCS	FI-143A	FLOW INDICATOR	SEAL INJ. FLOW INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y*
CVCS	FI-144A	FLOW INDICATOR	SEAL INJ. FLOW INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y*
CVCS	LI-102	LEVEL INDICATOR	BORIC ACID STORAGE TANK #32 LEVEL INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y*
CVCS	LI-106	LEVEL INDICATOR	BORIC ACID STORAGE TANK #31 LEVEL INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y*
CVCS	LI-112	LEVEL INDICATOR	VCT LEVEL INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y*
CVCS	PI-139	PRESSURE INDICATOR	VCT PRESSURE INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y*
CVCS	PI-142B	PRESSURE INDICATOR	CHG PP DISCH PRESS INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y*
CVCS	TI-122	TEMPERATURE INDICATOR	EXCESS LETDOWN TEMPERATURE INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y*
CVCS	TI-126	TEMPERATURE INDICATOR	REGEN HX CHG FLOW TEMP INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y*
CVCS	TI-127	TEMPERATURE INDICATOR	REGEN HX CHG FLOW TEMPERATURE INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y*
CVCS	TI-130	TEMPERATURE INDICATOR	NON REGHX OUTLET LETDOWN TEMP INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y*
EDG	EDG-31 CCR WATT XDCR	TRANSDUCER	DG 31 BUS OUTPUT WATTMETER TRANSDUCER	CB	53'-0"	0.51	0.46	0.18	Y*
EDG	EDG-32 CCR WATT XDCR	TRANSDUCER	DG 32 BUS OUTPUT WATTMETER TRANSDUCER	CB	53'-0"	0.51	0.46	0.18	Y*
EDG	EDG-33 CCR WATT XDCR	TRANSDUCER	DG 33 BUS OUTPUT WATTMETER TRANSDUCER	CB	53'-0"	0.51	0.46	0.18	Y*
IAS	PI-1144	PRESSURE INDICATOR	STATION AIR NUCL SERV PRESS INDICATOR	CB	15'-0"	0.51	0.46	0.18	Y*
IAS	PI-1192	PRESSURE INDICATOR	IACC WATER PRESS INDICATOR	CB	15'-0"	0.51	0.46	0.18	Y*

* Denotes "Rule-of-the-Box" Component

Table 3A.1
Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	HCLFP$_{50}$ g	A-46
MFW	LR-417-1	LEVEL RECORDER	SG 31 LEVEL RECORDER	CB	53'-0"	0.51	0.46	0.18	Y*
MFW	LR-417-2	LEVEL RECORDER	SG 32 LEVEL RECORDER	CB	53'-0"	0.51	0.46	0.18	Y*
MFW	LR-437-1	LEVEL RECORDER	SG 33 LEVEL RECORDER	CB	53'-0"	0.51	0.46	0.18	Y*
MFW	LR-437-2	LEVEL RECORDER	SG 34 LEVEL RECORDER	CB	53'-0"	0.51	0.46	0.18	Y*
MFW	LT-417A	LEVEL TRANSMITTER	SG 31 LEVEL TRANSMITTER	VC	68'-0"	0.51	0.46	0.18	Y*
RCS	31 BK-UP HTR XFMR	TRANSFORMER	PRZR HTR BK UP GROUP 31 TRANSFORMER	CB	33'-0"	0.51	0.46	0.18	Y
RCS	33 BK-UP HTR XFMR	TRANSFORMER	PRZR HTR BK UP GROUP 33 TRANSFORMER	CB	33'-0"	0.51	0.46	0.18	Y
RCS	FI-414	FLOW INDICATOR	RX COOLANT LOOP 1 FLOW INDICATOR CH I	CB	53'-0"	0.51	0.46	0.18	Y
RCS	FI-415	FLOW INDICATOR	RX COOLANT LOOP 1 FLOW INDICATOR CH II	CB	53'-0"	0.51	0.46	0.18	Y
RCS	FI-424	FLOW INDICATOR	RX COOLANT LOOP 2 FLOW INDICATOR CH I	CB	53'-0"	0.51	0.46	0.18	Y
RCS	FI-425	FLOW INDICATOR	RX COOLANT LOOP 2 FLOW INDICATOR CH II	CB	53'-0"	0.51	0.46	0.18	Y
RCS	FI-434	FLOW INDICATOR	RX COOLANT LOOP 3 FLOW INDICATOR CH I	CB	53'-0"	0.51	0.46	0.18	Y
RCS	FI-435	FLOW INDICATOR	RX COOLANT LOOP 3 FLOW INDICATOR CH II	CB	53'-0"	0.51	0.46	0.18	Y
RCS	FI-444	FLOW INDICATOR	RX COOLANT LOOP 4 FLOW INDICATOR CH I	CB	53'-0"	0.51	0.46	0.18	Y
RCS	FI-445	FLOW INDICATOR	RX COOLANT LOOP 4 FLOW INDICATOR CH II	CB	53'-0"	0.51	0.46	0.18	Y
RCS	FI-946A	FLOW INDICATOR	RHR TO RCS 34 COLD LEG FLOW INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y
RCS	FI-946B	FLOW INDICATOR	RHR TO RCS 33 COLD LEG FLOW INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y
RCS	FI-946C	FLOW INDICATOR	RHR TO RCS 32 COLD LEG FLOW INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y
RCS	FI-946D	FLOW INDICATOR	RHR TO RCS 31 COLD LEG FLOW INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y
RCS	LI-462A	INDICATOR	PRESSURIZER INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y
RCS	PI-413K	PRESSURE INDICATOR	LOOP 31 HOT LEG PRESSURE INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y
RCS	PI-443K	PRESSURE INDICATOR	LOOP 34 HOT LEG PRESSURE INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y
RCS	PI-472	PRESSURE INDICATOR	PRT PRESSURE INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y
RCS	TI-453	TEMPERATURE INDICATOR	PRESSURIZER LIQUID SPACE TEMP INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y
RCS	TI-454	TEMPERATURE INDICATOR	PRESSURIZER STEAM TEMP INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y
RCS	TI-471	TEMPERATURE INDICATOR	PRT TEMP INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y
RHR	FI-638	FLOW INDICATOR	RHR HEAT EXCHANGER 31 OUTLET FLOW INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y*
RHR	FI-640	FLOW INDICATOR	RHR HEAT EXCHANGER 32 OUTLET FLOW INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y*
RHR	TE-641	TEMPERATURE ELEMENT	RHR HX 32 OUTLET TEMP ELEMENT	VC	46'-0"	0.51	0.46	0.18	Y
RHR	TR-638	TEMPERATURE RECORDER	RHR HX 31 & 32 OUTLET TEMP. RECORDER	CB	53'-0"	0.51	0.46	0.18	Y
SIS	LI-920	LEVEL INDICATOR	RWST LEVEL INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y*
SWS	PI-1190	PRESSURE INDICATOR	SVC WATER NUCL HDR PRESS INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y*
SWS	PI-1191	PRESSURE INDICATOR	SVC WATER NUCL HDR PRESS INDICATOR	CB	53'-0"	0.51	0.46	0.18	Y*
PNL	SUPERVISORY PANEL	CONTROL PANEL	SUPERVISORY PANEL	CB	53'-0"	0.52	0.46	0.18	Y
RCS	32 BK-UP HTR XFMR	TRANSFORMER	PRZR HTR BK UP GROUP 32 TRANSFORMER	CB	33'-0"	0.52	0.46	0.18	Y
CCW	ACAHCC1	HEAT EXCHANGER	COMPONENT COOLING WATER HEAT EXCHANGER NO. 31	PAB	55'-0"	0.52	0.46	0.18	Y
CCW	ACAHCC2	HEAT EXCHANGER	COMPONENT COOLING WATER HEAT EXCHANGER NO. 32	PAB	55'-0"	0.52	0.46	0.18	Y
CVCS	PNL PF6	CONTROL PANEL	GAS ANALYZING PANEL	PAB	55'-0"	0.56	0.46	0.19	Y
RHR	ACAPRH1	MOTOR DRIVEN PUMP	31 RHR PUMP	PAB	15'-0"	0.62	0.46	0.21	Y
RHR	ACAPRH2	MOTOR DRIVEN PUMP	32 RHR PUMP	PAB	15'-0"	0.62	0.46	0.21	Y
480 VAC	36AMCC	MOTOR CONTROL CENTER	PAB MOTOR CONTROL CENTER 36A	PAB	55'-0"	0.62	0.46	0.21	Y
480 VAC	36BMCC	MOTOR CONTROL CENTER	PAB MOTOR CONTROL CENTER 36B	PAB	55'-0"	0.62	0.46	0.21	Y
480 VAC	37MCC	MOTOR CONTROL CENTER	PRIMARY AUX BUILDING MOTOR CONTROL CENTER 37	PAB	55'-0"	0.62	0.46	0.21	Y
480 VAC	52/MCC6A	CIRCUIT BREAKER	36AMCC SUPPLY BREAKER	CB	15'-0"	0.62	0.46	0.21	Y*
480 VAC	52/MCC6B	CIRCUIT BREAKER	36BMCC SUPPLY BREAKER	CB	15'-0"	0.62	0.46	0.21	Y*
480 VAC	52/MCC7	CIRCUIT BREAKER	37MCC SUPPLY BREAKER	CB	15'-0"	0.62	0.46	0.21	Y*
CCW	RHRP31-HTX	HEAT EXCHANGER	RHR PUMP #31 PUMP SEAL HTEXCH	PAB	15'-0"	0.62	0.46	0.21	Y*
CCW	RHRP32-HTX	HEAT EXCHANGER	RHR PUMP #32 PUMP SEAL HTEXCH	PAB	15'-0"	0.62	0.46	0.21	Y*
118 VAC	34 INVERTER	INVERTER	STATIC INVERTER 34	CB	33'-0"	0.65	0.46	0.22	Y
PWS	PW-S-TK	TANK	PRIMARY WATER STORAGE TANK	YD	54'-0"	0.65	0.46	0.22	Y
480 VAC	FUSE-2A-PT	FUSE	FUSES ON 480V BUS 2A POT XFRMR	CB	15'-0"	0.65	0.46	0.22	Y*
480 VAC	FUSE-3A-PT	FUSE	FUSES ON 480V BUS 3A POT XFRMR	CB	15'-0"	0.65	0.46	0.22	Y*
480 VAC	FUSE-5A-PT	FUSE	FUSES ON 480V BUS 5A POT XFRMR	CB	15'-0"	0.65	0.46	0.22	Y*
480 VAC	FUSE-6A-PT	FUSE	FUSES ON 480V BUS 6A POT XFRMR	CB	15'-0"	0.65	0.46	0.22	Y*
480 VAC	OTS-2A	OVERCURRENT SWITCH	OVERCURRENT TRIP SWITCH	CB	15'-0"	0.65	0.46	0.22	Y*
480 VAC	OTS-3A	OVERCURRENT SWITCH	OVERCURRENT TRIP SWITCH	CB	15'-0"	0.65	0.46	0.22	Y*
480 VAC	OTS-5A	OVERCURRENT SWITCH	OVERCURRENT TRIP SWITCH	CB	15'-0"	0.65	0.46	0.22	Y*

* Denotes "Rule-of-the-Box" Component

Table 3A.1
Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
480 VAC	OTS-6A	OVERCURRENT SWICTH	OVERCURRENT TRIP SWITCH	CB	15'-0"	0.65	0.46	0.22	Y*
480 VAC	SST-2	TRANSFORMER	STATION SERVICE TRANSFORMER 2	CB	15'-0"	0.65	0.46	0.22	Y
480 VAC	SST-3	TRANSFORMER	STATION SERVICE TRANSFORMER 3	CB	15'-0"	0.65	0.46	0.22	Y
480 VAC	SST-5	TRANSFORMER	STATION SERVICE TRANSFORMER 5	CB	15'-0"	0.65	0.46	0.22	Y
480 VAC	SST-6	TRANSFORMER	STATION SERVICE TRANSFORMER 6	CB	15'-0"	0.65	0.46	0.22	Y
480 VAC	480V BUS 2A PT	TRANSFORMER	480V BUS 2A POTENTIAL TRANSFORMER	CB	15'-0"	0.67	0.46	0.23	Y*
480 VAC	480V BUS 3A PT	TRANSFORMER	480V BUS 3A POTENTIAL TRANSFORMER	CB	15'-0"	0.67	0.46	0.23	Y*
480 VAC	480V BUS 5A PT	TRANSFORMER	480V BUS 5A POTENTIAL TRANSFORMER	CB	15'-0"	0.67	0.46	0.23	Y*
480 VAC	480V BUS 6A PT	TRANSFORMER	480V BUS 6A POTENTIAL TRANSFORMER	CB	15'-0"	0.67	0.46	0.23	Y*
480 VAC	52/2A	CIRCUIT BREAKER	480V STATION SERVICE TRANSFORMER NO. 2 BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
480 VAC	52/2AT3A	CIRCUIT BREAKER	480V BUS TIE BREAKER - BUS 2A - 3A	CB	15'-0"	0.67	0.46	0.23	Y*
480 VAC	52/2AT5A	CIRCUIT BREAKER	480V BUS TIE BREAKER - BUS 2A - 5A	CB	15'-0"	0.67	0.46	0.23	Y*
480 VAC	52/3A	CIRCUIT BREAKER	480V STATION SERVICE TRANSFORMER NO. 3 BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
480 VAC	52/3AT6A	CIRCUIT BREAKER	480V BUS TIE BREAKER - BUS 3A - 6A	CB	15'-0"	0.67	0.46	0.23	Y*
480 VAC	52/5A	CIRCUIT BREAKER	480V STATION SERVICE TRANSFORMER NO. 5 BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
480 VAC	52/6A	CIRCUIT BREAKER	480V STATION SERVICE TRANSFROMER NO. 6 BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
480 VAC	52/6AT5A	CIRCUIT BREAKER	480V BUS TIE BREAKER - BUS 6A - 5A	CB	15'-0"	0.67	0.46	0.23	Y*
480 VAC	BUS2A	480V AC BUS	BUS 2A 480V	CB	15'-0"	0.67	0.46	0.23	Y
480 VAC	BUS3A	480V AC BUS	BUS 3A 480V	CB	15'-0"	0.67	0.46	0.23	Y
480 VAC	BUS5A	480V AC BUS	BUS 5A 480V	CB	15'-0"	0.67	0.46	0.23	Y
480 VAC	BUS6A	480V AC BUS	BUS 6A 480V	CB	15'-0"	0.67	0.46	0.23	Y
480 VAC	SWGR31	480V AC SWITCHGEAR	480VAC SWGR 31 (BUS 2A AND BUS 5A)	CB	15'-0"	0.67	0.46	0.23	Y
480 VAC	SWGR32	MOTOR CONTROL CENTER	480VAC SWGR 32 (BUS 3A & BUS 6A)	CB	15'-0"	0.67	0.46	0.23	Y
AFW	52/AF1	CIRCUIT BREAKER	31 AUXILIARY FEEDWATER PUMP BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
AFW	52/AF3	CIRCUIT BREAKER	33 AUXILIARY FEEDWATER PUMP BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
AFW	PM-406A	TRANSDUCER	SG #31 FW VALVES HI SEL.	CB	53'-0"	0.67	0.46	0.23	Y*
AFW	PM-406B	TRANSDUCER	SG #32 FW VALVES SIG. HI SEL.	CB	53'-0"	0.67	0.46	0.23	Y*
AFW	PM-406C	TRANSDUCER	SG #33 FW VALVES SIG. HI SEL.	CB	53'-0"	0.67	0.46	0.23	Y*
AFW	PM-406D	TRANSDUCER	SG #34 FW VALVES SIG. HI SEL.	CB	53'-0"	0.67	0.46	0.23	Y*
CCW	52/CC1	CIRCUIT BREAKER	31 COMPONENT COOLING WATER PUMP BREAKER	CB	15-0"	0.67	0.46	0.23	Y*
CCW	52/CC2	CIRCUIT BREAKER	32 COMPONENT COOLING WATER PUMP BREAKER	CB	15-0"	0.67	0.46	0.23	Y*
CCW	52/CC3	CIRCUIT BREAKER	33 COMPONENT COOLING WATER PUMP BREAKER	CB	15-0"	0.67	0.46	0.23	Y*
CFC	52/CRF1	CIRCUIT BREAKER	31 FAN COOLER UNIT BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
CFC	52/CRF2	CIRCUIT BREAKER	32 FAN COOLER UNIT BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
CFC	52/CRF3	CIRCUIT BREAKER	33 FAN COOLER UNIT BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
CFC	52/CRF4	CIRCUIT BREAKER	34 FAN COOLER UNIT BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
CFC	52/CRF5	CIRCUIT BREAKER	35 FAN COOLER UNIT BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
CRD	CRPI	INDICATOR	CONTROL ROD CLUSTER POSITIVE INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
CSI	52/CS1	MDP 31 CIRCUIT BREAKER	31 CONTAINMENT SPRAY PUMP BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
CSI	52/CS2	MDP 32 CIRCUIT BREAKER	32 CONTAINMENT SPRAY PUMP BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
CVCS	52/C1	CIRCUIT BREAKER	31 CHARGING PUMP BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
CVCS	52/C2	CIRCUIT BREAKER	32 CHARGING PUMP BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
CVCS	52/C3	CIRCUIT BREAKER	33 CHARGING PUMP BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
CVCS	FIC-110	CONTROLLER	BORIC ACID FLOW CONTROLLER	CB	53'-0"	0.67	0.46	0.23	Y*
CVCS	FIC-111	FLOW INDICATOR CONTROLLER	PRIMARY WATER FLOW CONTROL	CB	53'-0"	0.67	0.46	0.23	Y*
CVCS	FR-156	FLOW RECORDER	34 RCP SEAL LEAKOFF FLOW	CB	53'-0"	0.67	0.46	0.23	Y*
CVCS	FR-157	FLOW RECORDER	33 RCP SEAL LEAKOFF FLOW	CB	53'-0"	0.67	0.46	0.23	Y*
CVCS	FR-158	FLOW RECORDER	32 RCP SEAL LEAKOFF FLOW	CB	53'-0"	0.67	0.46	0.23	Y*
CVCS	FR-159	FLOW RECORDER	31 RCP SEAL LEAKOFF FLOW	CB	53'-0"	0.67	0.46	0.23	Y*
CVCS	YIC-110	BORIC ACID FLOW TOTALIZER	BORIC ACID FLOW TOTALIZER	CB	53'-0"	0.67	0.46	0.23	Y*
EDG	52/EG1	CIRCUIT BREAKER	DIESEL GENERATOR 31 BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
EDG	52/EG2	CIRCUIT BREAKER	DIESEL GNERATOR 32 BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
EDG	52/EG3	CIRCUIT BREAKER	DIESEL GENERATOR 33 BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
MFW	LI-417A	LEVEL INDICATOR	SG 31 LEVEL INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
MFW	LI-427A	LEVEL INDICATOR	SG 32 LEVEL INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
MFW	LI-437A	LEVEL INDICATOR	SG 33 LEVEL INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
MFW	LI-447A	LEVEL INDICATOR	SG 34 LEVEL INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*

* Denot[illegible] 'e-of-the-Box" Component

Table 3A.1
Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
MSS	FI-419A	FLOW INDICATOR	SG 31 STEAM FLOW INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
MSS	FI-419B	FLOW INDICATOR	SG 31 STEAM FLOW INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
MSS	FI-429A	FLOW INDICATOR	SG 32 STEAM FLOW INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
MSS	FI-429B	FLOW INDICATOR	SG 32 STEAM FLOW INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
MSS	FI-439A	FLOW INDICATOR	SG 33 STEAM FLOW INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
MSS	FI-439B	FLOW INDICATOR	SG 33 STEAM FLOW INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
MSS	FI-449A	FLOW INDICATOR	SG 34 STEAM FLOW INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
MSS	FI-449B	FLOW INDICATOR	SG 34 STEAM FLOW INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
NIS	NI 31B	SOURCE RANGE COUNT RATE METER	SOURCE RANGE COUNT RATE METER	CB	53'-0"	0.67	0.46	0.23	Y*
NIS	NI 31D	SOURCE RANGE COUNT RATE METER	SOURCE RANGE COUNT RATE METER	CB	53'-0"	0.67	0.46	0.23	Y*
NIS	NI 32B	SOURCE RANGE COUNT RATE METER	SOURCE RANGE COUNT RATE METER	CB	53'-0"	0.67	0.46	0.23	Y*
NIS	NI 32D	SOURCE RANGE COUNT RATE METER	SOURCE RANGE COUNT RATE METER	CB	53'-0"	0.67	0.46	0.23	Y*
NIS	NI 35B	INTERMEDIATE RANGE METER	INTERMEDIATE RANGE METER	CB	53'-0"	0.67	0.46	0.23	Y*
NIS	NI 35D	INTERMEDIATE RANGE METER	INTERMEDIATE RANGE METER	CB	53'-0"	0.67	0.46	0.23	Y*
NIS	NI 36B	INTERMEDIATE RANGE METER	INTERMEDIATE RANGE METER	CB	53'-0"	0.67	0.46	0.23	Y*
NIS	NI 36D	INTERMEDIATE RANGE METER	INTERMEDIATE RANGE METER	CB	53'-0"	0.67	0.46	0.23	Y*
NIS	NI 41B	POWER RANGE METER	POWER RANGE METER	CB	53'-0"	0.67	0.46	0.23	Y*
NIS	NI 41C	POWER RANGE METER	POWER RANGE METER	CB	53'-0"	0.67	0.46	0.23	Y*
NIS	NI 42B	POWER RANGE METER	POWER RANGE METER	CB	53'-0"	0.67	0.46	0.23	Y*
NIS	NI 42C	POWER RANGE METER	POWER RANGE METER	CB	53'-0"	0.67	0.46	0.23	Y*
NIS	NI 43B	POWER RANGE METER	POWER RANGE METER	CB	53'-0"	0.67	0.46	0.23	Y*
NIS	NI 43C	POWER RANGE METER	POWER RANGE METER	CB	53'-0"	0.67	0.46	0.23	Y*
NIS	NI 44B	POWER RANGE METER	POWER RANGE METER	CB	53'-0"	0.67	0.46	0.23	Y*
NIS	NI 44C	POWER RANGE METER	POWER RANGE METER	CB	53'-0"	0.67	0.46	0.23	Y*
PNL	FLIGHT PANEL	CONTROL PANEL	FLIGHT PANEL	CB	53'-0"	0.67	0.46	0.23	Y
PWS	YIC-111	DEMINERALIZED TOTALIZER	DEMINERALIZED WATER FLOW TOTALIZER	CB	53'-0"	0.67	0.46	0.23	Y*
RCS	LI-459	INDICATOR	PRESSURIZER INDICATOR CH I	CB	53'-0"	0.67	0.46	0.23	Y
RCS	LI-460	INDICATOR	PRESSURIZER INDICATOR CH II	CB	53'-0"	0.67	0.46	0.23	Y
RCS	LI-461	INDICATOR	PRESSURIZER INDICATOR CH III	CB	53'-0"	0.67	0.46	0.23	Y
RCS	LI-470	INDICATOR	PRT LEVEL INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y
RCS	PI-402	PRESSURE INDICATOR	LOOP 31 HOT LEG PRESSURE INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y
RCS	PI-403	PRESSURE INDICATOR	LOOP 34 HOT LEG PRESSURE INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y
RCS	PI-455	PRESSURE INDICATOR	PZR PRESS INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y
RCS	PI-456	PRESSURE INDICATOR	PZR PRESS INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y
RCS	PI-457	PRESSURE INDICATOR	PZR PRESS INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y
RCS	TR-413	TEMPERATURE RECORDER	RCS 31 LOOP HOT/COLD WIDE RANGE RECORDER	CB	53'-0"	0.67	0.46	0.23	Y
RCS	TR-423	TEMPERATURE RECORDER	RCS 32 LOOP HOT/COLD WIDE RANGE RECORDER	CB	53'-0"	0.67	0.46	0.23	Y
RCS	TR-433	TEMPERATURE RECORDER	RCS 33 LOOP HOT/COLD WIDE RANGE RECORDER	CB	53'-0"	0.67	0.46	0.23	Y
RCS	TR-443	TEMPERATURE RECORDER	RCS 34 LOOP HOT/COLD WIDE RANGE RECORDER	CB	53'-0"	0.67	0.46	0.23	Y
RHR	52/RHR1	CIRCUIT BREAKER	RHR PUMP 31 BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
RHR	52/RHR2	CIRCUIT BREAKER	RHR PUMP 32 BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
SIS	52/R1	CIRCUIT BREAKER	RECIRCULATION PUMP 31 BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
SIS	52/R2	CIRCUIT BREAKER	RECIRCULATION PUMP 32 BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
SIS	52/SI1	CIRCUIT BREAKER	SAFETY INJECTION PUMP 31 BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
SIS	52/SI2	CIRCUIT BREAKER	SAFETY INJECTION PUMP 32 BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
SIS	52/SI3	CIRCUIT BREAKER	SAFETY INJECTION PUMP 33 BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
SWS	52/SW3	CIRCUIT BREAKER	SERVICE WATER PUMP 33 BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
SWS	52/SW6	CIRCUIT BREAKER	SERVICE WATER PUMP 36 BREAKER	CB	15'-0"	0.67	0.46	0.23	Y*
CVCS	PI-135	PRESSURE INDICATOR	NON REGEN HX OUTLET LETDOWN PRESS INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
CVCS	SC-141A	CONTROLLER	31 CHRG PP SPEED CONTROL	CB	53'-0"	0.67	0.46	0.23	Y*
CVCS	SC-141B	CONTROLLER	32 CHRG PP SPEED CONTROL	CB	53'-0"	0.67	0.46	0.23	Y*
CVCS	SC-141C	CONTROLLER	33 CHRG PP SPEED CONTROL	CB	53'-0"	0.67	0.46	0.23	Y*
CVCS	TE-128	TEMPERATURE ELEMENT	REGEN HX CHG FLOW TEMP ELEMENT	VC	46'-0"	0.67	0.46	0.23	Y*
MSS	PC-419	STEAM PRESSURE CONTROLLER	SG #31 STEAM PRESS CONTROLLER	CB	53'-0"	0.67	0.46	0.23	Y*
MSS	PC-429	STEAM PRESSURE CONTROLLER	SG #32 STEAM PRESS CONTROLLER	CB	53'-0"	0.67	0.46	0.23	Y*
MSS	PC-439	STEAM PRESSURE CONTROLLER	SG #33 STEAM PRESS CONTROLLER	CB	53'-0"	0.67	0.46	0.23	Y*
MSS	PC-449	STEAM PRESSURE CONTROLLER	SG #34 STEAM PRESS CONTROLLER	CB	53'-0"	0.67	0.46	0.23	Y*

* Denotes "Rule-of-the-Box" Component

Table 3A.1
Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	HCLFP$_{50}$ g	A-46
MSS	PI-419A	PRESSURE INDICATOR	SG 31 STEAM PRESS INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
MSS	PI-419B	PRESSURE INDICATOR	SG 31 STEAM PRESS INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
MSS	PI-419C	PRESSURE INDICATOR	SG 31 STEAM PRESS INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
MSS	PI-429A	PRESSURE INDICATOR	SG 32 STEAM PRESS INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
MSS	PI-429B	PRESSURE INDICATOR	SG 32 STEAM PRESS INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
MSS	PI-429C	PRESSURE INDICATOR	SG 32 STEAM PRESS INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
MSS	PI-439A	PRESSURE INDICATOR	SG 33 STEAM PRESS INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
MSS	PI-439B	PRESSURE INDICATOR	SG 33 STEAM PRESS INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
MSS	PI-439C	PRESSURE INDICATOR	SG 33 STEAM PRESS INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
MSS	PI-449A	PRESSURE INDICATOR	SG 34 STEAM PRESS INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
MSS	PI-449B	PRESSURE INDICATOR	SG 34 STEAM PRESS INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
MSS	PI-449C	PRESSURE INDICATOR	SG 34 STEAM PRESS INDICATOR	CB	53'-0"	0.67	0.46	0.23	Y*
RACK	RACK A-1	CCR RACK	CCR RK'S "A1" AND "A4" (RCS/ANALOG CH I)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK A-10	CCR RACK	CCR RKS "A7" AND "A10" (RCS/ANALOG CH II)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK A-2	CCR RACK	CCR RK'S "A2" AND "A3" (STM GEN ANALOG PROT CH I)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK A-3	CCR RACK	CCR RK'S "A2" AND "A3" (STM GEN ANALOG PROT CH I)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK A-4	CCR RACK	CCR RK'S "A1" AND "A4" (RCS/ANALOG CH I)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK A-5	CCR RACK	CCR RK'S "A5" AND "A6" (RCS/OPS ANALOG)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK A-6	CCR RACK	CCR RK'S "A5" AND "A6" (RCS/OPS ANALOG)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK A-7	CCR RACK	CCR RKS "A7" AND "A10" (RCS/ANALOG CH II)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK A-8	CCR RACK	CCR RKS "A9" AND "A8" (STM GEN/ANALOG CH II)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK A-9	CCR RACK	CCR RKS "A9" AND "A8" (STM GEN/ANALOG CH II)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK B-1	CCR RACK	CCR RKS "B1" "B2" AND "B3" (RCS/ANALOG - CH III)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK B-10	CCR RACK	CCR RK'S "B9" AND "B10" (RCS/ANALOG CH IV)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK B-11	CCR RACK	CCR RK'S "B10"	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK B-2	CCR RACK	CCR RKS "B1" "B2" AND "B3" (RCS/ANALOG - CH III)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK B-3	CCR RACK	CCR RKS "B1" "B2" AND "B3" (RCS/ANALOG - CH III)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK B-4	CCR RACK	CCR RK'S "B4" AND "B5" (FEEDWATER CONTROL)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK B-5	CCR RACK	CCR RK'S "B4" AND "B5" (FEEDWATER CONTROL)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK B-6	CCR RACK	CCR RK'S "B6","B7","B8","D8" (REACTOR TEMP/PRESS AND STM DUMP)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK B-7	CCR RACK	CCR RK'S "B6","B7","B8","D8" (REACTOR TEMP/PRESS AND STM DUMP)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK B-8	CCR RACK	CCR RK'S "B6","B7","B8","D8" (REACTOR TEMP/PRESS AND STM DUMP)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK B-9	CCR RACK	CCR RK'S "B9" AND "B10" (RCS/ANALOG CH IV)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK C-1	CCR RACK	RACK C-1 ROD POSITION DETECTOR AND BISTABLES ASSEMBLIES	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK C-10	CCR RACK	CCR RKS "C9" AND "C10" (CVCS AUX)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK C-2	CCR RACK	RACK C-2 ROD POSITION DETECTOR AND BISTABLES ASSEMBLIES	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK C-3	CCR RACK	RACK C-3 ROD POSITION DETECTOR AND BISTABLES ASSEMBLIES	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK C-4	CCR RACK	RACK C-4 ROD POSITION DETECTOR AND BISTABLES ASSEMBLIES	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK C-5	CCR RACK	CCR RK "C5" (REG-NIS)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK C-6	CCR RACK	CCR RKF "C6" (REG-NIS)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK C-7	CCR RACK	CCR RK "C7" (REG-NIS)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK C-8	CCR RACK	CCR RK "C8" (CONT/NIS)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK C-9	CCR RACK	CCR RKS "C9" AND "C10" (CVCS AUX)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK D-1	CCR RACK	CCR RK "D1" (RAD MONITORS R-1, 2, 4, 6, 7, 8, 10)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK D-10	CCR RACK	CCR RK "D10" (GEN MONITOR SYS)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK D-11	CCR RACK	CCR RK "D11" (RAD MONITOR R-32, 33, 34A, 34B, 34C 38A, 38B, 38C, 38D)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK D-2	CCR RACK	CCR RK "D2" (RAD MONITOR R-11, 15 AND RAD RECORDERS)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK D-3	CCR RACK	CCR RK "D3" (RAD MONITORS R-16,17A,17B,18,19,23)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK D-4	CCR RACK	NIS FLUX MAPPING CONSOLE ASSEMBLY	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK D-5	CCR RACK	NIS FLUX MAPPING CONSOLE ASSEMBLY	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK D-6	CCR RACK	NIS FLUX MAPPING CONSOLE ASSEMBLY	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK D-7	CCR RACK	NIS FLUX MAPPING CONSOLE ASSEMBLY	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK D-8	CCR RACK	CCR RK'S "B6","B7","B8","D8" (REACTOR TEMP/PRESS AND STM DUMP)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK D-9	CCR RACK	CCR RK "D9" (NIS MISC INSTR)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK E-1	CCR RACK	CCR RK "E1" (SIS/ANALOG CH II)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK E-2	CCR RACK	CCR RK'S "E2" AND "F2" (RPS CH I)	CB	53'-0"	0.67	0.46	0.23	Y

* Denote "-of-the-Box" Component

Table 3A.1

Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
RACK	RACK E-3	CCR RACK	CCR RKS "E3" AND "FE" (RPS CH II)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK E-4	CCR RACK	CCR RK'S "E4" AND "F4" (RPS CH III)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK E-5	CCR RACK	CCR RK'S "E5" AND "F5" (RPS/LOGIC CH IV)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK E-6	CCR RACK	CONTROL RM RK "E6" (REACTOR TRIP RELAYS TRAIN A CH I) CIRCUIT BREAKER	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK E-7	CCR RACK	REACTOR PROTECTION SYSTEM RACK E-7	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK F-1	CCR RACK	CCR RK "F1" (SIS/ANALOG)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK F-2	CCR RACK	CCR RK'S "E2" AND "F2" (RPS CH I)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK F-3	CCR RACK	CCR RKS "E3" AND "FE" (RPS CH II)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK F-4	CCR RACK	CCR RK'S "E4" AND "F4" (RPS CH III)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK F-5	CCR RACK	CCR RK'S "E5" AND "F5" (RPS/LOGIC CH IV)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK F-6	CCR RACK	CCR RK "F6" (RPS CH II)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK F-7	CCR RACK	REACTOR PROTECTION SYSTEM RACK F-7	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK G-1	CCR RACK	CCR RK "G1" (SIS - MISC RELAYS)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK G-2	CCR RACK	CCR RK "G2" (SIS MISC RELAYS)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK G-3	CCR RACK	CCR RK'S "G3" AND "G5" (SIS - MISC RELAYS)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK G-4	CCR RACK	CCR PNL "G4" (CNTMNT BLDG PERSON LOCK AND PRESS GAUGE SOV'S)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK G-5	CCR RACK	CCR RK'S "G3" AND "G5" (SIS - MISC RELAYS)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK G-6	CCR RACK	CCR RK "G6" (CNTMNT BLDG PERSON LOCK AND PRESS GAUGE SOV'S)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK H-1	CCR RACK	CCR RK "H1" (RCS/OPS ANALOG CH I) I.B. VOLTMETER	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK H-2	CCR RACK	RCS OVERPRESS ANALOG RELAY RACK (CHANNEL 2)	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK H-3	CCR RACK	CCR RK "H3" (RCS/OPS ANALOG CH IV) I.B. VOLTMETER	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK H-4	CCR RACK	CONTROL RM RK "H4" (RCS OVER-PRESSURIZATION SYSTEM TRAIN 'B') CIRCUIT BREAKER	CB	53'-0"	0.67	0.46	0.23	Y
RACK	RACK H-5	CCR RACK	CONTROL RM RK "H5" (RCS OVERPRESSURIZATION SYSTEM TRAIN A) CIRCUIT BREAKER	CB	53'-0"	0.67	0.46	0.23	Y
NIS	31AIB-2	CONTROL CABINET	CNTMNT PARMETERS RECORDER CABINET "JO2" (CH II) HCMC-B	CB	53'-0"	0.69	0.46	0.23	Y
NIS	32AIB-2	CONTROL CABINET	CNTMNT PARMETERS RECORDER CABINET "JO1" (CH I) HCMC-A	CB	53'-0"	0.69	0.46	0.23	Y
RACK	RACK 20	INSTRUMENT RACK	FLOW TRANSMITTER RACK	VC	68'-0"	0.69	0.46	0.23	Y
RCS	FT-414	FLOW TRANSMITTER	RX COOLANT LOOP 1 FLOW TRANSMITTER CH I	VC	68'-0"	0.69	0.46	0.23	Y
RCS	FT-415	FLOW TRANSMITTER	RX COOLANT LOOP 1 FLOW TRANSMITTER CH II	VC	68'-0"	0.69	0.46	0.23	Y
RCS	FT-424	FLOW TRANSMITTER	RX COOLANT LOOP 2 FLOW TRANSMITTER CH I	VC	68'-0"	0.69	0.46	0.23	Y
RCS	FT-425	FLOW TRANSMITTER	RX COOLANT LOOP 2 FLOW TRANSMITTER CH II	VC	68'-0"	0.69	0.46	0.23	Y
RCS	FT-434	FLOW TRANSMITTER	RX COOLANT LOOP 3 FLOW TRANSMITTER CH I	VC	68'-0"	0.69	0.46	0.23	Y
RCS	FT-435	FLOW TRANSMITTER	RX COOLANT LOOP 3 FLOW TRANSMITTER CH II	VC	68'-0"	0.69	0.46	0.23	Y
RCS	FT-444	FLOW TRANSMITTER	RX COOLANT LOOP 4 FLOW TRANSMITTER CH I	VC	68'-0"	0.69	0.46	0.23	Y
RCS	FT-445	FLOW TRANSMITTER	RX COOLANT LOOP 4 FLOW TRANSMITTER CH II	VC	68'-0"	0.69	0.46	0.23	Y
SWS	31 SW PUMP	MOTOR DRIVEN PUMP	SERVICE WATER PUMP NO. 31	INTAKE	15'-0"	0.69	0.46	0.23	Y
SWS	32 SW PUMP	MOTOR DRIVEN PUMP	SERVICE WATER PUMP NO. 32	INTAKE	15'-0"	0.69	0.46	0.23	Y
SWS	33 SW PUMP	MOTOR DRIVEN PUMP	SERVICE WATER PUMP NO. 33	INTAKE	15'-0"	0.69	0.46	0.23	Y
SWS	34 SW PUMP	MOTOR DRIVEN PUMP	SERVICE WATER PUMP NO. 34	INTAKE	15'-0"	0.69	0.46	0.23	Y
SWS	35 SW PUMP	MOTOR DRIVEN PUMP	SERVICE WATER PUMP NO. 35	INTAKE	15'-0"	0.69	0.46	0.23	Y
SWS	36 SW PUMP	MOTOR DRIVEN PUMP	SERVICE WATER PUMP NO. 36	INTAKE	15'-0"	0.69	0.46	0.23	Y
NIS	LR-1253	LEVEL RECORDER	VC PARAMETERS CONTAINMENT LEVEL RECORDER	CB	53'-0"	0.69	0.46	0.24	Y*
NIS	LR-1254	LEVEL RECORDER	VC PARAMETERS CONTAINMENT LEVEL RECORDER	CB	53'-0"	0.69	0.46	0.24	Y*
NIS	PR-1421	PRESSURE RECORDER	CONTAINMENT PRESSUE RECORDER	CB	53'-0"	0.69	0.46	0.24	Y*
NIS	PR-1422	PRESSURE RECORDER	CONTAINMENT PRESSUE RECORDER	CB	53'-0"	0.69	0.46	0.24	Y*
HVAC	31CRDF	FAN	CRD COOLING FAN	VC	98'-0"	0.71	0.46	0.24	Y
HVAC	32CRDF	FAN	CRD COOLING FAN	VC	98'-0"	0.71	0.46	0.24	Y
HVAC	33CRDF	FAN	CRD COOLING FAN	VC	98'-0"	0.71	0.46	0.24	Y
HVAC	34CRDF	FAN	CRD COOLING FAN	VC	98'-0"	0.71	0.46	0.24	Y
PWS	31 PWST PUMP	MOTOR DRIVEN PUMP	PRIMARY WATER MAKEUP PUMP 31	PAB	41'-0"	0.71	0.46	0.24	Y
PWS	32 PWST PUMP	MOTOR DRIVEN PUMP	PRIMARY WATER MAKEUP PUMP 32	PAB	41'-0"	0.71	0.46	0.24	Y
118 VAC	34IB-32	TRANSFORMER	ALTERNATE FEED FROM MCC-36C	CB	33'-0"	0.75	0.30	0.37	Y
120 VAC	BF8	TRANSFORMER	120/120 VAC SOLATRON TRANSFORMER #32	CB	33'-0"	0.75	0.30	0.37	Y

* Denotes "Rule-of-the-Box" Component

Table 3A.1
Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
480 VAC	BI3	TRANSFORMER	480/120 VAC SOLA XFMR (FOR IB-31,31A)	CB	33'-0"	0.75	0.30	0.37	Y
480 VAC	BI4	TRANSFORMER	480/120 VAC SOLA XFMR (FOR IB-32,32A)	CB	33'-0"	0.75	0.30	0.37	Y
480 VAC	BJ1	TRANSFORMER	480/120 VAC SOLA XFMR (ALT FOR IB-34,34A)	CB	33'-0"	0.75	0.30	0.37	Y
AFW	FAN-311-AB	EXHAUST FAN	WALL EXHAUST FAN FOR AUXILIARY FEED PUMP BLDG.	AB	18'-6"	0.75	0.30	0.37	N
AFW	FAN-312-AB	EXHAUST FAN	WALL EXHAUST FAN FOR AUXILIARY FEED PUMP BLDG.	AB	18'-6"	0.75	0.30	0.37	N
AFW	FT-418L	FLOW TRANSMITTER	SG #31 FEED LINE LOW RANGE FLOW TRANSMITTER	AB	18'-6"	0.75	0.30	0.37	N
AFW	FT-428L	FLOW TRANSMITTER	SG #32 FEED LINE LOW RANGE FLOW TRANSMITTER	AB	18'-6"	0.75	0.30	0.37	N
AFW	FT-438L	FLOW TRANSMITTER	SG #33 FEED LINE LOW RANGE FLOW TRANSMITTER	AB	18'-6"	0.75	0.30	0.37	N
AFW	FT-448L	FLOW TRANSMITTER	SG #34 FEED LINE LOW RANGE FLOW TRANSMITTER	AB	18'-6"	0.75	0.30	0.37	N
AFW	L-314	MOTOR OPERATED LOUVER	MOTOR OPERATED LOUVER FOR THE AUXILIARY FEED PUMP BUILDING	AB	18'-6"	0.75	0.30	0.37	N
AFW	PI-1260	PRESSURE INDICATOR	AFW 31 DISCHG PRESS INDICATOR	AB	18'-6"	0.75	0.30	0.37	Y
AFW	PI-1261	PRESSURE INDICATOR	AFW 32 DISCHG PRESS INDICATOR	AB	18'-6"	0.75	0.30	0.37	Y
AFW	PI-1262	PRESSURE INDICATOR	AFW 33 DISCHG PRESS INDICATOR	AB	18'-6"	0.75	0.30	0.37	Y
AFW	PM-405A	TRANSDUCER	CTRL VLV FCV-405A I/P TRANSDUCER	AB	18'-6"	0.75	0.30	0.37	Y
AFW	PM-405B	TRANSDUCER	CTRL VLV FCV-405B I/P TRANSDUCER	AB	18'-6"	0.75	0.30	0.37	Y
AFW	PM-405C	TRANSDUCER	CTRL VLV FCV-405C I/P TRANSDUCER	AB	18'-6"	0.75	0.30	0.37	Y
AFW	PM-405D	TRANSDUCER	CTRL VLV FCV-405D I/P TRANSDUCER	AB	18'-6"	0.75	0.30	0.37	Y
AFW	PM-406E	TRANSDUCER	CTRL VLV FCV-406A I/P TRANSDUCER	AB	18'-6"	0.75	0.30	0.37	Y
AFW	PM-406F	TRANSDUCER	CTRL VLV FCV-406B I/P TRANSDUCER	AB	18'-6"	0.75	0.30	0.37	Y
AFW	PM-406G	TRANSDUCER	CTRL VLV FCV-406C I/P TRANSDUCER	AB	18'-6"	0.75	0.30	0.37	Y
AFW	PM-406H	TRANSDUCER	CTRL VLV FCV-406D I/P TRANSDUCER	AB	18'-6"	0.75	0.30	0.37	Y
AFW	PT-406A	PRESSURE TRANSMITTER	31 AFW PP DISCH PRESS TRANSMITTER	AB	18'-6"	0.75	0.30	0.37	Y
AFW	PT-406B	PRESSURE TRANSMITTER	33 AFW PP DISCH PRESS TRANSMITTER	AB	18'-6"	0.75	0.30	0.37	Y
AFW	PT-412A	PRESSURE TRANSMITTER	1ST STAGE TURB PRESS TRANSMITTER	TB	32'-0"	0.75	0.30	0.37	N
AFW	PT-412B	PRESSURE TRANSMITTER	1ST STAGE TURB PRESS TRANSMITTER	TB	32'-0"	0.75	0.30	0.37	N
CCW	FT-601A	FLOW TRANSMITTER	CCW HTX OUTLET FLOW	PAB	41'-0"	0.75	0.30	0.37	Y
CCW	FT-601B	FLOW TRANSMITTER	CCW HTX OUTLET FLOW	PAB	41'-0"	0.75	0.30	0.37	Y
CCW	LT-628	LEVEL TRANSMITTER	CCW SURGE TANK # 31 LEVEL TRANSMITTER	PAB	73'-0"	0.75	0.30	0.37	Y
CCW	LT-629	LEVEL TRANSMITTER	CCW SURGE TANK # 32 LEVEL TRANSMITTER	PAB	73'-0"	0.75	0.30	0.37	Y
CDS	LT-1128	LEVEL TRANSMITTER	COND STG TANK LEVEL TRANSMITTER	TB	36'-0"	0.75	0.30	0.37	Y
CDS	LT-1128A	LEVEL TRANSMITTER	COND STG TANK LEVEL TRANSMITTER	TB	15'-0"	0.75	0.30	0.37	Y
CVCS	FT-128	FLOW TRANSMITTER	CHG FLOW TO REG HX TRANSMITTER	PP	41'-0"	0.75	0.30	0.37	Y
CVCS	FT-134	FLOW TRANSMITTER	LETDOWN FLOW TRANSMITTER	PAB	75'-0"	0.75	0.30	0.37	Y
CVCS	LT-112	LEVEL TRANSMITTER	VCT LEVEL TRANSMITTER	PAB	73'-0"	0.75	0.30	0.37	Y
CVCS	PNL PL6	CONTROL PANEL	CHARGING PUMPS SPEED CONTROL PANEL	PAB	55'-0"	0.75	0.30	0.37	Y
CVCS	PT-135	PRESSURE TRANSMITTER	NON REGEN HX OUTLET LETDOWN PRESS TRANSMITTER	PAB	73'-0"	0.75	0.30	0.37	Y
CVCS	PT-139	PRESSURE TRANSMITTER	VCT PRESSURE TRANSMITTER	PAB	73'-0"	0.75	0.30	0.37	Y
CVCS	PT-142	PRESSURE TRANSMITTER	CHG PP DISCH PRESS TRANSMITTER	PAB	55'-0"	0.75	0.30	0.37	Y
CVCS	TE-122	TEMPERATURE ELEMENT	EXCESS LETDOWN TEMP ELEMENT	VC	46'-0"	0.75	0.30	0.37	Y
CVCS	TE-127	TEMPERATURE ELEMENT	REGEN HX CHG FLOW TEMPERATURE ELEMENT	VC	46'-0"	0.75	0.30	0.37	Y
CVCS	TE-130	TEMPERATURE ELEMENT	NON REGHX OUTLET LETDOWN TEMP ELEMENT	PAB	73'-0"	0.75	0.30	0.37	Y
DGV	ED314	AIR OPERATED DAMPER	DGB EXHAUST FAN 314 AIR OPERATED DAMPER	DGB	44'-0"	0.75	0.30	0.37	N
DGV	ED315	AIR OPERATED DAMPER	DGB EXHAUST FAN 315 AIR OPERATED DAMPER	DGB	44'-0"	0.75	0.30	0.37	N
DGV	ED316	AIR OPERATED DAMPER	DGB EXHAUST FAN 316 AIR OPERATED DAMPER	DGB	44'-0"	0.75	0.30	0.37	N
DGV	ED317	AIR OPERATED DAMPER	DGB EXHAUST FAN 317 AIR OPERATED DAMPER	DGB	44'-0"	0.75	0.30	0.37	N
DGV	ED318	AIR OPERATED DAMPER	DGB EXHAUST FAN 318 AIR OPERATED DAMPER	DGB	44'-0"	0.75	0.30	0.37	N
DGV	ED319	AIR OPERATED DAMPER	DGB EXHAUST FAN 319 AIR OPERATED DAMPER	DGB	44'-0"	0.75	0.30	0.37	N
EDG	0031ART	TANK	AIR RECEIVER 30 GAL. TANK # 31	DGB	15'-0"	0.75	0.30	0.37	Y
EDG	0032ART	TANK	AIR RECEIVER 30 GAL. TANK # 32	DGB	15'-0"	0.75	0.30	0.37	Y
EDG	0033ART	TANK	AIR RECEIVER 30 GAL. TANK # 33	DGB	15'-0"	0.75	0.30	0.37	Y
EDG	EDG-31-FO-DTNK	TANK	F.O. DAY TANK NO. 31	DG	26'-0"	0.75	0.30	0.37	Y
EDG	EDG-31-FO-STNK	TANK	F.O. STORAGE TANK 31	YD	27'-0"	0.75	0.30	0.37	Y
EDG	EDG-31-JW-XTNK	TANK	DG 31 JACKET WATER EXPANSION TANK	DGB	26'-0"	0.75	0.30	0.37	Y
EDG	EDG-32-FO-DTNK	TANK	F.O. DAY TANK NO. 32	DG	26'-0"	0.75	0.30	0.37	Y
EDG	EDG-32-FO-STNK	TANK	F.O. STORAGE TANK 32	YD	27'-0"	0.75	0.30	0.37	Y
EDG	EDG-32-JW-XTNK	TANK	DG 32 JACKET WATER EXPANSION TANK	DGB	26'-0"	0.75	0.30	0.37	Y

* Denot· ·of-the-Box" Component

Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	HCLFP$_{50}$ g	A-46
EDG	EDG-33-FO-DTNK	TANK	F.O. DAY TANK NO. 33	DG	26'-0"	0.75	0.30	0.37	Y
EDG	EDG-33-FO-STNK	TANK	F.O. STORAGE TANK 33	YD	27'-0"	0.75	0.30	0.37	Y
EDG	EDG-33-JW-XTNK	TANK	DG 33 JACKET WATER EXPANSION TANK	DGB	26'-0"	0.75	0.30	0.37	Y
IAS	0031ARTMSIV	TANK	MSIV AIR RECEIVER TANK (MS-1-31)	AB	80'-0"	0.75	0.30	0.37	Y
IAS	0032ARTMSIV	TANK	MSIV AIR RECIEVER TANK (MS-1-32)	AB	74'-0"	0.75	0.30	0.37	Y
IAS	0033ARTMSIV	TANK	MSIV AIR RECIEVER TANK (MS-1-33)	AB	80'-0"	0.75	0.30	0.37	Y
IAS	0034ARTMSIV	TANK	MSIV AIR RECIEVER TANK (MA-1-34)	AB	74'-0"	0.75	0.30	0.37	Y
IAS	31A HDDA	FILTER	31A HEATLESS DESSICANT DRYER AFTERFILTER	CB	15'-0"	0.75	0.30	0.37	N
IAS	31A HDDP	FILTER	31A HEATLESS DESSICANT DRYER PREFILTER	CB	15'-0"	0.75	0.30	0.37	N
IAS	32A HDDA	FILTER	32A HEATLESS DESSICANT DRYER AFTERFILTER	CB	15'-0"	0.75	0.30	0.37	N
IAS	32A HDDP	FILTER	32A HEATLESS DESSICANT DRYER PREFILTER	CB	15'-0"	0.75	0.30	0.37	N
IAS	IA-31-FLT	FILTER	COMPRESSOR 31 INLET AIR FILTER	CB	15'-0"	0.75	0.30	0.37	N
IAS	IA-32-FLT	FILTER	COMPRESSOR 32 INLET AIR FILTER	CB	15'-0"	0.75	0.30	0.37	N
IAS	PT-1144	PRESSURE TRANSMITTER	STATION AIR NUCL SERV PRESS TRANSMITTER	CB	15'-0"	0.75	0.30	0.37	Y
IAS	PT-1192	PRESSURE TRANSMITTER	IACC WATER PRESS TRANSMITTER	CB	15'-0"	0.75	0.30	0.37	Y
NIS	BG1	TRANSFORMER	1KVA SOLATRON TRANSFORMER 120V/120V	CB	33'-0"	0.75	0.30	0.37	Y
NIS	BG2	TRANSFORMER	1KVA SOLATRON TRANSFORMER 120V/120V	CB	33'-0"	0.75	0.30	0.37	Y
NIS	BG3	TRANSFORMER	1KVA SOLATRON TRANSFORMER 120V/120V	CB	33'-0"	0.75	0.30	0.37	Y
NIS	BG4	TRANSFORMER	1KVA SOLATRON TRANSFORMER 120V/120V	CB	33'-0"	0.75	0.30	0.37	Y
NIS	LT-1253	LEVEL TRANSMITTER	VC PARAMETERS CONTAINMENT LEVEL TRANSMITTER	VC	46'-0"	0.75	0.30	0.37	Y
NIS	LT-1254	LEVEL TRANSMITTER	VC PARAMETERS CONTAINMENT LEVEL TRANSMITTER	VC	46'-0"	0.75	0.30	0.37	Y
PPR	PT-402	PRESSURE TRANSMITTER	LOOP 31 HOT LEG PRESSURE TRANSMITTER	VC	46'-0"	0.75	0.30	0.37	Y
PPR	PT-403	PRESSURE TRANSMITTER	LOOP 34 HOT LEG PRESSURE TRANSMITTER	VC	46'-0"	0.75	0.30	0.37	Y
PPR	RCPCPR1	TANK	PRESSURIZER	VC	78'-0"	0.75	0.30	0.37	N
RCS	FT-946A	FLOW TRANSMITTER	RHR TO RCS 34 COLD LEG FLOW TRANSMITTER	VC	68'-0"	0.75	0.30	0.37	Y
RCS	FT-946B	FLOW TRANSMITTER	RHR TO RCS 33 COLD LEG FLOW TRANSMITTER	VC	68'-0"	0.75	0.30	0.37	Y
RCS	FT-946C	FLOW TRANSMITTER	RHR TO RCS 32 COLD LEG FLOW TRANSMITTER	VC	68'-0"	0.75	0.30	0.37	Y
RCS	FT-946D	FLOW TRANSMITTER	RHR TO RCS 31 COLD LEG FLOW TRANSMITTER	VC	68'-0"	0.75	0.30	0.37	Y
RCS	LT-470	LEVEL TRANSMITTER	PRT LEVEL TRANSMITTER	VC	65'-0"	0.75	0.30	0.37	Y
RCS	PT-413	PRESSURE TRANSMITTER	LOOP 31 HOT LEG PRESSURE TRANSMITTER	VC	46'-0"	0.75	0.30	0.37	Y
RCS	PT-443	PRESSURE TRANSMITTER	LOOP 34 HOT LEG PRESSURE TRANSMITTER	VC	46'-0"	0.75	0.30	0.37	Y
RCS	PT-472	PRESSURE TRANSMITTER	PRT PRESSURE TRANSMITTER	VC	62'-0"	0.75	0.30	0.37	Y
RCS	TE-1313	TEMPERATURE ELEMENT	UPPER TAP COMPENSATION TEMP ELEMENT	VC	83'-9"	0.75	0.30	0.37	Y
RCS	TE-1314	TEMPERATURE ELEMENT	UPPER TAP COMPENSATION TEMP ELEMENT	VC	74'-0"	0.75	0.30	0.37	Y
RCS	TE-1317	TEMPERATURE ELEMENT	RVWL CONDUIT COMPENSATION TEMP ELEMENT	VC	40'-0"	0.75	0.30	0.37	Y
RCS	TE-1318	TEMPERATURE ELEMENT	RVWL CONDUIT COMPENSATION	VC	46'-0"	0.75	0.30	0.37	Y
RCS	TE-1319	TEMPERATURE ELEMENT	RVWL LOWER TAP CAPILLARY TEMP ELEMENT	VC	60'-0"	0.75	0.30	0.37	Y
RCS	TE-1323	TEMPERATURE ELEMENT	UPPER TAP COMPENSATION TEMP ELEMENT	VC	84'-6"	0.75	0.30	0.37	Y
RCS	TE-1324	TEMPERATURE ELEMENT	UPPER TAP COMPENSATION TEMP ELEMENT	VC	74'-0"	0.75	0.30	0.37	Y
RCS	TE-1327	TEMPERATURE ELEMENT	RVWL CONDUIT COMPENSATION TEMP ELEMENT	VC	40'-0"	0.75	0.30	0.37	Y
RCS	TE-1328	TEMPERATURE ELEMENT	RVWL CONDUIT COMPENSATION TEMP ELEMENT	VC	46'-0"	0.75	0.30	0.37	Y
RCS	TE-1329	TEMPERATURE ELEMENT	RVWL LOWER TAP CAPILLARY TEMP ELEMENT	VC	60'-0"	0.75	0.30	0.37	Y
RCS	TE-411A1	TEMPERATURE ELEMENT	RCS LOOP 31 HOT LEG TEMP ELEMENT	VC	55'-0"	0.75	0.30	0.37	Y
RCS	TE-411A2	TEMPERATURE ELEMENT	RCS LOOP 31 HOT LEG TEMP ELEMENT	VC	55'-0"	0.75	0.30	0.37	Y
RCS	TE-411A3	TEMPERATURE ELEMENT	RCS LOOP 31 HOT LEG TEMP ELEMENT	VC	55'-0"	0.75	0.30	0.37	Y
RCS	TE-411B	TEMPERATURE ELEMENT	RCS LOOP 31 COLD LEG TEMP ELEMENT	VC	46'-0"	0.75	0.30	0.37	Y
RCS	TE-413A	TEMPERATURE ELEMENT	RCS LOOP 31 HOT LEG WIDE RANGE TEMP ELEMENT	VC	46'-0"	0.75	0.30	0.37	Y
RCS	TE-413B	TEMPERATURE ELEMENT	RCS LOOP 31 COLD LEG TEMP ELEMENT	VC	46'-0"	0.75	0.30	0.37	Y
RCS	TE-421A1	TEMPERATURE ELEMENT	RCS LOOP 32 HOT LEG TEMP ELEMENT	VC	55'-0"	0.75	0.30	0.37	Y
RCS	TE-421A2	TEMPERATURE ELEMENT	RCS LOOP 32 HOT LEG TEMP ELEMENT	VC	55'-0"	0.75	0.30	0.37	Y
RCS	TE-421A3	TEMPERATURE ELEMENT	RCS LOOP 32 HOT LEG TEMP ELEMENT	VC	55'-0"	0.75	0.30	0.37	Y
RCS	TE-421B	TEMPERATURE ELEMENT	RCS LOOP 32 COLD LEG TEMP ELEMENT	VC	46'-0"	0.75	0.30	0.37	Y
RCS	TE-423A3	TEMPERATURE ELEMENT	RCS LOOP 32 HOT LEG WIDE RANGE TEMP ELEMENT	VC	46'-0"	0.75	0.30	0.37	Y
RCS	TE-423B	TEMPERATURE ELEMENT	RCS LOOP 32 COLD LEG TEMP ELEMENT	VC	46'-0"	0.75	0.30	0.37	Y
RCS	TE-431A1	TEMPERATURE ELEMENT	RCS LOOP 33 HOT LEG TEMP ELEMENT	VC	55'-0"	0.75	0.30	0.37	Y
RCS	TE-431A2	TEMPERATURE ELEMENT	RCS LOOP 33 HOT LEG TEMP ELEMENT	VC	55'-0"	0.75	0.30	0.37	Y
RCS	TE-431A3	TEMPERATURE ELEMENT	RCS LOOP 33 HOT LEG TEMP ELEMENT	VC	55'-0"	0.75	0.30	0.37	Y

* Denotes "Rule-of-the-Box" Component

Table 3A.1
Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
RCS	TE-431B	TEMPERATURE ELEMENT	RCS LOOP 33 COLD LEG TEMP ELEMENT	VC	46'-0"	0.75	0.30	0.37	Y
RCS	TE-433A	TEMPERATURE ELEMENT	RCS LOOP 33 HOT LEG WIDE RANGE TEMP ELEMENT	VC	46'-0"	0.75	0.30	0.37	Y
RCS	TE-433B	TEMPERATURE ELEMENT	RCS LOOP 33 COLD LEG TEMP ELEMENT	VC	46'-0"	0.75	0.30	0.37	Y
RCS	TE-441A1	TEMPERATURE ELEMENT	RCS LOOP 34 HOT LEG TEMP ELEMENT	VC	55'-0"	0.75	0.30	0.37	Y
RCS	TE-441A2	TEMPERATURE ELEMENT	RCS LOOP 34 HOT LEG TEMP ELEMENT	VC	55'-0"	0.75	0.30	0.37	Y
RCS	TE-441A3	TEMPERATURE ELEMENT	RCS LOOP 34 HOT LEG TEMP ELEMENT	VC	55'-0"	0.75	0.30	0.37	Y
RCS	TE-441B	TEMPERATURE ELEMENT	RCS LOOP 34 COLD LEG TEMP ELEMENT	VC	46'-0"	0.75	0.30	0.37	Y
RCS	TE-443A	TEMPERATURE ELEMENT	RCS LOOP 34 HOT LEG WIDE RANGE TEMP ELEMENT	VC	46'-0"	0.75	0.30	0.37	Y
RCS	TE-443B	TEMPERATURE ELEMENT	RCS LOOP 34 COLD LEG TEMP ELEMENT	VC	46'-0"	0.75	0.30	0.37	Y
RCS	TE-453	TEMPERATURE ELEMENT	PRESSURIZER LIQUID SPACE TEMP ELEMENT	VC	73'-0"	0.75	0.30	0.37	Y
RCS	TE-454	TEMPERATURE ELEMENT	PRESSURIZER STEAM SPACE TEMP ELEMENT	VC	117'-0	0.75	0.30	0.37	Y
RCS	TE-471	TEMPERATURE ELEMENT	PRT TEMP ELEMENT	VC	46'-0"	0.75	0.30	0.37	Y
RHR	FT-638	FLOW TRANSMITTER	RHR FLOW TRANSMITTER	VC	46'-0"	0.75	0.30	0.37	Y
RHR	FT-640	FLOW TRANSMITTER	RHR FLOW TRANSMITTER	VC	46'-0"	0.75	0.30	0.37	Y
RHR	TE-638	TEMPERATURE ELEMENT	RHR HX TEMP INLET TEMP ELEMENT	PAB	15'-0"	0.75	0.30	0.37	Y
RHR	TE-639	TEMPERATURE ELEMENT	RHR HX 31 OUTLET TEMP ELEMENT	VC	68'-0"	0.75	0.30	0.37	Y
SIS	LT-920	LEVEL TRANSMITTER	RWST LEVEL TRANSMITTER	YD	79'-0"	0.75	0.30	0.37	Y
SP	31 PLSSHTX	HEAT EXCHANGER	31 PZR LIQ SPACE SAMPLE HTX	PAB	55'-0"	0.75	0.30	0.37	Y
SP	31 RCSSHTX	HEAT EXCHANGER	31 RCS SAMPLE HTX	PAB	55'-0"	0.75	0.30	0.37	Y
SP	32 PLSSHTX	HEAT EXCHANGER	32 PZR LIQ SPACE SAMPLE HTX	PAB	55'-0"	0.75	0.30	0.37	Y
SP	32 RCSSHTX	HEAT EXCHANGER	32 RCS SAMPLE HTX	PAB	55'-0"	0.75	0.30	0.37	Y
SP	PT-433	PRESSURE TRANSMITTER	LOOP 33 HOT LEG PRESSURE	VC	46'-0"	0.75	0.30	0.37	Y
SWS	PT-1190	PRESSURE TRANSMITTER	SVC WATER NUCL HDR PRESS TRANSMITTER	TB	15'-0"	0.75	0.30	0.37	Y
SWS	PT-1191	PRESSURE TRANSMITTER	SVC WATER NUCL HDR PRESS TRANSMITTER	TB	15'-0"	0.75	0.30	0.37	Y
SWS	SWN CLC 31 HTX	HEAT EXCHANGER	ESSENTIAL CLOSED LOOP COOLING 31 HEAT EXCHANGER	CB	15'-0"	0.75	0.30	0.37	N
SWS	SWN CLC 32 HTX	HEAT EXCHANGER	ESSENTIAL CLOSED LOOP COOLING 32 HEAT EXCHANGER	CB	15'-0"	0.75	0.30	0.37	N
125VDC	BATT CHGR 35	BATTERY CHARGER	BATTERY CHARGER 35	CB	33'-0"	0.76	0.46	0.28	N
118 VAC	32IB-31	TRANSFORMER	MAIN FEED FROM 32 INVERTER OR MCC-33	CB	33'-0"	0.76	0.30	0.38	Y
IAS	0031CLWP	COOLING WATER PUMP	31 I/A CMPR COOLING WTR PMP	CB	15'-0"	0.82	0.46	0.28	Y*
IAS	0031IACJC	HEAT EXCHANGER	INST AIR COMP 31 JACKET COOLER	CB	15'-0"	0.82	0.46	0.28	Y*
IAS	0032CLWP	COOLING WATER PUMP	32 I/A CMPR CL COOLING WTR PMP	CB	15'-0"	0.82	0.46	0.28	Y*
IAS	0032IACJC	HEAT EXCHANGER	INST AIR COMP 32 JACKET COOLER	CB	15'-0"	0.82	0.46	0.28	Y*
IAS	31 IA COMPRESSOR	AIR COMPRESSOR	INSTRUMENT AIR COMPRESSOR #31	CB	15'-0"	0.82	0.46	0.28	Y
IAS	32 IA COMPRESSOR	AIR COMPRESSOR	INSTRUMENT AIR COMPRESSOR #32	CB	15'-0"	0.82	0.46	0.28	Y
IAS	IA-SOV-1198	SOLENOID OPERATED VALVE	COMPRESSOR 31 UNLOADER SOLENOID OPERATED VALVE	CB	15'-0"	0.82	0.46	0.28	Y*
IAS	IA-SOV-1199	SOLENOID OPERATED VALVE	COMPRESSOR 32 UNLOADER SOLENOID OPERATED VALVE	CB	15'-0"	0.82	0.46	0.28	Y*
IAS	PNL HA7	CONTROL PANEL	COMPRESSOR 32 CONTROL STATION	CB	15'-0"	0.82	0.46	0.28	Y*
IAS	PNL HF1	CONTROL PANEL	COMPRESSOR 31 CONTROL STATION	CB	15'-0"	0.82	0.46	0.28	Y*
ICC	SOV-1177	SOLENOID OPERATED VALVE	AFTERCOOLER 31 INLET SOLENOID OPERATED VALVE	CB	15'-0"	0.82	0.46	0.28	Y*
ICC	SOV-1178	SOLENOID OPERATED VALVE	AFTERCOOLER 32 INLET SOLENOID OPERATED VALVE	CB	15'-0"	0.82	0.46	0.28	Y*
RCS	CAB JR9	CONTROL PANEL	RVLIS CABINET	CB	53'-0"	0.82	0.46	0.28	Y
RCS	LI-1311	INDICATOR	RVWL NARROW RANGE INDICATOR	PP	41'-0"	0.82	0.46	0.28	Y
RCS	LI-1312	INDICATOR	RVWL WIDE RANGE INDICATOR	PP	41'-0"	0.82	0.46	0.28	Y
RCS	LI-1321	INDICATOR	RVWL NARROW RANGE INDICATOR	PP	41'-0"	0.82	0.46	0.28	Y
RCS	LI-1322	INDICATOR	RVWL WIDE RANGE INDICATOR	PP	41'-0"	0.82	0.46	0.28	Y
AFW	HC-1118A	CONVERTER	I/P CONVERTER FOR AFWP 32 TURBINE SPEED CONTROL VALVE HCV-1118	AB	18'-0"	0.84	0.46	0.29	Y
480 VAC	36CMCC	MOTOR CONTROL CENTER	PAB MOTOR CONTROL CENTER 36C	PAB	55'-0"	0.86	0.46	0.29	Y
480 VAC	52/MCC6C	CIRCUIT BREAKER	36CMCC SUPPLY BREAKER	CB	15'-0"	0.86	0.46	0.29	Y*
CFC	CRF1	FAN	CONTAINMENT RECIRC FAN 31	VC	68'-0"	0.86	0.46	0.29	Y
CFC	CRF1 (BLOW-IN DOOR)	BLOW-IN-DOOR	FAN COOLER UNIT 31 BLOW-IN DOOR	VC	68'-0"	0.86	0.46	0.29	N
CFC	CRF2	FAN	CONTAINMENT RECIRC FAN 32	VC	68'-0"	0.86	0.46	0.29	Y
CFC	CRF2 (BLOW-IN DOOR)	BLOW-IN-DOOR	FAN COOLER UNIT 32 BLOW-IN DOOR	VC	68'-0"	0.86	0.46	0.29	N
CFC	CRF3	FAN	CONTAINMENT RECIRC FAN 33	VC	68'-0"	0.86	0.46	0.29	Y
CFC	CRF3 (BLOW-IN DOOR)	BLOW-IN-DOOR	FAN COOLER UNIT 33 BLOW-IN DOOR	VC	68'-0"	0.86	0.46	0.29	N
CFC	CRF4	FAN	CONTAINMENT RECIRC FAN 34	VC	68'-0"	0.86	0.46	0.29	Y
CFC	CRF4 (BLOW-IN DOOR)	BLOW-IN-DOOR	FAN COOLER UNIT 34 BLOW-IN DOOR	VC	68'-0"	0.86	0.46	0.29	N

* Denote[illegible] "[illegible]le-of-the-Box" Component

Table 3A.1
Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	HCLFP$_{50}$ g	A-46
CFC	CRF5	FAN	CONTAINMENT RECIRC FAN 35	VC	68'-0"	0.86	0.46	0.29	Y
CFC	CRF5 (BLOW-IN DOOR)	BLOW-IN-DOOR	FAN COOLER UNIT 35 BLOW-IN DOOR	VC	68'-0"	0.86	0.46	0.29	N
CFC	D-CRF1	FAN COOLER UNIT 31 DAMPER D	FAN-COOLER FILTER UNIT 31 INCIDENT DAMPER	VC	68'-0"	0.86	0.46	0.29	N
CFC	D-CRF2	FAN COOLER UNIT 32 DAMPER D	FAN-COOLER FILTER UNIT 32 INCIDENT DAMPER	VC	68'-0"	0.86	0.46	0.29	N
CFC	D-CRF3	FAN COOLER UNIT 33 DAMPER D	FAN-COOLER FILTER UNIT 33 INCIDENT DAMPER	VC	68'-0"	0.86	0.46	0.29	N
CFC	D-CRF4	FAN COOLER UNIT 34 DAMPER D	FAN-COOLER FILTER UNIT 34 INCIDENT DAMPER	VC	68'-0"	0.86	0.46	0.29	N
CFC	D-CRF5	FAN COOLER UNIT 35 DAMPER D	FAN-COOLER FILTER UNIT 35 INCIDENT DAMPER	VC	68'-0"	0.86	0.46	0.29	N
MSS	FT-419A	FLOW TRANSMITTER	SG 31 STEAM FLOW TRANSMITTER	VC	68'-0"	0.86	0.46	0.29	Y*
MSS	FT-419B	FLOW TRANSMITTER	SG 31 STEAM FLOW TRANSMITTER	VC	68'-0"	0.86	0.46	0.29	Y*
MSS	FT-429A	FLOW TRANSMITTER	SG 32 STEAM FLOW TRANSMITTER	VC	68'-0"	0.86	0.46	0.29	Y*
MSS	FT-429B	FLOW TRANSMITTER	SG 32 STEAM FLOW TRANSMITTER	VC	68'-0"	0.86	0.46	0.29	Y*
MSS	FT-439A	FLOW TRANSMITTER	SG 33 STEAM FLOW TRANSMITTER	VC	68'-0"	0.86	0.46	0.29	Y*
MSS	FT-439B	FLOW TRANSMITTER	SG 33 STEAM FLOW TRANSMITTER	VC	68'-0"	0.86	0.46	0.29	Y*
MSS	FT-449A	FLOW TRANSMITTER	SG 34 STEAM FLOW TRANSMITTER	VC	68'-0"	0.86	0.46	0.29	Y*
MSS	FT-449B	FLOW TRANSMITTER	SG 34 STEAM FLOW TRANSMITTER	VC	68'-0"	0.86	0.46	0.29	Y*
RACK	RACK 4-A	INSTRUMENT RACK	SG #31 & #32 MAIN STM FLOW TRANSMITTER RACK	VC	68'-0"	0.86	0.46	0.29	Y
RACK	RACK 4-B	INSTRUMENT RACK	SG #33 & #34 MAIN STM FLOW TRANSMITTER RACK	VC	68'-0"	0.86	0.46	0.29	Y
125VDC	31-BATT-FUSE	FUSE	BATTERY 31 FUSES	CB	33'-0"	0.88	0.46	0.30	Y*
125VDC	32-BATT-FUSE	FUSE	BATTERY 32 FUSES	CB	33'-0"	0.88	0.46	0.30	Y*
125VDC	32PP-15	CIRCUIT BREAKER	125VDC POWER PANEL 32 BATTERY CIRCUIT BREAKER	CB	33'-0"	0.88	0.46	0.30	Y*
125VDC	34PP-MAIN	CIRCUIT BREAKER	POWER PANEL 34 BATT CKT BRKR	CB	33'-0"	0.88	0.46	0.30	Y*
125VDC	BATT 31	STATION BATTERY	BATTERY BANK 31	CB	33'-0"	0.88	0.46	0.30	Y
125VDC	BATT 32	STATION BATTERY	BATTERY BANK 32	CB	33'-0"	0.88	0.46	0.30	Y
125VDC	BATT 34	STATION BATTERY	BATTERY BANK 34	CB	33'-0"	0.88	0.46	0.30	Y
CDS	CST	TANK	CONDENSATE STOR TANK	TB	36'-0"	0.88	0.46	0.30	Y
HVAC	31 PABEF	EXHAUST FAN	PRIMARY AUX BUILDING EXHAUST FAN	FR	72'-0"	0.88	0.46	0.30	Y
HVAC	32 PABEF	EXHAUST FAN	PRIMARY AUX BUILDING EXHAUST FAN	FR	72'-0"	0.88	0.46	0.30	Y
EDG	PNL PP9	CONTROL PANEL	31 EDG CONTROL PANEL	DG	15'-0"	0.88	0.46	0.30	Y
EDG	PNL PQ1	CONTROL PANEL	32 EDG CONTROL PANEL	DG	15'-0"	0.88	0.46	0.30	Y
EDG	PNL PQ2	CONTROL PANEL	33 EDG CONTROL PANEL	DG	15'-0"	0.88	0.46	0.30	Y
EDG	PNL VRP 31	CONTROL PANEL	31 EDG VOLTAGE REG PANEL	DG	15'-0"	0.88	0.46	0.30	Y*
EDG	PNL VRP 32	CONTROL PANEL	32 EDG VOLTAGR REG PANEL	DG	15'-0"	0.88	0.46	0.30	Y*
EDG	PNL VRP 33	CONTROL PANEL	33 EDG VOLTAGE REG PANEL	DG	15'-0"	0.88	0.46	0.30	Y*
480 VAC	39MCC	MOTOR CONTROL CENTER	CONTROL BUILDING MOTOR CONTROL CENTER 39	CB	33'-0"	0.90	0.46	0.31	Y
480 VAC	52/MCC9	CIRCUIT BREAKER	39MCC SUPPLY BREAKER	CB	15'-0"	0.90	0.46	0.31	Y*
MFW	LT-417D	LEVEL TRANSMITTER	SG 31 LEVEL TRANSMITTER	VC	68'-0"	0.90	0.46	0.31	Y*
MFW	LT-427A	LEVEL TRANSMITTER	SG 32 LEVEL TRANSMITTER	VC	68'-0"	0.90	0.46	0.31	Y*
MFW	LT-427D	LEVEL TRANSMITTER	SG 32 LEVEL TRANSMITTER	VC	68'-0"	0.90	0.46	0.31	Y*
MFW	LT-437A	LEVEL TRANSMITTER	SG 33 LEVEL TRANSMITTER	VC	68'-0"	0.90	0.46	0.31	Y*
MFW	LT-437D	LEVEL TRANSMITTER	SG 33 LEVEL TRANSMITTER	VC	68'-0"	0.90	0.46	0.31	Y*
MFW	LT-447A	LEVEL TRANSMITTER	SG 34 LEVEL TRANSMITTER	VC	68'-0"	0.90	0.46	0.31	Y*
MFW	LT-447D	LEVEL TRANSMITTER	SG 34 LEVEL TRANSMITTER	VC	68'-0"	0.90	0.46	0.31	Y*
RACK	RACK 19	INSTRUMENT RACK	PRESSURIZER LEVEL TRANSMITTER CABINET	VC	68'-0"	0.90	0.46	0.31	Y
RACK	RACK 21	INSTRUMENT RACK	STEAM GENERATORS LEVEL TRANSMITTER	VC	68'-0"	0.90	0.46	0.31	Y
RCS	LT-459	LEVEL TRANSMITTER	PRESSURIZER LEVEL TRANSMITTER CH I	VC	68'-0"	0.90	0.46	0.31	Y
RCS	LT-460	LEVEL TRANSMITTER	PRESSURIZER LEVEL TRANSMITTER CH II	VC	68'-0"	0.90	0.46	0.31	Y
RCS	LT-461	LEVEL TRANSMITTER	PRESSURIZER LEVEL TRANSMITTER CH III	VC	68'-0"	0.90	0.46	0.31	Y
RCS	PT-455	PRESSURE TRANSMITTER	PRESSURIZER PRESSURE CH I TRANSMITTER	VC	68'-0"	0.90	0.46	0.31	Y
RCS	PT-456	PRESSURE TRANSMITTER	PRESSURIZER PRESSURE CH II TRANSMITTER	VC	68'-0"	0.90	0.46	0.31	Y
RCS	PT-457	PRESSURE TRANSMITTER	PRESSURIZER PRESSURE CH III TRANSMITTER	VC	68'-0"	0.90	0.46	0.31	Y
RCS	PT-474	PRESSURE TRANSMITTER	PRESSURIZER PRESSURE CH IV TRANSMITTER	VC	53'-0"	0.90	0.46	0.31	Y
480 VAC	32MCC	MOTOR CONTROL CENTER	TURBINE-GENERATOR BUILDING MOTOR CONTROL CENTER 32	TB	15'-0"	0.92	0.46	0.32	Y
480 VAC	33MCC	MOTOR CONTROL CENTER	TURBINE GENERATOR BUILDING MOTOR CONTROL CENTER 33	TB	15'-0"	0.92	0.46	0.32	Y
480 VAC	34MCC	MOTOR CONTROL CENTER	TURBINE GENERATOR BUILDING MOTOR CONTROL CENTER 34	TB	15'-0"	0.92	0.46	0.32	Y
480 VAC	52/MCC3	CIRCUIT BREAKER	33MCC SUPPLY BREAKER	CB	15'-0"	0.92	0.46	0.32	Y*
480 VAC	52/MCC4	CIRCUIT BREAKER	34MCC SUPPLY BREAKER	CB	15'-0"	0.92	0.46	0.32	Y*
NIS	PT-1421	PRESSURE TRANSMITTER	CTMT PRESSURE TRANSMITTER	PP	41'-0"	0.92	0.46	0.32	Y*

* Denotes "Rule-of-the-Box" Component

Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
NIS	PT-1422	PRESSURE TRANSMITTER	CTMT PRESSURE TRANSMITTER	PP	41'-0"	0.92	0.46	0.32	Y*
RACK	RACK 24A	INSTRUMENT RACK	TRANSMITTER RACK	PP	41'-0"	0.92	0.48	0.32	Y
CSI	INTSIATSAI	TANK	#31 SPRAY ADDITIVE TANK	PAB	41'-0"	0 99	0 46	0.34	N
EDG	BF4	TRANSFORMER	CURRENT TRANSFORMER ENCLOSURE D.G 31	DG	10'-0"	0 99	0.46	0.34	Y
EDG	BF5	TRANSFORMER	CURRENT TRANSFORMER ENCLOSURE D G 32	DG	10'-0"	0 99	0 46	0.34	Y
EDG	BF6	TRANSFORMER	CURRENT TRANSFORMER ENCLOSURE D G 33	DG	10' 0"	0 99	0 48	0.34	Y
SIS	RWST-31	TANK	REFUEL WTR STORAGE TANK	YD	80' 0"	1 03	0 46	0.35	Y
118 VAC	33 INVERTER	INVERTER	STATIC INVERTER 33	CB	33' 0"	1 08	0 46	0.37	Y
118 VAC	33IB-31	TRANSFORMER	MAIN FEED FROM 33 INVERTER OR MCC-39	CB	33' 0"	1 08	0 46	0.37	Y
480 VAC	B1G	TRANSFORMER	480/120 VAC ELGAR TRANSFORMER (FOR IB-33,33A)	CB	33' 0"	1 08	0 46	0.37	Y
118 VAC	31IB	118 V AC BUS	SINGLE PHASE 118V AC INSTRUMENT BUS 31 CHANNEL II	CB	53' 0"	1 13	0 30	0.58	Y
118 VAC	31IB-31	TRANSFORMER	MAIN FEED FROM 31 INVERTER OR MCC-34	CB	33'-0"	1 13	0 30	0.58	Y
118 VAC	32IB	118 V AC BUS	SINGLE PHASE 118V AC INSTRUMENT BUS 32 CHANNEL I	CB	53'-0"	1 13	0.30	0.58	Y
118 VAC	33IB	118V AC BUS	SINGLE PHASE 118V AC INSTRUMENT BUS 33 CHANNEL IV	CB	53'-0"	1.13	0.30	0.58	Y
118 VAC	34IB	118 V AC BUS	SINGLE PHASE 118V AC INSTRUMENT BUS 34 CHANNEL III	CB	53'-0"	1.13	0.30	0.58	Y
118 VAC	34IB-31	TRANSFORMER	MAIN FEED FROM 34 INVERTER (BACKUP-MCC-36B)	CB	33'-0"	1.13	0.30	0.58	Y
118 VAC	BI3	FUSE BOX	STATIC INVERTER #31 FUSE BOX	CB	33'-0"	1.13	0.30	0.58	Y
118 VAC	BI4	FUSE BOX	STATIC INVERTER #32 FUSE BOX	CB	33'-0"	1.13	0.30	0.58	Y
118 VAC	IB31 BYPASS SW	BYPASS SWITCH	INST BUS 31,31A MANUAL BY-PASS SWITCH	CB	33'-0"	1.13	0.30	0.58	Y
118 VAC	IB32 BYPASS SW	BYPASS SWITCH	INST BUS 32,32A MANUAL BY-PASS SWITCH	CB	33'-0"	1.13	0.30	0.58	Y
118 VAC	IB33 BYPASS SW	BYPASS SWITCH	INST BUS 33,33A MANUAL BY-PASS SWITCH	CB	33'-0"	1.13	0.30	0.58	Y
118 VAC	IB34 BYPASS SW	BYPASS SWITCH	INST BUS 34,34A MANUAL BY-PASS SWITCH	CB	33'-0"	1.13	0.30	0.58	Y
118 VAC	K4C	FUSE BOX	STATIC INVERTER #33 FUSE BOX	CB	33'-0"	1.13	0.30	0.58	Y
118 VAC	K50	UNKNOWN	118 VAC INST BUS 31A	CB	53'-0"	1.13	0.30	0.58	Y
118 VAC	K51	UNKNOWN	118 VAC INST BUS 32A	CB	53'-0"	1.13	0.30	0.58	Y
125VDC	31DP	DC DISTRIBUTION PANEL	125VDC DISTRIBUTION PANEL 31	CB	33'-0"	1.13	0.30	0.58	Y
125VDC	31PP	DC POWER PANEL	125VDC POWER PANEL 31	CB	33'-0"	1.13	0.30	0.58	Y
125VDC	31PP-17	CIRCUIT BREAKER	125 VDC POWER PANEL 31 BATTERY 31 CIRCUIT BREAKER	CB	33'-0"	1.13	0.30	0.58	Y*
125VDC	32DP	DC DISTRIBUTION PANEL	125VDC DISTRIBUTION PANEL 32	CB	33'-0"	1.13	0.30	0.58	Y
125VDC	32PP	DC POWER PANEL	125VDC POWER PANEL 32	CB	33'-0"	1.13	0.30	0.58	Y
125VDC	33-BATT-FUSE	FUSE	BATTERY 33 FUSES	CB	15'-0"	1.13	0.30	0.58	Y*
125VDC	33DP	DC DISTRIBUTION PANEL	125VDC DISTRIBUTION PANEL 33	CB	33'-0"	1.13	0.30	0.58	Y
125VDC	33PP	DC POWER PANEL	125VDC POWER PANEL 33	CB	15'-0"	1.13	0.30	0.58	Y
125VDC	33PP-MAIN	CIRCUIT BREAKER	POWER PANEL 33 BATT CKT BRKR	CB	15'-0"	1.13	0.30	0.58	Y*
125VDC	34DP	DC DISTRIBUTION PANEL	125VDC DISTRIBUTION PANEL 34	CB	33'-0"	1.13	0.30	0.58	Y
125VDC	34PP	DC POWER PANEL	125VDC POWER PANEL 34	CB	33'-0"	1.13	0.30	0.58	Y
125VDC	PNL K48	DC DISTRIBUTION PANEL	125 VDC DISTRIBUTION PNL 31A	CB	53'-0"	1.13	0.30	0.58	Y
125VDC	PNL K49	DC DISTRIBUTION PANEL	125 VDC DISTRIBUTION PNL 32A	CB	53'-0"	1.13	0.30	0.58	Y
480 VAC	BC2	TRANSFORMER	480/120 VAC TRANSFORMER #32 (FOR IB-34,34A)	CB	33'-0"	1.13	0.30	0.58	Y
AFW	BFD-31	CHECK VALVE	AUX. FW PUMP 32 DISCHARGE CHECK	AB	15'-0"	1.13	0.30	0.58	N
AFW	BFD-34	CHECK VALVE	AUX. FW PUMP 31 DISCHARGE CHECK	AB	15'-0"	1.13	0.30	0.58	N
AFW	BFD-35	CHECK VALVE	AFWP 31 FCV-406B OUTLET CHECK	AB	15'-0"	1.13	0.30	0.58	N
AFW	BFD-36	MANUAL VALVE	AFWP 31 FCV-406B OUTLET STOP	AB	15'-0"	1.13	0.30	0.58	N
AFW	BFD-37	CHECK VALVE	AFWP 31 FCV-406A OUTLET CHECK	AB	15'-0"	1.13	0.30	0.58	N
AFW	BFD-38	MANUAL VALVE	AFWP 31 FCV-406A OUTLET STOP	AB	15'-0"	1.13	0.30	0.58	N
AFW	BFD-39	CHECK VALVE	AUX. FW PUMP 33 DISCHARGE CHECK	AB	15'-0"	1.13	0.30	0.58	N
AFW	BFD-40	CHECK VALVE	AFWP 33 FCV-406C OUTLET CHECK	AB	15'-0"	1.13	0.30	0.58	N
AFW	BFD-41	MANUAL VALVE	AFWP 33 FCV-406C OUTLET STOP	AB	15'-0"	1.13	0.30	0.58	N
AFW	BFD-42	CHECK VALVE	AFWP 33 FCV-406D OUTLET CHECK	AB	15'-0"	1.13	0.30	0.58	N
AFW	BFD-43	MANUAL VALVE	AFWP 33 FCV-406D OUTLET STOP	AB	15'-0"	1.13	0.30	0.58	N
AFW	BFD-47-1	CHECK VALVE	AFWP 32 FCV-405C OUTLET CHECK	AB	15'-0"	1.13	0.30	0.58	N
AFW	BFD-47-2	CHECK VALVE	AFWP 32 FCV-405D OUTLET CHECK	AB	15'-0"	1.13	0.30	0.58	N
AFW	BFD-47-3	CHECK VALVE	AFWP 32 FCV-405B OUTLET CHECK	AB	15'-0"	1.13	0.30	0.58	N
AFW	BFD-47-4	CHECK VALVE	AFWP 32 FCV-405A OUTLET CHECK	AB	15'-0"	1.13	0.30	0.58	N
AFW	BFD-48-1	MANUAL VALVE	AFWP 32 FCV-405A OUTLET STOP	AB	15'-0"	1.13	0.30	0.58	N
AFW	BFD-48-2	MANUAL VALVE	AFWP 32 FCV-405B INLET STOP	AB	15'-0"	1.13	0.30	0.58	N
AFW	BFD-48-3	MANUAL VALVE	AFWP 32 FCV-405B OUTLET STOP	AB	15'-0"	1.13	0.30	0.58	N

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Table 3A.1
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SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
AFW	BFD-48-4	MANUAL VALVE	AFWP 32 FCV-405C INLET STOP	AB	15'-0"	1.13	0.30	0.56	N
AFW	BFD-48-5	MANUAL VALVE	AFWP 32 FCV-405C OUTLET STOP	AB	15'-0"	1.13	0.30	0.56	N
AFW	BFD-48-6	MANUAL VALVE	AFWP 32 FCV-405D INLET STOP	AB	15'-0"	1.13	0.30	0.56	N
AFW	BFD-48-7	MANUAL VALVE	AFWP 32 FCV-405D OUTLET STOP	AB	15'-0"	1.13	0.30	0.56	N
AFW	BFD-48-8	MANUAL VALVE	AFWP 32 FCV-405A INLET STOP	AB	15'-0"	1.13	0.30	0.56	N
AFW	BFD-50	CHECK VALVE	AFWP 32 RECIRC CHECK	AB	15'-0"	1.13	0.30	0.56	N
AFW	BFD-51	MANUAL VALVE	AFWP 32 RECIRC OUTLET STOP	AB	15'-0"	1.13	0.30	0.56	N
AFW	BFD-52	CHECK VALVE	AFWP 31 FCV-1121 OUTLET CHECK VALVE	AB	15'-0"	1.13	0.30	0.56	N
AFW	BFD-53	MANUAL VALVE	AFWP 31 FCV-1121 OUTLET STOP	AB	15'-0"	1.13	0.30	0.56	N
AFW	BFD-54	CHECK VALVE	AFWP 33 FCV-1123 OUTLET CHECK VALVE	AB	15'-0"	1.13	0.30	0.56	N
AFW	BFD-55	MANUAL VALVE	AFWP 33 FCV-1123 OUTLET STOP	AB	15'-0"	1.13	0.30	0.56	N
AFW	BFD-62-1	MANUAL VALVE	AFWP 31 FCV-406B INLET STOP	AB	18'-6"	1.13	0.30	0.56	N
AFW	BFD-62-2	MANUAL VALVE	AFWP 33 FCV-406C INLET STOP	AB	18'-6"	1.13	0.30	0.56	N
AFW	BFD-62-3	MANUAL VALVE	AFWP 33 FCV-406D INLET STOP	AB	18'-6"	1.13	0.30	0.56	N
AFW	BFD-62-4	MANUAL VALVE	AFWP 31 FCV-406A INLET STOP	AB	18'-6"	1.13	0.30	0.56	N
AFW	BFD-67	CHECK VALVE	CHECK VALVE FOR AFW TO NO 32 S/G	AB	44'-0"	1.13	0.30	0.56	N
AFW	BFD-68	CHECK VALVE	CHECK VALVE FOR AFW TO NO 31 S/G	AB	44'-0"	1.13	0.30	0.56	N
AFW	BFD-69	CHECK VALVE	CHECK VALVE FOR AFW TO NO 33 S/G	AB	44'-0"	1.13	0.30	0.56	N
AFW	BFD-70	CHECK VALVE	CHECK VALVE FOR AFW TO NO 34 S/G	AB	44'-0"	1.13	0.30	0.56	N
AFW	BFD-FCV-1121	FLOW CONTROL VALVE	31AFP RECIRC LINE CTRL VALVE	AB	18'-6"	1.13	0.30	0.56	Y
AFW	BFD-FCV-1123	FLOW CONTROL VALVE	33AFP RECIRC LINE CTRL VALVE	AB	18'-6"	1.13	0.30	0.56	Y
AFW	BFD-FCV-405A	FLOW CONTROL VALVE	NO.32 AFWP MAN FLOW CTRL TO 31 SG	AB	18'-6"	1.13	0.30	0.56	Y
AFW	BFD-FCV-405B	FLOW CONTROL VALVE	NO.32 AFWP MAN FLOW CTRL TO 32 SG	AB	18'-6"	1.13	0.30	0.56	Y
AFW	BFD-FCV-405C	FLOW CONTROL VALVE	NO.32 AFWP MAN FLOW CTRL TO 33 SG	AB	18'-6"	1.13	0.30	0.56	Y
AFW	BFD-FCV-405D	FLOW CONTROL VALVE	NO.32 AFWP MAN FLOW CTRL TO 34 SG	AB	18'-6"	1.13	0.30	0.56	Y
AFW	BFD-FCV-406A	FLOW CONTROL VALVE	NO.31 AFWP MAN FLOW CTRL TO 31 SG	AB	18'-6"	1.13	0.30	0.56	Y
AFW	BFD-FCV-406B	FLOW CONTROL VALVE	NO.31 AFWP MAN FLOW CTRL TO 32 SG	AB	18'-6"	1.13	0.30	0.56	Y
AFW	BFD-FCV-406C	FLOW CONTROL VALVE	NO.33 AFWP MAN FLOW CTRL TO 33 SG	AB	18'-6"	1.13	0.30	0.56	Y
AFW	BFD-FCV-406D	FLOW CONTROL VALVE	NO.33 AFWP MAN FLOW CTRL TO 34 SG	AB	18'-6"	1.13	0.30	0.56	Y
AFW	BFD-PCV-1187	PRESSURE CONTROL VALVE	AFWP 31 SUCTION STOP VALVE	AB	15'-0"	1.13	0.30	0.56	Y
AFW	BFD-PCV-1188	PRESSURE CONTROL VALVE	AFWP 32 SUCTION STOP VALVE	AB	15'-0"	1.13	0.30	0.56	Y
AFW	BFD-PCV-1189	PRESSURE CONTROL VALVE	AFWP 33 SUCTION STOP VALVE	AB	15'-0"	1.13	0.30	0.56	Y
AFW	BFD-PCV-1213	PRESSURE CONTROL VALVE	PRESSURE REGULATING VALVE FOR DISCHARGE OF 32 ABFP	AB	18'-6"	1.13	0.30	0.56	Y
AFW	CT-26	CHECK VALVE	AFWP 31 SUCTION CHECK	AB	15'-0"	1.13	0.30	0.56	N
AFW	CT-27	MANUAL VALVE	AFWP 31 SUCTION STOP	AB	15'-0"	1.13	0.30	0.56	N
AFW	CT-28	CHECK VALVE	AFWP 32 SUCTION CHECK	AB	15'-0"	1.13	0.30	0.56	N
AFW	CT-29-1	CHECK VALVE	AFWP 31 SUCTION CHECK	AB	15'-0"	1.13	0.30	0.56	N
AFW	CT-29-2	CHECK VALVE	AFWP 32 SUCTION CHECK	AB	15'-0"	1.13	0.30	0.56	N
AFW	CT-30	MANUAL VALVE	AFWP 32 SUCTION STOP	AB	15'-0"	1.13	0.30	0.56	N
AFW	CT-31	CHECK VALVE	AFWP 33 SUCTION CHECK	AB	15'-0"	1.13	0.30	0.56	N
AFW	CT-32	CHECK VALVE	AFWP 33 SUCTION CHECK	AB	15'-0"	1.13	0.30	0.56	N
AFW	CT-33	MANUAL VALVE	AFWP 33 SUCTION STOP	AB	15'-0"	1.13	0.30	0.56	N
AFW	CT-49	MANUAL VALVE	CITY WATER SUPPLY HEADER STOP	UT	9'-0"	1.13	0.30	0.56	N
AFW	CT-6	MANUAL VALVE	CST OUTLET ISOLATION VALVE	Yard	72'-0"	1.13	0.30	0.56	N
AFW	CT-64	MANUAL VALVE	CONDENSATE TO ABFP SUCTION HEADER STOP VALVE	AB	15'-0"	1.13	0.30	0.56	N
AFW	F-313	MOTOR OPERATED DAMPER	AFPB EXH FAN/DAMPER	AB	32'-6"	1.13	0.30	0.56	Y
AFW	FAN-311-AB (L)	MOTOR OPERATED LOUVER	LOUVER FOR FAN-311-AB	AB	18'-6"	1.13	0.30	0.56	Y
AFW	FAN-312-AB (L)	MOTOR OPERATED LOUVER	LOUVER FOR FAN-312-AB	AB	18'-6"	1.13	0.30	0.56	Y
AFW	HC-405A	CONTROLLER	AFWP 32 FCV-405A HAND CONTROLLER	CB	53'-0"	1.13	0.30	0.56	Y*
AFW	HC-405B	CONTROLLER	AFWP 32 FCV-405B HAND CONTROLLER	CB	53'-0"	1.13	0.30	0.56	Y*
AFW	HC-405C	CONTROLLER	AFWP 32 FCV-405C HAND CONTROLLER	CB	53'-0"	1.13	0.30	0.56	Y*
AFW	HC-405D	CONTROLLER	AFWP 32 FCV-405D HAND CONTROLLER	CB	53'-0"	1.13	0.30	0.56	Y*
AFW	HC-406A	CONTROLLER	AFWP 31 FCV-406A HAND CONTROLLER	CB	53'-0"	1.13	0.30	0.56	Y*
AFW	HC-406B	CONTROLLER	AFWP 31 FCV-406B HAND CONTROLLER	CB	53'-0"	1.13	0.30	0.56	Y*
AFW	HC-406C	CONTROLLER	AFWP 33 FCV-406C HAND CONTROLLER	CB	53'-0"	1.13	0.30	0.56	Y*
AFW	HC-406D	CONTROLLER	AFWP 33 FCV-406D HAND CONTROLLER	CB	53'-0"	1.13	0.30	0.56	Y*
AFW	HCV-1118	GOVERNOR VALVE	32 AFWP TURB GOVRNER	AB	18'-6"	1.13	0.30	0.56	Y

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Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	HCLFP$_{50}$ g	A-46
AFW	MS-PCV-1139	PRESSURE CONTROL VALVE	MAIN STM TO AFW TURBINE PCV	AB	18'-6"	1.13	0.30	0.56	Y
AFW	MS-PCV-1310A	PRESSURE CONTROL VALVE	32 ABFP STEAM SUPPLY FIRST ISOLATION	AB	43'-0"	1.13	0.30	0.56	Y
AFW	MS-PCV-1310B	PRESSURE CONTROL VALVE	32 ABFP STEAM SUPPLY SECOND ISOLATION	AB	32'-0"	1.13	0.30	0.56	Y
AFW	PNL PT2	CONTROL PANEL	AUX BOILER FEED PMP CONTROL STATION	AB	18'-6"	1.13	0.30	0.56	Y
AFW	SOV-1321	SOLENOID OPERATED VALVE	BFD-FCV-1121 SOLENOID.VALVE	AB	18'-0"	1.13	0.30	0.56	Y
AFW	SOV-1323	SOLENOID OPERATED VALVE	BFD-FCV-1123 SOLENOID VALVE	AB	18'-0"	1.13	0.30	0.56	Y
AFW	TB X32	TERMINAL BOX	RELAY TERMINAL BOX	AB	18'-6"	1.13	0.30	0.56	Y
AFW	TB Y2I	TERMINAL BOX	RELAY TERMINAL BOX	ET	34'-0"	1.13	0.30	0.56	Y
CBV	23-319	THERMOSTAT	LOUVER 319 THERMOSTA	CB	20-0"	1.13	0.30	0.56	N
CBV	319	MOTOR OPERATED LOUVER	LOUVER 319	CB	15-0"	1.13	0.30	0.56	N
CBV	LP-319	LIGHTING PANEL	CB LIGHTING PANEL	CB	33-0"	1.13	0.30	0.56	N
CCW	AC-1871A	MANUAL VALVE	RHR PUMP #32 PUMP SEAL HTEXCH INLET STOP	PAB	15'-0"	1.13	0.30	0.56	N
CCW	AC-1871B	MANUAL VALVE	RHR PUMP #32 PUMP SEAL HTEXCH OUTLET STOP	PAB	15'-0"	1.13	0.30	0.56	N
CCW	AC-1871C	MANUAL VALVE	RHR PUMP #31 PUMP SEAL HTEXCH OUTLET STOP	PAB	15'-0"	1.13	0.30	0.56	N
CCW	AC-1871D	MANUAL VALVE	RHR PUMP #31 PUMP SEAL HTEXCH INLET STOP	PAB	15'-0"	1.13	0.30	0.56	N
CCW	AC-701A	MANUAL VALVE	CHARGING PUMPS OIL AND FLUID DRIVE COOLERS SUPPLY CONN STOP	PAB	55'-0"	1.13	0.30	0.56	N
CCW	AC-701B	MANUAL VALVE	CHARGING PUMPS OIL AND FLUID DRIVE COOLERS OUTLET DRAIN	PAB	55'-0"	1.13	0.30	0.56	N
CCW	AC-736A	MANUAL VALVE	RHR PUMP #31 THERMAL BARRIER INLET STOP	PAB	15'-0"	1.13	0.30	0.56	N
CCW	AC-736B	MANUAL VALVE	RHR PUMP #32 THERMAL BARRIER INLET STOP	PAB	15'-0"	1.13	0.30	0.56	N
CCW	AC-737A	MANUAL VALVE	RHR PUMP #31 THERMAL BARRIER & SEAL OUTLET STOP	PAB	15'-0"	1.13	0.30	0.56	N
CCW	AC-737B	MANUAL VALVE	RHR PUMP #32 THERMAL BARRIER & SEAL OUTLET STOP	PAB	15'-0"	1.13	0.30	0.56	N
CCW	AC-749A	MANUAL VALVE	SIS PUMP #31 COOLER INLET STOP	PAB	34'-0"	1.13	0.30	0.56	N
CCW	AC-749B	MANUAL VALVE	SIS PUMP #32 COOLER INLET STOP	PAB	34'-0"	1.13	0.30	0.56	N
CCW	AC-749C	MANUAL VALVE	SIS PUMP #33 COOLER INLET STOP	PAB	34'-0"	1.13	0.30	0.56	N
CCW	AC-749D	MANUAL VALVE	SIS PUMP #31 COOLER OUTLET STOP	PAB	34'-0"	1.13	0.30	0.56	N
CCW	AC-749E	MANUAL VALVE	SIS PUMP #32 COOLER OUTLET STOP	PAB	34'-0"	1.13	0.30	0.56	N
CCW	AC-749F	MANUAL VALVE	SIS PUMP #33 COOLER OUTLET STOP	PAB	34'-0"	1.13	0.30	0.56	N
CCW	AC-750A	CHECK VALVE	SIS PUMP #31 OIL COOLER OUTLET CHECK	PAB	34'-0"	1.13	0.30	0.56	N
CCW	AC-750B	CHECK VALVE	SIS PUMP #32 OIL COOLER OUTLET CHECK	PAB	34'-0"	1.13	0.30	0.56	N
CCW	AC-750C	CHECK VALVE	SIS PUMP #33 OIL COOLER OUTLET CHECK	PAB	34'-0"	1.13	0.30	0.56	N
CCW	AC-750D	CHECK VALVE	RHR PUMP #32 THERMAL BARRIER AND SEAL OUTLET CHECK	PAB	15'-0"	1.13	0.30	0.56	N
CCW	AC-750E	CHECK VALVE	RHR PUMP #31 THERMAL BARRIER AND SEAL OUTLET CHECK	PAB	15'-0"	1.13	0.30	0.56	N
CCW	AC-751A	CHECK VALVE	CC HTEXCH #31 OUTLET CHECK	PAB	73'-0"	1.13	0.30	0.56	N
CCW	AC-751B	CHECK VALVE	CC HTEXCH #32 OUTLET CHECK	PAB	73'-0"	1.13	0.30	0.56	N
CCW	AC-752A	MANUAL VALVE	AUX CC PUMP #31 AND #32 INLET STOP	FAN HOUSE	68'-0"	1.13	0.30	0.56	N
CCW	AC-752B	MANUAL VALVE	AUX CC PUMP #31 INLET STOP	FAN HOUSE	68'-0"	1.13	0.30	0.56	N
CCW	AC-752C	MANUAL VALVE	AUX CC PUMP #32 INLET STOP	FAN HOUSE	68'-0"	1.13	0.30	0.56	N
CCW	AC-752D	MANUAL VALVE	AUX CC PUMP #31 DISCHARGE STOP	FAN HOUSE	68'-0"	1.13	0.30	0.56	N
CCW	AC-752E	MANUAL VALVE	AUX CC PUMP #32 DISCHARGE STOP	FAN HOUSE	68'-0"	1.13	0.30	0.56	N
CCW	AC-752F	MANUAL VALVE	AUX CC PUMPS #31 AND #32 DISCHARGE STOP	FAN HOUSE	68'-0"	1.13	0.30	0.56	N
CCW	AC-752G	MANUAL VALVE	RECIRC PUMP #31 INLET STOP	VC	46'-0"	1.13	0.30	0.56	N
CCW	AC-752H	MANUAL VALVE	RECIRC PUMP #31 OUTLET STOP	VC	46'-0"	1.13	0.30	0.56	N
CCW	AC-752J	MANUAL VALVE	RECIRC PUMP #31 INLET FIC-633A STOP	PAB	41'-0"	1.13	0.30	0.56	N
CCW	AC-752K	MANUAL VALVE	RECIRC PUMP #31 OUTLET FIC-633A STOP	PAB	41'-0"	1.13	0.30	0.56	N
CCW	AC-753A	MANUAL VALVE	AUX CC PUMPS #33 AND #34 INLET STOP	FAN HOUSE	68'-0"	1.13	0.30	0.56	N
CCW	AC-753B	MANUAL VALVE	AUX CC PUMP #33 INLET STOP	FAN HOUSE	68'-0"	1.13	0.30	0.56	N
CCW	AC-753C	MANUAL VALVE	AUX CC PUMP #34 INLET STOP	FAN HOUSE	68'-0"	1.13	0.30	0.56	N
CCW	AC-753D	MANUAL VALVE	AUX CC PUMP #33 DISCHARGE STOP	FAN HOUSE	68'-0"	1.13	0.30	0.56	N
CCW	AC-753E	MANUAL VALVE	AUX CC PUMP #34 DISCHARGE STOP	FAN HOUSE	68'-0"	1.13	0.30	0.56	N
CCW	AC-753F	MANUAL VALVE	AUX CC PUMPS #33 AND #34 DISCHARGE STOP	FAN HOUSE	68'-0"	1.13	0.30	0.56	N
CCW	AC-753G	MANUAL VALVE	RECIRC. PUMP #32 INLET STOP	VC	46'-0"	1.13	0.30	0.56	N

* Denote "-of-the-Box" Component

Table 3A.1
Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
CCW	AC-753H	MANUAL VALVE	RECIRC. PUMP #32 OUTLET STOP	VC	46'-0"	1.13	0.30	0.56	N
CCW	AC-753J	MANUAL VALVE	RECIRC PUMP #32 INLET FIC-633B STOP	PAB	41'-0"	1.13	0.30	0.56	N
CCW	AC-753K	MANUAL VALVE	RECIRC PUMP #32 OUTLET FIC-633B STOP	PAB	41'-0"	1.13	0.30	0.56	N
CCW	AC-755A	CHECK VALVE	AUX CC PUMPS #31 AND #32 BYPASS CHECK	FAN HOUSE	68'-0"	1.13	0.30	0.56	N
CCW	AC-755B	CHECK VALVE	RHR HTEXCH #31 VENT	FAN HOUSE	68'-0"	1.13	0.30	0.56	N
CCW	AC-755C	CHECK VALVE	AUX CC PUMPS #31 AND #32 BYPASS CHECK	FAN HOUSE	68'-0"	1.13	0.30	0.56	N
CCW	AC-755D	CHECK VALVE	AUX CC PUMP #31 OUTLET CHECK	FAN HOUSE	68'-0"	1.13	0.30	0.56	N
CCW	AC-755E	CHECK VALVE	AUX CC PUMP #32 OUTLET CHECK	FAN HOUSE	68'-0"	1.13	0.30	0.56	N
CCW	AC-755F	CHECK VALVE	AUX CC PUMPS #33 AND #34 BYPASS CHECK	FAN HOUSE	68'-0"	1.13	0.30	0.56	N
CCW	AC-756A	MANUAL VALVE	AUX CC PUMP #33 OUTLET CHECK	PAB	55'-0"	1.13	0.30	0.56	N
CCW	AC-756B	MANUAL VALVE	AUX CC PUMP #34 OUTLET CHECK	PAB	55'-0"	1.13	0.30	0.56	N
CCW	AC-757A	MANUAL VALVE	CHARGING PUMP #31 FLUID DRIVE COOLER INLET	PAB	55'-0"	1.13	0.30	0.56	N
CCW	AC-757B	MANUAL VALVE	CHARGING PUMP #32 FLUID DRIVE COOLER INLET	PAB	55'-0"	1.13	0.30	0.56	N
CCW	AC-757C	MANUAL VALVE	CHARGING PUMP #33 FLUID DRIVE COOLER INLET	PAB	55'-0"	1.13	0.30	0.56	N
CCW	AC-757D	MANUAL VALVE	CHARGING PUMP #31 OIL & DRIVE COOLERS OUTLET	PAB	55'-0"	1.13	0.30	0.56	N
CCW	AC-757E	MANUAL VALVE	CHARGING PUMP #32 OIL & DRIVE COOLERS OUTLET	PAB	55'-0"	1.13	0.30	0.56	N
CCW	AC-757F	MANUAL VALVE	CHARGING PUMP #33 OIL & DRIVE COOLERS OUTLET	PAB	55'-0"	1.13	0.30	0.56	N
CCW	AC-759A	MANUAL VALVE	CC HTEXCH #31 INLET STOP	PAB	73'-0"	1.13	0.30	0.56	N
CCW	AC-759B	MANUAL VALVE	CC HTEXCH #32 INLET STOP	PAB	73'-0"	1.13	0.30	0.56	N
CCW	AC-759C	MANUAL VALVE	CC PUMP DISCHARGE TO #31 HDR STOP	PAB	73'-0"	1.13	0.30	0.56	N
CCW	AC-759D	MANUAL VALVE	CC PUMP DISCHARGE TO #32 HDR STOP	PAB	73'-0"	1.13	0.30	0.56	N
CCW	AC-760A	MANUAL VALVE	CC PUMP #31 INLET STOP	PAB	41'-0"	1.13	0.30	0.56	N
CCW	AC-760B	MANUAL VALVE	CC PUMP #32 INLET STOP	PAB	41'-0"	1.13	0.30	0.56	N
CCW	AC-760C	MANUAL VALVE	CC PUMP #33 INLET STOP	PAB	41'-0"	1.13	0.30	0.56	N
CCW	AC-761A	CHECK VALVE	CC PUMP #31 OUTLET CHECK	PAB	41'-0"	1.13	0.30	0.56	N
CCW	AC-761B	CHECK VALVE	CC PUMP #32 OUTLET CHECK	PAB	41'-0"	1.13	0.30	0.56	N
CCW	AC-761C	CHECK VALVE	CC PUMP #33 OUTLET CHECK	PAB	41'-0"	1.13	0.30	0.56	N
CCW	AC-762A	MANUAL VALVE	CC PUMP #31 OUTLET STOP	PAB	41'-0"	1.13	0.30	0.56	N
CCW	AC-762B	MANUAL VALVE	CC PUMP #32 OUTLET STOP	PAB	41'-0"	1.13	0.30	0.56	N
CCW	AC-762C	MANUAL VALVE	CC PUMP #33 OUTLET STOP	PAB	41'-0"	1.13	0.30	0.56	N
CCW	AC-765A	MANUAL VALVE	CC HTEXCH #31 OUTLET STOP	PAB	55'-0"	1.13	0.30	0.56	N
CCW	AC-765B	MANUAL VALVE	CC HTEXCH #32 OUTLET STOP	PAB	55'-0"	1.13	0.30	0.56	N
CCW	AC-766A	MANUAL VALVE	CC PUMPS #31 AND #32 SUCTION TIE STOP	PAB	41'-0"	1.13	0.30	0.56	N
CCW	AC-766B	MANUAL VALVE	CC PUMPS #32 AND #33 SUCTION TIE STOP	PAB	41'-0"	1.13	0.30	0.56	N
CCW	AC-766C	MANUAL VALVE	CC HTEXCH DISCHARGE HEADER TIE STOP	PAB	41'-0"	1.13	0.30	0.56	N
CCW	AC-766D	MANUAL VALVE	CC HTEXCH OUTLET TIE STOP	PAB	41'-0"	1.13	0.30	0.56	N
CCW	AC-769	MOTOR OPERATED VALVE	CC ISOLATION TO RCP'S	PAB	51'-0"	1.13	0.30	0.56	N
CCW	AC-770	CHECK VALVE	CC SUPPLY TO RC PUMP CHECK	VC	??	1.13	0.30	0.56	N
CCW	AC-771A	MANUAL VALVE	RC PUMP #31 INLET STOP	VC	46'-0"	1.13	0.30	0.56	N
CCW	AC-771B	MANUAL VALVE	RC PUMP #32 INLET STOP	VC	46'-0"	1.13	0.30	0.56	N
CCW	AC-771C	MANUAL VALVE	RC PUMP #33 INLET STOP	VC	46'-0"	1.13	0.30	0.56	N
CCW	AC-771D	MANUAL VALVE	RC PUMP #34 INLET STOP	VC	46'-0"	1.13	0.30	0.56	N
CCW	AC-772A	MANUAL VALVE	RC PUMP #31 UPPER OIL COOLER INLET STOP	VC	78'-0"	1.13	0.30	0.56	N
CCW	AC-772B	MANUAL VALVE	RC PUMP #32 UPPER OIL COOLER INLET STOP	VC	78'-0"	1.13	0.30	0.56	N
CCW	AC-772C	MANUAL VALVE	RC PUMP #33 UPPER OIL COOLER INLET STOP	VC	78'-0"	1.13	0.30	0.56	N
CCW	AC-772D	MANUAL VALVE	RC PUMP #34 UPPER OIL COOLER INLET STOP	VC	82'-0"	1.13	0.30	0.56	N
CCW	AC-773A	MANUAL VALVE	RC PUMP #31 LOWER OIL COOLER INLET STOP	VC	78'-0"	1.13	0.30	0.56	N
CCW	AC-773B	MANUAL VALVE	RC PUMP #32 LOWER OIL COOLER INLET STOP	VC	??	1.13	0.30	0.56	N
CCW	AC-773C	MANUAL VALVE	RC PUMP #33 LOWER OIL COOLER INLET STOP	VC	76'-0"	1.13	0.30	0.56	N
CCW	AC-773D	MANUAL VALVE	RC PUMP #34 LOWER OIL COOLER INLET STOP	VC	76'-0"	1.13	0.30	0.56	N
CCW	AC-774A	CHECK VALVE	RC PUMP #31 THERMAL BARRIER INLET CHECK	VC	65'-0"	1.13	0.30	0.56	N

* Denotes "Rule-of-the-Box" Component

Table 3A.1
Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
CCW	AC-774B	CHECK VALVE	RC PUMP #32 THERMAL BARRIER INLET CHECK	VC	??	1.13	0.30	0.56	N
CCW	AC-774C	CHECK VALVE	RC PUMP #33 THERMAL BARRIER INLET CHECK	VC	69'-0"	1.13	0.30	0.56	N
CCW	AC-774D	CHECK VALVE	RC PUMP #34 THERMAL BARRIER INLET CHECK	VC	69'-0"	1.13	0.30	0.56	N
CCW	AC-775A	MANUAL VALVE	RC PUMP #31 UPPER OIL COOLER OUTLET STOP	VC	??	1.13	0.30	0.56	N
CCW	AC-775B	MANUAL VALVE	RC PUMP #32 UPPER OIL COOLER OUTLET STOP	VC	82'-0"	1.13	0.30	0.56	N
CCW	AC-775C	MANUAL VALVE	RC PUMP #33 UPPER OIL COOLER OUTLET STOP	VC	??	1.13	0.30	0.56	N
CCW	AC-775D	MANUAL VALVE	RC PUMP #34 UPPER OIL COOLER OUTLET STOP	VC	82'-0"	1.13	0.30	0.56	N
CCW	AC-776A	MANUAL VALVE	RC PUMP #31 LOWER OIL COOLER OUTLET STOP	VC	78'-0"	1.13	0.30	0.56	N
CCW	AC-776B	MANUAL VALVE	RC PUMP #32 LOWER OIL COOLER OUTLET STOP	VC	78'-0"	1.13	0.30	0.56	N
CCW	AC-776C	MANUAL VALVE	RC PUMP #33 LOWER OIL COOLER OUTLET STOP	VC	78'-0"	1.13	0.30	0.56	N
CCW	AC-776D	MANUAL VALVE	RC PUMP #34 LOWER OIL COOLER OUTLET STOP	VC	82'-0"	1.13	0.30	0.56	N
CCW	AC-780A	MANUAL VALVE	RC PUMP #31 OIL COOLER OUTLET STOP	VC	46'-0"	1.13	0.30	0.56	N
CCW	AC-780B	MANUAL VALVE	RC PUMP #32 OIL COOLER OUTLET STOP	VC	46'-0"	1.13	0.30	0.56	N
CCW	AC-780C	MANUAL VALVE	RC PUMP #33 OIL COOLER OUTLET STOP	VC	46'-0"	1.13	0.30	0.56	N
CCW	AC-780D	MANUAL VALVE	RC PUMP #34 OIL COOLER OUTLET STOP	VC	46'-0"	1.13	0.30	0.56	N
CCW	AC-781A	MANUAL VALVE	RC PUMP #31 THERMAL BARRIER OUTLET STOP	VC	46'-0"	1.13	0.30	0.56	N
CCW	AC-781B	MANUAL VALVE	RC PUMP #32 THERMAL BARRIER OUTLET STOP	VC	46'-0"	1.13	0.30	0.56	N
CCW	AC-781C	MANUAL VALVE	RC PUMP #33 THERMAL BARRIER OUTLET STOP	VC	46'-0"	1.13	0.30	0.56	N
CCW	AC-781D	MANUAL VALVE	RC PUMP #34 THERMAL BARRIER OUTLET STOP	VC	46'-0"	1.13	0.30	0.56	N
CCW	AC-784	MOTOR OPERATED VALVE	REACTOR COOLANT PUMP CCW RETURN LINE FIRST CONTAINMENT ISOLATION	PAB	68'-0"	1.13	0.30	0.56	Y
CCW	AC-786	MOTOR OPERATED VALVE	REACTOR COOLANT PUMP CCW RETURN LINE SECOND CONTAINMENT ISOLATION	PAB	68'-0"	1.13	0.30	0.56	Y
CCW	AC-787	MANUAL VALVE	SIS PUMP #32 AND #33 COOLERS OUTLET STOP	PAB	34'-0"	1.13	0.30	0.56	N
CCW	AC-789	MOTOR OPERATED VALVE	CC ISOLATION FROM RCP THERMAL BARRIER	PAB	68'-0"	1.13	0.30	0.56	Y
CCW	AC-797	MOTOR OPERATED VALVE	CCW TO RC PUMP ISOLATION	PAB	51'-0"	1.13	0.30	0.56	Y
CCW	AC-810	MANUAL VALVE	NON-REGEN HX ISOLATION VALVE	PAB	73'-0"	1.13	0.30	0.56	N
CCW	AC-818A	MANUAL VALVE	RHR HTEXCH #31 INLET STOP	VC	46'-0"	1.13	0.30	0.56	N
CCW	AC-818B	MANUAL VALVE	RHR HTEXCH #31 DISCHARGE STOP	VC	46'-0"	1.13	0.30	0.56	N
CCW	AC-818C	MANUAL VALVE	RHR HTEXCH #32 INLET STOP	VC	46'-0"	1.13	0.30	0.56	N
CCW	AC-818D	MANUAL VALVE	RHR HTEXCH #32 DISCHARGE STOP	VC	46'-0"	1.13	0.30	0.56	N
CCW	AC-820A	MANUAL VALVE	RHR HTEXCH #31 DISCHARGE BUTTERFLY	VC	46'-0"	1.13	0.30	0.56	N
CCW	AC-820B	MANUAL VALVE	RHR HTEXCH #32 DISCHARGE BUTTERFLY	VC	46'-0"	1.13	0.30	0.56	N
CCW	AC-822A	MOTOR OPERATED VALVE	RHR HTEXCH #31 CC DISCHARGE ISOLATION	PAB	68'-0"	1.13	0.30	0.56	Y
CCW	AC-822B	MOTOR OPERATED VALVE	RHR HTEXCH #32 CC DISCHARGE ISOLATION	PAB	68'-0"	1.13	0.30	0.56	Y
CCW	AC-832A	MANUAL VALVE	CC SURGE TANK #31 PUMPS SUCTION STOP	PAB	73'-0"	1.13	0.30	0.56	N
CCW	AC-832B	MANUAL VALVE	CC SURGE TANK #32 PUMPS SUCTION STOP	PAB	73'-0"	1.13	0.30	0.56	N
CCW	AC-833A	MANUAL VALVE	CHARGING PUMP #31 BEARING OIL COOLER INLET	PAB	55'-0"	1.13	0.30	0.56	N
CCW	AC-833B	MANUAL VALVE	CHARGING PUMP #32 BEARING OIL COOLER INLET	PAB	55'-0"	1.13	0.30	0.56	N
CCW	AC-833C	MANUAL VALVE	CHARGING PUMP #33 BEARING OIL COOLER INLET	PAB	55'-0"	1.13	0.30	0.56	N
CCW	AC-AOV-791	AIR OPERATED VALVE	CCW TO EXCESS LETDOWN HTEXCH ISOLATION	PP	51'-0"	1.13	0.30	0.56	Y
CCW	AC-AOV-793	AIR OPERATED VALVE	CCW FROM EXCESS LETDOWN HTEXCH ISOLATION	PP	51'-0"	1.13	0.30	0.56	Y
CCW	AC-AOV-796	AIR OPERATED VALVE	CCW FROM EXCESS LETDOWN HTEXCH ISOLATION	PP	51'-0"	1.13	0.30	0.56	Y
CCW	AC-AOV-798	AIR OPERATED VALVE	CCW TO EXCESS LETDOWN HTEXCH ISOLATION	PP	51'-0"	1.13	0.30	0.56	Y
CCW	AC-FCV-625	MOTOR OPERATED VALVE	RC PUMPS THERMAL BARRIER OUTLET FLOW CONTROL	PAB	55'-0"	1.13	0.30	0.56	Y
CCW	AUXCCP-31	MOTOR DRIVEN PUMP	AUXILLIARY COMPONENT COOLING PUMP 31	FAN HOUSE	68'-0"	1.13	0.30	0.56	N
CCW	AUXCCP-32	MOTOR DRIVEN PUMP	AUXILLIARY COMPONENT COOLING PUMP 32	FAN HOUSE	68'-0"	1.13	0.30	0.56	N
CCW	AUXCCP-33	MOTOR DRIVEN PUMP	AUXILLIARY COMPONENT COOLING PUMP 33	FAN HOUSE	68'-0"	1.13	0.30	0.56	N
CCW	AUXCCP-34	MOTOR DRIVEN PUMP	AUXILLIARY COMPONENT COOLING PUMP 34	FAN HOUSE	68'-0"	1.13	0.30	0.56	N
CCW	SOV-791-1	SOLENOID OPERATED VALVE	AC-791 SOLENOID VALVE	PP	51'-0"	1.13	0.30	0.56	Y
CCW	SOV-793-1	SOLENOID OPERATED VALVE	AC-793 SOLENOID VALVE	PP	51'-0"	1.13	0.30	0.56	Y
CCW	SOV-796-1	SOLENOID OPERATED VALVE	AC-796 SOLENOID VALVE	PP	51'-0"	1.13	0.30	0.56	Y

* Denote- ‾ -le-of-the-Box" Component

Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
CCW	SOV-798-1	SOLENOID OPERATED VALVE	AC-798 SOLENOID VALVE	PP	51'-0"	1.13	0.30	0.56	Y
CCW	TCV-130	MANUAL VALVE	NON-REGENERATIVE HTEXCH #31 OUTLET FLOW CONTROL	PAB	73'-0"	1.13	0.30	0.56	Y
CDS	CT-LCV-1158-2	LEVEL CONTROL VALVE	CST LO LVL CONTROL VALVE	TB	36'-0"	1.13	0.30	0.56	Y
CDS	CT-LCV-1158-1	LEVEL CONTROL VALVE	CST TO CONDENSERS LEVEL CONTROL VALVE	TB	36'-0"	1.13	0.30	0.56	Y
CDS	CT-SOV-1258-1	SOLENOID OPERATED VALVE	COND STORAGE TANK TO CONDENSERS CT-LCV-1158-1 SOLENOID	AB	18'-6"	1.13	0.30	0.56	Y*
CDS	CT-SOV-1258-2	SOLENOID OPERATED VALVE	COND STORAGE TANK TO CONDENSERS CT-LCV-1158-2 SOLENOID	AB	18'-6"	1.13	0.30	0.56	Y*
CDS	CT-SOV-1287	SOLENOID OPERATED VALVE	PCV-1187 SOLENOID VALVE	AB	18'-6"	1.13	0.30	0.56	Y*
CDS	CT-SOV-1288	SOLENOID OPERATED VALVE	PCV-1188 SOLENOID VALVE	AB	18'-6"	1.13	0.30	0.56	Y*
CDS	CT-SOV-1289	SOLENOID OPERATED VALVE	PCV-1189 SOLENOID VALVE	AB	18'-6"	1.13	0.30	0.56	Y*
CDS	PCV-1187	AIR OPERATED VALVE	CITY WATER SUPPLY ISO VALVE	AB	18'-6"	1.13	0.30	0.56	Y
CDS	PCV-1188	AIR OPERATED VALVE	CITY WATER SUPPLY ISO VALVE	AB	18'-6"	1.13	0.30	0.56	Y
CDS	PCV-1189	AIR OPERATED VALVE	CITY WATER SUPPLY ISO VALVE	AB	18'-6"	1.13	0.30	0.56	Y
CDS	PCV-1229	PRESSURE CONTROL VALVE	CONDENSER DISCHARGE TO VC ISOLATION	FAN HOUSE	51'-0"	1.13	0.30	0.56	N
CDS	PCV-1230	PRESSURE CONTROL VALVE	CONDENSER DISCHARGE TO VC ISOLATION	FAN HOUSE	51'-0"	1.13	0.30	0.56	N
CFC	VS-SOV-1294	SOLENOID VALVE OPERATOR	AIR SUPPLY SOL VALVE FOR FCU 31 DAMPER C	VC	68'-0"	1.13	0.30	0.56	N
CFC	VS-SOV-1297	SOLENOID VALVE OPERATOR	AIR SUPPLY SOL VALVE FOR FCU 32 DAMPER C	VC	68'-0"	1.13	0.30	0.56	N
CFC	VS-SOV-1298	SOLENOID VALVE OPERATOR	AIR SUPPLY SOL VALVE FOR FCU 32 DAMPER D AND DOOR	VC	68'-0"	1.13	0.30	0.56	N
CFC	VS-SOV-1300	SOLENOID VALVE OPERATOR	AIR SUPPLY SOL VALVE FOR FCU 33 DAMPER C	VC	68'-0"	1.13	0.30	0.56	N
CFC	VS-SOV-1301	SOLENOID VALVE OPERATOR	AIR SUPPLY SOL VALVE FOR FCU 33 DAMPER D AND DOOR	VC	68'-0"	1.13	0.30	0.56	N
CFC	VS-SOV-1303	SOLENOID VALVE OPERATOR	AIR SUPPLY SOL VALVE FOR FCU 34 DAMPER C	VC	68'-0"	1.13	0.30	0.56	N
CFC	VS-SOV-1304	SOLENOID VALVE OPERATOR	AIR SUPPLY SOL VALVE FOR FCU 34 DAMPER D AND DOOR	VC	68'-0"	1.13	0.30	0.56	N
CFC	VS-SOV-1306	SOLENOID VALVE OPERATOR	AIR SUPPLY SOL VALVE FOR FCU 35 DAMPER C	VC	68'-0"	1.13	0.30	0.56	N
CFC	VS-SOV-1307	SOLENOID VALVE OPERATOR	AIR SUPPLY SOL VALVE FOR FCU 35 DAMPER D AND DOOR	VC	68'-0"	1.13	0.30	0.56	N
CIS	DW-AOV-1	AIR OPERATED VALVE	WATER STATION CONTAINMENT ISOLATION	PAB	41'-0"	1.13	0.30	0.56	N
CIS	DW-AOV-2	AIR OPERATED VALVE	WATER STATION CONTAINMENT ISOLATION	PAB	41'-0"	1.13	0.30	0.56	N
CIS	FCV-1170	FLOW CONTROL VALVE	VC PURGE AIR SUPPLY ISOLATION VALVE	VC	88'-0"	1.13	0.30	0.56	N
CIS	FCV-1171	FLOW CONTROL VALVE	VC PURGE AIR SUPPLY ISOLATION VALVE	FAN HOUSE	88'-0"	1.13	0.30	0.56	N
CIS	FCV-1172	FLOW CONTROL VALVE	VC PURGE EXHAUST VALVE	VC	88'-0"	1.13	0.30	0.56	N
CIS	FCV-1173	FLOW CONTROL VALVE	VC PURGE EXHAUST VALVE	FAN HOUSE	59'-0"	1.13	0.30	0.56	N
CIS	PCV-1190	PRESSURE CONTROL VALVE	PRESSURE RELIEF ISOLATION VALVE PCV-1190	VC	59'-0"	1.13	0.30	0.56	N
CIS	PCV-1191	PRESSURE CONTROL VALVE	PRESSURE RELIEF ISOLATION VALVE PCV-1191	FAN HOUSE	59'-0"	1.13	0.30	0.56	N
CIS	PCV-1192	PRESSURE CONTROL VALVE	PRESSURE RELIEF ISOLATION VALVE PCV-1192	FAN HOUSE	59'-0"	1.13	0.30	0.56	N
CIS	PS-10	INSTRUMENT AIR TO POST ACCIDENT CONT. VE	INSTRUMENT AIR TO POST ACCIDENT CONT. VENT SYS	PAB	41'-0"	1.13	0.30	0.56	N
CIS	PS-7	PRESSURIZATION TO POST ACCIDENT CONT. VE	PRESSURIZATION TO POST ACCIDENT CONT VENT SYS	PAB	41'-0"	1.13	0.30	0.56	N
CIS	PS-8	PRESSURIZATION TO POST ACCIDENT CONT. VE	PRESSURIZATION TO POST ACCIDENT CONT FILTER STOP	PAB	41'-0"	1.13	0.30	0.56	N
CIS	PS-9	PRESSURIZATION TO POST ACCIDENT CONT. VE	PRESSURIZATION TO POST ACCIDENT CONT FILTER STOP	PAB	41'-0"	1.13	0.30	0.56	N
CSI	SI-885A	MANUAL VALVE	CONT. SPRAY PUMP #31 SUCTION STOP	PAB	41'-0"	1.13	0.30	0.56	N
CSI	SI-885B	MANUAL VALVE	CONT. SPRAY PUMP #32 SUCTION STOP	PAB	41'-0"	1.13	0.30	0.56	N
CSI	SI-866A	MOTOR OPERATED VALVE	CONTAINMENT SPRAY PUMP #31 DISCHARGE STOP	PAB	41'-0"	1.13	0.30	0.56	N
CSI	SI-866B	MOTOR OPERATED VALVE	CONTAINMENT SPRAY PUMP #32 DISCHARGE STOP	PAB	41'-0"	1.13	0.30	0.56	N
CSI	SI-867A	CHECK VALVE	CONTAINMENT SPRAY PUMP #31 DISCHARGE HDR CHECK	PAB	41'-0"	1.13	0.30	0.56	N
CSI	SI-867B	CHECK VALVE	CONTAINMENT SPRAY PUMP #32 DISCHARGE HDR CHECK	PAB	41'-0"	1.13	0.30	0.56	N
CSI	SI-869A	MANUAL VALVE	CONTAINMENT SPRAY PUMP #31 SPRAY HDR VC ISOLATION	PAB	41'-0"	1.13	0.30	0.56	N
CSI	SI-869B	MANUAL VALVE	CONTAINMENT SPRAY PUMP #32 SPRAY HDR. VC ISOLATION	PAB	41'-0"	1.13	0.30	0.56	N
CVCS	CH-201	AIR OPERATED VALVE	LETDN LINE ISO VLV	PP	51'-0"	1.13	0.30	0.56	Y
CVCS	CH-202	AIR OPERATED VALVE	LETDN LINE ISO VLV	PP	51'-0"	1.13	0.30	0.56	Y
CVCS	CH-210A	CHECK VALVE	CHARGING LINE CHECK TO LOOP 2 HOT LEG	VC	60'-0"	1.13	0.30	0.56	N
CVCS	CH-210B	CHECK VALVE	CHARGING LINE CHECK TO LOOP 1 COLD LEG	VC	60'-0"	1.13	0.30	0.56	N
CVCS	CH-210C	CHECK VALVE	CHARGING LINE CHECK TO LOOP 2 HOT LEG	VC	60'-0"	1.13	0.30	0.56	N
CVCS	CH-210D	CHECK VALVE	CHARGING LINE CHECK TO LOOP 1 COLD LEG	VC	60'-0"	1.13	0.30	0.56	N
CVCS	CH-218	RELIEF VALVE	SEAL RETURN RELIEF	VC	46'-0"	1.13	0.30	0.56	N
CVCS	CH-223	MANUAL VALVE	SEAL WATER FILTER #31 INLET STOP	PAB	15'-0"	1.13	0.30	0.56	N
CVCS	CH-225	MANUAL VALVE	SEAL WATER FILTER #31 OUTLET STOP	PAB	15'-0"	1.13	0.30	0.56	N
CVCS	CH-228	MANUAL VALVE	CHARGING LINE ISOLATION	PAB	15'-0"	1.13	0.30	0.56	N
CVCS	CH-230	MANUAL VALVE	CHARGING PUMP #31 DISCHARGE STOP	PAB	15'-0"	1.13	0.30	0.56	N
CVCS	CH-232	MANUAL VALVE	CHARGING PUMP #31 DISCHARGE - SEAL INJ STOP	PAB	15'-0"	1.13	0.30	0.56	N
CVCS	CH-233	MANUAL VALVE	CHARGING PUMP #32 DISCHARGE - SEAL INJ STOP	PAB	15'-0"	1.13	0.30	0.56	N

* Denotes "Rule-of-the-Box" Component

Table 3A.1
Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
CVCS	CH-235	MANUAL VALVE	32 CHARGING PUMP OUTLET ISOLATION	PAB	15'-0"	1.13	0.30	0.56	N
CVCS	CH-236	MANUAL VALVE	33 CHARGING PUMP OUTLET ISOLATION	PAB	15'-0"	1.13	0.30	0.56	N
CVCS	CH-238	MANUAL VALVE	33 CHARGING PUMP OUTLET TO SEAL INJECTION STOP	PAB	15'-0"	1.13	0.30	0.56	N
CVCS	CH-241A	MANUAL VALVE	RCP #31 SEAL INJ. CONTROL VALVE	PAB	41'-0"	1.13	0.30	0.56	N
CVCS	CH-241B	MANUAL VALVE	RCP #32 SEAL INJ. CONTROL VALVE	PAB	41'-0"	1.13	0.30	0.56	N
CVCS	CH-241C	MANUAL VALVE	RCP #33 SEAL INJ. CONTROL VALVE	PAB	41'-0"	1.13	0.30	0.56	N
CVCS	CH-241D	MANUAL VALVE	RCP #34 SEAL INJ. CONTROL VALVE	PAB	41'-0"	1.13	0.30	0.56	N
CVCS	CH-244A	MANUAL VALVE	FIT-159B OUTLET	VC	46'-0"	1.13	0.30	0.56	N
CVCS	CH-244B	MANUAL VALVE	FIT-158B OUTLET	VC	46'-0"	1.13	0.30	0.56	N
CVCS	CH-244C	MANUAL VALVE	FIT-157B OUTLET	VC	46'-0"	1.13	0.30	0.56	N
CVCS	CH-244D	MANUAL VALVE	FIT-156B OUTLET	VC	46'-0"	1.13	0.30	0.56	N
CVCS	CH-249A	MANUAL VALVE	SEAL INJECTION FILTER #31 OUTLET STOP	PAB	15'-0"	1.13	0.30	0.56	N
CVCS	CH-249B	MANUAL VALVE	SEAL INJECTION FILTER #31 INLET STOP	PAB	15'-0"	1.13	0.30	0.56	N
CVCS	CH-249C	MANUAL VALVE	SEAL INJECTION FILTER #32 OUTLET STOP	PAB	15'-0"	1.13	0.30	0.56	N
CVCS	CH-249D	MANUAL VALVE	SEAL INJECTION FILTER #32 INLET STOP	PAB	15'-0"	1.13	0.30	0.56	N
CVCS	CH-251A	CHECK VALVE	RCP #31 SEAL INJECTION CHECK	VC	68'-0"	1.13	0.30	0.56	N
CVCS	CH-251B	CHECK VALVE	RCP #32 SEAL INJECTION CHECK	VC	68'-0"	1.13	0.30	0.56	N
CVCS	CH-251C	CHECK VALVE	RCP #33 SEAL INJECTION CHECK	VC	68'-0"	1.13	0.30	0.56	N
CVCS	CH-251D	CHECK VALVE	RCP #34 SEAL INJECTION CHECK	VC	68'-0"	1.13	0.30	0.56	N
CVCS	CH-251E	CHECK VALVE	RCP #31 SEAL INJECTION CHECK	VC	68'-0"	1.13	0.30	0.56	N
CVCS	CH-251F	CHECK VALVE	RCP #32 SEAL INJECTION CHECK	VC	68'-0"	1.13	0.30	0.56	N
CVCS	CH-251G	CHECK VALVE	RCP #33 SEAL INJECTION CHECK	VC	68'-0"	1.13	0.30	0.56	N
CVCS	CH-251H	CHECK VALVE	RCP #34 SEAL INJECTION CHECK	VC	68'-0"	1.13	0.30	0.56	N
CVCS	CH-251J	CHECK VALVE	RCP #31 SEAL INJECTION CHECK	VC	68'-0"	1.13	0.30	0.56	N
CVCS	CH-251K	CHECK VALVE	RCP #32 SEAL INJECTION CHECK	VC	68'-0"	1.13	0.30	0.56	N
CVCS	CH-251L	CHECK VALVE	RCP #33 SEAL INJECTION CHECK	VC	68'-0"	1.13	0.30	0.56	N
CVCS	CH-251M	CHECK VALVE	RCP #34 SEAL INJECTION CHECK	VC	68'-0"	1.13	0.30	0.56	N
CVCS	CH-262A	MANUAL VALVE	FIT-159A INLET	VC	46'-0"	1.13	0.30	0.56	N
CVCS	CH-262B	MANUAL VALVE	FIT-158A INLET	VC	46'-0"	1.13	0.30	0.56	N
CVCS	CH-262C	MANUAL VALVE	FIT-157A INLET	VC	46'-0"	1.13	0.30	0.56	N
CVCS	CH-262D	MANUAL VALVE	FI-156A INLET	VC	46'-0"	1.13	0.30	0.56	N
CVCS	CH-272A	MANUAL VALVE	SEAL WATER HX #31 INLET	PAB	73'-0"	1.13	0.30	0.56	N
CVCS	CH-272B	MANUAL VALVE	SEAL WATER HX #31 OUTLET	PAB	73'-0"	1.13	0.30	0.56	N
CVCS	CH-278	MANUAL VALVE	#31 CHARGING PUMP SUCTION STOP	PAB	55'-0"	1.13	0.30	0.56	N
CVCS	CH-283	MANUAL VALVE	#32 CHARGING PUMP SUCTION STOP	PAB	55'-0"	1.13	0.30	0.56	N
CVCS	CH-284	MANUAL VALVE	#33 CHARGING PUMP SUCTION STOP	PAB	55'-0"	1.13	0.30	0.56	N
CVCS	CH-289	MANUAL VALVE	CHG PMP SUCTION HEADER PARTITION	PAB	55'-0"	1.13	0.30	0.56	N
CVCS	CH-290	CHECK VALVE	RWST SUPPLY CHECK TO CHG PMPS SUCTION	PAB	55'-0"	1.13	0.30	0.56	N
CVCS	CH-293	MANUAL VALVE	BORIC ACID BLENDER BYPASS	PAB	73'-0"	1.13	0.30	0.56	N
CVCS	CH-294	CHECK VALVE	RWST MAKE-UP LINE CHECK	PAB	73'-0"	1.13	0.30	0.56	N
CVCS	CH-295	MANUAL VALVE	RWST MAKE-UP LINE STOP	PAB	73'-0"	1.13	0.30	0.56	N
CVCS	CH-297	MANUAL VALVE	BORIC ACID BLENDER OUTLET TO CHARGING PUMPS STOP	PAB	73'-0"	1.13	0.30	0.56	N
CVCS	CH-310	PULSATION DAMPENER	DEBORATING DEMIN DIVERSION	PAB	42'-0"	1.13	0.30	0.56	Y
CVCS	CH-326	MANUAL VALVE	PRIMARY WATER INLET STOP TO BORIC BLENDER	PAB	73'-0"	1.13	0.30	0.56	N
CVCS	CH-327	CHECK VALVE	PRIMARY WATER INLET CHECK TO BORIC ACID BLENDER	PAB	73'-0"	1.13	0.30	0.56	N
CVCS	CH-328	CHECK VALVE	BORIC ACID BLENDER INLET CHECK	PAB	73'-0"	1.13	0.30	0.56	N
CVCS	CH-329	MANUAL VALVE	BORIC ACID INLET	PAB	73'-0"	1.13	0.30	0.56	N
CVCS	CH-332	CHECK VALVE	EMERGENCY BORATION CHECK	PAB	55'-0"	1.13	0.30	0.56	N
CVCS	CH-334	MANUAL VALVE	BORIC ACID FILTER OUTLET STOP	PAB	73'-0"	1.13	0.30	0.56	N
CVCS	CH-336	MANUAL VALVE	BORIC ACID FILTER INLET STOP	PAB	73'-0"	1.13	0.30	0.56	N
CVCS	CH-337	MANUAL VALVE	BAST #31 OUTLET STOP	PAB	55'-0"	1.13	0.30	0.56	N
CVCS	CH-339	MANUAL VALVE	PRIMARY WATER SUPPLY TO BLENDER STOP	PAB	73'-0"	1.13	0.30	0.56	N
CVCS	CH-350	MANUAL VALVE	RWST MAKEUP STOP	PAB	73'-0"	1.13	0.30	0.56	N
CVCS	CH-360	MANUAL VALVE	BATP #31 DISCHARGE TO BORIC ACID FILTER	PAB	55'-0"	1.13	0.30	0.56	N
CVCS	CH-362A	CHECK VALVE	BATP #31 DISCHARGE CHECK	PAB	55'-0"	1.13	0.30	0.56	N
CVCS	CH-362B	CHECK VALVE	BATP #32 DISCHARGE CHECK	PAB	55'-0"	1.13	0.30	0.56	N
CVCS	CH-364	MANUAL VALVE	BATP #31 SUCTION STOP	PAB	55'-0"	1.13	0.30	0.56	N

* Denot[illegible]-of-the-Box" Component

Table 3A.1
Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
CVCS	CH-368	MANUAL VALVE	BATP #32 SUCTION STOP	PAB	55'-0"	1.13	0.30	0.56	N
CVCS	CH-370	MANUAL VALVE	BATP #32 DISCHARGE TO BORIC ACID FILTER	PAB	55'-0"	1.13	0.30	0.56	N
CVCS	CH-373	MANUAL VALVE	BAST #32 OUTLET STOP	PAB	55'-0"	1.13	0.30	0.56	N
CVCS	CH-374	CHECK VALVE	REGEN HX INLET CHECK	VC	46'-0"	1.13	0.30	0.56	N
CVCS	CH-401	CHECK VALVE	CHARGING PUMP #31 DISCHARGE CHECK	PAB	55'-0"	1.13	0.30	0.56	N
CVCS	CH-402	CHECK VALVE	CHARGING PUMP #31 DISCHARGE - SEAL INJECTION CHECK	PAB	55'-0"	1.13	0.30	0.56	N
CVCS	CH-403	CHECK VALVE	CHARGING PUMP #32 DISCHARGE CHECK	PAB	55'-0"	1.13	0.30	0.56	N
CVCS	CH-404	CHECK VALVE	CHARGING PUMP #32 DISCHARGE - SEAL INJECTION CHECK	PAB	55'-0"	1.13	0.30	0.56	N
CVCS	CH-405	CHECK VALVE	CHARGING PUMP #33 DISCHARGE CHECK	PAB	55'-0"	1.13	0.30	0.56	N
CVCS	CH-406	CHECK VALVE	CHARGING PUMP #33 DISCHARGE - SEAL INJECTION CHECK	PAB	55'-0"	1.13	0.30	0.56	N
CVCS	CH-AOV-200A	AIR OPERATED VALVE	LETDOWN ORIFICE ISO VALVE	VC	46'-0"	1.13	0.30	0.56	Y
CVCS	CH-AOV-200B	AIR OPERATED VALVE	LETDOWN ORIFICE ISO VLV	VC	46'-0"	1.13	0.30	0.56	Y
CVCS	CH-AOV-200C	AIR OPERATED VALVE	LETDOWN ORIFICE ISO VLV	VC	46'-0"	1.13	0.30	0.56	Y
CVCS	CH-AOV-204A	AIR OPERATED VALVE	ALT CHG FLOW NO 32 HOT LEG CTRL VLV	VC	58'-0"	1.13	0.30	0.56	Y
CVCS	CH-AOV-204B	AIR OPERATED VALVE	CHG FLOW NO 31 COLD LEG CTRL VLV	VC	46'-0"	1.13	0.30	0.56	Y
CVCS	CH-AOV-212	AIR OPERATED VALVE	AUX SPRAY CTRL VLV	VC	46'-0"	1.13	0.30	0.56	Y
CVCS	CH-AOV-213A	AIR OPERATED VALVE	EXCESS LETDOWN CTRL VLV	VC	46'-0"	1.13	0.30	0.56	Y
CVCS	CH-AOV-213B	AIR OPERATED VALVE	EXCESS LETDOWN CTRL VLV	VC	46'-0"	1.13	0.30	0.56	Y
CVCS	CH-AOV-215	AIR OPERATED VALVE	EXC LETDN LINE DIVERSION CTRL VLV	VC	46'-0"	1.13	0.30	0.56	Y
CVCS	CH-AOV-246	AIR OPERATED VALVE	RCP SEAL NO. 1 BYPASS VLV TO VCT	VC	53'-0"	1.13	0.30	0.56	Y
CVCS	CH-AOV-261A	AIR OPERATED VALVE	31 RCP SEAL DISCHARGE	VC	79'-0"	1.13	0.30	0.56	Y
CVCS	CH-AOV-261B	AIR OPERATED VALVE	32 RCP SEAL DISCHARGE	VC	79'-0"	1.13	0.30	0.56	Y
CVCS	CH-AOV-261C	AIR OPERATED VALVE	33 RCP SEAL DISCHARGE	VC	79'-0"	1.13	0.30	0.56	Y
CVCS	CH-AOV-261D	AIR OPERATED VALVE	34 RCP SEAL DISCHARGE	VC	79'-0"	1.13	0.30	0.56	Y
CVCS	CH-FCV-110A	FLOW CONTROL VALVE	BORIC ACID FLOW CTRL	PAB	80'-0"	1.13	0.30	0.56	Y
CVCS	CH-FCV-110B	FLOW CONTROL VALVE	BORIC ACID BLNDR OUTLET	PAB	73'-0"	1.13	0.30	0.56	Y
CVCS	CH-FCV-111A	FLOW CONTROL VALVE	PRIMARY WTR MAKEUP VLV	PAB	78'-0"	1.13	0.30	0.56	Y
CVCS	CH-FCV-111B	FLOW CONTROL VALVE	BLENDER FLOW TO VCT CTRL VALVE	PAB	78'-0"	1.13	0.30	0.56	Y
CVCS	CH-HCV-123	HYDRAULIC CONTROL VALVE	EXCESS LETDOWN HX OUTFLOW CTRL VALVE	VC	46-0"	1.13	0.30	0.56	Y
CVCS	CH-HCV-133	HYDRAULIC CONTROL VALVE	RHR HTX OUTLET TO CVCS	VC	55'-3"	1.13	0.30	0.56	Y
CVCS	CH-HCV-142	HYDRAULIC CONTROL VALVE	REGEN HX FLOW CTRL	PP	41'-0"	1.13	0.30	0.56	Y
CVCS	CH-LCV-112A	LEVEL CONTROL VALVE	MAKE-UP TO VCT 3-WAY VALVE	PAB	80'-0"	1.13	0.30	0.56	Y
CVCS	CH-LCV-112B	LEVEL CONTROL VALVE	RWST TO CHARGING PUMP SUCTION VALVE	PAB	65'-0"	1.13	0.30	0.56	Y
CVCS	CH-LCV-112C	LEVEL CONTROL VALVE	VCT OUTLET ISO VLV	PAB	73'-0"	1.13	0.30	0.56	Y
CVCS	CH-LCV-459	LEVEL CONTROL VALVE	LETDOWN CTRL VALVE	VC	79'-0"	1.13	0.30	0.56	Y
CVCS	CH-LCV-460	LEVEL CONTROL VALVE	LETDOWN CTRL VALVE	VC	79'-0"	1.13	0.30	0.56	Y
CVCS	CH-MOV-205	MOTOR OPERATED VALVE	CHARGING FLOW TO RCS ISO VLV	PP	41'-0"	1.13	0.30	0.56	Y
CVCS	CH-MOV-222	MOTOR OPERATED VALVE	RCP SEAL WTR RETURN ISO VLV	PP	41'-0"	1.13	0.30	0.56	Y
CVCS	CH-MOV-226	MOTOR OPERATED VALVE	CHARGING LINE CTMT ISO VLV	PP	41'-0"	1.13	0.30	0.56	Y
CVCS	CH-MOV-250A	MOTOR OPERATED VALVE	31 RCP SEAL INJ CTMT ISO VLV	PP	41'-0"	1.13	0.30	0.56	Y
CVCS	CH-MOV-250B	MOTOR OPERATED VALVE	32 RCP SEAL INJ CTMT ISO VLV	PP	41'-0"	1.13	0.30	0.56	Y
CVCS	CH-MOV-250C	MOTOR OPERATED VALVE	33 RCP SEAL INJ CTMT ISO VLV	PP	41'-0"	1.13	0.30	0.56	Y
CVCS	CH-MOV-250D	MOTOR OPERATED VALVE	34 RCP SEAL INJ CTMT ISO VLV	PP	41'-0"	1.13	0.30	0.56	Y
CVCS	CH-MOV-333	MOTOR OPERATED VALVE	BORIC ACID FEED TO CHG PUMPS VALVE	PAB	73'-0"	1.13	0.30	0.56	Y
CVCS	CH-MOV-441	MOTOR OPERATED VALVE	31 RCP SEAL INJ CTMT ISO VLV	PP	41'-0"	1.13	0.30	0.56	Y
CVCS	CH-MOV-442	MOTOR OPERATED VALVE	32 RCP SEAL INJ CTMT ISO VLV	PP	41'-0"	1.13	0.30	0.56	Y
CVCS	CH-MOV-443	MOTOR OPERATED VALVE	33 RCP SEAL INJ CTMT ISO VLV	PP	41'-0"	1.13	0.30	0.56	Y
CVCS	CH-MOV-444	MOTOR OPERATED VALVE	34 RCP SEAL INJ CTMT ISO VLV	PP	41'-0"	1.13	0.30	0.56	Y
CVCS	CH-PCV-113A	PRESSURE CONTROL VALVE	VCT H2 REGULATOR	PAB	75'-0"	1.13	0.30	0.56	Y
CVCS	CH-PCV-114	PRESSURE CONTROL VALVE	VCT N2 REGULATOR	PAB	74'-0"	1.13	0.30	0.56	Y
CVCS	CH-PCV-135	PRESSURE CONTROL VALVE	LETDOWN BP CONTROL	PAB	75'-0"	1.13	0.30	0.56	Y
CVCS	CH-SOV-265	SOLENOID OPERATED VALVE	VCT GAS ANALYZER SAMPLE VALVE	PAB	73'-0"	1.13	0.30	0.56	Y
CVCS	CH-SOV-268	SOLENOID OPERATED VALVE	VCT VENT ISO VALVE	PAB	73'-0"	1.13	0.30	0.56	Y
CVCS	CH-TCV-149	TEMPERATURE CONTROL VALVE	DEMIN BYPASS VLV	PAB	80'-0"	1.13	0.30	0.56	Y
CVCS	CSFLBA1	FILTER	BORIC ACID FILTER #31	PAB	74'-0"	1.13	0.30	0.56	N
CVCS	FIT-111	FLOW INDICATOR CONTROLLER	PRM WTR FLOW INDZ XMTR	PAB	73'-0"	1.13	0.30	0.56	Y
CVCS	FIT-156A	FLOW TRANSMITTER	RCP 34 SEAL LEAKOFF FLOW TRANSMITTER	VC	46'-0"	1.13	0.30	0.56	Y

* Denotes "Rule-of-the-Box" Component

Table 3A.1

Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
CVCS	FIT-156B	FLOW TRANSMITTER	RCP 34 SEAL LEAKOFF FLOW TRANSMITTER	VC	46'-0"	1.13	0.30	0.56	Y
CVCS	FIT-157A	FLOW TRANSMITTER	RCP 33 SEAL LEAKOFF FLOW TRANSMITTER	VC	46'-0"	1.13	0.30	0.56	Y
CVCS	FIT-157B	FLOW TRANSMITTER	RCP 33 SEAL LEAKOFF FLOW TRANSMITTER	VC	46'-0"	1.13	0.30	0.56	Y
CVCS	FIT-158A	FLOW TRANSMITTER	RCP 32 SEAL LEAKOFF FLOW TRANSMITTER	VC	46'-0"	1.13	0.30	0.56	Y
CVCS	FIT-158B	FLOW TRANSMITTER	RCP 32 SEAL LEAKOFF FLOW TRANSMITTER	VC	46'-0"	1.13	0.30	0.56	Y
CVCS	FIT-159A	FLOW TRANSMITTER	RCP 31 SEAL LEAKOFF FLOW TRANSMITTER	VC	46'-0"	1.13	0.30	0.56	Y
CVCS	FIT-159B	FLOW TRANSMITTER	RCP 31 SEAL LEAKOFF FLOW TRANSMITTER	VC	46'-0"	1.13	0.30	0.56	Y
CVCS	FM-111A	ELECTRO PNEUMATIC CONVERTER	ELECTRO PNEUMATIC CONVERTER	PAB	73'-0"	1.13	0.30	0.56	Y*
CVCS	FT-115A	FLOW TRANSMITTER	SEAL INJ. FLOW TRANSMITTER	PP	41'-0"	1.13	0.30	0.56	Y*
CVCS	FT-116A	FLOW TRANSMITTER	SEAL INJ. FLOW TRANSMITTER	PP	41'-0"	1.13	0.30	0.56	Y*
CVCS	FT-143A	FLOW TRANSMITTER	SEAL INJ. FLOW TRANSMITTER	PP	41'-0"	1.13	0.30	0.56	Y*
CVCS	FT-144A	FLOW TRANSMITTER	SEAL INJ. FLOW TRANSMITTER	PP	41'-0"	1.13	0.30	0.56	Y*
CVCS	LT-102	LEVEL TRANSMITTER	BORIC ACID STORAGE TANK #32 LEVEL TRANSMITTER	PAB	73'-0"	1.13	0.30	0.56	Y
CVCS	LT-106	LEVEL TRANSMITTER	BORIC ACID STORAGE TANK #31 LEVEL TRANSMITTER	PAB	73'-0"	1.13	0.30	0.56	Y
CVCS	SOV-110A-1	SOLENOID OPERATED VALVE	CH-FCV-110A SOLENOID VALVE	PAB	80'-0"	1.13	0.30	0.56	Y*
CVCS	SOV-110B-1	SOLENOID OPERATED VALVE	CH-FCV-110B SOLENOID VALVE	PAB	73'-0"	1.13	0.30	0.56	Y*
CVCS	SOV-111A-1	SOLENOID OPERATED VALVE	CH-FCV-111A SOLENOID VALVE	PAB	78'-0"	1.13	0.30	0.56	Y*
CVCS	SOV-111B-1	SOLENOID OPERATED VALVE	CH-FCV-111B SOLENOID VALVE	PAB	78'-0"	1.13	0.30	0.56	Y*
CVCS	SOV-112A-1	SOLENOID OPERATED VALVE	CH-LCV-112A SOLENOID VALVE	PAB	80'-0"	1.13	0.30	0.56	Y
CVCS	SOV-133-1	SOLENOID OPERATED VALVE	CH-HCV-133 SOLENOID VALVE	VC	55'-3"	1.13	0.30	0.56	Y*
CVCS	SOV-149-1	SOLENOID OPERATED VALVE	CH-TCV-149 SOLENOID VALVE	PAB	80'-0"	1.13	0.30	0.56	Y
CVCS	SOV-200A-1	SOLENOID OPERATED VALVE	CH-AOV-200A SOLENOID VALVE	VC	46'-0"	1.13	0.30	0.56	Y*
CVCS	SOV-200B-1	SOLENOID OPERATED VALVE	CH-AOV-200B SOLENOID VALVE	VC	46'-0"	1.13	0.30	0.56	Y*
CVCS	SOV-200C-1	SOLENOID OPERATED VALVE	CH-AOV-200C SOLENOID VALVE	VC	46'-0"	1.13	0.30	0.56	Y*
CVCS	SOV-201-1	SOLENOID OPERATED VALVE	CH-201 SOLENOID VALVE	PP	51'-0"	1.13	0.30	0.56	Y*
CVCS	SOV-202-1	SOLENOID OPERATED VALVE	CH-202 SOLENOID VALVE	PP	51'-0"	1.13	0.30	0.56	Y*
CVCS	SOV-204A-1	SOLENOID OPERATED VALVE	CH-AOV-204A SOLENOID VALVE	VC	58'-0"	1.13	0.30	0.56	Y*
CVCS	SOV-204B-1	SOLENOID OPERATED VALVE	CH-AOV-204B SOLENOID VALVE	VC	46'-0"	1.13	0.30	0.56	Y*
CVCS	SOV-212-1	SOLENOID OPERATED VALVE	CH-AOV-212 SOLENOID VALVE	VC	46'-0"	1.13	0.30	0.56	Y*
CVCS	SOV-213A-1	SOLENOID OPERATED VALVE	CH-213A SOLENOID VALVE	VC	46'-0"	1.13	0.30	0.56	Y*
CVCS	SOV-213B-1	SOLENOID OPERATED VALVE	CH-213B SOLENOID VALVE	VC	46'-0"	1.13	0.30	0.56	Y*
CVCS	SOV-215-1	SOLENOID OPERATED VALVE	CH-AOV-215 SOLENOID VALVE	VC	46'-0"	1.13	0.30	0.56	Y
CVCS	SOV-246-1	SOLENOID OPERATED VALVE	CH-AOV-246 SOLENOID VALVE	VC	53'-0"	1.13	0.30	0.56	Y*
CVCS	SOV-261A-1	SOLENOID OPERATED VALVE	CH-AOV-261A SOLENOID VALVE	VC	79'-0"	1.13	0.30	0.56	Y*
CVCS	SOV-261B-1	SOLENOID OPERATED VALVE	CH-AOV-261B SOLENOID VALVE	VC	79'-0"	1.13	0.30	0.56	Y*
CVCS	SOV-261C-1	SOLENOID OPERATED VALVE	CH-AOV-261C SOLENOID VALVE	VC	79'-0"	1.13	0.30	0.56	Y*
CVCS	SOV-261D-1	SOLENOID OPERATED VALVE	CH-AOV-261D SOLENOID VALVE	VC	79'-0"	1.13	0.30	0.56	Y*
CVCS	SOV-310-1	SOLENOID OPERATED VALVE	CH-310 SOLENOID VALVE	PAB	42'-0"	1.13	0.30	0.56	Y*
CVCS	SOV-459-1	SOLENOID OPERATED VALVE	LETDOWN STOP VALVE	VC	79'-0"	1.13	0.30	0.56	Y*
CVCS	SOV-460-1	SOLENOID OPERATED VALVE	CH-LCV-460 SOLENOID VALVE	VC	79'-0"	1.13	0.30	0.56	Y*
DGV	0031OAL A	AIR OPERATED LOUVER	DG 31 ROOM VENTILATION INLET LOUVER L-316	DGB	44'-0"	1.13	0.30	0.56	Y
DGV	0031OAL B	AIR OPERATED LOUVER	DG 31 ROOM VENTILATION INLET LOUVER L-316	DGB	44'-0"	1.13	0.30	0.56	Y
DGV	0031OAL C	AIR OPERATED LOUVER	DG 31 ROOM VENTILATION INLET LOUVER L-316	DGB	44'-0"	1.13	0.30	0.56	Y
DGV	0032OAL A	AIR OPERATED LOUVER	DG 31 ROOM VENTILATION INLET LOUVER L-317	DGB	44'-0"	1.13	0.30	0.56	Y
DGV	0032OAL B	AIR OPERATED LOUVER	DG 31 ROOM VENTILATION INLET LOUVER L-317	DGB	44'-0"	1.13	0.30	0.56	Y
DGV	0032OAL C	AIR OPERATED LOUVER	DG 31 ROOM VENTILATION INLET LOUVER L-317	DGB	44'-0"	1.13	0.30	0.56	Y
DGV	0033OAL A	AIR OPERATED LOUVER	OUTSIDE AIR LOUVER 33 EDG	DGB	44'-0"	1.13	0.30	0.56	Y
DGV	0033OAL B	AIR OPERATED LOUVER	OUTSIDE AIR LOUVER 33 EDG	DGB	44'-0"	1.13	0.30	0.56	Y
DGV	0033OAL C	AIR OPERATED LOUVER	OUTSIDE AIR LOUVER 33 EDG	DGB	44'-0"	1.13	0.30	0.56	Y
DGV	DG EXHAUST FAN 314	EXHAUST FAN	DGB EXHAUST FAN 314	DGB	44'-0"	1.13	0.30	0.56	Y
DGV	DG EXHAUST FAN 315	EXHAUST FAN	DGB EXHAUST FAN 315	DGB	44'-0"	1.13	0.30	0.56	Y
DGV	DG EXHAUST FAN 316	EXHAUST FAN	DGB EXHAUST FAN 316	DGB	44'-0"	1.13	0.30	0.56	Y
DGV	DG EXHAUST FAN 317	EXHAUST FAN	DGB EXHAUST FAN 317	DGB	44'-0"	1.13	0.30	0.56	Y
DGV	DG EXHAUST FAN 318	EXHAUST FAN	DGB EXHAUST FAN 318	DGB	44'-0"	1.13	0.30	0.56	Y
DGV	DG EXHAUST FAN 319	EXHAUST FAN	DGB EXHAUST FAN 319	DGB	44'-0"	1.13	0.30	0.56	Y
EDG	31 DG FUEL XFER PUMP	MOTOR DRIVEN PUMP	F.O. TRANSFER PUMP	YD	38'-6"	1.13	0.30	0.56	Y
EDG	32 DG FUEL XFER PUMP	MOTOR DRIVEN PUMP	F.O. TRANSFER PUMP	YD	38'-0"	1.13	0.30	0.56	Y

* Denot… …-of-the-Box" Component

Table 3A.1
Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
EDG	33 DG FUEL XFER PUMP	MOTOR DRIVEN PUMP	F.O. TRANSFER PUMP	YD	38'-0"	1.13	0.30	0.58	Y
125VDC	33PP-1	CIRCUIT BREAKER	480V SWGR 31 BUS 2A BKR CONTROL AND BUS 2A AND 3A SAFEGUARDS CIRCUIT BREAKER	CB	15'-0"	1.13	0.30	0.58	Y*
EDG	CPT-29-(N)	FUSE	FUSE (NEG) AT SWGR31 CPT29	CB	15'-0"	1.13	0.30	0.58	Y*
EDG	CPT-29-(P)	FUSE	FUSE (POS) AT SWGR31 CPT29	CB	15'-0"	1.13	0.30	0.58	Y*
EDG	D31-F10	FUSE	FUSE F10(POS)	DGB	15'-0"	1.13	0.30	0.58	Y*
EDG	D31-F11	FUSE	FUSE F11(NEG)	DGB	15'-0"	1.13	0.30	0.58	Y*
EDG	D32-F10	FUSE	FUSE F10(POS)	DGB	15'-0"	1.13	0.30	0.58	Y*
EDG	D32-F11	FUSE	FUSE F11(NEG)	DGB	15'-0"	1.13	0.30	0.58	Y*
EDG	D33-F10	FUSE	FUSE F10(POS)	DGB	15'-0"	1.13	0.30	0.58	Y*
EDG	D33-F11	FUSE	FUSE F11(NEG)	DGB	15'-0"	1.13	0.30	0.58	Y*
EDG	DF-LCV-1207A	LEVEL CONTROL VALVE	F.O. DAY TANK 31 LEVEL CONTROL VALVE	DG	26'-0"	1.13	0.30	0.58	Y
EDG	DF-LCV-1207B	LEVEL CONTROL VALVE	F.O. DAY TANK 31 LEVEL CONTROL VALVE	DG	26'-0"	1.13	0.30	0.58	Y
EDG	DF-LCV-1208A	LEVEL CONTROL VALVE	F.O. DAY TANK 32 LEVEL CONTROL VALVE	DG	26'-0"	1.13	0.30	0.58	Y
EDG	DF-LCV-1208B	LEVEL CONTROL VALVE	F.O. DAY TANK 32 LEVEL CONTROL VALVE	DG	26'-0"	1.13	0.30	0.58	Y
EDG	DF-LCV-1209A	LEVEL CONTROL VALVE	F.O. DAY TANK 33 LEVEL CONTROL VALVE	DG	26'-0"	1.13	0.30	0.58	Y
EDG	DF-LCV-1209B	LEVEL CONTROL VALVE	F.O. DAY TANK 33 LEVEL CONTROL VALVE	DG	26'-0"	1.13	0.30	0.58	Y
125VDC	DP31-14	CIRCUIT BREAKER	DG33 CONTROL PANEL "PQ2" (CH II) CIRCUIT BREAKER	CB	53'-0"	1.13	0.30	0.58	Y*
SWS	FCV-1176	FLOW CONTROL VALVE	D.G. COOLER RETURN HEADER FCV	DG	15'-0"	1.13	0.30	0.58	Y
SWS	FCV-1176A	FLOW CONTROL VALVE	D.G. COOLER RETURN HEADER FCV	DG	15'-0"	1.13	0.30	0.58	Y
EDG	PNL 31EDGA	CONTROL PANEL	31 EDG AUX STARTERS & CONTROL PANEL	DG	15'-0"	1.13	0.30	0.58	Y
EDG	PNL 32EDGA	CONTROL PANEL	32 EDG AUX STARTERS & CONTROL PANEL	DG	15'-0"	1.13	0.30	0.58	Y
EDG	PNL 33EDGA	CONTROL PANEL	33 EDG AUX STARTERS & CONTROL PANEL	DG	15'-0"	1.13	0.30	0.58	Y
EDG	PNL PI1	CONTROL PANEL	31 EDG PNEU CONTROL PANEL	DGB	15'-0"	1.13	0.30	0.58	Y
EDG	PNL PI2	CONTROL PANEL	32 EDG PNEU CONTROL PANEL	DGB	15'-0"	1.13	0.30	0.58	Y
EDG	PNL PI3	CONTROL PANEL	33 EDG PNEU CONTROL PANEL	DGB	15'-0"	1.13	0.30	0.58	Y
EDG	PP31-4(N)	FUSE	NEG. FUSE FOR SWGR31 CPT18(52/EG3)	CB	15'-0"	1.13	0.30	0.58	Y*
EDG	PP31-4(P)	FUSE	POS. FUSE FOR SWGR31 CPT18(52/EG3)	CB	15'-0"	1.13	0.30	0.58	Y*
EDG	PP32-8(+)	FUSE	FUSE(+) FOR SWGR32 CPT15(52/EG2)	CB	15'-0"	1.13	0.30	0.58	Y*
EDG	PP32-8(-)	FUSE	FUSE(-) FOR SWGR32 CPT15(52/EG2)	CB	15'-0"	1.13	0.30	0.58	Y*
125VDC	PP33-4	CIRCUIT BREAKER	DIESEL GENERATOR 31 CONTROL CIRCUIT BREAKER	CB	15'-0"	1.13	0.30	0.58	Y*
EDG	SOV-1274	SOLENOID OPERATED VALVE	SOLENOID OPERATED VALVE FOR FCV-1176 & FCV-1176A	DG	15'-0"	1.13	0.30	0.58	Y*
EDG	SOV-1275	SOLENOID OPERATED VALVE	SOLENOID OPERATED VALVE FOR FCV-1176 & FCV-1176A	DG	15'-0"	1.13	0.30	0.58	Y*
EDG	SOV-18-1	SOLENOID OPERATED VALVE	DG 31 AIR START SOLENOID VALVE (EAST)	DGB	15'-0"	1.13	0.30	0.58	N
EDG	SOV-18-2	SOLENOID OPERATED VALVE	DG 31 AIR START SOLENOID VALVE (WEST)	DGB	15'-0"	1.13	0.30	0.58	N
EDG	SOV-18-3	SOLENOID OPERATED VALVE	DG 32 AIR START SOLENOID VALVE (EAST)	DGB	15'-0"	1.13	0.30	0.58	N
EDG	SOV-18-4	SOLENOID OPERATED VALVE	DG 32 AIR START SOLENOID VALVE (WEST)	DGB	15'-0"	1.13	0.30	0.58	N
EDG	SOV-18-5	SOLENOID OPERATED VALVE	DG 33 AIR START SOLENOID VALVE (EAST)	DGB	15'-0"	1.13	0.30	0.58	N
EDG	SOV-18-6	SOLENOID OPERATED VALVE	DG 33 AIR START SOLENOID VALVE (WEST)	DGB	15'-0"	1.13	0.30	0.58	N
EDG	SWN-SOV-1276	SOLENOID OPERATED VALVE	SOLENOID OPERATOR FOR FCV-1176	DG	15'-0"	1.13	0.30	0.58	Y*
EDG	SWN-SOV-1276A	SOLENOID OPERATED VALVE	SOLENOID OPERATOR FOR FCV-1176A	DG	15'-0"	1.13	0.30	0.58	Y*
GAS	PCV-1042	PRESSURE CONTROL VALVE	HYDROGEN SUPPLY PRESSURE CONTROL VALVE	PAB	55'-0"	1.13	0.30	0.58	Y
HVAC	HJ8	CONTROL STATION	33/34 ETEF LOCAL CTRL STATION	CB	33'-0"	1.13	0.30	0.58	Y
HVAC	HJ9	CONTROL STATION	31/32 ETEF LOCAL CTRL STATION	CB	33'-0"	1.13	0.30	0.58	Y
HVAC	PNL 324	LIGHTING PANEL	LIGHTING PANEL 324	AB	18'-6"	1.13	0.30	0.58	Y
HVAC	PNL JC1	CONTROL PANEL	FAN ROOM CONTROL PANEL	FR	72'-0"	1.13	0.30	0.58	Y
HVAC	PNL PY3	CONTROL PANEL	DELUGE SYS CONTROL PANEL PY3	PP	34'-0"	1.13	0.30	0.58	Y
HVAC	PNL PY4	CONTROL PANEL	DELUGE SYS CONTROL PANEL PY4	PP	34'-0"	1.13	0.30	0.58	Y
HVAC	PNL PY5	CONTROL PANEL	DELUGE SYS CONTROL PANEL PY5	PP	34'-0"	1.13	0.30	0.58	Y
HVAC	PNL PY6	CONTROL PANEL	DELUGE SYS CONTROL PANEL PY6	PP	34'-0"	1.13	0.30	0.58	Y
IAS	31 IA DRYER	DRYER	31 IA HEATLESS DRYER	CB	15'-0"	1.13	0.30	0.58	N
IAS	31A HDDT	TANK	31A HEATLESS DESSICANT DRYER TANK	CB	15'-0"	1.13	0.30	0.58	Y
IAS	31B HDDT	TANK	31B HEATLESS DESSICANT DRYER TANK	CB	15'-0"	1.13	0.30	0.58	Y
IAS	IA-1-1	RELIEF VALVE	31 IA COMPRESSOR OUTLET RELIEF VALVE	CB	15'-0"	1.13	0.30	0.58	N
IAS	IA-1-2	RELIEF VALVE	32 IA COMPRESSOR OUTLET RELIEF VALVE	CB	15'-0"	1.13	0.30	0.58	N
IAS	IA-10	MANUAL VALVE	REFRIGERANT DRYER 32 OUTLET STOP	CB	15'-0"	1.13	0.30	0.58	N
IAS	IA-11-1	MANUAL VALVE	MANUAL L.O. VLV 11-1	CB	15'-0"	1.13	0.30	0.58	N

* Denotes "Rule-of-the-Box" Component

Table 3A.1

Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
IAS	IA-11-2	MANUAL VALVE	STANDBY DRYER OUTLET VLV 11-2	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-12-1	MANUAL VALVE	AFTERFILTER INLET VLV 12-1	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-12-2	MANUAL VALVE	AFTERFILTER OUTLET VLV 12-2	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-174	MANUAL VALVE	MAIN REGEN DRYER INLET VLV	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-175	MANUAL VALVE	MAIN REGEN DRYER OUTLET VLV	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-2-1	CHECK VALVE	INSTRUMENT AIR COMPRESSOR AFTERCOOLER 31 DISCHARGE CHECK	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-2-1	CHECK VALVE	INSTRUMENT AIR COMPRESSOR AFTERCOOLER 31 DISCHARGE CHECK	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-2-2	CHECK VALVE	INSTRUMENT AIR COMPRESSOR AFTERCOOLER 32 DISCHARGE CHECK	CB	[illegible]	1.13	0.30	0.56	N
IAS	IA-2-2	CHECK VALVE	INSTRUMENT AIR COMPRESSOR AFTERCOOLER 32 DISCHARGE CHECK	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-3-1	MANUAL VALVE	31 IA COMPRESSOR MOISTURE SEPARATOR OUTLET ISOLATION	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-3-2	MANUAL VALVE	32 IA COMPRESSOR MOISTURE SEPARATOR OUTLET ISOLATION	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-39	CHECK VALVE	CONTAINMENT ISOLATION CHECK	PAB	??	1.13	0.30	0.56	N
IAS	IA-434	CHECK VALVE	IA-PCV-1276 OUTLET CHECK VALVE	AB	18'-0"	1.13	0.30	0.56	N
IAS	IA-438	MANUAL VALVE	IA TO HEATLESS DESICCANT DRYER ISOLATION	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-49	RELIEF VALVE	IA RECEIVER NO 31 RELIEF VALVE	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-5	MANUAL VALVE	INSTRUMENT AIR TO OUTSIDE SERVICES STOP	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-52	MANUAL VALVE	INSTRUMENT AIR TO NUCLEAR SERVICES STOP	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-53	MANUAL VALVE	AIR SUPPLY STOP TO AUXILIARY FEED PUMP HOUSE	AB	15'-0"	1.13	0.30	0.56	N
IAS	IA-54-1	MANUAL VALVE	PAB INSTRUMENT AIR HEADER STOP	PAB	41'-0"	1.13	0.30	0.56	N
IAS	IA-54-2	MANUAL VALVE	INSTRUMENT AIR HEADER TO VC STOP	PAB	41'-0"	1.13	0.30	0.56	N
IAS	IA-59	MANUAL VALVE	CONTAINMENT ISOLATION TO VC RING HEADER	VC	46'-0"	1.13	0.30	0.56	N
IAS	IA-6	MANUAL VALVE	31 IA RECEIVER OUTLET ISOLATION	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-618	MANUAL VALVE	IA TO 32A HEATLESS DESI DRYER PREFILTER INLET ISO	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-619	MANUAL VALVE	IA TO 32A HEATLESS DESI DRYER PREFILTER INLET ISO	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-622	MANUAL VALVE	IA TO 32 HEATLESS DESICANNT DRYER SET INLET	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-624	MANUAL VALVE	IA TO 32 HEATLESS DESICANNT DRYER SET OUTLET	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-625	MANUAL VALVE	IA TO 32A HEATLESS DESICANNT DRYER AFTERFILTER	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-626	MANUAL VALVE	IA 32A HEATLESS DESICANNT DRYER AFTERFILTER	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-632	AIR OPERATED VALVE	INLET ISOLATION TO LI-1140	PAB	55'-0"	1.13	0.30	0.56	N
IAS	IA-633	AIR OPERATED VALVE	PAB IA SAMPLE VALVE	PAB	55'-0"	1.13	0.30	0.56	N
IAS	IA-7	MANUAL VALVE	REFRIGERANT DRYER 31 INLET STOP	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-70	MANUAL VALVE	IA REFRIG DRYER 31 INLET VLV	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-71	MANUAL VALVE	BYPASS FILTER INLET VLV IA-70	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-76	MANUAL VALVE	PC-1162S AND PC-1164S SENSING LINE ISOLATION	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-77	CHECK VALVE	COMPRESSOR 31 GOVERNOR AIR CONTROL INLET CHECK	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-78	MANUAL VALVE	PC-1163S AND PC-1165S SENSING LINE ISOLATION	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-79	CHECK VALVE	COMPRESSOR 32 GOVERNOR AIR CONTROL INLET CHECK	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-8	MANUAL VALVE	REFRIGERANT DRYER 32 INLET STOP	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-83	CHECK VALVE	REGENERATIVE DRYER 1 DISCHARGE CHECK (NUCLEAR SERVICE)	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-84	CHECK VALVE	REGENERATIVE DRYER 2 DISCHARGE CHECK (NUCLEAR SERVICE)	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-9	MANUAL VALVE	REFRIGERANT DRYER 31 OUTLET STOP	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-AOV-82	AIR OPERATED VALVE	MAIN REGENERATIVE DESICCANT DRYER SELECTOR VALVE	CB	15'-0"	1.13	0.30	0.56	N
IAS	IA-PCV-1228	PRESSURE CONTROL VALVE	INSTRUMENT AIR CONTAINMENT ISOLATION	PP	41'-0"	1.13	0.30	0.56	Y
IAS	MS-SOV-1230	SOLENOID OPERATED VALVE	SG#31 MAIN STM ISOLATION VALVE 31 SUPPLY SOLENOID	AB	77'-4"	1.13	0.30	0.56	Y*
IAS	MS-SOV-1231	SOLENOID OPERATED VALVE	SG#31 MAIN STM ISOLATION VALVE 31 SUPPLY SOLENOID	AB	77'-4"	1.13	0.30	0.56	Y*
IAS	MS-SOV-1232	SOLENOID OPERATED VALVE	SG#31 MAIN STM ISOLATION VALVE 31 EXHAUST SOLENOID	AB	77'-4"	1.13	0.30	0.56	Y*
IAS	MS-SOV-1233	SOLENOID OPERATED VALVE	SG#31 MAIN STM ISOLATION VALVE 31 EXHAUST SOLENOID	AB	77'-4"	1.13	0.30	0.56	Y*
IAS	MS-SOV-1234	SOLENOID OPERATED VALVE	SG#32 MAIN STM ISOLATION VALVE 32 SUPPLY SOLENOID	AB	64'-8"	1.13	0.30	0.56	Y*
IAS	MS-SOV-1235	SOLENOID OPERATED VALVE	SG#32 MAIN STM ISOLATION VALVE 32 SUPPLY SOLENOID	AB	64'-8"	1.13	0.30	0.56	Y*
IAS	MS-SOV-1236	SOLENOID OPERATED VALVE	SG#32 MAIN STM ISOLATION VALVE 32 EXHAUST SOLENOID	AB	64'-8"	1.13	0.30	0.56	Y*
IAS	MS-SOV-1237	SOLENOID OPERATED VALVE	SG#32 MAIN STM ISOLATION VALVE 32 EXHAUST SOLENOID	AB	64'-8"	1.13	0.30	0.56	Y*
IAS	MS-SOV-1238	SOLENOID OPERATED VALVE	SG#33 MAIN STM ISOLATION VALVE 33 SUPPLY SOLENOID	AB	77'-4"	1.13	0.30	0.56	Y*
IAS	MS-SOV-1239	SOLENOID OPERATED VALVE	SG#33 MAIN STM ISOLATION VALVE 33 SUPPLY SOLENOID	AB	77'-4"	1.13	0.30	0.56	Y*

* Denotes "In-of-the-Box" Component

Table 3A.1
Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
IAS	MS-SOV-1240	SOLENOID OPERATED VALVE	SG#33 MAIN STM ISOLATION VALVE 33 EXHAUST SOLENOID	AB	77'-4"	1.13	0.30	0.56	Y*
IAS	MS-SOV-1241	SOLENOID OPERATED VALVE	SG#33 MAIN STM ISOLATION VALVE 33 EXHAUST SOLENOID	AB	77'-4"	1.13	0.30	0.56	Y*
IAS	MS-SOV-1242	SOLENOID OPERATED VALVE	SG#34 MAIN STM ISOLATION VALVE 34 SUPPLY SOLENOID	AB	64'-6"	1.13	0.30	0.56	Y*
IAS	MS-SOV-1243	SOLENOID OPERATED VALVE	SG#34 MAIN STM ISOLATION VALVE 34 SUPPLY SOLENOID	AB	64'-6"	1.13	0.30	0.56	Y*
IAS	MS-SOV-1244	SOLENOID OPERATED VALVE	SG#34 MAIN STM ISOLATION VALVE 34 EXHAUST SOLENOID	AB	64'-6"	1.13	0.30	0.56	Y*
IAS	MS-SOV-1245	SOLENOID OPERATED VALVE	SG#34 MAIN STM ISOLATION VALVE 34 EXHAUST SOLENOID	AB	64'-6"	1.13	0.30	0.56	Y*
IAS	PCV-1142	PRESSURE CONTROL VALVE	INSTRUMENT AIR EMERGENCY MAKEUP VALVE	CB	15'-0"	1.13	0.30	0.56	Y
IAS	PCV-1143	PRESSURE CONTROL VALVE	PCV 1143	CB	15'-0"	1.13	0.30	0.56	N
IAS	PCV-1542	PRESSURE CONTROL VALVE	REFRIG DRYER BYPAS PCV	CB	15'-0"	1.13	0.30	0.56	N
IAS	SOV-1142-1	SOLENOID OPERATED VALVE	PCV-1142 SOLENOID VALVE	CB	15'-0"	1.13	0.30	0.56	Y*
IAS	SOV-1428	SOLENOID OPERATED VALVE	SOLENOID VALVE FOR PCV-1228	PP	41'-0"	1.13	0.30	0.56	Y*
ICC	31 IACC PUMP	MOTOR DRIVEN PUMP	ESS CLC PUMP 31	CB	15'-0"	1.13	0.30	0.56	N
ICC	32 IACC PUMP	MOTOR DRIVEN PUMP	ESS CLC PUMP 32	CB	15'-0"	1.13	0.30	0.56	N
ICC	CC-39A	CHECK VALVE	COOLING PUMP 31 DISCHARGE CHECK	CB	15'-0"	1.13	0.30	0.56	N
ICC	CC-39B	CHECK VALVE	COOLING PUMP 32 DISCHARGE CHECK	CB	15'-0"	1.13	0.30	0.56	N
ICC	CC-40A	MANUAL VALVE	COOLING PUMP 31 DISCHARGE STOP	CB	15'-0"	1.13	0.30	0.56	N
ICC	CC-40B	MANUAL VALVE	COOLING PUMP 32 DISCHARGE STOP	CB	15'-0"	1.13	0.30	0.56	N
ICC	CC-41A	MANUAL VALVE	HEAT EXCHANGER 31 INLET STOP	CB	15'-0"	1.13	0.30	0.56	N
ICC	CC-41B	MANUAL VALVE	HEAT EXCHANGER 32 INLET STOP	CB	15'-0"	1.13	0.30	0.56	N
ICC	CC-42-1	MANUAL VALVE	HEAT EXCHANGER 31 OUTLET STOP	CB	15'-0"	1.13	0.30	0.56	N
ICC	CC-42-2	MANUAL VALVE	HEAT EXCHANGER 32 OUTLET STOP	CB	15'-0"	1.13	0.30	0.56	N
ICC	CC-43-1	MANUAL VALVE	AFTERCOOLER 31 INLET STOP	CB	15'-0"	1.13	0.30	0.56	N
ICC	CC-43-2	MANUAL VALVE	AFTERCOOLER 32 INLET STOP	CB	15'-0"	1.13	0.30	0.56	N
ICC	CC-45	MANUAL VALVE	COMPRESSOR 31 HEAD COOLING WATER OUTLET STOP	CB	15'-0"	1.13	0.30	0.56	N
ICC	CC-46	MANUAL VALVE	COMPRESSOR 32 HEAD COOLING WATER OUTLET STOP	CB	15'-0"	1.13	0.30	0.56	N
ICC	CC-47-1	MANUAL VALVE	COOLING PUMP 31 SUCTION STOP	CB	15'-0"	1.13	0.30	0.56	N
ICC	CC-47-2	MANUAL VALVE	COOLING PUMP 32 SUCTION STOP	CB	15'-0"	1.13	0.30	0.56	N
ICC	CC-56-1	RELIEF VALVE	AFTERCOOLER 31 INLET RELIEF	CB	15'-0"	1.13	0.30	0.56	N
ICC	CC-56-2	RELIEF VALVE	AFTERCOOLER 32 INLET RELIEF	CB	15'-0"	1.13	0.30	0.56	N
MFW	LI-417D	LEVEL INDICATOR	SG 31 LEVEL INDICATOR	AB	18'-6"	1.13	0.30	0.56	Y*
MFW	LI-427D	LEVEL INDICATOR	SG 32 LEVEL INDICATOR	AB	18'-6"	1.13	0.30	0.56	Y*
MFW	LI-437D	LEVEL INDICATOR	SG 33 LEVEL INDICATOR	AB	18'-6"	1.13	0.30	0.56	Y*
MFW	LI-447D	LEVEL INDICATOR	SG 34 LEVEL INDICATOR	AB	18'-6"	1.13	0.30	0.56	Y*
MSS	BD-PCV-1223	PRESSURE CONTROL VALVE	SG 31 BLOWDOWN SAMPLE UPSTREAM CONT ISOLATION	PP	51'-0"	1.13	0.30	0.56	N
MSS	BD-PCV-1223A	PRESSURE CONTROL VALVE	SG 31 BLOWDOWN SAMPLE DOWNSTREAM CONT ISOLATION	PP	51'-0"	1.13	0.30	0.56	N
MSS	BD-PCV-1224	PRESSURE CONTROL VALVE	SG 32 BLOWDOWN SAMPLE UPSTREAM CONT ISOLATION	PP	51'-0"	1.13	0.30	0.56	N
MSS	BD-PCV-1224A	PRESSURE CONTROL VALVE	SG 32 BLOWDOWN SAMPLE DOWNSTREAM CONT ISOLATION	PP	51'-0"	1.13	0.30	0.56	N
MSS	BD-PCV-1225	PRESSURE CONTROL VALVE	SG 33 BLOWDOWN SAMPLE UPSTREAM CONT ISOLATION	PP	51'-0"	1.13	0.30	0.56	N
MSS	BD-PCV-1225A	PRESSURE CONTROL VALVE	SG 33 BLOWDOWN SAMPLE DOWNSTREAM CONT ISOLATION	PP	51'-0"	1.13	0.30	0.56	N
MSS	BD-PCV-1226	PRESSURE CONTROL VALVE	SG 34 BLOWDOWN SAMPLE UPSTREAM CONT ISOLATION	PP	51'-0"	1.13	0.30	0.56	N
MSS	BD-PCV-1226A	PRESSURE CONTROL VALVE	SG 34 BLOWDOWN SAMPLE DOWNSTREAM CONT ISOLATION	PP	51'-0"	1.13	0.30	0.56	N
MSS	BD-PCV-1214	AIR OPERATED VALVE	31 S/G BLOWDOWN UP STREAM CONTAINMENT ISOLATION	PAB	55'-0"	1.13	0.30	0.56	N
MSS	BD-PCV-1214 (AO)	AIR OPERATED VALVE	CONTAINMENT ISOLATION VALVE BD-PCV-1214 AIR OPERATOR	PAB	55'-0"	1.13	0.30	0.56	N
MSS	BD-PCV-1215	AIR OPERATED VALVE	32 S/G BLOWDOWN UP STREAM CONTAINMENT ISOLATION	PAB	55'-0"	1.13	0.30	0.56	N
MSS	BD-PCV-1215 (AO)	AIR OPERATED VALVE	CONTAINMENT ISOLATION VALVE BD-PCV-1215 AIR OPERATOR	PAB	55'-0"	1.13	0.30	0.56	N
MSS	BD-PCV-1216	AIR OPERATED VALVE	33 S/G BLOWDOWN UP STREAM CONTAINMENT ISOLATION	PAB	55'-0"	1.13	0.30	0.56	N
MSS	BD-PCV-1216 (AO)	AIR OPERATED VALVE	CONTAINMENT ISOLATION VALVE BD-PCV-1216 AIR OPERATOR	PAB	55'-0"	1.13	0.30	0.56	N
MSS	BD-PCV-1217	AIR OPERATED VALVE	34 S/G BLOWDOWN UP STREAM CONTAINMENT ISOLATION	PAB	55'-0"	1.13	0.30	0.56	N
MSS	BD-PCV-1217 (AO)	AIR OPERATED VALVE	CONTAINMENT ISOLATION VALVE BD-PCV-1217 AIR OPERATOR	PAB	55'-0"	1.13	0.30	0.56	N
MSS	BD-SOV-1314	SOLENOID OPERATED VALVE	ISOL VALVE BD-PCV-1214 SOLENOID PILOT	PAB	55'-0"	1.13	0.30	0.56	N
MSS	BD-SOV-1314A	SOLENOID OPERATED VALVE	ISOL VALVE BD-PCV-1214A SOLENOID PILOT	PAB	55'-0"	1.13	0.30	0.56	N
MSS	BD-SOV-1315	SOLENOID OPERATED VALVE	ISOL VALVE BD-PCV-1215 SOLENOID PILOT	PAB	55'-0"	1.13	0.30	0.56	N
MSS	BD-SOV-1315A	SOLENOID OPERATED VALVE	ISOL VALVE BD-PCV-1215A SOLENOID PILOT	PAB	55'-0"	1.13	0.30	0.56	N
MSS	BD-SOV-1316	SOLENOID OPERATED VALVE	ISOL VALVE BD-PCV-1216 SOLENOID PILOT	PAB	55'-0"	1.13	0.30	0.56	N
MSS	BD-SOV-1316A	SOLENOID OPERATED VALVE	ISOL VALVE BD-PCV-1216A SOLENOID PILOT	PAB	55'-0"	1.13	0.30	0.56	N
MSS	BD-SOV-1317	SOLENOID OPERATED VALVE	ISOL VALVE BD-PCV-1217 SOLENOID PILOT	PAB	55'-0"	1.13	0.30	0.56	N
MSS	BD-SOV-1317A	SOLENOID OPERATED VALVE	ISOL VALVE BD-PCV-1217A SOLENOID PILOT	PAB	55'-0"	1.13	0.30	0.56	N

* Denotes "Rule-of-the-Box" Component

Table 3A.1
Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
MSS	MS-1-31	MAIN STEAM ISOLATION VALVE	SG #31 MAIN STM ISOLATION AIR-OP STOP CHECK	AB	77'-0"	1.13	0.30	0.56	Y
MSS	MS-1-32	MAIN STEAM ISOLATION VALVE	SG #32 MAIN STM ISOLATION AIR-OP STOP CHECK	AB	65'-0"	1.13	0.30	0.56	Y
MSS	MS-1-33	MAIN STEAM ISOLATION VALVE	SG #33 MAIN STM ISOLATION AIR-OP STOP CHECK	AB	77'-0"	1.13	0.30	0.56	Y
MSS	MS-1-34	MAIN STEAM ISOLATION VALVE	SG #34 MAIN STM ISOLATION AIR-OP STOP CHECK	AB	65'-0"	1.13	0.30	0.56	Y
MSS	MS-2-31	NON-RETURN CHECK VALVE	SG #31 MAIN STM NON-RETURN CHECK	AB	77'-0"	1.13	0.30	0.56	N
MSS	MS-2-32	NON-RETURN CHECK VALVE	SG #32 MAIN STM NON-RETURN CHECK	AB	77'-0"	1.13	0.30	0.56	N
MSS	MS-2-33	NON-RETURN CHECK VALVE	SG #33 MAIN STM NON-RETURN CHECK	AB	77'-0"	1.13	0.30	0.56	N
MSS	MS-2-34	NON-RETURN CHECK VALVE	SG #34 MAIN STM NON-RETURN CHECK	AB	77'-0"	1.13	0.30	0.56	N
MSS	MS-41	STOP CHECK VALVE	SG #32 MAIN STEAM TO AFW TURBINE STOP CHECK	AB	65'-0"	1.13	0.30	0.56	N
MSS	MS-42	STOP CHECK VALVE	SG #33 MAIN STEAM TO AFW PUMP TURBINE STOP CHECK	AB	65'-0"	1.13	0.30	0.56	N
MSS	MS-45-1	SAFETY RELIEF VALVE	STEAM GEN 31 SAFETY RELIEF VALVE	AB	77'-0"	1.13	0.30	0.56	Y
MSS	MS-45-2	SAFETY RELIEF VALVE	STEAM GEN 32 SAFETY RELIEF VALVE	AB	77'-0"	1.13	0.30	0.56	Y
MSS	MS-45-3	SAFETY RELIEF VALVE	STEAM GEN 33 SAFETY RELIEF VALVE	AB	77'-0"	1.13	0.30	0.56	Y
MSS	MS-45-4	SAFETY RELIEF VALVE	STEAM GEN 34 SAFETY RELIEF VALVE	AB	77'-0"	1.13	0.30	0.56	Y
MSS	MS-46-1	SAFETY RELIEF VALVE	STEAM GEN 31 SAFETY RELIEF VALVE	AB	77'-0"	1.13	0.30	0.56	Y
MSS	MS-46-2	SAFETY RELIEF VALVE	STEAM GEN 32 SAFETY RELIEF VALVE	AB	77'-0"	1.13	0.30	0.56	Y
MSS	MS-46-3	SAFETY RELIEF VALVE	STEAM GEN 33 SAFETY RELIEF VALVE	AB	77'-0"	1.13	0.30	0.56	Y
MSS	MS-46-4	SAFETY RELIEF VALVE	STEAM GEN 34 SAFETY RELIEF VALVE	AB	77'-0"	1.13	0.30	0.56	Y
MSS	MS-47-1	SAFETY RELIEF VALVE	STEAM GEN 31 SAFETY RELIEF VALVE	AB	77'-0"	1.13	0.30	0.56	Y
MSS	MS-47-2	SAFETY RELIEF VALVE	STEAM GEN 32 SAFETY RELIEF VALVE	AB	77'-0"	1.13	0.30	0.56	Y
MSS	MS-47-3	SAFETY RELIEF VALVE	STEAM GEN 33 SAFETY RELIEF VALVE	AB	77'-0"	1.13	0.30	0.56	Y
MSS	MS-47-4	SAFETY RELIEF VALVE	STEAM GEN 34 SAFETY RELIEF VALVE	AB	77'-0"	1.13	0.30	0.56	Y
MSS	MS-48-1	SAFETY RELIEF VALVE	STEAM GEN 31 SAFETY RELIEF VALVE	AB	77'-0"	1.13	0.30	0.56	Y
MSS	MS-48-2	SAFETY RELIEF VALVE	STEAM GEN 32 SAFETY RELIEF VALVE	AB	77'-0"	1.13	0.30	0.56	Y
MSS	MS-48-3	SAFETY RELIEF VALVE	STEAM GEN 33 SAFETY RELIEF VALVE	AB	77'-0"	1.13	0.30	0.56	Y
MSS	MS-48-4	SAFETY RELIEF VALVE	STEAM GEN 34 SAFETY RELIEF VALVE	AB	77'-0"	1.13	0.30	0.56	Y
MSS	MS-49-1	SAFETY RELIEF VALVE	STEAM GEN 31 SAFETY RELIEF VALVE	AB	77'-0"	1.13	0.30	0.56	Y
MSS	MS-49-2	SAFETY RELIEF VALVE	STEAM GEN 32 SAFETY RELIEF VALVE	AB	77'-0"	1.13	0.30	0.56	Y
MSS	MS-49-3	SAFETY RELIEF VALVE	STEAM GEN 33 SAFETY RELIEF VALVE	AB	77'-0"	1.13	0.30	0.56	Y
MSS	MS-49-4	SAFETY RELIEF VALVE	STEAM GEN 34 SAFETY RELIEF VALVE	AB	77'-0"	1.13	0.30	0.56	Y
MSS	PCV-1134	ATMOSPHERIC RELIEF VALVE	ATM STM RELIEF VALVE 31 SG	AB	74'-0"	1.13	0.30	0.56	Y*
MSS	PCV-1135	ATMOSPHERIC RELIEF VALVE	ATM STM RELIEF VALVE 32 SG	AB	61'-0"	1.13	0.30	0.56	Y*
MSS	PCV-1136	ATMOSPHERIC RELIEF VALVE	ATM STM RELIEF VALVE 33 SG	AB	74'-0"	1.13	0.30	0.56	Y*
MSS	PCV-1137	ATMOSPHERIC RELIEF VALVE	ATM STM RELIEF VALVE 34 SG	AB	61'-0"	1.13	0.30	0.56	Y*
MSS	PM-419I	SIGNAL CONVERTER	PRESSURE SIGNAL CONVERTER CONDITIONER	AB	77'-4"	1.13	0.30	0.56	Y*
MSS	PM-429I	SIGNAL CONVERTER	PRESSURE SIGNAL CONVERTER CONDITIONER	AB	64'-8"	1.13	0.30	0.56	Y*
MSS	PM-439I	SIGNAL CONVERTER	PRESSURE SIGNAL CONVERTER CONDITIONER	AB	77'-7"	1.13	0.30	0.56	Y*
MSS	PM-449I	SIGNAL CONVERTER	PRESSURE SIGNAL CONVERTER CONDITIONER	AB	64'-8"	1.13	0.30	0.56	Y*
MSS	PNL #1	CONTROL PANEL	ATM STEAM DUMP PANEL #1	AB	43'-0"	1.13	0.30	0.56	Y
MSS	PNL #2	CONTROL PANEL	ATM STEAM DUMP PANEL #2	AB	43'-0"	1.13	0.30	0.56	Y
MSS	PNL 1-31	CONTROL PANEL	31 SG MSIV SOV PANEL	AB	77'-4"	1.13	0.30	0.56	Y
MSS	PNL 1-32	CONTROL PANEL	32 SG MSIV SOV PANEL	AB	64'-8"	1.13	0.30	0.56	Y
MSS	PNL 1-33	CONTROL PANEL	33 SG MSIV SOV PANEL	AB	77'-4"	1.13	0.30	0.56	Y
MSS	PNL 1-34	CONTROL PANEL	34 SG MSIV SOV PANEL	AB	64'-8"	1.13	0.30	0.56	Y
MSS	S/G 31	STEAM GENERATOR 31	STEAM GENERATOR 31	VC	95'-0"	1.13	0.30	0.56	N
MSS	S/G 32	STEAM GENERATOR 32	STEAM GENERATOR 32	VC	95'-0"	1.13	0.30	0.56	N
MSS	S/G 33	STEAM GENERATOR 33	STEAM GENERATOR 33	VC	95'-0"	1.13	0.30	0.56	N
MSS	S/G 34	STEAM GENERATOR 34	STEAM GENERATOR 34	VC	95'-0"	1.13	0.30	0.56	N
MSS	SOV-1139-1	SOLENOID OPERATED VALVE	PCV-1139 SOLENOID VALVE	AB	15'-0"	1.13	0.30	0.56	Y*
MSS	SOV-1310	SOLENOID OPERATED VALVE	PCV-1310A SOLENOID VALVE	AB	36'-0"	1.13	0.30	0.56	Y*
MSS	SOV-1311	SOLENOID OPERATED VALVE	PCV-1310B SOLENOID VALVE	AB	36'-0"	1.13	0.30	0.56	Y*
MWS	MW-26	MANUAL VALVE	EMERGENCY CITY WATER SUPPLY TO CHARGING PUMP	PAB	55'-0"	1.13	0.30	0.56	N
MWS	MW-681	MANUAL VALVE	EMERGENCY COOLING TO CHARGING PUMPS DRAIN VALVE	PAB	55'-0"	1.13	0.30	0.56	N
MWS	MW-684	MANUAL VALVE	EMERGENCY COOLING TO CHARGING PUMPS DRAIN VALVE	PAB	55'-0"	1.13	0.30	0.56	N
MWS	MW-18-16	MANUAL VALVE	WASTE HOLDUP TANK PIT HOSE COUPLING STOP	PAB	77'-0"	1.13	0.30	0.56	N
N2	IA-409	MANUAL VALVE	INLET VALVE IA-409 PLUG	AB	15'-0"	1.13	0.30	0.56	N
N2	IA-410	MANUAL VALVE	OUTLET VALVE IA-410 PLUG	AB	15'-0"	1.13	0.30	0.56	N

* Denotes "[illegible]-of-the-Box" Component

Table 3A.1
Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
N2	IA-411	MANUAL VALVE	BYPASS VLV IA-411 PLUG	AB	15'-0"	1.13	0.30	0.56	N
N2	N2-1-1134	MANUAL VALVE	MANUAL VALVE	AB	77'-0"	1.13	0.30	0.56	N
N2	N2-1-1135	MANUAL VALVE	MANUAL VALVE	AB	65'-0"	1.13	0.30	0.56	N
N2	N2-1-1136	MANUAL VALVE	MANUAL VALVE	AB	77'-0"	1.13	0.30	0.56	N
N2	N2-1-1137	MANUAL VALVE	MANUAL VALVE	AB	65'-0"	1.13	0.30	0.56	N
N2	N2-2-1134	MANUAL VALVE	MANUAL VALVE	AB	77'-0"	1.13	0.30	0.56	N
N2	N2-2-1135	MANUAL VALVE	MANUAL VALVE	AB	65'-0"	1.13	0.30	0.56	N
N2	N2-2-1136	MANUAL VALVE	MANUAL VALVE	AB	77'-0"	1.13	0.30	0.56	N
N2	N2-2-1137	MANUAL VALVE	MANUAL VALVE	AB	65'-0"	1.13	0.30	0.56	N
N2	N2-3-1134	MANUAL VALVE	MANUAL VALVE	AB	77'-0"	1.13	0.30	0.56	N
N2	N2-3-1135	MANUAL VALVE	MANUAL VALVE	AB	65'-0"	1.13	0.30	0.56	N
N2	N2-3-1136	MANUAL VALVE	MANUAL VALVE	AB	77'-0"	1.13	0.30	0.56	N
N2	N2-3-1137	MANUAL VALVE	MANUAL VALVE	AB	65'-0"	1.13	0.30	0.56	N
N2	N2-4-1134	MANUAL VALVE	MANUAL VALVE	AB	77'-0"	1.13	0.30	0.56	N
N2	N2-4-1135	MANUAL VALVE	MANUAL VALVE	AB	65'-0"	1.13	0.30	0.56	N
N2	N2-4-1136	MANUAL VALVE	MANUAL VALVE	AB	77'-0"	1.13	0.30	0.56	N
N2	N2-4-1137	MANUAL VALVE	MANUAL VALVE	AB	65'-0"	1.13	0.30	0.56	N
N2	N2-5-1134	MANUAL VALVE	MANUAL VALVE	AB	77'-0"	1.13	0.30	0.56	N
N2	N2-5-1135	MANUAL VALVE	MANUAL VALVE	AB	65'-0"	1.13	0.30	0.56	N
N2	N2-5-1136	MANUAL VALVE	MANUAL VALVE	AB	77'-0"	1.13	0.30	0.56	N
N2	N2-5-1137	MANUAL VALVE	MANUAL VALVE	AB	65'-0"	1.13	0.30	0.56	N
N2	N2-6-1134	MANUAL VALVE	MANUAL VALVE	AB	77'-0"	1.13	0.30	0.56	N
N2	N2-6-1135	MANUAL VALVE	MANUAL VALVE	AB	65'-0"	1.13	0.30	0.56	N
N2	N2-6-1136	MANUAL VALVE	MANUAL VALVE	AB	77'-0"	1.13	0.30	0.56	N
N2	N2-6-1137	MANUAL VALVE	MANUAL VALVE	AB	65'-0"	1.13	0.30	0.56	N
N2	N2-PRV-1134	MANUAL VALVE	MANUAL VALVE	AB	77'-0"	1.13	0.30	0.56	N
N2	N2-PRV-1135	MANUAL VALVE	MANUAL VALVE	AB	65'-0"	1.13	0.30	0.56	N
N2	N2-PRV-1136	MANUAL VALVE	MANUAL VALVE	AB	77'-0"	1.13	0.30	0.56	N
N2	N2-PRV-1137	MANUAL VALVE	MANUAL VALVE	AB	65'-0"	1.13	0.30	0.56	N
N2	PCV-1043	PRESSURE CONTROL VALVE	N2 SUPPLY TO VCT PRESS CTRL VALVE	PAB	55'-0"	1.13	0.30	0.56	Y*
N2	PCV-1044	PRESSURE CONTROL VALVE	N2 SUPPLY TO VCT PRESS CTRL VALVE	PAB	55'-0"	1.13	0.30	0.56	Y*
N2	PCV-1273	PRESSURE CONTROL VALVE	N2 BACKUP SUPPLY	AB	18'-6"	1.13	0.30	0.56	Y
N2	PCV-1274	PRESSURE CONTROL VALVE	N2 BACKUP SUPPLY	AB	18'-6"	1.13	0.30	0.56	Y
N2	PCV-1275	PRESSURE CONTROL VALVE	N2 BACKUP SUPPLY	AB	18'-6"	1.13	0.30	0.56	Y
N2	PCV-1276	PRESSURE CONTROL VALVE	IA-PCV-1276 OUTLET CHECK VALVE	AB	18'-6"	1.13	0.30	0.56	Y
N2	PNL N2	CONTROL PANEL	N2 BOTTLE SUPPLY PCV PANEL	PAB	55'-0"	1.13	0.30	0.56	Y
N2	PRV-6300	PRESSURE CONTROL VALVE	N2 TO PORV 456 REG VALVE	VC	68'-0"	1.13	0.30	0.56	Y
N2	PRV-6301	PRESSURE CONTROL VALVE	N2 TO PORV 455C REG VALVE	VC	68'-0"	1.13	0.30	0.56	Y
NIS	FE1	PREAMPLIFIER	PREAMPLIFIER FOR NE-31	VC	68'-0"	1.13	0.30	0.56	Y
NIS	FE2	PREAMPLIFIER	PREAMPLIFIER FOR NE-32	VC	68'-0"	1.13	0.30	0.56	Y
NSS	PCV-1284	PRESSURE CONTROL VALVE	RELIEF VALVE	AB	18'-6"	1.13	0.30	NA	N
PNL	PNL PI7	CONTROL PANEL	LOCAL CCR AC CNTRL PANEL	CB	15'-0"	1.13	0.30	0.56	Y
PPR	8304(NNE-16)	RELIEF VALVE	N2 TO RC-PCV-455C HEADER RELIEF VALVE	VC	95'-0"	1.13	0.30	0.56	N
PPR	8305(NNE-15)	RELIEF VALVE	N2 TO RC-PCV-456 HEADER RELIEF VALVE	VC	95'-0"	1.13	0.30	0.56	N
PPR	8313(NNE-23)	MANUAL VALVE	N2 ACCUMULATOR FOR RC-PCV-455C OUTLET ISOLATION	VC	95'-0"	1.13	0.30	0.56	N
PPR	8321(NNE-31)	MANUAL VALVE	N2 ACCUMULATOR FOR RC-PCV-456 OUTLET ISOLATION	VC	95'-0"	1.13	0.30	0.56	N
PPR	PC-455G	PCV CONTROLLER	PZR SPRAY VALVE PROPTIONAL CONTROLLER	CB	53'-0"	1.13	0.30	0.56	N
PPR	PC-455H	PCV CONTROLLER	PZR SPRAY VALVE PROPORTIONAL CONTROLLER	CB	53'-0"	1.13	0.30	0.56	N
PPR	PC-455K	MASTER PRESSURE CONTROLLER	PZR CONTROLLER	CB	53'-0"	1.13	0.30	0.56	N
PPR	PCV-455A	PRESSURE CONTROL VALVE	PZR SPRAY CONTROL VALVE	VC	68'-0"	1.13	0.30	0.56	Y
PPR	PCV-455B	PRESSURE CONTROL VALVE	PZR SPRAY CONTROL VALVE	VC	68'-0"	1.13	0.30	0.56	Y
PPR	PCV-455C	PRESSURE CONTROL VALVE	PRESSURIZER PORV	VC	124'-0	1.13	0.30	0.56	Y
PPR	PCV-456	PRESSURE CONTROL VALVE	PRESSURIZER PORV	VC	124'-0	1.13	0.30	0.56	Y
PPR	RC-591	MANUAL VALVE	PCV-455A INLET ISOLATION	VC	65'-0"	1.13	0.30	0.56	N
PPR	RC-592	MANUAL VALVE	PCV-455A OUTLET ISOLATION	VC	65'-0"	1.13	0.30	0.56	N
PPR	RC-594	MANUAL VALVE	PCV-455B INLET ISOLATION	VC	65'-0"	1.13	0.30	0.56	N
PPR	RC-595	MANUAL VALVE	PCV-455B OUTLET ISOLATION	VC	65'-0"	1.13	0.30	0.56	N

* Denotes "Rule-of-the-Box" Component

Table 3A.1
Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
PPR	RC-MOV-535	MOTOR OPERATED VALVE	MOTOR OPERATED ISOLATION TO PCV-455C	VC	124'-0	1.13	0.30	0.56	Y
PPR	RC-MOV-536	MOTOR OPERATED VALVE	MOTOR OPERATED ISOLATION TO PCV-456	VC	124'-0	1.13	0.30	0.56	Y
PPR	RC-PCV-464	SAFETY RELIEF VALVE	OVER PRESSURIZATION PROTECTION	VC	130'-0"	1.13	0.30	0.56	N
PPR	RC-PCV-468	SAFETY RELIEF VALVE	OVER PRESSURIZATION PROTECTION	VC	130'-0"	1.13	0.30	0.56	N
PPR	RC-PCV-468	SAFETY RELIEF VALVE	OVER PRESSURIZATION PROTECTION	VC	130'-0"	1.13	0.30	0.56	N
PWS	PW-11	MANUAL VALVE	PRIMARY WATER PUMP 31 SUCTION STOP	PAB	41'-0"	1.13	0.30	0.56	N
PWS	PW-12	MANUAL VALVE	PRIMARY WATER PUMP 32 SUCTION STOP	PAB	41'-0"	1.13	0.30	0.56	N
PWS	PW-13	CHECK VALVE	PRIMARY WATER PUMP 31 DISCHARGE CHECK	PAB	41'-0"	1.13	0.30	0.56	N
PWS	PW-14	CHECK VALVE	PRIMARY WATER PUMP 32 DISCHARGE CHECK	PAB	41'-0"	1.13	0.30	0.56	N
PWS	PW-15	MANUAL VALVE	PRIMARY WATER PUMP 32 DISCHARGE STOP	PAB	41'-0"	1.13	0.30	0.56	N
PWS	PW-16	MANUAL VALVE	PRIMARY WATER PUMP 31 DISCHARGE STOP	PAB	41'-0"	1.13	0.30	0.56	N
PWS	PW-2	MANUAL VALVE	STORAGE TANK OUTLET STOP TO MAKEUP PUMPS SUCTION	YARD	55'-0"	1.13	0.30	0.56	N
PWS	PW-98	MANUAL VALVE	PRIMARY WATER HEADER SUPPLY STOP	PAB	41'-0"	1.13	0.30	0.56	N
RACK	RACK 6A	INSTRUMENT RACK	PRESSURIZATION LOCAL INSTRUMENT RACK 6	PP	41'-0"	1.13	0.30	0.56	Y
RACK	RACK C-11	CCR RACK	CCR RK "C11" (RCP VIB MONITOR SYS)	CB	53'-0"	1.13	0.30	0.56	Y
RCS	BK-UP GRP 31 DIST PNL	CONTROL PANEL	PRZR HTR BK UP GROUP 31 DIST PNL	ET	46'-0"	1.13	0.30	0.56	Y
RCS	BK-UP GRP 32 DIST PNL	CONTROL PANEL	PRZR HTR BK UP GROUP 32 DIST PNL	ET	46'-0"	1.13	0.30	0.56	Y
RCS	BK-UP GRP 33 DIST PNL	CONTROL PANEL	PRZR HTR BK UP GROUP 33 DIST PNL	ET	46'-0"	1.13	0.30	0.56	Y
RCS	LT-1311	LEVEL TRANSMITTER	RX VESSEL LEVEL TRANSMITTER NARROW RANGE	VC	68'-0"	1.13	0.30	0.56	Y
RCS	LT-1312	LEVEL TRANSMITTER	RX VESSEL LEVEL TRANSMITTER WIDE RANGE	VC	68'-0"	1.13	0.30	0.56	Y
RCS	LT-1321	LEVEL TRANSMITTER	RX VESSEL LVL TRNSMTR NARROW RANGE (RVLIS-B)	PP	41'-0"	1.13	0.30	0.56	Y
RCS	LT-1322	LEVEL TRANSMITTER	RX VESSEL LEVEL TRNSMTR WIDE RANGE (RVLIS-B)	PP	41'-0"	1.13	0.30	0.56	Y
RCS	LT-462	LEVEL TRANSMITTER	PRESSURIZER LEVEL TRANSMITTER CH IV	VC	68'-0"	1.13	0.30	0.56	Y
RCS	PBU1	HEATER	PRESSURIZER HEATER BACKUP GROUP 31	VC	88'-0"	1.13	0.30	0.56	Y
RCS	PBU2	HEATER	PRESSURIZER HEATER BACKUP GROUP 32	VC	68'-0"	1.13	0.30	0.56	Y
RCS	PBU3	HEATER	PRESSURIZER HEATER BACKUP GROUP 33	VC	68'-0"	1.13	0.30	0.56	Y
RCS	PCV-473	PRESSURE CONTROL VALVE	N2 SUPPLY TO PRT	PAB	41'-0"	1.13	0.30	0.56	Y
RCS	RC-519	AIR OPERATED VALVE	PRIMARY WATER MAKE-UP TO PRT VALVE	PP	41'-0"	1.13	0.30	0.56	Y
RCS	RC-523	??????	PRT DRAIN VALVE	VC	46'-0"	1.13	0.30	0.56	Y
RCS	RC-544	??????	REACTOR VESSEL FLANGE LEAK-OFF CTRL VLV	VC	60'-0"	1.13	0.30	0.56	Y
RCS	RC-548	AIR OPERATED VALVE	PRESS RELIEF GAS ANALYZER CTRL VALVE	PAB	54'-0"	1.13	0.30	0.56	N
RCS	RC-549	AIR OPERATED VALVE	PRESS RELIEF GAS ANALYZER CTRL VALVE	PAB	54'-0"	1.13	0.30	0.56	Y
RCS	RC-550	AIR OPERATED VALVE	CONTAINMENT NITROGEN SUPPLY ISOLATION TO PRT	PP	41'-0"	1.13	0.30	0.56	N
RCS	RC-552	AIR OPERATED VALVE	PRIMARY WATER MAKE-UP TO PRT VALVE	PP	41'-0"	1.13	0.30	0.56	Y
RCS	RC-560	??????	PRT SPRAY ISO STOP VALVE	VC	46'-0"	1.13	0.30	0.56	Y
RCS	RVLIS RACK TRAIN A	INSTRUMENT RACK	RVLIS TRANSMITTER RACK TRAIN "A"	PP	41'-0"	1.13	0.30	0.56	Y
RCS	RVLIS RACK TRAIN B	INSTRUMENT RACK	RVLIS TRANSMITTER RACK TRAIN "A"	PP	41'-0"	1.13	0.30	0.56	Y
RCS	SOV-455A-1	SOLENOID OPERATED VALVE	PCV-455A SOLENOID VALVE	VC	68'-0"	1.13	0.30	0.56	Y
RCS	SOV-455B-1	SOLENOID OPERATED VALVE	PCV-455B SOLENOID VALVE	VC	68'-0"	1.13	0.30	0.56	Y
RCS	SOV-455C-1	SOLENOID OPERATED VALVE	PCV-455C SOLENOID VALVE	VC	124'-0	1.13	0.30	0.56	Y
RCS	SOV-456-1	SOLENOID OPERATED VALVE	PCV-456 SOLENOID VALVE	VC	124'-0	1.13	0.30	0.56	Y
RCS	SOV-519-1	SOLENOID OPERATED VALVE	RC-519 SOLENOID VALVE	PP	41'-0"	1.13	0.30	0.56	Y
RCS	SOV-523-1	SOLENOID OPERATED VALVE	RC-523 SOLENOID VALVE	VC	46'-0"	1.13	0.30	0.56	Y
RCS	SOV-544-1	SOLENOID OPERATED VALVE	RC-544 SOLENOID VALVE	VC	60'-0"	1.13	0.30	0.56	Y
RCS	SOV-549-1	SOLENOID OPERATED VALVE	RC-549 SOLENOID VALVE	PAB	54'-0"	1.13	0.30	0.56	Y
RCS	SOV-552-1	SOLENOID OPERATED VALVE	RC-552 SOLENOID VALVE	PP	41'-0"	1.13	0.30	0.56	Y
RCS	SOV-560-1	SOLENOID OPERATED VALVE	RC-560 SOLENOID VALVE	VC	46'-0"	1.13	0.30	0.56	Y
RHR	AC-732	MANUAL VALVE	HOT LEG LOOP #32 ISOLATION TO RHR PUMPS SUCTION	PAB	54'-0"	1.13	0.30	0.56	N
RHR	AC-735A	MANUAL VALVE	RHR PUMP #31 SUCTION STOP	PAB	15'-0"	1.13	0.30	0.56	N
RHR	AC-735B	MANUAL VALVE	RHR PUMP #32 SUCTION STOP	PAB	15'-0"	1.13	0.30	0.56	N
RHR	AC-738A	CHECK VALVE	RHR PUMP #31 DISCHARGE CHECK	PAB	15'-0"	1.13	0.30	0.56	N
RHR	AC-738B	CHECK VALVE	RHR PUMP #32 DISCHARGE CHECK	PAB	15'-0"	1.13	0.30	0.56	N
RHR	AC-739A	MANUAL VALVE	RHR PUMP #31 DISCHARGE STOP	PAB	15'-0"	1.13	0.30	0.56	N
RHR	AC-739B	MANUAL VALVE	RHR PUMP #32 DISCHARGE STOP	PAB	15'-0"	1.13	0.30	0.56	N
RHR	AC-741	CHECK VALVE	RHR HTEXCH #31 INLET CHECK	VC	66'-0"	1.13	0.30	0.56	N
RHR	AC-742	MANUAL VALVE	RHR HTEXCH #31 INLET ISOLATION	VC	66'-0"	1.13	0.30	0.56	N
RHR	AC-837	CHECK VALVE	31 RHR PUMP INDIVIDUAL RECIRCULATION CHECK	PAB	15'-0"	1.13	0.30	0.56	N

* Denotes "Rule-of-the-Box" Component

Table 3A.1
Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	HCLFP$_{se}$ g	A-46
RHR	AC-838	CHECK VALVE	32 RHR PUMP INDIVIDUAL RECIRCULATION CHECK	PAB	15'-0"	1.13	0.30	0.56	N
RHR	AC-839	MANUAL VALVE	31 RHR PUMP INDIVIDUAL RECIRCULATION ISOLATION	PAB	15'-0"	1.13	0.30	0.56	N
RHR	AC-840	MANUAL VALVE	32 RHR PUMP INDIVIDUAL RECIRCULATION ISOLATION	PAB	15'-0"	1.13	0.30	0.56	N
RHR	AC-841	MANUAL VALVE	31 RHR PUMP INDIVIDUAL RECIRCULATION THROTTLE	PAB	15'-0"	1.13	0.30	0.56	N
RHR	AC-842	MANUAL VALVE	32 RHR PUMP INDIVIDUAL RECIRCULATION THROTTLE	PAB	15'-0"	1.13	0.30	0.56	N
RHR	AC-MOV-1870	MOTOR OPERATED VALVE	RHR PUMP MINI FLOW TEST LINE VALVE	PP	51'-0"	1.13	0.30	0.56	Y
RHR	AC-MOV-730	MOTOR OPERATED VALVE	RHR LOOP INLET STOP	VC	56'-6"	1.13	0.30	0.56	Y
RHR	AC-MOV-731	MOTOR OPERATED VALVE	RHR LOOP SUCTION ISOLATION	VC	59'-6"	1.13	0.30	0.56	Y
RHR	AC-MOV-743	MOTOR OPERATED VALVE	RHR PUMP MINI FLOW TEST LINE	PP	51'-0"	1.13	0.30	0.56	Y
RHR	AC-MOV-744	MOTOR OPERATED VALVE	RHR PUMPS DISCHARGE HEADER STOP	PAB	15'-0"	1.13	0.30	0.56	Y
RHR	AC-MOV-745A	MOTOR OPERATED VALVE	RHR HEAT EXCHANGER 32 INLET ISOLATION VLV	VC	66'-0"	1.13	0.30	0.56	Y
RHR	AC-MOV-745B	MOTOR OPERATED VALVE	RHR HEAT EXCHANGER 32 INLET ISOLATION VLV	VC	66'-0"	1.13	0.30	0.56	Y
RHR	SI-838A	CHECK VALVE	RECIRC TO LOOP 1 CHECK	VC	46'-0"	1.13	0.30	0.56	N
RHR	SI-838B	CHECK VALVE	RECIRC TO LOOP 2 CHECK	VC	46'-0"	1.13	0.30	0.56	N
RHR	SI-838C	CHECK VALVE	RECIRC TO LOOP 3 CHECK	VC	46'-0"	1.13	0.30	0.56	N
RHR	SI-838D	CHECK VALVE	RECIRC TO LOOP 4 CHECK	VC	46'-0"	1.13	0.30	0.56	N
RHR	SI-883	MOTOR OPERATED VALVE	RHR PUMP RECIRC LINE TO RWST STOP	PAB	15'-0"	1.13	0.30	0.56	N
RHR	SI-897A	CHECK VALVE	ACCUMULATOR TANK 31 TO LOOP 1 COLD LEG INLET CHECK	VC	46'-0"	1.13	0.30	0.56	N
RHR	SI-897B	CHECK VALVE	ACCUMULATOR TANK 32 OR LOOP 2 COLD LEG INLET CHECK	VC	46'-0"	1.13	0.30	0.56	N
RHR	SI-897C	CHECK VALVE	ACCUMULATOR TANK 33 TO LOOP 3 COLD LEG INLET CHECK	VC	46'-0"	1.13	0.30	0.56	N
RHR	SI-897D	CHECK VALVE	ACCUMULATOR TANK 34 TO LOOP 4 COLD LEG INLET CHECK	VC	46'-0"	1.13	0.30	0.56	N
RHR	SI-MOV-746	MOTOR OPERATED VALVE	#32 RHR HX OUTLT ISO STOP VLV	VC	68'-0"	1.13	0.30	0.56	Y
RHR	SI-MOV-747	MOTOR OPERATED VALVE	#31 RHR HX OUTLT ISO STOP VLV	VC	68'-0"	1.13	0.30	0.56	Y
SIS	SI-1807A	MANUAL VALVE	SAFETY INJECTION PUMP 31 RECIRC STOP	PAB	34'-0"	1.13	0.30	0.56	N
SIS	SI-1807B	MANUAL VALVE	SAFETY INJECTION PUMP 32 RECIRC STOP	PAB	34'-0"	1.13	0.30	0.56	N
SIS	SI-1807C	MANUAL VALVE	SAFETY INJECTION PUMP 33 RECIRC STOP	PAB	34'-0"	1.13	0.30	0.56	N
SIS	SI-1835A	MOTOR OPERATED VALVE	BORON INJECTION TANK DISCHARGE STOP	PAB	55'-0"	1.13	0.30	0.56	N
SIS	SI-1835B	MOTOR OPERATED VALVE	BORON INJECTION TANK DISCHARGE STOP	PAB	55'-0"	1.13	0.30	0.56	N
SIS	SI-1852A	MOTOR OPERATED VALVE	BORON INJECTION TANK INLET STOP	PAB	34'-0"	1.13	0.30	0.56	N
SIS	SI-1852B	MOTOR OPERATED VALVE	BORON INJECTION TANK INLET STOP	PAB	34'-0"	1.13	0.30	0.56	N
SIS	SI-1882	MANUAL VALVE	RWST MISC. RETURN STOP	YARD	81'-0"	1.13	0.30	0.56	N
SIS	SI-842	MOTOR OPERATED VALVE	SAFETY INJECTION PUMPS RECIRC TO RWST STOP	PAB	34'-0"	1.13	0.30	0.56	N
SIS	SI-843	MOTOR OPERATED VALVE	SAFETY INJECTION PUMPS RECIRC TO RWST STOP	PAB	34'-0"	1.13	0.30	0.56	N
SIS	SI-846	MANUAL VALVE	RWST OUTLET STOP	YARD	81'-0"	1.13	0.30	0.56	N
SIS	SI-847	CHECK VALVE	SAFETY INJECTION PUMPS SUCTION CHECK	PAB	34'-0"	1.13	0.30	0.56	N
SIS	SI-848A	MANUAL VALVE	SAFETY INJECTION PUMP 31 SUCTION STOP	PAB	34'-0"	1.13	0.30	0.56	N
SIS	SI-848B	MANUAL VALVE	SAFETY INJECTION PUMP 33 SUCTION STOP	PAB	34'-0"	1.13	0.30	0.56	N
SIS	SI-849A	CHECK VALVE	SAFETY INJECTION PUMP 31 DISCHARGE CHECK	PAB	34'-0"	1.13	0.30	0.56	N
SIS	SI-849B	CHECK VALVE	SAFETY INJECTION PUMP 33 DISCHARGE CHECK	PAB	34'-0"	1.13	0.30	0.56	N
SIS	SI-850B	MANUAL VALVE	SAFETY INJECTION PUMP 32 DISCHARGE STOP	PAB	34'-0"	1.13	0.30	0.56	N
SIS	SI-851A	MOTOR OPERATED VALVE	SAFETY INJECTION PUMP 32 PUMP DISCHARGE STOP	PAB	34'-0"	1.13	0.30	0.56	N
SIS	SI-851B	MOTOR OPERATED VALVE	SAFETY INJECTION PUMP 32 DISCHARGE STOP	PAB	34'-0"	1.13	0.30	0.56	N
SIS	SI-852A	CHECK VALVE	SAFETY INJECTION PUMP 32 DISCHARGE CHECK	PAB	34'-0"	1.13	0.30	0.56	N
SIS	SI-852B	CHECK VALVE	SAFETY INJECTION PUMP 32 DISCHARGE CHECK	PAB	34'-0"	1.13	0.30	0.56	N
SIS	SI-856A	MOTOR OPERATED VALVE	LOOP 1 COLD LEG HI HEAD INJECTION STOP	VC	46'-0"	1.13	0.30	0.56	N
SIS	SI-856B	MOTOR OPERATED VALVE	LOOP 3 HOT LEG HI HEAD INJECTION STOP	VC	46'-0"	1.13	0.30	0.56	N
SIS	SI-856C	MOTOR OPERATED VALVE	LOOP 4 COLD LEG HI HEAD INJECTION STOP	VC	46'-0"	1.13	0.30	0.56	N
SIS	SI-856D	MOTOR OPERATED VALVE	LOOP 2 COLD LEG HI HEAD INJECTION STOP	VC	46'-0"	1.13	0.30	0.56	N
SIS	SI-856E	MOTOR OPERATED VALVE	LOOP 1 COLD LEG HI HEAD INJECTION STOP	VC	46'-0"	1.13	0.30	0.56	N
SIS	SI-856F	MOTOR OPERATED VALVE	LOOP 3 COLD LEG HI HEAD INJECTION STOP	VC	46'-0"	1.13	0.30	0.56	N
SIS	SI-856G	MOTOR OPERATED VALVE	LOOP 1 HOT LEG HI HEAD INJECTION STOP	VC	46'-0"	1.13	0.30	0.56	N
SIS	SI-856H	MOTOR OPERATED VALVE	LOOP 3 COLD LEG HI HEAD INJECTION STOP	VC	46'-0"	1.13	0.30	0.56	N
SIS	SI-856J	MOTOR OPERATED VALVE	LOOP 2 COLD LEG HI HEAD INJECTION STOP	VC	46'-0"	1.13	0.30	0.56	N
SIS	SI-856K	MOTOR OPERATED VALVE	LOOP 4 COLD LEG HI HEAD INJECTION STOP	VC	46'-0"	1.13	0.30	0.56	N
SIS	SI-857A	CHECK VALVE	LOOP 1 COLD LEG SAFETY INJECTION LINE CHECK	VC	46'-0"	1.13	0.30	0.56	N

* Denotes "Rule-of-the-Box" Component

Table 3A.1

Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
SIS	SI-857B	CHECK VALVE	LOOP 3 HOT LEG HIGH HEAD INJECTION LINE CHECK	VC	46'-0"	1.13	0.30	0.58	N
SIS	SI-857C	CHECK VALVE	LOOP 4 COLD LEG HIGH HEAD INJECTION LINE CHECK	VC	46'-0"	1.13	0.30	0.58	N
SIS	SI-857D	CHECK VALVE	LOOP 2 COLD LEG HIGH HEAD INJECTION LINE CHECK	VC	46'-0"	1.13	0.30	0.58	N
SIS	SI-857E	CHECK VALVE	LOOP 1 COLD LEG HIGH HEAD INJECTION LINE CHECK	VC	46'-0"	1.13	0.30	0.58	N
SIS	SI-857F	CHECK VALVE	LOOP 3 COLD LEG HIGH HEAD INJECTION LINE CHECK	VC	46'-0"	1.13	0.30	0.58	N
SIS	SI-857G	CHECK VALVE	LOOP 1 COLD LEG SAFETY INJECTION LINE CHECK	VC	46'-0"	1.13	0.30	0.58	N
SIS	SI-857H	CHECK VALVE	LOOP 3 HOT LEG HIGH HEAD INJECTION LINE CHECK	VC	46'-0"	1.13	0.30	0.58	N
SIS	SI-857J	CHECK VALVE	LOOP 4 COLD LEG HIGH HEAD INJECTION LINE CHECK	VC	46'-0"	1.13	0.30	0.58	N
SIS	SI-857K	CHECK VALVE	LOOP 2 COLD LEG HIGH HEAD INJECTION LINE CHECK	VC	46'-0"	1.13	0.30	0.58	N
SIS	SI-857L	CHECK VALVE	LOOP 1 COLD LEG HIGH HEAD INJECTION LINE CHECK	VC	46'-0"	1.13	0.30	0.58	N
SIS	SI-857M	CHECK VALVE	LOOP 3 COLD LEG HIGH HEAD INJECTION LINE CHECK	VC	46'-0"	1.13	0.30	0.58	N
SIS	SI-857N	CHECK VALVE	LOOP 1 HOT LEG HIGH HEAD INJECTION LINE CHECK	VC	46'-0"	1.13	0.30	0.58	N
SIS	SI-857P	CHECK VALVE	LOOP 1 HOT LEG HIGH HEAD INJECTION LINE CHECK	VC	46'-0"	1.13	0.30	0.58	N
SIS	SI-857Q	CHECK VALVE	LOOP 3 COLD LEG SAFETY INJECTION LINE CHECK	VC	46'-0"	1.13	0.30	0.58	N
SIS	SI-857R	CHECK VALVE	LOOP 3 COLD LEG SAFETY INJECTION LINE CHECK	VC	46'-0"	1.13	0.30	0.58	N
SIS	SI-857S	CHECK VALVE	LOOP 2 COLD LEG SAFETY INJECTION LINE CHECK	VC	46'-0"	1.13	0.30	0.58	N
SIS	SI-857T	CHECK VALVE	LOOP 2 COLD LEG SAFETY INJECTION LINE CHECK	VC	46'-0"	1.13	0.30	0.58	N
SIS	SI-857U	CHECK VALVE	LOOP 4 COLD LEG SAFETY INJECTION LINE CHECK	VC	46'-0"	1.13	0.30	0.58	N
SIS	SI-857W	CHECK VALVE	LOOP 4 COLD LEG SAFETY INJECTION LINE CHECK	VC	46'-0"	1.13	0.30	0.58	N
SIS	SI-881	CHECK VALVE	RHR PUMP SUCTION CHECK	PAB	15'-0"	1.13	0.30	0.58	N
SIS	SI-884A	CHECK VALVE	SAFETY INJECTION PUMP 31 RECIRC CHECK	PAB	34'-0"	1.13	0.30	0.58	N
SIS	SI-884B	CHECK VALVE	SAFETY INJECTION PUMP 32 RECIRC CHECK	PAB	34'-0"	1.13	0.30	0.58	N
SIS	SI-884C	CHECK VALVE	SAFETY INJECTION PUMP 33 RECIRC CHECK	PAB	34'-0"	1.13	0.30	0.58	N
SIS	SI-886A	CHECK VALVE	RECIRC PUMP 31 DISCHARGE CHECK	VC	46'-0"	1.13	0.30	0.58	N
SIS	SI-886B	CHECK VALVE	RECIRC PUMP 32 DISCHARGE CHECK	VC	46'-0"	1.13	0.30	0.58	N
SIS	SI-887A	MOTOR OPERATED VALVE	SAFETY INJECTION PUMP 32 SUCTION ISOLATION STOP	PAB	34'-0"	1.13	0.30	0.58	N
SIS	SI-887B	MOTOR OPERATED VALVE	SAFETY INJECTION PUMP 32 SUCTION ISOLATION STOP	PAB	34'-0"	1.13	0.30	0.58	N
SIS	SI-888A	MOTOR OPERATED VALVE	HIGH HEAD INJECTION RECIRC STOP	PAB	51'-0"	1.13	0.30	0.58	Y
SIS	SI-888B	MOTOR OPERATED VALVE	HIGH HEAD INJECTION RECIRC STOP	PAB	51'-0"	1.13	0.30	0.58	Y
SIS	SI-898	MANUAL VALVE	SAFETY INJECTION PUMP 32 SUCTION BYPASS	PAB	34'-0"	1.13	0.30	0.58	N
SIS	SI-AOV-1851A	AIR OPERATED VALVE	BORON INJECTION TANK RECIRC ISOLATION	PP	51'-0"	1.13	0.30	0.58	N
SIS	SI-AOV-1851B	AIR OPERATED VALVE	BORON INJECTION TANK RECIRC ISOLATION	PP	51'-0"	1.13	0.30	0.58	N
SIS	SI-HCV-638	HYDRAULIC CONTROL VALVE	RHR HTX 31 DISCH. THROTTLE VLV.	VC	68'-0"	1.13	0.30	0.58	Y
SIS	SI-HCV-640	HYDRAULIC CONTROL VALVE	RHR HTX 32 DISCH. THROTTLE VLV.	VC	68'-0"	1.13	0.30	0.58	Y
SIS	SI-MOV-1802A	MOTOR OPERATED VALVE	SIS RECIRC PUMP DISCHARGE VALVE	VC	46'-0"	1.13	0.30	0.58	Y
SIS	SI-MOV-1802B	MOTOR OPERATED VALVE	SIS RECIRC PUMP DISCHARGE VALVE	VC	46'-0"	1.13	0.30	0.58	Y
SIS	SI-MOV-1810	MOTOR OPERATED VALVE	MOV RWST TO SI PUMP ISO VALVE	PAB	15'-0"	1.13	0.30	0.58	Y
SIS	SI-MOV-1869A	MOTOR OPERATED VALVE	RHR HX 32 TO RHR MINI FLOW VALVES	VC	55'-0"	1.13	0.30	0.58	Y
SIS	SI-MOV-1869B	MOTOR OPERATED VALVE	RHR HX 31 TO RHR MINI FLOW VALVES	VC	55'-0"	1.13	0.30	0.58	Y
SIS	SI-MOV-850A	MOTOR OPERATED VALVE	SAFETY INJECTION PUMP 32 PUMP DISCHARGE STOP	PAB	34'-0"	1.13	0.30	0.58	N
SIS	SI-MOV-850C	MOTOR OPERATED VALVE	SAFETY INJECTION PUMP 31 DISCHARGE STOP	PAB	34'-0"	1.13	0.30	0.58	N
SIS	SI-MOV-882	MOTOR OPERATED VALVE	RWST SUPPLY TO RHR PUMPS	PAB	15'-0"	1.13	0.30	0.58	Y
SIS	SI-MOV-885A	MOTOR OPERATED VALVE	RHR PUMPS SUCTION FROM CONTAINMENT SUMP	PAB	34'-0"	1.13	0.30	0.58	Y
SIS	SI-MOV-885B	MOTOR OPERATED VALVE	RHR PUMPS SUCTION FROM CONTAINMENT SUMP	PAB	34'-0"	1.13	0.30	0.58	Y
SIS	SI-MOV-889A	MOTOR OPERATED VALVE	CTMT SPRAY HEADER ISO VALVE	VC	72'-6"	1.13	0.30	0.58	Y
SIS	SI-MOV-889B	MOTOR OPERATED VALVE	CTMT SPRAY HEADER ISO VALVE	VC	72'-6"	1.13	0.30	0.58	Y
SIS	SI-MOV-894A	MOTOR OPERATED VALVE	NO. 31 ACCUM ISOLATION VALVE	VC	46'-0"	1.13	0.30	0.58	Y
SIS	SI-MOV-894B	MOTOR OPERATED VALVE	NO. 32 ACCUM ISOLATION VALVE	VC	46'-0"	1.13	0.30	0.58	Y
SIS	SI-MOV-894C	MOTOR OPERATED VALVE	NO. 33 ACCUM ISOLATION VALVE	VC	46'-0"	1.13	0.30	0.58	Y
SIS	SI-MOV-894D	MOTOR OPERATED VALVE	NO. 34 ACCUM ISOLATION VALVE	VC	46'-0"	1.13	0.30	0.58	Y
SIS	SI-MOV-899A	MOTOR OPERATED VALVE	RHR HTX 32 OUTLET STOP VLV	VC	68'-0"	1.13	0.30	0.58	Y
SIS	SI-MOV-899B	MOTOR OPERATED VALVE	RHR HTX 31 OUTLET STOP VLV	VC	68'-0"	1.13	0.30	0.58	Y
SP	PNL #3	CONTROL PANEL	SAMPLING SYS CONTROL PANEL #3	PAB	55'-0"	1.13	0.30	0.58	Y
SP	PNL #4	CONTROL PANEL	SAMPLING SYS CONTROL PANEL #4	PAB	55'-0"	1.13	0.30	0.58	Y
SP	SOV-958-1	SOLENOID OPERATED VALVE	RHR SAMPLE LINE VALVE	PP	41'-0"	1.13	0.30	0.58	Y*

* Denotes "...-of-the-Box" Component

Table 3A.1
Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
SP	SOV-959-1	SOLENOID OPERATED VALVE	RHR SAMPLE LINE VALVE	PP	41'-0"	1.13	0.30	0.56	Y*
SP	SP-AOV-953	AIR OPERATED VALVE	PRESSURIZER LIQUID SPACE SAMPLE VALVE	VC	73'-8"	1.13	0.30	0.56	Y
SP	SP-AOV-955A	AIR OPERATED VALVE	HOT LEG LOOP 1 (RCS) SAMPLE VALVE	VC	62'-0"	1.13	0.30	0.56	Y
SP	SP-AOV-955B	AIR OPERATED VALVE	HOT LEG LOOP 3 (RCS) SAMPLE VALVE	VC	62'-0"	1.13	0.30	0.56	Y
SP	SP-AOV-956A	AIR OPERATED VALVE	PRESSURIZER STEAM SAMPLE ISOLATION VALVE	PP	51'-0"	1.13	0.30	0.56	N
SP	SP-AOV-956B	AIR OPERATED VALVE	PRESSURIZER STEAM SAMPLE ISOLATION VALVE	PP	51'-0"	1.13	0.30	0.56	N
SP	SP-AOV-956C	AIR OPERATED VALVE	PRESSURIZER STEAM SAMPLE ISOLATION VALVE	PP	51'-0"	1.13	0.30	0.56	Y
SP	SP-AOV-956D	AIR OPERATED VALVE	PRESSURIZER STEAM SAMPLE ISOLATION VALVE	PP	51'-0"	1.13	0.30	0.56	Y
SP	SP-AOV-956E	AIR OPERATED VALVE	HOT LEG LOOP 1 & 3 SAMPLE ISOLATION VALVE	PP	41'-0"	1.13	0.30	0.56	Y
SP	SP-AOV-956F	AIR OPERATED VALVE	HOT LEG LOOP 1 & 3 SAMPLE ISOLATION VALVE	PP	41'-0"	1.13	0.30	0.56	Y
SP	SP-AOV-958	AIR OPERATED VALVE	RHR LOOP SAMPLE ISOLATION VALVE	PP	41'-0"	1.13	0.30	0.56	Y
SP	SP-AOV-959	AIR OPERATED VALVE	RHR LOOP SAMPLE ISOLATION VALVE	PP	41'-0"	1.13	0.30	0.56	Y
SP	SP-MOV-990A	MOTOR OPERATED VALVE	RECIRCULATION PUMP SAMPLE ISOLATION	PP	51'-0"	1.13	0.30	0.56	N
SP	SP-MOV-990B	MOTOR OPERATED VALVE	RECIRCULATION PUMP SAMPLE ISOLATION	PP	51'-0"	1.13	0.30	0.56	N
SP	SP-SOV-506	SOLENOID OPERATED VALVE	33 FAN COOLER UNIT SAMPLE TO H2 ANALYZER B ISOLATION	FAN HOUSE	67'-0"	1.13	0.30	0.56	N
SP	SP-SOV-507	SOLENOID OPERATED VALVE	34 FAN COOLER UNIT SAMPLE TO H2 ANALYZER B ISOLATION	FAN HOUSE	67'-0"	1.13	0.30	0.56	N
SP	SP-SOV-508	SOLENOID OPERATED VALVE	31 FAN COOLER UNIT SAMPLE TO H2 ANALYZER B ISOLATION	FAN HOUSE	67'-0"	1.13	0.30	0.56	N
SP	SP-SOV-509	SOLENOID OPERATED VALVE	31, 33, 34 FAN COOLER UNITS SAMPLE TO H2 ANALYZER B HEADER ISOLATION	FAN HOUSE	67'-0"	1.13	0.30	0.56	N
SP	SP-SOV-510	SOLENOID OPERATED VALVE	H2 ANALYZER A SAMPLE RETURN TO CONTAINMENT FIRST ISOLATION	FAN HOUSE	67'-0"	1.13	0.30	0.56	N
SP	SP-SOV-511	SOLENOID OPERATED VALVE	H2 ANALYZER A SAMPLE RETURN TO CONTAINMENT SECOND ISOLATION	FAN HOUSE	67'-0"	1.13	0.30	0.56	N
SP	SP-SOV-512	SOLENOID OPERATED VALVE	32 FAN COOLER UNIT SAMPLE TO H2 ANALYZER A ISOLATION	PAB	55'-0"	1.13	0.30	0.56	N
SP	SP-SOV-513	SOLENOID OPERATED VALVE	35 FAN COOLER UNIT SAMPLE TO H2 ANALYZER A ISOLATION	FAN HOUSE	67'-0"	1.13	0.30	0.56	N
SP	SP-SOV-514	SOLENOID OPERATED VALVE	32 AND 35 FAN COOLER UNITS SAMPLE TO H2 ANALYZER A HEADER ISOLATION	FAN HOUSE	67'-0"	1.13	0.30	0.56	N
SP	SP-SOV-515	SOLENOID OPERATED VALVE	H2 ANALYZER B SAMPLE RETURN TO CONTAINMENT FIRST ISOLATION	FAN HOUSE	67'-0"	1.13	0.30	0.56	N
SP	SP-SOV-953	SOLENOID OPERATED VALVE	PRESSURIZER LIQUID SPACE SAMPLE VALVE SOLENOID VALVE	VC	73'-0"	1.13	0.30	0.56	Y*
SP	SP-SOV-955A-1	SOLENOID OPERATED VALVE	HOT LEG LOOP 1 SAMPLE VALVE SOLENOID VALVE	VC	62'-0"	1.13	0.30	0.56	Y*
SP	SP-SOV-955B-1	SOLENOID OPERATED VALVE	HOT LEG LOOP 3 SAMPLE VALVE SOLENOID VALVE	VC	62'-0"	1.13	0.30	0.56	Y*
SP	SP-SOV-956C-1	SOLENOID OPERATED VALVE	SAMPLE ISOLATION VALVES & IVSWS SOLENOID VALVE	PP	41'-0"	1.13	0.30	0.56	Y
SP	SP-SOV-956D-1	SOLENOID OPERATED VALVE	SAMPLE ISOLATION VALVES & IVSWS SOLENOID VALVE	PP	41'-0"	1.13	0.30	0.56	Y
SP	SP-SOV-956F-1	SOLENOID OPERATED VALVE	SAMPLE ISOLATION VALVES & IVSWS SOLENOID VALVE	PP	41'-0"	1.13	0.30	0.56	Y
SP	SP-SOV-956G	SOLENOID OPERATED VALVE	ACC SAMPLE LINE ISOLATION VALVES & IVSWS SOLENOID	PP	41'-0"	1.13	0.30	0.56	Y
SP	SP-SOV-956H	SOLENOID OPERATED VALVE	ACC SAMPLE LINE ISOLATION VALVES & IVSWS SOLENOID	PP	51'-0"	1.13	0.30	0.56	N
SWS	PCV-1296	PRESSURE CONTROL VALVE	31 A/C UNIT CONDENSER	CB	15'-0"	1.13	0.30	0.56	Y
SWS	PCV-1297	PRESSURE CONTROL VALVE	32 A/C UNIT CONDENSER	CB	15'-0"	1.13	0.30	0.56	Y
SWS	PNL PS8	CONTROL PANEL	SERVICE WATER PUMP CONTROL STATION	CB	15'-0"	1.13	0.30	0.56	Y
SWS	SOV-1170	SOLENOID OPERATED VALVE	SWN-TCV-1104 SOLENOID VALVE	PP	35'-0"	1.13	0.30	0.56	Y*
SWS	SOV-1171	SOLENOID OPERATED VALVE	SWN-TCV-1105 SOLENOID VALVE	PP	35'-0"	1.13	0.30	0.56	Y*
SWS	SWN-1-1	CHECK VALVE	SERVICE WATER PUMP NO. 31 DISCHARGE CHECK VALVE	INTAKE	5'9"	1.13	0.30	0.56	N
SWS	SWN-1-2	CHECK VALVE	SERVICE WATER PUMP NO. 32 DISCHARGE CHECK VALVE	INTAKE	5'9"	1.13	0.30	0.56	N
SWS	SWN-1-3	CHECK VALVE	SERVICE WATER PUMP NO. 33 DISCHARGE CHECK VALVE	INTAKE	5'9"	1.13	0.30	0.56	N
SWS	SWN-1-4	CHECK VALVE	SERVICE WATER PUMP NO. 34 DISCHARGE CHECK VALVE	INTAKE	5'9"	1.13	0.30	0.56	N
SWS	SWN-1-5	CHECK VALVE	SERVICE WATER PUMP NO. 35 DISCHARGE CHECK VALVE	INTAKE	5'9"	1.13	0.30	0.56	N
SWS	SWN-1-6	CHECK VALVE	SERVICE WATER PUMP NO. 36 DISCHARGE CHECK VALVE	INTAKE	5'9"	1.13	0.30	0.56	N
SWS	SWN-100-1	CHECK VALVE	SWP'S 34,35,36 DISCHARGE ISOLATION CHECK TO NUCLEAR HEADER	TB	15'-0"	1.13	0.30	0.56	N
SWS	SWN-100-2	CHECK VALVE	SWP'S 31,32,33 DISCHARGE ISOLATION CHECK TO NUCLEAR HEADER	TB	15'-0"	1.13	0.30	0.56	N
SWS	SWN-2-1	BUTTERFLY VALVE	SERVICE WATER PUMP NO.31 DISCHARGE ISOLATION VALVE	INTAKE	5'9"	1.13	0.30	0.56	N
SWS	SWN-2-2	BUTTERFLY VALVE	SERVICE WATER PUMP NO.32 DISCHARGE ISOLATION VALVE	INTAKE	5'9"	1.13	0.30	0.56	N
SWS	SWN-2-3	BUTTERFLY VALVE	SERVICE WATER PUMP NO.33 DISCHARGE ISOLATION VALVE	INTAKE	5'9"	1.13	0.30	0.56	N
SWS	SWN-2-4	BUTTERFLY VALVE	SERVICE WATER PUMP NO.34 DISCHARGE ISOLATION VALVE	INTAKE	5'9"	1.13	0.30	0.56	N
SWS	SWN-2-5	BUTTERFLY VALVE	SERVICE WATER PUMP NO.35 DISCHARGE ISOLATION VALVE	INTAKE	5'9"	1.13	0.30	0.56	N
SWS	SWN-2-6	BUTTERFLY VALVE	SERVICE WATER PUMP NO.36 DISCHARGE ISOLATION VALVE	INTAKE	5'9"	1.13	0.30	0.56	N
SWS	SWN-28-1	BUTTERFLY VALVE	31 IA CLOSED COOLING HX OUTLET ISOLATION	CB	15'-0"	1.13	0.30	0.56	N
SWS	SWN-28-2	BUTTERFLY VALVE	32 IA CLOSED COOLING HX OUTLET ISOLATION	CB	15'-0"	1.13	0.30	0.56	N

* Denotes "Rule-of-the-Box" Component

Table 3A.1

Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
SWS	SWN-29	BUTTERFLY VALVE	D.G.HEADER SUPPLY INLET ISOL FROM SWP'S 34,35,38 DSCH.HEADER	DGB	15'-0"	1.13	0.30	0.56	N
SWS	SWN-31	BUTTERFLY VALVE	CCW HX'S SUPPLY FROM SWP'S 31, 32 & 33	PAB	41'-0	1.13	0.30	0.56	N
SWS	SWN-33-1	BUTTERFLY VALVE	CCW HX SUPPLY CROSS TIE	PAB	41'-0"	1.13	0.30	0.56	N
SWS	SWN-33-2	BUTTERFLY VALVE	CCW HX SUPPLY CROSS TIE	PAB	41'-0"	1.13	0.30	0.56	N
SWS	SWN-34-1	BUTTERFLY VALVE	31 CCW HX INLET ISOLATION	PAB	55'-0"	1.13	0.30	0.56	N
SWS	SWN-34-2	BUTTERFLY VALVE	32 CCW HX INLET ISOLATION	PAB	55'-0"	1.13	0.30	0.56	N
SWS	SWN-35-1	BUTTERFLY VALVE	31 CCW HX OUTLET ISOLATION	PAB	73'-0"	1.13	0.30	0.56	N
SWS	SWN-35-2	BUTTERFLY VALVE	32 CCW HX OUTLET ISOLATION	PAB	73'-0"	1.13	0.30	0.56	N
SWS	SWN-38	BUTTERFLY VALVE	FCU'S SUPPLY FROM SWP'S 34, 35, 38 ISOLATION	PAB	35'-0"	1.13	0.30	0.56	N
SWS	SWN-4	MANUAL VALVE	DISCH HDR X-TIE VALVE	INTAKE	15'-0"	1.13	0.30	0.56	Y
SWS	SWN-40-1	BUTTERFLY VALVE	FCU HEADER CROSS TIE ISOLATION	FAN HOUSE	54'-0"	1.13	0.30	0.56	N
SWS	SWN-40-2	BUTTERFLY VALVE	FCU HEADER CROSS TIE ISOLATION	FAN HOUSE	54'-0"	1.13	0.30	0.56	N
SWS	SWN-41-1	BUTTERFLY VALVE	31 FCU SUPPLY ISOLATION	FAN HOUSE	54'-0"	1.13	0.30	0.56	N
SWS	SWN-41-2	BUTTERFLY VALVE	32 FCU SUPPLY ISOLATION	FAN HOUSE	54'-0"	1.13	0.30	0.56	N
SWS	SWN-41-3	BUTTERFLY VALVE	33 FCU SUPPLY ISOLATION	FAN HOUSE	54'-0"	1.13	0.30	0.56	N
SWS	SWN-41-4	BUTTERFLY VALVE	34 FCU SUPPLY ISOLATION	FAN HOUSE	54'-0"	1.13	0.30	0.56	N
SWS	SWN-41-5	BUTTERFLY VALVE	35 FCU SUPPLY ISOLATION	FAN HOUSE	54'-0"	1.13	0.30	0.56	N
SWS	SWN-44-1	BUTTERFLY VALVE	31 FCU OUTLET ISOLATION	FAN HOUSE	72'-0"	1.13	0.30	0.56	N
SWS	SWN-44-2	BUTTERFLY VALVE	32 FCU OUTLET ISOLATION	FAN HOUSE	72'-0"	1.13	0.30	0.56	N
SWS	SWN-44-3	BUTTERFLY VALVE	33 FCU OUTLET ISOLATION	FAN HOUSE	72'-0"	1.13	0.30	0.56	N
SWS	SWN-44-4	BUTTERFLY VALVE	34 FCU OUTLET ISOLATION	FAN HOUSE	72'-0"	1.13	0.30	0.56	N
SWS	SWN-44-5	BUTTERFLY VALVE	35 FCU OUTLET ISOLATION	FAN HOUSE	72'-0"	1.13	0.30	0.56	N
SWS	SWN-5	MANUAL VALVE	DISCH HDR X-TIE VALVE	INTAKE	15'-0"	1.13	0.30	0.56	Y
SWS	SWN-520	MANUAL VALVE	31 FCU MOTOR COOLER INLET ISOLATION	VC	68'-0"	1.13	0.30	0.56	N
SWS	SWN-521	MANUAL VALVE	31 FCU MOTOR COOLER OUTLET ISOLATION	VC	68'-0"	1.13	0.30	0.56	N
SWS	SWN-522	MANUAL VALVE	32 FCU MOTOR COOLER INLET ISOLATION	VC	68'-0"	1.13	0.30	0.56	N
SWS	SWN-523	MANUAL VALVE	32 FCU MOTOR COOLER OUTLET ISOLATION	VC	68'-0"	1.13	0.30	0.56	N
SWS	SWN-524	MANUAL VALVE	33 FCU MOTOR COOLER INLET ISOLATION	VC	68'-0"	1.13	0.30	0.56	N
SWS	SWN-525	MANUAL VALVE	33 FCU MOTOR COOLER OUTLET ISOLATION	VC	68'-0"	1.13	0.30	0.56	N
SWS	SWN-526	MANUAL VALVE	34 FCU MOTOR COOLER INLET ISOLATION	VC	68'-0"	1.13	0.30	0.56	N
SWS	SWN-527	MANUAL VALVE	34 FCU MOTOR COOLER OUTLET ISOLATION	VC	68'-0"	1.13	0.30	0.56	N
SWS	SWN-528	MANUAL VALVE	35 FCU MOTOR COOLER INLET ISOLATION	VC	68'-0"	1.13	0.30	0.56	N
SWS	SWN-529	MANUAL VALVE	35 FCU MOTOR COOLER OUTLET ISOLATION	VC	68'-0"	1.13	0.30	0.56	N
SWS	SWN-55	BUTTERFLY VALVE	DG COOLER RET HEADER METERING VALVE	DGB	15'-0"	1.13	0.30	0.56	N
SWS	SWN-6	MANUAL VALVE	ISO VALVE-CONV COOLERS	INTAKE	15'-0"	1.13	0.30	0.56	Y
SWS	SWN-62-2	BUTTERFLY VALVE	31 D.G. SUPPLY HEADER FROM SWP'S 34,35,38 COOLER INLET ISOLA	DGB	15'-0"	1.13	0.30	0.56	N
SWS	SWN-62-4	BUTTERFLY VALVE	32 D.G. SUPPLY HEADER FROM SWP'S 34,35,38 COOLER INLET ISOLA	DGB	15'-0"	1.13	0.30	0.56	N
SWS	SWN-62-6	BUTTERFLY VALVE	33 D.G. SUPPLY HEADER FROM SWP'S 34,35,38 COOLER INLET ISOLA	DGB	15'-0"	1.13	0.30	0.56	N
SWS	SWN-66-1	BUTTERFLY VALVE	31 JACKET WATER COOLER OUTLET FLEXIBLE CONNECTION	DGB	19'-0"	1.13	0.30	0.56	N
SWS	SWN-66-3	BUTTERFLY VALVE	32 JACKET WATER COOLER OUTLET FLEXIBLE CONNECTION	DGB	19'-0"	1.13	0.30	0.56	N
SWS	SWN-66-5	BUTTERFLY VALVE	33 JACKET WATER COOLER OUTLET FLEXIBLE CONNECTION	DGB	19'-0"	1.13	0.30	0.56	N
SWS	SWN-67-1	MANUAL VALVE	31 D.G. RETURN HEADER COOLER OUTLET ISOLATION	DGB	19'-0"	1.13	0.30	0.56	N
SWS	SWN-67-2	MANUAL VALVE	32 D.G. RETURN HEADER COOLER OUTLET ISOLATION	DGB	19'-0"	1.13	0.30	0.56	N
SWS	SWN-67-3	MANUAL VALVE	33 D.G. RETURN HEADER COOLER OUTLET ISOLATION	DGB	19'-0"	1.13	0.30	0.56	N
SWS	SWN-7	MANUAL VALVE	ISO VALVE-CONV COOLERS	INTAKE	15'-0"	1.13	0.30	0.56	Y
SWS	SWN-70-1	BUTTERFLY VALVE	31 IA CLOSED COOLING HX SUPPLY ISOLATION FROM 34, 35 & 38 SWP'S	CB	15'-0"	1.13	0.30	0.56	N
SWS	SWN-70-2	BUTTERFLY VALVE	32 IA CLOSED COOLING HX SUPPLY ISOLATION FROM 34, 35 & 38 SWP'S	CB	15'-0"	1.13	0.30	0.56	N
SWS	SWN-71-1	MANUAL VALVE	31 FCU MOTOR COOLER OUTLET ISOLATION	FAN HOUSE	54'-0"	1.13	0.30	0.56	N
SWS	SWN-71-2	MANUAL VALVE	32 FCU MOTOR COOLER OUTLET ISOLATION	FAN HOUSE	54'-0"	1.13	0.30	0.56	N
SWS	SWN-71-3	MANUAL VALVE	33 FCU MOTOR COOLER OUTLET ISOLATION	FAN HOUSE	54'-0"	1.13	0.30	0.56	N
SWS	SWN-71-4	MANUAL VALVE	34 FCU MOTOR COOLER OUTLET ISOLATION	FAN HOUSE	54'-0"	1.13	0.30	0.56	N
SWS	SWN-71-5	MANUAL VALVE	35 FCU MOTOR COOLER OUTLET ISOLATION	FAN HOUSE	54'-0"	1.13	0.30	0.56	N
SWS	SWN-87-1	MANUAL VALVE	TCV-1113 INLET ISOLATION	CB	15'-0"	1.13	0.30	0.56	N
SWS	SWN-87-2	MANUAL VALVE	TCV-1113 OUTLET ISOLATION	CB	15'-0"	1.13	0.30	0.56	N

* Denotes "Rule-of-the-Box" Component

Table 3A.1
Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	HCLFP$_{50}$ g	A-46
SWS	SWN-98	MANUAL VALVE	SWP'S 31,32,33 DISCHARGE ISOLATION TO NUCLEAR HEADER	INTAKE	6'-0"	1.13	0.30	0.56	N
SWS	SWN-99	MANUAL VALVE	SWP'S 34,35,36 DISCHARGE ISOLATION TO NUCLEAR HEADER	INTAKE	6'-0"	1.13	0.30	0.56	N
SWS	SWN-FCV-1111	FLOW CONTROL VALVE	ISO VALVE-CONV PLANT SERVICES	INTAKE	15'-0"	1.13	0.30	0.56	Y
SWS	SWN-FCV-1112	FLOW CONTROL VALVE	ISO VALVE-CONV PLANT SERVICES	INTAKE	15'-0"	1.13	0.30	0.56	Y
SWS	SWN-TC-1113	TEMPERATURE CONTROLLER	INST AIR CC HX SW OUTLET TC	CB	15'-0"	1.13	0.30	0.56	Y
SWS	SWN-TCV-1103	TEMPERATURE CONTROL VALVE	CFCU OUTLET CONTROL VLV	PP	35'-0"	1.13	0.30	0.56	Y
SWS	SWN-TCV-1104	AIR OPERATED VALVE	SWN-TCV-1105 BYPASS TEMPERATURE CONTROL VALVE	PP	35'-0"	1.13	0.30	0.56	Y
SWS	SWN-TCV-1105	AIR OPERATED VALVE	CONTAINMENT FCU TEMPERATURE CONTROL VALVE	PP	35'-0"	1.13	0.30	0.56	Y
SWS	SWN-TCV-1113	TEMPERATURE CONTROL VALVE	INST AIR CC HX SW OUTLET TCV	CB	15'-0"	1.13	0.30	0.56	Y
SWS	SWP31-STRNR-AUTO	ZURN STRAINER FOR SWP 31	SERVICE WATER PUMP 31 DISCHARGE STRAINER	INTAKE	6'-0"	1.13	0.30	0.56	N
SWS	SWP32-STRNR-AUTO	ZURN STRAINER FOR SWP 32	SERVICE WATER PUMP 32 DISCHARGE STRAINER	INTAKE	6'-0"	1.13	0.30	0.56	N
SWS	SWP33-STRNR-AUTO	ZURN STRAINER FOR SWP 33	SERVICE WATER PUMP 33 DISCHARGE STRAINER	INTAKE	6'-0"	1.13	0.30	0.56	N
SWS	SWP34-STRNR-AUTO	ZURN STRAINER FOR SWP 34	SERVICE WATER PUMP 34 DISCHARGE STRAINER	INTAKE	6'-0"	1.13	0.30	0.56	N
SWS	SWP35-STRNR-AUTO	ZURN STRAINER FOR SWP 35	SERVICE WATER PUMP 35 DISCHARGE STRAINER	INTAKE	6'-0"	1.13	0.30	0.56	N
SWS	SWP36-STRNR-AUTO	ZURN STRAINER FOR SWP 36	SERVICE WATER PUMP 36 DISCHARGE STRAINER	INTAKE	6'-0"	1.13	0.30	0.56	N
VS	VS-PCV-1234	PRESSURE CONTROL VALVE	RAD MONITORS R-11 & R-12 CONTAINMENT ISOLATION VLV	FAN HOUSE	61'-0"	1.13	0.30	0.56	N
VS	VS-PCV-1235	PRESSURE CONTROL VALVE	RAD MONITORS R-11 & R-12 CONTAINMENT ISOLATION VLV	FAN HOUSE	61'-0"	1.13	0.30	0.56	N
VS	VS-PCV-1236	PRESSURE CONTROL VALVE	RAD MONITORS R-11 & R-12 CONTAINMENT ISOLATION VLV	FAN HOUSE	61'-0"	1.13	0.30	0.56	N
VS	VS-PCV-1237	PRESSURE CONTROL VALVE	RAD MONITORS R-11 & R-12 CONTAINMENT ISOLATION VLV	FAN HOUSE	61'-0"	1.13	0.30	0.56	N
WDS	WD-AOV-1610	AIR OPERATED VALVE	RCDT N2 HEADER ISOLATION	PAB	63'-0"	1.13	0.30	0.56	N
WDS	WD-AOV-1702	AIR OPERATED VALVE	RCDT PUMPS DISCHARGE ISOLATION	PP	51'-0"	1.13	0.30	0.56	N
WDS	WD-AOV-1705	AIR OPERATED VALVE	RCDT PUMPS DISCHARGE ISOLATION	PP	51'-0"	1.13	0.30	0.56	N
WDS	WD-AOV-1723	AIR OPERATED VALVE	CONTAINMENT SUMP PUMPS ISOLATION	PP	51'-0"	1.13	0.30	0.56	N
WDS	WD-AOV-1728	AIR OPERATED VALVE	CONTAINMENT SUMP PUMPS ISOLATION	PP	51'-0"	1.13	0.30	0.56	N
WDS	WD-AOV-1786	AIR OPERATED VALVE	CONTAINMENT VENT HEADER ISOLATION	PP	51'-0"	1.13	0.30	0.56	N
WDS	WD-AOV-1787	AIR OPERATED VALVE	CONTAINMENT VENT HEADER ISOLATION	PP	51'-0"	1.13	0.30	0.56	N
WDS	WD-AOV-1788	AIR OPERATED VALVE	RCDT GAS ANALYZER SAMPLE ISOLATION VALVE	PP	51'-0"	1.13	0.30	0.56	N
WDS	WD-AOV-1789	AIR OPERATED VALVE	RCDT GAS ANALYZER SAMPLE ISOLATION VALVE	PP	51'-0"	1.13	0.30	0.56	N
WELD	PS-PCV-1111-1	PRESSURE CONTROL VALVE	WELD CHANNEL PRESSURIZATION HEADER ISO VALVE	FAN HOUSE	41'-0"	1.13	0.30	0.56	N
WELD	PS-PCV-1111-2	PRESSURE CONTROL VALVE	WELD CHANNEL PRESSURIZATION HEADER ISO VALVE	FAN HOUSE	41'-0"	1.13	0.30	0.56	N
CBV	CB EXHFAN 33	EXHAUST FAN	CONTROL BLDG EXHAUST FAN 33	CB	27'-0"	1.16	0.46	0.40	N
CBV	CB EXHFAN 34	EXHAUST FAN	CONTROL BLDG EXHAUST FAN 34	CB	27'-0"	1.16	0.46	0.40	N
EDG	DE-31	DIESEL ENGINE	ED 31 ENGINE	DGB	15'-0"	1.16	0.46	0.40	Y*
EDG	DE-32	DIESEL ENGINE	ED 32 ENGINE	DGB	15'-0"	1.16	0.46	0.40	Y*
EDG	DE-33	DIESEL ENGINE	ED33 ENGINE	DGB	15'-0"	1.16	0.46	0.40	Y*
EDG	DG-31	DIESEL GENERATOR	DIESEL GEN NO. 31	DG	15'-0"	1.16	0.46	0.40	Y
EDG	DG-32	DIESEL GENERATOR	DIESEL GEN NO. 32	DG	15'-0"	1.16	0.46	0.40	Y
EDG	DG-33	DIESEL GENERATOR	DIESEL GEN NO. 33	DG	15'-0"	1.16	0.46	0.40	Y
EDG	EDG-32-JW HTX	HEAT EXCHANGER	DG 32 JACKET WATER COOLER	DG	15'-0"	1.16	0.46	0.40	Y*
EDG	EDG-32-LO HTX	HEAT EXCHANGER	DG 32 LUBE OIL COOLER	DG	15'-0"	1.16	0.46	0.40	Y*
EDG	EDG-32-LO-P	MOTOR DRIVEN PUMP	DG 32 ENGINE DRIVEN LUBE OIL PUMP	DG	15'-0"	1.16	0.46	0.40	Y*
EDG	EDG-33-JW HTX	HEAT EXCHANGER	DG 33 JACKET WATER COOLER	DG	15'-0"	1.16	0.46	0.40	Y*
EDG	EDG-33-LO HTX	HEAT EXCHANGER	DG 33 LUBE OIL COOLER	DG	15'-0"	1.16	0.46	0.40	Y*
EDG	EDG-33-LO-P	MOTOR DRIVEN PUMP	DG 33 ENGINE DRIVEN LUBE OIL PUMP	DG	15'-0"	1.16	0.46	0.40	Y*
HVAC	0031ETEF	MOTOR OPERATED LOUVER	EL TNL EXHAUST FAN 31 (LOWER)	ET	34'-0"	1.16	0.46	0.40	Y
HVAC	0032ETEF	MOTOR OPERATED LOUVER	EL TNL EXHAUST FAN 32 (LOWER)	ET	34'-0"	1.16	0.46	0.40	Y
HVAC	0033ETEF	EXHAUST FAN	EL TNL EXHAUST FAN 33 (UPPER)	ET	46'-0"	1.16	0.46	0.40	Y
HVAC	0034ETEF	EXHAUST FAN	EL TNL EXHAUST FAN 34 (UPPER)	ET	46'-0"	1.16	0.46	0.40	Y
EDG	EDG-31-JW HTX	HEAT EXCHANGER	DG 31 JACKET WATER COOLER	DG	15'-0"	1.16	0.30	0.40	Y*
EDG	EDG-31-LO HTX	HEAT EXCHANGER	DG 31 LUBE OIL COOLER	DG	15'-0"	1.16	0.30	0.40	Y*
EDG	EDG-31-LO-P	MOTOR DRIVEN PUMP	DG 31 ENGINE DRIVEN LUBE OIL PUMP	DG	15'-0"	1.16	0.30	0.40	Y*
MSS	PT-419A	PRESSURE TRANSMITTER	SG 31 STEAM PRESS TRANSMITTER	AB	18'-6"	1.19	0.46	0.41	Y*
MSS	PT-419B	PRESSURE TRANSMITTER	SG 31 STEAM PRESS TRANSMITTER	AB	18'-6"	1.19	0.46	0.41	Y*
MSS	PT-419C	PRESSURE TRANSMITTER	SG 31 STEAM PRESS TRANSMITTER	AB	18'-6"	1.19	0.46	0.41	Y*
MSS	PT-429A	PRESSURE TRANSMITTER	SG 32 STEAM PRESS TRANSMITTER	AB	18'-6"	1.19	0.46	0.41	Y*
MSS	PT-429B	PRESSURE TRANSMITTER	SG 32 STEAM PRESS TRANSMITTER	AB	18'-6"	1.19	0.46	0.41	Y*
MSS	PT-429C	PRESSURE TRANSMITTER	SG 32 STEAM PRESS TRANSMITTER	AB	18'-6"	1.19	0.46	0.41	Y*

* Denotes "Rule-of-the-Box" Component

Table 3A.1
Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
MSS	PT-439A	PRESSURE TRANSMITTER	SG 33 STEAM PRESS TRANSMITTER	AB	18'-6"	1.19	0.46	0.41	Y*
MSS	PT-439B	PRESSURE TRANSMITTER	SG 33 STEAM PRESS TRANSMITTER	AB	18'-6"	1.19	0.46	0.41	Y*
MSS	PT-439C	PRESSURE TRANSMITTER	SG 33 STEAM PRESS TRANSMITTER	AB	18'-6"	1.19	0.46	0.41	Y*
MSS	PT-449A	PRESSURE TRANSMITTER	SG 34 STEAM PRESS TRANSMITTER	AB	18'-6"	1.19	0.46	0.41	Y*
MSS	PT-449B	PRESSURE TRANSMITTER	SG 34 STEAM PRESS TRANSMITTER	AB	18'-6"	1.19	0.46	0.41	Y*
MSS	PT-449C	PRESSURE TRANSMITTER	SG 34 STEAM PRESS TRANSMITTER	AB	18'-6"	1.19	0.46	0.41	Y*
RACK	RACK 9	INSTRUMENT RACK	MAIN STM PRESS TRANSMITTER RACK	AB	18'-6"	1.19	0.46	0.41	Y
125VDC	BATT 33	STATION BATTERY	BATTERY BANK 33	CB	15'-0"	1.21	0.46	0.41	Y
CVCS	CSAHSW1	HEAT EXCHANGER	SEAL WTR HEAT EXCH NO. 31	PAB	73'-0"	1.23	0.46	0.42	Y
HVAC	PABSF	SUPPLY FAN	PRIMARY AUX BUILDING SUPPLY FAN	PAB	41'-0"	1.25	0.46	0.43	Y
125VDC	BATT CHGR 33	BATTERY CHARGER	BATTERY CHARGER 33	CB	15'-0"	1.29	0.46	0.44	Y
125VDC	BATT CHGR 34	BATTERY CHARGER	BATTERY CHARGER 34	CB	33'-0"	1.29	0.46	0.44	Y
CVCS	0031CHPS	STABILIZER SEPARATOR	31 CHARG PMP SUCT STABILIZER SEPARATOR	PAB	55'-0"	1.29	0.46	0.44	Y
CVCS	0032CHPS	STABILIZER SEPARATOR	32 CHARG PMP SUCT STABILIZER SEPARATOR	PAB	55'-0"	1.29	0.46	0.44	Y
CVCS	0033CHPS	STABILIZER SEPARATOR	33 CHARG PMP SUCT STABILIZER SEPARATOR	PAB	55'-0"	1.29	0.46	0.44	Y
SIS	31 RECIRC PUMP	MOTOR DRIVEN PUMP	RECIRC PUMP 31	VC	46'-0"	1.42	0.46	0.49	N
SIS	32 RECIRC PUMP	MOTOR DRIVEN PUMP	RECIRC PUMP 32	VC	46'-0"	1.42	0.46	0.49	N
SIS	BORON INJECTION TANK	TANK	BORON INJECTION TANK	PAB	34'-0"	1.53	0.46	0.52	N
RACK	RACK 26	INSTRUMENT RACK	PRESS TRANSMITTER RACK #26	AB	18'-6"	1.63	0.46	0.56	Y
AFW	FT-1200	FLOW TRANSMITTER	AFW TO SG 31 FLOW TRANSMITTER	AB	18'-6"	1.64	0.46	0.56	Y
AFW	FT-1201	FLOW TRANSMITTER	AFW TO SG 32 FLOW TRANSMITTER	AB	18'-6"	1.64	0.46	0.56	Y
AFW	FT-1202	FLOW TRANSMITTER	AFW TO SG 33 FLOW TRANSMITTER	AB	18'-6"	1.64	0.46	0.56	Y
AFW	FT-1203	FLOW TRANSMITTER	AFW TO SG 34 FLOW TRANSMITTER	AB	18'-6"	1.64	0.46	0.56	Y
AFW	31 ABFP	MOTOR DRIVEN PUMP	MOTOR DRIVEN AUX. FEEDWATER PUMP NO. 31	AB	18'-6"	1.72	0.46	0.59	Y
AFW	32 ABFP	TURBINE DRIVEN PUMP	TURBINE DRIVEN AUX. FEEDWATER PUMP NO. 32	AB	18'-6"	1.72	0.46	0.59	Y
AFW	33 ABFP	MOTOR DRIVEN PUMP	MOTOR DRIVEN AUX. FEEDWATER PUMP NO. 33	AB	18'-6"	1.72	0.46	0.59	Y
EDG	EDG-31-AR-TNK	TANK	DG 31 AIR RECEIVER TANK	DGB	15'-0"	1.72	0.46	0.59	Y
EDG	EDG-32-AR-TNK	TANK	DG 32 AIR RECEIVER TANK	DGB	15'-0"	1.72	0.46	0.59	Y
EDG	EDG-33-AR-TNK	TANK	DG 33 AIR RECEIVER TANK	DGB	15'-0"	1.72	0.46	0.59	Y
CCW	ACAPCC1	MOTOR DRIVEN PUMP	CCW PUMP NO 31	PAB	41'-0"	1.78	0.46	0.61	Y
CCW	ACAPCC2	MOTOR DRIVEN PUMP	CCW PUMP NO. 32	PAB	41'-0"	1.78	0.46	0.61	Y
CCW	ACAPCC3	MOTOR DRIVEN PUMP	CCW PUMP NO 33	PAB	41'-0"	1.78	0.46	0.61	Y
CVCS	CSAHEL1	HEAT EXCHANGER	31 EXCS LETDWN HTX	VC	68'-0"	1.91	0.46	0.66	Y
AFW	PT-1260	PRESSURE TRANSMITTER	AFW 31 DISCHG PRESS TRANSMITTER	AB	18'-6"	1.94	0.46	0.66	Y
AFW	PT-1261	PRESSURE TRANSMITTER	AFW 32 DISCHG PRESS TRANSMITTER	AB	18'-6"	1.94	0.46	0.66	Y
AFW	PT-1262	PRESSURE TRANSMITTER	AFW 33 DISCHG PRESS TRANSMITTER	AB	18'-6"	1.94	0.46	0.66	Y
RACK	RACK 8	INSTRUMENT RACK	PRESS TRANSMITTER RACK #8	AB	18'-6"	1.94	0.46	0.66	Y
HVAC	ACU31	AIR CONDITIONAL UNIT	CONTROL ROOM A/C UNIT 31	CB	15'-0"	2.05	0.46	0.70	Y
HVAC	ACU32	AIR CONDITIONAL UNIT	CONTROL ROOM A/C UNIT 32	CB	15'-0"	2.05	0.46	0.70	Y
CSI	31 CS PUMP	CONTAINMENT SPRAY PUMP 31	CONTAINMENT SPRAY PUMP #31	PAB	41'-0"	2.15	0.46	0.74	N
CSI	32 CS PUMP	CONTAINMENT SPRAY PUMP 32	CONTAINMENT SPRAY PUMP #32	PAB	41'-0"	2.15	0.46	0.74	N
CVCS	CSAHRG1	HEAT EXCHANGER	31 REGEN HTX	VC	68'-0"	2.15	0.46	0.74	Y
CVCS	CSAPBA1	MOTOR OPERATED PUMP	BORIC ACID TRANSFER PUMP 31	PAB	73'-0"	2.15	0.46	0.74	Y
CVCS	CSAPBA2	MOTOR OPERATED PUMP	BORIC ACID TRANSFER PUMP 32	PAB	73'-0"	2.15	0.46	0.74	Y
IAS	IA AFTERCOOL 31 HTX	HEAT EXCHANGER	IA COMPRESSOR 31 AFTERCOOLER	CB	15'-0"	2.80	0.46	0.96	Y
IAS	IA AFTERCOOL 32 HTX	HEAT EXCHANGER	IA COMPRESSOR 32 AFTERCOOLER	CB	15'-0"	2.80	0.46	0.96	Y
CCW	SISP31-CWP1	SHAFT DRIVEN PUMP	SIS PUMP #31 COOLING WATER PUMP	PAB	34'-0"	3.66	0.46	1.25	N
CCW	SISP32-CWP2	SHAFT DRIVEN PUMP	SIS PUMP #32 COOLING WATER PUMP	PAB	34'-0"	3.66	0.46	1.25	N
CCW	SISP33-CWP3	SHAFT DRIVEN PUMP	SIS PUMP #33 COOLING WATER PUMP	PAB	34'-0"	3.66	0.46	1.25	N
SIS	31 SI PUMP	MOTOR DRIVEN PUMP	SAFETY INJECTION PUMP 31	PAB	34'-0"	3.66	0.46	1.25	N
SIS	32 SI PUMP	MOTOR DRIVEN PUMP	SAFETY INJECTION PUMP 32	PAB	34'-0"	3.66	0.46	1.25	N
SIS	33 SI PUMP	MOTOR DRIVEN PUMP	SAFETY INJECTION PUMP 33	PAB	34'-0"	3.66	0.46	1.25	N
CVCS	CSFLSI1	FILTER	SEAL INJECTION FILTER #31	PAB	15'-0"	4.26	0.46	1.46	N
CVCS	CSFLSI2	FILTER	SEAL INJECTION FILTER #32	PAB	15'-0"	4.26	0.46	1.46	N
CVCS	CSFLSW1	FILTER	SEAL WATER RETURN FILTER #31	PAB	15'-0"	4.26	0.46	1.46	N
IAS	3KAT15	TANK	COMPRESSED AIR SYSTEM AIR RECEIVER	CB	15'-0"	4.73	0.46	1.62	Y
IAS	IACCHT	TANK	INST. AIR COMP CLG HEAD TANK	CB	33'-0"	5.16	0.46	1.77	Y

* Denotes "Out-of-the-Box" Component

Ta...e 3A.1
Shutdown Equipment List

SYSTEM	COMPONENT ID	COMPONENT TYPE	COMPONENT DESCRIPTION	BLDG	ELEV	MEDIAN ACCELERATION g	BETA 'C'	$HCLFP_{50}$ g	A-46
118 VAC	31 INVERTER	INVERTER	STATIC INVERTER 31	CB	33'-0"	6.24	0.46	2.13	Y
118 VAC	32 INVERTER	INVERTER	STATIC INVERTER 32	CB	33'-0"	6.24	0.46	2.13	Y

* Denotes "Rule-of-the-Box" Component

Table 3A.2
Components Associated with the "Rule-of-the-Box"

SYSTEM	COMPONENT ID	COMPONENT DESCRIPTION	RULE-OF THE-BOX ID	BLDG	ELEV
CCW	SISP31-CWP1	SIS PUMP #31 COOLING WATER PUMP	SI PUMP 31	PAB	34'-0"
CCW	SISP32-CWP2	SIS PUMP #32 COOLING WATER PUMP	SI PUMP 32	PAB	34'-0"
CCW	SISP33-CWP3	SIS PUMP #33 COOLING WATER PUMP	SI PUMP 33	PAB	34'-0"
PPR	PC-455G	PZR SPRAY VALVE PROPTIONAL CONTROLLER	PANEL FBF	CB	53'-0"
PPR	PC-455H	PZR SPRAY VALVE PROPORTIONAL CONTROLLER	PANEL FBF	CB	53'-0"
PPR	PC-455K	PZR CONTROLLER	PANEL FBF	CB	53'-0"
480 VAC	SST-2	STATION SERVICE TRANSFORMER 2	BUS 2A	CB	15'-0"
480 VAC	SST-3	STATION SERVICE TRANSFORMER 3	BUS 3A	CB	15'-0"
480 VAC	SST-5	STATION SERVICE TRANSFORMER 5	BUS 5A	CB	15'-0"
480 VAC	SST-6	STATION SERVICE TRANSFORMER 6	BUS 6A	CB	15'-0"
CCW	SOV-791-1	AC-791 SOLENOID VALVE	AC-AOV-791	PP	51'-0"
CCW	SOV-793-1	AC-793 SOLENOID VALVE	AC-AOV-793	PP	51'-0"
CCW	SOV-796-1	AC-796 SOLENOID VALVE	AC-AOV-796	PP	51'-0"
CCW	SOV-798-1	AC-798 SOLENOID VALVE	AC-AOV-798	PP	51'-0"
CVCS	0031CHPS	31 CHARG PMP SUCT STABILIZER SEPARATOR	CSAPCH1	PAB	55'-0"
CVCS	0032CHPS	32 CHARG PMP SUCT STABILIZER SEPARATOR	CSAPCH2	PAB	55'-0"
CVCS	0033CHPS	33 CHARG PMP SUCT STABILIZER SEPARATOR	CSAPCH3	PAB	55'-0"
125VDC	31-BATT-FUSE	BATTERY 31 FUSES	BATTERY BANK 31	CB	33'-0"
125VDC	31PP-17	125 VDC POWER PANEL 31 BATTERY 31 CIRCUIT BREAKER	POWER PANEL 31	CB	33'-0"
125VDC	32-BATT-FUSE	BATTERY 32 FUSES	BATTERY BANK 32	CB	33'-0"
125VDC	32PP-15	125VDC POWER PANEL 32 BATTERY CIRCUIT BREAKER	POWER PANEL 32	CB	33'-0"
125VDC	33-BATT-FUSE	BATTERY 33 FUSES	BATTERY BANK 33	CB	15'-0"
125VDC	33PP-MAIN	POWER PANEL 33 BATT CKT BRKR	POWER PANEL 33	CB	15'-0"
125VDC	34PP-MAIN	POWER PANEL 34 BATT CKT BRKR	POWER PANEL 34	CB	33'-0"
480 VAC	480V BUS 2A PT	480V BUS 2A POTENTIAL TRANSFORMER	BUS 2A	CB	15'-0"
480 VAC	480V BUS 3A PT	480V BUS 3A POTENTIAL TRANSFORMER	BUS 3A	CB	15'-0"
480 VAC	480V BUS 5A PT	480V BUS 5A POTENTIAL TRANSFORMER	BUS 5A	CB	15'-0"
480 VAC	480V BUS 6A PT	480V BUS 6A POTENTIAL TRANSFORMER	BUS 6A	CB	15'-0"
480 VAC	52/2A	480V STATION SERVICE TRANSFORMER NO. 2 BREAKER	SWGR 31	CB	15'-0"
480 VAC	52/2AT3A	480V BUS TIE BREAKER - BUS 2A - 3A	SWGR 31	CB	15'-0"
480 VAC	52/2AT5A	480V BUS TIE BREAKER - BUS 2A - 5A	SWGR 31	CB	15'-0"
480 VAC	52/3A	480V STATION SERVICE TRANSFORMER NO. 3 BREAKER	SWGR 32	CB	15'-0"
480 VAC	52/3AT6A	480V BUS TIE BREAKER - BUS 3A - 6A	SWGR 32	CB	15'-0"
480 VAC	52/5A	480V STATION SERVICE TRANSFORMER NO. 5 BREAKER	SWGR 31	CB	15'-0"
480 VAC	52/6A	480V STATION SERVICE TRANSFROMER NO. 6 BREAKER	SWGR 32	CB	15'-0"
480 VAC	52/6AT5A	480V BUS TIE BREAKER - BUS 6A - 5A	SWGR 32	CB	15'-0"
480 VAC	52/MCC3	33MCC SUPPLY BREAKER	MCC 33	CB	15'-0"
480 VAC	52/MCC4	34MCC SUPPLY BREAKER	MCC 34	CB	15'-0"

Table 3A.2
Components Associated with the "Rule-of-the-Box"

SYSTEM	COMPONENT ID	COMPONENT DESCRIPTION	RULE-OF THE-BOX ID	BLDG	ELEV
480 VAC	52/MCC6A	36AMCC SUPPLY BREAKER	MCC 36A	CB	15'-0"
480 VAC	52/MCC6B	36BMCC SUPPLY BREAKER	MCC 36B	CB	15'-0"
480 VAC	52/MCC6C	36CMCC SUPPLY BREAKER	MCC 36C	CB	15'-0"
480 VAC	52/MCC7	37MCC SUPPLY BREAKER	MCC 37	CB	15'-0"
480 VAC	52/MCC9	39MCC SUPPLY BREAKER	MCC 39	CB	15'-0"
480 VAC	FUSE-2A-PT	FUSES ON 480V BUS 2A POT XFRMR	BUS 2A	CB	15'-0"
480 VAC	FUSE-3A-PT	FUSES ON 480V BUS 3A POT XFRMR	BUS 3A	CB	15'-0"
480 VAC	FUSE-5A-PT	FUSES ON 480V BUS 5A POT XFRMR	BUS 5A	CB	15'-0"
480 VAC	FUSE-6A-PT	FUSES ON 480V BUS 6A POT XFRMR	BUS 6A	CB	15'-0"
480 VAC	OTS-2A	OVERCURRENT TRIP SWITCH	BUS 2A	CB	15'-0"
480 VAC	OTS-3A	OVERCURRENT TRIP SWITCH	BUS 3A	CB	15'-0"
480 VAC	OTS-5A	OVERCURRENT TRIP SWITCH	BUS 5A	CB	15'-0"
480 VAC	OTS-6A	OVERCURRENT TRIP SWITCH	BUS 6A	CB	15'-0"
AFW	52/AF1	31 AUXILIARY FEEDWATER PUMP BREAKER	BUS 3A	CB	15'-0"
AFW	52/AF3	33 AUXILIARY FEEDWATER PUMP BREAKER	BUS 6A	CB	15'-0"
AFW	HC-405A	AFWP 32 FCV-405A HAND CONTROLLER	BFD-FCV-405A	CB	53'-0"
AFW	HC-405B	AFWP 32 FCV-405B HAND CONTROLLER	BFD-FCV-405B	CB	53'-0"
AFW	HC-405C	AFWP 32 FCV-405C HAND CONTROLLER	BFD-FCV-405C	CB	53'-0"
AFW	HC-405D	AFWP 32 FCV-405D HAND CONTROLLER	BFD-FCV-405D	CB	53'-0"
AFW	HC-406A	AFWP 31 FCV-406A HAND CONTROLLER	BFD-FCV-406A	CB	53'-0"
AFW	HC-406B	AFWP 31 FCV-406B HAND CONTROLLER	BFD-FCV-406B	CB	53'-0"
AFW	HC-406C	AFWP 33 FCV-406C HAND CONTROLLER	BFD-FCV-406C	CB	53'-0"
AFW	HC-406D	AFWP 33 FCV-406D HAND CONTROLLER	BFD-FCV-406D	CB	53'-0"
AFW	PM-406A	SG #31 FW VALVES HI SEL.	RACK B-5	CB	53'-0"
AFW	PM-406B	SG #32 FW VALVES SIG. HI SEL.	RACK B-5	CB	53'-0"
AFW	PM-406C	SG #33 FW VALVES SIG. HI SEL.	RACK B-5	CB	53'-0"
AFW	PM-406D	SG #34 FW VALVES SIG. HI SEL.	RACK B-5	CB	53'-0"
CCW	52/CC1	31 COMPONENT COOLING WATER PUMP BREAKER	BUS 5A	CB	15-0"
CCW	52/CC2	32 COMPONENT COOLING WATER PUMP BREAKER	BUS 2A	CB	15-0"
CCW	52/CC3	33 COMPONENT COOLING WATER PUMP BREAKER	BUS 6A	CB	15-0"
CCW	RHRP31-HTX	RHR PUMP #31 PUMP SEAL HTEXCH	ACAPRH1	PAB	15'-0"
CCW	RHRP32-HTX	RHR PUMP #32 PUMP SEAL HTEXCH	ACAPRH2	PAB	15'-0"
CDS	CT-SOV-1258-1	COND STORAGE TANK TO CONDENSERS CT-LCV-1158-1 SOL	CT-LCV-1158-1	AB	18'-6"
CDS	CT-SOV-1258-2	COND STORAGE TANK TO CONDENSERS CT-LCV-1158-2 SOL	CT-LCV-1158-2	AB	18'-6"
CDS	CT-SOV-1287	PCV-1187 SOLENOID VALVE	BFD-PCV-1187	AB	18'-6"
CDS	CT-SOV-1288	PCV-1188 SOLENOID VALVE	BFD-PCV-1188	AB	18'-6"
CDS	CT-SOV-1289	PCV-1189 SOLENOID VALVE	BFD-PCV-1189	AB	18'-6"
CFC	52/CRF1	31 FAN COOLER UNIT BREAKER	BUS 5A	CB	15'-0"
CFC	52/CRF2	32 FAN COOLER UNIT BREAKER	BUS 2A	CB	15'-0"
CFC	52/CRF3	33 FAN COOLER UNIT BREAKER	BUS 5A	CB	15'-0"

Table 3A.2
Components Associated with the "Rule-of-the-Box"

SYSTEM	COMPONENT ID	COMPONENT DESCRIPTION	RULE-OF THE-BOX ID	BLDG	ELEV
CFC	52/CRF4	34 FAN COOLER UNIT BREAKER	BUS 3A	CB	15'-0"
CFC	52/CRF5	35 FAN COOLER UNIT BREAKER	BUS 6A	CB	15'-0"
CRD	CRPI	CONTROL ROD CLUSTER POSITIVE INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
CSI	52/CS1	31 CONTAINMENT SPRAY PUMP BREAKER	BUS 5A	CB	15'-0"
CSI	52/CS2	32 CONTAINMENT SPRAY PUMP BREAKER	BUS 6A	CB	15'-0"
CVCS	0033CHPD	33 CHP PULSATION DAMPENER	CSAPCH3	PAB	55'-0"
CVCS	52/C1	31 CHARGING PUMP BREAKER	BUS 5A	CB	15'-0"
CVCS	52/C2	32 CHARGING PUMP BREAKER	BUS 3A	CB	15'-0"
CVCS	52/C3	33 CHARGING PUMP BREAKER	BUS 6A	CB	15'-0"
CVCS	CHRG PP31 CASING HTX	CHARGING PP31 FLUID DRIVE CASING OIL COOLER	CSAPCH1	PAB	55'-0"
CVCS	CHRG PP31 CRANK HTX	CHARGING PP31 PUMP CRANKCASE OIL COOLER	CSAPCH1	PAB	55'-0"
CVCS	CHRG PP32 CASING HTX	CHARGING PP32 FLUID DRIVE CASING OIL COOLER	CSAPCH2	PAB	55'-0"
CVCS	CHRG PP32 CRANK HTX	CHARGING PP32 PUMP CRANKCASE OIL COOLER	CSAPCH2	PAB	55'-0"
CVCS	CHRG PP33 CASING HTX	CHARGING PP33 FLUID DRIVE CASING OIL COOLER	CSAPCH3	PAB	55'-0"
CVCS	CHRG PP33 CRANK HTX	CHARGING PP33 PUMP CRANKCASE OIL COOLER	CSAPCH3	PAB	55'-0"
CVCS	FI-115A	SEAL INJ. FLOW INDICATOR	SUPERVISORY PANEL	CB	53'-0"
CVCS	FI-116A	SEAL INJ. FLOW INDICATOR	SUPERVISORY PANEL	CB	53'-0"
CVCS	FI-128B	CHG FLOW TO REG HX INDICATOR	SUPERVISORY PANEL	CB	53'-0"
CVCS	FI-134	LETDOWN FLOW INDICATOR	SUPERVISORY PANEL	CB	53'-0"
CVCS	FI-143A	SEAL INJ. FLOW INDICATOR	SUPERVISORY PANEL	CB	53'-0"
CVCS	FI-144A	SEAL INJ. FLOW INDICATOR	SUPERVISORY PANEL	CB	53'-0"
CVCS	FIC-110	BORIC ACID FLOW CONTROLLER	FLIGHT PANEL FBF	CB	53'-0"
CVCS	FIC-111	PRIMARY WATER FLOW CONTROL	FLIGHT PANEL FBF	CB	53'-0"
CVCS	FM-111A	ELECTRO PNEUMATIC CONVERTER	CH-FCV-111A	PAB	73'-0"
CVCS	FR-156	34 RCP SEAL LEAKOFF FLOW	FLIGHT PANEL FDF	CB	53'-0"
CVCS	FR-157	33 RCP SEAL LEAKOFF FLOW	FLIGHT PANEL FDF	CB	53'-0"
CVCS	FR-158	32 RCP SEAL LEAKOFF FLOW	FLIGHT PANEL FDF	CB	53'-0"
CVCS	FR-159	31 RCP SEAL LEAKOFF FLOW	FLIGHT PANEL FDF	CB	53'-0"
CVCS	FT-115A	SEAL INJ. FLOW TRANSMITTER	RACK A-6	PP	41'-0"
CVCS	FT-116A	SEAL INJ. FLOW TRANSMITTER	RACK A-6	PP	41'-0"
CVCS	FT-143A	SEAL INJ. FLOW TRANSMITTER	RACK A-6	PP	41'-0"
CVCS	FT-144A	SEAL INJ. FLOW TRANSMITTER	RACK A-6	PP	41'-0"
CVCS	LI-102	BORIC ACID STORAGE TANK #32 LEVEL INDICATOR	SUPERVISORY PANEL	CB	53'-0"
CVCS	LI-106	BORIC ACID STORAGE TANK #31 LEVEL INDICATOR	SUPERVISORY PANEL	CB	53'-0"
CVCS	LI-112	VCT LEVEL INDICATOR	SUPERVISORY PANEL	CB	53'-0"
CVCS	PI-135	NON REGEN HX OUTLET LETDOWN PRESS INDICATOR	RACK C-10	CB	53'-0"
CVCS	PI-139	VCT PRESSURE INDICATOR	SUPERVISORY PANEL	CB	53'-0"
CVCS	PI-142B	CHG PP DISCH PRESS INDICATOR	SUPERVISORY PANEL	CB	53'-0"
CVCS	SC-141A	31 CHRG PP SPEED CONTROL	FLIGHT PANEL FBF	CB	53'-0"
CVCS	SC-141B	32 CHRG PP SPEED CONTROL	FLIGHT PANEL FBF	CB	53'-0"

Table 3A.2
Components Associated with the "Rule-of-the-Box"

SYSTEM	COMPONENT ID	COMPONENT DESCRIPTION	RULE-OF THE-BOX ID	BLDG	ELEV
CVCS	SC-141C	33 CHRG PP SPEED CONTROL	FLIGHT PANEL FBF	CB	53'-0"
CVCS	SOV-110A-1	CH-FCV-110A SOLENOID VALVE	CH-FCV-110A	PAB	80'-0"
CVCS	SOV-110B-1	CH-FCV-110B SOLENOID VALVE	CH-FCV-110B	PAB	73'-0"
CVCS	SOV-111A-1	CH-FCV-111A SOLENOID VALVE	CH-FCV-111A	PAB	78'-0"
CVCS	SOV-111B-1	CH-FCV-111B SOLENOID VALVE	CH-FCV-111B	PAB	78'-0"
CVCS	SOV-133-1	CH-HCV-133 SOLENOID VALVE	CH-HCV-133	VC	55'-3"
CVCS	SOV-200A-1	CH-AOV-200A SOLENOID VALVE	CH-AOV-200A	VC	46'-0"
CVCS	SOV-200B-1	CH-AOV-200B SOLENOID VALVE	CH-AOV-200B	VC	46'-0"
CVCS	SOV-200C-1	CH-AOV-200C SOLENOID VALVE	CH-AOV-200C	VC	46'-0"
CVCS	SOV-201-1	CH-201 SOLENOID VALVE	CH-201	PP	51'-0"
CVCS	SOV-202-1	CH-202 SOLENOID VALVE	CH-202	PP	51'-0"
CVCS	SOV-204A-1	CH-AOV-204A SOLENOID VALVE	CH-AOV-204A	VC	58'-0"
CVCS	SOV-204B-1	CH-AOV-204B SOLENOID VALVE	CH-AOV-204B	VC	46'-0"
CVCS	SOV-212-1	CH-AOV-212 SOLENOID VALVE	CH-AOV-212	VC	46'-0"
CVCS	SOV-213A-1	CH-213A SOLENOID VALVE	CH-AOV-213A	VC	46'-0"
CVCS	SOV-213B-1	CH-213B SOLENOID VALVE	CH-AOV-213B	VC	46'-0"
CVCS	SOV-246-1	CH-AOV-246 SOLENOID VALVE	CH-AOV-246	VC	53'-0"
CVCS	SOV-261A-1	CH-AOV-261A SOLENOID VALVE	CH-AOV-261A	VC	79'-0"
CVCS	SOV-261B-1	CH-AOV-261B SOLENOID VALVE	CH-AOV-261B	VC	79'-0"
CVCS	SOV-261C-1	CH-AOV-261C SOLENOID VALVE	CH-AOV-261C	VC	79'-0"
CVCS	SOV-261D-1	CH-AOV-261D SOLENOID VALVE	CH-AOV-261D	VC	79'-0"
CVCS	SOV-310-1	CH-310 SOLENOID VALVE	CH-310	PAB	42'-0"
CVCS	SOV-459-1	LETDOWN STOP VALVE	CH-LCV-459	VC	79'-0"
CVCS	SOV-460-1	CH-LCV-460 SOLENOID VALVE	CH-LCV-460	VC	79'-0"
CVCS	TE-126	REGEN HX CHG FLOW TEMP ELEMENT	RACK C-9	VC	46'-0"
CVCS	TI-122	EXCESS LETDOWN TEMPERATURE INDICATOR	SUPERVISORY PANEL	CB	53'-0"
CVCS	TI-126	REGEN HX CHG FLOW TEMP INDICATOR	SUPERVISORY PANEL	CB	53'-0"
CVCS	TI-127	REGEN HX CHG FLOW TEMPERATURE INDICATOR	SUPERVISORY PANEL	CB	53'-0"
CVCS	TI-130	NON REGHX OUTLET LETDOWN TEMP INDICATOR	SUPERVISORY PANEL	CB	53'-0"
CVCS	YIC-110	BORIC ACID FLOW TOTALIZER	FLIGHT PANEL FBF	CB	53'-0"
EDG	33PP-1	480V SWGR 31 BUS 2A BKR CONTROL AND BUS 2A AND 3A S	DC 31 POWER PANEL	CB	15'-0"
EDG	52/EG1	DIESEL GENERATOR 31 BREAKER	BUS 2A	CB	15'-0"
EDG	52/EG2	DIESEL GNERATOR 32 BREAKER	BUS 6A	CB	15'-0"
EDG	52/EG3	DIESEL GENERATOR 33 BREAKER	BUS 5A	CB	15'-0"
EDG	ACV(GEN)-1	DG 31 SYNCHRONIZING PANEL AC VOLTMETER-INCOMING	SUPERVISORY PANEL	CB	53'-0"
EDG	ACV(GEN)-2	DG 32 SYNCHRONIZING PANEL AC VOLTMETER-INCOMING	SUPERVISORY PANEL	CB	53'-0"
EDG	ACV(GEN)-3	DG 33 SYNCHRONIZING PANEL AC VOLTMETER-INCOMING	SUPERVISORY PANEL	CB	53'-0"
EDG	CPT-29-(N)	FUSE (NEG) AT SWGR31 CPT29	31PP	CB	15'-0"
EDG	CPT-29-(P)	FUSE (POS) AT SWGR31 CPT29	DC 31 POWER PANEL	CB	15'-0"
EDG	D31-F10	FUSE F10(POS)	DC 33 POWER PANEL	DGB	15'-0"

Table 3A.2
Components Associated with the "Rule-of-the-Box"

SYSTEM	COMPONENT ID	COMPONENT DESCRIPTION	RULE-OF THE-BOX ID	BLDG	ELEV
EDG	D31-F11	FUSE F11(NEG)	DC 33 POWER PANEL	DGB	15'-0"
EDG	D32-F10	FUSE F10(POS)	DC 32 POWER PANEL	DGB	15'-0"
EDG	D32-F11	FUSE F11(NEG)	DC 32 POWER PANEL	DGB	15'-0"
EDG	D33-F10	FUSE F10(POS)	DC 31 POWER PANEL	DGB	15'-0"
EDG	D33-F11	FUSE F11(NEG)	DC 31 POWER PANEL	DGB	15'-0"
EDG	DE-31	ED 31 ENGINE	DG-31	DGB	15'-0"
EDG	DE-32	ED 32 ENGINE	DG-32	DGB	15'-0"
EDG	DE-33	ED33 ENGINE	DG-33	DGB	15'-0"
EDG	DP31-14	DG33 CONTROL PANEL "PQ2" (CH II) CIRCUIT BREAKER	DC 31 POWER PANEL	CB	53'-0"
EDG	EDG-31 CCR WATT XDCR	DG 31 BUS OUTPUT WATTMETER TRANSDUCER	SUPERVISORY PANEL	CB	53'-0"
EDG	EDG-31-JW HTX	DG 31 JACKET WATER COOLER	DG-31	DG	15'-0"
EDG	EDG-31-LO HTX	DG 31 LUBE OIL COOLER	DG-31	DG	15'-0"
EDG	EDG-31-LO-P	DG 31 ENGINE DRIVEN LUBE OIL PUMP	DG-31	DG	15'-0"
EDG	EDG-32 CCR WATT XDCR	DG 32 BUS OUTPUT WATTMETER TRANSDUCER	SUPERVISORY PANEL	CB	53'-0"
EDG	EDG-32-JW HTX	DG 32 JACKET WATER COOLER	DG-32	DG	15'-0"
EDG	EDG-32-LO HTX	DG 32 LUBE OIL COOLER	DG-32	DG	15'-0"
EDG	EDG-32-LO-P	DG 32 ENGINE DRIVEN LUBE OIL PUMP	DG-32	DG	15'-0"
EDG	EDG-33 CCR WATT XDCR	DG 33 BUS OUTPUT WATTMETER TRANSDUCER	SUPERVISORY PANEL	CB	53'-0"
EDG	EDG-33-JW HTX	DG 33 JACKET WATER COOLER	DG-33	DG	15'-0"
EDG	EDG-33-LO HTX	DG 33 LUBE OIL COOLER	DG-33	DG	15'-0"
EDG	EDG-33-LO-P	DG 33 ENGINE DRIVEN LUBE OIL PUMP	DG-33	DG	15'-0"
EDG	PNL VRP 31	31 EDG VOLTAGE REG PANEL	PNL PP9	DG	15'-0"
EDG	PNL VRP 32	32 EDG VOLTAGR REG PANEL	PNL PQ1	DG	15'-0"
EDG	PNL VRP 33	33 EDG VOLTAGE REG PANEL	PNL PQ2	DG	15'-0"
EDG	PP31-4(N)	NEG. FUSE FOR SWGR31 CPT18(52/EG3)	DC 31 POWER PANEL	CB	15'-0"
EDG	PP31-4(P)	POS. FUSE FOR SWGR31 CPT18(52/EG3)	DC 31 POWER PANEL	CB	15'-0"
EDG	PP32-8(+)	FUSE(+) FOR SWGR32 CPT15(52/EG2)	DC 32 POWER PANEL	CB	15'-0"
EDG	PP32-8(-)	FUSE(-) FOR SWGR32 CPT15(52/EG2)	DC 32 POWER PANEL	CB	15'-0"
EDG	PP33-4	DIESEL GENERATOR 31 CONTROL CIRCUIT BREAKER	DC 33 POWER PANEL	CB	15'-0"
EDG	SOV-1274	SOLENOID OPERATED VALVE FOR FCV-1176 & FCV-1176A	FCV-1176	DG	15'-0"
EDG	SOV-1275	SOLENOID OPERATED VALVE FOR FCV-1176 & FCV-1176A	FCV-1176	DG	15'-0"
EDG	SWN-SOV-1276	SOLENOID OPERATOR FOR FCV-1176	FCV-1176A	DG	15'-0"
EDG	SWN-SOV-1276A	SOLENOID OPERATOR FOR FCV-1176A	FCV-1176A	DG	15'-0"
IAS	0031CLWP	31 I/A CMPR COOLING WTR PMP	31 IA COMPRESSOR	CB	15'-0"
IAS	0031IACJC	INST AIR COMP 31 JACKET COOLER	31 IA COMPRESSOR	CB	15'-0"
IAS	0032CLWP	32 I/A CMPR CL COOLING WTR PMP	32 IA COMPRESSOR	CB	15'-0"
IAS	0032IACJC	INST AIR COMP 32 JACKET COOLER	32 IA COMPRESSOR	CB	15'-0"
IAS	IA-SOV-1198	COMPRESSOR 31 UNLOADER SOLENOID OPERATED VALVE	31 IA COMPRESSOR	CB	15'-0"
IAS	IA-SOV-1199	COMPRESSOR 32 UNLOADER SOLENOID OPERATED VALVE	32 IA COMPRESSOR	CB	15'-0"
IAS	MS-SOV-1230	SG#31 MAIN STM ISOLATION VALVE 31 SUPPLY SOLENOID	PNL 1-31	AB	77'-4"

Table 3A.2
Components Associated with the "Rule-of-the-Box"

SYSTEM	COMPONENT ID	COMPONENT DESCRIPTION	RULE-OF THE-BOX ID	BLDG	ELEV
IAS	MS-SOV-1231	SG#31 MAIN STM ISOLATION VALVE 31 SUPPLY SOLENOID	PNL 1-31	AB	77'-4"
IAS	MS-SOV-1232	SG#31 MAIN STM ISOLATION VALVE 31 EXHAUST SOLENOID	PNL 1-31	AB	77'-4"
IAS	MS-SOV-1233	SG#31 MAIN STM ISOLATION VALVE 31 EXHAUST SOLENOID	PNL 1-31	AB	77'-4"
IAS	MS-SOV-1234	SG#32 MAIN STM ISOLATION VALVE 32 SUPPLY SOLENOID	PNL 1-32	AB	64'-8"
IAS	MS-SOV-1235	SG#32 MAIN STM ISOLATION VALVE 32 SUPPLY SOLENOID	PNL 1-32	AB	64'-8"
IAS	MS-SOV-1236	SG#32 MAIN STM ISOLATION VALVE 32 EXHAUST SOLENOID	PNL 1-32	AB	64'-8"
IAS	MS-SOV-1237	SG#32 MAIN STM ISOLATION VALVE 32 EXHAUST SOLENOID	PNL 1-32	AB	64'-8"
IAS	MS-SOV-1238	SG#33 MAIN STM ISOLATION VALVE 33 SUPPLY SOLENOID	PNL 1-33	AB	77'-4"
IAS	MS-SOV-1239	SG#33 MAIN STM ISOLATION VALVE 33 SUPPLY SOLENOID	PNL 1-33	AB	77'-4"
IAS	MS-SOV-1240	SG#33 MAIN STM ISOLATION VALVE 33 EXHAUST SOLENOID	PNL 1-33	AB	77'-4"
IAS	MS-SOV-1241	SG#33 MAIN STM ISOLATION VALVE 33 EXHAUST SOLENOID	PNL 1-33	AB	77'-4"
IAS	MS-SOV-1242	SG#34 MAIN STM ISOLATION VALVE 34 SUPPLY SOLENOID	PNL 1-34	AB	64'-8"
IAS	MS-SOV-1243	SG#34 MAIN STM ISOLATION VALVE 34 SUPPLY SOLENOID	PNL 1-34	AB	64'-8"
IAS	MS-SOV-1244	SG#34 MAIN STM ISOLATION VALVE 34 EXHAUST SOLENOID	PNL 1-34	AB	64'-8"
IAS	MS-SOV-1245	SG#34 MAIN STM ISOLATION VALVE 34 EXHAUST SOLENOID	PNL 1-34	AB	64'-8"
IAS	PI-1144	STATION AIR NUCL SERV PRESS INDICATOR	SUPERVISORY PANEL	CB	15'-0"
IAS	PI-1192	IACC WATER PRESS INDICATOR	SUPERVISORY PANEL	CB	15'-0"
IAS	PNL HA7	COMPRESSOR 32 CONTROL STATION	32 IA COMPRESSOR	CB	15'-0"
IAS	PNL HF1	COMPRESSOR 31 CONTROL STATION	31 IA COMPRESSOR	CB	15'-0"
IAS	SOV-1142-1	PCV-1142 SOLENOID VALVE	PCV-1142	CB	15'-0"
IAS	SOV-1428	SOLENOID VALVE FOR PCV-1228	IA-PCV-1228	PP	41'-0"
ICC	SOV-1177	AFTERCOOLER 31 INLET SOLENOID OPERATED VALVE	31 IA COMPRESSOR	CB	15'-0"
ICC	SOV-1178	AFTERCOOLER 32 INLET SOLENOID OPERATED VALVE	32 IA COMPRESSOR	CB	15'-0"
MFW	LI-417A	SG 31 LEVEL INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MFW	LI-417D	SG 31 LEVEL INDICATOR	PNL PT2	AB	18'-6"
MFW	LI-427A	SG 32 LEVEL INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MFW	LI-427D	SG 32 LEVEL INDICATOR	PNL PT2	AB	18'-6"
MFW	LI-437A	SG 33 LEVEL INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MFW	LI-437D	SG 33 LEVEL INDICATOR	PNL PT2	AB	18'-6"
MFW	LI-447A	SG 34 LEVEL INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MFW	LI-447D	SG 34 LEVEL INDICATOR	PNL PT2	AB	18'-6"
MFW	LR-417-1	SG 31 LEVEL RECORDER	SUPERVISORY PANEL	CB	53'-0"
MFW	LR-417-2	SG 32 LEVEL RECORDER	SUPERVISORY PANEL	CB	53'-0"
MFW	LR-437-1	SG 33 LEVEL RECORDER	SUPERVISORY PANEL	CB	53'-0"
MFW	LR-437-2	SG 34 LEVEL RECORDER	SUPERVISORY PANEL	CB	53'-0"
MFW	LT-417A	SG 31 LEVEL TRANSMITTER	RACK 21	VC	68'-0"
MFW	LT-417D	SG 31 LEVEL TRANSMITTER	RACK 21	VC	68'-0"
MFW	LT-427A	SG 32 LEVEL TRANSMITTER	RACK 21	VC	68'-0"
MFW	LT-427D	SG 32 LEVEL TRANSMITTER	RACK 21	VC	68'-0"
MFW	LT-437A	SG 33 LEVEL TRANSMITTER	RACK 21	VC	68'-0"

Table 3A.2
Components Associated with the "Rule-of-the-Box"

SYSTEM	COMPONENT ID	COMPONENT DESCRIPTION	RULE-OF THE-BOX ID	BLDG	ELEV
MFW	LT-437D	SG 33 LEVEL TRANSMITTER	RACK 21	VC	68'-0"
MFW	LT-447A	SG 34 LEVEL TRANSMITTER	RACK 21	VC	68'-0"
MFW	LT-447D	SG 34 LEVEL TRANSMITTER	RACK 21	VC	68'-0"
MSS	FI-419A	SG 31 STEAM FLOW INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MSS	FI-419B	SG 31 STEAM FLOW INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MSS	FI-429A	SG 32 STEAM FLOW INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MSS	FI-429B	SG 32 STEAM FLOW INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MSS	FI-439A	SG 33 STEAM FLOW INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MSS	FI-439B	SG 33 STEAM FLOW INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MSS	FI-449A	SG 34 STEAM FLOW INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MSS	FI-449B	SG 34 STEAM FLOW INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MSS	FT-419A	SG 31 STEAM FLOW TRANSMITTER	RACK 4-A	VC	68'-0"
MSS	FT-419B	SG 31 STEAM FLOW TRANSMITTER	RACK 4-A	VC	68'-0"
MSS	FT-429A	SG 32 STEAM FLOW TRANSMITTER	RACK 4-A	VC	68'-0"
MSS	FT-429B	SG 32 STEAM FLOW TRANSMITTER	RACK 4-A	VC	68'-0"
MSS	FT-439A	SG 33 STEAM FLOW TRANSMITTER	RACK 4-B	VC	68'-0"
MSS	FT-439B	SG 33 STEAM FLOW TRANSMITTER	RACK 4-B	VC	68'-0"
MSS	FT-449A	SG 34 STEAM FLOW TRANSMITTER	RACK 4-B	VC	68'-0"
MSS	FT-449B	SG 34 STEAM FLOW TRANSMITTER	RACK 4-B	VC	68'-0"
MSS	PC-419	SG #31 STEAM PRESS CONTROLLER	FLIGHT PANEL FBF	CB	53'-0"
MSS	PC-429	SG #32 STEAM PRESS CONTROLLER	FLIGHT PANEL FCF	CB	53'-0"
MSS	PC-439	SG #33 STEAM PRESS CONTROLLER	FLIGHT PANEL FCF	CB	53'-0"
MSS	PC-449	SG #34 STEAM PRESS CONTROLLER	FLIGHT PANEL FBF	CB	53'-0"
MSS	PCV-1134	ATM STM RELIEF VALVE 31 SG	PNL #1	AB	74'-0"
MSS	PCV-1135	ATM STM RELIEF VALVE 32 SG	PNL #1	AB	61'-0"
MSS	PCV-1136	ATM STM RELIEF VALVE 33 SG	PNL #2	AB	74'-0"
MSS	PCV-1137	ATM STM RELIEF VALVE 34 SG	PNL #2	AB	61'-0"
MSS	PI-419A	SG 31 STEAM PRESS INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MSS	PI-419B	SG 31 STEAM PRESS INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MSS	PI-419C	SG 31 STEAM PRESS INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MSS	PI-429A	SG 32 STEAM PRESS INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MSS	PI-429B	SG 32 STEAM PRESS INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MSS	PI-429C	SG 32 STEAM PRESS INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MSS	PI-439A	SG 33 STEAM PRESS INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MSS	PI-439B	SG 33 STEAM PRESS INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MSS	PI-439C	SG 33 STEAM PRESS INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MSS	PI-449A	SG 34 STEAM PRESS INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MSS	PI-449B	SG 34 STEAM PRESS INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MSS	PI-449C	SG 34 STEAM PRESS INDICATOR	FLIGHT PANEL FBF	CB	53'-0"
MSS	PM-419I	PRESSURE SIGNAL CONVERTER CONDITIONER	PNL 1-31	AB	77'-4"

Table 3A.2
Components Associated with the "Rule-of-the-Box"

SYSTEM	COMPONENT ID	COMPONENT DESCRIPTION	RULE-OF THE-BOX ID	BLDG	ELEV
MSS	PM-429I	PRESSURE SIGNAL CONVERTER CONDITIONER	PNL 1-32	AB	64'-8"
MSS	PM-439I	PRESSURE SIGNAL CONVERTER CONDITIONER	PNL 1-33	AB	77'-7"
MSS	PM-449I	PRESSURE SIGNAL CONVERTER CONDITIONER	PNL 1-34	AB	64'-8"
MSS	PT-419A	SG 31 STEAM PRESS TRANSMITTER	RACK 9	AB	18'-6"
MSS	PT-419B	SG 31 STEAM PRESS TRANSMITTER	RACK 9	AB	18'-6"
MSS	PT-419C	SG 31 STEAM PRESS TRANSMITTER	RACK 9	AB	18'-6"
MSS	PT-429A	SG 32 STEAM PRESS TRANSMITTER	RACK 9	AB	18'-6"
MSS	PT-429B	SG 32 STEAM PRESS TRANSMITTER	RACK 9	AB	18'-6"
MSS	PT-429C	SG 32 STEAM PRESS TRANSMITTER	RACK 9	AB	18'-6"
MSS	PT-439A	SG 33 STEAM PRESS TRANSMITTER	RACK 9	AB	18'-6"
MSS	PT-439B	SG 33 STEAM PRESS TRANSMITTER	RACK 9	AB	18'-6"
MSS	PT-439C	SG 33 STEAM PRESS TRANSMITTER	RACK 9	AB	18'-6"
MSS	PT-449A	SG 34 STEAM PRESS TRANSMITTER	RACK 9	AB	18'-6"
MSS	PT-449B	SG 34 STEAM PRESS TRANSMITTER	RACK 9	AB	18'-6"
MSS	PT-449C	SG 34 STEAM PRESS TRANSMITTER	RACK 9	AB	18'-6"
MSS	SOV-1139-1	PCV-1139 SOLENOID VALVE	MS-PCV-1139	AB	15'-0"
MSS	SOV-1310	PCV-1310A SOLENOID VALVE	MS-PCV-1310A	AB	36'-0"
MSS	SOV-1311	PCV-1310B SOLENOID VALVE	MS-PCV-1310B	AB	36'-0"
N2	PCV-1043	N2 SUPPLY TO VCT PRESS CTRL VALVE	PNL N2	PAB	55'-0"
N2	PCV-1044	N2 SUPPLY TO VCT PRESS CTRL VALVE	PNL N2	PAB	55'-0"
NIS	LR-1253	VC PARAMETERS CONTAINMENT LEVEL RECORDER	32AIB-2	CB	53'-0"
NIS	LR-1254	VC PARAMETERS CONTAINMENT LEVEL RECORDER	32AIB-2	CB	53'-0"
NIS	NI 31B	SOURCE RANGE COUNT RATE METER	FLIGHT PANEL FCF	CB	53'-0"
NIS	NI 31D	SOURCE RANGE COUNT RATE METER	FLIGHT PANEL FCF	CB	53'-0"
NIS	NI 32B	SOURCE RANGE COUNT RATE METER	FLIGHT PANEL FCF	CB	53'-0"
NIS	NI 32D	SOURCE RANGE COUNT RATE METER	FLIGHT PANEL FCF	CB	53'-0"
NIS	NI 35B	INTERMEDIATE RANGE METER	FLIGHT PANEL FCF	CB	53'-0"
NIS	NI 35D	INTERMEDIATE RANGE METER	FLIGHT PANEL FCF	CB	53'-0"
NIS	NI 36B	INTERMEDIATE RANGE METER	FLIGHT PANEL FCF	CB	53'-0"
NIS	NI 36D	INTERMEDIATE RANGE METER	FLIGHT PANEL FCF	CB	53'-0"
NIS	NI 41B	POWER RANGE METER	FLIGHT PANEL FDF	CB	53'-0"
NIS	NI 41C	POWER RANGE METER	FLIGHT PANEL FDF	CB	53'-0"
NIS	NI 42B	POWER RANGE METER	FLIGHT PANEL FDF	CB	53'-0"
NIS	NI 42C	POWER RANGE METER	FLIGHT PANEL FDF	CB	53'-0"
NIS	NI 43B	POWER RANGE METER	FLIGHT PANEL FDF	CB	53'-0"
NIS	NI 43C	POWER RANGE METER	FLIGHT PANEL FDF	CB	53'-0"
NIS	NI 44B	POWER RANGE METER	FLIGHT PANEL FDF	CB	53'-0"
NIS	NI 44C	POWER RANGE METER	FLIGHT PANEL FDF	CB	53'-0"
NIS	PR-1421	CONTAINMENT PRESSUE RECORDER	31AIB-2	CB	53'-0"
NIS	PR-1422	CONTAINMENT PRESSUE RECORDER	31AIB-2	CB	53'-0"

Table 3A.2
Components Associated with the "Rule-of-the-Box"

SYSTEM	COMPONENT ID	COMPONENT DESCRIPTION	RULE-OF THE-BOX ID	BLDG	ELEV
NIS	PT-1421	CTMT PRESSURE TRANSMITTER	RACK 24A	PP	41'-0"
NIS	PT-1422	CTMT PRESSURE TRANSMITTER	RACK 24A	PP	41'-0"
PWS	YIC-111	DEMINERALIZED WATER FLOW TOTALIZER	FLIGHT PANEL FBF	CB	53'-0"
RHR	52/RHR1	RHR PUMP 31 BREAKER	BUS 3A	CB	15'-0"
RHR	52/RHR2	RHR PUMP 32 BREAKER	BUS 6A	CB	15'-0"
RHR	FI-638	RHR HEAT EXCHANGER 31 OUTLET FLOW INDICATOR	SUPERVISORY PANEL	CB	53'-0'
RHR	FI-640	RHR HEAT EXCHANGER 32 OUTLET FLOW INDICATOR	SUPERVISORY PANEL	CB	53'-0"
SIS	52/R1	RECIRCULATION PUMP 31 BREAKER	BUS 5A	CB	15'-0"
SIS	52/R2	RECIRCULATION PUMP 32 BREAKER	BUS 6A	CB	15'-0"
SIS	52/SI1	SAFETY INJECTION PUMP 31 BREAKER	BUS 5A	CB	15'-0"
SIS	52/SI2	SAFETY INJECTION PUMP 32 BREAKER	BUS 2A	CB	15'-0"
SIS	52/SI3	SAFETY INJECTION PUMP 33 BREAKER	BUS 6A	CB	15'-0"
SIS	LI-920	RWST LEVEL INDICATOR	SUPERVISORY PANEL	CB	53'-0"
SP	SOV-958-1	RHR SAMPLE LINE VALVE	SP-AOV-958	PP	41'-0"
SP	SOV-959-1	RHR SAMPLE LINE VALVE	SP-AOV-959	PP	41'-0"
SP	SP-SOV-953	PRESSURIZER LIQUID SPACE SAMPLE VALVE SOLENOID VAL	SP-AOV-953	VC	73'-0"
SP	SP-SOV-955A-1	HOT LEG LOOP 1 SAMPLE VALVE SOLENOID VALVE	SP-AOV-955A	VC	62'-0"
SP	SP-SOV-955B-1	HOT LEG LOOP 3 SAMPLE VALVE SOLENOID VALVE	SP-AOV-955B	VC	62'-0"
SWS	52/SW3	SERVICE WATER PUMP 33 BREAKER	BUS 6A	CB	15'-0"
SWS	52/SW6	SERVICE WATER PUMP 36 BREAKER	BUS 6A	CB	15'-0"
SWS	PI-1190	SVC WATER NUCL HDR PRESS INDICATOR	SUPERVISORY PANEL	CB	53'-0"
SWS	PI-1191	SVC WATER NUCL HDR PRESS INDICATOR	SUPERVISORY PANEL	CB	53'-0"
SWS	SOV-1170	SWN-TCV-1104 SOLENOID VALVE	SWN-TCV-1104	PP	35'-0"
SWS	SOV-1171	SWN-TCV-1105 SOLENOID VALVE	SWN-TCV-1105	PP	35'-0"

Table 3A.3
Seismic-Induced Basic Event List

COMPONENT ID	COMPONENT TYPE	SEISMIC BASIC EVENT	ANCHORAGE BASIC EVENT	BLOCK WALL BASIC EVENT	EQUIPMENT EPRI NP-6041 (Am) g	ANCH (Am) g	BW (Am) g	$HCLFP_{50}$
CSATBA1	TANK		ZCVC-BAST-AN-15G		NA	0.15	NA	0.05
CSATBA2	TANK		ZCVC-BAST-AN-15G		NA	0.15	NA	0.05
CSATVC1	TANK		ZVCT1-AN-27G		NA	0.27	NA	0.09
TSC UPS BUS	BUS			ZTSCUPS-BW-22G	NA		0.22	0.11
ACATCC1	TANK		ZCCW-TANKS-27G		NA	0.41	NA	0.14
ACATCC2	TANK		ZCCW-TANKS-27G		NA	0.41	NA	0.14
CSAPCH1	MOTOR OPERATED PUMP		ZCVC-CPUMPS-41G		NA	0.47	NA	0.16
CSAPCH2	MOTOR OPERATED PUMP		ZCVC-CPUMPS-41G		NA	0.47	NA	0.16
CSAPCH3	MOTOR OPERATED PUMP		ZCVC-CPUMPS-41G		NA	0.47	NA	0.16
CSAHNRT	HEAT EXCHANGER		ZCVCHNHT-AN-49G		NA	0.49	NA	0.17
ACAHRS1	HEAT EXCHANGER		ZRHR-HTXS-AN-49G		NA	0.49	NA	0.17
ACAHRS2	HEAT EXCHANGER		ZRHR-HTXS-AN-49G		NA	0.49	NA	0.17
BATT CHGR 31	BATTERY CHARGER		ZDC1-BATCHR-51G		NA	0.51	NA	0.18
BATT CHGR 32	BATTERY CHARGER		ZDC1-BATCHR-51G		NA	0.51	NA	0.18
FI-115A	FLOW INDICATOR		ZSUPPANEL-AN-52G		NA	0.51	NA	0.18
FI-116A	FLOW INDICATOR		ZSUPPANEL-AN-52G		NA	0.51	NA	0.18
FI-128B	FLOW INDICATOR		ZSUPPANEL-AN-52G		NA	0.51	NA	0.18
FI-134	FLOW INDICATOR		ZSUPPANEL-AN-52G		NA	0.51	NA	0.18
FI-143A	FLOW INDICATOR		ZSUPPANEL-AN-52G		NA	0.51	NA	0.18
LI-102	LEVEL INDICATOR		ZSUPPANEL-AN-52G		NA	0.51	NA	0.18
LI-106	LEVEL INDICATOR		ZSUPPANEL-AN-52G		NA	0.51	NA	0.18
LI-112	LEVEL INDICATOR		ZSUPPANEL-AN-52G		NA	0.51	NA	0.18
PI-139	PRESSURE INDICATOR		ZSUPPANEL-AN-52G		NA	0.51	NA	0.18
PI-142B	PRESSURE INDICATOR		ZSUPPANEL-AN-52G		NA	0.51	NA	0.18
ACV(GEN)-1	VOLTMETER		ZSUPPANEL-AN-52G		NA	0.51	NA	0.18
ACV(GEN)-2	VOLTMETER		ZSUPPANEL-AN-52G		NA	0.51	NA	0.18
ACV(GEN)-3	VOLTMETER		ZSUPPANEL-AN-52G		NA	0.51	NA	0.18
EDG-31 CCR WATT XDCR	TRANSDUCER		ZSUPPANEL-AN-52G		NA	0.51	NA	0.18
EDG-32 CCR WATT XDCR	TRANSDUCER		ZSUPPANEL-AN-52G		NA	0.51	NA	0.18
EDG-33 CCR WATT XDCR	TRANSDUCER		ZSUPPANEL-AN-52G		NA	0.51	NA	0.18
LR-417-1	LEVEL RECORDER		ZSUPPANEL-AN-52G		NA	0.51	NA	0.18
LR-417-2	LEVEL RECORDER		ZSUPPANEL-AN-52G		NA	0.51	NA	0.18
LR-437-1	LEVEL RECORDER		ZSUPPANEL-AN-52G		NA	0.51	NA	0.18
LR-437-2	LEVEL RECORDER		ZSUPPANEL-AN-52G		NA	0.51	NA	0.18
LT-417A	LEVEL TRANSMITTER		ZSUPPANEL-AN-52G		NA	0.51	NA	0.18
LI-920	LEVEL INDICATOR		ZSUPPANEL-AN-52G		NA	0.51	NA	0.18
SUPERVISORY PANEL	CONTROL PANEL		ZSUPPANEL-AN-52G		NA	0.52	NA	0.18
ACAHCC1	HEAT EXCHANGER		ZCCWHTX-52G		NA	0.52	NA	0.18
ACAHCC2	HEAT EXCHANGER		ZCCWHTX-52G		NA	0.52	NA	0.18
ACAPRH1	MOTOR DRIVEN PUMP		ZRHR-PUMPS-62G		NA	0.62	NA	0.21
ACAPRH2	MOTOR DRIVEN PUMP		ZRHR-PUMPS-62G		NA	0.62	NA	0.21
36AMCC	MOTOR CONTROL CENTER		ZMCC36AB-AN-62G		NA	0.62	NA	0.21
36BMCC	MOTOR CONTROL CENTER		ZMCC36AB-AN-62G		NA	0.62	NA	0.21
37MCC	MOTOR CONTROL CENTER		ZMCC36AB-AN-62G		NA	0.62	NA	0.21
52/MCC6A	CIRCUIT BREAKER		ZMCC36AB-AN-62G		NA	0.62	NA	0.21
52/MCC6B	CIRCUIT BREAKER		ZMCC36AB-AN-62G		NA	0.62	NA	0.21
52/MCC7	CIRCUIT BREAKER		ZMCC36AB-AN-62G		NA	0.62	NA	0.21
RHRP31-HTX	HEAT EXCHANGER		ZRHR-PUMPS-62G		NA	0.62	NA	0.21
RHRP32-HTX	HEAT EXCHANGER		ZRHR-PUMPS-62G		NA	0.62	NA	0.21
34 INVERTER	INVERTER		ZINV34-AN-65G		NA	0.65	NA	0.22
PW-S-TK	TANK		ZPWSTK31-AN-65G		NA	0.65	NA	0.22
FUSE-2A-PT	FUSE		ZSWGR3132-AN-67G		NA	0.67	NA	0.22
FUSE-3A-PT	FUSE		ZSWGR3132-AN-67G		NA	0.67	NA	0.22
FUSE-5A-PT	FUSE		ZSWGR3132-AN-67G		NA	0.67	NA	0.22
FUSE-6A-PT	FUSE		ZSWGR3132-AN-67G		NA	0.67	NA	0.22
OTS-2A	OVERCURRENT SWICTH		ZSWGR3132-AN-67G		NA	0.67	NA	0.22
OTS-3A	OVERCURRENT SWICTH		ZSWGR3132-AN-67G		NA	0.67	NA	0.22
OTS-5A	OVERCURRENT SWICTH		ZSWGR3132-AN-67G		NA	0.67	NA	0.22
OTS-6A	OVERCURRENT SWICTH		ZSWGR3132-AN-67G		NA	0.67	NA	0.22
SST-2	TRANSFORMER		ZSST2356-AN-67G		NA	0.67	NA	0.22
SST-3	TRANSFORMER		ZSST2356-AN-67G		NA	0.67	NA	0.22

Table 3A.3
Seismic-Induced Basic Event List

COMPONENT ID	COMPONENT TYPE	SEISMIC BASIC EVENT	ANCHORAGE BASIC EVENT	BLOCK WALL BASIC EVENT	EQUIPMENT EPRI NP-6041 (Am) g	ANCH (Am) g	BW (Am) g	$HCLFP_{50}$
SST-5	TRANSFORMER		ZSST2356-AN-67G		NA	0.67	NA	0.22
SST-6	TRANSFORMER		ZSST2356-AN-67G		NA	0.67	NA	0.22
480V BUS 2A PT	TRANSFORMER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
480V BUS 3A PT	TRANSFORMER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
480V BUS 5A PT	TRANSFORMER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
480V BUS 6A PT	TRANSFORMER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/2A	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/2AT3A	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/2AT5A	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/3A	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/3AT6A	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/5A	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/6A	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/6AT5A	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
BUS2A	480V AC BUS		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
BUS3A	480V AC BUS		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
BUS5A	480V AC BUS		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
BUS6A	480V AC BUS		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/AF1	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/AF3	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/CC1	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/CC2	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/CC3	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/CRF1	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/CRF2	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/CRF3	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/CRF4	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/CRF5	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/CS1	MDP 31 CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/CS2	MDP 32 CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/C1	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/C2	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/C3	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
FIC-110	CONTROLLER		ZFLGPANEL-AN-67G		NA	0.67	NA	0.23
52/EG1	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/EG2	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/EG3	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
FLIGHT PANEL	CONTROL PANEL		ZFLGPANEL-AN-67G		NA	0.67	NA	0.23
YIC-111	DEMINERALIZED TOTALIZER		ZFLGPANEL-AN-67G		NA	0.67	NA	0.23
52/RHR1	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/RHR2	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/R1	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/R2	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/SI1	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/SI2	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/SI3	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/SW3	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
52/SW6	CIRCUIT BREAKER		ZSWGR3132-AN-67G		NA	0.67	NA	0.23
SC-141A	CONTROLLER		ZFLGPANEL-AN-67G		NA	0.67	NA	0.23
SC-141B	CONTROLLER		ZFLGPANEL-AN-67G		NA	0.67	NA	0.23
SC-141C	CONTROLLER		ZFLGPANEL-AN-67G		NA	0.67	NA	0.23
PC-419	STEAM PRESSURE CONTROLLER		ZFLGPANEL-AN-67G		NA	0.67	NA	0.23
PC-429	STEAM PRESSURE CONTROLLER		ZFLGPANEL-AN-67G		NA	0.67	NA	0.23
PC-439	STEAM PRESSURE CONTROLLER		ZFLGPANEL-AN-67G		NA	0.67	NA	0.23
PC-449	STEAM PRESSURE CONTROLLER		ZFLGPANEL-AN-67G		NA	0.67	NA	0.23
RACK A-1	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK A-10	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK A-2	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK A-3	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK A-4	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK A-5	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23

Table 3A.3

Seismic-Induced Basic Event List

COMPONENT ID	COMPONENT TYPE	SEISMIC BASIC EVENT	ANCHORAGE BASIC EVENT	BLOCK WALL BASIC EVENT	EQUIPMENT EPRI NP-6041 (Am) g	ANCH (Am) g	BW (Am) g	$HCLFP_{50}$
RACK A-6	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK A-7	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK A-8	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK A-9	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK B-1	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK B-10	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK B-11	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK B-2	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK B-3	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK B-4	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK B-5	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK B-6	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK B-7	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK B-8	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK B-9	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK C-1	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK C-10	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK C-2	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK C-3	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK C-4	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK C-5	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK C-6	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK C-7	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK C-8	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK C-9	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK D-1	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK D-10	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK D-11	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK D-2	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK D-3	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK D-4	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK D-5	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK D-6	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK D-7	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK D-8	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK D-9	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK E-1	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK E-2	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK E-3	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK E-4	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK E-5	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK E-6	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK E-7	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK F-1	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK F-2	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK F-3	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK F-4	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK F-5	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK F-6	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK F-7	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK G-1	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK G-2	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK G-3	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK G-4	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK G-5	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK G-6	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK H-1	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK H-2	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK H-3	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK H-4	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23
RACK H-5	CCR RACK		ZCCR-RACKS-67G		NA	0.67	NA	0.23

Table 3A.3
Seismic-Induced Basic Event List

COMPONENT ID	COMPONENT TYPE	SEISMIC BASIC EVENT	ANCHORAGE BASIC EVENT	BLOCK WALL BASIC EVENT	EQUIPMENT EPRI NP-6041 (Am) g	ANCH (Am) g	BW (Am) g	$HCLFP_{50}$
31 SW PUMP	MOTOR DRIVEN PUMP		ZSWSPUMPS-69G		NA	0.69	NA	0.23
32 SW PUMP	MOTOR DRIVEN PUMP		ZSWSPUMPS-69G		NA	0.69	NA	0.23
33 SW PUMP	MOTOR DRIVEN PUMP		ZSWSPUMPS-69G		NA	0.69	NA	0.23
34 SW PUMP	MOTOR DRIVEN PUMP		ZSWSPUMPS-69G		NA	0.69	NA	0.23
35 SW PUMP	MOTOR DRIVEN PUMP		ZSWSPUMPS-69G		NA	0.69	NA	0.23
36 SW PUMP	MOTOR DRIVEN PUMP		ZSWSPUMPS-69G		NA	0.69	NA	0.23
31 PWST PUMP	MOTOR DRIVEN PUMP		ZPWSPUMPS-71G		NA	0.71	NA	0.24
32 PWST PUMP	MOTOR DRIVEN PUMP		ZPWSPUMPS-71G		NA	0.71	NA	0.24
BATT CHGR 35	BATTERY CHARGER		ZBCC35-AN-76G		NA	0.76	NA	0.26
SOV-1177	SOLENOID OPERATED VALVE		ZIAC-AN-82G		NA	0.82	NA	0.28
SOV-1178	SOLENOID OPERATED VALVE		ZIAC-AN-82G		NA	0.82	NA	0.28
0031CLWP	COOLING WATER PUMP		ZIAC-AN-82G		NA	0.82	NA	0.28
0031IACJC	HEAT EXCHANGER		ZIAC-AN-82G		NA	0.82	NA	0.28
0032CLWP	COOLING WATER PUMP		ZIAC-AN-82G		NA	0.82	NA	0.28
0032IACJC	HEAT EXCHANGER		ZIAC-AN-82G		NA	0.82	NA	0.28
31 IA COMPRESSOR	AIR COMPRESSOR		ZIAC-AN-82G		NA	0.82	NA	0.28
32 IA COMPRESSOR	AIR COMPRESSOR		ZIAC-AN-82G		NA	0.82	NA	0.28
IA-SOV-1198	SOLENOID OPERATED VALVE		ZIAC-AN-82G		NA	0.82	NA	0.28
IA-SOV-1199	SOLENOID OPERATED VALVE		ZIAC-AN-82G		NA	0.82	NA	0.28
PNL HA7	CONTROL PANEL		ZIAC-AN-82G		NA	0.82	NA	0.28
PNL HF1	CONTROL PANEL		ZIAC-AN-82G		NA	0.82	NA	0.28
HC-1118A	CONVERTER		ZHC-1118C-AN-84G		NA	0.84	NA	0.29
36CMCC	MOTOR CONTROL CENTER		ZMCC36C-AN-86G		NA	0.86	NA	0.29
52/MCC6C	CIRCUIT BREAKER		ZMCC36C-AN-86G		NA	0.86	NA	0.29
CRF1	FAN		ZCRF12345-AN-86G		NA	0.86	NA	0.29
CRF1 (BLOW-IN DOOR)	BLOW-IN-DOOR		ZCRF12345-AN-86G		NA	0.86	NA	0.29
CRF2	FAN		ZCRF12345-AN-86G		NA	0.86	NA	0.29
CRF2 (BLOW-IN DOOR)	BLOW-IN-DOOR		ZCRF12345-AN-86G		NA	0.86	NA	0.29
CRF3	FAN		ZCRF12345-AN-86G		NA	0.86	NA	0.29
CRF3 (BLOW-IN DOOR)	BLOW-IN-DOOR		ZCRF12345-AN-86G		NA	0.86	NA	0.29
CRF4	FAN		ZCRF12345-AN-86G		NA	0.86	NA	0.29
CRF4 (BLOW-IN DOOR)	BLOW-IN-DOOR		ZCRF12345-AN-86G		NA	0.86	NA	0.29
CRF5	FAN		ZCRF12345-AN-86G		NA	0.86	NA	0.29
CRF5 (BLOW-IN DOOR)	BLOW-IN-DOOR		ZCRF12345-AN-86G		NA	0.86	NA	0.29
D-CRF1	FAN COOLER UNIT 31 DAMPER D		ZCRF12345-AN-86G		NA	0.86	NA	0.29
D-CRF2	FAN COOLER UNIT 32 DAMPER D		ZCRF12345-AN-86G		NA	0.86	NA	0.29
D-CRF3	FAN COOLER UNIT 33 DAMPER D		ZCRF12345-AN-86G		NA	0.86	NA	0.29
D-CRF4	FAN COOLER UNIT 34 DAMPER D		ZCRF12345-AN-86G		NA	0.86	NA	0.29
D-CRF5	FAN COOLER UNIT 35 DAMPER D		ZCRF12345-AN-86G		NA	0.86	NA	0.29
31-BATT-FUSE	FUSE		ZBATT-313234-88G		NA	0.88	NA	0.30
32-BATT-FUSE	FUSE		ZBATT-313234-88G		NA	0.88	NA	0.30
32PP-15	CIRCUIT BREAKER		ZBATT-313234-88G		NA	0.88	NA	0.30
34PP-MAIN	CIRCUIT BREAKER		ZBATT-313234-88G		NA	0.88	NA	0.30
BATT 31	STATION BATTERY		ZBATT-313234-88G		NA	0.88	NA	0.30
BATT 32	STATION BATTERY		ZBATT-313234-88G		NA	0.88	NA	0.30
BATT 34	STATION BATTERY		ZBATT-313234-88G		NA	0.88	NA	0.30
CST	TANK		ZCST31-88G		NA	0.88	NA	0.30
31 PABEF	EXHAUST FAN		ZPABEF-AN-88G		NA	0.88	NA	0.30
32 PABEF	EXHAUST FAN		ZPABEF-AN-88G		NA	0.88	NA	0.30
PNL PP9	CONTROL PANEL		ZEDGS-PNL-AN-88G		NA	0.88	NA	0.30
PNL PQ1	CONTROL PANEL		ZEDGS-PNL-AN-88G		NA	0.88	NA	0.30
PNL PQ2	CONTROL PANEL		ZEDGS-PNL-AN-88G		NA	0.88	NA	0.30
PNL VRP 31	CONTROL PANEL		ZEDGS-PNL-AN-88G		NA	0.88	NA	0.30
PNL VRP 32	CONTROL PANEL		ZEDGS-PNL-AN-88G		NA	0.88	NA	0.30
PNL VRP 33	CONTROL PANEL		ZEDGS-PNL-AN-88G		NA	0.88	NA	0.30
39MCC	MOTOR CONTROL CENTER		ZMCC39-AN-90G		NA	0.90	NA	0.31
52/MCC9	CIRCUIT BREAKER		ZMCC39-AN-90G		NA	0.90	NA	0.31
LT-417D	LEVEL TRANSMITTER		ZVC-RACKS-90G		NA	0.90	NA	0.31
LT-427A	LEVEL TRANSMITTER		ZVC-RACKS-90G		NA	0.90	NA	0.31
LT-427D	LEVEL TRANSMITTER		ZVC-RACKS-90G		NA	0.90	NA	0.31
LT-437A	LEVEL TRANSMITTER		ZVC-RACKS-90G		NA	0.90	NA	0.31

Table 3A.3
Seismic-Induced Basic Event List

COMPONENT ID	COMPONENT TYPE	SEISMIC BASIC EVENT	ANCHORAGE BASIC EVENT	BLOCK WALL BASIC EVENT	EQUIPMENT EPRI NP-6041 (Am) g	ANCH (Am) g	BW (Am) g	$HCLFP_{50}$
LT-437D	LEVEL TRANSMITTER		ZVC-RACKS-90G		NA	0.90	NA	0.31
LT-447A	LEVEL TRANSMITTER		ZVC-RACKS-90G		NA	0.90	NA	0.31
LT-447D	LEVEL TRANSMITTER		ZVC-RACKS-90G		NA	0.90	NA	0.31
RACK 21	INSTRUMENT RACK		ZVC-RACKS-90G		NA	0.90	NA	0.31
32MCC	MOTOR CONTROL CENTER		ZMCCTB-AN-92G		NA	0.92	NA	0.32
33MCC	MOTOR CONTROL CENTER		ZMCCTB-AN-92G		NA	0.92	NA	0.32
34MCC	MOTOR CONTROL CENTER		ZMCCTB-AN-92G		NA	0.92	NA	0.32
52/MCC3	CIRCUIT BREAKER		ZBATT-313234-88G		NA	0.92	NA	0.32
52/MCC4	CIRCUIT BREAKER		ZBATT-313234-88G		NA	0.92	NA	0.32
BF4	TRANSFORMER		ZEDGXTR-99G		NA	0.99	NA	0.34
BF5	TRANSFORMER		ZEDGXTR-99G		NA	0.99	NA	0.34
BF6	TRANSFORMER		ZEDGXTR-99G		NA	0.99	NA	0.34
RWST-31	TANK		ZRWST-AN-103G		NA	1.03	NA	0.35
33 INVERTER	INVERTER		ZINV33-AN-108G		NA	1.08	NA	0.37
33IB-31	TRANSFORMER		Z33IB-31-EQ-108G		NA	1.08	NA	0.37
32IB-31	TRANSFORMER	ZIB3133-EQ-75G			0.75	NA	NA	0.37
34IB-32	TRANSFORMER	ZIB3133-EQ-75G			0.75	NA	NA	0.37
FAN-311-AB	EXHAUST FAN	ZABFP-FAN-EQ-75G			0.75	NA	NA	0.37
FAN-312-AB	EXHAUST FAN	ZABFP-FAN-EQ-75G			0.75	NA	NA	0.37
FT-418L	FLOW TRANSMITTER	ZABFP-ASF-EQ-75G			0.75	NA	NA	0.37
FT-428L	FLOW TRANSMITTER	ZABFP-ASF-EQ-75G			0.75	NA	NA	0.37
FT-438L	FLOW TRANSMITTER	ZABFP-ASF-EQ-75G			0.75	NA	NA	0.37
FT-448L	FLOW TRANSMITTER	ZABFP-ASF-EQ-75G			0.75	NA	NA	0.37
L-314	MOTOR OPERATED LOUVER	ZL-314-EQ-75G			0.75	NA	NA	0.37
PM-405A	TRANSDUCER	ZAFW-TRANS-75G			0.75	NA	NA	0.37
PM-405B	TRANSDUCER	ZAFW-TRANS-75G			0.75	NA	NA	0.37
PM-405C	TRANSDUCER	ZAFW-TRANS-75G			0.75	NA	NA	0.37
PM-405D	TRANSDUCER	ZAFW-TRANS-75G			0.75	NA	NA	0.37
PM-406E	TRANSDUCER	ZAFW-TRANS-75G			0.75	NA	NA	0.37
PM-406F	TRANSDUCER	ZAFW-TRANS-75G			0.75	NA	NA	0.37
PM-406G	TRANSDUCER	ZAFW-TRANS-75G			0.75	NA	NA	0.37
PM-406H	TRANSDUCER	ZAFW-TRANS-75G			0.75	NA	NA	0.37
PT-406A	PRESSURE TRANSMITTER	ZAFW-DISPT-75G			0.75	NA	NA	0.37
PT-406B	PRESSURE TRANSMITTER	ZAFW-DISPT-75G			0.75	NA	NA	0.37
PT-412A	PRESSURE TRANSMITTER	ZAFW-ASP-75G			0.75	NA	NA	0.37
PT-412B	PRESSURE TRANSMITTER	ZAFW-ASP-75G			0.75	NA	NA	0.37
ED314	AIR OPERATED DAMPER	ZDGBAOD-75G			0.75	NA	NA	0.37
ED315	AIR OPERATED DAMPER	ZDGBAOD-75G			0.75	NA	NA	0.37
ED316	AIR OPERATED DAMPER	ZDGBAOD-75G			0.75	NA	NA	0.37
ED317	AIR OPERATED DAMPER	ZDGBAOD-75G			0.75	NA	NA	0.37
ED318	AIR OPERATED DAMPER	ZDGBAOD-75G			0.75	NA	NA	0.37
ED319	AIR OPERATED DAMPER	ZDGBAOD-75G			0.75	NA	NA	0.37
0031ART	TANK	ZEDGART-75G			0.75	NA	NA	0.37
0032ART	TANK	ZEDGART-75G			0.75	NA	NA	0.37
0033ART	TANK	ZEDGART-75G			0.75	NA	NA	0.37
EDG-31-FO-DTNK	TANK	ZEDG-DAYTNK-75G			0.75	NA	NA	0.37
EDG-31-FO-STNK	TANK	ZEDG-STOTNK-75G			0.75	NA	NA	0.37
EDG-31-JW-XTNK	TANK	ZEDG-JACTNK-75G			0.75	NA	NA	0.37
EDG-32-FO-DTNK	TANK	ZEDG-DAYTNK-75G			0.75	NA	NA	0.37
EDG-32-FO-STNK	TANK	ZEDG-STOTNK-75G			0.75	NA	NA	0.37
EDG-32-JW-XTNK	TANK	ZEDG-JACTNK-75G			0.75	NA	NA	0.37
EDG-33-FO-DTNK	TANK	ZEDG-DAYTNK-75G			0.75	NA	NA	0.37
EDG-33-FO-STNK	TANK	ZEDG-STOTNK-75G			0.75	NA	NA	0.37
EDG-33-JW-XTNK	TANK	ZEDG-JACTNK-75G			0.75	NA	NA	0.37
31A HDDA	FILTER	ZIASFLT-75G			0.75	NA	NA	0.37
31A HDDP	FILTER	ZIASFLT-75G			0.75	NA	NA	0.37
32A HDDA	FILTER	ZIASFLT-75G			0.75	NA	NA	0.37
32A HDDP	FILTER	ZIASFLT-75G			0.75	NA	NA	0.37
IA-31-FLT	FILTER	ZIASFLT-75G			0.75	NA	NA	0.37
IA-32-FLT	FILTER	ZIASFLT-75G			0.75	NA	NA	0.37
PT-402	PRESSURE TRANSMITTER	ZVC46PT-75G			0.75	NA	NA	0.37

Table 3A.3
Seismic-Induced Basic Event List

COMPONENT ID	COMPONENT TYPE	SEISMIC BASIC EVENT	ANCHORAGE BASIC EVENT	BLOCK WALL BASIC EVENT	EQUIPMENT EPRI NP-6041 (Am) g	ANCH (Am) g	BW (Am) g	$HCLFP_{50}$
PT-403	PRESSURE TRANSMITTER	ZVC46PT-75G			0.75	NA	NA	0.37
LT-920	LEVEL TRANSMITTER	ZLT-920-EQ-75G			0.75	NA	NA	0.37
SWN CLC 31 HTX	HEAT EXCHANGER	ZIACCWHTX-75G			0.75	NA	NA	0.37
SWN CLC 32 HTX	HEAT EXCHANGER	ZIACCWHTX-75G			0.75	NA	NA	0.37
CB EXHFAN 33	EXHAUST FAN		ZCB-EXFAN-116G		NA	1.16	NA	0.40
CB EXHFAN 34	EXHAUST FAN		ZCB-EXFAN-116G		NA	1.16	NA	0.40
DE-31	DIESEL ENGINE		ZEDGS-116G		NA	1.16	NA	0.40
DE-32	DIESEL ENGINE		ZEDGS-116G		NA	1.16	NA	0.40
DE-33	DIESEL ENGINE		ZEDGS-116G		NA	1.16	NA	0.40
DG-31	DIESEL GENERATOR		ZEDGS-116G		NA	1.16	NA	0.40
DG-32	DIESEL GENERATOR		ZEDGS-116G		NA	1.16	NA	0.40
DG-33	DIESEL GENERATOR		ZEDGS-116G		NA	1.16	NA	0.40
EDG-32-JW HTX	HEAT EXCHANGER		ZEDGS-116G		NA	1.16	NA	0.40
EDG-32-LO HTX	HEAT EXCHANGER		ZEDGS-116G		NA	1.16	NA	0.40
EDG-32-LO-P	MOTOR DRIVEN PUMP		ZEDGS-116G		NA	1.16	NA	0.40
EDG-33-JW HTX	HEAT EXCHANGER		ZEDGS-116G		NA	1.16	NA	0.40
EDG-33-LO HTX	HEAT EXCHANGER		ZEDGS-116G		NA	1.16	NA	0.40
EDG-33-LO-P	MOTOR DRIVEN PUMP		ZEDGS-116G		NA	1.16	NA	0.40
0031ETEF	MOTOR OPERATED LOUVER		ZHVA-ETEF-116G		NA	1.16	NA	0.40
0032ETEF	MOTOR OPERATED LOUVER		ZHVA-ETEF-116G		NA	1.16	NA	0.40
0033ETEF	EXHAUST FAN		ZHVAC-ETEF-116G		NA	1.16	NA	0.40
0034ETEF	EXHAUST FAN		ZHVAC-ETEF-116G		NA	1.16	NA	0.40
EDG-31-JW HTX	HEAT EXCHANGER		ZEDGS-116G		NA	1.16	NA	0.40
EDG-31-LO HTX	HEAT EXCHANGER		ZEDGS-116G		NA	1.16	NA	0.40
EDG-31-LO-P	MOTOR DRIVEN PUMP		ZEDGS-116G		NA	1.16	NA	0.40
BATT 33	STATION BATTERY		ZBATT33-AN-121G		NA	1.21	NA	0.41
CSAHSW1	HEAT EXCHANGER		ZCVC-HTX-AN-123G		NA	1.23	NA	0.42
PABSF	SUPPLY FAN		ZPABSF-AN-126G		NA	1.25	NA	0.43
BATT CHGR 33	BATTERY CHARGER		ZCHRG33-AN-129G		NA	1.29	NA	0.44
BATT CHGR 34	BATTERY CHARGER		ZCHRG34-AN-129G		NA	1.29	NA	0.44
31 RECIRC PUMP	MOTOR DRIVEN PUMP		ZRCIRC-PUMP-142G		NA	1.42	NA	0.49
32 RECIRC PUMP	MOTOR DRIVEN PUMP		ZRCIRC-PUMP-142G		NA	1.42	NA	0.49
BORON INJECTION TANK	TANK		ZBIT-AN-153G		NA	1.53	NA	0.52
RACK 26	INSTRUMENT RACK	SURROGATE			NA	1.63	NA	0.56
VS-SOV-1294	SOLENOID VALVE OPERATOR	SURROGATE			1.13	NA	NA	0.56
VS-SOV-1297	SOLENOID VALVE OPERATOR	SURROGATE			1.13	NA	NA	0.56
VS-SOV-1298	SOLENOID VALVE OPERATOR	SURROGATE			1.13	NA	NA	0.56
VS-SOV-1300	SOLENOID VALVE OPERATOR	SURROGATE			1.13	NA	NA	0.56
VS-SOV-1301	SOLENOID VALVE OPERATOR	SURROGATE			1.13	NA	NA	0.56
VS-SOV-1303	SOLENOID VALVE OPERATOR	SURROGATE			1.13	NA	NA	0.56
VS-SOV-1304	SOLENOID VALVE OPERATOR	SURROGATE			1.13	NA	NA	0.56
VS-SOV-1306	SOLENOID VALVE OPERATOR	SURROGATE			1.13	NA	NA	0.56
VS-SOV-1307	SOLENOID VALVE OPERATOR	SURROGATE			1.13	NA	NA	0.56
RC-PCV-464	SAFETY RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
RC-PCV-466	SAFETY RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
RC-PCV-468	SAFETY RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
SI-856A	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-856B	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-856C	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-856D	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-856E	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-856F	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-856G	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-856H	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-856J	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-856K	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
31IB	118 V AC BUS	SURROGATE			1.13	NA	NA	0.56
31IB-31	TRANSFORMER	SURROGATE			1.13	NA	NA	0.56
32IB	118 V AC BUS	SURROGATE			1.13	NA	NA	0.56
33IB	118 V AC BUS	SURROGATE			1.13	NA	NA	0.56
34IB	118 V AC BUS	SURROGATE			1.13	NA	NA	0.56

Table 3A.3
Seismic-Induced Basic Event List

COMPONENT ID	COMPONENT TYPE	SEISMIC BASIC EVENT	ANCHORAGE BASIC EVENT	BLOCK WALL BASIC EVENT	EQUIPMENT EPRI NP-6041 (Am) g	ANCH (Am) g	BW (Am) g	HCLFP$_{50}$
IB31 BYPASS SW	BYPASS SWITCH	SURROGATE			1.13	NA	NA	0.56
IB32 BYPASS SW	BYPASS SWITCH	SURROGATE			1.13	NA	NA	0.56
IB33 BYPASS SW	BYPASS SWITCH	SURROGATE			1.13	NA	NA	0.56
IB34 BYPASS SW	BYPASS SWITCH	SURROGATE			1.13	NA	NA	0.56
K51	UNKNOWN	SURROGATE			1.13	NA	NA	0.56
31DP	DC DISTRIBUTION PANEL	SURROGATE			1.13	NA	NA	0.56
31PP	DC POWER PANEL	SURROGATE			1.13	NA	NA	0.56
31PP-17	CIRCUIT BREAKER	SURROGATE			1.13	NA	NA	0.56
32DP	DC DISTRIBUTION PANEL	SURROGATE			1.13	NA	NA	0.56
32PP	DC POWER PANEL	SURROGATE			1.13	NA	NA	0.56
33-BATT-FUSE	FUSE	SURROGATE			1.13	NA	NA	0.56
33DP	DC DISTRIBUTION PANEL	SURROGATE			1.13	NA	NA	0.56
33PP	DC POWER PANEL	SURROGATE			1.13	NA	NA	0.56
33PP-MAIN	CIRCUIT BREAKER	SURROGATE			1.13	NA	NA	0.56
34DP	DC DISTRIBUTION PANEL	SURROGATE			1.13	NA	NA	0.56
34PP	DC POWER PANEL	SURROGATE			1.13	NA	NA	0.56
BFD-FCV-1121	FLOW CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-FCV-1123	FLOW CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-FCV-405A	FLOW CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-FCV-405B	FLOW CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-FCV-405C	FLOW CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-FCV-405D	FLOW CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-FCV-406A	FLOW CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-FCV-406B	FLOW CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-FCV-406C	FLOW CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-FCV-406D	FLOW CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-PCV-1187	PRESSURE CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-PCV-1188	PRESSURE CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-PCV-1189	PRESSURE CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-PCV-1213	PRESSURE CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
HC-405A	CONTROLLER	SURROGATE			1.13	NA	NA	0.56
HC-405B	CONTROLLER	SURROGATE			1.13	NA	NA	0.56
HC-405C	CONTROLLER	SURROGATE			1.13	NA	NA	0.56
HC-405D	CONTROLLER	SURROGATE			1.13	NA	NA	0.56
HC-406A	CONTROLLER	SURROGATE			1.13	NA	NA	0.56
HC-406B	CONTROLLER	SURROGATE			1.13	NA	NA	0.56
HC-406C	CONTROLLER	SURROGATE			1.13	NA	NA	0.56
HC-406D	CONTROLLER	SURROGATE			1.13	NA	NA	0.56
HCV-1118	GOVERNOR VALVE	SURROGATE			1.13	NA	NA	0.56
MS-PCV-1139	PRESSURE CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
MS-PCV-1310A	PRESSURE CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
MS-PCV-1310B	PRESSURE CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
PNL PT2	CONTROL PANEL	SURROGATE			1.13	NA	NA	0.56
SWP36-STRNR-AUTO	ZURN STRAINER FOR SWP 36	SURROGATE			1.13	NA	NA	0.56
23-319	THERMOSTAT	SURROGATE			1.13	NA	NA	0.56
319	MOTOR OPERATED LOUVER	SURROGATE			1.13	NA	NA	0.56
LP-319	LIGHTING PANEL	SURROGATE			1.13	NA	NA	0.56
AC-769	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
AC-784	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
AC-786	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
AC-787	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-789	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
AC-797	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
AC-822A	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
AC-822B	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
AC-FCV-625	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
AUXCCP-31	MOTOR DRIVEN PUMP	SURROGATE			1.13	NA	NA	0.56
AUXCCP-32	MOTOR DRIVEN PUMP	SURROGATE			1.13	NA	NA	0.56
AUXCCP-33	MOTOR DRIVEN PUMP	SURROGATE			1.13	NA	NA	0.56
AUXCCP-34	MOTOR DRIVEN PUMP	SURROGATE			1.13	NA	NA	0.56
SI-MOV-899A	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56

Table 3A.3
Seismic-Induced Basic Event List

COMPONENT ID	COMPONENT TYPE	SEISMIC BASIC EVENT	ANCHORAGE BASIC EVENT	BLOCK WALL BASIC EVENT	EQUIPMENT EPRI NP-6041 (Am) g	ANCH (Am) g	BW (Am) g	$HCLFP_{50}$
SI-MOV-899B	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
CT-SOV-1258-1	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
CT-SOV-1258-2	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
CT-SOV-1287	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
CT-SOV-1288	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
CT-SOV-1289	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
LCV-1158-1	LEVEL CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
LCV-1158-2	LEVEL CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
PCV-1187	AIR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
PCV-1188	AIR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
PCV-1189	AIR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-866A	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-866B	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
CH-AOV-204A	AIR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
CH-AOV-204B	AIR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
CH-AOV-261A	AIR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
CH-AOV-261B	AIR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
CH-AOV-261C	AIR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
CH-AOV-261D	AIR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
CH-FCV-110A	FLOW CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-FCV-110B	FLOW CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-FCV-111A	FLOW CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-FCV-111B	FLOW CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-HCV-123	HYDRAULIC CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-HCV-142	HYDRAULIC CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-LCV-112B	LEVEL CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-LCV-459	LEVEL CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-LCV-460	LEVEL CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-MOV-205	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
CH-MOV-222	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
CH-MOV-226	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
CH-MOV-250A	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
CH-MOV-250B	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
CH-MOV-250C	MOTOR ORERATED VALVE	SURROGATE			1.13	NA	NA	0.56
CH-MOV-250D	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
CH-MOV-333	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
CH-MOV-441	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
CH-MOV-442	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
CH-MOV-443	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
CH-MOV-444	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
FIT-156A	FLOW TRANSMITTER	SURROGATE			1.13	NA	NA	0.56
FIT-156B	FLOW TRANSMITTER	SURROGATE			1.13	NA	NA	0.56
FIT-157A	FLOW TRANSMITTER	SURROGATE			1.13	NA	NA	0.56
FIT-157B	FLOW TRANSMITTER	SURROGATE			1.13	NA	NA	0.56
FIT-158A	FLOW TRANSMITTER	SURROGATE			1.13	NA	NA	0.56
FIT-158B	FLOW TRANSMITTER	SURROGATE			1.13	NA	NA	0.56
FIT-159A	FLOW TRANSMITTER	SURROGATE			1.13	NA	NA	0.56
FIT-159B	FLOW TRANSMITTER	SURROGATE			1.13	NA	NA	0.56
SOV-110A-1	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-110B-1	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-1310	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-1311	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-18-6	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-200A-1	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-200B-1	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-200C-1	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-201-1	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-204A-1	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-204B-1	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-261A-1	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-261B-1	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56

Table 3A.3
Seismic-Induced Basic Event List

COMPONENT ID	COMPONENT TYPE	SEISMIC BASIC EVENT	ANCHORAGE BASIC EVENT	BLOCK WALL BASIC EVENT	EQUIPMENT EPRI NP-6041 (Am) g	ANCH (Am) g	BW (Am) g	$HCLFP_{50}$
SOV-261C-1	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-261D-1	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-310-1	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-459-1	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-460-1	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
0031OAL A	AIR OPERATED LOUVER	SURROGATE			1.13	NA	NA	0.56
0031OAL B	AIR OPERATED LOUVER	SURROGATE			[illegible]	NA	NA	0.56
0031OAL C	AIR OPERATED LOUVER	SURROGATE			[illegible]	NA	NA	0.56
0032OAL A	AIR OPERATED LOUVER	SURROGATE			[illegible]	NA	NA	0.56
0032OAL B	AIR OPERATED LOUVER	SURROGATE			[illegible]	NA	NA	0.56
0032OAL C	AIR OPERATED LOUVER	SURROGATE			1.13	NA	NA	0.56
0033OAL A	AIR OPERATED LOUVER	SURROGATE			1.13	NA	NA	0.56
0033OAL B	AIR OPERATED LOUVER	SURROGATE			1.13	NA	NA	0.56
0033OAL C	AIR OPERATED LOUVER	SURROGATE			1.13	NA	NA	0.56
31 DG FUEL XFER PUMP	MOTOR DRIVEN PUMP	SURROGATE			1.13	NA	NA	0.56
32 DG FUEL XFER PUMP	MOTOR DRIVEN PUMP	SURROGATE			1.13	NA	NA	0.56
33 DG [illegible]EL XFER PUMP	MOTOR DRIVEN PUMP	SURROGATE			1.13	NA	NA	0.56
33PP-1	CIRCUIT BREAKER	SURROGATE			1.13	NA	NA	0.56
CPT-[illegible])	FUSE	SURROGATE			1.13	NA	NA	0.56
CPT-29-(P)	FUSE	SURROGATE			1.13	NA	NA	0.56
D31-F10	FUSE	SURROGATE			1.13	NA	NA	0.56
D31-F11	FUSE	SURROGATE			1.13	NA	NA	0.56
D32-F10	FUSE	SURROGATE			1.13	NA	NA	0.56
D32-F11	FUSE	SURROGATE			1.13	NA	NA	0.56
D33-F10	FUSE	SURROGATE			1.13	NA	NA	0.56
D33-F11	FUSE	SURROGATE			1.13	NA	NA	0.56
DF-LCV-1207A	LEVEL CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
DF-LCV-1208A	LEVEL CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
DF-LCV-1209A	LEVEL CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
DP31-14	CIRCUIT BREAKER	SURROGATE			1.13	NA	NA	0.56
FCV-1176	FLOW CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
F[illegible]V-1[illegible]76[illegible]	FLOW CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
PNL 31EDGA	CONTROL PANEL	SURROGATE			1.13	NA	NA	0.56
PNL 32EDGA	CONTROL PANEL	SURROGATE			1.13	NA	NA	0.56
PNL 33EDGA	CONTROL PANEL	SURROGATE			1.13	NA	NA	0.56
PNL PI1	CONTROL PANEL	SURROGATE			1.13	NA	NA	0.56
PNL PI2	CONTROL PANEL	SURROGATE			1.13	NA	NA	0.56
PNL PI3	CONTROL PANEL	SURROGATE			1.13	NA	NA	0.56
PP31-4(N)	FUSE	SURROGATE			1.13	NA	NA	0.56
PP31-4(P)	FUSE	SURROGATE			1.13	NA	NA	0.56
PP32-8(+)	FUSE	SURROGATE			1.13	NA	NA	0.56
PP32-8(-)	FUSE	SURROGATE			1.13	NA	NA	0.56
PP33-4	CIRCUIT BREAKER	SURROGATE			1.13	NA	NA	0.56
SOV-133-1	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-18-1	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-18-2	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-18-3	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-18-4	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-18-5	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
[illegible]VN-SOV-1276	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
PNL 324	LIGHTING PANEL	SURROGATE			1.13	NA	NA	0.56
IA-1-1	RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
IA-1-2	RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
[illegible]A-49	RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
IA-F[illegible]CV-1[illegible]8	PRESSURE CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
MS-SOV-1230	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
MS-SOV-1231	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
MS-SOV-1232	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
MS-SOV-1233	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
MS-SOV-1234	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
MS-SOV-1235	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56

Table 3A.3
Seismic-Induced Basic Event List

COMPONENT ID	COMPONENT TYPE	SEISMIC BASIC EVENT	ANCHORAGE BASIC EVENT	BLOCK WALL BASIC EVENT	EQUIPMENT EPRI NP-6041 (Am) g	ANCH (Am) g	BW (Am) g	$HCLFP_{50}$
MS-SOV-1236	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
MS-SOV-1237	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
MS-SOV-1238	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
MS-SOV-1239	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
MS-SOV-1240	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
MS-SOV-1241	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
MS-SOV-1242	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
MS-SOV-1243	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
MS-SOV-1244	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
MS-SOV-1245	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
31 IACC PUMP	MOTOR DRIVEN PUMP	SURROGATE			1.13	NA	NA	0.56
32 IACC PUMP	MOTOR DRIVEN PUMP	SURROGATE			1.13	NA	NA	0.56
CC-56-1	RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
CC-56-2	RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-111B-1	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-1139-1	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
LI-417D	LEVEL INDICATOR	SURROGATE			1.13	NA	NA	0.56
LI-427D	LEVEL INDICATOR	SURROGATE			1.13	NA	NA	0.56
LI-437D	LEVEL INDICATOR	SURROGATE			1.13	NA	NA	0.56
LI-447D	LEVEL INDICATOR	SURROGATE			1.13	NA	NA	0.56
MS-1-31	MAIN STEAM ISOLATION VALVE	SURROGATE			1.13	NA	NA	0.56
MS-1-32	MAIN STEAM ISOLATION VALVE	SURROGATE			1.13	NA	NA	0.56
MS-1-33	MAIN STEAM ISOLATION VALVE	SURROGATE			1.13	NA	NA	0.56
MS-1-34	MAIN STEAM ISOLATION VALVE	SURROGATE			1.13	NA	NA	0.56
MS-45-1	SAFETY RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
MS-45-2	SAFETY RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
MS-45-3	SAFETY RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
MS-45-4	SAFETY RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
MS-46-1	SAFETY RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
MS-46-2	SAFETY RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
MS-46-3	SAFETY RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
MS-46-4	SAFETY RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
MS-47-1	SAFETY RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
MS-47-2	SAFETY RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
MS-47-3	SAFETY RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
MS-47-4	SAFETY RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
MS-48-1	SAFETY RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
MS-48-2	SAFETY RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
MS-48-3	SAFETY RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
MS-48-4	SAFETY RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
MS-49-1	SAFETY RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
MS-49-2	SAFETY RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
MS-49-3	SAFETY RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
MS-49-4	SAFETY RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
PCV-1134	ATMOSPHERIC RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
PCV-1135	ATMOSPHERIC RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
PCV-1136	ATMOSPHERIC RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
PCV-1137	ATMOSPHERIC RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
PNL #1	CONTROL PANEL	SURROGATE			1.13	NA	NA	0.56
PNL #2	CONTROL PANEL	SURROGATE			1.13	NA	NA	0.56
PNL 1-31	CONTROL PANEL	SURROGATE			1.13	NA	NA	0.56
PNL 1-32	CONTROL PANEL	SURROGATE			1.13	NA	NA	0.56
PNL 1-33	CONTROL PANEL	SURROGATE			1.13	NA	NA	0.56
PNL 1-34	CONTROL PANEL	SURROGATE			1.13	NA	NA	0.56
SOV-111A-1	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-1274	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SOV-1275	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
PCV-1273	PRESSURE CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
PCV-1274	PRESSURE CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
PCV-1275	PRESSURE CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
PCV-1276	PRESSURE CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56

Table 3A.3
Seismic-Induced Basic Event List

COMPONENT ID	COMPONENT TYPE	SEISMIC BASIC EVENT	ANCHORAGE BASIC EVENT	BLOCK WALL BASIC EVENT	EQUIPMENT EPRI NP-6041 (Am) g	ANCH (Am) g	BW (Am) g	$HCLFP_{50}$
PNL N2	CONTROL PANEL	SURROGATE			1.13	NA	NA	0.56
PRV-6300	PRESSURE CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
PRV-6301	PRESSURE CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
PNL PI7	CONTROL PANEL	SURROGATE			1.13	NA	NA	0.56
PCV-455A	PRESSURE CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
PCV-455B	PRESSURE CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
PCV-455C	PRESSURE CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
PCV-456	PRESSURE CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
RC-MOV-535	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
RC-MOV-536	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
AC-MOV-1870	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
AC-MOV-730	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
AC-MOV-731	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
AC-MOV-743	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
AC-MOV-744	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
AC-MOV-745A	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
AC-MOV-745B	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-1852B	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-888A	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-888B	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-MOV-1869A	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-MOV-1869B	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-1835A	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-1835B	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-1852A	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-842	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-843	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-851A	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-851B	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-883	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-887A	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-887B	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-AOV-1851A	AIR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-AOV-1851B	AIR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-HCV-638	HYDRAULIC CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
SI-HCV-640	HYDRAULIC CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
SI-MOV-1802A	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-MOV-1802B	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-MOV-1810	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-MOV-746	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-MOV-747	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-MOV-850A	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-MOV-850C	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-MOV-882	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-MOV-885A	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-MOV-885B	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-MOV-889A	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-MOV-889B	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-MOV-894A	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-MOV-894B	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-MOV-894C	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SI-MOV-894D	MOTOR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-2-1	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-2-2	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-2-3	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-2-4	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-2-5	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-2-6	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-28-1	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-28-2	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-29	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56

Table 3A.3
Seismic-Induced Basic Event List

COMPONENT ID	COMPONENT TYPE	SEISMIC BASIC EVENT	ANCHORAGE BASIC EVENT	BLOCK WALL BASIC EVENT	EQUIPMENT EPRI NP-6041 (Am) g	ANCH (Am) g	BW (Am) g	$HCLFP_{50}$
SWN-31	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-33-1	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-33-2	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-34-1	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-34-2	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-35-1	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-35-2	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-38	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-40-1	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-40-2	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-41-1	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-41-2	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-41-3	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-41-4	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-41-5	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-44-1	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-44-2	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-44-3	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-44-4	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-44-5	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-55	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-62-2	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-62-4	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-62-6	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-66-1	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-66-3	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-66-5	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-70-1	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-70-2	BUTTERFLY VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-SOV-1276A	SOLENOID OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-TC-1113	TEMPERATURE CONTROLLER	SURROGATE			1.13	NA	NA	0.56
SWN-TCV-1104	AIR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-TCV-1105	AIR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-TCV-1113	TEMPERATURE CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
SWP31-STRNR-AUTO	ZURN STRAINER FOR SWP 31	SURROGATE			1.13	NA	NA	0.56
SWP32-STRNR-AUTO	ZURN STRAINER FOR SWP 32	SURROGATE			1.13	NA	NA	0.56
SWP33-STRNR-AUTO	ZURN STRAINER FOR SWP 33	SURROGATE			1.13	NA	NA	0.56
SWP34-STRNR-AUTO	ZURN STRAINER FOR SWP 34	SURROGATE			1.13	NA	NA	0.56
SWP35-STRNR-AUTO	ZURN STRAINER FOR SWP 35	SURROGATE			1.13	NA	NA	0.56
34IB-31	TRANSFORMER	SURROGATE			1.13	NA	NA	0.56
BFD-31	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-34	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-35	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-36	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-37	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-38	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-39	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-40	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-41	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-42	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-43	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-47-1	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-47-2	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-47-3	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-47-4	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-48-1	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-48-2	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-48-3	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-48-4	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-48-5	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-48-6	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56

Table 3A.3
Seismic-Induced Basic Event List

COMPONENT ID	COMPONENT TYPE	SEISMIC BASIC EVENT	ANCHORAGE BASIC EVENT	BLOCK WALL BASIC EVENT	EQUIPMENT EPRI NP-6041 (Am) g	ANCH (Am) g	BW (Am) g	$HCLFP_{50}$
BFD-48-7	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-48-8	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-50	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-51	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-52	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-53	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-54	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-55	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-62-1	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-62-2	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-62-3	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-62-4	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-67	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-68	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-69	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
BFD-70	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CT-26	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CT-27	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CT-28	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CT-29-1	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CT-29-2	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CT-30	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CT-31	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CT-32	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CT-33	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CT-49	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CT-6	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CT-64	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
FAN-311-AB (L)	MOTOR OPERATED LOUVER	SURROGATE			1.13	NA	NA	0.56
FAN-312-AB (L)	MOTOR OPERATED LOUVER	SURROGATE			1.13	NA	NA	0.56
AC-1871A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-1871B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-1871C	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-1871D	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-701A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-701B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-736A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-736B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-737A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-737B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-749A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-749B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-749C	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-749D	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-749E	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-749F	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-750A	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-750B	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-750C	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-750D	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-750E	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-751A	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-751B	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-752A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-752B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-752C	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-752D	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-752E	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-752F	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-752G	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-752H	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56

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Seismic-Induced Basic Event List

COMPONENT ID	COMPONENT TYPE	SEISMIC BASIC EVENT	ANCHORAGE BASIC EVENT	BLOCK WALL BASIC EVENT	EQUIPMENT EPRI NP-6041 (Am) g	ANCH (Am) g	BW (Am) g	$HCLFP_{50}$
AC-752J	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-752K	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-753A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-753B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-753C	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-753D	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-753E	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-753F	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-753G	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-753H	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-753J	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-753K	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-755A	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-755B	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-755C	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-755D	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-755E	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-755F	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-756A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-756B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-757A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-757B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-757C	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-757D	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-757E	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-757F	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-759A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-759B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-759C	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-759D	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-760A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-760B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-760C	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-761A	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-761B	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-761C	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-762A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-762B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-762C	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-765A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-765B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-766A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-766B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-766C	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-766D	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-770	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-771A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-771B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-771C	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-771D	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-772A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-772B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-772C	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-772D	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-773A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-773B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-773C	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-773D	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-774A	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-774B	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-774C	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56

Table 3A.3
Seismic-Induced Basic Event List

COMPONENT ID	COMPONENT TYPE	SEISMIC BASIC EVENT	ANCHORAGE BASIC EVENT	BLOCK WALL BASIC EVENT	EQUIPMENT EPRI NP-6041 (Am) g	ANCH (Am) g	BW (Am) g	$HCLFP_{50}$
AC-774D	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-775A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-775B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-775C	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-775D	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-776A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-776B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-776C	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-776D	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-780A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-780B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-780C	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-780D	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-781A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-781B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-781C	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-781D	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-810	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-818A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-818B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-818C	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-818D	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-820A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-820B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-832A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-832B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-833A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-833B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-833C	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SI-857U	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-857W	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-865A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SI-865B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SI-867A	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-867B	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-210B	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-210D	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-218	RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
CH-223	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-225	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-228	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-230	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-232	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-233	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-235	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-236	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-238	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-241A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-241B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-241C	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-241D	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-244A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-244B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-244C	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-244D	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-249A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-249B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-249C	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-249D	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-251A	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-251B	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56

Table 3A.3
Seismic-Induced Basic Event List

COMPONENT ID	COMPONENT TYPE	SEISMIC BASIC EVENT	ANCHORAGE BASIC EVENT	BLOCK WALL BASIC EVENT	EQUIPMENT EPRI NP-6041 (Am) g	ANCH (Am) g	BW (Am) g	$HCLFP_{50}$
CH-251C	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-251D	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-251E	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-251F	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-251G	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-251H	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-251J	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-251K	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-251L	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-251M	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-262A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-262B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-262C	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-262D	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-272A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-272B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-278	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-283	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-284	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-289	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-290	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-293	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-294	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-295	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-297	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-326	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-327	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-328	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-329	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-332	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-334	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-336	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-337	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-339	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-350	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-360	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-362A	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-362B	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-364	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-366	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-370	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-373	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CH-374	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-401	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-402	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-403	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-404	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-405	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CH-406	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CSFLBA1	FILTER	SURROGATE			1.13	NA	NA	0.56
FT-115A	FLOW TRANSMITTER	SURROGATE			1.13	NA	NA	0.56
FT-116A	FLOW TRANSMITTER	SURROGATE			1.13	NA	NA	0.56
FT-143A	FLOW TRANSMITTER	SURROGATE			1.13	NA	NA	0.56
FT-144A	FLOW TRANSMITTER	SURROGATE			1.13	NA	NA	0.56
LT-102	LEVEL TRANSMITTER	SURROGATE			1.13	NA	NA	0.56
LT-106	LEVEL TRANSMITTER	SURROGATE			1.13	NA	NA	0.56
DG EXHAUST FAN 314	EXHAUST FAN	SURROGATE			1.13	NA	NA	0.56
DG EXHAUST FAN 315	EXHAUST FAN	SURROGATE			1.13	NA	NA	0.56
DG EXHAUST FAN 316	EXHAUST FAN	SURROGATE			1.13	NA	NA	0.56
DG EXHAUST FAN 317	EXHAUST FAN	SURROGATE			1.13	NA	NA	0.56
DG EXHAUST FAN 318	EXHAUST FAN	SURROGATE			1.13	NA	NA	0.56

Table 3A.3
Seismic-Induced Basic Event List

COMPONENT ID	COMPONENT TYPE	SEISMIC BASIC EVENT	ANCHORAGE BASIC EVENT	BLOCK WALL BASIC EVENT	EQUIPMENT EPRI NP-6041 (Am) g	ANCH (Am) g	BW (Am) g	$HCLFP_{50}$
DG EXHAUST FAN 319	EXHAUST FAN	SURROGATE			1.13	NA	NA	0.56
SWN-FCV-1112	FLOW CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
31A HDDT	TANK	SURROGATE			1.13	NA	NA	0.56
31B HDDT	TANK	SURROGATE			1.13	NA	NA	0.56
IA-10	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-11-1	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-11-2	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-12-1	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-12-2	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-174	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-175	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-2-1	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
IA-2-1	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
IA-2-2	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
IA-2-2	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
IA-3-1	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-3-2	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-39	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
IA-434	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
IA-436	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-5	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-52	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-53	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-54-1	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-54-2	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-59	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-6	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-618	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-619	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-622	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-624	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-625	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-626	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-632	AIR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
IA-633	AIR OPERATED VALVE	SURROGATE			1.13	NA	NA	0.56
IA-7	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-70	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-71	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-76	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-77	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
IA-78	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-79	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
IA-8	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-83	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
IA-84	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
IA-9	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
PCV-1143	PRESSURE CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
PCV-1542	PRESSURE CONTROL VALVE	SURROGATE			1.13	NA	NA	0.56
CC-39A	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CC-39B	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
CC-40A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CC-40B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CC-41A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CC-41B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CC-42-1	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CC-42-2	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CC-43-1	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CC-43-2	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CC-45	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CC-46	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
CC-47-1	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56

Table 3A.3
Seismic-Induced Basic Event List

COMPONENT ID	COMPONENT TYPE	SEISMIC BASIC EVENT	ANCHORAGE BASIC EVENT	BLOCK WALL BASIC EVENT	EQUIPMENT EPRI NP-6041 (Am) g	ANCH (Am) g	BW (Am) g	$HCLFP_{50}$
CC-47-2	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
MS-2-31	NON-RETURN CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
MS-2-32	NON-RETURN CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
MS-2-33	NON-RETURN CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
MS-2-34	NON-RETURN CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
MS-41	STOP CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
MS-42	STOP CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
MW-26	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
MW-681	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
MW-684	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
MW-18-16	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-409	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-410	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
IA-411	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
N2-1-1134	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
N2-1-1135	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
N2-1-1136	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
N2-1-1137	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
N2-2-1134	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
N2-2-1135	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
N2-2-1136	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
N2-2-1137	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
N2-3-1134	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
N2-3-1135	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
N2-3-1136	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
N2-3-1137	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
N2-4-1134	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
N2-4-1135	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
N2-4-1136	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
N2-4-1137	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
N2-PRV-1134	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
N2-PRV-1135	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
N2-PRV-1136	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
N2-PRV-1137	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
8304(NNE-18)	RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
8305(NNE-15)	RELIEF VALVE	SURROGATE			1.13	NA	NA	0.56
8313(NNE-23)	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
8321(NNE-31)	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
RC-591	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
RC-592	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
RC-594	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
RC-595	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
PW-11	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
PW-12	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
PW-13	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
PW-14	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
PW-15	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
PW-16	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
PW-2	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
PW-98	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
RACK 6A	INSTRUMENT RACK	SURROGATE			1.13	NA	NA	0.56
RACK C-11	CCR RACK	SURROGATE			1.13	NA	NA	0.56
AC-732	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-735A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-735B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-738A	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-738B	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-739A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-739B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-741	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-742	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56

Table 3A.3
Seismic-Induced Basic Event List

COMPONENT ID	COMPONENT TYPE	SEISMIC BASIC EVENT	ANCHORAGE BASIC EVENT	BLOCK WALL BASIC EVENT	EQUIPMENT EPRI NP-6041 (Am) g	ANCH (Am) g	BW (Am) g	$HCLFP_{50}$
AC-837	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-838	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
AC-839	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-840	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-841	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
AC-842	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SI-1862	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SI-838A	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-838B	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-869B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SI-897A	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-897B	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
RVLIS RACK TRAIN A	INSTRUMENT RACK	SURROGATE			1.13	NA	NA	0.56
RVLIS RACK TRAIN B	INSTRUMENT RACK	SURROGATE			1.13	NA	NA	0.56
SI-1807A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SI-1807B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SI-1807C	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SI-838C	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-838D	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-846	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SI-847	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-848A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SI-848B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SI-849A	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-849B	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-850B	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SI-852A	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-852B	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-857A	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-857B	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-857C	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-857D	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-857E	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-857F	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-857G	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-857H	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-857J	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-857K	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-857L	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-857M	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-857N	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-857P	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-857Q	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-857R	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-857S	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-857T	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-869A	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SI-881	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-884A	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-884B	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-884C	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-886A	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-886B	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-897C	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-897D	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SI-898	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
PNL PS6	CONTROL PANEL	SURROGATE			1.13	NA	NA	0.56
SWN-1-1	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-1-2	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-1-3	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-1-4	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56

Table 3A.3
Seismic-Induced Basic Event List

COMPONENT ID	COMPONENT TYPE	SEISMIC BASIC EVENT	ANCHORAGE BASIC EVENT	BLOCK WALL BASIC EVENT	EQUIPMENT EPRI NP-6041 (Am) g	ANCH (Am) g	BW (Am) g	$HCLFP_{50}$
SWN-1-5	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-1-6	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-100-1	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-100-2	CHECK VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-520	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-521	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-522	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-523	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-524	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-525	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-526	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-527	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-528	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-529	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-67-1	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-67-2	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-67-3	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-71-1	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-71-2	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-71-3	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-71-4	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-71-5	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-87-1	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-87-2	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-98	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
SWN-99	MANUAL VALVE	SURROGATE			1.13	NA	NA	0.56
31 ABFP	MOTOR DRIVEN PUMP	SURROGATE			NA	1.72	NA	0.59
32 ABFP	TURBINE DRIVEN PUMP	SURROGATE			NA	1.72	NA	0.59
33 ABFP	MOTOR DRIVEN PUMP	SURROGATE			NA	1.72	NA	0.59
EDG-31-AR-TNK	TANK	SURROGATE			NA	1.72	NA	0.59
EDG-32-AR-TNK	TANK	SURROGATE			NA	1.72	NA	0.59
EDG-33-AR-TNK	TANK	SURROGATE			NA	1.72	NA	0.59
ACAPCC1	MOTOR DRIVEN PUMP	SURROGATE			NA	1.78	NA	0.61
ACAPCC2	MOTOR DRIVEN PUMP	SURROGATE			NA	1.78	NA	0.61
ACAPCC3	MOTOR DRIVEN PUMP	SURROGATE			NA	1.78	NA	0.61
RACK 8	INSTRUMENT RACK	SURROGATE			NA	1.94	NA	0.66
ACU31	AIR CONDITIONAL UNIT	SURROGATE			NA	2.05	NA	0.70
ACU32	AIR CONDITIONAL UNIT	SURROGATE			NA	2.05	NA	0.70
31 CS PUMP	CONTAINMENT SPRAY PUMP 31	SURROGATE			NA	2.15	NA	0.74
32 CS PUMP	CONTAINMENT SPRAY PUMP 32	SURROGATE			NA	2.15	NA	0.74
CSAHRG1	HEAT EXCHANGER	SURROGATE			NA	2.15	NA	0.74
CSAPBA1	MOTOR OPERATED PUMP	SURROGATE			NA	2.15	NA	0.74
CSAPBA2	MOTOR OPERATED PUMP	SURROGATE			NA	2.15	NA	0.74
IA AFTERCOOL 31 HTX	HEAT EXCHANGER	SURROGATE			NA	2.80	NA	0.96
IA AFTERCOOL 32 HTX	HEAT EXCHANGER	SURROGATE			NA	2.80	NA	0.96
SISP31-CWP1	SHAFT DRIVEN PUMP	SURROGATE			NA	3.66	NA	1.25
SISP32-CWP2	SHAFT DRIVEN PUMP	SURROGATE			NA	3.66	NA	1.25
SISP33-CWP3	SHAFT DRIVEN PUMP	SURROGATE			NA	3.66	NA	1.25
31 SI PUMP	MOTOR DRIVEN PUMP	SURROGATE			NA	3.66	NA	1.25
32 SI PUMP	MOTOR DRIVEN PUMP	SURROGATE			NA	3.66	NA	1.25
33 SI PUMP	MOTOR DRIVEN PUMP	SURROGATE			NA	3.66	NA	1.25
CSFLSI1	FILTER	SURROGATE			NA	4.26	NA	1.46
CSFLSI2	FILTER	SURROGATE			NA	4.26	NA	1.46
CSFLSW1	FILTER	SURROGATE			NA	4.26	NA	1.46
3KAT15	TANK	SURROGATE			NA	4.73	NA	1.62
IACCHT	TANK	SURROGATE			NA	5.16	NA	1.77
31 INVERTER	INVERTER	SURROGATE			NA	6.24	NA	2.13
32 INVERTER	INVERTER	SURROGATE			NA	6.24	NA	2.13
PCV-1284	PRESSURE CONTROL VALVE	SURROGATE			NA	NA	NA	NA

Table 3A.4

Non-Seismic Basic Event List

SYSTEM	COMPONENT ID	COMPONENT DESCRIPTION	BASIC EVENT NAME	BASIC EVENT DESCRIPTION	PROBABILIT
118 VAC	31 INVERTER	INVERTER	AC1-INV-HW-INV31	FAILURE OF STATIC INVERTER 31	6.67E-04
118 VAC	31IB	118 V AC BUS	AC1-BAC-ST-BUS31	FAULT AT 118VAC BUS 31	3.43E-05
118 VAC	31IB	118 V AC BUS	AC1-SBR-CO-BUS31	118VAC FDR CKT BRKR FLS TO RMN CLS	1.93E-05
118 VAC	31IB-31	TRANSFORMER	AC1-XFR-HW-MCC34	FAIL OF REGUL/SD XFMR FR MCC 34 TO BS 31	2.78E-05
118 VAC	32 INVERTER	INVERTER	AC1-INV-HW-INV32	FAILURE OF STATIC INVERTER 32	6.67E-04
118 VAC	32IB	118 V AC BUS	AC1-BAC-ST-BUS32	FAULT AT 118VAC BUS 32	3.43E-05
118 VAC	32IB	118 V AC BUS	AC1-SBR-CO-BUS32	118VAC FDR CKT BRKR FLS TO RMN CLS	1.93E-05
118 VAC	32IB-31	MAIN FEED FROM 32 INVERTER OR MCC-33	AC1-XFR-HW-MC33Z	FAIL OF REGUL/SD XFMR FR MCC 33 TO BS 32	2.78E-05
118 VAC	33 INVERTER	STATIC INVERTER 33	AC1-INV-HW-IN33Z	FAILURE OF STATIC INVERTER 33	6.67E-04
118 VAC	33IB	118 V AC BUS	AC1-BAC-ST-BUS33	FAULT AT 118VAC BUS 33	3.43E-05
118 VAC	33IB	118 V AC BUS	AC1-SBR-CO-BUS33	118VAC FDR CKT BRKR FLS TO RMN CLS	1.93E-05
118 VAC	33IB-31	MAIN FEED FROM 33 INVERTER OR MCC-39	AC1-XFR-HW-MC39Z	FAIL OF REGUL/SD XFMR FR MCC 39 TO BS 33	2.78E-05
118 VAC	34 INVERTER	STATIC INVERTER 34	AC1-INV-HW-IN34Z	FAILURE OF STATIC INVERTER 34	6.67E-04
118 VAC	34 INVERTER	STATIC INVERTER 34	AC1-SBR-DN-BIB34	118VAC BU FDR BRKR DOES NOT OPER PROPLY	2.27E-04
118 VAC	34 INVERTER	STATIC INVERTER 34	AC1-SBR-DN-NIB34	118VAC NORM FDR BRKR DOES NOT OPER PROP	2.27E-04
118 VAC	34IB	118 V AC BUS	AC1-BAC-ST-BUS34	FAULT AT 118VAC BUS 34	3.43E-05
118 VAC	34IB-31	TRANSFORMER	AC1-XFR-HW-MC36B	FAIL OF TRANSFORMER FR MCC 36B TO BS 34	2.78E-05
118 VAC	34IB-32	ALTERNATE FEED FROM MCC-36C	AC1-XFR-HW-C36CZ	FAIL OF TRANSFORMER FR MCC 36C TO BS 34	2.78E-05
118 VAC	COMMON CAUSE	CCF DC POWER PANELS 31 AND 32	AC1-CCF-HW-3132I	CCF OF DC PP 31 AND 32	3.11E-06
118 VAC	COMMON CAUSE	CCF DC POWER PANELS 31 AND 33	AC1-CCF-HW-3133I	CCF OF DC PP 31 AND 33	3.11E-06
118 VAC	COMMON CAUSE	CCF DC POWER PANELS 31 AND 34	AC1-CCF-HW-3134I	CCF OF DC PP 31 AND 34	3.11E-06
118 VAC	COMMON CAUSE	CCF DC POWER PANELS 32 AND 33	AC1-CCF-HW-3233I	CCF OF DC PP 32 AND 33	3.11E-06
118 VAC	COMMON CAUSE	CCF DC POWER PANELS 32 AND 34	AC1-CCF-HW-3234I	CCF OF DC PP 32 AND 34	3.11E-06
118 VAC	COMMON CAUSE	CCF DC POWER PANELS 32 AND 35	AC1-CCF-HW-3334I	CCF OF DC PP 33 AND 34	3.11E-06
118 VAC	IB33 BYPASS SW	BYPASS SWITCH	AC1-XHE-RE-MBS33	OPERATOR FAILS TO SELECT MBS 33 FOR MCC	1.00E-04
125VDC	31DP	125VDC DISTRIBUTION PANEL 31	DC1-BDC-ST-DP-31	PANEL FAULTS AT DC DIST PNL 31	1.32E-05
125VDC	31PP	125VDC POWER PANEL 31	DC1-BDC-ST-PP-31	PANEL FAULTS AT DC PWR PNL 31	1.32E-05
125VDC	31PP-17	CIRCUIT BREAKER	DC1-SBR-CO-BAT31	CKT BRKR FROM BATT 31 FLS TO RMN CLOSED	1.50E-05
125VDC	32DP	125VDC DISTRIBUTION PANEL 32	DC1-BDC-ST-DP-32	PANEL FAULTS AT DC DIST PNL 32	1.32E-05
125VDC	32DP	125VDC DISTRIBUTION PANEL 32	DC1-SBR-CO-D3210	DC DIST PNL 32 CKT BRKR 10 FLS TO RMN CL	1.50E-05
125VDC	32PP	125VDC POWER PANEL 32	DC1-BDC-ST-PP-32	PANEL FAULTS AT DC PWR PNL 32	1.32E-05
125VDC	32PP-15	125VDC POWER PANEL 32 BATTERY CIRCUIT BREAKER	DC1-SBR-CO-BT32Z	CKT BRKR FROM BATT 32 FLS TO RMN CLOSED	1.50E-05
125VDC	33PP	125VDC POWER PANEL 33	DC1-BDC-ST-PP-33	PANEL FAULTS AT DC PWR PNL 33	1.32E-05
125VDC	33PP-1	480V SWGR 31 BUS 2A BKR CONTROL AND BUS 2A A	DC1-SBR-CO-D3131	DC PWR PNL 31 SWITCH 1 FLS TO RMN CL	1.50E-05
125VDC	33PP-MAIN	CIRCUIT BREAKER	DC1-SBR-CO-BAT33	CKT BRKR FROM BATT 33 FLS TO RMN CLOSED	1.50E-05
125VDC	34DP	125VDC DISTRIBUTION PANEL 34	DC1-BDC-ST-DP-34	PANEL FAULTS AT DC DIST PNL 34	1.32E-05
125VDC	34PP	125VDC POWER PANEL 34	DC1-BDC-ST-PP-34	PANEL FAULTS AT DC PWR PNL 34	1.32E-05
125VDC	34PP-MAIN	POWER PANEL 34 BATT CKT BRKR	DC1-SBR-CO-BT34Z	CKT BRKR FROM BATT 34 FLS TO RMN CLOSED	1.50E-05
125VDC	BATT 31	BATTERY BANK 31	DC1-BAT-HW-BT31Z	FAILURE OF BATTERY 31	6.56E-05
125VDC	BATT 32	BATTERY BANK 32	DC1-BAT-HW-BT32Z	FAILURE OF BATTERY 32	6.56E-05
125VDC	BATT 33	BATTERY BANK 33	DC1-BAT-HW-BT33Z	FAILURE OF BATTERY 33	6.56E-05
125VDC	BATT 34	BATTERY BANK 34	DC1-BAT-HW-BT34Z	FAILURE OF BATTERY 34	6.56E-05
125VDC	BATT CHGR 31	BATTERY CHARGER 31	DC1-BCC-HW-BC31Z	FAILURE OF BATT CHGR 31	6.56E-05

Table 3A.4
Non-Seismic Basic Event List

SYSTEM	COMPONENT ID	COMPONENT DESCRIPTION	BASIC EVENT NAME	BASIC EVENT DESCRIPTION	PROBABILITY
125VDC	BATT CHGR 31	BATTERY CHARGER 31	DC1-MAI-MA-BCC31	BATT CHGR 31 IN MAINTENANCE	9.64E-03
125VDC	BATT CHGR 32	BATTERY CHARGER 32	DC1-BCC-HW-BC32Z	FAILURE OF BATT CHGR 32	6.56E-05
125VDC	BATT CHGR 32	BATTERY CHARGER 32	DC1-MAI-MA-BCC32	BATT CHGR 32 IN MAINTENANCE	3.00E-03
125VDC	BATT CHGR 33	BATTERY CHARGER 33	DC1-BCC-HW-BC33Z	FAILURE OF BATT CHGR 33	6.56E-05
125VDC	BATT CHGR 33	BATTERY CHARGER 33	DC1-MAI-MA-BCC33	BATT CHGR 33 IN MAINTENANCE	1.74E-03
125VDC	BATT CHGR 34	BATTERY CHARGER 34	DC1-BCC-HW-BC34Z	FAILURE OF BATT CHGR 34	6.56E-05
125VDC	COMMON CAUSE	COMMON CAUSE FAILURE OF DC PANELS	DC1-CCF-HW-3123P	CCF OF DC PANELS	2.19E-07
125VDC	COMMON CAUSE	COMMON CAUSE FAILURE BATTERIES 31 & 32	DC1-CCF-HW-3132B	CCF OF BATTERIES 31 AND 32	4.38E-07
125VDC	COMMON CAUSE	COMMON CAUSE FAILURE OF DC PNLS 31 & 32	DC1-CCF-HW-3132P	COMMON CAUSE FAILURE OF DC POWER PNLS 31 AND 32	6.00E-06
125VDC	COMMON CAUSE	COMMON CAUSE FAILURE BATTERIES 31 & 33	DC1-CCF-HW-3133B	CCF OF BATTERIES 31 AND 33	4.38E-07
125VDC	COMMON CAUSE	COMMON CAUSE FAILURE OF DC PNLS 31 & 33	DC1-CCF-HW-3133P	COMMON CAUSE FAILURE OF DC POWER PNLS 31 AND 33	6.00E-06
125VDC	COMMON CAUSE	COMMON CAUSE FAILURE BATTERIES 32 & 33	DC1-CCF-HW-3233B	CCF OF BATTERIES 32 AND 33	4.38E-07
125VDC	DP31-14	DG33 CONTROL PANEL "PQ2" (CH II) CIRCUIT BREAKER	DC1-SBR-CO-D3114	DC DIST PNL 31 CKT BRKR 14 FLS TO RMN CL	1.50E-05
125VDC	PP33-4	DIESEL GENERATOR 31 CONTROL CIRCUIT BREAKE	DC1-SBR-CO-PP334	DC PWR PNL 33 CKT BRKR 4 FLS TO RMN CLSD	1.50E-05
480 VAC	32MCC	TURBINE-GENERATOR BUILDING MOTOR CONTROL CENTER 32	AC4-BAC-ST-MC32Z	FAULT AT 480V MCC 32	3.18E-05
480 VAC	33MCC	TURBINE GENERATOR BUILDING MOTOR CONTROL CENTER 33	AC4-BAC-ST-MC33Z	POWER AT 480V MCC 33 UNAVAILABLE	3.18E-05
480 VAC	34MCC	TURBINE GENERATOR BUILDING MOTOR CONTROL CENTER 34	AC4-BAC-ST-MC34Z	FAULT AT 480V MCC 34	3.18E-05
480 VAC	36AMCC	PAB MOTOR CONTROL CENTER 36A	AC4-BAC-ST-C36AZ	FAULT AT 480V MCC 36A	3.18E-05
480 VAC	36BMCC	PAB MOTOR CONTROL CENTER 36B	AC4-BAC-ST-C36BZ	FAULT AT 480V MCC 36B	3.18E-05
480 VAC	36CMCC	PAB MOTOR CONTROL CENTER 36C	AC4-BAC-ST-C36CZ	FAULT AT 480V MCC 36C	3.18E-05
480 VAC	37MCC	PRIMARY AUX BUILDING MOTOR CONTROL CENTER 37	AC4-BAC-ST-CC37Z	FAULT AT 480V MCC 37	3.18E-05
480 VAC	39MCC	CONTROL BUILDING MOTOR CONTROL CENTER 39	AC4-BAC-ST-CC39Z	FAULT AT 480V MCC 39	3.18E-05
480 VAC	480V BUS 2A PT	480V BUS 2A POTENTIAL TRANSFORMER	AC4-PTR-HW-BS2AZ	FAILURE OF POT XFMR ON BUS 2A	5.03E-05
480 VAC	480V BUS 3A PT	480V BUS 3A POTENTIAL TRANSFORMER	AC4-PTR-HW-BS3AZ	FAILURE OF POT XFMR ON BUS 3A	5.03E-05
480 VAC	480V BUS 5A PT	480V BUS 5A POTENTIAL TRANSFORMER	AC4-PTR-HW-BS5AZ	FAILURE OF POT XFMR ON BUS 5A	5.03E-05
480 VAC	480V BUS 6A PT	480V BUS 6A POTENTIAL TRANSFORMER	AC4-PTR-HW-BS6AZ	FAILURE OF POT XFMR ON BUS 6A	5.03E-05
480 VAC	52/2A	480V STATION SERVICE TRANSFORMER NO. 2 BREAKER	AC4-CRB-CC-522AZ	480V BRKR 52/2A FAILS TO TRIP	4.27E-04
480 VAC	52/2AT3A	480V BUS TIE BREAKER - BUS 2A - 3A	AC4-CRB-OO-AT3AZ	480V CKT BRKR 2AT3A FAILS TO CLOSE	4.27E-04
480 VAC	52/2AT5A	480V BUS TIE BREAKER - BUS 2A - 5A	AC4-CRB-CC-AT5AZ	480V BRKR 52/2AT5A FAILS TO TRIP	4.27E-04
480 VAC	52/5A	480V STATION SERVICE TRANSFORMER NO. 5 BREAKER	AC4-CRB-CC-52-5A	480V BRKR 52/5A FAILS TO TRIP	4.27E-04
480 VAC	52/6A	480V STATION SERVICE TRANSFROMER NO. 6 BREAKER	AC4-CRB-CC-52-6A	480V BRKR 52/6A FAILS TO TRIP	4.27E-04
480 VAC	52/6AT5A	480V BUS TIE BREAKER - BUS 6A - 5A	AC4-CRB-CC-6A5AZ	480V BRKR 52/6AT5A FAILS TO TRIP	4.27E-04
480 VAC	52/MCC4	34MCC SUPPLY BREAKER	AC4-CRB-CO-MCC4Z	480V CKT BRKR 52/MCC3 FAILS TO RMN CLSD	1.15E-05
480 VAC	52/MCC6A	36AMCC SUPPLY BREAKER	AC4-CRB-CO-MC6AZ	480V CKT BRKR 52/MCC4 FAILS TO RMN CLSD	1.15E-05
480 VAC	52/MCC6B	36BMCC SUPPLY BREAKER	AC4-CRB-CO-MC6BZ	480V CKT BRKR 52/MCC6A FAILS TO RMN CLSD	1.15E-05
480 VAC	52/MCC6C	36CMCC SUPPLY BREAKER	AC4-CRB-CO-MC6CZ	480V CKT BRKR 52/MCC6B FAILS TO RMN CLSD	1.15E-05
480 VAC	52/MCC7	37MCC SUPPLY BREAKER	AC4-CRB-CO-MCC7Z	480V CKT BRKR 52/MCC6C FAILS TO RMN CLSD	1.15E-05

Non-Seismic Basic Event List

SYSTEM	COMPONENT ID	COMPONENT DESCRIPTION	BASIC EVENT NAME	BASIC EVENT DESCRIPTION	PROBABILI
480 VAC	52/MCC9	39MCC SUPPLY BREAKER	AC4-CRB-CO-MCC9Z	480V CKT BRKR 52/MCC7 FAILS TO RMN CLSD	1.15E-05
480 VAC	BUS2A	BUS 2A 480V	AC4-BAC-ST-BS2AZ	480V CKT BRKR 52/MCC9 FAILS TO RMN CLSD	3.18E-05
480 VAC	BUS3A	BUS 3A 480V	AC4-BAC-ST-BS3AZ	FAULT AT 480V BUS 3A	3.18E-05
480 VAC	BUS5A	BUS 5A 480V	AC4-BAC-ST-BS5AZ	FAULT AT 480V BUS 5A	3.18E-05
480 VAC	BUS6A	BUS 6A 480V	AC4-BAC-ST-BS6AZ	FAULT AT 480V BUS 6A	3.18E-05
480 VAC	COMMON CAUSE	480V AC SWITCHGEARS 31 & 32	AC4-CCF-HW-480VS	COMMON CAUSE FAILURE OF 480V SWGR 31&32	1.06E-06
480 VAC	FUSE-2A-PT	FUSES ON 480V BUS 2A POT XFRMR	AC4-FUS-NO-FS2AZ	FUSES BUS 2A POT XFMR BLOWN	5.16E-05
480 VAC	FUSE-3A-PT	FUSES ON 480V BUS 3A POT XFRMR	AC4-FUS-NO-FS3AZ	FUSES BUS 3A POT XFMR BLOWN	5.16E-05
480 VAC	FUSE-5A-PT	FUSES ON 480V BUS 5A POT XFRMR	AC4-FUS-NO-FS5AZ	FUSES BUS 5A POT XFMR BLOWN	5.16E-05
480 VAC	FUSE-6A-PT	FUSES ON 480V BUS 6A POT XFRMR	AC4-FUS-NO-FS6AZ	FUSES BUS 6A POT XFMR BLOWN	5.16E-05
AFW	31 ABFP	MOTOR DRIVEN AUX. FEEDWATER PUMP NO. 31	AFW-MDP-FS-PM31Z	AFW PUMP 31 FAILS TO START ON DEMAND	1.36E-03
AFW	31 ABFP	MOTOR DRIVEN AUX. FEEDWATER PUMP NO. 31	AFW-RCK-NO-PM31	SWGR CONTROL CIRCUIT NO OUTPUT	2.50E-03
AFW	32 ABFP	TURBINE DRIVEN AUX. FEEDWATER PUMP NO. 32	AFW-RCK-NO-TDP32	AFW TDP 32 CONTROL CIRCUIT FAILURE	2.50E-03
AFW	32 ABFP	TURBINE DRIVEN AUX. FEEDWATER PUMP NO. 32	AFW-TDP-FR-TDP32	AFW TDP 32 FAILS TO CONTINUE TO RUN	2.83E-02
AFW	32 ABFP	TURBINE DRIVEN AUX. FEEDWATER PUMP NO. 32	AFW-TDP-FS-TP32Z	AFW TDP 32 FAILS TO START ON DEMAND	4.34E-03
AFW	33 ABFP	MOTOR DRIVEN AUX. FEEDWATER PUMP NO. 33	AFW-MDP-FS-PM33Z	AFW PUMP 33 FAILS TO START ON DEMAND	1.36E-03
AFW	33 ABFP	MOTOR DRIVEN AUX. FEEDWATER PUMP NO. 33	AFW-RCK-NO-PM33	SWGR CONTROL CIRCUIT NO OUTPUT	2.50E-03
AFW	52/AF1	31 AUXILIARY FEEDWATER PUMP BREAKER	AFW-CRB-DN-AF1Z	MDP 31 CIRCUIT BRKER 52/AF1 DOESN'T OPER	4.27E-04
AFW	52/AF3	33 AUXILIARY FEEDWATER PUMP BREAKER	AFW-CRB-DN-AF3Z	MDP 33 CIRCUIT BRKR 52/AF3 DOESN'T OPERA	4.27E-04
AFW	BFD-31	AUX. FW PUMP 32 DISCHARGE CHECK	AFW-CKV-CC-BFD31	CHECK VALVE BFD-31 FAILS TO OPEN	8.54E-05
AFW	BFD-34	AUX. FW PUMP 31 DISCHARGE CHECK	AFW-CKV-CC-BFD34	PM 31 DISC CHECK VLV BFD-34 FAIL TO OPEN	8.54E-05
AFW	BFD-35	AFWP 31 FCV-406B OUTLET CHECK	AFW-CKV-CC-BFD35	CHECK VALVE BFD-35 FAILS TO OPEN	8.54E-05
AFW	BFD-36	AFWP 31 FCV-406B OUTLET STOP	AFW-XVM-PG-BFD36	ISOLAT VLV BFD-36 FAIL CLS (PLUGGED)	6.12E-04
AFW	BFD-37	AFWP 31 FCV-406A OUTLET CHECK	AFW-CKV-CC-BFD37	CHECK VALVE BFD-37 FAILS TO OPEN	8.54E-05
AFW	BFD-38	AFWP 31 FCV-406A OUTLET STOP	AFW-XVM-PG-BFD38	ISOLAT VLV BFD-38 FAIL CLS (PLUGGED)	6.12E-04
AFW	BFD-39	AUX. FW PUMP 33 DISCHARGE CHECK	AFW-CKV-CC-BFD39	PM 33 DISC CHECK VLV BFD-39 FAIL TO OPEN	8.54E-05
AFW	BFD-40	AFWP 33 FCV-406C OUTLET CHECK	AFW-CKV-CC-BFD40	CHECK VALVE BFD-40 FAILS TO OPEN	8.54E-05
AFW	BFD-41	AFWP 33 FCV-406C OUTLET STOP	AFW-XVM-PG-BFD41	ISOLAT VLV BFD-41 FAIL CLS (PLUGGED)	6.12E-04
AFW	BFD-42	AFWP 33 FCV-406D OUTLET CHECK	AFW-CKV-CC-BFD42	CHECK VALVE BFD-42 FAILS TO OPEN	8.54E-05
AFW	BFD-43	AFWP 33 FCV-406D OUTLET STOP	AFW-XVM-PG-BFD43	ISOLAT VLV BFD-43 FAIL CLS (PLUGGED)	6.12E-04
AFW	BFD-47-1	AFWP 32 FCV-405C OUTLET CHECK	AFW-CKV-CC-47-1	CHECK VALVE BFD-47-1 FAILS TO OPEN	8.54E-05
AFW	BFD-47-2	AFWP 32 FCV-405D OUTLET CHECK	AFW-CKV-CC-47-2	CHECK VALVE BFD-47-2 FAILS TO OPEN	8.54E-05
AFW	BFD-47-3	AFWP 32 FCV-405B OUTLET CHECK	AFW-CKV-CC-47-3	CHECK VALVE BFD-47-3 FAILS TO OPEN	8.54E-05
AFW	BFD-47-4	AFWP 32 FCV-405A OUTLET CHECK	AFW-CKV-CC-47-4	CHECK VALVE BFD 47-4 FAILS TO OPEN	8.54E-05
AFW	BFD-48-1	AFWP 32 FCV-405A OUTLET STOP	AFW-XVM-PG-48-1	ISOLAT VLV BFD-48-1 FAIL CLS (PLUGGED)	6.12E-04
AFW	BFD-48-2	AFWP 32 FCV-405B INLET STOP	AFW-XVM-PG-48-2	ISOLA VLV BFD-48-2 FAIL CLS (PLUGGED)	3.40E-05
AFW	BFD-48-3	AFWP 32 FCV-405B OUTLET STOP	AFW-XVM-PG-48-3	ISOLAT VLV BFD-48-3 FAIL CLS (PLUGGED)	6.12E-04
AFW	BFD-48-4	AFWP 32 FCV-405C INLET STOP	AFW-XVM-PG-48-4	ISOLAT VLV BFD-48-4 FAIL CLS (PLUGGED)	3.40E-05
AFW	BFD-48-5	AFWP 32 FCV-405C OUTLET STOP	AFW-XVM-PG-48-5	ISOLAT VLV BFD-48-5 FAIL CLS (PLUGGED)	6.12E-04
AFW	BFD-48-6	AFWP 32 FCV-405D INLET STOP	AFW-XVM-PG-48-6	ISOLAT VLV BFD-48-6 FAIL CLS (PLUGGED)	3.40E-05
AFW	BFD-48-7	AFWP 32 FCV-405D OUTLET STOP	AFW-XVM-PG-48-7	ISOLAT VLV BFD-48-7 FAILS CLS (PLUGGED)	6.12E-04
AFW	BFD-48-8	AFWP 32 FCV-405A INLET STOP	AFW-XVM-PG-48-8	ISOLA VLV BFD-48-8 FAIL CLS (PLUGGED)	3.40E-05
AFW	BFD-50	AFWP 32 RECIRC CHECK	AFW-CKV-CC-BFD5O	CHECK VALVE BFD-50 DOES NOT OPEN	8.54E-05
AFW	BFD-51	AFWP 32 RECIRC OUTLET STOP	AFW-XVM-PG-BFD51	ISOLAT VLV BFD-51 DOES RM OPEN (PLUGGED)	3.40E-05
AFW	BFD-52	AFWP 31 FCV-1121 OUTLET CHECK VALVE	AFW-CKV-CC-BFD52	CHECK VALVE BFD-52 DOES NOT OPEN	8.54E-05

Table 3A.4
Non-Seismic Basic Event List

SYSTEM	COMPONENT ID	COMPONENT DESCRIPTION	BASIC EVENT NAME	BASIC EVENT DESCRIPTION	PROBABILITY
AFW	BFD-53	AFWP 31 FCV-1121 OUTLET STOP	AFW-XVM-CC-BFD53	PM 31 REC THROT VLV BFD-53 FAILS TO OPEN	8.89E-05
AFW	BFD-54	AFWP 33 FCV-1123 OUTLET CHECK VALVE	AFW-CKV-CC-BFD54	CHECK VALVE BFD-54 DOES NOT OPEN	8.54E-05
AFW	BFD-55	AFWP 33 FCV-1123 OUTLET STOP	AFW-XVM-CC-BFD55	PM 33 REC THROT VLV BFD-55 FAILS CLOSED	8.89E-05
AFW	BFD-62-1	AFWP 31 FCV-406B INLET STOP	AFW-XVM-PG-62-1	ISOLAT VLV BFD-62-1 FAIL CLS (PLUGGED)	3.40E-05
AFW	BFD-62-2	AFWP 33 FCV-406C INLET STOP	AFW-XVM-PG-62-2	ISOLAT VLV BFD-62-2 FAIL CLS (PLUGGED)	3.40E-05
AFW	BFD-62-3	AFWP 33 FCV-406D INLET STOP	AFW-XVM-PG-62-3	ISOLAT VLV BFD-62-3 FAIL CLS (PLUGGED)	3.40E-05
AFW	BFD-62-4	AFWP 31 FCV-406A INLET STOP	AFW-XVM-PG-62-4	ISOLAT VLV BFD-62-4 FAIL CLS (PLUGGED)	3.40E-05
AFW	BFD-67	CHECK VALVE FOR AFW TO NO 32 S/G	AFW-CKV-CC-BFD67	CK VLV BFD-67 IN AFW FD LN FAIL TO OPEN	8.54E-05
AFW	BFD-68	CHECK VALVE FOR AFW TO NO 31 S/G	AFW-CKV-CC-BFD68	CK VLV BFD-68 IN AFW FD LI FAIL TO OPEN	8.54E-05
AFW	BFD-69	CHECK VALVE FOR AFW TO NO 33 S/G	AFW-CKV-CC-BFD69	CK VLV BFD-69 IN AFW FD LI FAIL TO OPEN	8.54E-05
AFW	BFD-70	CHECK VALVE FOR AFW TO NO 34 S/G	AFW-CKV-CC-BFD70	CK VLV BFD-70 IN AFW FD LI FAIL TO OPEN.	8.54E-05
AFW	BFD-FCV-1121	FLOW CONTROL VALVE	AFW-FCV-PG-1121	VLV FCV-1121 PLUGGED (FLOW<40GPM)	3.55E-05
AFW	BFD-FCV-1123	FLOW CONTROL VALVE	AFW-FCV-PG-F1123	VLV FCV-1123 PLUGGED (FLOW<40GPM)	3.55E-05
AFW	BFD-FCV-405A	NO.32 AFWP MAN FLOW CTRL TO 31 SG	AFW-FCV-CC-405AZ	AOV FCV-405A DOES NOT OPEN	1.00E-03
AFW	BFD-FCV-405B	NO.32 AFWP MAN FLOW CTRL TO 32 SG	AFW-FCV-CC-405BZ	AOV FCV-405B DOES NOT OPEN	1.00E-03
AFW	BFD-FCV-405C	NO.32 AFWP MAN FLOW CTRL TO 33 SG	AFW-FCV-CC-405CZ	AOV FCV-405C DOES NOT OPEN	1.00E-03
AFW	BFD-FCV-405D	NO.32 AFWP MAN FLOW CTRL TO 34 SG	AFW-FCV-CC-405DZ	AOV FCV-405D DOES NOT OPEN	1.00E-03
AFW	BFD-FCV-406A	NO.31 AFWP MAN FLOW CTRL TO 31 SG	AFW-FCV-PG-F406A	AOV FCV-406A FAILS TO RM OPEN (PLUGGED)	1.06E-04
AFW	BFD-FCV-406B	NO.31 AFWP MAN FLOW CTRL TO 32 SG	AFW-FCV-PG-F406B	AOV FCV-406B FAILS TO RM OPEN (PLUGGED)	1.06E-04
AFW	BFD-FCV-406C	NO.33 AFWP MAN FLOW CTRL TO 33 SG	AFW-FCV-PG-F406C	AOV FCV-406C FAILS TO RM OPEN (PLUGGED)	1.06E-04
AFW	BFD-FCV-406D	NO.33 AFWP MAN FLOW CTRL TO 34 SG	AFW-FCV-PG-F406D	AOV FCV-406D FAILS TO RM OPEN (PLUGGED)	1.06E-04
AFW	BFD-PCV-1187	PRESSURE CONTROL VALVE	AFW-AOV-CC-V1187	VALVE PCV-1187 DOES NOT OPEN	1.12E-03
AFW	BFD-PCV-1187	PRESSURE CONTROL VALVE	AFW-RCK-NO-V1187	VALVE PCV-1187 CONTROL CIRCUIT FAILURE	2.50E-03
AFW	BFD-PCV-1188	PRESSURE CONTROL VALVE	AFW-AOV-CC-V1188	VALVE PCV-1188 DOES NOT OPEN	1.12E-03
AFW	BFD-PCV-1188	PRESSURE CONTROL VALVE	AFW-RCK-NO-V1188	VALVE PCV-1188 CONTROL CIRCUIT FAILURE	2.50E-03
AFW	BFD-PCV-1189	PRESSURE CONTROL VALVE	AFW-AOV-CC-V1189	VALVE PCV-1189 DOES NOT OPEN	1.12E-03
AFW	BFD-PCV-1189	PRESSURE CONTROL VALVE	AFW-RCK-NO-V1189	VALVE PCV-1189 CONTROL CIRCUIT FAILURE	2.50E-03
AFW	COMMON CAUSE	COMMON CAUSE FAILURE OF CHECK VALVES BFD-31 & 34	AFW-CCF-CC-C3134	CCF OF CHECK VLVS BFD-31 & 34 TO OPEN	5.12E-06
AFW	COMMON CAUSE	COMMON CAUSE FAILURE OF CHECK VALVES BFD-31 & 39	AFW-CCF-CC-C3139	CCF OF CHECK VLVS BFD-31 & 39 TO OPEN	5.12E-06
AFW	COMMON CAUSE	COMMON CAUSE FAILURE OF FOUR TDP FCVs	AFW-CCF-CC-TDPDV	CCF OF ALL FOUR PM 32 FCVs TO OPEN	1.10E-04
AFW	COMMON CAUSE	COMMON CAUSE FAILURE OF MOTOR DRIVEN AFW PUMPS	AFW-CCF-FS-AFWPM	CCF OF AFW MOTOR DRIVEN PUMPS	1.15E-04
AFW	CT-26	AFWP 31 SUCTION CHECK	AFW-CKV-CC-CT-26	CHECK VALVE CT-26 FAILS TO OPEN	8.54E-05
AFW	CT-27	AFWP 31 SUCTION STOP	AFW-XVM-PG-CT-27	ISOLATION VALVE CT-27 FAIL CLS (PLUGGED)	3.40E-05
AFW	CT-28	AFWP 32 SUCTION CHECK	AFW-CKV-CC-CT-28	CHECK VALVE CT-28 FAILS TO OPEN	8.54E-05
AFW	CT-29-1	AFWP 31 SUCTION CHECK	AFW-CKV-CC-29-1	CHECK VALVE CT-29-1 FAILS TO OPEN	8.54E-05
AFW	CT-29-2	AFWP 32 SUCTION CHECK	AFW-CKV-CC-29-2	CHECK VALVE CT-29-2 FAILS TO OPEN	8.54E-05
AFW	CT-30	AFWP 32 SUCTION STOP	AFW-XVM-PG-CT-30	ISOLATION VLV CT-30 FAIL CLS (PLUGGED)	3.40E-05
AFW	CT-31	AFWP 33 SUCTION CHECK	AFW-CKV-CC-CT-31	CHECK VALVE CT-31 FAILS TO OPEN	8.54E-05
AFW	CT-32	AFWP 33 SUCTION CHECK	AFW-CKV-CC-CT-32	CHECK VALVE CT-32 FAILS TO OPEN	8.54E-05
AFW	CT-33	AFWP 33 SUCTION STOP	AFW-XVM-PG-CT-33	ISOLAT VLV CT-33 FAIL CLS (PLUGGED)	3.40E-05
AFW	CT-49	CITY WATER SUPPLY HEADER STOP	AFW-XVM-PG-CT-49	ISOLATION VLV CT-49 FAIL CLS (PLUGGED)	6.12E-04
AFW	CT-6	CST OUTLET ISOLATION VALVE	AFW-XVM-PG-CT-6	STOP VALVE CT-6 FAIL CLOSED (PLUGGED)	3.40E-05

Table 3A.4
Non-Seismic Basic Event List

SYSTEM	COMPONENT ID	COMPONENT DESCRIPTION	BASIC EVENT NAME	BASIC EVENT DESCRIPTION	PROBABILITY
AFW	CT-64	CONDENSATE TO ABFP SUCTION HEADER STOP VALVE	AFW-XVM-PG-CT-64	ISOLATION VALVE CT-64 FAIL CLS (PLUGGED)	3.40E-05
AFW	FAN-311-AB	WALL EXHAUST FAN FOR AUXILIARY FEED PUMP BLDG.	AFV-FAN-FR-EF311	WALL EXH FAN 311 FAILS TO CONT TO RUN	3.00E-05
AFW	FAN-311-AB	WALL EXHAUST FAN FOR AUXILIARY FEED PUMP BLDG.	AFV-FAN-FS-F311Z	WALL EXH FAN 311 FAILS TO START	3.00E-04
AFW	FAN-311-AB (L)	MOTOR OPERATED LOUVER	AFV-MOD-CC-ED311	WALL EXH FAN 311 DAMPER FLS TO OPEN	3.00E-03
AFW	FAN-312-AB	WALL EXHAUST FAN FOR AUXILIARY FEED PUMP BLDG.	AFV-FAN-FR-EF312	WALL EXH FAN 312 FAILS TO CONT TO RUN	2.16E-03
AFW	FAN-312-AB	WALL EXHAUST FAN FOR AUXILIARY FEED PUMP BLDG.	AFV-FAN-FS-F312Z	WALL EXH FAN 312 FAILS TO START	3.00E-04
AFW	FAN-312-AB (L)	MOTOR OPERATED LOUVER	AFV-MOD-CC-ED312	WALL EXH FAN 312 DAMPER FLS TO OPEN	3.00E-03
AFW	FT-418L	SG #31 FEED LINE LOW RANGE FLOW TRANSMITTER	MFW-ASF-HI-418LZ	MAIN FW FT418L FAILS HIGH	5.76E-05
AFW	FT-428L	SG #32 FEED LINE LOW RANGE FLOW TRANSMITTER	MFW-ASF-HI-428LZ	MAIN FW FT428L FAILS HIGH	5.76E-05
AFW	FT-438L	SG #33 FEED LINE LOW RANGE FLOW TRANSMITTER	MFW-ASF-HI-438LZ	MAIN FW FT438L FAILS HIGH	5.76E-05
AFW	FT-448L	SG #34 FEED LINE LOW RANGE FLOW TRANSMITTER	MFW-ASF-HI-448LZ	MAIN FW FT448L FAILS HIGH	5.76E-05
AFW	HC-405A	AFWP 32 FCV-405A HAND CONTROLLER	AFW-FLC-DN-405AZ	AFW HC-405A DOES NOT OPERATE CORRECTLY	1.25E-04
AFW	HC-405B	AFWP 32 FCV-405B HAND CONTROLLER	AFW-FLC-DN-405BZ	AFW HC-405B DOES NOT OPERATE CORRECTLY	1.25E-04
AFW	HC-405C	AFWP 32 FCV-405C HAND CONTROLLER	AFW-FLC-DN-405CZ	AFW HC-405C DOES NOT OPERATE CORRECTLY	1.25E-04
AFW	HC-405D	AFWP 32 FCV-405D HAND CONTROLLER	AFW-FLC-DN-405DZ	AFW HC-405D DOES NOT OPERATE CORRECTLY	1.25E-04
AFW	HC-406A	AFWP 31 FCV-406A HAND CONTROLLER	AFW-FLC-DN-406AZ	AFW HC-406A DOES NOT OPERATE CORRECTLY	1.25E-04
AFW	HC-406B	AFWP 31 FCV-406B HAND CONTROLLER	AFW-FLC-DN-406BZ	AFW HC-406B DOES NOT OPERATE CORRECTLY	1.25E-04
AFW	HC-406C	AFWP 33 FCV-406C HAND CONTROLLER	AFW-FLC-DN-406CZ	AFW HC-406C DOES NOT OPERATE CORRECTLY	1.25E-04
AFW	HC-406D	AFWP 33 FCV-406D HAND CONTROLLER	AFW-FLC-DN-406DZ	AFW HC-406D DOES NOT OPERATE CORRECTLY	1.25E-04
AFW	HCV-1118	GOVERNOR VALVE	AFW-TNV-OC-TRIPV	OVERSPEED SOLEND ENERGIZE TRIP STOP VLV	7.49E-05
AFW	L-314	MOTOR OPERATED LOUVER FOR THE AUXILIARY FEED PUMP BUILDING	AFV-MOD-CC-L314Z	AFW ROOM INLET LOUVER L-314 FAILS TO OPN	3.00E-03
AFW	MS-54	MAIN STM TO AFW TURBINE STOP	AFW-XVM-PG-MS54	STM SUP ISO VLV MS-54 FAIL CLS (PLUGGED)	3.40E-05
AFW	MS-PCV-1139	MAIN STM TO AFW TURBINE PCV	AFW-AOV-CC-1139Z	STEAM CNTRL VLV PCV-1139 DOES NOT OPEN	1.12E-03
AFW	MS-PCV-1310A	PRESSURE CONTROL VALVE	AFW-AOV-PG-1310A	VALVE PCV-1310A FAIL CLS	3.58E-05
AFW	PT-406A	31 AFW PP DISCH PRESS TRANSMITTER	AFW-ASP-LO-406AZ	PT-406A FAILS LOW	1.08E-06
AFW	PT-406B	33 AFW PP DISCH PRESS TRANSMITTER	AFW-ASP-LO-406BZ	PT-406B FAILS LOW	1.08E-06
AFW	PT-412A	1ST STAGE TURB PRESS TRANSMITTER	AFW-ASP-LO-412AZ	TURB FIRST STG PRESS PT-412A FLS LOW	1.08E-06
AFW	PT-412B	1ST STAGE TURB PRESS TRANSMITTER	AFW-ASP-LO-412BZ	TURB FIRST STG PRESS PT-412B FLS LOW	1.08E-06
AFW	TC-1112A	ABFP 32 STEAM SUPPLY ISOLATION ON AUX FEED PUMP ROOM HIGH TEMP, ALARM SWITCH	AFW-ATS-HI-1112A	TEMP SWITCH TC-1112A FAILS HIGH	5.40E-05
AFW	TC-1113A	ABFP 32 STEAM SUPPLY ISOLATION ON AUX FEED PUMP ROOM HIGH TEMP, ALARM SWITCH	AFW-ATS-HI-1113A	TEMP SWITCH TC-1113A FAILS HIGH	5.40E-05
AFW	TC-311S	WALL EXHAUST FAN 311 TEMPERATURE CONTROL SWITCH	AFV-TSW-OO-EF311	WALL EF 311 TEMP SW FLS TO CL AT 9O DEGR	2.16E-05

Table 3A.4
Non-Seismic Basic Event List

SYSTEM	COMPONENT ID	COMPONENT DESCRIPTION	BASIC EVENT NAME	BASIC EVENT DESCRIPTION	PROBABILITY
AFW	TC-312S	WALL EXHAUST FAN 312 TEMPERATURE CONTROL SWITCH	AFV-TSW-OO-EF312	WALL EF 312 TEMP SW FLS TO CL AT 100 DEG	2.16E-05
AFW	TSC UPS BUS	AMSAC BUS	AFW-BAC-HW-UPSZ	POWER AT TSC UPS BUS UNAVAILABLE	7.15E-06
CBV	23-319	THERMOSTAT	CBV-TSW-OO-TS319	TEMP SW L-319 CT FL TO CL AT 100 DEGF	2.16E-05
CBV	319	MOTOR OPERATED LOUVER	CBV-MOD-CC-CL319	MTR OPER LOUVER L-319 DOES NOT OPEN	3.00E-03
CBV	CB EXHFAN 33	CONTROL BLDG EXHAUST FAN 33	CBV-FAN-FR-CBV33	CB VENT FAN 33 FLS TO RUN GIVEN START	2.16E-03
CBV	CB EXHFAN 33	CONTROL BLDG EXHAUST FAN 33	CBV-FAN-FS-CB33Z	CB VENT FAN 33 FLS TO START ON DEMAND	3.00E-04
CBV	CB EXHFAN 33	CONTROL BLDG EXHAUST FAN 33	CBV-RCK-NO-CBV33	CB VENT FAN 33 CNTRL CKT NO OUTPUT	2.50E-03
CBV	CB EXHFAN 34	CONTROL BLDG EXHAUST FAN 34	CBV-FAN-FR-CBV34	CB VENT FAN 34 FLS TO RUN GIVEN START	2.16E-03
CBV	CB EXHFAN 34	CONTROL BLDG EXHAUST FAN 34	CBV-FAN-FS-CB34Z	CB VENT FAN 34 FLS TO START ON DEMAND	3.00E-04
CBV	CB EXHFAN 34	CONTROL BLDG EXHAUST FAN 34	CBV-RCK-NO-CBV34	CB VENT FAN 34 CNTRL CKT NO OUTPUT	2.50E-03
CBV	LP-319	CB LIGHTING PANEL	AC1-BAC-ST-LP319	FAULT AT 120VAC LIGHTING PANEL 319	3.43E-05
CCW	52/CC3	33 COMPONENT COOLING WATER PUMP BREAKER	CCW-CRB-DN-52C3Z	CCW PUMP BKR 52/CC3 FAILS TO OPERATE	4.27E-04
CCW	AC-1871A	RHR PUMP #32 PUMP SEAL HTEXCH INLET STOP	CCW-XVM-OC-1871A	MAN VALVE AC-1871A FAIL TO REMAIN OPEN	6.05E-06
CCW	AC-1871B	RHR PUMP #32 PUMP SEAL HTEXCH OUTLET STOP	CCW-XVM-OC-1871B	MAN VALVE AC-1871B FAIL TO REMAIN OPEN	6.05E-06
CCW	AC-1871C	RHR PUMP #31 PUMP SEAL HTEXCH OUTLET STOP	CCW-XVM-OC-1871C	MAN VLV AC-1871C FAILS TO REMAIN OPEN	6.05E-06
CCW	AC-1871D	RHR PUMP #31 PUMP SEAL HTEXCH INLET STOP	CCW-XVM-OC-1871D	MAN VLV AC-1871D FAILS TO REMAIN OPEN	6.05E-06
CCW	AC-701A	CHARGING PUMPS OIL AND FLUID DRIVE COOLERS SUPPLY CONN STOP	CCW-XVM-CC-701A	CITY WTR SUPLY MAN VLV 701A FAIL TO OPEN	1.00E-04
CCW	AC-701B	CHARGING PUMPS OIL AND FLUID DRIVE COOLERS OUTLET DRAIN	CCW-XVM-CC-701B	CITY WTR DRN MAN VLV 701B FAIL TO OPEN	1.00E-04
CCW	AC-736A	RHR PUMP #31 THERMAL BARRIER INLET STOP	CCW-XVM-OC-736A	MAN VALVE AC-736A FAIL TO REMAIN OPEN	6.05E-06
CCW	AC-736B	RHR PUMP #32 THERMAL BARRIER INLET STOP	CCW-XVM-OC-736B	MAN VALVE AC-736B FAIL TO REMAIN OPEN	6.05E-06
CCW	AC-737A	RHR PUMP #31 THERMAL BARRIER & SEAL OUTLET STOP	CCW-XVM-OC-737A	MAN VALVE AC-737A FAIL TO REMAIN OPEN	6.05E-06
CCW	AC-737B	RHR PUMP #32 THERMAL BARRIER & SEAL OUTLET STOP	CCW-XVM-OC-737B	MAN VALVE AC-737B FAIL TO REMAIN OPEN	6.05E-06
CCW	AC-749A	SIS PUMP #31 COOLER INLET STOP	CCW-XVM-OC-749A	MAN VLV AC-749A FAILS TO REMAIN OPEN	6.05E-06
CCW	AC-749B	SIS PUMP #32 COOLER INLET STOP	CCW-XVM-OC-749B	MAN VLV AC-749B FAILS TO REMAIN OPEN	6.05E-06
CCW	AC-749C	SIS PUMP #33 COOLER INLET STOP	CCW-XVM-OC-749C	MAN VLV AC-749C FAILS TO REMAIN OPEN	6.05E-06
CCW	AC-749D	SIS PUMP #31 COOLER OUTLET STOP	CCW-XVM-OC-749D	MAN VLV AC-749D FAIL TO REMAIN OPEN.	6.05E-06
CCW	AC-749E	SIS PUMP #32 COOLER OUTLET STOP	CCW-XVM-OC-749E	MAN VLV AC-749E FAILS TO REMAIN OPEN	6.05E-06
CCW	AC-749F	SIS PUMP #33 COOLER OUTLET STOP	CCW-XVM-OC-749F	MAN VLV AC-749F FAILS TO REMAIN OPEN	6.05E-06
CCW	AC-750A	SIS PUMP #31 OIL COOLER OUTLET CHECK	CCW-CKV-OC-750A	CHECK VLV AC-750A FAILS TO REMAIN OPEN	6.15E-06
CCW	AC-750B	SIS PUMP #32 OIL COOLER OUTLET CHECK	CCW-CKV-OC-750B	CHECK VLV AC-750B FAILS TO REMAIN OPEN	6.15E-06
CCW	AC-750C	SIS PUMP #33 OIL COOLER OUTLET CHECK	CCW-CKV-OC-750C	CHECK VLV AC-750C FAILS TO REMAIN OPEN	6.15E-06
CCW	AC-750D	RHR PUMP #32 THERMAL BARRIER AND SEAL OUTLET CHECK	CCW-CKV-OC-750D	CHECK VLV AC-750D FAILS TO REMAIN OPEN	6.15E-06
CCW	AC-750E	RHR PUMP #31 THERMAL BARRIER AND SEAL OUTLET CHECK	CCW-CKV-OC-750E	CHECK VLV AC-750E FAILS TO REMAIN OPEN	6.15E-06
CCW	AC-751A	CC HTEXCH #31 OUTLET CHECK	CCW-CKV-OC-751A	CHECK VLV AC-751A FAILS TO REMAIN OPEN	6.15E-06
CCW	AC-751B	CC HTEXCH #32 OUTLET CHECK	CCW-CKV-OC-751B	CHECK VLV AC-751B FAILS TO REMAIN OPEN	6.15E-06
CCW	AC-752A	AUX CC PUMP #31 AND #32 INLET STOP	ACC-XVM-OC-752A	MAN VALVE AC-752A FAIL TO REMAIN OPEN	6.86E-06
CCW	AC-752B	AUX CC PUMP #31 INLET STOP	ACC-XVM-OC-752B	MAN VALVE AC-752B FAIL TO REMAIN OPEN	3.43E-05
CCW	AC-752C	AUX CC PUMP #32 INLET STOP	ACC-XVM-OC-752C	MAN VALVE AC-752C FAIL TO REMAIN OPEN	3.43E-05

Table 3A.4
Non-Seismic Basic Event List

SYSTEM	COMPONENT ID	COMPONENT DESCRIPTION	BASIC EVENT NAME	BASIC EVENT DESCRIPTION	PROBABILITY
CCW	AC-752D	AUX CC PUMP #31 DISCHARGE STOP	ACC-XVM-OC-752D	MAN VALVE AC-752D FAIL TO REMAIN OPEN	3.43E-05
CCW	AC-752E	AUX CC PUMP #32 DISCHARGE STOP	ACC-XVM-OC-752E	MAN VALVE AC-752E FAIL TO REMAIN OPEN	3.43E-05
CCW	AC-752F	AUX CC PUMPS #31 AND #32 DISCHARGE STOP	ACC-XVM-OC-752F	MAN VALVE AC-752F FAIL TO REMAIN OPEN	6.86E-06
CCW	AC-752G	RECIRC PUMP #31 INLET STOP	ACC-XVM-OC-752G	MAN VALVE AC-752G FAIL TO REMAIN OPEN	6.86E-06
CCW	AC-752H	RECIRC PUMP #31 OUTLET STOP	ACC-XVM-OC-752H	MAN VALVE AC-752H FAIL TO REMAIN OPEN	6.86E-06
CCW	AC-752J	RECIRC PUMP #31 INLET FIC-633A STOP	ACC-XVM-OC-752J	MAN VALVE AC-752J FAIL TO REMAIN OPEN	6.86E-06
CCW	AC-752K	RECIRC PUMP #31 OUTLET FIC-633A STOP	ACC-XVM-OC-752K	MAN VALVE AC-752K FAIL TO REMAIN OPEN	6.86E-06
CCW	AC-753A	AUX CC PUMPS #33 AND #34 INLET STOP	ACC-XVM-OC-753A	MAN VALVE AC-753A FAIL TO REMAIN OPEN	6.86E-06
CCW	AC-753B	AUX CC PUMP #33 INLET STOP	ACC-XVM-OC-753B	MAN VALVE AC-753B FAIL TO REMAIN OPEN	3.43E-05
CCW	AC-753C	AUX CC PUMP #34 INLET STOP	ACC-XVM-OC-753C	MAN VALVE AC-753C FAIL TO REMAIN OPEN	3.43E-05
CCW	AC-753D	AUX CC PUMP #33 DISCHARGE STOP	ACC-XVM-OC-753D	MAN VALVE AC-753D FAIL TO REMAIN OPEN	3.43E-05
CCW	AC-753E	AUX CC PUMP #34 DISCHARGE STOP	ACC-XVM-OC-753E	MAN VALVE AC-753E FAIL TO REMAIN OPEN	3.43E-05
CCW	AC-753F	AUX CC PUMPS #33 AND #34 DISCHARGE STOP	ACC-XVM-OC-753F	MAN VLV AC-753F FAIL TO REMAIN OPEN	6.86E-06
CCW	AC-753G	RECIRC. PUMP #32 INLET STOP	ACC-XVM-OC-753G	MAN VALVE AC-753G FAIL TO REMAIN OPEN	6.86E-06
CCW	AC-753H	RECIRC. PUMP #32 OUTLET STOP	ACC-XVM-OC-753H	MAN VALVE AC-753H FAIL TO REMAIN OPEN	6.86E-06
CCW	AC-753J	RECIRC PUMP #32 INLET FIC-633B STOP	ACC-XVM-OC-753J	MAN VLV AC-753J FAIL TO REMAIN OPEN	6.86E-06
CCW	AC-753K	RECIRC PUMP #32 OUTLET FIC-633B STOP	ACC-XVM-OC-753K	MAN VALVE AC-753K FAIL TO REMAIN OPEN	6.86E-06
CCW	AC-755A	AUX CC PUMPS #31 AND #32 BYPASS CHECK	ACC-CKV-OC-755A	CHK VLV AC-755A FAILS CLOSED	8.42E-06
CCW	AC-755A	AUX CC PUMPS #31 AND #32 BYPASS CHECK	ACC-CKV-OO-755A	CHK VLV AC-755A FAILS TO CLOSE	1.00E-03
CCW	AC-755B	RHR HTEXCH #31 VENT	ACC-CKV-CC-755B	CHK VLV AC-755B FAIL TO OPEN ON DEMAND	9.16E-05
CCW	AC-755B	RHR HTEXCH #31 VENT	ACC-CKV-CO-755B	CHECK VLV AC-755D REVERSE LEAKAGE	3.52E-05
CCW	AC-755C	AUX CC PUMPS #31 AND #32 BYPASS CHECK	ACC-CKV-CC-755C	CHK VLV AC-755C FAIL TO OPEN ON DEMAND	9.16E-05
CCW	AC-755C	AUX CC PUMPS #31 AND #32 BYPASS CHECK	ACC-CKV-CO-755C	CHECK VLV AC-755C REVERSE LEAKAGE	3.52E-05
CCW	AC-755D	AUX CC PUMPS #33 AND #34 BYPASS CHECK	ACC-CKV-OC-755D	CHECK VLV AC-755D FAIL CLOSED	8.42E-06
CCW	AC-755D	AUX CC PUMPS #33 AND #34 BYPASS CHECK	ACC-CKV-OO-755D	CHK VLV AC-755D FAILS TO CLOSE	1.00E-03
CCW	AC-755E	AUX CC PUMP #33 OUTLET CHECK	ACC-CKV-CC-755E	CHK VLV AC-755E FAIL TO OPEN ON DEMAND	9.16E-05
CCW	AC-755E	AUX CC PUMP #33 OUTLET CHECK	ACC-CKV-CO-755E	CHECK VLV AC-755E REVERSE LEAKAGE	3.52E-05
CCW	AC-755F	AUX CC PUMP #34 OUTLET CHECK	ACC-CKV-CC-755F	CHK VLV AC-755F FAIL TO OPEN ON DEMAND	9.16E-05
CCW	AC-755F	AUX CC PUMP #34 OUTLET CHECK	ACC-CKV-CO-755F	CHECK VLV AC-755F REVERSE LEAKAGE	3.52E-05
CCW	AC-756A	AUX CC PUMP #33 OUTLET CHECK	CCW-XVM-OC-756A	MAN VALVE AC-756A FAIL TO REMAIN OPEN	6.05E-06
CCW	AC-756A	AUX CC PUMP #33 OUTLET CHECK	CCW-XVM-OO-756A	MANUAL VALVE AC-756A FAILS TO CLOSE	1.00E-04
CCW	AC-756B	AUX CC PUMP #34 OUTLET CHECK	CCW-XVM-OC-756B	MAN VALVE AC-756B FAIL TO REMAIN OPEN	6.05E-06
CCW	AC-757A	CHARGING PUMP #31 FLUID DRIVE COOLER INLET	CCW-XVM-OC-757A	MAN VALVE AC-757A FAIL TO REMAIN OPEN	6.05E-06
CCW	AC-757B	CHARGING PUMP #32 FLUID DRIVE COOLER INLET	CCW-XVM-OC-757B	MAN VALVE AC-757B FAIL TO REMAIN OPEN	6.05E-06
CCW	AC-757C	CHARGING PUMP #33 FLUID DRIVE COOLER INLET	CCW-XVM-OC-757C	MAN VALVE AC-757C FAIL TO REMAIN OPEN	6.05E-06
CCW	AC-757D	CHARGING PUMP #31 OIL & DRIVE COOLERS OUTLET	CCW-XVM-OC-757D	MAN VALVE AC-757D FAIL TO REMAIN OPEN	6.05E-06
CCW	AC-757E	CHARGING PUMP #32 OIL & DRIVE COOLERS OUTLET	CCW-XVM-OC-757E	MAN VALVE AC-757E FAIL TO REMAIN OPEN	6.05E-06
CCW	AC-757F	CHARGING PUMP #33 OIL & DRIVE COOLERS OUTLET	CCW-XVM-OC-757F	MAN VALVE AC-757F FAIL TO REMAIN OPEN	6.05E-06
CCW	AC-759A	CC HTEXCH #31 INLET STOP	CCW-XVM-OC-759A	MAN VALVE AC-759A FAILS TO REMAIN OPEN	6.05E-06
CCW	AC-759B	CC HTEXCH #32 INLET STOP	CCW-XVM-OC-759B	MAN VALVE AC-759B FAILS TO REMAIN OPEN	6.05E-06
CCW	AC-759C	CC PUMP DISCHARGE TO #31 HDR STOP	CCW-XVM-OC-759C	MAN VALVE AC-759C FAILS TO REMAIN OPEN	6.05E-06
CCW	AC-759D	CC PUMP DISCHARGE TO #32 HDR STOP	CCW-XVM-OC-759D	MAN VALVE AC-759D FAILS TO REMAIN OPEN	6.05E-06

Table 3A.4
Non-Seismic Basic Event List

SYSTEM	COMPONENT ID	COMPONENT DESCRIPTION	BASIC EVENT NAME	BASIC EVENT DESCRIPTION	PROBABILITY
CCW	AC-760A	CC PUMP #31 INLET STOP	CCW-XVM-OC-760A	MAN VALVE AC-760A FAILS TO REMAIN OPEN	6.05E-06
CCW	AC-760B	CC PUMP #32 INLET STOP	CCW-XVM-OC-760B	MAN VALVE AC-760B FAILS TO REMAIN OPEN	6.05E-06
CCW	AC-760C	CC PUMP #33 INLET STOP	CCW-XVM-OC-760C	MAN VALVE AC-760C FAIL TO REMAIN OPEN	3.02E-05
CCW	AC-761A	CC PUMP #31 OUTLET CHECK	CCW-CKV-OC-761A	CHECK VALVE AC-761A FAIL TO REMAIN OPEN	6.15E-06
CCW	AC-761A	CC PUMP #31 OUTLET CHECK	CCW-CKV-OO-761A	CHECK VLV AC-761A STUCK OPEN	1.00E-03
CCW	AC-761B	CC PUMP #32 OUTLET CHECK	CCW-CKV-OC-761B	CHECK VALVE AC-761B FAIL TO REMAIN OPEN	6.15E-06
CCW	AC-761B	CC PUMP #32 OUTLET CHECK	CCW-CKV-OO-761B	CHECK VLV AC-761B STUCK OPEN	1.00E-03
CCW	AC-761C	CC PUMP #33 OUTLET CHECK	CCW-CKV-CC-761C	CHECK VALVE AC-761C FAILS TO OPEN	1.00E-04
CCW	AC-761C	CC PUMP #33 OUTLET CHECK	CCW-CKV-CO-761C	CHECK VALVE AC-761C REVERSE LEAKAGE	3.77E-05
CCW	AC-762A	CC PUMP #31 OUTLET STOP	CCW-XVM-OC-762A	MAN VALVE AC-762A FAILS TO REMAIN OPEN	6.05E-06
CCW	AC-762B	CC PUMP #32 OUTLET STOP	CCW-XVM-OC-762B	MAN VALVE AC-762B FAILS TO REMAIN OPEN	6.05E-06
CCW	AC-762C	CC PUMP #33 OUTLET STOP	CCW-XVM-OC-762C	MAN VALVE AC-762C FAIL TO REMAIN OPEN	3.02E-05
CCW	AC-765A	CC HTEXCH #31 OUTLET STOP	CCW-XVM-OC-765A	MAN VALVE AC-765A FAILS TO REMAIN OPEN	6.05E-06
CCW	AC-765B	CC HTEXCH #32 OUTLET STOP	CCW-XVM-OC-765B	MAN VALVE AC-765B FAILS TO REMAIN OPEN	6.05E-06
CCW	AC-766A	CC PUMPS #31 AND #32 SUCTION TIE STOP	CCW-XVM-OC-766A	MAN VALVE AC-766A FAILS TO REMAIN OPEN	6.05E-06
CCW	AC-766B	CC PUMPS #32 AND #33 SUCTION TIE STOP	CCW-XVM-OC-766B	MAN VALVE AC-766B FAIL TO REMAIN OPEN	6.05E-06
CCW	AC-766C	CC HTEXCH DISCHARGE HEADER TIE STOP	CCW-XVM-OC-766C	MAN VALVE AC-766C FAILS TO REMAIN OPEN	6.05E-06
CCW	AC-766D	CC HTEXCH OUTLET TIE STOP	CCW-XVM-OC-766D	MAN VALVE AC-766D FAILS TO REMAIN OPEN	6.05E-06
CCW	AC-787	SIS PUMP #32 AND #33 COOLERS OUTLET STOP	CCW-XVM-OC-787	MAN VLVVE AC-787 FAILS TO REMAIN OPEN	6.05E-06
CCW	AC-810	MANUAL VALVE	CCW-XVM-OO-AC810	NON-REGEN HX ISO VALVE FAILS TO CLOSE	1.00E-04
CCW	AC-818A	RHR HTEXCH #31 INLET STOP	CCW-XVM-OC-818A	MAN VALVE AC-818A FAIL TO REMAIN OPEN	6.05E-06
CCW	AC-818B	RHR HTEXCH #31 DISCHARGE STOP	CCW-XVM-OC-818B	MAN VALVE AC-818B FAIL TO REMAIN OPEN	6.05E-06
CCW	AC-818C	RHR HTEXCH #32 INLET STOP	CCW-XVM-OC-818C	MAN VALVE AC-818C FAIL TO REMAIN OPEN	6.05E-06
CCW	AC-818D	RHR HTEXCH #32 DISCHARGE STOP	CCW-XVM-OC-818D	MAN VALVE AC-818D FAIL TO REMAIN OPEN	6.05E-06
CCW	AC-820A	RHR HTEXCH #31 DISCHARGE BUTTERFLY	CCW-XVM-OC-820A	MAN VALVE AC-820A FAIL TO REMAIN OPEN	6.05E-06
CCW	AC-820B	RHR HTEXCH #32 DISCHARGE BUTTERFLY	CCW-XVM-OC-820B	MAN VALVE AC-820B FAIL TO REMAIN OPEN	6.05E-06
CCW	AC-822A	MOTOR OPERATED VALVE	CCW-MOV-CC-822A	MOV AC-822A FAIL TO OPEN	6.62E-03
CCW	AC-822A	MOTOR OPERATED VALVE	CCW-RCK-NO-822A	MOV 822A CONTROL CIRCUIT NO OUTPUT	2.50E-03
CCW	AC-822B	MOTOR OPERATED VALVE	CCW-MOV-CC-822B	MOV AC-822B FAIL TO OPEN	6.62E-03
CCW	AC-822B	MOTOR OPERATED VALVE	CCW-RCK-NO-822B	MOV 822B CONTROL CIRCUIT NO OUTPUT	2.50E-03
CCW	AC-832A	CC SURGE TANK #31 PUMPS SUCTION STOP	CCW-XVM-OC-832A	MAN VALVE AC-832A FAILS TO REMAIN OPEN	6.05E-06
CCW	AC-832B	CC SURGE TANK #32 PUMPS SUCTION STOP	CCW-XVM-OC-832B	MAN VALVE AC-832B FAILS TO REMAIN OPEN	6.05E-06
CCW	AC-833A	CHARGING PUMP #31 BEARING OIL COOLER INLET	CCW-XVM-OC-833A	MAN VALVE AC-833A FAIL TO REMAIN OPEN	6.05E-06
CCW	AC-833B	CHARGING PUMP #32 BEARING OIL COOLER INLET	CCW-XVM-OC-833B	MAN VALVE AC-833B FAIL TO REMAIN OPEN	6.05E-06
CCW	AC-833C	CHARGING PUMP #33 BEARING OIL COOLER INLET	CCW-XVM-OC-833C	MAN VALVE AC-833C FAIL TO REMAIN OPEN	6.05E-06
CCW	ACAHCC1	COMPONENT COOLING WATER HEAT EXCHANGER NO. 31	CCW-HTX-VF-31Z	HEAT EXCHANGER NO. 31 FAILURE	1.86E-05
CCW	ACAHCC2	COMPONENT COOLING WATER HEAT EXCHANGER NO. 32	CCW-HTX-VF-32Z	HEAT EXCHANGER NO. 32 FAILURE	1.86E-05
CCW	ACAPCC1	CCW PUMP NO 31	CCW-MDP-FR-PM31Z	CCW PUMP 31 FAILS TO CONTINUE TO RUN	1.70E-03
CCW	ACAPCC1	CCW PUMP NO 31	CCW-MDP-RS-PM31	CCW PUMP 31 FAILS TO RESTART	1.50E-03
CCW	ACAPCC2	CCW PUMP NO. 32	CCW-MDP-FR-PM32Z	CCW PUMP 32 FAILS TO CONTINUF TO RUN	1.70E-03
CCW	ACAPCC2	CCW PUMP NO. 32	CCW-MDP-RS-PM32	CCW PUMP 32 FAILS TO RESTART	1.50E-03
CCW	ACAPCC3	CCW PUMP NO 33	CCW-MAI-MA-PM33	CCW PUMP 33 MAINT UNAVAIL	3.71E-02
CCW	ACAPCC3	CCW PUMP NO 33	CCW-MDP-FR-PM33Z	CCW PUMP 33 FAILS TO CONTINUE TO RUN	1.70E-03

Table 3A.4
Non-Seismic Basic Event List

SYSTEM	COMPONENT ID	COMPONENT DESCRIPTION	BASIC EVENT NAME	BASIC EVENT DESCRIPTION	PROBABILITY
CCW	ACAPCC3	CCW PUMP NO 33	CCW-MDP-FS-PM33	CCW PMP 33 FAILS TO START ON DEMAND	1.47E-03
CCW	ACAPCC3	CCW PUMP NO 33	CCW-RCK-NO-PM33	SWGR CONTROL CIRCUIT NO OUTPUT	2.50E-03
CCW	AUXCCP-31	AUXILLIARY COMPONENT COOLING PUMP 31	ACC-MAI-MA-PM31	ACCW PM 32 IN TEST OR MAINTENANCE	1.10E-03
CCW	AUXCCP-31	AUXILLIARY COMPONENT COOLING PUMP 31	ACC-MDP-FR-PM31	MDP ACC-31 FAIL TO CONTINUE TO RUN	2.16E-03
CCW	AUXCCP-31	AUXILLIARY COMPONENT COOLING PUMP 31	ACC-MDP-FS-PM31	MDP ACC-31 FAIL TO START ON DEMAND	4.77E-04
CCW	AUXCCP-31	AUXILLIARY COMPONENT COOLING PUMP 31	ACC-RCK-NO-PM31	31 ACCW PMP CONTROL CIRCUIT NO OUTPUT	2.50E-03
CCW	AUXCCP-32	AUXILLIARY COMPONENT COOLING PUMP 32	ACC-MAI-MA-PM32	ACCW PM 32 IN TEST OR MAINTENANCE	5.19E-03
CCW	AUXCCP-32	AUXILLIARY COMPONENT COOLING PUMP 32	ACC-MDP-FR-PM32	MDP ACC-32 FAIL TO CONTINUE TO RUN	2.16E-03
CCW	AUXCCP-32	AUXILLIARY COMPONENT COOLING PUMP 32	ACC-MDP-FS-PM32	MDP ACC-32 FAIL TO START ON DEMAND	4.77E-04
CCW	AUXCCP-32	AUXILLIARY COMPONENT COOLING PUMP 32	ACC-RCK-NO-PM32	32 ACCW PMP CONTROL CIRCUIT NO OUTPUT	2.50E-03
CCW	AUXCCP-33	AUXILLIARY COMPONENT COOLING PUMP 33	ACC-MAI-MA-PM33	ACCW PM 33 IN TEST OR MAINTENANCE	8.87E-04
CCW	AUXCCP-33	AUXILLIARY COMPONENT COOLING PUMP 33	ACC-MDP-FR-PM33	MDP ACC-33 FAIL TO CONTINUE TO RUN	2.16E-03
CCW	AUXCCP-33	AUXILLIARY COMPONENT COOLING PUMP 33	ACC-MDP-FS-PM33	MDP ACC-33 FAILS TO START ON DEMAND	4.77E-04
CCW	AUXCCP-33	AUXILLIARY COMPONENT COOLING PUMP 33	ACC-RCK-NO-PM33	33 ACCW PMP CONTROL CIRCUIT NO OUTPUT	2.50E-03
CCW	AUXCCP-34	AUXILLIARY COMPONENT COOLING PUMP 34	ACC-MAI-MA-PM34	ACCW PM 34 IN TEST OR MAINTENANCE	9.08E-04
CCW	AUXCCP-34	AUXILLIARY COMPONENT COOLING PUMP 34	ACC-MDP-FR-PM34	MDP ACC-34 FAIL TO CONTINUE TO RUN	2.16E-03
CCW	AUXCCP-34	AUXILLIARY COMPONENT COOLING PUMP 34	ACC-MDP-FS-PM34	MDP ACC-34 FAILS TO START ON DEMAND	4.77E-04
CCW	AUXCCP-34	AUXILLIARY COMPONENT COOLING PUMP 34	ACC-RCK-NO-PM34	34 ACCW PMP CONTROL CIRCUIT NO OUTPUT	2.50E-03
CCW	COMMON CAUSE	COMMON CAUSE OF ACCW PUMP DISH CHK VLVS	ACC-CCF-CC-DCKV	CCF OF ALL 4 ACCW PUMP DISH CHECK VLVS	5.50E-06
CCW	COMMON CAUSE	COMMON CAUSE OF AUXCCP-31,32,33&34	ACC-CCF-FS-ACCW	CCF OF ALL 4 ACCW PUMPS	7.20E-05
CCW	COMMON CAUSE	COMMON CAUSE FAILURE OF MOVs-822A&B	CCW-CCF-CC-822	CCF OF MOV AC-822A&B	2.64E-04
CCW	COMMON CAUSE	COMMON CAUSE FAILURE OF CCW PUMPS	CCW-CCF-FR-ACPM	CCF OF CCW PUMPS	1.70E-05
CCW	SISP31-CWP1	SHAFT DRIVEN PUMP	CCW-SDP-DN-SI31	SI PMP 31 SHAFT DRVN CCW PMP DOES NOT OP	2.02E-04
CCW	SISP32-CWP2	SHAFT DRIVEN PUMP	CCW-SDP-DN-SI32	SI PMP 32 SHAFT DRVN CCW PMP DOES NOT OP	2.02E-04
CCW	SISP33-CWP3	SHAFT DRIVEN PUMP	CCW-SDP-DN-SI33	SI PMP 33 SHAFT DRVN CCW PMP DOES NOT OP	2.02E-04
CDS	LCV-1158-1	LEVEL CONTROL VALVE	AFW-AOV-OO-11581	AOV LCV-1158-1 DOES NOT CLOSE	2.38E-03
CDS	LCV-1158-2	LEVEL CONTROL VALVE	AFW-AOV-OO-11582	AOV LCV-1158-2 DOES NOT CLOSE	2.38E-03
CFC	52/CRF1	31 FAN COOLER UNIT BREAKER	CFC-CRB-DN-FC31Z	FCU 31 CIRCUIT BRKR 52/CRF1 DOESN'T OPER	4.27E-04
CFC	52/CRF2	32 FAN COOLER UNIT BREAKER	CFC-CRB-DN-FC32Z	FCU 32 CIRCUIT BRKR 52/CRF2 DOESN'T OPER	4.27E-04
CFC	52/CRF3	33 FAN COOLER UNIT BREAKER	CFC-CRB-DN-FC33Z	FCU 33 CIRCUIT BRKR 52/CRF3 DOESN'T OPER	4.27E-04
CFC	52/CRF4	34 FAN COOLER UNIT BREAKER	CFC-CRB-DN-FC34Z	FCU 34 CIRCUIT BRKR 52/CRF4 DOESN'T OPER	4.27E-04
CFC	52/CRF5	35 FAN COOLER UNIT BREAKER	CFC-CRB-DN-FC35Z	FCU 35 CIRCUIT BRKR 52/CRF5 DOESN'T OPER	4.27E-04
CFC	COMMON CAUSE	COMMON CAUSE FAILURE OF THREE FAN COOLERS UNITS	CFC-CCF-FR-3FCUS	COMMON CAUSE FAILURE 3/5 FAN CLING UNITS	2.47E-06
CFC	CRF1	CONTAINMENT RECIRC FAN 31	CFC-FCU-FR-31	FAIL OF FAN CLING UNIT 31 CONTINU TO RUN	5.70E-05
CFC	CRF1	CONTAINMENT RECIRC FAN 31	CFC-FCU-FS-31Z	FAILURE OF FAN COOLING UNIT 31 TO START	4.92E-04
CFC	CRF1	CONTAINMENT RECIRC FAN 31	CFC-MAI-MA-FCU31	FAN COOLING UNIT 31 UNAVA DUE TO T & M	8.13E-03
CFC	CRF1	CONTAINMENT RECIRC FAN 31	CFC-RCK-NO-FCU31	SWGR CONTROL CIRCUIT NO OUTPUT	2.50E-03
CFC	CRF1 (BLOW-IN DOOR)	FAN COOLER UNIT 31 BLOW-IN DOOR	CFC-DOR-CC-31DRZ	FCU 31 BLOW IN DOOR FAILS TO OPEN	7.70E-06
CFC	CRF2	CONTAINMENT RECIRC FAN 32	CFC-FCU-FR-32	FAIL OF FAN CLING UNIT 32 CONTINU TO RUN	5.70E-05
CFC	CRF2	CONTAINMENT RECIRC FAN 32	CFC-FCU-FS-32Z	FAILURE OF FAN COOLING UNIT 32 TO START	4.92E-04
CFC	CRF2	CONTAINMENT RECIRC FAN 32	CFC-MAI-MA-FCU32	FAN COOLING UNIT 32 UNAVA DUE TO T & M	3.96E-03
CFC	CRF2	CONTAINMENT RECIRC FAN 32	CFC-RCK-NO-FCU32	SWGR CONTROL CIRCUIT NO OUTPUT	2.50E-03
CFC	CRF2 (BLOW-IN DOOR)	FAN COOLER UNIT 32 BLOW-IN DOOR	CFC-DOR-CC-32DRZ	FCU 32 BLOW IN DOOR FAILS TO OPEN	7.70E-06
CFC	CRF3	CONTAINMENT RECIRC FAN 33	CFC-FCU-FR-33	FAIL OF FAN CLING UNIT 33 CONTINE TO RUN	5.70E-05

Table 3A.4
Non-Seismic Basic Event List

SYSTEM	COMPONENT ID	COMPONENT DESCRIPTION	BASIC EVENT NAME	BASIC EVENT DESCRIPTION	PROBABILITY
CFC	CRF3	CONTAINMENT RECIRC FAN 33	CFC-FCU-FS-33Z	FAILURE OF FAN COOLING UNIT 33 TO START	4.92E-04
CFC	CRF3	CONTAINMENT RECIRC FAN 33	CFC-MAI-MA-FCU33	FAN COOLING UNIT 33 UNAVIL DUE TO T & M	1.96E-03
CFC	CRF3	CONTAINMENT RECIRC FAN 33	CFC-RCK-NO-FCU33	SWGR CONTROL CIRCUIT NO OUTPUT	2.50E-03
CFC	CRF3 (BLOW-IN DOOR)	FAN COOLER UNIT 33 BLOW-IN DOOR	CFC-DOR-CC-33DRZ	FCU 33 BLOW IN DOOR FAILS TO OPEN	7.70E-06
CFC	CRF4	CONTAINMENT RECIRC FAN 34	CFC-FCU-FR-34	FAIL OF FAN CLING UNIT 34 CONTINU TO RUN	5.70E-05
CFC	CRF4	CONTAINMENT RECIRC FAN 34	CFC-FCU-FS-34Z	FAILURE OF FAN COOLING UNIT 34 TO START	4.92E-04
CFC	CRF4	CONTAINMENT RECIRC FAN 34	CFC-MAI-MA-FCU34	FAN COOLING UNIT 34 UNAVIL DUE TO T & M	2.86E-03
CFC	CRF4	CONTAINMENT RECIRC FAN 34	CFC-RCK-NO-FCU34	SWGR CONTROL CIRCUIT NO OUTPUT	2.50E-03
CFC	CRF4 (BLOW-IN DOOR)	FAN COOLER UNIT 34 BLOW-IN DOOR	CFC-DOR-CC-34DRZ	FCU 34 BLOW IN DOOR FAILS TO OPEN	7.70E-06
CFC	CRF5	CONTAINMENT RECIRC FAN 35	CFC-FCU-FR-35	FAIL OF FAN CLING UNIT 35 CONTINU TO RUN	5.70E-05
CFC	CRF5	CONTAINMENT RECIRC FAN 35	CFC-FCU-FS-35Z	FAILURE OF FAN COOLING UNIT 35 TO START	4.92E-04
CFC	CRF5	CONTAINMENT RECIRC FAN 35	CFC-MAI-MA-FCU35	FAN COOLING UNIT 35 UNAVIL DUE TO T & M	2.67E-03
CFC	CRF5	CONTAINMENT RECIRC FAN 35	CFC-RCK-NO-FCU35	SWGR CONTROL CIRCUIT NO OUTPUT	2.50E-03
CFC	CRF5 (BLOW-IN DOOR)	FAN COOLER UNIT 35 BLOW-IN DOOR	CFC-DOR-CC-35DRZ	FCU 35 BLOW IN DOOR FAILS TO OPEN	7.70E-06
CFC	D-CRF1	FAN-COOLER FILTER UNIT 31 INCIDENT DAMPER	CFC-PND-CC-31DPZ	FCU 31 DAMPER D FAILS TO OPEN	1.81E-02
CFC	D-CRF1	FAN-COOLER FILTER UNIT 31 INCIDENT DAMPER	CFC-PND-OC-31DPC	FCU 31 DAMPER C FAILS TO REMAIN OPEN	7.70E-06
CFC	D-CRF2	FAN-COOLER FILTER UNIT 32 INCIDENT DAMPER	CFC-PND-CC-32DPZ	FCU 32 DAMPER D FAILS TO OPEN	1.81E-02
CFC	D-CRF2	FAN-COOLER FILTER UNIT 32 INCIDENT DAMPER	CFC-PND-OC-32DPC	FCU 32 DAMPER C FAILS TO REMAIN OPEN	7.70E-06
CFC	D-CRF3	FAN-COOLER FILTER UNIT 33 INCIDENT DAMPER	CFC-PND-CC-33DPZ	FCU 33 DAMPER D FAILS TO OPEN	1.81E-02
CFC	D-CRF3	FAN-COOLER FILTER UNIT 33 INCIDENT DAMPER	CFC-PND-OC-33DPC	FCU 33 DAMPER C FAILS TO REMAIN OPEN	7.70E-06
CFC	D-CRF4	FAN-COOLER FILTER UNIT 34 INCIDENT DAMPER	CFC-PND-CC-34DPZ	FCU 34 DAMPER D FAILS TO OPEN	1.81E-02
CFC	D-CRF4	FAN-COOLER FILTER UNIT 34 INCIDENT DAMPER	CFC-PND-OC-34DPC	FCU 34 DAMPER C FAILS TO REMAIN OPEN	7.70E-06
CFC	D-CRF5	FAN-COOLER FILTER UNIT 35 INCIDENT DAMPER	CFC-PND-CC-35DPZ	FCU 35 DAMPER D FAILS TO OPEN	1.81E-02
CFC	D-CRF5	FAN-COOLER FILTER UNIT 35 INCIDENT DAMPER	CFC-PND-OC-35DPC	FCU 35 DAMPER C FAILS TO REMAIN OPEN	7.70E-06
CFC	VS-SOV-1294	AIR SUPPLY SOL VALVE FOR FCU 31 DAMPER C	CFC-SOV-HW-1294Z	SOLENOID VALVE 1294 FAILS TO FUNCTION	2.00E-03
CFC	VS-SOV-1297	AIR SUPPLY SOL VALVE FOR FCU 32 DAMPER C	CFC-SOV-HW-1295Z	SOLENOID VALVE 1295 FAILS TO FUNCTION	2.00E-03
CFC	VS-SOV-1298	AIR SUPPLY SOL VALVE FOR FCU 32 DAMPER D AND DOOR	CFC-SOV-HW-1297Z	SOLENOID VALVE 1297 FAILS TO FUNCTION	2.00E-03
CFC	VS-SOV-1300	AIR SUPPLY SOL VALVE FOR FCU 33 DAMPER C	CFC-SOV-HW-1298Z	SOLENOID VALVE 1298 FAILS TO FUNCTION	2.00E-03
CFC	VS-SOV-1301	AIR SUPPLY SOL VALVE FOR FCU 33 DAMPER D AND DOOR	CFC-SOV-HW-1300Z	SOLENOID VALVE 1300 FAILS TO FUNCTION	2.00E-03
CFC	VS-SOV-1303	AIR SUPPLY SOL VALVE FOR FCU 34 DAMPER C	CFC-SOV-HW-1301Z	SOLENOID VALVE 1301 FAILS TO FUNCTION	2.00E-03
CFC	VS-SOV-1304	AIR SUPPLY SOL VALVE FOR FCU 34 DAMPER D AND DOOR	CFC-SOV-HW-1303Z	SOLENOID VALVE 1303 FAILS TO FUNCTION	2.00E-03
CFC	VS-SOV-1306	AIR SUPPLY SOL VALVE FOR FCU 35 DAMPER C	CFC-SOV-HW-1304Z	SOLENOID VALVE 1304 FAILS TO FUNCTION	2.00E-03
CRD	CRPI	INDICATOR	CFC-SOV-HW-1307	SOLENOID VALVE 1307 FAILS TO FUNCTION	2.00E-03
CSI	31 CS PUMP	CONTAINMENT SPRAY PUMP 31	CSS-MAI-MA-PM31	PUMP 31 PATH COMPTS IN TEST & MAINTENANC	2.51E-03
CSI	31 CS PUMP	CONTAINMENT SPRAY PUMP 31	CSS-MDP-FR-PM31	CONT SPR PUMP 31 FAIL TO CONTINUE TO RUN	2.10E-03
CSI	31 CS PUMP	CONTAINMENT SPRAY PUMP 31	CSS-MDP-FS-PM31	CONT SPR PUMP 31 FAIL TO START ON DEMAND	2.16E-04
CSI	31 CS PUMP	CONTAINMENT SPRAY PUMP 31	CSS-RCK-NO-PM31	SWGR CONTROL CIRCUIT NO OUTPUT	2.50E-03
CSI	32 CS PUMP	CONTAINMENT SPRAY PUMP 32	CSS-MAI-MA-PM32	PUMP 32 PATH COMPTS IN TEST & MAINTENANC	1.11E-03
CSI	32 CS PUMP	CONTAINMENT SPRAY PUMP 32	CSS-MDP-FR-PM32	CON SPR PUMP 32 FAILS TO CONTINUE TO RUN	2.10E-03
CSI	32 CS PUMP	CONTAINMENT SPRAY PUMP 32	CSS-MDP-FS-PM32	CONT SPR PUMP 32 FAIL TO START ON DEMAND	2.16E-04
CSI	32 CS PUMP	CONTAINMENT SPRAY PUMP 32	CSS-RCK-NO-PM32	SWGR CONTROL CIRCUIT NO OUTPUT	2.50E-03
CSI	52/CS1	31 CONTAINMENT SPRAY PUMP BREAKER	CSS-CRB-DN-PM31Z	CN SP PM 31 CIRC BKR 52/CS1 DOESN'T OPER	4.27E-04

Table 3A.4
Non-Seismic Basic Event List

SYSTEM	COMPONENT ID	COMPONENT DESCRIPTION	BASIC EVENT NAME	BASIC EVENT DESCRIPTION	PROBABILITY
CSI	52/CS2	32 CONTAINMENT SPRAY PUMP BREAKER	CSS-CRB-DN-PM32Z	CN SP PM 32 CIRC BKR 52/CS2 DOESN'T OPER	4.27E-04
CSI	COMMON CAUSE	COMMON CAUSE FAILURE OF MOVs 866A&B	CSS-CCF-CC-866AB	COMMON CAUSE FAIL OF M0V-866A&B TO OPEN	2.74E-05
CSI	COMMON CAUSE	COMMON CAUSE FAILURE OF VALVES 867A&B	CSS-CCF-CC-867AB	CCF OF CHECK VLVS SI-867A/B FAIL TO OPEN	5.86E-06
CSI	COMMON CAUSE	COMMON CAUSE FAILURE 0F CSS PUMPS	CSS-CCF-FS-PUMPS	COMMON CAUSE FAIL OF CONTAIN SPRAY PUMPS	3.64E-05
CSI	SI-865A	MANUAL VALVE	CSS-XVM-PG-865A	MANUL VLV SI-865A FAIL TO RM OPEN (PLUG)	3.56E-05
CSI	SI-865B	MANUAL VALVE	CSS-XVM-PG-865B	MANUL VLV SI-865B FAIL TO RM OPEN (PLUG)	3.56E-05
CSI	SI-866A	MOTOR OPERATED VALVE	CSS-MOV-CC-866A	SI-MOV-866A DOES NOT OPEN	2.16E-04
CSI	SI-866A	MOTOR OPERATED VALVE	CSS-RCK-NO-866A	SI-MOV-866A CONTROL CIRCUIT NO OUTPUT	2.50E-03
CSI	SI-866B	MOTOR OPERATED VALVE	CSS-MOV-CC-866B	SI-MOV-866B DOES NOT OPEN	2.16E-04

Table 3A.5

Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
EDG	DG-31	RELAY WHSE M101	K1/EG1	EDG VOLT REG RELAY PNL31	DG	10'-0"	Y
EDG	DG-33	RELAY WHSE M101	K1/EG3	EDG VOLT REG RELAY PNL33	DGB	10'-0"	Y
EDG	DG-32	RELAY WHSE M101	K1/EG2	EDG VOLT REG RELAY PNL32	DGB	10'-0"	Y
EDG	DG-31	RELAY WHSE M110	K2/EG1	EDG VOLT REG RELAY PNL31	DGB	10'-0"	Y
EDG	DG-33	RELAY WHSE M110	K2/EG3	EDG VOLT REG RELAY PNL33	DGB	10'-0"	Y
EDG	DG-32	RELAY WHSE M110	K2/EG2	EDG VOLT REG RELAY PNL32	DGB	10'-0"	Y
EDG	DG-31	BREAKER CLOSURE RELAY WHSE Z	K4/EG1	EDG VOLT REG RELAY PNL31	DGB	10'-0"	Y
EDG	DG-33	BREAKER CLOSURE RELAY WHSE Z	K4/EG3	EDG VOLT REG RELAY PNL33	DGB	10'-0"	Y
EDG	DG-32	BREAKER CLOSURE RELAY WHSE Z	K4/EG2	EDG VOLT REG RELAY PNL32	DGB	10'-0"	Y
EDG	DG-31	RELAY WHSE Z	K3/EG1	EDG VOLT REG RELAY PNL31	DGB	10'-0"	Y
EDG	DG-33	RELAY WHSE Z	K3/EG3	EDG VOLT REG RELAY PNL33	DGB	10'-0"	Y
EDG	DG-32	RELAY WHSE Z	K3/EG2	EDG VOLT REG RELAY PNL32	DGB	10'-0"	Y
SP	956C	"CLOSE/OPEN" CONTROL SWITCH 2-POSITION MAINTAINED	1/S1	SAMPLING PANEL	PA	55'-0"	Y
SP	956D	"CLOSE/OPEN" CONTROL SWITCH 2-POSITION MAINTAINED	1/S1	SAMPLING PANEL	PA	55'-0"	Y
SP	956E	"CLOSE/OPEN" SWITCH 2-POSITION MAINTAINED	1/S1	SAMPLING PANEL	PA	55'-0"	Y
SP	956F	"CLOSE/OPEN" SWITCH 2-POSITION MAINTAINED	1/S1	SAMPLING PANEL	PA	55'-0"	Y
SP	959	"CLOSE/OPEN" SWITCH 2-POSITION MAINTAINED	1/S1	SAMPLING PANEL	PA	55'-0"	Y
SP	953	"CLOSE/OPEN" SWITCH TWO POSITION MAINTAINED	1/953	SAMPLING PANEL	PA	55'-0"	Y
IA	SOV-1199	"HAND-AOO-AUTO" MANUAL SWITCH		LOCAL COMPT CTRL PNL	CB	15'-0"	Y
IA	0031 IAC	"HAND-OFF-AUTO" MANUAL SWITCH	1/IAC31	LOCAL COMPR CTRL PNL	CB	15'-0"	Y
IA	0032 IAC	"HAND-OFF-AUTO" MANUAL SWITCH	1/IAC32	LOCAL COMPR CTRL PNL	CB	15'-0"	Y
IA	SOV-1177	"HAND-OFF-AUTO" MANUAL SWITCH	1/IAC21	LOCAL COMPT CTRL PNL	CB	15'-0"	Y
IA	SOV-1178	"HAND-OFF-AUTO" MANUAL SWITCH	1/IAC22	LOCAL COMPT CTRL PNL	CB	15'-0"	Y
IA	SOV-1198	"HAND-OFF-AUTO" MANUAL SWITCH	1/IAC21	LOCAL COMPT CTRL PNL	CB	15'-0"	Y
SIS	SI-0888A	"OFF/ON" SWITCH	43/RS5	CCR PANEL SBF-1	CB	53'-0"	Y
SIS	SI-0888B	"OFF/ON" SWITCH	43/RS5	CCR PANEL SBF-1	CB	53'-0"	Y
SIS	SI-1802A	"OFF/ON" SWITCH	43/RS-4	CCR PANEL SBF-1	CB	53'-0"	Y
SIS	SI-1802B	"OFF/ON" SWITCH	43/RS-4	CCR PANEL SBF-1	CB	53'-0"	Y
SIS	SI-1810	"OFF/ON" SWITCH	43/RS-8	CCR PANEL SBF-1	CB	53'-0"	Y
IA	0031CLWP	"ON-OFF-STANDBY" MANUAL SWITCH	1/CSP31	IACC CIRC PMP CONT STA	CB	15'-0"	Y
IA	0031CLWP	"ON-OFF-STANDBY" MANUAL SWITCH	1/CSP32	IACC CIRC PMP CONT STA	CB	15'-0"	Y
IA	0032CLWP	"ON-OFF-STANDBY" MANUAL SWITCH	1/CSP32	IACC CIRC PMP CONT STA	CB	15'-0"	Y
IA	0032CLWP	"ON-OFF-STANDBY" MANUAL SWITCH	1/CSP31	IACC CIRC PMP CONT STA	CB	15'-0"	Y
SIS	SI-0882	"ON/OFF" MAINTAINED	43/RS-3	CCR PANEL SBF-1	CB	53'-0"	Y
HVAC	32CRDF	"PULL-STOP-AUTO-START" TO "AUTO"	1/CRCF2 (o,sc,o)	CCR PANEL SL	CB	53'-0"	Y
HVAC	0034CRFU	"REMOTE-LOCAL" MAN TRANS SWITCH	43	LOCAL	VC	68'-0"	Y
HVAC	0035CRFU	"REMOTE-LOCAL" TRANS SW	43	LOCAL	VC	68'-0"	Y
HVAC	0034CRFU	"STOP-AUTO-START" MAN SWITCH	1/CRF4	CCR PANEL SBF-2	CB	53'-0"	Y
MS	MS-1-31	"TRIP-AUTO-RESET" SPRING RETURN TO AUTO	SEL SW. 1/MS-1-31	CCR PANEL SBF-1	CB	53'-0"	Y
MS	MS-1-32	"TRIP-AUTO-RESET" SPRING RETURN TO AUTO	SEL SW 1/MS-1-32	CCR PANEL SBF-1	CB	53'-0"	Y
MS	MS-1-33	"TRIP-AUTO-RESET" SPRING RETURN TO AUTO	SEL SW 1/MS-1-33	CCR PANEL SBF-1	CB	53'-0"	Y
MS	MS-1-34	"TRIP-AUTO-RESET" SPRING RETURN TO AUTO	SEL SW 1/MS-1-34	CCR PANEL SBF-1	CB	53'-0"	Y
SWN	31 SW PUMP	1,2,3,4,5,6 MODE SELECTOR SWITCH	43/SW	CCR PANEL SBF-1	CB	53'-0"	Y
SWN	32 SW PUMP	1,2,3-4,5,6 MODE SELECTOR SWITCH	43/SW	CCR PANEL SBF-1	CB	53'-0"	Y
SWN	33 SW PUMP	1,2,3-4,5,6 MODE SELECTOR SWITCH	43/SW	CCR PANEL SBF-1	CB	53'-0"	Y
SWN	35 SW PUMP	1,2,3-4,5,6 SELECTOR SWITCH	43/SW	CCR PANEL SBF-1	CB	53'-0"	Y
SWN	36 SW PUMP	1,2,3-4,5,6 SELECTOR SWITCH	43/SW	CCR PANEL SBF-1	CB	53'-0"	Y
SWN	34 SW PUMP	1 2,3-4 5,6 MODE SELECTOR SWITCH	43/SW	CCR PANEL SBF-1	CB	53'-0"	Y
HVAC	ACU31	3 POSITION MAINTAINED SWITCH	43-ACF31/H-O-A	ACU31	CB	15'-0"	Y
HVAC	ACU32	3 POSITION MAINTAINED SWITCH	43-ACF32/H-O-A	ACU32	CB	15'-0"	Y
DC	33CHGR (GE8)	AC FAILURE ALARM	PLR	BATTERY CHRGR 33	CB	33'-0"	Y
DC	34CHGR (GF3)	AC FAILURE ALARM	PLR	BATTERY CHRGR 34	CB	33'-0"	Y
DC	33CHGR (GE8)	AC FAILURE ALARM BYPASS SELECTOR SWITCH	SW1	CCR PANEL SHF	CB	53'-0"	Y
DC	34CHGR (GF3)	AC FAILURE ALARM BYPASS SELECTOR SWITCH	SW1	CCR PANEL SHF	CB	53'-0"	Y
RCS	PCV-455C	ALARM BI-STABLE	TC-433L	CCR RACK H-2	CB	53'-0"	Y
RCS	PCV-455C	ALARM BI-STABLE ALARM UNIT	TC-413L	CCR RACK H-1	CB	53'-0"	Y
DC	33CHGR (GE8)	ALARM RELAY	AR	BATTERY CHRGR 33	CB	33'-0"	Y
DC	34CHGR (GF3)	ALARM RELAY	AR	BATTERY CHRGR 34	CB	33'-0"	Y
EDG	DG-33	ALARM SILENCE PB	ASP/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
EDG	DG-32	ALARM SILENCE PB	ASP/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-31	ALARM SILENCE PUSHBUTTON	ASP/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
DC	33CHGR (GE8)	ALARM SILENCE SWITCH	S2	BATTERY CHRGR 33	CB	15'-0"	Y
DC	34CHGR (GF3)	ALARM SILENCE SWITCH	S2	BATTERY CHRGR 34	CB	33'-0"	Y
118VAC	EGA1	ALTERN SOURCE INPUT CKT BREAKER CONTACTS	CB3	INVERTER CAB	CB	33'-0"	Y
118VAC	EGA2	ALTERN SOURCE INPUT CKT. BREAKER CONTACTS	CB3	INVERTER CAB	CB	33'-0"	Y
118VAC	GC9	ALTERN SOURCE INPUT CKT. BREAKER CONTACTS	CB3	INVERTER CAB	CB	33'-0"	Y
HVAC	0031ETEF	AUTO/RUN SWITCH	1/F31-2	31/32 LOCAL CTRL STN(HJ9)	CB	33'-0"	Y
HVAC	0032ETEF	AUTO/RUN SWITCH	1/F32-2	31/32 LOCAL CTRL STN(HJ9)	CB	33'-0"	Y
HVAC	0033ETEF	AUTO/RUN SWITCH	1/F33-2	33/34 LOCAL CTRL STN(HJ8)	CB	33'-0"	Y
HVAC	0034ETEF	AUTO/RUN SWITCH	1/F34-2	33/34 LOCAL CTRL STN(HJ8)	CB	33'-0"	Y
CCW	ACAPCC1	AUX BKR CONTACTS	52a/EG3, 52b/EG3	480V SWGR 31	CB	15'-0"	Y
CCW	ACAPCC1	AUX BKR CONTACTS	33H, 33a/EG3, 33/EG3	480V SWGR 31	CB	15'-0"	Y
CCW	ACAPCC2	AUX BKR CONTACTS	52aEG1, 52bEG1	480V SWGR 31	CB	15'-0"	Y
CCW	ACAPCC2	AUX BKR CONTACTS	33a, 33EG1	480V SWGR 31	CB	15'-0"	Y
CCW	ACAPCC3	AUX BKR CONTACTS	52aEG2, 52bEG2	480V SWGR 32	CB	15'-0"	Y
CCW	ACAPCC3	AUX BKR CONTACTS	33aEG2, 33EG2	480V SWGR 32	CB	15'-0"	Y
480VAC	MCC-39	AUX CONTACT BREAKER 52/5A	52b/52/5A	480V SWGR 31, COMPT 17B	CB	15'-0"	Y
480VAC	MCC-39	AUX CONTACT BREAKER 52/EG3	52a/52/EG3	480V SWGR 31, COMPT. 18B	CB	15'-0"	Y
AFW	BFD-FCV-1121	AUX CONTACT CIRCUIT BREAKER 52a/AF1	52a/AF1	480V SWGR 32	CB	15'-0"	Y
AFW	BFD-FCV-1123	AUX CONTACT CIRCUIT BREAKER 52a/AF3	52a/AF3	480V SWGR 32	CB	15'-0"	Y
CVCS	CH-PCV-135	AUX RELAY	T/135	CCR RACK C-10	CB	53'-0"	Y
DC	33CHGR (GE8)	AUX RELAY	PLRA	CCR PANEL SHF	CB	53'-0"	Y
DC	33CHGR (GE8)	AUX RELAY	PVRA	CCR PANEL SHF	CB	53'-0"	Y
DC	33CHGR (GE8)	AUX RELAY	GDRA	CCR PANEL SHF	CB	53'-0"	Y
DC	34CHGR (GF3)	AUX RELAY	PLRA	CCR PANEL SHF	CB	53'-0"	Y
DC	34CHGR (GF3)	AUX RELAY	PVRA	CCR PANEL SHF	CB	53'-0"	Y
DC	34CHGR (GF3)	AUX RELAY	GDRA	CCR PANEL SHF	CB	53'-0"	Y
MS	PCV-1310A	AUX RELAY	TC-1112A/X	CCR PANEL SC	CB	53'-0"	Y
MS	PCV-1310B	AUX RELAY	TC-1113A/X	CCR PANEL SC	CB	53'-0"	Y
CVCS	CH-FCV-110A	AUX RELAY BF22F	LC-112BX	CCR RACK G-2	CB	53'-0"	Y
CVCS	CH-LCV-112A	AUX RELAY BF22F	LC-112A/X	CCR RACK G-2	CB	53'-0"	Y
480VAC	480V SWGR 31	AUX RELAY BFD120S	27-5A/X3	480V SWGR 31 COMPT 25H	CB	15'-0"	Y
HVAC	0033ETEF	AUX RELAY BFD22S	R3	DELUGE SYS CTRL PNL PY5	ET	34'-0"	Y
HVAC	0033ETEF	AUX RELAY BFD22S	R4	DELUGE SYS CTRL PNL PY6	ET	34'-0"	Y
HVAC	0034ETEF	AUX RELAY BFD22S	R3	DELUGE SYS CTRL PNL PY5	ET	34'-0"	Y
HVAC	0034ETEF	AUX RELAY BFD22S	R4	DELUGE SYS CTRL PNL PY6	ET	34'-0"	Y
ACS	AC-0899A	AUX RLY WHSE #BFD48S	SI/6A1	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
ACS	AC-0899B	AUX RLY WHSE #BFD48S	SI/6A1	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
118VAC	GF2	BATTERY INPUT BREAKER CONTACTS	CB2	INVERTER CAB	CB	33'-0"	Y
118VAC	EGA1	BATTERY INPUT CKT BREAKER CONTACTS	CB1	INVERTER CAB	CB	33'-0"	Y
118VAC	EGA2	BATTERY INPUT CKT BREAKER CONTACTS	CB1	INVERTER CAB	CB	33'-0"	Y
118VAC	GC9	BATTERY INPUT CKT. BREAKER CONTACTS	CB1	INVERTER CAB	CB	33'-0"	Y
CVCS	CSAPCH1	BEARING OIL PRESSURE SWITCH A B BULLETION 836-T	63-1	LOCAL	PAB	55'-0"	Y
CVCS	CSAPCH2	BEARING OIL PRESSURE SWITCH A B BULLETION 836-T	63	LOCAL	PAB	55'-0"	Y
CVCS	CSAPCH3	BEARING OIL PRESSURE SWITCH A B BULLETION 836-T	63	LOCAL	PAB	55'-0"	Y
CCW	ACAPCC1	BKR AUX SWITCH	33 CC2	480V SWGR 31, COMPT 32D	CB	15'-0"	Y
CCW	ACAPCC1	BKR AUX SWITCH	52a/CC2	480V SWGR 31, COMPT 32D	CB	15'-0"	Y
CCW	ACAPCC1	BKR AUX SWITCH	33 CC3	480V SWGR 32, COMPT 15D	CB	15'-0"	Y
CCW	ACAPCC1	BKR AUX SWITCH	52a/CC3	480V SWGR 32, COMPT 15D	CB	15'-0"	Y
CVCS	CH-FCV-110B	BORIC ACID COUNTER	YIC-110	CCR PANEL FBF	CB	53'-0"	Y
CVCS	CH-FCV-111A	BORIC ACID COUNTER	YIC-110	CCR PANEL FBF	CB	53'-0"	Y
CVCS	CSAPBA1	BORIC ACID COUNTER	YIC-110	CCR PANEL FBF	CB	53'-0"	Y
CVCS	CSAPBA2	BORIC ACID COUNTER	YIC-110	CCR PANEL FBF	CB	53'-0"	Y
PW	31PWMUP	BORIC ACID COUNTER	YIC-110	CCR PANEL FBF	CB	53'-0"	Y
PW	32PWMUP	BORIC ACID COUNTER	YIC-110	CCR PANEL FBF	CB	53'-0"	Y
CVCS	CH-FCV-110A	BORIC AIC COUNTER	YIC-110	CCR PANEL FBF	CB	53'-0"	Y
CVCS	CH-FCV-111B	BORIC AICD COUNTER	YIC-110	CCR PANEL FBF	CB	53'-0"	Y
480VAC	480V SWGR 31	BREAKER CONTROL SWITCH	1-2/2A	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
480VAC	480V SWGR 31	BREAKER CONTROL SWITCH	1-2/2AT3A	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
480VAC	480V SWGR 31	BREAKER CONTROL SWITCH	1-2/5A	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
480VAC	480V SWGR 32	BREAKER CONTROL SWITCH	1-2/6A	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
480VAC	480V SWGR 32	BREAKER CONTROL SWITCH	1-2/3A	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
480VAC	480V SWGR 31	BREAKER CONTROL SWITCH	1-2/EG1	31EDG CONRTOL PANEL PP9	DGB	15'-0"	Y
DC	34CHGR (GF3)	CHARGE-DISCARGE KEY SELECTOR SWITCH	S1	BATTERY CHRGR 34	CB	33'-0"	Y
DC	33CHGR (GE8)	CHARGE-DISCHARGE KEY SELECTOR SWITCH	S1	BATTERY CHRGR 33	CB	15'-0"	Y
CVCS	CH-LCV-112B	CLOSE CONTACT	42/C	MCC 36B, COMPT. 1RH	PAB	55'-0"	Y
ACS	AC-0730	CLOSE CONTACTOR	42/C	MCC 36A	PAB	55'-0"	Y
ACS	AC-0731	CLOSE CONTACTOR	42/C	MCC 36B	PAB	55'-0"	Y
ACS	AC-0743	CLOSE CONTACTOR	42/C	MCC 36A	PAB	55'-0"	Y
ACS	AC-0744	CLOSE CONTACTOR	42/C	MCC 36A	PAB	55'-0"	Y
ACS	AC-0745A	CLOSE CONTACTOR	42/C	MCC 36B	PAB	55'-0"	Y
ACS	AC-0745B	CLOSE CONTACTOR	42/C	MCC 36A	PAB	55'-0"	Y
ACS	AC-0746	CLOSE CONTACTOR	42/C	MCC 36A	PAB	55'-0"	Y
ACS	AC-0747	CLOSE CONTACTOR	42/C	MCC 36A	PAB	55'-0"	Y
ACS	AC-1870	CLOSE CONTACTOR	42/C	MCC 36B	PAB	55'-0"	Y
ACS	AC-0899A	CLOSE CONTACTOR	42/C	MCC 36B, COMPT 2FH	PAB	55'-0"	Y
ACS	AC-0899B	CLOSE CONTACTOR	42/C	MCC 36A, COMPT. 6RM	PAB	55'-0"	Y
CCW	AC-769	CLOSE CONTACTOR	42/C	MCC 36B, COMPT. 3FD	PAB	55'-0"	Y
CCW	AC-784	CLOSE CONTACTOR	42/C	MCC 36A, COMPT. 3FH	PAB	55'-0"	Y
CCW	AC-786	CLOSE CONTACTOR	42/C	MCC 36B, COMPT 3FM	PAB	55'-0"	Y
CCW	AC-789	CLOSE CONTACTOR	42/C	MCC 36B, COMPT 3FM	PAB	55'-0"	Y
CCW	AC-797	CLOSE CONTACTOR	42/C	MCC 36, COMPT 3FD	PAB	55'-0"	Y
CCW	AC-822B	CLOSE CONTACTOR	42/C	MCC 36B, COMPT 1FM	PAB	55'-0"	Y
CCW	AC-FCV-625	CLOSE CONTACTOR	42/C	MCC 36, COMPT 3FM	PAB	55'-0"	Y
CVCS	CH-LCV-112C	CLOSE CONTACTOR	42/C	MCC 36A, COMPT 1RH	PAB	55'-0"	Y
CVCS	CH-MOV-205	CLOSE CONTACTOR	42/C	MCC 36BEX, COMPT. 9FJ	PAB	55'-0"	Y
CVCS	CH-MOV-222	CLOSE CONTACTOR	42/O	MCC 36A, COMPT 1RM	PAB	55'-0"	Y
CVCS	CH-MOV-226	CLOSE CONTACTOR	42/C	MCC 36B, COMPT 9FJ	PAB	55'-0"	Y
CVCS	CH-MOV-250A	CLOSE CONTACTOR	42/C	MCC 36BEX, COMPT 11FC	PAB	55'-0"	Y
CVCS	CH-MOV-250B	CLOSE CONTACTOR	42/C	MCC 36BEX, COMPT 10FJ	PAB	55'-0"	Y
CVCS	CH-MOV-250C	CLOSE CONTACTOR	42/C	MCC 36BEX, COMPT 9FM	PAB	55'-0"	Y
CVCS	CH-MOV-250D	CLOSE CONTACTOR	42/C	MCC 36BEX, COMPT 11FF	PAB	55'-0"	Y
CVCS	CH-MOV-333	CLOSE CONTACTOR	42/C	MCC 36B, COMPT 1RM	PAB	55'-0"	Y
CVCS	CH-MOV-441	CLOSE CONTACTOR	42/C	MCC 36A, COMPT 10FC	PAB	55'-0"	Y
CVCS	CH-MOV-442	CLOSE CONTACTOR	42/C	MCC 36A, COMPT 10FF	PAB	55'-0"	Y
CVCS	CH-MOV-443	CLOSE CONTACTOR	42/C	MCC 36A, COMPT 10FJ	PAB	55'-0"	Y
CVCS	CH-MOV-444	CLOSE CONTACTOR	42/C	MCC 36A, COMPT 11FF	PAB	55'-0"	Y
SIS	SI-0885A	CLOSE CONTACTOR	42/C	MCC 36A	PAB	55'-0"	Y
SIS	SI-0885B	CLOSE CONTACTOR	42/C	MCC 36B	PAB	55'-0"	Y
SIS	SI-0888A	CLOSE CONTACTOR	42/C	MCC 36A	PAB	55'-0"	Y
SIS	SI-0888B	CLOSE CONTACTOR	42/C	MCC 36B	PAB	55'-0"	Y
SIS	SI-0889A	CLOSE CONTACTOR	42/C	MCC 36A	PAB	55'-0"	Y
SIS	SI-0889B	CLOSE CONTACTOR	42/C	MCC 36B	PAB	55'-0"	Y
SIS	SI-0894A	CLOSE CONTACTOR	42/C	MCC 36A	PAB	55'-0"	Y
SIS	SI-0894B	CLOSE CONTACTOR	42/C	MCC 36B	PAB	55'-0"	Y
SIS	SI-0894C	CLOSE CONTACTOR	42/C	MCC 36A	PAB	55'-0"	Y
SIS	SI-0894D	CLOSE CONTACTOR	42/C	MCC 36B	PAB	55'-0"	Y
SIS	SI-1802A	CLOSE CONTACTOR	42/C	MCC 36A	PAB	55'-0"	Y
SIS	SI-1802B	CLOSE CONTACTOR	42/C	MCC 36B	PAB	55'-0"	Y
SIS	SI-1810	CLOSE CONTACTOR	42/C	MCC 36A	PAB	55'-0"	Y
SIS	SI-1869A	CLOSE CONTACTOR	42/C	MCC 36A	PAB	55'-0"	Y
SIS	SI-1869B	CLOSE CONTACTOR	42/C	MCC 36B	PAB	55'-0"	Y
SIS	SI-HCV-638	CLOSE CONTACTOR	42/C	MCC 36B	PAB	55'-0"	Y
SIS	SI-HCV-640	CLOSE CONTACTOR	42/C	MCC 36A	PAB	55'-0"	Y
IA	SOV-1428	CLOSE-OPEN SWITCH	1/IAIV	CCR PANEL SNF	CB	53'-0"	Y
SWN	FCV-1176	CLOSE/AUTO/OPEN SELECTOR SWITCH	1/DGCW1	LOCAL	CB	53'-0"	Y
SWN	FCV-1176A	CLOSE/AUTO/OPEN SELECTOR SWITCH	1/DGCW2	LOCAL	CB	53'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
RCS	RC-544	CLOSE/OPEN SWITCH	1/544	CCR PANEL SAF	CB	53'-0"	Y
CCW	AC-822A	CLSOE CONTACTOR	42/C	MCC 36A, COMPT. 1FM	PAB	55'-0"	Y
HVAC	ACU31	COMPRESSOR THERMOSTAT CONTACTS	1CT	ACU31	CB	15'-0"	Y
HVAC	ACU31	COMPRESSOR THERMOSTAT CONTACTS	2CT	ACU31	CB	15'-0"	Y
HVAC	ACU32	COMPRESSOR THERMOSTAT RELAY	1CT	ACU32	CB	15'-0"	Y
HVAC	ACU32	COMPRESSOR THERMOSTAT RELAY	2CT	ACU32	CB	15'-0"	Y
CVCS	CH-LCV-112C	CONTACTOR AUX CONTACT	42a/C	MCC 36A, COMPT. 1RH	PAB	55'-0"	Y
CVCS	CH-LCV-112C	CONTACTOR AUX CONTACT	42a/O	MCC 36A, COMPT. 1RH	PAB	55'-0"	Y
CVCS	CH-LCV-112C	CONTACTOR AUX CONTACT	42b/O	MCC 36A, COMPT. 1RH	PAB	55'-0"	Y
CVCS	CH-MOV-333	CONTACTOR AUX CONTACT	42a/O	MCC 36B, COMPT. 1RM	PAB	55'-0"	Y
CVCS	CH-MOV-333	CONTACTOR AUX CONTACT	42a/C	MCC 36B, COMPT. 1RM	PAB	55'-0"	Y
SIS	SI-0885A	CONTACTOR AUX CONTACTS	42ao,42ac,42b,42bc	MCC 36A	PAB	55'-0"	Y
SIS	SI-0885B	CONTACTOR AUX CONTACTS	42ao,42ac,42bo,42bc	MCC 36B	PAB	55'-0"	Y
SIS	SI-0889A	CONTACTOR AUX CONTACTS	42ac,42ao,42bc,42bo	MCC 36A	PAB	55'-0"	Y
SIS	SI-0889B	CONTACTOR AUX CONTACTS	42ac,42ao,42bc,42bo	MCC 36B	PAB	55'-0"	Y
SIS	SI-0894A	CONTACTOR AUX CONTACTS	42ac,42ao,42bc,42bo	MCC 36A	PAB	55'-0"	Y
SIS	SI-0894B	CONTACTOR AUX CONTACTS	42ac,42ao,42bc,42bo	MCC 36B	PAB	55'-0"	Y
SIS	SI-0894C	CONTACTOR AUX CONTACTS	42ac,42ao,42bc,42bo	MCC 36A	PAB	55'-0"	Y
SIS	SI-0894D	CONTACTOR AUX CONTACTS	42ac,42ao,42bc,42bo	MCC 36B	PAB	55'-0"	Y
SIS	SI-1802A	CONTACTOR AUX CONTACTS	42ac,42ao,42bc,42bo	MCC 36A	PAB	55'-0"	Y
SIS	SI-1802B	CONTACTOR AUX CONTACTS	42ac,42ao,42bc,42bo	MCC 36B	PAB	55'-0"	Y
SIS	SI-1810	CONTACTOR AUX CONTACTS	42ac,42ao,42bc,42bo	MCC 36A	PAB	55'-0"	Y
SIS	SI-1869A	CONTACTOR AUX CONTACTS	42(ac,ao,bc,bo)	MCC 36A	PAB	55'-0"	Y
SIS	SI-1869B	CONTACTOR AUX CONTACTS	42ac,ao,bc,bo	MCC 36B	PAB	55'-0"	Y
RCS	PCV-455C	CONTROL AUX CONTACTS	33(ac,bo)	VALVE MOUNTED	VC	124'-0"	Y
480VAC	480V SWGR 31	CONTROL SWITCH	1/2A	CCR PANEL SH	CB	53'-0"	Y
480VAC	480V SWGR 32	CONTROL SWITCH	1/3A	CCR PANEL SH	CB	53'-0"	Y
AFW	BFD-FCV-1121	CONTROL SWITCH	1/AF1	CCR PANEL SC	CB	53'-0"	Y
AFW	BFD-FCV-1123	CONTROL SWITCH	1/AF3	CCR PANEL SC	CB	53'-0"	Y
CCW	ACAPCC1	CONTROL SWITCH	1/CC1	CCR PANEL SGF	CB	53'-0"	Y
CCW	ACAPCC2	CONTROL SWITCH	1/CC2	CCR PANEL SGF	CB	53'-0"	Y
CCW	ACAPCC3	CONTROL SWITCH	1/CC3	CCR PANEL SGF	CB	53'-0"	Y
EDG	DG-31	CONTROL SWITCH	1-1/EG1	CCR PANEL SH	CB	53'-0"	Y
EDG	DG-33	CONTROL SWITCH	1-1/EG3	CCR PANEL SH	CB	53'-0"	Y
EDG	DG-32	CONTROL SWITCH	1-1/EG2	CCR PANEL SH	CB	53'-0"	Y
RCS	RC-549	CONTROL SWITCH	E3	GAS ANALYZER PANEL PF6	PAB	55'-0"	Y
RCS	RC-MOV-535	CONTROL SWITCH	1/535	CCR PANEL FCF	CB	53'-0"	Y
RCS	G-4	CONTROL SWITCH	1/FW1DA	CCR RACK G-4	CB	53'-0"	Y
RCS	G-6	CONTROL SWITCH	1/FWIDB	CCR RACK G-6	CB	53'-0"	Y
RCS	RC-MOV-536	CONTROL SWITCH	1/536	CCR PANEL FCF	CB	53'-0"	Y
RHR	ACAPRH1	CONTROL SWITCH	1/RHR1	CCR PANEL SGF	CB	53'-0"	Y
RHR	ACAPRH2	CONTROL SWITCH	1/RHR2	CCR PANEL SGF	CB	53'-0"	Y
SIS	SI-0894A	CONTROL SWITCH "CLOSE/AUTO/OPEN" 3-POS SPR RET TO AUTO	1/0894A	CCR PANEL SMF	CB	53'-0"	Y
SIS	SI-0894B	CONTROL SWITCH "CLOSE/AUTO/OPEN" 3-POS SPR RET TO AUTO	1/0894B	CCR PANEL SMF	CB	53'-0"	Y
SIS	SI-0894C	CONTROL SWITCH "CLOSE/AUTO/OPEN" 3-POS SPR RET TO AUTO	1/0894C	CCR PANEL SMF	CB	53'-0"	Y
SIS	SI-0894D	CONTROL SWITCH "CLOSE/AUTO/OPEN" 3-POS SPR RET TO AUTO	1/0894D	CCR PANEL SMF	CB	53'-0"	Y
SIS	SI-0889A	CONTROL SWITCH "CLOSE/AUTO/OPEN" 3-POS. SPR RET TO AUTO	1/889A	CCR PANEL SBF-1	CB	53'-0"	Y
SIS	SI-0889B	CONTROL SWITCH "CLOSE/AUTO/OPEN" 3-POS. SPR RET TO AUTO	1/889B	CCR PANEL SBF-1	CB	53'-0"	Y
CCW	AC-791	CONTROL SWITCH (CLOSE OPEN)	1/791	CCR PANEL SNF	CB	53'-0"	Y
CCW	AC-793	CONTROL SWITCH (CLOSE OPEN)	1/793	CCR PANEL SNF	CB	53'-0"	Y
CCW	AC-796	CONTROL SWITCH (CLOSE OPEN)	1/796	CCR PANEL SGF	CB	53'-0"	Y
CCW	AC-798	CONTROL SWITCH (CLOSE OPEN)	1/798	CCR PANEL SNF	CB	53'-0"	Y
ACS	AC-0730	CONTROL SWITCH (CLOSE/AUTO/OPEN)	1/730	CCR PANEL SGF	CB	53'-0"	Y
ACS	AC-0731	CONTROL SWITCH (CLOSE/AUTO/OPEN)	1/731	CCR PANEL SGF	CB	53'-0"	Y
ACS	AC-0746	CONTROL SWITCH (CLOSE/AUTO/OPEN)	1/746	CCR PANEL SGF	CB	53'-0"	Y
ACS	AC-0747	CONTROL SWITCH (CLOSE/AUTO/OPEN)	1/747	CCR PANEL SGF	CB	53'-0"	Y
ACS	AC-0899A	CONTROL SWITCH (CLOSE/AUTO/OPEN)	1/899A	CCR PANEL SGF	CB	53'-0"	Y
ACS	AC-0899B	CONTROL SWITCH (CLOSE/AUTO/OPEN)	1/899B	CCR PANEL SGF	CB	53'-0"	Y
AFW	BFD-FCV-1121	CONTROL SWITCH (CLOSE/AUTO/OPEN)	1/AFPR1	CCR PANEL SC	CB	53'-0"	Y

Table 3A.5

Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
AFW	BFD-FCV-1123	CONTROL SWITCH (CLOSE/AUTO/OPEN)	1/AFPR3	CCR PANEL SC	CB	53'-0"	Y
CVCS	CH-LCV-112B	CONTROL SWITCH (CLOSE/AUTO/OPEN)	1/112B	CCR PANEL SFF	CB	53'-0"	Y
CVCS	CH-MOV-222	CONTROL SWITCH (CLOSE/AUTO/OPEN)	1/222	CCR PANEL SNF	CB	53'-0"	Y
RCS	PCV-455C	CONTROL SWITCH (CLOSE/AUTO/OPEN)	1/455C	CCR PANEL FCF	CB	53'-0"	Y
RCS	PCV-456	CONTROL SWITCH (CLOSE/AUTO/OPEN)	1/456	CCR PANEL FCF	CB	53'-0"	Y
SIS	SI-0882	CONTROL SWITCH (CLOSE/AUTO/OPEN)	1/882	CCR PANEL SBF-1	CB	53'-0"	Y
SIS	SI-0885A	CONTROL SWITCH (CLOSE/AUTO/OPEN)	1/885A	CCR PANEL SBF-1	CB	53'-0"	Y
SIS	SI-0885B	CONTROL SWITCH (CLOSE/AUTO/OPEN)	1/885B	CCR PANEL SBF-1	CB	53'-0"	Y
SIS	SI-0888A	CONTROL SWITCH (CLOSE/AUTO/OPEN)	1/888A	CCR PANEL SBF-1	CB	53'-0"	Y
SIS	SI-0888B	CONTROL SWITCH (CLOSE/AUTO/OPEN)	1/888B	CCR PANEL SBF-1	CB	53'-0"	Y
SIS	SI-1802A	CONTROL SWITCH (CLOSE/AUTO/OPEN)	1/1802A	CCR PANEL SBF-1	CB	53'-0"	Y
SIS	SI-1802B	CONTROL SWITCH (CLOSE/AUTO/OPEN)	1/1802B	CCR PANEL SBF-1	CB	53'-0"	Y
SIS	SI-1810	CONTROL SWITCH (CLOSE/AUTO/OPEN)	1/1810	CCR PANEL SBF-1	CB	53'-0"	Y
SIS	SI-1869A	CONTROL SWITCH (CLOSE/AUTO/OPEN)	1/1869A	CCR PANEL SBF-1	CB	53'-0"	Y
SIS	SI-1869B	CONTROL SWITCH (CLOSE/AUTO/OPEN)	1/1869B	CCR PANEL SBF-1	CB	53'-0"	Y
ACS	AC-0743	CONTROL SWITCH (CLOSE/OPEN)	1/743	CCR PANEL SBF-1	CB	53'-0"	Y
ACS	AC-0744	CONTROL SWITCH (CLOSE/OPEN)	1/744	CCR PANEL SBF-1	CB	53'-0"	Y
ACS	AC-0745A	CONTROL SWITCH (CLOSE/OPEN)	1/745A	CCR PANEL SBF-1	CB	53'-0"	Y
ACS	AC-0745B	CONTROL SWITCH (CLOSE/OPEN)	1/745B	CCR PANEL SBF-1	CB	53'-0"	Y
COND	PCV-1187	CONTROL SWITCH (CLOSE/OPEN)	1/CWMU1	CCR PANEL SCF	CB	53'-0"	Y
COND	PCV-1188	CONTROL SWITCH (CLOSE/OPEN)	1/CWMU2	CCR PANEL SCF	CB	53'-0"	Y
COND	PCV-1189	CONTROL SWITCH (CLOSE/OPEN)	1/CWMU3	CCR PANEL SCF	CB	53'-0"	Y
CVCS	CH-201	CONTROL SWITCH (CLOSE/OPEN)	1/201	CCR PANEL SNF	CB	53'-0"	Y
CVCS	CH-202	CONTROL SWITCH (CLOSE/OPEN)	1/202	CCR PANEL SNF	CB	53'-0"	Y
CVCS	CH-268	CONTROL SWITCH (CLOSE/OPEN)	1/268	CCR PANEL SFF	CB	53'-0"	Y
CVCS	CH-310	CONTROL SWITCH (CLOSE/OPEN)	1/310	CCR PANEL SFF	CB	53'-0"	Y
CVCS	CH-AOV-200A	CONTROL SWITCH (CLOSE/OPEN)	1/200A	CCR PANEL SFF	CB	53'-0"	Y
CVCS	CH-AOV-200B	CONTROL SWITCH (CLOSE/OPEN)	1/200B	CCR PANEL SFF	CB	53'-0"	Y
CVCS	CH-AOV-200C	CONTROL SWITCH (CLOSE/OPEN)	1/200C	CCR PANEL SFF	CB	53'-0"	Y
CVCS	CH-AOV-204A	CONTROL SWITCH (CLOSE/OPEN)	1/204A	CCR PANEL SFF	CB	53'-0"	Y
CVCS	CH-AOV-204B	CONTROL SWITCH (CLOSE/OPEN)	1/204B	CCR PANEL SFF	CB	53'-0"	Y
CVCS	CH-AOV-212	CONTROL SWITCH (CLOSE/OPEN)	1/212	CCR PANEL SFF	CB	53'-0"	Y
CVCS	CH-AOV-213A	CONTROL SWITCH (CLOSE/OPEN)	1/213A	CCR PANEL SFF	CB	53'-0"	Y
CVCS	CH-AOV-213B	CONTROL SWITCH (CLOSE/OPEN)	1/213B	CCR PANEL SFF	CB	53'-0"	Y
CVCS	CH-AOV-215	CONTROL SWITCH (CLOSE/OPEN)	1/215	CCR PANEL SFF	CB	53'-0"	Y
CVCS	CH-AOV-246	CONTROL SWITCH (CLOSE/OPEN)	1/246	CCR PANEL SFF	CB	53'-0"	Y
CVCS	CH-AOV-261A	CONTROL SWITCH (CLOSE/OPEN)	1/261A	CCR PANEL SAF	CB	53'-0"	Y
CVCS	CH-AOV-261B	CONTROL SWITCH (CLOSE/OPEN)	1/261B	CCR PANEL SAF	CB	53'-0"	Y
CVCS	CH-AOV-261C	CONTROL SWITCH (CLOSE/OPEN)	1/261C	CCR PANEL SAF	CB	53'-0"	Y
CVCS	CH-AOV-261D	CONTROL SWITCH (CLOSE/OPEN)	1/261D	CCR PANEL SAF	CB	53'-0"	Y
CVCS	CH-MOV-205	CONTROL SWITCH (CLOSE/OPEN)	1/205	MCC 36BEX, COMPT 9FJ	PAB	55'-0"	Y
CVCS	CH-MOV-226	CONTROL SWITCH (CLOSE/OPEN)	1/226	MCC 36B, COMPT 9FJ	PAB	55'-0"	Y
CVCS	CH-MOV-250A	CONTROL SWITCH (CLOSE/OPEN)	1/250A	MCC 36BEX, COMPT 11FC	PAB	55'-0"	Y
CVCS	CH-MOV-250B	CONTROL SWITCH (CLOSE/OPEN)	1/250B	MCC 36BEX, COMPT 10FJ	PAB	55'-0"	Y
CVCS	CH-MOV-250C	CONTROL SWITCH (CLOSE/OPEN)	1/250C	MCC 36BEX, COMPT 9FM	PAB	55'-0"	Y
CVCS	CH-MOV-250D	CONTROL SWITCH (CLOSE/OPEN)	1/250D	MCC 36BEX, COMPT 11FF	PAB	55'-0"	Y
CVCS	CH-MOV-333	CONTROL SWITCH (CLOSE/OPEN)	1/333	CCR PANEL SFF	CB	53'-0"	Y
CVCS	CH-MOV-441	CONTROL SWITCH (CLOSE/OPEN)	1/441	MCC 36A, COMPT 10FC	PAB	55'-0"	Y
CVCS	CH-MOV-443	CONTROL SWITCH (CLOSE/OPEN)	1/443	MCC 36A, COMPT 10FJ	PAB	55'-0"	Y
CVCS	CH-MOV-444	CONTROL SWITCH (CLOSE/OPEN)	1/444	MCC 36A, COMPT 11FF	PAB	55'-0"	Y
MS	PCV-1310A	CONTROL SWITCH (CLOSE/OPEN)	1/AFPSS1	CCR PANEL SC	CB	53'-0"	Y
MS	PCV-1310B	CONTROL SWITCH (CLOSE/OPEN)	1/AFPSS2	CCR PANEL SC	CB	53'-0"	Y
RCS	RC-516	CONTROL SWITCH (CLOSE/OPEN)	1/516	CCR PANEL SAF	CB	53'-0"	Y
RCS	RC-519	CONTROL SWITCH (CLOSE/OPEN)	1/V519	CCR PANEL SAF	CB	53'-0"	Y
RCS	RC-523	CONTROL SWITCH (CLOSE/OPEN)	1/523	CCR PANEL SAF	CB	53'-0"	Y
RCS	RC-552	CONTROL SWITCH (CLOSE/OPEN)	1/V552	CCR PANEL SAF	CB	53'-0"	Y
RCS	RC-560	CONTROL SWITCH (CLOSE/OPEN)	1/560	CCR PANEL SAF	CB	53'-0"	Y
SIS	SI-HCV-638	CONTROL SWITCH (CLOSE/OPEN)	1/638	CCR PANEL SGF	CB	53'-0"	Y
SIS	SI-HCV-640	CONTROL SWITCH (CLOSE/OPEN)	1/640	CCR PANEL SGF	CB	53'-0"	Y

Table 3A.5

Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
SP	955A	CONTROL SWITCH (CLOSE/OPEN)	1/955A	SAMPLING PANEL	PAB	55'-0"	Y
CVCS	CH-AOV-200A	CONTROL SWITCH (CLOSE/REMOTE)	43	LOCAL	VC	46'-0"	Y
CVCS	CH-AOV-200B	CONTROL SWITCH (CLOSE/REMOTE)	43	LOCAL	VC	46'-0"	Y
CVCS	CH-AOV-200C	CONTROL SWITCH (CLOSE/REMOTE)	43	LOCAL	VC	46'-0"	Y
AFW	ABFP-31	CONTROL SWITCH (TRIP/OFF/CLOSE)	1/AF1	CCR PANEL SC	CB	53'-0"	Y
AFW	ABFP-33	CONTROL SWITCH (TRIP/OFF/CLOSE)	1/AF3	CCR PANEL SC	CB	53'-0"	Y
SP	958	CONTROL SWITCH 2-POSITION MAINTAINED (CLOSE/OPEN)	1/958	CCR PANEL JK1	CB	53'-0"	Y
CVCS	SOV-460-1	CONTROL SWITCH 3 POSITION MAINTAINED	1/LCV-460	CCR PANEL SFF	CB	53'-0"	Y
PW	31PWMUP	CONTROL SWITCH 3-POSITION	1/PWMP31	CCR PANEL FCF	CB	53'-0"	Y
PW	32PWMUP	CONTROL SWITCH 3-POSITION	1/PWMP32	CCR PANEL FCF	CB	53'-0"	Y
RCS	PBU1	CONTROL SWITCH 3-POSITION	1/PBU1	CCR PANEL FBF	CB	53'-0"	Y
RCS	PBU2	CONTROL SWITCH 3-POSITION	1/PBU2	CCR PANEL FBF	CB	53'-0"	Y
RCS	PBU3	CONTROL SWITCH 3-POSITION	1/PBU3	CCR PANEL FBF	CB	53'-0"	Y
CVCS	SOV-459-1	CONTROL SWITCH 3-POSITION MAINTAINED	1/LCV-459	CCR PANEL SFF	CB	53'-0"	Y
480VAC	MCC-36A	CONTROL SWITCH 3-POSITION SPRING RETURN TO OFF	1/MCC6A	CCR PANEL SBF-2	CB	53'-0"	Y
480VAC	MCC-36B	CONTROL SWITCH 3-POSITION SPRING RETURN TO OFF	1/MCC6B	CCR PANEL SBF-2	CB	53'-0"	Y
480VAC	480V SWGR 31	CONTROL SWITCH 3-POSITION SPRING RETURN TO OFF	1-1/2A	CCR PANEL SH	CB	53'-0"	Y
480VAC	480V SWGR 31	CONTROL SWITCH 3-POSITION SPRING RETURN TO OFF	1-1/2AT3A	CCR PANEL SH	CB	53'-0"	Y
480VAC	480V SWGR 31	CONTROL SWITCH 3-POSITION SPRING RETURN TO OFF	SS/2AT3A	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
480VAC	480V SWGR 31	CONTROL SWITCH 3-POSITION SPRING RETURN TO OFF	1/2AT5A	CCR PANEL SH	CB	53'-0"	Y
480VAC	480V SWGR 31	CONTROL SWITCH 3-POSITION SPRING RETURN TO OFF	1-1/5A	CCR PANEL SH	CB	53'-0"	Y
480VAC	480V SWGR 32	CONTROL SWITCH 3-POSITION SPRING RETURN TO OFF	1-1/6A	CCR PANEL SH	CB	53'-0"	Y
480VAC	480V SWGR 32	CONTROL SWITCH 3-POSITION SPRING RETURN TO OFF	1-1/3A	CCR PANEL SH	CB	53'-0"	Y
480VAC	480V SWGR 32	CONTROL SWITCH 3-POSITION SPRING RETURN TO OFF	1/3AT6A	CCR PANEL SH	CB	53'-0"	Y
480VAC	MCC-36C	CONTROL SWITCH 3-POSITION SPRING RETURN TO OFF	1/MCC6C	CCR PANEL SBF-1	CB	53'-0"	Y
CVCS	CSAPCH1	CONTROL SWITCH SPRING RETURN TO OFF	1/C1	CCR PANEL FBF	CB	53'-0"	Y
CVCS	CSAPCH2	CONTROL SWITCH SPRING RETURN TO OFF	1/C2	CCR PANEL FBF	CB	53'-0"	Y
CVCS	CSAPCH3	CONTROL SWITCH SPRING RETURN TO OFF	1/C3	CCR PANEL FBF	CB	53'-0"	Y
SP	955B	CONTROL SWITICH (CLOSE/OPEN)	1/955B	SAMPLING PANEL	PAB	55'-0"	Y
ACS	AC-1870	CONTROL SWTICH (CLOSE/OPEN)	1/1870	CCR PANEL SBF-1	CB	53'-0"	Y
CVCS	CH-MOV-442	CONTROL SWTICH (CLOSE/OPEN)	1/442	MCC 36A, COMPT 10FF	PAB	55'-0"	Y
EDG	DG-31	CURRENT SENSING RELAY WHSE CW 2892988A17A	32/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-33	CURRENT SENSING RELAY WHSE CW 2892988A17A	32/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	CURRENT SENSING RELAY WHSE CW 2892988A17A	32/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
DC	33CHGR (GE8)	DC LOW VOLTAGE ALARM BYPASS SELECTOR SWITCH	SW2	CCR PANEL SHF	CB	53'-0"	Y
DC	34CHGR (GF3)	DC LOW VOLTAGE ALARM BYPASS SELECTOR SWITCH	SW2	CCR PANEL SHF	CB	53'-0"	Y
HVAC	0031ETEF	DELUGE SYSTEM CONTACT	1X	DELUGE SYS CTRL PNL PY3	ET	34'-0"	Y
HVAC	0031ETEF	DELUGE SYSTEM CONTACT	2X	DELUGE SYS CTRL PNL PY4	ET	34'-0"	Y
HVAC	0032ETEF	DELUGE SYSTEM CONTACT	1X	DELUGE SYS CTRL PNL PY3	ET	34'-0"	Y
HVAC	0032ETEF	DELUGE SYSTEM CONTACT	2X	DELUGE SYS CTRL PNL PY4	ET	34'-0"	Y
HVAC	0033ETEF	DELUGE SYSTEM CONTACT	3X	DELUGE SYS CTRL PNL PY5	ET	34'-0"	Y
HVAC	0033ETEF	DELUGE SYSTEM CONTACT	4X	DELUGE SYS CTRL PNL PY6	ET	34'-0"	Y
HVAC	0034ETEF	DELUGE SYSTEM CONTACT	3X	DELUGE SYS CTRL PNL PY5	ET	34'-0"	Y
HVAC	0034ETEF	DELUGE SYSTEM CONTACT	4X	DELUGE SYS CTRL PNL PY6	ET	34'-0"	Y
PW	31PWMUP	DEMIN WATER COUNTER	YIC-111	CCR PANEL FBF	CB	53'-0"	Y
PW	32PWMUP	DEMIN WATER COUNTER	YIC-111	CCR PANEL FBF	CB	53'-0"	Y
CVCS	CSAPBA1	DEMIN. WATER COUNTER	YIC-111	CCR PANEL FBF	CB	53'-0"	Y
CVCS	CSAPBA2	DEMIN WATER COUNTER	YIC-111	CCR PANEL FBF	CB	53'-0"	Y
480VAC	480V SWGR 31	DIESEL GENERATOR ISOLATION SWITCH	4/ISO	SWGR ISOLATION CAB CH IV	CB	15'-0"	Y
480VAC	480V SWGR 32	DIESEL GENERATOR ISOLATION SWITCH	5/ISO	SWGR ISOLATION CAB CH III	CB	15'-0"	Y
480VAC	480V SWGR 32	DIESEL GENERATOR ISOLATION SWITCH	7/ISO	DIESEL ISOLATION CABINET			Y
480VAC	480V SWGR 31	DIESEL GENERATOR ISOLATION SWITCH (MAINTAINED CONTACTS)	8/ISO	DIESEL ISOLATION CABINET			Y
RCS	PCV-455C	DIFF BI-STABLE ALARM UNIT	PC-443	CCR RACK H-3	CB	53'-0"	Y
RCS	PCV-455C	DIFF BISTABLE ALARM UNIT	PC-413	CCR RACK H-1	CB	53'-0"	Y
DC	31CHGR (GE3)	DIFF PRESS RELAY	DPR	BATTERY CHRGR 31	CB	33'-0"	Y
DC	32CHGR (GE4)	DIFF PRESS RELAY	DPR	BATTERY CHRGR 32	CB	33'-0"	Y
HVAC	F-311	DISC SWITCH	DISC SW	LOCAL	AB	18'-6"	Y
HVAC	F-312	DISC SWITCH	DISC SW	LOCAL	AB	18'-6"	Y
HVAC	F-313	DISC SWITCH	DISC SW	LOCAL	AB	18'-6"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
EDG	DG-33	EMERG FIELD SHTDWN PB	ES/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	EMERG FIELD SHTDWN PB	ES/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-31	EMERG FIELD SHUTDOWN PUSHBUTTON	ES/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
HVAC	0033ETEF	FAN 33/34 SEL SWITCH	43U/F33	CCR PANEL SL	CB	53'-0"	Y
HVAC	0034ETEF	FAN 33/34 SEL SWITCH	43u/F34	CCR PANEL SL	CB	53'-0"	Y
HVAC	0032ETEF	FAN11/FAN12 SEL SWITCH	43U/F32	CCR PANEL SL	CB	53'-0"	Y
HVAC	0031ETEF	FAN21/FAN22 SELECTOR SWITCH	43U/F31	CCR PANEL SL	CB	53'-0"	Y
DC	33CHGR (GE8)	FLOAT EQUALIZER CHARGE SELECTOR SWITCH	SW5	BATTERY CHRGR 33	CB	15'-0"	Y
DC	34CHGR (GF3)	FLOAT EQUALIZER CHARGE SELECTOR SWITCH	SW5	BATTERY CHRGR 34	CB	33'-0"	Y
DC	31CHGR (GE3)	FLOAT EQUALIZER SWITCH	SW1	BATTERY CHRGR 31	CB	33'-0"	Y
DC	32CHGR (GE4)	FLOAT EQUALIZER SWITCH	SW1	BATTERY CHRGR 32	CB	33'-0"	Y
AFW	BFD-FCV-1121	FLOW SWITCH	80-1/AFPR1	LOCAL	AB	18'-6"	Y
AFW	BFD-FCV-1121	FLOW SWITCH	80/AFPR1	LOCAL	AB	18'-6"	Y
AFW	BFD-FCV-1123	FLOW SWITCH	80-1/AFPR3	LOCAL	AB	18'-6"	Y
AFW	BFD-FCV-1123	FLOW SWITCH	80/AFPR3	LOCAL	AB	18'-6"	Y
CCW	AC-FCV-625	FLOW SWITCH	FIC-625	CCR PANEL SGF	CB	53'-0"	Y
EDG	DG-31	GOVERNOR SPEED	SSP/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-33	GOVERNOR SPEED	SSP/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	GOVERNOR SPEED	SSP/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
DC	31CHGR (GE3)	GROUND DETECT RELAY RESET SWITCH	SW3	BATTERY CHRGR 31	CB	33'-0"	Y
DC	32CHGR (GE4)	GROUND DETECT RELAY RESET SWITCH	SW3	BATTERY CHRGR 32	CB	33'-0"	Y
DC	34CHGR (GF3)	GROUND DETECTION ALARM BYPASS SELECTOR SWITCH	SW3	CCR PANEL SHF	CB	53'-0"	Y
DC	33CHGR (GE8)	GROUND DETECTION ALARM BYPASS SELECTOR SWITCH	SW3	CCR PANEL SHF	CB	53'-0"	Y
DC	33CHGR (GE8)	GROUND DETECTION RELAY	GDR	BATTERY CHRGR 33	CB	33'-0"	Y
DC	34CHGR (GF3)	GROUND DETECTION RELAY	GDR	BATTERY CHRGR 34	CB	33'-0"	Y
DC	31CHGR (GE3)	HIGH D.C. VOLTAGE CONTROL RELAY	K21	BATTERY CHRGR 31	CB	33'-0"	Y
DC	32CHGR (GE4)	HIGH D C. VOLTAGE CONTROL RELAY	K21	BATTERY CHRGR 32	CB	33'-0"	Y
HVAC	ACU32	HIGH PRESSURE CUTOUT RELAY	1HIP	ACU32	CB	15'-0"	Y
HVAC	ACU32	HIGH PRESSURE CUTOUT RELAY	2HIP	ACU32	CB	15'-0"	Y
HVAC	ACU31	HIGH PRESSURE CUTOUT SWITCH	1HIP	ACU31	CB	15'-0"	Y
HVAC	ACU31	HIGH PRESSURE CUTOUT SWITCH	2HIP	ACU31	CB	15'-0"	Y
DC	31CHGR (GE3)	HIGH VOLTAGE CONTROL RELAY RESET SWITCH	SW14	BATTERY CHRGR 31	CB	33'-0"	Y
DC	32CHGR (GE4)	HIGH VOLTAGE CONTROL RELAY RESET SWITCH	SW14	BATTERY CHRGR 32	CB	33'-0"	Y
118VAC	GF2	INV. A C. OUTPUT BREAKER CONTACTS	CB4	INVERTER CAB	CB	33'-0"	Y
118VAC	GF2	INV. D.C INPUT BREAKER CONTACTS	CB3	INVERTER CAB	CB	33'-0"	Y
118VAC	EGA1	INVERTER OUTPUT CKT. BREAKER CONTACTS	CB2	INVERTER CAB	CB	33'-0"	Y
118VAC	EGA2	INVERTER OUTPUT CKT. BREAKER CONTACTS	CB2	INVERTER CAB	CB	33'-0"	Y
118VAC	GC9	INVERTER OUTPUT CKT. BREAKER CONTACTS	CB2	INVERTER CAB	CB	33'-0"	Y
480VAC	480V SWGR 31	ISOLATION SWITCH	1/ISO	SWGR ISOLATION CAB CH IV	CB	15'-0"	Y
480VAC	BUS 2A-VM	ISOLATION SWITCH	3/ISO	480V SWGR 31	CB	15'-0"	Y
480VAC	BUS 3A-VM	ISOLATION SWITCH	3/ISO	480V SWGR 31	CB	15'-0"	Y
EDG	DG-31	ISOLATION SWITCH	9/ISO	DIESEL ISOLATION CABINET			Y
EDG	DG-31	ISOLATION SWITCH	2/ISO	SWGR ISOLATION CAB CH IV	CB	15'-0"	Y
EDG	DG-33	ISOLATION SWITCH	27-2/5A	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
EDG	DG-32	ISOLATION SWITCH	27-2/6A	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
EDG	DG-31-WM	ISOLATION SWITCH	10/ISO	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	JACKET WATER PRESSURE SWITCH	JWPS1/EG1	DG-31 SKID	DGB	10'-0"	Y
EDG	DG-31	JACKET WATER PRESSURE SWITCH	JWPS2/EG1	DG-31 SKID	DGB	10'-0"	Y
EDG	DG-31	JACKET WATER PRESSURE SWITCH	JWPS4/EG1	DG-31 SKID	DGB	10'-0"	Y
EDG	DG-31	JACKET WATER PRESSURE SWITCH	JWPS3/EG1	DG-31 SKID	DGB	10'-0"	Y
EDG	DG-31	JACKET WATER PRESSURE SWITCH	JWPS5/EG1	DG-31 SKID	DGB	10'-0"	Y
EDG	DG-33	JACKET WATER PRESSURE SWITCH	JWPS1/EG3	DG-33 SKID	DGB	10'-0"	Y
EDG	DG-33	JACKET WATER PRESSURE SWITCH	JWPS2/EG3	DG-33 SKID	DGB	10'-0"	Y
EDG	DG-33	JACKET WATER PRESSURE SWITCH	JWPS4/EG3	DG-33 SKID	DGB	10'-0"	Y
EDG	DG-33	JACKET WATER PRESSURE SWITCH	JWPS3/EG3	DG-33 SKID	DGB	10'-0"	Y
EDG	DG-33	JACKET WATER PRESSURE SWITCH	JWPS6/EG3	DG 33 SKID	DGB	10'-0"	Y
EDG	DG-32	JACKET WATER PRESSURE SWITCH	JWPS1/EG2	DG-32 SKID	DGB	10'-0"	Y
EDG	DG-32	JACKET WATER PRESSURE SWITCH	JWPS2/EG2	DG-32 SKID	DGB	10'-0"	Y
EDG	DG-32	JACKET WATER PRESSURE SWITCH	JWPS4/EG2	DG 32 SKID	DGB	10'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
EDG	DG-32	JACKET WATER PRESSURE SWITCH	JWPS3/EG2	DG-32 SKID	DGB	10'-0"	Y
EDG	DG-32	JACKET WATER PRESSURE SWITCH	JWPS6/EG2	DG-31 SKID	DGB	10'-0"	Y
480VAC	480V SWGR 31	KEY OPERATED TEST SWITCH 1-POSITION MAINTAINED	TS/DGV/2A	480V SWGR 31 COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	KEY OPERATED TEST SWITCH 1-POSITION MAINTAINED	TS/DGV/5A	480V SWGR 31 COMPT 25H	CB	15'-0"	Y
480VAC	480V SWGR 32	KEY OPERATED TEST SWITCH 1-POSITION MAINTAINED	TS/DGV/6A	480V SWGR 32 COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 31	KEY OPERATED TEST SWITCH 1-POSITION MAINTAINED	TS/DGV/3A	480V SWGR 31. COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	KEY OPERATED TEST SWITCH 3-POSITION MAINTAINED	TS/UV/2A	480V SWGR 31 COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	KEY OPERATED TEST SWITCH 3-POSITION MAINTAINED	TS/UV/5A	480V SWGR 31 COMPT 25H	CB	15'-0"	Y
480VAC	480V SWGR 32	KEY OPERATED TEST SWITCH 3-POSITION MAINTAINED	TS/UV/6A	480V SWGR 32 COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 31	KEY OPERATED TEST SWITCH 3-POSITION MAINTAINED	TS/UV/3A	480V SWGR 31. COMPT 28H	CB	15'-0"	Y
EDG	DG-31	KEY SYNCHRONIZER SWITCH	SS/2A	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	KEY SYNCHRONIZER SWITCH	SS/3A	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	KEY SYNCHRONIZER SWITCH	SS-2AT3A	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	KEY SYNCHRONIZER SWITCH	SS/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-33	KEY SYNCHRONIZER SWITCH	SS/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	KEY SYNCHRONIZER SWITCH	SS/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
480VAC	480V SWGR 31	KEY SYNCHRONIZING SWITCH	SS/2A	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
118VAC	EGA1	LAMP TEST/ALARM RESET PUSHBUTTON	PB2	INVERTER CAB	CB	33'-0"	Y
118VAC	EGA2	LAMP TEST/ALARM RESET PUSHBUTTON	PB2	INVERTER CAB	CB	33'-0"	Y
EDG	31 DG FUEL XFER PUMP	LC-1204S LEVEL SWITCH	71/FST1	STORAGE TANK 31	DGB	38'-0"	Y
EDG	32 DG FUEL XFER PUMP	LC-1205S LEVEL SWITCH	71/FST2	STORAGE TANK 32	DGB	38'-0"	Y
EDG	33 DG FUEL XFER PUMP	LC-1206S LEVEL SWITCH	71/FST3	STORAGE TANK 33	DGB	38'-0"	Y
EDG	31 DG FUEL XFER PUMP	LC-1207S LEVEL SWITCH	71/DT1	F O DAY TANK 31	DGB	26'-0"	Y
EDG	DF-LCV-1207A	LC-1207S LEVEL SWITCH	71/DT1	F O DAY TANK 31	DGB	26'-0"	Y
EDG	DF-LCV-1207B	LC-1207S LEVEL SWITCH	71/DT1	F O DAY TANK 31	DGB	26'-0"	Y
EDG	32 DG FUEL XFER PUMP	LC-1208S LEVEL SWITCH	71/DT2	F O DAY TANK 32	DGB	26'-0"	Y
EDG	DF-LCV-1208A	LC-1208S LEVEL SWITCH	71/DT2	F O DAY TANK 32	DGB	26'-0"	Y
EDG	DF-LCV-1208B	LC-1208S LEVEL SWITCH	71/DT2	F O DAY TANK 32	DGB	26'-0"	Y
EDG	33 DG FUEL XFER PUMP	LC-1209S LEVEL SWITCH	71/DT3	F O DAY TANK 33	DGB	26'-0"	Y
EDG	DF-LCV-1209A	LC-1209S LEVEL SWITCH	71/DT3	F O DAY TANK 33	DGB	26'-0"	Y
EDG	DF-LCV-1209B	LC-1209S LEVEL SWITCH	71/DT3	F O DAY TANK 33	DGB	26'-0"	Y
COND	LCV-1158-1	LEVEL SWITCH	71/CST-1 (LIC-1120S)	LOCAL	AB	18'-6"	Y
COND	LCV-1158-2	LEVEL SWITCH	71/CST-2 (LIC-1455S)	LOCAL	AB	18'-6"	Y
COND	PCV-1187	LIMIT SWITCH	33(ao,bo)/CUMU1	LOCAL	AB	18'-6"	Y
COND	PCV-1188	LIMIT SWITCH	33(ao,bo)/CUMU2	LOCAL	AB	18'-6"	Y
COND	PCV-1189	LIMIT SWITCH	33(ao,bo)/CUMU3	LOCAL	AB	18'-6"	Y
EDG	31 DG FUEL XFER PUMP	LIMIT SWITCH	33-1/ac	VALVE MOUNTED	DGB	26'-0"	Y
EDG	31 DG FUEL XFER PUMP	LIMIT SWITCH	33-11/ac	VALVE MOUNTED	DGB	26'-0"	Y
EDG	32 DG FUEL XFER PUMP	LIMIT SWITCH	33-2/ac	VALVE MOUNTED	DGB	26'-0"	Y
EDG	32 DG FUEL XFER PUMP	LIMIT SWITCH	33-12/ac	VALVE MOUNTED	DGB	26'-0"	Y
EDG	33 DG FUEL XFER PUMP	LIMIT SWITCH	33-13/ac	VALVE MOUNTED	DGB	26'-0"	Y
EDG	33 DG FUEL XFER PUMP	LIMIT SWITCH	33-3/ac	VALVE MOUNTED	DGB	26'-0"	Y
CVCS	SOV-459-1	LIMIT SWITCH CONTACT	33(ao,ac,bo)	VALVE MOUNTED	VC	79'-0"	Y
CVCS	SOV-460-1	LIMIT SWITCH CONTACT	33(ac,ao,bo)	VALVE MOUNTED	VC	79'-0"	Y
SP	953	LIMIT SWITCHES	33(ac,bo)	VALVE MOUNTED	VC	73'-0"	Y
EDG	DG-33	LO START AIR PRESS RLY GE CR120	LAPR/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	LO START AIR PRESSURE RELAY GE CR120	LAPR/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
HVAC	ACU31	LOCAL BYPASS SWITCH	BYPASS 1L	ACU31	CB	15'-0"	Y
HVAC	ACU32	LOCAL BYPASS SWITCH	BYPASS 2L	ACU32	CB	15'-0"	Y
HVAC	ACU31	LOCAL SWITCH	43C/L	ACU31	CB	15'-0"	Y
HVAC	ACU32	LOCAL SWITCH	43C/L	ACU32	CB	15'-0"	Y
HVAC	F-316	LOCAL THERMOSTAT	23-6	LOCAL	DGB	15'-0"	Y
HVAC	F-317	LOCAL THERMOSTAT	23-7	LOCAL	DGB	15'-0"	Y
HVAC	F-318	LOCAL THERMOSTAT	23-8	LOCAL	DGB	15'-0"	Y
HVAC	F-319	LOCAL THERMOSTAT	23-9	LOCAL	DGB	15'-0"	Y
DC	31CHGR (GE3)	LOW DC VOLTAGE CONTROL RELAY	K22	BATTERY CHRGR 31	CB	33'-0"	Y
DC	32CHGR (GE4)	LOW DC VOLTAGE CONTROL RELAY	K22	BATTERY CHRGR 32	CB	33'-0"	Y
HVAC	ACU32	LOW PRESSURE CUTOUT RELAY	1LOP	ACU32	CB	15'-0"	Y
HVAC	ACU32	LOW PRESSURE CUTOUT RELAY	2LOP	ACU32	CB	15'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
HVAC	ACU31	LOW PRESSURE CUTOUT SWITCH	1LOP	ACU31	CB	15'-0"	Y
HVAC	ACU31	LOW PRESSURE CUTOUT SWITCH	2LOP	ACU31	CB	15'-0"	Y
DC	33CHGR (GE8)	LOW VOLTAGE RELAY	LVR	BATTERY CHRGR 33	CB	33'-0"	Y
DC	34CHGR (GF3)	LOW VOLTAGE RELAY	LVR	BATTERY CHRGR 34	CB	33'-0"	Y
SWN	FCV-1176	LUBE OIL CLR JACKET TEMPERATURE SWITCH	HLOTR1/DG1	DG #31	DGB	15'-0"	Y
SWN	FCV-1176	LUBE OIL CLR JACKET TEMPERATURE SWITCH	HLOTR1/DG2	DG #32	DGB	15'-0"	Y
SWN	FCV-1176A	LUBE OIL CLR JACKET TEMPERATURE SWITCH	HLOTR1/DG1	DG #31	DGB	15'-0"	Y
SWN	FCV-1176A	LUBE OIL CLR JACKET TEMPERATURE SWITCH	HLOTR1/DG2	DG #32	DGB	15'-0"	Y
SWN	FCV-1176A	LUBE OIL CLR JACKET TEMPERATURE SWITCH	HLOTR1/DG3	DG #33	DGB	15'-0"	Y
SWN	FCV-1176	LUBE OIL CLR JACKET TEMPERATURE SWITCH	HLOTR1/DG3	DG #33	DGB	15'-0"	Y
PW	31PWMUP	MAKEUP SWITCH "STOP/NORM/START"	1/BCR	CCR PANEL FCF	CB	53'-0"	Y
PW	32PWMUP	MAKEUP SWITCH "STOP/NORM/START"	1/BCR	CCR PANEL FCF	CB	53'-0"	Y
CVCS	CH-FCV-110A	MAKEUP SWITCH (STOP/NORM/START)	1/BCR	CCR PANEL FCF	CB	53'-0"	Y
CVCS	CH-FCV-110B	MAKEUP SWITCH (STOP/NORM/START)	1/BCR	CCR PANEL FBF	CB	53'-0"	Y
CVCS	CH-FCV-111A	MAKEUP SWITCH (STOP/NORM/START)	1/BCR	CCR PANEL FCF	CB	53'-0"	Y
CVCS	CH-FCV-111B	MAKEUP SWITCH (STOP/NORM/START)	1/BCR	CCR PANEL FCF	CB	53'-0"	Y
CVCS	CSAPBA1	MAKEUP SWITCH (STOP/NORM/START) SPRING RTN TO NORM AFTER S	1/BCR	CCR PANEL FBF	CB	53'-0"	Y
CVCS	CSAPBA2	MAKEUP SWITCH (STOP/NORM/START) SPRING RTN TO NORM AFTER S	1/BCR	CCR PANEL FBF	CB	53'-0"	Y
EDG	DG-33	MAN/OFF/AUTO ENGN CONTROL SWITCH	ECS/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	MAN/OFF/AUTO ENGN CONTROL SWITCH	ECS/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-31	MAN/OFF/AUTO ENGN CTRL SWITCH	ECS/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
RCS	RC-MOV-535	MANUAL SWITCH	CS	CCR PANEL FCF	CB	53'-0"	Y
RCS	RC-MOV-536	MANUAL SWITCH	CS	CCR PANEL FCF	CB	53'-0"	Y
IA	PCV-1141	MCC STARTER AUX CONTACT	42b/IAC 32	MCC 34	TB	15'-0"	Y
IA	PCV-1141	MCC STARTER AUX CONTACT	42b/IAC 31	MCC 39	CB	33'-0"	Y
IA	PCV-1142	MCC STARTER AUX CONTACT	42b/IAC 32	MCC 34	TB	15'-0"	Y
IA	PCV-1142	MCC STARTER AUX CONTACT	42b/IAC 31	MCC 39	CB	33'-0"	Y
IA	PCV-1143	MCC STARTER AUX CONTACT	42b/IAC 32	MCC 34	TB	15'-0"	Y
IA	PCV-1143	MCC STARTER AUX CONTACT	42b/IAC 31	MCC 39	CB	33'-0"	Y
CVCS	CSAPCH3	MECH. SWITCH	52aC3	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
CVCS	CSAPCH3	MECH. SWITCH	33C3	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
CVCS	CSAPCH2	MECHANICAL CONTACTS	52aC2	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
EDG	DG-31	MECHANICAL CONTACTS	52b/2A	480V SWGR 31	CB	15'-0"	Y
EDG	DG-31	MECHANICAL CONTACTS	52b/2AT5A	480V SWGR 31	CB	15'-0"	Y
EDG	DG-33	MECHANICAL CONTACTS	52b/5A	480V SWGR 31	CB	15'-0"	Y
EDG	DG-33	MECHANICAL CONTACTS	52b/2AT5A	480V SWGR 32	CB	15'-0"	Y
EDG	DG-32	MECHANICAL CONTACTS	52b/6A	480V SWGR 32	CB	15'-0"	Y
EDG	DG-32	MECHANICAL CONTACTS	52b/3AT6A	480V SWGR 32	CB	15'-0"	Y
HVAC	ACU31	MECHANICAL CONTACTS	1st STG COOL	ACU31	CB	15'-0"	Y
HVAC	ACU31	MECHANICAL CONTACTS	2nd STG COOL	ACU31	CB	15'-0"	Y
HVAC	ACU32	MECHANICAL CONTACTS	1st STG COOL	ACU32	CB	15'-0"	Y
HVAC	ACU32	MECHANICAL CONTACTS	2nd STG COOL	ACU32	CB	15'-0"	Y
CVCS	CSAPCH2	MECHANICAL SWITCH	33C2	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
PW	31PWMUP	MODE SWITCH "DILUTE/BORATE/AUTO/MANUAL"	43/BAB	CCR PANEL FCF	CB	53'-0"	Y
PW	32PWMUP	MODE SWITCH "DILUTE/BORATE/AUTO/MANUAL"	43/BAB	CCR PANEL FCF	CB	53'-0"	Y
CVCS	CH-FCV-111B	MODE SWITCH (BORATE/AUTO/MANUAL/DILUTE)	43/BAB	CCR PANEL FCF	CB	53'-0"	Y
CVCS	CH-FCV-110A	MODE SWITCH (DILUTE/BORATE/AUTO/MANUAL)	43/BAB	CCR PANEL FCF	CB	53'-0"	Y
CVCS	CH-FCV-111A	MODE SWITCH (DILUTE/BORATE/AUTO/MANUAL)	43/BAB	CCR PANEL FCF	CB	53'-0"	Y
CVCS	CSAPBA1	MODE SWITCH (DILUTE/BORATE/AUTO/MANUAL)	43/BAB	CCR PANEL FBF	CB	53'-0"	Y
CVCS	CSAPBA2	MODE SWITCH (DILUTE/BORATE/AUTO/MANUAL)	43/BAB	CCR PANEL FBF	CB	53'-0"	Y
CVCS	CH-FCV-110B	MODE SWITCH (DILUTE/BORATER/AUTO/MANUAL)	43/BAB	CCR PANEL FBF	CB	53'-0"	Y
EDG	32 DG FUEL XFER PUMP	MOTOR STARTER AUX CONTACTS	42, 42a	32EDG AUX START &CTRL PNL	DGB	15'-0"	Y
EDG	33 DG FUEL XFER PUMP	MOTOR STARTER AUX CONTACTS	42, 42a	33EDG AUX START &CTRL PNL	DGB	15'-0"	Y
HVAC	0031ETEF	MOTOR STARTER AUX CONTACTS	42a, 42b	MCC 36A	PAB	55'-0"	Y
HVAC	0032ETEF	MOTOR STARTER AUX CONTACTS	42a, 42b	MCC 36B	PAB	55'-0"	Y
HVAC	0033ETEF	MOTOR STARTER AUX CONTACTS	42a, 42b	MCC 36A	PAB	55'-0"	Y
HVAC	0034ETEF	MOTOR STARTER AUX CONTACTS	42a, 42b	MCC 36B	PAB	55'-0"	Y
HVAC	F-314	MOTOR STARTER AUX CONTACTS	42a,42b	31EDG AUX START &CTRL PNL	PAB	55'-0"	Y
HVAC	F-315	MOTOR STARTER AUX CONTACTS	42a,42b	31EDG AUX START &CTRL PNL	PAB	55'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
HVAC	F-316	MOTOR STARTER AUX CONTACTS	42(a,b)	32EDG AUX START &CTRL PNL	PAB	55'-0"	Y
HVAC	F-317	MOTOR STARTER AUX CONTACTS	42a,42b	32EDG AUX START &CTRL PNL	PAB	55'-0"	Y
HVAC	F-318	MOTOR STARTER AUX CONTACTS	42a,42b	33EDG AUX START &CTRL PNL	PAB	55'-0"	Y
HVAC	F-319	MOTOR STARTER AUX CONTACTS	42a,42b	33EDG AUX START &CTRL PNL	PAB	55'-0"	Y
EDG	31 DG FUEL XFER PUMP	MOTOR STARTER CKTS	42, 42a	31EDG AUX START &CTRL PNL	DGB	15'-0"	Y
HVAC	31 PABEF	MOTOR STARTER CONTACT	42b/CBPF	480V MCC 37	PAB	55'-0"	Y
HVAC	31 PABEF	MOTOR STARTER CONTACT	42b/PABSF	480V MCC 37	PAB	55'-0"	Y
HVAC	32 PABEF	MOTOR STARTER CONTACT	42b/CBPF	480V MCC 37	PAB	55'-0"	Y
HVAC	32 PABEF	MOTOR STARTER CONTACT	42b/PABSF	480V MCC 37	PAB	55'-0"	Y
IA	0031CLWP	MOTOR STARTER CONTACT	42b/CSP32	MCC 34	TB	15'-0"	Y
HVAC	F-314	MOTOR STARTER CONTACTOR	42	31EDG AUX START &CTRL PNL	PAB	55'-0"	Y
HVAC	F-315	MOTOR STARTER CONTACTOR	42	31EDG AUX START &CTRL PNL	PAB	55'-0"	Y
HVAC	F-316	MOTOR STARTER CONTACTOR	42	32EDG AUX START &CTRL PNL	PAB	55'-0"	Y
HVAC	F-317	MOTOR STARTER CONTACTOR	42	32EDG AUX START &CTRL PNL	PAB	55'-0"	Y
HVAC	F-318	MOTOR STARTER CONTACTOR	42	33EDG AUX START &CTRL PNL	PAB	55'-0"	Y
HVAC	F-319	MOTOR STARTER CONTACTOR	42	33EDG AUX START &CTRL PNL	PAB	55'-0"	Y
CVCS	CSAPBA1	MOTOR STARTER CONTACTS	42(S),42(F),42b(S),42b(F),42a(F)	MCC 36A, COMPT 7RH	PAB	55'-0"	Y
CVCS	CSAPBA2	MOTOR STARTER CONTACTS	42(S),42(F),42b(S),42b(F),42a(F)	MCC 36B, COMPT 7RH	PAB	55'-0"	Y
HVAC	31CRDF	MOTOR STARTER CONTACTS	42, 42a, 42b	MCC 38, COMPT 2D	VC	68'-0"	Y
HVAC	0031ETEF	MOTOR STARTER CONTACTS	42	MCC 36A	PAB	55'-0"	Y
HVAC	32CRDF	MOTOR STARTER CONTACTS	42, 42a, 42b	MCC 38, COMPT 2F	VC	68'-0"	Y
HVAC	0032ETEF	MOTOR STARTER CONTACTS	42	MCC 36B	PAB	55' 0"	Y
HVAC	33CRDF	MOTOR STARTER CONTACTS	42, 42a, 42b	MCC 38, COMPT 2H	VC	68'[illegible]	Y
HVAC	34CRDF	MOTOR STARTER CONTACTS	42, 42a, 42b	MCC 38, COMP 2K	CB	68'-0"	Y
HVAC	0033ETEF	MOTOR STARTER CONTACTS	42	MCC 36A	PAB	55'-0"	Y
HVAC	0034ETEF	MOTOR STARTER CONTACTS	42	MCC 36B	PAB	55'-0"	Y
HVAC	ACU31	MOTOR STARTER CONTACTS	42a,o	ACU31	CB	15'-0"	Y
HVAC	ACU32	MOTOR STARTER CONTACTS	42a,o	ACU32	CB	15'-0"	Y
HVAC	PABSF	MOTOR STARTER CONTACTS	42, 42b	MCC37, COMPT 1FE	PAB	55'-0"	Y
IA	0031 IAC	MOTOR STARTER CONTACTS	42, 42a, 42b	MCC 39	CB	33'-0"	Y
IA	0032 IAC	MOTOR STARTER CONTACTS	42, 42a, 42b	MCC 34	TB	33'-0"	Y
IA	SOV-1177	MOTOR STARTER CONTACTS	42, 42a, 42b	MCC 39	CB	33'-0"	Y
IA	SOV-1178	MOTOR STARTER CONTACTS	42, 42a, 42b	MCC 34	TB	15'-0"	Y
IA	SOV-1198	MOTOR STARTER CONTACTS	42, 42a, 42b	MCC 39	CB	33'-0"	Y
IA	SOV-1199	MOTOR STARTER CONTACTS	42, 42a, 42b	MCC 34	TB	15'-0"	Y
IA	0031CLWP	MOTOR STARTER CONTACTS	42, 42a, 42b	MCC 39, COMPT 4K	CB	33'-0"	Y
IA	0032CLWP	MOTOR STARTER CONTACTS	42, 42a, 42b	MCC 34	TB	15'-0"	Y
IA	0032CLWP	MOTOR STARTER CONTACTS	42b/CSP31	MCC 39	CB	33'-0"	Y
PW	31PWMUP	MOTOR STARTER CONTACTS	42/PWMP31, 42a	MCC-37, COMPT 6RK	PAB	55'-0"	Y
PW	32PWMUP	MOTOR STARTER CONTACTS	42/PWMP32, 42a	MCC-37, COMPT 5RK	PAB	55'-0"	Y
RCS	RC-MOV-535	MOTOR STARTER CONTACTS	42	MCC 36B, COMPT 1FH	PAB	55'-0"	Y
RCS	RC-MOV-536	MOTOR STARTER CONTACTS	42 CONTACTS	MCC 36A, COMPT 1FH	PAB	55'-0"	Y
SIS	SI-0882	MOTOR STARTER CONTACTS	42	MCC 36B	PAB	55'-0"	Y
HVAC	ACU31	MOTOR STARTER RELAY	42/ACF31	ACU31	CB	15'-0"	Y
HVAC	ACU32	MOTOR STARTER RELAY	42/ACF32A	ACU32	CB	15'-0"	Y
HVAC	ACU32	MOTOR STARTER RELAY	42/ACF32B	ACU32	CB	15'-0"	Y
HVAC	ACU31	MOTOR STARTER RELAY	42/ACC31A	ACU31	CB	15'-0"	Y
HVAC	ACU31	MOTOR STARTER RELAY	42/ACC31B	ACU31	CB	15'-0"	Y
HVAC	ACU32	MOTOR STARTER RELAY	42/ACF32	ACU32	CB	15'-0"	Y
HVAC	ACU32	MOTOR STARTER RELAY	42/ACC32A	ACU32	CB	15'-0"	Y
HVAC	ACU32	MOTOR STARTER RELAY	42/ACC32B	ACU32	CB	15'-0"	Y
ACS	AC-0743	MOV AUX CONTACTS	33(tc,to,ac,ao,bc,bo)	VALVE MOUNTED	PP	51'-0"	Y
ACS	AC-0744	MOV AUX CONTACTS	33(tc,to,ac,ao,bc,bo)	VALVE MOUNTED	PP	51'-0"	Y
ACS	AC-0745A	MOV AUX CONTACTS	33(tc,to,ac,ao,bc,bo)	VALVE MOUNTED	VC	66'-0"	Y
ACS	AC-0745B	MOV AUX CONTACTS	33(tc,to,ac,ao,bc,bo)	VALVE MOUNTED	VC	66'-0"	Y
ACS	AC-0746	MOV AUX CONTACTS	33(tc,to,ac,ao,bc,bo)	VALVE MOUNTED	VC	68'-0"	Y
ACS	AC-0747	MOV AUX CONTACTS	33(tc,to,ac,ao,bc,bo)	VALVE MOUNTED	VC	68'-0"	Y
ACS	AC-1870	MOV AUX CONTACTS	33(tc,to,ac,ao,bc,bo)	VALVE MOUNTED	PP	51'-0"	Y
ACS	AC-0899A	MOV AUX CONTACTS	33(tc,to,ac,ao,bc,bo)	VALVE MOUNTED	VC	68'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
ACS	AC-0899B	MOV AUX CONTACTS	33(lc,to,ac,ao,bc,bo)	VALVE MOUNTED	CB	68'-0"	Y
CCW	AC-769	MOV AUX CONTACTS	33(lc,to,ac,ao,bc,bo)	VALVE MOUNTED	PAB	55'-7"	Y
CCW	AC-784	MOV AUX CONTACTS	33(lc,to,ac,ao,bc bo)	VALVE MOUNTED	PP	51'-0"	Y
CCW	AC-786	MOV AUX CONTACTS	33(lc to,ac,ao bc bo)	VALVE MOUNTED	PP	51'-0"	Y
CCW	AC-789	MOV AUX CONTACTS	33(lc to ac ao bc bo)	VALVE MOUNTED	PAB	57'-9"	Y
CCW	AC-797	MOV AUX CONTACTS	33(lc to ac ao bc bo)	VALVE MOUNTED	PP	51'-0"	Y
CCW	AC-822A	MOV AUX CONTACTS	33(lc to ac ao bc bo)	VALVE MOUNTED	PP	41'-0"	Y
CCW	AC-822B	MOV AUX CONTACTS	33(lc to ac ao bc bo)	VALVE MOUNTED	PP	41'-0"	Y
CCW	AC-FCV-625	MOV AUX CONTACTS	33(lc to ac ao bc bo)	VALVE MOUNTED	PP	51'-0"	Y
CVCS	CH-MOV-205	MOV AUX CONTACTS	33(lc to ao bc bo)	VALVE MOUNTED	PP	41'-0"	Y
CVCS	CH-MOV-226	MOV AUX CONTACTS	33(lc to ao bc bo)	VALVE MOUNTED	PP	41'-0"	Y
CVCS	CH-MOV-250A	MOV AUX CONTACTS	33(lc to ao bc bo)	VALVE MOUNTED	PP	41'-0"	Y
CVCS	CH-MOV-250B	MOV AUX CONTACTS	33(lc to ao bc bo)	VALVE MOUNTED	PP	41'-0"	Y
CVCS	CH-MOV-250C	MOV AUX CONTACTS	33(lc,to ao bc bo)	VALVE MOUNTED	PP	41'-0"	Y
CVCS	CH-MOV-250D	MOV AUX CONTACTS	33(lc,to,ao,bc,bo)	VALVE MOUNTED	PP	41'-0"	Y
CVCS	CH-MOV-333	MOV AUX CONTACTS	33(lc,to,ac,ao,bc,bo)	VALVE MOUNTED	PP	41'-0"	Y
CVCS	CH-MOV-441	MOV AUX CONTACTS	33(lc,to,ao,bc,bo)	VALVE MOUNTED	PP	41'-0"	Y
CVCS	CH-MOV-442	MOV AUX CONTACTS	33(lc,to,ao,bc,bo)	VALVE MOUNTED	PP	41'-0"	Y
CVCS	CH-MOV-443	MOV AUX CONTACTS	33(lc,to,ao,bc,bo)	VALVE MOUNTED	PP	41'-0"	Y
CVCS	CH-MOV-444	MOV AUX CONTACTS	33(lc,to,ao,bc,bo)	VALVE MOUNTED	PP	41'-0"	Y
SIS	SI-0885A	MOV AUX CONTACTS	33(lc,to,ac,ao,bc,bo)	VALVE MOUNTED	PAB	34'-0"	Y
SIS	SI-0885B	MOV AUX CONTACTS	33(lc,to,ac,ao,bc,bo)	VALVE MOUNTED	PAB	34'-0"	Y
SIS	SI-0888A	MOV AUX CONTACTS	33(lc,to,ac,ao,bc,bo)	VALVE MOUNTED	PAB	51'-0"	Y
SIS	SI-0888B	MOV AUX CONTACTS	33(lc,to,ac,ao,bc bo)	VALVE MOUNTED	PAB	51'-0"	Y
SIS	SI-0889A	MOV AUX CONTACTS	33(lc to,ao,bc bo ac)	VALVE MOUNTED	VC	72'-0"	Y
SIS	SI-0889B	MOV AUX CONTACTS	33(lc to,ao bc bo ac)	VALVE MOUNTED	VC	72'-0"	Y
SIS	SI-0894A	MOV AUX CONTACTS	33(lc to ao bc bo ac)	VALVE MOUNTED	VC	46'-0"	Y
SIS	SI-0894B	MOV AUX CONTACTS	33(lc to ao bc bo ac)	VALVE MOUNTED	VC	46'-0"	Y
SIS	SI-0894C	MOV AUX CONTACTS	33(lc to ao bc bo ac)	VALVE MOUNTED	VC	46'-0"	Y
SIS	SI-0894D	MOV AUX CONTACTS	33(lc to ao bc bo ac)	VALVE MOUNTED	VC	46'-0"	Y
SIS	SI-1802A	MOV AUX CONTACTS	33(lc to ac ao bc bo)	VALVE MOUNTED	VC	46'-0"	Y
SIS	SI-1802B	MOV AUX CONTACTS	33(lc to ac ao bc bo)	VALVE MOUNTED	VC	46'-0"	Y
SIS	SI-1810	MOV AUX CONTACTS	33(lc to ac ao bc bo)	VALVE MOUNTED	PAB	15'-0"	Y
SIS	SI-1869A	MOV AUX CONTACTS	33(lc to ac ao bc bo)	VALVE MOUNTED	PAB	15'-0"	Y
SIS	SI-1869B	MOV AUX CONTACTS	33(lc to ac,ao bc bo)	VALVE MOUNTED	PAB	15'-0"	Y
SIS	SI-HCV-638	MOV AUX CONTACTS	33(lc to ac,ao bc bo)	VALVE MOUNTED	VC	66'-0"	Y
SIS	SI-HCV-640	MOV AUX CONTACTS	33(lc to ac,ao bc bo)	VALVE MOUNTED	VC	66'-0"	Y
DC	32CHGR (GE4)	NEGATIVE GRD DETECT CONTROL RELAY	K3	BATTERY CHRGR 32	CB	33'-0"	Y
DC	31CHGR (GE3)	NEGATIVE GROUND DETECT CONTROL RELAY	K3	BATTERY CHRGR 31	CB	33'-0"	Y
EDG	DG-31	OFF-AUTO SPACE HTR SWITCH	SHS/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-33	OFF-AUTO SPACE HTR SWITCH	SHS/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	OFF-AUTO SPACE HTR SWITCH	SHS/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	OIL PRESSURE SW	OPS3/EG2	DG-32 SKID	DGB	10'-0"	Y
EDG	DG-32	OIL PRESSURE SW	OPS2/EG2	DG-32 SKID	DGB	10'-0"	Y
EDG	DG-32	OIL PRESSURE SW	OPS1/EG2	DG-32 SKID	DGB	10'-0"	Y
EDG	DG-31	OIL PRESSURE SWITCH	OPS3/EG1	DG-31 SKID	DGB	10'-0"	Y
EDG	DG-31	OIL PRESSURE SWITCH	OPS2/EG1	DG-31 SKID	DGB	10'-0"	Y
EDG	DG-31	OIL PRESSURE SWITCH	OPS1/EG1	DG-31 SKID	DGB	10'-0"	Y
EDG	DG-33	OIL PRESSURE SWITCH	OPS3/EG3	DG-33 SKID	DGB	10'-0"	Y
EDG	DG-33	OIL PRESSURE SWITCH	OPS2/EG3	DG-33 SKID	DGB	10'-0"	Y
EDG	DG-33	OIL PRESSURE SWITCH	OPS1/EG3	DG-33 SKID	DGB	10'-0"	Y
CVCS	CH-LCV-112B	OPEN CONTACT	42/O	MCC 36B, COMPT 1RH	PAB	55'-0"	Y
ACS	AC-0730	OPEN CONTACTOR	42/O	MCC 36A	PAB	55'-0"	Y
ACS	AC-0731	OPEN CONTACTOR	42/O	MCC 36B	PAB	55'-0"	Y
ACS	AC-0743	OPEN CONTACTOR	42/O	MCC 36A	PAB	55'-0"	Y
ACS	AC-0744	OPEN CONTACTOR	42/O	MCC 36A	PAB	55'-0"	Y
ACS	AC-0745A	OPEN CONTACTOR	42/O	MCC 36B	PAB	55'-0"	Y
ACS	AC-0745B	OPEN CONTACTOR	42/O	MCC 36A	PAB	55'-0"	Y
ACS	AC-0746	OPEN CONTACTOR	42/O	MCC 36A	PAB	55'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
ACS	AC-0747	OPEN CONTACTOR	42/O	MCC 36A	PAB	55'-0"	Y
ACS	AC-1870	OPEN CONTACTOR	42/O	MCC 36B	PAB	55'-0"	Y
ACS	AC-0899A	OPEN CONTACTOR	42/O	MCC 36B COMPT 2FH	PAB	55'-0"	Y
ACS	AC-0899B	OPEN CONTACTOR	42/0	MCC 36A COMPT 6RM	PAB	55'-0	Y
CCW	AC-769	OPEN CONTACTOR	42/O	MCC 36B COMPT 3FU	PAB	55'-0"	Y
CCW	AC-784	OPEN CONTACTOR	42/O	MCC 36A COMPT 3FH	PAB	55'-0"	Y
CCW	AC-786	OPEN CONTACTOR	42/O	MCC 36B COMPT [illegible]	PAB	55'-0"	Y
CCW	AC-789	OPEN CONTACTOR	42/O	[illegible]	PAB	55'-0"	Y
CCW	AC-797	OPEN CONTACTOR	42/O	[illegible]	PAB	55'-0"	Y
CCW	AC-822A	OPEN CONTACTOR	42/O	[illegible]	PAB	55'-0"	Y
CCW	AC-822B	OPEN CONTACTOR	42/O	[illegible]	PAB	55'-0"	Y
CCW	AC-FCV-625	OPEN CONTACTOR	42/O	[illegible]	PAB	55'-0"	Y
CVCS	CH-LCV-112C	OPEN CONTACTOR	42/O	MCC 36A COMPT [illegible]	PAB	55'-0"	Y
CVCS	CH-MOV-205	OPEN CONTACTOR	42/O	MCC 36BEX COMPT 9FJ	PAB	55'-0"	Y
CVCS	CH-MOV-222	OPEN CONTACTOR	42/C	MCC 36A COMPT 1RM	PAB	55'-0"	Y
CVCS	CH-MOV-226	OPEN CONTACTOR	42/O	MCC 36B COMPT 9FJ	PAB	55'-0"	Y
CVCS	CH-MOV-250A	OPEN CONTACTOR	42/O	MCC 36BEX, COMPT 11FC	PAB	55'-0"	Y
CVCS	CH-MOV-250B	OPEN CONTACTOR	42/O	MCC 36BEX, COMPT 10FJ	PAB	55'-0"	Y
CVCS	CH-MOV-250C	OPEN CONTACTOR	42/O	MCC 36BEX, COMPT 9FM	PAB	55'-0"	Y
CVCS	CH-MOV-250D	OPEN CONTACTOR	42/O	MCC 36BEX, COMPT 11FF	PAB	55'-0"	Y
CVCS	CH-MOV-333	OPEN CONTACTOR	42/O	MCC 36B, COMPT 1RM	PAB	55'-0"	Y
CVCS	CH-MOV-441	OPEN CONTACTOR	42/O	MCC 36A, COMPT 10FC	PAB	55'-0"	Y
CVCS	CH-MOV-442	OPEN CONTACTOR	42/O	MCC 36A, COMPT 10FF	PAB	55'-0"	Y
CVCS	CH-MOV-443	OPEN CONTACTOR	42/O	MCC 36A, COMPT 10FJ	PAB	55'-0"	Y
CVCS	CH-MOV-444	OPEN CONTACTOR	42/O	MCC 36A COMPT 11FF	PAB	55'-0"	Y
SIS	SI-0885A	OPEN CONTACTOR	42/O	MCC 36A	PAB	55'-0"	Y
SIS	SI-0885B	OPEN CONTACTOR	42/O	MCC 36B	PAB	55'-0"	Y
SIS	SI-0888A	OPEN CONTACTOR	42/O	MCC 36A	PAB	55'-0"	Y
SIS	SI-0888B	OPEN CONTACTOR	42/O	MCC 36B	PAB	55'-0"	Y
SIS	SI-0889A	OPEN CONTACTOR	42/O	MCC 36A	PAB	55'-0"	Y
SIS	SI-0889B	OPEN CONTACTOR	42/O	MCC 36B	PAB	55'-0"	Y
SIS	SI-0894A	OPEN CONTACTOR	42/O	MCC 36A	PAB	55'-0"	Y
SIS	SI-0894B	OPEN CONTACTOR	42/O	MCC 36B	PAB	55'-0"	Y
SIS	SI-0894C	OPEN CONTACTOR	42/O	MCC 36A	PAB	55'-0"	Y
SIS	SI-0894D	OPEN CONTACTOR	42/O	MCC 36B	PAB	55'-0"	Y
SIS	SI-1802A	OPEN CONTACTOR	42/O	MCC 36A	PAB	55'-0"	Y
SIS	SI-1802B	OPEN CONTACTOR	42/O	MCC 36B	PAB	55'-0"	Y
SIS	SI-1810	OPEN CONTACTOR	42/O	MCC 36A	PAB	55'-0"	Y
SIS	SI-1869A	OPEN CONTACTOR	42/O	MCC 36A	PAB	55'-0"	Y
SIS	SI-1869B	OPEN CONTACTOR	42/O	MCC 36B	PAB	55'-0"	Y
SIS	SI-HCV-638	OPEN CONTACTOR	42/O	MCC 36B	PAB	55'-0"	Y
SIS	SI-HCV-640	OPEN CONTACTOR	42/O	MCC 36A	PAB	55'-0"	Y
EDG	DG-31	OVERCURRENT RELAY WHSE COV-8	51V-3/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	OVERCURRENT RELAY WHSE COV-8	51V-1/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	OVERCURRENT RELAY WHSE COV-8	51V-2/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-33	OVERCURRENT RELAY WHSE COV-8	51V-3/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	OVERCURRENT RELAY WHSE COV-8	51V-1/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	OVERCURRENT RELAY WHSE COV-8	51V-2/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	OVERCURRENT RELAY WHSE COV-8	51V-3/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	OVERCURRENT RELAY WHSE COV-8	51V-1/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	OVERCURRENT RELAY WHSE COV-8	51V-2/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
480VAC	480V SWGR 32	OVERCURRENT TRIP ALARM CONTACTS	OTS/A	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 31	OVERCURRENT TRIP ALARM CONTACTS	OTS/A	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
EDG	DG-32	OVERSPEED MICRO SW	OSR/EG2	DG-32 SKID	DGB	10'-0"	Y
EDG	DG-31	OVERSPEED MICRO SWITCH	OSR/EG1	DG-31 SKID	DGB	10'-0"	Y
EDG	DG-33	OVERSPEED MICRO SWITCH	OSR/EG3	DG-33 SKID	DGB	10'-0"	Y
EDG	DG-31	PERMISSIVE START SWITCH	BG1S/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-33	PERMISSIVE START SWITCH	BGIS/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	PERMISSIVE START SWITCH	BGIS/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
CVCS	CSAPCH1	POSITION SWITCH	33	480V SWGR 31	CB	15'-0"	Y
HVAC	ACU31	POSITION SWITCH	33-D1/OPEN	LOCAL CCR AC CTRL PNL PI7	CB	15'-0"	Y
480VAC	MCC-39	POSITION SWITCH BREAKER 52/5A	33/b/52/5A	480V SWGR 31, COMPT 17B	CB	15'-0"	Y
480VAC	MCC-39	POSITION SWITCH BREAKER 52/EG3	33b/52/EG3	480V SWGR 31, COMPT 18B	CB	15'-0"	Y
DC	31CHGR (GE3)	POSITIVE GROUND DETECT CONTROL RELAY	K2	BATTERY CHRGR 31	CB	33'-0"	Y
DC	32CHGR (GE4)	POSITIVE GROUND DETECT CONTROL RELAY	K2	BATTERY CHRGR 32	CB	33'-0"	Y
118VAC	EGA1	PRE-CHARGE PUSHBUTTON	PB1	INVERTER CAB	CB	33'-0"	Y
118VAC	EGA2	PRE-CHARGE PUSHBUTTON	PB1	INVERTER CAB	CB	33'-0"	Y
118VAC	GF2	PRE-CHARGE PUSHBUTTON	PB1	INVERTER CAB	CB	33'-0"	Y
118VAC	GC9	PRE-CHARGE PUSHBUTTON	PB1	INVERTER CAB	CB	33'-0"	Y
IA	0032CLWP	PRESS SWITCH PC-1173S	63/CSP31	LOCAL	CB	15'-0"	Y
IA	0031CLWP	PRESS SWITCH PC-1174S	63/CSP32	LOCAL	CB	15'-0"	Y
IA	0031CLWP	PRESS SWITCH PC-1177S	63/CSP	LOCAL	CB	15'-0"	Y
IA	PCV-1141	PRESSURE SWITCH	63-2/SA (PC1168S)	LOCAL	CB	15'-0"	Y
IA	PCV-1142	PRESSURE SWITCH	63-1/IA (PC1169S)	LOCAL	CB	15'-0"	Y
IA	PCV-1143	PRESSURE SWITCH	63-2/IA (PC1170S)	LOCAL	CB	15'-0"	Y
IA	0031 IAC	PRESSURE SWITCH PC-1162S	63-1	LOCAL COMPR CTRL PNL	CB	15'-0"	Y
IA	SOV-1177	PRESSURE SWITCH PC-1162S	63-1	LOCAL COMPT CTRL PNL	CB	15'-0"	Y
IA	SOV-1198	PRESSURE SWITCH PC-1162S	63-1	LOCAL COMPT CTRL PNL	CB	15'-0"	Y
IA	0032 IAC	PRESSURE SWITCH PC-1163S	63-1	LOCAL COMPR CTRL PNL	CB	15'-0"	Y
IA	SOV-1178	PRESSURE SWITCH PC-1163S	63-1	LOCAL COMPT CTRL PNL	CB	15'-0"	Y
IA	0031 IAC	PRESSURE SWITCH PC-1164S	63-2	LOCAL COMPR CTRL PNL	CB	15'-0"	Y
IA	SOV-1177	PRESSURE SWITCH PC-1164S	63-2	LOCAL COMPT CTRL PNL	CB	15'-0"	Y
IA	SOV-1198	PRESSURE SWITCH PC-1164S	63-2	LOCAL COMPT CTRL PNL	CB	15'-0"	Y
IA	0032 IAC	PRESSURE SWITCH PC-1165S	63-2	LOCAL COMPR CTRL PNL	CB	15'-0"	Y
IA	SOV-1178	PRESSURE SWITCH PC-1165S	63-2	LOCAL COMPT CTRL PNL	CB	15'-0"	Y
IA	SOV-1199	PRESSURE SWITCH PC-1165S	63-2	LOCAL COMPT CTRL PNL	CB	15'-0"	Y
IA	SOV-1199	PRESSURE SWITCH PC-1163S	63-1	LOCAL COMPT CTRL PNL	CB	15'-0"	Y
CVCS	CH-FCV-110A	PRIMARY WATER COUNTER	YIC-111	CCR PANEL FBF	CB	53'-0"	Y
CVCS	CH-FCV-110B	PRIMARY WATER COUNTER	YIC-111	CCR PANEL FBF	CB	53'-0"	Y
CVCS	CH-FCV-111A	PRIMARY WATER COUNTER	YIC-111	CCR PANEL FBF	CB	53'-0"	Y
CVCS	CH-FCV-111B	PRIMARY WATER COUNTER	YIC-111	CCR PANEL FBF	CB	53'-0"	Y
EDG	DG-32	PUL-OUT TO LOCK OUT BUS 2A-XFORM BRKR TRIP AND CLOSE SW	BCS-SS6A	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-33	PUL-OUT TO LOCK OUT BUS 5A-XFORM BRKR TRIP AND CLOSE SW	SS/5A	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-31	PULL-OUT TO LOCK-OUT DG-31 BUS 2A BREAKER	BCS/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-32	PULL-OUT TO LOCK-OUT DG-32 BUS 2A BREAKER	BCS/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-33	PULL-OUT TO LOCK-OUT DG-33 BUS 5A BREAKER	BCS/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
HVAC	33CRDF	PULL-START-AUTO-STOP	1/CRCF3 (o,sc,c)	CCR PANEL SL	CB	53'-0"	Y
HVAC	31CRDF	PULL-STOP-AUTO-START	1/CRCF1 (o,sc,c)	CCR PANEL SL	CB	53'-0"	Y
SWN	33 SW PUMP	PULLOUT-STOP-AUTO-START	1/SW3	CCR PANEL SJF	CB	53'-0"	Y
SWN	31 SW PUMP	PULLOUT-STOP-AUTO-START SWITCH	1/SW1	CCR PANEL SJF	CB	53'-0"	Y
SWN	32 SW PUMP	PULLOUT-STOP-AUTO-START SWITCH	1/SW2	CCR PANEL SJF	CB	53'-0"	Y
SWN	34 SW PUMP	PULLOUT-STOP-AUTO-START SWITCH	1/SW4	CCR PANEL SJF	CB	53'-0"	Y
SWN	35 SW PUMP	PULLOUT-STOP-AUTO-START SWITCH	1/SW5	CCR PANEL SJF	CB	53'-0"	Y
SWN	36 SW PUMP	PULLOUT-STOP-AUTO-START SWITCH	1/SW6	CCR PANEL SJF	CB	53'-0"	Y
EDG	DG-31	PULOUT TO LOCKOUT BUS 2A - XFORM. BRKR TRIP AND CLOSE SW	BCS-2A	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-33	PULOUT TO LOCKOUT BUS 2A - XFORM. BRKR. TRIP AND CLOSE SW	BCS-5A	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	PULOUT TO LOCKOUT BUS 2A - XFORM BRKR TRIP AND CLOSE SW	BCS-6A	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-31	PULOUT TO LOCKOUT BUS 3A - XFORM. BRKR TRIP AND CLOSE SW	BCS-3A	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
480VAC	MCC-32	PUSHBUTTON	CLOSE	480V SWGR 32, COMPT 3C	CB	15'-0"	Y
480VAC	MCC-32	PUSHBUTTON	TRIP	480V SWGR 32, COMPT 3C	CB	15'-0"	Y
480VAC	MCC-33	PUSHBUTTON	CLOSE	480V SWGR 31, COMPT 31C	CB	15'-0"	Y
480VAC	MCC-33	PUSHBUTTON	TRIP	480V SWGR 31, COMPT 31C	CB	15'-0"	Y
480VAC	MCC-36A	PUSHBUTTON	CLOSE	480V SWGR 31, COMPT 21C	CB	15'-0"	Y
480VAC	MCC-36A	PUSHBUTTON	TRIP	480V SWGR 31, COMPT 21C	CB	15'-0"	Y
480VAC	MCC-36B	PUSHBUTTON	CLOSE	480V SWGR 32, COMPT 11C	CB	15'-0"	Y
480VAC	MCC-36B	PUSHBUTTON	TRIP	480V SWGR 32, COMPT 11C	CB	15'-0"	Y
480VAC	MCC-37	PUSHBUTTON	CLOSE	480V SWGR 32, COMPT 12C	CB	15'-0"	Y
480VAC	MCC-37	PUSHBUTTON	TRIP	480V SWGR 32, COMPT 12C	CB	15'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
480VAC	MCC-38	PUSHBUTTON	CLOSE	480V SWGR 31, COMPT 20C	CB	15'-0"	Y
480VAC	MCC-38	PUSHBUTTON	TRIP	480V SWGR 31, COMPT 20C	CB	15'-0"	Y
480VAC	MCC-39	PUSHBUTTON	CLOSE	480V SWGR 31, COMPT 20C	CB	15'-0"	Y
480VAC	MCC-39	PUSHBUTTON	TRIP	480V SWGR 31, COMPT 20C	CB	15'-0"	Y
480VAC	MCC-34	PUSHBUTTON	CLOSE	480V SWGR 31, COMPT 30C	CB	15'-0"	Y
480VAC	MCC-34	PUSHBUTTON	TRIP	480V SWGR 31, COMPT 30C	CB	15'-0"	Y
480VAC	MCC-36C	PUSHBUTTON	CLOSE	480V SWGR 31, COMPT 26D	CB	15'-0"	Y
480VAC	MCC-36C	PUSHBUTTON	TRIP	480V SWGR 31, COMPT 26D	CB	15'-0"	Y
480VAC	480V SWGR 31	PUSHBUTTON	RSTR/EG1	31EDG CONTROL PANEL PP9	DGB	15'-0"	Y
AFW	ABFP-31	PUSHBUTTON	START	LOCAL	AB	18'-6"	Y
AFW	ABFP-31	PUSHBUTTON	STOP	LOCAL	AB	18'-6"	Y
AFW	ABFP-33	PUSHBUTTON	START	LOCAL	AB	18'-6"	Y
AFW	ABFP-33	PUSHBUTTON	STOP	LOCAL	AB	18'-6"	Y
CCW	AC-791	PUSHBUTTON	PB4	CCR PANEL SNF	CB	53'-0"	Y
CCW	AC-793	PUSHBUTTON	PB6	CCR PANEL SNF	CB	53'-0"	Y
CCW	AC-796	PUSHBUTTON	PB3	CCR PANEL SNF	CB	53'-0"	Y
CCW	AC-798	PUSHBUTTON	PB5	CCR PANEL SNF	CB	53'-0"	Y
CVCS	CH-201	PUSHBUTTON	PB12	CCR PANEL SNF	CB	53'-0"	Y
CVCS	CH-202	PUSHBUTTON	PB11	CCR PANEL SNF	CB	53'-0"	Y
CVCS	CSAPCH1	PUSHBUTTON	START	LOCAL	PAB	55'-0"	Y
CVCS	CSAPCH1	PUSHBUTTON	STOP	LOCAL	PAB	55'-0"	Y
CVCS	CSAPCH2	PUSHBUTTON	START	LOCAL	PAB	55'-0"	Y
CVCS	CSAPCH2	PUSHBUTTON	STOP	LOCAL	PAB	55'-0"	Y
CVCS	CSAPCH3	PUSHBUTTON	START	LOCAL	PAB	55'-0"	Y
CVCS	CSAPCH3	PUSHBUTTON	STOP	LOCAL	PAB	55'-0"	Y
EDG	DG-31	PUSHBUTTON	RESET/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-33	PUSHBUTTON	RESET/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	PUSHBUTTON	RESET/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
HVAC	31CRDF	PUSHBUTTON	START, STOP	LOCAL	VC	95'-0"	Y
HVAC	0031CRFU	PUSHBUTTON	START, STOP	LOCAL	VC	68'-0"	Y
HVAC	0032CRFU	PUSHBUTTON	START, STOP	LOCAL	VC	68'-0"	Y
HVAC	33CRDF	PUSHBUTTON	START, STOP	LOCAL	VC	95'-0"	Y
HVAC	0033CRFU	PUSHBUTTON	START, STOP	LOCAL	VC	68'-0"	Y
HVAC	34CRDF	PUSHBUTTON	START, STOP	LOCAL	CB	95'-0"	Y
HVAC	0035CRFU	PUSHBUTTON	START, STOP	LOCAL	VC	68'-0"	Y
HVAC	PABSF	PUSHBUTTON	JOG	FAN ROOM CTRL PNL JC1	FR		Y
HVAC	0034CRFU	PUSHBUTTON	START, STOP	LOCAL	VC	68'-0"	Y
IA	SOV-1428	PUSHBUTTON	PB28	CCR PANEL SMF	CB	53'-0"	Y
RCS	RC-549	PUSHBUTTON	PB33	CCR PANEL SNF	CB	53'-0"	Y
RCS	RC-519	PUSHBUTTON	PB8	CCR PANEL SNF	CB	53'-0"	Y
RCS	RC-552	PUSHBUTTON	PB31	CCR PANEL SNF	CB	53'-0"	Y
RCS	G-3	PUSHBUTTON	PB/SITR1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	PUSHBUTTON	PB/VTR1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	PUSHBUTTON	PB/RTT1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	PUSHBUTTON	PB/CATR1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-4	PUSHBUTTON	PB/STR1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	PUSHBUTTON	PB/OBTR1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	PUSHBUTTON	PB/T1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	PUSHBUTTON	PB/TR1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-5	PUSHBUTTON	PB/SITR2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	PUSHBUTTON	PB/UTR2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	PUSHBUTTON	PB/RTT2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	PUSHBUTTON	PB/CATR2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-6	PUSHBUTTON	PB/STR2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	PUSHBUTTON	PB/CBTR2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	PUSHBUTTON	PB/T2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	PUSHBUTTON	PB/TR2	CCR RACK G-6	CB	53'-0"	Y
RCS	PBU1	PUSHBUTTON	START	PANEL PL5	PAB	55'-0"	Y
RCS	PBU1	PUSHBUTTON	STOP	PANEL PL5	PAB	55'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
SP	956C	PUSHBUTTON	PB-42	SAMPLING PANEL	PAB	55'-0"	Y
SP	956D	PUSHBUTTON	PB-47	SAMPLING PANEL	PAB	55'-0"	Y
SP	956E	PUSHBUTTON	PB-36	SAMPLING PANEL	PAB	55'-0"	Y
SP	956E	PUSHBUTTON	PB-36A	OUTSIDE OF SAMP ROOM			Y
SP	956F	PUSHBUTTON	PB-41	SAMPLING PANEL	PAB	55'-0"	Y
SP	956F	PUSHBUTTON	PB-41A	OUTSIDE OF SAMP ROOM			Y
SP	959	PUSHBUTTON	PB-49	SAMPLING PANEL	PAB	55'-0"	Y
SP	958	PUSHBUTTON	PB54	CCR PANEL JK1	CB	54'-0"	Y
SWN	33 SW PUMP	PUSHBUTTON	START	PNL PS6	CB	15'-0"	Y
SWN	33 SW PUMP	PUSHBUTTON	STOP	PNL PS6	CB	15'-0"	Y
SWN	34 SW PUMP	PUSHBUTTON	START	PNL PS6	CB	15'-0"	Y
SWN	31 SW PUMP	PUSHBUTTON	START	PNL PS6	CB	15'-0"	Y
SWN	31 SW PUMP	PUSHBUTTON	STOP	PNL PS6	CB	15'-0"	Y
SWN	32 SW PUMP	PUSHBUTTON	STOP	PNL PS6	CB	15'-0"	Y
SWN	32 SW PUMP	PUSHBUTTON	START	PNL PS6	CB	15'-0"	Y
SWN	34 SW PUMP	PUSHBUTTON	STOP	PNL PS6	CB	15'-0"	Y
SWN	35 SW PUMP	PUSHBUTTON	START	PNL PS6	CB	15'-0"	Y
SWN	35 SW PUMP	PUSHBUTTON	STOP	PNL PS6	CB	15'-0"	Y
SWN	36 SW PUMP	PUSHBUTTON	STOP	PNL PS6	CB	15'-0"	Y
SWN	36 SW PUMP	PUSHBUTTON	START	PNL PS6	CB	15'-0"	Y
HVAC	32CRDF	PUSHBUTTONS	START, STOP	LOCAL	VC	95'-0"	Y
SWN	31 SW PUMP	RECIRC PHASE SWITCH (OFF/ON)	43/RS-2	CCR PANEL SBF-1	CB	53'-0"	Y
SWN	34 SW PUMP	RECIRC PHASE SWITCH (OFF/ON)	43/RS-2	CCR PANEL SBF-1	CB	53'-0"	Y
118VAC	GF2	RECT. A.C INPUT BREAKER CONTACTS (NOT USED)	CB1	INVERTER CAB	CB	33'-0"	Y
AFW	ABFP-31	RELAY	AMSAC	RACK F-7 (AMSAC CABINET)	CB	53'-0"	Y
AFW	ABFP-33	RELAY	AMSAC	RACK F-7 (AMSAC CABINET)	CB	53'-0"	Y
MS	PCV-1139	RELAY	AMSAC	RACK F-7 (AMSAC CABINET)	CB	15'-0"	Y
SP	958	RELAY	IR54	CCR PANEL JK1	CB	53'-0"	Y
HVAC	ACU31	RELAY BF44F	RF	ACU31	CB	15'-0"	Y
HVAC	ACU32	RELAY BF44F	RF	ACU32	CB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	RR/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	OSR/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	OPR1/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	OCR/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	SDR/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	32X/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	ESR1/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	ESR2/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	ESR-11/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	ESR21/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	CR1/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	CR2/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	BG1R/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	51VX/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	86X/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	FODPR/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	HLOTR/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	HLOTR-1/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	LAPR/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	LFLR/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	HWTR/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	HWTR-1/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	HHWTR/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	ASR/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	HR/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	K1X/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	FR/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	LODFR/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	FODSR/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
EDG	DG-31	RELAY GE CR120A	51GX/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY GE CR120A	LODSR/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	RR/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	OSR/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	OPR1/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	OCR/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	SDR/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	32X/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	ESR1/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	ESR2/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	ESR-11/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	ESR-21/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	CR1/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	CR2/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	BG1R/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	51VX/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	86X/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	FODPR/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	HLOTR/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	HLOTR-1/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	LFLR/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	HWTR/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	HWTR-1/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	HHWTR/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	ASR/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	HR/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	K1X/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	FR/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	LODFR/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	FODSR/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	51GX/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY GE CR120A	LODSR/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	RR/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	OSR/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	OPR1/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	OCR/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	SDR/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	32X/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	ESR1/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	ESR2/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	ESR-11/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	ESR21/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	CR1/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	CR2/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	BG1R/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	51VX/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	86X/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	FODPR/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	HLOTR/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	HLOTR-1/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	LFLR/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	HWTR/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	HWTR-1/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	HHWTR/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	ASR/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	HR/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	K1X/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	FR/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	LODFR/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
EDG	DG-32	RELAY GE CR120A	SWLFX/EG2	32 EDG CONTROL PANEL PQ1	CB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	FODSR/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	51GX/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY GE CR120A	LODSR/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
CCW	AC-791	RELAY GOULD J13	IR4	CCR PANEL SHR	CB	53'-0"	Y
CCW	AC-793	RELAY GOULD J13	IR6	CCR PANEL SHR	CB	53'-0"	Y
CCW	AC-796	RELAY GOULD J13	IR3	CCR PANEL SHR	CB	53'-0"	Y
CCW	AC-798	RELAY GOULD J13	IR5	CCR PANEL SHR	CB	53'-0"	Y
CVCS	CH-201	RELAY GOULD J13	IR12	CCR PANEL SHR	CB	53'-0"	Y
CVCS	CH-202	RELAY GOULD J13	IR11	CCR PANEL SHR	CB	53'-0"	Y
RCS	RC-519	RELAY GOULD J13	IR8	CCR PANEL SHR	CB	53'-0"	Y
RCS	RC-552	RELAY GOULD J13	IR31	CCR PANEL SHR	CB	53'-0"	Y
EDG	DG-31	RELAY GOULD J13P20	RSIS	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-33	RELAY GOULD J13P20	RSIS/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	RELAY GOULD J13P20	RSIS/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
IA	SOV-1428	RELAY GOULD J13P20	IR28	CCR PANEL SHR	CB	53'-0"	Y
SP	956C	RELAY GOULD J13P20	IR42	SAMPLING PANEL	PAB	55'-0"	Y
SP	956D	RELAY GOULD J13P20	IR47	SAMPLING PANEL	PAB	55'-0"	Y
SP	956E	RELAY GOULD J13P20	IR36	SAMPLING PANEL	PAB	55'-0"	Y
SP	956F	RELAY GOULD J13P20	IR41	SAMPLING PANEL	PAB	55'-0"	Y
SP	959	RELAY GOULD J13P20	IR49	SAMPLING PANEL	PAB	55'-0"	Y
RCS	G-4	RELAY GOULD J13P30	C-A15X	CCR RACK G-4	CB	53'-0"	Y
RCS	G-6	RELAY GOULD J13P30	C-A25X	CCR RACK G-6	CB	53'-0"	Y
480VAC	480V SWGR 31	RELAY GOULD J16SV12	27-3/2A & 27-3X/2A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY GOULD J16SV12	27-4/2A & 27-4X/2A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY GOULD J16SV12	27-3/5A & 27-3X/5A	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY GOULD J16SV12	27-4/5A & 27-4X/5A	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
480VAC	480V SWGR 32	RELAY GOULD J16SV12	27-3/6A & 27-3X/6A	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 32	RELAY GOULD J16SV12	27-4/6A & 27-4X/6A	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY GOULD J16SV12	27-3/3A & 27-3X/3A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY GOULD J16SV12	27-4/3A & 27-4X/3A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
RCS	RC-549	RELAY GOULD J33	IR-33	CCR PANEL SHR	CB	53'-0"	Y
AFW	BFD-FCV-1123	RELAY MAGNACRAFT ELEC. CO. 188RX-4	80X1/AFPR3	TERM BOX Y2J	ET	34'-0"	Y
AFW	BFD-FCV-1123	RELAY MAGNACRAFT ELEC. CO. 188RX-4	80X1-1/AFPR3	TERM BOX Y2J	ET	34'-0"	Y
AFW	BFD-FCV-1121	RELAY MAGNECRAFT ELEC. CO. 188RX-4	80X1/AFPR1	TERM BOX Y2I	ET	34'-0"	Y
AFW	BFD-FCV-1121	RELAY MAGNECRAFT ELEC. CO 188RX-4	80X1-1/AFPR1	TERM BOX Y2I	ET	34'-0"	Y
480VAC	480V SWGR 31	RELAY MG-6	27X1/EG1	31EDG CONTROL PANEL PP9	DGB	15'-0"	Y
480VAC	480V SWGR 31	RELAY SG12V	27-3A/X1	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY UV/DGV IN TEST ANNUCIATOR	74-1/2A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY UV/DGV IN TEST ANNUCIATOR	74-1/3A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY UV/DGV IN TEST ANNUCIATOR	74-1/5A	480V SWGR 31 COMPT 25H	CB	15'-0"	Y
480VAC	480V SWGR 32	RELAY UV/DGV IN TEST ANNUNICATOR	74-1/6A	480V SWGR 32 COMPT 8H	CB	15'-0"	Y
CVCS	CH-FCV-110B	RELAY WHSE BF22	LC-112BX	CCR RACK G-2	CB	53'-0"	Y
CVCS	CH-FCV-111A	RELAY WHSE BF22	LC-112BX	CCR RACK G-2	CB	53'-0"	Y
CVCS	CSAPBA1	RELAY WHSE BF22	LC-112BX	CCR RACK G-2	CB	53'-0"	Y
CVCS	CSAPBA2	RELAY WHSE BF22	LC-112BX	CCR RACK G-2	CB	53'-0"	Y
PW	31PWMUP	RELAY WHSE BF22	LC-112BX	CCR RACK G-2	CB	53'-0"	Y
PW	32PWMUP	RELAY WHSE BF22	LC-112BX	CCR RACK G-2	CB	53'-0"	Y
HVAC	0031ETEF	RELAY WHSE BF22F	74-1	CCR PANEL SL	CB	53'-0"	Y
HVAC	ACU31	RELAY WHSE BF22F	3/ACC31A	ACU31	CB	15'-0"	Y
HVAC	ACU31	RELAY WHSE BF22F	3/ACC31B	ACU31	CB	15'-0"	Y
HVAC	ACU31	RELAY WHSE BF22F	RF1	ACU31	CB	15'-0"	Y
HVAC	ACU32	RELAY WHSE BF22F	RF2	ACU32	CB	15'-0"	Y
HVAC	ACU32	RELAY WHSE BF22F	3/ACC32A	ACU32	CB	15'-0"	Y
HVAC	ACU32	RELAY WHSE BF22F	3/ACC32B	ACU32	CB	15'-0"	Y
HVAC	ACU32	RELAY WHSE BF22F	RF2	ACU32	CB	15'-0"	Y
HVAC	ACU32	RELAY WHSE BF22F	432	ACU32	CB	15'-0"	Y
RCS	PCV-455C	RELAY WHSE BF22F	PC-474B/X	CCR PANEL FCF	CB	53'-0"	Y
RCS	PCV-456	RELAY WHSE BF22F	PC-457 F/X	CCR PANEL FCF	CB	53'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
RCS	G-1	RELAY WHSE BF22F	LC-920A/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-920B/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-931/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-934A/X	CCR RACK G-1	CB	13'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-934B/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-934C/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-934D/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-934E/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-934F/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-934G/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-934H/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-935A/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-935B/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-935C/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-935D/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-935E/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-935F/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-935G/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-935H/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	PC-936A/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	PC-936B/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	PC-936C/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	PC-936D/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	PC-936E/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	PC-936F/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	PC-936G/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	PC-936H/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	PC-937A/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	PC-937B/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	PC-937C/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	PC-937D/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	PC-937E/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	PC-937F/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	PC-937G/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	PC-937H/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-417I/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-427I/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-437I/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-447I/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-486/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-487/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-492/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-493/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	RCP-31HI/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	RCP-31LO/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	RCP-32HI/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	RCP-32LO/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	RCP-33HI/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	RCP-33LO/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	RCP-34HI/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	RCP-34LO/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-488/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-489/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-490/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	LC-491/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	PC-418C/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	FC-418E/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	FC-428C/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	FC-428E/X	CCR RACK G-1	CB	53'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
RCS	G-1	RELAY WHSE BF22F	FC-438C/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	FC-438E/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	FC-448C/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	FC-448E/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	FC-417J/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	FC-427J/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	FC-437J/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	FC-447J/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	1/NC-31A/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	1/NC-32A/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NC-32C/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NC-31C/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NC-32H/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NC-31H/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NC-35K/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NC-36K/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NC-41T/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NC-42T/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NC-43T/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NC-44T/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NC-46B/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NM-31D/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NM-32D/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NM-35C/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NM-36C/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NM-41E/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NM-42E/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NM-43E/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NM-44E/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NM-37E/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NC-35M/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NC-36M/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	TC/D	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	TC/B	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NC-35E/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	NC-36E/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	PC-412/AX	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	TURB /B	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF22F	RSC/1	CCR RACK G-1	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	LC-459F/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	LC-459G/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	LC-460D/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	LC-470A/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	LC-470B/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	LC-102A/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	PC-455I/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	PC-456G/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	PC-457F/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	PC-472/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	PC-474B/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-401/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-411F/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	YC-411A/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	YC-411B/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-412B/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-421F/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	YC-421A/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	YC-421B/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-422B/X	CCR RACK G-2	CB	53'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
RCS	G-2	RELAY WHSE BF22F	TC-431F/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	YC-431A/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	YC-431B/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-432B/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-441F/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	YC-441A/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-412/I-X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-412/K-X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-412/L-X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	YC-441B/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	PC-SAT-1	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-442B/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-450/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-451/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-452/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-453/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-454/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-463/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-465/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-467/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-469/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-471/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	LC-106A/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	PC-SAT-2	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-412/QX	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-412/RX	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	FC-134/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	FC-156A/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	FC-156B/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	FC-157A/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	FC-157B/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	FC-158A/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	FC-158B/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	FC-159A/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	FC-159B/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	FC-601A/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	FC-601B/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	LC-102/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	LC-106/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	LC-112A/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	LC-112B/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-103/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-107/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-122/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-127/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-129/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-140/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-602A/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-917A/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TC-917B/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	LC-628A/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	LC-628B/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	LC-629A/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	LC-629B/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	TURB A	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	PC-124/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	PC-131/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	PC-135B/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	PC-139/X	CCR RACK G-2	CB	53'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
RCS	G-2	RELAY WHSE BF22F	PC-145/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	PC-919/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	PC-602B/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	YC-110/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	YC-111/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	PC-183/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	PC-186/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	PC-187/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	PC-188/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	FC-946A/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	FC-946B/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	PC-947/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	FC-946C/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF22F	FC-946D/X	CCR RACK G-2	CB	53'-0"	Y
IA	PCV-1141	RELAY WHSE BF40F	TD1X	CCR PANEL SJ	CB	53'-0"	Y
IA	PCV-1142	RELAY WHSE BF40F	TD1X	CCR PANEL SJ	CB	53'-0"	Y
IA	PCV-1143	RELAY WHSE BF40F	TD1X	CCR PANEL SJ	CB	53'-0"	Y
RCS	PCV-455C	RELAY WHSE BF44V	PC-443XB	CCR RACK H-4	CB	53'-0"	Y
RCS	PCV-455C	RELAY WHSE BF44V	PC-413XB	CCR RACK H-4	CB	53'-0"	Y
RCS	PCV-455C	RELAY WHSE BF44V	TC-435XB	CCR RACK H-4	CB	53'-0"	Y
RCS	PCV-455C	RELAY WHSE BF44V	TC-433XB2	CCR RACK H-4	CB	53'-0"	Y
RCS	PCV-455C	RELAY WHSE BF44V	TC-443XB2	CCR RACK H-4	CB	53'-0"	Y
RCS	PCV-455C	RELAY WHSE BF44V	TC-413XB2	CCR RACK H-4	CB	53'-0"	Y
RCS	PCV-456	RELAY WHSE BF44V	PC443XA	CCR RACK H-5	CB	53'-0"	Y
RCS	PCV-456	RELAY WHSE BF44V	PC413XA	CCR RACK H-5	CB	53'-0"	Y
RCS	PCV-456	RELAY WHSE BF44V	PC433XA	CCR RACK H-5	CB	53'-0"	Y
RCS	PCV-456	RELAY WHSE BF44V	TC443XA2	CCR RACK H-5	CB	53'-0"	Y
RCS	PCV-456	RELAY WHSE BF44V	TC413XA2	CCR RACK H-5	CB	53'-0"	Y
RCS	PCV-456	RELAY WHSE BF44V	TC433XA2	CCR RACK H-5	CB	53'-0"	Y
RCS	RC-MOV-535	RELAY WHSE BF44V	TC413XB1	CCR RACK H-4	CB	53'-0"	Y
RCS	RC-MOV-535	RELAY WHSE BF44V	TC433XB1	CCR RACK H-4	CB	53'-0"	Y
RCS	RC-MOV-535	RELAY WHSE BF44V	TC443XB1	CCR RACK H-4	CB	53'-0"	Y
RCS	PCV-456	RELAY WHSE BF44V	TC033XA	CCR RACK H-5	CB	53'-0"	Y
RCS	RC-MOV-536	RELAY WHSE BF44V	TC413XA1	CCR RACK H-5	CB	53'-0"	Y
RCS	RC-MOV-536	RELAY WHSE BF44V	TC433XA1	CCR RACK H-5	CB	53'-0"	Y
RCS	RC-MOV-536	RELAY WHSE BF44V	TC443XA1	CCR RACK H-5	CB	53'-0"	Y
CVCS	CH-FCV-110B	RELAY WHSE BF66	BSX-2	CCR RACK G-2	CB	53'-0"	Y
CVCS	CH-FCV-110B	RELAY WHSE BF66	BSX-4X1	CCR RACK G-2	CB	53'-0"	Y
CVCS	CH-FCV-110B	RELAY WHSE BF66	BSX-1	CCR RACK G-2	CB	53'-0"	Y
CVCS	CH-FCV-110B	RELAY WHSE BF66	BSX-3	CCR RACK G-2	CB	53'-0"	Y
CVCS	CH-FCV-111A	RELAY WHSE BF66	BSX-1	CCR RACK G-2	CB	53'-0"	Y
CVCS	CH-FCV-111A	RELAY WHSE BF66	BSX-2	CCR RACK G-2	CB	53'-0"	Y
CVCS	CH-FCV-111A	RELAY WHSE BF66	BSX-3	CCR RACK G-2	CB	53'-0"	Y
CVCS	CH-FCV-111B	RELAY WHSE BF66	BSX-1	CCR RACK G-2	CB	53'-0"	Y
CVCS	CH-FCV-111B	RELAY WHSE BF66	BSX-3	CCR RACK G-2	CB	53'-0"	Y
CVCS	CH-FCV-111B	RELAY WHSE BF66	BSX-2	CCR RACK G-2	CB	53'-0"	Y
CVCS	CSAPBA1	RELAY WHSE BF66	BSX-1	CCR RACK G-2	CB	53'-0"	Y
CVCS	CSAPBA1	RELAY WHSE BF66	BSX-2	CCR RACK G-2	CB	53'-0"	Y
CVCS	CSAPBA1	RELAY WHSE BF66	BSX-3	CCR RACK G-2	CB	53'-0"	Y
CVCS	CSAPBA2	RELAY WHSE BF66	BSX-1	CCR RACK G-2	CB	53'-0"	Y
CVCS	CSAPBA2	RELAY WHSE BF66	BSX-2	CCR RACK G-2	CB	53'-0"	Y
CVCS	CSAPBA2	RELAY WHSE BF66	BSX-3	CCR RACK G-2	CB	53'-0"	Y
PW	31PWMUP	RELAY WHSE BF66	BSX-1	CCR RACK G-2	CB	53'-0"	Y
PW	31PWMUP	RELAY WHSE BF66	BSX-2	CCR RACK G-2	CB	53'-0"	Y
PW	31PWMUP	RELAY WHSE BF66	BSX-3	CCR RACK G-2	CB	53'-0"	Y
PW	32PWMUP	RELAY WHSE BF66	BSX-1	CCR RACK G-2	CB	53'-0"	Y
PW	32PWMUP	RELAY WHSE BF66	BSX-2	CCR RACK G-2	CB	53'-0"	Y
PW	32PWMUP	RELAY WHSE BF66	BSX-3	CCR RACK G-2	CB	53'-0"	Y
ACS	AC-0730	RELAY WHSE BF66F	PC-402AX	CCR RACK G-2	CB	53'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
ACS	AC-0730	RELAY WHSE BF66F	PC-402BX	CCR RACK G-2	CB	53'-0"	Y
ACS	AC-0730	RELAY WHSE BF66F	730/33acX	CCR RACK G-2	CB	53'-0"	Y
ACS	AC-0731	RELAY WHSE BF66F	PC-403AX	CCR RACK G-1	CB	53'-0"	Y
ACS	AC-0731	RELAY WHSE BF66F	PC-403BX	CCR RACK G-1	CB	53'-0"	Y
ACS	AC-0731	RELAY WHSE BF66F	731/33acX	CCR RACK G-2	CB	53'-0"	Y
CCW	ACAPCC2	RELAY WHSE BF66F	PC 600AX	CCR RACK G-2	CB	53'-0"	Y
CCW	ACAPCC2	RELAY WHSE BF66F	PC 600BX	[illegible]	CB	53'-0"	Y
CVCS	CH-LCV-112B	RELAY WHSE BF66F	LC [illegible]	[illegible]	CB	53'-0"	Y
CVCS	CH-LCV-112C	RELAY WHSE BF66F	LC [illegible]	[illegible]	CB	53'-0"	Y
CVCS	SOV-459-1	RELAY WHSE BF66F	LC [illegible] X	[illegible]	CB	53'-0"	Y
CVCS	SOV-460-1	RELAY WHSE BF66F	LC [illegible] X	[illegible]	CB	53'-0"	Y
MS	PCV-1139	RELAY WHSE BF66F	71/SG1 X	[illegible]	CB	53'-0"	Y
MS	PCV-1139	RELAY WHSE BF66F	71/SG2 X	[illegible]	CB	15'-0"	Y
MS	PCV-1139	RELAY WHSE BF66F	71/SG3-X	CCR RACK G-2	CB	15'-0"	Y
MS	PCV-1139	RELAY WHSE BF66F	71/SG4-X	CCR RACK G 2	CB	15'-0"	Y
RCS	PCV-455C	RELAY WHSE BF66F	PC-455F/X	CCR PANEL FCF	CB	53'-0"	Y
RCS	PCV-456	RELAY WHSE BF66F	PC-456 F/X	CCR PANEL FCF	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	PC-403A/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	RTAL/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	PC-403B/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	1/TC-412A/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	1/TC-422A/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	1/TC-432A/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	1/TC-442A/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	NC-41L/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	NC-42L/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	NC-43L/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	NC-44L/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	1/NC-41L/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	1/NC-42L/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	1/NC-43L/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	1/NC-44L/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	TC-411/BX	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	TC-421/BX	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	TC-431/BX	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	TC-441/BX	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	1/TC-411/BX	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	1/TC-411/DX	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	1/TC-421/BX	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	1/TC-421/DX	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	1/TC-431/BX	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	1/TC-431/DX	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	1/TC-441/BX	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	1/TC-441/DX	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	TC-411D/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	TC-421D/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	TC-431D/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	TC-441D/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	V731-33ac/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	S2	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	TC-412A/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	TC-422A/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	TC-432A/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	TC-442A/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	RC-19/X	CCR RACK G-1	CB	53'-0"	Y
RCS	G-1	RELAY WHSE BF66F	RS/1	CCR RACK G-1	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF66F	LC-459C/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF66F	LC-459E/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF66F	LC-460C/X	CCR RACK G-2	CB	53'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
RCS	G-2	RELAY WHSE BF66F	PC-402A/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF66F	PC-455F/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF66F	PC-455J/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF66F	PC-456F/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF66F	71-SG1/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF66F	71-SG2/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF66F	71-SG3/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF66F	71-SG4/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF66F	TC-412/L-X-2	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF66F	P5	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF66F	LC-112C/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF66F	S1	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF66F	PC-402B/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF66F	PC-600A/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF66F	PC-600B/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF66F	BSX/1	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF66F	BSX/2	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF66F	BSX/3	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF66F	BSX/4X1	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF66F	V-730-33ac/X	CCR RACK G-2	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	LC-459B/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	PC-455E/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	PC-455C/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	PC-419A/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	PC-419D/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	FC-419A/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	FC-429A/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	FC-439A/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	FC-449A/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	TC-412D/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	LC-427C/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	LC-437C/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	PC-439C/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	PC-439D/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	TC-412M/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	LC-461B/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	PC-457E/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	PC-457C/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	PC-429G/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	PC-429H/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	TC-432D/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	PC-429E/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	PC-433A/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	PC-948E/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	PC-943B/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	PC-949B/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	LC-417E/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	LC-427E/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	LC-437E/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BF66F	LC-447E/X1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	LC-460B/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	PC-456E/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	PC-456C/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	PC-429A/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	PC-429C/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	FC-419B/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	FC-429B/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	FC-439B/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	TC-422D/X1	CCR RACK G-4	CB	53'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
RCS	G-4	RELAY WHSE BF66F	PC-949C/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	LC-417C/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	LC-447C/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	PC-419B/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	PC-419E/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	PC-419C/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	PC-419F/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	TC-442D/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	PC-419G/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	PC-449A/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	PC-948D/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	PC-948A/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	PC-949A/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	LC-417A/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	LC-427A/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	LC-437A/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BF66F	LC-447A/X1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	LC-459B/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	PC-455E/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	PC-455C/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	PC-419A/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	PC-419D/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	FC-419A/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	FC-429A/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	FC-439A/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	FC-449A/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	TC-412D/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	LC-427C/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	LC-437C/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	PC-439C/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	PC-439D/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	TC-412M/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	LC-461B/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	PC-457E/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	PC-457C/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	PC-429G/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	PC-429H/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	TC-432D/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	PC-429E/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	PC-433A/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	PC-948E/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	PC-943B/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	PC-949B/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	LC-417E/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	LC-427E/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	LC-437E/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BF66F	LC-447E/X2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	LC-460B/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	PC-456E/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	PC-456C/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	PC-429A/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	PC-429C/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	FC-419B/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	FC-429B/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	FC-439B/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	FC-449B/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	TC-422D/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	PC-948F/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	PC-948C/X2	CCR RACK G-6	CB	53'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
RCS	G-6	RELAY WHSE BF66F	PC-949C/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	LC-417C/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	LC-447C/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	PC-419B/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	PC-419E/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	PC-419C/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	PC-419F/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	TC-442D/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	PC-419G/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	PC-449A/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	PC-948D/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	PC-949A/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	LC-417A/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	LC-427A/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	LC-437A/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BF66F	LC-447A/X2	CCR RACK G-6	CB	53'-0"	Y
RCS	PBU1	RELAY WHSE BF66F	LC-459/EX	CCR RACK G-2	CB	53'-0"	Y
RCS	PBU1	RELAY WHSE BF66F	PC-455/JX	CCR RACK G-2	CB	53'-0"	Y
RCS	PBU1	RELAY WHSE BF66F	LC-459/CX	CCR RACK G-2	CB	53'-0"	Y
RCS	PBU1	RELAY WHSE BF66F	LC-460/CX	CCR RACK G-2	CB	53'-0"	Y
RCS	PBU2	RELAY WHSE BF66F	LC-459/EX	CCR RACK G-2	CB	53'-0"	Y
RCS	PBU2	RELAY WHSE BF66F	PC-455/JX	CCR RACK G-2	CB	53'-0"	Y
RCS	PBU2	RELAY WHSE BF66F	LC-459/CX	CCR RACK G-2	CB	53'-0"	Y
RCS	PBU2	RELAY WHSE BF66F	LC-460/CX	CCR RACK G-2	CB	53'-0"	Y
RCS	PBU3	RELAY WHSE BF66F	LC-459/EX	CCR RACK G-2	CB	53'-0"	Y
RCS	PBU3	RELAY WHSE BF66F	PC-455/JX	CCR RACK G-2	CB	53'-0"	Y
RCS	PBU3	RELAY WHSE BF66F	LC-459/CX	CCR RACK G-2	CB	53'-0"	Y
RCS	PBU3	RELAY WHSE BF66F	LC-460/CX	CCR RACK G-2	CB	53'-0"	Y
SIS	SI-0885A	RELAY WHSE BF66F	73-33acX	CCR RACK G-2	CB	53'-0"	Y
SIS	SI-0885B	RELAY WHSE BF66F	731-33acX	CCR RACK G-1	CB	53'-0"	Y
SIS	SI-0888A	RELAY WHSE BF66F	730-33acX	CCR RACK G-2	CB	53'-0"	Y
SIS	SI-0888B	RELAY WHSE BF66F	731-33acX	CCR RACK G-1	CB	53'-0"	Y
CVCS	CH-FCV-111A	RELAY WHSE BF84	BSX-4	CCR RACK G-2	CB	53'-0"	Y
CVCS	CSAPBA1	RELAY WHSE BF84	BSX-4	CCR RACK G-2	CB	53'-0"	Y
CVCS	CSAPBA2	RELAY WHSE BF84	BSX-4	CCR RACK G 2	CB	53'-0"	Y
PW	31PWMUP	RELAY WHSE BF84	BSX-4	CCR RACK G 2	CB	53'-0"	Y
PW	32PWMUP	RELAY WHSE BF84	BSX-4	CCR RACK G 2	CB	53'-0"	Y
RCS	G-2	RELAY WHSE BF84F	BSX/4	CCR RACK G 2	CB	53'-0"	Y
SWN	FCV-1176A	RELAY WHSE BFD 48S	SI-22X	CCR RACK G 3	CB	53'-0"	Y
CCW	AC-822A	RELAY WHSE BFD120	SI-10X	CCR RACK G 3	CB	53'-0"	Y
CCW	AC-822B	RELAY WHSE BFD120	SI-20X	CCR RACK G 5	CB	53'-0"	Y
480VAC	MCC-32	RELAY WHSE BFD120S	3-3/3A	480V SWGR 31 COMPT 28H	CB	15'-0"	Y
480VAC	MCC-39	RELAY WHSE BFD120S	3-3/5A2	480V SWGR 31 COMPT 25H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD120S	27-2A/X2	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD120S	SI-21X/TRAIN 2	CCR RACK G-5	CB	53'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD120S	SI-11X/TRAIN 1	CCR RACK G-3	CB	53'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD120S	27-3A/X2	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD120S	SI/2A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 32	RELAY WHSE BFD120S	27-6A/X2	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 32	RELAY WHSE BFD120S	SI-21X/TRAIN 2	CCR RACK G-5	CB	53'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD120S	SI/2A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 32	RELAY WHSE BFD120S	SI-11X/TRAIN 1	CCR RACK G-3	CB	53'-0"	Y
480VAC	480V SWGR 32	RELAY WHSE BFD120S	3-1/6A	480V SWGR 32 COMPT 8H	CB	15'-0"	Y
480VAC	MCC-34	RELAY WHSE BFD120S	27-2A/2X	480V SWGR 31, COMPT 28M	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD120S	3-3/3A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD120S	3-1/5A	480V SWGR 31 COMPT 25H	CB	15'-0"	Y
CCW	ACAPCC1	RELAY WHSE BFD120S	3-1/5A	480V SWGR 31 COMPT 25H	CB	15'-0"	Y
CCW	ACAPCC1	RELAY WHSE BFD120S	27-5A/X3	480V SWGR 31 COMPT 25H	CB	15'-0"	Y
CCW	ACAPCC2	RELAY WHSE BFD120S	27-2A/X2	480V SWGR 31 COMPT 28	CB	15'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
CCW	ACAPCC3	RELAY WHSE BFD120S	3-1/6A	480V SWGR 32 COMPT 8H	CB	15'-0"	Y
CVCS	CSAPCH1	RELAY WHSE BFD120S	SI-11X	CCR RACK G-3	CB	53'-0"	Y
CVCS	CSAPCH1	RELAY WHSE BFD120S	27-5A/X3	480V SWGR 31 COMPT 25H	CB	15'-0"	Y
CVCS	CSAPCH2	RELAY WHSE BFD120S	3-3/3A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
CVCS	CSAPCH2	RELAY WHSE BFD120S	27-3A/X2	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
CVCS	CSAPCH2	RELAY WHSE BFD120S	SI/2A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
CVCS	CSAPCH2	RELAY WHSE BFD120S	SI-11X	CCR RACK G-3	CB	53'-0"	Y
CVCS	CSAPCH2	RELAY WHSE BFD120S	SI-21X	CCR RACK G-5	CB	53'-0"	Y
CVCS	CSAPCH3	RELAY WHSE BFD120S	3-3/6A2	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
CVCS	CSAPCH3	RELAY WHSE BFD120S	27-6A/X2	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
CVCS	CSAPCH3	RELAY WHSE BFD120S	SI/6A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
CVCS	CSAPCH3	RELAY WHSE BFD120S	SI-21X	CCR RACK G-5	CB	53'-0"	Y
EDG	DG-31	RELAY WHSE BFD120S	SI-21X	CCR RACK G-5	CB	53'-0"	Y
EDG	DG-31	RELAY WHSE BFD120S	SI-11X	CCR RACK G-3	CB	53'-0"	Y
EDG	DG-31	RELAY WHSE BFD120S	SI-2A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
EDG	DG-33	RELAY WHSE BFD120S	27-5A/X2	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
EDG	DG-32	RELAY WHSE BFD120S	27-6A/X2	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
HVAC	0031CRFU	RELAY WHSE BFD120S	27-5A/X3	480V SWGR 31	CB	15'-0"	Y
HVAC	0031CRFU	RELAY WHSE BFD120S	3-1/5A	480V SWGR 31	CB	15'-0"	Y
HVAC	0032CRFU	RELAY WHSE BFD120S	3-1/2A	480V SWGR 31	CB	15'-0"	Y
HVAC	0033CRFU	RELAY WHSE BFD120S	3-1/5A	480V SWGR 31	CB	15'-0"	Y
HVAC	0034CRFU	RELAY WHSE BFD120S	27-3A/X2	480V SWGR 31	CB	15'-0"	Y
HVAC	0035CRFU	RELAY WHSE BFD120S	27-6A/X2	480V SWGR 32	CB	15'-0"	Y
HVAC	31 PABEF	RELAY WHSE BFD120S	3-3/3A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
RCS	G-3	RELAY WHSE BFD120S	SI11X	CCR RACK G-3	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BFD120S	SI21X	CCR RACK G-5	CB	53'-0"	Y
RCS	PBU1	RELAY WHSE BFD120S	3-3/3A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
RHR	ACAPRH1	RELAY WHSE BFD120S	27-3A/X2	480V SWGR 31, COMPT 28H	CB	53'-0"	Y
RHR	ACAPRH1	RELAY WHSE BFD120S	3-1/3A	CCR RACK G-2	CB	53'-0"	Y
RHR	ACAPRH2	RELAY WHSE BFD120S	27-6A/X2	480V SWGR 32, COMPT 8H	CB	53'-0"	Y
RHR	ACAPRH2	RELAY WHSE BFD120S	3-1/6A	CCR RACK G-2	CB	53'-0"	Y
SWN	31 SW PUMP	RELAY WHSE BFD120S	27-5A/X3	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
SWN	31 SW PUMP	RELAY WHSE BFD120S	3-1/5A	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
SWN	32 SW PUMP	RELAY WHSE BFD120S	27-2A/X2	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
SWN	32 SW PUMP	RELAY WHSE BFD120S	SI/2A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
SWN	33 SW PUMP	RELAY WHSE BFD120S	27-6A/X2	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
SWN	33 SW PUMP	RELAY WHSE BFD120S	3-1/6A	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
SWN	34 SW PUMP	RELAY WHSE BFD120S	27-5A/X3	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
SWN	34 SW PUMP	RELAY WHSE BFD120S	3-1/5A	480V SWGR 31, COMPT 25H.	CB	15'-0"	Y
SWN	35 SW PUMP	RELAY WHSE BFD120S	27-3A/X2	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
SWN	35 SW PUMP	RELAY WHSE BFD120S	SI/2A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
SWN	36 SW PUMP	RELAY WHSE BFD120S	27-6A/X2	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
SWN	36 SW PUMP	RELAY WHSE BFD120S	3-1/6A	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
HVAC	0031CRFU	RELAY WHSE BFD20S	74	CCR PANEL SBF-2	CB	53'-0"	Y
HVAC	0032CRFU	RELAY WHSE BFD20S	74	CCR PANEL SBF-2	CB	53'-0"	Y
HVAC	0033CRFU	RELAY WHSE BFD20S	74	CCR PANEL SBF-2	CB	53'-0"	Y
HVAC	0034CRFU	RELAY WHSE BFD20S	74	CCR PANEL SBF-2	CB	53'-0"	Y
RHR	ACAPRH1	RELAY WHSE BFD20S	74 (ALARM)	CCR PANEL SGF	CB	53'-0"	Y
RHR	ACAPRH2	RELAY WHSE BFD20S	74 (ALARM)	CCR PANEL SGF	CB	53'-0"	Y
480VAC	480V SWGR 32	RELAY WHSE BFD22S	74/6A	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 32	RELAY WHSE BFD22S	3-5/6A	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 32	RELAY WHSE BFD22S	3-4/6A	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 32	RELAY WHSE BFD22S	1X/BFPT1	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 32	RELAY WHSE BFD22S	1X/BFPT2	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD22S	BFP/L	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD22S	74/2A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD22S	74/5A	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD22S	3-5/5A	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
CCW	ACAPCC1	RELAY WHSE BFD22S	86	480V SWGR 31, COMPT 21A	CB	15'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
CCW	ACAPCC2	RELAY WHSE BFD22S	86	480V SWGR 31, COMPT 30A	CB	15'-0"	Y
EDG	DG-31	RELAY WHSE BFD22S	R1/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY WHSE BFD22S	R2/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY WHSE BFD22S	74/EG1	CCR PANEL SH	CB	53'-0"	Y
EDG	DG-33	RELAY WHSE BFD22S	R1/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY WHSE BFD22S	R2/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	RELAY WHSE BFD22S	R1/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY WHSE BFD22S	R2/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY WHSE BFD22S	74/EG2	CCR PANEL SH	CB	53'-0"	Y
HVAC	0031ETEF	RELAY WHSE BFD22S	R1	DELUGE SYS CTRL PNL PY3	ET	34'-0"	Y
HVAC	0031ETEF	RELAY WHSE BFD22S	R2	DELUGE SYS CTRL PNL PY4	ET	34'-0"	Y
HVAC	0032ETEF	RELAY WHSE BFD22S	R2	DELUGE SYS CTRL PNL PY4	ET	34'-0"	Y
HVAC	0032ETEF	RELAY WHSE BFD22S	R1	DELUGE SYS CTRL PNL PY3	ET	34'-0"	Y
MS	PCV-1139	RELAY WHSE BFD22S	BFPL	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
RCS	PBU1	RELAY WHSE BFD22S	86	480V SWGR 32, COMPT 4A	CB	15'-0"	Y
RCS	PBU2	RELAY WHSE BFD22S	86	480V SWGR 31, COMPT 30A	CB	15'-0"	Y
RCS	PBU3	RELAY WHSE BFD22S	86	480V SWGR 31, COMPT 20A	CB	15'-0"	Y
SWN	31 SW PUMP	RELAY WHSE BFD22S	3-4/5A	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
SWN	33 SW PUMP	RELAY WHSE BFD22S	3-4/6A	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
SWN	34 SW PUMP	RELAY WHSE BFD22S	3-4/5A	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
SWN	36 SW PUMP	RELAY WHSE BFD22S	3-4/6A	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD24S	27-3A/X5	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
CCW	ACAPCC3	RELAY WHSE BFD32S	86	480V SWGR 32, COMPT 15A	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD40S	3-1/2A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD40S	3-1/3A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD40S	3-2/2A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD40S	3-2/3A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD40S	3-2/5A	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
AFW	ABFP-31	RELAY WHSE BFD40S	3-1/3A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
AFW	ABFP-31	RELAY WHSE BFD40S	3-2/3A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
AFW	ABFP-33	RELAY WHSE BFD40S	3-1/6A	480V SWGR 31	CB	15'-0"	Y
AFW	ABFP-33	RELAY WHSE BFD40S	3-2/6A	480V SWGR 31	CB	15'-0"	Y
CCW	ACAPCC1	RELAY WHSE BFD40S	3-2/5A	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
CCW	ACAPCC2	RELAY WHSE BFD40S	3-2/2A	480V SWGR 31, COMPT 28	CB	15'-0"	Y
CCW	ACAPCC2	RELAY WHSE BFD40S	3-1/2A	480V SWGR 31, COMPT 28	CB	15'-0"	Y
MS	PCV-1139	RELAY WHSE BFD40S	3-2/3A	480V SWGR 31, COMPT 28H	CB	15-0"	Y
SWN	31 SW PUMP	RELAY WHSE BFD40S	3-2/5A	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
SWN	32 SW PUMP	RELAY WHSE BFD40S	3-1/2A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
SWN	32 SW PUMP	RELAY WHSE BFD40S	3-2/2A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
SWN	34 SW PUMP	RELAY WHSE BFD40S	3-2/5A	480V SWGR 31 COMPT 25H	CB	15'-0"	Y
SWN	35 SW PUMP	RELAY WHSE BFD40S	3-1/3A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
SWN	35 SW PUMP	RELAY WHSE BFD40S	3-2/3A	480V SWGR 31 COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 32	RELAY WHSE BFD44S	BFP	480V SWGR 32 COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD44S	3-5/2A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD44S	BFP/K	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
AFW	ABFP-31	RELAY WHSE BFD44S	BFP-K	480V SWGR 31 COMPT 28H	CB	15'-0"	Y
AFW	ABFP-31	RELAY WHSE BFD44S	BFP	480V SWGR 32 COMPT 8H	CB	15'-0"	Y
AFW	ABFP-33	RELAY WHSE BFD44S	BFP-K	480V SWGR 31	CB	15'-0"	Y
HVAC	0032CRFU	RELAY WHSE BFD44S	27-2A/X2	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD48S	SI/2A1	480V SWGR 31 COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD48S	SI/5A1	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
480VAC	480V SWGR 32	RELAY WHSE BFD48S	SI/6A1	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
480VAC	MCC-36C	RELAY WHSE BFD48S	SI/2A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
ACS	AC-0746	RELAY WHSE BFD48S	SI/5A1	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
ACS	AC-0747	RELAY WHSE BFD48S	SI/5A1	480 SWGR31, COMPT 25H	CB	15'-0"	Y
CCW	AC-791	RELAY WHSE BFD48S	C-A11X	CCR RACK G-4	CB	53'-0"	Y
CCW	AC-793	RELAY WHSE BFD48S	C-A11X	CCR RACK G-4	CB	53'-0"	Y
CCW	AC-796	RELAY WHSE BFD48S	C-A21X	CCR RACK G-6	CB	53'-0"	Y
CCW	AC-798	RELAY WHSE BFD48S	C-A21X	CCR RACK G-6	CB	53'-0"	Y

Table 3A.5

Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
CCW	ACAPCC1	RELAY WHSE BFD48S	SI/5A1	480V SWGR 31 COMPT 25H	CB	15'-0"	Y
CCW	ACAPCC2	RELAY WHSE BFD48S	SI/2A1	480V SWGR 31 COMPT 28	CB	15'-0"	Y
CCW	ACAPCC3	RELAY WHSE BFD48S	SI/6A1	480V SWGR 32 COMPT 8H	CB	53'-0"	Y
CVCS	CH-201	RELAY WHSE BFD48S	C-A11X	CCR RACK G-4	CB	53'-0"	Y
CVCS	CH-202	RELAY WHSE BFD48S	C-A21X	CCR RACK G-6	CB	53'-0"	Y
CVCS	CH-AOV-200A	RELAY WHSE BFD48S	C-A11X	CCR RACK G-4	CB	53'-0"	Y
CVCS	CH-AOV-200B	RELAY WHSE BFD48S	C-A11X	CCR RACK G-4	CB	53'-0"	Y
CVCS	CH-AOV-200C	RELAY WHSE BFD48S	C-A11X	CCR RACK G-4	CB	53'-0"	Y
EDG	DG-31	RELAY WHSE BFD48S	SI-23X	CCR RACK G-5	CB	53'-0"	Y
EDG	DG-31	RELAY WHSE BFD48S	SI-13X	CCR RACK G-3	CB	53'-0"	Y
EDG	DG-32	RELAY WHSE BFD48S	SI-23X/EG2	CCR RACK G-5	CB	53'-0"	Y
IA	SOV-1428	RELAY WHSE BFD48S	C-A13X	CCR RACK G-4	CB	53'-0"	Y
IA	SOV-1428	RELAY WHSE BFD48S	C-A23X	CCR RACK G-6	CB	53'-0"	Y
RCS	RC-549	RELAY WHSE BFD48S	C-A21X	CCR RACK G-6	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BFD48S	SI12X	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BFD48S	SI13X	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BFD48S	FWX2	CCR RACK G-3	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BFD48S	C-A11X	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BFD48S	C-A12X	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BFD48S	C-A13X	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BFD48S	C-A14X	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BFD48S	TR1-1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BFD48S	TR2-1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BFD48S	TR3-1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BFD48S	SI22X	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BFD48S	SI23X	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BFD48S	FWX12	CCR RACK G-5	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BFD48S	C-A21X	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BFD48S	C-A22X	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BFD48S	C-A23X	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BFD48S	C-A24X	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BFD48S	TR1-2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BFD48S	TR2-2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BFD48S	TR3-2	CCR RACK G-6	CB	53'-0"	Y
RHR	ACAPRH1	RELAY WHSE BFD48S	SI/2A1	480V SWGR 31. COMPT 28H	CB	53'-0"	Y
RHR	ACAPRH2	RELAY WHSE BFD48S	SI/6A1	480V SWGR 32. COMPT 8H	CB	53'-0"	Y
SIS	SI-0888A	RELAY WHSE BFD48S	SI-11X	CCR RACK G-3	CB	53'-0"	Y
SIS	SI-0888B	RELAY WHSE BFD48S	SI-21X	CCR RACK G-5	CB	53'-0"	Y
SIS	SI-0888B	RELAY WHSE BFD48S	SI/6A1	480V SWGR 32. COMPT 8H	CB	15'-0"	Y
SIS	SI-0894A	RELAY WHSE BFD48S	SI-12X	CCR RACK G-3	CB	53'-0"	Y
SIS	SI-0894B	RELAY WHSE BFD48S	SI-22X	CCR RACK G-5	CB	53'-0"	Y
SIS	SI-0894C	RELAY WHSE BFD48S	SI-12X	CCR RACK G-3	CB	53'-0"	Y
SIS	SI-0894D	RELAY WHSE BFD48S	SI-22X	CCR RACK G-5	CB	53'-0"	Y
SP	956C	RELAY WHSE BFD48S	C-A12X	CCR RACK G-4	CB	53'-0"	Y
SP	956D	RELAY WHSE BFD48S	C-A22X	CCR RACK G-6	CB	53'-0"	Y
SP	956E	RELAY WHSE BFD48S	C-A12X	CCR RACK G-4	CB	53'-0"	Y
SP	956F	RELAY WHSE BFD48S	C-A22X	CCR RACK G-6	CB	53'-0"	Y
SP	959	RELAY WHSE BFD48S	C-A24X	CCR RACK G-6	CB	53'-0"	Y
SP	958	RELAY WHSE BFD48S	C-A13X	CCR RACK G-4	CB	53'-0"	Y
SWN	SWN-TCV-1104	RELAY WHSE BFD48S	SI-12X	CCR RACK G-3	CB	53'-0"	Y
SWN	SWN-TCV-1105	RELAY WHSE BFD48S	SI-22X	CCR RACK G-3	CB	53'-0"	Y
SWN	FCV-1176	RELAY WHSE BFD48S	SI-12X	CCR RACK G-3	DGB	15'-0"	Y
CVCS	CH-FCV-110A	RELAY WHSE BFD66	BSX-1	CCR RACK G-2	CB	53'-0"	Y
CVCS	CH-FCV-110A	RELAY WHSE BFD66	BSX-2	CCR RACK G-2	CB	53'-0"	Y
CVCS	CH-FCV-110A	RELAY WHSE BFD66	BSX-3	CCR RACK G-2	CB	53'-0"	Y
CCW	ACAPCC1	RELAY WHSE BFD66F	PC-600AX	CCR RACK G-2	CB	53'-0"	Y
CCW	ACAPCC1	RELAY WHSE BFD66F	PC-600BX	CCR RACK G-2	CB	53'-0"	Y
CCW	ACAPCC3	RELAY WHSE BFD66F	PC600 AX	CCR RACK G-2	CB	53'-0"	Y
CCW	ACAPCC3	RELAY WHSE BFD66F	PC600 BX	CCR RACK G-2	CB	53'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
CCW	AC-769	RELAY WHSE BFD66S	C-B21X	CCR RACK G-6	CB	53'-0"	Y
CCW	AC-784	RELAY WHSE BFD66S	C-B11X	CCR RACK G-6	CB	53'-0"	Y
CCW	AC-786	RELAY WHSE BFD66S	C-B21X	CCR RACK G-6	CB	53'-0"	Y
CCW	AC-789	RELAY WHSE BFD66S	C-B21X	CCR RACK G-6	CB	53'-0"	Y
CCW	AC-797	RELAY WHSE BFD66S	C-B11X	CCR RACK G 6	CB	53'-0"	Y
CCW	AC-FCV-625	RELAY WHSE BFD66S	C B11X	CCR RACK G 4	CB	53'-0'	Y
CCW	ACAPCC1	RELAY WHSE BFD66S	52 SWX	[illegible] COMPT [illegible]	CB	15'-0"	Y
CCW	ACAPCC2	RELAY WHSE BFD66S	52 SWX	[illegible] COMPT [illegible]	CB	15'-0"	Y
CVCS	CH-MOV-222	RELAY WHSE BFD66S	C B11X	[illegible]	CB	53'-0"	Y
CVCS	CH-MOV-222	RELAY WHSE BFD66S	C B21X	[illegible]	CB	53'-0"	Y
MS	MS-1-31	RELAY WHSE BFD66S	MS11	[illegible]	CB	53'-0'	Y
MS	MS-1-31	RELAY WHSE BFD66S	MS1	[illegible]	CB	53'-0"	Y
MS	MS-1-32	RELAY WHSE BFD66S	MS12	CCR RACK G 6	CB	53'-0"	Y
MS	MS-1-32	RELAY WHSE BFD66S	MS2	CCR RACK G 4	CB	53'-0"	Y
MS	MS-1-33	RELAY WHSE BFD66S	MS13	CCR RACK G-6	CB	53'-0"	Y
MS	MS-1-33	RELAY WHSE BFD66S	MS3	CCR RACK G-4	CB	53'-0"	Y
MS	MS-1-34	RELAY WHSE BFD66S	MS14	CCR RACK G-6	CB	53'-0"	Y
MS	MS-1-34	RELAY WHSE BFD66S	MS4	CCR RACK G-4	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BFD66S	SIR1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BFD66S	SIB1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BFD66S	F1X	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BFD66S	F2X	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BFD66S	F3X	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BFD66S	F4X	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BFD66S	FWX-3T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BFD66S	RTX1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE BFD66S	FWX1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BFD66S	V1-1X	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BFD66S	SL1	CCR RACK G 4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BFD66S	MS1	CCR RACK G 4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BFD66S	MS2	CCR RACK G 4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BFD66S	MS3	CCR RACK G 4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BFD66S	MS4	CCR RACK G 4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BFD66S	74X1	CCR RACK G 4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BFD66S	AS1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BFD66S	S1-1X	CCR RACK G 4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BFD66S	CB-1R	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BFD66S	C-B11X	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BFD66S	CA-1R	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BFD66S	CS-1R	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE BFD66S	74-X3	CCR RACK G-4	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BFD66S	SIR2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BFD66S	SIB2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BFD66S	F11X	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BFD66S	F12X	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BFD66S	F13X	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BFD66S	F14X	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BFD66S	FWX-13T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BFD66S	RTX11	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BFD66S	FWX11	CCR RACK G-5	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BFD66S	V2-1X	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BFD66S	SL2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BFD66S	MS11	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BFD66S	MS12	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BFD66S	MS13	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BFD66S	MS14	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BFD66S	74X2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BFD66S	AS22	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BFD66S	S2-1X	CCR RACK G-6	CB	53'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
RCS	G-6	RELAY WHSE BFD66S	CB-2R	CCR RACK G-5	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BFD66S	C-B21X	CCR RACK G-[illegible]	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BFD66S	CA-2R	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BFD66S	CS-2R	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE BFD66S	74-X4	CCR RACK G-6	CB	53'-0"	Y
SWN	32 SW PUMP	RELAY WHSE BFD66S	52 SW1X	480V SWGR 31. COMPT 25H	CB	15'-0"	Y
SWN	32 SW PUMP	RELAY WHSE BFD66S	52 EGX	480V SWGR 31. COMPT 25H	CB	15'-0"	Y
SWN	35 SW PUMP	RELAY WHSE BFD66S	52 EGX	480V SWGR 31. COMPT 25H	CB	15'-0"	Y
SWN	35 SW PUMP	RELAY WHSE BFD66S	52 SW4X	480V SWGR 31. COMPT 25H	CB	15'-0"	Y
SWN	33 SW PUMP	RELAY WHSE BFD66S	52 SW1X	480V SWGR 31. COMPT 25H	CB	15'-0"	Y
SWN	33 SW PUMP	RELAY WHSE BFD66S	52 SW2X	480V SWGR 31. COMPT 25H	CB	15'-0"	Y
SWN	33 SW PUMP	RELAY WHSE BFD66S	52 EGX	480V SWGR 31. COMPT 25H	CB	15'-0"	Y
SWN	36 SW PUMP	RELAY WHSE BFD66S	52 SW4X	480V SWGR 31. COMPT 25H	CB	15'-0"	Y
SWN	36 SW PUMP	RELAY WHSE BFD66S	52 SW5X	480V SWGR 31. COMPT 25H	CB	15'-0"	Y
RCS	G-3	RELAY WHSE BFD75S	SI10X	CCR RACK G-3	CB	53'-0"	Y
RCS	G-5	RELAY WHSE BFD75S	SI20X	CCR RACK G-5	CB	53'-0"	Y
480VAC	MCC-33	RELAY WHSE BFD80S	3-3/3A1	480V SWGR 31. COMPT 28H	CB	15'-0"	Y
480VAC	MCC-37	RELAY WHSE BFD80S	3-3/6A2	480V SWGR 32 COMPT 8H	CB	15'-0"	Y
480VAC	MCC-38	RELAY WHSE BFD80S	3-3/5A2	480V SWGR 31. COMPT 25H	CB	15'-0"	Y
480VAC	480V SWGR 32	RELAY WHSE BFD80S	3-2/6A	480V SWGR 32. COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 32	RELAY WHSE BFD80S	3-3/6A1	480V SWGR 32 COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 32	RELAY WHSE BFD80S	3-3/6A2	480V SWGR 32. COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD80S	3-3/2A1	480V SWGR 31. COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD80S	3-3/2A2	480V SWGR 31. COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD80S	3-3/5A1	480V SWGR 31. COMPT. 25H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD80S	3-3/5A2	480V SWGR 31 COMPT 25H	CB	15'-0"	Y
CCW	ACAPCC1	RELAY WHSE BFD80S	3-3/5A2	480V SWGR 31. COMPT 25H	CB	15'-0"	Y
CCW	ACAPCC2	RELAY WHSE BFD80S	3-3/2A1	480V SWGR 31. COMPT 28	CB	15'-0"	Y
CCW	ACAPCC3	RELAY WHSE BFD80S	3-2/6A	480V SWGR 32. COMPT 8H	CB	15'-0"	Y
CCW	ACAPCC3	RELAY WHSE BFD80S	3-3/6A2	480V SWGR 32 COMPT 8H	CB	15'-0"	Y
CVCS	CSAPCH1	RELAY WHSE BFD80S	3-3/5A1	480V SWGR 31. COMPT 25H	CB	15'-0"	Y
EDG	DG-31	RELAY WHSE BFD80S	3-3/2A	480V SWGR 31. COMPT 28H	CB	15'-0"	Y
EDG	DG-33	RELAY WHSE BFD80S	3-3/5A1	480V SWGR 31 COMPT 25H	CB	15'-0"	Y
HVAC	32 PABEF	RELAY WHSE BFD80S	3-3/6A1	480V SWGR 32 COMPT 8H	CB	15'-0"	Y
MS	PCV-1139	RELAY WHSE BFD80S	3-2/6A	480V SWGR 31 COMPT 8H	CB	15'-0"	Y
RCS	PBU2	RELAY WHSE BFD80S	3-3/2A2	480V SWGR 31 COMPT 28H	CB	15'-0"	Y
RCS	PBU3	RELAY WHSE BFD80S	3-3/5A2	480V SWGR 31 COMPT 25H	CB	15'-0"	Y
SWN	33 SW PUMP	RELAY WHSE BFD80S	3-2/6A	480V SWGR 32. COMPT 8H	CB	15'-0"	Y
SWN	36 SW PUMP	RELAY WHSE BFD80S	3-2/6A	480V SWGR 32 COMPT 8H	CB	15'-0"	Y
CVCS	CH-FCV-110A	RELAY WHSE BFD84	BSX-4	CCR RACK G-2	CB	53'-0"	Y
480VAC	MCC-36A	RELAY WHSE BFD84S	SI/5A	480V SWGR 31. COMPT 25H	CB	15'-0"	Y
480VAC	MCC-36B	RELAY WHSE BFD84S	SI/6A	480V SWGR 31. COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD84S	SI/5A	480V SWGR 31. COMPT 25H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD84S	27-5A/X2	480V SWGR 31. COMPT 25H	CB	15'-0"	Y
480VAC	480V SWGR 32	RELAY WHSE BFD84S	27-6A/X3	480V SWGR 32. COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE BFD84S	27-3A/X3	480V SWGR 31 COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 32	RELAY WHSE BFD84S	SI/6A	480V SWGR 32. COMPT 8H	CB	15'-0"	Y
AFW	ABFP-31	RELAY WHSE BFD84S	27-3A/X3	480V SWGR 31 COMPT 28H	CB	15'-0"	Y
AFW	ABFP-33	RELAY WHSE BFD84S	27-6A/X3	480V SWGR 31	CB	15'-0"	Y
CCW	ACAPCC1	RELAY WHSE BFD84S	52 CC2X	480V SWGR 31. COMPT 25H	CB	15'-0"	Y
CCW	ACAPCC1	RELAY WHSE BFD84S	52 CC3X	480V SWGR 31. COMPT 25H	CB	15'-0"	Y
CCW	ACAPCC2	RELAY WHSE BFD84S	52 CC3X	480V SWGR 31 COMPT 25H	CB	15'-0"	Y
CCW	ACAPCC3	RELAY WHSE BFD84S	27-6A/X3	480V SWGR 32. COMPT 8H	CB	15'-0"	Y
CVCS	CSAPCH1	RELAY WHSE BFD84S	SI-5A	480V SWGR 31. COMPT 25H	CB	15'-0"	Y
CVCS	CSAPCH1	RELAY WHSE BFD84S	27-5A/X2	480V SWGR 31 COMPT 25H	CB	15'-0"	Y
CVCS	CSAPCH2	RELAY WHSE BFD84S	27-3A/X3	480V SWGR 31. COMPT 28H	CB	15'-0"	Y
CVCS	CSAPCH3	RELAY WHSE BFD84S	27-6A/X3	480V SWGR 31 COMPT 28H	CB	15'-0"	Y
EDG	DG-31	RELAY WHSE BFD84S	27-2A/X2	480V SWGR 31 COMPT 28H	CB	15'-0"	Y
EDG	DG-33	RELAY WHSE BFD84S	SI-13X/EG2	CCR RACK G-3	CB	53'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
EDG	DG-33	RELAY WHSE BFD84S	27-5A/X3	480V SWGR 31, COMPT. 25H	CB	15'-0"	Y
EDG	DG-33	RELAY WHSE BFD84S	74/EG3	CCR PANEL SH	CB	53'-0"	Y
EDG	DG-32	RELAY WHSE BFD84S	27-6A/X3	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
EDG	DG-33	RELAY WHSE BFD84S	SI-5A	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
HVAC	0033CRFU	RELAY WHSE BFD84S	27-5A/X3	480V SWGR 31	CB	15'-0"	Y
RCS	RC-519	RELAY WHSE BFD84S	C-A11X	CCR RACK G-4	CB	53'-0"	Y
RCS	RC-552	RELAY WHSE BFD84S	C-A21X	CCR RACK G-6	CB	53'-0"	Y
SIS	SI-0888A	RELAY WHSE BFD84S	SI-5A1	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
SWN	31 SW PUMP	RELAY WHSE BFD84S	SI/5A	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
SWN	33 SW PUMP	RELAY WHSE BFD84S	SI/6A	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
SWN	34 SW PUMP	RELAY WHSE BFD84S	SI/5A	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
SWN	36 SW PUMP	RELAY WHSE BFD84S	SI/6A	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
HVAC	0032ETEF	RELAY WHSE BFDF31S	74-2	CCR PANEL SL	CB	53'-0"	Y
HVAC	0033ETEF	RELAY WHSE BFDF31S	74-1	CCR PANEL SL	CB	53'-0"	Y
HVAC	0034ETEF	RELAY WHSE BFDF31S	74-2	CCR PANEL SL	CB	53'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE CR120A	K1X/EG1	31EDG CONTROL PANEL PP9	DGB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE CV-7	27-1/2A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE CV-7	27-2/2A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE CV-7	27-1/5A	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE CV-7	27-2/5A	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
480VAC	480V SWGR 32	RELAY WHSE CV-7	27-1/6A	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 32	RELAY WHSE CV-7	27-2/6A	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE CV-7	27-1/3A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE CV-7	27-2/3A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
CVCS	CSAPCH1	RELAY WHSE CV-7	27-1/5A	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
CVCS	CSAPCH1	RELAY WHSE CV-7	27-2/5A	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
CVCS	CSAPCH2	RELAY WHSE CV-7	27-1/3A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
CVCS	CSAPCH2	RELAY WHSE CV-7	27-2/3A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
CVCS	CSAPCH3	RELAY WHSE CV-7	27-1/6A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
CVCS	CSAPCH3	RELAY WHSE CV-7	27-2/6A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
EDG	DG-33	RELAY WHSE CV-7	27-1/5A	480V SWGR 31,COMPT 25H	CB	15'-0"	Y
EDG	DG-32	RELAY WHSE CV-7	27-1/6A	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
EDG	DG-31	RELAY WHSE CV-7	27-1/2A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
EDG	DG-31	RELAY WHSE CV-7	27-2/2A	480V SWGR31, COMPT 28H	CB	15'-0"	Y
HVAC	0035CRFU	RELAY WHSE CV-7	3-1/6A	480V SWGR 32	CB	15'-0"	Y
HVAC	0031OAL A	RELAY WHSE MG-6	CVX/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
HVAC	0031OAL B	RELAY WHSE MG-6	CVX/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
HVAC	0031OAL C	RELAY WHSE MG-6	CVX/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
HVAC	0032OAL A	RELAY WHSE MG-6	CVX/EG2	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
HVAC	0032OAL B	RELAY WHSE MG-6	CVX/EG2	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
HVAC	0032OAL C	RELAY WHSE MG-6	CVX/EG2	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
HVAC	0033OAL A	RELAY WHSE MG-6	CVX/EG3	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
HVAC	0033OAL B	RELAY WHSE MG-6	CVX/EG3	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
HVAC	0033OAL C	RELAY WHSE MG-6	CVX/EG3	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
RCS	G-3	RELAY WHSE MG-6	SI1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	RELAY WHSE MG-6	SI11	CCR RACK G-3	CB	53'-0"	Y
RCS	G-4	RELAY WHSE MG-6	C-A1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE MG-6	C-A11	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE MG-6	S1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE MG-6	C-B1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	RELAY WHSE MG-6	V1	CCR RACK G-4	CB	53'-0"	Y
RCS	G-5	RELAY WHSE MG-6	SI2	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	RELAY WHSE MG-6	SI12	CCR RACK G-5	CB	53'-0"	Y
RCS	G-6	RELAY WHSE MG-6	C-A2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE MG-6	C-A12	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE MG-6	S1	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE MG-6	C-B2	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	RELAY WHSE MG-6	V2	CCR RACK G-6	CB	53'-0"	Y
CVCS	CSAPCH2	RELAY WHSE NBFD24S	27-3A/X5	480V SWGR 31, COMPT 28H	CB	15'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
AFW	BFD-FCV-1121	RELAY WHSE NBFD66S	1X/AF1	CCR PANEL SC	CB	53'-0"	Y
AFW	BFD-FCV-1123	RELAY WHSE NBFD66S	1X/AF3	CCR PANEL SC	CB	53'-0"	Y
RCS	PCV-455C	RELAY WHSE NBFD66S	OPXB	CCR RACK H-4	CB	53'-0"	Y
RCS	PCV-455C	RELAY WHSE NBFD66S	OPXB2	CCR RACK H-4	CB	53'-0"	Y
RCS	PCV-456	RELAY WHSE NBFD66S	OPXA	CCR RACK H-5	CB	53'-0"	Y
RCS	PCV-456	RELAY WHSE NBFD66S	OPXA2	CCR RACK H-5	CB	53'-0"	Y
RCS	RC-MOV-535	RELAY WHSE NBFD66S	OPXB1	CCR RACK H-4	CB	53'-0"	Y
RCS	RC-MOV-536	RELAY WHSE NBFD66S	OPXA1	CCR RACK H-5	CB	53'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE NBFD84S	27-2A/X3	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
EDG	DG-31	RELAY WHSE NBFD84S	27-2A/X3	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
EDG	DG-31	RELAY WHSE SG	27-2A/X1	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
EDG	DG-31	RELAY WHSE SG	27-2A/X4	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
EDG	DG-33	RELAY WHSE SG	27-5A/X1	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
EDG	DG-33	RELAY WHSE SG	27-5A/X4	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
EDG	DG-32	RELAY WHSE SG	27-6A/X1	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
EDG	DG-32	RELAY WHSE SG	27-6A/X4	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE SG12V	27-2A/X1	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE SG12V	27-2A/X4	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE SG12V	27-5A/X4	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE SG12V	27-5A/X1	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
480VAC	480V SWGR 32	RELAY WHSE SG12V	27-6A/X4	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 32	RELAY WHSE SG12V	27-6A/X1	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE SG12V	27-3A/X1	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE SG12V	27-3A/X4	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
CVCS	*CSAPCH1*	*RELAY WHSE SG12V*	27-5A/X1	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
CVCS	CSAPCH1	RELAY WHSE SG12V	27-5A/X4	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
CVCS	CSAPCH2	RELAY WHSE SG12V	27-3A/X1	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
CVCS	CSAPCH2	RELAY WHSE SG12V	27-3A/X4	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
CVCS	CSAPCH3	RELAY WHSE SG12V	27-6A/X1	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
CVCS	CSAPCH3	RELAY WHSE SG12V	27-6A/X4	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE WL	86/2A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE WL	86/3A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE WL	86/5A	480V SWGR 31, COMPT, 25H	CB	15'-0"	Y
480VAC	480V SWGR 32	RELAY WHSE WL	86/6A	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 31	RELAY WHSE WL	86/EG1	31EGD CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY WHSE WL	86/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	RELAY WHSE WL	86/2A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
EDG	DG-33	RELAY WHSE WL	86/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	RELAY WHSE WL	86/5A	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
EDG	DG-32	RELAY WHSE WL	86/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	RELAY WHSE WL	86/6A	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
HVAC	ACU31	REMOTE BYPASS SWITCH	BYPASS IR	AC CTRL PNL	CB	53'-0"	Y
HVAC	ACU32	REMOTE BYPASS SWITCH	BYPASS 2R	AC CTRL PNL	CB	53'-0"	Y
HVAC	ACU31	REMOTE SWITCH	43C/R	ACU31	CB	15'-0"	Y
HVAC	ACU32	REMOTE SWITCH	43C/R	ACU32	CB	15'-0"	Y
HVAC	0031CRFU	REMOTE-LOCAL SWITCH	43	LOCAL	VC	68'-0"	Y
HVAC	*0032CRFU*	*REMOTE-LOCAL TRANS SWITCH*	43	LOCAL	VC	68'-0"	Y
HVAC	0033CRFU	REMOTE-LOCAL TRANS SWITCH	43	LOCAL	VC	68'-0"	Y
SP	956C	REMOTE/LOCAL CONTROL SWITCH 2-POSITION MAINTAINED	1/956C	CCR PANEL SNF	CB	53'-0"	Y
SP	956D	REMOTE/LOCAL CONTROL SWITCH 2-POSITION MAINTAINED	1/956D	CCR PANEL SNF	CB	53'-0"	Y
SP	956E	REMOTE/LOCAL CONTROL SWITCH 2-POSITION MAINTAINED	1/956E	CCR PANEL SNF	CB	53'-0"	Y
SP	956F	REMOTE/LOCAL CONTROL SWITCH 2-POSITION MAINTAINED	1/956F	CCR PANEL SNF	CB	53'-0"	Y
EDG	DG-33	RESET PB	BATT-RE/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	RESET PB	BATT-RE/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-31	RESET PUSHBUTTON	BATT-RE/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
HVAC	ACU31	RESET PUSHBUTTON	1RS	ACU31	CB	15'-0"	Y
HVAC	ACU31	RESET PUSHBUTTON	2RS	ACU31	CB	15'-0"	Y
HVAC	ACU32	RESET PUSHBUTTON	1RS	ACU32	CB	15'-0"	Y
HVAC	ACU32	RESET PUSHBUTTON	2RS	ACU32	CB	15'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
480VAC	480V SWGR 32	RESET PUSHBUTTON TEST 1. BUS 6A	RESET PB	CCR PANEL SBF-1	CB	53'-0"	Y
HVAC	ACU31	RESET RELAY	1RR3	ACU31	CB	15'-0"	Y
HVAC	ACU31	RESET RELAY	2RR3	ACU31	CB	15'-0"	Y
HVAC	ACU31	RESET RELAY	1RR2	ACU31	CB	15'-0"	Y
HVAC	ACU31	RESET RELAY	2RR2	ACU31	CB	15'-0"	Y
HVAC	ACU32	RESET RELAY	1RR3	ACU32	CB	15'-0"	Y
HVAC	ACU32	RESET RELAY	2RR3	ACU32	CB	15'-0"	Y
HVAC	ACU32	RESET RELAY	1RR2	ACU32	CB	15'-0"	Y
HVAC	ACU32	RESET RELAY	2RR2	ACU32	CB	15'-0"	Y
ACS	AC-0743	SELECTOR SWITCH	43/RS-5	CCR PANEL SBF-1	CB	53'-0"	Y
ACS	AC-0744	SELECTOR SWITCH	43/RS-3	CCR PANEL SBF-1	CB	53'-0"	Y
ACS	AC-0746	SELECTOR SWITCH	43/RS-5	CCR PANEL SGF	CB	53'-0"	Y
ACS	AC-0747	SELECTOR SWITCH	43/RS-5	CCR PANEL SGF	CB	53'-0"	Y
ACS	AC-1870	SELECTOR SWITCH	43/RS5	CCR PANEL SNF	CB	53'-0"	Y
ACS	AC-0899A	SELECTOR SWITCH	43/RS-5	CCR PANEL SGF	CB	53'-0"	Y
ACS	AC-0899B	SELECTOR SWITCH	43/RS-5	CCR PANEL SGF	CB	53'-0"	Y
CCW	ACAPCC3	SELECTOR SWITCH	43/RS-2	CCR PANEL SBF-1	CB	53'-0"	Y
CVCS	CH-265	SELECTOR SWITCH	1/265	GAS ANALYZER PANEL PF6	PAB	55'-0"	Y
HVAC	34CRDF	SELECTOR SWITCH	1/CRCF4 (o,sc,c)	CCR PANEL SL	CB	53'-0"	Y
HVAC	ACU32	SELECTOR SWITCH	33-02/OPEN	LOCAL CCR AC CTRL PNL PI7	CB	15'-0"	Y
HVAC	PABSF	SELECTOR SWITCH	43/EXF	FAN ROOM CTRL PNL JC1	FR		Y
HVAC	31 PABEF	SELECTOR SWITCH	43/EXF	FAN ROOM CONTROL PNL JC1	FR	80'-0"	Y
HVAC	32 PABEF	SELECTOR SWITCH	43/EXF	FAN ROOM CONTROL PNL JC1	FR	80'-0"	Y
RHR	ACAPRH1	SELECTOR SWITCH	43/RS-3	CCR PANEL SBF-1	CB	53'-0"	Y
RHR	ACAPRH2	SELECTOR SWITCH	43/RS-3	CCR PANEL SBF-1	CB	53'-0"	Y
SWN	SWN-TCV-1104	SELECTOR SWITCH	1/RFCW1	CCR PANEL SBF-1	CB	53'-0"	Y
SWN	SWN-TCV-1105	SELECTOR SWITCH	1/RFCW2	CCR PANEL SBF-1	CB	53'-0"	Y
CCW	AC-769	SELECTOR SWITCH (CLOSE/AUTO/OPEN)	1/769	CCR PANEL SNF	CB	53'-0"	Y
CCW	AC-784	SELECTOR SWITCH (CLOSE/AUTO/OPEN)	1/784	CCR PANEL SNF	CB	53'-0"	Y
CCW	AC-786	SELECTOR SWITCH (CLOSE/AUTO/OPEN)	1/786	CCR PANEL SNF	CB	53'-0"	Y
CCW	AC-789	SELECTOR SWITCH (CLOSE/AUTO/OPEN)	1/789	CCR PANEL SNF	CB	53'-0"	Y
CCW	AC-797	SELECTOR SWITCH (CLOSE/AUTO/OPEN)	1/797	CCR PANEL SNF	CB	53'-0"	Y
CCW	AC-822A	SELECTOR SWITCH (CLOSE/AUTO/OPEN)	1/822A	CCR PANEL SGF	CB	53'-0"	Y
CCW	AC-822B	SELECTOR SWITCH (CLOSE/AUTO/OPEN)	1/822B	CCR PANEL SGF	CB	53'-0"	Y
CCW	AC-FCV-625	SELECTOR SWITCH (CLOSE/AUTO/OPEN)	1/625	CCR PANEL SNF	CB	53'-0"	Y
CVCS	CH-LCV-112C	SELECTOR SWITCH (CLOSE/AUTO/OPEN)	LCV-112C	CCR PANEL SFF	CB	53'-0"	Y
RCS	RC-549	SELECTOR SWITCH (CLOSE/REMOTE)	1/V459	CCR PANEL SNF	CB	53'-0"	Y
CVCS	CH-LCV-112A	SELECTOR SWITCH (DIRECT/AUTO/NORMAL)	1/112A	CCR PANEL SFF	CB	53'-0"	Y
CVCS	CH-TCV-149	SELECTOR SWITCH (DIVERT/AUTO)	1/149	CCR PANEL SFF	CB	53'-0"	Y
CVCS	CSAPBA1	SELECTOR SWITCH (LOCAL/REMOTE)	43-1/BATP31	LOCAL CTRL STATION			Y
CVCS	CSAPBA2	SELECTOR SWITCH (LOCAL/REMOTE)	43-1/BATP32	LOCAL CTRL STATION			Y
AFW	ABFP-31	SELECTOR SWITCH (REMOTE/LOCAL)	43/AF1	LOCAL	AB	18'-6"	Y
AFW	ABFP-33	SELECTOR SWITCH (REMOTE/LOCAL)	43/AF3	LOCAL	AB	18'-6"	Y
CVCS	CSAPCH1	SELECTOR SWITCH (REMOTE/LOCAL)	43	LOCAL	PAB	55'-0"	Y
CVCS	CSAPCH2	SELECTOR SWITCH (REMOTE/LOCAL)	43	LOCAL	PAB	55'-0"	Y
CVCS	CSAPCH3	SELECTOR SWITCH (REMOTE/LOCAL)	43	LOCAL	PAB	55'-0"	Y
CVCS	CSAPBA1	SELECTOR SWITCH (SLOW/FAST)	43A/BATP31	CCR PANEL FBF	CB	53'-0"	Y
CVCS	CSAPBA2	SELECTOR SWITCH (SLOW/FAST)	43A/BATP32	CCR PANEL FBF	CB	53'-0"	Y
CVCS	CSAPBA1	SELECTOR SWITCH (SLOW/STOP/FAST)	1-2/BATP31	LOCAL CTRL STATION			Y
CVCS	CSAPBA2	SELECTOR SWITCH (SLOW/STOP/FAST)	1-2/BATP32	LOCAL CTRL STATION			Y
MS	PCV-1139	SELECTOR SWITCH (TRIP/AUTO/ON)	1-2/ABFP2	LOCAL	AB	15'-0"	Y
MS	PCV-1139	SELECTOR SWITCH (TRIP/AUTO/ON)	1-1/ABFP2	CCR PANEL SC	CB	53'-0"	Y
480VAC	480V SWGR 31	SOLID STATE (AMPTECTOR) SERIES OVERCURRENT	OTS	480V SWGR 31. COMPT 25H	CB	15'-0"	Y
480VAC	480V SWGR 32	SOLID STATE (AMPTECTOR) SERIES OVERCURRENT TRIP	OTS	480V SWGR 32. COMPT 8H	CB	15'-0"	Y
CVCS	CSAPBA1	SPRING RTN TO AUTO SWITCH (START/AUTO/STOP/PULL)	1/BATP31	CCR PANEL FBF	CB	53'-0"	Y
CVCS	CSAPBA2	SPRING RTN TO AUTO SWITCH (START/AUTO/STOP/PULL)	1/BATP32	CCR PANEL FBF	CB	53'-0"	Y
IA	PCV-1141	SRVC AIR COMPR BREAKER CELL SWITCH	33H/SAC	480V SWGR 31	CB	15'-0"	Y
IA	PCV-1143	SRVC AIR COMPR BREAKER CELL SWITCH	33H/SAC	480V SWGR 31	CB	15'-0"	Y
IA	PCV-1141	SRVC AIR COMPR BREAKER SWITCH	52b/SAC	480V SWGR 31	CB	15'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
IA	PCV-1142	SRVC AIR COMPR BREAKER SWITCH	52b/SAC	480V SWGR 31	CB	15'-0"	Y
IA	PCV-1143	SRVC AIR COMPR BREAKEI? SWITCH	52b/SAC	480V SWGR 31	CB	15'-0"	Y
IA	PCV-1142	SRVC AIR COMPR BREALER CELL SWITCH	33H/SAC	480V SWGR 31	CB	15'-0"	Y
EDG	DG-31	START PUSHBUTTON	SPB/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-33	START PUSHBUTTON	SPB/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	START PUSHBUTTON	SPB/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-31	STOP PUSHBUTTON	STP/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-33	STOP PUSHBUTTON	STP/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	STOP PUSHBUTTON	STP/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
HVAC	0032ETEF	STOP-AUTO-START 3-POSITION MAINTAINED	1/F32	CCR PANEL SL	CB	53'-0"	Y
EDG	33 DG FUEL XFER PUMP	STOP-AUTO-START SEL SW	1/FP3	33EDG AUX START &CTRL PNL	DGB	15'-0"	Y
HVAC	0031CRFU	STOP-AUTO-START SWITCH	1/CRF1	CCR PANEL SBF-2	CB	53'-0"	Y
HVAC	0032CRFU	STOP-AUTO-START SWITCH	1/CRF2	CCR PANEL SBF-2	CB	53'-0"	Y
HVAC	0033CRFU	STOP-AUTO-START SWITCH	1/CRF3	CCR PANEL SBF-2	CB	53'-0"	Y
HVAC	0033ETEF	STOP-AUTO-START SWITCH	1/F33	CCR PANEL SL	CB	53'-0"	Y
HVAC	0034ETEF	STOP-AUTO-START SWITCH	1/F34	CCR PANEL SL	CB	53'-0"	Y
EDG	31 DG FUEL XFER PUMP	STOP-AUTO-START TO AUTO	1/FP1	31EDG AUX START &CTRL PNL	DGB	15'-0"	Y
EDG	32 DG FUEL XFER PUMP	STOP-AUTO-START TO AUTO	1/FP2	32EDG AUX START &CTRL PNL	DGB	15'-0"	Y
HVAC	0031ETEF	STOP/AUTO/START/SWITCH	1/F31	CCR PANEL SL	CB	53'-0"	Y
EDG	DG-32	SWCHGR BREAKER CONTACTS	33H/6A	480V SWGR 32	CB	15'-0"	Y
EDG	DG-32	SWCHGR BREAKER CONTACTS	33H/3AT6A	480V SWGR 32	CB	15'-0"	Y
EDG	DG-31	SWGR 31 BUS 2A-3A TIE BREAKER 52/2AT3A TRIP AND CLOSE SW	BCS-2AT3A	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
HVAC	PABSF	SWGR BREAKER CONTACTS	H	480V SWGR 32	CB	15'-0"	Y
HVAC	PABSF	SWGR BREAKER MECHANICAL CONTACTS	52a EXF1, 52a/EXF2	480V SWGR 32	CB	15'-0"	Y
SP	955A	SWITCH	SS-34	SAMPLING PANEL	PAB	55'-0"	Y
SP	955B	SWITCH	SS-35	SAMPLING PANEL	PAB	55'-0"	Y
118VAC	KG7	SWITCH CONTACTS	B,W	MANUAL TRANSFER SW (KG7)	CB	33'-0"	Y
118VAC	K4F	SWITCH CONTACTS	B,W	MANUAL BYPASS SW (K4F)	CB	33'-0"	Y
118VAC	K4G	SWITCH CONTACTS	B,W	MANUAL BYPASS SW (K4G)	CB	33'-0"	Y
118VAC	B1G	SWITCH CONTACTS	B,W	MANUAL BYPASS SW B1G	CB	33'-0"	Y
EDG	DG-33	SWITCHEAGR BREAKER CONTACTS	33H/2AT5A	480V SWGR 31	CB	15'-0"	Y
480VAC	480V SWGR 32	SWITCHGEAR BREAKER AUX CONTACTS (MECHANICALLY ACTIVATED)	52a, 52b	480V SWGR 32 COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 31	SWITCHGEAR BREAKER AUX CONTACTS (MECHANICALLY ACTIVATED)	52a [illegible]b	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
480VAC	480V SWGR 32	SWITCHGEAR BREAKER CELL SWITCHES (MECHANICALLY ACTIVATED)	33H	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 31	SWITCHGEAR BREAKER CELL SWITCHES (MECHANICALLY ACTIVATED)	33H	480V SWGR 31 COMPT 25H	CB	15'-0"	Y
EDG	DG-31	SWITCHGEAR BREAKER CONTACTS	33H/2A	480V SWGR 31	CB	15'-0"	Y
EDG	DG-31	SWITCHGEAR BREAKER CONTACTS	33H/2AT5A	480V SWGR 31	CB	15'-0"	Y
EDG	DG-33	SWITCHGEAR BREAKER CONTACTS	33H/5A	480V SWGR 31	CB	15'-0"	Y
480VAC	480V SWGR 31	SYNCHRONIZING SWITCH	SS/5A	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
480VAC	480V SWGR 32	SYNCHRONIZING SWITCH	SS/6A	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
480VAC	480V SWGR 32	SYNCHRONIZING SWITCH	SS/3A	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
480VAC	480V SWGR 31	SYNCHRONIZING SWITCH	SS/EG1	31EDG CONTROL PANEL PP9	DGB	15'-0"	Y
RCS	G-1	SYRACUSE ON-OFF TIMER	STO	CCR RACK G-1	CB	53'-0"	Y
IA	0031 IAC	TC-1104S	23-1	LOCAL	CB	15'-0"	Y
IA	SOV-1177	TC-1104S	23-1	LOCAL	CB	15'-0"	Y
IA	SOV-1198	TC-1104S	23-1	LOCAL	CB	15'-0"	Y
IA	0032 IAC	TC-1105S	23-1	LOCAL	CB	15'-0"	Y
IA	SOV-1178	TC-1105S	23-1	LOCAL	CB	15'-0"	Y
IA	SOV-1199	TC-1105S	23-1	LOCAL	CB	15'-0"	Y
IA	0031 IAC	TC-1106S	23-2	LOCAL	CB	15'-0"	Y
IA	SOV-1177	TC-1106S	23-2	LOCAL	CB	15'-0"	Y
IA	SOV-1198	TC-1106S	23-2	LOCAL	CB	15'-0"	Y
IA	0032 IAC	TC-1107S	23-2	LOCAL	CB	15'-0"	Y
IA	SOV-1178	TC-1107S	23-2	LOCAL	CB	15'-0"	Y
IA	SOV-1199	TC-1107S	23-2	LOCAL	CB	15'-0"	Y
RCS	G-4	TDPU 0 5 TO 5 SEC, SET @ 2 SEC	62	CCR RACK G-4	CB	53'-0"	Y
RCS	G-6	TDPU 0 5 TO 5 SEC, SET @ 2 SEC.	62-1	CCR RACK G-6	CB	53'-0"	Y
HVAC	F-314	TEMP CONTROL	23-4	LOCAL	DGB	15'-0"	Y
HVAC	F-315	TEMP CONTROL	23-5	LOCAL	DGB	15'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
CVCS	CH-TCV-149	TEMP CONTROLLER	LIC-149	LOCAL	PAB	80'-0"	Y
MS	PCV-1310A	TEMP CONTROLLER	TC-1112A	LOCAL	AB	30'-0"	Y
MS	PCV-1310B	TEMP CONTROLLER	TC-1113A	LOCAL	AB	36'-0"	Y
CVCS	CSAPCH1	TEST SWITCH	TS/UV/5A	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
EDG	DG-31	TEST SWITCH	TS/UV/2A	480V SWGR 31 COMPT 28H	CB	15'-0"	Y
EDG	DG-33	TEST SWITCH	TS/UV/5A	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
EDG	DG-32	TEST SWITCH	TS/UV/6A	480V SWGR 32, COMPT 8H	CB	15'-0"	Y
RCS	G-3	TEST SWITCH	FC-419A/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	FC-429A/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	FC-439A/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	FC-449A/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	TC-412D/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	PC-455C/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	LC-459B/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	PC-455E/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	PC-419D/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	PC-439C/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	PC-419A/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	PC-439D/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	LC-427C/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	LC-437C/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	TC-412M/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	PC-429E/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	PC-439A/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	TC-432D/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	PC-457C/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	LC-461B/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	PC-457E/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	PC-429G/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	PC-429H/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	LC-427E/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	LC-437E/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	LC-417E/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	LC-447E/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	PC-948B/X1T	CCR RACK G-3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	PC-949B/X1T	CCR RACK G 3	CB	53'-0"	Y
RCS	G-3	TEST SWITCH	PC-948E/X1T	CCR RACK G 3	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	FC-429B/X1T	CCR RACK G 4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	FC-419B/X1T	CCR RACK G 4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	FC-449B/X1T	CCR RACK G 4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	FC-439B/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	TC-422D/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	PC-456C/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	LC-460B/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	PC-456E/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	PC-429A/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	PC-419E/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	PC-419B/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	PC-429C/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	LC-417C/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	LC-447C/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	PC-948C/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	PC-949C/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	PC-948F/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	PC-419G/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	PC-449A/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	TC-442D/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	PC-419C/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	PC-419F/X1T	CCR RACK G 4	CB	53'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
RCS	G-4	TEST SWITCH	LC-427A/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	LC-437A/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	LC-417A/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	LC-447A/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	PC-948A/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	PC-949A/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-4	TEST SWITCH	PC-948D/X1T	CCR RACK G-4	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	FC-419A/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	FC-429A/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	FC-439A/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	TC-412D/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	PC-455C/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	LC-459B/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	PC-455E/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	PC-419D/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	PC-439D/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	PC-419A/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	PC-439A/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	LC-427C/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	LC-437C/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	TC-412M/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	PC-429E/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	PC-439A/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	TC-432D/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	PC-457C/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	LC-461B/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	PC-457E/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	PC-429G/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	PC-429H/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	LC-427E/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	LC-437E/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	LC-417E/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	LC-447E/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	PC-948B/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	PC-949B/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-5	TEST SWITCH	PC-948E/X2T	CCR RACK G-5	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	FC-429B/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	FC-419B/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	FC-449B/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	FC-439B/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	TC-422D/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	PC-456C/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	LC-460B/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	PC-456E/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	PC-429A/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	PC-419E/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	PC-419B/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	PC-429C/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	LC-417C/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	LC-447C/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	PC-948C/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	PC-949C/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	PC-948F/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	PC-419G/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	PC-449A/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	TC-442D/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	PC-419C/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	PC-419F/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	LC-427A/X2T	CCR RACK G-6	CB	53'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
RCS	G-6	TEST SWITCH	LC-437A/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	LC-417A/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	LC-447A/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	PC-948A/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	PC-949A/X2T	CCR RACK G-6	CB	53'-0"	Y
RCS	G-6	TEST SWITCH	PC-948D/X2T	CCR RACK G-6	CB	53'-0"	Y
CVCS	CSAPCH2	TEST SWITCH 3-POSITION MAINAINED	TS/UV/3A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
CVCS	CSAPCH3	TEST SWITCH 3-POSITION MAINAINED	TS/UV/6A	480V SWGR 31, COMPT 28H	CB	15'-0"	Y
HVAC	ACU31	THEMAL OVERLOAD CONTACTS	10L1	ACU31	CB	15'-0"	Y
HVAC	ACU32	THERMAL OVERLOAD CONTACT	10L1	ACU32	CB	15'-0"	Y
HVAC	ACU32	THERMAL OVERLOAD CONTACT	10L2	ACU32	CB	15'-0"	Y
HVAC	ACU32	THERMAL OVERLOAD CONTACT	20L1	ACU32	CB	15'-0"	Y
HVAC	ACU32	THERMAL OVERLOAD CONTACT	20L2	ACU32	CB	15'-0"	Y
HVAC	ACU31	THERMAL OVERLOAD CONTACTS	10L2	ACU31	CB	15'-0"	Y
HVAC	ACU31	THERMAL OVERLOAD CONTACTS	20L1	ACU31	CB	15'-0"	Y
HVAC	ACU31	THERMAL OVERLOAD CONTACTS	20L2	ACU31	CB	15'-0"	Y
HVAC	ACU31	THERMAL OVERLOAD CONTACTS	30L1	ACU31	CB	15'-0"	Y
HVAC	ACU31	THERMAL OVERLOAD CONTACTS	30L2	ACU31	CB	15'-0"	Y
HVAC	ACU31	THERMAL OVERLOAD CONTACTS	30L3	ACU31	CB	15'-0"	Y
HVAC	PABSF	THERMAL OVERLOAD CONTACTS	49	MCC37, COMPT 1FE	PAB	55'-0"	Y
ACS	AC-0730	THERMAL OVERLOAD DEVICE	49	VALVE MOUNTED	VC	56'-0"	Y
ACS	AC-0731	THERMAL OVERLOAD DEVICE	49	VALVE MOUNTED	VC	59'-0"	Y
CVCS	CH-LCV-112B	THERMAL OVERLOAD DEVICE	49	MCC 36B, COMPT 1RH	PAB	55'-0"	Y
CVCS	CH-LCV-112C	THERMAL OVERLOAD DEVICE	49	MCC 36A, COMPT 1RH	PAB	55'-0"	Y
CVCS	CSAPBA1	THERMAL OVERLOAD DEVICE	49(F),49 (S)	MCC 36A, COMPT 7RH	PAB	55'-0"	Y
CVCS	CSAPBA2	THERMAL OVERLOAD DEVICE	49(F),49 (S)	MCC 36B, COMPT 7RH	PAB	55'-0"	Y
EDG	31 DG FUEL XFER PUMP	THERMAL OVERLOAD DEVICE	49	31EDG AUX START &CTRL PNL	DGB	15'-0"	Y
EDG	32 DG FUEL XFER PUMP	THERMAL OVERLOAD DEVICE	49	32EDG AUX START &CTRL PNL	DGB	15'-0"	Y
EDG	33 DG FUEL XFER PUMP	THERMAL OVERLOAD DEVICE	49	33EDG AUX START &CTRL PNL	DGB	15'-0"	Y
HVAC	31CRDF	THERMAL OVERLOAD DEVICE	49	MCC 38, COMPT 2D	VC	68'-0"	Y
HVAC	0031ETEF	THERMAL OVERLOAD DEVICE	49	MCC 36A	PAB	55'-0"	Y
HVAC	32CRDF	THERMAL OVERLOAD DEVICE	49	MCC 38, COMPT 2F	VC	68'-0"	Y
HVAC	0032ETEF	THERMAL OVERLOAD DEVICE	49	MCC 36B	PAB	55'-0"	Y
HVAC	33CRDF	THERMAL OVERLOAD DEVICE	49	MCC 38, COMPT 2H	VC	68'-0"	Y
HVAC	34CRDF	THERMAL OVERLOAD DEVICE	49	MCC 38, COMPT 2K	CB	68'-0"	Y
HVAC	0033ETEF	THERMAL OVERLOAD DEVICE	49	MCC 36A	PAB	55'-0"	Y
HVAC	0034ETEF	THERMAL OVERLOAD DEVICE	49	MCC 36B	PAB	55'-0"	Y
HVAC	F-314	THERMAL OVERLOAD DEVICE	49	31EDG AUX START &CTRL PNL	PAB	55'-0"	Y
HVAC	F-315	THERMAL OVERLOAD DEVICE	49	31EDG AUX START &CTRL PNL	PAB	55'-0"	Y
HVAC	F-316	THERMAL OVERLOAD DEVICE	49	32EDG AUX START &CTRL PNL	PAB	55'-0"	Y
HVAC	F-317	THERMAL OVERLOAD DEVICE	49	32EDG AUX START &CTRL PNL	PAB	55'-0"	Y
HVAC	F-318	THERMAL OVERLOAD DEVICE	49	33EDG AUX START &CTRL PNL	PAB	55'-0"	Y
HVAC	F-319	THERMAL OVERLOAD DEVICE	49	33EDG AUX START &CTRL PNL	PAB	55'-0"	Y
IA	0031 IAC	THERMAL OVERLOAD DEVICE	49	MCC 39	CB	33'-0"	Y
IA	0032 IAC	THERMAL OVERLOAD DEVICE	49	MCC 34	TB	33'-0"	Y
IA	SOV-1177	THERMAL OVERLOAD DEVICE	49	MCC 39	CB	33'-0"	Y
IA	SOV-1178	THERMAL OVERLOAD DEVICE	49	MCC 34	TB	15'-0"	Y
IA	SOV-1198	THERMAL OVERLOAD DEVICE	49	MCC 39	CB	33'-0"	Y
IA	SOV-1199	THERMAL OVERLOAD DEVICE	49	MCC 34	TB	15'-0"	Y
IA	0031CLWP	THERMAL OVERLOAD DEVICE	49	MCC 39, COMPT 4K	CB	33'-0"	Y
IA	0032CLWP	THERMAL OVERLOAD DEVICE	49	MCC 34	TB	15'-0"	Y
PW	31PWMUP	THERMAL OVERLOAD DEVICE	49	MCC-37, COMPT 6RK	PAB	55'-0"	Y
PW	32PWMUP	THERMAL OVERLOAD DEVICE	49	MCC-37, COMPT 5RK	PAB	55'-0"	Y
RCS	RC-MOV-535	THERMAL OVERLOAD DEVICE	49	MCC 36B, COMPT 1FH	PAB	55'-0"	Y
RCS	RC-MOV-536	THERMAL OVERLOAD DEVICE	49	MCC 36A, COMPT 1FH	PAB	55'-0"	Y
SIS	SI-0882	THERMAL OVERLOAD DEVICE	49	MCC 36B	PAB	55'-0"	Y
SIS	SI-0885A	THERMAL OVERLOAD DEVICE	49	MCC 36A	PAB	55'-0"	Y
SIS	SI-0885B	THERMAL OVERLOAD DEVICE	49	MCC 36B	PAB	55'-0"	Y
SIS	SI-0889A	THERMAL OVERLOAD DEVICE	49	MCC 36A	PAB	55'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
SIS	SI-0889B	THERMAL OVERLOAD DEVICE	49	MCC 36B	PAB	55'-0"	Y
SIS	SI-0894A	THERMAL OVERLOAD DEVICE	49	MCC 36A	PAB	55'-0"	Y
SIS	SI-0894B	THERMAL OVERLOAD DEVICE	49	MCC 36B	PAB	55'-0"	Y
SIS	SI-0894C	THERMAL OVERLOAD DEVICE	49	MCC 36A	PAB	55'-0"	Y
SIS	SI-0894D	THERMAL OVERLOAD DEVICE	49	MCC 36B	PAB	55'-0"	Y
SIS	SI-1810	THERMAL OVERLOAD DEVICE	49	MCC 36A	PAB	55'-0"	Y
SIS	SI-1869A	THERMAL OVERLOAD DEVICE	49	MCC 36A	PAB	55'-0"	Y
SIS	SI-1869B	THERMAL OVERLOAD DEVICE	49	MCC 36B	PAB	55'-0"	Y
HVAC	F-311	THERMOSTAT	23/311	LOCAL	AB	18'-6"	Y
HVAC	F-312	THERMOSTAT	23/312	LOCAL	AB	18'-6"	Y
HVAC	F-313	THERMOSTAT	23/313	LOCAL	AB	18'-6"	Y
EDG	DG-31	TIME DELAY AGA 2412PF	PDT	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
DC	31CHGR (GE3)	TIME DELAY RELAY	TDR	BATTERY CHRGR 31	CB	33'-0"	Y
DC	32CHGR (GE4)	TIME DELAY RELAY	TDR	BATTERY CHRGR 32	CB	33'-0"	Y
IA	0031 IAC	TIME DELAY RELAY	TD	LOCAL COMPR CTRL PNL	CB	15'-0"	Y
IA	0032 IAC	TIME DELAY RELAY	TD	LOCAL COMPR CTRL PNL	CB	15'-0"	Y
IA	SOV-1177	TIME DELAY RELAY	TD	LOCAL COMPT CTRL PNL	CB	15'-0"	Y
IA	SOV-1178	TIME DELAY RELAY	TD	LOCAL COMPT CTRL PNL	CB	15'-0"	Y
IA	SOV-1198	TIME DELAY RELAY	TD	LOCAL COMPT CTRL PNL	CB	15'-0"	Y
IA	SOV-1199	TIME DELAY RELAY	TD	LOCAL COMPT CTRL PNL	CB	15'-0"	Y
AFW	ABFP-31	TIME DELAY RELAY AGA 2412	TDC/AFPR1	CCR PANEL SC	CB	53'-0"	Y
AFW	ABFP-33	TIME DELAY RELAY AGA 2412	TDC/AFPR3	CCR PANEL SC	CB	53'-0"	Y
CCW	ACAPCC2	TIME DELAY RELAY AGA 2412	2CC2	480V SWGR31, COMPT 30A	CB	15'-0"	Y
CVCS	CSAPCH1	TIME DELAY RELAY AGA 2412	2C1	LOCAL	PAB	55'-0"	Y
HVAC	ACU31	TIME DELAY RELAY AGA 2412 ECLLM	1CR	ACU31	CB	15'-0"	Y
HVAC	ACU31	TIME DELAY RELAY AGA 2412 ECLLM	2CR	ACU31	CB	15'-0"	Y
HVAC	ACU32	TIME DELAY RELAY AGA 2412 ECLLM	1CR	ACU32	CB	15'-0"	Y
HVAC	ACU32	TIME DELAY RELAY AGA 2412 ECLLM	2CR	ACU32	CB	15'-0"	Y
RCS	G-3	TIME DELAY RELAY AGA 2412-PE 120 SEC.	2-SI-D1	CCR RACK G-3	CB	53'-0"	Y
RCS	G-5	TIME DELAY RELAY AGA 2412-PE 120 SEC.	2-SI-D2	CCR RACK G-5	CB	53'-0"	Y
HVAC	ACU31	TIME DELAY RELAY AGA 2412ACLLM	2-ACF31/T-D-O	ACU31	CB	15'-0"	Y
HVAC	ACU32	TIME DELAY RELAY AGA 2412ALARM	2-ACF32/T-D-O	ACU32	CB	15'-0"	Y
AFW	ABFP-31	TIME DELAY RELAY AGA 2412PC	2-1/TDC	480V SWGR 32, BUS 6A	CB	15'-0"	Y
CCW	ACAPCC1	TIME DELAY RELAY AGA 2412PC	2CC1-1	480V SWGR 31, COMPT 21A	CB	15'-0"	Y
CCW	ACAPCC1	TIME DELAY RELAY AGA 2412PC	2CC1	480V SWGR 31, COMPT 21A	CB	15'-0"	Y
SWN	32 SW PUMP	TIME DELAY RELAY AGA 2412PC	2SW2-1	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
SWN	35 SW PUMP	TIME DELAY RELAY AGA 2412PC	2SW5-1	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
SWN	33 SW PUMP	TIME DELAY RELAY AGA 2412PC	2SW3-1	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
SWN	33 SW PUMP	TIME DELAY RELAY AGA 2412PC	2SW3-2	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
SWN	36 SW PUMP	TIME DELAY RELAY AGA 2412PC	2SW6-1	480V SWGR 31 COMPT 25H	CB	15'-0"	Y
SWN	36 SW PUMP	TIME DELAY RELAY AGA 2412PC	2SW6-2	480V SWGR 31, COMPT 25H	CB	15'-0"	Y
CCW	ACAPCC1	TIME DELAY RELAY AGA 2412PD	2CC1-2	480V SWGR 31 COMPT 21A	CB	15'-0"	Y
CCW	ACAPCC3	TIME DELAY RELAY AGA 2412PD	2CC3-2	480V SWGR 32 COMPT 15A	CB	15'-0"	Y
CVCS	CSAPCH3	TIME DELAY RELAY AGA 2412PD	2C3	480V SWGR 32 COMPT 5A	CB	15'-0"	Y
EDG	DG-31	TIME DELAY RELAY AGA 2412PD	OPT2/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	TIME DELAY RELAY AGA 2412PD	OPT1/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	TIME DELAY RELAY AGA 2412PD	OCT1/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-31	TIME DELAY RELAY AGA 2412PD	OCT2/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-33	TIME DELAY RELAY AGA 2412PD	OPT2/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	TIME DELAY RELAY AGA 2412PD	OPT1/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	TIME DELAY RELAY AGA 2412PD	OCT1/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-33	TIME DELAY RELAY AGA 2412PD	OCT2/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	TIME DELAY RELAY AGA 2412PD	OPT2/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	TIME DELAY RELAY AGA 2412PD	OPT1/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	TIME DELAY RELAY AGA 2412PD	OCT1/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-32	TIME DELAY RELAY AGA 2412PD	OCT2/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
HVAC	0031CRFU	TIME DELAY RELAY AGA 2412PD	2/CRF1	480V SWGR 31	CB	15'-0"	Y
HVAC	0032CRFU	TIME DELAY RELAY AGA 2412PD	2/CRF2	480V SWGR 31, COMPT 12A	CB	15'-0"	Y
HVAC	0033CRFU	TIME DELAY RELAY AGA 2412PD	2/CRF3	480V SWGR 31 COMPT 22A	CB	15'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
HVAC	0035CRFU	TIME DELAY RELAY AGA 2412PD	2/CRF5	CCR RACK G-2	CB	53'-0"	Y
RHR	ACAPRH1	TIME DELAY RELAY AGA 2412PD	2/RHR1	480V SWGR 32 COMPT 5A	CB	53'-0"	Y
RHR	ACAPRH2	TIME DELAY RELAY AGA 2412PD	2/RHR2	CCR RACK G-2	CB	53'-0"	Y
SWN	31 SW PUMP	TIME DELAY RELAY AGA 2412PD	2SW1	480V SWGR 31 COMPT 25H	CB	15'-0"	Y
SWN	32 SW PUMP	TIME DELAY RELAY AGA 2412PD	2SW2	480V SWGR 31 COMPT 32A	CB	15'-0"	Y
SWN	33 SW PUMP	TIME DELAY RELAY AGA 2412PD	2SW3	480V SWGR 32 COMPT 10A	CB	15'-0"	Y
SWN	34 SW PUMP	TIME DELAY RELAY AGA 2412PD	2SW4	[illegible] COMPT 23A	CB	15'-0"	Y
SWN	35 SW PUMP	TIME DELAY RELAY AGA 2412PD	2SW[illegible]	[illegible] COMPT 3A	CB	15'-0"	Y
SWN	36 SW PUMP	TIME DELAY RELAY AGA 2412PD	2SW[illegible]	[illegible] COMPT [illegible]A	CB	15'-0"	Y
EDG	DG-33	TIME DELAY RELAY AGA 2412PF	PDT/EG3	[illegible] PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	TIME DELAY RELAY AGA 2412PF	PDT/EG2	[illegible] PANEL PQ1	DGB	15'-0"	Y
CCW	ACAPCC2	TIME DELAY RELAY AGA 2412S	2CC2.2	[illegible] COMPT 30A	CB	15'-0"	Y
RCS	G-2	TIME DELAY RELAY AGA 2414AD	2-BSX/5	CCR RACK G-2	CB	53'-0"	Y
RCS	G-2	TIME DELAY RELAY AGA 2414AD	2-BSX/7	CCR RACK G-2	CB	53'-0"	Y
HVAC	0034CRFU	TIME DELAY RELAY AGA 2414PD	2/CRF4	480V SWGR 31	CB	53'-0"	Y
IA	PCV-1141	TIME DELAY RELAY AGA 2422	TD1	CCR PANEL SJ	CB	53'-0"	Y
IA	PCV-1142	TIME DELAY RELAY AGA 2422	TD1	CCR PANEL SJ	CB	53'-0"	Y
IA	PCV-1143	TIME DELAY RELAY AGA 2422	TD1	CCR PANEL SJ	CB	53'-0"	Y
EDG	DG-33	TIME DELAY RELAY AGA 2422PF	NST/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	TIME DELAY RELAY AGA 2422PF	NST/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
AFW	ABFP-33	TIME DELAY RELAY AGA 7014PD	2-1/TDC	480V SWGR 32 COMPT 11D	CB	15'-0"	Y
EDG	DG-31	TIME DELAY RELAY AGA 7022PF	NST/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
CVCS	CSAPCH3	TIME DELAY RELAY AGA E7012PD	62/C3	480V SWGR 31 COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	TIME DELAY RELAY AGA TDPU 2 SEC	62-2/2A	480V SWGR 31 COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	TIME DELAY RELAY AGA TDPU 2 SEC	62-2/5A	480V SWGR 31 COMPT 25H	CB	15'-0"	Y
480VAC	480V SWGR 32	TIME DELAY RELAY AGA TDPU 2 SEC	62-2/6A	480V SWGR 32 COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 31	TIME DELAY RELAY AGA TDPU 2 SEC	62-2/3A	480V SWGR 31 COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	TIME DELAY RELAY AGA TDPU 40 SEC	62-1/2A	480V SWGR 31 COMPT 28H	CB	15'-0"	Y
480VAC	480V SWGR 31	TIME DELAY RELAY AGA TDPU 40 SEC	62-1/5A	480V SWGR 31 COMPT 25H	CB	15'-0"	Y
480VAC	480V SWGR 32	TIME DELAY RELAY AGA TDPU 40 SEC	62-1/6A	480V SWGR 32 COMPT 8H	CB	15'-0"	Y
480VAC	480V SWGR 31	TIME DELAY RELAY AGA TDPU 40 SEC	62-1/3A	480V SWGR 31 COMPT 28H	CB	15'-0"	Y
CVCS	CSAPCH2	TIME DELAY RLY AGA 2412PD	2C2	480V SWGR 32 COMPT 5A	CB	15'-0"	Y
CVCS	CSAPCH1	TIME DELAY RLY AGA E7012PD	62/C1	LOCAL	PAB	55'-0"	Y
CVCS	CSAPCH2	TIME DELAY RLY AGA E7012PD	62/C2	480V SWGR 31 COMPT 28H	CB	15'-0"	Y
HVAC	ACU31	TRANSFER DEVICE SWITCH	43ACC31A	LOCAL CCR AC CTRL PNL PI7	CB	15'-0"	Y
HVAC	ACU31	TRANSFER DEVICE SWITCH	43ACC31B	LOCAL CCR AC CTRL PNL PI7	CB	15'-0"	Y
HVAC	ACU32	TRANSFER SWITCH	43ACC32A	LOCAL CCR AC CTRL PNL PI7	CB	15'-0"	Y
HVAC	ACU32	TRANSFER SWITCH	43ACC32B	LOCAL CCR AC CTRL PNL PI7	CB	15'-0"	Y
RCS	PBU1	TRANSFER SWITCH (REMOTE/LOCAL)	43	PANEL PL6	PAB	55'-0"	Y
SWN	31 SW PUMP	TRANSFER SWITCH REMOTE/LOCAL	43	PNL PS6	CB	15'-0"	Y
SWN	32 SW PUMP	TRANSFER SWITCH REMOTE/LOCAL	43	PNL PS6	CB	15'-0"	Y
SWN	33 SW PUMP	TRANSFER SWITCH REMOTE/LOCAL	43	PNL PS6	CB	15'-0"	Y
SWN	34 SW PUMP	TRANSFER SWITCH REMOTE/LOCAL	43	PNL PS6	CB	15'-0"	Y
SWN	35 SW PUMP	TRANSFER SWITCH REMOTE/LOCAL	43	PNL PS6	IS	15'-0"	Y
SWN	36 SW PUMP	TRANSFER SWITCH REMOTE/LOCAL	43	PNL PS6	CB	15'-0"	Y
MS	PCV-1139	TRIP VALVE LIMIT SWITCH (ALSO OPERATES ON OVERSPEED TRIP)	33-3	LOCAL	AB	15'-0"	Y
HVAC	PABSF	TYPE "W2" CTRL SW 3 POSITION, SPRING RETURN TO OFF SELECT SW	1/EXF	FAN ROOM CTRL PNL JC1	FR		Y
HVAC	32 PABEF	TYPE "W2" CTRL SW 3-POSITION SPRING RETURN TO OFF	1/EXF	FAN ROOM CONTROL PNL JC1	FR	80'-0"	Y
HVAC	31 PABEF	TYPE W2 CONTROL SW 3-POSITION SPRING RETURN TO OFF	1/EXF	FAN ROOM CONTROL PNL JC1	FR	80'-0"	Y
EDG	DG-31	UNDERVOLTAGE RELAY MG6	27X1/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-33	UNDERVOLTAGE RELAY MG6	27X1/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	UNDERVOLTAGE RELAY MG6	27X1/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-31	UNIT PARALLEL SWITCH	UPS/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-33	UNIT PARALLEL SWITCH	UPS/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	UNIT PARALLEL SWITCH	UPS/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
RCS	PCV-456	VALVE AUX CONTACTS	33 (ac,bo)	VALVE MOUNTED	VC	124'-0"	Y
SWN	SWN-TCV-1105	VALVE AUX CONTACTS	33 (ab,ao,bc,bo)	VALVE MOUNTED	PP	35'-0"	Y
SWN	SWN-TCV-1104	VALVE AUX CONTACTS	33 (ab,ao,bc,bo)	VALVE MOUNTED	PP	35'-0"	Y
IA	PCV-1141	VALVE LIMIT SWITCHES	33-2/SA-ac	VALVE MOUNTED	CB	15'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
IA	PCV-1141	VALVE LIMIT SWITCHES	33-2/SA-bo	VALVE MOUNTED	CB	15'-0"	Y
IA	PCV-1142	VALVE LIMIT SWITCHES	33-1/IA-ac	VALVE MOUNTED	CB	15'-0"	Y
IA	PCV-1142	VALVE LIMIT SWITCHES	33-1/IA-bo	VALVE MOUNTED	CB	15'-0"	Y
IA	PCV-1143	VALVE LIMIT SWITCHES	33-2/IA-ac	VALVE MOUNTED	CB	15'-0"	Y
IA	PCV-1143	VALVE LIMIT SWITCHES	33-2/IA-bo	VALVE MOUNTED	CB	15'-0"	Y
SP	958	VALVE LIMIT SWITCHES	33/O 33/C	VALVE MOUNTED	PAB	55'-0"	Y
IA	SOV-1428	VALVE POSITION SWITCHES	33 (ac bo bc)	VALVE MOUNTED	PP	41'-0"	Y
SP	956C	VALVE POSITION SWITCHES	33(bo ac bc)	VALVE MOUNTED	PP	41'-0"	Y
SP	956D	VALVE POSITION SWITCHES	33(bo ac bc)	VALVE MOUNTED	PP	41'-0"	Y
SP	956E	VALVE POSITION SWITCHES	33(bo ac bc)	VALVE MOUNTED	PP	41'-0"	Y
SP	956F	VALVE POSITION SWITCHES	33(bo ac bc)	VALVE MOUNTED	PP	41'-0"	Y
CVCS	CH-FCV-111B	VLV AUX CONTACT	33(ac)	VALVE MOUNTED	PAB	78'-0"	Y
ACS	AC-0730	VLV AUX CONTACTS	33(lc to ac ao bc bo)	VALVE MOUNTED	VC	56'-0"	Y
ACS	AC-0731	VLV AUX CONTACTS	33(lc to ac ao bc bo)	VALVE MOUNTED	VC	59'-0"	Y
CCW	AC-791	VLV AUX CONTACTS	33(ac,bc,bo)	VALVE MOUNTED	PP	51'-0"	Y
CCW	AC-793	VLV AUX CONTACTS	33(ac,bc,bo)	VALVE MOUNTED	PP	51'-0"	Y
CCW	AC-796	VLV AUX CONTACTS	33(ac,bc,bo)	VALVE MOUNTED	PP	51'-0"	Y
CCW	AC-798	VLV AUX CONTACTS	33(ac,bc,bo)	VALVE MOUNTED	PP	51'-0"	Y
CVCS	CH-201	VLV AUX CONTACTS	33(ac,bc,bo)	VALVE MOUNTED	PP	51'-0"	Y
CVCS	CH-202	VLV AUX CONTACTS	33(ac,bc,bo)	VALVE MOUNTED	PP	51'-0"	Y
CVCS	CH-310	VLV AUX CONTACTS	33(bo,ac)	VALVE MOUNTED	PAB	42'-0"	Y
CVCS	CH-AOV-200A	VLV AUX CONTACTS	33(ac,bc,bo)	VALVE MOUNTED	VC	46'-0"	Y
CVCS	CH-AOV-200B	VLV AUX CONTACTS	33(ac,bc,bo)	VALVE MOUNTED	VC	46'-0"	Y
CVCS	CH-AOV-200C	VLV AUX CONTACTS	33(ac,bc,bo)	VALVE MOUNTED	VC	46'-0"	Y
CVCS	CH-AOV-204A	VLV AUX CONTACTS	33(ac,bo)	VALVE MOUNTED	VC	46'-0"	Y
CVCS	CH-AOV-204B	VLV AUX CONTACTS	33(ac bo)	VALVE MOUNTED	VC	46'-0"	Y
CVCS	CH-AOV-212	VLV AUX CONTACTS	33(ac bo)	VALVE MOUNTED	VC	46'-0"	Y
CVCS	CH-AOV-213A	VLV AUX CONTACTS	33(ac bo)	VALVE MOUNTED	VC	46'-0"	Y
CVCS	CH-AOV-213B	VLV AUX CONTACTS	33(ac bo)	VALVE MOUNTED	VC	46'-0"	Y
CVCS	CH-AOV-215	VLV AUX CONTACTS	33(ac bo)	VALVE MOUNTED	VC	46'-0"	Y
CVCS	CH-AOV-246	VLV AUX CONTACTS	33(ac bo)	VALVE MOUNTED	VC	53'-0"	Y
CVCS	CH-AOV-261A	VLV AUX CONTACTS	33(ac bo)	VALVE MOUNTED	VC	79'-0"	Y
CVCS	CH-AOV-261B	VLV AUX CONTACTS	33(ac bo)	VALVE MOUNTED	VC	79'-0"	Y
CVCS	CH-AOV-261C	VLV AUX CONTACTS	33(ac bo)	VALVE MOUNTED	VC	79'-0"	Y
CVCS	CH-AOV-261D	VLV AUX CONTACTS	33(ac bo)	VALVE MOUNTED	VC	79'-0"	Y
CVCS	CH-FCV-110B	VLV AUX CONTACTS	33(ac)	VALVE MOUNTED	PAB	73'-0"	Y
CVCS	CH-LCV-112A	VLV AUX CONTACTS	33(ac,bo)	VALVE MOUNTED	PAB	80'-0"	Y
CVCS	CH-LCV-112B	VLV AUX CONTACTS	33(ac,bo,lc,ao,lo bc)	VALVE MOUNTED	PAB	65'-0"	Y
CVCS	CH-LCV-112C	VLV AUX CONTACTS	33(ao)	VALVE MOUNTED	PAB	65'-0"	Y
CVCS	CH-LCV-112C	VLV AUX CONTACTS	33(ac,ao,bc,bo,lc,lo)	VALVE MOUNTED	PAB	73'-0"	Y
CVCS	CH-TCV-149	VLV AUX CONTACTS	33(ac,bo)	VALVE MOUNTED	PAB	80'-0"	Y
RCS	RC-516	VLV AUX CONTACTS	33(ac,bo)	VALVE MOUNTED	VC	46'-0"	Y
RCS	RC-519	VLV AUX CONTACTS	33(ac,bc,bo)	VALVE MOUNTED	PP	41'-0"	Y
RCS	RC-523	VLV AUX CONTACTS	33(ac,bo)	VALVE MOUNTED	VC	46'-0"	Y
RCS	RC-544	VLV AUX CONTACTS	33(ac,bo)	VALVE MOUNTED	VC	60'-0"	Y
RCS	RC-552	VLV AUX CONTACTS	33(ab,bc,bo)	VALVE MOUNTED	PP	41'-0"	Y
RCS	RC-560	VLV AUX CONTACTS	33(ac,bo)	VALVE MOUNTED	VC	46'-0"	Y
RCS	RC-MOV-536	VLV AUX LIMIT SWITCH	33(ao,ac,bo,bc)	VALVE MOUNTED	VC	124'-0"	Y
RCS	RC-MOV-535	VLV AUX LIMIT SWITCHES	33(ao,ac,bo,bc)	VALVE MOUNTED	VC	124'-0"	Y
SIS	SI-0882	VLV AUX LIMIT SWITCHES	33(ao,ac,bo,bc)	VALVE MOUNTED	PAB	15'-0"	Y
SP	955A	VLV AUX LIMIT SWITCHES	33(ac,bo)	VALVE MOUNTED	VC	62'-0"	Y
SP	955B	VLV AUX LIMIT SWITCHES	33(ac,bo)	VALVE MOUNTED	VC	62'-0"	Y
RCS	RC-MOV-535	VLV AUX TORQUE SWITCH	33(to,tc)	VALVE MOUNTED	VC	124'-0"	Y
RCS	RC-MOV-536	VLV AUX TORQUE SWITCH	33(to,tc)	VALVE MOUNTED	VC	124'-0"	Y
SIS	SI-0882	VLV AUX TORQUE SWITCHES	33(tc,to)	VALVE MOUNTED	PAB	15'-0"	Y
EDG	DG-31	VOLT CONTROL SELECTOR SWITCH	CTS/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-33	VOLT CONTROL SELECTOR SWITCH	CTS/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	VOLT CTRL SEL SWITCH	CTS/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-31	VOLT REG RESET PB	VRE/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y

Table 3A.5
Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46
EDG	DG-33	VOLT REG RESET PB	VRE/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	VOLT REG RESET PB	VRE/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
EDG	DG-31	VOLTAGE BUILDUP RELAY WHSE CV-7	VBR/EG1	31 EDG CONTROL PANEL PP9	DGB	15'-0"	Y
EDG	DG-33	VOLTAGE BUILDUP RELAY WHSE CV-7	VBR/EG3	33 EDG CONTROL PANEL PQ2	DGB	15'-0"	Y
EDG	DG-32	VOLTAGE BUILDUP RELAY WHSE CV-7	VBR/EG2	32 EDG CONTROL PANEL PQ1	DGB	15'-0"	Y
SWN	FCV-1176	WATER JACKET TEMPERATURE SWITCH	HWTR1/DG1	DG #31	DGB	15'-0"	Y
SWN	FCV-1176	WATER JACKET TEMPERATURE SWITCH	HWTR1/DG2	DG #32	DGB	15'-0"	Y
SWN	FCV-1176	WATER JACKET TEMPERATURE SWITCH	HWTR1/DG3	DG #33	DGB	15'-0"	Y
SWN	FCV-1176A	WATER JACKET TEMPERATURE SWITCH	HWTR1/DG1	DG #31	DGB	15'-0"	Y
SWN	FCV-1176A	WATER JACKET TEMPERATURE SWITCH	HWTR1/DG2	DG #32	DGB	15'-0"	Y
SWN	FCV-1176A	WATER JACKET TEMPERATURE SWITCH	HWTR1/DG3	DG #33	DGB	15'-0"	Y
HVAC	31 PABEF	WHSE RELAY	BF444/CBP31	FAN ROOM CONTROL PNL JC1	FR	80'-0"	Y
HVAC	32 PABEF	WHSE RELAY	BF44/CBP32	FAN ROOM CONTROL PNL JC1	FR	80'-0"	Y

Table 3A.6
Low Seismic Relay List

SYSTEM	IMPACTED COMPONENT	RELAY_TYPE	CONTCT_GRP	MOUNTING	BLDG	ELEV	A-46	COMMENTS
EDG	DG-31	RELAY WHSE M101	K1/EG1	EDG VOLT REG	DG	10'-0"	Y	A-46 OUTLIER
EDG	DG-33	RELAY WHSE M101	K1/EG3	EDG VOLT REG	DGB	10'-0"	Y	A-46 OUTLIER
EDG	DG-32	RELAY WHSE M101	K1/EG2	EDG VOLT. REG	DGB	10'-0"	Y	A-46 OUTLIER
EDG	DG-31	RELAY WHSE M110	K2/EG1	EDG VOLT REG	DGB	10'-0"	Y	A-46 OUTLIER
EDG	DG-33	RELAY WHSE M110	K2/EG3	EDG VOLT REG	DGB	10'-0"	Y	A-46 OUTLIER
EDG	DG-32	RELAY WHSE M110	K2/EG2	EDG VOLT REG	DGB	10'-0"	Y	A-46 OUTLIER
EDG	DG-31	BREAKER CLOSURE RELAY WHSE Z	K4/EG1	EDG VOLT REG	DGB	10'-0"	Y	A-46 OUTLIER
EDG	DG-33	BREAKER CLOSURE RELAY WHSE Z	K4/EG3	EDG VOLT. REG	DGB	10'-0"	Y	A-46 OUTLIER
EDG	DG-32	BREAKER CLOSURE RELAY WHSE Z	K4/EG2	EDG VOLT REG	DGB	10'-0"	Y	A-46 OUTLIER
EDG	DG-31	RELAY WHSE Z	K3/EG1	EDG VOLT REG	DGB	10'-0"	Y	A-46 OUTLIER
EDG	DG-33	RELAY WHSE Z	K3/EG3	EDG VOLT REG	DGB	10'-0"	Y	A-46 OUTLIER
EDG	DG-32	RELAY WHSE Z	K3/EG2	EDG VOLT REG	DGB	10'-0"	Y	A-46 OUTLIER

Table 3A.7
Seismic Correlated Basic Event List

BLDG	ELEV	MEDIAN ACCELERATION g	HCLFP$_{84}$ ACCELERATION g	HCLFP$_{84}$ ACCELERATION g	SYSTEM ID	SEISMIC CORRELATED BASIC EVENT	SEISMIC CORRELATED EVENT DESCRIPTION	COMPONENTS MODELED
AB	18'-6"	0.75	0.50	0.37	AFW	ZABFP-ASF-EQ-75G	SEISMIC FAILURE OF ABFP SGs FEED LINE LOW RANGE FLOW TRANSMITTERS	FT-418L, FT-428L, FT-438L, & FT-448L
AB	18'-6"	0.75	0.50	0.37	AFW	ZABFP-FAN-EQ-75G	SEISMIC FAILURE OF ABFP WALL EXH FANS 311 & 312	FAN-311-AB & FAN-312-AB
AB	18'-6"	0.75	0.50	0.37	AFW	ZAFW-DISPT-75G	SEISMIC FAILURE OF AFW PUMP DISCH PRESS TRANSMITTER	PT-406A & PT-406B
AB	18'-6"	0.75	0.50	0.37	AFW	ZAFW-TRANS-75G	SEISMIC FAILURE OF FCV-405A,B,C,D & 406 E,F,G & H I/P TRANSDUCERS	PM-405A PM-405B PM-405C, PM-405D, PM-405E, PM-405F, PM-405G, & PM-405H
CB	15'-0"	0.65	0.31	0.22	480 VAC	ZSS12356-AN-67G	SEISMIC ANCHORAGE FAILURE STATION TRANSFORMER 2	STATION TRANSFORMERS 2, 3, 5, & 6
CB	15'-0"	0.65	0.31	0.22	480 VAC	ZSWGR3132-AN-67G	SEISMIC ANCHORAGE FAILURE SWITCHGEARS # 31 & 32	SWITCHGEARS 31 & 32
CB	15'-0"	0.75	0.50	0.37	SWS	ZIACCWHTX-75G	SEISMIC FAILURE OF IACCW HEAT EXCHANGERS	INSTRUMENT AIR COMPONENT COOLING WATER HEAT EXCHANGERS
CB	15'-0"	0.75	0.50	0.37	IAS	ZIASFLT-75G	SEISMIC FAILURE OF IAS FILTERS	INSTRUMENT AIR SYSTEM AIR FILTERS
CB	15'-0"	0.82	0.38	0.28	IAS	ZIAC-AN-82G	SEISMIC ANCHORAGE FAILURE IAS COMPRESSORS 31 & 32	INSTRUMENT AIR COMPRESSORS 31 & 32
CB	27'-0"	1.16	0.54	0.40	CBV	ZCB-EXFAN-116G	SEISMIC FAILURE OF CB EXHAUST FANS	CONTROL BUILDING EXHAUST FANS 33 & 34
CB	33'-0"	0.51	0.24	0.18	125VDC	ZDC1-BATCHR-51G	SEISMIC ANCHORAGE FAILURE BATTERY CHARGERS # 31 & 32	BATTERY CHARGERS 31 & 32
CB	33'-0"	0.75	0.50	0.37	118 VAC	ZIB3133-EQ-75G	SEISMIC FAILURE OF TRANSFORMER ALTERNATE FEED MCC 33 TO BS 32 & MCC 36C	321B-31 & 341B-32
CB	33'-0"	0.88	0.41	0.30	125VDC	ZBATT-313234-88G	SEISMIC ANCHORAGE FAILURE BATTERTY BANKS 31, 32, & 34	BATTERY BANLS 31, 32, &34
CB	53'-0"	0.67	0.31	0.23	RACK	ZCCR-RACKS-67G	SEISMIC ANCHORAGE FAILURE CCR RACKS	CONTROL ROOM RACKS A-1,2,3,4,5,6,7,8,9,10, B-1,2,3,4,5,6,7,8,9,10,11, . C1,2 3 4 5,6 7,8 9,10, D-1,2,3,4 5,6,7,8,9,10,11, E1,2,3,4,5,6,7, F-1,2,3,4,5,6,7, G-1,2,3,4,5,6, & H-1,2,3,4,5
DG	10'-0"	0.99	0.46	0.34	EDG	ZEDGXTR-99G	SEISMIC ANCHORAGE FAILURE EDGs CURRENT TRANSFORMER	EMERGENCY DIESEL GENERATORS CURRENT TRANSFORMERS BF4,5,&6
DG	15'-0"	0.88	0.41	0.30	EDG	ZEDGS-PNL-AN-88G	SEISMIC ANCHORAGE FAILURE EDGs 31, 32, & 33 CONTROL PANELS	EMERGENCY DIESEL GENERATORS CONTROL PANELS
DG	26'-0"	0.75	0.50	0.37	EDG	ZEDG-DAYTNK-75G	SEISMIC FAILURE OF EDGs DAY TANKS	EMERGENCY DIESEL GENERATORS DAY TANKS
DGB	15'-0"	0.75	0.50	0.37	EDG	ZEDGART-75G	SEISMIC FAILURE OF EDGs AIR RECEIVER TANKS	EMERGENCY DIESEL GENERATORS AIR RECEIVER TANKS
DGB	15'-0"	1.16	0.54	0.40	EDG	ZEDGS-116G	SEISMIC ANCHORAGE FAILURE DIESEL GENERATORS	EMERGENCY DIESEL GENERATORS 31, 32, & 33
DGB	26'-0"	0.75	0.50	0.37	EDG	ZEDG-JACTNK-75G	SEISMIC FAILURE OF EDGs JACKET WATER TANKS	EMERGENCY DIESEL GENERATORS JACKET WATER TANKS
DGB	44'-0"	0.75	0.50	0.37	DGV	ZDGBAOD-75G	SEISMIC FAILURE OF DGB EXHAUST FAN AIR OPERATED DAMPER	DIESEL GENERATOR BUILDING EXHAUST FANS 314, 315, 316, 317, 318 / 319
ET	34'-0"	1.16	0.54	0.40	HVAC	ZHVA-ETEF-116G	SEISMIC ANCHORAGE FAILURE ET EXHAUST FANS AT 34'EL	ELECTRIC TUNNEL EXHAUST FANS 31, 32, 33, & 34
FR	72'-0"	0.88	0.41	0.30	HVAC	ZPABEF-AN-88G	SEISMIC ANCHORAGE FAILURE PAB EXHAUST FANS 31 & 32	PAB EXHAUST FANS 31 & 32
INTAKE	15'-0"	0.69	0.32	0.23	SWS	ZSWSPUMPS-69G	SEISMIC ANCHORAGE FAILURE SERVICE WATER PUMPS	SERVICE WATER SYSTEM PUMPS 31, 32, 33, 34, 35, &36
PAB	15'-0"	0.62	0.29	0.21	RHR	ZRHR-PUMPS-62G	SEISMIC ANCHORAGE FAILURE RHR PUMPS # 31 & 32	RHR SYSTEM PUMPS 31 & 32
PAB	41'-0"	0.71	0.33	0.24	PWS	ZPWSPUMPS-71G	SEISMIC ANCHORAGE FAILURE PRIMARY WATER SYSTEM PUMPS	PRIMARY WATER SYSTEM PUMPS 31 & 32
PAB	55'-0"	0.47	0.22	0.16	CVCS	ZCVC-CPUMPS-47G	SEISMIC ANCHORAGE FAILURE CVCS CPs # 31, 32 & 33	CHARGING PUMPS CSAPCH1, CSAPCH2, & CSAPCH3
PAB	55'-0"	0.52	0.24	0.18	CCW	ZCCWHTX-52G	SEISMIC ANCHORAGE FAILURE CCW HEAT EXCHANGERS	COMPONENT COOLING WATER HEAT EXCAHNGERS ACAHCC1C & ACAHCC2
PAB	55'-0"	0.62	0.29	0.21	480 VAC	ZMCC36AB-AN-62G	SEISMIC ANCHORAGE FAILURE MCCs 36A, 36B & 37	MCC-36A, MCC-36B & MCC-37
PAB	73'-0	0.15	0.07	0.05	CVCS	ZCVC-BAST-AN-15G	SEISMIC ANCHORAGE FAILURE BAST # 31 & 32	B ORIC ACID STORAGE TANKS CSATBA1 & CSATBA2
PAB	73'-0"	0.41	0.19	0.14	CCW	ZCCW-TANKS-41G	SEISMIC ANCHORAGE FAILURE CCW SURGE TANKS # 31 & 32	COMPONENT COOLING WATER SURGE TANK ACATCC1C & ACATCC2
TB	15'-0"	0.92	0.43	0.32	480 VAC	ZMCCTB-AN-92G	SEISMIC ANCHORAGE FAILURE TB MCC 32, 33, & 34	MCC-32, MCC-33, & MCC-34
TB	32'-0"	0.75	0.50	0.37	AFW	ZAFW-ASP-75G	SEISMIC FAILURE OF 1ST STAGE TURB PRESS TRANSMITTERS	PT-412A, & PT-412B
VC	46'-0"	0.75	0.50	0.37	PPR	ZVC46PT-75G	SEISMIC FAILURE OF LOOP 31 & 34 HOT LEG PRESSURE TRANSMITTERS	PT-402 & PT-403
VC	46'-0"	1.42	0.66	0.49	SIS	ZRCIRC-PUMP-142G	SEISMIC ANCHORAGE FAILURE RECIR PUMPS # 31 & 32	RECIRCULATION SYSTEM PUMPS 31 & 32
VC	66'-0"	0.49	0.23	0.17	RHR	ZRHR-HTXS-AN-49G	SEISMIC ANCHORAGE FAILURE RHR HEAT EXCHANGERS # 31 & 32	RHR HEAT EXCHANGERS 31 & 32
VC	68'-0"	0.86	0.40	0.29	CFC	ZCRF12345-AN-86G	SEISMIC ANCHORAGE FAILURE FAN COOLING UNITS 31, 32 33, 34 & 35	CONTAINMENT FAN COOLERS CRF1, CRF2, CRF3, CRF4, & CRF5
VC	68'-0"	0.90	0.42	0.31	MFW	ZVC-RACKS-90G	SEISMIC ANCHORAGE FAILURE VC INSTRUMENT RACKS 19, 21, 4A & 4B	VC INSTRUMENT RACKS 19, 21, 4A & 4B
YD	27'-0"	0.75	0.50	0.37	EDG	ZEDG-STOTNK-75G	SEISMIC FAILURE OF EDGs FUEL OIL STORAGE TANKS	EMERGENCY DIESEL GENERATORS FUEL OIL STORAGE TANKS

Table 3A.8
Seismic Pre-Initiator Human Failure Events List

BASIC EVENT NAME	IP3 IPE HUMAN ERROR PROBABILITY	BASIC EVENT DESCRIPTION
AC4-XHE-RE-MCC32	3.00E-04	FAILURE TO RESTORE MCC32 AFTER MAINT
AC4-XHE-RE-MCC33	3.00E-04	FAILURE TO RESTORE MCC33 AFTER MAINT
AC4-XHE-RE-MCC34	3.00E-04	FAILURE TO RESTORE MCC34 AFTER MAINT
AC4-XHE-RE-MCC37	3.00E-04	FAILURE TO RESTORE MCC37 AFTER MAINT
AC4-XHE-RE-MCC39	2.13E-04	FAILURE TO RESTORE MCC39 AFTER MAINT
AC4-XHE-RE-MCC6A	2.13E-04	FAILURE TO RESTORE MCC36A AFTER MAINT
AC4-XHE-RE-MCC6B	2.13E-04	FAILURE TO RESTORE MCC36B AFTER MAINT
AC4-XHE-RE-MCC6C	2.13E-04	FAILURE TO RESTORE MCC36C AFTER MAINT
ACC-XHE-RE-3132	3.20E-04	RESTORATION ERROR ON ACC PUMPS 31 & 32
ACC-XHE-RE-3334	3.20E-04	RESTORATION ERROR ON ACC PUMPS 33 & 34
ACC-XHE-RE-PM31	1.20E-02	FAIL TO RESTORE PM ACC-31 COMP AFT MAINT
ACC-XHE-RE-PM32	1.20E-02	FAIL TO RESTORE PM ACC-32 COMP AFT MAINT
ACC-XHE-RE-PM33	1.20E-02	FAIL TO RESTORE PM ACC-33 COMP AFT MAINT
ACC-XHE-RE-PM34	1.20E-02	FAIL TO RESTORE PM ACC-34 COMP AFT MAINT
AFV-XHE-RE-AFBV	2.20E-04	AUX FEEDWATER BLDG VENT TEMP SW MISCAL
AFW-XHE-FO-CITYW	2.00E-02	OPER FAILS TO OPEN CITY WATER SUPPLY VLV
AFW-XHE-FO-HC405	2.10E-03	OPERATOR FAILS TO OPERATE HC-405A,B,C&D
AFW-XHE-FO-TDP32	1.30E-02	OPERATOR FAILS TO RESET OVERSPEED TRIP
AFW-XHE-MC-PT412	2.46E-03	MISCALIBRATION OF PT412A AND PT412B
AFW-XHE-RE-AFW31	4.75E-03	FAIL TO RESTORE PM 31 PATH COMPS AFT MAI
AFW-XHE-RE-AFW32	5.02E-03	FAIL TO RESTORE PM 32 PATH COMPS AFT MAI
AFW-XHE-RE-AFW33	4.75E-03	FAIL TO RESTORE PM 33 PATH COMPS AFT MAI
AFW-XHE-RE-AFWCC	9.50E-06	FAIL TO RESTORE ALL AFW PUMPS AFTER TEST
AFW-XHE-RE-MS41	2.13E-03	STOP CHECK VLV MS-41 LEFT CLOSE AFT TEST
AFW-XHE-RE-MS42	2.13E-03	STOP CHECK VLV MS-42 LEFT CLOSE AFT TEST
CCW-XHE-FO-43CC2	1.00E-01	OPER FAILS TO ALIGN BACKUP POWER SUPPLY
CCW-XHE-RE-CCW33	6.21E-04	FAILURE TO RESTORE PMP 33 AFTER MAINT
CFC-XHE-RE-FCU31	2.10E-03	FCU 31 FAILS TO RESTORE AFT T & M
CFC-XHE-RE-FCU32	8.69E-04	FCU 32 FAILS TO RESTORE AFT T & M
CFC-XHE-RE-FCU33	2.10E-03	FCU 33 FAILS TO RESTORE AFT T & M
CFC-XHE-RE-FCU34	8.69E-04	FCU 34 FAILS TO RESTORE AFT T & M
CFC-XHE-RE-FCU35	8.69E-04	FCU 35 FAILS TO RESTORE AFT T & M
CSS-XHE-RE-PM31	7.17E-03	FAIL TO RESTO PM 31 PATH COMPS AFT MAINT
CSS-XHE-RE-PM32	7.17E-03	FAIL TO RESTO PM 32 PATH COMPS AFT MAINT
CSS-XVM-PG-865A	3.56E-05	MANUL VLV SI-865A FAIL TO RM OPEN (PLUG)
CVC-XHE-FO-BORAT	2.10E-03	OPER FAIL TO INITIA EMERGENCY BORATION
CVC-XHE-RE-BPM31	2.10E-02	FAIL TO RESTO PM 31 PATH COMPTS AFT MAIN
CVC-XHE-RE-BPM32	2.10E-02	FAIL TO RESTO PM 32 PATH COMPTS AFT MAIN
CVC-XHE-RE-PM32	1.80E-03	FAIL TO RESTO PM 32 PATH COMPTS AFT MAIN
CVC-XHE-RE-PM33	1.80E-03	FAIL TO RESTO PM 33 PATH COMPTS AFT MAIN
EDG-XHE-RE-31RHE	3.00E-03	FAIL TO RES DG31 VOLT CNTRL RHEO AFT TST
EDG-XHE-RE-32RHE	3.00E-03	FAIL TO RES DG32 VOLT CNTRL RHEO AFT TST
EDG-XHE-RE-33RHE	3.00E-03	FAIL TO RES DG33 VOLT CNTRL RHEO AFT TST
HHI-XHE-MC-LT920	1.00E-04	MISCALIBRATION OF LEVEL XMTER LT-920
HHI-XHE-RE-HHICC	8.20E-07	FAIL TO RESTORE ALL HHSI PUMPS AFTER TEST

Table 3A.8
Seismic Pre-Initiator Human Failure Events List

BASIC EVENT NAME	IP3 IPE HUMAN ERROR PROBABILITY	BASIC EVENT DESCRIPTION
HHI-XHE-RE-SI31	1.38E-03	FAIL TO RESTOE MDP 31 PATH COMPS AFT MAI
HHI-XHE-RE-SI32	1.10E-03	FAIL TO RESTOE MDP 32 PATH COMPS AFT MAI
HHI-XHE-RE-SI33	1.01E-03	FAIL TO RESTOE MDP 33 PATH COMPS AFT MAI
IAS-XHE-RE-IAS32	1.80E-03	FAIL TO RESTORE CMP 32 PATH COMP AFT MAI
LHI-XHE-RE-883	1.00E-04	SI-MOV-883 FAIL TO RESTO CL AFT TEST/MAI
LHI-XHE-RE-PM31	6.00E-03	FAIL TO RESTO PM 31 PATH COMPS AFT MAINT
LHI-XHE-RE-PM32	6.00E-03	FAIL TO RESTO PM 32 PATH COMPS AFT MAINT
LHI-XHE-RE-RHRCC	1.30E-05	FAIL TO RESTORE BOTH RHR PUMPS AFTER TEST
LHR-XHE-RE-PM31	6.21E-04	FAIL TO RESTO PM 31 PATH COMPS AFT MAINT
LHR-XHE-RE-PM32	6.21E-04	FAIL TO RESTO PM 32 PATH COMPS AFT MAINT
MFW-XHE-MC-MFWFT	3.00E-02	MISCALIBRATION OF MFW FLW TRANS TO AMSAC
PWS-XHE-RE-PWP32	3.00E-03	PM 32 PATH COMPS FAIL TO RESTO AFT MAINT
RCS-XHE-MC-PT402	7.98E-03	RCS PRE XTMER PT-402 MISCALIBRATION
RCS-XHE-MC-PT403	7.98E-03	RCS PRE XTMER PT-403 MISCALIBRATION
SAS-XHE-RE-SI-A	1.00E-05	FAIL TO RESET AND RESTORE SI-A AFT TEST
SAS-XHE-RE-SI-B	1.00E-05	FAIL TO RESET AND RESTORE SI-B AFT TEST
SWS-XHE-RE-PMP33	4.97E-04	FAIL TO RESTORE PMP 33 AFTER MAINTENANCE
SWS-XHE-RE-PMP36	4.97E-04	FAIL TO RESTORE PMP 36 AFTER MAINTENANCE
SWS-XHE-RE-SWN29	2.56E-04	SWN-29/SWN-30 SWAPPED DURING HDR ALIGNMT

Tal A.9
Post-Initiator Human Failure Events List

BASIC EVENT NAME	IP3 IPEEE HUMAN ERROR PROBABILITY (<0.1g)	IP3 IPEEE HUMAN ERROR PROBABILITY (> 0.1g < 0.5g)	IP3 IPEEE HUMAN ERROR PROBABILITY (= 0.5g)	IP3 IPEEE HUMAN ERROR PROBABILITY (>0.5g)	BASIC EVENT DESCRIPTION	OPERATOR ACTION LOCATION
AFW-XHE-FO-CITYW	2.0E-2	4.00E-02	2.00E-01	1.00E+00	ALIGN CITY WATER TO AFW PUMP SUCTION GIVEN UNAVAILABILITY OF CST	ABFP ROOM
AFW-XHE-FO-HC405	1.3E-3	2.60E-03	1.30E-02	1.00E+00	OPERATE HC-405A, B, C, AND D	ABFP ROOM
AFW-XHE-FO-TDP32	2.2E-2	4.40E-02	2.20E-01	1.00E+00	RESET AFW 32 TURBINE OVERSPEED TRIP	ABFP ROOM
B-DEP	7.1E-3	1.42E-02	7.10E-02	1.00E+00	RECOVER ac POWER GIVEN OPERATORS DEPRESSURIZES RCS	NA
B-nDEP	9.0E-3	1.80E-02	9.00E-02	1.00E+00	RECOVER ac POWER GIVEN RCS NOT DEPRESSURIZED	NA
CWRHR-TCCW	3.3E-2	6.60E-02	3.30E-01	1.00E+00	ALIGN BACKUP CITY WATER TO RHR PUMP 31	PAB
SLOCA-TCCW	6.6E-2	1.32E-01	6.60E-01	1.00E+00	ALIGN BACKUP CITY WATER TO RHR PUMP 31 GIVEN FAILURE TO ALIGN CITY WATER TO CHARGING PUMPS.	PAB
OFB	1.2E-2	2.40E-02	1.20E-01	1.00E-01	INITIATE PRIMARY COOLING BLEED AND FEED	CONTROL ROOM
LTS-MRI	2.1E-3	4.20E-03	2.10E-02	1.00E-01	FAILURE TO ESTABLISH LONG-TERM SHUTDOWN DURING ATWS VIA EMERGENCY BORATION OR LOCALLY TRIPPING REACTOR GIVEN MANUAL ROD INSERTION SUCCESSFUL	CONTROL ROOM
LTS-nMRI	4.8E-3	9.60E-03	4.80E-02	1.00E-01	ESTABLISH LONG-TERM SHUTDOWN DURING ATWS VIA EMERGENCY BORATION OR LOCALLY TRIPPIMG REACTOR GIVEN MANUAL ROD INSERTION FAILED	CONTROL ROOM
MRI	2.0E-1	4.00E-01	1.00E+00	1.00E-01	PERFORM MANUAL ROD INSERTION DURING ATWS	CONTROL ROOM
OMCC312A	1.3E-2	2.60E-02	1.30E-01	1.00E+00	ALIGN APPENDIX R SAFE SHUTDOWN EQUIPMENT TO MCC-312A GIVEN FLOOD IN CB 15-ft ELEVATION	YARD
ODEP-S2	2.60E-03	5.20E-03	2.60E-02	1.00E-01	DEPRESSURIZE RCS FOR LOW-HEAD INJECTION DURING SMALL LOCA AND FAILURE OF HHSI	CONTROL ROOM
ODEP-S1	5.10E-02	1.02E-01	5.10E-01	1.00E-01	DEPRESSURIZE RCS FOR LOW-HEAD INJECTION DURING MEDIUM AND FAILURE OF HHSI	CONTROL ROOM
ODEPR	2.6E-3	5.20E-03	2.60E-02	1.00E-01	DEPRESSURIZE RCS FOR POST-LOCA COOLDOWN	CONTROL ROOM
OHR	4.8E-4	9.60E-04	4.80E-03	1.00E-01	OPERATOR FAILS TO INITIATE HIGH HEAD RECIRCULATION DURING TRANSIENT	CONTROL ROOM
OHHIR-S2	4.8E-4	9.60E-04	4.80E-03	1.00E-01	INITIATE INTERNAL HIGH-HEAD RECIRCULATION FLOW DURING SMALL LOCA	CONTROL ROOM
OHHER-S2	2.2E-3	4.40E-03	2.20E-02	1.00E-01	INITIATE EXTERNAL HIGH-HEAD RECIRCULATION FLOW DURING SMALL LOCA	CONTROL ROOM
OHHIR-DEP-S2	2.2E-3	4.40E-03	2.20E-02	1.00E-01	INITIATE INTERNAL HIGH-HEAD RECIRCULATION FLOW DURING SMALL LOCA GIVEN FAILURE TO DEPRESSURIZE RCS	CONTROL ROOM
OLHIR-S2	3.0E-4	6.00E-04	3.00E-03	1.00E-01	INITIATE INTERNAL LOW-HEAD RECIRCULATION FLOW DURING SMALL LOCA	CONTROL ROOM
OLHER-S2	9.2E-3	1.84E-02	9.20E-02	1.00E-01	INITIATE EXTERNAL LOW-HEAD RECIRCULATION FLOW DURING SMALL LOCA	CONTROL ROOM
OPR-RHR-SD	9.3E-4	1.86E-03	9.30E-03	1.00E-01	PROVIDE DECAY HEAT REMOVAL USING NORMAL RHR SHUTDOWN COOLING DURING SMALL-SMALL LOCA OR SGTR	CONTROL ROOM
SLOCA	2.1E-2	4.20E-02	2.10E-01	1.00E+00	ALIGN BACKUP CITY WATER TO CHARGING PUMP COOLERS	PAB
WRWST	1.8E-1	3.60E-01	1.00E+00	1.00E-01	REFILL RWST FOR CONTINUED CORE COOLING DURING SGTR	CONTROL ROOM
OAFW-HVAC	7.6E-3	1.52E-02	7.60E-02	1.00E+00	PROVIDE ALTERNATIVE ABFP ROOM VENTILATION	ABFP ROOM
OCTL15-HVAC	1.0E-1	2.00E-01	1.00E+00	1.00E+00	PROVIDE ALTERNATIVE SWITCHGEAR ROOM VENTILATION	ABFP ROOM

Table 3A.10
Summary of Seismic PRA Equipment

	ID	Description	Bldg	Elev	Screen	Anchorage	A-46
1	0031 IAC	INST AIR COMP 31	CB	15'-0"	Y	0.82	x
2	0031ART	AIR RECEIVER 30 GAL. TANK # 31	DGB	15'-0"	Y	R	x
3	0031ARTMSIV	MSIV AIR RECEIVER TANK (MS-1-31)	AFPB	80'-0"	Y	R	x
4	0031CHPS	31 CHARG PMP SUCT STABILIZER SEPARATOR	PAB	55'-0"	Y	1.29	x
5	0031CLWP	31 I/A CMPR COOLING WTR PMP	CB	15'-0"	Y	0.84	x
6	0031CRFU	31 CTMT RECIRC FAN UNIT	VC	68'-0"	Y	0.86	x
7	0031CWHX	31 I/A CMPR COOLING WTR HX	CB	15'-0"	Y	2.8	x
8	0031EDJET	JKT WTR EXP TANK 31 DG	DGB	26'-0"	Y	R	x
9	0031EDSAT	START AIR TANK 31 DG	DGB	15'-0"	Y	1.72	x
10	0031ETEF	EL TNL EXHAUST FAN 31 (LOWER)	ET	34'-0"	Y	1.16	x
11	0031OAL A	OUTSIDE AIR LOUVER 31 EDG	DGB	44'-0"	Y	R	x
12	0031OAL B	OUTSIDE AIR LOUVER 31 EDG	DGB	44'-0"	Y	R	x
13	0031OAL C	OUTSIDE AIR LOUVER 31 EDG	DGB	44'-0"	Y	R	x
14	0032 IAC	INST AIR COMP 32	CB	15'-0"	Y	0.82	x
15	0032ART	AIR RECEIVER 30 GAL. TANK # 32	DGB	15'-0"	Y	R	x
16	0032ARTMSIV	MSIV AIR RECIEVER TANK (MS-1-32)	AFPB	74'-0"	Y	R	x
17	0032CHPS	32 CHARG PMP SUCT STABILIZER SEPARATOR	PAB	55'-0"	Y	1.29	x
18	0032CLWP	32 I/A CMPR CL COOLING WTR PMP	CB	15'-0"	Y	0.84	x
19	0032CRFU	32 CTMT RECIRC FAN UNIT	VC	68'-0"	Y	0.86	x
20	0032CWHX	32 I/A CMPR CL COOLING WTR HX	CB	15'-0"	Y	2.8	x
21	0032EDJET	JKT WTR EXP TANK 32 DG	DGB	26'-0"	Y	R	x
22	0032EDSAT	START AIR TANK 32 DG	DGB	15'-0"	Y	1.72	x
23	0032ETEF	EL TNL EXHAUST FAN 32 (LOWER)	ET	34'-0"	Y	1.16	x
24	0032OAL A	OUTSIDE AIR LOUVER 32 EDG	DGB	44'-0"	Y	R	x
25	0032OAL B	OUTSIDE AIR LOUVER 32 EDG	DGB	44'-0"	Y	R	x
26	0032OAL C	OUTSIDE AIR LOUVER 32 EDG	DGB	44'-0"	Y	R	x
27	0033ART	AIR RECEIVER 30 GAL. TANK # 33	DGB	15'-0"	Y	R	x
28	0033ARTMSIV	MSIV AIR RECIEVER TANK (MS-1-33)	AFPB	80'-0"	Y	R	x
29	0033CHPS	33 CHARG PMP SUCT STABILIZER SEPARATOR	PAB	55'-0"	Y	1.29	x
30	0033CRFU	33 CTMT RECIRC FAN UNIT	VC	68'-0"	Y	0.86	x
31	0033EDJET	JKT WTR EXP TANK 33 DG	DGB	26'-0"	Y	R	x
32	0033EDSAT	START AIR TANK 33 DG	DGB	15'-0"	Y	1.72	x
33	0033ETEF	EL TNL EXHAUST FAN 33 (UPPER)	ET	46'-0"	Y	1.16	x
34	0033OAL A	OUTSIDE AIR LOUVER 33 EDG	DGB	44'-0"	Y	R	x
35	0033OAL B	OUTSIDE AIR LOUVER 33 EDG	DGB	44'-0"	Y	R	x
36	0033OAL C	OUTSIDE AIR LOUVER 33 EDG	DGB	44'-0"	Y	R	x
37	0034ARTMSIV	MSIV AIR RECIEVER TANK (MA-1-34)	AFPB	74'-0"	Y	R	x

Table 3A.10
Summary of Seismic PRA Equipment

38	0034CRFU	34 CTMT RECIRC FAN UNIT	VC	68'-0"	Y	0.86	x
39	0034ETEF	EL TNL EXHAUST FAN 34 (UPPER)	ET	46'-0"	Y	1.16	x
40	0035CRFU	35 CTMT RECIRC FAN UNIT	VC	68'-0"	Y	0.86	x
41	23-319	LOUVER 319 THERMOSTA	CB	20-0"	Y	R	
42	31 BK-UP HTR XFMR	PRZR HTR BK UP GROUP 31 TRANSFORMER	CB	33'-0"	Y	0.52	x
43	31 CS PUMP	CONTAINMENT SPRAY PUMP #31	PAB	41'-0"	Y	2.15	
44	31 DG FUEL XFER PUMP	F.O. TRANSFER PUMP	YD	38'-6"	Y	R	x
45	31 IACC PUMP	ESS CLC PUMP 31	CB	15'-0"	Y	R	
46	31 PABEF	PRIMARY AUX BUILDING EXHAUST FAN	FH	72'-0"	Y	0.88	x
47	31 PLSSHTX	31 PZR LIQ SPACE SAMPLE HTX	PAB	55'-0"	Y	R	x
48	31 RCSSHTX	31 RCS SAMPLE HTX	PAB	55'-0"	Y	R	x
49	31 RECIRC PUMP	RECIRC PUMP 31	VC	46'-0"	Y	1.42	
50	31 SI PUMP	SAFETY INJECTION PUMP 31	PAB	34'-0"	Y	3.66	
51	31 SW PUMP (M)	31 SERVICE WATER PUMP	IS	15'-0"	Y	0.69	x
52	319	LOUVER 319	CB	15-0"	Y	R	
53	31A HDDA	31A HEATLESS DESSICANT DRYER AFTERFILTER	CB	15'-0"	Y	R	
54	31A HDDP	31A HEATLESS DESSICANT DRYER PREFILTER	CB	15'-0"	Y	R	
55	31CHGR (GE3)	BATTERY CHARGER 31	CB	33'-0"	Y	0.52	x
56	31CRDF	CRD COOLING FAN	VC	98'-0"	Y	0.71	x
57	31PWMUP	31 PRIMARY WATER MAKEUP PUMP	PAB	41'-0"	Y	0.71	x
58	32 BK-UP HTR XFMR	PRZR HTR BK UP GROUP 32 TRANSFORMER	CB	33'-0"	Y	0.52	x
59	32 CS PUMP	CONTAINMENT SPRAY PUMP #32	PAB	41'-0"	Y	2.15	
60	32 DG FUEL XFER PUMP	F.O. TRANSFER PUMP	YD	38'-0"	Y	R	x
61	32 IACC PUMP	ESS CLC PUMP 32	CB	15'-0"	Y	R	
62	32 PABEF	PRIMARY AUX BUILDING EXHAUST FAN	FH	72'-0"	Y	0.88	x
63	32 PLSSHTX	32 PZR LIQ SPACE SAMPLE HTX	PAB	55'-0"	Y	R	x
64	32 RCSSHTX	32 RCS SAMPLE HTX	PAB	55'-0"	Y	R	x
65	32 RECIRC PUMP	RECIRC PUMP 32	VC	46'-0"	Y	1.42	
66	32 SI PUMP	SAFETY INJECTION PUMP 32	PAB	34'-0"	Y	3.66	
67	32 SW PUMP (M)	32 SERVICE WATER PUMP	IS	15'-0"	Y	0.69	x
68	32A HDDA	32A HEATLESS DESSICANT DRYER AFTERFILTER	CB	15'-0"	Y	R	
69	32A HDDP	32A HEATLESS DESSICANT DRYER PREFILTER	CB	15'-0"	Y	R	
70	32CHGR (GE4)	BATTERY CHARGER 32	CB	33'-0"	Y	0.52	x
71	32CRDF	CRD COOLING FAN	VC	98'-0"	Y	0.71	x
72	32PWMUP	32 PRIMARY WATER MAKEUP PUMP	PAB	41'-0"	Y	0.71	x
73	33 BK-UP HTR XFMR	PRZR HTR BK UP GROUP 33 TRANSFORMER	CB	33'-0"	Y	0.52	x
74	33 DG FUEL XFER PUMP	F.O. TRANSFER PUMP	YD	38'-0"	Y	R	x
75	33 SI PUMP	SAFETY INJECTION PUMP 33	PAB	34'-0"	Y	3.66	

Table 3A.10
Summary of Seismic PRA Equipment

76	33 SW PUMP (M)	33 SERVICE WATER PUMP	IS	15'-0"	Y	0.69	x
77	33CHGR (GE8)	BATTERY CHARGER 33	CB	15'-0"	Y	1.29	x
78	33CRDF	CRD COOLING FAN	VC	98'-0"	Y	0.71	x
79	34 SW PUMP (M)	34 SERVICE WATER PUMP	IS	15'-0"	Y	0.69	x
80	34CHGR (GF3)	BATTERY CHARGER 34	CB	33'-0"	Y	1.29	x
81	34CRDF	CRD COOLING FAN	VC	98'-0"	Y	0.71	x
82	35 SW PUMP (M)	35 SERVICE WATER PUMP	IS	15'-0"	Y	0.69	x
83	36 SW PUMP (M)	36 SERVICE WATER PUMP	IS	15'-0"	Y	0.69	x
84	953	PZR LIQ SPC SAMPLE LINE	VC	73'-6"	Y	n/a	x
85	955A	31 HL SAMPLE LINE	VC	62'-0"	Y	n/a	x
86	955B	33 HL SAMPLE LINE	VC	62'-0"	Y	n/a	x
87	956C	PZR LIQ SPACE SAMPLE LINE	PP	41'-0"	Y	n/a	x
88	956D	PZR LIQ SPACE SAMPLE LINE	PP	41'-0"	Y	n/a	x
89	956E	RCS HL SAMPLE LINE ISO VALVE	PP	41'-0"	Y	n/a	x
90	956F	RCS HL SAMPLE LINE ISO VALVE	PP	41'-0"	Y	n/a	x
91	958	RHR SAMPLE LINE VALVE	PP	41'-0"	Y	n/a	x
92	959	RHR SAMPLE LINE VALVE	PP	41'-0"	Y	n/a	x
93	ABFP-31	MOTOR DRIVEN AUX. FEEDWATER PUMP NO. 31	AFPB	18'-6"	Y	1.72	x
94	ABFP-32	TURBINE DRIVEN AUX. FEEDWATER PUMP NO. 32	AFPB	18'-6"	Y	1.72	x
95	ABFP-33	MOTOR DRIVEN AUX. FEEDWATER PUMP NO. 33	AFPB	18'-6"	Y	1.72	x
96	AC-769	CC ISOLATION TO RCP'S	PAB	51'-0"	Y	n/a	
97	AC-791	CCW TO EXC L/DN HX-31 ISO VLV	PP	51'-0"	Y	n/a	x
98	AC-793	CCW RETRN FR EXC L/D ISO VLV	PP	51'-0"	Y	n/a	x
99	AC-796	CCW RETRN FR EXC L/DN HX-31 ISO VLV	PP	51'-0'	Y	n/a	x
100	AC-798	CCW TO EXC L/DN HX-31 ISO VLV	PP	51'-0"	Y	n/a	x
101	AC-FCV-625	CCW RET FR RCP MTR COOLERS	PP	51'-0"	Y	n/a	x
102	AC-MOV-0730	RHR SUCT LN ISO VLV	VC	56'-6"	Y	n/a	x
103	AC-MOV-0731	RHR SUCT LN ISO VLV	VC	59'-6"	Y	n/a	x
104	AC-MOV-0743	RHR PUMP MINI FLOW TEST LINE	PP	51'-0"	Y	n/a	x
105	AC-MOV-0744	RHR PUMP DISCH ISO VLV	PAB	15'-0"	Y	n/a	x
106	AC-MOV-0745A	RHR HEAT EXCHANGER 32 INLET ISOLATION VLV	VC	66'-0"	Y	n/a	x
107	AC-MOV-0745B	RHR HEAT EXCHANGER 32 INLET ISOLATION VLV	VC	66'-0"	Y	n/a	x
108	AC-MOV-0746	#32 RHR HX OUTLT ISO STOP VLV	VC	68'-0"	Y	n/a	x
109	AC-MOV-0747	#31 RHR HX OUTLT ISO STOP VLV	VC	68'-0"	Y	n/a	x
110	AC-MOV-1870	RHR PUMP MINI FLOW TEST LINE VALVE	PP	51'-0"	Y	n/a	x
111	AC-MOV-769	CCW SUPP-RCP ISO	PAB	55'-7"	Y	n/a	x
112	AC-MOV-784	CCW RET FR RCP ISO VALVE	PP	51'-0"	Y	n/a	x
113	AC-MOV-786	CCW RET FR RCP ISO VALVE	PP	51'-0"	Y	n/a	x

Table 3A.10
Summary of Seismic PRA Equipment

114	AC-MOV-789	CCW RET FR RCP ISO VALVE	PP	51'-0"	Y	n/a	x
115	AC-MOV-797	CCW SUPP-RCP ISO VALVE	PP	51'-0"	Y	n/a	x
116	AC-MOV-822A	RHR HTX ISO. VLV	PP	41'-0"	Y	n/a	x
117	AC-MOV-822B	RHR HTX ISO. VLV	PP	41'-0"	Y	n/a	x
118	ACAHCC1	CCW HEAT EXCH NO 31	PAB	55'-0"	Y	0.52	x
119	ACAHCC2	CCW HEAT EXCH NO 32	PAB	55'-0"	Y	0.52	x
120	ACAHRS1	RHR HTEXCH # 31	VC	66'-0"	Y	0.49	x
121	ACAHRS2	RHR HTEXCH # 32	VC	66'-0"	Y	0.49	x
122	ACAPCC1	CCW PUMP NO 31	PAB	41'-0"	Y	1.78	x
123	ACAPCC2	CCW PUMP NO 32	PAB	41'-0"	Y	1.78	x
124	ACAPCC3	CCW PUMP NO 33	PAB	41'-0"	Y	1.78	x
125	ACAPRH1	31 RHR PUMP	PAB	15'-0"	Y	0.62	x
126	ACAPRH2	32 RHR PUMP	PAB	15'-0"	Y	0.62	x
127	ACATCC1	CC SURGE TANK #31	PAB	73'-0"	Y	0.41	x
128	ACATCC2	CC SURGE TANK #32	PAB	73'-0"	Y	0.41	x
129	ACU31	CONTROL ROOM A/C UNIT 31	CB	15'-0"	Y	2.04	x
130	ACU32	CONTROL ROOM A/C UNIT 32	CB	15'-0"	Y	2.04	x
131	AUXCCP-31	AUXILLIARY COMPONENT COOLING PUMP 31	FH	68'-0"	Y	n/a	
132	AUXCCP-32	AUXILLIARY COMPONENT COOLING PUMP 32	FH	68'-0"	Y	n/a	
133	AUXCCP-33	AUXILLIARY COMPONENT COOLING PUMP 33	FH	68'-0"	Y	n/a	
134	AUXCCP-34	AUXILLIARY COMPONENT COOLING PUMP 34	FH	68'-0"	Y	n/a	
135	B1G	480/120 VAC ELGAR TRANSFORMER (FOR IB-33,33A)	CB	33'-0"	Y	1.08	x
136	B1G	INST BUS 33,33A MANUAL BY-PASS SWITCH	CB	33'-0"	Y	1.08	x
137	BATT CHGR 35	BATTERY CHARGER 35	CB	33'-0"	Y	0.75	
138	BATTERY 31	BATTERY BANK 31	CB	33'-0"	Y	0.88	x
139	BATTERY 32	BATTERY BANK 32	CB	33'-0"	Y	0.88	x
140	BATTERY 33	BATTERY BANK 33	DGB	15'-0"	Y	1.2	x
141	BATTERY 34	BATTERY BANK 34	CB	33'-0"	Y	0.88	x
142	BC2	480/120 VAC TRANSFORMER #32 (FOR IB-34,34A)	CB	33'-0"	Y	R	x
143	BD-PCV-1214	31 S/G BLOWDOWN UP STREAM CONTAINMENT ISOLATION	PAB	55'-0"	Y	n/a	
144	BD-PCV-1214 (AO)	CONTAINMENT ISOLATION VALVE BD-PCV-1214 AIR OPERATOR	PAB	55'-0"	Y	n/a	
145	BD-PCV-1215	32 S/G BLOWDOWN UP STREAM CONTAINMENT ISOLATION	PAB	55'-0"	Y	n/a	
146	BD-PCV-1215 (AO)	CONTAINMENT ISOLATION VALVE BD-PCV-1215 AIR OPERATOR	PAB	55'-0"	Y	n/a	
147	BD-PCV-1216	33 S/G BLOWDOWN UP STREAM CONTAINMENT ISOLATION	PAB	55'-0"	Y	n/a	
148	BD-PCV-1216 (AO)	CONTAINMENT ISOLATION VALVE BD-PCV-1216 AIR OPERATOR	PAB	55'-0"	Y	n/a	
149	BD-PCV-1217	34 S/G BLOWDOWN UP STREAM CONTAINMENT ISOLATION	PAB	55'-0"	Y	n/a	
150	BD-PCV-1217 (AO)	CONTAINMENT ISOLATION VALVE BD-PCV-1217 AIR OPERATOR	PAB	55'-0"	Y	n/a	
151	BD-PCV-1223	SG 31 BLOWDOWN SAMPLE UPSTREAM CONT ISOLATION	PP	51'-0"	Y	n/a	

152	BD-PCV-1223A	SG 31 BLOWDOWN SAMPLE DOWNSTREAM CONT ISOLATION	PP	51'-0"	Y	n/a	
153	BD-PCV-1224	SG 32 BLOWDOWN SAMPLE UPSTREAM CONT ISOLATION	PP	51'-0"	Y	n/a	
154	BD-PCV-1224A	SG 32 BLOWDOWN SAMPLE DOWNSTREAM CONT ISOLATION	PP	51'-0"	Y	n/a	
155	BD-PCV-1225	SG 33 BLOWDOWN SAMPLE UPSTREAM CONT ISOLATION	PP	51'-0"	Y	n/a	
156	BD-PCV-1225A	SG 33 BLOWDOWN SAMPLE DOWNSTREAM CONT ISOLATION	PP	51'-0"	Y	n/a	
157	BD-PCV-1226	SG 34 BLOWDOWN SAMPLE UPSTREAM CONT ISOLATION	PP	51'-0"	Y	n/a	
158	BD-PCV-1226A	SG 34 BLOWDOWN SAMPLE DOWNSTREAM CONT ISOLATION	PP	51'-0"	Y	n/a	
159	BF4	CURRENT TRANSFORMER ENCLOSURE D.G. 31	DGB	10'-0"	Y	0.99	x
160	BF5	CURRENT TRANSFORMER ENCLOSURE D.G. 32	DGB	10'-0"	Y	0.99	x
161	BF6	CURRENT TRANSFORMER ENCLOSURE D.G. 33	DGB	10'-0"	Y	0.99	x
162	BF8	120/120 VAC SOLATRON TRANSFORMER #32	CB	33'-0"	Y	R	x
163	BFD-FCV-1121	31AFP RECIRC LINE CTRL VALVE	AFPB	18'-6"	Y	n/a	x
164	BFD-FCV-1123	33AFP RECIRC LINE CTRL VALVE	AFPB	18'-6"	Y	n/a	x
165	BFD-FCV-405A	NO.32 AFWP MAN FLOW CTRL TO 31 SG	AFPB	18'-6"	Y	n/a	x
166	BFD-FCV-405B	NO.32 AFWP MAN FLOW CTRL TO 32 SG	AFPB	18'-6"	Y	n/a	x
167	BFD-FCV-405C	NO.32 AFWP MAN FLOW CTRL TO 33 SG	AFPB	18'-6"	Y	n/a	x
168	BFD-FCV-405D	NO.32 AFWP MAN FLOW CTRL TO 34 SG	AFPB	18'-6"	Y	n/a	x
169	BFD-FCV-406A	NO.31 AFWP MAN FLOW CTRL TO 31 SG	AFPB	18'-6"	Y	n/a	x
170	BFD-FCV-406B	NO.31 AFWP MAN FLOW CTRL TO 32 SG	AFPB	18'-6"	Y	n/a	x
171	BFD-FCV-406C	NO.33 AFWP MAN FLOW CTRL TO 33 SG	AFPB	18'-6"	Y	n/a	x
172	BFD-FCV-406D	NO.33 AFWP MAN FLOW CTRL TO 34 SG	AFPB	18'-6"	Y	n/a	x
173	BG1	1KVA SOLATRON TRANSFORMER 120V/120V	CB	33'-0"	Y	R	x
174	BG2	1KVA SOLATRON TRANSFORMER 120V/120V	CB	33'-0"	Y	R	x
175	BG3	1KVA SOLATRON TRANSFORMER 120V/120V	CB	33'-0"	Y	R	x
176	BG4	1KVA SOLATRON TRANSFORMER 120V/120V	CB	33'-0"	Y	R	x
177	BI3	480/120 VAC SOLA XFMR (FOR IB-31,31A)	CB	33'-0"	Y	R	x
178	BI3	STATIC INVERTER #31 FUSE BOX	CB	33'-0"	Y	R	x
179	BI4	480/120 VAC SOLA XFMR (FOR IB-32,32A)	CB	33'-0"	Y	R	x
180	BI4	STATIC INVERTER #32 FUSE BOX	CB	33'-0"	Y	R	x
181	BJ1	480/120 VAC SOLA XFMR (ALT FOR IB-34,34A)	CB	33'-0"	Y	R	x
182	BK-UP GRP 31 DIST PNL	PRZR HTR BK UP GROUP 31 DIST PNL	ET	46'-0"	Y	R	x
183	BK-UP GRP 32 DIST PNL	PRZR HTR BK UP GROUP 32 DIST PNL	ET	46'-0"	Y	R	x
184	BK-UP GRP 33 DIST PNL	PRZR HTR BK UP GROUP 33 DIST PNL	ET	46'-0"	Y	R	x
185	BORON INJECTION TANK	BORON INJECTION TANK	PAB	34'-0"	Y	1.53	
186	CAB JO1	CONTAINMENT MONITORING CABINET CHANNEL I	CB	53'-0"	Y	0.69	x
187	CAB JO2	CONTAINMENT MONITORING CABINET CHANNEL II	CB	53'-0"	Y	0.69	x
188	CAB JR9	RVLIS CABINET	CB	53'-0"	Y	0.82	x
189	CB EXHFAN 33	CONTROL BLDG EXHAUST FAN 33	CB	27-0"	Y	1.16	

Table 3A.10
Summary of Seismic PRA Equipment

190	CB EXHFAN 34	CONTROL BLDG EXHAUST FAN 34	CB	27-0"	Y	1.16	
191	CBBATT33	*400A BATTERY 33 CIRCUIT BREAKER*	*CB*	*33'-0"*	Y	R	x
192	CC-56-1	AFTERCOOLER 31 INLET RELIEF	CB	15'-0"	Y	n/a	
193	CC-56-2	AFTERCOOLER 32 INLET RELIEF	CB	15'-0"	Y	n/a	
194	CH-201	LETDN LINE ISO VLV	PP	51'-0"	Y	n/a	x
195	CH-202	LETDN LINE ISO VLV	PP	51'-0"	Y	n/a	x
196	CH-310	DEBORATING DEMIN DIVERSION	PAB	42'-0"	Y	n/a	x
197	CH-AOV-200A	LETDOWN ORIFICE ISO VALVE	VC	46'-0"	Y	n/a	x
198	CH-AOV-200B	LETDOWN ORIFICE ISO VLV	VC	46'-0"	Y	n/a	x
199	CH-AOV-200C	LETDOWN ORIFICE ISO VLV	VC	46'-0"	Y	n/a	x
200	CH-AOV-204A	ALT CHG FLOW NO 32 HOT LEG CTRL VLV	VC	58'-0"	Y	n/a	x
201	CH-AOV-204B	CHG FLOW NO 31 COLD LEG CTRL VLV	VC	46'-0"	Y	n/a	x
202	CH-AOV-212	AUX SPRAY CTRL VLV	VC	46'-0"	Y	n/a	x
203	CH-AOV-213A	EXCESS LETDOWN CTRL VLV	VC	46'-0"	Y	n/a	x
204	CH-AOV-213B	EXCESS LETDOWN CTRL VLV	VC	46'-0"	Y	n/a	x
205	CH-AOV-215	EXC LETDN LINE DIVERSION CTRL VLV	VC	46'-0"	Y	n/a	x
206	CH-AOV-246	RCP SEAL NO. 1 BYPASS VLV TO VCT	VC	53'-0"	Y	n/a	x
207	CH-AOV-261A	31 RCP SEAL DISCHARGE	VC	79'-0"	Y	n/a	x
208	CH-AOV-261B	32 RCP SEAL DISCHARGE	VC	79'-0"	Y	n/a	x
209	CH-AOV-261C	33 RCP SEAL DISCHARGE	VC	79'-0'	Y	n/a	x
210	CH-AOV-261D	34 RCP SEAL DISCHARGE	VC	79'-0"	Y	n/a	x
211	CH-FCV-110A	BORIC ACID FLOW CTRL	PAB	80'-0"	Y	n/a	x
212	CH-FCV-110B	BORIC ACID BLNDR OUTLET	PAB	73'-0"	Y	n/a	x
213	CH-FCV-111A	PRIMARY WTR MAKEUP VLV	PAB	78'-0"	Y	n/a	x
214	CH-FCV-111B	BLENDER FLOW TO VCT CTRL VALVE	PAB	78'-0"	Y	n/a	x
215	CH-HCV-123	EXCESS LETDOWN HX OUTFLOW CTRL VALVE	VC	46-0"	Y	n/a	x
216	CH-HCV-133	RHR HTX OUTLET TO CVCS	VC	55'-3"	Y	n/a	x
217	CH-HCV-142	REGEN HX FLOW CTRL	PP	41'-0"	Y	n/a	x
218	CH-LCV-112A	MAKE-UP TO VCT 3-WAY VALVE	PAB	80'-0"	Y	n/a	x
219	CH-LCV-112B	RWST TO CHARGING PUMP SUCTION VALVE	PAB	65'-0"	Y	n/a	x
220	CH-LCV-112C	VCT OUTLET ISO VLV	PAB	73'-0"	Y	n/a	x
221	CH-LCV-459	LETDOWN CTRL VALVE	VC	79'-0"	Y	n/a	x
222	CH-LCV-460	LETDOWN CTRL VALVE	VC	79'-0"	Y	n/a	x
223	CH-MOV-205	CHARGING FLOW TO RCS ISO VLV	PP	41'-0"	Y	n/a	x
224	CH-MOV-222	RCP SEAL WTR RETURN ISO VLV	PP	41'-0"	Y	n/a	x
225	CH-MOV-226	CHARGING LINE CTMT ISO VLV	PP	41'-0"	Y	n/a	x
226	CH-MOV-250A	31 RCP SEAL INJ CTMT ISO VLV	PP	41'-0"	Y	n/a	x
227	CH-MOV-250B	32 RCP SEAL INJ CTMT ISO VLV	PP	41'-0"	Y	n/a	x

Table 3A.10
Summary of Seismic PRA Equipment

228	CH-MOV-250C	33 RCP SEAL INJ CTMT ISO VLV	PP	41'-0"	Y	n/a	x
229	CH-MOV-250D	34 RCP SEAL INJ CTMT ISO VLV	PP	41'-0"	Y	n/a	x
230	CH-MOV-333	BORIC ACID FEED TO CHG PUMPS VALVE	PAB	73'-0"	Y	n/a	x
231	CH-MOV-441	31 RCP SEAL INJ CTMT ISO VLV	PP	41'-0"	Y	n/a	x
232	CH-MOV-442	32 RCP SEAL INJ CTMT ISO VLV	PP	41'-0"	Y	n/a	x
233	CH-MOV-443	33 RCP SEAL INJ CTMT ISO VLV	PP	41'-0"	Y	n/a	x
234	CH-MOV-444	34 RCP SEAL INJ CTMT ISO VLV	PP	41'-0"	Y	n/a	x
235	CH-PCV-113A	VCT H2 REGULATOR	PAB	75'-0"	Y	n/a	x
236	CH-PCV-114	VCT N2 REGULATOR	PAB	74'-0"	Y	n/a	x
237	CH-PCV-135	LETDOWN BP CONTROL	PAB	75'-0"	Y	n/a	x
238	CH-SOV-265	VCT GAS ANALYZER SAMPLE VALVE	PAB	73'-0"	Y	n/a	x
239	CH-SOV-268	VCT VENT ISO VALVE	PAB	73'-0"	Y	n/a	x
240	CH-TCV-149	DEMIN BYPASS VLV	PAB	80'-0"	Y	n/a	x
241	CSAHEL1	31 EXCS LETDWN HTX	VC	46'-0"	Y	1.91	x
242	CSAHNRT	NON REGEN HEAT EXCH NO 31	PAB	73'-0	Y	0.49	x
243	CSAHRG1	31 REGEN HTX	VC	68'-0"	Y	2.15	x
244	CSAHSW1	SEAL WTR HEAT EXCH NO. 31	PAB	73'-0"	Y	1.23	x
245	CSAPBA1	BORIC ACID TRANSFER PUMP 31	PAB	73'-0"	Y	2.15	x
246	CSAPBA2	BORIC ACID TRANSFER PUMP 32	PAB	73'-0"	Y	2.15	x
247	CSAPCH1	NO. 31 CHARGING PUMP	PAB	55'-0"	Y	0.47	x
248	CSAPCH2	NO. 32 CHARGING PUMP	PAB	55'-0"	Y	0.47	x
249	CSAPCH3	NO. 33 CHARGING PUMP	PAB	55'-0"	Y	0.47	x
250	CSATBA1	BORIC ACID STG TANK 31	PAB	73'-0	Y	0.15	x
251	CSATBA2	BORIC ACID STG TANK 32	PAB	73'-0"	Y	0.15	x
252	CSATVC1	VOLUME CONTROL TANK NO. 31	PAB	73'-0"	Y	0.27	x
253	CSFLBA1	BORIC ACID FILTER #31	PAB	74'-0"	Y	R	
254	CSFLSI1	SEAL INJECTION FILTER #31	PAB	15'-0"	Y	4.26	
255	CSFLSI2	SEAL INJECTION FILTER #32	PAB	15'-0"	Y	4.26	
256	CSFLSW1	SEAL WATER RETURN FILTER #31	PAB	15'-0"	Y	4.26	
257	CST	CONDENSATE STOR TANK	YD	69'-0"	N	0.88	x
258	DF-LCV-1207A	31 EDG FODT CNTRL VALVE	DGB	26'-0"	Y	n/a	x
259	DF-LCV-1207B	31 EDG FODT CNTRL VALVE	DGB	26'-0"	Y	n/a	x
260	DF-LCV-1208A	32 EDG FODT CNTRL VALVE	DGB	26'-0"	Y	n/a	x
261	DF-LCV-1208B	32 EDG FODT CNTRL VALVE	DGB	26'-0"	Y	n/a	x
262	DF-LCV-1209A	33 EDG FODT CNTRL VALVE	DGB	26'-0"	Y	n/a	x
263	DF-LCV-1209B	33 EDG FODT CNTRL VALVE	DGB	26'-0"	Y	n/a	x
264	DG-31	DIESEL GEN NO. 31	DGB	15'-0"	Y	1.16	x
265	DG-32	DIESEL GEN NO. 32	DGB	15'-0"	Y	1.16	x

Table 3A.10
Summary of Seismic PRA Equipment

266	DG-33	DIESEL GEN NO. 33	DGB	15'-0"	Y	1.16	x
267	DRYER SET 31	HEATLESS DESSICANT DRYER SET #31	CB	15'-0"	Y	R	x
268	DRYER SET 32	HEATLESS DESSICANT DRYER SET #32	CB	15'-0"	Y	R	x
269	DW-AOV-1	WATER STATION CONTAINMENT ISOLATION	PAB	41'-0"	Y	n/a	
270	DW-AOV-2	WATER STATION CONTAINMENT ISOLATION	PAB	41'-0"	Y	n/a	
271	ED314	DGB EXHAUST FAN 314 AIR OPERATED DAMPER	DGB	44'-0"	Y	R	
272	ED315	DGB EXHAUST FAN 315 AIR OPERATED DAMPER	DGB	44'-0"	Y	R	
273	ED316	DGB EXHAUST FAN 316 AIR OPERATED DAMPER	DGB	44'-0"	Y	R	
274	ED317	DGB EXHAUST FAN 317 AIR OPERATED DAMPER	DGB	44'-0"	Y	R	
275	ED318	DGB EXHAUST FAN 318 AIR OPERATED DAMPER	DGB	44'-0"	Y	R	
276	ED319	DGB EXHAUST FAN 319 AIR OPERATED DAMPER	DGB	44'-0"	Y	R	
277	EDG-31-FO-DTNK	F.O. DAY TANK NO. 31	DGB	26'-0"	Y	R	x
278	EDG-31-FO-STNK	F.O. STORAGE TANK 31	YD	27'-0"	Y	R	x
279	EDG-32-FO-DTNK	F.O. DAY TANK NO. 32	DGB	26'-0"	Y	R	x
280	EDG-32-FO-STNK	F.O. STORAGE TANK 32	YD	27'-0"	Y	R	x
281	EDG-33-FO-DTNK	F.O. DAY TANK NO. 33	DGB	26'-0"	Y	R	x
282	EDG-33-FO-STNK	F.O. STORAGE TANK 33	YD	27'-0"	Y	R	x
283	EGA1	25 KVA STATIC INVERTER #31	CB	33'-0"	Y	6.24	x
284	EGA2	25 KVA STATIC INVERTER #32	CB	33'-0"	Y	6.24	x
285	F-311	AFPB EXH FAN/DAMPER	AFPB	18'-6"	Y	R	x
286	F-312	AFPB EXH FAN/DAMPER	AFPB	18'-6"	Y	R	x
287	F-313	AFPB EXH FAN/DAMPER	AFPB	32'-6"	Y	R	x
288	F-314	EDG 31 CMPT EF 314	DGB	44'-0"	Y	R	x
289	F-315	EDG 31 CMPT EF 315	DGB	44'-0"	Y	R	x
290	F-316	EDG 32 CMPT EF 316	DGB	44'-0"	Y	R	x
291	F-317	EDG 32 CMPT EF 317	DGB	44'-0"	Y	R	x
292	F-318	EDG 33 CMPT EF 318	DGB	44'-0"	Y	R	x
293	F-319	EDG 33 CMPT EF 319	DGB	44'-0"	Y	R	x
294	FAN-311-AB	WALL EXHAUST FAN FOR AUXILIARY FEED PUMP BLDG.	AFPB	18'-6"	Y	R	
295	FAN-312-AB	WALL EXHAUST FAN FOR AUXILIARY FEED PUMP BLDG.	AFPB	18'-6"	Y	R	
296	FCV-1170	VC PURGE AIR SUPPLY ISOLATION VALVE	VC	88'-0"	Y	n/a	
297	FCV-1171	VC PURGE AIR SUPPLY ISOLATION VALVE	FH	88'-0"	Y	n/a	
298	FCV-1172	VC PURGE EXHAUST VALVE	VC	88'-0"	Y	n/a	
299	FCV-1173	VC PURGE EXHAUST VALVE	FH	88'-0"	Y	n/a	
300	FCV-1176	EDG JW/LO CLRS RET HDR FLOW CONT. VLV.	DGB	15'-0"	Y	n/a	x
301	FCV-1176A	EDG JW/LO CLRS RET HDR FLOW CONT. VLV	DGB	15'-0"	Y	n/a	x
302	FE1	PREAMPLIFIER FOR NE-31	VC	68'-0"	Y	R	x
303	FE2	PREAMPLIFIER FOR NE-32	VC	68'-0"	Y	R	x

Table 3A.10
Summary of Seismic PRA Equipment

304	FIT-111	PRM WTR FLOW INOZ XMTR	PAB	73'-0"	Y	n/a	x
305	FIT-156A	RCP 34 SEAL LEAKOFF FLOW TRANSMITTER	VC	46'-0"	Y	n/a	x
306	FIT-156B	RCP 34 SEAL LEAKOFF FLOW TRANSMITTER	VC	46'-0"	Y	n/a	x
307	FIT-157A	RCP 33 SEAL LEAKOFF FLOW TRANSMITTER	VC	46'-0"	Y	n/a	x
308	FIT-157B	RCP 33 SEAL LEAKOFF FLOW TRANSMITTER	VC	46'-0"	Y	n/a	x
309	FIT-158A	RCP 32 SEAL LEAKOFF FLOW TRANSMITTER	VC	46'-0"	Y	n/a	x
310	FIT-158B	RCP 32 SEAL LEAKOFF FLOW TRANSMITTER	VC	46'-0"	Y	n/a	x
311	FIT-159A	RCP 31 SEAL LEAKOFF FLOW TRANSMITTER	VC	46'-0"	Y	n/a	x
312	FIT-159B	RCP 31 SEAL LEAKOFF FLOW TRANSMITTER	VC	46'-0"	Y	n/a	x
313	FLIGHT PANEL	FLIGHT PANEL	CB	53'-0"	Y	0.67	x
314	FT-128	CHG FLOW TO REG HX TRANSMITTER	PP	41'-0"	Y	R	x
315	FT-134	LETDWN FLOW TRANSMITTER	PAB	75'-0"	Y	R	x
316	FT-418L	SG #31 FEED LINE LOW RANGE FLOW TRANSMITTER	AFPB	18'-6"	Y	R	
317	FT-428L	SG #32 FEED LINE LOW RANGE FLOW TRANSMITTER	AFPB	18'-6"	Y	R	
318	FT-438L	SG #33 FEED LINE LOW RANGE FLOW TRANSMITTER	AFPB	18'-6"	Y	R	
319	FT-448L	SG #34 FEED LINE LOW RANGE FLOW TRANSMITTER	AFPB	18'-6"	Y	R	
320	FT-601A	CCW HTX OUTLET FLOW	PAB	41'-0"	Y	R	x
321	FT-601B	CCW HTX OUTLET FLOW	PAB	41'-0"	Y	R	x
322	FT-638	RHR FLOW TRANSMITTER	VC	46'-0"	Y	R	x
323	FT-640	RHR FLOW TRANSMITTER	VC	46'-0"	Y	R	x
324	FT-946A	RHR TO RCS 34 COLD LEG FLOW TRANSMITTER	VC	68'-0"	Y	R	x
325	FT-946B	RHR TO RCS 33 COLD LEG FLOW TRANSMITTER	VC	68'-0"	Y	R	x
326	FT-946C	RHR TO RCS 32 COLD LEG FLOW TRANSMITTER	VC	68'-0"	Y	R	x
327	FT-946D	RHR TO RCS 31 COLD LEG FLOW TRANSMITTER	VC	68'-0"	Y	R	x
328	GC9	25 KVA STATIC INVERTER #33	CB	33'-0"	Y	1.08	x
329	GF2	25 KVA STATIC INVERTER #34	CB	33'-0"	Y	0.65	x
330	HC-1118A	SIGNAL CONVERTER	AFPB	18'-0"	Y	0.84	x
331	HCV-1118	32 AFWP TURB GOVRNER	AFPB	18'-6"	Y	n/a	x
332	HJ8	33/34 ETEF LOCAL CTRL STATION	CB	33'-0"	Y	R	x
333	HJ9	31/32 ETEF LOCAL CTRL STATION	CB	33'-0"	Y	R	x
334	IA-1-1	31 IA COMPRESSOR OUTLET RELIEF VALVE	CB	15'-0"	Y	n/a	
335	IA-1-2	32 IA COMPRESSOR OUTLET RELIEF VALVE	CB	15'-0"	Y	n/a	
336	IA-31-FLT	COMPRESSOR 31 INLET AIR FILTER	CB	15'-0"	Y	n/a	
337	IA-31-TK	INST AIR RECEIVER	CB	15'-0"	Y	4.73	x
338	IA-32-FLT	COMPRESSOR 32 INLET AIR FILTER	CB	15'-0"	Y	n/a	
339	IA-49	IA RECEIVER NO 31 RELIEF VALVE	CB	15'-0"	Y	n/a	
340	IACCHT	INST. AIR COMP CLG HEAD TANK	CB	33'-0"	Y	5.16	x
341	INTSIATSAI	#31 SPRAY ADDITIVE TANK	PAB	41'-0"	Y	0.99	

Table 3A.10
Summary of Seismic PRA Equipment

342	K4C	STATIC INVERTER #33 FUSE BOX	CB	33'-0"	Y	R	x
343	K4F	INST BUS 31,31A MANUAL BY-PASS SWITCH	CB	33'-0"	Y	R	x
344	K4G	INST BUS 32,32A MANUAL BY-PASS SWITCH	CB	33'-0"	Y	R	x
345	K50	118 VAC INST BUS 31A	CB	53'-0"	Y	R	x
346	K51	118 VAC INST BUS 32A	CB	53'-0"	Y	R	x
347	KG7	MANUAL TRANSFER SWITCH #34	CB	33'-0"	Y	R	x
348	L-314	MOTOR OPERATED LOUVER FOR THE AUXILIARY FEED PUMP BU	AFPB	18'-6"	Y	R	
349	LCV-1158-1	CST LO LVL CONTROL VALVE	AFPB	18'-6"	Y	n/a	x
350	LCV-1158-2	CST LO LVL CONTROL VALVE	AFPB	18'-6"	Y	n/a	x
351	LP-319	CB LIGHTING PANEL	CB	33'-0"	Y	R	
352	LT-102	BORIC ACID STORAGE TANK #32 LEVEL TRANSMITTER	PAB	73'-0"	Y	R	x
353	LT-106	BORIC ACID STORAGE TANK #31 LEVEL TRANSMITTER	PAB	73'-0"	Y	R	x
354	LT-112	VCT LEVEL TRANSMITTER	PAB	73'-0"	Y	n/a	x
355	LT-1128	COND STG TANK LEVEL TRANSMITTER	YD	82'-0"	Y	R	x
356	LT-1128A	COND STG TANK LEVEL TRANSMITTER	YD	82'-0"	Y	R	x
357	LT-1253	CMT LEVEL TRANSMITTER	VC	46'-0"	Y	R	x
358	LT-1254	CMT LEVEL TRANSMITTER	VC	46'-0"	Y	R	x
359	LT-462	PRESSURIZER LEVEL TRANSMITTER CH IV	VC	68'-0"	Y	R	
360	LT-470	PRT LEVEL TRANSMITTER	VC	65'-0"	Y	R	x
361	LT-628	CCW SURGE TANK # 31 LEVEL TRANSMITTER	PAB	73'-0"	Y	R	x
362	LT-629	CCW SURGE TANK # 32 LEVEL TRANSMITTER	PAB	73'-0"	Y	R	x
363	LT-920	RWST LEVEL TRANSMITTER	YD	79'-0"	Y	R	x
364	MCC-32	480 VAC MCC	TB	15'-0"	Y	0.92	x
365	MCC-33	480 VAC MCC	TB	15'-0"	Y	0.92	x
366	MCC-34	480 VAC MCC	TB	15'-0"	Y	0.92	x
367	MCC-36A	480 VAC MCC	PAB	55'-0"	Y	0.62	x
368	MCC-36A EXTENSION	480 VAC MCC	PAB	55'-0"	Y	0.62	x
369	MCC-36B	480 VAC MCC	PAB	55'-0"	Y	0.62	x
370	MCC-36B EXTENSION	480 VAC MCC	PAB	55'-0"	Y	0.62	x
371	MCC-36C	480 VAC MCC	CB	15'-0"	Y	0.86	x
372	MCC-37	480 VAC MCC	PAB	55'-0"	Y	0.62	x
373	MCC-38	480 VAC MCC	VC	68'-0"	N	0.22	x
374	MCC-39	480 VAC MCC	CB	33'-0"	Y	0.9	x
375	MS-1-31	31 SG MSIV	AFPB	77'-0"	Y	n/a	x
376	MS-1-32	32 SG MSIV	AFPB	65'-0"	Y	n/a	x
377	MS-1-33	33 SG MSIV	AFPB	77'-0"	Y	n/a	x
378	MS-1-34	34 SG MSIV	AFPB	65'-0"	Y	n/a	x
379	MS-45-1	STEAM GEN 31 SAFETY RELIEF VALVE	AFPB	77'-0"	Y	n/a	x

Table 3A.10

Summary of Seismic PRA Equipment

380	MS-45-2	STEAM GEN 32 SAFETY RELIEF VALVE	AFPB	77'-0"	Y	n/a	x
381	MS-45-3	STEAM GEN 33 SAFETY RELIEF VALVE	AFPB	77'-0"	Y	n/a	x
382	MS-45-4	STEAM GEN 34 SAFETY RELIEF VALVE	AFPB	77'-0"	Y	n/a	x
383	MS-46-1	STEAM GEN 31 SAFETY RELIEF VALVE	AFPB	77'-0"	Y	n/a	x
384	MS-46-2	STEAM GEN 32 SAFETY RELIEF VALVE	AFPB	77'-0"	Y	n/a	x
385	MS-46-3	STEAM GEN 33 SAFETY RELIEF VALVE	AFPB	77'-0"	Y	n/a	x
386	MS-46-4	STEAM GEN 34 SAFETY RELIEF VALVE	AFPB	77'-0"	Y	n/a	x
387	MS-47-1	STEAM GEN 31 SAFETY RELIEF VALVE	AFPB	77'-0"	Y	n/a	x
388	MS-47-2	STEAM GEN 32 SAFETY RELIEF VALVE	AFPB	77'-0"	Y	n/a	x
389	MS-47-3	STEAM GEN 33 SAFETY RELIEF VALVE	AFPB	77'-0"	Y	n/a	x
390	MS-47-4	STEAM GEN 34 SAFETY RELIEF VALVE	AFPB	77'-0"	Y	n/a	x
391	MS-48-1	STEAM GEN 31 SAFETY RELIEF VALVE	AFPB	77'-0"	Y	n/a	x
392	MS-48-2	STEAM GEN 32 SAFETY RELIEF VALVE	AFPB	77'-0"	Y	n/a	x
393	MS-48-3	STEAM GEN 33 SAFETY RELIEF VALVE	AFPB	77'-0"	Y	n/a	x
394	MS-48-4	STEAM GEN 34 SAFETY RELIEF VALVE	AFPB	77'-0"	Y	n/a	x
395	MS-49-1	STEAM GEN 31 SAFETY RELIEF VALVE	AFPB	77'-0"	Y	n/a	x
396	MS-49-2	STEAM GEN 32 SAFETY RELIEF VALVE	AFPB	77'-0"	Y	n/a	x
397	MS-49-3	STEAM GEN 33 SAFETY RELIEF VALVE	AFPB	77'-0"	Y	n/a	x
398	MS-49-4	STEAM GEN 34 SAFETY RELIEF VALVE	AFPB	77'-0"	Y	n/a	x
399	PABSF	PRIMARY AUX BUILDING SUPPLY FAN	PAB	41'-0"	Y	1.25	x
400	PCV-1042	HYDROGEN SUPPLY PRESSURE CONTROL VALVE	PAB	55'-0"	Y	n/a	x
401	PCV-1139	AUX FWP TURB STM SUPP PRESS REDUCING VALVE	AFPB	15'-0"	Y	n/a	x
402	PCV-1142	INSTRUMENT AIR EMERGENCY MAKEUP VALVE	CB	15'-0"	Y	n/a	x
403	PCV-1187	CITY WATER SUPPLY ISO VALVE	AFPB	18'-6"	Y	n/a	x
404	PCV-1188	CITY WATER SUPPLY ISO VALVE	AFPB	18'-6"	Y	n/a	x
405	PCV-1189	CITY WATER SUPPLY ISO VALVE	AFPB	18'-6"	Y	n/a	x
406	PCV-1190	PRESSURE RELIEF ISOLATION VALVE PCV-1190	VC	59'-0"	Y	n/a	
407	PCV-1191	PRESSURE RELIEF ISOLATION VALVE PCV-1191	FH	59'-0"	Y	n/a	
408	PCV-1192	PRESSURE RELIEF ISOLATION VALVE PCV-1192	FH	59'-0"	Y	n/a	
409	PCV-1213	PRESSURE CONTROL VALVE	AFPB	18'-6"	Y	n/a	x
410	PCV-1228	I/A SPPLY CONT BLDG INSTR AIR HDR	PP	41'-0"	Y	n/a	x
411	PCV-1229	CONDENSER DISCHARGE TO VC ISOLATION	FH	51'-0"	Y	n/a	
412	PCV-1230	CONDENSER DISCHARGE TO VC ISOLATION	FH	51'-0"	Y	n/a	
413	PCV-1273	N2 BACKUP SUPPLY	AFPB	18'-6"	Y	n/a	x
414	PCV-1274	N2 BACKUP SUPPLY	AFPB	18'-6"	Y	n/a	x
415	PCV-1275	N2 BACKUP SUPPLY	AFPB	18'-6"	Y	n/a	x
416	PCV-1276	N2 BACKUP SUPPLY	AFPB	18'-6"	Y	n/a	x
417	PCV-1284	RELIEF VALVE	AFPB	18'-6"	Y	n/a	

Table 3A.10
Summary of Seismic PRA Equipment

418	PCV-1296	31 A/C UNIT CONDENSER	CB	15'-0"	Y	n/a	x
419	PCV-1297	32 A/C UNIT CONDENSER	CB	15'-0"	Y	n/a	x
420	PCV-1310A	AUX FWP TURB STM SUPP SHUT-OFF VALVE	AFPB	30'-0"	Y	n/a	x
421	PCV-1310B	AUX FWP TURB STM SUPP SHUT-OFF VALVE	AFPB	36'-0"	Y	n/a	x
422	PCV-455A	PZR SPRAY CONTROL VALVE	VC	68'-0"	Y	n/a	x
423	PCV-455B	PZR SPRAY CONTROL VALVE	VC	68'-0"	Y	n/a	x
424	PCV-455C	PRESSURIZER PORV	VC	124'-0	Y	n/a	x
425	PCV-456	PRESSURIZER PORV	VC	124'-0	Y	n/a	x
426	PCV-473	N2 SUPPLY TO PRT	PAB	41'-0"	Y	n/a	x
427	PE6	118 VAC INSTR BUS 34	CB	53'-0"	Y	R	x
428	PE7	118 VAC INSTR BUS 33	CB	53'-0"	Y	R	x
429	PE8	118 VAC INST BUS 31	CB	53'-0"	Y	R	x
430	PE9	118 VAC INST BUS 32	CB	53'-0"	Y	R	x
431	PI-1260	AFW 31 DISCHG PRESS INDICATOR	AFPB	18'-6"	Y	R	x
432	PI-1261	AFW 32 DISCHG PRESS INDICATOR	AFPB	18'-6"	Y	R	x
433	PI-1262	AFW 33 DISCHG PRESS INDICATOR	AFPB	18'-6"	Y	R	x
434	PM-405A	PRESSURE SIGNAL CONVERTER CONDITIONER 32 AFWP	AFPB	18'-6"	Y	R	x
435	PM-405B	PRESSURE SIGNAL CONVERTER CONDITIONER 32 AFWP	AFPB	18'-6"	Y	R	x
436	PM-405C	PRESSURE SIGNAL CONVERTER CONDITIONER 32 AFWP	AFPB	18'-6"	Y	R	x
437	PM-405D	PRESSURE SIGNAL CONVERTER CONDITIONER 32 AFWP	AFPB	18'-6"	Y	R	x
438	PM-406E	PRESSURE SIGNAL CONVERTER CONDITIONER 31 AFWP	AFPB	18'-6"	Y	R	x
439	PM-406F	PRESSURE SIGNAL CONVERTER CONDITIONER 31 AFWP	AFPB	18'-6"	Y	R	x
440	PM-406G	PRESSURE SIGNAL CONVERTER CONDITIONER 33 AFWP	AFPB	18'-6"	Y	R	x
441	PM-406H	PRESSURE SIGNAL CONVERTER CONDITIONER 33 AFWP	AFPB	18'-6"	Y	R	x
442	PNL #1	ATM STEAM DUMP PANEL #1	AFPB	43'-0"	Y	R	x
443	PNL #2	ATM STEAM DUMP PANEL #2	AFPB	43'-0"	Y	R	x
444	PNL #3	SAMPLING SYS CONTROL PANEL #3	PAB	55'-0"	Y	R	x
445	PNL #4	SAMPLING SYS CONTROL PANEL #4	PAB	55'-0"	Y	R	x
446	PNL 1-31	31 SG MSIV SOV PANEL	AFPB	77'-4"	Y	R	x
447	PNL 1-32	32 SG MSIV SOV PANEL	AFPB	64'-8"	Y	R	x
448	PNL 1-33	33 SG MSIV SOV PANEL	AFPB	77'-4"	Y	R	x
449	PNL 1-34	34 SG MSIV SOV PANEL	AFPB	64'-8"	Y	R	x
450	PNL 31EDGA	31 EDG AUX STARTERS & CONTROL PANEL	DGB	15'-0"	Y	R	x
451	PNL 324	LIGHTING PANEL 324	AFPB	18'-6"	Y	R	x
452	PNL 32EDGA	32 EDG AUX STARTERS & CONTROL PANEL	DGB	15'-0"	Y	R	x
453	PNL 33EDGA	33 EDG AUX STARTERS & CONTROL PANEL	DGB	15'-0"	Y	R	x
454	PNL JC1	FAN ROOM CONTROL PANEL	FH	72'-0"	Y	R	x
455	PNL K48	125 VDC DISTRIBUTION PNL 31A	CB	53'-0"	Y	R	x

Summary of Seismic PRA Equipment

456	PNL K49	125 VDC DISTRIBUTION PNL 32A	CB	53'-0"	Y	R	x
457	PNL N2	N2 BOTTLE SUPPLY PCV PANEL	PAB	55'-0"	Y	R	x
458	PNL PC1	125 VDC POWER PANEL #31	CB	33'-0"	Y	R	x
459	PNL PC2	125 VDC POWER PANEL #32	CB	33'-0"	Y	R	x
460	PNL PC3	125 VDC DISTRIBUTION PNL 31	CB	53'-0"	Y	R	x
461	PNL PC4	125 VDC DISTRIBUTION PNL 32	CB	53'-0"	Y	R	x
462	PNL PC8	125 VDC DISTRIBUTION PNL 33	CB	53'-0"	Y	R	x
463	PNL PC9	125 VDC POWER PANEL #33	CB	15'-0"	Y	R	x
464	PNL PD9	125 VDC DISTRIBUTION PNL 34	CB	53'-0"	Y	R	x
465	PNL PF6	GAS ANALYZING PANEL	PAB	55'-0"	Y	0.56	x
466	PNL PF7	125 VDC POWER PANEL #34	CB	33'-0"	Y	R	x
467	PNL PI1	31 EDG PNEU CONTROL PANEL	DGB	15'-0"	Y	R	x
468	PNL PI2	32 EDG PNEU CONTROL PANEL	DGB	15'-0"	Y	R	x
469	PNL PI3	33 EDG PNEU CONTROL PANEL	DGB	15'-0"	Y	R	x
470	PNL PI7	LOCAL CCR AC CNTRL PANEL	CB	15'-0"	Y	R	x
471	PNL PL6	CHARGING PUMPS SPEED CONTROL PANEL	PAB	55'-0"	Y	R	x
472	PNL PP9	31 EDG CONTROL PANEL	DGB	15'-0"	Y	0.88	x
473	PNL PQ1	32 EDG CONTROL PANEL	DGB	15'-0"	Y	0.88	x
474	PNL PQ2	33 EDG CONTROL PANEL	DGB	15'-0"	Y	0.88	x
475	PNL PS6	SERVICE WATER PUMP CONTROL STATION	CB	15'-0"	Y	R	x
476	PNL PT2	AUX BOILER FEED PMP CONTROL STATION	AFPB	18'-6"	Y	R	x
477	PNL PY3	DELUGE SYS CONTROL PANEL PY3	PP	34'-0"	Y	R	x
478	PNL PY4	DELUGE SYS CONTROL PANEL PY4	PP	34'-0"	Y	R	x
479	PNL PY5	DELUGE SYS CONTROL PANEL PY5	PP	34'-0"	Y	R	x
480	PNL PY6	DELUGE SYS CONTROL PANEL PY6	PP	34'-0"	Y	R	x
481	PRV-6300	N2 TO PORV 456 REG VALVE	VC	68'-0"	Y	n/a	x
482	PRV-6301	N2 TO PORV 455C REG VALVE	VC	68'-0"	Y	n/a	x
483	PS-10	INSTRUMENT AIR TO POST ACCIDENT CONT. VENT SYS	PAB	41'-0"	Y	n/a	
484	PS-7	PRESSURIZATION TO POST ACCIDENT CONT VENT SYS	PAB	41'-0"	Y	n/a	
485	PS-8	PRESSURIZATION TO POST ACCIDENT CONT FILTER STOP	PAB	41'-0"	Y	n/a	
486	PS-9	PRESSURIZATION TO POST ACCIDENT CONT FILTER STOP	PAB	41'-0"	Y	n/a	
487	PS-PCV-1111-1	WELD CHANNEL PRESSURIZATION HEADER ISO VALVE	FH	41'-0"	Y	n/a	
488	PS-PCV-1111-2	WELD CHANNEL PRESSURIZATION HEADER ISO VALVE	FH	41'-0"	Y	n/a	
489	PT-1144	STATION AIR NUCL SERV PRESS TRANSMITTER	CB	15'-0"	Y	R	x
490	PT-1190	SVC WATER NUCL HDR PRESS TRANSMITTER	TB	15'-0"	Y	R	x
491	PT-1191	SVC WATER NUCL HDR PRESS TRANSMITTER	TB	15'-0"	Y	R	x
492	PT-1192	IACC WATER PRESS TRANSMITTER	CB	15'-0"	Y	R	x
493	PT-135	NON REGEN HX OUTLET LETDOWN PRESS TRANSMITTER	PAB	73'-0"	Y	R	x

Table 3A.10
Summary of Seismic PRA Equipment

494	PT-139	VCT PRESSURE TRANSMITTER	PAB	73'-0"	Y	R	x
495	PT-142	CHG PP DISCH PRESS TRANSMITTER	PAB	55'-0"	Y	R	x
496	PT-402	LOOP 31 HOT LEG PRESSURE TRANSMITTER	VC	46'-0"	Y	R	x
497	PT-403	LOOP 34 HOT LEG PRESSURE TRANSMITTER	VC	46'-0"	Y	R	x
498	PT-412A	1ST STAGE TURB PRESS TRANSMITTER	TB	32'-0"	Y	R	
499	PT-412B	1ST STAGE TURB PRESS TRANSMITTER	TB	32'-0"	Y	R	
500	PT-413	LOOP 31 HOT LEG PRESSURE TRANSMITTER	VC	46'-0"	Y	R	x
501	PT-433	LOOP 33 HOT LEG PRESSURE	VC	46'-0"	Y	R	x
502	PT-443	LOOP 34 HOT LEG PRESSURE TRANSMITTER	VC	46'-0"	Y	R	x
503	PT-472	PRT PRESSURE TRANSMITTER	VC	62'-0"	Y	R	x
504	PWST 21	PRIMARY WATER STORAGE TANK	YD	54'-0"	N	0.65	x
505	RACK 19	INSTRUMENT RACK	VC	68'-0"	Y	0.9	x
506	RACK 20	INSTRUMENT RACK	VC	68'-0"	Y	0.69	x
507	RACK 21	INSTRUMENT RACK	VC	68'-0"	Y	0.9	x
508	RACK 24A	INSTRUMENT RACK	PP	41'-0"	Y	0.92	x
509	RACK 26	INSTRUMENT RACK	AFPB	18'-6"	Y	1.63	x
510	RACK 4-A	INSTRUMENT RACK	VC	68'-0"	Y	0.86	x
511	RACK 4-B	INSTRUMENT RACK	VC	68'-0"	Y	0.86	x
512	RACK 6A	INSTRUMENT RACK	PP	41'-0"	Y	R	x
513	RACK 8	INSTRUMENT RACK	AFPB	18'-6"	Y	1.94	x
514	RACK 9	INSTRUMENT RACK	AFPB	18'-6"	Y	1.18	x
515	RACK A-1	CCR RACK	CB	53'-0"	Y	0.67	x
516	RACK A-10	CCR RACK	CB	53'-0"	Y	0.67	x
517	RACK A-2	CCR RACK	CB	53'-0"	Y	0.67	x
518	RACK A-3	CCR RACK	CB	53'-0"	Y	0.67	x
519	RACK A-4	CCR RACK	CB	53'-0"	Y	0.67	x
520	RACK A-5	CCR RACK	CB	53'-0"	Y	0.67	x
521	RACK A-6	CCR RACK	CB	53'-0"	Y	0.67	x
522	RACK A-7	CCR RACK	CB	53'-0"	Y	0.67	x
523	RACK A-8	CCR RACK	CB	53'-0"	Y	0.67	x
524	RACK A-9	CCR RACK	CB	53'-0"	Y	0.67	x
525	RACK B-1	CCR RACK	CB	53'-0"	Y	0.67	x
526	RACK B-10	CCR RACK	CB	53'-0"	Y	0.67	x
527	RACK B-11	CCR RACK	CB	53'-0"	Y	0.67	x
528	RACK B-2	CCR RACK	CB	53'-0"	Y	0.67	x
529	RACK B-3	CCR RACK	CB	53'-0"	Y	0.67	x
530	RACK B-4	CCR RACK	CB	53'-0"	Y	0.67	x
531	RACK B-5	CCR RACK	CB	53'-0"	Y	0.67	x

Table 3A.10
Summary of Seismic PRA Equipment

532	RACK B-6	CCR RACK	CB	53'-0"	Y	0.67	x
533	RACK B-7	CCR RACK	CB	53'-0"	Y	0.67	x
534	RACK B-8	CCR RACK	CB	53'-0"	Y	0.67	x
535	RACK B-9	CCR RACK	CB	53'-0"	Y	0.67	x
536	RACK C-1	CCR RACK	CB	53'-0"	Y	0.67	x
537	RACK C-10	CCR RACK	CB	53'-0"	Y	0.67	x
538	RACK C-11	CCR RACK	CB	53'-0"	N	0.22	x
539	RACK C-2	CCR RACK	CB	53'-0"	Y	0.67	x
540	RACK C-3	CCR RACK	CB	53'-0"	Y	0.67	x
541	RACK C-4	CCR RACK	CB	53'-0"	Y	0.67	x
542	RACK C-5	CCR RACK	CB	53'-0"	Y	0.67	x
543	RACK C-6	CCR RACK	CB	53'-0"	Y	0.67	x
544	RACK C-7	CCR RACK	CB	53'-0"	Y	0.67	x
545	RACK C-8	CCR RACK	CB	53'-0"	Y	0.67	x
546	RACK C-9	CCR RACK	CB	53'-0"	Y	0.67	x
547	RACK D-1	CCR RACK	CB	53'-0"	Y	0.67	x
548	RACK D-10	CCR RACK	CB	53'-0"	Y	0.67	x
549	RACK D-11	CCR RACK	CB	53'-0"	Y	0.67	x
550	RACK D-2	CCR RACK	CB	53'-0"	Y	0.67	x
551	RACK D-3	CCR RACK	CB	53'-0"	Y	0.67	x
552	RACK D-4	CCR RACK	CB	53'-0"	Y	0.67	x
553	RACK D-5	CCR RACK	CB	53'-0"	Y	0.67	x
554	RACK D-6	CCR RACK	CB	53'-0"	Y	0.67	x
555	RACK D-7	CCR RACK	CB	53'-0"	Y	0.67	x
556	RACK D-8	CCR RACK	CB	53'-0"	Y	0.67	x
557	RACK D-9	CCR RACK	CB	53'-0"	Y	0.67	x
558	RACK E-1	CCR RACK	CB	53'-0"	Y	0.67	x
559	RACK E-2	CCR RACK	CB	53'-0"	Y	0.67	x
560	RACK E-3	CCR RACK	CB	53'-0"	Y	0.67	x
561	RACK E-4	CCR RACK	CB	53'-0"	Y	0.67	x
562	RACK E-5	CCR RACK	CB	53'-0"	Y	0.67	x
563	RACK E-6	CCR RACK	CB	53'-0"	Y	0.67	x
564	RACK E-7	CCR RACK	CB	53'-0"	Y	0.67	x
565	RACK F-1	CCR RACK	CB	53'-0"	Y	0.67	x
566	RACK F-2	CCR RACK	CB	53'-0"	Y	0.67	x
567	RACK F-3	CCR RACK	CB	53'-0"	Y	0.67	x
568	RACK F-4	CCR RACK	CB	53'-0"	Y	0.67	x
569	RACK F-5	CCR RACK	CB	53'-0"	Y	0.67	x

Table 3A.10
Summary of Seismic PRA Equipment

570	RACK F-6	CCR RACK	CB	53'-0"	Y	0.67	x
571	RACK F-7	CCR RACK	CB	53'-0"	Y	0.67	x
572	RACK G-1	CCR RACK	CB	53'-0"	Y	0.67	x
573	RACK G-2	CCR RACK	CB	53'-0"	Y	0.67	x
574	RACK G-3	CCR RACK	CB	53'-0"	Y	0.67	x
575	RACK G-4	CCR RACK	CB	53'-0"	Y	0.67	x
576	RACK G-5	CCR RACK	CB	53'-0"	Y	0.67	x
577	RACK G-6	CCR RACK	CB	53'-0"	Y	0.67	x
578	RACK H-1	CCR RACK	CB	53'-0"	Y	0.67	x
579	RACK H-2	CCR RACK	CB	53'-0"	Y	0.67	x
580	RACK H-3	CCR RACK	CB	53'-0"	Y	0.67	x
581	RACK H-4	CCR RACK	CB	53'-0"	Y	0.67	x
582	RACK H-5	CCR RACK	CB	53'-0"	Y	0.67	x
583	RC-519	PRIMARY WATER MAKE-UP TO PRT VALVE	PP	41'-0"	Y	n/a	x
584	RC-523	PRT DRAIN VALVE	VC	46'-0"	Y	n/a	x
585	RC-544	REACTOR VESSEL FLANGE LEAK-OFF CTRL VLV	VC	60'-0"	Y	n/a	x
586	RC-548	PRESS RELIEF GAS ANALYZER CTRL VALVE	PAB	54'-0"	Y	n/a	
587	RC-549	PRESS RELIEF GAS ANALYZER CTRL VALVE	PAB	54'-0"	Y	n/a	x
588	RC-550	CONTAINMENT NITROGEN SUPPLY ISOLATION TO PRT	PP	41'-0"	Y	n/a	
589	RC-552	PRIMARY WATER MAKE-UP TO PRT VALVE	PP	41'-0"	Y	n/a	x
590	RC-560	PRT SPRAY ISO STOP VALVE	VC	46'-0"	Y	n/a	x
591	RC-MOV-535	PORV BLK VLV 455C	VC	124'-0	Y	n/a	x
592	RC-MOV-536	PORV BLK VLV 456	VC	124'-0	Y	n/a	x
593	RC-PCV-464	OVER PRESSURIZATION PROTECTION	VC	130'	Y	n/a	
594	RC-PCV-466	OVER PRESSURIZATION PROTECTION	VC	130'	Y	n/a	
595	RC-PCV-468	OVER PRESSURIZATION PROTECTION	VC	130'	Y	n/a	
596	RCPCPR1	PRESSURIZER	VC	78'-0"	Y	n/a	
597	RVLIS RACK TRAIN A	RVLIS TRANSMITTER RACK TRAIN "A"	PP	41'-0"	Y	R	x
598	RWST-31	REFUEL WTR STORAGE TANK	YD	80'-0"	N	1.03	x
599	S/G 31	STEAM GENERATOR 31	VC	95'-0"	Y	n/a	
600	S/G 32	STEAM GENERATOR 32	VC	95'-0"	Y	n/a	
601	S/G 33	STEAM GENERATOR 33	VC	95'-0"	Y	n/a	
602	S/G 34	STEAM GENERATOR 34	VC	95'-0"	Y	n/a	
603	SI-1835A	BORON INJECTION TANK DISCHARGE STOP	PAB	55'-0"	Y	n/a	
604	SI-1835B	BORON INJECTION TANK DISCHARGE STOP	PAB	55'-0"	Y	n/a	
605	SI-1852A	BORON INJECTION TANK INLET STOP	PAB	34'-0"	Y	n/a	
606	SI-1852B	BORON INJECTION TANK INLET STOP	PAB	34'-0"	Y	n/a	
607	SI-842	SAFETY INJECTION PUMPS RECIRC TO RWST STOP	PAB	34'-0"	Y	n/a	

608	SI-843	SAFETY INJECTION PUMPS RECIRC TO RWST STOP	PAB	34'-0"	Y	n/a	
609	SI-851A	SAFETY INJECTION PUMP 32 PUMP DISCHARGE STOP	PAB	34'-0"	Y	n/a	
610	SI-851B	SAFETY INJECTION PUMP 32 DISCHARGE STOP	PAB	34'-0"	Y	n/a	
611	SI-856A	LOOP 1 COLD LEG HI HEAD INJECTION STOP	VC	46'-0"	Y	n/a	
612	SI-856B	LOOP 3 HOT LEG HI HEAD INJECTION STOP	VC	46'-0"	Y	n/a	
613	SI-856C	LOOP 4 COLD LEG HI HEAD INJECTION STOP	VC	46'-0"	Y	n/a	
614	SI-856D	LOOP 2 COLD LEG HI HEAD INJECTION STOP	VC	46'-0"	Y	n/a	
615	SI-856E	LOOP 1 COLD LEG HI HEAD INJECTION STOP	VC	46'-0"	Y	n/a	
616	SI-856F	LOOP 3 COLD LEG HI HEAD INJECTION STOP	VC	46'-0"	Y	n/a	
617	SI-856G	LOOP 1 HOT LEG HI HEAD INJECTION STOP	VC	46'-0"	Y	n/a	
618	SI-856H	LOOP 3 COLD LEG HI HEAD INJECTION STOP	VC	46'-0"	Y	n/a	
619	SI-856J	LOOP 2 COLD LEG HI HEAD INJECTION STOP	VC	46'-0"	Y	n/a	
620	SI-856K	LOOP 4 COLD LEG HI HEAD INJECTION STOP	VC	46'-0"	Y	n/a	
621	SI-866A	CONTAINMENT SPRAY PUMP #31 DISCHARGE STOP	PAB	41'-0"	Y	n/a	
622	SI-866B	CONTAINMENT SPRAY PUMP #32 DISCHARGE STOP	PAB	41'-0"	Y	n/a	
623	SI-883	RHR PUMP RECIRC LINE TO RWST STOP	PAB	15'-0"	Y	n/a	
624	SI-887A	SAFETY INJECTION PUMP 32 SUCTION ISOLATION STOP	PAB	34'-0"	Y	n/a	
625	SI-887B	SAFETY INJECTION PUMP 32 SUCTION ISOLATION STOP	PAB	34'-0"	Y	n/a	
626	SI-AOV-1851A	BORON INJECTION TANK RECIRC ISOLATION	PP	51'-0"	Y	n/a	
627	SI-AOV-1851B	BORON INJECTION TANK RECIRC ISOLATION	PP	51'-0"	Y	n/a	
628	SI-HCV-638	RHR HTX 31 DISCH. THROTTLE VLV.	VC	66'-0"	Y	n/a	x
629	SI-HCV-640	RHR HTX 32 DISCH. THROTTLE VLV.	VC	66'-0"	Y	n/a	x
630	SI-MOV-0882	RWST SUPPLY TO RHR PUMPS	PAB	15'-0"	Y	n/a	x
631	SI-MOV-0885A	RHR PUMPS SUCTION FROM CONTAINMENT SUMP	PAB	34'-0"	Y	n/a	x
632	SI-MOV-0885B	RHR PUMPS SUCTION FROM CONTAINMENT SUMP	PAB	34'-0"	Y	n/a	x
633	SI-MOV-0888A	HIGH HEAD INJECTION RECIRC STOP	PAB	51'-0"	Y	n/a	x
634	SI-MOV-0888B	HIGH HEAD INJECTION RECIRC STOP	PAB	51'-0"	Y	n/a	x
635	SI-MOV-0889A	CTMT SPRAY HEADER ISO VALVE	VC	72'-6"	Y	n/a	x
636	SI-MOV-0889B	CTMT SPRAY HEADER ISO VALVE	VC	72'-6"	Y	n/a	x
637	SI-MOV-0894A	NO. 31 ACCUM ISOLATION VALVE	VC	46'-0"	Y	n/a	x
638	SI-MOV-0894B	NO. 32 ACCUM ISOLATION VALVE	VC	46'-0"	Y	n/a	x
639	SI-MOV-0894C	NO. 33 ACCUM ISOLATION VALVE	VC	46'-0"	Y	n/a	x
640	SI-MOV-0894D	NO. 34 ACCUM ISOLATION VALVE	VC	46'-0"	Y	n/a	x
641	SI-MOV-0899A	RHR HTX 32 OUTLET STOP VLV	VC	68'-0"	Y	n/a	x
642	SI-MOV-0899B	RHR HTX 31 OUTLET STOP VLV	VC	68'-0"	Y	n/a	x
643	SI-MOV-1802A	SIS RECIRC PUMP DISCHARGE VALVE	VC	46'-0"	Y	n/a	x
644	SI-MOV-1802B	SIS RECIRC PUMP DISCHARGE VALVE	VC	46'-0"	Y	n/a	x
645	SI-MOV-1810	MOV RWST TO SI PUMP ISO VALVE	PAB	15'-0"	Y	n/a	x

Table 3A.10
Summary of Seismic PRA Equipment

646	SI-MOV-1869A	RHR HX 32 TO RHR MINI FLOW VALVES	VC	55'-0"	Y	n/a	x
647	SI-MOV-1869B	RHR HX 31 TO RHR MINI FLOW VALVES	VC	55'-0"	Y	n/a	x
648	SI-MOV-850A	SAFETY INJECTION PUMP 32 PUMP DISCHARGE STOP	PAB	34'-0"	Y	n/a	
649	SI-MOV-850C	SAFETY INJECTION PUMP 31 DISCHARGE STOP	PAB	34'-0"	Y	n/a	
650	SOV-110B-1	CH-FCV-110B SOLENOID VALVE	PAB	73'-0"	Y	n/a	x
651	SOV-111A-1	CH-FCV-111A SOLENOID VALVE	PAB	78'-0"	Y	n/a	
652	SOV-112A-1	CH-LCV-112A SOLENOID VALVE	PAB	80'-0"	Y	n/a	
653	SOV-1139-1	PCV-1139 SOLENOID VALVE	AFPB	15'-0"	Y	n/a	x
654	SOV-1139-2	PCV-1139 SOLENOID VALVE	AFPB	15'-0"	Y	n/a	x
655	SOV-149-1	CH-TCV-149 SOLENOID VALVE	PAB	80'-0"	Y	n/a	x
656	SOV-18-1	DG 31 AIR START SOLENOID VALVE (EAST)	DGB	15'-0"	Y	n/a	
657	SOV-18-2	DG 31 AIR START SOLENOID VALVE (WEST)	DGB	15'-0"	Y	n/a	
658	SOV-18-3	DG 32 AIR START SOLENOID VALVE (EAST)	DGB	15'-0"	Y	n/a	
659	SOV-18-4	DG 32 AIR START SOLENOID VALVE (WEST)	DGB	15'-0"	Y	n/a	
660	SOV-18-5	DG 33 AIR START SOLENOID VALVE (EAST)	DGB	15'-0"	Y	n/a	
661	SOV-18-6	DG 33 AIR START SOLENOID VALVE (WEST)	DGB	15'-0"	Y	n/a	
662	SOV-200A-1	CH-AOV-200A SOLENOID VALVE	VC	46'-0"	Y	n/a	x
663	SOV-200B-1	CH-AOV-200B SOLENOID VALVE	VC	46'-0"	Y	n/a	x
664	SOV-200C-1	CH-AOV-200C SOLENOID VALVE	VC	46'-0"	Y	n/a	x
665	SOV-212-1	CH-AOV-212 SOLENOID VALVE	VC	46'-0"	Y	n/a	x
666	SOV-215-1	CH-AOV-215 SOLENOID VALVE	VC	46'-0"	Y	n/a	x
667	SOV-310-1	CH-310 SOLENOID VALVE	PAB	42'-0"	Y	n/a	
668	SOV-459-1	LETDOWN STOP VALVE	VC	79'-0"	Y	n/a	x
669	SOV-460-1	CH-LCV-460 SOLENOID VALVE	VC	79'-0"	Y	n/a	x
670	SOV-544-1	RC-544 SOLENOID VALVE	VC	60'-0"	Y	n/a	x
671	SOV-549-1	RC-549 SOLENOID VALVE	PAB	54'-0"	Y	n/a	
672	SOV-552-1	RC-552 SOLENOID VALVE	PP	41'-0"	Y	n/a	x
673	SOV-560-1	RC-560 SOLENOID VALVE	VC	46'-0"	Y	n/a	x
674	SOV-793-1	AC-793 SOLENOID VALVE	PP	51'-0"	Y	n/a	x
675	SOV-956C-1	956C SOLENOID VALVE	PP	41'-0"	Y	n/a	x
676	SOV-956D-1	956D SOLENOID VALVE	PP	41'-0"	Y	n/a	x
677	SOV-956E-1	956E SOLENOID VALVE	PP	41'-0"	Y	n/a	x
678	SOV-956F-1	956F SOLENOID VALVE	PP	41'-0"	Y	n/a	x
679	SP-AOV-956A	PRESSURIZER STEAM SAMPLE ISOLATION VALVE	PP	51'-0"	Y	n/a	
680	SP-AOV-956B	PRESSURIZER STEAM SAMPLE ISOLATION VALVE	PP	51'-0"	Y	n/a	
681	SP-AOV-956C	PRESSURIZER STEAM SAMPLE ISOLATION VALVE	PP	51'-0"	Y	n/a	
682	SP-AOV-956D	PRESSURIZER STEAM SAMPLE ISOLATION VALVE	PP	51'-0"	Y	n/a	
683	SP-MOV-990A	RECIRCULATION PUMP SAMPLE ISOLATION	PP	51'-0"	Y	n/a	

Table 3A.10
Summary of Seismic PRA Equipment

684	SP-MOV-990B	RECIRCULATION PUMP SAMPLE ISOLATION	PP	51'-0"	Y	n/a	
685	SP-SOV-506	33 FAN COOLER UNIT SAMPLE TO H2 ANALYZER B ISOLATION	FH	67'-0"	Y	n/a	
686	SP-SOV-507	34 FAN COOLER UNIT SAMPLE TO H2 ANALYZER B ISOLATION	FH	67'-0"	Y	n/a	
687	SP-SOV-508	31 FAN COOLER UNIT SAMPLE TO H2 ANALYZER B ISOLATION	FH	67'-0"	Y	n/a	
688	SP-SOV-509	31, 33, 34 FAN COOLER UNITS SAMPLE TO H2 ANALYZER B	FH	67'-0"	Y	n/a	
689	SP-SOV-510	H2 ANALYZER A SAMPLE RETURN TO CONTAINMENT FIRST ISO	FH	67'-0"	Y	n/a	
690	SP-SOV-511	H2 ANALYZER A SAMPLE RETURN TO CONTAINMENT SECOND IS	FH	67'-0"	Y	n/a	
691	SP-SOV-512	32 FAN COOLER UNIT SAMPLE TO H2 ANALYZER A ISOLATION	PAB	55'-0"	Y	n/a	
692	SP-SOV-513	35 FAN COOLER UNIT SAMPLE TO H2 ANALYZER A ISOLATION	FH	67'-0"	Y	n/a	
693	SP-SOV-514	32 AND 35 FAN COOLER UNITS SAMPLE TO H2 ANALYZER A H	FH	67'-0"	Y	n/a	
694	SP-SOV-515	H2 ANALYZER B SAMPLE RETURN TO CONTAINMENT FIRST ISO	FH	67'-0"	Y	n/a	
695	SP-SOV-956H	ACC SAMPLE LINE ISOLATION VALVES & IVSWS SOLENOID	PP	51'-0"	Y	n/a	
696	SUPERVISORY PANEL	SUPERVISORY PANEL	CB	53'-0"	Y	0.52	x
697	SWGR31	480VAC SWGR 31 (BUS 2A AND BUS 5A)	CB	15'-0"	Y	0.67	x
698	SWGR32	480VAC SWGR 32 (BUS 3A & BUS 6A)	CB	15'-0"	Y	0.67	x
699	SWN CLC 31 HTX	ESSENTIAL CLOSED LOOP COOLING 31 HEAT EXCHANGER	CB	15'-0"	Y	R	
700	SWN CLC 32 HTX	ESSENTIAL CLOSED LOOP COOLING 32 HEAT EXCHANGER	CB	15'-0"	Y	R	
701	SWN-2-1	SERVICE WATER PUMP NO.31 DISCHARGE ISOLATION VALVE	IS	5'9"	Y	n/a	
702	SWN-2-2	SERVICE WATER PUMP NO.32 DISCHARGE ISOLATION VALVE	IS	5'9"	Y	n/a	
703	SWN-2-3	SERVICE WATER PUMP NO.33 DISCHARGE ISOLATION VALVE	IS	5'9"	Y	n/a	
704	SWN-2-4	SERVICE WATER PUMP NO.34 DISCHARGE ISOLATION VALVE	IS	5'9"	Y	n/a	
705	SWN-2-5	SERVICE WATER PUMP NO.35 DISCHARGE ISOLATION VALVE	IS	5'9"	Y	n/a	
706	SWN-2-6	SERVICE WATER PUMP NO.36 DISCHARGE ISOLATION VALVE	IS	5'9"	Y	n/a	
707	SWN-28-1	31 IA CLOSED COOLING HX OUTLET ISOLATION	CB	15'-0"	Y	n/a	
708	SWN-28-2	32 IA CLOSED COOLING HX OUTLET ISOLATION	CB	15'-0"	Y	n/a	
709	SWN-29	D.G.HEADER SUPPLY INLET ISOL FROM SWP'S 34,35,36 DSC	DGB	15'-0"	Y	n/a	
710	SWN-31	CCW HX'S SUPPLY FROM SWP'S 31, 32 & 33	PAB	41'-0	Y	n/a	
711	SWN-33-1	CCW HX SUPPLY CROSS TIE	PAB	41'-0"	Y	n/a	
712	SWN-33-2	CCW HX SUPPLY CROSS TIE	PAB	41'-0"	Y	n/a	
713	SWN-34-1	31 CCW HX INLET ISOLATION	PAB	55'-0"	Y	n/a	
714	SWN-34-2	32 CCW HX INLET ISOLATION	PAB	55'-0"	Y	n/a	
715	SWN-35-1	31 CCW HX OUTLET ISOLATION	PAB	73'-0"	Y	n/a	
716	SWN-35-2	32 CCW HX OUTLET ISOLATION	PAB	73'-0"	Y	n/a	
717	SWN-38	FCU'S SUPPLY FROM SWP'S 34, 35, 36 ISOLATION	PAB	34'-0"	Y	n/a	
718	SWN-40-1	FCU HEADER CROSS TIE ISOLATION	FH	54'-0"	Y	n/a	
719	SWN-40-2	FCU HEADER CROSS TIE ISOLATION	FH	54'-0"	Y	n/a	
720	SWN-41-1	31 FCU SUPPLY ISOLATION	FH	54'-0"	Y	n/a	
721	SWN-41-2	32 FCU SUPPLY ISOLATION	FH	54'-0"	Y	n/a	

Table 3A.10
Summary of Seismic PRA Equipment

722	SWN-41-3	33 FCU SUPPLY ISOLATION	FH	54'-0"	Y	n/a	
723	SWN-41-4	34 FCU SUPPLY ISOLATION	FH	54'-0"	Y	n/a	
724	SWN-41-5	35 FCU SUPPLY ISOLATION	FH	54'-0"	Y	n/a	
725	SWN-44-1	31 FCU OUTLET ISOLATION	FH	72'-0"	Y	n/a	
726	SWN-44-2	32 FCU OUTLET ISOLATION	FH	72'-0"	Y	n/a	
727	SWN-44-3	33 FCU OUTLET ISOLATION	FH	72'-0"	Y	n/a	
728	SWN-44-4	34 FCU OUTLET ISOLATION	FH	72'-0"	Y	n/a	
729	SWN-44-5	35 FCU OUTLET ISOLATION	FH	72'-0"	Y	n/a	
730	SWN-55	DG COOLER RET HEADER METERING VALVE	DGB	15'-0"	Y	n/a	
731	SWN-62-2	31 D.G. SUPPLY HEADER FROM SWP'S 34,35,36 COOLER INL	DGB	15'-0"	Y	n/a	
732	SWN-62-4	32 D.G. SUPPLY HEADER FROM SWP'S 34,35,36 COOLER INL	DGB	15'-0"	Y	n/a	
733	SWN-62-6	33 D.G. SUPPLY HEADER FROM SWP'S 34,35,36 COOLER INL	DGB	15'-0"	Y	n/a	
734	SWN-66-1	31 JACKET WATER COOLER OUTLET FLEXIBLE CONNECTION	DGB	19'-0"	Y	n/a	
735	SWN-66-3	32 JACKET WATER COOLER OUTLET FLEXIBLE CONNECTION	DGB	19'-0"	Y	n/a	
736	SWN-66-5	33 JACKET WATER COOLER OUTLET FLEXIBLE CONNECTION	DGB	19'-0"	Y	n/a	
737	SWN-70-1	31 IA CLOSED COOLING HX SUPPLY ISOLATION FROM 34, 35	CB	15'-0"	Y	n/a	
738	SWN-70-2	32 IA CLOSED COOLING HX SUPPLY ISOLATION FROM 34, 35	CB	15'-0"	Y	n/a	
739	SWN-TC-1113	INST AIR CC HX SW OUTLET TC	CB	15'-0"	Y	R	x
740	SWN-TCV-1103	CFCU OUTLET CONTROL VLV	PP	35'-0"	Y	n/a	x
741	SWN-TCV-1104	CFCU OUTLET BYPASS VLV	PP	35'-0"	Y	n/a	x
742	SWN-TCV-1105	CFCU OUTLET BYPASS VLV	PP	35'-0"	Y	n/a	x
743	SWN-TCV-1113	INST AIR CC HX SW OUTLET TCV	CB	15'-0"	Y	n/a	x
744	SWP31-STRNR-AUTO	SERVICE WATER PUMP 31 DISCHARGE STRAINER	IS	6'-0"	Y	R	
745	SWP32-STRNR-AUTO	SERVICE WATER PUMP 32 DISCHARGE STRAINER	IS	6'-0"	Y	R	
746	SWP33-STRNR-AUTO	SERVICE WATER PUMP 33 DISCHARGE STRAINER	IS	6'-0"	Y	R	
747	SWP34-STRNR-AUTO	SERVICE WATER PUMP 34 DISCHARGE STRAINER	IS	6'-0"	Y	R	
748	SWP35-STRNR-AUTO	SERVICE WATER PUMP 35 DISCHARGE STRAINER	IS	6'-0"	Y	R	
749	SWP36-STRNR-AUTO	SERVICE WATER PUMP 36 DISCHARGE STRAINER	IS	6'-0"	Y	R	
750	T1	A/C UNIT 31/32 THERMOSTAT	CB	53'-0"	Y	n/a	x
751	TB X32	RELAY TERMINAL BOX	AFPB	18'-6"	Y	R	x
752	TB Y2I	RELAY TERMINAL BOX	ET	34'-0"	Y	R	x
753	TCV-130	NON REGEN HX OUTLET TCV	PAB	73'-0"	Y	n/a	x
754	TE-122	EXCESS LETDOWN TEMP ELEMENT	VC	46'-0"	Y	n/a	x
755	TE-126	REGEN HX CHG FLOW TEMP ELEMENT	VC	46'-0"	Y	n/a	x
756	TE-127	REGEN HX CHG FLOW TEMPERATURE ELEMENT	VC	46'-0"	Y	n/a	x
757	TE-130	NON REGHX OUTLET LETDOWN TEMP ELEMENT	PAB	73'-0"	Y	n/a	x
758	TE-1313	UPPER TAP COMPENSATION TEMP ELEMENT	VC	83'-9"	Y	n/a	x
759	TE-1314	UPPER TAP COMPENSATION TEMP ELEMENT	VC	74'-0"	Y	n/a	x

Table 3A.10

Summary of Seismic PRA Equipment

760	TE-1317	RVWL CONDUIT COMPENSATION TEMP ELEMENT	VC	40'-0"	Y	n/a		x
761	TE-1318	RVWL CONDUIT COMPENSATION	VC	46'-0"	Y	n/a		x
762	TE-1319	RVWL LOWER TAP CAPILLARY TEMP ELEMENT	VC	60'-0"	Y	n/a		x
763	TE-1323	UPPER TAP COMPENSATION TEMP ELEMENT	VC	84'-6"	Y	n/a		x
764	TE-1324	UPPER TAP COMPENSATION TEMP ELEMENT	VC	74'-0"	Y	n/a		x
765	TE-1327	RVWL CONDUIT COMPENSATION TEMP ELEMENT	VC	40'-0"	Y	n/a		x
766	TE-1328	RVWL CONDUIT COMPENSATION TEMP ELEMENT	VC	46'-0"	Y	n/a		x
767	TE-1329	RVWL LOWER TAP CAPILLARY TEMP ELEMENT	VC	60'-0"	Y	n/a		x
768	TE-411A1	RCS LOOP 31 HOT LEG TEMP ELEMENT	VC	55'-0"	Y	n/a		x
769	TE-411A2	RCS LOOP 31 HOT LEG TEMP ELEMENT	VC	55'-0"	Y	n/a		x
770	TE-411A3	RCS LOOP 31 HOT LEG TEMP ELEMENT	VC	55'-0"	Y	n/a		x
771	TE-411B	RCS LOOP 31 COLD LEG TEMP ELEMENT	VC	46'-0"	N	n/a		x
772	TE-413A	RCS LOOP 31 HOT LEG WIDE RANGE TEMP ELEMENT	VC	46'-0"	Y	n/a		x
773	TE-413B	RCS LOOP 31 COLD LEG TEMP ELEMENT	VC	46'-0"	Y	n/a		x
774	TE-421A1	RCS LOOP 32 HOT LEG TEMP ELEMENT	VC	55'-0"	Y	n/a		x
775	TE-421A2	RCS LOOP 32 HOT LEG TEMP ELEMENT	VC	55'-0"	Y	n/a		x
776	TE-421A3	RCS LOOP 32 HOT LEG TEMP ELEMENT	VC	55'-0"	Y	n/a		x
777	TE-421B	RCS LOOP 32 COLD LEG TEMP ELEMENT	VC	46'-0"	Y	n/a		x
778	TE-423A3	RCS LOOP 32 HOT LEG WIDE RANGE TEMP ELEMENT	VC	46'-0"	Y	n/a		x
779	TE-423B	RCS LOOP 32 COLD LEG TEMP ELEMENT	VC	46'-0"	Y	n/a		x
780	TE-431A1	RCS LOOP 33 HOT LEG TEMP ELEMENT	VC	55'-0"	Y	n/a		x
781	TE-431A2	RCS LOOP 33 HOT LEG TEMP ELEMENT	VC	55'-0"	Y	n/a		x
782	TE-431A3	RCS LOOP 33 HOT LEG TEMP ELEMENT	VC	55'-0"	Y	n/a		x
783	TE-431B	RCS LOOP 33 COLD LEG TEMP ELEMENT	VC	46'-0"	Y	n/a		x
784	TE-433A	RCS LOOP 33 HOT LEG WIDE RANGE TEMP ELEMENT	VC	46'-0"	Y	n/a		x
785	TE-433B	RCS LOOP 33 COLD LEG TEMP ELEMENT	VC	46'-0"	Y	n/a		x
786	TE-441A1	RCS LOOP 34 HOT LEG TEMP ELEMENT	VC	55'-0"	Y	n/a		x
787	TE-441A2	RCS LOOP 34 HOT LEG TEMP ELEMENT	VC	55'-0"	Y	n/a		x
788	TE-441A3	RCS LOOP 34 HOT LEG TEMP ELEMENT	VC	55'-0"	Y	n/a		x
789	TE-441B	RCS LOOP 34 COLD LEG TEMP ELEMENT	VC	46'-0"	Y	n/a		x
790	TE-443A	RCS LOOP 34 HOT LEG WIDE RANGE TEMP ELEMENT	VC	46'-0"	Y	n/a		x
791	TE-443B	RCS LOOP 34 COLD LEG TEMP ELEMENT	VC	46'-0"	Y	n/a		x
792	TE-453	PRESSURIZER LIQUID SPACE TEMP ELEMENT	VC	73'-0"	Y	n/a		x
793	TE-454	PRESSURIZER STEAM SPACE TEMP ELEMENT	VC	117'-0	Y	n/a		x
794	TE-471	PRT TEMP ELEMENT	VC	46'-0"	Y	n/a		x
795	TE-636	RHR HX TEMP INLET TEMP ELEMENT	PAB	15'-0"	Y	n/a		x
796	TE-639	RHR HX 31 OUTLET TEMP ELEMENT	VC	68'-0"	Y	n/a		x
797	TE-641	RHR HX 32 OUTLET TEMP ELEMENT	VC	46'-0"	Y	n/a		x

Table 3A.10
Summary of Seismic PRA Equipment

798	TSC UPS BUS	AMSAC BUS	AB	15	N	0 22	
799	VS-PCV-1234	RAD MONITORS R-11 & R-12 CONTAINMENT ISOLATION VLV	FH	61'-0"	Y	n/a	
800	VS-PCV-1235	RAD MONITORS R-11 & R-12 CONTAINMENT ISOLATION VLV	FH	61'-0"	Y	n/a	
801	VS-PCV-1236	RAD MONITORS R-11 & R-12 CONTAINMENT ISOLATION VLV	FH	61'-0"	Y	n/a	
802	VS-PCV-1237	RAD MONITORS R-11 & R-12 CONTAINMENT ISOLATION VLV	FH	61'-0"	Y	n/a	
803	VS-SOV-1294	AIR SUPPLY SOL VALVE FOR FCU 31 DAMPER C	VC	68'-0"	Y	n/a	
804	VS-SOV-1297	AIR SUPPLY SOL VALVE FOR FCU 32 DAMPER C	VC	68'-0"	Y	n/a	
805	VS-SOV-1298	AIR SUPPLY SOL VALVE FOR FCU 32 DAMPER D AND DOOR	VC	68'-0"	Y	n/a	
806	VS-SOV-1300	AIR SUPPLY SOL VALVE FOR FCU 33 DAMPER C	VC	68'-0"	Y	n/a	
807	VS-SOV-1301	AIR SUPPLY SOL VALVE FOR FCU 33 DAMPER D AND DOOR	VC	68'-0"	Y	n/a	
808	VS-SOV-1303	AIR SUPPLY SOL VALVE FOR FCU 34 DAMPER C	VC	68'-0"	Y	n/a	
809	VS-SOV-1304	AIR SUPPLY SOL VALVE FOR FCU 34 DAMPER D AND DOOR	VC	68'-0"	Y	n/a	
810	VS-SOV-1306	AIR SUPPLY SOL VALVE FOR FCU 35 DAMPER C	VC	68'-0"	Y	n/a	
811	VS-SOV-1307	AIR SUPPLY SOL VALVE FOR FCU 35 DAMPER D AND DOOR	VC	68'-0"	Y	n/a	
812	WD-AOV-1610	RCDT N2 HEADER ISOLATION	PAB	63'-0"	Y	n/a	
813	WD-AOV-1702	RCDT PUMPS DISCHARGE ISOLATION	PP	41'-0"	Y	n/a	
814	WD-AOV-1705	RCDT PUMPS DISCHARGE ISOLATION	PP	41'-0"	Y	n/a	
815	WD-AOV-1723	CONTAINMENT SUMP PUMPS ISOLATION	PP	41'-0"	Y	n/a	
816	WD-AOV-1728	CONTAINMENT SUMP PUMPS ISOLATION	PP	41'-0"	Y	n/a	
817	WD-AOV-1786	CONTAINMENT VENT HEADER ISOLATION	PP	51'-0"	Y	n/a	
818	WD-AOV-1787	CONTAINMENT VENT HEADER ISOLATION	PP	51'-0"	Y	n/a	
819	WD-AOV-1788	RCDT GAS ANALYZER SAMPLE ISOLATION VALVE	PP	51'-0"	Y	n/a	
820	WD-AOV-1789	RCDT GAS ANALYZER SAMPLE ISOLATION VALVE	PP	51'-0"	Y	n/a	

Figure 3A.1
Best Estimate Analysis - System Fragilities

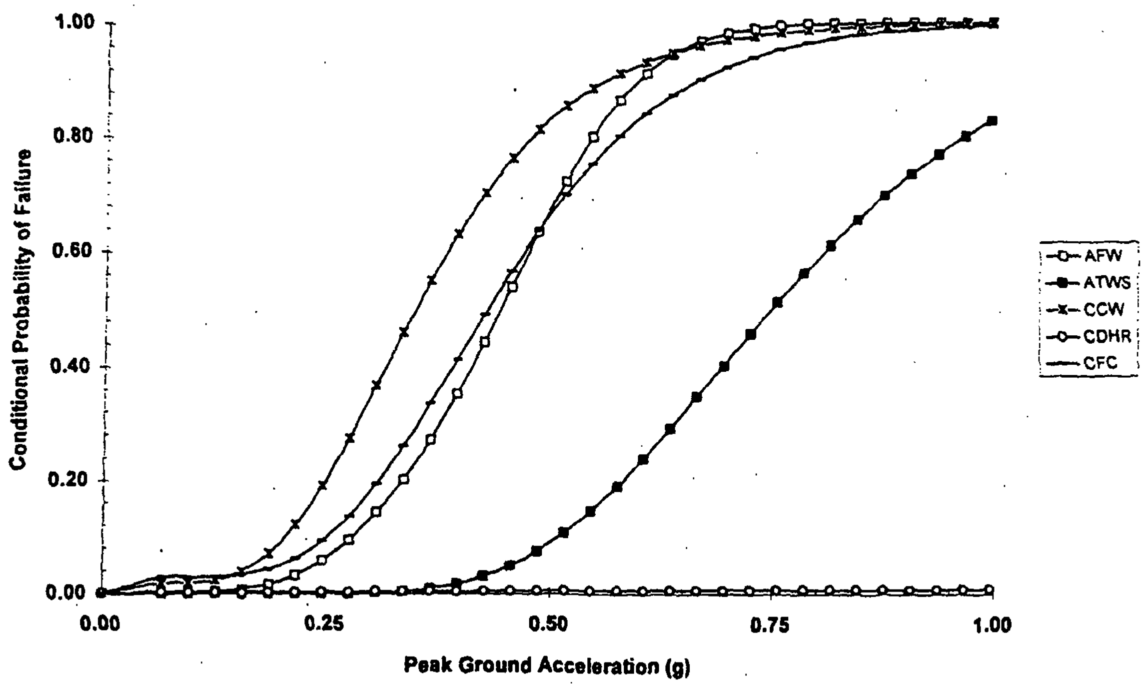


Figure 3A.2
Best Estimate Analysis - System Fragilities

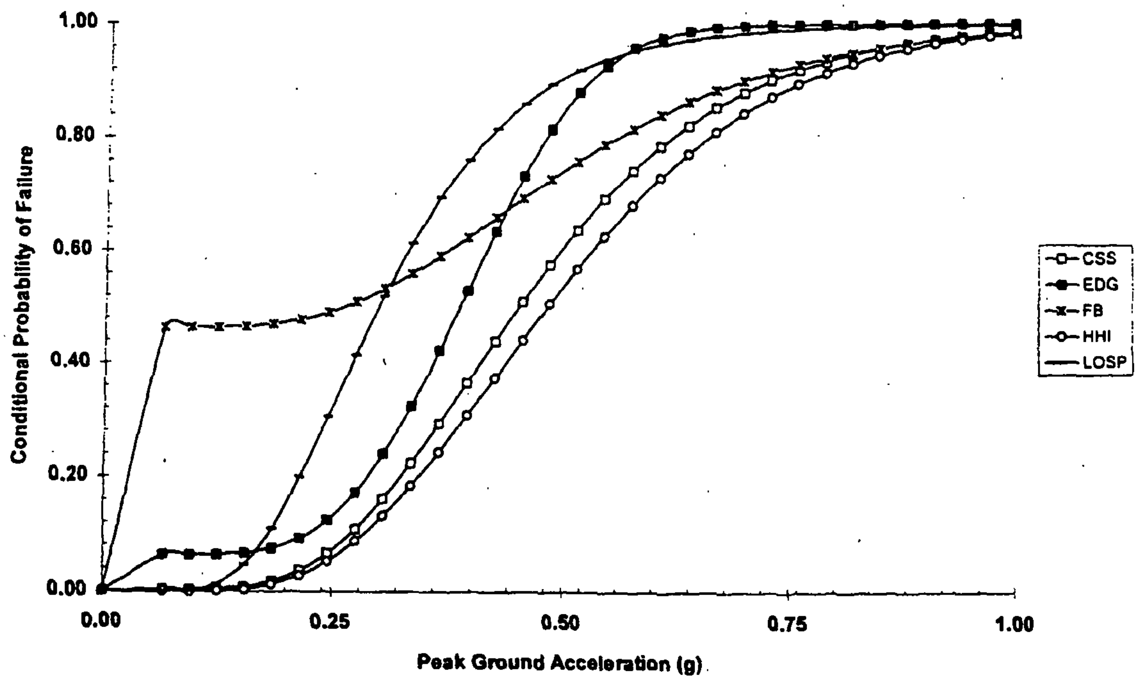
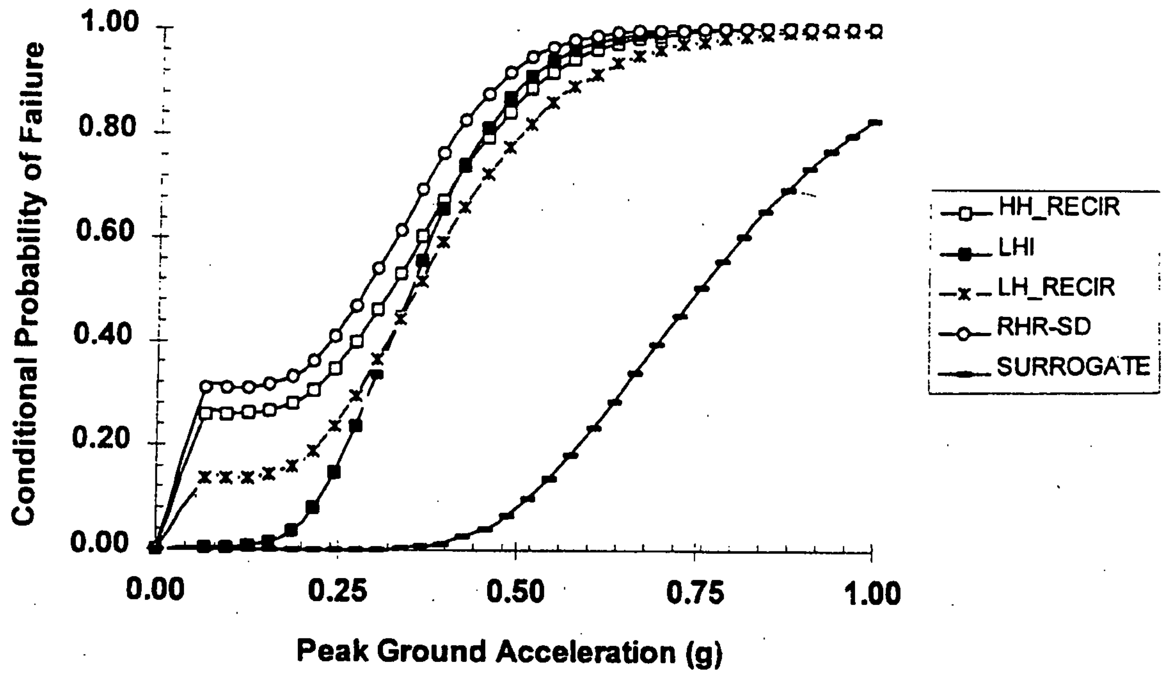


Figure 3A.3
Best Estimate Analysis - System Fragilities



APPENDIX 3B

CUT SETS FOR DOMINANT SEISMIC ACCIDENT SEQUENCES

CONTENTS

S_8_CD DOMINANT CORE DAMAGE ACCIDENT SEQUENCE

TERM NUMBER	CUT SET LISTING			
1	EQ_T1	FLAG-S_8_CD	ZBATT-313234-88G	
2	EQ_T1	FLAG-S_8_CD	ZCB-EXFAN-116G	
3	EQ_T1	FLAG-S_8_CD	ZDC1-BATCHR-51G	
4	EQ_T1	FLAG-S_8_CD	ZDGBAOD-75G	
5	EQ_T1	FLAG-S_8_CD	ZEDG-DAYTNK-75G	
6	EQ_T1	FLAG-S_8_CD	ZEDG-JACTNK-75G	
7	EQ_T1	FLAG-S_8_CD	ZEDG-STOTNK-75G	
8	EQ_T1	FLAG-S_8_CD	ZEDGART-75G	
9	EQ_T1	FLAG-S_8_CD	ZEDGS-116G	
10	EQ_T1	FLAG-S_8_CD	ZEDGS-PNL-AN-88G	
11	EQ_T1	FLAG-S_8_CD	ZEDGXTR-99G	
12	EQ_T1	FLAG-S_8_CD	ZMCC36AB-AN-62G	
13	EQ_T1	FLAG-S_8_CD	ZMCC39-AN-90G	
14	EQ_T1	FLAG-S_8_CD	ZSWGR3132-AN-67G	
15	EQ_T1	FLAG-S_8_CD	ZSWSPUMPS-69G	
16	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZCCR-RACKS-67G
17	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
18	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
19	EDG-MAI-MA-EDG32	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
20	EDG-MAI-MA-EDG33	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
21	EDG-ENG-FR-DG32R	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
22	EDG-ENG-FR-DG33R	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
23	DC1-MAI-MA-BCC31	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
24	DC1-MAI-MA-BCC32	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
25	EDG-XHE-RE-32RHE	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
26	EDG-XHE-RE-33RHE	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
27	DGV-RCK-NO-DV318	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
28	AC4-RCK-NO-BCH37	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
29	EDG-RCK-NO-FOT32	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
30	AC4-RCK-NO-BCH39	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
31	EDG-RCK-NO-FOT33	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
32	EDG-MDP-FR-FOT32	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G

33	EDG-MDP-FR-FOT33	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
34	DGV-CCF-HW-DG32F	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
35	DGV-CCF-HW-DG33F	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
36	EDG-MDP-FS-FOT32	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
37	EDG-MDP-FS-FOT33	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
38	AC4-CRB-CC-52-6A	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
39	AC4-CRB-CC-6A5AZ	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
40	AC4-CRB-OO-52E2Z	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
41	AC4-CRB-CC-52-5A	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
42	AC4-CRB-OO-52E3Z	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
43	AC4-RCS-OO-32CVX	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
44	EDG-RCS-OO-D32CV	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
45	EDG-RCS-OO-336A1	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
46	AC4-RCS-OO-33CVX	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
47	EDG-RCS-OO-D33CV	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
48	EDG-RCS-OO-335A1	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
49	EDG-RCS-CC-32CVX	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
50	EDG-RCS-CC-D32K1	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
51	EDG-RCS-CC-32NST	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
52	EDG-RCS-CC-33CVX	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
53	EDG-RCS-CC-D33K1	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
54	EDG-RCS-CC-33NST	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
55	EDG-ENG-FS-D32SZ	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
56	EDG-ENG-FS-D33SZ	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
57	DGV-CCF-HW-DG32L	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
58	DGV-CCF-HW-DG32D	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
59	DGV-CCF-HW-DG33L	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
60	DGV-CCF-HW-DG33D	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
61	DC1-BCC-HW-BC32Z	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
62	DC1-BAT-HW-BT32Z	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
63	DC1-BCC-HW-BC31Z	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
64	DC1-BAT-HW-BT31Z	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
65	EDG-STR-PG-DG32F	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
66	EDG-STR-PG-DG33F	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
67	AC4-BAC-ST-C36AZ	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
68	AC4-BAC-ST-C36BZ	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
69	AC4-BAC-ST-BS6AZ	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G

70	AC4-BAC-ST-CC37Z	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
71	AC4-BAC-ST-BS5AZ	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
72	EQ_T1	FLAG-S_8_CD	SWS-XVM-OC-62-4	ZMCC36C-AN-86G
73	EQ_T1	FLAG-S_8_CD	SWS-XVM-OC-67-2	ZMCC36C-AN-86G
74	EQ_T1	FLAG-S_8_CD	SWS-XVM-OC-62-6	ZMCC36C-AN-86G
75	EQ_T1	FLAG-S_8_CD	SWS-XVM-OC-67-3	ZMCC36C-AN-86G
76	EDG-RCS-OC-33OSS	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
77	EDG-RCS-OC-86EG2	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
78	EDG-RCS-OC-32OCR	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
79	EDG-RCS-OC-32OCT	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
80	EDG-RCS-OC-32OSR	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
81	EDG-RCS-OC-32OSS	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
82	AC4-RCS-OC-866A	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
83	AC4-RCS-OC-OTS6A	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
84	EDG-RCS-OC-3286X	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
85	EDG-RCS-OC-32SDR	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
86	EDG-RCS-OC-86EG3	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
87	EDG-RCS-OC-33OCR	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
88	EDG-RCS-OC-33OCT	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
89	EDG-RCS-OC-33OSR	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
90	AC4-RCS-OC-865A	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
91	AC4-RCS-OC-OTS5A	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
92	EDG-RCS-OC-3386X	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
93	EDG-RCS-OC-33SDR	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
94	EDG-MSW-OC-32STP	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
95	AC4-MSW-CO-CREG2	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
96	AC4-MSW-CO-CREG3	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
97	EDG-MSW-OC-33STP	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
98	DGV-RCS-CO-D32AR	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
99	DGV-RCS-CO-D33AR.	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
100	AC4-RCS-CO-866A	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
101	EDG-RCS-CO-D32RR	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
102	AC4-RCS-CO-865A	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
103	EDG-RCS-CO-D33RR	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
104	AC4-ASW-OC-OTS6A	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
105	EDG-ASW-OC-32PS3	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
106	AC4-ASW-OC-OTS5A	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G

107	EDG-ASW-OC-33PS3	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
108	DC1-SBR-CO-D3131	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
109	DC1-SBR-CO-D3114	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
110	DC1-SBR-CO-BT32Z	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
111	DC1-SBR-CO-BAT31	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
112	DC1-SBR-CO-D3210	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
113	DC1-BDC-ST-DP-31	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
114	DC1-BDC-ST-PP-32	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
115	DC1-BDC-ST-PP-31	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
116	DC1-BDC-ST-DP-32	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
117	DC1-FUS-NO-D3310	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
118	DC1-FUS-NO-BT32Z	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
119	DC1-FUS-NO-EG2NG	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
120	DC1-FUS-NO-EG2PS	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
121	DC1-FUS-NO-BT31Z	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
122	DC1-FUS-NO-D3311	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
123	DC1-FUS-NO-D3210	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
124	DC1-FUS-NO-EG3PS	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
125	DC1-FUS-NO-EG3NG	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
126	DC1-FUS-NO-D3211	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
127	EDG-LSW-OO-1209S	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
128	EDG-LSW-OC-1208S	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
129	EDG-LSW-OO-1205S	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
130	EDG-LSW-OO-1208S	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
131	EDG-LSW-OC-1209S	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
132	EDG-LSW-OO-1206S	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
133	EDG-LCV-OC-1208A	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
134	EDG-LCV-OC-1209A	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
135	EDG-PSW-OC-32OPS	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
136	EDG-PSW-OC-33OPS	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
137	EDG-MSW-CO-32FP2	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
138	EDG-MSW-CO-33FP3	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
139	DC1-MSW-CO-D3232	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
140	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
141	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
142	EDG-MAI-MA-EDG32	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
143	EDG-MAI-MA-EDG33	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G

144	EDG-ENG-FR-DG32R	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
145	EDG-ENG-FR-DG33R	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
146	DC1-MAI-MA-BCC31	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
147	DC1-MAI-MA-BCC32	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
148	EDG-XHE-RE-32RHE	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
149	EDG-XHE-RE-33RHE	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
150	DGV-RCK-NO-DV318	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
151	AC4-RCK-NO-BCH37	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
152	EDG-RCK-NO-FOT32	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
153	AC4-RCK-NO-BCH39	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
154	EDG-RCK-NO-FOT33	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
155	EDG-MDP-FR-FOT32	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
156	EDG-MDP-FR-FOT33	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
157	DGV-CCF-HW-DG32F	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
158	DGV-CCF-HW-DG33F	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
159	EDG-MDP-FS-FOT32	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
160	EDG-MDP-FS-FOT33	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
161	AC4-CRB-CC-52-6A	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
162	AC4-CRB-CC-6A5AZ	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
163	AC4-CRB-OO-52E2Z	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
164	AC4-CRB-CC-52-5A	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
165	AC4-CRB-OO-52E3Z	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
166	AC4-RCS-OO-32CVX	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
167	EDG-RCS-OO-D32CV	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
168	EDG-RCS-OO-336A1	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
169	AC4-RCS-OO-33CVX	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
170	EDG-RCS-OO-D33CV	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
171	EDG-RCS-OO-335A1	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
172	EDG-RCS-CC-32CVX	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
173	EDG-RCS-CC-D32K1	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
174	EDG-RCS-CC-32NST	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
175	EDG-RCS-CC-33CVX	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
176	EDG-RCS-CC-D33K1	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
177	EDG-RCS-CC-33NST	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
178	EDG-ENG-FS-D32SZ	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
179	EDG-ENG-FS-D33SZ	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
180	DGV-CCF-HW-DG32L	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G

181	DGV-CCF-HW-DG32D	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
182	DGV-CCF-HW-DG33L	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
183	DGV-CCF-HW-DG33D	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
184	DC1-BCC-HW-BC32Z	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
185	DC1-BAT-HW-BT32Z	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
186	DC1-BCC-HW-BC31Z	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
187	DC1-BAT-HW-BT31Z	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
188	EDG-STR-PG-DG32F	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
189	EDG-STR-PG-DG33F	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
190	AC4-BAC-ST-C36BZ	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
191	AC4-BAC-ST-BS6AZ	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
192	AC4-BAC-ST-CC37Z	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
193	AC4-BAC-ST-C36AZ	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
194	AC4-BAC-ST-BS5AZ	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
195	EQ_T1	FLAG-S_8_CD	SWS-XVM-OC-62-4	ZSUPPANEL-AN-52G
196	EQ_T1	FLAG-S_8_CD	SWS-XVM-OC-67-2	ZSUPPANEL-AN-52G
197	EQ_T1	FLAG-S_8_CD	SWS-XVM-OC-62-6	ZSUPPANEL-AN-52G
198	EQ_T1	FLAG-S_8_CD	SWS-XVM-OC-67-3	ZSUPPANEL-AN-52G
199	EDG-RCS-OC-33SDR	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
200	EDG-RCS-OC-86EG2	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
201	EDG-RCS-OC-32OCR	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
202	EDG-RCS-OC-32OCT	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
203	EDG-RCS-OC-32OSR	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
204	EDG-RCS-OC-32OSS	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
205	AC4-RCS-OC-866A	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
206	AC4-RCS-OC-OTS6A	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
207	EDG-RCS-OC-3286X	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
208	EDG-RCS-OC-32SDR	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
209	AC4-RCS-OC-865A	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
210	EDG-RCS-OC-86EG3	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
211	EDG-RCS-OC-33OCR	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
212	EDG-RCS-OC-33OCT	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
213	EDG-RCS-OC-33OSR	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
214	EDG-RCS-OC-33OSS	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
215	AC4-RCS-OC-OTS5A	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
216	EDG-RCS-OC-3386X	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
217	EDG-MSW-OC-32STP	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G

218	AC4-MSW-CO-CREG2	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
219	AC4-MSW-CO-CREG3	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
220	EDG-MSW-OC-33STP	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
221	DGV-RCS-CO-D32AR	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
222	DGV-RCS-CO-D33AR	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
223	AC4-RCS-CO-866A	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
224	EDG-RCS-CO-D32RR	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
225	AC4-RCS-CO-865A	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
226	EDG-RCS-CO-D33RR	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
227	AC4-ASW-OC-OTS6A	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
228	EDG-ASW-OC-32PS3	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
229	AC4-ASW-OC-OTS5A	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
230	EDG-ASW-OC-33PS3	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
231	DC1-SBR-CO-D3131	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
232	DC1-SBR-CO-D3114	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
233	DC1-SBR-CO-D3210	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
234	DC1-SBR-CO-BT32Z	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
235	DC1-SBR-CO-BAT31	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
236	DC1-BDC-ST-DP-31	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
237	DC1-BDC-ST-PP-32	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
238	DC1-BDC-ST-PP-31	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
239	DC1-BDC-ST-DP-32	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
240	DC1-FUS-NO-D3310	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
241	DC1-FUS-NO-BT31Z	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
242	DC1-FUS-NO-BT32Z	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
243	DC1-FUS-NO-EG2PS	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
244	DC1-FUS-NO-EG2NG	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
245	DC1-FUS-NO-EG3NG	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
246	DC1-FUS-NO-D3311	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
247	DC1-FUS-NO-EG3PS	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
248	DC1-FUS-NO-D3211	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
249	DC1-FUS-NO-D3210	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
250	EDG-LSW-OO-1206S	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
251	EDG-LSW-OC-1208S	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
252	EDG-LSW-OO-1205S	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
253	EDG-LSW-OO-1208S	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
254	EDG-LSW-OC-1209S	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G

255	EDG-LSW-OO-1209S	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G	
256	EDG-LCV-OC-1208A	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G	
257	EDG-LCV-OC-1209A	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G	
258	EDG-PSW-OC-32OPS	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G	
259	EDG-PSW-OC-33OPS	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G	
260	DC1-MSW-CO-D3232	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G	
261	EDG-MSW-CO-32FP2	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G	
262	EDG-MSW-CO-33FP3	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G	
263	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
264	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
265	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
266	EDG-MAI-MA-EDG32	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
267	EDG-MAI-MA-EDG33	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
268	EDG-ENG-FR-DG32R	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
269	EDG-ENG-FR-DG33R	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
270	DC1-MAI-MA-BCC31	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
271	EDG-XHE-RE-33RHE	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
272	DC1-MAI-MA-BCC32	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
273	EDG-XHE-RE-32RHE	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
274	EDG-RCK-NO-FOT33	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
275	DGV-RCK-NO-DV318	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
276	AC4-RCK-NO-BCH37	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
277	EDG-RCK-NO-FOT32	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
278	AC4-RCK-NO-BCH39	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
279	EDG-MDP-FR-FOT33	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
280	EDG-MDP-FR-FOT32	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
281	DGV-CCF-HW-DG32F	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
282	DGV-CCF-HW-DG33F	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
283	EDG-MDP-FS-FOT32	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
284	EDG-MDP-FS-FOT33	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
285	AC4-CRB-CC-52-6A	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
286	AC4-CRB-CC-6A5AZ	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
287	AC4-CRB-OO-52E2Z	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
288	AC4-CRB-CC-52-5A	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
289	AC4-CRB-OO-52E3Z	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
290	EDG-RCS-OO-335A1	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
291	AC4-RCS-OO-32CVX	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G

292	EDG-RCS-OO-D32CV	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
293	EDG-RCS-OO-336A1	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
294	AC4-RCS-OO-33CVX	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
295	EDG-RCS-OO-D33CV	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
296	EDG-RCS-CC-32CVX	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
297	EDG-RCS-CC-D32K1	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
298	EDG-RCS-CC-32NST	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
299	EDG-RCS-CC-33CVX	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
300	EDG-RCS-CC-D33K1	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
301	EDG-RCS-CC-33NST	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
302	EDG-ENG-FS-D33SZ	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
303	EDG-ENG-FS-D32SZ	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
304	DGV-CCF-HW-DG32D	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
305	DGV-CCF-HW-DG32L	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
306	DGV-CCF-HW-DG33L	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
307	DGV-CCF-HW-DG33D	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
308	DC1-BCC-HW-BC32Z	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
309	DC1-BAT-HW-BT32Z	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
310	DC1-BCC-HW-BC31Z	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
311	DC1-BAT-HW-BT31Z	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
312	EDG-STR-PG-DG32F	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
313	EDG-STR-PG-DG33F	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
314	AC4-BAC-ST-C36BZ	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
315	AC4-BAC-ST-BS6AZ	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
316	AC4-BAC-ST-CC37Z	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
317	AC4-BAC-ST-C36AZ	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
318	AC4-BAC-ST-BS5AZ	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
319	EQ_T1	FLAG-S_8_CD	SWS-XVM-OC-62-4	ZBATT33-AN-121G	ZCHRG33-AN-129G
320	EQ_T1	FLAG-S_8_CD	SWS-XVM-OC-67-2	ZBATT33-AN-121G	ZCHRG33-AN-129G
321	EQ_T1	FLAG-S_8_CD	SWS-XVM-OC-62-6	ZBATT33-AN-121G	ZCHRG33-AN-129G
322	EQ_T1	FLAG-S_8_CD	SWS-XVM-OC-67-3	ZBATT33-AN-121G	ZCHRG33-AN-129G
323	AC4-RCS-OC-865A	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
324	EDG-RCS-OC-86EG2	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
325	EDG-RCS-OC-32OCR	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
326	EDG-RCS-OC-32OSR	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
327	EDG-RCS-OC-32OSS	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
328	AC4-RCS-OC-866A	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G

329	AC4-RCS-OC-OTS6A	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
330	EDG-RCS-OC-3286X	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
331	EDG-RCS-OC-32SDR	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
332	EDG-RCS-OC-32OCT	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
333	EDG-RCS-OC-86EG3	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
334	EDG-RCS-OC-33OCR	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
335	EDG-RCS-OC-33OCT	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
336	EDG-RCS-OC-33OSR	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
337	EDG-RCS-OC-33OSS	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
338	AC4-RCS-OC-OTS5A	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
339	EDG-RCS-OC-3386X	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
340	EDG-RCS-OC-33SDR	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
341	EDG-MSW-OC-32STP	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
342	AC4-MSW-CO-CREG2	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
343	AC4-MSW-CO-CREG3	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
344	EDG-MSW-OC-33STP	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
345	DGV-RCS-CO-D32AR	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
346	DGV-RCS-CO-D33AR	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
347	EDG-RCS-CO-D32RR	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
348	AC4-RCS-CO-866A	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
349	AC4-RCS-CO-865A	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
350	EDG-RCS-CO-D33RR	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
351	EDG-ASW-OC-32PS3	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
352	AC4-ASW-OC-OTS5A	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
353	AC4-ASW-OC-OTS6A	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
354	EDG-ASW-OC-33PS3	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
355	DC1-SBR-CO-D3131	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
356	DC1-SBR-CO-D3114	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
357	DC1-SBR-CO-BT32Z	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
358	DC1-SBR-CO-BAT31	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
359	DC1-SBR-CO-D3210	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
360	DC1-BDC-ST-DP-31	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
361	DC1-BDC-ST-PP-32	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
362	DC1-BDC-ST-PP-31	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
363	DC1-BDC-ST-DP-32	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
364	DC1-FUS-NO-D3311	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
365	DC1-FUS-NO-BT32Z	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G

366	DC1-FUS-NO-BT31Z	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
367	DC1-FUS-NO-D3211	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
368	DC1-FUS-NO-D3210	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
369	DC1-FUS-NO-D3310	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
370	DC1-FUS-NO-EG2PS	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
371	DC1-FUS-NO-EG2NG	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
372	DC1-FUS-NO-EG3PS	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
373	DC1-FUS-NO-EG3NG	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
374	EDG-LSW-OO-1209S	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
375	EDG-LSW-OC-1208S	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
376	EDG-LSW-OO-1208S	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
377	EDG-LSW-OO-1206S	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
378	EDG-LSW-OO-1205S	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
379	EDG-LSW-OC-1209S	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
380	EDG-LCV-OC-1208A	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
381	EDG-LCV-OC-1209A	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
382	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
383	AC4-RCK-NO-BC36C	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZBATT33-AN-121G
384	DC1-MAI-MA-BCC33	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZBATT33-AN-121G
385	AC4-RCK-NO-BC36C	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
386	AC4-RCK-NO-BC36C	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
387	DC1-MAI-MA-BCC33	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
388	DC1-MAI-MA-BCC33	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
389	AC4-RCK-NO-BC36C	EDG-MAI-MA-EDG32	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
390	DC1-BCC-HW-BC33Z	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZBATT33-AN-121G
391	AC4-RCK-NO-BC36C	EDG-MAI-MA-EDG33	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
392	DC1-MAI-MA-BCC33	EDG-MAI-MA-EDG32	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
393	DC1-MAI-MA-BCC33	EDG-MAI-MA-EDG33	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
394	AC4-RCK-NO-BC36C	EDG-ENG-FR-DG32R	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
395	AC4-RCK-NO-BC36C	EDG-ENG-FR-DG33R	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
396	AC4-BAC-ST-C36CZ	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZBATT33-AN-121G
397	DC1-MAI-MA-BCC33	EDG-ENG-FR-DG32R	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
398	DC1-MAI-MA-BCC33	EDG-ENG-FR-DG33R	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
399	AC4-RCK-NO-BC36C	DC1-MAI-MA-BCC31	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
400	AC4-RCK-NO-BC36C	EDG-XHE-RE-33RHE	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
401	AC4-RCK-NO-BC36C	DC1-MAI-MA-BCC32	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
402	AC4-RCK-NO-BC36C	EDG-XHE-RE-32RHE	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G

403	AC4-RCK-NO-BC36C	DGV-RCK-NO-DV318	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
404	AC4-RCK-NO-BC36C	EDG-RCK-NO-FOT32	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
405	AC4-RCK-NO-BC36C	AC4-RCK-NO-BCH37	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
406	AC4-RCK-NO-BC36C	AC4-RCK-NO-BCH39	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
407	AC4-RCK-NO-BC36C	EDG-RCK-NO-FOT33	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
408	AC4-RCK-NO-BC36C	EDG-MDP-FR-FOT32	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
409	AC4-RCK-NO-BC36C	EDG-MDP-FR-FOT33	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
410	DC1-MAI-MA-BCC33	EDG-XHE-RE-33RHE	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
411	DC1-MAI-MA-BCC33	EDG-XHE-RE-32RHE	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
412	DC1-BCC-HW-BC33Z	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
413	DC1-BCC-HW-BC33Z	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
414	DC1-MAI-MA-BCC33	EDG-RCK-NO-FOT33	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
415	DC1-MAI-MA-BCC33	DGV-RCK-NO-DV318	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
416	AC4-RCK-NO-BCH37	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
417	DC1-MAI-MA-BCC33	EDG-RCK-NO-FOT32	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
418	AC4-RCK-NO-BCH39	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
419	DC1-MAI-MA-BCC33	EDG-MDP-FR-FOT33	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
420	DC1-MAI-MA-BCC33	EDG-MDP-FR-FOT32	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
421	DC1-BCC-HW-BC33Z	EDG-MAI-MA-EDG32	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
422	AC4-RCK-NO-BC36C	DGV-CCF-HW-DG32F	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
423	AC4-RCK-NO-BC36C	DGV-CCF-HW-DG33F	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
424	DC1-BCC-HW-BC33Z	EDG-MAI-MA-EDG33	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
425	AC4-RCK-NO-BC36C	EDG-MDP-FS-FOT33	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
426	AC4-RCK-NO-BC36C	EDG-MDP-FS-FOT32	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
427	DC1-MAI-MA-BCC33	DGV-CCF-HW-DG33F	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
428	DC1-MAI-MA-BCC33	DGV-CCF-HW-DG32F	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
429	AC4-CRB-CC-6A5AZ	AC4-RCK-NO-BC36C	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
430	AC4-CRB-CC-52-6A	AC4-RCK-NO-BC36C	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
431	AC4-CRB-OO-52E2Z	AC4-RCK-NO-BC36C	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
432	AC4-CRB-CC-52-5A	AC4-RCK-NO-BC36C	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
433	AC4-CRB-OO-52E3Z	AC4-RCK-NO-BC36C	EQ_T1	FLAG-S_8_CD	ZBATT33-AN-121G
434	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-MSW-OC-SITR1	ZMCC36C-AN-86G
435	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-RCI-FE-SI1OZ	ZMCC36C-AN-86G
436	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-RCS-CO-SIR1Z	ZMCC36C-AN-86G
437	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-RCS-CO-TR11Z	ZMCC36C-AN-86G
438	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-RCS-OO-SI1	ZMCC36C-AN-86G
439	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-RCS-OO-SI5A	ZMCC36C-AN-86G

440	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-XHE-RE-SI-A	ZMCC36C-AN-86G
441	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-XLF-TE-SASA	ZMCC36C-AN-86G
442	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-MSW-OC-SITR2	ZSUPPANEL-AN-52G
443	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-RCI-FE-SI1OZ	ZSUPPANEL-AN-52G
444	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-RCS-CO-SIR2Z	ZSUPPANEL-AN-52G
445	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-RCS-CO-TR12Z	ZSUPPANEL-AN-52G
446	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-RCS-OO-SI2	ZSUPPANEL-AN-52G
447	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-RCS-OO-SI6A,	ZSUPPANEL-AN-52G
448	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-XHE-RE-SI-B	ZSUPPANEL-AN-52G
449	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-XLF-TE-SASB	ZSUPPANEL-AN-52G
450	DC1-BAT-HW-BT33Z	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZCHRG33-AN-129G
451	DC1-SBR-CO-BAT33	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZCHRG33-AN-129G
452	DC1-FUS-NO-BAT33	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZCHRG33-AN-129G
453	DC1-BAT-HW-BT33Z	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-S_8_CD	ZCHRG33-AN-129G
454	DC1-BAT-HW-BT33Z	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_8_CD	ZCHRG33-AN-129G
455	DC1-BAT-HW-BT33Z	EDG-MAI-MA-EDG32	EQ_T1	FLAG-S_8_CD	ZCHRG33-AN-129G
456	DC1-BAT-HW-BT33Z	EDG-MAI-MA-EDG33	EQ_T1	FLAG-S_8_CD	ZCHRG33-AN-129G
457	DC1-SBR-CO-BAT33	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_8_CD	ZCHRG33-AN-129G
458	DC1-SBR-CO-BAT33	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-S_8_CD	ZCHRG33-AN-129G
459	DC1-BAT-HW-BT33Z	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZMCC36C-AN-86G
460	EDG-RCS-OC-3333X	EQ_T1	FLAG-NO-SI	FLAG-S_8_CD	ZMCC36C-AN-86G
461	EDG-RCS-OC-3232X	EQ_T1	FLAG-NO-SI	FLAG-S_8_CD	ZMCC36C-AN-86G
462	EDG-PRY-HW-3333	EQ_T1	FLAG-NO-SI	FLAG-S_8_CD	ZMCC36C-AN-86G
463	EDG-PRY-HW-3351V	EQ_T1	FLAG-NO-SI	FLAG-S_8_CD	ZMCC36C-AN-86G
464	EDG-PRY-HW-3232	EQ_T1	FLAG-NO-SI	FLAG-S_8_CD	ZMCC36C-AN-86G
465	EDG-PRY-HW-3251V	EQ_T1	FLAG-NO-SI	FLAG-S_8_CD	ZMCC36C-AN-86G
466	DC1-SBR-CO-BAT33	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZMCC36C-AN-86G
467	DC1-BDC-ST-DP-34	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZMCC36C-AN-86G
468	DC1-FUS-NO-S8G3N	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZMCC36C-AN-86G
469	DC1-FUS-NO-S8G3P	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZMCC36C-AN-86G
470	DC1-FUS-NO-BAT33	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZMCC36C-AN-86G
471	DC1-FUS-NO-N6A	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZMCC36C-AN-86G
472	DC1-FUS-NO-P6A	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZMCC36C-AN-86G
473	DC1-FUS-NO-S18GP	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZMCC36C-AN-86G
474	DC1-FUS-NO-S18GN	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZMCC36C-AN-86G
475	DGV-RCK-NO-DV316	DGV-RCK-NO-DV317	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
476	DGV-FAN-FR-DV317	DGV-RCK-NO-DV316	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G

477	DGV-FAN-FR-DV316	DGV-RCK-NO-DV317	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
478	DGV-FAN-FR-DV316	DGV-FAN-FR-DV317	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
479	DGV-FAN-FR-DV318	DGV-FAN-FR-DV319	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
480	DGV-AOD-CC-E317Z	DGV-RCK-NO-DV316	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
481	DGV-AOD-CC-E316Z	DGV-RCK-NO-DV317	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
482	DGV-AOD-CC-E319Z	DGV-FAN-FR-DV318	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
483	DGV-AOD-CC-E318Z	DGV-FAN-FR-DV319	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
484	DGV-AOD-CC-E316Z	DGV-FAN-FR-DV317	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
485	DGV-AOD-CC-E317Z	DGV-FAN-FR-DV316	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
486	EDG-ASV-FE-DG33A	EDG-ASV-FE-DG33B	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
487	EDG-ASV-FE-DG32A	EDG-ASV-FE-DG32B	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
488	DGV-AOD-CC-E316Z	DGV-AOD-CC-E317Z	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
489	DGV-AOD-CC-E318Z	DGV-AOD-CC-E319Z	EQ_T1	FLAG-S_8_CD	ZMCC36C-AN-86G
490	DC1-MSW-CO-D3432	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZMCC36C-AN-86G
491	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-MSW-OC-SITR2	ZMCC36C-AN-86G
492	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-RCI-FE-SI1OZ	ZMCC36C-AN-86G
493	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-RCS-CO-SIR2Z	ZMCC36C-AN-86G
494	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-RCS-CO-TR12Z	ZMCC36C-AN-86G
495	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-RCS-OO-SI2	ZMCC36C-AN-86G
496	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-RCS-OO-SI6A	ZMCC36C-AN-86G
497	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-XHE-RE-SI-B	ZMCC36C-AN-86G
498	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-XLF-TE-SASB	ZMCC36C-AN-86G
499	EDG-RCS-OC-3333X	EQ_T1	FLAG-NO-SI	FLAG-S_8_CD	ZSUPPANEL-AN-52G
500	EDG-RCS-OC-3232X	EQ_T1	FLAG-NO-SI	FLAG-S_8_CD	ZSUPPANEL-AN-52G
501	EDG-PRY-HW-3333	EQ_T1	FLAG-NO-SI	FLAG-S_8_CD	ZSUPPANEL-AN-52G
502	EDG-PRY-HW-3351V	EQ_T1	FLAG-NO-SI	FLAG-S_8_CD	ZSUPPANEL-AN-52G
503	EDG-PRY-HW-3232	EQ_T1	FLAG-NO-SI	FLAG-S_8_CD	ZSUPPANEL-AN-52G
504	EDG-PRY-HW-3251V	EQ_T1	FLAG-NO-SI	FLAG-S_8_CD	ZSUPPANEL-AN-52G
505	DC1-BDC-ST-DP-34	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZSUPPANEL-AN-52G
506	DC1-FUS-NO-S8G3N	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZSUPPANEL-AN-52G
507	DC1-FUS-NO-S8G3P	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZSUPPANEL-AN-52G
508	DC1-FUS-NO-P6A	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZSUPPANEL-AN-52G
509	DC1-FUS-NO-S18GP	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZSUPPANEL-AN-52G
510	DC1-FUS-NO-N6A	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZSUPPANEL-AN-52G
511	DC1-FUS-NO-S18GN	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZSUPPANEL-AN-52G
512	DGV-RCK-NO-DV316	DGV-RCK-NO-DV317	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
513	DGV-FAN-FR-DV316	DGV-RCK-NO-DV317	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G

514	DGV-FAN-FR-DV317	DGV-RCK-NO-DV316	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
515	DGV-FAN-FR-DV316	DGV-FAN-FR-DV317	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
516	DGV-FAN-FR-DV318	DGV-FAN-FR-DV319	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
517	DGV-AOD-CC-E316Z	DGV-RCK-NO-DV317	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
518	DGV-AOD-CC-E317Z	DGV-RCK-NO-DV316	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
519	DGV-AOD-CC-E317Z	DGV-FAN-FR-DV316	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
520	DGV-AOD-CC-E319Z	DGV-FAN-FR-DV318	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
521	DGV-AOD-CC-E316Z	DGV-FAN-FR-DV317	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
522	DGV-AOD-CC-E318Z	DGV-FAN-FR-DV319	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
523	EDG-ASV-FE-DG32A	EDG-ASV-FE-DG32B	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
524	EDG-ASV-FE-DG33A	EDG-ASV-FE-DG33B	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
525	DGV-AOD-CC-E318Z	DGV-AOD-CC-E319Z	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
526	DGV-AOD-CC-E316Z	DGV-AOD-CC-E317Z	EQ_T1	FLAG-S_8_CD	ZSUPPANEL-AN-52G
527	DC1-MSW-CO-D3432	EQ_T1	FLAG-SI	FLAG-S_8_CD	ZSUPPANEL-AN-52G
528	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-MSW-OC-SITR1	ZSUPPANEL-AN-52G
529	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-RCI-FE-SI1OZ	ZSUPPANEL-AN-52G
530	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-RCS-CO-SIR1Z	ZSUPPANEL-AN-52G
531	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-RCS-CO-TR11Z	ZSUPPANEL-AN-52G
532	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-RCS-OO-SI1	ZSUPPANEL-AN-52G
533	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-RCS-OO-SI5A	ZSUPPANEL-AN-52G
534	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-XHE-RE-SI-A	ZSUPPANEL-AN-52G
535	EQ_T1	FLAG-SI	FLAG-S_8_CD	SAS-XLF-TE-SASA	ZSUPPANEL-AN-52G

EQ_T1_2 DOMINANT CORE DAMAGE ACCIDENT SEQUENCE

TERM NUMBER	CUT SET LISTING					
1	EQ_T1	FLAG-T1_2CD	ZPABEF-AN-88G			
2	EQ_T1	FLAG-T1_2CD	ZPABSF-AN-126G			
3	EQ_T1	FLAG-T1_2CD	ZRHR-HTXS-AN-49G			
4	EQ_T1	FLAG-T1_2CD	ZRHR-PUMPS-62G			
5	EQ_T1	FLAG-T1_2CD	ZVC46PT-75G			
6	AC1-INV-HW-INV32	EQ_T1	FLAG-T1_2CD	ZIB3133-EQ-75G		
7	AC1-INV-HW-INV31	EQ_T1	FLAG-T1_2CD	ZMCC36C-AN-86G		
8	EQ_T1	FLAG-T1_2CD	LHI-CKV-CC-738B	ZMCC36C-AN-86G		
9	EQ_T1	FLAG-T1_2CD	LHI-CRB-DN-PM32Z	ZMCC36C-AN-86G		
10	EQ_T1	FLAG-T1_2CD	LHI-MAI-MA-PM32	ZMCC36C-AN-86G		
11	EQ_T1	FLAG-T1_2CD	LHI-MDP-FR-PM32	ZMCC36C-AN-86G		
12	EQ_T1	FLAG-T1_2CD	LHI-MDP-FS-PM32Z	ZMCC36C-AN-86G		
13	EQ_T1	FLAG-T1_2CD	LHI-MSW-DN-RHR2Z	ZMCC36C-AN-86G		
14	EQ_T1	FLAG-T1_2CD	LHI-RCK-NO-PM32	ZMCC36C-AN-86G		
15	EQ_T1	FLAG-T1_2CD	LHI-XHE-RE-PM32	ZMCC36C-AN-86G		
16	AC1-INV-HW-INV31	EQ_T1	FLAG-T1_2CD	ZMCCTB-AN-92G		
17	AC1-INV-HW-INV31	EQ_T1	FLAG-T1_2CD	ZBATT33-AN-121G	ZCHRG33-AN-129G	
18	EQ_T1	FLAG-T1_2CD	LHI-CKV-CC-738B	ZBATT33-AN-121G	ZCHRG33-AN-129G	
19	EQ_T1	FLAG-T1_2CD	LHI-CRB-DN-PM32Z	ZBATT33-AN-121G	ZCHRG33-AN-129G	
20	EQ_T1	FLAG-T1_2CD	LHI-MAI-MA-PM32	ZBATT33-AN-121G	ZCHRG33-AN-129G	
21	EQ_T1	FLAG-T1_2CD	LHI-MDP-FR-PM32	ZBATT33-AN-121G	ZCHRG33-AN-129G	
22	EQ_T1	FLAG-T1_2CD	LHI-MDP-FS-PM32Z	ZBATT33-AN-121G	ZCHRG33-AN-129G	
23	EQ_T1	FLAG-T1_2CD	LHI-RCK-NO-PM32	ZBATT33-AN-121G	ZCHRG33-AN-129G	
24	EQ_T1	FLAG-T1_2CD	LHI-XHE-RE-PM32	ZBATT33-AN-121G	ZCHRG33-AN-129G	
25	EQ_T1	FLAG-T1_2CD	SWS-MAI-MA-PM33	SWS-STR-PG-31	ZMCC36C-AN-86G	
26	EQ_T1	FLAG-T1_2CD	SWS-MAI-MA-PM33	SWS-MDP-FR-PM31Z	ZMCC36C-AN-86G	
27	EQ_T1	FLAG-T1_2CD	SWS-CKV-OO-SW1-2	SWS-MAI-MA-PM33	ZMCC36C-AN-86G	
28	EQ_T1	FLAG-T1_2CD	SWS-FCV-OO-1112	SWS-MAI-MA-PM33	ZMCC36C-AN-86G	
29	EQ_T1	FLAG-T1_2CD	SWS-CKV-OO-SW1-2	SWS-MAI-MA-PM33	ZBATT33-AN-121G	ZCHRG33-AN-129G
30	EQ_T1	FLAG-T1_2CD	SWS-FCV-OO-1112	SWS-MAI-MA-PM33	ZBATT33-AN-121G	ZCHRG33-AN-129G
31	EQ_T1	FLAG-T1_2CD	SWS-MAI-MA-PM33	SWS-MDP-FR-PM31Z	ZBATT33-AN-121G	ZCHRG33-AN-129G
32	EQ_T1	FLAG-LOSP	FLAG-T1_2CD	SWS-MAI-MA-PM33	SWS-MDP-RS-PMP31	ZMCC36C-AN-86G

33	EQ_T1	FLAG-SI	FLAG-T1_2CD	SWS-MAI-MA-PM33	SWS-MDP-RS-PMP31	ZMCC3EC-AN-86G
34	EQ_T1	FLAG-LOSP	FLAG-T1_2CD	SWS-MAI-MA-PM33	SWS-MDP-RS-PMP31	ZBATT33-AN-121G

S_6_CD DOMINANT CORE DAMAGE ACCIDENT SEQUENCE

TERM NUMBER	CUT SET LISTING				
1	EQ_T1	FLAG-S_6_CD	ZCCW-TANKS-41G		
2	EQ_T1	FLAG-S_6_CD	ZCCWHTX-52G		
3	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_6_CD	ZMCC36C-AN-86G	
4	CCW-RCK-NO-PM33	EQ_T1	FLAG-S_6_CD	ZMCC36C-AN-86G	
5	CCW-MDP-FR-PM31Z	EQ_T1	FLAG-S_6_CD	ZMCC36C-AN-86G	
6	CCW-MDP-FR-PM33Z	EQ_T1	FLAG-S_6_CD	ZMCC36C-AN-86G	
7	CCW-MDP-FS-PM33	EQ_T1	FLAG-S_6_CD	ZMCC36C-AN-86G	
8	CCW-CKV-OO-761B	EQ_T1	FLAG-S_6_CD	ZMCC36C-AN-86G	
9	CCW-XHE-RE-CCW33	EQ_T1	FLAG-S_6_CD	ZMCC36C-AN-86G	
10	CCW-CRB-DN-52C3Z	EQ_T1	FLAG-S_6_CD	ZMCC36C-AN-86G	
11	CCW-CKV-CC-761C	EQ_T1	FLAG-S_6_CD	ZMCC36C-AN-86G	
12	CCW-XVM-OC-760C	EQ_T1	FLAG-S_6_CD	ZMCC36C-AN-86G	
13	CCW-XVM-OC-762C	EQ_T1	FLAG-S_6_CD	ZMCC36C-AN-86G	
14	CCW-MSW-DN-1-CC3	EQ_T1	FLAG-S_6_CD	ZMCC36C-AN-86G	
15	CCW-CKV-OC-761A	EQ_T1	FLAG-S_6_CD	ZMCC36C-AN-86G	
16	CCW-XVM-OC-760A	EQ_T1	FLAG-S_6_CD	ZMCC36C-AN-86G	
17	CCW-XVM-OC-762A	EQ_T1	FLAG-S_6_CD	ZMCC36C-AN-86G	
18	AC4-RCK-NO-BC36C	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G
19	CCW-MAI-MA-PM33	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G
20	AC4-RCK-NO-BC36C	CCW-RCK-NO-PM33	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G
21	CCW-RCK-NO-PM33	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G
22	AC4-RCK-NO-BC36C	CCW-MDP-FR-PM31Z	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G
23	AC4-RCK-NO-BC36C	CCW-MDP-FR-PM33Z	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G
24	AC4-RCK-NO-BC36C	CCW-MDP-FS-PM33	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G
25	CCW-MDP-FR-PM31Z	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G
26	CCW-MDP-FR-PM33Z	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G
27	CCW-MDP-FS-PM33	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G
28	AC4-RCK-NO-BC36C	CCW-CKV-OO-761B	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G
29	CCW-MAI-MA-PM33	DC1-BCC-HW-BC33Z	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G
30	CCW-CKV-OO-761B	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G
31	AC4-RCK-NO-BC36C	CCW-XHE-RE-CCW33	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G
32	CCW-XHE-RE-CCW33	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G
33	AC4-RCK-NO-BC36C	CCW-CRB-DN-52C3Z	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G

34	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G	
35	CCW-RCK-NO-PM33	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G	
36	CCW-MDP-FR-PM33Z	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G	
37	CCW-MDP-FR-PM31Z	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G	
38	CCW-MDP-FS-PM33	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G	
39	CCW-CKV-OO-761B	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G	
40	CCW-XHE-RE-CCW33	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G	
41	CCW-CRB-DN-52C3Z	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G	
42	CCW-CKV-CC-761C	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G	
43	CCW-XVM-OC-760C	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G	
44	CCW-XVM-OC-762C	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G	
45	CCW-MSW-DN-1-CC3	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G	
46	CCW-CKV-OC-761A	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G	
47	CCW-XVM-OC-762A	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G	
48	CCW-XVM-OC-760A	EQ_T1	FLAG-S_6_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G	
49	CCW-MAI-MA-PM33	DC1-BAT-HW-BT33Z	EQ_T1	FLAG-S_6_CD	ZCHRG33-AN-129G	
50	CCW-MDP-RS-PM31	EQ_T1	FLAG-SI	FLAG-S_6_CD	ZMCC36C-AN-86G	
51	CCW-MDP-RS-PM31	EQ_T1	FLAG-LOSP	FLAG-S_6_CD	ZMCC36C-AN-86G	
52	AC4-RCK-NO-BC36C	CCW-MDP-RS-PM31	EQ_T1	FLAG-LOSP	FLAG-S_6_CD	ZBATT33-AN-121G
53	CCW-MDP-RS-PM31	DC1-MAI-MA-BCC33	EQ_T1	FLAG-LOSP	FLAG-S_6_CD	ZBATT33-AN-121G
54	CCW-MDP-RS-PM31	EQ_T1	FLAG-LOSP	FLAG-S_6_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G

S_18_CD DOMINANT CORE DAMAGE ACCIDENT SEQUENCE

TERM NUMBER		CUT SET LISTING
1	FLAG-S_18_CD	SURROGATE

S_7_CD DOMINANT CORE DAMAGE ACCIDENT SEQUENCE

TERM NUMBER		CUT SET LISTING			
1	CCW-CCF-FR-ACPM	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
2	CFC-CCF-FR-3FCUS	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCW-TANKS-41G
3	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G	ZCCW-TANKS-41G
4	CFC-CCF-FR-3FCUS	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCWHTX-52G
5	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G	ZCCWHTX-52G
6	CCW-CCF-FR-ACPM	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCRF12345-AN-86G
7	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCW-TANKS-41G	ZCRF12345-AN-86G
8	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCWHTX-52G	ZCRF12345-AN-86G
9	AC4-RCI-FE-U1-5A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZMCC36C-AN-86G
10	AC4-RCI-FE-U1-6A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZMCC36C-AN-86G
11	AC4-FUS-NO-FS5AZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZMCC36C-AN-86G
12	AC4-FUS-NO-FS6AZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZMCC36C-AN-86G
13	AC4-PTR-HW-BS5AZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZMCC36C-AN-86G
14	AC4-PTR-HW-BS6AZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZMCC36C-AN-86G
15	AC4-RCS-OC-U5AX1	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZMCC36C-AN-86G
16	AC4-RCS-OC-U5AX4	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZMCC36C-AN-86G
17	AC4-RCS-OC-U5AX3	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZMCC36C-AN-86G
18	AC4-RCS-OC-U6AX1	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZMCC36C-AN-86G
19	AC4-RCS-OC-U6AX4	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZMCC36C-AN-86G
20	AC4-PRY-HW-IU25A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZMCC36C-AN-86G
21	AC4-PRY-HW-IU15A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZMCC36C-AN-86G
22	AC4-PRY-HW-IU26A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZMCC36C-AN-86G
23	AC4-PRY-HW-IU16A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZMCC36C-AN-86G
24	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G
25	AC4-RCI-FE-U1-5A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G
26	AC4-RCI-FE-U1-6A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G
27	CCW-RCK-NO-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G
28	CCW-MDP-FR-PM31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G
29	CCW-MDP-FR-PM33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G
30	CCW-MDP-FS-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G
31	CCW-CKV-OO-761B	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G
32	CCW-XHE-RE-CCW33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G
33	CCW-CRB-DN-52C3Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G

34	CCW-CKV-CC-761C	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G	
35	AC4-FUS-NO-FS5AZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G	
36	AC4-FUS-NO-FS6AZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G	
37	AC4-PTR-HW-BS5AZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G	
38	AC4-PTR-HW-BS6AZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G	
39	AC4-RCS-OC-U5AX3	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G	
40	AC4-RCS-OC-U5AX1	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G	
41	AC4-RCS-OC-U5AX4	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G	
42	AC4-RCS-OC-U6AX1	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G	
43	AC4-RCS-OC-U6AX4	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G	
44	CCW-XVM-OC-760C	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G	
45	CCW-XVM-OC-762C	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G	
46	CCW-MSW-DN-1-CC3	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G	
47	AC4-PRY-HW-IU25A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G	
48	AC4-PRY-HW-IU15A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G	
49	AC4-PRY-HW-IU26A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G	
50	AC4-PRY-HW-IU16A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G	
51	CCW-CCF-FR-ACPM	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G	
52	CCW-CKV-OC-761A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G	
53	CCW-XVM-OC-760A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G	
54	CCW-XVM-OC-762A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G	
55	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCW-TANKS-41G	ZSUPPANEL-AN-52G	
56	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCWHTX-52G	ZSUPPANEL-AN-52G	
57	CCW-MDP-RS-PM31	EQ_T1	FLAG-LOSP	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
58	CCW-MDP-RS-PM31	EQ_T1	FLAG-LOSP	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
59	CCW-MAI-MA-PM33	CFC-PND-CC-31DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
60	CCW-MAI-MA-PM33	CFC-PND-CC-35DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
61	CCW-MAI-MA-PM33	CFC-PND-CC-33DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
62	CCW-MAI-MA-PM33	CFC-MAI-MA-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
63	CCW-MAI-MA-PM33	CFC-MAI-MA-FCU35	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
64	CCW-MAI-MA-PM33	CFC-RCK-NO-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
65	CCW-MAI-MA-PM33	CFC-RCK-NO-FCU35	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
66	CCW-MAI-MA-PM33	CFC-RCK-NO-FCU33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
67	AC4-RCK-NO-BC36C	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
68	AC4-RCK-NO-BC36C	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
69	CCW-MAI-MA-PM33	CFC-XHE-RE-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
70	CCW-MAI-MA-PM33	CFC-XHE-RE-FCU33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G

71	CCW-MAI-MA-PM33	CFC-SOV-HW-1294Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
72	CCW-MAI-MA-PM33	CFC-SOV-HW-1295Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
73	CCW-MAI-MA-PM33	CFC-SOV-HW-1306Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
74	CCW-MAI-MA-PM33	CFC-SOV-HW-1307	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
75	CCW-MAI-MA-PM33	CFC-SOV-HW-1300Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
76	CCW-MAI-MA-PM33	CFC-SOV-HW-1301Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
77	CCW-MAI-MA-PM33	CFC-MAI-MA-FCU33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
78	CCW-MAI-MA-PM33	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
79	CCW-MAI-MA-PM33	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
80	AC4-RCI-FE-U1-5A	AC4-RCK-NO-BC36C	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
81	AC4-RCI-FE-U1-6A	AC4-RCK-NO-BC36C	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
82	AC4-RCK-NO-BC36C	CFC-PND-CC-31DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
83	AC4-RCK-NO-BC36C	CFC-PND-CC-35DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
84	AC4-RCK-NO-BC36C	CFC-PND-CC-35DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
85	AC4-RCK-NO-BC36C	CFC-PND-CC-33DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
86	AC4-RCK-NO-BC36C	CFC-PND-CC-33DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
87	CCW-RCK-NO-PM33	CFC-PND-CC-31DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
88	CCW-RCK-NO-PM33	CFC-PND-CC-35DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
89	CCW-RCK-NO-PM33	CFC-PND-CC-33DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
90	AC4-RCK-NO-BC36C	CFC-PND-CC-31DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
91	AC4-RCI-FE-U1-5A	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
92	AC4-RCI-FE-U1-6A	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
93	CCW-MAI-MA-PM33	CFC-XHE-RE-FCU35	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
94	CFC-PND-CC-31DPZ	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
95	CFC-PND-CC-35DPZ	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
96	CFC-PND-CC-35DPZ	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
97	CFC-PND-CC-33DPZ	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
98	CFC-PND-CC-33DPZ	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
99	CFC-PND-CC-31DPZ	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
100	CCW-MDP-FR-PM31Z	CFC-PND-CC-31DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
101	CCW-MDP-FR-PM31Z	CFC-PND-CC-35DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
102	CCW-MDP-FR-PM31Z	CFC-PND-CC-33DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
103	CCW-MDP-FR-PM33Z	CFC-PND-CC-31DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
104	CCW-MDP-FR-PM33Z	CFC-PND-CC-35DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
105	CCW-MDP-FR-PM33Z	CFC-PND-CC-33DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
106	CCW-MDP-FS-PM33	CFC-PND-CC-31DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
107	CCW-MDP-FS-PM33	CFC-PND-CC-35DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G

108	CCW-MDP-FS-PM33	CFC-PND-CC-33DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
109	AC4-RCK-NO-BC36C	CFC-MAI-MA-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
110	AC4-RCK-NO-BC36C	CFC-MAI-MA-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
111	CCW-RCK-NO-PM33	CFC-MAI-MA-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
112	CCW-MAI-MA-PM33	CFC-FCU-FS-31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
113	CCW-MAI-MA-PM33	CFC-FCU-FS-35Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
114	CCW-MAI-MA-PM33	CFC-FCU-FS-33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
115	CCW-CKV-OO-761B	CFC-PND-CC-33DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
116	CCW-CKV-OO-761B	CFC-PND-CC-31DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
117	CCW-CKV-OO-761B	CFC-PND-CC-35DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
118	CCW-MAI-MA-PM33	CFC-CRB-DN-FC31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
119	CCW-MAI-MA-PM33	CFC-CRB-DN-FC35Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
120	CCW-MAI-MA-PM33	CFC-CRB-DN-FC33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
121	CFC-MAI-MA-FCU31	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
122	CFC-MAI-MA-FCU31	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
123	CCW-MDP-FR-PM33Z	CFC-MAI-MA-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
124	CCW-MDP-FR-PM31Z	CFC-MAI-MA-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
125	CCW-MDP-FS-PM33	CFC-MAI-MA-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
126	CCW-XHE-RE-CCW33	CFC-PND-CC-31DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
127	CCW-XHE-RE-CCW33	CFC-PND-CC-35DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
128	CCW-XHE-RE-CCW33	CFC-PND-CC-33DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
129	CCW-CKV-OO-761B	CFC-MAI-MA-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
130	CCW-CRB-DN-52C3Z	CFC-PND-CC-31DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
131	CCW-CRB-DN-52C3Z	CFC-PND-CC-35DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
132	CCW-CRB-DN-52C3Z	CFC-PND-CC-33DPZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
133	AC4-RCK-NO-BC36C	CFC-MAI-MA-FCU35	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
134	AC4-RCK-NO-BC36C	CFC-MAI-MA-FCU35	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
135	CCW-RCK-NO-PM33	CFC-MAI-MA-FCU35	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
136	AC4-RCK-NO-BC36C	CFC-RCK-NO-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
137	AC4-RCK-NO-BC36C	CFC-RCK-NO-FCU35	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
138	AC4-RCK-NO-BC36C	CFC-RCK-NO-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
139	AC4-RCK-NO-BC36C	CFC-RCK-NO-FCU33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
140	AC4-RCK-NO-BC36C	CFC-RCK-NO-FCU35	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
141	AC4-RCK-NO-BC36C	CFC-RCK-NO-FCU33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
142	CCW-RCK-NO-PM33	CFC-RCK-NO-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
143	CCW-RCK-NO-PM33	CFC-RCK-NO-FCU35	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
144	CCW-RCK-NO-PM33	CFC-RCK-NO-FCU33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G

145	AC4-RCK-NO-BC36C	CCW-RCK-NO-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
146	AC4-RCK-NO-BC36C	CCW-RCK-NO-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
147	AC4-RCK-NO-BC36C	CFC-XHE-RE-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
148	AC4-RCK-NO-BC36C	CFC-XHE-RE-FCU33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
149	AC4-RCK-NO-BC36C	CFC-XHE-RE-FCU33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
150	CCW-RCK-NO-PM33	CFC-XHE-RE-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
151	CCW-RCK-NO-PM33	CFC-XHE-RE-FCU33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
152	AC4-RCK-NO-BC36C	CFC-XHE-RE-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
153	CCW-XHE-RE-CCW33	CFC-MAI-MA-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
154	AC4-RCK-NO-BC36C	CFC-SOV-HW-1307	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
155	AC4-RCK-NO-BC36C	CFC-SOV-HW-1295Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
156	AC4-RCK-NO-BC36C	CFC-SOV-HW-1294Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
157	AC4-RCK-NO-BC36C	CFC-SOV-HW-1307	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
158	AC4-RCK-NO-BC36C	CFC-SOV-HW-1306Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
159	AC4-RCK-NO-BC36C	CFC-SOV-HW-1306Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
160	AC4-RCK-NO-BC36C	CFC-SOV-HW-1301Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
161	AC4-RCK-NO-BC36C	CFC-SOV-HW-1300Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
162	AC4-RCK-NO-BC36C	CFC-SOV-HW-1301Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
163	CCW-RCK-NO-PM33	CFC-SOV-HW-1295Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
164	CCW-RCK-NO-PM33	CFC-SOV-HW-1306Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
165	CCW-RCK-NO-PM33	CFC-SOV-HW-1307	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
166	CCW-RCK-NO-PM33	CFC-SOV-HW-1300Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
167	AC4-RCK-NO-BC36C	CFC-SOV-HW-1295Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
168	CCW-RCK-NO-PM33	CFC-SOV-HW-1301Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
169	AC4-RCK-NO-BC36C	CFC-SOV-HW-1300Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
170	CCW-RCK-NO-PM33	CFC-SOV-HW-1294Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
171	AC4-RCK-NO-BC36C	CFC-SOV-HW-1294Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
172	AC4-RCK-NO-BC36C	CFC-MAI-MA-FCU33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
173	AC4-RCK-NO-BC36C	CFC-MAI-MA-FCU33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
174	CCW-RCK-NO-PM33	CFC-MAI-MA-FCU33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
175	CFC-MAI-MA-FCU35	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
176	CFC-MAI-MA-FCU35	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
177	CCW-MDP-FR-PM31Z	CFC-MAI-MA-FCU35	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
178	CCW-MDP-FR-PM33Z	CFC-MAI-MA-FCU35	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
179	CFC-RCK-NO-FCU31	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
180	CFC-RCK-NO-FCU35	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
181	CFC-RCK-NO-FCU35	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G

182	CFC-RCK-NO-FCU33	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
183	*CFC-RCK-NO-FCU33*	*DC1-MAI-MA-BCC33*	*EQ_T1*	*FLAG-S_7_CD*	*FLAG_NO_CFC*	*ZBATT33-AN-121G*
184	CCW-RCK-NO-PM33	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
185	CCW-RCK-NO-PM33	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
186	CFC-RCK-NO-FCU31	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
187	AC4-RCK-NO-BC36C	CCW-MDP-FR-PM31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
188	CCW-MDP-FR-PM31Z	CFC-RCK-NO-FCU35	EQ_T1	FLAG-S_7_CD	FLAG NO CFC	ZBATT33-AN-121G
189	CCW-MDP-FR-PM31Z	CFC-RCK-NO-FCU33	EQ_T1	FLAG-S_7_CD	FLAG NO CFC	ZBATT33-AN-121G
190	CCW-MDP-FR-PM33Z	CFC-RCK-NO-FCU31	EQ_T1	FLAG-S_7_CD	FLAG NO CFC	ZBATT33-AN-121G
191	CCW-MDP-FR-PM33Z	CFC-RCK-NO-FCU35	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
192	AC4-RCK-NO-BC36C	CCW-MDP-FR-PM33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
193	AC4-RCK-NO-BC36C	CCW-MDP-FR-PM31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
194	CCW-MDP-FR-PM33Z	CFC-RCK-NO-FCU33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
195	AC4-RCK-NO-BC36C	CCW-MDP-FR-PM33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
196	CCW-MDP-FR-PM31Z	CFC-RCK-NO-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
197	CCW-MDP-FS-PM33	CFC-MAI-MA-FCU35	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
198	CCW-MDP-FS-PM33	CFC-RCK-NO-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
199	CCW-MDP-FS-PM33	CFC-RCK-NO-FCU33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
200	AC4-RCK-NO-BC36C	CCW-MDP-FS-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
201	AC4-RCK-NO-BC36C	CCW-MDP-FS-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
202	CCW-MDP-FS-PM33	CFC-RCK-NO-FCU35	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
203	CFC-XHE-RE-FCU31	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
204	CFC-XHE-RE-FCU33	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
205	CFC-XHE-RE-FCU31	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
206	CFC-XHE-RE-FCU33	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
207	CCW-MDP-FR-PM31Z	CFC-XHE-RE-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
208	CCW-MDP-FR-PM33Z	CFC-XHE-RE-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
209	CCW-MDP-FR-PM33Z	CFC-XHE-RE-FCU33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
210	CCW-MDP-FR-PM31Z	CFC-XHE-RE-FCU33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
211	CFC-SOV-HW-1295Z	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
212	CFC-SOV-HW-1295Z	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
213	CFC-SOV-HW-1294Z	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
214	CFC-SOV-HW-1307	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
215	CFC-SOV-HW-1294Z	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
216	CFC-SOV-HW-1300Z	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
217	CFC-SOV-HW-1306Z	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
218	CFC-SOV-HW-1307	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G

219	CFC-SOV-HW-1301Z	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
220	CFC-SOV-HW-1300Z	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
221	CFC-SOV-HW-1301Z	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
222	CFC-SOV-HW-1306Z	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
223	CCW-CRB-DN-52C3Z	CFC-MAI-MA-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
224	CFC-MAI-MA-FCU33	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
225	CFC-MAI-MA-FCU33	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
226	CCW-MDP-FR-PM31Z	CFC-SOV-HW-1306Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
227	CCW-MDP-FR-PM33Z	CFC-SOV-HW-1295Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
228	CCW-MDP-FR-PM31Z	CFC-SOV-HW-1307	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
229	CCW-MDP-FR-PM31Z	CFC-SOV-HW-1295Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
230	CCW-MDP-FR-PM31Z	CFC-SOV-HW-1294Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
231	CCW-MDP-FR-PM33Z	CFC-SOV-HW-1306Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
232	CCW-MDP-FR-PM31Z	CFC-SOV-HW-1300Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
233	CCW-MDP-FR-PM33Z	CFC-SOV-HW-1294Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
234	CCW-MDP-FR-PM31Z	CFC-SOV-HW-1301Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
235	CCW-MDP-FR-PM33Z	CFC-SOV-HW-1307	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
236	CCW-MDP-FR-PM33Z	CFC-SOV-HW-1301Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
237	CCW-MDP-FR-PM33Z	CFC-SOV-HW-1300Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
238	CCW-MDP-FR-PM31Z	CFC-MAI-MA-FCU33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
239	CCW-MDP-FR-PM33Z	CFC-MAI-MA-FCU33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
240	CCW-MDP-FS-PM33	CFC-XHE-RE-FCU33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
241	CCW-MDP-FS-PM33	CFC-XHE-RE-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
242	CCW-MDP-FR-PM31Z	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
243	CCW-MDP-FR-PM33Z	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
244	CCW-MDP-FR-PM33Z	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
245	CCW-MDP-FR-PM31Z	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
246	CCW-MDP-FS-PM33	CFC-SOV-HW-1294Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
247	CCW-MDP-FS-PM33	CFC-SOV-HW-1300Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
248	CCW-MDP-FS-PM33	CFC-SOV-HW-1301Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
249	CCW-MDP-FS-PM33	CFC-SOV-HW-1295Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
250	CCW-MDP-FS-PM33	CFC-SOV-HW-1306Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
251	CCW-MDP-FS-PM33	CFC-SOV-HW-1307	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
252	CCW-MDP-FS-PM33	CFC-MAI-MA-FCU33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
253	CCW-CKV-OO-761B	CFC-MAI-MA-FCU35	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
254	CCW-MDP-FS-PM33	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
255	CCW-MDP-FS-PM33	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G

256	CCW-CKV-OO-761B	CFC-RCK-NO-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
257	CCW-CKV-OO-761B	CFC-RCK-NO-FCU33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
258	AC4-RCK-NO-BC36C	CCW-CKV-OO-761B	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
259	AC4-RCK-NO-BC36C	CCW-CKV-OO-761B	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
260	CCW-CKV-OO-761B	CFC-RCK-NO-FCU35	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
261	CCW-MAI-MA-PM33	DC1-BCC-HW-BC33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
262	CCW-MAI-MA-PM33	DC1-BCC-HW-BC33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
263	AC4-RCK-NO-BC36C	CFC-XHE-RE-FCU35	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
264	CCW-RCK-NO-PM33	CFC-XHE-RE-FCU35	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
265	AC4-RCK-NO-BC36C	CFC-XHE-RE-FCU35	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
266	CCW-MAI-MA-PM33	CFC-FCU-FR-33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
267	CCW-MAI-MA-PM33	CFC-FCU-FR-35	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
268	CCW-MAI-MA-PM33	CFC-FCU-FR-31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
269	CCW-CKV-OO-761B	CFC-XHE-RE-FCU33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
270	CCW-CKV-OO-761B	CFC-XHE-RE-FCU31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
271	CCW-CKV-OO-761B	CFC-SOV-HW-1300Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
272	CCW-CKV-OO-761B	CFC-SOV-HW-1306Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
273	CCW-CKV-OO-761B	CFC-SOV-HW-1294Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
274	CCW-CKV-OO-761B	CFC-SOV-HW-1295Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
275	CCW-CKV-OO-761B	CFC-SOV-HW-1301Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
276	CCW-CKV-OO-761B	CFC-SOV-HW-1307	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZBATT33-AN-121G
277	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-CCF-CC-FCUS	ZBATT33-AN-121G
278	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-CKV-CC-SW1-6	ZBATT33-AN-121G
279	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-CRB-DN-52S6Z	ZBATT33-AN-121G
280	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZBATT33-AN-121G
281	AC4-RCK-NO-BC36C	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZBATT33-AN-121G
282	CCW-RCK-NO-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZBATT33-AN-121G
283	AC4-RCK-NO-BC36C	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZBATT33-AN-121G
284	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZBATT33-AN-121G
285	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZBATT33-AN-121G
286	CCW-MDP-FR-PM31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZBATT33-AN-121G
287	CCW-MDP-FR-PM33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZBATT33-AN-121G
288	CCW-MDP-FS-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZBATT33-AN-121G
289	CCW-CKV-OO-761B	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZBATT33-AN-121G
290	CCW-XHE-RE-CCW33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZBATT33-AN-121G
291	CCW-CRB-DN-52C3Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZBATT33-AN-121G
292	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZBATT33-AN-121G

293	CCW-RCK-NO-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZBATT33-AN-121G
294	AC4-RCK-NO-BC36C	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZBATT33-AN-121G
295	AC4-RCK-NO-BC36C	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZBATT33-AN-121G
296	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZBATT33-AN-121G
297	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZBATT33-AN-121G
298	CCW-MDP-FR-PM31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZBATT33-AN-121G
299	CCW-MDP-FR-PM33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZBATT33-AN-121G
300	CCW-MDP-FS-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZBATT33-AN-121G
301	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZBATT33-AN-121G
302	AC4-RCK-NO-BC36C	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZBATT33-AN-121G
303	AC4-RCK-NO-BC36C	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZBATT33-AN-121G
304	CCW-RCK-NO-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZBATT33-AN-121G
305	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZBATT33-AN-121G
306	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZBATT33-AN-121G
307	CCW-MDP-FR-PM31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZBATT33-AN-121G
308	CCW-MDP-FR-PM33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZBATT33-AN-121G
309	CCW-MDP-FS-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZBATT33-AN-121G
310	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZBATT33-AN-121G
311	AC4-RCK-NO-BC36C	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZBATT33-AN-121G
312	CCW-RCK-NO-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZBATT33-AN-121G
313	AC4-RCK-NO-BC36C	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZBATT33-AN-121G
314	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZBATT33-AN-121G
315	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZBATT33-AN-121G
316	CCW-MDP-FR-PM31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZBATT33-AN-121G
317	CCW-MDP-FR-PM33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZBATT33-AN-121G
318	CCW-MDP-FS-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZBATT33-AN-121G
319	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZBATT33-AN-121G
320	AC4-RCK-NO-BC36C	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZBATT33-AN-121G
321	AC4-RCK-NO-BC36C	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZBATT33-AN-121G
322	CCW-RCK-NO-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZBATT33-AN-121G
323	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZBATT33-AN-121G
324	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZBATT33-AN-121G
325	CCW-MDP-FR-PM33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZBATT33-AN-121G
326	CCW-MDP-FR-PM31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZBATT33-AN-121G
327	CCW-MDP-FS-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZBATT33-AN-121G
328	CCW-CKV-OO-761B	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZBATT33-AN-121G
329	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-STR-PG-34	ZBATT33-AN-121G

330	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-STR-PG-36	ZBATT33-AN-121G
331	AC4-RCK-NO-BC36C	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-STR-PG-36	ZBATT33-AN-121G
332	CCW-RCK-NO-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-STR-PG-36	ZBATT33-AN-121G
333	AC4-RCK-NO-BC36C	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-STR-PG-36	ZBATT33-AN-121G
334	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-STR-PG-36	ZBATT33-AN-121G
335	DC1-MAI-MA-BCC33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-STR-PG-36	ZBATT33-AN-121G
336	CCW-MDP-FR-PM33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-STR-PG-36	ZBATT33-AN-121G
337	CCW-MDP-FR-PM31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-STR-PG-36	ZBATT33-AN-121G
338	CCW-MDP-FS-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-STR-PG-36	ZBATT33-AN-121G
339	CCW-CKV-OO-761B	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-STR-PG-36	ZBATT33-AN-121G
340	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	SWS-XHE-RE-PMP36	ZBATT33-AN-121G
341	CCW-MAI-MA-PM33	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
342	CCW-MAI-MA-PM33	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
343	CCW-MAI-MA-PM33	EDG-MAI-MA-EDG31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
344	CCW-MAI-MA-PM33	EDG-MAI-MA-EDG33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
345	CCW-MDP-RS-PM31	EQ_T1	FLAG-LOSP	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
346	AC4-RCI-FE-U1-2A	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
347	AC4-RCI-FE-U1-2A	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
348	CCW-MAI-MA-PM33	EDG-ENG-FR-DG33R	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
349	CCW-MAI-MA-PM33	EDG-ENG-FR-DG31R	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
350	CCW-MAI-MA-PM33	DC1-MAI-MA-BCC31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
351	AC4-RCI-FE-U1-5A	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
352	AC4-RCI-FE-U1-2A	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
353	AC4-RCI-FE-U1-2A	EDG-MAI-MA-EDG32	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
354	AC4-RCI-FE-U1-2A	EDG-MAI-MA-EDG33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
355	CCW-RCK-NO-PM33	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
356	CCW-RCK-NO-PM33	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
357	CCW-MDP-FR-PM31Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
358	CCW-MDP-FR-PM32Z	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
359	CCW-MDP-FR-PM33Z	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
360	CCW-MDP-FR-PM31Z	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
361	CCW-MDP-FR-PM33Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
362	CCW-MDP-FR-PM32Z	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
363	AC4-RCI-FE-U1-2A	EDG-ENG-FR-DG33R	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
364	AC4-RCI-FE-U1-2A	EDG-ENG-FR-DG32R	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
365	CCW-MDP-FS-PM33	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
366	CCW-MDP-FS-PM33	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G

367	CCW-MAI-MA-PM33	EDG-XHE-RE-33RHE	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
368	CCW-MAI-MA-PM33	EDG-XHE-RE-31RHE	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
369	AC4-RCK-NO-BCH39	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
370	CCW-MAI-MA-PM33	EDG-RCK-NO-FOT33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
371	CCW-MAI-MA-PM33	DGV-RCK-NO-DV318	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
372	CCW-MAI-MA-PM33	EDG-RCK-NO-FOT31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
373	AC4-RCI-FE-U1-2A	DC1-MAI-MA-BCC31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
374	AC4-RCI-FE-U1-2A	AC4-RCI-FE-U1-5A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
375	AC4-RCI-FE-U1-2A	AC4-RCI-FE-U1-6A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
376	CCW-MAI-MA-PM33	EDG-MDP-FR-FOT33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
377	CCW-MAI-MA-PM33	EDG-MDP-FR-FOT31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
378	CCW-CKV-OO-761A	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
379	CCW-CKV-OO-761B	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
380	CCW-RCK-NO-PM33	EDG-MAI-MA-EDG31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
381	CCW-MAI-MA-PM33	CCW-MDP-FR-PM31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
382	CCW-MAI-MA-PM33	CCW-MDP-FR-PM32Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
383	CCW-RCK-NO-PM33	EDG-MAI-MA-EDG33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
384	CCW-MDP-FR-PM31Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
385	CCW-MDP-FR-PM33Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
386	CCW-MDP-FR-PM31Z	EDG-MAI-MA-EDG32	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
387	CCW-MDP-FR-PM32Z	EDG-MAI-MA-EDG32	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
388	CCW-XHE-RE-CCW33	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
389	CCW-XHE-RE-CCW33	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
390	CCW-MDP-FS-PM33	EDG-MAI-MA-EDG31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
391	CCW-MDP-FR-PM32Z	EDG-MAI-MA-EDG33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
392	CCW-MDP-FR-PM33Z	EDG-MAI-MA-EDG33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
393	CCW-RCK-NO-PM33	EDG-ENG-FR-DG33R	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
394	CCW-RCK-NO-PM33	EDG-ENG-FR-DG31R	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
395	CCW-MDP-FS-PM33	EDG-MAI-MA-EDG33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
396	CCW-CRB-DN-52C3Z	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
397	CCW-CRB-DN-52C3Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
398	CCW-CKV-OO-761B	EDG-MAI-MA-EDG31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
399	AC4-RCI-FE-U1-2A	EDG-XHE-RE-33RHE	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
400	AC4-RCI-FE-U1-2A	DC1-MAI-MA-BCC32	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
401	AC4-RCI-FE-U1-2A	EDG-XHE-RE-32RHE	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
402	CCW-MAI-MA-PM33	DGV-CCF-HW-DG33F	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
403	CCW-MAI-MA-PM33	DGV-CCF-HW-DG31F	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G

404	CCW-RCK-NO-PM33	DC1-MAI-MA-BCC31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
405	CCW-MDP-FR-PM31Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
406	CCW-MDP-FR-PM32Z	EDG-ENG-FR-DG33R	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
407	CCW-MDP-FR-PM33Z	EDG-ENG-FR-DG33R	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
408	CCW-MDP-FR-PM31Z	EDG-ENG-FR-DG32R	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
409	CCW-MDP-FR-PM33Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
410	CCW-MDP-FR-PM32Z	EDG-ENG-FR-DG32R	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
411	AC4-RCI-FE-U1-2A	AC4-RCK-NO-BCH39	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
412	AC4-RCI-FE-U1-2A	EDG-RCK-NO-FOT33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
413	AC4-RCI-FE-U1-2A	DGV-RCK-NO-DV318	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
414	AC4-RCI-FE-U1-5A	CCW-RCK-NO-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
415	AC4-RCI-FE-U1-2A	AC4-RCK-NO-BCH37	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
416	AC4-RCI-FE-U1-2A	CCW-RCK-NO-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
417	AC4-RCI-FE-U1-2A	EDG-RCK-NO-FOT32	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
418	CCW-CKV-OO-761A	EDG-MAI-MA-EDG33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
419	CCW-MDP-FS-PM33	EDG-ENG-FR-DG33R	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
420	CCW-MDP-FS-PM33	EDG-ENG-FR-DG31R	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
421	AC4-RCI-FE-U1-2A	EDG-MDP-FR-FOT33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
422	AC4-RCI-FE-U1-2A	EDG-MDP-FR-FOT32	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
423	CCW-XHE-RE-CCW33	EDG-MAI-MA-EDG31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
424	CCW-MAI-MA-PM33	EDG-MDP-FS-FOT33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
425	CCW-MAI-MA-PM33	EDG-MDP-FS-FOT31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
426	CCW-MDP-FR-PM32Z	DC1-MAI-MA-BCC31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
427	CCW-MDP-FR-PM33Z	DC1-MAI-MA-BCC31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
428	AC4-RCI-FE-U1-2A	CCW-MDP-FR-PM31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
429	AC4-RCI-FE-U1-5A	CCW-MDP-FR-PM33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
430	AC4-RCI-FE-U1-6A	CCW-MDP-FR-PM31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
431	AC4-RCI-FE-U1-2A	CCW-MDP-FR-PM33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
432	AC4-RCI-FE-U1-6A	CCW-MDP-FR-PM32Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
433	AC4-RCI-FE-U1-5A	CCW-MDP-FR-PM32Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
434	AC4-CRB-CC-52-5A	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
435	AC4-CRB-OO-52E3Z	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
436	AC4-CRB-CC-522AZ	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
437	AC4-CRB-OO-52E1Z	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
438	CCW-XHE-RE-CCW33	EDG-MAI-MA-EDG33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
439	CCW-MDP-FS-PM33	DC1-MAI-MA-BCC31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
440	CCW-CKV-OO-761B	EDG-ENG-FR-DG31R	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G

441	CCW-CKV-OO-761A	EDG-ENG-FR-DG33R	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
442	AC4-RCI-FE-U1-5A	CCW-MDP-FS-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
443	AC4-RCI-FE-U1-2A	CCW-MDP-FS-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
444	CCW-CRB-DN-52C3Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
445	AC4-RCS-OO-33CVX	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
446	CCW-MAI-MA-PM33	EDG-RCS-OO-D33CV	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
447	CCW-MAI-MA-PM33	EDG-RCS-OO-335A1	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
448	AC4-RCS-OO-31CVX	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
449	CCW-MAI-MA-PM33	EDG-RCS-OO-D31CV	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
450	CCW-MAI-MA-PM33	EDG-RCS-OO-332A1	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
451	CCW-CRB-DN-52C3Z	EDG-MAI-MA-EDG33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
452	CCW-CKV-OO-761A	DC1-MAI-MA-BCC31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
453	AC4-RCI-FE-U1-2A	CCW-CKV-OO-761B	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
454	AC4-RCI-FE-U1-5A	CCW-CKV-OO-761A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
455	CCW-XHE-RE-CCW33	EDG-ENG-FR-DG33R	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
456	CCW-XHE-RE-CCW33	EDG-ENG-FR-DG31R	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
457	CCW-CKV-CC-761C	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
458	CCW-CKV-CC-761C	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
459	CCW-RCK-NO-PM33	EDG-XHE-RE-33RHE	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
460	CCW-RCK-NO-PM33	EDG-XHE-RE-31RHE	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
461	CCW-MAI-MA-PM33	EDG-RCS-CC-33CVX	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
462	CCW-MAI-MA-PM33	EDG-RCS-CC-D33K1	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
463	CCW-MAI-MA-PM33	EDG-RCS-CC-33NST	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
464	CCW-MAI-MA-PM33	EDG-RCS-CC-31CVX	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
465	CCW-MAI-MA-PM33	EDG-RCS-CC-D31K1	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
466	CCW-MAI-MA-PM33	EDG-RCS-CC-31NST	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
467	CCW-RCK-NO-PM33	EDG-RCK-NO-FOT33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
468	CCW-RCK-NO-PM33	DGV-RCK-NO-DV318	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
469	AC4-RCK-NO-BCH39	CCW-RCK-NO-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
470	CCW-RCK-NO-PM33	EDG-RCK-NO-FOT31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
471	AC4-RCI-FE-U1-2A	DGV-CCF-HW-DG33F	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
472	AC4-RCI-FE-U1-2A	DGV-CCF-HW-DG32F	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
473	CCW-XHE-RE-CCW33	DC1-MAI-MA-BCC31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
474	CCW-CRB-DN-52C3Z	EDG-ENG-FR-DG33R	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
475	CCW-CRB-DN-52C3Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
476	AC4-RCI-FE-U1-5A	CCW-XHE-RE-CCW33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
477	AC4-RCI-FE-U1-2A	CCW-XHE-RE-CCW33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G

478	CCW-RCK-NO-PM33	EDG-MDP-FR-FOT33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
479	CCW-RCK-NO-PM33	EDG-MDP-FR-FOT31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
480	CCW-MDP-FR-PM32Z	EDG-XHE-RE-33RHE	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
481	CCW-MDP-FR-PM31Z	DC1-MAI-MA-BCC32	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
482	CCW-MDP-FR-PM33Z	EDG-XHE-RE-33RHE	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
483	CCW-MDP-FR-PM31Z	EDG-XHE-RE-32RHE	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
484	CCW-MDP-FR-PM32Z	DC1-MAI-MA-BCC32	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
485	CCW-MDP-FR-PM31Z	EDG-XHE-RE-31RHE	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
486	CCW-MDP-FR-PM33Z	EDG-XHE-RE-31RHE	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
487	CCW-MDP-FR-PM32Z	EDG-XHE-RE-32RHE	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
488	CCW-MAI-MA-PM33	EDG-ENG-FS-D33SZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
489	CCW-MAI-MA-PM33	EDG-ENG-FS-D31SZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
490	AC4-RCI-FE-U1-2A	EDG-MDP-FS-FOT33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
491	AC4-RCI-FE-U1-2A	EDG-MDP-FS-FOT32	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
492	CCW-MDP-FS-PM33	EDG-XHE-RE-33RHE	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
493	CCW-MDP-FS-PM33	EDG-XHE-RE-31RHE	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
494	AC4-RCK-NO-BCH39	CCW-MDP-FR-PM32Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
495	CCW-MDP-FR-PM31Z	EDG-RCK-NO-FOT31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
496	CCW-MDP-FR-PM32Z	EDG-RCK-NO-FOT33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
497	AC4-RCK-NO-BCH39	CCW-MDP-FR-PM33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
498	CCW-MDP-FR-PM33Z	DGV-RCK-NO-DV318	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
499	AC4-RCK-NO-BCH37	CCW-MDP-FR-PM31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
500	CCW-MDP-FR-PM31Z	EDG-RCK-NO-FOT32	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
501	CCW-MDP-FR-PM32Z	DGV-RCK-NO-DV318	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
502	CCW-MDP-FR-PM32Z	CCW-RCK-NO-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
503	CCW-MDP-FR-PM33Z	EDG-RCK-NO-FOT31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
504	AC4-RCK-NO-BCH37	CCW-MDP-FR-PM32Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
505	CCW-MDP-FR-PM31Z	CCW-RCK-NO-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
506	CCW-MDP-FR-PM32Z	EDG-RCK-NO-FOT32	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
507	CCW-MDP-FR-PM33Z	EDG-RCK-NO-FOT33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
508	CCW-CRB-DN-52C3Z	DC1-MAI-MA-BCC31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
509	AC4-CRB-CC-52-5A	AC4-RCI-FE-U1-2A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
510	AC4-CRB-OO-52E3Z	AC4-RCI-FE-U1-2A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
511	AC4-RCI-FE-U1-2A	CCW-CRB-DN-52C3Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
512	AC4-RCI-FE-U1-5A	CCW-CRB-DN-52C3Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
513	AC4-CRB-CC-52-6A	AC4-RCI-FE-U1-2A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
514	AC4-CRB-CC-6A5AZ	AC4-RCI-FE-U1-2A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G

515	AC4-CRB-OO-52E2Z	AC4-RCI-FE-U1-2A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
516	AC4-FUS-NO-FS2AZ	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
517	AC4-FUS-NO-FS2AZ	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
518	CCW-MAI-MA-PM33	DGV-CCF-HW-DG33L	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
519	CCW-MAI-MA-PM33	DGV-CCF-HW-DG33D	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
520	CCW-MAI-MA-PM33	DGV-CCF-HW-DG31L	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
521	CCW-MAI-MA-PM33	DGV-CCF-HW-DG31D	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
522	AC4-PTR-HW-BS2AZ	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
523	AC4-PTR-HW-BS2AZ	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
524	AC4-RCK-NO-BCH39	CCW-MDP-FS-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
525	CCW-MDP-FS-PM33	DGV-RCK-NO-DV318	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
526	CCW-MDP-FS-PM33	EDG-RCK-NO-FOT31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
527	CCW-MDP-FS-PM33	EDG-RCK-NO-FOT33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
528	CCW-MDP-FR-PM32Z	EDG-MDP-FR-FOT33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
529	CCW-MDP-FR-PM31Z	EDG-MDP-FR-FOT32	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
530	CCW-MDP-FR-PM31Z	EDG-MDP-FR-FOT31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
531	CCW-MDP-FR-PM33Z	EDG-MDP-FR-FOT31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
532	CCW-MDP-FR-PM33Z	EDG-MDP-FR-FOT33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
533	CCW-MDP-FR-PM32Z	EDG-MDP-FR-FOT32	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
534	CCW-MDP-FS-PM33	EDG-MDP-FR-FOT33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
535	CCW-MDP-FS-PM33	EDG-MDP-FR-FOT31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
536	CCW-CKV-CC-761C	EDG-MAI-MA-EDG31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
537	CCW-CKV-OO-761B	EDG-XHE-RE-31RHE	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
538	CCW-CKV-OO-761A	EDG-XHE-RE-33RHE	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
539	CCW-CKV-CO-761C_	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
540	CCW-MDP-FR-PM31Z	CCW-MDP-FR-PM32Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
541	CCW-MDP-FR-PM31Z	CCW-MDP-FR-PM33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
542	CCW-MDP-FR-PM32Z	CCW-MDP-FR-PM33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
543	AC4-RCI-FE-U1-2A	EDG-RCS-OO-335A1	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
544	AC4-RCI-FE-U1-2A	AC4-RCS-OO-33CVX	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
545	AC4-RCI-FE-U1-2A	EDG-RCS-OO-D33CV	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
546	AC4-RCI-FE-U1-2A	EDG-RCS-OO-D32CV	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
547	AC4-RCI-FE-U1-2A	EDG-RCS-OO-336A1	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
548	AC4-RCI-FE-U1-2A	AC4-RCS-OO-32CVX	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
549	CCW-CKV-OO-761A	DGV-RCK-NO-DV318	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
550	CCW-CKV-OO-761A	EDG-RCK-NO-FOT33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
551	AC4-RCK-NO-BCH39	CCW-CKV-OO-761A	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G

552	CCW-CKV-OO-761B	EDG-RCK-NO-FOT31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
553	CCW-MDP-FR-PM31Z	CCW-MDP-FS-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
554	CCW-MDP-FR-PM32Z	CCW-MDP-FS-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
555	CCW-MAI-MA-PM33	DC1-BCC-HW-BC31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
556	CCW-MAI-MA-PM33	DC1-BAT-HW-BT31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
557	CCW-MAI-MA-PM33	EDG-STR-PG-DG33F	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
558	CCW-MAI-MA-PM33	EDG-STR-PG-DG31F	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
559	AC4-RCS-OC-U2AX1	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
560	CCW-XVM-OC-762C	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
561	CCW-XVM-OC-760C	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
562	CCW-XVM-OC-762C	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
563	AC4-RCS-OC-U2AX2	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
564	AC4-RCS-OC-U2AX2	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
565	AC4-RCS-OC-U2AX4	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
566	CCW-XVM-OC-760C	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
567	AC4-RCS-OC-U2AX1	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
568	AC4-RCS-OC-U2AX4	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
569	CCW-CKV-CC-761C	EDG-MAI-MA-EDG33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
570	CCW-CKV-OO-761A	EDG-MDP-FR-FOT33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
571	CCW-CKV-OO-761B	EDG-MDP-FR-FOT31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
572	CCW-MSW-DN-1-CC3	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
573	CCW-MSW-DN-1-CC3	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
574	AC4-FUS-NO-FS5AZ	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
575	AC4-FUS-NO-FS2AZ	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
576	AC4-PTR-HW-BS2AZ	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
577	AC4-PTR-HW-BS5AZ	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
578	CCW-XHE-RE-CCW33	EDG-XHE-RE-33RHE	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
579	CCW-XHE-RE-CCW33	EDG-XHE-RE-31RHE	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
580	AC4-PRY-HW-IU22A	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
581	AC4-PRY-HW-IU12A	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
582	AC4-PRY-HW-IU12A	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
583	AC4-PRY-HW-IU22A	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
584	CCW-CKV-OO-761A	CCW-MDP-FR-PM31Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
585	CCW-CKV-OO-761B	CCW-MDP-FR-PM32Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
586	AC4-RCI-FE-U1-2A	EDG-RCS-CC-D32K1	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
587	AC4-RCI-FE-U1-2A	EDG-RCS-CC-32CVX	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
588	AC4-RCI-FE-U1-2A	EDG-RCS-CC-33CVX	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G

589	AC4-RCI-FE-U1-2A	EDG-RCS-CC-33NST	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
590	AC4-RCI-FE-U1-2A	EDG-RCS-CC-D33K1	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
591	AC4-RCI-FE-U1-2A	EDG-RCS-CC-32NST	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
592	CCW-RCK-NO-PM33	DGV-CCF-HW-DG31F	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
593	CCW-RCK-NO-PM33	DGV-CCF-HW-DG33F	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
594	AC4-RCK-NO-BCH39	CCW-XHE-RE-CCW33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
595	CCW-XHE-RE-CCW33	DGV-RCK-NO-DV318	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
596	CCW-XHE-RE-CCW33	EDG-RCK-NO-FOT31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
597	CCW-XHE-RE-CCW33	EDG-RCK-NO-FOT33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
598	AC4-FUS-NO-FS2AZ	EDG-MAI-MA-EDG32	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
599	AC4-PTR-HW-BS2AZ	EDG-MAI-MA-EDG32	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
600	CCW-CKV-CC-761C	EDG-ENG-FR-DG33R	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
601	CCW-CKV-CC-761C	EDG-ENG-FR-DG31R	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
602	CCW-XHE-RE-CCW33	EDG-MDP-FR-FOT31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
603	CCW-XHE-RE-CCW33	EDG-MDP-FR-FOT33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
604	CCW-CRB-DN-52C3Z	EDG-XHE-RE-31RHE	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
605	CCW-CRB-DN-52C3Z	EDG-XHE-RE-33RHE	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
606	CCW-RCK-NO-PM33	EDG-MDP-FS-FOT31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
607	CCW-RCK-NO-PM33	EDG-MDP-FS-FOT33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
608	AC4-RCI-FE-U1-2A	EDG-ENG-FS-D32SZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
609	AC4-RCI-FE-U1-2A	EDG-ENG-FS-D33SZ	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
610	CCW-MAI-MA-PM33	DC1-BAT-HW-BT33Z	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
611	AC4-FUS-NO-FS2AZ	EDG-MAI-MA-EDG33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
612	AC4-BAC-ST-BS5AZ	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
613	AC4-BAC-ST-C36AZ	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
614	AC4-BAC-ST-C36CZ	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
615	AC4-BAC-ST-BS2AZ	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
616	AC4-PTR-HW-BS2AZ	EDG-MAI-MA-EDG33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
617	AC4-RCS-OC-U5AX4	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
618	CCW-MAI-MA-PM33	EDG-RCS-OC-33SDR	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
619	AC4-RCS-OC-862A	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
620	CCW-MAI-MA-PM33	EDG-RCS-OC-33OSR	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
621	AC4-RCS-OC-OTSG1	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
622	CCW-MAI-MA-PM33	EDG-RCS-OC-33OCT	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
623	AC4-RCS-OC-U2AX4	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
624	CCW-MAI-MA-PM33	EDG-RCS-OC-31OSR	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
625	CCW-MAI-MA-PM33	EDG-RCS-OC-31SDR	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G

626	CCW-MAI-MA-PM33	EDG-RCS-OC-33OCR	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
627	CCW-MAI-MA-PM33	EDG-RCS-OC-K1XE1	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
628	AC4-RCS-OC-OTS5A	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
629	AC4-RCS-OC-U2AX2	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
630	CCW-MAI-MA-PM33	EDG-RCS-OC-31OCR	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
631	AC4-RCS-OC-865A	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
632	CCW-MAI-MA-PM33	EDG-RCS-OC-86EG1	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
633	CCW-MAI-MA-PM33	EDG-RCS-OC-3386X	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
634	AC4-RCS-OC-U2AX1	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
635	CCW-MAI-MA-PM33	EDG-RCS-OC-33OSS	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
636	CCW-MAI-MA-PM33	EDG-RCS-OC-86EG3	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
637	AC4-RCS-OC-U5AX3	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
638	CCW-MAI-MA-PM33	EDG-RCS-OC-31OCT	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
639	CCW-MAI-MA-PM33	EDG-RCS-OC-3186X	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
640	CCW-MAI-MA-PM33	EDG-RCS-OC-31OSS	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
641	AC4-RCS-OC-OTS2A	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
642	AC4-RCS-OC-U5AX1	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
643	CCW-MAI-MA-PM33	EDG-MSW-OC-31STP	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
644	CCW-MAI-MA-PM33	EDG-MSW-OC-33STP	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
645	AC4-MSW-CO-CREG3	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
646	AC4-MSW-CO-SO31Z	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
647	AC4-MSW-CO-CREG1	CCW-MAI-MA-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
648	CCW-MDP-FR-PM31Z	DGV-CCF-HW-DG32F	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
649	CCW-MDP-FR-PM32Z	DGV-CCF-HW-DG33F	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
650	CCW-MDP-FR-PM32Z	DGV-CCF-HW-DG32F	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
651	CCW-MDP-FR-PM33Z	DGV-CCF-HW-DG33F	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
652	CCW-MDP-FR-PM33Z	DGV-CCF-HW-DG31F	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
653	CCW-MDP-FR-PM31Z	DGV-CCF-HW-DG31F	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
654	CCW-CKV-CO-761C	EDG-MAI-MA-EDG32	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
655	AC4-CRB-CC-522AZ	CCW-RCK-NO-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
656	CCW-CRB-DN-52C3Z	EDG-RCK-NO-FOT33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
657	AC4-CRB-OO-52E3Z	CCW-RCK-NO-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
658	CCW-CRB-DN-52C3Z	EDG-RCK-NO-FOT31	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
659	AC4-CRB-OO-52E1Z	CCW-RCK-NO-PM33	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
660	CCW-CRB-DN-52C3Z	DGV-RCK-NO-DV318	EQ_T1	FLAG-S_7_CD	FLAG_NO_CFC	ZCCR-RACKS-67G

S_15_CD DOMINANT CORE DAMAGE ACCIDENT SEQUENCE

TERM NUMBER	CUT SET LISTING				
1	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZBATT-313234-88G	
2	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZCB-EXFAN-116G	
3	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZDC1-BATCHR-51G	
4	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZDGBAOD-75G	
5	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZEDG-DAYTNK-75G	
6	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZEDG-JACTNK-75G	
7	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZEDG-STOTNK-75G	
8	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZEDGART-75G	
9	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZEDGS-116G	
10	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZEDGS-PNL-AN-88G	
11	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZEDGXTR-99G	
12	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZMCC36AB-AN-62G	
13	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZMCC39-AN-90G	
14	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZSWGR3132-AN-67G	
15	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZSWSPUMPS-69G	
16	C-MECHANICAL	EQ_T1	FLAG-SI	FLAG-S_15_CD	ZCCR-RACKS-67G
17	C-MECHANICAL	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
18	C-MECHANICAL	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
19	C-MECHANICAL	EDG-MAI-MA-EDG32	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
20	C-MECHANICAL	EDG-MAI-MA-EDG33	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
21	C-MECHANICAL	EDG-ENG-FR-DG33R	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
22	C-MECHANICAL	EDG-ENG-FR-DG32R	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
23	C-MECHANICAL	DC1-MAI-MA-BCC31	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
24	C-MECHANICAL	EDG-XHE-RE-33RHE	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
25	C-MECHANICAL	DC1-MAI-MA-BCC32	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
26	C-MECHANICAL	EDG-XHE-RE-32RHE	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
27	AC4-RCK-NO-BCH39	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
28	C-MECHANICAL	EDG-RCK-NO-FOT33	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
29	C-MECHANICAL	DGV-RCK-NO-DV318	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
30	AC4-RCK-NO-BCH37	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
31	C-MECHANICAL	EDG-RCK-NO-FOT32	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
32	C-MECHANICAL	EDG-MDP-FR-FOT33	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
33	C-MECHANICAL	EDG-MDP-FR-FOT32	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G

34	C-MECHANICAL	DGV-CCF-HW-DG33F	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
35	C-MECHANICAL	DGV-CCF-HW-DG32F	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
36	C-MECHANICAL	EDG-MDP-FS-FOT33	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
37	C-MECHANICAL	EDG-MDP-FS-FOT32	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
38	AC4-CRB-OO-52E3Z	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
39	AC4-CRB-CC-52-5A	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
40	AC4-CRB-OO-52E2Z	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
41	AC4-CRB-CC-6A5AZ	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
42	AC4-CRB-CC-52-6A	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
43	AC4-RCS-OO-33CVX	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
44	C-MECHANICAL	EDG-RCS-OO-D32CV	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
45	C-MECHANICAL	EDG-RCS-OO-336A1	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
46	C-MECHANICAL	EDG-RCS-OO-335A1	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
47	C-MECHANICAL	EDG-RCS-OO-D33CV	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
48	AC4-RCS-OO-32CVX	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZMCC36C-AN-86G
49	C-MECHANICAL	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G
50	C-MECHANICAL	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G
51	C-MECHANICAL	EDG-MAI-MA-EDG32	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G
52	C-MECHANICAL	EDG-MAI-MA-EDG33	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G
53	C-MECHANICAL	EDG-ENG-FR-DG32R	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G
54	C-MECHANICAL	EDG-ENG-FR-DG33R	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G
55	C-MECHANICAL	DC1-MAI-MA-BCC31	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G
56	C-MECHANICAL	EDG-XHE-RE-33RHE	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G
57	C-MECHANICAL	DC1-MAI-MA-BCC32	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G
58	C-MECHANICAL	EDG-XHE-RE-32RHE	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G
59	AC4-RCK-NO-BCH39	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G
60	C-MECHANICAL	EDG-RCK-NO-FOT33	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G
61	C-MECHANICAL	DGV-RCK-NO-DV318	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G
62	C-MECHANICAL	EDG-RCK-NO-FOT32	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G
63	AC4-RCK-NO-BCH37	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G
64	C-MECHANICAL	EDG-MDP-FR-FOT32	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G
65	C-MECHANICAL	EDG-MDP-FR-FOT33	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G
66	C-MECHANICAL	DGV-CCF-HW-DG32F	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G
67	C-MECHANICAL	DGV-CCF-HW-DG33F	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G
68	C-MECHANICAL	EDG-MDP-FS-FOT33	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G
69	C-MECHANICAL	EDG-MDP-FS-FOT32	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G
70	AC4-CRB-OO-52E2Z	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G

71	AC4-CRB-OO-52E3Z	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G	
72	AC4-CRB-CC-52-5A	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G	
73	AC4-CRB-CC-52-6A	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G	
74	AC4-CRB-CC-6A5AZ	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G	
75	C-MECHANICAL	EDG-RCS-OO-335A1	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G	
76	C-MECHANICAL	EDG-RCS-OO-336A1	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G	
77	AC4-RCS-OO-32CVX	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G	
78	C-MECHANICAL	EDG-RCS-OO-D33CV	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G	
79	AC4-RCS-OO-33CVX	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G	
80	C-MECHANICAL	EDG-RCS-OO-D32CV	EQ_T1	FLAG-S_15_CD	ZSUPPANEL-AN-52G	
81	AC4-RCK-NO-BC36C	C-MECHANICAL	EQ_T1	FLAG-SI	FLAG-S_15_CD	ZBATT33-AN-121G
82	C-MECHANICAL	DC1-MAI-MA-BCC33	EQ_T1	FLAG-SI	FLAG-S_15_CD	ZBATT33-AN-121G
83	C-MECHANICAL	EQ_T1	FLAG-SI	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
84	C-MECHANICAL	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
85	C-MECHANICAL	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
86	C-MECHANICAL	EDG-MAI-MA-EDG32	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
87	C-MECHANICAL	EDG-MAI-MA-EDG33	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
88	C-MECHANICAL	EDG-ENG-FR-DG32R	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
89	C-MECHANICAL	EDG-ENG-FR-DG33R	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
90	C-MECHANICAL	DC1-MAI-MA-BCC31	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
91	C-MECHANICAL	EDG-XHE-RE-32RHE	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
92	C-MECHANICAL	EDG-XHE-RE-33RHE	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
93	C-MECHANICAL	DC1-MAI-MA-BCC32	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
94	AC4-RCK-NO-BCH39	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
95	C-MECHANICAL	EDG-RCK-NO-FOT32	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
96	C-MECHANICAL	EDG-RCK-NO-FOT33	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
97	C-MECHANICAL	DGV-RCK-NO-DV318	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
98	AC4-RCK-NO-BCH37	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
99	C-MECHANICAL	EDG-MDP-FR-FOT33	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
100	C-MECHANICAL	EDG-MDP-FR-FOT32	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
101	C-MECHANICAL	DGV-CCF-HW-DG33F	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
102	C-MECHANICAL	DGV-CCF-HW-DG32F	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
103	C-MECHANICAL	EDG-MDP-FS-FOT33	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
104	C-MECHANICAL	EDG-MDP-FS-FOT32	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
105	AC4-CRB-OO-52E2Z	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
106	AC4-CRB-CC-52-6A	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
107	AC4-CRB-CC-52-5A	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G

108	AC4-CRB-CC-6A5AZ	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
109	AC4-CRB-OO-52E3Z	C-MECHANICAL	EQ_T1	FLAG-S_15_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G
110	C-MECHANICAL	EQ_T1	FLAG-SI	FLAG-S_15_CD	ZBATT33-AN-121G	ZMCC36C-AN-86G
111	C-MECHANICAL	EQ_T1	FLAG-SI	FLAG-S_15_CD	SAS-RCS-OO-SI6A	ZMCC36C-AN-86G
112	C-MECHANICAL	EQ_T1	FLAG-SI	FLAG-S_15_CD	SAS-RCS-OO-SI5A	ZMCC36C-AN-86G
113	C-MECHANICAL	EQ_T1	FLAG-SI	FLAG-S_15_CD	SAS-XLF-TE-SASB	ZMCC36C-AN-86G
114	C-MECHANICAL	EQ_T1	FLAG-SI	FLAG-S_15_CD	SAS-XLF-TE-SASA	ZMCC36C-AN-86G
115	C-MECHANICAL	EQ_T1	FLAG-SI	FLAG-S_15_CD	SAS-RCS-OO-SI1	ZMCC36C-AN-86G
116	C-MECHANICAL	EQ_T1	FLAG-SI	FLAG-S_15_CD	SAS-RCS-OO-SI2	ZMCC36C-AN-86G
117	C-MECHANICAL	EQ_T1	FLAG-SI	FLAG-S_15_CD	SAS-RCS-OO-SI6A	ZSUPPANEL-AN-52G
118	C-MECHANICAL	EQ_T1	FLAG-SI	FLAG-S_15_CD	SAS-RCS-OO-SI5A	ZSUPPANEL-AN-52G
119	C-MECHANICAL	EQ_T1	FLAG-SI	FLAG-S_15_CD	SAS-XLF-TE-SASB	ZSUPPANEL-AN-52G
120	C-MECHANICAL	EQ_T1	FLAG-SI	FLAG-S_15_CD	SAS-XLF-TE-SASA	ZSUPPANEL-AN-52G
121	C-MECHANICAL	EQ_T1	FLAG-SI	FLAG-S_15_CD	SAS-RCS-OO-SI2	ZSUPPANEL-AN-52G
122	C-MECHANICAL	EQ_T1	FLAG-SI	FLAG-S_15_CD	SAS-RCS-OO-SI1	ZSUPPANEL-AN-52G
123	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	SWS-MAI-MA-PM36	ZBATT33-AN-121G
124	AC4-RCI-FE-U1-6A	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	ZBATT33-AN-121G
125	AC4-RCI-FE-U1-5A	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	ZBATT33-AN-121G
126	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	SWS-RCK-NO-PM36	ZBATT33-AN-121G
127	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	SWS-STR-PG-36	ZBATT33-AN-121G
128	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	SWS-MDP-FR-PM34Z	ZBATT33-AN-121G
129	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	SWS-MDP-FR-PM36Z	ZBATT33-AN-121G
130	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	SWS-MDP-FS-PMP36	ZBATT33-AN-121G
131	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	SWS-MDP-RS-PMP34	ZBATT33-AN-121G
132	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	SWS-CKV-OO-SW1-5	ZBATT33-AN-121G
133	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	SWS-XHE-RE-PMP36	ZBATT33-AN-121G
134	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	SWS-STR-PG-34	ZBATT33-AN-121G
135	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	SWS-CRB-DN-52S6Z	ZBATT33-AN-121G
136	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	SWS-MAI-MA-PM36	ZBATT33-AN-121G
137	AC4-RCI-FE-U1-6A	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	ZBATT33-AN-121G
138	AC4-RCI-FE-U1-5A	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	ZBATT33-AN-121G
139	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	SWS-RCK-NO-PM36	ZBATT33-AN-121G
140	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	SWS-STR-PG-36	ZBATT33-AN-121G
141	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	SWS-MDP-FR-PM34Z	ZBATT33-AN-121G
142	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	SWS-MDP-FR-PM36Z	ZBATT33-AN-121G
143	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	SWS-MDP-FS-PMP36	ZBATT33-AN-121G
144	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	SWS-MDP-RS-PMP34	ZBATT33-AN-121G

145	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	SWS-CKV-OO-SW1-5	ZBATT33-AN-121G
146	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	SWS-XHE-RE-PMP36	ZBATT33-AN-121G
147	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	SWS-STR-PG-34	ZBATT33-AN-121G
148	C-MECHANICAL	EQ_T1	FLAG-LOSP	FLAG-S_15_CD	SWS-CRB-DN-52S6Z	ZBATT33-AN-121G

EQ_T1_3 DOMINANT CORE DAMAGE ACCIDENT SEQUENCE

TERM NUMBER	CUT SET LISTING				
1	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCCR-RACKS-67G	
2	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
3	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
4	EDG-MAI-MA-EDG32	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
5	EDG-MAI-MA-EDG33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
6	EDG-ENG-FR-DG33R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
7	EDG-ENG-FR-DG32R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
8	DC1-MAI-MA-BCC31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
9	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	OPR_RHR-SD	ZCRF12345-AN-86G
10	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	RCS-XHE-MC-PT403	ZCRF12345-AN-86G
11	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	RCS-XHE-MC-PT402	ZCRF12345-AN-86G
12	DC1-MAI-MA-BCC32	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
13	EDG-XHE-RE-33RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
14	EDG-XHE-RE-32RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
15	AC4-RCK-NO-BCH37	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
16	EDG-RCK-NO-FOT33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
17	EDG-RCK-NO-FOT32	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
18	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-RCK-NO-731	ZCRF12345-AN-86G
19	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-RCK-NO-730	ZCRF12345-AN-86G
20	DGV-RCK-NO-DV318	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
21	AC4-RCK-NO-BCH39	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
22	EDG-MDP-FR-FOT33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
23	EDG-MDP-FR-FOT32	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
24	DGV-CCF-HW-DG33F	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
25	DGV-CCF-HW-DG32F	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
26	EDG-MDP-FS-FOT33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
27	EDG-MDP-FS-FOT32	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
28	AC4-CRB-CC-52-5A	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
29	AC4-CRB-OO-52E3Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
30	AC4-CRB-CC-52-6A	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
31	AC4-CRB-CC-6A5AZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
32	AC4-CRB-OO-52E2Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
33	AC4-RCS-OO-33CVX	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G

34	EDG-RCS-OO-D33CV	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
35	EDG-RCS-OO-335A1	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
36	AC4-RCS-OO-32CVX	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
37	EDG-RCS-OO-D32CV	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
38	EDG-RCS-OO-336A1	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
39	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHR-RLY-NO-403AZ	ZCRF12345-AN-86G
40	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHR-RLY-NO-402AZ	ZCRF12345-AN-86G
41	CCW-CCF-CC-822	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
42	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-MOV-CC-731	ZCRF12345-AN-86G
43	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-MOV-CC-730	ZCRF12345-AN-86G
44	AC4-XHE-RE-MCC6A	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
45	AC4-XHE-RE-MCC6B	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
46	EDG-RCS-CC-33CVX	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
47	EDG-RCS-CC-D33K1	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
48	EDG-RCS-CC-33NST	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
49	EDG-RCS-CC-32CVX	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
50	EDG-RCS-CC-D32K1	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
51	EDG-RCS-CC-32NST	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
52	EDG-ENG-FS-D33SZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
53	EDG-ENG-FS-D32SZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
54	DGV-CCF-HW-DG33L	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
55	DGV-CCF-HW-DG33D	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
56	DGV-CCF-HW-DG32L	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
57	DGV-CCF-HW-DG32D	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
58	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-XHE-RE-883	ZCRF12345-AN-86G
59	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-XVM-CC-732	ZCRF12345-AN-86G
60	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-CKV-CC-741	ZCRF12345-AN-86G
61	DC1-BCC-HW-BC32Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
62	DC1-BAT-HW-BT32Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
63	DC1-BCC-HW-BC31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
64	DC1-BAT-HW-BT31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
65	EDG-STR-PG-DG33F	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
66	EDG-STR-PG-DG32F	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
67	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-CCF-FR-NESPM	ZCRF12345-AN-86G
68	AC1-BAC-ST-BUS31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
69	AC1-BAC-ST-BUS32	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
70	AC4-BAC-ST-C36AZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G

71	AC4-BAC-ST-BS5AZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
72	AC4-BAC-ST-BS6AZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
73	AC4-BAC-ST-CC37Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
74	AC4-BAC-ST-C36BZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
75	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-XVM-OC-67-2	ZCRF12345-AN-86G
76	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-XVM-OC-62-6	ZCRF12345-AN-86G
77	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-XVM-OC-62-4	ZCRF12345-AN-86G
78	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-XVM-OC-67-3	ZCRF12345-AN-86G
79	EDG-RCS-OC-32SDR	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
80	EDG-RCS-OC-33OSS	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
81	EDG-RCS-OC-86EG2	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
82	EDG-RCS-OC-33OSR	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
83	EDG-RCS-OC-86EG3	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
84	EDG-RCS-OC-33OCR	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
85	EDG-RCS-OC-33OCT	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
86	AC4-RCS-OC-OTS5A	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
87	EDG-RCS-OC-3386X	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
88	EDG-RCS-OC-32OCR	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
89	EDG-RCS-OC-32OCT	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
90	EDG-RCS-OC-32OSS	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
91	EDG-RCS-OC-3286X	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
92	AC4-RCS-OC-865A	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
93	AC4-RCS-OC-866A	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
94	EDG-RCS-OC-32OSR	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
95	EDG-RCS-OC-33SDR	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
96	AC4-RCS-OC-OTS6A	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
97	AC4-MSW-CO-CREG2	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
98	EDG-MSW-OC-32STP	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
99	AC4-MSW-CO-CREG3	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
100	EDG-MSW-OC-33STP	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
101	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	HHR-MOV-CO-888A	ZCRF12345-AN-86G
102	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	HHR-MOV-CO-888B	ZCRF12345-AN-86G
103	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-CCF-FS-PUMPS	ZCRF12345-AN-86G
104	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-MSW-DN-730Z	ZCRF12345-AN-86G
105	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-MSW-DN-731Z	ZCRF12345-AN-86G
106	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-MOV-CO-883	ZCRF12345-AN-86G
107	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	RCS-ASP-HI-P403Z	ZCRF12345-AN-86G

108	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	RCS-ASP-HI-P402Z	ZCRF12345-AN-86G	
109	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G	ZPABEF-AN-88G	
110	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-CCF-CC-FCUS	ZPABEF-AN-88G	
111	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G	ZPABSF-AN-126G	
112	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-CCF-CC-FCUS	ZPABSF-AN-126G	
113	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G	ZRHR-HTXS-AN-49G	
114	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-CCF-CC-FCUS	ZRHR-HTXS-AN-49G	
115	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G	ZRHR-PUMPS-62G	
116	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-CCF-CC-FCUS	ZRHR-PUMPS-62G	
117	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G	ZVC46PT-75G	
118	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-CCF-CC-FCUS	ZVC46PT-75G	
119	EQ_T1	FLAG-SI	FLAG-T1_3CD	FLAG_NO_CFC	SAS-RCS-OO-SI6A	ZCRF12345-AN-86G
120	EQ_T1	FLAG-SI	FLAG-T1_3CD	FLAG_NO_CFC	SAS-RCS-OO-SI5A	ZCRF12345-AN-86G
121	EQ_T1	FLAG-SI	FLAG-T1_3CD	FLAG_NO_CFC	SAS-XLF-TE-SASB	ZCRF12345-AN-86G
122	EQ_T1	FLAG-SI	FLAG-T1_3CD	FLAG_NO_CFC	SAS-XLF-TE-SASA	ZCRF12345-AN-86G
123	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-XHE-RE-PM32	ZCRF12345-AN-86G
124	EQ_T1	FLAG-SI	FLAG-T1_3CD	FLAG_NO_CFC	SAS-RCS-OO-SI2	ZCRF12345-AN-86G
125	EQ_T1	FLAG-SI	FLAG-T1_3CD	FLAG_NO_CFC	SAS-RCS-OO-SI1	ZCRF12345-AN-86G
126	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-RCK-NO-PM32	ZCRF12345-AN-86G
127	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-XHE-RE-PM32	ZCRF12345-AN-86G
128	EQ_T1	FLAG-SI	FLAG-T1_3CD	FLAG_NO_CFC	SAS-RCI-FE-SI2OZ	ZCRF12345-AN-86G
129	EQ_T1	FLAG-SI	FLAG-T1_3CD	FLAG_NO_CFC	SAS-RCI-FE-SI1OZ	ZCRF12345-AN-86G
130	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-MAI-MA-PM32	ZCRF12345-AN-86G
131	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-XHE-RE-PM32	ZCRF12345-AN-86G
132	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-RCK-NO-PM32	ZCRF12345-AN-86G
133	AC1-INV-HW-INV31	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
134	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-MDP-FR-PM32	ZCRF12345-AN-86G
135	CCW-MOV-CC-822A	CCW-MOV-CC-822B	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
136	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-MAI-MA-PM32	ZCRF12345-AN-86G
137	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-XHE-RE-PM31	LHI-XHE-RE-PM32	ZCRF12345-AN-86G
138	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-RCK-NO-PM32	ZCRF12345-AN-86G
139	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-MAI-MA-PM31	LHI-XHE-RE-PM32	ZCRF12345-AN-86G
140	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-CRB-DN-PM32Z	ZCRF12345-AN-86G
141	EDG-RCS-OC-3232X	EQ_T1	FLAG-NO-SI	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
142	EDG-RCS-OC-3333X	EQ_T1	FLAG-NO-SI	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
143	EQ_T1	FLAG-SI	FLAG-T1_3CD	FLAG_NO_CFC	SAS-MSW-OC-SITR2	ZCRF12345-AN-86G
144	EQ_T1	FLAG-SI	FLAG-T1_3CD	FLAG_NO_CFC	SAS-MSW-OC-SITR1	ZCRF12345-AN-86G

145	EDG-PRY-HW-3333	EQ_T1	FLAG-NO-SI	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
146	EDG-PRY-HW-3351V	EQ_T1	FLAG-NO-SI	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
147	EDG-PRY-HW-3251V	EQ_T1	FLAG-NO-SI	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
148	EDG-PRY-HW-3232	EQ_T1	FLAG-NO-SI	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
149	AC1-INV-HW-INV31	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G
150	AC1-INV-HW-INV32	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G	ZIB3133-EQ-75G
151	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-XHE-RE-PM32	ZCRF12345-AN-86G	ZMCC36C-AN-86G
152	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-RCK-NO-PM32	ZCRF12345-AN-86G	ZMCC36C-AN-86G
153	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-MAI-MA-PM32	ZCRF12345-AN-86G	ZMCC36C-AN-86G
154	AC1-INV-HW-INV31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G	ZMCC36C-AN-86G
155	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-MDP-FR-PM32	ZCRF12345-AN-86G	ZMCC36C-AN-86G
156	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-CRB-DN-PM32Z	ZCRF12345-AN-86G	ZMCC36C-AN-86G
157	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	OPR_RHR-SD	SWS-MAI-MA-PM36	ZMCC36C-AN-86G
158	CFC-PND-CC-33DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	OPR_RHR-SD	ZMCC36C-AN-86G
159	CFC-PND-CC-31DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	OPR_RHR-SD	ZMCC36C-AN-86G
160	CFC-PND-CC-35DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	OPR_RHR-SD	ZMCC36C-AN-86G
161	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	RCS-XHE-MC-PT402	SWS-MAI-MA-PM36	ZMCC36C-AN-86G
162	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	RCS-XHE-MC-PT403	SWS-MAI-MA-PM36	ZMCC36C-AN-86G
163	CFC-PND-CC-33DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	RCS-XHE-MC-PT403	ZMCC36C-AN-86G
164	CFC-PND-CC-33DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	RCS-XHE-MC-PT402	ZMCC36C-AN-86G
165	CFC-PND-CC-31DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	RCS-XHE-MC-PT402	ZMCC36C-AN-86G
166	CFC-PND-CC-31DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	RCS-XHE-MC-PT403	ZMCC36C-AN-86G
167	CFC-PND-CC-35DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	RCS-XHE-MC-PT403	ZMCC36C-AN-86G
168	CFC-PND-CC-35DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	RCS-XHE-MC-PT402	ZMCC36C-AN-86G
169	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-XHE-RE-PM32	SWS-MAI-MA-PM36	ZMCC36C-AN-86G
170	CFC-PND-CC-33DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-XHE-RE-PM32	ZMCC36C-AN-86G
171	CFC-PND-CC-31DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-XHE-RE-PM32	ZMCC36C-AN-86G
172	CFC-PND-CC-35DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-XHE-RE-PM32	ZMCC36C-AN-86G
173	CFC-MAI-MA-FCU31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	OPR_RHR-SD	ZMCC36C-AN-86G
174	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-MDP-FS-PM32Z	ZCRF12345-AN-86G	ZMCC36C-AN-86G
175	CFC-MAI-MA-FCU31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	RCS-XHE-MC-PT403	ZMCC36C-AN-86G
176	CFC-MAI-MA-FCU31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	RCS-XHE-MC-PT402	ZMCC36C-AN-86G
177	CFC-MAI-MA-FCU31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-XHE-RE-PM32	ZMCC36C-AN-86G
178	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-RCK-NO-730	SWS-MAI-MA-PM36	ZMCC36C-AN-86G
179	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-RCK-NO-PM32	SWS-MAI-MA-PM36	ZMCC36C-AN-86G
180	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-RCK-NO-731	SWS-MAI-MA-PM36	ZMCC36C-AN-86G
181	CFC-PND-CC-33DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-RCK-NO-731	ZMCC36C-AN-86G

182	CFC-PND-CC-33DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-RCK-NO-PM32	ZMCC36C-AN-86G
183	CFC-PND-CC-33DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-RCK-NO-730	ZMCC36C-AN-86G
184	CFC-PND-CC-31DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-RCK-NO-PM32	ZMCC36C-AN-86G
185	CFC-PND-CC-35DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-RCK-NO-730	ZMCC36C-AN-86G
186	CFC-PND-CC-35DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-RCK-NO-731	ZMCC36C-AN-86G
187	CFC-PND-CC-31DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-RCK-NO-731	ZMCC36C-AN-86G
188	CFC-PND-CC-31DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-RCK-NO-730	ZMCC36C-AN-86G
189	CFC-PND-CC-35DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-RCK-NO-PM32	ZMCC36C-AN-86G
190	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-CKV-CC-738B	ZCRF12345-AN-86G	ZMCC36C-AN-86G
191	CFC-MAI-MA-FCU35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	OPR_RHR-SD	ZMCC36C-AN-86G
192	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-MAI-MA-PM32	SWS-MAI-MA-PM36	ZMCC36C-AN-86G
193	CFC-PND-CC-35DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-MAI-MA-PM32	ZMCC36C-AN-86G
194	CFC-PND-CC-33DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-MAI-MA-PM32	ZMCC36C-AN-86G
195	CFC-PND-CC-31DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-MAI-MA-PM32	ZMCC36C-AN-86G
196	CFC-RCK-NO-FCU35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	OPR_RHR-SD	ZMCC36C-AN-86G
197	CFC-RCK-NO-FCU33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	OPR_RHR-SD	ZMCC36C-AN-86G
198	CFC-RCK-NO-FCU31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	OPR_RHR-SD	ZMCC36C-AN-86G
199	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	OPR_RHR-SD	SWS-RCK-NO-PM36	ZMCC36C-AN-86G
200	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	OPR_RHR-SD	SWS-STR-PG-36	ZMCC36C-AN-86G
201	CFC-MAI-MA-FCU35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	RCS-XHE-MC-PT402	ZMCC36C-AN-86G
202	CFC-MAI-MA-FCU35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	RCS-XHE-MC-PT403	ZMCC36C-AN-86G
203	CFC-MAI-MA-FCU31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-RCK-NO-PM32	ZMCC36C-AN-86G
204	CFC-MAI-MA-FCU31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-RCK-NO-730	ZMCC36C-AN-86G
205	CFC-MAI-MA-FCU31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	LHI-RCK-NO-731	ZMCC36C-AN-86G
206	AC1-INV-HW-INV31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZCRF12345-AN-86G	ZMCCTB-AN-92G
207	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZMCC36C-AN-86G	ZPABEF-AN-88G
208	CFC-PND-CC-33DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
209	CFC-PND-CC-31DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
210	CFC-PND-CC-35DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
211	CFC-MAI-MA-FCU31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
212	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZPABEF-AN-88G
213	CFC-PND-CC-33DPZ	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
214	CFC-PND-CC-31DPZ	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
215	CFC-PND-CC-35DPZ	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
216	CFC-MAI-MA-FCU35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
217	CFC-RCK-NO-FCU35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
218	CFC-RCK-NO-FCU33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G

219	CFC-RCK-NO-FCU31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
220	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZMCC36C-AN-86G	ZPABEF-AN-88G
221	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-36	ZMCC36C-AN-86G	ZPABEF-AN-88G
222	CFC-XHE-RE-FCU33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
223	CFC-XHE-RE-FCU31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
224	CFC-SOV-HW-1306Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
225	CFC-SOV-HW-1307	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
226	CFC-SOV-HW-1300Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
227	CFC-SOV-HW-1301Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
228	CFC-SOV-HW-1294Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
229	CFC-SOV-HW-1295Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
230	CFC-MAI-MA-FCU33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
231	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZMCC36C-AN-86G	ZPABEF-AN-88G
232	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZMCC36C-AN-86G	ZPABEF-AN-88G
233	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZMCC36C-AN-86G	ZPABEF-AN-88G
234	CFC-MAI-MA-FCU31	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
235	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZPABEF-AN-88G
236	CFC-PND-CC-33DPZ	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
237	CFC-PND-CC-31DPZ	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
238	CFC-PND-CC-35DPZ	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
239	CFC-XHE-RE-FCU35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
240	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZPABEF-AN-88G
241	CFC-PND-CC-33DPZ	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
242	CFC-PND-CC-31DPZ	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
243	CFC-PND-CC-35DPZ	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
244	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-XHE-RE-PMP36	ZMCC36C-AN-86G	ZPABEF-AN-88G
245	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-34	ZMCC36C-AN-86G	ZPABEF-AN-88G
246	CFC-FCU-FS-35Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
247	CFC-FCU-FS-33Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
248	CFC-FCU-FS-31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
249	CFC-MAI-MA-FCU31	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
250	CFC-CRB-DN-FC35Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
251	CFC-CRB-DN-FC33Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
252	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-CRB-DN-52S6Z	ZMCC36C-AN-86G	ZPABEF-AN-88G
253	CFC-CRB-DN-FC31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
254	CFC-MAI-MA-FCU35	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
255	CFC-RCK-NO-FCU33	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G

256	CFC-RCK-NO-FCU31	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
257	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZPABEF-AN-88G
258	CFC-RCK-NO-FCU35	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
259	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-36	ZPABEF-AN-88G
260	CFC-XHE-RE-FCU33	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
261	CFC-XHE-RE-FCU31	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
262	CFC-SOV-HW-1300Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
263	CFC-SOV-HW-1301Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
264	CFC-SOV-HW-1294Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
265	CFC-SOV-HW-1295Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
266	CFC-SOV-HW-1306Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
267	CFC-SOV-HW-1307	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
268	CFC-MAI-MA-FCU33	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
269	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZPABEF-AN-88G
270	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZPABEF-AN-88G
271	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZPABEF-AN-88G
272	CFC-MAI-MA-FCU31	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
273	CFC-MAI-MA-FCU35	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
274	CFC-RCK-NO-FCU33	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
275	CFC-RCK-NO-FCU31	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
276	CFC-RCK-NO-FCU35	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
277	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZPABEF-AN-88G
278	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-36	ZPABEF-AN-88G
279	CFC-XHE-RE-FCU35	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
280	CFC-XHE-RE-FCU31	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
281	CFC-XHE-RE-FCU33	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
282	CFC-SOV-HW-1300Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
283	CFC-SOV-HW-1294Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
284	CFC-SOV-HW-1307	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
285	CFC-SOV-HW-1301Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
286	CFC-SOV-HW-1306Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
287	CFC-SOV-HW-1295Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
288	CFC-MAI-MA-FCU33	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
289	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZPABEF-AN-88G
290	CFC-PND-CC-33DPZ	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
291	CFC-PND-CC-31DPZ	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
292	CFC-PND-CC-35DPZ	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G

293	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZPABEF-AN-88G
294	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZPABEF-AN-88G
295	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-CKV-CC-SW1-6	ZMCC36C-AN-86G	ZPABEF-AN-88G
296	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZPABEF-AN-88G
297	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZPABEF-AN-88G
298	CFC-PND-CC-33DPZ	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
299	CFC-PND-CC-31DPZ	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
300	CFC-PND-CC-35DPZ	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
301	EDG-MDP-FR-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZPABEF-AN-88G
302	CFC-PND-CC-33DPZ	EDG-MDP-FR-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
303	CFC-PND-CC-31DPZ	EDG-MDP-FR-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
304	CFC-PND-CC-35DPZ	EDG-MDP-FR-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
305	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-XHE-RE-PMP36	ZPABEF-AN-88G
306	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-34	ZPABEF-AN-88G
307	CFC-FCU-FS-33Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
308	CFC-FCU-FS-31Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
309	CFC-FCU-FS-35Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
310	CFC-MAI-MA-FCU35	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
311	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZPABEF-AN-88G
312	CFC-RCK-NO-FCU33	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
313	CFC-RCK-NO-FCU31	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
314	CFC-RCK-NO-FCU35	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
315	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-36	ZPABEF-AN-88G
316	CFC-CRB-DN-FC33Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
317	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-CRB-DN-52S6Z	ZPABEF-AN-88G
318	CFC-CRB-DN-FC35Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
319	CFC-CRB-DN-FC31Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
320	CFC-XHE-RE-FCU33	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
321	CFC-XHE-RE-FCU31	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
322	CFC-FCU-FR-35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
323	CFC-FCU-FR-31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
324	CFC-FCU-FR-33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABEF-AN-88G
325	CFC-SOV-HW-1294Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
326	CFC-SOV-HW-1300Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
327	CFC-SOV-HW-1306Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
328	CFC-SOV-HW-1301Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
329	CFC-SOV-HW-1295Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G

330	CFC-SOV-HW-1307	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
331	CFC-MAI-MA-FCU33	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
332	CFC-XHE-RE-FCU35	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
333	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZPABEF-AN-88G
334	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZPABEF-AN-88G
335	CFC-MAI-MA-FCU31	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
336	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZPABEF-AN-88G
337	CFC-MAI-MA-FCU31	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABEF-AN-88G
338	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZMCC36C-AN-86G	ZPABSF-AN-126G
339	CFC-PND-CC-33DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
340	CFC-PND-CC-31DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
341	CFC-PND-CC-35DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
342	CFC-MAI-MA-FCU31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
343	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZPABSF-AN-126G
344	CFC-PND-CC-33DPZ	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
345	CFC-PND-CC-31DPZ	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
346	CFC-PND-CC-35DPZ	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
347	CFC-MAI-MA-FCU35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
348	CFC-RCK-NO-FCU33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
349	CFC-RCK-NO-FCU31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
350	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZMCC36C-AN-86G	ZPABSF-AN-126G
351	CFC-RCK-NO-FCU35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
352	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-36	ZMCC36C-AN-86G	ZPABSF-AN-126G
353	CFC-XHE-RE-FCU33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
354	CFC-XHE-RE-FCU31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
355	CFC-SOV-HW-1300Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
356	CFC-SOV-HW-1301Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
357	CFC-SOV-HW-1294Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
358	CFC-SOV-HW-1295Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
359	CFC-SOV-HW-1306Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
360	CFC-SOV-HW-1307	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
361	CFC-MAI-MA-FCU33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
362	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZMCC36C-AN-86G	ZPABSF-AN-126G
363	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZMCC36C-AN-86G	ZPABSF-AN-126G
364	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZMCC36C-AN-86G	ZPABSF-AN-126G
365	CFC-MAI-MA-FCU31	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
366	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZPABSF-AN-126G

367	CFC-PND-CC-33DPZ	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
368	CFC-PND-CC-31DPZ	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
369	CFC-PND-CC-35DPZ	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
370	CFC-XHE-RE-FCU35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
371	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZPABSF-AN-126G
372	CFC-PND-CC-33DPZ	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
373	CFC-PND-CC-31DPZ	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
374	CFC-PND-CC-35DPZ	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG NO CFC	ZPABSF-AN-126G
375	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-XHE-RE-PMP36	ZMCC36C-AN-86G	ZPABSF-AN-126G
376	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-34	ZMCC36C-AN-86G	ZPABSF-AN-126G
377	CFC-FCU-FS-33Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
378	CFC-FCU-FS-31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
379	CFC-FCU-FS-35Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
380	CFC-MAI-MA-FCU31	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
381	CFC-CRB-DN-FC33Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
382	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-CRB-DN-52S6Z	ZMCC36C-AN-86G	ZPABSF-AN-126G
383	CFC-CRB-DN-FC31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
384	CFC-CRB-DN-FC35Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
385	CFC-MAI-MA-FCU35	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
386	CFC-RCK-NO-FCU33	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
387	CFC-RCK-NO-FCU31	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
388	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZPABSF-AN-126G
389	CFC-RCK-NO-FCU35	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
390	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-36	ZPABSF-AN-126G
391	CFC-XHE-RE-FCU33	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
392	CFC-XHE-RE-FCU31	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
393	CFC-SOV-HW-1300Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
394	CFC-SOV-HW-1301Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
395	CFC-SOV-HW-1294Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
396	CFC-SOV-HW-1295Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
397	CFC-SOV-HW-1306Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
398	CFC-SOV-HW-1307	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
399	CFC-MAI-MA-FCU33	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
400	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZPABSF-AN-126G
401	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZPABSF-AN-126G
402	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZPABSF-AN-126G
403	CFC-MAI-MA-FCU31	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G

404	CFC-MAI-MA-FCU35	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
405	CFC-RCK-NO-FCU33	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
406	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZPABSF-AN-126G
407	CFC-RCK-NO-FCU31	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
408	CFC-RCK-NO-FCU35	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
409	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-36	ZPABSF-AN-126G
410	CFC-XHE-RE-FCU35	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
411	CFC-XHE-RE-FCU33	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
412	CFC-XHE-RE-FCU31	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
413	CFC-SOV-HW-1300Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
414	CFC-SOV-HW-1301Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
415	CFC-SOV-HW-1294Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
416	CFC-SOV-HW-1307	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
417	CFC-SOV-HW-1295Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
418	CFC-SOV-HW-1306Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
419	CFC-MAI-MA-FCU33	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
420	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZPABSF-AN-126G
421	CFC-PND-CC-33DPZ	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
422	CFC-PND-CC-31DPZ	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
423	CFC-PND-CC-35DPZ	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
424	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZPABSF-AN-126G
425	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZPABSF-AN-126G
426	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-CKV-CC-SW1-6	ZMCC36C-AN-86G	ZPABSF-AN-126G
427	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZPABSF-AN-126G
428	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZPABSF-AN-126G
429	CFC-PND-CC-33DPZ	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
430	CFC-PND-CC-31DPZ	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
431	CFC-PND-CC-35DPZ	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
432	EDG-MDP-FR-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZPABSF-AN-126G
433	CFC-PND-CC-33DPZ	EDG-MDP-FR-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
434	CFC-PND-CC-31DPZ	EDG-MDP-FR-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
435	CFC-PND-CC-35DPZ	EDG-MDP-FR-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
436	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-XHE-RE-PMP36	ZPABSF-AN-126G
437	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-34	ZPABSF-AN-126G
438	CFC-FCU-FS-33Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
439	CFC-FCU-FS-31Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
440	CFC-FCU-FS-35Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G

441	CFC-MAI-MA-FCU35	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
442	CFC-RCK-NO-FCU33	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
443	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZPABSF-AN-126G
444	CFC-RCK-NO-FCU31	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
445	CFC-RCK-NO-FCU35	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
446	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-36	ZPABSF-AN-126G
447	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-CRB-DN-52S6Z	ZPABSF-AN-126G
448	CFC-CRB-DN-FC31Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
449	CFC-CRB-DN-FC35Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
450	CFC-CRB-DN-FC33Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
451	CFC-XHE-RE-FCU33	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
452	CFC-XHE-RE-FCU31	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
453	CFC-FCU-FR-31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
454	CFC-FCU-FR-35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
455	CFC-FCU-FR-33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZPABSF-AN-126G
456	CFC-SOV-HW-1301Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
457	CFC-SOV-HW-1300Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
458	CFC-SOV-HW-1307	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
459	CFC-SOV-HW-1306Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
460	CFC-SOV-HW-1294Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
461	CFC-SOV-HW-1295Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
462	CFC-MAI-MA-FCU33	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
463	CFC-XHE-RE-FCU35	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
464	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZPABSF-AN-126G
465	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZPABSF-AN-126G
466	CFC-MAI-MA-FCU31	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
467	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZPABSF-AN-126G
468	CFC-MAI-MA-FCU31	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZPABSF-AN-126G
469	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
470	CFC-PND-CC-35DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
471	CFC-PND-CC-33DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
472	CFC-PND-CC-31DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
473	CFC-MAI-MA-FCU31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
474	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZRHR-HTXS-AN-49G
475	CFC-PND-CC-33DPZ	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
476	CFC-PND-CC-31DPZ	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
477	CFC-PND-CC-35DPZ	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G

478	CFC-MAI-MA-FCU35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
479	CFC-RCK-NO-FCU35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
480	CFC-RCK-NO-FCU33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
481	CFC-RCK-NO-FCU31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
482	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
483	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-36	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
484	CFC-XHE-RE-FCU33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
485	CFC-XHE-RE-FCU31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
486	CFC-SOV-HW-1306Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
487	CFC-SOV-HW-1307	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
488	CFC-SOV-HW-1300Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
489	CFC-SOV-HW-1301Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
490	CFC-SOV-HW-1294Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
491	CFC-SOV-HW-1295Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
492	CFC-MAI-MA-FCU33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
493	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
494	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
495	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
496	CFC-MAI-MA-FCU31	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
497	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZRHR-HTXS-AN-49G
498	CFC-PND-CC-33DPZ	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
499	CFC-PND-CC-31DPZ	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
500	CFC-PND-CC-35DPZ	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
501	CFC-XHE-RE-FCU35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
502	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZRHR-HTXS-AN-49G
503	CFC-PND-CC-33DPZ	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
504	CFC-PND-CC-31DPZ	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
505	CFC-PND-CC-35DPZ	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
506	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-XHE-RE-PMP36	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
507	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-34	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
508	CFC-FCU-FS-35Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
509	CFC-FCU-FS-33Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
510	CFC-FCU-FS-31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
511	CFC-MAI-MA-FCU31	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
512	CFC-CRB-DN-FC35Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
513	CFC-CRB-DN-FC33Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
514	CFC-CRB-DN-FC31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G

515	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-CRB-DN-52S6Z	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
516	CFC-MAI-MA-FCU35	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
517	CFC-RCK-NO-FCU33	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
518	CFC-RCK-NO-FCU31	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
519	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZRHR-HTXS-AN-49G
520	CFC-RCK-NO-FCU35	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
521	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-36	ZRHR-HTXS-AN-49G
522	CFC-XHE-RE-FCU33	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
523	CFC-XHE-RE-FCU31	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
524	CFC-SOV-HW-1300Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
525	CFC-SOV-HW-1301Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
526	CFC-SOV-HW-1294Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
527	CFC-SOV-HW-1295Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
528	CFC-SOV-HW-1306Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
529	CFC-SOV-HW-1307	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
530	CFC-MAI-MA-FCU33	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
531	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZRHR-HTXS-AN-49G
532	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZRHR-HTXS-AN-49G
533	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZRHR-HTXS-AN-49G
534	CFC-MAI-MA-FCU31	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
535	CFC-MAI-MA-FCU35	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
536	CFC-RCK-NO-FCU33	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
537	CFC-RCK-NO-FCU31	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
538	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZRHR-HTXS-AN-49G
539	CFC-RCK-NO-FCU35	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
540	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-36	ZRHR-HTXS-AN-49G
541	CFC-XHE-RE-FCU35	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
542	CFC-XHE-RE-FCU31	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
543	CFC-XHE-RE-FCU33	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
544	CFC-SOV-HW-1294Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
545	CFC-SOV-HW-1307	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
546	CFC-SOV-HW-1300Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
547	CFC-SOV-HW-1301Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
548	CFC-SOV-HW-1295Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
549	CFC-SOV-HW-1306Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
550	CFC-MAI-MA-FCU33	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
551	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZRHR-HTXS-AN-49G

552	CFC-PND-CC-31DPZ	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
553	CFC-PND-CC-33DPZ	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
554	CFC-PND-CC-35DPZ	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
555	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZRHR-HTXS-AN-49G
556	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZRHR-HTXS-AN-49G
557	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-CKV-CC-SW1-6	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
558	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZRHR-HTXS-AN-49G
559	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZRHR-HTXS-AN-49G
560	CFC-PND-CC-35DPZ	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
561	CFC-PND-CC-33DPZ	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
562	CFC-PND-CC-31DPZ	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
563	EDG-MDP-FR-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZRHR-HTXS-AN-49G
564	CFC-PND-CC-33DPZ	EDG-MDP-FR-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
565	CFC-PND-CC-35DPZ	EDG-MDP-FR-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
566	CFC-PND-CC-31DPZ	EDG-MDP-FR-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
567	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-XHE-RE-PMP36	ZRHR-HTXS-AN-49G
568	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-34	ZRHR-HTXS-AN-49G
569	CFC-FCU-FS-35Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
570	CFC-FCU-FS-33Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
571	CFC-FCU-FS-31Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
572	CFC-MAI-MA-FCU35	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
573	CFC-RCK-NO-FCU33	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
574	CFC-RCK-NO-FCU31	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
575	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZRHR-HTXS-AN-49G
576	CFC-RCK-NO-FCU35	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
577	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-36	ZRHR-HTXS-AN-49G
578	CFC-CRB-DN-FC33Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
579	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-CRB-DN-52S6Z	ZRHR-HTXS-AN-49G
580	CFC-CRB-DN-FC35Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
581	CFC-CRB-DN-FC31Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
582	CFC-XHE-RE-FCU31	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
583	CFC-XHE-RE-FCU33	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
584	CFC-FCU-FR-35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
585	CFC-FCU-FR-33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
586	CFC-FCU-FR-31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-HTXS-AN-49G
587	CFC-SOV-HW-1295Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
588	CFC-SOV-HW-1306Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G

589	CFC-SOV-HW-1300Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
590	CFC-SOV-HW-1301Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
591	CFC-SOV-HW-1307	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
592	CFC-SOV-HW-1294Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
593	CFC-MAI-MA-FCU33	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
594	CFC-XHE-RE-FCU35	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
595	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZRHR-HTXS-AN-49G
596	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZRHR-HTXS-AN-49G
597	CFC-MAI-MA-FCU31	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
598	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZRHR-HTXS-AN-49G
599	CFC-MAI-MA-FCU31	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-HTXS-AN-49G
600	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
601	CFC-PND-CC-33DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
602	CFC-PND-CC-31DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
603	CFC-PND-CC-35DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
604	CFC-MAI-MA-FCU31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
605	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZRHR-PUMPS-62G
606	CFC-PND-CC-33DPZ	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
607	CFC-PND-CC-31DPZ	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
608	CFC-PND-CC-35DPZ	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
609	CFC-MAI-MA-FCU35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
610	CFC-RCK-NO-FCU33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
611	CFC-RCK-NO-FCU31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
612	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
613	CFC-RCK-NO-FCU35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
614	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-36	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
615	CFC-XHE-RE-FCU33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
616	CFC-XHE-RE-FCU31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
617	CFC-SOV-HW-1300Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
618	CFC-SOV-HW-1301Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
619	CFC-SOV-HW-1294Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
620	CFC-SOV-HW-1295Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
621	CFC-SOV-HW-1306Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
622	CFC-SOV-HW-1307	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
623	CFC-MAI-MA-FCU33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
624	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
625	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZMCC36C-AN-86G	ZRHR-PUMPS-62G

626	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
627	CFC-MAI-MA-FCU31	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
628	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZRHR-PUMPS-62G
629	CFC-PND-CC-33DPZ	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
630	CFC-PND-CC-31DPZ	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
631	CFC-PND-CC-35DPZ	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
632	CFC-XHE-RE-FCU35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
633	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZRHR-PUMPS-62G
634	CFC-PND-CC-33DPZ	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
635	CFC-PND-CC-31DPZ	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
636	CFC-PND-CC-35DPZ	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
637	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-XHE-RE-PMP36	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
638	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-34	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
639	CFC-FCU-FS-33Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
640	CFC-FCU-FS-31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
641	CFC-FCU-FS-35Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
642	CFC-MAI-MA-FCU31	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
643	CFC-CRB-DN-FC33Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
644	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-CRB-DN-52S6Z	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
645	CFC-CRB-DN-FC31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
646	CFC-CRB-DN-FC35Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
647	CFC-MAI-MA-FCU35	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
648	CFC-RCK-NO-FCU33	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
649	CFC-RCK-NO-FCU31	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
650	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZRHR-PUMPS-62G
651	CFC-RCK-NO-FCU35	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
652	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-36	ZRHR-PUMPS-62G
653	CFC-XHE-RE-FCU33	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
654	CFC-XHE-RE-FCU31	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
655	CFC-SOV-HW-1300Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
656	CFC-SOV-HW-1301Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
657	CFC-SOV-HW-1294Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
658	CFC-SOV-HW-1295Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
659	CFC-SOV-HW-1306Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
660	CFC-SOV-HW-1307	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
661	CFC-MAI-MA-FCU33	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
662	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZRHR-PUMPS-62G

663	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZRHR-PUMPS-62G
664	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZRHR-PUMPS-62G
665	CFC-MAI-MA-FCU31	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
666	CFC-MAI-MA-FCU35	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
667	CFC-RCK-NO-FCU33	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
668	CFC-RCK-NO-FCU31	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
669	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZRHR-PUMPS-62G
670	CFC-RCK-NO-FCU35	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
671	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-36	ZRHR-PUMPS-62G
672	CFC-XHE-RE-FCU35	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
673	CFC-XHE-RE-FCU31	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
674	CFC-XHE-RE-FCU33	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
675	CFC-SOV-HW-1300Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
676	CFC-SOV-HW-1301Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
677	CFC-SOV-HW-1294Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
678	CFC-SOV-HW-1295Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
679	CFC-SOV-HW-1306Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
680	CFC-SOV-HW-1307	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
681	CFC-MAI-MA-FCU33	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
682	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZRHR-PUMPS-62G
683	CFC-PND-CC-31DPZ	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
684	CFC-PND-CC-33DPZ	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
685	CFC-PND-CC-35DPZ	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
686	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZRHR-PUMPS-62G
687	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZRHR-PUMPS-62G
688	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-CKV-CC-SW1-6	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
689	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZRHR-PUMPS-62G
690	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZRHR-PUMPS-62G
691	CFC-PND-CC-31DPZ	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
692	CFC-PND-CC-35DPZ	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
693	CFC-PND-CC-33DPZ	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
694	EDG-MDP-FR-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZRHR-PUMPS-62G
695	CFC-PND-CC-33DPZ	EDG-MDP-FR-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
696	CFC-PND-CC-35DPZ	EDG-MDP-FR-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
697	CFC-PND-CC-31DPZ	EDG-MDP-FR-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
698	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-XHE-RE-PMP36	ZRHR-PUMPS-62G
699	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-34	ZRHR-PUMPS-62G

700	CFC-FCU-FS-33Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
701	CFC-FCU-FS-35Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
702	CFC-FCU-FS-31Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
703	CFC-MAI-MA-FCU35	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
704	CFC-RCK-NO-FCU33	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
705	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZRHR-PUMPS-62G
706	CFC-RCK-NO-FCU31	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
707	CFC-RCK-NO-FCU35	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
708	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-36	ZRHR-PUMPS-62G
709	CFC-CRB-DN-FC31Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
710	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-CRB-DN-52S6Z	ZRHR-PUMPS-62G
711	CFC-CRB-DN-FC35Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
712	CFC-CRB-DN-FC33Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
713	CFC-XHE-RE-FCU33	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
714	CFC-XHE-RE-FCU31	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
715	CFC-FCU-FR-31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
716	CFC-FCU-FR-33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
717	CFC-FCU-FR-35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZRHR-PUMPS-62G
718	CFC-SOV-HW-1300Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
719	CFC-SOV-HW-1306Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
720	CFC-SOV-HW-1301Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
721	CFC-SOV-HW-1307	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
722	CFC-SOV-HW-1294Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
723	CFC-SOV-HW-1295Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
724	CFC-MAI-MA-FCU33	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
725	CFC-XHE-RE-FCU35	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
726	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZRHR-PUMPS-62G
727	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZRHR-PUMPS-62G
728	CFC-MAI-MA-FCU31	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
729	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZRHR-PUMPS-62G
730	CFC-MAI-MA-FCU31	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZRHR-PUMPS-62G
731	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZMCC36C-AN-86G	ZVC46PT-75G
732	CFC-PND-CC-33DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
733	CFC-PND-CC-31DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
734	CFC-PND-CC-35DPZ	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
735	CFC-MAI-MA-FCU31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
736	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZVC46PT-75G

737	CFC-PND-CC-33DPZ	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
738	CFC-PND-CC-31DPZ	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
739	CFC-PND-CC-35DPZ	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
740	CFC-MAI-MA-FCU35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
741	CFC-RCK-NO-FCU33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
742	CFC-RCK-NO-FCU31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
743	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZMCC36C-AN-86G	ZVC46PT-75G
744	CFC-RCK-NO-FCU35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
745	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-36	ZMCC36C-AN-86G	ZVC46PT-75G
746	CFC-XHE-RE-FCU33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
747	CFC-XHE-RE-FCU31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
748	CFC-SOV-HW-1300Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
749	CFC-SOV-HW-1301Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
750	CFC-SOV-HW-1294Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
751	CFC-SOV-HW-1295Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
752	CFC-SOV-HW-1306Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
753	CFC-SOV-HW-1307	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
754	CFC-MAI-MA-FCU33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
755	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZMCC36C-AN-86G	ZVC46PT-75G
756	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZMCC36C-AN-86G	ZVC46PT-75G
757	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZMCC36C-AN-86G	ZVC46PT-75G
758	CFC-MAI-MA-FCU31	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
759	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZVC46PT-75G
760	CFC-PND-CC-33DPZ	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
761	CFC-PND-CC-31DPZ	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
762	CFC-PND-CC-35DPZ	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
763	CFC-XHE-RE-FCU35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
764	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZVC46PT-75G
765	CFC-PND-CC-33DPZ	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
766	CFC-PND-CC-31DPZ	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
767	CFC-PND-CC-35DPZ	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
768	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-XHE-RE-PMP36	ZMCC36C-AN-86G	ZVC46PT-75G
769	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-34	ZMCC36C-AN-86G	ZVC46PT-75G
770	CFC-FCU-FS-33Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
771	CFC-FCU-FS-31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
772	CFC-FCU-FS-35Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
773	CFC-MAI-MA-FCU31	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G

774	CFC-CRB-DN-FC33Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
775	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-CRB-DN-52S6Z	ZMCC36C-AN-86G	ZVC46PT-75G
776	CFC-CRB-DN-FC31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
777	CFC-CRB-DN-FC35Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
778	CFC-MAI-MA-FCU35	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
779	CFC-RCK-NO-FCU33	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
780	CFC-RCK-NO-FCU31	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
781	CFC-RCK-NO-FCU35	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
782	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZVC46PT-75G
783	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-36	ZVC46PT-75G
784	CFC-XHE-RE-FCU33	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
785	CFC-XHE-RE-FCU31	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
786	CFC-SOV-HW-1300Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
787	CFC-SOV-HW-1301Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
788	CFC-SOV-HW-1294Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
789	CFC-SOV-HW-1295Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
790	CFC-SOV-HW-1306Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
791	CFC-SOV-HW-1307	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
792	CFC-MAI-MA-FCU33	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
793	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZVC46PT-75G
794	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZVC46PT-75G
795	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZVC46PT-75G
796	CFC-MAI-MA-FCU31	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
797	CFC-MAI-MA-FCU35	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
798	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZVC46PT-75G
799	CFC-RCK-NO-FCU33	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
800	CFC-RCK-NO-FCU35	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
801	CFC-RCK-NO-FCU31	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
802	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-36	ZVC46PT-75G
803	CFC-XHE-RE-FCU35	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
804	CFC-XHE-RE-FCU33	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
805	CFC-XHE-RE-FCU31	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
806	CFC-SOV-HW-1300Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
807	CFC-SOV-HW-1301Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
808	CFC-SOV-HW-1307	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
809	CFC-SOV-HW-1294Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
810	CFC-SOV-HW-1295Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G

811	CFC-SOV-HW-1306Z	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
812	CFC-MAI-MA-FCU33	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
813	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZVC46PT-75G
814	CFC-PND-CC-33DPZ	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
815	CFC-PND-CC-31DPZ	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
816	CFC-PND-CC-35DPZ	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
817	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZVC46PT-75G
818	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZVC46PT-75G
819	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-CKV-CC-SW1-6	ZMCC36C-AN-86G	ZVC46PT-75G
820	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZVC46PT-75G
821	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZVC46PT-75G
822	CFC-PND-CC-35DPZ	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
823	CFC-PND-CC-31DPZ	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
824	CFC-PND-CC-33DPZ	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
825	EDG-MDP-FR-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MAI-MA-PM36	ZVC46PT-75G
826	CFC-PND-CC-33DPZ	EDG-MDP-FR-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
827	CFC-PND-CC-31DPZ	EDG-MDP-FR-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
828	CFC-PND-CC-35DPZ	EDG-MDP-FR-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
829	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-XHE-RE-PMP36	ZVC46PT-75G
830	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-34	ZVC46PT-75G
831	CFC-FCU-FS-33Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
832	CFC-FCU-FS-35Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
833	CFC-FCU-FS-31Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
834	CFC-MAI-MA-FCU35	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
835	CFC-RCK-NO-FCU33	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
836	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-RCK-NO-PM36	ZVC46PT-75G
837	CFC-RCK-NO-FCU31	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
838	CFC-RCK-NO-FCU35	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
839	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-STR-PG-36	ZVC46PT-75G
840	CFC-CRB-DN-FC35Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
841	CFC-CRB-DN-FC31Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
842	CFC-CRB-DN-FC33Z	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
843	EDG-GEN-HW-DG31Z	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-CRB-DN-52S6Z	ZVC46PT-75G
844	CFC-XHE-RE-FCU31	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
845	CFC-XHE-RE-FCU33	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
846	CFC-FCU-FR-35	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
847	CFC-FCU-FR-33	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G

848	CFC-FCU-FR-31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZMCC36C-AN-86G	ZVC46PT-75G
849	CFC-SOV-HW-1295Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
850	CFC-SOV-HW-1307	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
851	CFC-SOV-HW-1294Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
852	CFC-SOV-HW-1306Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
853	CFC-SOV-HW-1301Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
854	CFC-SOV-HW-1300Z	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
855	CFC-MAI-MA-FCU33	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
856	CFC-XHE-RE-FCU35	EDG-MAI-MA-EDG31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
857	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM36Z	ZVC46PT-75G
858	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FR-PM34Z	ZVC46PT-75G
859	CFC-MAI-MA-FCU31	EDG-XHE-RE-31RHE	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G
860	EDG-ENG-FR-DG31R	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	SWS-MDP-FS-PMP36	ZVC46PT-75G
861	CFC-MAI-MA-FCU31	EDG-RCK-NO-FOT31	EQ_T1	FLAG-T1_3CD	FLAG_NO_CFC	ZVC46PT-75G

EQ_T1_12 DOMINANT CORE DAMAGE ACCIDENT SEQUENCE

TERM NUMBER	CUT SET LISTING			
1	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZABFP-FAN-EQ-75G
2	EQ_T1	FLAG-T1_12CD	OFB-01G	ZABFP-FAN-EQ-75G
3	DC1-MAI-MA-BCC31	EQ_T1	FLAG-T1_12CD	ZABFP-FAN-EQ-75G
4	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZABFP-FAN-EQ-75G
5	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZABFP-FAN-EQ-75G
6	DC1-MAI-MA-BCC32	EQ_T1	FLAG-T1_12CD	ZABFP-FAN-EQ-75G
7	AC4-RCK-NO-BCH39	EQ_T1	FLAG-T1_12CD	ZABFP-FAN-EQ-75G
8	EQ_T1	FLAG-T1_12CD	PPR-CCF-CC-PORVS	ZABFP-FAN-EQ-75G
9	EQ_T1	FLAG-T1_12CD	PPR-MSW-DN-455C	ZABFP-FAN-EQ-75G
10	EQ_T1	FLAG-T1_12CD	OFB-05G	ZABFP-FAN-EQ-75G
11	EQ_T1	FLAG-T1_12CD	OFB->05G	ZABFP-FAN-EQ-75G
12	EQ_T1	FLAG-T1_12CD	NSS-RRV-CO-N8305	ZABFP-FAN-EQ-75G
13	EQ_T1	FLAG-T1_12CD	NSS-RRV-CO-N8304	ZABFP-FAN-EQ-75G
14	EQ_T1	FLAG-T1_12CD	NSS-PCV-DN-6300	ZABFP-FAN-EQ-75G
15	EQ_T1	FLAG-T1_12CD	NNS-PCV-DN-6301	ZABFP-FAN-EQ-75G
16	DC1-BAT-HW-BT31Z	EQ_T1	FLAG-T1_12CD	ZABFP-FAN-EQ-75G
17	DC1-BCC-HW-BC31Z	EQ_T1	FLAG-T1_12CD	ZABFP-FAN-EQ-75G
18	DC1-BCC-HW-BC32Z	EQ_T1	FLAG-T1_12CD	ZABFP-FAN-EQ-75G
19	DC1-BAT-HW-BT32Z	EQ_T1	FLAG-T1_12CD	ZABFP-FAN-EQ-75G
20	AC4-BAC-ST-CC37Z	EQ_T1	FLAG-T1_12CD	ZABFP-FAN-EQ-75G
21	EQ_T1	FLAG-T1_12CD	PPR-MSW-DN-456	ZABFP-FAN-EQ-75G
22	AC4-RCK-NO-BCH37	EQ_T1	FLAG-T1_12CD	ZABFP-FAN-EQ-75G
23	DC1-MAI-MA-BCC31	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G
24	AC4-RCK-NO-BCH39	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G
25	DC1-BCC-HW-BC31Z	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G
26	DC1-BAT-HW-BT31Z	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G
27	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZCST31-88G
28	EQ_T1	FLAG-T1_12CD	OFB-01G	ZCST31-88G
29	DC1-MAI-MA-BCC31	EQ_T1	FLAG-T1_12CD	ZCST31-88G
30	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZCST31-88G
31	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZCST31-88G
32	DC1-MAI-MA-BCC32	EQ_T1	FLAG-T1_12CD	ZCST31-88G

33	AC4-RCK-NO-BCH39	EQ_T1	FLAG-T1_12CD	ZCST31-88G
34	EQ_T1	FLAG-T1_12CD	PPR-CCF-CC-PORVS	ZCST31-88G
35	EQ_T1	FLAG-T1_12CD	PPR-MSW-DN-455C	ZCST31-88G
36	EQ_T1	FLAG-T1_12CD	OFB-05G	ZCST31-88G
37	EQ_T1	FLAG-T1_12CD	OFB->05G	ZCST31-88G
38	EQ_T1	FLAG-T1_12CD	NSS-RRV-CO-N8305	ZCST31-88G
39	EQ_T1	FLAG-T1_12CD	NSS-RRV-CO-N8304	ZCST31-88G
40	EQ_T1	FLAG-T1_12CD	NSS-PCV-DN-6300	ZCST31-88G
41	EQ_T1	FLAG-T1_12CD	NNS-PCV-DN-6301	ZCST31-88G
42	DC1-BAT-HW-BT31Z	EQ_T1	FLAG-T1_12CD	ZCST31-88G
43	DC1-BCC-HW-BC31Z	EQ_T1	FLAG-T1_12CD	ZCST31-88G
44	DC1-BCC-HW-BC32Z	EQ_T1	FLAG-T1_12CD	ZCST31-88G
45	DC1-BAT-HW-BT32Z	EQ_T1	FLAG-T1_12CD	ZCST31-88G
46	AC4-BAC-ST-CC37Z	EQ_T1	FLAG-T1_12CD	ZCST31-88G
47	EQ_T1	FLAG-T1_12CD	PPR-MSW-DN-456	ZCST31-88G
48	AC4-RCK-NO-BCH37	EQ_T1	FLAG-T1_12CD	ZCST31-88G
49	DC1-MAI-MA-BCC31	EQ_T1	FLAG-T1_12CD	ZIAC-AN-82G
50	AC4-RCK-NO-BCH39	EQ_T1	FLAG-T1_12CD	ZIAC-AN-82G
51	DC1-BCC-HW-BC31Z	EQ_T1	FLAG-T1_12CD	ZIAC-AN-82G
52	DC1-BAT-HW-BT31Z	EQ_T1	FLAG-T1_12CD	ZIAC-AN-82G
53	DC1-MAI-MA-BCC31	EQ_T1	FLAG-T1_12CD	ZIACCWHTX-75G
54	AC4-RCK-NO-BCH39	EQ_T1	FLAG-T1_12CD	ZIACCWHTX-75G
55	DC1-BAT-HW-BT31Z	EQ_T1	FLAG-T1_12CD	ZIACCWHTX-75G
56	DC1-BCC-HW-BC31Z	EQ_T1	FLAG-T1_12CD	ZIACCWHTX-75G
57	DC1-MAI-MA-BCC31	EQ_T1	FLAG-T1_12CD	ZIASFLT-75G
58	AC4-RCK-NO-BCH39	EQ_T1	FLAG-T1_12CD	ZIASFLT-75G
59	DC1-BAT-HW-BT31Z	EQ_T1	FLAG-T1_12CD	ZIASFLT-75G
60	DC1-BCC-HW-BC31Z	EQ_T1	FLAG-T1_12CD	ZIASFLT-75G
61	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZL-314-EQ-75G
62	EQ_T1	FLAG-T1_12CD	OFB-01G	ZL-314-EQ-75G
63	DC1-MAI-MA-BCC31	EQ_T1	FLAG-T1_12CD	ZL-314-EQ-75G
64	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZL-314-EQ-75G
65	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZL-314-EQ-75G
66	DC1-MAI-MA-BCC32	EQ_T1	FLAG-T1_12CD	ZL-314-EQ-75G
67	AC4-RCK-NO-BCH39	EQ_T1	FLAG-T1_12CD	ZL-314-EQ-75G
68	EQ_T1	FLAG-T1_12CD	PPR-CCF-CC-PORVS	ZL-314-EQ-75G
69	EQ_T1	FLAG-T1_12CD	PPR-MSW-DN-455C	ZL-314-EQ-75G

70	EQ_T1	FLAG-T1_12CD	PPR-MSW-DN-456	ZL-314-EQ-75G	
71	EQ_T1	FLAG-T1_12CD	OFB-05G	ZL-314-EQ-75G	
72	EQ_T1	FLAG-T1_12CD	OFB->05G	ZL-314-EQ-75G	
73	EQ_T1	FLAG-T1_12CD	NSS-RRV-CO-N8305	ZL-314-EQ-75G	
74	EQ_T1	FLAG-T1_12CD	NSS-RRV-CO-N8304	ZL-314-EQ-75G	
75	EQ_T1	FLAG-T1_12CD	NSS-PCV-DN-6300	ZL-314-EQ-75G	
76	EQ_T1	FLAG-T1_12CD	NNS-PCV-DN-6301	ZL-314-EQ-75G	
77	DC1-BCC-HW-BC31Z	EQ_T1	FLAG-T1_12CD	ZL-314-EQ-75G	
78	DC1-BCC-HW-BC32Z	EQ_T1	FLAG-T1_12CD	ZL-314-EQ-75G	
79	DC1-BAT-HW-BT32Z	EQ_T1	FLAG-T1_12CD	ZL-314-EQ-75G	
80	DC1-BAT-HW-BT31Z	EQ_T1	FLAG-T1_12CD	ZL-314-EQ-75G	
81	AC4-BAC-ST-CC37Z	EQ_T1	FLAG-T1_12CD	ZL-314-EQ-75G	
82	AC4-RCK-NO-BCH37	EQ_T1	FLAG-T1_12CD	ZL-314-EQ-75G	
83	DC1-MAI-MA-BCC31	EQ_T1	FLAG-T1_12CD	ZMCCTB-AN-92G	
84	AC4-RCK-NO-BCH39	EQ_T1	FLAG-T1_12CD	ZMCCTB-AN-92G	
85	DC1-BCC-HW-BC31Z	EQ_T1	FLAG-T1_12CD	ZMCCTB-AN-92G	
86	DC1-BAT-HW-BT31Z	EQ_T1	FLAG-T1_12CD	ZMCCTB-AN-92G	
87	AFV-MOD-CC-L314Z	EQ_T1	FLAG-T1_12CD	ZVC-RACKS-90G	
88	EQ_T1	FLAG-T1_12CD	ZL-314-EQ-75G	ZVC-RACKS-90G	
89	EQ_T1	FLAG-T1_12CD	ZCST31-88G	ZVC-RACKS-90G	
90	EQ_T1	FLAG-T1_12CD	ZABFP-FAN-EQ-75G	ZVC-RACKS-90G	
91	AC1-BAC-ST-LB33	EQ_T1	FLAG-T1_12CD	ZVC-RACKS-90G	
92	AC1-BAC-ST-LP324	EQ_T1	FLAG-T1_12CD	ZVC-RACKS-90G	
93	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
94	EDG-MAI-MA-EDG32	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
95	EDG-ENG-FR-DG32R	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
96	EDG-XHE-RE-32RHE	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
97	EDG-RCK-NO-FOT32	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
98	EDG-MDP-FR-FOT32	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
99	DGV-CCF-HW-DG32F	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
100	EDG-MDP-FS-FOT32	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
101	EQ_T1	FLAG-T1_12CD	PPR-MOV-CC-RC535	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
102	AC4-CRB-CC-52-6A	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
103	AC4-CRB-CC-6A5AZ	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
104	AC4-CRB-OO-52E2Z	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
105	AC4-RCS-OO-32CVX	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
106	EDG-RCS-OO-D32CV	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G

107	EDG-RCS-OO-336A1	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
108	AC4-XHE-RE-MCC6B	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
109	EDG-RCS-CC-32CVX	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
110	EDG-RCS-CC-D32K1	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
111	EDG-RCS-CC-32NST	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
112	EDG-ENG-FS-D32SZ	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
113	DGV-CCF-HW-DG32D	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
114	DGV-CCF-HW-DG32L	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
115	EDG-STR-PG-DG32F	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
116	EQ_T1	FLAG-T1_12CD	PPR-CCF-CC-BLKVS	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
117	AC4-BAC-ST-C36BZ	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
118	AC4-BAC-ST-BS6AZ	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
119	EDG-RCS-OC-32OCT	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
120	AC4-RCS-OC-OTS6A	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
121	EDG-RCS-OC-32SDR	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
122	EDG-RCS-OC-86EG2	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
123	AC4-RCS-OC-866A	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
124	EDG-RCS-OC-32OSS	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
125	EDG-RCS-OC-3286X	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
126	EDG-RCS-OC-32OCR	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
127	EDG-RCS-OC-32OSR	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
128	AC4-MSW-CO-CREG2	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
129	EDG-MSW-OC-32STP	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZABFP-FAN-EQ-75G
130	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
131	EDG-MAI-MA-EDG33	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
132	EDG-ENG-FR-DG33R	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
133	EDG-XHE-RE-33RHE	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
134	EDG-RCK-NO-FOT33	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
135	DGV-RCK-NO-DV318	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
136	EDG-MDP-FR-FOT33	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
137	DGV-CCF-HW-DG33F	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
138	EQ_T1	FLAG-T1_12CD	PPR-MOV-CC-RC536	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
139	EDG-MDP-FS-FOT33	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
140	AC4-CRB-CC-52-5A	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
141	AC4-CRB-OO-52E3Z	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
142	AC4-RCS-OO-33CVX	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
143	EDG-RCS-OO-D33CV	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G

144	EDG-RCS-OO-335A1	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
145	AC4-XHE-RE-MCC6A	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
146	EDG-RCS-CC-33CVX	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
147	EDG-RCS-CC-D33K1	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
148	EDG-RCS-CC-33NST	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
149	EDG-ENG-FS-D33SZ	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
150	DGV-CCF-HW-DG33L	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
151	DGV-CCF-HW-DG33D	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
152	EDG-STR-PG-DG33F	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
153	EQ_T1	FLAG-T1_12CD	PPR-CCF-CC-BLKVS	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
154	AC4-BAC-ST-C36AZ	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
155	AC4-BAC-ST-BS5AZ	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
156	EDG-RCS-OC-33OSR	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
157	EDG-RCS-OC-33OCR	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
158	EDG-RCS-OC-86EG3	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
159	EDG-RCS-OC-33OCT	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
160	AC4-RCS-OC-865A	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
161	EDG-RCS-OC-33OSS	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
162	AC4-RCS-OC-OTS5A	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
163	EDG-RCS-OC-3386X	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
164	EDG-RCS-OC-33SDR	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
165	AC4-MSW-CO-CREG3	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
166	EDG-MSW-OC-33STP	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZABFP-FAN-EQ-75G
167	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	PPR-RCK-NO-RC535	ZABFP-FAN-EQ-75G
168	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	PPR-RCK-NO-RC536	ZABFP-FAN-EQ-75G
169	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	SWS-XVM-OC-62-4	ZABFP-FAN-EQ-75G
170	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	SWS-XVM-OC-62-6	ZABFP-FAN-EQ-75G
171	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	SWS-XVM-OC-67-2	ZABFP-FAN-EQ-75G
172	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	SWS-XVM-OC-67-3	ZABFP-FAN-EQ-75G
173	AFW-TDP-FR-TDP32	DC1-MAI-MA-BCC32	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G
174	AC4-RCK-NO-BCH37	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G
175	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	OFB->05G	ZAFW-DISPT-75G
176	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	OFB->05G	ZAFW-DISPT-75G
177	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	OFB->05G	ZAFW-DISPT-75G
178	AFW-TDP-FS-TP32Z	EQ_T1	FLAG-T1_12CD	OFB->05G	ZAFW-DISPT-75G
179	AFW-RCK-NO-TDP32	EQ_T1	FLAG-T1_12CD	OFB->05G	ZAFW-DISPT-75G
180	AFW-XHE-FO-HC405	EQ_T1	FLAG-T1_12CD	OFB->05G	ZAFW-DISPT-75G

181	AFW-AOV-CC-1139Z	EQ_T1	FLAG-T1_12CD	OFB->05G	ZAFW-DISPT-75G
182	AFW-RLY-NO-BFPL	EQ_T1	FLAG-T1_12CD	OFB->05G	ZAFW-DISPT-75G
183	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	OFB-01G	ZAFW-DISPT-75G
184	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	OFB-01G	ZAFW-DISPT-75G
185	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	OFB-01G	ZAFW-DISPT-75G
186	AFW-TDP-FS-TP32Z	EQ_T1	FLAG-T1_12CD	OFB-01G	ZAFW-DISPT-75G
187	AFW-RCK-NO-TDP32	EQ_T1	FLAG-T1_12CD	OFB-01G	ZAFW-DISPT-75G
188	AFW-XHE-FO-HC405	EQ_T1	FLAG-T1_12CD	OFB-01G	ZAFW-DISPT-75G
189	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZAFW-DISPT-75G
190	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZAFW-DISPT-75G
191	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZAFW-DISPT-75G
192	AFW-TDP-FS-TP32Z	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZAFW-DISPT-75G
193	AFW-RCK-NO-TDP32	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZAFW-DISPT-75G
194	AFW-XHE-FO-HC405	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZAFW-DISPT-75G
195	AFW-AOV-CC-1139Z	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZAFW-DISPT-75G
196	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	OFB-05G	ZAFW-DISPT-75G
197	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	OFB-05G	ZAFW-DISPT-75G
198	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	OFB-05G	ZAFW-DISPT-75G
199	AFW-TDP-FS-TP32Z	EQ_T1	FLAG-T1_12CD	OFB-05G	ZAFW-DISPT-75G
200	AFW-RCK-NO-TDP32	EQ_T1	FLAG-T1_12CD	OFB-05G	ZAFW-DISPT-75G
201	AFW-XHE-FO-HC405	EQ_T1	FLAG-T1_12CD	OFB-05G	ZAFW-DISPT-75G
202	AFW-AOV-CC-1139Z	EQ_T1	FLAG-T1_12CD	OFB-05G	ZAFW-DISPT-75G
203	AFW-RLY-NO-BFPL	EQ_T1	FLAG-T1_12CD	OFB-05G	ZAFW-DISPT-75G
204	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZAFW-DISPT-75G
205	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZAFW-DISPT-75G
206	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZAFW-DISPT-75G
207	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZAFW-DISPT-75G
208	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZAFW-DISPT-75G
209	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZAFW-DISPT-75G
210	EQ_T1	FLAG-T1_12CD	OFB-05G	ZAFW-DISPT-75G	ZAFW-TRANS-75G
211	EQ_T1	FLAG-T1_12CD	OFB->05G	ZAFW-DISPT-75G	ZAFW-TRANS-75G
212	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZAFW-DISPT-75G	ZAFW-TRANS-75G
213	EQ_T1	FLAG-T1_12CD	OFB-01G	ZAFW-DISPT-75G	ZAFW-TRANS-75G
214	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZAFW-DISPT-75G	ZAFW-TRANS-75G
215	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZAFW-DISPT-75G	ZAFW-TRANS-75G
216	DC1-MAI-MA-BCC32	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G	ZAFW-TRANS-75G
217	AC4-RCK-NO-BCH37	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G	ZAFW-TRANS-75G

218	EQ_T1	FLAG-T1_12CD		PPR-CCF-CC-PORVS	ZAFW-DISPT-75G	ZAFW-TRANS-75G
219	EQ_T1	FLAG-T1_12CD		NSS-RRV-CO-N8305	ZAFW-DISPT-75G	ZAFW-TRANS-75G
220	EQ_T1	FLAG-T1_12CD		NSS-RRV-CO-N8304	ZAFW-DISPT-75G	ZAFW-TRANS-75G
221	EQ_T1	FLAG-T1_12CD		NSS-PCV-DN-6300	ZAFW-DISPT-75G	ZAFW-TRANS-75G
222	EQ_T1	FLAG-T1_12CD		NNS-PCV-DN-6301	ZAFW-DISPT-75G	ZAFW-TRANS-75G
223	DC1-BCC-HW-BC32Z	EQ_T1		FLAG-T1_12CD	ZAFW-DISPT-75G	ZAFW-TRANS-75G
224	DC1-BAT-HW-BT32Z	EQ_T1		FLAG-T1_12CD	ZAFW-DISPT-75G	ZAFW-TRANS-75G
225	EDG-GEN-HW-DG32Z	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
226	EDG-MAI-MA-EDG32	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
227	EDG-ENG-FR-DG32R	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
228	EDG-XHE-RE-32RHE	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
229	EDG-RCK-NO-FOT32	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
230	EDG-MDP-FR-FOT32	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
231	DGV-CCF-HW-DG32F	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
232	EQ_T1	FLAG-T1_12CD		PPR-MOV-CC-RC535	PPR-PHN-CC-RC535	ZCST31-88G
233	EDG-MDP-FS-FOT32	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
234	AC4-CRB-CC-52-6A	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
235	AC4-CRB-CC-6A5AZ	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
236	AC4-CRB-OO-52E2Z	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
237	AC4-RCS-OO-32CVX	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
238	EDG-RCS-OO-D32CV	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
239	EDG-RCS-OO-336A1	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
240	AC4-XHE-RE-MCC6B	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
241	EDG-RCS-CC-32CVX	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
242	EDG-RCS-CC-D32K1	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
243	EDG-RCS-CC-32NST	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
244	EDG-ENG-FS-D32SZ	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
245	DGV-CCF-HW-DG32L	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
246	DGV-CCF-HW-DG32D	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
247	EDG-STR-PG-DG32F	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
248	EQ_T1	FLAG-T1_12CD		PPR-CCF-CC-BLKVS	PPR-PHN-CC-RC535	ZCST31-88G
249	AC4-BAC-ST-C36BZ	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
250	AC4-BAC-ST-BS6AZ	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
251	EDG-RCS-OC-32OSR	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
252	AC4-RCS-OC-OTS6A	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
253	EDG-RCS-OC-32OSS	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
254	EDG-RCS-OC-3286X	EQ_T1		FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G

255	EDG-RCS-OC-32OCT	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
256	EDG-RCS-OC-86EG2	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
257	EDG-RCS-OC-32SDR	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
258	EDG-RCS-OC-32OCR	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
259	AC4-RCS-OC-866A	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
260	EDG-MSW-OC-32STP	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
261	AC4-MSW-CO-CREG2	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZCST31-88G
262	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
263	EDG-MAI-MA-EDG33	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
264	EDG-ENG-FR-DG33R	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
265	EDG-XHE-RE-33RHE	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
266	EDG-RCK-NO-FOT33	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
267	DGV-RCK-NO-DV318	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
268	EDG-MDP-FR-FOT33	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
269	DGV-CCF-HW-DG33F	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
270	EDG-MDP-FS-FOT33	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
271	EQ_T1	FLAG-T1_12CD	PPR-MOV-CC-RC536	PPR-PHN-CC-RC536	ZCST31-88G
272	AC4-CRB-CC-52-5A	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
273	AC4-CRB-OO-52E3Z	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
274	AC4-RCS-OO-33CVX	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
275	EDG-RCS-OO-D33CV	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
276	EDG-RCS-OO-335A1	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
277	AC4-XHE-RE-MCC6A	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
278	EDG-RCS-CC-33CVX	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
279	EDG-RCS-CC-D33K1	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
280	EDG-RCS-CC-33NST	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
281	EDG-ENG-FS-D33SZ	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
282	DGV-CCF-HW-DG33L	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
283	DGV-CCF-HW-DG33D	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
284	EDG-STR-PG-DG33F	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
285	EQ_T1	FLAG-T1_12CD	PPR-CCF-CC-BLKVS	PPR-PHN-CC-RC536	ZCST31-88G
286	AC4-BAC-ST-C36AZ	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
287	AC4-BAC-ST-BS5AZ	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
288	AC4-RCS-OC-OTS5A	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
289	EDG-RCS-OC-33OSS	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
290	EDG-RCS-OC-33SDR	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
291	EDG-RCS-OC-33OCR	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G

292	EDG-RCS-OC-33OSR	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
293	AC4-RCS-OC-865A	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
294	EDG-RCS-OC-3386X	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
295	EDG-RCS-OC-86EG3	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
296	EDG-RCS-OC-33OCT	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
297	AC4-MSW-CO-CREG3	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
298	EDG-MSW-OC-33STP	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZCST31-88G
299	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	PPR-RCK-NO-RC535	ZCST31-88G
300	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	PPR-RCK-NO-RC536	ZCST31-88G
301	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	SWS-XVM-OC-62-4	ZCST31-88G
302	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	SWS-XVM-OC-62-6	ZCST31-88G
303	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	SWS-XVM-OC-67-2	ZCST31-88G
304	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	SWS-XVM-OC-67-3	ZCST31-88G
305	EQ_T1	FLAG-T1_12CD	OFB-05G	ZAFW-DISPT-75G	ZHC-1118C-AN-84G
306	EQ_T1	FLAG-T1_12CD	OFB->05G	ZAFW-DISPT-75G	ZHC-1118C-AN-84G
307	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZAFW-DISPT-75G	ZHC-1118C-AN-84G
308	EQ_T1	FLAG-T1_12CD	OFB-01G	ZAFW-DISPT-75G	ZHC-1118C-AN-84G
309	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZAFW-DISPT-75G	ZHC-1118C-AN-84G
310	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZAFW-DISPT-75G	ZHC-1118C-AN-84G
311	DC1-MAI-MA-BCC32	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G	ZHC-1118C-AN-84G
312	AC4-RCK-NO-BCH37	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G	ZHC-1118C-AN-84G
313	EQ_T1	FLAG-T1_12CD	PPR-CCF-CC-PORVS	ZAFW-DISPT-75G	ZHC-1118C-AN-84G
314	EQ_T1	FLAG-T1_12CD	NSS-RRV-CO-N8305	ZAFW-DISPT-75G	ZHC-1118C-AN-84G
315	EQ_T1	FLAG-T1_12CD	NSS-RRV-CO-N8304	ZAFW-DISPT-75G	ZHC-1118C-AN-84G
316	EQ_T1	FLAG-T1_12CD	NSS-PCV-DN-6300	ZAFW-DISPT-75G	ZHC-1118C-AN-84G
317	EQ_T1	FLAG-T1_12CD	NNS-PCV-DN-6301	ZAFW-DISPT-75G	ZHC-1118C-AN-84G
318	DC1-BAT-HW-BT32Z	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G	ZHC-1118C-AN-84G
319	DC1-BCC-HW-BC32Z	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G	ZHC-1118C-AN-84G
320	AFW-TDP-FR-TDP32	DC1-MAI-MA-BCC32	EQ_T1	FLAG-T1_12CD	ZIAC-AN-82G
321	AC4-RCK-NO-BCH37	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	ZIAC-AN-82G
322	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIAC-AN-82G
323	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIAC-AN-82G
324	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIAC-AN-82G
325	AFW-TDP-FS-TP32Z	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIAC-AN-82G
326	AFW-RCK-NO-TDP32	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIAC-AN-82G
327	AFW-XHE-FO-HC405	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIAC-AN-82G
328	AFW-AOV-CC-1139Z	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIAC-AN-82G

329	AFW-RLY-NO-BFPL	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIAC-AN-82G
330	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	OFB-01G	ZIAC-AN-82G
331	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	OFB-01G	ZIAC-AN-82G
332	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	OFB-01G	ZIAC-AN-82G
333	AFW-TDP-FS-TP32Z	EQ_T1	FLAG-T1_12CD	OFB-01G	ZIAC-AN-82G
334	AFW-RCK-NO-TDP32	EQ_T1	FLAG-T1_12CD	OFB-01G	ZIAC-AN-82G
335	AFW-XHE-FO-HC405	EQ_T1	FLAG-T1_12CD	OFB-01G	ZIAC-AN-82G
336	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZIAC-AN-82G
337	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZIAC-AN-82G
338	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZIAC-AN-82G
339	AFW-TDP-FS-TP32Z	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZIAC-AN-82G
340	AFW-RCK-NO-TDP32	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZIAC-AN-82G
341	AFW-XHE-FO-HC405	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZIAC-AN-82G
342	AFW-AOV-CC-1139Z	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZIAC-AN-82G
343	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIAC-AN-82G
344	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIAC-AN-82G
345	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIAC-AN-82G
346	AFW-TDP-FS-TP32Z	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIAC-AN-82G
347	AFW-RCK-NO-TDP32	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIAC-AN-82G
348	AFW-XHE-FO-HC405	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIAC-AN-82G
349	AFW-AOV-CC-1139Z	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIAC-AN-82G
350	AFW-RLY-NO-BFPL	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIAC-AN-82G
351	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZIAC-AN-82G
352	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZIAC-AN-82G
353	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZIAC-AN-82G
354	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZIAC-AN-82G
355	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZIAC-AN-82G
356	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZIAC-AN-82G
357	EQ_T1	FLAG-T1_12CD	OFB-05G	ZAFW-TRANS-75G	ZIAC-AN-82G
358	EQ_T1	FLAG-T1_12CD	OFB->05G	ZAFW-TRANS-75G	ZIAC-AN-82G
359	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZAFW-TRANS-75G	ZIAC-AN-82G
360	EQ_T1	FLAG-T1_12CD	OFB-01G	ZAFW-TRANS-75G	ZIAC-AN-82G
361	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZAFW-TRANS-75G	ZIAC-AN-82G
362	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZAFW-TRANS-75G	ZIAC-AN-82G
363	DC1-MAI-MA-BCC32	EQ_T1	FLAG-T1_12CD	ZAFW-TRANS-75G	ZIAC-AN-82G
364	AC4-RCK-NO-BCH37	EQ_T1	FLAG-T1_12CD	ZAFW-TRANS-75G	ZIAC-AN-82G
365	EQ_T1	FLAG-T1_12CD	PPR-CCF-CC-PORVS	ZAFW-TRANS-75G	ZIAC-AN-82G

366	EQ_T1	FLAG-T1_12CD	NSS-RRV-CO-N8305	ZAFW-TRANS-75G	ZIAC-AN-82G
367	EQ_T1	FLAG-T1_12CD	NSS-RRV-CO-N8304	ZAFW-TRANS-75G	ZIAC-AN-82G
368	EQ_T1	FLAG-T1_12CD	NNS-PCV-DN-6301	ZAFW-TRANS-75G	ZIAC-AN-82G
369	EQ_T1	FLAG-T1_12CD	NSS-PCV-DN-6300	ZAFW-TRANS-75G	ZIAC-AN-82G
370	DC1-BAT-HW-BT32Z	EQ_T1	FLAG-T1_12CD	ZAFW-TRANS-75G	ZIAC-AN-82G
371	DC1-BCC-HW-BC32Z	EQ_T1	FLAG-T1_12CD	ZAFW-TRANS-75G	ZIAC-AN-82G
372	EQ_T1	FLAG-T1_12CD	OFB-05G	ZHC-1118C-AN-84G	ZIAC-AN-82G
373	EQ_T1	FLAG-T1_12CD	OFB->05G	ZHC-1118C-AN-84G	ZIAC-AN-82G
374	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZHC-1118C-AN-84G	ZIAC-AN-82G
375	EQ_T1	FLAG-T1_12CD	OFB-01G	ZHC-1118C-AN-84G	ZIAC-AN-82G
376	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZHC-1118C-AN-84G	ZIAC-AN-82G
377	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZHC-1118C-AN-84G	ZIAC-AN-82G
378	DC1-MAI-MA-BCC32	EQ_T1	FLAG-T1_12CD	ZHC-1118C-AN-84G	ZIAC-AN-82G
379	AC4-RCK-NO-BCH37	EQ_T1	FLAG-T1_12CD	ZHC-1118C-AN-84G	ZIAC-AN-82G
380	EQ_T1	FLAG-T1_12CD	PPR-CCF-CC-PORVS	ZHC-1118C-AN-84G	ZIAC-AN-82G
381	EQ_T1	FLAG-T1_12CD	NSS-RRV-CO-N8305	ZHC-1118C-AN-84G	ZIAC-AN-82G
382	EQ_T1	FLAG-T1_12CD	NSS-RRV-CO-N8304	ZHC-1118C-AN-84G	ZIAC-AN-82G
383	EQ_T1	FLAG-T1_12CD	NNS-PCV-DN-6301	ZHC-1118C-AN-84G	ZIAC-AN-82G
384	EQ_T1	FLAG-T1_12CD	NSS-PCV-DN-6300	ZHC-1118C-AN-84G	ZIAC-AN-82G
385	DC1-BAT-HW-BT32Z	EQ_T1	FLAG-T1_12CD	ZHC-1118C-AN-84G	ZIAC-AN-82G
386	DC1-BCC-HW-BC32Z	EQ_T1	FLAG-T1_12CD	ZHC-1118C-AN-84G	ZIAC-AN-82G
387	AFW-TDP-FR-TDP32	DC1-MAI-MA-BCC	32 EQ_T1	FLAG-T1_12CD	ZIACCWHTX-75G
388	AC4-RCK-NO-BCH37	AFW-TDP-FR-TDP	32 EQ_T1	FLAG-T1_12CD	ZIACCWHTX-75G
389	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIACCWHTX-75G
390	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIACCWHTX-75G
391	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIACCWHTX-75G
392	AFW-TDP-FS-TP32Z	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIACCWHTX-75G
393	AFW-RCK-NO-TDP32	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIACCWHTX-75G
394	AFW-XHE-FO-HC405	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIACCWHTX-75G
395	AFW-AOV-CC-1139Z	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIACCWHTX-75G
396	AFW-RLY-NO-BFPL	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIACCWHTX-75G
397	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	OFB-01G	ZIACCWHTX-75G
398	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	OFB-01G	ZIACCWHTX-75G
399	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	OFB-01G	ZIACCWHTX-75G
400	AFW-TDP-FS-TP32Z	EQ_T1	FLAG-T1_12CD	OFB-01G	ZIACCWHTX-75G
401	AFW-RCK-NO-TDP32	EQ_T1	FLAG-T1_12CD	OFB-01G	ZIACCWHTX-75G
402	AFW-XHE-FO-HC405	EQ_T1	FLAG-T1_12CD	OFB-01G	ZIACCWHTX-75G

403	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZIACCWHTX-75G
404	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZIACCWHTX-75G
405	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZIACCWHTX-75G
406	AFW-TDP-FS-TP32Z	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZIACCWHTX-75G
407	AFW-RCK-NO-TDP32	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZIACCWHTX-75G
408	AFW-XHE-FO-HC405	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZIACCWHTX-75G
409	AFW-AOV-CC-1139Z	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZIACCWHTX-75G
410	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIACCWHTX-75G
411	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIACCWHTX-75G
412	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIACCWHTX-75G
413	AFW-TDP-FS-TP32Z	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIACCWHTX-75G
414	AFW-RCK-NO-TDP32	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIACCWHTX-75G
415	AFW-XHE-FO-HC405	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIACCWHTX-75G
416	AFW-AOV-CC-1139Z	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIACCWHTX-75G
417	AFW-RLY-NO-BFPL	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIACCWHTX-75G
418	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZIACCWHTX-75G
419	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZIACCWHTX-75G
420	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZIACCWHTX-75G
421	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZIACCWHTX-75G
422	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZIACCWHTX-75G
423	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZIACCWHTX-75G
424	EQ_T1	FLAG-T1_12CD	OFB-05G	ZAFW-TRANS-75G	ZIACCWHTX-75G
425	EQ_T1	FLAG-T1_12CD	OFB->05G	ZAFW-TRANS-75G	ZIACCWHTX-75G
426	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZAFW-TRANS-75G	ZIACCWHTX-75G
427	EQ_T1	FLAG-T1_12CD	OFB-01G	ZAFW-TRANS-75G	ZIACCWHTX-75G
428	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZAFW-TRANS-75G	ZIACCWHTX-75G
429	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZAFW-TRANS-75G	ZIACCWHTX-75G
430	DC1-MAI-MA-BCC32	EQ_T1	FLAG-T1_12CD	ZAFW-TRANS-75G	ZIACCWHTX-75G
431	AC4-RCK-NO-BCH37	EQ_T1	FLAG-T1_12CD	ZAFW-TRANS-75G	ZIACCWHTX-75G
432	EQ_T1	FLAG-T1_12CD	PPR-CCF-CC-PORVS	ZAFW-TRANS-75G	ZIACCWHTX-75G
433	EQ_T1	FLAG-T1_12CD	NSS-RRV-CO-N8304	ZAFW-TRANS-75G	ZIACCWHTX-75G
434	EQ_T1	FLAG-T1_12CD	NSS-RRV-CO-N8305	ZAFW-TRANS-75G	ZIACCWHTX-75G
435	EQ_T1	FLAG-T1_12CD	NNS-PCV-DN-6301	ZAFW-TRANS-75G	ZIACCWHTX-75G
436	EQ_T1	FLAG-T1_12CD	NSS-PCV-DN-6300	ZAFW-TRANS-75G	ZIACCWHTX-75G
437	DC1-BAT-HW-BT32Z	EQ_T1	FLAG-T1_12CD	ZAFW-TRANS-75G	ZIACCWHTX-75G
438	DC1-BCC-HW-BC32Z	EQ_T1	FLAG-T1_12CD	ZAFW-TRANS-75G	ZIACCWHTX-75G
439	EQ_T1	FLAG-T1_12CD	OFB-05G	ZHC-1118C-AN-84G	ZIACCWHTX-75G

440	EQ_T1	FLAG-T1_12CD	OFB->05G	ZHC-1118C-AN-84G	ZIACCWHTX-75G
441	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZHC-1118C-AN-84G	ZIACCWHTX-75G
442	EQ_T1	FLAG-T1_12CD	OFB-01G	ZHC-1118C-AN-84G	ZIACCWHTX-75G
443	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZHC-1118C-AN-84G	ZIACCWHTX-75G
444	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZHC-1118C-AN-84G	ZIACCWHTX-75G
445	DC1-MAI-MA-BCC32	EQ_T1	FLAG-T1_12CD	ZHC-1118C-AN-84G	ZIACCWHTX-75G
446	AC4-RCK-NO-BCH37	EQ_T1	FLAG-T1_12CD	ZHC-1118C-AN-84G	ZIACCWHTX-75G
447	EQ_T1	FLAG-T1_12CD	PPR-CCF-CC-PORVS	ZHC-1118C-AN-84G	ZIACCWHTX-75G
448	EQ_T1	FLAG-T1_12CD	NSS-RRV-CO-N8305	ZHC-1118C-AN-84G	ZIACCWHTX-75G
449	EQ_T1	FLAG-T1_12CD	NSS-RRV-CO-N8304	ZHC-1118C-AN-84G	ZIACCWHTX-75G
450	EQ_T1	FLAG-T1_12CD	NNS-PCV-DN-6301	ZHC-1118C-AN-84G	ZIACCWHTX-75G
451	EQ_T1	FLAG-T1_12CD	NSS-PCV-DN-6300	ZHC-1118C-AN-84G	ZIACCWHTX-75G
452	DC1-BCC-HW-BC32Z	EQ_T1	FLAG-T1_12CD	ZHC-1118C-AN-84G	ZIACCWHTX-75G
453	DC1-BAT-HW-BT32Z	EQ_T1	FLAG-T1_12CD	ZHC-1118C-AN-84G	ZIACCWHTX-75G
454	AFW-TDP-FR-TDP32	DC1-MAI-MA-BCC32	EQ_T1	FLAG-T1_12CD	ZIASFLT-75G
455	AC4-RCK-NO-BCH37	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	ZIASFLT-75G
456	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIASFLT-75G
457	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIASFLT-75G
458	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIASFLT-75G
459	AFW-TDP-FS-TP32Z	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIASFLT-75G
460	AFW-RCK-NO-TDP32	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIASFLT-75G
461	AFW-XHE-FO-HC405	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIASFLT-75G
462	AFW-AOV-CC-1139Z	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIASFLT-75G
463	AFW-RLY-NO-BFPL	EQ_T1	FLAG-T1_12CD	OFB->05G	ZIASFLT-75G
464	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	OFB-01G	ZIASFLT-75G
465	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	OFB-01G	ZIASFLT-75G
466	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	OFB-01G	ZIASFLT-75G
467	AFW-TDP-FS-TP32Z	EQ_T1	FLAG-T1_12CD	OFB-01G	ZIASFLT-75G
468	AFW-RCK-NO-TDP32	EQ_T1	FLAG-T1_12CD	OFB-01G	ZIASFLT-75G
469	AFW-XHE-FO-HC405	EQ_T1	FLAG-T1_12CD	OFB-01G	ZIASFLT-75G
470	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZIASFLT-75G
471	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZIASFLT-75G
472	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZIASFLT-75G
473	AFW-TDP-FS-TP32Z	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZIASFLT-75G
474	AFW-RCK-NO-TDP32	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZIASFLT-75G
475	AFW-XHE-FO-HC405	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZIASFLT-75G
476	AFW-AOV-CC-1139Z	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZIASFLT-75G

477	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIASFLT-75G
478	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIASFLT-75G
479	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIASFLT-75G
480	AFW-TDP-FS-TP32Z	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIASFLT-75G
481	AFW-RCK-NO-TDP32	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIASFLT-75G
482	AFW-XHE-FO-HC405	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIASFLT-75G
483	AFW-AOV-CC-1139Z	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIASFLT-75G
484	AFW-RLY-NO-BFPL	EQ_T1	FLAG-T1_12CD	OFB-05G	ZIASFLT-75G
485	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZIASFLT-75G
486	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZIASFLT-75G
487	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZIASFLT-75G
488	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZIASFLT-75G
489	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZIASFLT-75G
490	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZIASFLT-75G
491	EQ_T1	FLAG-T1_12CD	OFB-05G	ZAFW-TRANS-75G	ZIASFLT-75G
492	EQ_T1	FLAG-T1_12CD	OFB->05G	ZAFW-TRANS-75G	ZIASFLT-75G
493	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZAFW-TRANS-75G	ZIASFLT-75G
494	EQ_T1	FLAG-T1_12CD	OFB-01G	ZAFW-TRANS-75G	ZIASFLT-75G
495	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZAFW-TRANS-75G	ZIASFLT-75G
496	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZAFW-TRANS-75G	ZIASFLT-75G
497	DC1-MAI-MA-BCC32	EQ_T1	FLAG-T1_12CD	ZAFW-TRANS-75G	ZIASFLT-75G
498	AC4-RCK-NO-BCH37	EQ_T1	FLAG-T1_12CD	ZAFW-TRANS-75G	ZIASFLT-75G
499	EQ_T1	FLAG-T1_12CD	PPR-CCF-CC-PORVS	ZAFW-TRANS-75G	ZIASFLT-75G
500	EQ_T1	FLAG-T1_12CD	NSS-RRV-CO-N8305	ZAFW-TRANS-75G	ZIASFLT-75G
501	EQ_T1	FLAG-T1_12CD	NSS-RRV-CO-N8304	ZAFW-TRANS-75G	ZIASFLT-75G
502	EQ_T1	FLAG-T1_12CD	NSS-PCV-DN-6300	ZAFW-TRANS-75G	ZIASFLT-75G
503	EQ_T1	FLAG-T1_12CD	NNS-PCV-DN-6301	ZAFW-TRANS-75G	ZIASFLT-75G
504	DC1-BAT-HW-BT32Z	EQ_T1	FLAG-T1_12CD	ZAFW-TRANS-75G	ZIASFLT-75G
505	DC1-BCC-HW-BC32Z	EQ_T1	FLAG-T1_12CD	ZAFW-TRANS-75G	ZIASFLT-75G
506	EQ_T1	FLAG-T1_12CD	OFB-05G	ZHC-1118C-AN-84G	ZIASFLT-75G
507	EQ_T1	FLAG-T1_12CD	OFB->05G	ZHC-1118C-AN-84G	ZIASFLT-75G
508	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZHC-1118C-AN-84G	ZIASFLT-75G
509	EQ_T1	FLAG-T1_12CD	OFB-01G	ZHC-1118C-AN-84G	ZIASFLT-75G
510	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZHC-1118C-AN-84G	ZIASFLT-75G
511	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZHC-1118C-AN-84G	ZIASFLT-75G
512	DC1-MAI-MA-BCC32	EQ_T1	FLAG-T1_12CD	ZHC-1118C-AN-84G	ZIASFLT-75G
513	AC4-RCK-NO-BCH37	EQ_T1	FLAG-T1_12CD	ZHC-1118C-AN-84G	ZIASFLT-75G

551	EDG-RCS-OC-86EG2	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
552	EDG-RCS-OC-32OSR	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
553	EDG-RCS-OC-32OCT	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
554	EDG-RCS-OC-32OSS	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
555	AC4-RCS-OC-866A	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
556	EDG-MSW-OC-32STP	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
557	AC4-MSW-CO-CREG2	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
558	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
559	EDG-MAI-MA-EDG33	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
560	EDG-ENG-FR-DG33R	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
561	EDG-XHE-RE-33RHE	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
562	EDG-RCK-NO-FOT33	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
563	DGV-RCK-NO-DV318	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
564	EDG-MDP-FR-FOT33	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
565	DGV-CCF-HW-DG33F	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
566	EDG-MDP-FS-FOT33	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
567	EQ_T1	FLAG-T1_12CD	PPR-MOV-CC-RC536	PPR-PHN-CC-RC536	ZL-314-EQ-75G
568	AC4-CRB-CC-52-5A	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
569	AC4-CRB-OO-52E3Z	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
570	AC4-RCS-OO-33CVX	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
571	EDG-RCS-OO-D33CV	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
572	EDG-RCS-OO-335A1	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
573	AC4-XHE-RE-MCC6A	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
574	EDG-RCS-CC-33CVX	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
575	EDG-RCS-CC-D33K1	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
576	EDG-RCS-CC-33NST	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
577	EDG-ENG-FS-D33SZ	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
578	DGV-CCF-HW-DG33L	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
579	DGV-CCF-HW-DG33D	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
580	EDG-STR-PG-DG33F	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
581	EQ_T1	FLAG-T1_12CD	PPR-CCF-CC-BLKVS	PPR-PHN-CC-RC536	ZL-314-EQ-75G
582	AC4-BAC-ST-C36AZ	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
583	AC4-BAC-ST-BS5AZ	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
584	EDG-RCS-OC-33OSR	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
585	AC4-RCS-OC-865A	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
586	EDG-RCS-OC-33OCR	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
587	EDG-RCS-OC-86EG3	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G

514	EQ_T1	FLAG-T1_12CD	PPR-CCF-CC-PORVS	ZHC-1118C-AN-84G	ZIASFLT-75G
515	EQ_T1	FLAG-T1_12CD	NSS-RRV-CO-N8305	ZHC-1118C-AN-84G	ZIASFLT-75G
516	EQ_T1	FLAG-T1_12CD	NSS-RRV-CO-N8304	ZHC-1118C-AN-84G	ZIASFLT-75G
517	EQ_T1	FLAG-T1_12CD	NNS-PCV-DN-6301	ZHC-1118C-AN-84G	ZIASFLT-75G
518	EQ_T1	FLAG-T1_12CD	NSS-PCV-DN-6300	ZHC-1118C-AN-84G	ZIASFLT-75G
519	DC1-BAT-HW-BT32Z	EQ_T1	FLAG-T1_12CD	ZHC-1118C-AN-84G	ZIASFLT-75G
520	DC1-BCC-HW-BC32Z	EQ_T1	FLAG-T1_12CD	ZHC-1118C-AN-84G	ZIASFLT-75G
521	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
522	EDG-MAI-MA-EDG32	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
523	EDG-ENG-FR-DG32R	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
524	EDG-XHE-RE-32RHE	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
525	EDG-RCK-NO-FOT32	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
526	EDG-MDP-FR-FOT32	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
527	DGV-CCF-HW-DG32F	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
528	EQ_T1	FLAG-T1_12CD	PPR-MOV-CC-RC535	PPR-PHN-CC-RC535	ZL-314-EQ-75G
529	EDG-MDP-FS-FOT32	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
530	AC4-CRB-CC-52-6A	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
531	AC4-CRB-CC-6A5AZ	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
532	AC4-CRB-OO-52E2Z	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
533	AC4-RCS-OO-32CVX	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
534	EDG-RCS-OO-D32CV	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
535	EDG-RCS-OO-336A1	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
536	AC4-XHE-RE-MCC6B	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
537	EDG-RCS-CC-32CVX	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
538	EDG-RCS-CC-D32K1	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
539	EDG-RCS-CC-32NST	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
540	EDG-ENG-FS-D32SZ	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
541	DGV-CCF-HW-DG32D	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
542	DGV-CCF-HW-DG32L	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
543	EDG-STR-PG-DG32F	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
544	EQ_T1	FLAG-T1_12CD	PPR-CCF-CC-BLKVS	PPR-PHN-CC-RC535	ZL-314-EQ-75G
545	AC4-BAC-ST-C36BZ	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
546	AC4-BAC-ST-BS6AZ	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
547	EDG-RCS-OC-32OCR	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
548	AC4-RCS-OC-OTS6A	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
549	EDG-RCS-OC-3286X	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G
550	EDG-RCS-OC-32SDR	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	ZL-314-EQ-75G

625	AFW-ATS-HI-1112A	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G	ZVC-RACKS-90G
626	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G	ZAFW-TRANS-75G	ZVC-RACKS-90G
627	AFW-CCF-FS-AFWPM	EQ_T1	FLAG-T1_12CD	ZAFW-TRANS-75G	ZVC-RACKS-90G
628	EQ_T1	FLAG-T1_12CD	IAS-CCF-FR-IACMP	ZAFW-TRANS-75G	ZVC-RACKS-90G
629	EQ_T1	FLAG-T1_12CD	IAS-RRV-CO-49	ZAFW-TRANS-75G	ZVC-RACKS-90G
630	EQ_T1	FLAG-T1_12CD	SWS-TSW-LO-1113	ZAFW-TRANS-75G	ZVC-RACKS-90G
631	EQ_T1	FLAG-T1_12CD	SWS-TCV-OC-1113	ZAFW-TRANS-75G	ZVC-RACKS-90G
632	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G	ZHC-1118C-AN-84G	ZVC-RACKS-90G
633	AFW-CCF-FS-AFWPM	EQ_T1	FLAG-T1_12CD	ZHC-1118C-AN-84G	ZVC-RACKS-90G
634	EQ_T1	FLAG-T1_12CD	IAS-CCF-FR-IACMP	ZHC-1118C-AN-84G	ZVC-RACKS-90G
635	EQ_T1	FLAG-T1_12CD	IAS-RRV-CO-49	ZHC-1118C-AN-84G	ZVC-RACKS-90G
636	EQ_T1	FLAG-T1_12CD	SWS-TSW-LO-1113	ZHC-1118C-AN-84G	ZVC-RACKS-90G
637	EQ_T1	FLAG-T1_12CD	SWS-TCV-OC-1113	ZHC-1118C-AN-84G	ZVC-RACKS-90G
638	EQ_T1	FLAG-T1_12CD	ZHC-1118C-AN-84G	ZIAC-AN-82G	ZVC-RACKS-90G
639	EQ_T1	FLAG-T1_12CD	ZAFW-TRANS-75G	ZIAC-AN-82G	ZVC-RACKS-90G
640	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	ZIAC-AN-82G	ZVC-RACKS-90G
641	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	ZIAC-AN-82G	ZVC-RACKS-90G
642	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	ZIAC-AN-82G	ZVC-RACKS-90G
643	AFW-TDP-FS-TP32Z	EQ_T1	FLAG-T1_12CD	ZIAC-AN-82G	ZVC-RACKS-90G
644	AFW-RCK-NO-TDP32	EQ_T1	FLAG-T1_12CD	ZIAC-AN-82G	ZVC-RACKS-90G
645	AFW-XHE-FO-HC405	EQ_T1	FLAG-T1_12CD	ZIAC-AN-82G	ZVC-RACKS-90G
646	AFW-AOV-CC-1139Z	EQ_T1	FLAG-T1_12CD	ZIAC-AN-82G	ZVC-RACKS-90G
647	AFW-RLY-NO-BFPL	EQ_T1	FLAG-T1_12CD	ZIAC-AN-82G	ZVC-RACKS-90G
648	AFW-MAI-MA-32VLV	EQ_T1	FLAG-T1_12CD	ZIAC-AN-82G	ZVC-RACKS-90G
649	AFW-CCF-CC-TDPDV	EQ_T1	FLAG-T1_12CD	ZIAC-AN-82G	ZVC-RACKS-90G
650	AFW-CKV-CC-BFD5O	EQ_T1	FLAG-T1_12CD	ZIAC-AN-82G	ZVC-RACKS-90G
651	AFW-CKV-CC-BFD31	EQ_T1	FLAG-T1_12CD	ZIAC-AN-82G	ZVC-RACKS-90G
652	AFW-CKV-CC-29-2	EQ_T1	FLAG-T1_12CD	ZIAC-AN-82G	ZVC-RACKS-90G
653	AFW-ATS-HI-1113A	EQ_T1	FLAG-T1_12CD	ZIAC-AN-82G	ZVC-RACKS-90G
654	AFW-ATS-HI-1112A	EQ_T1	FLAG-T1_12CD	ZIAC-AN-82G	ZVC-RACKS-90G
655	EQ_T1	FLAG-T1_12CD	ZHC-1118C-AN-84G	ZIACCWHTX-75G	ZVC-RACKS-90G
656	EQ_T1	FLAG-T1_12CD	ZAFW-TRANS-75G	ZIACCWHTX-75G	ZVC-RACKS-90G
657	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	ZIACCWHTX-75G	ZVC-RACKS-90G
658	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	ZIACCWHTX-75G	ZVC-RACKS-90G
659	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	ZIACCWHTX-75G	ZVC-RACKS-90G
660	AFW-TDP-FS-TP32Z	EQ_T1	FLAG-T1_12CD	ZIACCWHTX-75G	ZVC-RACKS-90G
661	AFW-RCK-NO-TDP32	EQ_T1	FLAG-T1_12CD	ZIACCWHTX-75G	ZVC-RACKS-90G

588	AC4-RCS-OC-OTS5A	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
589	EDG-RCS-OC-33OSS	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
590	EDG-RCS-OC-33OCT	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
591	EDG-RCS-OC-33SDR	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
592	EDG-RCS-OC-3386X	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
593	EDG-MSW-OC-33STP	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
594	AC4-MSW-CO-CREG3	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	ZL-314-EQ-75G
595	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	PPR-RCK-NO-RC535	ZL-314-EQ-75G
596	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	PPR-RCK-NO-RC536	ZL-314-EQ-75G
597	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	SWS-XVM-OC-62-4	ZL-314-EQ-75G
598	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	SWS-XVM-OC-62-6	ZL-314-EQ-75G
599	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC535	SWS-XVM-OC-67-2	ZL-314-EQ-75G
600	EQ_T1	FLAG-T1_12CD	PPR-PHN-CC-RC536	SWS-XVM-OC-67-3	ZL-314-EQ-75G
601	COND_PROB_CST31	DC1-MAI-MA-BCC31	EQ_T1	FLAG-T1_12CD	ZUNIT1-STACK-73G
602	COND_PROB_CST31	DC1-MAI-MA-BCC32	EQ_T1	FLAG-T1_12CD	ZUNIT1-STACK-73G
603	AC4-RCK-NO-BCH39	COND_PROB_CST31	EQ_T1	FLAG-T1_12CD	ZUNIT1-STACK-73G
604	AC4-RCK-NO-BCH37	COND_PROB_CST31	EQ_T1	FLAG-T1_12CD	ZUNIT1-STACK-73G
605	COND_PROB_CST31	EQ_T1	FLAG-T1_12CD	OFB->05G	ZUNIT1-STACK-73G
606	COND_PROB_CST31	EQ_T1	FLAG-T1_12CD	OFB-01G	ZUNIT1-STACK-73G
607	COND_PROB_CST31	EQ_T1	FLAG-T1_12CD	OFB-02-049G	ZUNIT1-STACK-73G
608	COND_PROB_CST31	EQ_T1	FLAG-T1_12CD	OFB-05G	ZUNIT1-STACK-73G
609	COND_PROB_CST31	EQ_T1	FLAG-T1_12CD	PPR-CCF-CC-PORVS	ZUNIT1-STACK-73G
610	COND_PROB_CST31	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-455C	ZUNIT1-STACK-73G
611	COND_PROB_CST31	EQ_T1	FLAG-T1_12CD	PPR-PRV-CC-456	ZUNIT1-STACK-73G
612	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G	ZVC-RACKS-90G
613	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G	ZVC-RACKS-90G
614	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G	ZVC-RACKS-90G
615	AFW-TDP-FS-TP32Z	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G	ZVC-RACKS-90G
616	AFW-RCK-NO-TDP32	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G	ZVC-RACKS-90G
617	AFW-XHE-FO-HC405	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G	ZVC-RACKS-90G
618	AFW-AOV-CC-1139Z	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G	ZVC-RACKS-90G
619	AFW-RLY-NO-BFPL	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G	ZVC-RACKS-90G
620	AFW-MAI-MA-32VLV	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G	ZVC-RACKS-90G
621	AFW-CCF-CC-TDPDV	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G	ZVC-RACKS-90G
622	AFW-CKV-CC-BFD5O	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G	ZVC-RACKS-90G
623	AFW-CKV-CC-BFD31	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G	ZVC-RACKS-90G
624	AFW-ATS-HI-1113A	EQ_T1	FLAG-T1_12CD	ZAFW-DISPT-75G	ZVC-RACKS-90G

662	AFW-XHE-FO-HC405	EQ_T1	FLAG-T1_12CD	ZIACCWHTX-75G	ZVC-RACKS-90G
663	AFW-AOV-CC-1139Z	EQ_T1	FLAG-T1_12CD	ZIACCWHTX-75G	ZVC-RACKS-90G
664	AFW-RLY-NO-BFPL	EQ_T1	FLAG-T1_12CD	ZIACCWHTX-75G	ZVC-RACKS-90G
665	AFW-MAI-MA-32VLV	EQ_T1	FLAG-T1_12CD	ZIACCWHTX-75G	ZVC-RACKS-90G
666	AFW-CCF-CC-TDPDV	EQ_T1	FLAG-T1_12CD	ZIACCWHTX-75G	ZVC-RACKS-90G
667	AFW-CKV-CC-BFD31	EQ_T1	FLAG-T1_12CD	ZIACCWHTX-75G	ZVC-RACKS-90G
668	AFW-CKV-CC-BFD5O	EQ_T1	FLAG-T1_12CD	ZIACCWHTX-75G	ZVC-RACKS-90G
669	AFW-CKV-CC-29-2	EQ_T1	FLAG-T1_12CD	ZIACCWHTX-75G	ZVC-RACKS-90G
670	AFW-ATS-HI-1113A	EQ_T1	FLAG-T1_12CD	ZIACCWHTX-75G	ZVC-RACKS-90G
671	AFW-ATS-HI-1112A	EQ_T1	FLAG-T1_12CD	ZIACCWHTX-75G	ZVC-RACKS-90G
672	EQ_T1	FLAG-T1_12CD	ZHC-1118C-AN-84G	ZIASFLT-75G	ZVC-RACKS-90G
673	EQ_T1	FLAG-T1_12CD	ZAFW-TRANS-75G	ZIASFLT-75G	ZVC-RACKS-90G
674	AFW-TDP-FR-TDP32	EQ_T1	FLAG-T1_12CD	ZIASFLT-75G	ZVC-RACKS-90G
675	AFW-MAI-MA-TDP32	EQ_T1	FLAG-T1_12CD	ZIASFLT-75G	ZVC-RACKS-90G
676	AFW-XHE-RE-AFW32	EQ_T1	FLAG-T1_12CD	ZIASFLT-75G	ZVC-RACKS-90G
677	AFW-TDP-FS-TP32Z	EQ_T1	FLAG-T1_12CD	ZIASFLT-75G	ZVC-RACKS-90G
678	AFW-RCK-NO-TDP32	EQ_T1	FLAG-T1_12CD	ZIASFLT-75G	ZVC-RACKS-90G
679	AFW-XHE-FO-HC405	EQ_T1	FLAG-T1_12CD	ZIASFLT-75G	ZVC-RACKS-90G
680	AFW-AOV-CC-1139Z	EQ_T1	FLAG-T1_12CD	ZIASFLT-75G	ZVC-RACKS-90G
681	AFW-RLY-NO-BFPL	EQ_T1	FLAG-T1_12CD	ZIASFLT-75G	ZVC-RACKS-90G
682	AFW-MAI-MA-32VLV	EQ_T1	FLAG-T1_12CD	ZIASFLT-75G	ZVC-RACKS-90G
683	AFW-CCF-CC-TDPDV	EQ_T1	FLAG-T1_12CD	ZIASFLT-75G	ZVC-RACKS-90G
684	AFW-CKV-CC-BFD31	EQ_T1	FLAG-T1_12CD	ZIASFLT-75G	ZVC-RACKS-90G
685	AFW-CKV-CC-BFD5O	EQ_T1	FLAG-T1_12CD	ZIASFLT-75G	ZVC-RACKS-90G
686	AFW-CKV-CC-29-2	EQ_T1	FLAG-T1_12CD	ZIASFLT-75G	ZVC-RACKS-90G
687	AFW-ATS-HI-1112A	EQ_T1	FLAG-T1_12CD	ZIASFLT-75G	ZVC-RACKS-90G
688	AFW-ATS-HI-1113A	EQ_T1	FLAG-T1_12CD	ZIASFLT-75G	ZVC-RACKS-90G
689	COND_PROB_CST31	EQ_T1	FLAG-T1_12CD	ZUNIT1-STACK-73G	ZVC-RACKS-90G

S_14_CD DOMINANT CORE DAMAGE ACCIDENT SEQUENCE

TERM NUMBER		CUT SET LISTING				
1	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	ZSUPPANEL-AN-52G	
2	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	LTS-MRI->05G	ZCCR-RACKS-67G
3	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	PR2	ZCCR-RACKS-67G
4	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	LTS-MRI-05G	ZCCR-RACKS-67G
5	C-MECHANICAL	DC1-MAI-MA-BCC31	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
6	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	PPR-PRV-CC-455C	ZCCR-RACKS-67G
7	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	PPR-PRV-CC-456	ZCCR-RACKS-67G
8	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	LTS-MRI-02-049G	ZCCR-RACKS-67G
9	C-MECHANICAL	DC1-MAI-MA-BCC32	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
10	AC4-RCK-NO-BCH	37 C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
11	AC4-RCK-NO-BCH	39 C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	ZCCR-RACKS-67G
12	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	LTS-MRI-01G	ZCCR-RACKS-67G
13	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	PPR-CCF-CC-PORVS	ZCCR-RACKS-67G
14	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	PPR-SRV-CC-468	ZCCR-RACKS-67G
15	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	PPR-SRV-CC-466	ZCCR-RACKS-67G
16	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	PPR-SRV-CC-464	ZCCR-RACKS-67G
17	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	LTS-MRI->05G	ZCRF12345-AN-86G
18	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	PR2	ZCRF12345-AN-86G
19	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	LTS-MRI-05G	ZCRF12345-AN-86G
20	C-MECHANICAL	DC1-MAI-MA-BCC31	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	ZCRF12345-AN-86G
21	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	PPR-PRV-CC-456	ZCRF12345-AN-86G
22	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	PPR-PRV-CC-455C	ZCRF12345-AN-86G
23	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	LTS-MRI-02-049G	ZCRF12345-AN-86G
24	C-MECHANICAL	DC1-MAI-MA-BCC32	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	ZCRF12345-AN-86G
25	AC4-RCK-NO-BCH37	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	ZCRF12345-AN-86G
26	AC4-RCK-NO-BCH39	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	ZCRF12345-AN-86G
27	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	LTS-MRI-01G	ZCRF12345-AN-86G
28	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	PPR-CCF-CC-PORVS	ZCRF12345-AN-86G
29	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	PPR-SRV-CC-466	ZCRF12345-AN-86G
30	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	PPR-SRV-CC-464	ZCRF12345-AN-86G
31	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	PPR-SRV-CC-468	ZCRF12345-AN-86G
32	C-MECHANICAL	EQ_T1	FLAG-S_14_CD	FLAG_NO_CFC	ZCRF12345-AN-86G	ZCVC-CPUMPS-47G

S_13_CD DOMINANT CORE DAMAGE ACCIDENT SEQUENCE

TERM NUMBER	CUT SET LISTING				
1	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZCVC-CPUMPS-47G	
2	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZCVCHNHT-AN-49G	
3	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZFLGPANEL-AN-67G	
4	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZIAC-AN-82G	
5	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZIACCWHTX-75G	
6	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZIASFLT-75G	
7	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZPABEF-AN-88G	
8	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZPABSF-AN-126G	
9	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZVCT1-AN-27G	
10	AC4-XHE-RE-MCC6B	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZCVC-BAST-AN-15G
11	AC4-RCS-OO-32CVX	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZCVC-BAST-AN-15G
12	C-MECHANICAL	EDG-RCS-OO-D32CV	EQ_T1	FLAG-S_13_CD	ZCVC-BAST-AN-15G
13	C-MECHANICAL	EDG-RCS-OO-336A1	EQ_T1	FLAG-S_13_CD	ZCVC-BAST-AN-15G
14	AC4-CRB-CC-52-6A	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZCVC-BAST-AN-15G
15	AC4-CRB-CC-6A5AZ	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZCVC-BAST-AN-15G
16	AC4-CRB-OO-52E2Z	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZCVC-BAST-AN-15G
17	C-MECHANICAL	EDG-MDP-FS-FOT32	EQ_T1	FLAG-S_13_CD	ZCVC-BAST-AN-15G
18	C-MECHANICAL	DGV-CCF-HW-DG32F	EQ_T1	FLAG-S_13_CD	ZCVC-BAST-AN-15G
19	C-MECHANICAL	CVC-LCV-CC-L112B	EQ_T1	FLAG-S_13_CD	ZCVC-BAST-AN-15G
20	C-MECHANICAL	EDG-XHE-RE-32RHE	EQ_T1	FLAG-S_13_CD	ZCVC-BAST-AN-15G
21	C-MECHANICAL	EDG-RCK-NO-FOT32	EQ_T1	FLAG-S_13_CD	ZCVC-BAST-AN-15G
22	C-MECHANICAL	CVC-RCK-NO-L112B	EQ_T1	FLAG-S_13_CD	ZCVC-BAST-AN-15G
23	C-MECHANICAL	EDG-MDP-FR-FOT32	EQ_T1	FLAG-S_13_CD	ZCVC-BAST-AN-15G
24	C-MECHANICAL	EDG-ENG-FR-DG32R	EQ_T1	FLAG-S_13_CD	ZCVC-BAST-AN-15G
25	C-MECHANICAL	EDG-MAI-MA-EDG32	EQ_T1	FLAG-S_13_CD	ZCVC-BAST-AN-15G
26	C-MECHANICAL	EDG-GEN-HW-DG32Z	EQ_T1	FLAG-S_13_CD	ZCVC-BAST-AN-15G
27	AC1-SBR-DN-NIB34	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZIB3133-EQ-75G
28	AC1-INV-HW-IN34Z	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZIB3133-EQ-75G
29	AC1-SBR-DN-BIB34	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZINV34-AN-65G
30	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZIB3133-EQ-75G	ZINV34-AN-65G
31	AC4-XHE-RE-MCC39	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZMCC36C-AN-86G
32	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ICC-MDP-FR-31	ZMCC36C-AN-86G

33	AC1-INV-HW-INV31	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZMCC36C-AN-86G	
34	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	IAS-SOV-HW-1198Z	ZMCC36C-AN-86G	
35	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	IAS-CMP-FR-IA31Z	ZMCC36C-AN-86G	
36	AC4-XHE-RE-MCC39	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZMCCTB-AN-92G	
37	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ICC-MDP-FR-31	ZMCCTB-AN-92G	
38	C-MECHANICAL	EDG-RCS-OO-D33CV	EQ_T1	FLAG-S_13_CD	ZMCCTB-AN-92G	
39	AC4-RCS-OO-33CVX	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZMCCTB-AN-92G	
40	C-MECHANICAL	EDG-RCS-OO-335A1	EQ_T1	FLAG-S_13_CD	ZMCCTB-AN-92G	
41	AC4-CRB-OO-52E3Z	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZMCCTB-AN-92G	
42	AC4-CRB-CC-52-5A	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZMCCTB-AN-92G	
43	C-MECHANICAL	EDG-MDP-FS-FOT33	EQ_T1	FLAG-S_13_CD	ZMCCTB-AN-92G	
44	AC1-INV-HW-INV31	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZMCCTB-AN-92G	
45	C-MECHANICAL	DGV-CCF-HW-DG33F	EQ_T1	FLAG-S_13_CD	ZMCCTB-AN-92G	
46	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	IAS-SOV-HW-1198Z	ZMCCTB-AN-92G	
47	C-MECHANICAL	EDG-XHE-RE-33RHE	EQ_T1	FLAG-S_13_CD	ZMCCTB-AN-92G	
48	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	IAS-CMP-FR-IA31Z	ZMCCTB-AN-92G	
49	C-MECHANICAL	EDG-RCK-NO-FOT33	EQ_T1	FLAG-S_13_CD	ZMCCTB-AN-92G	
50	C-MECHANICAL	DGV-RCK-NO-DV318	EQ_T1	FLAG-S_13_CD	ZMCCTB-AN-92G	
51	C-MECHANICAL	EDG-MDP-FR-FOT33	EQ_T1	FLAG-S_13_CD	ZMCCTB-AN-92G	
52	C-MECHANICAL	EDG-ENG-FR-DG33R	EQ_T1	FLAG-S_13_CD	ZMCCTB-AN-92G	
53	C-MECHANICAL	EDG-MAI-MA-EDG33	EQ_T1	FLAG-S_13_CD	ZMCCTB-AN-92G	
54	C-MECHANICAL	EDG-GEN-HW-DG33Z	EQ_T1	FLAG-S_13_CD	ZMCCTB-AN-92G	
55	C-MECHANICAL	CVC-MAI-MA-PM33	CVC-PDP-FR-PM31Z	EQ_T1	FLAG-S_13_CD	ZMCC36C-AN-86G
56	C-MECHANICAL	CVC-MAI-MA-PM33	CVC-RCK-NO-PM31Z	EQ_T1	FLAG-S_13_CD	ZMCC36C-AN-86G
57	C-MECHANICAL	EQ_T1	FLAG-SI	FLAG-S_13_CD	SAS-RCS-OO-SI1	ZMCCTB-AN-92G
58	C-MECHANICAL	EQ_T1	FLAG-SI	FLAG-S_13_CD	SAS-RCS-OO-SI2	ZCVC-BAST-AN-15G
59	C-MECHANICAL	EQ_T1	FLAG-SI	FLAG-S_13_CD	SAS-RCS-OO-SI5A	ZMCCTB-AN-92G
60	C-MECHANICAL	EQ_T1	FLAG-SI	FLAG-S_13_CD	SAS-RCS-OO-SI6A	ZCVC-BAST-AN-15G
61	C-MECHANICAL	EQ_T1	FLAG-SI	FLAG-S_13_CD	SAS-XLF-TE-SASA	ZMCCTB-AN-92G
62	C-MECHANICAL	EQ_T1	FLAG-SI	FLAG-S_13_CD	SAS-XLF-TE-SASB	ZCVC-BAST-AN-15G
63	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	IAS-CMP-FR-IA31Z	ZBATT33-AN-121G	ZCHRG33-AN-129G
64	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	IAS-SOV-HW-1198Z	ZBATT33-AN-121G	ZCHRG33-AN-129G
65	AC1-INV-HW-INV31	C-MECHANICAL	EQ_T1	FLAG-S_13_CD	ZBATT33-AN-121G	ZCHRG33-AN-129G

Section 4

FIRE

4.0 METHODOLOGY SELECTION

The intent of the internal fire analysis is to identify critical vulnerabilities to fires during full-power operation: to ascertain if there is a significant likelihood that fire could compromise safety equipment. Of particular concern is the potential for fire in areas in which redundant safe shutdown equipment is located, for the cross-zone spread of fire, and for transient fuels supplementing other fuels already present.

Although NUREG-1407 [1] does not prescribe which internal fire analysis methodology to adopt in the IPEEE, it identifies necessary features. The selected methodology must:

- Identify critical areas of vulnerability
- Calculate fire initiation frequencies
- Determine whether critical safety functions are disabled
- Identify fire-induced initiating events and their impact on systems
- Perform a containment analysis.

The methodology should also address seismic/fire interactions (see section 3.2.2), the effects of fire suppression on safety equipment, and control system interactions.

Two principal methodologies for fire analysis have emerged in recent years, both developed by EPRI: the Fire Induced Vulnerability Evaluation (FIVE) [2] and the fire PRA [3]. The Authority elected to use the fire PRA methodology for IP3. This methodology was developed subsequent to FIVE but adopts some of the latter's features such as fire model temperature profiles for critical equipment and the treatment of damage to critical components resulting from the development of hot gas layers. While the fire PRA methodology was adopted for this study, specific data, concepts, and methods provide in FIVE were used:

- Fire damage scenarios for screened-in zones were analyzed using fire hazard data screen from FIVE.
- Generic ignition frequencies were obtained from FIVE.

- Potential transient combustibles were handled as suggested in FIVE.
- The generic Unavailabilities of fire suppression systems were obtained from FIVE.
- The attributes of an adequate fire protection system are those suggested in FIVE.

Data for those fire propagation models are drawn from sources such as NUREG/CR-4840 [4] and NUREG/CR-2815 [5], insights being taken from the various Sandia National Laboratory and EPRI research programs.

Unlike FIVE, the fire PRA utilizes the detailed IPE internal event models [6] to address fire-induced initiators and appropriate equipment failure modes, thus allowing both fire-induced and random failures to be addressed at the level of detail employed in the IPE. This approach facilitates the use of the computer codes and databases associated with detailed internal event IPE models developed for IP3. Another advantage of the fire PRA is that its treatment of detection, suppression, and fire barrier performance is more comprehensive--FIVE merely credits surveillance for assuming the acceptable effectiveness of fire barriers. A final advantage of the fire PRA is that it lends itself to the development of a performance-based fire protection program to address such emerging issues as a reduction of fire surveillances, the evaluation of the need for and type of fire watches, and a more realistic assessment of proposed fire-related plant modifications. For these reasons, the fire PRA methodology was selected for use in the IPEEE fire analysis.

The equipment and cable databases necessary for the fire PRA were constructed by combining:

- The plant electrical cable and raceway information system (ECRIS) database of all plant cabling
- The existing 10CFR50, Appendix R associated cable analysis to determine fire zone routing of particular Appendix R cables
- A database of cable failures impacting non-Appendix R components modeled in the IPE.

Additional analysis was done to incorporate non-Appendix R cables modeled in the IPE into the database. Plant walkdowns were conducted to catalog potential ignition sources and to confirm the locations of equipment and raceways where this is not detailed in databases and drawings.

Fire zones were identified and examined individually. Identification entailed the use of the IP3 fire hazard analysis [7], pre-fire plans [8] and plant layout drawings. Fire zones for which the fire-induced conditional core damage probability (CCDP) is negligible were then screened out. Further walkdowns were conducted on the remaining critical zones to locate fixed ignition sources, designated areas in which transient ignition sources may be present, combustibles, and fire compartment interactions. Fire ignition frequencies were calculated based on the type and number of ignition sources present. Fire damage scenarios for screened-in zones were analyzed using the fire hazard data sheets presented in FIVE [2] to assess the degree of fire damage. Further details of the methodology and assumptions used in the detailed fire analysis and the results obtained are presented in the following sections.

4.1 REVIEW OF PLANT INFORMATION AND WALKDOWNS

An extensive volume of plant data was used to support the fire PRA. These data include:

- The 10 CFR 50, Appendix R safe shut down analysis [15]
- The fire hazards analysis [8]
- The Electrical Cable and Raceway Information System (ECRIS)
- Pre-fire plan [8]
- Plant drawings
- Plant procedures
- The IP3 IPE [6]
- Design basis documents [12]

NYPA Reactor Engineering/NSA group personnel and contractors performed walkdowns. The walkdowns were conducted as described in the Fire PRA Implementation Guide [3] using the forms from that guide. Detailed preparations were made prior to each walkdown. In the walkdowns, distances from ignition sources to potential targets, the location of fire detection and suppression equipment and fire doors and dampers, and the placement of combustible materials were recorded and equipment was examined to determine if it was a potential ignition source.

Walkdowns were conducted as follows:

Date	Building/Area
10/29/96	Control room
12/2 - 12/4/96	Turbine building, control building, screenwell, yard
1/14 - 1/17/97	Cable spreading room, auxiliary feedwater pumps room, switchgear room
2/10 - 2/12/97	Primary auxiliary building, electrical tunnels, screenwell
3/4 - 3/6/97	Control building, emergency diesel generator rooms, turbine building
6/13/97	Control building, cable spreading room, electrical tunnels, diesel generator rooms, auxiliary boiler feedwater pump room, turbine building

The results of the walkdowns are incorporated in the analyses described in Sections 4.7.2, 4.7.3, and 4.7.4.

4.2 DEFINITION OF FIRE AREAS AND ZONES

A first step in the fire PRA is to define the fire areas—a fire area is a zones in which equipment modeled in the IPE is located. The plant is divided into fire areas, defined as an enclosure sufficiently bounded by barriers such that it will withstand fire hazards within the area and protect important equipment from a fire outside the area. A fire zone lies within a fire area as a defined compartment--it is a spatial division selected to meet the criteria of BTP 9.5-1, Appendix A [9]. Fire zones do not necessarily have fire barriers--they may have open equipment hatches, ladder ways, open doorways or unsealed penetrations.

The fire areas and zones defined in the IP3 Fire Hazards Analysis and Appendix R Safe Shutdown Analysis were used in the fire PRA. Appendix R equipment required for safe shutdown from a fire was then reviewed. Because equipment locations were found to be separated by the fire zone boundaries, it was decided to define fire zones as the compartment boundaries defined in the Fire PRA Implementation Guide [3].

4.3 EVALUATION OF COMPONENT DAMAGE AND FAILURE MODES

The Fire PRA Implementation Guide [3] emphasizes the selection of damage criteria, or thresholds, as a key element in modeling fire-induced risk. The criteria used in this study were those presented in Appendix F to the guide. In particular, cables within sealed conduit and trays were assumed to be susceptible to damage if threshold temperature was exceeded. While the criteria for damage to cable were of special concern, damage criteria for other equipment were also noted.

The damage criteria for cables were integrated into the analysis as follows. For each IPE event, a detailed cable analysis was performed identifying conductor failures, which could cause the failure mode of concern. The existing IP3 Appendix R Safe Shutdown analysis were used to determine the cable (and their location) associated with Appendix R Safe Shutdown equipment. Therefore, the scope and assumptions remain consistent with the IP3 Appendix R Safe Shutdown analysis.

For non-Appendix R equipment credited in this analysis, cables were identified along with their routing.

Open-circuit, short-to-ground, and short-to-power (hot short) conductor failures were considered in this evaluation. Once the cables associated with the equipment were identified, an analysis was done to determine the impact of the loss of these cables, considering all of the above failure modes, on the functionality of the equipment. Potential hot short circuit conditions were evaluated only for conductors within a cable jacket since these are more likely to occur than are short circuits between conductors within adjacent cables. The assumption is considered to have no significant impact on the fire risk since: a) this assumption is limited to non-Appendix R components such as offsite power; and b) external cable faults due to hot shorts are the least likely cable failure mode.

Once cables affecting equipment credited in the fire PRA are identified, the conservative assumption was made that in damaging cable, a fire would induce the conductor failure mode of concern.

The detailed cable analysis for each component modeled in the IPE resulted in the creation of a database listing the basic event identifier(s), the equipment lost should the cable be damaged and the associated fire zone cable and raceway routing. For some cables this entailed a manual search through raceway drawings and the plant cable database to identify the fire zones traversed by the cables. From the cable database, the equipment that might be lost as a result of fire-induced damage in each fire zone was identified.

The internal events IPE event tree sequence logic for transient events was collapsed using a four-step procedure to construct a single fault tree model with core damage as the top gate. The steps were:

1. Minimize system success and failure combinations in the event tree sequence Boolean logic to reduce the number of core damage sequences.

2. Create a new irreducible discrete fault tree for each system success-failure combination by renaming all the gates in the failed system fault trees to avoid confusion, and removing common success system logic and basic events.

3. Insert the new discrete fault tree sections for each success-failure combination into the combined linked fault tree logic and again attempt to minimize the sequence logic by collapsing the event trees further and factoring all success systems into the new logic.

   Steps 2 and 3 are repeated until no further reduction was possible.

4. Combine all remaining system combinations into one large Boolean expression, with the single top gate being core damage.

The same process was repeated to create separate fault tree logic within the model for special initiators and loss of offsite power.

These models were confirmed to be logically equivalent to the original IPE event tree sequence model except that they contain only logic for transients, transient-induced LOCAs (e.g., stuck open PORVs or RCP seal LOCAs), special initiators and loss-of-offsite power initiators. Other initiating events (e.g., ATWS, LOCAs, SGTRs and main steam line breaks) were excluded because of the very low likelihood of their being induced by fire. The fail-safe design of the reactor protection system (RPS) and the redundancy and separation of RPS components results in a very low likelihood of a fire-induced ATWS event. The values of maintenance unavailability, common cause and pre-accident human error were retained from the original IPE.

Taking each fire zone in turn, each of the fire-induced basic events was set to logical TRUE in the fault tree model and its logic compressed. The list of equipment lost was then reviewed with its respective fire procedure and the revised fault tree logic corresponding to the particular initiator(s) was retained for quantification. Finally, any IPE-modeled equipment that is de-activated according to plant procedures during a fire was set to logical TRUE in the fault tree model. Solution of this fault tree yields the conditional core damage probability (CCDP) resulting from damage to all equipment in the zone. To address the possible impact of a fire on operator reliability, a screening value of 0.1 was conservatively assigned to all post-accident operator actions.

The probabilities of non-recovery were applied, where applicable, to CCDP minimal cutsets. In doing so, credit was taken for specific recovery actions in the internal events IPE (using screening values of 0.1 versus nominal IPE values) and fire-specific recoveries addressed in the procedures only if the equipment required for recovery is accessible and available during fire conditions.

Multiplying the calculated CCDP by the zone ignition frequencies described in Section 4.4, yielded a fire zone core damage frequency (CDF) to be used for screening purposes. Applying a screening value of 10^{-6}/year (or 10^{-7}/year if containment bypass could result) [3], zones that make a lesser contribution to the fire-induced CDF were screened out. The remaining zones were retained for detailed fire modeling.

The CDF was calculated for scenarios requiring a detailed analysis using the following equation:

$$CDF = IF * CCDP * P_{AS} * P_{MS} * P_{NR} * AR * SF$$

where

IF is the fire ignition frequency (/year),

CCDP is the condition core damage probability,

P_{AS} is the probability of automatic suppression failure,

P_{MS} is the probability of manual suppression failure,

P_{NR} is the probability of non-recovery, AR is the exposure area ratio (equal to one for fixed ignition sources), and

SF is the severity factor--a conditional probability that the ignition source goes beyond the incipient stage and into a fully developed (i.e., peak heat release rate) fire.

4.4 FIRE IGNITION SOURCES AND FREQUENCIES

A determination of fire ignition sources and frequencies was performed in the five-step process set forth in the Fire PRA Implementation Guide [3]. These steps are:

- Identify fire ignition sources
- Determine the location weighting factor for each zone
- Calculate ignition source weighting factors for each zone
- Calculate fire ignition frequencies for each zone
- Screen zones on the basis of fire frequency.

The guidance provided in Appendix C to the Fire PRA Implementation Guide was used to identify ignition sources in each fire zone and to compute totals for various plant locations. The fire hazards analysis [7], pre-fire plan [8] and plant equipment database were used and walkdowns performed in making this count. The results of this exercise are presented in this section together with comments on weighting factors and each of the ignition source types for which generic frequencies are presented in Attachment 10.3 to FIVE [2].

4.4.1 Location Weighting Factors (WF_L)

Location weighting factors are used to transform generic fire frequencies for a location to specific, single-zone, fire frequencies. These weighting factors are intended to account for the number of ignition sources at IP3 compared to the number in an "average" plant.

In Reference Table 1.1 of Attachment 10.3 to FIVE [2], the methodology dictates that fire frequencies be developed for zones corresponding to the following generic locations for PWRs:

Cable spreading room	Auxiliary building
Intake structure	Control room
Diesel generator room	Turbine building
Switchgear room	Radwaste area
Battery room	Transformer yard

For each location listed above, a distinct method of calculating a weighting factor is summarized in Reference Table 1.1 to FIVE [2]. The fire zones at IP3 were assigned to locations in Reference Table 1.1 according to their similarity to a generic plant location and the types of ignition sources present within the zone.

The classification of fire zones at IP3 is presented in Table 4.4.1.1. Only the switchgear room, battery room and radwaste areas required a weighting factor other than one:

Switchgear room	$WF_L = (.50)$
Battery room	$WF_L = (.50)$
Radwaste areas	$WF_L = (.50)$

For these areas, the location weighting factor apportions the zone ignition sources.

Eighteen fire zones at IP3 were excluded because they do not correspond to one of the areas listed in Table 1.1. Those excluded comprise zones in the administration building (6), security building (1), condensate polisher building (2), outage support building (2), water tanks and discharge piping (6), the hydrogen crib (1), and containment (15).

Table 4.4.1.1

Classification of Indian Point 3 Fire Zones

Generic Location	Fire Area	Fire Zone	Room
PRIMARY AUXILIARY BUILDING			
$WF_L = 1/1 = 1$	PAB-2	1	CCW Pump Room
	PAB-2	1A	Flash Evaporator Room
	PAB-2	2	Containment Spray Pump Room
	PAB-2	2A	Primary Makeup Water Pump Room
	PAB-2	3	RHR Pump Room 31
	PAB-2	3A	Piping Tunnel
	PAB-2	4	RHR Pump Room 32
	PAB-2	4A	PAB Corridor
	PAB-2	5	Charging Pump Room 31
	PAB-2	5A	PAB Piping Tunnel and Pipe Chase
	PAB-2	6	Charging Pump Room 32
	PAB-2	6A	PAB Valve Room
	PAB-2	7	Charging Pump Room 33
	PAB-2	8	Boric Acid Tank Area
	PAB-2	8A	RWST Recirc. Pump Room/SGBD Heat Exchanger Room
	PAB-2	9	Safety Injection Pump Room
	PAB-2	9A	Future RHR Pump Room
	PAB-2	10A	Valve Corridor
	PAB-2	11A	Sump Tank and Pump Room
	PAB-2	12A	Corridor
	PAB-2	13A	Large Gas Decay Tank Room
	PAB-2	14A	PAB Southwest Quadrant
	PAB-2	16A	Chemical Drain Tank Room
	PAB-2	17A	Corridor
	PAB-2	18A	Waste Gas Compressor Room
	PAB-2	19A	Waste Evaporator Room
	PAB-2	20A	Sample Room
	PAB-2	22A	Boric Acid Evaporator Room
	PAB-2	23A	Entry for Zones 22A and 24A
	PAB-2	24A	Boric Acid Evaporator Room
	PAB-2	25A	Seal Water Heat Exchanger Room
	PAB-2	26A	Reactor Coolant Filter Room
	PAB-2	27A	Corridor
	PAB-2	28A	Valve Corridor
	PAB-2	29A	Volume Control Tank Room
	PAB-2	30A	Valve Corridor
	PAB-2	31A	Concentrates Holding Tank Room
	PAB-2	32A	Non-Regenerative Heat Exchanger Room

Table 4.4.1.1 (continued)

Classification of Indian Point 3 Fire Zones

Generic Location	Fire Area	Fire Zone	Room
	PAB-2	58A	Piping Tunnel
	PAB-2	59A	Pipe Penetration Area
	PAB-2	61A	Piping Trench
	PAB-2	62A	Pipe Tunnel
	PAB-2	63A	Stair to Containment Access Facility
	PAB-2	69A	Piping and Valve Room
	PAB-2	79A	SGBD Tank Room
	PAB-2	88A	Control Station/Filter Area - Fan House
	PAB-2	89A	Instrument Calibration Lab
	PAB-2	107	RAMS Building
	PAB-2	127	Containment Access Facility
	PAB-2	128	Truck Bay Annex
	PAB-2	622	Boron Injection Tank
	CTL-3	33A	Transformer Valve Deluge Room
	CTL-3	34A	Fan Room
	CTL-3	35A	A/C Equipment Room, Corridor & Stairwell
	CTL-3	36A	Valve Room
	ETN-4	7A	Lower Electrical Tunnel
	ETN-4	60A	Upper Electrical Tunnel
	ETN-4	73A	Upper Electrical Penetration Area
	ETN-4	74A	Lower Electrical Penetration Area
	AFW-6	23	Auxiliary Boiler Feed Pump Room
	ETN-4	73	ET Fan House
DIESEL GENERATOR ROOM			
$WF_L = 5/5 = 1$	CTL-3	10	Diesel Generator 31
	CTL-3	101A	Diesel Generator 32
	CTL-3	102A	Diesel Generator 33
	TBL-5	59	OSTSC Diesel Generator
	YARD-7	131	Appendix R Diesel Generator
SWITCHGEAR ROOM			
$WF_L = 1/2 = .5$	CTL-3	14	480V Switchgear Room
	TBL-5	37A	South Turbine Building - 6.9KV Switchgear

Table 4.4.1.1 (continued)

Classification of Indian Point 3 Fire Zones

Generic Location	Fire Area	Fire Zone	Room
BATTERY ROOM			
$WF_L = 1/2 = .5$	CTL-3	12	Battery Room 31
	CTL-3	13	Battery Room 32
	CTL-3	11	Battery Room 34
	TBL-5	16	Battery Room 36
CONTROL ROOM			
$WF_L = 1/1 = 1$	CTL-3	15	Control Room
CABLE SPREADING ROOM			
$WF_L = 1/1 = 1$	CTL-3	11	Cable Spreading Room
INTAKE STRUCTURE			
$WF_L = 1/1 = 1$	YARD-7	22	Screenwell Area (Service Water Pumps)
	YARD-7	55A	Screenwell Area
	YARD-7	56A	De-icing Pit
	YARD-7	132	Fire Pump House
	YARD-7	133	Power Conversion Equipment Building
	YARD-7	222	Backup Service Water Pit
TURBINE BUILDING			
$WF_L = 1/1 = 1$	TBL-5	16	Turbine Lube Oil Storage (Battery Room 36)
	TBL-5	17	Turbine Lube Oil Reservoir and Coolers
	TBL-5	18	Turbine Lube Oil Condenser Area
	TBL-5	19	Station Air Compressor
	TBL-5	20	Oil Console - Turbine Building
	TBL-5	21	H_2 Seal Oil Unit
	TBL-5	38A	Chemical Laboratory
	TBL-5	39A	Main Boiler Feed Pumps
	TBL-5	40A	Main Condenser Area
	TBL-5	41A	Heater Drain Pumps
	TBL-5	42A	Northeast Corner Turbine Building
	TBL-5	43A	South End Turbine Building
	TBL-5	44A	South End Heater Bay
	TBL-5	45A	North End of Heater Bay
	TBL-5	46A	Turbine Building, Mezzanine

Table 4.4.1.1 (continued)

Classification of Indian Point 3 Fire Zones

Generic Location	Fire Area	Fire Zone	Room
	TBL-5	47A	North End Turbine Building
	TBL-5	48A	North Loading Well
	TBL-5	49A	South Turbine Floor
	TBL-5	50A	Main Turbine Area
	TBL-5	51A	North Turbine Floor
	TBL-5	52A	Chemical Addition Area - AFW Building
	TBL-5	53A	Feedwater Bypass Regulator Platform
	TBL-5	54A	Main Boiler Feedwater Regulator Area
	TBL-5	57A	Main Steam and Feedwater Valve Area
	TBL-5	58	Service Water Valve Pit
	TBL-5	109	Auxiliary Boiler Annex Building - Boiler Room
	TBL-5	110	West Auxiliary Boiler Annex Building - Elev. 15ft
	TBL-5	111	East Auxiliary Boiler Annex Building - Elev. 35ft
	TBL-5	112	West Auxiliary Boiler Annex Building - Elev. 33ft
	TBL-5	113	East Auxiliary Boiler Annex Building - Elev. 53ft
	TBL-5	114	West Auxiliary Boiler Annex Building - Elev. 53ft
	YARD-7	115	Machine Shop/Maintenance Shop/Office Area - Admin. Building
	YARD-7	116	Warehouse/Fire Brigade Room - Administration Building
RADWASTE AREA $WF_L = 1/2 = .5$	PAB-2	15A	Spent Resin Storage Tank Room
	PAB-2	21A	Waste Storage and Drumming Area
	PAB-2	68A	Ion Exchange Column Room
	YARD-7	94A	Hold-up Tank 33 Area
	YARD-7	95A	Hold-up Tank 32 Area
	YARD-7	96A	Hold-up Tank 31 Area
	YARD-7	97A	Waste Hold-up Tank 31 Area
	YARD-7	98A	Hold-up Tank Pump Area
	YARD-7	90A	Fuel Storage Building, Elev. 55ft
	YARD-7	91A	Fuel Storage Building, Elev. 95ft

Table 4.4.1.1 (continued)

Classification of Indian Point 3 Fire Zones

Generic Location	Fire Area	Fire Zone	Room
TRANSFORMER YARD			
$WF_L = 1/1 = 1$	YARD-7	64A	Main Transformer 31
	YARD-7	65A	Main Transformer 32
	YARD-7	66A	Unit Auxiliary Transformer
	YARD-7	67A	Station Auxiliary Transformer
CONTAINMENT	CNT-1	70A	Reactor Coolant Pump Area
	CNT-1	71A	Reactor Coolant Pump Area
	CNT-1	72A	Outer Annulus
	CNT-1	75A	Outer Annulus
	CNT-1	76A	Outer Annulus
	CNT-1	77A	Outer Annulus (Pressurizer Relief Tank)
	CNT-1	78A	Recirc Pumps and RHR Heat Exchanger Area
	CNT-1	80A	Containment Fan Cooler Unit 31 Area
	CNT-1	81A	Containment Fan Cooler Unit 33 Area
	CNT-1	82A	Containment Fan Cooler Unit 34 Area
	CNT-1	83A	Containment Fan Cooler Unit 35 Area
	CNT-1	84A	Containment Fan Cooler Unit 32 Area
	CNT-1	85A	Incore Detector Drive Area
	CNT-1	86A	Refueling Floor Area
	CNT-1	87A	Outer Annulus

As a first step in counting components, a distinction is made between "zone-specific" and "plant-wide" ignition sources. This distinction is made to allow the calculated ignition frequencies for components to be apportioned accurately.

4.4.2 Zone-Specific Ignition Sources

Zone-specific ignition source weighting factors account for the distribution of components and ignition source frequency within a specific zone using data from past fire events. The need to apportion the ignition source frequency was most apparent in the auxiliary and turbine buildings for which FIVE states that a ratio of components within the specific zone to the total number of components within the generic location be used as a weighting factor. The other zone ignition source weighting factor method used was for the "yard transformers (others)" category. The methodology dictates that a weighting factor be obtained for this category by dividing the number of ignition sources in the specific fire area by the total number in all other generic plant locations. Except for these instances, components did not require an zone-specific ignition source weighting factor.

Zone-specific ignition sources will now be discussed in detail.

4.4.2.1 Electrical Cabinets

Electrical cabinets are located throughout the generic plant locations identified by FIVE excluding the transformer yard. Components included in the electrical cabinet category are panels (i.e., for control, distribution, instrumentation, power and lighting), motor control centers, breakers, switches, inverters and switchgear. Because the auxiliary and turbine buildings are both large areas, a weighting factor is required to account for the number and location of electrical cabinets. However, the other generic locations that contain electrical cabinets such as the intake structure, radwaste area, diesel generator, switchgear, main control, and cable spreading rooms do not require an ignition source weighting factor. Furthermore, electrical cabinets in the radwaste area are addressed in the miscellaneous components category for that area. At IP3, the primary auxiliary and turbine buildings contain 405 and 373 electrical cabinets, respectively.

4.4.2.2 Pumps

Based on guidance in FIVE, an ignition source weighting factor was applied only to auxiliary building and turbine building pumps except for the main feedwater pumps, where no ignition source weighting factor is necessary. The weighting factor is calculated by dividing the number of pumps in the zone by the total number found in the selected building (plant location). At IP3, the primary auxiliary and turbine buildings contain 61 and 93 pumps, respectively.

4.4.2.3 Batteries

At IP3, fire zones 11, 12, 13 and 16 contain the main station batteries. An ignition frequency was assigned to each plant battery room obviating the need for a weighting factor. Of the other zones, which contain batteries, only those zones containing batteries of a capacity equal to that of a main station battery were assigned a similar ignition frequency.

4.4.2.4 Diesel Generators

Because emergency diesel generators are likely to be located in one area of a plant, FIVE assigned an ignition source frequency specific to that location to each diesel. At IP3, there are three separate emergency diesel generator rooms (10, 101A, 102A) with one diesel situated in each room. In addition, the Appendix R and technical support center (TSC) diesel generators are located in zones 131 and 59, respectively.

4.4.2.5 Turbine/Generator Excitor

The ignition frequency for the turbine generator excitor is a single term that applies only to fire zone 49A in the turbine building. No ignition source weighting factor is necessary for this term since there is only one excitor at IP3.

4.4.2.6 Turbine/Generator Hydrogen

FIVE computed an ignition source frequency based on past turbine generator hydrogen fire events. This single term is applied to fire zone 49A, which contains the main generator. A weighting factor is not needed for this term.

4.4.2.7 Turbine/Generator Oil

This single term applies to fire zone 50A, which contains the main turbine. No weighting factor is necessary for this term.

4.4.2.8 Boiler

This term applies only to fire zone 109, which houses the plant auxiliary boiler. No ignition source weighting factor is necessary.

4.4.2.9 Radwaste Miscellaneous Components

All location-specific components found within the radwaste areas such as electrical cabinets and pumps were included in the miscellaneous components term. The ignition source frequency applies equally to all these components without the need for a weighting factor. Any plant-wide ignition sources still contribute to the overall zone ignition frequency for the radwaste areas.

4.4.2.10 Yard Transformers

As a result of various yard transformer fires that have occurred, the FIVE methodology created three categories, each with its own calculated ignition source frequency, to better model potential fire scenarios. Yard transformer fires that cause a loss of offsite power or that propagate to the turbine building have specific fire frequencies that do not require a weighting factor. Other types of yard transformer fire also have a specific frequency but with an ignition source weighting factor obtained by dividing the number of ignition sources in the zone by the total number in all plant locations.

4.4.3 Plant-Wide Ignition Sources

Plant-wide component ignition sources are listed in Reference Table 1.3 in Attachment 10.3 to FIVE [2] together with their ignition frequencies and the method for computing their ignition source weighting factor. The components will now be discussed.

4.4.3.1 Fire Protection Panels

At IP3, fire protection panels were identified in walkdowns and database searches. A plant wide ignition source weighting factor for fire protection panels, the "F" weighting factor, was computed by dividing the number of fire protection panels in the fire zone by the total number in all fire zones.

4.4.3.2 MG Sets

Although the FIVE methodology specifically refers to motor-generator (mg) sets in reactor protection systems as a plant-wide ignition source, at IP3 the two control rod drive motor-generator sets were addressed in a similar fashion to be conservative. The weighting factor used for fire protection panels was also applied to motor generator sets.

4.4.3.3 Non-Qualified Cable Run

Power and control cable at IP3 are assumed to have the ignition and fire propagation characteristics of IEEE 383 rated cable as defined in the EPRI Fire PRA Implementation Guide [3]. Instrumentation cable at IP3 is assumed to behave as non-IEEE 383 cable, except that it is not capable of producing a self-ignited cable fire. In addition, cables installed following original construction were purchased to comply with IEEE 383. Further information about cable qualification at IP3 is provided in Section 4.5.

4.4.3.4 Junction Boxes/Splices

To compute an ignition source frequency for junction boxes and splices in both qualified and non-qualified cable, a weighting factor was used. The total cable heat of combustion in a fire zone is divided by the cable heat of combustion for all fire zones throughout the plant excluding radwaste and containment areas. This weighting factor is then multiplied by the fire frequency given in FIVE. This method assumes that the number of junction boxes and splices is distributed in the same proportions as the cable.

4.4.3.5 Transformers

A search of plant databases and walkdowns identified 123 lighting, power, current and potential transformers at IP3. Transformers that are internal to or are sub-components of major electrical equipment were not included in this category. In accordance with Reference Table 1.2 of FIVE [2], the ignition source weighting factor was obtained by dividing the number of ignition sources in the fire area by the total number in all the locations.

4.4.3.6 Battery Chargers

Only station battery chargers were included in the count for this plant-wide component type. Emergency lighting battery chargers found in large numbers throughout IP3 were screened from further analysis because of their design: plant walkdowns demonstrated that they pose a minimal threat as an ignition source. In accordance with Reference Table 1.2 of FIVE [2], the ignition source weighting factor was obtained by dividing the number of ignition sources in the fire area by the total number in all the locations.

4.4.3.7 Air Compressors

Thirteen air compressors were identified at IP3. In accordance with Reference Table 1.2 of FIVE [2], the ignition source weighting factor was obtained by dividing the number of ignition sources in the fire area by the total number in all the locations.

4.4.3.8 Ventilation Subsystems

Ventilation subsystems include a broad range of components within a plant. At IP3, these subsystems comprise fans, motor operated dampers, heaters, chillers and air handling units. A total of 245 ventilation subsystems were counted. In accordance with Reference Table 1.2 of FIVE [2], the ignition source weighting factor was obtained by dividing the number of ignition sources in the fire area by the total number in all the locations.

4.4.3.9 Hydrogen Tanks

At IP3 there are no large hydrogen tanks located indoors; small portable tanks were considered to pose no significant risk based on industry operating experience derived from FEDB [13]. Hydrogen storage tanks found in the yard are located in the hydrogen crib (fire zone 108), which is currently not used. A weighting factor was computed by taking the reciprocal of the total number of fire zones within the plant. The risks posed by the release and explosion of hydrogen at IP3 are addressed in Section 5.5.2.2.

4.4.3.10 Dryers

At IP3, the H_2 dryers located in the turbine building (fire zone 37A) and clothes dryers located in zones 118 and121 are significant ignition sources. Instrument air dryers were subsumed in the ignition frequency for compressors. In accordance with Reference Table 1.2 of FIVE [2], the ignition source weighting factor was obtained by dividing the number of ignition sources in the fire area by the total number in all the locations.

4.4.3.11 Transients (Excluding Welding)

The FIVE methodology states that potential transient combustibles should be considered for all fire zones within the plant unless their presence is precluded by administrative controls or practices or design features that would essentially eliminate any possibility of transient combustibles being involved in a fire. Six factors that impact the ignition frequencies involving transient combustibles are described in the methodology, each with its own weighting factor:

- Cigarette smoking
- Extension cords
- Heaters
- Candles
- Overheating
- Hot pipes.

At IP3, cigarette smoking and the use of candles are prohibited inside the plant, thereby removing these factors from further consideration. To obtain a weighting factor for the remaining terms, the factors were summed for ignition sources, which are allowed in the zone and then divided by the total number of zones in the plant. The individual weighting factor for each term can be found in Note D to Table 1.2 in Attachment 10.3 of FIVE [2].

4.4.3.12 Cable Fires Caused by Welding

The possibility of a cable fire as a direct result of hot work was considered for areas within the plant containing a heat of combustion loading for cable insulation [10] unless the cable fires are unlikely to be self-sustaining and thus not risk significant [11]. The FIVE methodology states that a weighting factor should be computed as the reciprocal of the total number of fire zones within the plant.

4.4.3.13 Transient Fires Caused by Welding and Cutting

The occurrence of fires involving transient combustibles and initiated by hot work was considered for all areas within the plant. Although some areas might be excluded because of good work practices or controls, it was concluded that for conservatism the term should be applied to all fire zones containing exposed cables. The ignition source weighting factor was again calculated as the reciprocal of the total number of fire zones at IP3.

4.4.3.14 Other Plant-Wide Sources

The remaining plant-wide ignition sources listed in FIVE are elevator motors, gas turbines and miscellaneous hydrogen fires. These ignition sources were not considered in the frequency analysis. Plant walkdowns concluded that elevator motors do not pose a significant hazard. Since there are no gas turbines within the confines of IP3, the corresponding ignition source was also excluded from the analysis. Hydrogen fires are addressed in section 5.5.2.2.

4.4.4 Ignition Frequency Results

Containment fires (15 fire zones) were excluded from evaluation based on the EPRI FIVE methodology [2] and Fire PRA Implementation Guide [3], which eliminate containment fires as a source of risk due to 1) the infrequent number of fires in containment at power, 2) the finding by previous fire PRAs that such fires were not risk significant, and 3) the low likelihood that a fire in containment could affect redundant trains. Therefore, containment fires were eliminated from the fire ignition frequency analysis. A containment performance analysis to identify containment vulnerabilities to fire induced early containment failure is presented in section 4.8. Frequencies for ignition sources are presented in Table 4.4.4.1.

Table 4.4.4.1

Fire Ignition Frequency

Area	Zone	Location	Ignition Frequency (/year)
PAB-2	1	CCW Pump Room	1.66E-03
PAB-2	1A	Flash Evaporator Room	1.92E-03
PAB-2	2	Containment Spray Pump Room	9.41E-04
PAB-2	2A	Primary Makeup Water Pump Room	2.81E-03
PAB-2	3	RHR Pump Room 31	6.66E-04
PAB-2	3A	Piping Tunnel	2.80E-04
PAB-2	4	RHR Pump Room 32	6.31E-04
PAB-2	4A	PAB Corridor, Elev. 34ft	6.09E-04
PAB-2	5	Charging Pump Room 31	6.39E-04
PAB-2	5A	PAB Piping Tunnel and Pipe Chase	3.27E-04
PAB-2	6	Charging Pump Room 32	6.39E-04
PAB-2	6A	PAB Valve Room	3.18E-04
PAB-2	7	Charging Pump Room 33	5.92E-04
PAB-2	8	Boric Acid Tank Area	1.41E-03
PAB-2	8A	RWST Recirculation Pump Room/SGBD Heat Exchanger Room	1.69E-03
PAB-2	9	Safety injection Pump Room	1.25E-03
PAB-2	9A	Future RHR Pump Room	3.56E-04
PAB-2	10A	Valve Corridor	3.19E-04
PAB-2	11A	Sump Tank and Pump Room	9.03E-04
PAB-2	12A	Corridor	3.58E-04
PAB-2	13A	Large Gas Decay Tank Room	3.13E-04
PAB-2	14A	PAB Southwest Quadrant, Elev. 15ft	1.10E-03
PAB-2	15A	Spent Resin Storage Tank Room	2.80E-04
PAB-2	16A	Chemical Drain Tank Room	5.92E-04
PAB-2	17A	Corridor	1.25E-02
PAB-2	18A	Waste Gas Compressor Room	1.31E-03
PAB-2	19A	Waste Evaporator Room	3.28E-04
PAB-2	20A	Sample Room	9.10E-04
PAB-2	21A	Waste Storage and Drumming Area	8.21E-03
PAB-2	22A	Boric Acid Evaporator Room	2.80E-04
PAB-2	23A	Entry for Zones 22A and 24A	6.48E-04
PAB-2	24A	Boric Acid Evaporator Room	3.44E-04
PAB-2	25A	Seal Water Heat Exchanger Room	3.19E-04
PAB-2	26A	Reactor Coolant Filter Room	2.80E-04
PAB-2	27A	Corridor	1.83E-03
PAB-2	28A	Valve Corridor	3.19E-04
PAB-2	29A	Volume Control Tank Room	3.97E-04
PAB-2	30A	Valve Corridor	4.43E-04
PAB-2	31A	Concentrates Holding Tank Room	9.03E-04
PAB-2	32A	Non-Regenerative Heat Exchanger Room	2.80E-04
PAB-2	58A	Piping Tunnel	8.16E-04
PAB-2	59A	Pipe Penetration Area	8.26E-04

Table 4.4.4.1 (Continued)

Fire Ignition Frequency

Area	Zone	Location	Ignition Frequency (/year)
PAB-2	61A	Piping Trench	9.03E-04
PAB-2	63A	Stair to Containment Access Facility	2.80E-04
PAB-2	68A	Ion Exchange Column Room, Elev. 34ft	2.80E-04
PAB-2	69A	Piping and Valve Room	2.80E-04
PAB-2	79A	SGBD Tank Room	2.80E-04
PAB-2	88A	Control Station/Filter Area - Fan House	2.42E-03
PAB-2	89A	Instrument Calibration Lab	2.80E-04
PAB-2	107	RAMS Building	5.35E-03
PAB-2	127	Containment Access Facility	2.80E-04
PAB-2	128	Truck Bay Annex	2.80E-04
PAB-2	622	Boron Injection Tank	4.21E-04
CTL-3	10	Diesel Generator 31	3.20E-02
CTL-3	11	Cable Spreading Room	1.75E-02
CTL-3	12	Battery Room 31	1.95E-03
CTL-3	13	Battery Room 32	1.95E-03
CTL-3	14	Switchgear Room	1.06E-02
CTL-3	15	Control Room	9.91E-03
CTL-3	33A	Transformer Valve Deluge Room	2.80E-04
CTL-3	34A	Fan Room	8.80E-04
CTL-3	35A	A/C Equipment Room, Corridor & Control Building Stair	1.11E-03
CTL-3	36A	Valve Room	1.51E-03
CTL-3	101A	Diesel Generator 32	2.88E-02
CTL-3	102A	Diesel Generator 33	2.88E-02
ETN-4	7A	Lower Electrical Tunnel	1.03E-03
ETN-4	60A	Upper Electrical Tunnel	1.23E-03
ETN-4	73A	Upper Electrical Penetration Area	1.76E-03
ETN-4	74A	Lower Electrical Penetration Area	8.21E-04
TBL-5	16	Turbine Lube Oil Storage (Battery Room 36)	5.18E-04
TBL-5	17	Turbine Lube Oil Reservoir and Coolers	3.83E-04
TBL-5	18	Turbine Lube Oil Condenser Area	2.80E-04
TBL-5	19	Station Air Compressor	1.00E-03
TBL-5	20	Oil Console - Turbine Building	1.27E-03
TBL-5	21	H2 Seal 0il Unit	5.57E-04
TBL-5	37A	South Turbine Building, Elev. 15ft	1.42E-02
TBL-5	38A	Chemical Laboratory	2.80E-03
TBL-5	39A	Main Boiler Feed Pumps	6.26E-03
TBL-5	40A	Main Condenser Area	2.58E-03
TBL-5	41A	Heater Drain Pumps	1.26E-03
TBL-5	42A	Northeast Corner Turbine Building, Elev. 15ft	2.28E-03
TBL-5	43A	South End Turbine Building, Elev. 36ft-9"	2.05E-03
TBL-5	44A	South End Heater Bay, Elev. 36ft-9"	4.58E-04

Table 4.4.4.1 (Continued)

Fire Ignition Frequency

Area	Zone	Location	Ignition Frequency (/year)
TBL-5	45A	North End of Heater Bay, Elev. 36ft-9"	3.72E-04
TBL-5	46A	Mezzanine Floor, Turbine Building, Elev. 36ft-9"	8.41E-04
TBL-5	47A	North End Turbine Building, Elev. 36ft-9"	1.05E-03
TBL-5	48A	North Loading Well	3.14E-04
TBL-5	49A	South Turbine Floor, Elev. 53ft	1.02E-02
TBL-5	50A	Main Turbine Area, Elev. 53ft	1.41E-02
TBL-5	51A	North Turbine Floor, Elev. 53ft	1.03E-03
TBL-5	52A	Chemical Addition Area - AFW Building	6.43E-04
TBL-5	53A	Feedwater Bypass Regulator Platform	2.80E-04
TBL-5	54A	Main Boiler Feedwater Regulator Area	2.80E-04
TBL-5	57A	Main Steam and Feedwater Valve Area	1.01E-03
TBL-5	58	Service Water Valve Pit	3.48E-04
TBL-5	59	OSTSC Diesel Generator Building	2.87E-02
TBL-5	109	Auxiliary Boiler Annex Building - Boiler Room	3.10E-03
TBL-5	110	West Auxiliary Boiler Annex Building - Elev. 15ft	3.90E-03
TBL-5	111	East Auxiliary Boiler Annex Building - Elev. 35ft	1.74E-03
TBL-5	112	West Auxiliary Boiler Annex Building - Elev. 33ft	1.06E-03
TBL-5	113	East Auxiliary Boiler Annex Building - Elev. 53ft	4.21E-04
TBL-5	114	West Auxiliary Boiler Annex Building - Elev. 53ft	1.35E-03
AFW-6	23	Auxiliary Boiler Feed Pump Room	1.33E-03
YARD-7	22	Screenwell Area	5.94E-03
YARD-7	55A	Screenwell Area	6.47E-03
YARD-7	56A	De-icing Pit	3.56E-03
YARD-7	64A	Main Transformer 31	4.25E-03
YARD-7	65A	Main Transformer 32	4.02E-04
YARD-7	66A	Unit Aux. Transformer	4.25E-03
YARD-7	67A	Station Aux. Transformer	1.85E-03
YARD-7	90A	Fuel Storage Building, Elev. 55ft	4.63E-03
YARD-7	91A	Fuel Storage Building, Elev. 95ft	4.77E-03
YARD-7	94A	Hold-up Tank 33 Area	2.80E-04
YARD-7	95A	Hold-up Tank 32 Area	2.80E-04
YARD-7	96A	Hold-up Tank 31 Area	2.80E-04
YARD-7	97A	Waste Hold-up Tank 31 Area	4.71E-03
YARD-7	98A	Hold-up Tank Pump Area	4.63E-03
YARD-7	115	Machine Shop/Maintenance Shop/Office Area - Administration Building	1.35E-03
YARD-7	116	Warehouse/Fire Brigade Room - Administration Building	6.25E-03
YARD-7	131	Appendix R Diese¹ Gener ıtor Building	3.24E-02
YARD-7	132	Fire Pump House	1.02E-02
YARD-7	133	Power Conversion Equipment Building	4.97E-03
YARD-7	222	Backup Service Water Pit	5.88E-03

4.4.5 Preliminary Screening

Using the ignition frequencies listed in Table 4.4.4.1, fire zone core damage frequencies (CDF) were calculated for the remaining 124 zones to screen fire-induced scenarios insignificant to risk—first, the conditional core damage probabilities (CCDPs) were calculated assuming that all equipment in the zone fails. Fixed ignition source screening and severity factors were applied to selected fire zones in accordance with guidance provided in the Fire PRA Implementation Guide [3], steps 4.2 and 5.2, developing a revised fire zone ignition frequency. A CDF was then calculated as the product of the fire zone ignition frequency and CCDP. Zones with a calculated CDF of less than 10^{-6}/year (or 10^{-7}/year if containment bypass may result) were screened; for the remaining fire zones, fire growth and propagation were evaluated. All but 11 zones were screened at the completion of the preliminary screening. Detailed modeling of the 11 compartments is discussed in Sections 4.7.2 (Single Zone Fire Analysis) and 4.7.4 (Control Room Analysis).

The preliminary CDFs calculated for each fire zone are presented in Table 4.4.4.2.

Table 4.4.4.2

Core Damage Frequency for Fire Zones [1]

Fire Zone	Fire Zone Description	Initiator	Ign Freq (/year)	CCDP	CDF (/year)
1	CCW Pump Room	TCCW	2.62E-04 [2]	3.80E-05	9.96E-09
2	Containment Spray Pump Room	T3	2.07E-04 [2]	2.83E-05	5.86E-09
3	RHR Pump Room 31	T3	1.48E-04 [2]	2.83E-05	4.19E-09
4	RHR Pump Room 32	T3	1.43E-04 [2]	2.83E-05	4.05E-09
5	Charging Pump Room 31	T3	1.43E-04 [2]	2.83E-05	4.05E-09
6	Charging Pump Room 32	T3	1.43E-04 [2]	2.83E-05	4.05E-09
7	Charging Pump Room 33	T3	5.92E-04 [2]	2.83E-05	1.67E-08
8	Boric Acid Tank Area	T3	2.64E-04 [2]	2.84E-05	7.50E-09
9	Safety injection Pump Room	T3	2.67E-04 [2]	1.25E-04	3.34E-08
10	Diesel Generator 31	T3	2.93E-02 [2]	1.98E-04	5.80E-06
11	Cable Spreading Room	T1	1.43E-03 [2]	1.00E+00	1.43E-03
12	Battery Room 31	TDC31	8.43E-05 [2]	4.77E-04	4.02E-08
13	Battery Room 32	TDC32	8.43E-05 [2]	6.57E-04	5.54E-08
14	Switchgear Room	T3	1.02E-03 [2]	1.00E+00	1.02E-03
15	Control Room	T1	9.91E-03	1.00E+00	9.91E-03
16	Turbine Lube Oil Storage (Battery Room 36)	T3	5.18E-04	2.84E-05	1.47E-08
17	Turbine Lube Oil Reservoir and Coolers	T3	3.83E-04	2.83E-05	1.08E-08
18	Turbine Lube Oil Condenser Area	T3	2.80E-04	2.84E-05	7.96E-09
19	Station Air Compressor	T3	1.00E-03	2.84E-05	2.85E-08
20	Oil Console - Turbine Building	T3	1.27E-03	2.84E-05	3.60E-08
21	H2 Seal 011 Unit	T3	5.57E-04	2.84E-05	1.58E-08
22	Screenwell Area (Service Water Pump Cage)	T3	7.23E-04 [2]	1.24E-04	8.97E-08
23	Auxiliary Boiler Feed Pump Room	T3	2.79E-04 [2]	1.59E-02	4.44E-06
58	Service Water Valve Pit	T3	3.48E-04	2.84E-05	9.88E-09
107	RAMS Building	T3	5.35E-03	2.84E-05	1.52E-07
109	Auxiliary Boiler Annex Building – Boiler Room	T3	3.10E-03	2.84E-05	8.79E-08
110	West Auxiliary Boiler Annex Building - Elev. 15'	T3	3.90E-03	2.84E-05	1.11E-07
111	East Auxiliary Boiler Annex Building – Elev. 35'	T3	1.74E-03	2.84E-05	4.93E-08
112	West Auxiliary Boiler Annex Building - Elev. 33'	T3	1.06E-03	2.84E-05	3.00E-08
113	East Auxiliary Boiler Annex Building – Elev. 53'	T3	4.21E-04	2.84E-05	1.20E-08
114	West Auxiliary Boiler Annex Building - Elev. 53'	T3	1.35E-03	2.84E-05	3.84E-08
115	Machine Shop/Maintenance Shop/Office Area - Administration Building	T3	1.35E-03	2.84E-05	3.83E-08
116	Warehouse/Fire Brigade Room – Administration Building	T3	6.25E-03	2.84E-05	1.77E-07
127	Containment Access Facility	T3	2.80E-04	2.84E-05	7.96E-09
128	Truck Bay Annex	T3	2.80E-04	2.84E-05	7.96E-09
131	Appendix R Diesel Generator Building	T3	3.24E-02	2.84E-05	9.21E-07
132	Fire Pump House	T3	1.02E-02	2.84E-05	2.89E-07
133	Power Conversion Equipment Building	T3	4.97E-03	2.84E-05	1.41E-07
222	Backup Service Water Pit	T3	5.88E-03	2.83E-05	1.66E-07
622	Boron Injection Tank	T3	4.21E-04	2.84E-05	1.20E-08

Table 4.4.4.2(Continued)

Core Damage Frequency for Fire Zones [1]

Fire Zone	Fire Zone Description	Initiator	Ign Freq (/year)	CCDP	CDF (/year)
101A	Diesel Generator 32	T3	2.61E-02	3.15E-05	8.22E-07
102A	Diesel Generator 33	T3	2.61E-02	1.80E-04	4.70E-06
10A	Valve Corridor	T3	2.83E-05	2.83E-05	8.01E-10
11A	Sump Tank and Pump Room	T3	9.03E-04	2.84E-05	2.57E-08
12A	Corridor	T3	3.58E-04	2.84E-05	1.02E-08
13A	Large Gas Decay Tank Room	T3	3.13E-04	2.84E-05	8.89E-09
14A	PAB Southwest Quadrant Elev. 15'-0"	T3	1.10E-03	2.84E-05	3.13E-08
15A	Spent Resin Storage Tank Room	T3	2.80E-04	2.84E-05	7.96E-09
16A	Chemical Drain Tank Room	T3	5.92E-04	2.84E-05	1.68E-08
17A	Corridor	T3	1.82E-03	1.00E+00	1.82E-03
18A	Waste Gas Compressor Room	T3	1.31E-03	2.83E-05	3.71E-08
19A	Waste Evaporator Room	T3	8.34E-05	5.30E-04	4.42E-08
1A	Flash Evaporator Room	T3	2.05E-04	2.84E-05	5.82E-09
20A	Sample Room	T3	9.10E-04	2.84E-05	2.58E-08
21A	Waste Storage and Drumming Area	T3	8.21E-03	2.83E-05	2.32E-07
22A	Boric Acid Evaporator Room	T3	2.80E-04	2.84E-05	7.96E-09
23A	Entry for Zones 22A and 24A	T3	6.48E-04	2.84E-05	1.84E-08
24A	Boric Acid Evaporator Room	T3	3.44E-04	2.84E-05	9.78E-09
25A	Salt Water Heat Exchanger Room	T3	3.19E-04	2.84E-05	9.06E-09
26A	Reactor Coolant Filter Room	T3	2.80E-04	2.84E-05	7.96E-09
27A	Corridor	T3	5.08E-05	2.84E-05	1.44E-09
28A	Valve Corridor	T3	3.19E-04	2.84E-05	9.06E-09
29A	Volume Control Tank Room	T3	3.97E-04	2.84E-05	1.13E-08
2A	Primary Makeup Water Pump Room	T3	4.13E-04	1.77E-03	7.31E-07
30A	Valve Corridor	T3	4.43E-04	2.84E-05	1.26E-08
31A	Concentrates Holding Tank Room	T3	9.03E-04	2.84E-05	2.57E-08
32A	Non-Regenerative Heat Exchanger Room	T3	2.80E-04	2.84E-05	7.96E-09
33A	Transformer Valve Deluge Room	T3	2.80E-04	2.84E-05	7.96E-09
34A	Fan Room	T3	8.80E-04	2.83E-05	2.49E-08
35A	A/C Equipment Room, 15"-0 Elevation Corridor & Control Building Stair	T3	1.11E-03	2.84E-05	3.14E-08
36A	Valve Room	T3	2.62E-04	4.52E-05	1.18E-08
37A	South Turbine Building Elev. 15'	T1	2.62E-03	4.28E-02	1.12E-04
38A	Chemical Laboratory	T3	2.80E-03	2.83E-05	7.93E-08
39A	Main Boiler Feed Pumps	T2	6.26E-03	2.83E-05	1.77E-07
3A	Piping Tunnel	T3	2.80E-04	2.83E-05	7.93E-09
40A	Main Condenser Area	T2	2.58E-03	2.83E-05	7.30E-08
41A	Heater Drain Pumps	T2	1.26E-03	2.83E-05	3.56E-08
42A	Northeast Corner Turbine Building Elev. 15'	T2	2.28E-03	2.83E-05	6.45E-08
43A	South End Turbine Building Elev. 36'-9	T1	2.05E-03	2.83E-05	5.80E-08

Table 4.4.4.2 (Continued)

Core Damage Frequency for Fire Zones [1]

Fire Zone	Fire Zone Description	Initiator	Ign Freq (/year)	CCDP	CDF (/year)
44A	South End Heater Bay, Elev. 36'-9"	T2	4.58E-04	2.83E-05	1.30E-08
45A	North End of Heater Bay, Elev. 36'-9	T3	3.72E-04	3.51E-04	1.31E-07
46A	Mezzanine Floor, Turbine Building Elev. 36'-9"	T3	8.41E-04	3.99E-05	3.36E-08
47A	North End Turbine Building, Elev. 36'-9	T3	1.05E-03	3.38E-05	3.56E-08
48A	North Loading Well	T3	3.14E-04	2.84E-05	8.92E-09
49A	South Turbine Floor, Elev. 53'-0"	T3	1.02E-02	2.84E-05	2.89E-07
4A	PAB Corridor at Elev. 34'-0"	T3	8.87E-05 [2]	2.83E-05	2.51E-09
50A	Main Turbine Area, Elev. 53'-0"	T3	1.41E-02	2.84E-05	4.00E-07
51A	North Turbine Floor, Elev. 53'-0"	T3	1.03E-03	3.38E-05	3.48E-08
52A	Chemical Addition Area - AFW Building	T3	6.43E-04	2.84E-05	1.83E-08
53A	Feedwater Bypass Regulator Platform	T2	8.34E-05 [2]	2.83E-05	2.36E-09
54A	Main Boiler Feedwater Regulator Area	T2	8.34E-05 [2]	2.83E-05	2.36E-09
55A	Screenwell Area (Circ Water Pumps/TWS)	T3	7.23E-04 [2]	2.84E-05	2.05E-08
56A	De-icing Pit	T3	3.56E-03	2.84E-05	1.01E-07
57A	Main Steam and Feedwater Valve Area	T2	1.01E-03	1.61E-04	1.62E-07
58A	Piping Tunnel	T3	8.87E-05 [2]	2.86E-05	2.54E-09
59	OSTSC Diesel Generator Building	T3	2.87E-02	2.84E-05	8.15E-07
59A	Pipe Penetration Area	T3	8.26E-04	1.25E-04	1.03E-07
5A	PAB Piping Tunnel and Pipe Chase	T3	3.27E-04	2.84E-05	9.29E-09
60A	Upper Electrical Tunnel	T3	1.56E-04 [2]	1.00E+00	1.56E-04
61A	Piping Trench	T3	9.03E-04	2.84E-05	2.57E-08
62A	Pipe Tunnel	T3	2.80E-04	1.25E-04	3.50E-08
63A	Stair to Containment Access Facility	T3	2.80E-04	2.83E-05	7.93E-09
64A	Main Transformer 31	T3	4.25E-03	2.84E-05	1.21E-07
65A	Main Transformer 32	T3	4.02E-04	3.38E-05	1.36E-08
66A	Unit Aux. Transformer	T3	4.25E-03	1.42E-04	6.03E-07
67A	Station Aux. Transformer	T3	1.85E-03	3.38E-05	6.24E-08
68A	Ion Exchange Column Room Elev. 34'-0"	T3	2.80E-04	2.84E-05	7.96E-09
69A	Piping and Valve Room	T3	8.34E-05 [2]	2.83E-05	2.36E-09
6A	PAB Valve Room	TCCW	3.18E-04	2.83E-05	9.01E-09
73A	Upper Electrical Penetration Area	T2	1.40E-04 [2]	6.60E-03	9.24E-07
74A	Lower Electrical Penetration Area	T3	1.11E-04 [2]	2.08E-03	2.31E-07
79A	SGBD Tank Room	T3	2.80E-04	2.84E-05	7.96E-09
7A	Lower Electrical Tunnel	T3	1.40E-04 [2]	1.06E-02	1.48E-06
88A	Control Station/Filter Area - Fan House	T2	4.16E-04 [2]	1.25E-04	5.20E-08
89A	Instrument Calibration Lab	T3	2.80E-04	2.84E-05	7.96E-09
8A	RWST Recirc. Pump Room/SGBD Heat Exchanger Room	T3	1.69E-03	2.84E-05	4.80E-08
90A	Fuel Storage Building Elev. 55'	T3	4.63E-03	2.84E-05	1.31E-07
91A	Fuel Storage Building Elev. 95'	T3	4.77E-03	2.84E-05	1.36E-07
94A	Hold-up Tank #33 Area	T3	2.80E-04	2.84E-05	7.96E-09

Table 4.4.4.2 (continued)

Core Damage Frequency for Fire Zones [1]

Fire Zone	Fire Zone Description	Initiator	Ign Freq (/year)	CCDP	CDF (/year)
95A	Hold-up Tank #32 Area	T3	2.80E-04	2.84E-05	7.96E-09
96A	Hold-up Tank #31 Area	T3	2.80E-04	2.84E-05	7.96E-09
97A	Waste Hold-up Tank #31 Area	T3	4.71E-03	2.84E-05	1.34E-07
98A	Hold-up Tank Pump Area	T3	4.63E-03	2.84E-05	1.31E-07
9A	Future RHR Pump Room	T3	3.56E-04	2.84E-05	1.01E-08

[1] Scenarios in which the CDF exceed 10^{-6} are printed in bold type.

[2] Revised fire zone ignition frequency based on screening fixed ignition sources and applying severity factors per guidance in the Fire PRA Implementation Guide [3]

4.5 FIRE GROWTH AND PROPAGATION

Fire modeling was performed on the zones that did not meet the initial screening criteria described in Section 4.4. The FIVE methodology [2] was used for this purpose. FIVE models fires in individual zones to allow for a more realistic assessment of the behavior of fire plumes and ceiling jets along with any resulting hot gas layer. The objective was to quantitatively determine temperature rise and its effects on potential targets. Credible fire scenarios were determined by walkdowns performed in accordance with the Fire PRA Implementation Guide[3] considering fixed and postulated transient ignition sources, the proximity of combustible materials, and the location of safe shutdown equipment.

Fire modeling of the scenarios identified during the walkdowns utilized realistic approximations of the burning rates of ignition sources, ignition and burning characteristics of combustible materials involved in the fire, the impact of fire protection features (such as sprinklers or fire barriers) on fire development, and the temperatures at which potential targets are damaged. The conservative approximations and related fire modeling assumptions used in the analysis are summarized below:

<u>Ignition Source Burning Characteristics</u>

- IP3 cable ignition characteristics:

  Power and control cable:
  - Not subject to self-ignition or to ignition from welding because it is equivalent to IEEE 383 qualified cable [13].
  - Ignition temperature of 700°F [14].

  Instrumentation cable:
  - Not subject to self-ignition because of its low energy-producing capabilities or to ignition from welding.
  - Ignition temperature of 425°F [2].

- The following heat release rates (HRR) were used for IP3 ignition sources [3]:

Electrical cabinets	65 Btu/s
Transformers	65 Btu/s
Pumps (excluding oil spills)	65 Btu/s
Ventilation systems	65 Btu/s

Combustible Material Burning Characteristics

- The following heat release rates (HRR) were used for IP3 combustible materials [3]:

Exposed cable (i.e., in trays)	19 Btu/s-ft^2 (Table 1E of [2] for XPE/FRXPE cable)
Typical maintenance materials (transients)	138 Btu/s [3]
Protective clothing (PCs)	380 Btu/s [3]

- Fire propagation in exposed cable trays was modeled as recommended in [3]:

  Fires in vertical runs of cable were assumed to propagate instantaneously up to the fire barrier or until the cable changed direction and traversed horizontally.

  Vertically propagating fires in horizontal tray stacks (ladderback trays) were assumed to propagate as described in the Fire Implementation Guide, Appendix I [3].

  Except as noted in the analyses, marinite board fire breaks were not credited in the modeling to prevent or delay damage to cables above.

Equipment Failure

- IP3 cable failure characteristics:

  Power and control cable (equivalent to IEEE 383 qualified) [14]:

Failure temperature	700°F [2]
Failure heat flux	1.0 Btu/s-ft^2 [2]

  Instrumentation cable (non-qualified):

Failure temperature	425°F [2]
Failure heat flux	1.0 Btu/s-ft^2 [2]

- Conduit and cable tray failure characteristics:

  Conduit and cable trays are assumed to behave the same as bare cable.

- Electrical equipment failure characteristics:

Electrical equipment such as motors are assumed to fail under a radiant heat flux of 1.0 Btu/s-ft^2 [2].

Other Fire Modeling Considerations

Ventilation systems were assumed to provide no heat removal unless otherwise specified in the analyses.

Transient combustibles stored in UL/FM approved containers were not considered to be exposed and were screened from the analysis.

IP3 power and control cables were evaluated and determined to be equivalent to IEEE 383 qualified cable as summarized below. In addition, detailed evaluations [14] determined that cable self-ignition temperatures were above 700° F.

The original plant power and control cables were required to pass:

- A vertical flame test in accordance with ASTM D-2633. This test establishes a limit for vertical flame propagation in vertical cables.
- Con Edison's vertical flame test. This test determined the time-to-ignition, extent of burning and time-to-self extinguish as a result of a 5-minute exposure to a 1900°F natural gas flame.
- Con Edison's bonfire test. In this test, cable bundles were immersed in an oil-fire for 5 minutes and cable function was verified during the exposure.
- Heat and roasting tests. These tests raised the conductor temperature to 500°F for 2 hours after which the cable jacket and insulation were verified to be free of visible degradation.

Given these tests, it can be concluded that the original power and control cable are equivalent to IEEE 383 qualified cable and exhibit the following burning characteristics:

- There is a delay between initial flame exposure and cable ignition or failure
- Vertical flame propagation along vertically oriented cables is limited
- The cable will self extinguish when the source fire is removed
- Cable self-heating to temperatures well in excess of normal operating temperatures will not initiate insulation or jacket failure. Therefore, cable self-ignition is unlikely.

Submittals to the NRC prepared in response to BTP 9.5-1, Appendix A [9], were consistent with the conclusion above and included the statement that "The tests performed on the .... cables are equivalent to the IEEE 383 flame test." The submittals also addressed instrumentation cable, which was not tested as rigorously in the statement "... some instrument wires will not meet IEEE 383... However, since they're used exclusively for instrumentation purposes, they have a low energy producing capability and will not generate high currents capable of igniting the wires."

In conclusion, IP3 power and control cable has ignition and burning characteristics equivalent to IEEE 383 qualified cable.

4.6 FIRE DETECTION AND SUPPRESSION

This section summarizes the fire detection and suppression systems present at IP3. More detailed descriptions can be found in the fire protection system design basis document [12].

4.6.1 Fire Detection System

Fire detection is provided by a protective signaling system which transmits various fire alarm, supervisory and trouble signals to the control room via Fire Display and Control Panel (FDCP) visual displays and annunciation. In addition to signals from heat, smoke and flame detectors located throughout the plant, the system also transmits the status of installed fire suppression systems. The FDCP has controls and indicating lights for the fire pumps, level indicators for the fire water storage tanks and fire door indicating lights for identification of the position of critical doors. Fire detectors monitor for fire conditions and initiate alarms or actuate suppression. In selecting and placing heat, flame and smoke detectors, ceiling height, ventilation airflow rates and patterns, and the locations and arrangement of plant equipment and combustibles were accounted for. System availability is sensed through pressure, level, power and valve position devices. Fire suppression system flow and pressure indicate system actuation. The FDCP was specifically designed to contain distinct and unique alarms as well as backup emergency power in the event of a loss of offsite power.

Fire detection is provided in each zone evaluated in this analysis. It is discussed explicitly for those zones in which more detailed analysis is required and for which credit was taken for fire detection and suppression.

4.6.2 Fire Suppression System

The fire suppression system is designed to supply adequate volumes of water, foam, carbon dioxide and halon for fire suppression in the plant. In addition to fixed fire protection systems and hose stations, portable extinguishers are located in all areas of the plant.

Fixed water suppression systems consist of both dry (pre-action) and wet pipe configurations. In either case, annunciation is provided in the control room.

Wet pipe system utilize flow switches which provide control room annunciation of suppression system actuation. Hose stations and standpipes allow for coverage with at least one hose stream in safety related areas or other plant areas containing fire hazards. Water for the fixed suppression systems is supplied by two redundant 350,000 gallon fire water storage tanks each with a dedicated level of 300,000 gallons which provide inventory to two 100 percent-capacity fire protection pumps--one motor-driven and one diesel engine-driven. Two jockey pumps maintain system pressure and provide makeup.

Foam spray systems provide suppression capability for oil fire hazards from the turbine lube oil reservoir and storage tank, hydrogen seal oil unit and boiler feed pump oil console. At IP3, each foam spray system is complete with a foam storage tank, hose reels and foam compound. Carbon dioxide systems utilize a fire suppressant agent that will not leave a chemical residue or result in damage to equipment. Two 10-ton CO_2 storage tanks provide CO_2 to the emergency diesel generators, main turbine, main boiler feed pumps, cable spreading room and 480-V switchgear room suppression systems. Halon fire suppression systems chemically inhibit combustion and provide a fire suppression system for normally occupied areas by using a suppressant agent that is not immediately life threatening to occupants. The Appendix R diesel generator enclosure, documents vault and the technical support center computer room contain halon systems.

Portable fire suppression equipment located throughout the plant consists of CO_2, dry chemical, pressurized water, foam, and halon extinguishers and is relied upon by the plant fire brigade. In areas protected by fixed suppression systems, portable extinguishers augment fire fighting capability by allowing for manual backup. The types of portable extinguishers in an area are determined by the hazards present.

Credit was taken for manual actuation of suppression systems by the plant fire brigade in selected scenarios, accounting for the estimated time to damage and time to detection. A detailed discussion of the fire brigade at IP3 is presented in Section 4.9.3.

Manual and/or automatic fire suppression capability exists in each zone evaluated in this analysis and is discussed explicitly for those zones in which a more detailed analysis is required and for which suppression was credited. The following generic unavailabilities from the FIVE methodology [2] were used for automatic suppression: wet pipe sprinkler systems (0.02), pre-action sprinkler systems (0.05), deluge sprinkler systems (0.05), CO_2 systems (0.04), and halon systems (0.05).

4.7 ANALYSIS OF PLANT SYSTEMS, SEQUENCES, AND PLANT RESPONSE

4.7.1 Refinement of Models

In the earlier steps of this fire PRA, fire zones were screened out by examining the fire-induced core damage frequency (CDF) calculated by combining ignition frequencies with the conditional core damage probabilities (CCDPs) associated with the failure of all equipment and cables within the zones . Unscreened fire zones were then subjected to a more refined analysis in which fire models were used to determine whether individual cables and items of equipment would fail as a result of fire-induced damage caused by specific ignition sources. The basic events that result from this fire damage were then set to logical TRUE in the fault tree model while other events not affected by that fire were set to their random failure probability. By this means, a CCDP could be calculated for each ignition source and, combining this CCDP with the ignition source frequency,, the contribution of the ignition source to the CDF could be determined. The CDF for scenarios requiring a detailed analysis was calculated using the following equation :

$$CDF = IF * CCDP * P_{AS} * P_{MS} * P_{NR} * AR * SF$$

where

IF is the fire ignition frequency (/year),

CCDP is the conditional core damage probability,

P_{AS} is the probability of automatic suppression failure,

P_{MS} is the probability of manual suppression failure,

P_{NR} is the probability of non-recovery (including plant shut down from outside the control room, etc., where appropriate),

AR is the exposure area ratio (equal to unity for fixed ignition sources), and

SF is the severity factor (a conditional probability that the ignition source fire is sufficiently intense to cause the damage modeled).

This refined analysis was applied to fires in single and multiple zones and in the control room.

4.7.2 Single Zone Analysis

The risk posed by fires in single zones was evaluated for zones that were not screened out in Section 4.4.5:

Control building (zones 11 and 14) – Sections 4.7.2.4 and 4.7.2.1
Turbine building (zone 37A) – Section 4.7.2.2
Primary auxiliary building (zones 1, 2A and 17A) – Section 4.7.2.5
Diesel generator building (zones 10, 101A and 102A) – Section 4.7.2.3
Auxiliary boiler feed pump building (zone 23) – Section 4.7.2.6
Upper and lower electrical cable tunnels (zones 60A and 7A) – Section 4.7.2.7
Control Room (zone 15) – Section 4.7.4

The methodology and assumptions used in modeling fire growth and propagation are presented in Section 4.5 of this study.

4.7.2.1 Fire Zone 14: 480-V Switchgear Room

<u>General Zone Description</u>. The 480-V switchgear room is located on the 15-ft elevation of the control building and has a floor area of 2985 ft^2 and a 16-ft ceiling. Appendix A barriers separate it from adjacent control building zones; Appendix R barriers separate it from other fire areas. The north, south and west walls and ceiling are 3-hour fire rated barriers; the remaining barriers are non-rated. Two doors open into other fire zones within the control building while a third door communicates directly with the turbine building fire area. The doors have 3-hour fire ratings. Fire dampers FD-1 and FD-2 (with a 3-hour rating) and FD-9 (with a 1.5-hour rating) are also in the zone. Fire dampers are provided with electro-thermal links which close dampers automatically if temperatures at the dampers exceed 165°F, or manually upon actuation of the CO_2 system. An outside air intake louver equipped with a motor operated damper is located in the southwest corner of the room. The damper is normally closed and opens when the second exhaust fan is started.

<u>Suppression and Detection</u>. This fire zone has an area wide, total flooding CO_2 system. Area-wide smoke and thermal detection systems annunciate in the control room. Two separate ionization smoke detection systems are mounted on the ceiling. Ceiling-mounted thermal detectors provide the actuation signal for the CO_2 system at a temperature of 225°F. The earliest indication of a fire in the switchgear room is likely to be provided by either smoke detectors or room temperature detectors. The high room temperature alarms are set to alert the control room if the temperature in the exhaust duct reaches 100°F.

The activation sequence for the CO_2 system will not initiate unless control building ventilation fans are manually shut down at the local control station found in the stairwell outside the 480-V switchgear room. Shut down of the fans also closes all three fire dampers in the room. The fire brigade leader determines the severity of the fire and decides whether to activate the CO_2 system. The fire brigade may choose to extinguish the fire by means of manual CO_2, halon, dry chemical or water extinguishers available in the vicinity. In addition, a hose station is present outside the switchgear room in the turbine building.

Significant Ignition Sources. Significant ignition sources in the room comprise the instrument air compressors and instrument air closed cooling pumps (with their respective oil inventories), 480-V switchgear cabinets, station service transformers, battery charger 33 and transients. Transient combustibles in this compartment are expected to consist of typical maintenance materials. Other electrical cabinets and equipment within the zone are not classified as ignition sources since they have no openings through which a fire could propagate or because potential targets are outside critical damage distances.

Fires resulting from the compressors or pumps could be initiated by a fire in an electric motor or by the ignition of hot oil released as a result of bearing failure. Adjacent equipment and overhead cables could be damaged.

The 480-V switchgear, station service transformers and the battery charger are also close to overhead cable trays and represent potential ignition sources.

Significant Targets. The safe shutdown equipment in the room includes: 480-V safeguards buses 2A, 3A, 5A and 6A, battery charger 33, motor control eenter 36C, 125-Vdc power panel 33 and cables for the auxiliary feedwater (AFW), chemical volume control (CVCS), residual heat removal (RHR), component cooling water (CCW) and service water (SWS) systems. Other major equipment in the room are station service transformers 2, 3, 5 and 6, instrument air compressors 31 and 32 and instrument air closed cooling pumps 31 and 32.

Failure Modes and Assumptions

- Switchgear conservatively assumed to fail at a temperature of 117°F [28].
- The bus ducts are conservatively assumed to fail structurally at the melting point of aluminum (~1200°F).
- The CCDP for failures in overhead trays in the west end of switchgear 31 (raceways 78N-DD, 76N-DD, 78N-DD, 76N-DB, 62P-JB, and riser 91N-DB) is assumed to bound the CCDP for failures in overhead trays along the entire length of switchgear 31. Similarly, the CCDP for failures in overhead trays at the west end of switchgear 32 (raceways 47N-CC, 48N-FB/CC, 56N-DA, and 61N-DC) is assumed to bound the CCDP for failures along the entire length of switchgear 32.
- The analysis has conservatively not credited the bus ducts with providing shielding of the overhead trays from the effects of radiant heat from a switchgear or transformer fire.

Shutdown Procedures. Operator response to fires in the 480-V switchgear room is directed by procedures:

- ONOP-FP-1, Plant Fires
- ONOP-FP-1A, Safe Shutdown From Outside the Control Room
- ONOP-FP-1C, Fire Area Evaluation
- ONOP-FP-30, Control Building Fires – CTL-3

Operator actions were credited, as appropriate, in determining the CDF contribution made by each fire scenario evaluated for the 480-V switchgear Room.

Fire Scenarios

Case 1: Fire at 480-V Switchgear 31

This case addresses an electrical cabinet fire in 480-V switchgear 31. In this scenario, internal ignition of the switchgear affects the EDG 32 bus duct, three overhead raceways in the plume of the fire, and a vertical riser. The bottom tray of the overhead raceway is located above the emergency diesel generator 32 bus duct and is approximately 3 ft from the top of the switchgear cabinet. Smoke detector actuation occurs within 1 minute. If CO_2 suppression is not activated within 11 minutes, propagation of the source fire to overhead cable trays results in a hot gas layer (HGL) temperature of 117°F, which is assumed to fail the 480-V switchgear. However, offsite power to Appendix R Bus 312 is still available. Should suppression fail to be activated within 31 minutes, fire propagation to overhead cable trays results in an HGL temperature of 700°F. This temperature is sufficient to cause widespread damage to cables and equipment throughout the room, including a loss of offsite power.

In summary, damage from a fire at 480-V switchgear 31 will be limited to the EDG 32 bus duct, raceways 78N-DD, 76N-DB and 62P-JB, and vertical riser 91N-DB if the suppression system is activated within 11 minutes. The CCDP calculated for this scenario is 3.38×10^{-3}. Should suppression fail to be activated within 11 minutes, the CCDP (without recovery) is 1.0. If suppression is activated within 31 minutes, offsite power to Bus 312 remains available. Core damage can be prevented using the alternate safe shutdown equipment. If suppression fails, the Appendix R diesel generator must be used to supply power to Bus 312.

Case 2: Fire at 480-V Switchgear 32

This case addresses an electrical cabinet fire in 480-V switchgear 32. In this scenario, the internal ignition of the cabinet affects three raceways in the plume of the fire. The bottom tray is located approximately 2 ft above the switchgear cabinet. Smoke detector actuation occurs within 1 minute. If suppression is not activated within 11 minutes, propagation of the source fire to overhead cable trays results in a hot gas layer (HGL) temperature of 117°F, which is assumed to fail the 480-V switchgear. However, offsite power to Appendix R Bus 312 is still available. Should suppression fail to be activated within 31 minutes, fire propagation to overhead cable trays results in an HGL temperature of 700°F. This temperature is sufficient to cause widespread damage to cables and equipment throughout the room, including a loss of offsite power.

In summary, damage from a fire at 480-V switchgear 32 will be limited to raceways 47N-CC, 48N-FB/CC, 56N-DA and 61N-DC if the suppression system is activated within 11 minutes. The CCDP calculated for this scenario is 3.06×10^{-2}. Should suppression fail to be activated within 11 minutes, the CCDP (without recovery) is 1.0. If suppression is activated within 31 minutes, offsite power to Bus 312 remains available. Core damage can be prevented using the alternate safe shutdown equipment. If suppression fails, the Appendix R diesel generator must be used to supply power to Bus 312.

Case 3: Fire at Station Service Transformer 2

This case addresses an internal fire in station service transformer 2. There are three potential targets: the EDG 31 bus duct; a group of four horizontally stacked trays, with the lowest raceway less than 2 ft above the transformer and within the fire's plume; and a single overhead tray located 5 ft above the transformer at an offset of 2 ft.

Examining the four horizontally stacked raceways in the plume of the fire, we note that the bottom tray is lined with marinite board and is located above emergency diesel generator 31's bus duct. However, no credit was taken for the marinite board mitigating fire propagation. Smoke detector actuation occurs within 1 minute. If suppression is not activated within 11 minutes, propagation of the source fire to overhead cable trays results in a hot gas layer (HGL) temperature of 117°F, which is assumed to fail the 480-V switchgear. However, offsite power to Appendix R Bus 312 is still available. Should suppression fail to be activated within 31 minutes, fire propagation to overhead cable trays results in an HGL temperature of 700°F. This temperature is sufficient to cause widespread damage to cables and equipment throughout the room, including a loss of offsite power.

The second potential target consists of a single overhead raceway located outside the fire plume by an offset of 2 ft. Because the tray is outside the critical radial distance, it will not ignite nor be damaged as the target temperature reaches only 108°F. The nearest smoke detector would actuate within 3 seconds.

In summary, damage from an internal fire in station service transformer 2 will be limited to the EDG 31 bus duct and raceways 81N-DD, 81N-DB, 81N-CB and 81N-CD if the suppression system is activated within 11 minutes. The CCDP calculated for this scenario is 1.50×10^{-3}. Should suppression fail to be activated within 11 minutes, the CCDP (without recovery) is 1.0. If suppression is activated within 31 minutes, offsite power to Bus 312 remains available. Core damage can be prevented using the alternate safe shutdown equipment. If suppression fails, the Appendix R diesel generator must be used to supply power to Bus 312.

Case 4: Fire at Station Service Transformer 3

This case addresses an internal fire in station service transformer 3. There are three potential targets: a single tray located less than 3 ft above the transformer and within the fire's plume; a group of four horizontally stacked trays less than 1 ft above the transformer but outside the fire's plume at an offset of 1.75 ft; and a single overhead raceway located outside the fire plume by an offset of 2 ft.

Examining the first target, the single tray is less than 3 ft above the transformer and in the fire's plume. The temperature at the overhead raceway reaches 1177°F igniting and damaging the cables. The minimum time-to-damage for the cable is 35 seconds. Smoke detector actuation occurs at 3 seconds. The resulting HGL temperature will not damage other cables in the zone. The tray fire will self-extinguish without propagating or damaging additional trays.

The second target comprises a group of four horizontally stacked trays. Although the first raceway is less than 1 ft above the transformer, because it is outside the fire's plume at an offset of approximately 2 ft, no damage or ignition occurs. The temperature at the first raceway is 108°F. Smoke detector actuation is calculated to occur within 3 seconds.

The third target consists of a single overhead raceway 5 ft above and outside the fire plume at an offset of 2 ft. No damage occurs mainly because the tray is beyond the critical radiant and damage distances. Again, the target temperature only reaches 108°F and a smoke detector actuates within 3 seconds.

In summary, fire in station service transformer 3 will be limited to damage to raceway 39L-FD/DD/JD, even if suppression fails to actuate. The CCDP for this scenario is 5.66×10^{-4}.

Case 5: Fire at Station Service Transformer 5

This case addresses an internal fire in station service transformer 5. There are two targets: two parallel sets of three horizontally stacked trays above the transformer and within the fire's plume; and two horizontally stacked trays with the lower tray 0.5 ft below the top of the transformer. Both trays are outside the fire's plume at an offset of 2 ft.

Examining the impact of a fire on the first target, smoke detector actuation occurs within 1 minute. If suppression is not activated within 11 minutes, propagation of the source fire to overhead cable trays results in a hot gas layer (HGL) temperature of 117°F, which is assumed to fail the 480-V switchgear. However, offsite power to Appendix R Bus 312 is still available.

Should suppression fail to be activated within 31 minutes, fire propagation to overhead cable trays results in an HGL temperature of 700°F. This temperature is sufficient to cause widespread damage to cables and equipment throughout the room, including a loss of offsite power.

The second target comprises two horizontally stacked trays. Although the first raceway is less than 1 ft below the top of the transformer, no damage or ignition will occur since the raceway is outside the fire's plume, and beyond the critical distance for damage from radiant heat at an offset of approximately 2 ft. The second tray, which is outside the critical radiant distance of 1.4 ft, would also not be damaged—the target temperatures do not exceed 108°F.

In conclusion, damage from an internal fire in station service transformer 5 will be limited to raceways 71N-CD, 70N-CD, 93N-CD, 74N-CB, 73N-CB, and 72N-CB if the suppression system is activated within 11 minutes. The CCDP calculated for this scenario is 4.00×10^{-4}. Should suppression fail to be activated within 11 minutes, the CCDP (without recovery) is 1.0. If suppression is activated within 31 minutes, offsite power to Bus 312 remains available. Core damage can be prevented using the alternate safe shutdown equipment. If suppression fails, the Appendix R diesel generator must be used to supply power to Bus 312.

Case 6: Fire at Station Service Transformer 6

This case addresses an internal fire in station service transformer 6. Potential targets comprise two sets of three horizontally stacked trays located above the transformer and within the fire's plume.

Examining the effects of fire on these targets, smoke detector actuation occurs within 1 minute. If suppression is not activated within 11 minutes, propagation of the source fire to overhead cable trays results in a hot gas layer (HGL) temperature of 117°F, which is assumed to fail the 480-V switchgear. However, offsite power to Appendix R Bus 312 is still available. Should suppression fail to be activated within 31 minutes, fire propagation to overhead cable trays results in an HGL temperature of 700°F. This temperature is sufficient to cause widespread damage to cables and equipment throughout the room, including a loss of offsite power.

In conclusion, this scenario results in damage being limited to raceways 66N-CA, 65N-CA, 64N-CA, 71N-CD, 70N-CD and 93N-CD if the suppression system is activated within 11 minutes. The CCDP calculated for this scenario is 4.00×10^{-4}. Should suppression fail to be activated within 11 minutes, the CCDP (without recovery) is 1.0. If suppression is activated within 31 minutes, offsite power to Bus 312 remains available. Core damage can be prevented using the alternate safe shutdown equipment. If suppression fails, the Appendix R diesel generator must be used to supply power to Bus 312.

Case 7: Fire at Battery Charger 33

This case addresses an electrical fire in battery charger 33. The limiting case occurs as a result of the internal ignition of the cabinet which affects four horizontally stacked overhead raceways. The first tray is located 5 ft above the battery charger and outside the fire's plume at an offset of less than 0.5 ft. A battery charger fire results in a cable tray exposure temperature and a hot gas layer temperature of 102°F and will therefore not damage any other cables or equipment in the compartment. Smoke detector actuation occurs within 8 seconds.

Case 8: Fire at 31 or 32 Instrument Air Compressor

This case addresses an oil fire at an instrument air compressor, conservatively assuming the entire inventory of oil spreads onto the compartment floor and ignites. Each instrument air compressor contains approximately 4.5 gallons of oil. Smoke detector actuation occurs within one minute. Should suppression be successful the resultant CCDP is 1.51×10^{-3}. Analysis shows that even if credit is taken for the floor drains limiting the spread of the oil, the room could heat up to 117°F in less than one minute, resulting in failure of the 480-V switchgear. In addition, offsite power cables could be damaged. Therefore, because of the short time to damage and the lack of automatic suppression, no credit was taken for fire suppression prior to damage to the 480-V switchgear and offsite power. The resultant CCDP is 1.0.

Case 9: Fire at 32 Instrument Air Closed Cooling Pump

This case addresses an oil fire at an instrument air closed cooling pump. Each instrument air closed loop cooling pump contains approximately 0.25 gallons of oil. Conservatively assuming the entire inventory of oil from the No. 32 pump spreads evenly on the compartment floor and ignites, an HGL of 117°F could occur if suppression is not activated within 12 minutes, resulting in loss of the 480-V switchgear. In addition, because offsite power could be lost within the first minute, alternative safe shutdown would require use of the Appendix R diesel generator. This scenario would be limited to a loss of offsite power and damage to raceways 85N-DB, 85N-CB, 85N-CD and 46N-CD and riser 90N-DD should suppression be successful within 12 minutes. The resulting CCDP for this scenario is 1.81×10^{-3}. Should suppression efforts fail, the resultant CCDP (without recovery) is 1.0, and alternative safe shutdown would require use of the Appendix R diesel generator to supply power to Bus 312.

An oil fire caused by the No. 31 pump was determined to pose no threat to overhead raceways and would only impact the No. 31 and 32 instrument air closed cooling pumps. The resulting CDF is negligible compared to the other sources of fire in the 480-V switchgear room.

Case 10: Transient Fires

Transient fires were determined to pose no threat to overhead raceways and vertical risers within the zone since these targets are located outside the critical damage distance for typical maintenance materials.

<u>Conclusion</u>. The total CDF arising from fires in the 480-V switchgear room was calculated to be 3.51 x 10^{-5}/yr. Details of the calculations are presented in Table 4.7.2.1. IP3 has one switchgear room which contains circuits for both divisions of the AC power. Approximately 65% of the fire risk in this switchgear room comes from fires in the 480-V switchgear that grow beyond incipient stage and involve significant amounts of combustibles (i.e., cables) within the switchgear. Both switchgear are vented high and have exposed cable trays overhead that can be damaged and ignited prior to successful suppression, resulting in loss of one division. If the CO_2 suppression system is not manually activated in time, the heat generated from cable trays above the first switchgear is sufficient to cause damage to the other switchgear division. Approximately 33% of the fire risk in the switchgear room results from oil fires at the instrument air compressors or instrument air closed loop cooling water pumps which propagate to overhead cable trays and result in loss of both switchgear. In the event of loss of both divisions, safe shutdown is accomplished through manual local operation of the auxiliary feedwater pump and use of Bus 312 with the Appendix R diesel generator. Success of this activity is driven by successful alignment of the Appendix R diesel generator to Bus 312 following the loss of two 480-V switchgear and offsite power.

Table 4.7.2.1

CDF Calculations for Fire Zone 14 (480V Switchgear Room)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Suppression	Manual Non-suppression [1]	Area Ratio	CCDP	Non Recovery [3]	CDF (/year)
14	1	480V Switchgear 31	3.06E-03	0.12	1.0	0.66 [2]	1.0	3.38E-03	1.0	8.19E-07
		480V Switchgear 31	3.06E-03	0.12	1.0	0.30	1.0	1.0	0.051	5.60E-06
		480V Switchgear 31	3.06E-03	0.12	1.0	0.04	1.0	1.0	0.15	2.27E-06
14	2	480V Switchgear 32	2.84E-03	0.12	1.0	0.66 [2]	1.0	3.06E-02	1.0	6.88E-06
		480V Switchgear 32	2.84E-03	0.12	1.0	0.30	1.0	1.0	0.051	5.20E-06
		480V Switchgear 32	2.84E-03	0.12	1.0	0.04	1.0	1.0	0.15	2.11E-06
14	3	Station Service Transformer 2	6.42E-05	0.1	1.0	0.66 [2]	1.0	1.50E-03	1.0	6.36E-09
		Station Service Transformer 2	6.42E-05	0.1	1.0	0.30	1.0	1.0	0.051	9.80E-08
		Station Service Transformer 2	6.42E-05	0.1	1.0	0.04	1.0	1.0	0.15	3.97E-08

Table 4.7.2.1 (continued)

CDF Calculations for Fire Zone 14 (480V Switchgear Room)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Suppression	Manual Non-suppression [1]	Area Ratio	CCDP	Non Recovery [3]	CDF (/year)
14	4	Station Service Transformer 3	6.42E-05	0.1	1.0	1.0	1.0	5.66E-04	1.0	3.64E-09
14	5	Station Service Transformer 5	6.42E-05	0.1	1.0	0.66 [2]	1.0	4.00E-04	1.0	1.70E-09
		Station Service Transformer 5	6.42E-05	0.1	1.0	0.30	1.0	1.0	0.051	9.80E-08
		Station Service Transformer 5	6.42E-05	0.1	1.0	0.04	1.0	1.0	0.15	3.97E-08
14	6	Station Service Transformer 6	6.42E-05	0.1	1.0	0.66 [2]	1.0	3.70E-02	1.0	1.57E-07
		Station Service Transformer 6	6.42E-05	0.1	1.0	0.30	1.0	1.0	0.051	9.80E-08
		Station Service Transformer 6	6.42E-05	0.1	1.0	0.04	1.0	1.0	0.15	3.97E-08

Table 4.7.2.1 (continued)

CDF Calculations for Fire Zone 14 (480V Switchgear Room

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Suppression	Manual Non-suppression [1]	Area Ratio	CCDP	Non Recovery [3]	CDF (/year)
	8	Instrument Air Compressor	3.62E-04	0.2	1.0	1.0	1.0	1.0	0.15	1.09E-05
14	9	Instrument Air Closed Cooling Pump	1.56E-04	0.2	1.0	0.85 [2]	1.0	1.81E-03	1.0	4.78E-08
		Instument Air Closed Cooling Pump	1.56E-04	0.2	1.0	0.15	1.0	1.0	0.15	7.00E-07
		Total Zone14								**3.51E-05**

[1] The 480 V switchgear room has a area-wide, total –flooding, CO_2 system which is manually actuated. The activation sequence will not initiate unless control building ventilation fans are manually shut down at the local control station located outside the 480-V switchgear room.

[2] This probability represents the probability of successful fire suppression.

[3] This recovery involves safely shutting down the plant from outside the control room using the safe shutdown equipment. For a more detailed description of this action, refer to Appendix 4A

4.7.2.2 Fire Zone 37A: 6.9-kV Switchgear Area

<u>General Zone Description</u>. The 6.9-kV switchgear area is located on the 15-ft elevation at the south end of the turbine building and has a floor area of 5838 ft^2 and a 20-ft ceiling. This fire zone is an open area adjacent to the control and administration service buildings and main transformer yard. A 3-hour rated fire barrier separates zone 37A from the control building. A controlled, non-rated water curtain separates it from the main transformer yard. While the south wall abutting the administration service building is also controlled, it is non-rated. Interfaces with zones within the turbine building fire area are Appendix A whereas interfaces with other fire areas are classified as Appendix R. The floor, ceiling and other barriers are non-rated.

<u>Suppression and Detection</u>. Wet pipe sprinklers are located throughout the area except over 6.9-kV switchgear 31 and 32. Ionization smoke detectors that annunciate in the control room are mounted above these switchgear cabinets. The fire brigade has access to manual CO_2, dry chemical and foam extinguishers as well as hose stations in the vicinity.

<u>Significant Ignition Sources</u>. The significant ignition sources in the zone are 6.9-kV switchgear 31 and 32, Appendix R motor control center 312A and transients. Transient combustibles in the 6.9-kV switchgear area are expected to consist of typical maintenance materials. Other electrical equipment within the zone was screened as an ignition source since the equipment has no openings through which a fire could propagate or because targets were outside the critical radiant distance. The switchgear, service transformers and motor control center are close to overhead cable trays.

<u>Significant Targets</u>. Significant targets in the zone include 6.9-kV switchgear 31 and 32, power distribution panel PDP-TG-1, Appendix R motor control center 312A, 480-V switchgear 312 and 313 and their associated service transformers.

<u>Failure Modes and Assumptions</u>

The assumptions discussed in Section 4.5 were applied to analysis of the 6.9-kV switchgear area.

<u>Shutdown Procedures</u>. Operator response to fires in Fire Zone 37A is directed by procedures:

- ONOP-FP-1, Plant Fires
- ONOP-FP-1C, Fire Area Evaluation
- ONOP-FP-50, Turbine Building Fires – TBL - 5

Fire Scenarios

Case 1: Fire at 6.9-kV Switchgear 31

This case addresses an internal fire in 6.9-kV switchgear 31. There are two potential targets: a single horizontal tray, 6 ft above the switchgear and outside the fire's plume at an offset of 1.5 ft; and a single overhead tray within the plume of the fire and 4.5 ft above the switchgear.

In the event of fire at 6.9-kV switchgear 31, the temperature at the first offset overhead raceway target reaches only 92°F. No damage to the target will result.

The temperature of the second target, raceway 51A-BA will reach 540°F. However, as noted by its designation of "BA", this raceway contains 6.9-kV power cables rated for 700°F and no damage occurs.

In summary, fire at 6.9-kV switchgear 31 will result in damage only to switchgear 31 itself. The CCDP calculated for this scenario is 2.92×10^{-5}.

Case 2: Fire at 6.9-kV Switchgear 32

This case addresses an internal fire in 6.9-kV switchgear 32. There are four targets: three horizontally stacked trays, the lowest of which is 6 ft above the switchgear and within the fire's plume; two overhead trays outside the plume of the fire at an offset of 1.75 ft; four horizontally stacked overhead trays within the fire's plume; and a single overhead tray located 6 feet above the fire source and in the fire's plume.

In the event of a fire in 6.9-kV switchgear 32, the three stacked trays that comprise the first target do not ignite or suffer damage since the target temperature at the first tray is 369°F. The HGL temperature increases only to 92°F which will not damage the other two trays or any surrounding cables and equipment. An ionization smoke detector actuates within 1 second.

The second target comprises two trays with the lowest raceway 6 ft above the switchgear and outside the fire's plume. The target temperature is 92°F, which will not damage either tray or any surrounding cables and equipment.

The third target comprises four overhead trays 3 ft above the top of the switchgear cabinet and within the fire's plume. The 973°F temperature at the first tray causes cable damage and ignition. The minimum time-to-damage for the cable in this tray is 58 seconds. The nearest smoke detector actuates within 1 second. If suppression is not accomplished within 5 minutes, the second and third trays also ignite. Should suppression efforts fail altogether, all four trays would ignite, but the fire would eventually self-extinguish without propagating further.

Although the single tray that comprises the final target is overhead and in the fire's plume, no damage or ignition occurs because its temperature reaches only 369°F.

In summary, fire in 6.9-kV switchgear 32 will result in damage to raceways 42B-CD, 42B-CB, 60A-DB/JB and 02A-FB/DB/JB. The CCDP calculated for this scenario is 1.28×10^{-4}.

Case 3: Fire at Motor Control Center 312A

This case addresses an electrical fire in Appendix R motor control center 312A. The potential target comprises a group of three horizontally stacked trays, the lowest located 3.5 ft above the source and within the fire's plume. The resulting 774°F temperature at the first tray causes damage to and ignition of cables within the tray. The minimum time-to-damage for the cable is 101 seconds. The nearest smoke detector actuates within 3 seconds. If suppression is not applied within 5 minutes, the second and third trays may also ignite, but the tray fire would eventually self-extinguish without propagating further.

In summary, this scenario may result in damage to raceways 42B-CD, 42B-CB and 44B-DB/JB. The CCDP calculated for this scenario is 1.28×10^{-4}.

Case 4: Transient Fires

Transient fires were determined to pose no threat to overhead raceways and vertical risers within the zone since these targets are outside the critical damage distance for typical maintenance materials.

<u>Conclusion</u>. The total CDF arising from fires in the 6.9-kV switchgear zone is 3.78×10^{-8} /yr. Details of the calculations are presented in Table 4.7.2.2.

Table 4.7.2.2

CDF Calculations for Fire Zone 37A (6.9-kV Switchgear Area)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Suppression	Manual Non-suppression	Area Ratio	CCDP	Non Recovery	CDF (/year)
37A	1	6.9KV switchgear 31	1.48E-03	0.12	1.0	1.0	1.0	2.92E-05	1.0	5.19E-09
37A	2	6.9KV switchgear 32	1.57E-03	0.12	1.0	1.0	1.0	1.28E-04	1.0	2.41E-08
37A	3	Motor control center 312A	5.56E-04	0.12	1.0	1.0	1.0	1.28E-04	1.0	8.54E-09
		Total Zone 37A								**3.78E-08**

4.7.2.3

Fire Zones 10, 101A, 102A: Diesel Generator Rooms

(b)(7)(F)

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(2 pages)

Case 2: Battery Fires

Battery 33 is located directly opposite and 3 ft away from the diesel engine, directly adjacent to DG rack 31. As noted in the discussion of significant targets, failure of the diesel engine or generator as a result of a fire at the battery is not considered to be credible.

The DG rack holds a collection of electrical components associated with DG 31. Conduits to and from the exhaust system fans are routed to boxes on the DG rack. These boxes are mounted at a horizontal distance of approximately 5-ft from the north end of the battery, with the top of the boxes approximately 5 ft above the floor.

The most severe battery fire in nuclear industry operating experience (as documented in EPRI's Fire Events Database) involved the tops of two cells [3]. Conservatively postulating a fire involving the top and sides of three cells yields a heat release rate of approximately 300 Btu/s and a critical radial distance of 3.1 feet. As the conduits of interest are 2 ft beyond the critical radial distance, they will not be damaged. Accordingly, no further analysis was performed for battery fires.

Case 3: Transient Fires

A bounding analysis of transient fires, which assumed failure of everything in the zone and allowed credit to be taken only for manual suppression of the transient fire in its incipient stage, showed that transient fires contribute less than 1% of the core damage frequency for the zone. The bounding CDF for fire scenarios involving transients in zones 10, 101A and 102A is less than 10^{-7}/yr. Because of this low risk, detailed fire modeling analysis was not performed for transient fires in the DG rooms.

<u>**Conclusion**</u>. The total CDF arising from fires in the diesel generator room 31 (fire zone 10) was calculated to be 2.13 x 10^{-6}/yr. The total CDF arising from fires in the diesel generator room 32 (fire zone 101A) was calculated to be 3.38 x 10^{-7}/yr. The total CDF arising from fires in the diesel generator room 33 (fire zone 102A) was calculated to be 1.93 x 10^{-6}/yr. These contributions were determined using conservatively estimated CCDPs. The calculations are presented in Table 4.7.2.3.

Table 4.7.2.3

CDF Calculations for Fire Zones 10, 101A, 102A (Diesel Generator Rooms)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Suppression	Manual Non-suppression	Area Ratio	CCDP	Non Recovery	CDF (/year)
10	1	DG 31	2.60E-02	0.41	1.0	1.0	1.0	1.98E-04	1.0	2.11E-06
	3	Transients	8.28E-05	0.65	1.0	1.0	1.0	1.98E-04	1.0	1.07E-08
		Welding/transient	1.97E-04	0.15	1.0	1.0	1.0	1.98E-04	1.0	5.85E-09
		Total Zone 10								**2.13E-06**
101A	1	DG 32	2.60E-02	0.41	1.0	1.0	1.0	3.15E-05	1.0	3.36E-07
	3	Transients	8.28E-05	0.65	1.0	1.0	1.0	3.15E-05	1.0	1.70E-09
		Welding/transient	1.97E-04	0.15	1.0	1.0	1.0	3.15E-05	1.0	9.31E-10
		Total Zone 101A								**3.38E-07**
102A	1	DG 33	2.60E-02	0.41	1.0	1.0	1.0	1.80E-04	1.0	1.92E-06
	3	Transients	8.28E-05	0.65	1.0	1.0	1.0	1.80E-04	1.0	9.69E-09
		Welding/transient	1.97E-04	0.15	1.0	1.0	1.0	1.80E-04	1.0	5.32E-09
		Total Zone 102A								**1.93E-06**
		Total Diesel Generator Room Area								**4.36E-06**

4.7.2.4 Fire Zone 11: Cable Spreading Room

<u>General Zone Description</u>. The cable spreading room (fire zone 11) is located on the 33-ft elevation of the control building. The room is fully enclosed with a floor area of 3,122 ft^2 and a ceiling height of 16 ft. The floor, ceiling, and all walls are 3-hour rated fire barriers. Openings in the cable spreading room include three fire doors opening into the turbine building, the control building stairwell and the lower electrical tunnel. The doors opening to the turbine building and stairwell are normally closed. The door opening to the lower electrical tunnel is normally open, but closes automatically on actuation of area-wide fire detectors. The cable spreading room fully encloses a smaller compartment housing battery 34.

The cable spreading room is ventilated by the control building ventilation system. Two dampers FD-10 and FD-11 and one intake louver L-320 in the southwest corner of the room, near the door to the turbine building, allow air to be drawn into the room. One damper FD-50 in the southeast corner of the room, allows air to be exhausted by control building exhaust fans 31 and 32 in the adjacent fan room. The ventilation system is normally operating, and the dampers are normally open. Dampers close automatically on actuation of area-wide fire detectors.

The cable spreading room is provided with area-wide smoke and heat detection, and a total flooding CO_2 system actuated by the heat detectors. A second discharge of the CO_2 system is available. Local coverage is provided for the cable trays at the entrance to the lower electrical tunnel by a pre-action water spray system. Local ultraviolet fire detection is provided in battery room 34.

The earliest indication of a fire in the cable spreading room is likely to be provided by smoke detectors. In addition, a high temperature alarm is set to alert the control room if the temperature exceeds 101°F in the HVAC exhaust duct.

Radiant energy shields consisting of marinite board are installed in the cable spreading room wherever cable trays of redundant channels are located close to each other. However, no credit was taken for the marinite board mitigating fire propagation.

<u>Significant Ignition Sources</u>. Significant ignition sources in the room include two MG sets, four battery chargers, numerous electrical cabinets and transformers, two battery room ventilation fans and potential transient ignition sources.

Fires at the MG sets can be initiated by the electric motor, by bearing failures, or by electrical faults. However, there is very little combustible material associated with the MG sets (motor and generator bearings are lubricated with grease and are assumed not to represent a significant fire hazard) and the generator, flywheel and terminal box are enclosed within a metal housing which will substantially shield effects of radiant heat. Accordingly, motor fires were analyzed using a conservative heat release rate for electrical fires based on SNL tests of fires in vertical cabinets and qualified cables (<65 Btu/s).

Battery chargers and electrical cabinets throughout the room may be a source of ignition for fires to which cables in overhead trays are susceptible. Heat release rates for fires in electrical cabinets and battery chargers are expected to be bounded by SNL cabinet fire tests in vertical cabinets with qualified cable (<65 Btu/s).

Transformers in the cable spreading room are all low-voltage, dry-type transformers. Because there is little combustible material associated with the transformers, they were analyzed using a conservative heat release rate for electrical fires based on SNL tests of fires in vertical cabinets and qualified cables (<65 Btu/s).

The battery room ventilation fans are small fans located above the ceilings of battery rooms 31 and 32. Again, because there is little combustible material associated with these fans, they were analyzed using a conservative heat release rate for electrical fires based on SNL tests of fires in vertical cabinets and qualified cables (<65 Btu/s).

Transient fires may be a source of exposure in this room. Transient combustibles in this compartment are expected to consist of typical maintenance materials (< 138 Btu/s).

<u>Significant Targets</u>. Significant targets in the cable spreading room include numerous emergency power system components: MCC 39, battery chargers 31, 32, 34 and 35, static inverters 31, 32, 33 and 34, power panels 31, 32 and 34. Power and control cables for channels A, B, C, and D are also routed throughout the room. Specifically:

- DC power panel 34 is located on the west wall, outside battery room 34
- DC power panels 31 and 32 are located on the south wall outside battery rooms 31 and 32 respectively. They are approximately 1.5 ft apart.
- Battery charger 34 and static inverter 34 are located adjacent to one another in the west end of the room, across the aisle from the north wall.
- Static inverters 31 and 32 and battery chargers 31 an 32 are located in the west end of the room, approximately along the north-south axis of the room, and positioned approximately 2 ft apart.
- Battery charger 35 and static inverter 33 are located in the east end of the room, across the aisle from the south wall. The plant parameters signal inverter cabinet separates them from one another.
- Cables associated with channels A and C are routed primarily on the north side of the room. Cables associated with channels B and D are routed primarily on the south side of

the room. Exceptions occur at the west end of the room, above battery room 34 and at the east end of the room near the tunnel entrance. Above battery room 34, B and D trays are separated from A trays by approximately 2.5 ft. At the tunnel entrance, B and D trays are separated from A and C trays by approximately 5.5 ft.

Analysis

Failure Modes and Assumptions. The assumptions discussed in section 4.5 were applied to the analysis of the cable spreading room.

Shutdown Procedures. Operator response to fires in the cable spreading room is directed by procedures:

- ONOP-FP-1, Plant Fires
- ONOP-FP-1C, Fire Area Evaluation
- ONOP-FP-30, Control Building Fires—CTL-3.

Operator actions were credited, where applicable, in determining the CDF contribution for each fire scenario evaluated for the compartment.

Fire Scenarios

Cases 1 to 28: Fixed Ignition Sources

Because of the large number of ignition sources in the cable spreading room, fire modeling was performed for an idealized fixed exposure fire having a peak heat release rate of 65 Btu/s, an average heat release rate of 32.5 Btu/s, a duration of 30 minutes and thus a total heat release of 58,500 Btu [3]. The idealized fixed exposure fire encompasses fires occurring at the MG sets, battery chargers, electrical cabinets, and transformers. The analysis determined that fires of this size result in:

- Exposure temperatures of 700°F or greater at cables within 3.8 ft of the virtual surface of the fire

- Exposure temperatures of 425°F for cables within 5.4 ft of the virtual surface of the fire

- Critical flux levels at a radial distance of 1.4 ft

- Compartment temperatures less than 100°F.

The time to damage within these zones of influence depends on how close the exposed cable trays are to the virtual surface of the fire. Analysis showed that damage to trays within 1 ft of the fire could occur within a few seconds, and damage to trays within 3 ft of the fire could occur within about 1 minute. The most rapid detector response time was determined to be about 33 seconds for detectors located at the ceiling directly above the exposure fire. Detectors on the ceiling but offset from the centerline of the exposure fire by more than about 4.6 ft, may not actuate at all. Allowing for a 1-minute delay before discharge of the CO_2 system, a severe fire is therefore likely to damage overhead cable trays and may also ignite overhead trays before automatic suppression can occur.

However, the resulting tray fire is likely to be suppressed very rapidly. The limiting case is represented by a tray fire in the lowest tray, at a 40 ft 6 in. elevation (7.5 ft above the floor), with a detector located on the ceiling about 10 ft away from the centerline of the plume. In this case, a heat release rate of about 300 Btu/s will actuate the detector within about 1 min. For tray fires closer to a detector, or at a higher elevation, detector response would be more rapid.

A heat release rate of 300 Btu/s is roughly equivalent to a tray fire involving about 16 sq. ft of cable tray. Tray fires with heat release rates of 300 Btu/s result in:

- Exposure temperatures of 700°F or greater at cables within 7.6 ft of the virtual surface of the fire
- Exposure temperatures of 425°F for cables within 11.9 ft of the virtual surface of the fire
- Critical flux levels at a radial distance of 3.1 ft
- Compartment temperatures less than 180°F.

The unscreened fixed ignition sources were examined in turn.

MG Sets. Trays above the MG sets are all beyond the critical heights for damage and ignition of cables. Therefore, no further analysis was performed for the MG sets.

Battery Chargers. Trays above the four battery chargers are within the critical distances for damage and ignition of cables. A severe fire at a battery charger could ignite overhead trays before the automatic CO_2 system actuates. If automatic suppression is successful, damage is expected to be limited to the tray stack directly above the charger. If automatic suppression fails, the tray fire could eventually cause critical temperatures throughout the room. Trays likely to be damaged before suppression occurs were identified and CCDPs quantified for each battery charger scenario.

Electrical Cabinets

- Eleven electrical cabinets were found to have trays within critical distances for damage and ignition. These cabinets house the static inverter bypass switch 33, the CFMX multiplexer, the pressurizer heater ground relay, the rod drive MG set output breaker, the plant parameters signal converter, the reactor trip breaker, static inverter 31, static inverter 32, static inverter 33, static inverter 34, and Westinghouse power cabinets, respectively. A severe fire at one of these cabinets could ignite overhead trays before the automatic CO_2 system actuates. If automatic suppression is successful, damage is expected to be limited to the tray stack directly above the cabinet. If automatic suppression fails, the tray fire could eventually result in critical temperatures throughout the room. Trays likely to be damaged before suppression occurs were identified and CCDPs quantified for each cabinet fire scenario.

- Trays close to IB filter 32 are within critical distances for damage. However, this is a small, low voltage component with little combustible content. While damage to overhead trays is conservatively assumed to occur, ignition of trays is considered not to be credible. Trays likely to be damaged by a fire at this source were identified and a CCDP quantified.

- Trays in proximity to IB filter 31 and voltage regulator BE9 are beyond the critical distances for damage and ignition. No further analysis was performed for these two ignition sources.

Transformers

- Cable trays above the four 480-V pressurizer heater control group power transformers are within the critical distance for ignition. In addition, a cable tray riser immediately adjacent to 45-kVA-strip heater transformer 35 is within the critical radiant flux distance. A severe fire at one of these transformers could ignite trays before the automatic CO_2 system actuates. If automatic suppression is successful, damage is expected to be limited to the tray stack directly above (or beside) the transformer. If automatic suppression fails, the tray fire could eventually result in critical temperatures throughout the room. Trays likely to be damaged before suppression occurs were identified and CCDPs quantified for each of these five transformer fire scenarios.

- One tray above the AIB back-up transformers is within the critical distance for damage. However, these are small, low voltage transformers with little combustible content. Thus while the overhead tray is conservatively assumed to be damaged, ignition of the tray is not considered credible. A CCDP was quantified for failure of the tray potentially affected by these transformers.

Battery Room Fans. The battery room fans are located above battery rooms 31 and 32. The fans are small with little combustible content and thus will not ignite overhead trays. The fans were, however, conservatively assumed to be capable of damaging trays or conduits in close proximity. While the area above the battery rooms was inaccessible during walkdowns, drawings were used to identify cables and conduits routed in the area where the fans are located. A CCDP was calculated for the failure of trays and conduits potentially affected by the battery room fan fires. The CCDP thus determined is conservative, as it includes trays and conduits that may not actually be within the critical distances of the fans. As the battery room fans were shown not to be significant contributors to the core damage frequency in the cable spreading room, a more precise determination of the targets affected by the fans was not required.

Cases TR0 to TR11: Transient Ignition Sources

Transient fires were analyzed at a peak heat release rate of 138 Btu/s, an average heat release rate of 69 Btu/s, a duration of 30 minutes and thus a total heat released of 124,200 Btu. Credit was taken for manual suppression of the fires in their incipient stages, either by workers present or by a firewatch. If not suppressed in the incipient stage, the analysis determined that fires of this size involving transient combustibles result in:

- Exposure temperatures of 700°F or greater at cables within 5.1 ft of the virtual surface of the fire or 6.8 ft if the fire is located next to a wall.
- Exposure temperatures of 425°F for cables within 7.5 ft of the virtual surface of the fire or 9.9 ft if the fire is located next to a wall.
- Critical flux levels at a radial distance of 2.1 ft.
- Compartment temperatures limited to 107°F.

Trays are above the critical heights for ignition of cable by transient fires in most of the cable spreading room except in the northeast corner of the room where cable tray stacks converge before entering the electrical tunnels, and along the north and south walls where risers enter through the floor from the switchgear rooms below. In addition, a fire involving transient combustibles might damage installed equipment at several locations in the room.

Transient fires in the following locations are expected to envelop the risk from transient fires in the cable spreading room:

- Cable tray stacks near the tunnel entrance at the northeast corner of the room
- Tray riser 96N on the north wall (west side)
- Tray risers 80N and 88N on the north wall (east side)
- Tray risers 42K and 53H on the south wall (west end)

- Tray risers 89N and 90N on the south wall (east side)
- Between DC power panels 31 and 32 on the south wall
- Between battery charger 31 and static inverter 32 in the west side of the room.

Analysis of transient fires at the tunnel entrance shows that a small floor-based fire next to a cable tray stack or riser may not actuate detectors on the ceiling before the fire propagates to the cables. However, actuation of the automatic CO_2 system will confine the damage to a single tray stack. The limiting case is represented by a tray fire in the lowest tray at the 34-ft elevation (1 ft above the floor), with a detector located on the ceiling about 10 ft away from the centerline of the plume. For this case, a heat release rate of about 650 Btu/s is sufficient to actuate the detector within about 1 min. For tray fires closer to a detector, response would be more rapid. Tray fires with heat release rates of 650 Btu/s result in:

- Exposure temperatures of 700°F or greater at elevations within 10.6 ft of the virtual surface of the fire
- Exposure temperatures of 425°F at the ceiling and within a radial distance of 1 ft from the center line of the plume
- Critical flux levels at a radial distance of 4.5 ft
- Compartment temperatures less than 203°F.

Similarly, with tray risers, actuation of the automatic CO_2 system will confine the damage to the single tray stack directly above the riser. The limiting case is represented by a fire located a radial distance of about 10 feet from a detector mounted on the ceiling. For this case, a heat release rate of about 380 Btu/s is sufficient to actuate the detector within about 1 min. Tray fires with heat release rates of 380 Btu/s result in:

- Exposure temperatures of 700°F or greater at elevations within 8.0 ft of the virtual surface of the fire
- Exposure temperatures of 425°F at elevations within 12.2 ft of the virtual surface of the fire
- Critical flux levels at a radial distance of 3.5 ft
- Compartment temperatures less than 147°F.

Conclusion. The total CDF arising from fires in the cable spreading room (fire zone 11) was calculated to be 7.01 x 10^{-6}/yr. This contribution was determined using conservatively estimated CCDPs and recovery probabilities. Details of the calculations are presented in Table 4.7.2.4. Like many plants IP3 has a single cable spreading room that contains circuits affecting both trains of safe shutdown systems. However, the IP3 cable spreading room has detection and automatic suppression systems adequate to prevent damage resulting from nearly all fires that impact all divisions of safe shutdown systems cables in the room. This is in part attributed to separation of circuits by division in the cable spreading room.

Table 4.7.2.4

CDF Calculations for Fire Zone 11 (Cable Spreading Room)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Suppression	Manual Non-suppression	Area Ratio	CCDP	Non Recovery [1]	CDF (/year)
11	1	Fixed ignition sources igniting overheadf trays, auto suppression fails, critical room temperatures.	2.71E-03	1.20E-01	0.04	1.0	1.0	1.00E+00	0.15	1.95E-06
	2	IB filter 32	3.11E-05	1.20E-01	1.0	1.0	1.0	2.14E-04	1.0	7.99E-10
	3	IB filter 33	3.11E-05	1.20E-01	1.0	1.0	1.0	2.14E-04	1.0	7.99E-10
	4	33 static inv. Bypass switch *	3.11E-05	1.20E-01	0.96	1.0	1.0	1.38E-04	1.0	4.94E-10
	5	CFMS multiplexer *	3.11E-05	1.20E-01	0.96	1.0	1.0	1.00E-03	1.0	3.58E-09
	6	PZR heater ground relay pnl *	3.11E-05	1.20E-01	0.96	1.0	1.0	2.27E-03	1.0	8.13E-09
	7	Rod drive mg set output breaker *	6.21E-05	1.20E-01	0.96	1.0	1.0	1.43E-04	1.0	1.02E-09

Table 4.7.2.4 (continued)

CDF Calculations for Fire Zone 11 (Cable Spreading Room)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Suppression	Manual Non-suppression	Area Ratio	CCDP	Non Recovery [1]	CDF (/year)
	8	Plant parameters signal covonverter cabinet *	3.11E-05	1.20E-01	0.96	1.0	1.0	1.38E-04	1.0	4.94E-10
	9	RX trip breaker panel *	1.86E-04	1.20E-01	0.96	1.0	1.0	1.43E-04	1.0	3.06E-09
	10	Static invereter 31 *	3.11E-05	1.20E-01	0.96	1.0	1.0	4.99E-02	1.0	1.79E-07
	11	Static invereter 32 *	3.11E-05	1.20E-01	0.96	1.0	1.0	4.99E-02	1.0	1.79E-07
	12	Static invereter 33 *	3.11E-05	1.20E-01	0.96	1.0	1.0	1.38E-04	1.0	4.94E-10
	13	Static invereter 34 *	3.11E-05	1.20E-01	0.96	1.0	1.0	2.14E-04	1.0	7.67E-10
	14	Westinghouse power cabinets (x14) *	4.35E-04	1.20E-01	0.96	1.0	1.0	1.41E-02	1.0	7.07E-07
	15,16,17	AIB backup transformers (x7)	3.76E-04	1.00E-01	1.0	1.0	1.0	3.04E-03	1.0	1.14E-07

Table 4.7.2.4 (continued)

CDF Calculations for Fire Zone 11 (Cable Spreading Room)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Suppression	Manual Non-suppression	Area Ratio	CCDP	Non Recovery [1]	CDF (/year)
	18	Battery charger 31 *	3.64E-04	1.20E-01	0.96	1.0	1.0	2.82E-02	1.0	1.18E-06
	19	Battery charger 32 *	3.64E-04	1.20E-01	0.96	1.0	1.0	3.13E-02	1.0	1.31E-06
	20	Battery charger 34 *	3.64E-04	1.20E-01	0.96	1.0	1.0	1.41E-04	1.0	5.91E-09
	21	Battery charger 35 *	3.64E-04	1.20E-01	0.96	1.0	1.0	6.97E-03	1.0	2.92E-07
	22	Battery room 31 exhaust fan	3.88E-05	8.00E-02	1.0	1.0	1.0	2.97E-02	1.0	9.22E-08
	23	Battery room 32 exhaust fan	3.88E-05	8.00E-02	1.0	1.0	1.0	2.97E-02	1.0	9.22E-08
	24	Strip heater transformer 32 *	6.37E-05	1.00E-01	0.96	1.0	1.0	1.79E-02	1.0	1.09E-07

Table 4.7.2.4 (continued)

CDF Calculations for Fire Zone 11 (Cable Spreading Room)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Suppression	Manual Non-suppression	Area Ratio	CCDP	Non Recovery [1]	CDF (/year)
	25	Pressurizer heater control group power transformer (BB8) *	6.37E-05	1.00E-01	0.96	1.0	1.0	2.47E-03	1.0	1.51E-08
	26	Pressurizer heater control group power transformer (BB9) *	6.37E-05	1.00E-01	0.96	1.0	1.0	2.47E-03	1.0	1.51E-08
	27	Pressurizer heater control group power transformer (BB7) *	6.37E-05	1.00E-01	0.96	1.0	1.0	4.04E-02	1.0	2.47E-07
	28	Pressurizer heater control group power transformer (BB6) *	6.37E-05	1.00E-01	0.96	1.0	1.0	2.12E-03	1.0	1.30E-08
		Total Fixed Ignition Sources								**6.53E-06**
	TRC	Transient ignition sources igniting trays, auto suppression fails, critical room temperatures	2.72E-04	2.90E-01	0.04	1.0	1.69E-01	1.00E+00	0.15	8.00E-08

Table 4.7.2.4 (continued)

CDF Calculations for Fire Zone 11 (Cable Spreading Room)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Suppression	Manual Non-suppression	Area Ratio	CCDP	Non Recovery [1]	CDF (/year)
	TR1	Riser 96N, north wall, dwg section N	2.72E-04	2.90E-01	0.96	1.0	1.30E-02	9.00E-04	1.0	8.86E-10
	TR2	Riser 80N north wall, dwg sections G1 and G2 (MD AFW pmp)	2.72E-04	2.90E-01	0.96	1.0	1.10E-02	1.79E-02	1.0	1.49E-08
	TR3	Riser 88N, north wall, between dwg sections G2 and F2 (MD AFW pmp control)	2.72E-04	2.90E-01	0.96	1.0	1.10E-02	2.42E-03	1.0	2.02E-09
	TR4	Tunnel entrance, north stack	2.72E-04	2.90E-01	0.96	1.0	1.60E-02	3.43E-03	1.0	4.16E-09
	TR5	Tunnel entrance, south stack	2.72E-04	2.90E-01	0.96	1.0	3.00E-02	3.67E-03	1.0	8.34E-09
	TR6	Risers 42K and 53H, south wall, dwg sections G2 and F2 (chg pumps control)	2.72E-04	2.90E-01	0.96	1.0	2.10E-02	1.99E-02	1.0	3.16E-08

Table 4.7.2.4 (continued)

CDF Calculations for Fire Zone 11 (Cable Spreading Room)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Suppression	Manual Non-suppression	Area Ratio	CCDP	Non Recovery [1]	CDF (/year)
	TR7	Risers 89N and 90N, south wall, dwg sections N and M	2.72E-04	2.90E-01	0.96	1.0	1.30E-02	3.11E-03	1.0	3.06E-09
	TR8	Risers 80N and 88N, north wall, dwg section G2 (btw TR2 and TR3) (MD AFW pumps control)	2.72E-04	2.90E-01	0.96	1.0	5.00E-03	3.46E-02	1.0	1.31E-08
	TR9	Tunnel entrance, aisle btw north and south stacks	2.72E-04	2.90E-01	0.96	1.0	4.90E-02	2.63E-03	1.0	9.76E-09
	TR10	DC power panels 31 and 32	2.72E-04	2.90E-01	1.0	1.0	2.03E-02	8.70E-02	1.0	1.39E-07
	TR11	Battery Charger 31 and inverter 32, west side of the room	2.72E-04	2.90E-01	1.0	1.0	1.59E-02	3.82E-04	1.0	4.79E-10
		Total Transient Ignition Sources								**3.08E-07**
		Total Zone 11								**6.83E-06**

Table 4.7.2.4 (continued)

CDF Calculations for Fire Zone 11 (Cable Spreading Room)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Suppression	Manual Non-suppression	Area Ratio	CCDP	Non Recovery [1]	CDF (/year)

[1] – This recovery involves safely shutting down the plant from outside the control room using the safe shutdown equipment. For a more detailed description, see Appendix 4A.

[2] – The ignition frequency for case 1 consists of the sum of the frequencies for ignition sources (electrical cabinets) where analysis showed the fires were capable of propagating to overhead trays (11 electrical cabinets, 5 transformers, and 4 battery chargers identified in the text), as indicated by the presence of an asterik(*) in the case description.

4.7.2.5 Fire Zone 17A: Primary Auxiliary Building (PAB) Corridor

General Zone Description. The PAB corridor (fire zone 17A) is located on the 55-ft elevation of the primary auxiliary building. The total area of the corridor is 6386 ft^2; the ceiling is 16 ft high in the areas of interest. Openings in the enclosure include an open stairway to the 34-ft elevation. Zone 17A is open to zone 8, which has an area of 744 ft^2, at the northeast end of the corridor.

The corridor has area-wide ionization detectors and ultra-violet detectors in the motor control center (MCC) area that annunciate in the control room. Fixed combustible materials in the compartment consist mainly of fully loaded cable trays in stacks extending from approximately 8 ft above the floor to the ceiling. Marinite boards to limit vertical cable fire spread separate some cable trays. However, no credit was taken for the marinite board mitigating fire propagation.

Significant Ignition Sources. The significant ignition sources in the area include the two lighting switchgear transformers (32 and 33) and their associated switchgear buses, the computer standby power cabinet, strip heater transformer 34, and a unit heater above the protective clothing storage area.

Transient fires may also be a source of exposure in this room. Transient combustibles in the PAB Corridor are expected to consist of typical maintenance materials.

Significant Targets. Significant targets in zone 17A are the three motor control centers (36A, 36B and 37), the lighting switchgear buses and transformers and cable trays and conduits overhead.

Analysis

Failure Modes and Assumptions

The assumptions and failure modes discussed in Section 4.5 were applied to analysis of the PAB corridor.

Shutdown Procedures. An exemption from Appendix R requirements was granted for the MCC area, based in part on an acceptable alternate safe-shutdown capability [7]. Operator response to fires in zone 17A is directed by procedures:

- ONOP-FP-1, Plant Fires,
- ONOP-FP-1C, Fire Area Evaluation
- ONOP-FP-24 - MCC Area Fires—PAB-2 (4)

Fire Scenarios

Case 1: Computer Standby Power Cabinet Fire

This fire scenario concerns a fire initiated in one of the computer standby power cabinets. The smaller power cabinet has louvered vents on the top, which could allow the plume from an internal electrical fire to emerge. The maximum heat release rate that could result was estimated as
65 Btu/sec. The cabinet is located 5 ft below the closest cable tray. As analysis shows that the critical height for damage from a 65 Btu/s fire located next to the wall is 5 ft. In the event of a severe fire in the computer power cabinet, the cables in the tray above could be exposed to temperatures of approximately 700°F from the fire plume. Cable damage and ignition are conservatively postulated. The temperature rise occasioned by hot gas layer effects in the corridor is not significant because of the large volume.

Case 2: Unit Heater Fire

The unit heater is located above the protective clothing storage area, outside the west wall of the radiation monitor room. It is mounted about 1-ft directly below a cable tray stack. The fire was analyzed as a 65 Btu/s electrical fire. Analysis results indicate that damage to the overhead tray stack could occur.

Case 3: Fire in the Strip Heater Transformer 34

This fire scenario is similar to Case 1. The strip heater transformer is located about 3 ft 6 in. directly beneath the lowest tray. The second and third trays are offset from the ignition source by about 2 ft. but could be damaged by secondary fire ignited in the lowest tray. No credit was taken for a thin marinite barrier beneath the lowest tray. However, damage in this location will be limited to the three trays and conduit on the wall above the transformer.

Cases 4A and 5A: Fires in Lighting Switchgear Buses 32 and 33

Analysis of fires occurring in the switchgear transformers (cases 4B and 5B) also applies to fires occurring in the switchgear buses. A fire in a switchgear bus is postulated to damage its associated transformer, but not the redundant transformer or bus.

Cases 4B and 5B: Fires in Lighting Switchgear Transformers 32 and 33

Fires in the lighting switchgear transformers were postulated to occur in the uppermost regions of the cabinet. This placed the fires at 7.5 feet above the floor, and 1-1/2 feet below the closest cable tray. Analysis shows that the critical height for damage from a 65 Btu/s fire located away from the wall is 3.8 ft. The tray directly above the transformer is postulated to be ignited by the transformer fire. A six-tray stack about 1 ft to the east of bus 33 and a four tray stack about 1 ft east of bus 32 are postulated to be damaged by radiant flux from the secondary cable tray fire. Because of the angle of incidence of the radiant flux, no credit was taken for marinite barriers in the tray stacks. It was also conservatively postulated that a fire in one of the transformers could result in damage to the adjacent transformer.

Cases 6A to 6E: Transient Fires

A transient fire in the PAB corridor might damage floor-based equipment, as well as junction boxes, electrical panels and conduit mounted along walls. Damage could occur within 6.8 feet of the floor if the fire occurs next to a wall, and within 5.1 ft of the floor for fires away from the walls. Damage to floor based equipment could occur within a radial distance of 2.1 feet of the fire. Cable trays throughout the zone are above the critical damage heights. The most risk-significant components are the MCCs, lighting switchgear buses, and transformers in the northwest corner of the 55-ft elevation corridor. Transient fires in the aisles between the electrical cabinets are expected to encompass most of the risk due to transient fires in this area. In addition, a transient fire in the protective clothing storage area could affect several overhead cable trays. The following transient fire scenarios were examined:

- Transient fire in the aisle between MCC 36B and MCC 37
- Transient fire in the aisle between MCC 37 and lighting switchgear bus 32
- Transient fire in the aisle between MCC 37 and lighting switchgear bus 33
- Transient fire in the aisle between MCC 37 and lighting switchgear transformers 32 and 33
- Transient fire propagating to protective clothing in the storage area.

Note that the aisle between MCC 36A and MCC 36B is about 5 $^1/_2$ feet wide. This width is sufficient to prevent a single fire involving transient combustibles in the aisle from damaging both MCCs.

__Conclusion__. The total CDF arising from fires the PAB corridor (zone 17A) was determined to be 3.17 x 10^{-8}/ yr. Details of the calculations are presented in Table 4.7.2.5. Even though the room contains multiple divisions, separation of combustibles is such that a single fire will not damage both divisions even without suppression.

Table 4.7.2.5

CDF Calculations for Fire Zone 17A (Primary Auxiliary Building (PAB) Corridor)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Suppression	Manual Non-Suppression	Area Ratio	CCDP	Non-Recovery	CDF (/year)
17A	1	Electrical fire at computer standby power cabinet	4.73E-05	1.20E-01	1.0	1.0	1.0	2.93E-05	1.0	1.66E-10
17A	2	Unit heater fire	3.88E-05	8.00E-02	1.0	1.0	1.0	5.30E-04	1.0	1.65E-09
17A	3	Electrical fire at the strip heater transformer	6.37E-05	1.00E-01	1.0	1.0	1.0	2.87E-05	1.0	1.83E-10
17A	4A	Electrical fire at the lighting switchgear bus 32	2.36E-04	1.20E-01	1.0	1.0	1.0	5.63E-04	1.0	1.59E-08
17A	4B	Electrical fire at the lighting switchgear transformer 32	6.35E-05	1.00E-01	1.0	1.0	1.0	5.63E-04	1.0	3.58E-09

Table 4.7.2.5 (continued)

CDF Calculations for Fire Zone 17A (Primary Auxiliary Building (PAB) Corridor)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Suppression	Manual Non-Suppression	Area Ratio	CCDP	Non-Recovery	CDF (/year)
17A	5A	Electrical fire at the lighting switchgear bus 33	2.84E-04	1.20E-01	1.0	1.0	1.0	2.94E-05	1.0	1.00E-09
17A	5B	Electrical fire at lighting switchgear transformer 33	6.35E-05	1.00E-01	1.0	1.0	1.0	5.30E-04	1.0	3.37E-09
		Total fixed ignition scenarios								**2.59E-08**
17A	6A	Transient fire in the aisle between MCC 36B and MCC 37	8.28E-05	6.50E-01	1.0	1.0	1.06E-02	3.29E-03	1.0	1.89E-09
17A		Welding/transient fire in the aisle between MCC 36B and MCC 37	1.97E-04	1.50E-01	1.0	1.0	1.06E-02	3.29E-03	1.0	1.04E-09

Table 4.7.2.5 (continued)

CDF Calculations for Fire Zone 17A (Primary Auxiliary Building (PAB) Corridor)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Suppression	Manual Non-Suppression	Area Ratio	CCDP	Non-Recovery	CDF (/year)
17A	6B	Transient fire in the aisle between MCC 37 and switchgear bus #32	8.28E-05	6.50E-01	1.0	1.0	3.76E-03	2.90E-03	1.0	5.87E-10
17A		Welding/transient fire in the aisle between MCC 37 and switchgear bus #32	1.97E-04	1.50E-01	1.0	1.0	3.76E-03	2.90E-03	1.0	3.22E-10
17A	6C	Transient fire in the aisle between MCC 37 and switchgear bus #33	8.28E-05	6.50E-01	1.0	1.0	3.76E-03	2.89E-03	1.0	5.85E-10
17A		Welding/transient fire in the aisle between MCC 37 and lighting switchgear bus #33	1.97E-04	1.50E-01	1.0	1.0	3.76E-03	2.89E-03	1.0	3.21E-10

Table 4.7.2.5 (continued)

CDF Calculations for Fire Zone 17A (Primary Auxiliary Building (PAB) Corridor)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Suppression	Manual Non-Suppression	Area Ratio	CCDP	Non-Recovery	CDF (/year)
17A	6D	Transient fire in the aisle between MCC 37 and transformers 32 & 33	8.28E-05	6.50E-01	1.0	1.0	3.76E-03	2.89E-03	1.0	5.85E-10
17A		Welding/transient fire in the aisle between MCC 37 and Transformers 32 & 33	1.97E-04	1.50E-01	1.0	1.0	3.76E-03	2.89E-03	1.0	3.21E-10
17A	6E	Transient fire in protective clothing storage area	8.28E-05	6.50E-01	1.0	1.0	1.03E-02	1.52E-04	1.0	8.45E-11
17A		Welding/transient fire in protective clothing storage area	1.97E-04	1.50E-01	1.0	1.0	1.03E-02	1.52E-04	1.0	4.64E-11
		Total Transient Scenarios								**5.77E-09**
		Total Zone 17A								**3.17E-08**

4.7.2.6 Fire Zone 23: Auxiliary Feedwater Pump Room

General Zone Description. The auxiliary feedwater pump room (Fire zone 23) is located on the 18-ft elevation of the auxiliary boiler feed pump building. The room is a fully enclosed compartment with a floor area of 1254 ft^2 and a ceiling height of 12 ft. Openings in the enclosure include a swinging door and a roll-up door which open to the outside and a swinging door, which opens to the adjacent main feedwater piping area. All doors are normally closed.

The ventilation system in the compartment consists of two exhaust fans above the door on the south end of the compartment and a pneumatically controlled louver, on the north wall, which permits outside air to be drawn into the compartment.

The room has area-wide wet pipe sprinklers and ionization smoke detectors, which annunciate in the control room. The room has a very low fire hazard as fixed combustible materials in the compartment are limited to four lightly loaded cable trays located approximately 11 ft above the floor, and a small amount of oil contained in the bearings of the three pumps.

Significant Ignition Sources. The significant ignition sources in the room include the three pumps with bearing oil inventories, two unit heaters, a ventilation fan and potential transient ignition sources.

Fires at an AFW pump could be initiated by the electric motor or by a bearing failure releasing and igniting oil. Adjacent equipment and overhead cables could be damaged.

Two unit heaters are suspended approximately 1.5 ft below two cable trays. Fires at the heater fan motors might damage the trays.

Exhaust fan 311 is close to an overhead cable tray and represents a potential source of exposure to the cables.

Transient fires may also be a source of exposure in this room. Transient combustibles in this compartment are expected to consist of typical maintenance materials.

Significant Targets. Significant targets in the room are the AFW pumps, the AFW flow control valves, ventilation fans, a ventilation louver, and cables in conduits, panels and overhead trays associated with those components.

Motor-driven AFW pumps 33 and 31 are located in the north end and center regions (respectively) of the compartment. Power cables to pump 33 are located within vertical conduits that enter through the ceiling in the vicinity of the pump. Power cables to pump 31 are located in vertical conduits entering through the floor immediately adjacent to the pump. Control cables enter through the south wall at about the elevation of the cable trays and then traverse horizontally, dropping down directly from above each pump. The pump motors themselves are also considered to be targets, which could be damaged by fire.

Steam driven AFW pump 32 is located toward the south end of the compartment. Automatic and manual pump control is localized at the pump.

Two sets of four pneumatic AFW flow control valves are located in the room. One set (FCV-406A/B/C/D) is at the north end of the room and the other set (FCV-405A/B/C/D) is near the south end. The valves have electrical controls but can be operated manually. The cables to the valves run in the trays overhead.

The ventilation system comprises exhaust fan units 311 and 312, which are powered from the lighting panel 324. Room temperature sensors control the fans. The fans are located above the door on the south wall, and the lighting panel is mounted on the east (near containment) wall. The louver and its pneumatic operator are located on the north wall close to the floor.

Analysis

Failure Modes and Assumptions

- The motor-driven AFW pump motors fail at 160°F (their environmental qualification temperature). The pumps are not susceptible to temperature damage.
- The turbine driven AFW pump fails when a steam isolation heat detector, located approximately 8 ft directly above the pump, senses 130°F and isolates the steam supply to the turbine.
- Oil reservoirs for the motor-driven AFW pump bearings were field-estimated to contain 1 pint of oil per pump bearing. The pump bearing nearest the motor is located above a 2-ft^2 bermed area; the outboard bearing is outside the berm and could give rise to an unconfined spill. The motor bearings are grease lubricated and assumed not to represent a fire hazard.
- Oil reservoirs for the turbine-driven AFW pump bearings were field estimated to contain 1 quart per bearing. One reservoir is located at the north end of the turbine outside the bermed area and the other is on the south end of the pump within a bermed area of approximately 2 ft^2.
- Unconfined oil spills are assumed to occur on a perfectly flat floor, conservatively ignoring the effects of floor drains in the room to remove the oil.

Shutdown Procedures. An exemption from Appendix R requirements was granted for the AFW pump room, based in part on the availability of manual actions. Operator response to fires in the auxiliary feedwater pump room is directed by procedures:

- ONOP-FP-1, Plant Fires
- ONOP-FP-1C, Fire Area Evaluation
- ONOP-FP-60, Auxiliary Feedwater Pump Room Fires – Fire Zone 23
- FP-29, Appendix R Supplemental Ventilation.

Operator actions were credited, as appropriate, in determining the CDF contribution for each fire scenario evaluated for the compartment.

Fire Scenarios

Case 1: Fire at Motor-Driven AFW Pump Bearing

This fire scenario entails an oil fire at one of the motor-driven AFW pump bearings. The limiting case occurs as a result of an unconfined spill and ignition of 1 pint of oil. (A spill confined between the pump and motor will not damage any targets.) Since the configuration of motor-driven pumps 31 and 33 is identical, this scenario evaluates spills at the south end of either pump. The fire resulting from an unconfined spill of 15 ft^2 and a radius of 4.5 ft yields an overhead cable tray exposure temperature of approximately 1200°F. The analysis demonstrates that the minimum time-to-damage for the cable is 5 seconds and sprinkler actuation is calculated to occur at 20 seconds. If the sprinklers actuate, localized damage could occur but the fire will not propagate to the cable trays and the compartment temperatures are limited to 100°F. However, if the sprinklers fail to actuate, the fire could propagate. The ensuing tray fire could result in compartment temperatures above 700°F within approximately 10 minutes. Consequently, no credit was taken for brigade response.

If the fire occurs at AFW pump 33, localized damage could include loss of AFW pumps 31 and 33, one train of FCVs (FCV 406-A/B/C/D), and overhead cables. If the sprinklers fail to actuate and the cable trays become involved, all electrical equipment in the compartment could be damaged. The turbine-driven pump should remain operable, although control power to the turbine driven pump and the flow control valves could be lost.

If the fire occurs at AFW pump 31, localized damage could include loss of AFW pumps 31 and 33 and overhead cable trays. If the sprinklers fail to actuate and the cable trays become involved, all electrical equipment in the compartment could be damaged. Again, the turbine-driven pump should remain operable, although control power to the turbine-driven pump and flow control valves may be lost.

In this scenario, no credit was taken for room ventilation reducing air temperatures. If the sprinklers actuate, room heat-up is expected to be minimal. Furthermore, localized equipment damage can be recovered through manual actions. If the sprinklers fail to actuate HVAC system components may be damaged. In this case recovery actions to restore failed equipment may entail restoring room ventilation through alternative means.

Case 2: Fire at Turbine-Driven AFW Pump Bearing

This fire scenario concerns an unconfined oil fire at the north end turbine bearing. As was the case with the confined spill scenario evaluated for the motor-driven pumps, a spill and fire at the south end of the turbine driven pump will not damage any targets.

The scenario involves an unconfined oil spill of surface area 30 ft^2 with a damage radius of 11 ft. The ignition of this spill may result in temperatures at the cable trays above in excess of 700°F with cable damage within 1 second and sprinkler actuation at approximately 12 seconds. If the sprinklers actuate, localized damage could occur but the fire will not propagate to the cable trays and the compartment temperatures are limited to 111°F. However, if the sprinklers fail to actuate the fire could propagate. The ensuing tray fire could result in room temperatures above 700°F in less than 10 minutes. Consequently, no credit was taken for brigade response.

Localized damage could include loss of AFW turbine-driven pump 32, PCV-1139 and overhead cables. If the sprinklers fail to actuate and the cable trays become involved, all electrical equipment in the compartment could be damaged. The turbine-driven pump is assumed not to be recoverable. While power to at least one motor-driven pump should be unaffected, control power to the pumps and the flow control valves may be unavailable.

As with Case 1, no credit was taken for room ventilation reducing air temperatures. If the sprinklers actuate, room heat-up is expected to be minimal and localized equipment damage can be recovered through manual actions. If the sprinklers fail to actuate, damage to circuits and equipment could include components of the HVAC system. In this case, proceduralized recovery actions to restore failed equipment include restoring room ventilation by opening the roll-up door.

Case 3: Fire at Unit Heaters

This fire scenario concerns a fire initiated in one of the unit heaters mounted approximately 1.5 ft below two overhead cable trays.

In the event of a heater fire, cables in the overhead tray could be exposed to temperatures in excess of 700°F. Damage to the cables is calculated to occur within 27 seconds and the sprinkler response time is 53 seconds. Damage to the cables in the tray directly overhead is therefore postulated. Cable ignition is also postulated, since the cable temperature is above its ignition temperature, but the ensuing fire will be of very limited duration if the sprinklers actuate. The maximum temperature in the upper structure of the room (i.e., above the elevation of the tray fire) is 156°F, if the sprinklers fail to actuate; if the sprinklers actuate, the maximum temperature is 98°F. Therefore, damage resulting from this scenario is limited to cables in the tray directly over the heaters regardless of when suppression occurs.

Case 4: Ventilation Fan Fire

The analysis described for Case 3 also applies to fires at the ventilation fan. Damage will be limited to the tray adjacent to the fan regardless of when suppression occurs.

Case 5: Transient Fire

A transient fire might damage equipment at several locations in the room. However, because of the spatial separation of equipment, damage from any single fire will be localized and limited to no more than two components. The following transient fire scenarios are expected to bound the risk due to transient fires in the compartment:

- A single fire might damage AFW pump 33 and the ventilation louver on the north end of the room. However, the other two AFW pumps will remain available as well as all AFW FCVs. Operator action may be required to restore ventilation.
- A transient fire directly below lighting panel 324 may cause a loss of power to the room ventilation system. Loss of room ventilation could eventually impact the operation of the AFW pumps.
- A transient fire adjacent to the AFW local control panel could impact the AFW pumps.
- A transient fire adjacent to two of the AFW FCVs.

No credit was taken for automatic suppression in the transient scenarios. However, credit was taken for the fire being suppressed in its incipient stages, either by workers present or by a firewatch during welding activities.

Conclusion. The total CDF arising from fires in the auxiliary feedwater pump room Fire Zone 23 was calculated to be 2.29×10^{-7}/yr. This contribution has been determined using conservatively estimated CCDPs. Details of the calculations are provided in Table 4.7.2.6.

Table 4.7.2.6

CDF Calculations for Fire Zone 23 (Auxiliary Feedwater Pump Room)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Suppression	Manual Non-suppression	Area Ratio	CCDP	Non Recovery	CDF (/year)
AFW-6	1A	AFW Pump 33 fire:								
		Auto suppression succeeds; room heatup is prevented. Localized damage: loss of AFW 33 & 31, one train of FCVs, overhead cable trays.	3.11E-04	0.20	0.98	1.00	1.0	5.30E-04 [1]	1.0	3.23E-08
		Auto suppression fails; room heat-up to critical levels. Localized damage as above, plus loss of all electrical components and cables in the room, incl HVAC.	3.11E-04	0.20	0.02	1.00	1.0	1.59E-02	1.0	1.98E-08

Table 4.7.2.6 (continued)

CDF Calculations for Fire Zone 23 (Auxiliary Feedwater Pump Room)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Suppression	Manual Non-suppression	Area Ratio	CCDP	Non Recovery	CDF (/year)
	1B	AFW Pump 31 fire:								
		Auto suppression succeeds; room heatup is prevented. Localized damage: loss of AFW 33 & 31, overhead cable trays.	3.11E-04	0.20	0.98	1.00	1.0	5.30E-04	1.0	3.23E-08
		Auto suppression fails; room heat-up to critical levels. Localized damage as above, plus loss of all electrical components and cables in the room, including HVAC.	3.11E-04	0.20	0.02	1.00	1.0	1.59E-02	1.0	1.98E-08

Table 4.7.2.6 (continued)

CDF Calculations for Fire Zone 23 (Auxiliary Feedwater Pump Room)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Suppression	Manual Non-suppression	Area Ratio	CCDP	Non Recovery	CDF (/year)
	2	AFW Pump 32 fire:								
		Auto suppression succeeds; room heatup is prevented. Localized damage to AFW #32, PCV-1139 and overhead cables. TDP is not recoverable. Power to MDPs undamaged, but control may be unavailable. Manual start of the TDP and local operation of both trains of FCVs should be possible.	3.11E-04	0.20	0.98	1.00	1.0	1.59E-02	0.1 [2]	9.69E-08

Table 4.7.2.6 (continued)

CDF Calculations for Fire Zone 23 (Auxiliary Feedwater Pump Room)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Suppression	Manual Non-suppression	Area Ratio	CCDP	Non Recovery	CDF (/year)
		Auto suppression fails; room heat-up to critical levels. Local damage as above, plus loss of all electrical components and cables in the room, including HVAC. TDP not recoverable. Power to AFW 31and 33 avail, but control power probably lost.	3.11E-04	0.20	0.02	1.00	1.0	1.59E-02	1.0	1.98E-08
	3	Space Heater Fire. Localized damage to overhead cable trays.	7.76E-05	0.08	1.00	1.00	1.0	5.30E-04 [1]	1.0	3.29E-09
	4	Ventilation fan fire. Localized damage to overhead cable trays; loss of HVAC.	7.76E-05	0.08	1.00	1.00	1.0	5.30E-04 [1]	1.0	3.29E-09

Table 4.7.2.6 (continued)

CDF Calculations for Fire Zone 23 (Auxiliary Feedwater Pump Room)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Suppression	Manual Non-suppression	Area Ratio	CCDP	Non Recovery	CDF (/year)
	5	Transient fires	8.28E-05	0.65	1.00	1.00	0.0	5.30E-04 [1]	1.0	6.82E-10
		Transient/welding fires	1.97E-04	0.15	1.00	1.00	0.0	5.30E-04 [1]	1.0	3.13E-10
		Total Zone 23								**2.28E-07**

[1] – This probability is a bounding value. It credits only the availability of bleed-and-feed cooling and the recovery of ventilation by opening the roll-up door. It is credited only for those cases where room heatup due to the fire is expected to be minimal, and at least one AFW path is unaffected by the fire.

[2] – This probability is a screening valve for post-fire recovery actions taken to restore ventilation by opening the roll-up door as well as locally starting one motor-driven pump (31 or 33) and manually operating the associated flow control valves.

4.7.2.7 Fire Zones 60A and 7A: Upper and Lower Electrical Tunnels

General Zone Description. The upper and lower electrical tunnels are fire zones 60A and 7A, respectively. The tunnels run from the cable spreading room in the control building to the containment cable penetration areas. The lower cable tunnel, fire zone 7A, has a floor area of 2975 ft^2 with a ceiling height of between 8 and 9 ft. The upper cable tunnel, fire zone 60A has a floor area of 3200 ft^2 with a ceiling height of between 9 and 10 ft. At the entrance to the tunnel from the cable spreading room, there is a single tunnel approximately 10 ft wide and 18 ft tall. This tunnel entrance area is approximately 20 ft long and is considered part of the lower tunnel. Beyond the tunnel entrance, the upper and lower tunnels are separated by a floor/ceiling comprising 1-ft thick concrete with no openings. The barrier is not a rated but is adequate to prevent fire propagating from one tunnel to the other. All cable trays and conduits entering the tunnels from the control building pass through this tunnel entrance area.

There are four separate pre-action sprinkler systems (individual valves and heat detection systems) in the trays. One system protects the trays along each wall of the tunnels with heads at 10-ft intervals in the cable trays. Four separate heat detector systems (one for each pre-action system) are located in the trays with individual detectors at approximately 20-ft intervals. The zones also have area wide ionization detectors and CO_2 fire extinguishers. In addition, a hose station is present in the control building.

Significant Ignition Sources. There are no fixed ignition sources in these fire zones. Only fires resulting from transient combustibles are of concern.

Significant Targets. The two stacks of cable trays in each electrical tunnel represent significant targets. The tray stacks are separated into the four electrical channels, with channels I and II in the upper cable tunnel and channels III and IV in the lower cable tunnel. Each tray stack contains cable from one of the four channels. All four channels pass through the tunnel entrance area of the lower tunnel. The trays may be damaged and ignited by a floor-based transient fire.

Analysis

Shutdown Procedures. Operator response to fires in the cable tunnels is directed by procedures:

- ONOP-FP-1, Plant Fires
- ONOP-FP-1C, Fire Area Evaluation
- ONOP-FP-41, Electrical Tunnel Entrance Fires - ETN-4 (1A) and ETN-4 (1B)
- ONOP-FP-42, Upper Electrical Tunnel Fires - ETN-4 (2)
- ONOP-FP-44, Lower Electrical Tunnel and Penetration Area Fires- ETN-4 (4)

Fire Scenarios. The only credible type of fire in the tunnels is a transient fire, which damages exposed cables in the trays. The physical arrangement of the trays in the tunnels is essentially the same along the length of the both tunnels. A vertical stack of horizontal ladder-back trays run from floor to ceiling. The trays are spaced approximately 1 ft apart and are located along the outside walls of the tunnels with a 4-ft wide walkway separating them.

One fire scenario was analyzed in detail to determine the timing and extent of fire damage. To determine the specific targets that could be damaged in the tunnels, this one typical scenario was evaluated at a representative location in the upper tunnel, the lower tunnel and the tunnel entrance area.

Case 1: Fire in Zone 7A

The fire scenario entails a floor-based transient fire ignited by a transient ignition source. Analyses show that a single fire in the middle of the walkway between the tray stacks, with a heat release rate of 138 Btu/s, is energetic enough to damage and ignite cable on both sides of the tunnel prior to sprinkler actuation. If the fire is located more than 2.1 ft from one of the tray stacks, then it will initially damage and ignite cable trays only on one side of the tunnel.

When a heat release rate of 500 Btu/s is reached, the fire has a critical radial distance of 4 ft which is just large enough to damage the trays on the other side of the tunnel. This heat release rate is roughly equivalent to burning 27 sq. ft of cable tray. This fire damages all the cables in the first tray stack, actuates both pre-action sprinkler systems in approximately 80 seconds, and, without sprinkler actuation, damages cable on the other side of the tunnel in approximately 135 seconds.

In summary, a fire located in the middle of the walkway will cause a loss of all cables in the tunnel. A fire occurring adjacent to one stack of trays will ignite and damage those trays. If the suppression system works, it will actuate within 80 seconds and prevent damage to the cables in trays on the other side of the tunnel. If the suppression fails, cables in the trays on the other side of the tunnel will also be damaged resulting in loss of all cables in the tunnel.

Case 2 : Fire in Zone 7A, Tunnel Entrance Area

The physical arrangement of cable trays and suppression systems in the tunnel entrance area is similar to the individual tunnels. However, the tray stacks are taller and the walkway between the tray stacks is approximately 6 ft wide instead of 4 ft. A fire located in the middle of the walkway will not damage or ignite cables on both sides of the tunnel. A fire located within 2.1 ft of a tray stack will damage and ignite cables in that stack. If suppression works, it will actuate the cables in trays on the other side of the tunnel. If suppression fails, cables in the trays on the other side of the tunnel will also be damaged, resulting in a loss of all cables in the tunnel.

Case 3: Fire in Zone 60A

That portion of zone 60A, which is separate from the lower tunnel (zone 7A), has essentially the same configuration as the lower tunnel. Therefore, they have similar transient fire scenarios.

__Conclusion__. The CDFs arising from fires in the electrical tunnels are 2.78×10^{-7}/yr for the lower cable tunnel (fire zone 7A) and 7.14×10^{-7}/yr for the upper cable tunnel (fire zone 60A). Details of the calculations are presented in Table 4.7.2.7. IP3 has two, upper and lower electrical tunnels that are connected in the entrance area of the cable spreading room. Upper electrical tunnel (Zone 60A) and the entrance area contains circuits that if damaged by fire can impact multiple means of safe shutdown. However, the risk involving these fires is low because the transient fires have to be specifically located within these fire zones (about 15% of the floor area of the two tunnels.) Also automatic suppression in the zones is capable of limiting damage to two (out of four) channels. The assumption of uniform distribution of transients (Section 4.5) implies that it is equally likely for transient fires to occur under stacks of cable trays next to the walls as it is in the middle of the room.

Table 4.7.2.7

CDF Calculations for Fire Zones 60A (Upper Electrical Tunnel) and 7A (Lower Electrical Tunnels)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Supression	Manual Non-suppression	Area Ratio	CCDP	Non Recovery	CDF (/year)
7A	1A	Transient fire affecting Ch. IV stack. - transients	7.45E-05	1.0	0.98	0.65	0.35	5.27E-04	1.0	8.75E-09
		Transient fire affecting Ch. IV stack. - welding	1.97E-04	1.0	0.98	0.15	0.35	5.27E-04	1.0	5.34E-09
	1B	Transient fire affecting Ch. III stack. - transients	7.45E-05	1.0	0.98	0.65	0.35	5.81E-04	1.0	9.65E-09
		Transient fire affecting Ch. III stack. - welding	1.97E-04	1.0	0.98	0.15	0.35	5.81E-04	1.0	5.89E-09
	1C	Transient fire affecting all Ch. III and IV cables. - transients	7.45E-05	1.0	0.02	0.65	0.3	5.92E-04	1.0	1.72E-10
		Transient fire affecting all Ch. III and IV cables. -welding	1.97E-04	1.0	0.02	0.15	0.3	5.92E-04	1.0	1.05E-10
	1D	Transient fire affecting all Ch. III and IV cables. - transients	7.45E-05	1.0	1.0	0.65	0.3	5.92E-04	1.0	8.60E-09

Table 4.7.2.7 (continued)

CDF Calculations for Fire Zones 60A (Upper Electrical Tunnel) and 7A (Lower Electrical Tunnels)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Supression	Manual Non-suppression	Area Ratio	CCDP	Non Recovery	CDF (/year)
		Transient fire affecting all Ch. III and IV cables. -welding	1.97E-04	1.0	1.0	0.15	0.3	5.92E-04	1.0	5.25E-09
	2A	Transient fire in the tunnel entrance area affecting all Ch. I and III cables- transients	7.45E-05	1 0	0.98	0.65	0.02	0.1	1.0	9.49E-08
		Transient fire in the tunnel entrance area affecting Ch. I and III cables- welding	1.97E-04	1.0	0.98	0.15	0.02	0.1	1.0	5.79E-08
	2B	Transient fire in the tunnel entrance area affecting Ch. II and IV cables- transient	7.45E-05	1.0	0.98	0.65	0.02	2.04E-03	1.0	1.94E-09
		Transient fire in the tunnel entrance area affecting all Ch. II and IV cables- welding	1.97E-04	1.0	0.98	0.15	0.02	2.04E-03	1.0	1.18E-09

Table 4.7.2.7 (continued)

CDF Calculations for Fire Zones 60A (Upper Electrical Tunnel) and 7A (Lower Electrical Tunnels)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Supression	Manual Non-suppression	Area Ratio	CCDP	Non Recovery	CDF (/year)
	2C	Transient fire in the tunnel entrance area affecting Ch.I, II, III and IV cables- transients	7.45E-05	1.0	0.02	0.65	0.05	1.0	1.0	4.84E-08
		Transient fire in the tunnel entrance area affecting Ch.I, II, III and IV cables-welding	1.97E-04	1.0	0.02	0.15	0.05	1.0	1.0	2.96E-08
		Total Zone 7A								**2.78E-07**
60A	3A	Transient fire affecting Ch. II stack - transients	7.45E-05	1.0	0.98	0.65	0.35	5.05E-04	1.0	8.39E-09
		Transient fire affecting Ch. II stack - welding	1.97E-04	1.0	0.98	0.15	0.35	5.05E-04	1.0	5.12E-09
	3B	Transient fire affecting Ch. I stack - transients	7.45E-05	1.0	0.98	0.65	0.35	9.55E-03	1.0	1.59E-07
		Transient fire affecting Ch. I stack - welding	1.97E-04	1.0	0.98	0.15	0.35	9.55E-03	1.0	9.68E-08

Table 4.7.2.7 (continued)

CDF Calculations for Fire Zones 60A (Upper Electrical Tunnel) and 7A (Lower Electrical Tunnels)

Zone	Case	Description	Ignition Frequency (/year)	Severity Factor	Auto Non-Supression	Manual Non-suppression	Area Ratio	CCDP	Non Recovery	CDF (/year)
	3C	Transient fire affecting all cables channel I and II - transients	7.45E-05	1.0	0.02	0.65	0.35	1.86E-02	1.0	6.30E-09
		Transient fire affecting all cables channel I and II- welding	1.97E-04	1.0	0.02	0.15	0.35	1.86E-02	1.0	3.85E-09
60A	3D	Transient fire affecting all cables channel I and II - transients	7.45E-05	1.0	1.0	0.65	0.3	1.86E-02	1.0	2.70E-07
		Transient fire affecting all cables channel I and II- welding	1.97E-04	1.0	1.0	0.15	0.3	1.86E-02	1.0	1.65E-07
		Total Zone 60A								**7.14E-07**
		Total For Zones 7A, 60A								**9.92E-07**

4.7.3 Multi-Compartment Analysis

The multi-compartment analysis evaluates the risk arising from the propagation of fire between zones. Such propagation may increase risk beyond that anticipated for fires within single zones by failing additional equipment and so increasing the predicted core damage frequency. Furthermore, as a result of propagation the frequencies of fires in zones to which fire propagate may be significantly higher than the ignition frequencies for those zones.

4.7.3.1 Method

In this methodology the potential for fire propagation from one zone to another, including propagation through or across rated fire barriers, is evaluated for all fire zones, including those screened out in the single compartment analysis. The probabilities of fire propagation across zone boundaries and fire suppression are treated probabilistically, using generic probabilities that account for the type of boundary and fire suppression.

The first step in the multi-compartment analysis was a screening evaluation to identify combinations of zones for which the product of the fire ignition frequency (listed in Table 4.4.4.2) and the propagation probabilities exceed 10^{-7}/yr. This screening analysis entailed the examination of each fire zone in turn, treating this fire zone as the zone in which ignition occurs. If the maximum CCDP associated with fire in that zone (as listed in Table 4.4.4.2) is 1.0 and no credit was taken for recovery actions in scenarios for which the CCDP is 1.0 in the single zone analysis (Section 4.7.2), then propagation from that zone was not considered further as it will not exacerbate the incident. Accordingly, fire propagation from the upper electrical tunnel (fire zone 60A) was not considered further in the multi-compartment analysis.

For each of the other fire zones, the spread of fire to adjacent zones by all possible propagation paths was considered and the combined frequencies of ignition and propagation were calculated. The propagation probabilities listed in Table 4.7.3.1 were applied. This iterative process of developing feasible propagation paths from zones in which ignition occurs that satisfy the screening criterion was continued until the 10^{-7}/yr criteria for product of ignition frequency and propagation probabilities were no longer exceeded. Credit was then taken for automatic fire suppression (it was assumed that successful discharge of auto suppression would halt the propagation of fire to the next zone). To account for suppression, non-suppression probabilities were applied where appropriate and again all fire zone combinations with a frequency $< 10^{-7}$/yr were screened out.

Finally, the equipment lost in the multi-compartment fires was identified and conditional probabilities for core damage were calculated and applied to the multi-compartment fire frequencies. The contributions of multi-compartment fires to the core damage frequency could then be calculated.

Table 4.7.3.1
Fire Propagation Probabilities For Specific Fire Barrier Types

Barrier Type	Propagation Probability	Comments
No barrier	1.0	Conservative assumption that fire propagates with probability 1.0 for a no barrier case. A walkdown analysis may lead to a lower propagation probability.
Stairwell (fire propagation to zone above)	0.1	Conservative estimate of fire damage caused by rising of hot gas layer.
Stairwell (fire propagation to zone below)	0.0	Fire assumed not to propagate downwards.
Wall (full, non-fire rated, with doors)	0.008	Value for door failure from Reference 3.
Wall (full, non-fire rated, with open passage)	0.5	Solid concrete walls surrounding zone prevent the propagation of fire. Generic value of 0.5 used for propagation across a corridor, or open door, based on probable location of combustibles.
Wall (full, non-fire rated, complete enclosure)	0.0	Solid concrete walls completely surrounds the zone and the propagation of fire is assigned a probability of 0.0.
Wall (full, non-fire rated, ¾ height walls, tunnels)	0.1	Solid concrete walls surrounding zone prevent the propagation of fire. Propagation of fire through passages smaller than doors estimated at 0.1.
Wall (full, 3 hour fire rated, with doors)	0.008	Value for door failure from Reference 3.
Wall (full, 3 hour fire rated, with open passage)	0.5	Same as for non-fire rated wall.
Wall (full, 3 hour fire rated, complete enclosure)	0.0	Same as for non-fire rated wall.
Wall (full, 3 hour fire rated, partial enclosure)	0.1	Same as for non-fire rated wall.
Floor (open passage to zone above)	1.0	Fire damage caused by rising hot gas layer.

Table 4.7.3.1 (continued)
Fire Propagation Probabilities For Specific Fire Barrier Types

Barrier Type	Propagation Probability	Comments
Floor (open passage to zone below)	0.0	No fire damage—hot gas layer rises.
RHR 31 pump room to intermediate bay	0.05	Estimate based on height and position of wall, the lack of transient combustibles in RHR pump room and minimal fixed combustibles.
RHR 31 pump room to RHR 32 pump room	0.01	Estimate based on geometry of zones and lack of transient combustibles in area.
Floor (solid concrete with no openings)	0.0	No fire damage from rising of hot gas layer .
Damper	0.0027	Value from ERPI Fire Implementation Guide[3]

4.7.3.2 Assumptions

The following assumptions were made in the analysis:

- Fire zones inside containment are not addressed.
- The probability of multiple independent fires occurring simultaneously is negligible.
- Although a fire occurring in a zone having no essential cables may not impact the conditional core damage probability, fire propagation out of that zone is to be considered.
- The probabilities of fire propagation across barriers are listed in Table 4.7.3.1.
- Where credit was taken for suppression in preventing the propagation of fire from one zone to another, the probabilities of failure of automatic and manual fire suppression used are those described in Section 4.6.2. However, manual actuation of a CO_2 system was considered equivalent to manual recovery of automatic suppression systems and an unavailability of 0.3 was assigned.
- When examining the propagation of fire into fire zone 17A, the PAB corridor, propagation from one end of the corridor to the other was judged unlikely and thus damage to equipment resulting from propagating fires entering this fire zone depended on which end of the zone the fire entered.

4.7.3.3 Results

The results of the fire analysis for multi-compartment fires are presented in Table 4.7.3.2. Only a single multi-compartment fire contributed more than 10^{-6}/yr to the CDF. This fire involves ignition in the 480-V switchgear room (fire zone 14) and propagation through a failed door or damper to the south turbine building (fire zone 37A). Hot gases propagating into zone 37A could activate the wet pipe sprinkler system and subsequent a damage bus 312. Regardless of the likelihood of water damage, the hot gases and smoke egressing from the switchgear room were judged to make safe shutdown from zone 37A difficult. As a result, no credit was taken for shutdown outside the control room. The fire results in a loss of on- and off-site power to 480-V safeguard buses and safe shutdown equipment (ie, AFW pumps, charging pumps, CCW pumps, SW pumps 31 through 36, diesel generators, high head pumps, low head pumps, and bus 312). Unable to align the Appendix R safe shutdown equipment from the Appendix R diesel generator, core damage results.

The results from the multi-compartment fire analysis are consistent with the plant design and the results of the single zone analysis. While plants with complete train separation typically have low single-zone contributions to the CDF and comparable multi-zone contributions to the CDF, limited separation in the cable spreading room, electrical tunnels, and switchgear rooms at IP3 results in fires in these zones dominating the fire-induced contributions to the CDF.

Table 4.7.3.2

Results of Multi-Compartment Fire Analysis

Fire Ignited In Zone	Fire Propagation To Zones	Barrier Failure Probability	Ignition Frequency (/yr)	Probability Non-supression	CCDP	Contribution to CDF (/yr)
14	37A	1.07E-02	4.20E-04	1.0	1.00E+00	4.49E-06
11	43A	1.61E-02	1.43E-03	0.02	1.50E-01	6.91E-08
12A, 14A	17A	0.1	1.46E-03	1.0	2.89E-03	4.22E-07
16, 17, 41A, 18, 42A	-	1.0	4.72E-03	1.0	2.96E-05	1.40E-07
52A	57A	1.0	6.43E-04	1.0	1.61E-04	1.04E-07
55A	22	0.1	6.47E-03	1.0	1.24E-04	8.02E-08
10	101A	7.94E-03	2.93E-02	1.0	1.80E-04	4.19E-08
40A, 39A, 21, 38A, 37A	-	1.0	1.49E-02	0.02	1.28E-04	3.81E-08
101A	10	7.94E-03	2.61E-02	1.0	1.80E-04	3.73E-08
101A	102A	7.94E-03	2.61E-02	1.0	1.80E-04	3.73E-08
102A	101A	7.87E-03	2.61E-02	1.0	1.80E-04	3.70E-08
74A	7A	3.00E-02	1.11E-04	1.0	1.06E-02	3.53E-08
4A	17A	0.1	8.87E-05	1.0	2.89E-03	2.56E-08
20A	17A	8.00E-03	9.10E-04	1.0	2.89E-03	2.10E-08
21A	17A	8.00E-03	8.21E-03	1.0	1.52E-04	9.99E-09
91A, 90A	88A	8.00E-03	9.40E-03	1.0	1.25E-04	9.40E-09
8	17A	1.0	2.64E-04	1.0	2.83E-05	7.47E-09
128	17A	8.00E-03	2.80E-04	1.0	2.89E-03	6.48E-09
8A	4A, 17A, 9, 6A	8.00E-04	1.69E-03	1.0	2.89E-03	3.91E-09
11A	4A, 17A, 9, 6A	8.00E-04	9.03E-04	1.0	2.89E-03	2.09E-09
5	17A	8.00E-03	1.51E-03	1.0	1.52E-04	1.84E-09
18A	17A	8.00E-03	1.31E-03	1.0	1.52E-04	1.60E-09
16A	12A, 14A, 4A, 17A, 9, 6A	8.00E-04	5.92E-04	1.0	2.89E-03	1.37E-09
53A	57A	9.92E-02	8.34E-05	1.0	1.61E-04	1.33E-09

Table 4.7.3.2 (continued)

Results of Multi-Compartment Fire Analysis

Fire Ignited In Zone	Fire Propagation To Zones	Barrier Failure Probability	Ignition Frequency (/yr)	Probability Non-supression	CCDP	Contribution to CDF (/yr)
107	17A	8.00E-03	5.35E-03	1.0	2.83E-05	1.21E-09
53A	52A	7.20E-03	8.34E-04	1.0	1.61E-04	9.67E-10
9A	17A	8.00E-04	3.56E-04	1.0	2.89E-03	8.24E-10
6A	4A, 17A	8.00E-04	3.18E-04	1.0	2.89E-03	7.36E-10
13A	4A, 17A, 9, 6A	8.00E-04	3.13E-04	1.0	2.89E-03	7.24E-10
15A	12A, 14A, 4A, 17A, 9, 6A	8.00E-04	2.80E-04	1.0	2.89E-03	6.48E-10
9	4A, 17A	8.00E-04	2.67E-04	1.0	2.89E-03	6.17E-10
5	6	9.92E-02	1.43E-04	1.0	2.96E-05	4.20E-10
6	5	9.92E-02	1.43E-04	1.0	2.96E-05	4.20E-10
10	101A,102A	6.40E-05	2.93E-02	1.0	1.80E-04	3.38E-10
7	17A	8.00E-03	2.64E-04	1.0	1.52E-04	3.21E-10
12A, 14A	10A	7.08E-03	1.46E-03	1.0	3.06E-05	3.17E-10
10A	12A, 14A	7.20E-03	1.43E-03	1.0	3.06E-05	3.15E-10
101A	10, 102A	6.40E-05	2.61E-02	1.0	1.80E-04	3.01E-10
128	88A	7.94E-03	2.80E-04	1.0	1.25E-04	2.78E-10
4	69A	4.95E-02	1.43E-04	1.0	2.96E-05	2.10E-10
3	69A	4.70E-02	1.48E-04	1.0	3.00E-05	2.09E-10
3	9A	4.66E-02	1.48E-04	1.0	2.89E-05	2.00E-10
6	17A	8.00E-03	1.43E-04	1.0	1.52E-04	1.74E-10
69A	4	4.75E-02	8.34E-05	1.0	2.96E-05	1.17E-10
69A	3	4.51E-02	8.34E-05	1.0	3.00E-05	1.13E-10
54A	23, 53A, 57A	8.00E-05	8.34E-05	1.0	1.59E-02	1.06E-10
19A	17A	8.00E-03	8.34E-05	1.0	1.52E-04	1.01E-10
36A	35A	7.14E-03	2.62E-04	1.0	4.52E-05	8.46E-11
6A	4A	7.20E-03	3.18E-04	1.0	2.97E-05	6.80E-11

Table 4.7.3.2 (continued)

Results of Multi-Compartment Fire Analysis

Fire Ignited In Zone	Fire Propagation To Zones	Barrier Failure Probability	Ignition Frequency (/yr)	Probability Non-supression	CCDP	Contribution to CDF (/yr)
10A	12A, 14A, 4A, 17A, 9, 6A	8.00E-04	2.83E-05	1.0	2.89E-03	6.54E-11
4A	6A	7.14E-03	8.87E-05	1.0	2.97E-05	1.88E-11
36A	35A	1.51E-03	2.62E-04	1.0	4.52E-05	1.79E-11
53A	52A, 57A	8.00E-04	8.34E-05	1.0	1.61E-04	1.07E-11
4A	9, 6A	5.76E-05	8.87E-05	1.0	1.25E-04	6.39E-13

4.7.4 CONTROL ROOM ANALYSIS (ZONE 15)

4.7.4.1 Introduction

The methodology described in the EPRI Fire PRA Implementation Guide [3] was used to analyze control room fires at IP3. This methodology evaluates cabinet and panel fires and addresses control room evacuation should this be made necessary by an uninhabitable environment or the inoperability of control room equipment. Should the control room be evacuated, the plant can be shutdown safely using the remote shutdown capability. In contrast, for fires that are suppressed early and cause only limited damage to equipment, safe shutdown can be achieved from the control room using normal shutdown procedures and equipment.

The analysis of control room fires followed the guidelines presented in Appendix M of the Fire PRA Implementation Guide [3]. The principle steps are to:

- Identify the contents of each control cabinet and the equipment they affect.
- Determine the ignition frequency of each control room cabinet.
- Determine the conditional probability of core damage after a damaging fire in each cabinet.
- Determine the probability that control room evacuation will be required in the event of a fire and identify the remote shutdown capability that is available outside the control room.
- Determine the potential for propagation of fire between cabinets and characterize the resulting multi-cabinet fire scenarios.
- Calculate the core damage frequencies (CDFs) resulting from each cabinet fire, considering scenarios with and without control room evacuation.

4.7.4.2 Control Room Walkdown

The control room is located at the 53-ft elevation of the control building and is part of fire area CTL-3. The control room is fully enclosed on all sides, but the floors and ceilings are not rated fire barriers. The control room covers 3627 ft^2 of floor space and has a volume of over 40,000 ft^3. All cable penetrations go through the floor into the cable spreading room. Two main control panels control most equipment of interest in this analysis: the flight panel and the contiguous panel comprising panels SAF through SOF (the main control board).

The flight panel contains the controls for plant equipment such as RCPs, ADVs, PORVs, main turbine and feedwater systems, and the generator. It is 8-ft high x 8-ft wide x 20-ft long and has eight individual compartments. There are two smoke detectors in each cabinet. The cabinets are vented at the top and are separated by steel walls without an air space. There is no fire suppression capability inside the cabinets.

The main control board is one continuous cabinet, approximately 50 feet long with no walls separating the individual control boards. The main control board contains smoke detection devices inside the cabinets. It has a significant void fraction inside, the combustible loading being concentrated at the back on the control panels. The control cables for each individual control board enter in the middle of the corresponding panel and exit through the floor together. The main control board is used to control all ESF equipment and offsite power.

Throughout the rest of the control room are 125-Vdc distribution panels 31 through 34, 118-Vac instrument buses 31 through 34 and 31A through 34A, and additional instrument racks and back panels. These additional instrument racks and back panels contain very little equipment that is modeled in the PRA. Cabinets A1 through A10, B1 through B11, C1 through C11, and D1 through D11 are vented on top and bottom, and are low voltage. Steel walls, some of which have air space in between, separate these cabinets.

4.7.4.3 Assumptions

The following key assumptions were made in the IP3 control room fire analysis:

- As dictated by Section 1.0.a of the "Safe Shutdown from Outside the Control Room" procedure, ONOP-FP-1A, the control room will be evacuated if the control room becomes uninhabitable or safe shutdown equipment cannot be operated from within the control room.
- The time required for a cabinet fire to create uninhabitable conditions is 15 minutes (as determined using the Sandia National Laboratory (SNL) cabinet fire tests [27]).
- Each cabinet contains sufficient cable or combustible loading to generate enough smoke to cause control room evacuation should suppression fail.
- Several cabinets do not contain safe shutdown equipment. While fire in these cabinets will have limited impact on core damage frequency should suppression be successful, should suppression be unsuccessful, control room evacuation may be required.
- Partial fire damage to a cabinet was not considered. Fire in a cabinet (or individual control board in the main control board) was assumed to fail all control circuits in that cabinet. Cable routing inside cabinets was not available. It was, therefore, necessary to assume complete function loss for that cabinet.
- Smoke from the control room would not adversely affect operator actions taken at the local control stations.

- Cabinet SHF was the only cabinet in which fires were assumed to result in a loss of offsite power. Fire in SHF will fail all offsite power and all EDG control from the control room.

- Successful manual suppression limits fire damage to the cabinet in which it initiated.

- An ATWS event occurring concurrently with a fire is not considered credible. The reactor protection system (RPS) is designed to be fail-safe. Concurrent fires disabling both trains of reactor trip circuitry is not considered credible. In addition, the initial operator actions of ONOP-FP-1A, "Safe Shutdown From Outside the Control Room," includes manual trip and verification of reactor trip.

- All cables are routed through the control room floor and directly into the cabinets. No cables are routed in the overhead or sub-floor area.

- Just prior to control room evacuation, the operators would secure reactor coolant pumps, main feedwater pumps, close MSIVs, isolate main feedwater, and deactivate PORVs (open circuit breakers in dc distribution panels 31 and 32). The probability of an inadvertently open PORV occurring as a result of a control room fire is considered negligibly small.

- Cabinet fires are the only potentially significant fires in the control room because there are no class A flammables, no welding and only limited class B transient combustibles in the control room. Transient fires are assumed incapable of causing cable damage inside a cabinet because of the limited ability of low BTU combustibles to cause cabinet damage and the high probability of rapid suppression.

- Re-entry into the control room after evacuation is not considered. The CCDP was found for safe shutdown from outside the control room for 24 hours.

- If offsite power is not lost as a result of the fire, it is assumed to remain available throughout the event, as operators are not instructed to trip offsite power before leaving the control room.

- A fire in the control room will be suppressed or the control room evacuated before the fire spreads across more than 15 linear ft of the control board.

- The ignition frequency for cabinets was apportioned uniformially, each panel being assigned the same ignition frequency. This uniform distribution because of the uncertainty of the specific ignition frequencies associated with components in each panel

4.7.4.4 Fire Scenarios and Equipment Unavailability Resulting from Cabinet Fires

Risk Important Equipment. Risk important systems and the panels used to control them are listed in Table 4.7.4.1. The systems that will fail as a result of fire in each panel are listed in Table 4.7.4.2.

Table 4.7.4.1

Risk Important Equipment Associated with Each Panel

System	Panel
Service Water System (SWS)	SJF, SBF-1
SG Atmospheric Dump Valves (ADVs)	FBF
MSIVs	SBF-1
Condenser Steam Dump Valves	FCF
Component Cooling Water (CCW)	SGF
RWST Refill	FBF
Auxiliary Feedwater (AFW)	SCF
High Head Safety Injection (HHSI)	SBF-2 (HHSI pumps and valves)
Low Head Safety Injection (LHSI)	SGF (RHR pumps and valves) and SBF-1 (valves)
Recirculation	SBF-1 (Recirculation pumps and valves.)
	SBF-2 (HHSI pumps and valves)
Containment Spray (CSS)	SBF-1
480VAC Power	SHF
Accumulators	SMF (no Impact by CCR fire)
Primary Pressure Relief -PORVs (PPR)	FCF (PORV's), FBF (Pressurizer spray valves)
Condensate (CDS)	SCF
Main Feedwater (MFW)	SCF, FAF, and FBF
Chemical and Volume Control (CVCS)	FBF (Charging pumps), SFF (valve MOV-333)
Safeguards Actuation System (SAS)	Racks G3, G4, G5, and G6
6.9kV AC Electric Power	SHF
EDG Output Breakers	SHF
Offsite Electric Power	SHF
Containment Air Recirculation & Cooling	SBF-2

Table 4.7.4.2

IPE Equipment that Fails as a Result of Fires in Each Cabinet or Panel

Cabinet/ Panel	Name/Contents	IPE Equipment Failed
SAF	Reactor Coolant	RCPs, PRT, Seal flow
SBF-1	Safeguards	SWS, LHSI, MSIVs, CSS, Recirculation
SBF-2	Safeguards	CFCs, HHSI
SCF	Feedwater and Condensate	CDS, MFW, AFW
SDF	Turbine Recorder	None (Non-critical)
SEF	Turbine Startup	None (Non-critical)
SFF	Chemical and Volume Control	CVCS, Letdown Valves, Make-up Valves, Boration, Auxiliary Spray.
SGF	Auxiliary Coolant	CCW, RHR
SHF	Electrical	6.9-kV, 480-Vac, EDGs
SJF	Cooling Water	Service Water & Circulating Water
SKF	Bearing Water	None (Non-critical)
SLF	Weld Channel	None (Non-critical)
SMF	Safety Injection	Accumulators
SNF	Containment Isolation	Containment Isolation Valves
SOF	Fan Cooler Condensate	Containment Fan Coolers Condensate Valves
A1-A4	RPS Channel-I	None (Non-critical)
A5	RCS ACS	None (Non-critical)
A6	RCS	None (Non-critical)
A7-A10	RPS Channel-II	None (Non-critical)
B1-B3	RPS Channel-III	None (Non-critical)
B4-B5	Feedwater Control	MFW
B6	Pressurizer Pressure & Level	None (Non-critical)
B7	Rod Control	None (Non-critical)
B8	Rod Insertion Limit	None (Non-critical)

Table 4.7.4.2 (continued)

IPE Equipment that Fails as a Result of Fires in Each Cabinet or Panel

Cabinet/ Panel	Name/Contents	IPE Equipment Failed
B9-B10	RPS Channel-IV	None (Non-critical)
B11	I/I Converter	None (Non-critical)
C1-C4	Rod Position (APRI)	None (Non-critical)
C5-C8	NIS Channel I-IV	None (Non-critical)
C9-C10	CVCS	CVCS Control
C11	Vibration Monitoring	None (Non-critical)
D1-D3	Radiation Monitoring	None (Non-critical)
D4-D7	Incore Detector Drives	None (Non-critical)
D8	T_{ave} Steam Dump Control	SDVs
D9	Power Supplies	None (Non-critical)
D10	General Monitoring Panel	None (Non-critical)
D11	Air Monitoring	None (Non-critical)
E1	Safety Injection Sys (Train A)	ESFAS Train A Instrumentation
E2-E5	RPS Train A, Channels I-IV	None (Non-critical)
E6	RPS Train A Test Logic	None (Non-critical)
E7	Impact Monitoring (DMIMS)	None (Non-critical)
F1	Safety Injection Sys (Train B)	ESFAS Train B Instrumentation
F2-F5	RPS Train B, Chs I-IV	None (Non-critical)
F6	RPS Train B Test Logic	None (Non-critical)
F7	AMSAC	AMSAC
G1-G2	Auxiliary Relays	SAS Relays (Non-critical)

Table 4.7.4.2 (continued)

IPE Equipment that Fails as a Result of Fires in Each Cabinet or Panel

Cabinet/ Panel	Name/Contents	IPE Equipment Failed
G3-G4	SAS Actuation Logic	SAS Actuation Logic
G5-G6	SAS Actuation Logic	SAS Actuation Logic
G7	Turbine Overspeed Protection	None (Non-critical)
H1	OPS (Overpressurization) Analog Instrumentation Ch1	None (Non-critical)
H2	OPS (Overpressurization) Analog Instrumentation Ch2	None (Non-critical)
H3	OPS (Overpressurization) Analog Instrumentation Ch4	None (Non-critical)
H4/5	OPS (Overpressurization) Logic Train B	None (Non-critical)
FAF	Flight Panel	MFW
FBF	Flight Panel	ADVs, CVCS, RWST Refill, PORVs, MFW, Pressurizer Spray Valves
FCF	Flight Panel	SDVs, PORVs
FDF	Flight Panel	None (Non-critical)
PR1	Containment Parameter Recorder Cab	None (Non-critical)
PR2	Containment Parameter Recorder Cab	None (Non-critical)
DM	Demand Metering Panel	None (Non-critical)

Table 4.7.4.2 (continued)

IPE Equipment that Fails as a Result of Fires in Each Cabinet or Panel

Cabinet/ Panel	Name/Contents	IPE Equipment Failed
RVLIS	RVLIS	None (Non-critical)
I/O	I/O Cabinet	None (Non-critical)
H2	H2 Recombiner Cabinet	None (Non-critical)
RMS-1	Radiation Monitoring	None (Non-critical)
RMS-2	Radiation Monitoring	None (Non-critical)
RMS-3	Radiation Monitoring	None (Non-critical)
VI	Containment Isolation Valve Control	Containment Isolation Valves
#31 DP	125-Vdc Distribution Panel	125-Vdc Distribution Panel 31 and Breakers
#31A DP	125-Vdc Distribution Panel	125-Vdc Distribution Panel 31A and Breakers
#32 DP	125-Vdc Distribution Panel	125-Vdc Distribution Panel 32 and Breakers
#32A DP	125-Vdc Distribution Panel	125-Vdc Distribution Panel 32A and Breakers
#33 DP	125-Vdc Distribution Panel	125-Vdc Distribution Panel 33 and Breakers
#34 DP	125-Vdc Distribution Panel	125-Vdc Distribution Panel 34 and Breakers
#31 IB	118-Vac Instrument Bus	118-Vac Instrument Bus 31
#31A IB	CCR 118-Vac Distribution Bus	118-Vac Instrument Bus 31A
#32 IB	118-Vac Instrument Bus	118-Vac Instrument Bus 32A
#32A IB	CCR 118-Vac Distribution Bus	118-Vac Instrument Bus 32A

Table 4.7.4.2 (continued)

IPE Equipment that Fails as a Result of Fires in Each Cabinet or Panel

Cabinet/ Panel	Name/Contents	IPE Equipment Failed
#33 IB	118-Vac Instrument Bus	118-Vac Instrument Bus 33
#33A IB	CCR 118-Vac Distribution Bus	118-Vac Instrument Bus 33A
#34 IB	118-Vac Instrument Bus	118-Vac Instrument Bus 34
#34A IB	CCR 118-Vac Distribution Bus	118-Vac Instrument Bus 34A

Fires in the instrument racks and back panels would not fail any critical equipment. However, smoke obscuration will require control room evacuation and shutdown from outside the control room. Such shutdown has a higher conditional core damage probability (CCDP) than has shutdown from within the control room.

__Fire Scenarios__. Based on the experimental evidence from the electrical cabinet fire tests [27]:

- Fire damage in the control room will likely be limited to one cabinet since damaging hot gas layers in the control room are very unlikely—the ceilings in the control room are high and all cables are routed through the floor

- Smoke from a single cabinet fire can obscure the control boards and require evacuation of the control room if the fire is not suppressed within 15 minutes

- Fire can propagate from one panel to the next, but damage in the adjacent panels is unlikely to occur until 15 minutes has elapsed should there be partitions between the panels.

The following sequence of events is therefore postulated in a fire scenario:

1. A fire is initiated in a single cabinet

2. Fire damages the critical cables before suppression is possible

3. Personnel attempt to suppress the fire

4. If the fire is suppressed within 15 minutes, it does not spread to adjacent cabinets (except in the main control board) and the control room remains habitable. Shutdown is achieved from the control room with the remaining operable equipment.

5. If suppression fails, the control room is evacuated 15 minutes after fire initiation and the fire spreads to adjacent cabinets. Shutdown is performed from outside the control room with remote shutdown capability.

__Shutdown Outside the Control Room__. Two issues are central to the evaluation of shutdown outside the control room: equipment operability and the availability of AC power.

__Equipment Operability__. The AFW, CCW, SW and CVCS systems and SG ADVs can be operated from outside of the control room to bring the plant to a safe hot shutdown condition, assuming AC power is available to their respective buses. This equipment and the diesel generators are provided with local control circuits and instrumentation and switches are provided to activate the local control circuits and isolate the damaged control room circuits. The AFW, CCW, SW and CVCS systems and SG ADVs are sufficient to provide RCP seal cooling and steam generator heat removal. Reactor subcriticality is assumed to be largely unaffected by fire and inadvertent open relief valves are prevented by defeating actuation circuits prior to leaving the control room. Thus, all essential safety functions are provided to maintain the plant in hot shutdown.

AC Power Availability. AC power can be provided from three sources after control room evacuation:

1. Offsite power (assuming it is not lost as a result of fire).

2. The emergency diesel generators. If offsite power is lost as a result of the fire (eg, as a result of fire damage to panel SHF), the diesel generators can be started locally and loaded on the 480-V emergency buses. Power is then available on the 480-V buses and lower MCCs for AFW, CCW, SW, CVCS and CCW components. These actions are possible even if the fire damages control circuits for the diesels and the 480-V buses (panel SHF contains controls for offsite power, the diesel generators and 480-V buses). Local control circuits are provided for the 480-V buses and the diesel generators so that the damaged control room circuits can be isolated.

3. The Appendix R diesel. Should offsite power be lost as a result of the fire and the emergency diesel generators or 480-V buses are unavailable because of other random failures, the Appendix R diesel can be locally started and aligned to power one SW pump, one CCW pump and one of two charging pumps. The turbine-driven AFW pump can also operate under local control.

We can therefore conclude that after control room evacuation, the operators have available the minimal equipment required for shutdown, most of which is independent of the control room circuits. The only function dependent on the control room integrity is offsite power, the controls for offsite power being contained in cabinet SHF. Thus the only threat arising from continued propagation of fire after control room evacuation is damage to this cabinet.

Fire Propagation in the Main Control Board. As noted above, fire propagation between adjacent cabinets or boards within 15 minutes of fire initiation is a credible concern only in the main control board. Because the cabinets in the Sandia studies were single cabinets or had partitions between them, the Sandia studies do not provide a representative basis for evaluation of inter panel propagation in the main control board. Lacking representative tests or applicable fire modeling codes, fire propagation between cabinets was evaluated based on the equipment that was lost, rather than the probability of fire propagation. The contents of each panel were identified and the combinations of panel failures evaluated. Using this approach, propagation makes the equipment loss significantly worse for only two groups of panels: the SJF/SHF/SGF/SFF and the SCF/SBF combinations. Damage to the first group will cause the loss of AC power and the CCW, SW and CVCS systems. However, as all these systems have local control capability, fire propagation from one cabinet to the next does not create a new accident scenario but simply requires the operators to control more equipment locally. Damage to the second group of panels is more significant as it will cause the loss of AFW and SI systems and, because SI has no local control capability, failure of the cabinet will fail the high- and low-head safety injection systems and the containment spray system.

4.7.4.5 Calculation of Core Damage Probability

The FIVE methodology gives a total control room cabinet fire frequency of 9.5 x 10^{-3}/yr. This ignition frequency was apportioned uniformly, each panel being assigned the same ignition frequency. The resulting ignition frequencies are presented in Table 4.7.4.3.

CCDPs were first calculated for each cabinet assuming complete damage to the cabinet but no propagation of fire from one cabinet to the next. Two CCDPs were derived for fires in each cabinet: one for the case in which the fire is suppressed and damage is limited to circuits within the ignited panel; and one for the case in which a failure to suppress the fire leads to control room evacuation.

Propagation was then considered, the SCF/SBF combination being included in the core damage calculation using a propagation probability of 0.5.

The probability that operators have to leave the control room is a function of the time available to suppress the fire before smoke reduces visibility at the main control board. The time available to suppress the fire was assessed in Appendix M of the EPRI Fire PRA Implementation Guide. This assessment was based on review of SNL cabinet fire test data [27] on smoke accumulation. As noted above, Appendix M reports that for fires similar to those in the SNL tests, operators would have about 15 minutes before visibility was impaired. The probability of non-suppression as a function of time is also assessed in Appendix M using EPRI's Human Cognitive Reliability (HCR) correlation to interpret the control room fire durations in the EPRI Fire Events Database [13]. The model fits the event times (eg, fire durations) to a log-normal curve to estimate the probability of inaction for times greater than those observed. Using this method, the probability of non-suppression within 15 minutes is given as 0.0034.

Table 4.7.4.3

Panel Ignition Frequencies

Cabinet/ Panel	Number of Panels	Apportioned Frequency (/yr)
SAF	1	8.56E-05
SBF-1	1	8.56E-05
SBF-2	1	8.56E-05
SCF	1	8.56E-05
SDF	1	8.56E-05
SEF	1	8.56E-05
SFF	1	8.56E-05
SGF	1	8.56E-05
SHF	1	8.56E-05
SJF	1	8.56E-05
SKF	1	8.56E-05
SLF	1	8.56E-05
SMF	1	8.56E-05
SNF	1	8.56E-05
SOF	1	8.56E-05
A1-A4	4	3.42E-04
A5	1	8.56E-05
A6	1	8.56E-05
A7-A10	4	3.42E-04
B1-B3	3	2.57E-04
B4-B5	2	1.71E-04
B6	1	8.56E-05
B7	1	8.56E-05
B8	1	8.56E-05
B9-B10	2	1.71E-04
B11	1	8.56E-05
C1-C4	4	3.42E-04

Table 4.7.4.3 (continued)

Panel Ignition Frequencies

Cabinet/ Panel	Number of Panels	Apportioned Frequency (/yr)
C5-C8	4	3.42E-04
C9-C10	2	1.71E-04
C11	1	8.56E-05
D1-D3	3	2.57E-04
D4-D7	4	3.42E-04
D8	1	8.56E-05
D9	1	8.56E-05
D10	1	8.56E-05
D11	1	8.56E-05
E1	1	8.56E-05
E2-E5	4	3.42E-04
E6	1	8.56E-05
E7	1	8.56E-05
F1	1	8.56E-05
F2-F5	4	3.42E-04
F6	1	8.56E-05
F7	1	8.56E-05
G1-G2	2	1.71E-04
G3-G4	2	1.71E-04
G5-G6	2	1.71E-04
G7	1	8.56E-05
H1	1	8.56E-05
H2	1	8.56E-05
H3	1	8.56E-05
H4/5	1	8.56E-05
FAF	1	8.56E-05

Table 4.7.4.3 (continued)

Panel Ignition Frequencies

Cabinet/ Panel	Number of Panels	Apportioned Frequency (/yr)
FBF	1	8.56E-05
FCF	1	8.56E-05
FDF	1	8.56E-05
PR1	1	8.56E-05
PR2	1	8.56E-05
DM	1	8.56E-05
RVLIS	1	8.56E-05
I/O	1	8.56E-05
H2	1	8.56E-05
RMS-1	1	8.56E-05
RMS-2	1	8.56E-05
RMS-3	1	8.56E-05
VI	1	8.56E-05
#31 DP	1	8.56E-05
#31A DP	1	8.56E-05
#32 DP	1	8.56E-05
#32A DP	1	8.56E-05
#33 DP	1	8.56E-05
#34 DP	1	8.56E-05
#31 IB	1	8.56E-05
#31A IB	1	8.56E-05
#32 IB	1	8.56E-05
#32A IB	1	8.56E-05
#33 IB	1	8.56E-05
#33A IB	1	8.56E-05
#34 IB	1	8.56E-05
#34A IB	1	8.56E-05

4.7.4.6 Results

The baseline CCDP for shutdown within the control room with all equipment available (ie, for a T3 event—a turbine trip with main feedwater initially available) is 2.83 x 10^{-5}. The CCDP for shutdown outside the control room using alternate shutdown capability, with offsite power available, is 0.051. The CCDP for shutdown from outside the control room using the Appendix R diesel generator is 0.15. The calculation of CCDPs for shutdown from outside the control room is presented in Appendix 4A.

The core damage frequency resulting from control room fires in 3.65 x 10^{-6}/year. The results are presented in Table 4.7.4.4, listed by cabinet and panel. The CDF can be grouped into three general scenario types:

1. Fires involving a non-critical cabinet, but resulting in control room evacuation, contribute 1.73 x 10^{-6}/year to the CDF, or 48% of control room fire-induced CDF.

   In this scenario, after control room evacuation the plant must be stabilized in hot shutdown using the remote shutdown capability. In practice, this entails the provision of RCP seal cooling to prevent seal LOCAs and auxiliary feedwater to remove heat from the steam generators. If this can be achieved, the plant can stay in hot shutdown until the control room is habitable and the necessary repairs are made. Seal LOCAs must be avoided as they cannot be mitigated easily by remote shutdown. PORV LOCAs are unlikely because operators will deactivate PORV control circuits before leaving the control room. In this scenario, the failure to provide seal cooling and auxiliary feedwater using the remote shutdown capability has an associated conditional core damage probability of 0.051.

2. Fires involving damage to cabinets SCF and SBF contribute 1.15 x 10^{-6}/year to the CDF, or 32% of control room fire-induced CDF.

   Panels SCF and SBF are adjacent panels in the main control boards and are not physically separated by a metal partition. Fire in one panel therefore spreads to the other resulting in damage to the controls for the auxiliary feedwater and SI systems. As the latter have no local control, bleed-and-feed cooling is unavailable and thus the operators must exert local control over the auxiliary feedwater system to remove heat from the steam generators and prevent core damage. The CCDP associated with a failure to exert local control over the AFW system in this scenario is 0.027.

3. Fires involving damage to a risk significant system and failure to provide safe shutdown from the control room. These contribute 7.6 x 10^{-7}/year to the CDF, or 21% of control room fire-induced CDF.

   The largest contribution to this scenario is fire damage to panel SHF which results in the loss of 6.9-kV and 480-Vac power.

Table 4.7.4.4
Contribution of Control Room Fires to CDF

Cabinet/Panel	Name/Contents	IPE Equipment Failed	Initiating Event frequency (/yr)	Probability Evacuation Required	CCDP (no evacuation)	CCDP (evacuation)	Contribution to CDF (/year)	Remarks
SCF/SBF	AFW,Safeguards	AFW,SI	4.28E-05	3.40E-03	2.67E-02	5.10E-02	1.15E-06	
SHF	Electrical	6.9-kV,480-V and EDG Breaker	8.56E-05	3.40E-03	4.17E-03	5.10E-02	3.72E-07	
#32	125-Vdc Distribution Panel	DC Panel 32	8.56E-05	3.40E-03	6.57E-04	5.10E-02	7.11E-08	Bat 32 zone 1
#32A	125-Vdc Distribution Panel	DC Panel 32A	8.56E-05	3.40E-03	6.57E-04	5.10E-02	7.11E-08	Bat 32 zone 1
A1-A4	RPS Channel-I	None (Non-critical)	3.42E-04	3.40E-03	2.83E-05	5.10E-02	6.9E-08	Base case
A7-A10	RPS Channel-II	None (Non-critical)	3.42E-04	3.40E-03	2.83E-05	5.10E-02	6.9E-08	Base case
C1-C4	Rod Position	None (Non-critical)	3.42E-04	3.40E-03	2.83E-05	5.10E-02	6.9E-08	Base case
C5-C8	NIS	None (Non-critical)	3.42E-04	3.40E-03	2.83E-05	5.10E-02	6.9E-08	Base case
D4-D7	Incore Detector Drives	None (Non-critical)	3.42E-04	3.40E-03	2.83E-05	5.10E-02	6.9E-08	Base case
E2-E5	RPS Train A, Channels I-IV	None (Non-critical)	3.42E-04	3.40E-03	2.83E-05	5.10E-02	6.9E-08	Base case
F2-F5	RPS Train B, Channels I-IV	None (Non-critical)	3.42E-04	3.40E-03	2.83E-05	5.10E-02	6.9E-08	Base case
#31	125-Vdc Distribution Panel	DC Panel 31	8.56E-05	3.40E-03	4.77E-04	5.10E-02	5.57E-08	Bat 31 zone 1
#31A	125-Vdc Distribution Panel	DC Panel 31A	8.56E-05	3.40E-03	4.77E-04	5.10E-02	5.57E-08	Bat 31 zone 1
SCF	Feedwater and Condensate	CDS, MFW, AFW	8.56E-05	3.40E-03	4.57E-04	5.10E-02	5.4E-08	AFW zone 23
B1-B3	RPS Channel-III	None (Non-critical)	2.57E-04	3.40E-03	2.83E-05	5.10E-02	5.18E-08	Base case
D1-D3	Radiation Monitoring	None (Non-critical)	2.57E-04	3.40E-03	2.83E-05	5.10E-02	5.18E-08	Base case
C9-C10	CVCS	CVCS	1.71E-04	3.40E-03	3.23E-05	5.10E-02	3.52E-08	SIF zones 5,6
B4-B5	Feedwater Control	MFW	1.71E-04	3.40E-03	2.83E-05	5.10E-02	3.45E-08	MFW zone 3
B9-B10	RPS Channel-IV	None (Non-critical)	1.71E-04	3.40E-03	2.83E-05	5.10E-02	3.45E-08	Base case
G1-G2	Auxiliary Relays	Relays (Non-critical)	1.71E-04	3.40E-03	2.83E-05	5.10E-02	3.45E-08	Base case

Table 4.7.4.4 (continued)
Contribution of Control Room Fires to CDF

Cabinet/Panel	Name/Contents	IPE Equipment Failed	Initiating Event frequency (/yr)	Probability Evacuation Required	CCDP (no evacuation)	CCDP (evacuation)	Contribution to CDF (/year)	Remarks
G3-G4	SAS Actuation Logic	ESFAS	1.71E-04	3.40E-03	2.83E-05	5.10E-02	3.45E-08	Base case
G5-G6	SAS Actuation Logic	ESFAS	1.71E-04	3.40E-03	2.83E-05	5.10E-02	3.45E-08	Base case
SGF	Auxiliary Coolant	CCW, RHR	8.56E-05	3.40E-03	5.77E-05	5.10E-02	1.98E-08	CCW zone 1
SFF	Chemical and Volume Control	CVCS Valves, SIF	8.56E-05	3.40E-03	3.23E-05	5.10E-02	1.76E-08	CHP zones 5,
SBF-1	Safeguards	HHR,LHSI, RECIRP,MSIV,CSS	8.56E-05	3.40E-03	3.20E-05	5.10E-02	1.76E-08	SI zone 9
SBF-2	Safeguards	CFC,HHSI,MCC36A/B	8.56E-05	3.40E-03	3.20E-05	5.10E-02	1.76E-08	SI zone 9
SJF	Circ Water and SW	SWP 31-39, CWPs	8.56E-05	3.40E-03	3.20E-05	5.10E-02	1.76E-08	SWP zone 22
D8	T_{ave} Steam Dump Control (FA-18)	SDVs	8.56E-05	3.40E-03	3.22E-05	5.10E-02	1.76E-08	MS zone 57A
FAF	Flight Panel	MFW	8.56E-05	3.40E-03	3.21E-05	5.10E-02	1.76E-08	MFW zone 3
FBF	Flight Panel	ADVs, CVCS, PORVs, MFW,	8.56E-05	3.40E-03	3.20E-05	5.10E-02	1.76E-08	SI zone 9
FCF	Flight Panel	SDVs, PORVs	8.56E-05	3.40E-03	3.20E-05	5.10E-02	1.76E-08	SI zone 9
SAF	Reactor Coolant	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
SDF	Turbine Recorder	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
SEF	Turbine Startup	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
SKF	Bearing Water	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
SLF	HVAC	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
SMF	Safety Injection	ACC Valves	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case

Table 4.7.4.4 (continued)
Contribution of Control Room Fires to CDF

Cabinet/Panel	Name/Contents	IPE Equipment Failed	Initiating Event frequency (/yr)	Probability Evacuation Required	CCDP (no evacuation)	CCDP (evacuation)	Contribution to CDF (/year)	Remarks
SNF	Containment Isolation	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
SOF	Fan Cooler Condensate	CFC Condensate Valve	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
A5	RCS ACS	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
A6	RCS	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
B6	Pressurizer I&C	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
B7	Rod Control	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
B8	Rod Insertion Limit	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
B11	I/I Conv	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
C11	Vibration Monitoring	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
D9	Power Supplies	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
D10	General Monitoring Panel	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
D11	Air Monitoring	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
E1	Safety Injection Sys (Train A)	ESFAS-A	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
E6	RPS Train A Test Logic	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
E7	Impact Monitoring (DMIMS)	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
F1	Safety Injection Sys (Train B)	EFSAF-B	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
F6	RPS Train B Test Logic	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
F7	AMSAC	AMSAC	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case

Table 4.7.4.4 (continued)
Contribution of Control Room Fires to CDF

Cabinet/Panel	Name/Contents	IPE Equipment Failed	Initiating Event frequency (/yr)	Probability Evacuation Required	CCDP (no evacuation)	CCDP (evacuation)	Contribution to CDF (/year)	Remarks
G7	Turbine Overspeed Protection	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
H1	OPS Analog CH1	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
H2	OPS Analog CH2	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
H3	OPS Analog CH4	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
H4/5	OPS Analog Logic	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
FDF	Flight Panel	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
PR1	Ctm Parameter Recorder Cab	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
PR2	Ctm Parameter Recorder Cab	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
DM	Demand Metering Panel	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
RVLIS	RVLIS	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
I/O	I/O Cabinet	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
H2	H2 Recombiner Cabinet	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
RMS-1	Radiation Monitoring	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
RMS-2	Radiation Monitoring	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
RMS-3	Radiation Monitoring	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
VI	Containment Isolation Valve Control	None (Non-critical)	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
#33	125-Vdc Distribution Panel	DC Panel 33	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
#34	125-Vdc Distribution Panel	DC Panel 34	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case

Table 4.7.4.4 (continued)
Contribution of Control Room Fires to CDF

Cabinet/Panel	Name/Contents	IPE Equipment Failed	Initiating Event frequency (/yr)	Probability Evacuation Required	CCDP (no evacuation)	CCDP (evacuation)	Contribution to CDF (/year)	Remarks
#31	118-Vac Instrument Bus	AC Bus 31	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
#31A	CCR 118-Vac Distribution Bus	AC Bus 31A	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
#32	118-Vac Instrument Bus	AC Bus 32	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
#32A	CCR 118-Vac Distribution Bus	AC Bus 32A	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
#33	118-Vac Instrument Bus	AC Bus 33	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
#33A	CCR 118-Vac Distribution Bus	AC Bus 33A	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
#34	118-Vac Instrument Bus	AC Bus 34	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
#34A	CCR 118-Vac Distribution Bus	AC Bus 34A	8.56E-05	3.40E-03	2.83E-05	5.10E-02	1.73E-08	Base case
Total CDF							3.65E-06	

4.7.5 Conclusions

The total core damage frequency due to fires is predicted to be 5.64 x 10^{-5}/year. The contributions from single- and multi-zone zone fires to the core damage frequency are summarized in Table 4.7.5.1 and Figure 4.7.5.1. Where two fire zones are listed together, the contribution results from a multi-zone fire.

Table 4.7.5.1

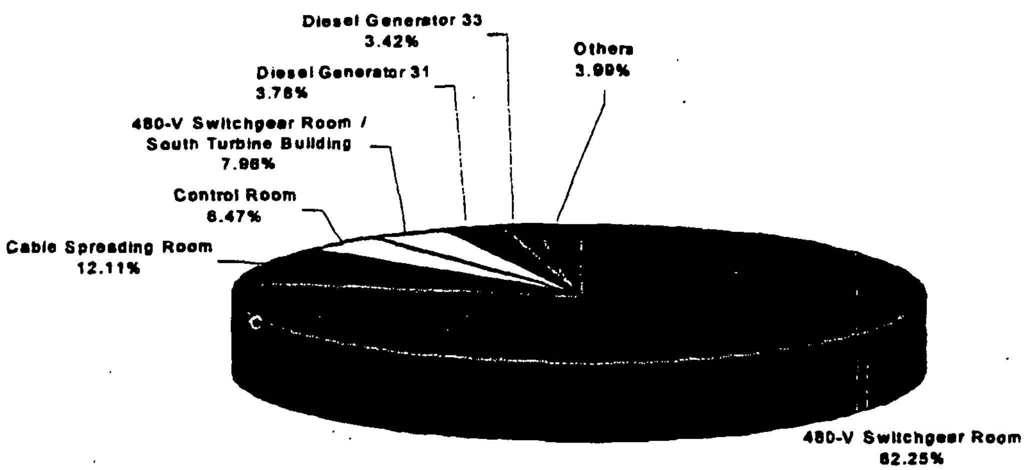
Fire-Induced Contributions to the Core Damage Frequency

Fire Zone	Fire-Zone Description	CDF (/year)	Percent Contribution
14	480-V Switchgear Room	3.51E-05	62.25
11	Cable Spreading Room	6.83E-06	12.11
15	Control Room	3.65E-06	6.47
14/37A	480-V Switchgear Room / South Turbine Building	4.49E-06	7.96
10	Diesel Generator 31	2.13E-06	3.78
102A	Diesel Generator 33	1.93E-06	3.42
60A	Upper Electrical Tunnel	7.14E-07	1.27
101A	Diesel Generator 32	3.38E-07	0.60
7A	Lower Electrical Tunnel	2.78E-07	0.49
23	Auxiliary Feedwater Pump Room	2.28E-07	0.40
37A	South Turbine Building Elevation 15ft	3.78E-08	0.67
17A	PAB Corridor	3.17E-08	0.56
	Total=	**5.64E-05**	

The dominant contributions result from single-zone fires in the 480-V switchgear, cable spreading and control rooms, a multi-zone fire in the 480-V switchgear room and south turbine building, and single zone fires in diesel generator rooms 31and 33. These rooms contain the bulk of the plant control circuitry except remote shutdown circuitry. The dominant causes of fire-induced core damage will now be described in more detail. When considering the magnitude of the contribution of fires to the core damage frequency, it should be stressed that this magnitude may in part be an artifact of the modeling conservatism.

Figure 4.7.5.1

Dominant Contributions to Core Damage Frequency



4.7.5.1 480-V Switchgear Room – Fire Zone 14

Fires in the 480-V switchgear room are the dominant cause of fire-induced core damage. Of these, the largest contribution to the core damage frequency comes from fires in the 480-V switchgear 32. Such fires damage the power supplies to 480-V buses 3A and 6A, and AFW motor-driven pumps 31 and 33 and other cables. In consequence, both AFW motor-driven pumps are without 480-V power and bleed-and-feed is unavailable because of a failure of power to the PORV block valve. If the fire is suppressed before widespread equipment damage occurs, core damage is dominated by a random failure of the turbine-driven AFW pump. If the fire is not suppressed, core damage occurs from subsequent failure to align the alternative safe shutdown equipment.

In light of the contribution to the core damage frequency made by switchgear room fires, it is recommended that action be taken to mitigate such fires. Specifically, it is recommended that the area-wide, total flooding CO_2 suppression system be restored to automatic actuation.

4.7.5.2 Cable Spreading Room – Fire Zone 11

The largest contribution to core damage caused by cable spreading room fires arises from fires originating in electrical cabinets and propagating to overhead cable tray stacks. Such fires result in a loss of power to safe shutdown equipment (ie, motor-driven AFW pumps, charging pumps, CCW pumps, SW pumps 31 to 36, diesel generators, high head and low head pumps). Should the operator subsequently fail to align the Appendix R safe shutdown equipment, core damage results.

4.7.5.3 Control Room Analysis – Fire Zone 15

There are three principal scenarios that contribute to control room fire-induced core damage:

- Fires involving non-critical cabinets but requiring evacuation of the control room. A subsequent failure to provide RCP seal cooling and auxiliary feedwater using the remote shutdown capability results in core damage.
- Fires involving panels SBF and SCF on the main control board. Such fires eliminate the SI systems and require local control of the AFW system. A failure of the operator to provide such control results in core damage.
- Fires involving damage to a risk-significant system and a failure to provide safe shutdown from the control room. In particular, fire damage to panel SHF on the main control board will result in a loss of 6.9-kV and 480-V power. Core damage will then result if the operator fails to start the emergency diesel generators locally or, should the emergency diesel generators or 480-V buses be unavailable because of random failures, to start the Appendix R diesel generator and align power to an SW pump, a CCW pump, and a charging pump.

4.7.5.4 480-V Switchgear Room / South Turbine Building – Fire Zones 14/37A

The largest contribution to core damage caused by this multi-zone fire arises from fires originating in electrical cabinets in the 480-V switchgear room and propagation through door and damper to the south turbine building. Such fires result in a loss of on- and off-site power to 480-V safeguard buses and safe shutdown equipment (ie, AFW pumps, charging pumps, CCW pumps, SW pumps 31 through 36, diesel generators, high head pumps, low head pumps, and bus 312). Unable to align the Appendix R safe shutdown equipment from the Appendix R diesel generator, core damage results. While plants with complete train separation typically have low single-zone contributions to the CDF and comparable multi-zone contributions to the CDF, limited separation in the cable spreading room, electrical tunnels, and switchgear rooms at IP3 results in fires in these zones dominating the fire-induced contributions to the CDF.

4.7.5.5 Diesel Generator Room 31 – Fire Zone 10

The largest contribution to core damage frequency resulting from diesel generator 31 room fires comes from a fire in the pit beneath the diesel generator skid that damages conduits routed beneath the decks. Because of the configuration of the power supplies to the ventilation fans, this fire could interrupt power to all six DG rooms exhaust fans and so fail all diesel generators. The subsequent random loss of offsite power and operator failure to align the Appendix R diesel generator results in core damage as will the random failure of AFW motor-driven pump 33 and AFW turbine-driven pump 32 and failure of bleed-and-feed should offsite power still be available.

4.7.5.6 Diesel Generator Room 33 – Fire Zone 102A

The largest contribution to core damage frequency resulting from fires in diesel generator room 33 is similar to that for diesel generator room 31: a fire in the pit beneath the diesel generator skid damages conduits routed beneath the decks. This fire interrupts power to all four DG rooms 32 and 33 exhaust fans and so fails diesel generators 32 and 33. The subsequent random loss of offsite power and operator failure to align the Appendix R diesel generator results in core damage as will the random failure of the AFW motor-driven pumps 31 and 33, failure of bleed-and-feed, and failure to manually operate the AFW turbine-driven pump 32 should offsite power be available.

4.8 ANALYSIS OF CONTAINMENT PERFORMANCE

In NUREG 1407 [1], the NRC explicitly requested that a containment performance analysis be performed to identify vulnerabilities to fire-induced early containment failure. Such an analysis must therefore address containment integrity, bypass and isolation, and containment decay heat removal systems. The IP3 IPE [6] was used to determine which systems to examine.

4.8.1 Containment Bypass

Two significant pathways for containment bypass were identified in the IP3 IPE [6]: unisolated steam generator tube rupture (SGTR) and interfacing system loss-of-coolant accidents (ISLOCAs). Since plant fires do not give rise to RCS pressures higher than those examined in the internal events IPE, no new unisolated SGTR events need be considered. Mechanical failure or spurious valve opening causes ISLOCAs. Fire-induced mechanical failures are considered not credible. Spurious valve opening caused by fire-induced electrical shorts is one of the assumptions for this study and examined in Sections 4.4 and 4.7—no significant containment bypass events (containment bypass sequences were less than 10^{-7}/year) were identified. Therefore, we conclude there are no fire-induced containment bypass vulnerabilities.

4.8.2 Containment Isolation

Containment isolation prevents the release of fission products to the environment during a postulated accident. Isolation is provided for piping that enters the RCS and penetrates the containment wall structure and piping that communicates directly with the containment atmosphere. Containment isolation comprises two redundant barriers involving a combination of motor-operated valves, check valves, manual valves, or blank flanges in series. Containment isolation valves are listed in Table 4.8.2.1.

Potential hot shorts, which may result in the containment isolation valves opening or remaining open, were examined. While most risk significant fire areas pertinent to such hot shorts are located in the switchgear, cable spreading and control rooms, these areas are well separated from the containment penetration areas where the containment isolation valves are located. Accordingly we can conclude that fires that give rise to hot shorts will not impede access to the containment isolation valves or prevent local operator action to close the isolation valves. Furthermore, since fire-induced accidents do not lead to early reactor vessel failure, many hours are available to take corrective action and close open containment isolation valves. Therefore, we conclude there no fire-induced containment isolation valve vulnerabilities.

Table 4.8.2.1

Containment Isolation Valves

Component ID	Component Description	Building	Elev.	Fire Zone	Fire Area	Fire zone description
AC-769	CC isolation to RCPfts	PAB	51ft-0"	59A	PAB-2	Pipe penetration area
AC-797	CCW to RC pump isolation	PAB	51ft-0"	59A	PAB-2	Pipe penetration area
AC-FCV-625	RC pumps thermal barrier outlet flow control	PAB	55ft-0"	59A	PAB-2	Pipe penetration area
AC-784	Reactor coolant pump CCW return line first containment isolation	PAB	68ft-0"	88A	PAB-2	Control station/filter area -fan house
AC-786	Reactor coolant pump CCW return line second containment isolation	PAB	68ft-0"	88A	PAB-2	Control station/filter area -fan house
AC-789	CC isolation from RCP thermal barrier	PAB	68ft-0"	59A	PAB-2	Pipe penetration area
AC-822A	RHR heat exchange 31 CC discharge isolation	PAB	68ft-0"	59A	PAB-2	Pipe penetration area
AC-822B	RHR heat exchange 32 CC discharge isolation	PAB	68ft-0"	59A	PAB-2	Pipe penetration area
AC-791	CCW to excess letdown heat exchange isolation	PP	51ft-0"	59A	PAB-2	Pipe penetration area

Table 4.8.2.1 (continued)

Containment Isolation Valves

Component ID	Component Description	Building	Elev.	Fire Zone	Fire Area	Fire zone description
AC-798	CCW to excess letdown heat exchange isolation	PP	51ft-0"	59A	PAB-2	Pipe penetration area
AC-796	CCW from excess letdown heat exchange isolation	PP	51ft-0ft	59A	PAB-2	Pipe penetration area
PCV-1229	Condenser discharge to VC isolation	Fan house	51ft-0"	59A	PAB-2	Pipe penetration area
PCV-1230	Condenser discharge to VC isolation	Fan house	51ft-0"	59A	PAB-2	Pipe penetration area
FCV-1173	VC purge exhaust valve	Fan house	59ft-0"	59A	PAB-2	Pipe penetration area
PCV-1191	Pressure relief isolation valve PCV-1191	Fan house	59ft-0"	59A	PAB-2	Pipe penetration area
PCV-1192	Pressure relief isolation valve PCV-1192	Fan house	59ft-0"	59A	PAB-2	Pipe penetration area
FCV-1171	VC purge air supply isolation valve	Fan house	88ft-0"	88A	PAB-2	Control station/filter area -fan house
DW-AOV-1	Water station containment isolation	PAB	41ft-0"	59A	PAB-2	Pipe penetration area

Table 4.8.2.1 (continued)

Containment Isolation Valves

Component ID	Component Description	Building	Elev.	Fire Zone	Fire Area	Fire zone description
DW-AOV-2	Water station containment isolation	PAB	41ft-0"	59A	PAB-2	Pipe penetration area
PS-10	Instrument air to post accident cont. Vent sys	PAB	41ft-0"	59A	PAB-2	Pipe penetration area
PS-7	Pressurization to post accident cont vent sys	PAB	41ft-0"	59A	PAB-2	Pipe penetration area
PS-8	Pressurization to post accident cont filter stop	PAB	41ft-0"	59A	PAB-2	Pipe penetration area
PS-9	Pressurization to post accident cont filter stop	PAB	41ft-0"	59A	PAB-2	Pipe penetration area
PCV-1190	Pressure relief isolation valve PCV-1190	VC	59ft-0"	59A	PAB-2	Pipe penetration area
FCV-1170	VC purge air supply isolation valve	VC	88ft-0"	84A	CNT-1	Containment fan cooler unit 31 area
FCV-1172	VC purge exhaust valve	VC	88ft-0"	84A	CNT-1	Containment Fan Cooler Unit 31 Area
CH-MOV-205	Charging flow to RCS iso valve	PP	41ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House

Table 4.8.2.1 (continued)

Containment Isolation Valves

Component ID	Component Description	Building	Elev.	Fire Zone	Fire Area	Fire zone description
CH-MOV-222	RCP seal wtr return isolation valve	PP	41ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
CH-MOV-226	Charging line ctmt isolation valve	PP	41ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
CH-MOV-250A	31 RCP seal inj ctmt isolation valve	PP	41ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
CH-MOV-250B	32 RCP seal inj ctmt isolation valve	PP	41ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
CH-MOV-250C	33 RCP seal inj ctmt isolation valve	PP	41ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
CH-MOV-250D	34 RCP seal inj ctmt isolation valve	PP	41ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
CH-MOV-441	31 RCP seal inj ctmt isolation valve	PP	41ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
CH-MOV-442	32 RCP seal inj ctmt isolation valve	PP	41ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House

Table 4.8.2.1 (continued)

Containment Isolation Valves

Component ID	Component Description	Building	Elev.	Fire Zone	Fire Area	Fire zone description
CH-MOV-443	33 RCP seal inj ctmt isolation valve	PP	41ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
CH-MOV-444	34 RCP seal inj ctmt isolation valve	PP	41ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
CH-201	Letdown line isolation valve	PP	51ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
CH-202	Letdown line isolation valve	PP	51ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
IA-PCV-1228	Instrument air containment isolation	PP	41ft-0"	59A	PAB-2	Pipe Penetration Area
BD-PCV-1214	31 S/G blowdown up stream containment isolation	PAB	55ft-0"	59A	PAB-2	Pipe Penetration Area
BD-PCV-1214A	31 S/G blowdown up stream containment isolation	PAB	55ft-0"	59A	PAB-2	Pipe Penetration Area
BD-PCV-1215	32 S/G blowdown up stream containment isolation	PAB	55ft-0"	59A	PAB-2	Pipe Penetration Area
BD-PCV-1215A	32 S/G blowdown up stream containment isolation	PAB	55ft-0"	59A	PAB-2	Pipe Penetration Area

Table 4.8.2.1 (continued)

Containment Isolation Valves

Component ID	Component Description	Building	Elev.	Fire Zone	Fire Area	Fire zone description
BD-PCV-1216	33 S/G blowdown up stream containment isolation	PAB	55ft-0"	59A	PAB-2	Pipe Penetration Area
BD-PCV-1216A	33 S/G blowdown up stream containment isolation	PAB	55ft-0"	59A	PAB-2	Pipe Penetration Area
BD-PCV-1217	34 S/G blowdown up stream containment isolation	PAB	55ft-0"	59A	PAB-2	Pipe Penetration Area
BD-PCV-1217A	34 S/G blowdown up stream containment isolation	PAB	55ft-0"	59A	PAB-2	Pipe Penetration Area
BD-PCV-1223	SG 31 blowdown sample upstream cont isolation	PP	51ft-0"	59A	PAB-2	Pipe Penetration Area
BD-PCV-1223A	SG 31 blowdown sample downstream cont isolation	PP	51ft-0"	59A	PAB-2	Pipe Penetration Area
BD-PCV-1224	SG 32 blowdown sample upstream cont isolation	PP	51ft-0"	59A	PAB-2	Pipe Penetration Area
BD-PCV-1224A	SG 32 blowdown sample downstream cont isolation	PP	51ft-0"	59A	PAB-2	Pipe Penetration Area
BD-PCV-1225A	SG 33 blowdown sample downstream cont isolation	PP	51ft-0"	59A	PAB-2	Pipe Penetration Area

Table 4.8.2.1 (continued)

Containment Isolation Valves

Component ID	Component Description	Building	Elev.	Fire Zone	Fire Area	Fire zone description
BD-PCV-1226	SG 34 blowdown sample upstream cont isolation	PP	51ft-0"	59A	PAB-2	Pipe Penetration Area
BD-PCV-1226A	SG 34 blowdown sample downstream cont isolation	PP	51ft-0"	59A	PAB-2	Pipe Penetration Area
RC-548	Press relief gas analyzer CTRL valve	PAB	54ft-0"	59A	PAB-2	Pipe Penetration Area
RC-549	Press relief gas analyzer CTRL valve	PAB	54ft-0"	59A	PAB-2	Pipe Penetration Area
RC-519	Primary water make-up to PRT valve	PP	41ft-0"	59A	PAB-2	Pipe Penetration Area
RC-550	Containment nitrogen supply isolation to PRT	PP	41ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
RC-552	Primary water make-up to PRT valve	PP	41ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
AC-MOV-744	RHR pumps discharge header stop	PAB	15ft-0"	622	PAB-2	Boron Injection Tank
AC-MOV-1870	RHR pump mini flow test line valve	PP	51ft-0"	59A	PAB-2	Pipe Penetration Area
AC-MOV-743	RHR pump mini flow test line	PP	51ft-0"	62A	PAB-2	Pipe Tunnel

Table 4.8.2.1 (continued)

Containment Isolation Valves

Component ID	Component Description	Building	Elev.	Fire Zone	Fire Area	Fire zone description
SI-851A	Safety injection pump 32 pump discharge stop	PAB	34ft-0"	9	PAB-2	Safety Injection Pump Room
SI-MOV-850A	Safety injection pump 32 pump discharge stop	PAB	34ft-0"	9	PAB-2	Safety Injection Pump Room
SI-MOV-850C	Safety injection pump 31 discharge stop	PAB	34ft-0"	9	PAB-2	Safety Injection Pump Room
SI-MOV-885A	RHR pumps suction from containment sump	PAB	34ft-0"	58A	PAB-2	Piping Tunnel
SI-MOV-885B	RHR pumps suction from containment sump	PAB	34ft-0"	58A	PAB-2	Piping Tunnel
SI-888A	High head injection recirc stop	PAB	51ft-0"	62A	PAB-2	Pipe Tunnel
SI-888B	High head injection recirc stop	PAB	51ft-0"	62A	PAB-2	Pipe Tunnel
SI-1835A	Boron injection tank discharge stop	PAB	55ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
SI-1835B	Boron injection tank discharge stop	PAB	55ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House

Table 4.8.2.1 (continued)

Containment Isolation Valves

Component ID	Component Description	Building	Elev.	Fire Zone	Fire Area	Fire zone description
SI-869A	Containment spray pump 31 spray HDRVC isolation	PAB	54ft-0"	59A	PAB-2	Pipe Penetration Area
SI-869B	Containment spray pump 32 spray HDRVC isolation	PAB	54ft-0"	59A	PAB-2	Pipe Penetration Area
SP-SOV-506	33 fan cooler unit sample to H2 analyzer B isolation	Fan house	67ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
SP-SOV-507	34 fan cooler unit sample to H2 analyzer B isolation	Fan house	67ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
SP-SOV-508	31 fan cooler unit sample to H2 analyzer B isolation	Fan house	67ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
SP-SOV-509	31, 33, 34 fan cooler units sample to H2 analyzer B header isolation	Fan house	67ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
SP-SOV-510	H2 analyzer a sample return to containment first isolation	Fan house	67ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
SP-SOV-511	H2 analyzer a sample return to containment second isolation	Fan house	67ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
SP-SOV-513	35 fan cooler unit sample to H2 analyzer a isolation	Fan house	67ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
SP-SOV-514	32 and 35 fan cooler units sample to H2 analyzer a header isolation	Fan house	67ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House

Table 4.8.2.1 (continued)

Containment Isolation Valves

Component ID	Component Description	Building	Elev.	Fire Zone	Fire Area	Fire zone description
SP-SOV-515	H2 analyzer b sample return to containment first isolation	Fan house	67ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
SP-SOV-512	32 fan cooler unit sample to H2 analyzer a isolation	PAB	55ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
SP-AOV-956E	Hot leg loop 1 & 3 sample isolation valve	PP	41ft-0"	59A	PAB-2	Pipe Penetration Area
SP-AOV-956F	Hot leg loop 1 & 3 sample isolation valve	PP	41ft-0"	59A	PAB-2	Pipe Penetration Area
SP-AOV-958	RHR loop sample isolation valve	PP	41ft-0"	59A	PAB-2	Pipe Penetration Area
SP-AOV-959	RHR loop sample isolation valve	PP	41ft-0"	59A	PAB-2	Pipe Penetration Area
SP-AOV-956G	Acc sample line isolation valves & ivsws solenoid	PP	41ft-0"	59A	PAB-2	Pipe Penetration Area
SP-AOV-956A	Pressurizer steam sample isolation valve	PP	51ft-0"	59A	PAB-2	Pipe Penetration Area
SP-AOV-956B	Pressurizer steam sample isolation valve	PP	51ft-0"	59A	PAB-2	Pipe Penetration Area

Table 4.8.2.1 (continued)

Containment Isolation Valves

Component ID	Component Description	Building	Elev.	Fire Zone	Fire Area	Fire zone description
SP-AOV-956C	Pressurizer steam sample isolation valve	PP	51ft-0"	59A	PAB-2	Pipe Penetration Area
SP-AOV-956D	Pressurizer steam sample isolation valve	PP	51ft-0"	59A	PAB-2	Pipe Penetration Area
SP-MOV-990A	Recirculation pump sample isolation	PP	51ft-0"	59A	PAB-2	Pipe Penetration Area
SP-MOV-990B	Recirculation pump sample isolation	PP	51ft-0"	59A	PAB-2	Pipe Penetration Area
SP-AOV-956H	Acc sample line isolation valves & ivsws solenoid	PP	51ft-0"	59A	PAB-2	Pipe Penetration Area
VS-PCV-1234	Rad monitors R-11 & R-12 containment isolation valve	Fan house	61ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
VS-PCV-1235	Rad monitors R-11 & R-12 containment isolation valve	Fan house	61ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
VS-PCV-1236	Rad monitors R-11 & R-12 containment isolation valve	Fan house	61ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House
VS-PCV-1237	Rad monitors R-11 & R-12 containment isolation valve	Fan house	61ft-0"	88A	PAB-2	Control Station/Filter Area -Fan House

Table 4.8.2.1 (continued)

Containment Isolation Valves

Component ID	Component Description	Building	Elev.	Fire Zone	Fire Area	Fire zone description
WD-AOV-1702	RCDT pumps discharge isolation	PP	51ft-0"	59A	PAB-2	Pipe Penetration Area
WD-AOV-1705	RCDT pumps discharge isolation	PP	51ft-0"	59A	PAB-2	Pipe Penetration Area
WD-AOV-1723	Containment sump pumps isolation	PP	51ft-0"	59A	PAB-2	Pipe Penetration Area
WD-AOV-1728	Containment sump pumps isolation	PP	51ft-0"	59A	PAB-2	Pipe Penetration Area
WD-AOV-1786	Containment vent header isolation	PP	51ft-0"	59A	PAB-2	Pipe Penetration Area
WD-AOV-1787	Containment vent header isolation	PP	51ft-0"	59A	PAB-2	Pipe Penetration Area
WD-AOV-1788	RCDT gas analyzer sample isolation valve	PP	51ft-0"	59A	PAB-2	Pipe Penetration Area
WD-AOV-1789	RCDT gas analyzer sample isolation valve	PP	51ft-0"	59A	PAB-2	Pipe Penetration Area
PS-PCV-1111-1	Weld channel pressurization header isolation valve	Fan house	41ft-0"	59A	PAB-2	Pipe Penetration Area

Table 4.8.2.1 (continued)

Containment Isolation Valves

Component ID	Component Description	Building	Elev.	Fire Zone	Fire Area	Fire zone description
PS-PCV-1111-2	Weld channel pressurization header isolation valve	Fan house	41ft-0"	59A	PAB-2	Pipe Penetration Area

4.8.3 Containment Heat Removal

The response of containment heat removal functions and systems (such as containment fan coolers and sprays) in fire-induced accident sequences was analyzed. While 480-V switchgear 31 and 32, cable spreading room and individual control room panels may be susceptible to fires, these failures are not significant to containment performance or plant damages states because they can be recovered by manual operation of breakers. If containment heat removal is not recovered, long-term containment overpressuruzation will occur. However, as no fire-induced accident sequence leads to early containment failure, no new fire-induced mechanism for the loss of containment heat removal was found.

4.8.4 Containment Failure Modes

The IPE [6] noted that early containment failures are primarily the result of sequences in which the accident initiator causes containment bypass. These accident initiators are steam generator tube rupture (SGTR) or inter-systems face LOCA's (ISLOCA's). However, the fire probabilistic risk assessment concludes there are no dominant fire-induced initiators that lead to early containment failure.

From the IPE, late containment failure is likely only if late containment heat removal is absent or long-term core-concrete interactions melt through the containment basemat. Late containment failures are evenly distributed between late containment overpressure and basemat meltthrough failures. Therefore, the fire PRA concludes that late containment failure is more probable than early containment failure.

4.8.5 Containment Performance Analysis Summary

The containment performance analysis considered systems, equipment and structures important to containment heat removal. The following conclusions were drawn from the containment performance analysis for fire-induced accident sequences:

- The results for fire-induced sequences are very similar to those derived for internal events in the IPE [6].

- No unique fire-induced containment failure mechanisms were identified.

- There are no vulnerabilities to fire-induced containment bypass.

4.9 TREATMENT OF FIRE RISK SCOPING STUDY ISSUES

A major NRC-funded research program was undertaken by Sandia National Laboratories to investigate issues concerning nuclear power plant risk that had previously remained unresolved. These issues included data uncertainties, requantification, identification and assessment of additional potential risk issues, and the evaluation of the completeness of 10CFR50, Appendix R rules in light of the other issues raised. From the report on this project, the "Fire Risk Scoping Study" or FRSS [10], a final list of risk issues of concern was developed. The NRC requires that these issues be addressed in the IPEEE. The risk issues are:

- Control systems interaction
- Seismic/fire interactions
- Manual fire fighting effectiveness (including smoke control)
- Total environment equipment survival (including spurious operation of suppression systems)
- Adequacy of fire barriers
- Adequacy of analytical tools for fires.

The issues will now be discussed insofar as they are pertinent to this plant and study.

4.9.1 Control Systems Interaction

The FRSS [10] identified the need to have safe shutdown circuits physically independent of, or be capable of being isolated from, the control room for a fire in the control room area.

Procedures ONOP-FP-1, 1A and 1B govern control room evacuation and remote shutdown. These procedures, specify the remote actions required to bring the plant to shutdown in case of a control room fire,:

- Verify the trip of (or manually trip) the reactor, turbine and main boiler feed pumps
- Verify that no reactor coolant pumps are running (and to manually trip running pumps)
- Isolate the reactor coolant system

- Ensure the MSIVs are closed
- Align charging pump suction to the RWST
- Check that 480-Vac buses are energized
- Open the roll-up door in the auxiliary boiler feed pump (ABFP) room to ensure adequate ventilation
- Ensure steam supply to the turbine-driven ABFP
- Ensure the controls for the motor-driven auxiliary boiler feed pumps are transferred to local and that both motor-driven pumps are running
- Control steam generator pressures
- Check the nitrogen back-up system for modulation of the AFW flow control valves
- Control steam generator water levels
- Maintain the average temperature of the RCS loop 31 cold leg
- Verify natural circulation in the RCS, adjusting steam generator pressures and feedwater flows as appropriate.

Subsequently, the operators:

- Operate the 480-V and 6.9-kV breakers locally as required
- Energize 480-V bus 312
- Ensure the operation of a component cooling water pump and charging pump, making transfers to power from MCC-312A if necessary
- Terminate the spurious operation of the containment spray pumps, RHR pumps, HHSI pumps and pressurizer heaters.
- Ensure the operation of one essential and one non-essential service water pump.

Once hot shutdown is achieved, cooldown from outside the control room is initiated.

Should the steps required for shutdown not be feasible or the appropriate response not be obtained, the procedures give directions for the action to be taken. The remote shutdown actions are performed outside the control room at the local pressurizer and pressure control panel on the 55-ft elevation of the PAB, the local ABFP/steam generator panel in the ABFP building, and the 6.9-kV switchgear area in the 15-ft elevation of the turbine building. Certain steps may require the manual operation of valves and breakers in the PAB, the penetration area and elsewhere.

Remote shutdown circuits are provided with parallel fused paths should the control room fire induce short circuits. Most transfer switches are found at the local panels, bypassing or de-energizing cables routed to the control room. Power for the alternate safe shutdown equipment control is from 125-Vdc power panel P0A. Power feeder cables to and from this panel are routed so as to not be impacted by fires in the control building that would require evacuation of the control room. Power supplies for alternate safe shutdown instrumentation are in general located in the turbine building; the instruments are located in the AFP room and PAB.

From this description, it is concluded that safe shutdown circuits are either physically independent of, or could be isolated from, the control room in the event of a fire in the control room area.

4.9.2 Seismic/Fire Interactions

The seismic/fire interactions were evaluated in Section 3.2.2 of this report.

4.9.3 Manual Fire-fighting Effectiveness

At IP3, the plant fire brigade meets or exceeds the attributes of an adequate fire protection program as recommended in the FIVE methodology, Attachment 10.5, III [2]. An effective manual firefighting program requires incident reporting guidelines, adequate staffing and equipment, training programs including practice drills, and established record-keeping practices. Examining each of these attributes of the IP3 fire protection program, we would note the following.

4.9.3.1 Reporting Fires

All personnel with unescorted access to the plant receive initial general employee training along with annual retraining, which delineates the procedure for reporting a fire. If smoke or fire is spotted, personnel are instructed to notify the control room immediately either by telephone or by way of the plant paging system. Although portable extinguishers are located throughout the plant, only personnel specifically trained in their use are allowed to operate them.

4.9.3.2 Fire Brigade

The onsite fire brigade consists of at least five members, two of whom are knowledgeable about plant safety-related systems and understand the effects of fire and fire suppression techniques on safe shutdown capability. One of these five is designated as the fire brigade leader. The leader is proficient in assessing the potential safety consequences of a fire and is able to advise control room personnel. The fire brigade complement consists of a licensed reactor operator who is part of the work control process, one unlicensed operator and three Nuclear Security Officers. All members of the brigade receive yearly physicals to assess their ability to perform fire-fighting duties.

The equipment provided for the brigade includes:

- Personal protective equipment such as self-contained breathing apparatus (SCBA), helmets, turnout coats, boots and gloves
- Emergency communications equipment
- Portable lights
- Portable ventilation equipment
- Portable extinguishers.
- Hand tools
- Nozzles and water appliances
- Hoses

4.9.3.3 Fire Brigade Training

Members of the fire brigade receive both initial and continuing training. Training consists of a combination of classroom instruction and a hands-on field practice of live fire combat. Training topics include:

- Brigade organization and responsibilities
- Fire protection gear and equipment
- Fire chemistry and extinguishers, foam additives

- Search and rescue, communications, and the use of self-contained breathing apparatus
- Fire attacks, fire streams and ventilation
- Plant safety and suppression systems
- Hazardous materials and radiation protection

Fire brigade leaders receive additional training in:

- Pre-fire plans
- Incident command, strategy and tactics

First aid and CPR is taught outside of the fire brigade training program.

4.9.3.4 Practice

Continuing training requires yearly live fire field practice including experience in extinguishing actual fires and the use of emergency breathing apparatus. Fire brigade leaders also perform actual incident command responsibilities.

4.9.3.5 Drills

Each fire brigade member performs a minimum of two (announced or unannounced) in-plant fire drills on a yearly basis. Each shift has one unannounced drill per quarter. The exercises selected for these drills are designed to simulate the characteristics of a fire, which could reasonably occur in the selected area. The Fire Protection Supervisor critiques all drills.

4.9.3.6 Records

The Training Department maintains documentation relating to fire fighting training activities. The Fire Protection Supervisor tracks the status of brigade personnel who successfully complete fire brigade training and drills. Annual monitoring of the physical condition of brigade members is the responsibility of the Authority physician and Occupational Health Nurse. Any deviation from a requirement is reported on a monthly basis to the brigade member and his/her manager.

4.9.3.7 Credit of Manual Fire Suppression

In the analysis, little credit was taken for fire brigade activities. Most of the fire zones that required detailed fire modeling had critical damage times that were less than postulated response time. Credit was taken for manual activation of the CO_2 suppression system during fires in the 480-V switchgear room, as discussed in Section 4.7.2.1. In addition, for fires induced by transient combustibles, some credit was taken for manual suppression of the fire in its incipient stage, either by workers present or by a firewatch.

4.9.4 Total Environment Equipment Survival (Including Spurious Operation Of Suppression Systems)

A fire suppression effects analysis has been performed for IP3 [17]. The analysis considered the effects of inadvertent actuation or rupture causing water flooding and spray and CO_2 discharge in all fire zones in which suppression may occur. The effects of control panel malfunction were also considered. The analysis concluded that a number of components were susceptible to water spray and flooding. These components and the resolution of concerns about the impact of flooding on them are listed in Table 4.9.4.1.

Table 4.9.4.1

Safety-Related Equipment Potentially Impacted by Inadvertent Actuation or Rupture of Fire Protection Systems [17]

Fire area	Fire zone	Safety related equipment impacted	Event	Comments
PAB-2	2	Containment spray pumps	Pipe rupture (water spray)	Alternative means of providing containment spray using RHR pumps remains available. Safe shutdown capability of plant is not impacted. Furthermore, procedural guidance now exists for the case in which both containment spray pumps are lost.
	8	Boric acid transfer pumps	Pipe rupture (water spray)	Safe shutdown capability of plant is not impacted.
	8	EHT 33 panels	Pipe rupture (water spray)	Loss of heat tracing circuits invokes plant off-normal operating procedure.
	90A	Spent fuel pit pumps	Pipe rupture (water spray)	Loss of spent fuel pool cooling and instrumentation invokes plant off-normal operating procedure.

Table 4.9.4.1 (continued)

Safety-Related Equipment Potentially Impacted by Inadvertent Actuation or Rupture of Fire Protection Systems [17]

Fire area	Fire zone	Safety related equipment impacted	Event	Comments
CL-T3	35A	Control building a/c equipment	Flooding from pipe rupture or adjacent zone fire fighting.	Equipment lost due to postulated flooding if no credit is taken for area drainage and overflow into adjacent zones. Safe shutdown capability of plant is not impacted. Furthermore, surveillance testing has now been instituted to verify that zone drainage is sufficient to prevent significant flooding of this fire zone.
TBL-5	37A	6.9-kV switchgear RCP feed breaker CTs	Pipe rupture (water spray)	Safe shutdown capability of plant is not impacted.
	39A	BFP discharge stop MOVs	Pipe rupture or inadvertent actuation (water spray)	Only one of two valves is impacted by a single event. Safe shutdown capability of plant is not impacted.
	44A	SOVs for FCV-1207 operator	Pipe rupture or inadvertent actuation (water spray)	Safe shutdown capability of plant is not impacted.
	45A	SOVs for FCV-1209, 1211 operators	Pipe rupture or inadvertent actuation (water spray)	Loss of SOVs for both FCVs because of a single inadvertent actuation of pipe rupture is not expected. Safe shutdown capability of plant is not impacted

Table 4.9.4.1 (continued)

Safety-Related Equipment Potentially Impacted by Inadvertent Actuation or Rupture of Fire Protection Systems [17]

Fire area	Fire zone	Safety related equipment impacted	Event	Comments
	46A	SOVs for FCV- 1206, 1208, 1210 operators	Pipe rupture or inadvertent actuation (water spray)	Loss of SOVs for all FCVs due to a single inadvertent actuation of pipe rupture is not expected. Safe shutdown capability of plant is not impacted.
	50A	SOVs for PCV1175-3, PCV1175-4	Pipe rupture (water spray)	Safe shutdown capability of plant is not impacted.
	53A	EHT 32 panels	Pipe rupture (water spray)	Loss of heat tracing circuits invokes plant off-normal operating procedure.

It will be noted that ac motor control centers and dc batteries, battery chargers and power panels are not included in the list of susceptible equipment. These items of equipment are located in areas with automatic CO_2 suppression systems and have been determined not to be impacted in the event of system discharge.

4.9.5 Adequacy of Fire Barriers

The FRSS [10] expressed concern over the effectiveness of fire barriers at nuclear plants in the absence of differential pressure testing. These concerns were also noted in various NRC IE notices regarding the improper installation and operation of dampers, and the inadequate qualification and documentation for fire penetration seals. At IP3, these concerns have been addressed both in the design basis of the plant and in inspections and tests of fire barriers that will now be described.

Fire Doors. Inspections of safety-critical fire doors are performed on a weekly basis using procedure FP-19 [21]. Other, less important, fire doors are inspected on a monthly basis using procedure FP-31 [22]. The inspections entail the visual verification of door position, proper mechanical operation (including auto-close) and the complete integrity of doors and frames (including the absence of holes, mechanical damage, missing bolts and hardware, and the misalignment of the door in its frame). While minor maintenance can be conducted during the inspection, remaining deficiencies in the doors addressed in FP-19 (Operations Specification, Appendix R and other important fire barriers) are to be brought to the attention of the Shift Manager and a fire watch instituted as appropriate. In contrast, deficiencies in the other less important doors addressed in FP-31 are to be brought to the attention of the Fire Protection System Engineer, the Fire Protection Supervisor, or the Performance & Reliability Supervisor.

Fire Dampers. The functional testing of electrical tunnel fire dampers is addressed in procedure 3PT-R95 [20]. Dampers are first inspected for physical damage and debris and then tested by removing thermal links and verifying the full closure of each damper. Any failure to meet acceptability criteria will require prompt corrective action.

The annual inspection, cleaning and preventive maintenance of fire and smoke dampers in the control building, battery rooms, PAB, diesel generator building, an electrical tunnels are addressed in procedure FIR-005-FIR [23]. Again testing entails visual inspection and verification that the damper closes unassisted on removal of the fusible link, electro-thermal link or J-hook.

Penetration Seal Assemblies. The fire resistive integrity of penetrations of fire-rated barriers is maintained by ensuring that mechanical/pipe penetrations are sealed to give protection equivalent to that provided by the barrier. The requirements for fire barrier integrity are dictated by the various codes and commitments made by the Authority [12]. In addition, a seal surface inspection program has been implemented and seal maintenance is performed as required to maintain seal integrity. Seal inspection and maintenance are facilitated by an IP3 penetration seal database.

Fire barrier penetration seal inspection is addressed in procedure 3PT-R100 [16]. This procedure calls for the visual inspection of seal surfaces (with specific acceptability criteria for different types of seal material, internal conduit seals and flamemastic fire stops) and the formal reporting of any seals that do not meet acceptability criteria to the fire protection system engineer. The inspection frequency for penetration seals is dictated in part by the results of inspections. 15 percent of each type of fire barrier penetration seal are to be inspected every 24 months. Should seals not meet acceptability criteria, an additional 15 percent sample of the seals are to be inspected. While inaccessible penetration seals need not be inspected, seals that are not readily accessible must be inspected within 15 years or when they are made accessible.

Fire Barrier Wrap/Radiant Energy Shield. The inspection of fire barrier wrap/radiant energy shields is addressed in procedure 3PT-R102 [19]. Fire barrier wrap/radiant energy shields included in this procedure is marinite board separating redundant pumps, marinite board shield separating cable trays from instrument racks, fire protective wrap on power feed conduit, cable trays, cable bundles and instrument system conduit. Inspection calls for the identification of penetrations through the barriers of any combustible material, excepting cable, rips, gaps, holes or cracks in marinite board or wrap, a lack of continuity or overlap in wrap and blanket, and missing fire stops. Should acceptability criteria not be met, a fire watch will be posted or fire watch patrol established as appropriate.

Other Fire Barriers. The inspection of controlled fire barriers, other than fire doors, dampers, penetration seals and fire barrier wrap/radiant energy shields is addressed in procedure 3PT-R100A [18]. These barriers comprise room and corridor walls in the PAB, control building, auxiliary boiler building, turbine building, administrative service building and fire protection pump house. The visual inspection of these barriers requires that any conditions that might compromise the ability of the fire barrier to withstand the hazards of the area be identified, reviewed and documented and that the fire protection system engineer be informed of them that same shift. The fire protection system engineer can then take steps to remedy the situation.

4.9.6 Adequacy of Analytical Tools

This present study made use of the fire PRA methodology and FIVE fire [2] modeling. Accordingly, as indicated in the Fire PRA Implementation Guide [3], there is no need for further evaluation of the adequacy of these tools.

4.10 USI A-45 AND OTHER SAFETY ISSUES

4.10.1 USI A-45

The primary objectives of the USI A-45 program were to evaluate the adequacy of the decay heat removal systems and determine the costs and benefits of providing alternative means of decay heat removal. An analysis was conducted to ascertain if any additional decay heat removal vulnerabilities were introduced by fire at IP3. The insights gained from the evaluations were discussed and evaluated as prescribed in NUREG-1289 [24], and Supplement 5 to Generic Letter 88-20 [26]. The important insights pertinent to IP3 are discussed below:

Support system failures are significant contributors to the CDF. In the IP3 IPE, loss of the 480-V safeguards was found to have the largest impact on CDF for support systems. While a fire may disable all four 480-V safeguards buses (2A, 3A, 5A, and 6A), the plant can be safely shut down using the safe shutdown equipment powered by 480-V bus 312.

The adequacy of physical separation and protection of redundant safeguard trains is often lacking. While areas were identified where the potential exists for disabling redundant safeguards trains (e.g., 480-V safeguard buses), alternative methods of providing the function are available (e.g., 480-V bus 312).

Sharing and interconnections between redundant safeguard trains create single point vulnerabilities. There are no such vulnerabilities for decay heat removal systems.

Human errors were found to be of special significance. Human errors were not found to pose vulnerabilities for decay heat removal systems. This was validated by the fact that screening values were used for post-accident operator actions credited in the IP3 IPE.

LOSP events were found to contribute significantly to risk. Fire scenarios were identified that might result in a loss of offsite power and the 480-V safeguards buses. However, these scenarios are mitigated by the ability to safely shut down the plant using safe shutdown equipment powered by 480-V bus 312. While representing a significant contribution to risk, these scenarios do not pose a vulnerability.

An analysis of systems and components required for decay heat removal was performed based on the IP3 IPE accounting for the random failure of non-fire damaged components. NUREG/CR-1289 [24] determined that the most severe fires in terms of their impact on decay heat removal occur in single fire zones--the fire barriers were assumed intact. The dominant initiator resulting in a loss of decay heat removal involved failure of the 480-V switchgear buses (2A, 3A, 5A, and 6A).

4.10.2 Generic Issue GI-57

Generic issue GI-57 [29] concerns the effects of inadvertent suppression. This issue was examined as part of a review of concerns raised in the Fire Risk Scoping Study and is described in detail in Section 4.9.4. Although certain components were found to be vulnerable to water spray effects, none were dominant contributors to core damage frequency. No significant vulnerabilities to water spray, flooding, and CO_2 effects on safe shutdown equipment were found. This generic safety issue was therefore judged to be resolved.

This notwithstanding, it should be noted that prior to the recent corrective actions taken [11] of the CO_2 fire suppression systems in the emergency diesel generator rooms, a vulnerability to the operation of this system was present. The spurious operation of a system would cause the unavailability of the EDG room ventilation system and thus, eventually, the unavailability of the EDGs. Thus, a seismic event might result in vibration of the EDG fire suppression control panels and the spurious operation of the CO_2 fire suppression systems in their automatic mode. Given that a seismic event is also assumed to cause a loss-of-offsite-power, a significant contribution to the core damage frequency could be anticipated. The corrective actions made to the CO_2 fire suppression systems was to isolate power from CO_2 relays that initiate isolation of the EDG room ventilation, isolation of the CO_2 supply, and the posting of continuous fire watch personnel. Spurious operation of these systems is thus most unlikely even given a seismic event.

Generic issue GI-57 concerns the effects of inadvertent suppression. This issue was examined as part of a review of concerns raised in the Fire Risk Scoping Study and is described in detail in Section 4.9.4. Although certain components were found to be vulnerable to water spray effects, none were dominant contributors to core damage frequency. No significant vulnerabilities to water spray, flooding, and CO_2 effects on safe shutdown equipment were found. This generic safety issue was therefore judged to be resolved.

4.10.3 Generic Issue GI-106

Generic issue GI-106 addressing piping and the use of highly combustible gases, is evaluated in Section 5.5.2.2 of the IPEEE. At IP3, this generic safety issue pertains to hydrogen lines in the turbine building, the primary auxiliary building, the pipe trench and the containment access facility annex. The analysis concluded that the CDF induced by hydrogen fires and explosions is approximately equal to the screening criterion of 10^{-6}/ year. However, hydrogen fires and explosions make only a small (approximately 2 percent) contribution to the total CDF. Furthermore, methods to further reduce the risk from hydrogen fires and explosions (and in particular, installing an excess-flow valve in the hydrogen supply line) were identified. No additional vulnerabilities to hydrogen fires and explosions and random equipment failures were identified in the fire PRA.

4.11 REFERENCES

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Appendix 4A

HUMAN ERROR ANALYSIS
FOR
PLANT SHUTDOWN FROM
OUTSIDE THE CONTROL ROOM

SUMMARY

a. Task. Safely shut down the plant from outside the control room using 480-V bus 312.

b. Success Criterion. Success requires power to be supplied to 480-V bus 312, manual startup and control of turbine-driven ABFP 32, steam generator level control and restoration of either RCP seal injection or thermal barrier cooling.

c. Scenario/Event Tree(s) Used. This action may be required in scenarios involving fires in the control room (fire zone 15), cable spreading room (fire zone 11) and 480-V switchgear room (fire zone 14).

ACTION

a. Initial Conditions. The plant is initially operating at full power. A fire occurs resulting in an inability to shut down the plant from the control room because of a loss of plant control and instrumentation or control room inhabitability.

b. Preceding Operator Actions. The operators will first confirm that there is a fire and then determine whether an adverse environment (ie, control room fire) or the potential loss of shutdown capability from the control room requires control room evacuation.

c. Symptoms/Indications. Actuation of a fire detection or suppression system in the control room, cable spreading room, or 480-V switchgear room will result in an alarm in the control room. A control room fire will be obvious.

d. Procedural Guidance. Upon receipt of indications of a fire, the operators enter ONOP-FP-1 (Plant Fires). The operator actions required in ONOP-FP-1 depend upon the location and severity of the fire. For fires that might result in loss of plant control from the control room, the procedure directs the operators to perform ONOP-FP-1A (Safe Shutdown from Outside the Control Room).

e. Response. The critical actions required to safely shut down the plant from outside the control room, given a fire which results in a station blackout, can be summarized as follows:

- Verify or establish power to Appendix R 480-V bus 312, either from offsite power (if available) or from the Appendix R diesel generator.
- Establish secondary cooling using turbine-driven ABFP 32.
- Establish RCP seal cooling using RCP seal injection or thermal barrier cooling.
- Maintain adequate secondary decay heat removal by controlling steam generator water levels.

PERFORMANCE SHAPING FACTORS

a. Timing.

Time Available – One hour is available to restore RCP seal cooling before an RCP seal LOCA could exceed the capacity of the charging pumps (Section H2.17 of the IP3 IPE).

Time Needed - The timing of events that follow ignition will depend upon the location and intensity of the fire. While a fire in the control room will be confirmed rapidly, it may delay the arrival of operators at the remote shutdown locations. Conversely, while there may be delays in confirming fires in other locations, travel to the remote shutdown panels may be unimpeded. A conservative estimate of the time required to perform the actions necessary to re-establish RCP seal cooling is 30 minutes based on Appendix R training records and discussions with operations and training personnel.

b. Competing Actions/Alarms. None. All concurrent actions will involve mitigating fire effects from the remote shutdown panels.

c. Consequence of Actions.

Success - Success implies continued RCP seal cooling and adequate secondary decay heat removal. A stable plant will result.

Failure - Failure implies an inability to re-establish RCP seal cooling or secondary decay heat removal and eventual core damage.

d. Training/Experience. While the operators are familiar with the fire procedures and safe shutdown from outside the control room, the procedure is practiced less frequently than are other procedures such as LOCAs or loss of secondary heat sink.

e. Stress. A fire that requires control room evacuation and control of the plant from outside the control room is expected to result in high levels of stress.

f. Skill/Rule/Knowledge-Based. Rule-based--each action is proceduralized.

e. Task Complexity. Moderate to high.

QUANTIFICATION

Figures 4A-1 and 4A-2 were developed to depict the inter-relationships between critical actions involved in shutting down the plant outside the control room. The probability that the operators fail to safely shut down the plant from outside the control room, given the availability of offsite power to 480-V bus 312, is 0.051, as shown on Figure 4A-1. The probability that the operators fail to safely shut down the plant from outside the control room, given that the Appendix R diesel generator must be aligned to bus 312, is 0.15, as shown on Figure 4A-2. The "nodes" on the human action event trees in Figures 4A-1 and 4A-2 are described and quantified below:

[A] Diagnose Need to Align Safe Shutdown Equipment

Based on the time available to restore RCP seal cooling (60 minutes) and the time required to perform the necessary actions (30 minutes), the time available for diagnosis is $60 - 30 = 30$ minutes. From Table 8-2 of NUREG/CR-4772, the median diagnosis human error probability (HEP) is 10^{-3}, with an error factor of 5. This results in a mean HEP of 2.7×10^{-3}.

[B] Align Appendix R Diesel Generator to Bus 312

This action is required only for fire scenarios that involve both a loss of the 480-V safeguards buses and loss of offsite power to bus 312. Therefore, with offsite power available, this HEP is equal to 0.0. With offsite power unavailable, the following critical actions must be performed to align the Appendix R diesel generator to bus 312:

1. Open gas turbine substation bus breakers GT-2F, GT-BT and GT-CP

2. Open all load breakers on 480-V bus 312 except for PDP-TG-1

3. Open various 6900-V breakers and knife switches

4. Close ST-312 (6900-V bus 1 supply breaker to station transformer 312)

5. Close GT-35 (6900-V gas turbine substation bus supply to 6900-V bus 5)

6. Start and load Appendix R diesel

(The probability that the operators fail to align the safe shutdown equipment to bus 312 is modeled separately for the charging pump, CCW pump 32 and backup SW pump 38).

The median HEP assigned to each of the above actions from Table 8-5 of NUREG/CR-4772 (item 3) is 0.02 with an error factor of 5. The mean HEP for each action is thus 0.032.

Once the Appendix R diesel is aligned to bus 312, the operator is instructed to periodically monitor the diesel. In addition, failure to properly align the Appendix R diesel will be evident during steps in the procedures that direct the SM to check the status of the safe shutdown equipment. As a result, credit was taken for a step-by-step verification. From Table 8-5 (item 6), the median HEP for this verification is 0.02, with an error factor of 5. The mean HEP for verification is thus 0.32.

In addition to performance of the above actions, success requires that the Appendix R diesel generator be available. The unavailability of the Appendix R diesel generator was estimated to be approximately 0.041.

Therefore, the total HEP for [B], accounting for hardware failure, is $6 \times 0.032 \times 0.32 + 0.041 = 0.10$.

[C] <u>Align Turbine-Driven ABFP 32</u>

The critical action involved in aligning the steam turbine-driven auxiliary boiler feed pump is opening steam supply valves PCV-1310A/B. (Operator action to open the discharge flow control valves is modeled separately). Prior to evacuating the control room, the CRS is instructed to open the steam supply valves. From Table 8-5 (item 3) of NUREG/CR-4772, the median HEP for this action is 0.02 with an error factor of 5. The mean HEP is thus 0.032.

Should the CRS fail to open the steam supply valves from the control room, a verification is performed by the NPO, RO and STA. From Table 8-5 (item 6) of NUREG/CR-4772, the median HEP associated with each recovery is 0.2 with an error factor of 5. The mean recovery HEP is thus 0.32.

In addition to performance of the above actions, success requires that the ABFP 32 be available. The unavailability of this pump was estimated to be approximately 0.017.

Therefore, the total HEP for [C], accounting for hardware failure, is $0.032 \times 0.32 \times 0.32 \times 0.32 + 0.017 = 0.018$.

[D] <u>Control SG Water Level</u>

The RO must open the ABFP 32 flow control valves and maintain steam generator wide range levels between 80% and 90%. From Table 8-5 (item 3) of NUREG/CR-4772, the median HEP for this action is 0.02 with an error factor of 5. The mean HEP is thus 0.032.

A step-by-step verification is performed by the STA and a dynamic verification is performed by the CRS. From Table 8-5 (items 6 and 7, respectively) of NUREG/CR-4772, median HEPs of 0.2 and 0.5 were assigned to these actions with error factors of 5. The resulting mean HEPs for verification are thus 0.32 and 0.81, respectively.

Therefore, the total HEP for [D] is $0.032 \times 0.32 \times 0.81 = 8.3 \times 10^{-3}$.

[E] Align Charging Pump for Seal Injection

The Appendix R bus 312 can supply power to either charging pump 31 or 32. Either charging pump can supply adequate seal injection to the RCPs to cool the RCP seals and prevent a seal LOCA.

The SM must transfer power for the charging pump (31 or 32) to the alternate feed from MCC 312A by removing the load from bus 312, placing the alternate feed transfer switch in the "Alternate Feed" position, closing the disconnect switch on MCC-312A, and starting the charging pump using the key switch at MCC 312A. From Table 8-5 (item 3) of NUREG/CR-4772, the median HEP for each of these four actions is 0.02 with an error factor of 5. This results in a mean HEP of 0.032 for each action. Both the CRS and STA perform a step-by-step verification. From Table 8-5 (item 6) of NUREG/CR-4772, the median HEP associated with each recovery is 0.2 with an error factor of 5. This results in mean recovery HEPs of 0.32.

In addition, long-term success of RCP seal cooling using charging pump seal injection requires that suction to the charging pumps be transferred from the VCT to the RWST by opening CH-288 and de-energizing and closing CH-LCV-112C. The CRS directs the NPO to perform this action in Step 11 of Section 4.0 in ONOP-FP-1A. A step-by-step verification is performed by the STA. Based on the above discussion, the mean HEP for the original error is 0.032, and the HEP for recovery by the STA is 0.32.

Once the charging pump is started and aligned to the RWST, the CRS must control charging pump speed to maintain RCP seal injection flows between 6 - 12 gpm each. A step-by-step verification is performed by both the NPO (using Attachment 3 of ONOP-FP-1A) and by the STA, who is instructed to verify the actions performed by the CRS and NPO. Based on previous discussions, the mean HEP for the original error is 0.032, and the HEPs for recovery by both the NPO and STA are 0.32.

In addition to the above actions, success requires that either charging pump 31 or 32 be available. The unavailability these charging pumps was estimated to be approximately 9.7×10^{-3}.

Therefore accounting for hardware failure, the total HEP for [E] is $4 \times 0.032 \times 0.32 \times 0.32 + 0.032 \times 0.32 + 0.032 \times 0.32 \times 0.32 + 9.7 \times 10^{-3} = 0.036$.

[F] Align CCW Pump 32 (Given Successful Alignment of Charging Pump Seal Injection)

Appendix R bus 312 supplies alternative power to component cooling water (CCW) pump 32. This pump supplies cooling to the charging pumps (which in turn are used for

RCP seal injection) and RCP thermal barrier heat exchangers.

The SM must transfer power for CCW pump 32 to the alternate feed from MCC 312A by removing the load from bus 312, placing the alternate feed transfer switch in the "Alternate Feed" position, closing the disconnect switch on MCC-312A, and starting the No. 32 CCW pump using the key switch at MCC 312A. From Table 8-5 (item 3) of NUREG/CR-4772, the median HEP for each of these four actions is 0.02 with an error factor of 5. The mean HEP for each action is thus 0.032. Both the CRS and STA perform a step-by-step verification. From Table 8-5 (item 6) of NUREG/CR-4772, the median HEP associated with each recovery is 0.2 with an error factor of 5. The mean recovery HEPs are thus 0.32.

In addition to the above actions, success requires that CCW pump 32 be available. The unavailability of this pump was estimated to be approximately 7.2×10^{-3}.

Therefore, the total HEP for [F], accounting for hardware failure, is $4 \times 0.032 \times 0.32 \times 0.32 + 7.2 \times 10^{-3} = 0.020$.

[G] Align CCW Pump 32 (Given Failure to Align a Charging Pump for Seal Injection)

This action is similar to that in node [F] except that, given failure to properly align a charging pump for seal injection, some dependency was assumed. Namely, if the CRS and STA fail to recover an error associated with establishing RCP seal injection, it is assumed that recovery of an error associated with verifying CCW pump alignment will also fail. Therefore, the total HEP for [G], accounting for hardware failure, is $4 \times 0.032 + 7.2\times10^{-3} = 0.14$.

[H] Align City Water Cooling to Charging Pump

This action is addressed only on scenarios in which RCP seal injection via a charging pump is successful but CCW cooling to the charging pump is unsuccessful. Given this scenario, continued operation of the charging pump can be maintained by aligning backup city water to cool the charging pump. To align the city water cooling supply to the charging pump, the operator must: 1) close MW-681, 2) close MW-684, 3) close AC-756A, 4) close AC-756B, 5) open MW-26, 6) open AC-701A, and 7) remove the flange next to AC-701B and open AC-701B. From Table 8-5 (item 3) of NUREG/CR-4772, the median HEP for each of these seven actions is 0.02 with an error factor of 5. The mean HEP for each action is thus 0.032. Credit for recovery by the CRS was taken. From Table 8-5 (item 6) of NUREG/CR-4772, the median HEP associated with this recovery is 0.2 with an error factor of 5. This results in a mean recovery HEP of 0.32.

Therefore, the total HEP for node [H] is $7 \times 0.032 \times 0.32 = 0.072$.

[I] Align Backup Service Water Pump 38 (Given Successful Alignment of No. 32 CC Pump

Given that RCP seal cooling has been successfully established, service water is eventually required to remove heat from the CCW heat exchangers to allow for continued operation RCP seal cooling.

The SM must transfer power for SW pump 38 to the alternate feed from MCC 312A by removing the load from bus 312, closing the disconnect switch on MCC-312A, and starting the No. 38 SW pump using the key switch at MCC 312A. From Table 8-5 (item 3) of NUREG/CR-4772, the median HEP for each of these three actions is 0.02 with an error factor of 5. The mean HEP for each action is thus 0.032. Both the CRS and STA perform a step-by-step verification. From Table 8-5 (item 6) of NUREG/CR-4772, the median HEP associated with each recovery is 0.2 with an error factor of 5. This results in mean recovery HEPs of 0.32.

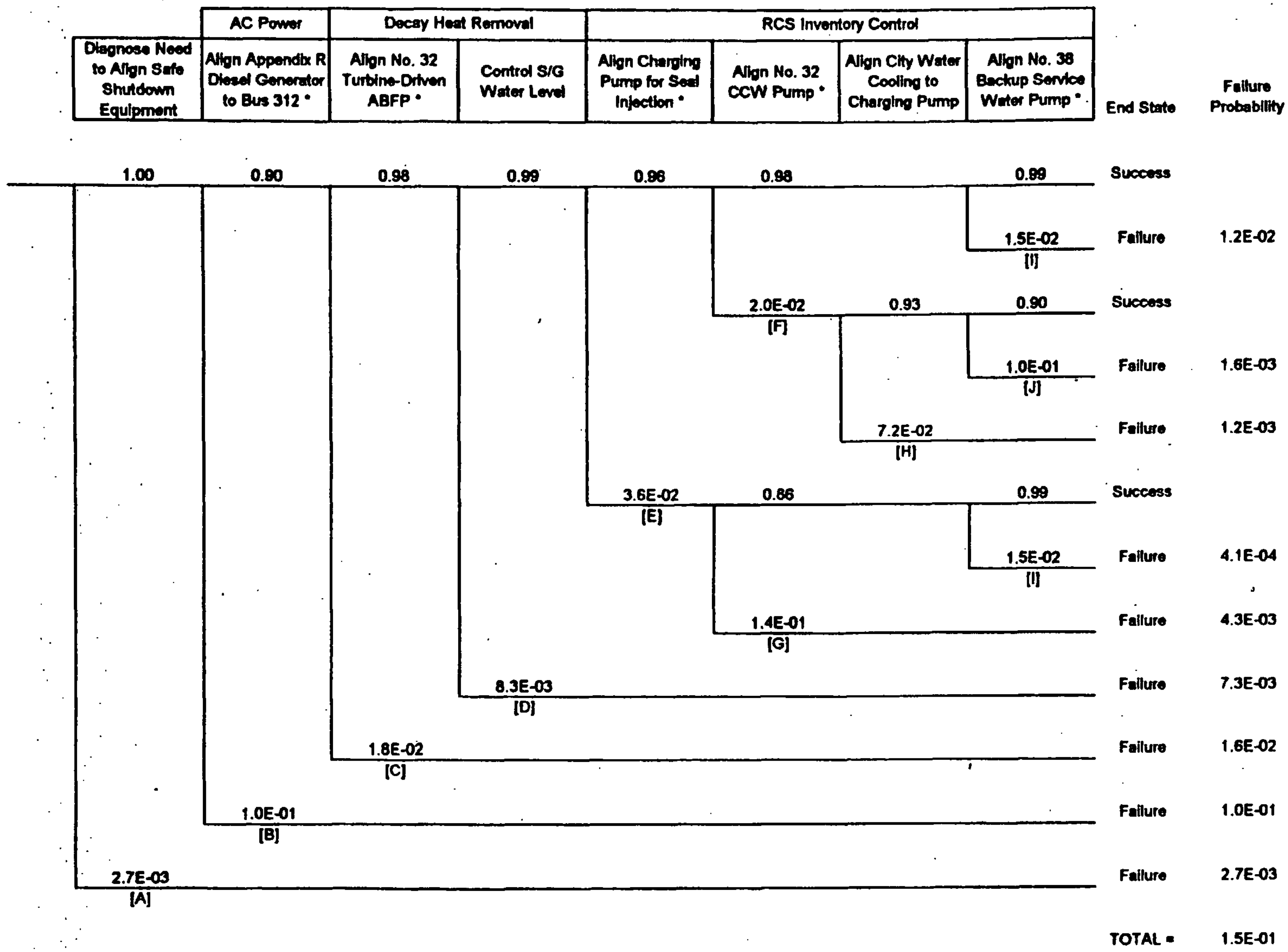
In addition to the above actions, success requires that SW pump 38 be available. The unavailability of this pump was estimated to be approximately 0.005.

Therefore, the total HEP for [I], accounting for hardware failure, is $3 \times 0.032 \times 0.32 \times 0.32 + 0.005 = 0.015$.

[J] <u>Align Backup Service Water Pump 38 (Given Unsuccessful Alignment of No. 32 CCW Pump</u>

This action is similar to that in node [I] except that, given failure to properly align CCW pump 32, some dependency was assumed. Namely, if the CRS and STA fail to recover an error associated with aligning CCW pump 32, it is assumed that recovery of an error associated with verifying SW pump 38 alignment will also fail. Therefore, the total HEP for [J], accounting for hardware failure, is $3 \times 0.032 + 0.005 = 0.10$.

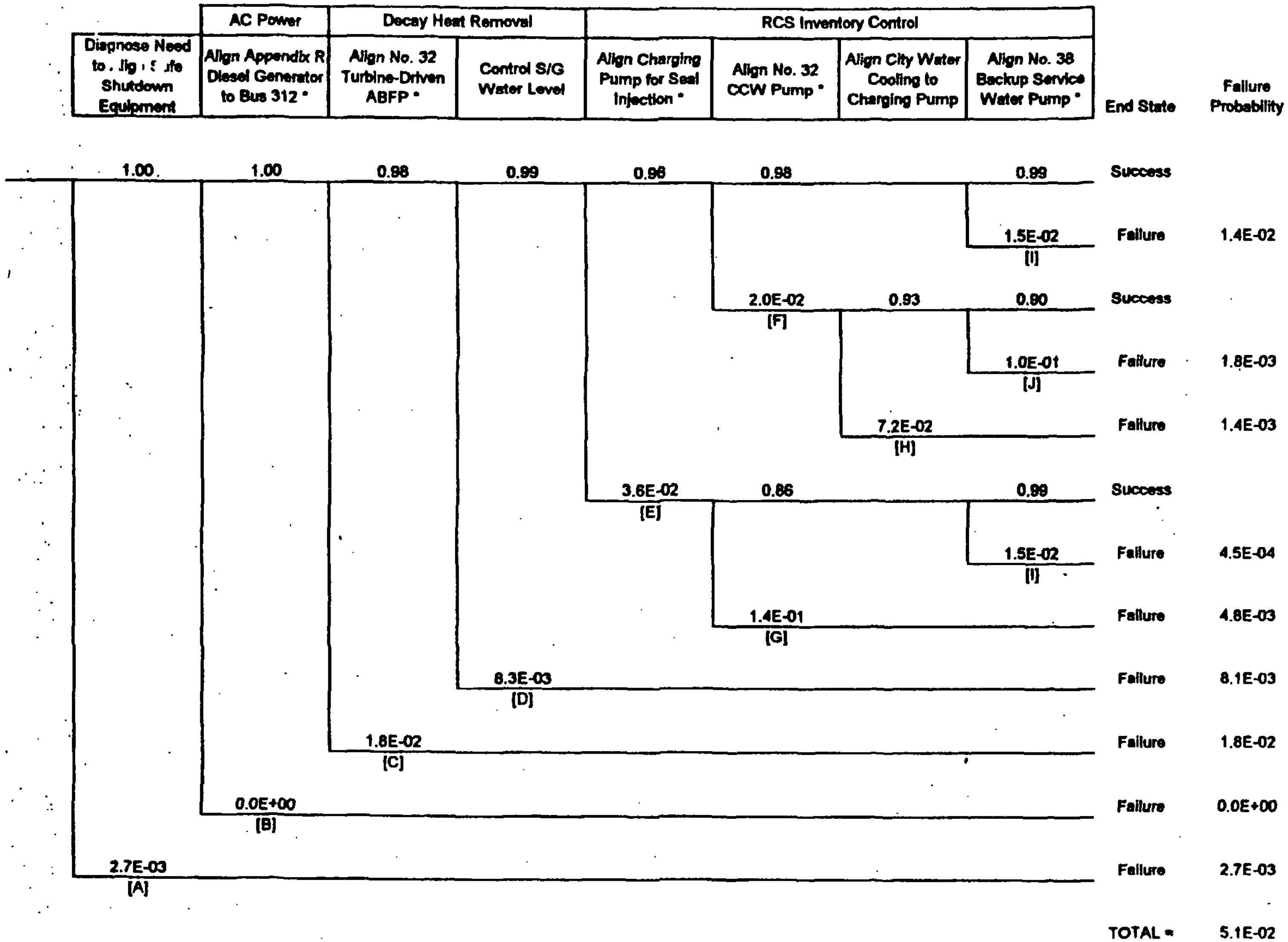
Figure 4A-2
Operator Action Event Tree for Safe Shutdown Outside the Control Room (Offsite Power Unavailable)



* Failure probability includes equipment unavailability

Figure 4A-1

Operator Action Event Tree for Safe Shutdown Outside the Control Room (Offsite Power Available)



* Failure probability includes equipment unavailability

Section 5

HIGH WINDS AND TORNADOES, EXTERNAL FLOODS, AND HAZARDOUS CHEMICAL, TRANSPORTATION AND NEARBY FACILITY INCIDENTS

5.1 INTRODUCTION

This section reports upon the results of the Individual Plant Examination of External Events, as applied to the impact of high winds and tornadoes, external floods, and hazardous chemical, transportation and nearby facility incidents, for the Indian Point Unit 3 Nuclear Power Plant (IP3). This examination was performed to meet the requirements of the NRC's Generic Letter 88-20 [1]. In conducting the examination, particular attention was paid to data and methodologies that have been developed since the plant operating license was issued.

5.2 METHODOLOGY

The methodologies employed to evaluate the impact of external events such as high winds, external floods and transportation and nearby facility incidents were the iterative methodologies suggested by NUREG-1407 [2]. The first step common to all external events of concern was to review plant-specific hazard data and the licensing bases to ascertain how the events were addressed prior to issuance of the plant operating license. This review was scrutinized to ensure that data required for comparison with the 1975 Standard Review Plan (SRP) were gathered. Significant changes to the plant and to the characterization of the external events and their impact on plant safety were then identified. For example, in evaluating high winds and tornadoes, the issues raised in NRC Information Notice 93-53 relating to lessons learned from the effects of Hurricane Andrew [3] were addressed. A similar review was conducted to identify significant changes to the characterization of the causes of external flooding. This review ensured that GI 103, "Design for Probable Maximum Precipitation", was properly addressed and that recent National Weather Service probable maximum precipitation data and other recent predictions of Hudson River flood levels were obtained and addressed.

A determination was then made as to whether IP3 meets the 1975 SRP criteria with respect to high winds and tornadoes, external floods and transportation and nearby facility incidents, and whether there are particular susceptibilities that would result in a core damage frequency of 10^{-6}/year or more. In making this determination, the potential for damage to safety-related equipment consequent to the failure of non-safety related structures and equipment induced by external events was addressed. Where it could not be clearly demonstrated from existing studies that IP3 meets SRP criteria, further analyses were conducted as follows.

5.2.1 High Winds and Tornadoes

High winds and tornadoes can damage systems and structures within a nuclear power plant as a result of dynamic wind loadings, missiles generated by a tornado, and pressure differentials induced by a tornado. The evaluation of risks associated with tornadoes and high winds comprised the following steps:

- Determining the frequencies of tornadoes and high winds at IP3 as a function of wind velocity. The methodology described by Rutch, et al. [4] was used in conjunction with reported tornado data from 1958 through 1994.

- Characterizing tornadoes that meet the 10^{-6}/year frequency criterion of concern [2].

- Identifying vulnerabilities to tornado-generated wind loadings, pressure differentials, and missiles.

- Assessing tornado damage potential and identifying the causes and estimating the frequency of core damage resulting from high winds and tornadoes, alone or in conjunction with the random failure of other equipment.

Measures were then identified to reduce significant risks arising from tornadoes and strong winds.

5.2.2 External Floods

Prior to plant commissioning, bounding Hudson River floods were identified and characterized to demonstrate that no foreseeable floods could overflow the river embankment into the plant. In this present examination of external flooding, the assumptions made in the earlier analyses were reviewed to ensure their continuing applicability. In addition, more recent studies that characterize river levels as a function of their return period were also reviewed. Finally, potential risk scenarios not fully addressed in the design of the plant were identified. These scenarios were found to be associated with the impact of probable maximum levels of precipitation on roof drainage. The consequences of these scenarios on the plant were then determined, accounting, where appropriate, for mitigating features in place. Measures that could reduce the risk arising from external flooding would then have been identified should this risk have proved significant.

5.2.3 Hazardous Chemical, Transportation, and Nearby Facility Incidents

The assessment of hazardous chemical, transportation, and nearby facility incidents addressed the risk posed by toxic hazards, explosions, and aircraft impact. The characterization of on- and off-site toxic hazards was undertaken as a series of subtasks that built upon the control room habitability studies performed in response to NUREG-0737, Section IIID.3.4 [5]. Other hazards were characterized in new analyses. The following steps were taken to assess hazardous chemical, transportation, and nearby facility incidents:

- Military and industrial facilities within five miles of IP3 that store or use chemicals that could give rise to a toxic hazard at the IP3 site were identified. This step entailed inquiries of the Westchester County Health Department and road-side surveys in the vicinity of the plant to identify sources of potential toxic and explosion hazard to the plant. Chemicals stored on-site at IP3 that could give rise to an explosion or airborne toxic hazard (by evaporation or combustion) were also identified as were possible transportation incidents in the vicinity of the plant involving the potential airborne release of toxic materials.

- A screening analysis was performed in which potential toxic vapor release incidents were examined to determine whether, under the most adverse release and atmospheric conditions, vapor dispersion from the release could result in hazardous levels of the toxic substance in the IP3 control room.

- Potential toxic release incidents that might give rise to toxic concentrations exceeding the specified criterion for control room vulnerability at IP3 were characterized in more detail. Should the probability of the incident exceed the 10^{-6}/yr criterion of concern (assuming a conditional probability of 0.1 for core damage), the route by which the incident leads to core damage was determined. This evaluation of release incidents entailed the definition of toxic release scenarios. These scenarios included the catastrophic rupture of storage tanks and tank trucks, and the catastrophic failure of lines, valves and transfer hoses. In these scenarios, the behavior of toxic vapor from each release was modeled. Various combinations of wind speed and air stability were examined to identify the combination that resulted in the worst consequences upon control room habitability. Should the release scenario pose no threat to control room habitability, it was examined no further.

- The probability of release in the remaining scenarios was estimated. Should the probable frequency of such a toxic release exceed the incident frequency criterion, the dispersion of toxic vapor was modeled for a representative selection of wind speeds and directions and air stabilities to identify the wind speed/air stability combinations under which the release posed a threat to control room habitability. The probability of the combinations of concern were then combined with the release frequency to calculate a total incident frequency. Should this frequency be less than the incident frequency criterion, the incident was examined no further.

- For any incidents not screened out on the basis of their frequency or consequences, the impact of the toxic vapor on IP3 staff was defined in more detail and the probability of injury to control room staff was estimated. This estimation accounted for the functioning of the control room ventilation system, the build-up of toxic gases within the control room, and the likelihood that control room staff will don respirators. Sequences of events by which core damage could then result were characterized. The development of each accident scenario ceased at the point at which the predicted frequency of its causing core damage falls below

10^{-6}/year.

- A similar iterative analysis was performed to identify potential explosion incidents [explosions within confined spaces, vapor cloud explosions outdoors, and boiling liquid expanding vapor explosions (BLEVEs)] that could give rise to a 1-psi overpressure at the plant with a predicted frequency in excess of 10^{-5}/year. For any such incident, the susceptibility of the plant to overpressures and explosions both within and without plant structures was defined in terms of the overpressure that would impair safety-related structures. Sequences of events by which core damage could result were then characterized. The development of each accident scenario ceased at the point at which the predicted frequency of its causing core damage falls below 10^{-6}/year.

- A similar risk assessment was made to characterize hazards posed by the collision of aircraft with the plant using the criteria and procedures described in the Standard Review Plan, Section 3.5.1.

Finally measures with which to mitigate significant hazardous chemical, transportation and nearby facility incidents were identified.

5.2.4 Ice

In addition to high winds and tornadoes, external floods, and hazardous chemical, transportation and nearby facility incidents, ice blockage of the water intake structure was also examined. However, no detailed analysis was performed as the design of the intake structure and pumps makes the probability of ice blockage remote as noted in Section 9.6.1 of the FSAR [7]: the service water pumps can obtain water through four separate intakes; the service water pump suction is at 10 ft below mean sea level (and 6 ft below the hypothesized extreme low river level). Furthermore, plant operating experience indicates that icing of the intake structure is not a problem.

5.3 HIGH WINDS AND TORNADOES

5.3.1 Plant Data Review

5.3.1.1 Plant-Specific Hazard Data and Licensing Bases

Meteorology at the Plant Site. Meteorology in the vicinity of the IP3 site was evaluated in Section 2.6 of the Final Safety Analysis Report (FSAR) [7] to provide a basis for preliminary determination of design criteria for storm protection. This evaluation included a review of data from a one-year 1984 meteorological study at the site and studies performed for Consolidated Edison prior to licensing. These studies suggested that the winds in the region are controlled primarily by topography with both terrain channeling and a thermally driven valley wind contributing to the observed wind frequency distribution.

Wind and Tornado Loads. Section 16.2.1 of the FSAR [7] states that Class I buildings and structures are designed for tornado loadings calculated assuming the simultaneous application of a tangential wind velocity of 300 mph, a translational velocity of 60 mph, a pressure change (drop or increase) of 3 psi in 3 sec., and postulated tornado missiles. Potential missiles included a plank and a 4000-lb automobile.

Plant Structure and Tornado Effects. Section 16.2.2 of the FSAR identifies equipment or systems that are protected from tornado effects. The equipment or systems located within tornado-proof structures include:

Primary auxiliary building

- Safety injection pumps
- Residual heat removal pumps
- Component cooling system
- Waste disposal system (except for waste hold-up tank in waste hold-up tank pit and reactor coolant drain tank and pumps in the containment)
- Chemical and volume control system (except for excess letdown and regenerative heat exchangers inside the containment and hold-up tanks in the waste hold-up tank pit)
- Refueling water purification pump
- Sampling systems

- Auxiliary building ventilation system (ducts and supply fans only)
- Containment spray pumps
- Spray additive tanks
- Pressurization air receivers
- Electrical tunnels
- Waste hold-up tank pit

Control Building

- Instrumentation readouts and controls
- Control room ventilation system
- Control building ventilation system
- Batteries and battery chargers
- Instrument air system
- Additional CCR HVAC cooling condenser units (restrained to the control building roof to prevent them from becoming missiles but are not tornado missile protected)

Containment

- Reactor vessel, core, instrumentation, and controls
- Primary coolant system (including pressurizer and pressurizer relief tank)
- Steam generators
- Residual heat removal heat exchangers
- Reactor coolant drain tank and pumps
- Excess letdown and regenerative heat exchangers
- Accumulators

- Recirculation pumps

- Containment air recirculation cooling and filtration system

Diesel generator building. (The intake louvers and exhaust fans are capable of withstanding 160 mph winds [8]; the structure can withstand even higher winds. The exhaust fans and air intake louvers are not protected against tornado missiles, however [9]).

Auxiliary boiler feed pump building.

The service water pumps are protected by the service water enclosure (SWE) which is surrounded by the metal-clad intake structure enclosure (ISE). The service water enclosure comprises steel grating about 3 in. deep. Although the sidings and roof of the ISE are postulated to become airborne during a tornado, the SWE will protect the SW pump motors from damage. While the concrete substructure and structural steel super-structure of the SWE are capable of resisting tornado wind loads, the structure itself is incapable of resisting missile penetration. The service water lines are buried underground with a minimum 4 ft 6 in. of cover or are protected by a minimum 2 ft of concrete. Accordingly, these lines were judged not to be vulnerable to missiles. In addition, Section 9.6.1 of the FSAR [7] states that the backup service water valve pit is protected from tornado missiles by a tornado-proof structure.

Section 16.2.2 of the FSAR concluded that all components and equipment essential for safe shutdown and isolation of the reactor are housed within tornado-proof structures or are redundant with other equipment or systems. Redundancy was asserted to provided protection to the vital 480-V electric power system, the emergency feed requirements of the steam generators, the water requirements of the primary system and the service water supply. It should be noted, however, that some of this redundancy is more apparent than real. For example, winds that damage the 480-V switchgear are unlikely to leave the gas-turbine generator enclosure, above-ground incoming power lines and the Buchanan substation unscathed. Similarly, wind loadings and missiles could impair the redundancy provided to the primary water make-up system by the condensate storage tank and the refueling water storage tank.

Section 16.2.2 of the FSAR also stated that special design procedures had been employed to ensure the capability of reinforced concrete structures to withstand tornado wind loadings and missile penetration. These procedures were intended to ensure that a tornado would not cause a loss-of-coolant accident (LOCA), impair the ability of the plant to safely shutdown, or, following a LOCA, impair the long-term safety of the plant.

The other structures at the plant are not designed to withstand tornadoes.

5.3.1.2 Significant Changes to the Plant and Hazard Characterization

Since design of the plant was completed, a number of issues have been raised and new data made available that are relevant to the impact of high winds and tornadoes on the safety of the plant. These issues and new data will be discussed now.

Indian Point Probabilistic Safety Study (IPPSS). The risks posed to the plant by strong winds and wind-induced missiles were addressed in some detail in Section 7.5 of the IPPSS [10]. Models were developed for determining tornado and extreme wind exceedance using historical data for tornadoes, hurricanes, cyclones and other extreme winds. A computer simulation of tornado strikes at the plant was also performed. The IPPSS concluded that while tornado missiles would be unlikely to penetrate critical reinforced concrete structures and that failure from wind loadings was not expected for these structures except at extraordinarily high wind velocities, metal structures would be susceptible. In particular, the auxiliary boiler feed pump building, condensate storage tank, refueling water storage tank, city water storage tank, superheater stack, service water pumps, diesel generators, gas turbines and offsite power supply are all vulnerable.

An inconsistency between the IPPSS [10] and the FSAR [7] was noted: while Section 16.2.2 of the FSAR held that the auxiliary boiler feed pump building represented a tornado-proof enclosure, Section 7.5.3 of the IPPSS stated that the building and its contents are vulnerable. This inconsistency has its origin in the fact that while the upper story of the building comprises a steel framework and cladding, the lower story including its ceiling is constructed of reinforced concrete. While the FSAR takes credit for the protection afforded by the reinforced concrete, the IPPSS calculated that the siding on the upper levels had a median capacity to withstand winds of 145 mph and could be penetrated by tornado missiles, thereby concluding that the contents of the auxiliary boiler feed pump building were vulnerable. In particular, the IPPSS assumed that the steel structure of the building and the auxiliary feedwater lines would fail and that the building contents could be damaged by the entry of tornado missiles through the steel clad upper story.

Consequently, in Section 7.5.5.2 of the IPPSS a wind-induced core damage frequency of 1.3×10^{-6}/yr was predicted. It should be noted that this value does not include combinations of random equipment failures with wind-induced failures. Subsequently, a review of the IPPSS conducted for the NRC [11] expressed concern over a lack of conservatism with respect to hurricane hazards and wind loading. The review concurred, however, with the wind-induced core damage frequency predicted for IP3.

A report prepared by Russell [12] in conjunction with the NRC review of the IPPSS took a less sanguine view of the IPPSS analysis. In particular, he took exception to the assertion that the offsite power and transmission lines had a median capacity to withstand winds of 140 mph and predicted very much higher frequencies for high hurricane-induced wind speeds. He did, however, agree with the conclusion that potential wind pressures and tornado missiles were not significant to safety-related concrete structures at IP3.

New Tornado Frequency Data. Subsequent to plant design, issuance of the operating license and completion of the IPPSS, tornado data recorded between 1954 and 1983 and extensive data on estimating extreme winds associated with tornadoes striking nuclear power plant sites were published by the NRC [13]. More recent tornado data are available from the Storm Prediction Center tornado database [14].

Impact and Lessons Learned from Hurricane Andrew. The impact of and lessons learned from the effect of Hurricane Andrew on Turkey Point Nuclear Generation Station were summarized in an NRC information notice [3]. These issues and lessons and their relevance to the impact of tornadoes and high winds at IP3 are as follows:

- Adequacy of timing of plant shutdown in anticipation of a hurricane. Both units at Turkey Point were in hot shutdown when the hurricane hit, the licensees plant procedures being far more conservative than was required by commitments made in response to the station blackout rule. However, should tornadoes strike IP3, it must be assumed that the plant will be operating at full power when the tornado strikes--the relevant operating procedure, OD-8 [15], does not call for plant shutdown in response to a tornado watch.

- Adequacy of licensee offsite communications for natural disasters. At Turkey Point, all offsite communications were lost for about 4 hours during the storm and reliable communications were not restored for about 24 hours following the storm. However, at IP3 extensive plans have been prepared to ensure the availability of offsite communications should an emergency occur [75] and a recent NRC inspection of the IP3 emergency preparedness program concluded that a good program was in place [76]. Furthermore, we would note that the swathe of damage occasioned by a tornado would be narrower and more localized than that resulting from a hurricane and thus widespread devastation would not be anticipated.

- Early preparations for hurricane. Turkey Point benefited greatly from previous hurricane experience among plant staff and extensive planning done in preparing and implementing the emergency plan for natural emergencies. At IP3, operating procedure OD-8 [15] defines the steps to be taken in response to a warning of high winds. These steps call for:

  - Plant shutdown prior to the arrival of high winds (ie, wind speeds in excess of 100 mph)
  - Ensuring plant readiness
  - Reviewing the adequacy of plant staffing
  - Expediting the restoration of out-of-service equipment
  - Verifying the status of ac power sources
  - Maximizing condensate storage tank levels

- Verifying that both fire water storage tanks are full

- Reviewing station blackout and power restoration procedures.

- Impact of non-safety equipment on important equipment. During the storm, failed non-safety-grade equipment damaged certain important equipment at Turkey Point. Concern over this event, and its relevance to possible high winds and tornadoes, led the NRC to issue a supplement [16] to the information notice emphasizing the importance of a confirmatory walkdown of the plant concentrating on onsite outdoor facilities that could be affected by high winds and whose failure could damage safety-related equipment and disable the safe shutdown capability. The supplement to the notice also emphasized the importance of compensatory measures that would alleviate such conditions.

5.3.1.3 Determination of Whether Plant and Facilities Meet Current Safety Criteria

<u>Protection of Structures, Systems, and Components from Externally Generated Missiles</u>. The protection of structures, systems and components from externally generated missiles is addressed in both deterministic and probabilistic ways in the Standard Review Plan (SRP) [17].

Section 3.1.5.4 of the SRP addresses the possible hazards occasioned by missiles generated by natural phenomena and, in particular, by high winds and tornadoes. Acceptability of the assessment of these hazards is based on compliance with:

- General Design Criteria 2 and 4 as they relate to the capability of structures, systems and components important to safety.

- The guidelines of Regulatory Guide 1.76 and 1.117.

These require that the assessment:

- Identify design basis natural phenomena which might generate missiles.

- Estimate the frequency of damage to important structures, systems and components resulting from a specific design basis phenomenon capable of generating missiles.

- Demonstrate that specific design provisions are provided to reduce the estimate of damage frequency to an allowable level, should the damage frequency exceed the accepted level set out Regulatory Guide 1.117.

- Ensure that the plant is designed to protect safety-related equipment against damage from missiles which might be generated by the design basis tornado for that plant. Postulated missiles are defined in the SRP: they include a range of missiles representative of construction debris and a set of three hypothetical missiles.

Section 3.3.1 of the SRP addresses wind loadings. Because our primary concern in this study was the more severe tornadoes, the contents of this section were not considered further.

Section 3.3.2 of the SRP addresses tornado loadings. The design of structures is deemed acceptable if the tornado wind (and the resulting missiles) used in the design was the most severe wind that has been reported by the site and surrounding area with sufficient margin for the limited accuracy and quantity of data and the limited period of time over which data have been accumulated.

Acceptance criteria for the procedures used to translate the tornado parameters into effective loadings on structures were provided in the SRP. Information provided to demonstrate that failure of any structure or component not designed for tornado loads will not affect the capability of other structures or components to perform necessary safety functions is acceptable if:

- The collapse or structural failure of such structures or components, including missiles, can be shown not to result in any damage to safety-related structures or components

- Safety-related structures are designed to resist the effects of postulated structural failures, collapse or missile generation from structures and components not designed for tornado loads.

Section 3.5.1.4 of the SRP addresses the assessment of possible hazards occasioned by missiles generated by the design basis tornado. Acceptance criteria for this assessment focus on the characterization of postulated missiles, the calculation of an annual probability of a design-basis tornado causing damage to important structures, the verification of design provisions that reduce the estimated damage probability to an acceptable level, and the verification that safety-related equipment can be protected against damage from missiles generated by the design basis tornado. Section 3.5.1.5 of the SRP then defines procedures with which to identify structures, systems and components (SSCs) vulnerable to missiles and to calculate the total probability of missiles striking a vulnerable critical area of the plant.

Section 3.5.2 of the SRP addresses the protection of structures, systems, and components from externally generated missiles. These structures, systems and components include such elements as essential service water intakes, buried piping (e.g., storage tanks and essential service water piping), and access openings and penetrations in structures. In particular, acceptance of the facility is based on meeting:

- Regulatory position C.2 of Regulatory Guide 1.13, "Spent Fuel Storage Facility Design Basis", by preventing missiles generated by tornado winds from causing significant loss of watertight integrity of the fuel storage pool, and from contacting fuel within the pool.

- Regulatory positions C.2 and C.3 of Regulatory Guide 1.27, "Ultimate Heat Sink for Nuclear Power Plants", so that the ultimate heat sink is capable of withstanding the effects of external missiles generated by natural phenomena.

- Regulatory positions C.1, C.2, and C.3 and the Appendix to regulatory Guide 1.117, "Tornado Design Classification", such that structures, systems and components important to safety are protected from the effects of missiles generated by the design basis tornado by providing missile barriers for individual components, locating independent redundant systems or components in missile protected structures or by underground locations at a depth sufficient to protect against missiles.

- Identifying all structures, systems, and components requiring protection against the effects of externally generated missiles.

Section 3.5.3 of the SRP addresses missile barrier design procedures including procedures used to predict local damage at the point of impact and the overall response of the barrier to the impact. The adequacy of the parameters that define the missile is also reviewed.

Conclusions. In light of the fact that IP3 structures and systems pre-date and do not meet SRP criteria, that the IPPSS [10] concluded that the wind-induced core melt frequency exceeded 10^{-6}/year, that a subsequent review [11] expressed concerns over a lack of conservatism in certain aspects of the analysis of wind-induced damage, and new data that have become available, it is clear that a comprehensive evaluation of the probability and consequences of high winds and tornadoes is warranted in this study.

5.3.2 Evaluation of Risk Associated with High Winds and Tornadoes

IP3 may be exposed to tornadoes and high winds occasioned by hurricanes, extra-tropical cyclones and thunderstorms. Detailed predictions of wind speed exceedance probabilities were derived for IP3 in Section 7.5.1 of the IPPSS [10]. These predictions demonstrated that, at wind speeds of 105 mph, the median probability of high winds being caused by tornadoes exceeds the probability of their having other causes. Higher wind speeds are far more likely to be occasioned by tornadoes. Therefore, it can be concluded that tornadoes bound the severity and frequency of high winds that might cause severe damage to IP3. This conclusion is supported by data that indicate that while 96 tornadoes, including some with wind speeds in excess of 207 mph, have been recorded within 50 nautical miles of Buchanan between 1958 and 1994, the peak wind velocity for a 100-year period of recurrence is 90 mph (Section 2.6 of the FSAR [7]) and the highest wind speed recorded at the site between 1992 and 1995 (at 122 m. above grade) was less than 56 mph. Furthermore, we would note that:

- Hurricanes seldom occur in the North Atlantic states—hurricanes are fed by moist convective currents from warm tropical oceans and weaken and die when they encounter cool water or land.

- There will be advance warning of hurricanes and thus ample opportunity to implement operating procedure OD-8 (Guidelines for Severe Weather) and shut down the plant, eliminating the external event from the purview of the IPEEE. No such warning should be anticipated for tornadoes. This advance warning should also balance any concerns about the conservatism of predictions of the frequency of high wind speeds induced by hurricanes [12].

- While there would appear to have been no change in the frequency of tropical storms over the past 50 years, there has been a strong decrease in the number of intense hurricanes [18]. Thus the frequency determinations presented in Section 7.5.1 of the IPPSS [10] can be regarded as being valid though perhaps overly conservative for intense storms.

That said, we would also note that:

- Wind damage from extra-tropical cyclones, hurricanes and thunderstorms may also contribute to the core damage frequency as a result of an induced loss of offsite power. While as noted above, damage at wind speeds above 105 mph will be bounded by tornado-induced damage, at lower wind speeds the frequencies of non-tornadic winds will exceed those of tornadoes. Though such winds should not cause building damage at IP3, they may result in a loss of offsite power as a result of damage to the IP3 switchyard or to transmission lines beyond the switchyard. The latter causes of a loss of offsite power are addressed in the IPE [26] along with network instabilities, isolated grid faults and other isolated weather damage. A key feature of such events is the reasonable probability that recovery of power within 24 hours is possible and that generic recovery factors for offsite power can be applied.

  In contrast, damage to the switchyard may preclude a restoration of power within 24 hours. Examining this scenario further, we would note that switchyards are typically designed to withstand wind speeds in excess of 90 mph—in the IPPSS, the median structural capacities for transmission lines and equipment were set at 140 mph [10]. At such wind speeds, the contributions of extra-tropical cyclones, hurricanes and thunderstorms will be minimal compared to those of tornadoes. Furthermore, even if it were assumed that switchyard damage were to occur at wind speeds of less than 105 mph, the resulting contribution to the core damage frequency can conservatively be calculated as follows. A conservative estimate of the frequency with which wind speeds in excess of 95 mph impact the switchyard is 5×10^{-4}/yr [10], where 95 mph corresponds to the high confidence structural capacity for transmission lines. For wind speeds of 105 mph, the failure probability for the transmission lines is approximately 0.2. The conditional core damage probability (CCDP) given a loss of offsite power and no offsite power recovery is 5.4×10^{-3}. Therefore, a conservative estimate of the core damage frequency (CDF) associated with non-tornadic high winds is 5.4×10^{-7}/yr. As the contribution of this event to the core damage frequency is less than the criterion of concern, it need not be considered further.

- Much of the damage caused by hurricanes results from a wind-induced storm surge and heavy rains. The possibility of such a surge causing high water levels in New York harbor, and thus at IP3, and the impact of heavy rains was examined in the evaluation of external flooding (Section 5.4.2).

5.3.2.1 Tornadoes

The National Weather Service defined a tornado as a violent rotating column of air in contact with the ground and moving. A tornado usually forms from a severe thunderstorm along, or ahead of, a frontal zone where there is a tremendous temperature difference between the side-by-side air mass. It is usually recognized as a funnel-shaped vortex accompanied by a loud roar. The severity of tornadoes is usually ranked on the Fujita (F) scale, which ranges from F0 (least severe) to F12 (a tornado with near-sonic wind speeds). In the United States, it is only tornadoes of severity F5 (most severe) or less that are of concern. The truncated F-scale, its associated wind speed range, and the damage that can be anticipated are presented in Table 5.3.2.1.

Tornado damage results from velocity-related pressures, pressure differentials and the impact of tornado-borne missiles. These effects are driven by wind speeds. Rutch et al. [4] developed a methodology with which to estimate the annual probability of a given point being hit by a tornado of a certain strength. In this methodology, the probability of a tornado striking a given area is multiplied by a factor that accounts for relative distribution of tornado occurrence, the mean length and width of the area damaged, and the distribution of wind speeds within a tornado. These factors are presented in Table 5.3.2.2. The accounting for the variation of tornado strength across the width and length of the ton.ado path is of particular importance if wind speed estimates are not to be extremely conservative [19].

Table 5.3.2.1

Tornado Classification

F-Scale	Wind Speed (mph)	Damage [23]
F0	40-72	Light--some damage to chimneys or TV antennae; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F1	73-112	Moderate--roof surfaces peeled off; windows broken; trailer houses pushed or overturned; trees on soft ground uprooted; some trees snapped; moving autos pushed off road
F2	113-157	Considerable--roofs torn off frame houses; weak structures, outbuildings or trailer houses demolished; railroad box cars pushed over; large trees snapped or uprooted; light-object missiles generated; cars blown off highway; block structures and walls badly damaged.
F3	158-206	Severe--roofs and walls torn off well constructed frame houses; some rural buildings demolished or flattened; warehouse type structures torn; cars lifted off ground and rolled some distance; most trees uprooted, level, or snapped; block structures often leveled.
F4	207-260	Devastating--well constructed frame houses leveled; structures with weak foundations lifted, torn, and blown some distance; cars thrown or rolled considerable distances, finally disintegrating; large missiles generated.
F5	261-318	Incredible--strong frame houses lifted off foundation and carried considerable distances; steel-reinforced concrete badly damaged; auto-sized missiles fly distances of 100 yards or more.

Table 5.3.2.2

Table of Uniform Distributions of Wind Speeds Adjusted for Distribution of Wind Speeds within a Tornado [4]

Wind Speed (mph)	Probability of Exceeding Wind Speed
80	0.32253138
100	0.16543789
120	0.07797703
140	0.03415626
160	0.01401469
180	0.00541855
200	0.00198331
220	0.00068984
240	0.00022872
260	0.00007248
280	0.00002200
300	0.00000641

5.3.2.2 Tornado Frequency

Data on the number and type of tornadoes that occurred between 1958 and 1994 within 50 nautical miles (57.5 statute miles) of Buchanan were obtained from the Storm Forecast Center [14]. These data are summarized in Table 5.3.2.3; the approach direction being determined from data that define the latitude and longitude of the beginning and end of the tornado path. No data prior to 1958 were considered because of the lower efficiency in reporting and classifying these data [4, 19]. The data used indicate that 96 tornadoes occurred; the average length of a tornado being 2.2 miles and the average width (calculated as the average damage area divided by the average length) 0.07 miles. The tornado frequency and annual strike probability in the vicinity of IP3 can be calculated from the data presented in Table 5.3.2.3 once a correction is made to account for the 1/10th of the area within 50 nautical miles of the plant that lies over Long Island Sound or the Atlantic Ocean [13]. No correction is made, however, to account for the approach direction of tornadoes as it would appear that hills, cliffs, lakes and rivers have little effect on the speed and intensity of tornadoes [20]. The calculated tornado frequency is 2.78×10^{-4} $yr^{-1}.mile^{-2}$; the probability of a given point in the vicinity of IP3 being struck by a tornado is 4.34×10^{-5}/year; and, assuming a plant diameter (excluding the switchyard) of 900 ft, the probability that the plant itself is struck is 1.59×10^{-4}/yr [21]. The 2.78×10^{-4} yr^{-1}-$mile^{-2}$ tornado frequency calculated here is greater than the 2×10^{-4} yr^{-1}-$mile^{-2}$ frequency assumed in the IPPSS [10].

In using these data, it should be recognized that there is still considerable uncertainty in the classification of tornadoes. In particular, it appears that many F-2 ranked tornadoes recorded prior to 1976 were overrated [22]. Conversely, the process of urbanization leads to an increase in both the number and intensity of significant storms recorded. It should also be recognized that down-bursts, potent initiators of damaging winds, may also occur in conjunction with tornadoes.

5.3.2.3 Tornado Strike Characterization

Given a 1.59 x 10^{-4}/year probability of a tornado striking IP3 and the probabilities of various tornado wind speeds presented in Table 5.3.2.2, we can conclude that the cumulative frequency of wind speeds in excess of 175 mph falls below the 10^{-6}/year screening criterion for high winds and tornadoes suggested in NUREG-1407 [2]. A similar conclusion can be drawn from the point strike frequencies presented in Table 16 of NUREG/CR-2944 [19]. In other words, we need only be concerned about tornadoes of severity F3 or less as initiating events, as the cumulative frequency of more severe tornadoes falls below the 10^{-6}/year screening criterion for high winds and tornadoes. This conclusion is in accord with the data on tornadoes touching down within 50 nautical miles of the plant—of the 96 tornadoes recorded between 1958 and 1994, only one tornado was of severity F4 and none were of higher severity. However, as lesser tornadoes are capable of causing severe damage and can generate significant missiles, an assessment of the vulnerability of IP3 to tornadoes and high winds is required. The probability of a tornado striking the plant within 24 hours of another initiating event can also be eliminated as a cause of concern. The frequency of such an event is ~10^{-6}/year and additional failures would be required for core damage to occur.

Table 5.3.2.3

Tornadoes within 50 Nautical Miles [14]

Year	Length	Width	Area	Fujita Scale	Approach Direction
1958	0	200	0.01	F1	Not available
1961	7	750	1.03	F2	SE
1962	12	360	0.86	F3	WNW
1962	0	20	0	F2	Not available
1962	2	750	0.36	F2	Not available
1968	1	0	0	F1	NW
1969	0	0	0	Not available	Not available
1970	2	150	0.06	F2	Not available
1970	0	230	0.02	F2	Not available
1971	1	0	0	F2	Not available
1971	0	600	0	F3	Not available
1971	1	2400	0.45	F1	Not available
1971	2	1200	0.45	F1	Not available
1971	6	250	0.33	F2	SW
1971	5	100	0.1	F2	SSW
1971	0	100	0.01	F1	Not available
1972	2	0	0	F1	Not available
1972	0	120	0.01	F2	Not available
1973	1	70	0.02	F2	Not available
1973	2	230	0.11	F1	W
1973	0	0	0	F1	Not available
1973	0	150	0.01	F3	Not available
1973	0	150	0.01	F3	Not available
1973	0	70	0.012	F1	Not available
1973	1	100	0.03	F1	Not available
1973	2	500	0.27	F2	WSW
1974	5	120	0.13	F1	NW
1974	0	300	0.03	F2	Not available
1974	2	200	0.08	F2	Not available
1974	2	150	0.06	F1	Not available
1975	5	0	0	F1	WNW
1975	0	90	0.01	F1	Not available
1975	1	450	0.13	F1	Not available
1975	13	500	1.29	F1	WSW
1976	3	150	0.11	F1	SSW
1976	0	90	0	F2	Not available
1976	0	90	0	F1	Not available
1976	0	0	0	F0	Not available
1976	1	300	0.06	F1	Not available
1977	2	60	0.02	Not available	Not available
1978	1	50	0.01	Not available	Not available
1978	0	0	0	Not available	Not available

Table 5.3.2.3

Tornadoes within 50 Nautical Miles [14]

Year	Length	Width	Area	Fujita Scale	Approach Direction
1981	4	750	0.62	F2	NW
1981	0	1200	0.18	F2	Not available
1982	2	450	0.21	F1	Not available
1983	0	900	0.09	F0	Not available
1984	0	0	0	F0	Not available
1984	0	0	0	F0	Not available
1985	7	230	0.01	F1	SW
1985	0	220	0.01	F1	Not available
1985	1	150	0.04	F1	Not available
1986	1	300	0.06	F1	Not available
1986	0	300	0.03	F2	Not available
1987	0	20	0	F0	Not available
1987	0	30	0	F0	Not available
1987	0	70	0.01	F1	Not available
1987	0	50	0	F0	Not available
1988	0	30	0	F0	Not available
1988	3	240	0.16	F3	W
1988	0	600	0.09	F1	Not available
1989	9	220	0.4	F2	NNW
1989	5	300	0.31	F2	NW
1989	4	300	0.27	F4	N
1989	2	300	0.16	F1	WNW
1989	1	300	0.08	F0	WNW
1989	5	300	0.32	F0	WNW
1989	0	90	0	F0	Not available
1989	0	150	0.01	F0	Not available
1989	0	40	0	F0	Not available
1989	0	40	0	F0	Not available
1989	0	90	0.01	F1	Not available
1989	1	40	0.01	F0	Not available
1989	0	300	0.03	F2	Not available
1989	0	40	0	F0	Not available
1989	1	600	0.17	F1	Not available
1989	14	300	0.8	F1	SSE
1990	0	30	0	F0	Not available
1990	25	450	2.14	F0	WSW
1990	0	150	0.01	F0	Not available
1990	0	90	0.01	F0	Not available
1990	0	150	0.01	F0	Not available
1990	2	50	0.02	F0	Not available
1990	1	600	0.11	F0	Not available
1991	0	150	0.02	F0	Not available

Table 5.3.2.3

Tornadoes within 50 Nautical Miles [14]

Year	Length	Width	Area	Fujita Scale	Approach Direction
1992	0	60	0	F0	Not available
1992	0	30	0	F1	Not available
1992	2	300	0.11	F0	Not available
1992	1	120	0.03	F1	Not available
1992	0	60	0	F0	Not available
1992	20	220	0.86	F1	WSW
1992	5	210	0.23	F0	WNW
1993	0	100	0	F0	Not available
1993	2	2100	0.99	F0	Not available
1993	0	150	0.01	F1	Not available
1994	11	90	0.19	F1	WSW
1994	2	300	0.11	F1	Not available

5.3.2.4 Tornado Vulnerabilities

As noted earlier, tornado damage results from velocity-related pressures, pressure differentials and the impact of tornado-borne missiles. Tornado winds are cyclonic, or counterclockwise in the northern hemisphere, with circular speeds that greatly exceed translational speeds. Accordingly, missiles may be ejected tangentially in any direction. That said, it is appropriate to take credit for the reduced vulnerability of walls that would be struck at an angle and those struck only by missiles ejected from a receding tornado from which missiles are depleted. Furthermore, it should be recognized that any tornado that strikes IP3 is likely to approach from the west (Table 5.3.2.3) and that, as noted in Section 5.3.1.1, many components which directly affect the ultimate safe shutdown of the plant are protected from tornado effects. The design basis tornado for which the structures surrounding these critical components were designed is more severe than any tornado that can be reasonably expected: the design basis assumed the simultaneous application of a tangential wind velocity of 300 mph, a translational velocity of 60 mph, a pressure change (drop or increase) of 3 psi in 3 sec., and tornado missiles including a heavy plank and an automobile. With these factors in mind, the vulnerability of the plant to damage from tornadoes and high winds was evaluated by looking first at tornado-generated missiles and then at the wind loadings and pressure drops associated with the tornado.

<u>Tornado Generated Missiles</u>. Assuming the 4.3×10^{-4} $yr^{-1}.mile^{-2}$ tornado occurrence rate characteristic of Region I [24] (the region in which IP3 is located), the mean frequency of tornado missile impact on a hypothetical plant in Region I can be calculated as 4.71×10^{-5}/year for F2 and 5.52×10^{-5}/year for F3 tornadoes [24]. The probability of high velocity missile impact and damage to safety-related reinforced concrete structures with F2 and F3 tornadoes is, however, negligible [24]. While more severe tornadoes would result in greater damage, their lower frequency eliminates them as a source of concern to this hypothetical plant. Given that the tornado occurrence rate at IP3 (2.78×10^{-4} $yr^{-1}.mile^{-2}$) is one third less than the rate assumed in these calculations for a plant in Region I, we can conclude that the impact of tornado-generated missiles on safety-related reinforced concrete structures at IP3 is of no significance. This conclusion is reinforced by an examination of potential missiles. Previous studies have concluded that most tornado-generated missiles that strike a plant will originate from within 1000 ft of the plant, that the probability that missiles originating beyond 2000 ft from the plant will strike it is negligible, that the most significant threat is posed by objects that originate at above 25 ft from ground level, and that missiles that originate close to the potential target are unlikely to cause damage [21, 24]. Given that tornadoes that strike IP3 will, in all likelihood, come from the west (Table 5.3.2.3 shows that 76 percent of recent tornadoes in the vicinity of IP3 for which the direction is known came from between the SW and NW) and thus from off the river, the number of potential missiles is limited. Finally, it is worth noting that the close proximity of structures at IP3 inherently provides some missile protection [10], particularly to the auxiliary boiler feed pump building located to the east of the turbine building and to the intake of the control room ventilation system which is located in the east wall of the control building below the electrical tunnel.

Thus from both a probabilistic and design perspective, there would appear to be little risk of core damage as a result of the impact of tornado missiles on critical reinforced concrete structures. However, a number of safety-related equipment and structures not so protected were assumed to be susceptible to missile damage [10]: equipment within the service water pump enclosure, the auxiliary boiler feed pump building, and the gas turbine enclosures, and the condensate storage tanks, refueling water storage tanks, and city water tanks. The outside air intake louvers located in the north end of the emergency diesel generator building and the wall exhaust fans in the south end of that building are also susceptible to missile damage but a low probability can be assigned to missiles striking more than one louver or fan [21].

<u>Wind Loadings and Pressure Differentials</u>. Tornadoes also pose a threat to the plant because of the accompanying wind loadings and pressure differentials. Of these two effects, it is wind pressures rather than the pressure drop within the core of the tornado that is the primary cause of the tornado-induced failure of conventional structures [19, 25]. While the plant was designed with the intent that safety-critical portions of the plant could withstand tornadoes, other portions would be sacrificed. Thus, as noted in Section 5.3.1.1, a tornado striking the plant would likely sweep away the siding and roofing of the service water enclosure. This would not, however, impair the safe operation of the plant or generate significant missiles. Other safety-related areas of the plant are, however, susceptible to tornado damage: the switchyard and transformer area, the gas turbine building, upper levels of the auxiliary boiler feed pump building, the condensate storage tanks, refueling water storage tank, and city water storage tank. Damage to the condensate storage tanks, refueling water storage tank, and city water storage tank should be limited, however, as these tanks should not buckle if they are maintained 2/3 to ¾ full as is normal (IPPSS, Section 7.5.3 [10]). While they may loose their roofs in case of a tornado, this should not impair their function.

Two additional points can be made about the impact of a tornado on IP3: the unit 1 superheater stack is capable of resisting 360-mph winds; and the low resistance of the gas turbine shelters to high winds is unlikely to be of import in an analysis that relies upon IPE models and data as no credit was taken in the IPE for the gas turbine in recovering from a loss of offsite power [26].

5.3.2.5 Tornado Damage Potential

Tornadoes of F0 severity can be ignored because the most severe damage anticipated from such a tornado is the loss of offsite power -- tornadoes of such strength are not expected to cause building damage at IP3. This loss of offsite power is addressed below and is demonstrated to result in a contribution to the core damage frequency that falls below the 10^{-6}/year criterion of concern. Accordingly, this analysis will focus on the impact of F1, F2, and F3-scale tornadoes on IP3 and account for possible tornado-induced damage to the supply of offsite power and to the auxiliary feedwater and service water systems.

Damage to the Switchyard. Passage of a tornado through the switchyard is assumed to result in a loss of offsite power as a result of damage to the IP3 switchyard or to transmission lines beyond the switchyard. The latter causes of a loss of offsite power are addressed in the IPE [26] along with network instabilities, isolated grid faults and other isolated weather damage. A key feature of such events is the reasonable probability that recovery of power within 24 hours is possible and that generic recovery factors for offsite power can be applied. In contrast, tornado-induced damage to the switchyard may preclude a restoration of power within 24 hours. Examining this scenario further, the frequency with which a tornado will impact the switchyard can be calculated as 5.73×10^{-5}/year [21], assuming the switchyard is 110 ft in diameter. The conditional core damage probability for this event is 5.4×10^{-3} ignoring any possibility for the recovery of offsite power. Therefore, the contribution of this event to the core damage frequency is 3×10^{-7}/year, which is below the criterion of concern and accordingly our concern in this analysis will be with loss of offsite power events coupled with other tornado damage. Such scenarios require that a tornado strike both the Buchanan switchyard or the transmission lines and another portion of the plant. In this analysis it was conservatively assumed that if a tornado strikes IP3, offsite power is lost.

Loss of Offsite Power and Damage to the Auxiliary Feedwater System. In this scenario, a tornado strike causes both a loss of offsite power and wind load induced damage to the auxiliary feedwater system. The most likely subsequent sequence of events is that described for sequence T1-2 [26] in which, subsequent to a loss of offsite power and failure of the auxiliary feedwater system, core cooling is achieved by the high-head safety injection system, bleed-and-feed operation and high-head long term cold-leg recirculation. This sequence results in a safe core and containment.

While additional random failures might negate this safe sequence, they need not be considered as such scenarios may be screened out. The frequency with which a tornado strikes any one point (ie, the auxiliary boiler feed pump building) is estimated to be 4.34×10^{-5}/year. Given that the wind capacity of the AFW pump building is 145 mph [10], the probability of this wind speed being exceeded given a tornado strike is 0.028 (by interpolation of the data in Table 5.3.2.2) and thus the probability of a tornado and loss of offsite power, coupled with damage to the auxiliary boiler feed pump building, is approximately 10^{-6}/year. Given that additional random failures are required for core damage to occur, the predicted core damage frequency would be less than the criterion of concern.

Possible tornado missile damage to the auxiliary feedwater system also needs be considered in conjunction with a loss of offsite power. The frequency with which a single target is struck by a missile is $\sim 5 \times 10^{-6}$/year [24]. Given the protected location of the auxiliary boiler feed pump building, the scarcity of missiles to the west of the turbine building and the fact that the missile must damage specific lines, a 10^{-6}/year frequency of tornado missile induced damage to the AFW system would seem reasonable. Therefore, this scenario can be screened out as additional failures must occur before core damage can result.

Loss of Offsite Power and Loss of Service Water System. While a tornado will remove the sidings of the intake structure enclosure (ISE), the resulting flying debris will not damage the service water enclosure [7]. A missile originating outside the intake structure enclosure might penetrate the service water enclosure, however, and damage the service water pumps. Coupled with a loss of offsite power, a station blackout event would result unless ac power could be restored—unless offsite power or the flow of service water to the emergency diesel generators is re-established. The latter can be achieved by using the back-up service water pumps. These pumps are located in discharge canal. Given that the frequency with which a tornado missile would damage the service water pump enclosure is ~10^{-6}/year [24], that ~76 percent of tornadoes in the vicinity would appear to approach from the west (Table 5.3.2.3) and thus would not be carrying missiles, and that the conditional probability of missile damage to the backup service water pumps is 10^{-2}[24], assuming missile damage to the service water pump enclosure, the predicted frequency of a scenario involving a complete loss of service water and a loss of offsite power falls below the criterion of concern.

Given this conclusion, other tornado-induced failures that occur in conjunction with the loss of offsite power and loss of service water system pumps can also be screened out. It should be noted, however, that such combinations of events will result in a rapid progression to core damage. Thus, for example, the tornado-induced failure of offsite power, the service water system and the auxiliary feedwater system will result in core damage unless ac power is restored within 2 hours of station blackout [26]. It should also be noted that the probability of such adverse scenarios will not necessarily be significantly less than the probability of scenarios involving lesser damage to the plant—a tornado capable of inflicting severe missile damage to the service water pumps will likely be of such intensity as to be capable of inflicting severe wind load damage to the auxiliary boiler feed pump building and thus to the auxiliary feedwater system. The likelihood of missile damage to two independent structures is low, however [24], making simultaneous tornado missile damage to the service water pumps and to the auxiliary feedwater system or to the CST and city water storage tank unlikely.

5.3.3 Mitigating Measures for High Winds and Tornadoes

The risk of core damage associated with high winds and tornadoes is below the 10^{-6}/year criterion for concern. This conclusion is based in part on the assumption that high water levels are maintained in the CST and city water storage tank, thus preventing significant wind load and pressure differential damage to the tanks that provide water to the auxiliary feedwater system. This assumption is warranted in that the Technical Specifications require that the CST be 60 percent full. The conclusion is also based on the assumption that damage to both the service water and backup service water pumps is unlikely and that operators will realize the importance of using the backup service water pumps if necessary. Again this assumption is warranted in that off-normal operating procedure ONOP-RW-1 (Service Water Malfunction) provides instructions for aligning back-up service water pumps in the event of a loss-of-offsite power. However, it is recommended that operating procedure OD-8, Guidelines for Severe Weather, emphasize the importance of ensuring that the CST is at least 2/3 full and explicitly inform the operators of the possibility of damage to the service water pumps coupled with a loss of offsite power should a tornado strike the plant.

5.4 EXTERNAL FLOODING

5.4.1 Plant Data Review

5.4.1.1 Plant-Specific Hazard Data and Licensing Bases

Hydrology of the Plant Site. IP3 is located on the east bank of the Hudson River 43 miles north of the Battery in New York City. The lowest elevation of the plant, the embankment and screenwell structure, is 14.0 ft above mean sea level. The hydrology of the plant site was discussed in Section 2.5 of the FSAR [7] and was the object of numerous studies prior to plant commissioning [eg, 27]. Though the principal concern in Section 2.5 of the FSAR is the analysis of radioactive discharges from the plant, flooding was addressed [7]:

- It was concluded that flow in the Hudson River is controlled more by tides than run-off from the tributary watershed.
- No flooding has occurred at the site. The highest recorded water level was 7.4 ft above mean sea level during an exceptionally severe hurricane in November 1950.
- River water would have to rise to 15.3 ft above mean sea level before it could enter any building.
- The highest projected river water level at IP3 is 15 ft. This hypothetical level would result from the simultaneous occurrence of a standard project flood, failure of the Ashokan Dam and a standard project hurricane at New York Harbor.

From these statements it was concluded that river flooding posted no significant risk to IP3.

Localized Floods and Probable Maximum Precipitation. In the FSAR, no mention was made of localized floods or of the impact of probable maximum precipitation on plant buildings and structures beyond a statement in Section 16.4.6 that buildings or structures housing safety related items were evaluated for effects from rainfall accumulation. In particular, roof and storm drainage at the site was designed assuming rainfall intensities of 5 to 5.5 in./hour with roof design loadings of 40 lb/ft^2.

FSAR and Technical Specifications. The FSAR makes no mention of possible flooding and its effects other than the items summarized above. The Technical Specifications for IP3, however, address river water levels directly. In Section 3.12 (River Level) it is stated that:

> "When the Hudson River water elevation as measured at the Indian Point Unit No. 3 intake structure reaches 11'-0" above mean sea level, sandbagging the service water pumps will be initiated. If the Hudson

River water elevation reaches 12'-5" above mean sea level at the Indian Point Unit No. 3 intake structure, the reactor will be in the cold shutdown condition within the following 30 hours."

The basis for this specification is that:

"Analyses have been performed which indicate that the river water elevation would have to reach 15'-3" above mean sea level before it would seep into the lowest floor elevation of any buildings housing equipment vital for safe shutdown of the reactor."

5.4.1.2 Significant Changes to the Plant and Hazard Characterization

Since design of the plant was completed, a number of issues have been raised and new data made available that are relevant to the impact of external events on the safety of the plant. These issues and new data will be discussed now.

Indian Point Probabilistic Safety Study (IPPSS). Section 7.4 of the IPPSS [10] briefly addressed external flooding, reviewing previous studies that examined potential high river water levels at Indian Point. It was concluded that the maximum sustained surface water elevation was 14.0 ft. This level resulted from a postulated combination of a Hudson River maximum flood, probable maximum precipitation over the Esopus Creek Basin that resulted in the failure of the Ashokan Dam, and a hurricane at New York Bay. Given that the elevation of the plant embankment adjoining the river is 14.0 ft and that all buildings and equipment on-site are higher still, it was concluded that the contribution of external flooding to the core-melt frequency is extremely small.

The NRC review of the IPPSS agreed with that conclusion [11]. However, it took exception to the deterministic nature of the external flooding analysis, pointing out that a probabilistic analysis would have helped quantify the larger uncertainties associated with flood hazard projections and perhaps demonstrate that predicted flood frequencies were significantly higher than had been believed.

As is the case with the FSAR, neither the IPPSS nor its NRC review considered local external flooding or the effect of probable maximum precipitation on plant buildings and structures.

Probable Maximum Precipitation (PMP). PMP data published by the National Weather Service [28, 29] call for higher rainfall intensities over shorter time intervals and smaller areas than had previously been considered. These higher rainfall intensities could result in higher site flooding levels and greater roof ponding loads than had been used in design bases. Concern over this issue led the NRC to characterize the potential problem as Generic Issue 103. This generic issue was resolved by revising Sections 2.4.2 and 2.4.3 of the Standard Review Plan to incorporate new flooding assessment criteria for new plants, and informing licensees through generic letter 89-22 [30] of the availability of new PMP criteria, the adoption of these criteria for future plants, and to recommend that licensees review the material to determine if additional action is appropriate.

There is no record of any technical review of this issue for IP3.

5.4.1.3 Determination of Whether Plant and Facilities Meet Current Safety Criteria

The Standard Review Plan. Section 2.4.1 of the SRP addresses the hydrologic description of the plant and, in particular, the identification of hydrologic causal mechanisms that may require special plant design bases or operating limitations with respect to floods and water supply requirements. The acceptance criteria for this review are that the description and elevations of safety related structures and facilities and accesses to them should be sufficiently complete to allow evaluation of the impact of flood design bases. The description of the hydrologic characterization of streams and lakes must correspond to those prepared by appropriate government agencies.

Section 2.4.2 of the SRP addresses external flooding resulting from the occurrence of an abnormally high water level, overflow from a stream, or local intense precipitation. Acceptance of analyses of external flooding is based on the thoroughness of the reviews of potential flood sources, flood history, flood characteristics, and flood design considerations, and of the effect of intense precipitation with respect to the capacity of site drainage facilities, including drainage from the roofs of buildings. Of particular relevance to IP3 is the requirement that surges, wave action and runoff induced by probable maximum hurricanes and the possibility of dam failures be addressed.

Section 2.4.3 of the SRP addresses the probable maximum flood (PMF) at the plant site. For IP3 this requires the evaluation of the effect of probable maximum precipitation (PMP) over the Hudson River drainage area upstream, the determination of probable maximum floodwater conditions at the site, and the evaluation of coincident wind-generated wave conditions that could occur with the probable maximum flood. Included in the review are the evaluation of the details of the design basis for site drainage and runoff for site drainage (including the roofs of safety related structures) and drainage areas adjacent to the plant site resulting from the probable maximum precipitation. The criteria for acceptance of the plant design basis with respect to probable maximum floods depend on whether the water level reached in the probable maximum flood, with coincident wind waves, establishes a required protection level to be used in facility design; whether the design basis flood protection level is established by another phenomenon (e.g., a hurricane); or whether the site is "dry" (ie, well above the elevation reached by a probable maximum flood with coincident wind conditions). Previous studies would indicate that the second condition combined with elements of the first can be held to apply at IP3. The procedures for characterizing wind-generated wave actions are also specified in Section 2.4.3 of the SRP.

Section 2.4.4 of the SRP addresses potential dam failures including seismic-induced dam failure. Acceptance of analyses of dam failures is based on an acceptance of the analysis of coincident river flows at the site and at the dams being analyzed and the calculation of flood levels at the site. In this regard, we would note that failure of the Ashokan dam, which holds back the largest body of stored water within 100 miles of IP3, was addressed in previous studies [27].

Section 2.4.5 of the SRP addresses probable maximum surge and seiche flooding. The intent is to ascertain the extent of flood protection required for safety related plant systems with respect to probable maximum hurricanes and wind storms. Specific acceptance criteria include the requirements that ambient water levels be established and that combinations of surge levels and waves that may be critical to plant design be considered. At IP3, it is hurricane-induced surges rather than seiches that are of concern.

Section 2.4.10 of the SRP defines the level of flood protection that may be required and Section 2.4.11 provides acceptance criteria for the cooling water supply to assure that an adequate water supply will exist to operate or shutdown the plant under normal and emergency conditions. The areas of review include the worst drought considered reasonably possible in the region.

Section 2.4.14 of the SRP addresses the technical specifications and emergency procedures required to implement flood protection for safety-related facilities and to assure an adequate water supply for shutdown and cooling purposes. The acceptance criteria require that hydrologic events of concern, the actions to be taken, the appropriate water levels and conditions at which action is to be initiated, and the appropriate emergency procedures and amount of time to implement such procedures should all be identified.

Section 3.4.1 of the SRP addresses flood protection. This section states that the facility design and equipment arrangements should be reviewed to identify safety-related structures, systems and components (SSC) that must be protected against flooding, to determine the ability of structures housing safety-related systems or equipment to withstand flood conditions, to determine the adequacy of the isolation of redundant safety-related systems or equipment, and to identify possible in-leakage sources.

Conclusions. Potential threats from external flooding to IP3 result from severe local precipitation and runoff and river flooding, in conjunction with tides, hurricanes and dam failure. While these issues were addressed in the plant design basis and FSAR, developments since then make it advisable to reevaluate the issue. Of particular concern are the revised probable maximum precipitation criteria that give rainfall intensities that exceed design values and the impact of these revisions on hydrologic and hydraulic processes at the plant.

5.4.2 Evaluation of Risk Associated with External Flooding

Flood damage to IP3 may result from high Hudson River water levels or intense precipitation local to the site.

5.4.2.1 High River Levels

Both the IPPSS [10] and studies performed prior to plant commissioning [27] concluded that the maximum river flood levels anticipated at IP3 would result from hurricane-induced storm surges and heavy precipitation occurring in conjunction with high tides and other events. While the impact of hurricanes must therefore be evaluated from the perspective of flood damage, it should be recalled that a hurricane that would lead to high flood water levels would also cause direct wind damage and, in particular, a probable loss of offsite power. Tornadoes may also be spawned by hurricanes. While these events would serve to exacerbate the incident, it must also be recognized that an evaluation of maximum hurricane-induced Hudson River flood levels is one that seeks to establish the maximum credible water levels at IP3 and is not necessarily a scenario of direct concern to this IPEEE. In particular, operating procedure, OD-8 [15] would demand the plant be shut down prior to the arrival of a severe hurricane. Furthermore, the technical specifications for IP3 require that if the Hudson River water elevation reaches 12 ft 5 in. above mean sea level at the intake structure, the reactor will placed in cold shutdown.

In attempting to characterize conceivable floods at IP3 it is important to recognize the considerable uncertainty associated with the impact of hurricanes. The flooding effects they induce will differ according to the direction taken by the hurricane (eg, storms moving parallel to coasts will produce smaller surges than those crossing the coast), central pressure, storm radius, forward velocity and geographic setting [31]. Furthermore, when dealing with extremely unlikely events, events or associated phenomena may occur that it are not within the historical record [31].

The approach adopted in previous evaluations of Hudson River flood levels and their possible impact on IP3 [27] was to demonstrate that no foreseeable combination of events, however unlikely, could raise the river level at IP3 to such a height that flood damage to the plant would result. While this approach was criticized in the NRC review of the IPPSS [11] in which a reviewer suggested a probabilistic approach, it would appear to be a very reasonable approach if it can be demonstrated that the bounding flood will not damage the plant and if event frequency data are lacking. However, in reexamining the potential impact of river flooding in this study, both predicted flood frequencies and bounding floods were examined.

Flood Frequencies. A Federal Emergency Management Agency (FEMA) flood insurance study [32] examined Hudson River flooding using detailed calculation methods. The principal flood problems noted in this study were occasioned by hurricanes; the predicted flood elevations with their recurrence period are presented in Table 5.4.2.1. It is clear that the predicted river levels are substantially below the IP3 embankment level or the level at which plant technical specifications call for plant shutdown. While the use of extreme value distributions to extrapolate from 500 year return data to longer return periods may not be appropriate, given that different phenomena may induce more damaging but less frequent floods [31], it is probably safe to assert that floods with return periods of 10,000 years or less will not damage the plant.

Table 5.4.2.1

Hudson River Flood Elevations [32]

Recurrence Period (years)	Elevation (ft)
10	6.0
50	7.0
100	7.6
500	9.0

Bounding Floods. Earlier studies of possible floods, alone or in combination, concluded that while floods might conceivably require plant shutdown (as dictated by plant technical specifications), no damage was anticipated from flooding. Scrutiny of these potential worst-case floods is appropriate, however, to ensure that the conclusions concerning them still hold and thus that high river levels can be excluded from further consideration on deterministic as well as probabilistic grounds. That said, we would note that excepting the revision of probable maximum precipitation data, the tendency in recent years has been to emphasize the characterization of floods and hurricanes with return periods of 500 years or less rather than to attempt to predict hypothetical worst-case events. Accordingly, there would appear to be little pertinent worst-case data on floods that were not available earlier.

While revised probable maximum precipitation data have been published, they have little effect on the predicted probable maximum (precipitation-induced) flood at IP3. The probable maximum flood is one that results from probable maximum precipitation and related run-off in a particular area—for the Hudson River at IP3, the probable maximum flood was calculated as resulting from 14 in. of precipitation over a period of 72 hours over the entire 12,650 mile^2 area of the Hudson River basin [27]. As noted in Section 5.4.1.2, estimates of PMP were revised subsequent to plant commissioning. However, the principal changes in estimated PMPs were in precipitation anticipated over a small area for short periods. Thus the 72 hour PMP now predicted for a 10,000 mile^2 drainage area upstream of IP3 in New York varies between 13 and 16 in. [28], a value entirely consistent with the 14 in. PMP assumed in earlier calculations of probable maximum floods [27]. Accordingly, the probable maximum flood predicted would seem appropriate.

Furthermore, given that the flood peak at IP3 is not expected until 80 hours after the commencement of probable maximum precipitation [27], adequate time will clearly be available to place the plant in cold shutdown.

Finally, we would note that there is no evidence that the Ashokan dam has any increased propensity for failure or that the consequences of dam failure are worse than had been predicted earlier. The most recent (1978) dam safety study pronounced the dam to be safe [33].

We can therefore conclude that the anticipated frequency of Hudson River flood levels that might require plant shut down is $<10^{-4}$/year, that the bounding flood scenarios developed for IP3 in previous studies still hold, and that operating procedures and technical specifications would ensure that the plant be shut down in advance of high river water levels. External flooding, in the form of high river levels, can thus be judged to pose no significant risk to IP3 when the plant is operating at full power.

5.4.2.2 Precipitation Local to the Site

In Section 5.4.1.1, it was noted that roof and storm drainage at the site was designed on the basis of rainfall intensities of 5 to 5.5 in./hour with roof design loadings of 40 lb/ft^2. However, data published by the National Weather Service [28, 29] subsequent to plant commissioning call for higher rainfall intensities over shorter time intervals and smaller areas than had previously been considered. Application of the new PMP criteria to IP3 indicate that the probable maximum rainfall intensity on site is 17.5 in./hour for a 1-hour duration, 37.1 in./hour for a 15-minute duration, and 71.4 in./hour for a 5-minute duration [29]. These data are for 1 mile^2 areas. Given that the values for storms of one-hour duration or less are several times the design values, a review of the impact of the revised local maximum probable precipitation was conducted.

This review comprised a walkdown of the perimeters of plant buildings to examine ground water run-off and an evaluation of the adequacy of primary auxiliary building (PAB), auxiliary boiler feed pump (ABFP) building, control building, fan house and turbine building roof drainage and the drainage of run-off from the containment building. The walkdown of building perimeters was conducted to ascertain whether run off would drain into plant buildings. However, no natural flow paths for such drainage were identified and no areas in which ponding might occur were observed in proximity to the buildings. This result was not unexpected as the area to the east of the plant slopes steeply towards the river. Furthermore, it was noted that the land adjacent to plant buildings is paved or covered with gravel--runoff over such surfaces will be far more rapid than over heavy turf and thus water is unlikely to accumulate in the vicinity of the buildings. Finally, it was noted that the flood zones identified in the Individual Plant Examination for Internal Events [26] as being susceptible to internal flooding--in particular, the 15-ft elevation of the control building--are unlikely to be subject to external flooding induced by local precipitation because exterior doors in these zones open above grade or onto well drained areas. In light of all these factors, it can be concluded that ground drainage is unlikely to pose problems even when it results from the probable maximum precipitation currently anticipated.

As noted earlier, the original roof drainage system designs were based on rates of precipitation of 5 to 5.5 in./hour. The tables and data presented by Blendermann [34] and Merritt and Ambrose [35] confirm the adequacy of these drainage systems when faced with such rates of precipitation. However, given that revised probable maximum precipitations (PMPs) (eg, 17.5 in./hour for a 1-hour duration) are several times those predicted in the original design, it is possible that the existing roof drainage systems are undersized for such rates of precipitation. While this would result in the accumulation of water upon the roofs behind parapets, hydraulic calculations performed using the revised PMPs show the 40 lb/ft^2 load capacity of the various roof areas examined will not be exceeded. It can therefore be concluded that heavy rainfall poses no significant risk of roof damage or collapse.

5.4.3 Mitigating Measures for External Flooding

No external flooding scenario was identified that could lead to core damage with a probability in excess of 10^{-6}/year. Accordingly, no recommendations are made for measures to further mitigate the possibility of external flooding at IP3.

5.5 HAZARDOUS CHEMICAL, TRANSPORTATION AND NEARBY FACILITY INCIDENTS

5.5.1 Plant Data Review

5.5.1.1 Plant-Specific Hazard Data and Licensing Bases

Atmospheric Stability and Classification. The dispersion of released chemicals into the atmosphere depends on atmospheric stability. Site meteorology and Pasquill type stability classifications were discussed in detail in Section 2.6 of the FSAR [7] though with a primary focus on the dispersion of radioisotopes following a plant incident.

Hazards. No explicit mention of toxic or explosive hazards or of aircraft accidents was made in the FSAR. The control room was designed, however, to ensure habitability in case of radioactive release.

5.5.1.2 Significant Changes to the Plant and Hazard Characterization

Since design of the plant was completed, a number of issues have been raised and new data made available that are relevant to the impact of external events on the safety of the plant. These issues and new data will be discussed now.

Improvements in the Modeling of Chemical Release Hazards. Since IP3 was designed, a series of major incidents involving the release of chemicals have led to both a heightened awareness of chemical hazards and dramatic improvements in the modeling of chemical release hazards. These incidents have included the release of toxic chemicals (Bhopal, India, 1984; Seveso, Italy, 1976) [36]; vapor cloud explosions (Flixborough, U.K., 1974; Port Hudson, Mo., 1970; Enschede, The Netherlands, 1980; East St. Louis, Il., 1972; Ufa, Russia, 1989) [37]; and boiling liquid expanding vapor explosions or BLEVEs (Haltern, Germany, 1976; Brooklyn, NY, 1970; Crescent City, Il., 1970; Mexico City, 1984; Nijmegen, The Netherlands, 1978; Texas City, Tx., 1978; San Carols de la Rapita, Spain, 1978; and Worms, Germany, 1988 [37, 38]). It is therefore likely that, regardless of what analyses were performed previously, studies performed before, at, or immediately after the commissioning of IP3 would need to be repeated to take advantage of advances in our ability to characterize the consequences of the release of chemicals. Furthermore, changes in hazardous chemical inventories and shipments would also create an imperative to update earlier analysis. That said, we would note that analyses have in fact been performed on potentially hazardous chemical releases. These analyses will now be described.

Indian Point Probabilistic Safety Study (IPPSS). The risks posed to the plant by the transportation and storage of hazardous materials were addressed in some detail in Section 7.7 of the IPPSS [10]. Both nearby transportation routes and facilities and the proximate concentrations of hazardous materials of significance were examined. The shipments of hazardous materials addressed were:

- The transportation of fuel oil, chlorine, hydrochloric acid, sodium hydroxide, sulfuric acid and phosphoric acid along Conrail lines 0.9 miles west and 0.6 miles east of the plant site
- The shipment of liquid propane gas (LPG) along NY Highway Route 9 two miles east of the plant site
- Barge shipments of no. 2 fuel oil and sodium hydroxide to Indian Point
- Barge shipments of petroleum products along the Hudson River
- Gas transmission lines 400 ft from the nearest IP3 plant structure.

The IPPSS concluded that the risk of an event involving such offsite shipments was extremely small.

It was also noted in the IPPSS that hazardous materials were stored onsite (ie, in Indian Point Units 1, 2 or 3). These materials included liquid carbon dioxide, hydrogen gas, ammonium hydroxide, hydrazine, sodium hydroxide and sulfuric acid. For materials posing toxic risks, the

IPPSS noted that an analysis was in progress [39] but concluded, on the assurance that corrective action would be taken to eliminate any risk of concern, that the risk of core damage associated with the release of toxic materials would be very small. As noted in the following description of toxic chemical control room habitability studies, changes were made to ensure risks posed by the release of toxic chemicals are minimal. Risks posed by the explosive energies of gases stored on-site were also deemed minimal because of the separation between critical facilities and the stored gases and because of the presence of intervening structures.

In its review of the IPPSS, the NRC agreed with the conclusion that the truck and rail transport of flammable gases would pose negligible risk to the plant [11]. While the NRC disagreed with the assessment of the probability of a petroleum spill near the cooling water intake structures, it too concluded that a petroleum fire at the intake structure would be of less importance that other causes of service water failure and thus that large petroleum fires would not be expected to significantly impact risk at Indian Point. The NRC also concurred that in a hypothetical gas line explosion, blast fragments would pose a negligible risk to reinforced concrete structures and to safety-related equipment inside.

In Section 7.6, the IPPSS also addressed the potential for risk posed by aircraft accidents. It listed nine airports within approximately 25 miles of Indian Point and used the analytical procedures provided in Section 3.5.1.6 of the SRP [17] to evaluate operations at the Peekskill seaplane base and along designated and direct route airways within 12 miles of the plant. As a result of this analysis, it was concluded that aircraft accidents posed no significant risk to Indian Point. This conclusion was found acceptable by the NRC reviewers [11].

<u>Toxic Chemical Control Room Habitability Studies</u>. A report was submitted to the NRC in 1981 [39] addressing the habitability of the control room at IP3 following postulated on- and off-site releases of toxic chemicals. This report was required by Section III.D.3.4 of NUREG-0737 [5]. In examining the impact of toxic chemicals, this report identified off- and on-site stationary and mobile sources of toxic risk. While it specifically noted that no gaseous chlorine was stored on-site, it also identified a number of chemicals (anhydrous ammonia, carbon dioxide, chlorine and hydrogen cyanide) for which control room concentrations subsequent to an accident and release might exceed toxicity limits. Subsequently, a more detailed analysis [40] concluded that liquid carbon dioxide stored on-site posed no significant risks to control room operators because the maximum concentrations that could occur within the control room were well below their toxicity levels. The same analysis concluded that the anticipated frequency with which other releases of toxic chemicals could cause incapacitating concentrations within the control room were well below the 10^{-6}/year criterion of concern. The NRC, however, disagreed with the rail car accident frequency used in this analysis [41]. Accordingly, a toxic gas monitoring system was installed, providing staff with the opportunity to don breathing equipment and close dampers.

The assumptions made in the study were conservative:

- For each postulated incident, the entire contents of the largest single container (storage tank, rail car or tank truck) were assumed to be released instantaneously.
- If ten or more deliveries are made each year, the postulated release was based on the catastrophic failure of the delivery tank truck if this is larger than the storage tank.
- Spills that can form pools were assumed to spread to a uniform thin layer, regardless of curbs or other means of containment.
- It was assumed that the control room fresh air intake is located at the release height (generally ground level) except for on-site releases of carbon dioxide. In the release of liquid carbon dioxide, a falling plume of carbon dioxide was assumed to be positioned exactly at the control room air intake.

The calculations performed for the worst scenarios all concluded that the maximum predicted control room concentrations of toxic chemicals were all below the toxicity acceptance criteria. It was therefore concluded that there are no toxic gas hazards that require either gas detectors or automatic isolation of the control room.

<u>Hydrogen Explosions</u>. In December 1992, GE alerted all BWR owners to the potential for a hydrogen explosion in the turbine building mezzanine from a break in a turbine generator hydrogen cooling line [42]. Subsequently, the NRC issued Generic Letter 93-06 [43] to summarize the results of research into the potential for hydrogen explosions and resolve Generic Issue 106, "Piping and the Use of Combustible Gases in Vital Areas". The entire scope of this generic issue is pertinent to IP3: the storage and distribution of hydrogen for the volume control tank and main electric generator, the evolution of hydrogen in battery rooms and the waste gas system, and the use of small, portable gas bottles in maintenance, testing and calibration. While the NRC concluded that the risk posed by hydrogen fires within plant buildings was small and that the safety benefit of certain recommended actions was marginal for some or all licensees, it could not preclude a larger risk at specific plants.

In response to the generic letter, the Authority assessed the issue for both its nuclear plants [44]. For IP3, it was concluded that the risks were small. This conclusion was drawn from plant-specific data and a generic study [45]. The potential for hydrogen explosions was demonstrated, however, in an unusual event that occurred at IP3 [46]: on June 9, 1996, a hydrogen explosion occurred in a hydrogen dryer control panel, blowing off the door. It is believed that hydrogen leaked through the electrical conduit into the control panel and ignited.

5.5.1.3 Determination of Whether Plant and Facilities Meet Current Safety Criteria

The Standard Review Plan. Sections 2.2.1 and 2.2.2 of the Standard Review Plan address potential hazards in the vicinity of the site including those posed by air, ground and water traffic, pipelines, and fixed manufacturing, processing and storage facilities. Such hazards are adequately identified if:

- The locations and distance of industrial, military, and transportation facilities in the vicinity of the plant are determined. In particular, all facilities and activities within eight kilometers (5 miles) of the plant should be reviewed together with facilities and activities at greater distances if they have the potential for affecting plant safety-related features.
- Descriptions of the activities conducted, including the products and materials likely to be processed, stored, used or transported are adequate to permit identification of possible hazards.
- Sufficient data with respect to hazardous materials are provided to establish a basis for evaluating the potential hazard to the plant.

A review of these data is then required to identify all potentially hazardous activities that cannot be eliminated from further consideration on account of their frequency or consequences.

Section 2.2.3 of the SRP addresses the evaluation of the probabilistic analysis of potential accidents involving hazardous materials or activities in the vicinity of the plant, noting, however, that potential accidents that could affect control room habitability are addressed in Section III.D.3.4 of NUREG-0737. The criteria for acceptability of offsite hazards that might cause onsite incidents leading to the release of significant quantities of radioactive fission products is that the incidents should have a sufficiently low probability of occurrence--ie, an occurrence rate of 10^{-6}/year or less for the initiating event.

Section 6.4 of the SRP addresses control room habitability with the intent to ensure that plant operators are adequately protected against the effects of accident releases of toxic gas. Acceptance criteria relevant to toxic gas incidents include ventilation system criteria, the relative locations of sources of toxic gases and the control room, and the characterization of toxic gas hazards. These criteria are derived in part from Section III.D.3.4 of NUREG-0737 [5].

Finally, Section 3.5.1.6 of the SRP addresses aircraft hazards. The intent of the acceptance criteria in this review is to ensure that the probability of aircraft impact on the plant is acceptably low. This can be achieved by examining the distances between a plant and airports, military training routes, airways, holding patterns, and approach patterns. Alternatively, a detailed probabilistic analysis can be performed.

__Conclusions__. Transportation, chemical, and nearby facility incidents were not addressed in the FSAR.

While the requirements of the SRP would appear to have been met at one time by analyses included within the IPPSS [10] or in studies performed in response to Section III.D.3.4 of NUREG-0737 [39, 40], the sources of risk may have been changed since these studies were performed. Furthermore, new accident data and tools with which to characterize such risks have become available [47]. Accordingly, a detailed examination of transportation, chemical and nearby facility incidents was required in this study.

A similar conclusion can be drawn with respect to aircraft hazards. While it can be asserted that IP3 met the SRP criteria in 1982, possible changes to the frequency of flight operations at nearby airports and the proximity of the Peekskill seaplane base and federal airways to the plant all call for a detailed review of aircraft hazards in this present study.

5.5.2 Evaluation of Risk Associated with Hazardous Chemical, Transportation and Nearby Facility Incidents

5.5.2.1 Toxic Hazards

An analysis was performed to re-examine the results of the control room habitability studies [39-41] and model additional toxic release scenarios.

__Potential Toxic Hazards__. The hazards of concern result from the release of toxic chemicals and asphyxiants such that control room habitability might be threatened. NRC Regulatory Guide 1.78 [48] requires that all potentially toxic chemicals and asphyxiants at or within five miles of the plant be identified. Extraordinarily hazardous substances present in amounts exceeding threshold planning quantities were identified by reviewing the 1996 Tier II EPCRA submissions for the Town of Cortlandt (and in particular for Buchanan, Montrose, Crugers and Verplank), the City of Peekskill, and the Village of Croton-on-Hudson. These data are retained by the Westchester County Department of Public Health. In addition, roadside surveys of placarded vehicles were conducted. Data on the movement of specified hydrocarbon and chemical products passing IP3 on the Hudson River were obtained from the Waterborne Commerce Statistics Center (Table 5.5.2.1 [49], [50]). Shipments of toxic material by rail were eliminated as sources of concern because Conrail states that no hazardous chemicals are transported within five miles of the plant [50]. Shipments of hazardous material by road, other than to or from local facilities, must use interstate highways. This practice was confirmed by roadside surveys conducted on May 9, 1996, between 8:40 am and 1:15 pm in which no shipments of hazardous (ie, placarded) materials were observed other than those known to be used in local facilities.

Table 5.5.2.1

Movement of Specified Chemical Products Past Buchanan Dock Calendar Year 1994 [49]

Direction	Commodity	Tons
Down-bound	Carnallite, sylvite and other crude non-potassium salts	1,271
	Fluorinated derivatives of acyclic hydrocarbons	3
	Methanol	7
	Unsaturated acyclic monocarboxylic acids and derivatives	17
	Lactams	2
	Esters of inorganic acids, their salts and derivatives	3
	Sulfur dioxide	6
	Halides and halide oxides of non-metals	22
	Synthetic organic coloring matter	3
	Pigments, paints, varnishes and related materials	48
	Essential oils, resinoids and perfume materials	2
	Mineral or chemical fertilizers	22,998
	Plastics in primary form	74
	Plastics in non-primary form	11
	Artificial waxes and prepared waxes	9
Up-bound	Amino aldehydes and ketones, amino quiones and salts	1
	Chemical waste	1,795

The list of potentially toxic chemicals and asphyxiants was screened for analysis using the criteria set forth in Regulatory Guide 1.78 [48]. The following types of material were eliminated from further consideration:

- Solids and low volatility liquids and slurries (typical of most of the chemical commodities, including hazardous wastes, carried up and down the Hudson River)
- Materials in quantities of less than 100 lbs or stored beyond 5 miles of the plant
- Gasoline stored in underground tanks
- Simple asphyxiants stored offsite.

The conclusions of the control room habitability study [40, 41] were also considered in evaluating whether a material should be considered further. The list of materials not eliminated in the screening process is presented in Table 5.5.2.2. It will be noted that the sulfuric acid stored in the condensate polisher and water factory buildings is absent from the list because of its low vapor pressure and the minimal sulfuric acid concentrations that will result in the IP3 control room should a release occur [40, 41]. The hydrazine present on the 15-ft elevation of the control building was also omitted from the list because it is stored as a 35 percent aqueous solution.

<u>Exposure Limits to Toxic Gases and Asphyxiants</u>. For nuclear power plant control rooms, the criterion used to define maximum acceptable toxic gas and asphyxiant concentrations is that control room operators should be able to tolerate two-minute exposures to the specified toxic gas concentration, don fresh air masks, and continue to operate the reactor (if the toxic material or asphyxiant is eliminated) or safely shut it down (if the toxic gas or asphyxiant remains) [53]. Possible values for this exposure limit together with other data on the consequences of exposure to toxic gases or asphyxiants are presented in Table 5.5.2.3. It will be noted that there is some variability in the exposure limits suggested. The exposure limit values adopted for this study represent a conservative consensus: eg, exposure limits of 20 ppm for chlorine were used.

<u>Analyses</u>. A screening analysis was performed to ascertain if the release of any of the toxic chemicals and asphyxiants could lead to a loss of control room habitability as defined above with a predicted frequency that exceeds the 10^{-6}/year frequency criterion of concern. In these analyses, the concentration of the toxic chemical or asphyxiant in the control room was calculated using conservative assumptions and compared with the exposure limits presented in Table 5.5.2.3 to ascertain whether hazardous concentrations could ever occur. The frequency of the scenario of concern was also predicted where necessary. The assumptions made in these analyses were as follows:

Table 5.5.2.2

Toxic Chemicals and Asphyxiants

Location	Chemical	Quantity	Distance from Control Room Air Intake
IP3	Nitrogen	Multiple tanks west of machine shop	60 m. (200 ft)
	Carbon dioxide	Auxiliary boiler feed pump building: 20,000 lb	100 m. (320 ft)
		Administration building: 20,000 lb	45 m. (150 ft)
		Tank truck carrying 40,000 lb delivers 2 times/year	
	Morpholine (NO_x evolved on combustion)	Up to 3,000 gal. 6 deliveries/year	Tank 90 m. (300 ft)
	Freon F-12 (phosgene evolved on decomposition)	150-lb container	90 m. (300 ft)
Peekskill Wastewater Treatment Plant	Chlorine	10,000 lb (held in 2,000 lb containers)	5 km (3.1 miles)
Buchanan Sewage Treatment Works	Chlorine	1,800 lb (held in 150 lb containers)	1.4 km (0.87 miles)
Montrose Improvement District Water Treatment Plant	Chlorine	1,800 lb (held in 150 lb containers)	6 km (3.7 miles)
Peekskill Water Department	Chlorine	8,000 lb (held in 2,000 lb containers)	5.3 km (3.3 miles)
Waterborne commerce	Sulfur dioxide	12,000 lb	300 m. (1000 ft)
	Halides, etc (assume chlorine)	44,000 lb (assumed held in 2000 lb containers)	300 m. (1000 ft)

Table 5.5.2.3

Toxic Gas and Asphyxiant Exposure Limits

Toxic Gas	Exposure (ppm)	Comments	Source
Carbon dioxide	27,900	Short term exposure limit	NIOSH [51]
	30,000	Short term exposure limit	OSHA
	5,000	Time-weighted average/ permissible exposure limit	[52]
	9367		Regulatory Guide 1.78 [48]
Chlorine	30	Maximum acceptable toxic gas concentration	NUREG/CR-5669 [53]
	55 (for 15 minutes) 13.7 (for 1 hour)	Acute toxicity concentration	[54]
	20	Instantaneous serious eye and respiratory tract irritation	[55]
	>100	Immediate respiratory paralysis and death	[55]
Nitrogen	236,000	Asphyxiant	[56]
Sulfur dioxide	100	Acute toxicity concentration	[54]
Freon F-12 (Phosgene)	15,000 (2)	IDLH (Acute toxicity concentration)	[73] ([54])

- The entire contents of the largest single storage container or tank truck were assumed to be released instantaneously.

- Spills from tank trucks that can form pools were assumed to spread to a minimum thickness regardless of any containment curbs. Bunds were accounted for, however, in evaluating spills from fixed storage tanks.

- Winds blow directly from the release to the control room ventilation fresh air intake.

- The most conservative wind speed, air stabilities, and release heights were assumed--in general a wind speed of 0.5 m/sec (1.6 ft/s) and F-class air stability were assumed.

- An outside ambient temperature of 77°F (25°C) was assumed [57].

The analyses were performed using WHAZAN [58] where dispersion modeling was required.

<u>**Nitrogen Release from Storage at IP3 and Delivery Tank Trucks**</u>. The role of nitrogen as an asphyxiant was eliminated from detailed consideration because maximum control room nitrogen concentrations resulting from the rupture of storage tanks or tanks being delivered are significantly less than the concentrations required to asphyxiate control room staff. Essentially, the mass of nitrogen on-site is insufficient to cause the prolonged nitrogen concentrations at the control room air intake required for a substantial accumulation of nitrogen in the control room.

<u>**Carbon Dioxide Release from Storage at IP3 and Delivery Tank Trucks**</u>. Carbon dioxide is stored in Cardox carbon dioxide fire suppression systems. Two 10-ton tanks are located in the administration and auxiliary boiler feed pump buildings. The control room habitability study [41] concluded that the maximum concentration of carbon dioxide predicted for the control room is less than 1/3 of the short term exposure limit. This maximum concentration is, however, greater than the time-weighted average and permissible exposure limits (Table 5.5.2.3); furthermore the rapid release of carbon dioxide will likely result in overpressures and shock waves that may damage the turbine building. Given these circumstances, the release of carbon dioxide on site was examined in more detail.

High concentrations of carbon dioxide in the control room may result from the discharge of the carbon dioxide fire protection system in the relay room, the catastrophic rupture of a carbon dioxide tank in the administration or auxiliary boiler feed pump building at elevated tank temperatures and pressures, the catastrophic rupture of a carbon dioxide tank in the administration or auxiliary boiler feed pump building at normal tank temperatures and pressures, lesser releases of carbon dioxide inside buildings, or the rupture of carbon dioxide delivery tank trucks.

Examining first the operation of the carbon dioxide fire protection system, we would note that IP3 staff are fully conversant with the dangers of high concentrations of carbon dioxide. Releases to suppress fires are annunciated and are addressed in procedures. Such releases can therefore be held to pose no major risk to plant operation. The inadvertent release of carbon dioxide within the administration or auxiliary boiler feed pump buildings can be characterized as being of one of three types: the catastrophic rupture of a carbon dioxide tank in the turbine building at elevated tank temperatures and pressures; the catastrophic rupture of a carbon dioxide tank in the turbine building at normal tank temperatures and pressures; and lesser releases of carbon dioxide.

Examining first the catastrophic rupture of a carbon dioxide tank in the administration or auxiliary boiler feed pump building at elevated tank temperatures and pressures, we would note that the frequency of such an event is predicted in Section 5.5.2.2 to be less than the frequency criterion of concern. Accordingly, this event was examined no further.

The catastrophic rupture of a carbon dioxide tank at its normal temperature and pressure will result in the rapid evolution of carbon dioxide from both flashing on release and the boiling of liquid carbon dioxide. While it will not result in a shock wave, it will result in an overpressure, perhaps of several psi in magnitude within the administration or auxiliary boiler feed pump building and presumably the bursting of doors and ductwork and other structural damage. In this scenario, we would expect carbon dioxide to be vented from many points in the turbine building or warehouse area of the administration building resulting in significant dilution of the carbon dioxide released. In these circumstances, we would not expect the short-term exposure limit for carbon dioxide to be exceeded in the control room though clearly injury and death may occur within the building in which the release occurs.

Lesser releases of carbon dioxide within the administration, auxiliary boiler feed pump or turbine building will essentially be accommodated by normal ventilation. For example the escape of liquid carbon dioxide through a ½-in. orifice will result in the release of 1.9 kg/s (4.2 lb/s) of carbon dioxide. Of this liquid, about 30 percent will flash on release and the remainder will boil away after striking the ground. While a small pressure rise will be seen in the building, the rate at which gaseous carbon dioxide is generated can be handled by normal building ventilation, assuming 2-3 changes of air/hour. The exhaust stream will comprise carbon dioxide mixed with air and further diluted by momentum effects, if the building exhaust fans are running. The resulting carbon dioxide concentration at the control room ventilation system inlets will be lower than the lowest concentration of concern. Accordingly such releases need be considered no further.

While the catastrophic rupture of the carbon dioxide delivery truck may result in carbon dioxide concentrations in excess of the short-term exposure limit outside the control building, the predicted frequency of such an event (5.6×10^{-8}/yr) is below the level of concern. The frequency of this accident scenario can be calculated considering the frequency of carbon dioxide deliveries (about 2/year), the probability of an accident occurring in the course of a delivery (say about 10^{-6}/delivery [59] assuming accidents within 100 m are of concern) and the probability of a major release given an accident (0.028 [60]). In addition, specific wind directions would be required for carbon dioxide to drift from the point of release to the control room ventilation system intake. Accordingly, this accident scenario need be considered no further.

<u>**Morpholine Tank Adjacent to Turbine Building**</u>. A tank containing morpholine is located outside the north-west corner of the turbine building. Morpholine is a flammable liquid that poses a potential toxic hazard in that toxic NO_x gases are evolved when it burns. The flash point of pure morpholine is 100°F (defining morpholine as a Class II combustible liquid); the 60 percent solution in water in which morpholine is stored has a flash point of 155°F (allowing the solution to be characterized as a Class IIIA combustible liquid). Given the relative ease of ignition of morpholine, its release from the tank or lines or while it is being unloaded from a tank truck and its subsequent ignition poses a toxic risk.

A scenario in which morpholine is released while unloading and then ignites can be eliminated from further consideration because it does not meet the toxic risk frequency criterion of concern. Specifically, deliveries of morpholine are made approximately every two months while the reactor is operating. Assuming a 0.01/year failure frequency for the hose used to transfer morpholine [54], the frequency of release during transfer can be calculated as 2.4×10^{-4}/year, this value being the product of 0.01 (the flexible hose failure frequency), 6 (deliveries/year), 1/250 (reciprocal of the total number of deliveries made to all customers in course of a year, conservatively assuming one delivery is made each day). To this frequency a 0.2 non-recovery probability is applied to account for the fact that closure of valves will terminate the release [54] and a 0.01 ignition probability [61] is applied to account for the ignition probability of pure morpholine. The predicted frequency of a fire involving morpholine is therefore 4.8×10^{-7}/year. When combined with a 0.1 conditional probability of core damage subsequent to the evolution of toxic combustion products, this frequency is below the criterion for concern and thus needs be examined no further. Furthermore, the action of the fire brigade and the operation of the control room ventilation system in the recycle mode will also mitigate any adverse consequences arising from this event.

Similarly, a scenario in which morpholine solution is released from its tank or transfer lines and then ignites can also be eliminated from further consideration. Assuming that line, pipe or valve rupture is required to obtain a release that, if ignited, would be sufficient to pose a toxic risk to control room habitability and the line, valve and pump rupture rates developed by Eide [62] and Jamali [63] apply, the probability of a major release of morpholine solution is 1.6×10^{-4}/year. Combining this frequency with a 0.001 ignition probability [61] for morpholine diluted with water, the predicted frequency of a fire involving morpholine solution is therefore 1.6×10^{-7}/year. When combined with a 0.1 conditional probability of core damage subsequent to the evolution of toxic combustion products, this frequency is well below the criterion for concern and thus needs be examined no further. Furthermore, the action of the fire brigade and the operation of the control room ventilation system in the recycle mode will also serve to mitigate any adverse consequences arising from this event.

<u>**Freon F-12 Containers Adjacent to Turbine Building.**</u> Cylinders containing 150 lb. of Freon F-12 (dichlorodifluoromethane) are located in the gas bottle storage rack outside the north-

west corner of the turbine building. Freon F-12 is a non-flammable gas that has narcotic effects at high concentrations. Previous calculations have shown, however, that the release of Freon F-12 poses no direct risk to control room staff -- the maximum control room concentration that would result from the release of Freon F-12 is less than the NIOSH/OSHA time-weighted average limit for the gas [73].

Freon F-12 also poses another risk that has not been examined previously: when heated to decomposition, it will emit highly toxic fumes of phosgene. Although the probability of a fire impacting the gas bottle storage rack is ~10^{-3}/year [74], the subsequent release and thermal decomposition of Freon and the drifting of phosgene produced to the control room air intake are most improbable -- Freon stored under pressure will likely escape without decomposition should it be released into an unconfined space. Given that phosgene has an IDLH concentration of 2 ppm, however, it is recommended that the control room operators be aware of the risks should a Freon F-12 container be involved in a fire.

<u>Chlorine Stored at Water and Wastewater Treatment Plants</u>. The Tier II emergency and hazardous chemical inventory EPCRA submissions indicate that chlorine is present at a number of sites within 8 km (5 miles) of IP3, stored in 1-ton containers or 150-lb cylinders. Examining the catastrophic rupture of a 1-ton chlorine container, the dispersion of chlorine was modeled as a dense cloud assuming the failure of all mitigating measures, no rain out of liquid chlorine from the cloud produced on tank rupture, a 77°F storage and ambient temperature [57], a 2 m/s wind speed, and F-class air stability. Under these conditions, the 20-ppm exposure limit concentration of chlorine will be seen at 2390 m (1.48 miles) from the point of release. Similarly, releases from 150-lb cylinders will give rise to 20 ppm chlorine concentrations at a distance of 1210 m (0.75 miles) from the point of release given worst-case wind speeds and air stabilities. These impact distances are not particularly sensitive to wind speeds and less stable air will increase dispersion. It can therefore be concluded that a worst case chlorine release from any of the water treatment facilities poses no risk to control room habitability at IP3 given their distance from IP3. Indeed, even the highly unlikely event of a rupture of a chlorine container on Broadway, the road running along the eastern boundary of the plant site, would barely cause a 100 ppm chlorine concentration at the plant under the most unfavorable conditions of wind speed and direction and air stability. In this regard, it should also be noted that the tanks in which the chlorine is conveyed and stored will not be damaged by drops and impact and that it is unlikely that 1-ton containers of chlorine would in fact be conveyed along Broadway. Finally, it should be noted that toxic gas monitors inside the control room would trigger an alarm should chlorine gas enter the control room and that, in response, the control room ventilation system would be placed in a 100 percent recirculation mode, drastically reducing the rate at which outside air (and thus chlorine) enters the control room.

<u>Sulfur Dioxide Transported Down Hudson River</u>. In 1994, six tons of sulfur dioxide were carried past IP3. Any risk posed by these shipments can be regarded as being insignificant on probabilistic grounds: given the volume of sulfur dioxide shipped, presumably shipments are made in relatively small containers along with other cargo. Assuming that sulfur dioxide is

shipped in 150-lb cylinders (i.e., 80 shipments per year), that the impact distance following the catastrophic rupture of such a container is 750 m., that any risk increase imposed by multiple shipments is compensated for by a reduced probability of any one container rupturing, that the spill probability from the barge is 10^{-6}/mile [47], and that the probability of a sulfur dioxide leak given barge damage is 0.1, the frequency of a release within a mile of IP3 is ~ 8 x 10^{-6}/year. Given such a release, the probability of the wind direction being such that toxic concentrations of sulfur dioxide reach the IP3 control room is ~ 0.05. The predicted frequency with which control room habitability at IP3 is affected (~ 4 x 10^{-7}/year) is thus significantly less than the frequency criterion of concern and thus this release scenario need be examined no further. As noted below for halide and halide oxide releases, still lower frequencies can be calculated for releases from multiple containers or the random failure of containers in the absence of barge accidents.

<u>Halides and Halide Oxides Transported Down Hudson River</u>. In 1994, 22 tons of halides and halide oxides were carried past IP3. Assuming the halides and their oxides transported can be treated as chlorine and that this material will be carried in 1-ton containers (i.e., 22 shipments per year), the rupture of a container within 3.9 km (2.4 miles) as a result of a barge accident may result in toxic exposure at IP3. However, any risk posed these shipments can be regarded as being insignificant on probabilistic grounds. First consider the release of chlorine from a single container subsequent to a barge accident. Assuming:

- any risk increase imposed by multiple shipments is compensated for by a reduced probability of any one container rupturing

- the spill probability as a result of a barge accident is 10^{-6}/mile [47]

- a 0.1 probability that a 1-ton container of chlorine is breached given the integrity of the barge is lost and a spill occurs

- the probability of the wind direction being such that toxic concentrations of halides reach the IP3 control room is ~ 0.05,

the frequency of such a release resulting in a toxic concentration at IP3 ~ 5 x 10^{-7}/year. While releases from multiple containers may result in higher halide concentrations (and thus be of consequence if they occur further than 3.9 km/from the plant), the probability of such releases will be less. The probability of a random failure of a container (ie, without a barge collision) within 3.9 km of IP3 is ~ 1.2 x 10^{-8}/year assuming a 10^{-5}/year failure rate for containers and a barge speed of 4.4 m/s (10 mph).

The predicted frequencies with which control room habitability at IP3 is affected are thus less than the frequency criterion of concern and thus these release scenarios need be examined no further. Again, it should be noted that toxic gas monitors inside the control room would trigger an alarm should chlorine gas enter the control room and that, in response, the control room ventilation system would be placed in a 100 percent recirculation mode, drastically reducing the rate at which outside air (and thus chlorine) enters the control room.

5.5.2.2 Explosion Hazards

Potential Explosion Hazards. Potential explosion hazards at IP3 include explosions within plant structures, vapor cloud explosions (VCEs) and boiling liquid expanding vapor explosions (BLEVEs). A VCE is an explosion occurring outdoors that produces a damaging overpresssure. It results from the ignition of a cloud of flammable vapor created by the release of a large quantity of flammable vaporizing liquid or gas from a storage tank, process, transport vehicle, or pipeline. In general, three features are required for a vapor cloud explosion [37]:

- The released material must be flammable and at suitable temperatures and pressures to create a vapor cloud. Such materials include liquefied gases under pressure, ordinary flammable liquids at high temperatures and pressures, and non-liquefied flammable gases.

- A cloud of sufficient size must form prior to ignition. Ignition delays of 1 to 5 minutes are considered most likely to cause vapor cloud explosions though delays of as little as a few seconds and greater than 30 minutes are recorded.

- A sufficient amount of the cloud must be within the flammable range to cause extensive overpressures.

In general, VCEs result from deflagration within the cloud; while detonation is held to be possible it is most unlikely unless a priming confined or condensed explosive source is ignited [61]. Because ignition occurs at the edge of clouds and because the flammable clouds themselves tend to be jet shaped or be flat, models of vapor cloud explosions tend to exaggerate the overpressures anticipated and thus must be considered to give conservative results [64].

A BLEVE is an explosion that results from the catastrophic failure of a vessel containing a liquid at a temperature significantly above its boiling point at normal atmospheric pressure [37]. The liquid does not have to be flammable. Containment failure in a BLEVE may be caused by impact, the weakening of the container beyond the point at which it can withstand internal pressure, or engulfment of the container in a fire. Containment failure is followed by sudden liquid boiling and production of a shock wave. BLEVEs involving nonflammable liquids produce a blast as a result of the expansion of the vapor and flashing of the liquid upon release and fragmentation or missiles from the failed container. Of particular concern, however, are BLEVEs involving flammable liquids in a container that fails rapidly as a result of fire engulfment. Such BLEVEs will produce buoyant fireballs as the released contents will be ignited immediately. If ignition is delayed until the flammable contents mix with air, a vapor cloud explosion may result. While intense thermal radiation is the principal hazard associated with most BLEVEs, here our concern is with equipment sheltered behind concrete structures. Accordingly, the potential for shrapnel and rocketing tank parts will be addressed. With respect to this concern, we would note that flying shrapnel and rocketing tank parts may travel as far as 3,900 ft from the explosion [37, 65].

Recently, the definition of BLEVEs has been refined to account for more destructive events named boiling liquid compressed bubble explosions (BLCBEs) [66]. These events result from a loss of containment of gas liquefied by pressure when the container is engulfed in a fire.

Potential sources of these explosions within five miles of the plant were identified using a list of materials obtained from the records on 1996 Tier II EPCRA submissions for the Town of Cortlandt, the City of Peekskill and the Village of Croton-on-Hudson maintained by the Westchester County Department of Public Health, supplemented by roadside surveys of placarded vehicles. Data on the movement of specified hydrocarbon and chemical products passing IP3 on the Hudson River were obtained from the Waterborne Commerce Statistics Center (Table 5.5.2.1).

The list of chemicals that might be involved in causing a VCE was selected for analysis using the following criteria:

- The chemical is flammable and capable of creating a vapor cloud upon release.
- The chemical must be present in quantities of more than 100 lbs[1].

The list of chemicals that might be involved in causing a BLEVE was selected for analysis using the following criteria:

- The chemicals are contained in vessels as liquids at temperatures significantly above their boiling point at normal atmospheric pressure.
- The chemicals must be present in quantities of more than 100 lbs.
- The chemicals are located within 3,900 ft of IP3 (this is the greatest distance to which tank parts are known to have been rocketed).

Explosions within buildings could result from the release of a flammable gas or vapor cloud into a confined, and unventilated, area.

[1]Although it has been asserted that releases of at least 1 ton of vapor at a rate of 0.1 tons/minute are required to cause a VCE, it would appear that there is no theoretical basis for assuming smaller releases are incapable of causing an explosion [58]. However, smaller releases are less likely to ignite--the probability of an explosion with the release of 10 tons of vapor is 0.1; the probability of an explosion with 1 ton of vapor or less is 0.001 [63].

The resulting list of materials to be examined is presented in Table 5.5.2.4. It will be noted that materials conveyed along the Hudson River and along Conrail railway lines are excluded from this list. The rationale for this exclusion is as follows: there would appear to be no materials transported that would result in vapor cloud explosions outside confined areas in barges and vessels [49]. While explosions involving petroleum product vapors are possible in "empty" tanks or other confined areas (substantial quantities of gasoline, jet fuel, naphtha, kerosene and fuel oil carried up the Hudson River past IP3 [50]), it is unlikely that the destructive effects of such explosions (either as an overpressure or missiles) would impact the plant. While a rapid spill and fire involving petroleum products in the vicinity of IP3 is possible, its probability has been calculated as 10^{-5} to 10^{-8}/year [10]. Furthermore, as a fire on the river or at the shore line would not affect any equipment that would preclude a safe shutdown, the contribution of such fires to the core damage frequency will be extremely small [10].

The risks posed by rail transportation in the vicinity of IP3 (on lines on the east and west banks of the Hudson River, 1100 m. (0.66 miles) and 1450 m. (0.9 miles), respectively, from IP3) are also deemed minimal for two reasons. First, Conrail has ceased to transport hazardous materials on these lines [50]; second, even an extremely severe vapor cloud explosion involving the entire contents of a 45,000 gallon propane tank car would not cause 1-psi overpressures at IP3.

Table 5.5.2.4

Potential Explosion Hazards

Location	**Chemical**	**Quantity**	**Hazard**	**Distance from Containment Building**
IP3	Hydrogen	5 tanks (about 18 kg (40 lb) Tank truck delivers 12 times per year Hydrogen lines within buildings	VCE Explosion	70 m. (240 ft) Adjacent
	Natural gas	Natural gas pipeline	VCE	0.7 miles (1.1 km)
	Carbon dioxide	10-ton tanks in the administration and auxiliary boiler feed pump buildings Tank truck makes 8 deliveries per year	BLEVE	100 m. (320 ft) 25 m. (80 ft)
Burnwell Gas Corporation	Propane	>100,000 lb in two 18,000 gallon and two 30,000 gallon containers	VCE BLEVE	0.41 km (0.25 miles)
Paraco Gas Company	Propane	>100,000 lb	VCE BLEVE	0.35 km (0.22 miles)

Analyses. Analyses were performed to ascertain if potential explosions could lead to damaging overpressures or rocket or missile damage to IP3. A damaging overpressure resulting from an outdoor explosion is defined as an 1.0 psi side-on peak overpressure [6, 23]. In this analysis, potential overpressures were calculated using very conservative assumptions. In particular, for vapor cloud explosions involving propane liquefied under pressure and compressed hydrogen gas, the entire contents of the largest single storage tank or tank truck were assumed to be released instantaneously and participate in the explosion with an overall explosion efficiency of 10 percent.

The evaluations of vapor cloud explosions were performed using WHAZAN [58]. The evaluations of the blast effects of BLEVEs were performed using the procedures defined in "Guidelines for Evaluating the Characteristics of Vapor Cloud explosions, Flash Fires, and BLEVEs" [37].

The calculations performed in the analyses will now be presented. The results of the analysis are summarized in Table 5.5.2.5.

Hydrogen Explosions. Hydrogen poses a significant fire hazard because a low energy input suffices to ignite a mixture of hydrogen and air-leaking hydrogen may self-ignite from static electricity, and because of its very wide flammable range (4 to 75 percent by volume of hydrogen in air). However, its low molecular weight results in its rising rapidly in air and in a low mass being present within a flammable volume. Consequently, hydrogen explosions tend to be of limited magnitude and probability.

At IP3, potential hydrogen explosion risks are posed by the release of hydrogen from:

- The outside storage tanks located to the northwest of the turbine building
- The underground line carrying hydrogen from the outside storage tanks into the auxiliary boiler feed pump building or turbine building and to the fuel storage building
- Lines, valves and equipment within the turbine building
- Lines, valves and equipment within the fuel storage building, containment access facility annex and primary auxiliary building (PAB) used to provide hydrogen make-up to the volume control tank (VCT)
- Delivery tank trucks and filling operations.

Table 5.5.2.5

Analysis of Potential Explosions

Location	Chemical	Potential Hazard
IP3	Hydrogen	Vapor cloud explosion subsequent to rupture of underground hydrogen lines will produce 1 psi overpressures on plant structures. However, the predicted frequency of such incidents is below the frequency threshold criterion. Hydrogen explosions following hydrogen leaks within the plant buildings have predicted frequencies above the frequency threshold criterion. Mitigating actions are proposed.
	Carbon dioxide	BLEVE, should a tank containing liquid carbon dioxide rupture at elevated temperature and pressure. However, the predicted frequency of such an event is below the frequency threshold criterion.
Right of way across IP3 site	Methane	Vapor cloud explosion following rupture of the natural gas pipeline may result in damaging overpressures at IP3. However, the predicted frequency of such an event is below the frequency threshold criterion.
Burnwell Gas Corporation	Propane	No missile damage or significant overpressures to IP3 following BLEVEs and VCEs at this facility.
Paraco Gas Co.	Propane	No missile damage or significant overpressures to IP3 following BLEVEs and VCEs at this facility.

The sources of risk will now be examined.

Outside Storage Tanks and Delivery Tank Trucks. The hydrogen storage facility for the main generator is located 160 ft north-west of the turbine-generator building. The facility comprises trailer-mounted hydrogen tubes and fixed active and reserve hydrogen tube banks. At present, hydrogen is supplied from the trailer-mounted tubes -- the fixed tube banks are isolated and unused. A vapor cloud explosion involving the contents of a single tank will not result in damaging overpressures at the turbine building, containment building, service water pumps or any other safety related portion of the plant. Furthermore, larger hydrogen explosions are most unlikely: the simultaneous rupture of several tanks following an explosion is both improbable (given that the movement of tanks is more likely to cause line rupture) and is more likely to result in a fire rather than an explosion given the continuing presence of ignition sources. Though the contents of multiple tanks may be released through a ruptured line, only a small mass of hydrogen will exist in the flammable region of the resulting hydrogen cloud--the flammable content of a jet of hydrogen resulting from the rupture of a hydrogen line in the storage facility will be insufficient to cause damaging overpressures even if the jet points toward the plant and the explosion is centered about the furthest point in the jet at which flammable concentrations will be found. Finally, we would note that the mechanical overpressure resulting from the rupture of a single hydrogen tube and the adiabatic expansion of the high pressure hydrogen stored within it will also not cause damaging overpressures at the turbine building. It is equally unlikely that large fragments of a hydrogen tank will strike and damage safety-critical portions of the plant. Given these results, we can conclude that incidents involving the hydrogen storage tanks serving the electric generator pose no risk to the plant. A similar conclusion can be drawn concerning the impact on IP3 of hydrogen explosions at IP2.

With respect to incidents involving trailer-mounted hydrogen tubes in transit, we would note that hydrogen deliveries are made approximately once a month. In making these deliveries, the hydrogen trailer will pass within 40 m (130 ft) of the containment building and 25 m (80 ft) of the emergency diesel generator rooms. A hydrogen explosion following the release of hydrogen from the trailer along this roadway could therefore result in damaging overpressures on safety-critical portions of the plant. The probability of such an incident can be calculated: assuming that accidents along the 750-ft length of road to the south and west of the plant pose a threat, that the truck accident rate is 8.66×10^{-6}/vehicle-mile [59], and that 12 deliveries are made each year, the probability of an accident involving the hydrogen trailer is 2.95×10^{-5}/year. For an explosion to occur that might result in damaging overpressures, there would have to be both a major release and delayed ignition (probability <0.001 [67]) subsequent to the accident. Consequently, it can be concluded that hydrogen deliveries pose no significant threat to the plant.

Rupture of an Underground Hydrogen Line. A 1-1/2 in. diameter line conveying hydrogen to the generator runs underground in a 3-in. guard line from the hydrogen storage facility to the auxiliary boiler feed pump building and from the turbine building to the fuel storage building. While the guard tube will limit both the likelihood and consequences of hydrogen tube rupture, should the guard and hydrogen lines be ruptured, the contents of the hydrogen storage tanks will be blown down rapidly. While a vapor cloud explosion involving hydrogen is most unlikely because of the low molecular weight of hydrogen and its tendency to dissipate rapidly unless cold, should such an explosion occur, buildings adjacent to the hydrogen lines (though not the containment building) may be damaged. However, the probability of a release from the hydrogen lines (~ 3 x 10^{-4}/year assuming a hydrogen line rupture frequency of 1.2 x 10^{-10}/hr-ft [62]) coupled with the probability of delayed ignition (0.001 [67]) and that fact that the hydrogen line runs in a guard tube eliminate such release as sources of concern.

Hydrogen Leaks Within the Turbine Building. As noted in Section 5.5.1.2, hydrogen leaks within the turbine building have been the subject of previous inquiry [44]. Of particular concern is the possibility that a hydrogen explosion within the turbine building might cause severe damage to the diesel generator fire panel (possibly disabling the diesel generator ventilation system), the 6.9-kV switchgear and other electrical cables. A station blackout event would result from this scenario. In determining whether this is a major risk, the critical issue is whether significant volumes of hydrogen can accumulate undetected, be ignited, and explode.

The total volume of the turbine building, excluding the heater bay, is 4 x 10^6 ft^3. Given that the total volume of hydrogen in the outside tanks is 5750 scf, it is clear that the rapid release of the entire contents of the hydrogen tanks into the turbine building will not result in the 4.1 percent lower flammable limit of hydrogen being reached in the turbine building if the hydrogen is uniformly dispersed throughout the building. We can therefore conclude that the threat of a hydrogen explosion is posed only by the ignition of a local accumulation of hydrogen. Such an undetected accumulation of hydrogen is, however, a real possibility as 200 ft of unguarded 1-1/2 in. hydrogen line runs down the west wall of the turbine building to the hydrogen pressure control station. Additional risk is posed by hydrogen leakage from valves and other instruments and the hydrogen lines to the generator.

In the absence of hydrogen detectors, leaks may persist for as much as a day before high hydrogen usage is detected. The predicted frequency of hydrogen leakage in the turbine building is ~ 7.5 x 10^{-3}/year assuming a line leak frequency of 3 x 10^{-9}/hr-ft and valve leak frequency of 10^{-8}/hour [62]. Likewise, the predicted frequency of hydrogen rupture events in the turbine building is 2.1 x 10^{-4}/yr assuming a line rupture frequency of 1.2 x 10^{-10}/hr-ft and a valve rupture frequency of 4 x 10^{-4}/hr [62]. It will be noted that no credit has been taken in this calculation for the fact that the hydrogen lines in the turbine building are now normally isolated [44]. In the absence of a hydrogen detection system or the more extensive use of guard pipes, undetected damage to isolated hydrogen supply piping will still result in a hydrogen leak once the hydrogen supply valves are opened. While some measure of protection will be afforded by the possibility that damaged hydrogen piping may be detected prior to the isolation valve being opened and the lower probability of ignition (given a shorter time exposure), it is unlikely that this protection will be substantial in the absence of hydrogen detectors. The released hydrogen can accumulate beneath the 36 ft 9 in. mezzanine floor. Because the probability of ignition and explosion of such a hydrogen release in a confined area cannot be easily predicted, a 0.001 probability of ignition and explosion was assumed for hydrogen line leaks and a 0.01 probability of ignition and explosion was assumed for hydrogen line ruptures. Assuming a further 0.1 conditional probability of other damage leading to a station blackout incident, a 9.6 x 10^{-7}/year core damage frequency resulting from turbine building hydrogen explosions can be calculated. This frequency is probably too conservative in light of the small mass of hydrogen that would be involved in a hydrogen explosion in the turbine building and the separation between the point of release and safety-related equipment within the turbine building. Corrective actions which could further reduce this contribution to the core damage frequency are presented in Section 5.5.3.

It should be noted that turbine building ventilation plays little part in determining whether significant flammable concentrations of hydrogen can be created in the turbine building. The reasons for this are three-fold. First, our concern is only with local concentrations of hydrogen because the limited volume of hydrogen in the storage tanks will not cause flammable concentrations throughout the turbine building. Second, in the absence of excess flow valves, the contents of the hydrogen tank will be blown down rapidly should a hydrogen line rupture. Third, the turbine building ventilation system is operated manually. Accordingly, a realistic but conservative assumption is that there is no forced ventilation of the turbine building. With the truck doors to the heater bay closed, this will result in an air change rate of 2-3 turnovers/hr [61].

Hydrogen Explosions in the PAB, Pipe Trench and Fuel Storage Building. The electric generator hydrogen supply is also normally used to manually provide hydrogen make-up to the volume control tank (VCT) located on the 73-ft elevation of the PAB. Although the VCT has its own dedicated hydrogen supply, comprising 12 bottles located in a hydrogen storage shed at the 55-ft elevation of the containment access facility annex and next to the PAB, this dedicated supply is normally isolated. Its manifold and valves are, however, used in hydrogen make-up.

The assessment of the risk posed by hydrogen performed in response to generic letter 93-06 concluded that fire and explosion following the rupture of a hydrogen line in the PAB poses little risk to plant safety [44]. The loss of the VCT itself would cause the failure of the CVCS and the loss of charging flow. A manual scram would then be required to protect components such as the RCP seals. A hydrogen explosion that damaged the VCT could therefore be regarded as a T3 initiating event (turbine trip with feedwater available initially) [26]. As the anticipated frequency of hydrogen explosions is insignificant compared to the 3.6/year frequency of T3 events [26], the possibility of hydrogen explosions within the PAB can be ignored provided damage is limited to the VCT and CVCS system. This assumption is supported by the base case analyses presented in NUREG/CR-5759 [45] that concluded that the absence of safety-related components in the vicinity of hydrogen lines and equipment (other than the VCT) made the risk of other hydrogen explosion damage remote. Finally, we would note that the hydrogen line to the VCT runs in a 4-in. guard tube between the 55 ft and 67 ft 6 in. elevations.

While this analysis allows the elimination of hydrogen explosions in the vicinity of the VCT as potential sources of significant risk, it does not address the possibility of hydrogen releases and explosions within the pipe trench and chase traversed by the hydrogen line between the truck fill point on the south wall of the fuel storage building and the hydrogen manifold enclosure on the 55-ft elevation of the containment access facility annex. Consider the hydrogen line in the pipe trench. The 25-ft length of line in this area has a leak probability of 6.5×10^{-4}/year using the line leak rates predicted by Eide et al. [62]. Should the leak ignite and result in an explosion, the 18-in. service water lines running to and from the containment fan cooling units, safety injection, component cooling water and CVCS lines, and the boron injection tanks might be damaged or ruptured, possibly resulting in a loss of service water (TSWS) event exacerbated by the failure of other systems. Applying a 0.001 probability of an explosion given a hydrogen leak and a 0.1 conditional core damage probability given an explosion within the pipe chase, the contribution to the core damage frequency created by a hydrogen explosion within the pipe chase is 6.5×10^{-8}/yr. This frequency is probably conservative given the air circulation that is provided by the PAB ventilation system and the lack of ignition sources in the pipe chase.

<u>Carbon Dioxide Storage Tanks at IP3 and Delivery Tank Trucks</u>. Carbon dioxide is stored as a refrigerated liquid at 300 psig and 0°F for use in Cardox carbon dioxide fire suppression systems. Two 10-ton tanks are located at opposite ends of the turbine building: unit 3-1 on the 55-ft elevation of the auxiliary boiler feed pump building and unit 3-2 on the 15-ft elevation of the administration building in the north-west corner of the warehouse area. The catastrophic rupture of these tanks will result in a BLEVE with the adiabatic expansion of compressed carbon dioxide vapor and the possible flashing of carbon dioxide liquid. In addition, portions of the ruptured carbon dioxide storage tank may rocket around inside the area in which the tank is located. The extent of damage will depend upon the temperature and pressure at which the carbon dioxide tank ruptures--should rupture occur at higher than normal temperatures a significant overpressure and damage may result. Given the number of carbon dioxide tank explosions (9 in North America and Europe in 40 years) and the estimated population of carbon dioxide storage tanks (about 20,000 in North America and Europe), a tank explosion frequency of 1.12×10^{-5}/year can be calculated. In light of this frequency and the potential damage, incidents involving carbon dioxide storage tanks and delivery tank trucks were examined in more detail. Incidents involving the catastrophic failure of a carbon dioxide delivery tank truck need concern us no further, however: the analysis presented in Section 5.5.2.1 showed the probability of such an event to be below the 10^{-6}/year frequency criterion of concern.

Hypothetical accident scenarios involving the carbon dioxide storage tanks at IP3 can be developed. The catastrophic rupture of the carbon dioxide storage tanks may result in a BLEVE with the adiabatic expansion of compressed carbon dioxide vapor and the possible flashing of carbon dioxide liquid. In addition, portions of the carbon dioxide storage tank may rocket around inside the areas in which the tanks are located. The extent of damage will depend upon the temperature and pressure at which the carbon dioxide tank ruptures. If the rupture occurs at the normal tank operating temperature and pressure (0°F, 300 psig), perhaps as a result of brittle failure, the release will occur with the liquid carbon dioxide at a temperature 27 deg. F below the maximum superheat temperature for carbon dioxide at atmospheric pressure--the temperature at which vapor bubbles will develop spontaneously in the liquid at atmospheric pressure even in the absence of nucleation sites. In these circumstances, the liquid carbon dioxide will boil but should not flash explosively and generate a shock wave even though carbon dioxide can flash explosively at temperatures below the maximum superheat temperature [37]. While an overpressure, perhaps of several psi in magnitude, will result within the turbine building, bursting doors and causing other structural damage, damage to safety-related systems and components is less likely because they are located in tornado resistant structures. Given the 10^{-5}/year estimated frequency of pressure vessel rupture and the fact that damage to safety-related systems and components is not anticipated, this scenario was examined no further.

In contrast, should rupture occur at elevated temperatures and pressures, explosive boiling of the liquid carbon dioxide will occur, greatly increasing the expansion energy. A shock wave may result, delivering a greater impulse than would a TNT charge with the same energy [37] and damaging both surrounding equipment and the structure of the turbine building. In addition, portions of the ruptured tank may rocket. Rocketing portions of the 10-ton carbon dioxide tanks are unlikely to damage any important safety related equipment in the turbine building, however, as the 6.9-kV switchgear, the main boiler feedwater pumps, the condensate pumps, or the 480-V switchgear for Appendix R alternative safe shutdown are not in the immediate vicinity of the Cardox tanks. While rupture of fire protection system lines might cause flooding, it should not cause or facilitate a core damage incident [26].

Furthermore, for such damage to occur, the temperature of the carbon dioxide would have to rise to 28°F, the superheat limit temperature for carbon dioxide before the tank ruptured. At this temperature, the pressure of carbon dioxide would be 475 psig. However, such rises in temperature and pressure are most unlikely as a locally mounted pressure gage and alarm bell and a control room 325-psig high pressure alarm would alert the operators to the rising pressure. The operators could then make repairs to the failed carbon dioxide tank refrigeration unit--the most likely cause of elevated carbon dioxide tank temperature and pressure is a failure of the refrigeration unit. Should it not be possible to complete repairs before the pressure in the well-insulated tank rises toward the 341-psig relief valve set-point and the 357-psig safety valve set-point, the operators could cool the tank by venting carbon dioxide. This procedure entails opening the vapor vent valve and vapor vent isolation valve; it is followed when adding liquid carbon dioxide to the tank. Finally, at their set-points, the pressure relief valve and two safety valves on the tank will open, cooling the tank contents and reducing its pressure. An event tree analysis of this scenario predicts that the frequency of a carbon dioxide tank rupturing at elevated temperatures and pressures is $<10^{-7}$/year. Given that this frequency is below the frequency criterion for concern, this scenario was examined no further.

Propane Storage Tanks and Delivery Tank Trucks. Propane is stored in two 18,000 gal. and two 30,000 gal. storage tanks at the Burnwell Gas Corp. facility. Over 100,000 lb of propane is also stored by the Paraco Gas Co. The catastrophic rupture of one 30,000 gal. tank followed by the drift of a dense cloud of propane and the delayed ignition of this cloud will result, at worst, in a 1-psi overpressure being experienced 0.405 km (0.25 miles) from the Burnwell Gas Corp. storage facility. Given the separation between this facility and IP3, it is clear that the explosion of propane from this source will pose no threat to IP3. Similarly BLEVE-induced missile and rocket damage could not affect IP3. Similar conclusions can be drawn about explosions involving the entire propane inventory of the Paraco Gas Co. Given that the quantities of propane carried in delivery trucks are no more than those maintained in the storage tanks, propane release from propane tank trucks passing along public roads (and in particular on New York Highway Route 9 and Broadway, along the eastern perimeter of the plant site) pose no risks either.

<u>**Natural Gas Pipelines**</u>. Two natural gas transmission pipelines owned and operated by the Algonquin Gas Transmission Company cross the IP3 plant site within 400 ft of safety related structures. Three pig launch sites and manual shut-off valves for both lines are located by the Hudson River crossing. The other manual shut-off valves required to isolate the lines crossing the plant site are 10 miles to the west in Yorktown.

One of the gas transmission lines is of 26 in. in diameter, has a maximum allowable operating pressure of 674 psig, and has been hydrostatically tested to 1125 psig. It normally operates at a pressure of 600-650 psig. The other line is of 30 in. in diameter, has a maximum allowable operating pressure of 750 psig and has been hydrostatically tested to 1390 psig. This line normally operates at a pressure of 600-750 psig. A significant margin thus exists between pipeline operating pressures and their design and test pressures. The pipelines themselves are inspected internally every three years on average for flaws and reduced wall thickness using smart pigs. Aerial, vehicular and walking surveys of the pipeline routes are also made to detect gas leaks (often revealed by dead vegetation) and possible threats to pipeline integrity. Finally, we would note that the portions of the pipelines closest to IP3 are buried in a wide, clear and well marked right of way on NYPA property. Accordingly, the pipelines are unlikely to be damaged by careless construction or excavation.

Most leakage in gas pipelines results from small pinholes and significant losses of gas do not occur unless induced stresses cause a larger hole or rupture of the pipeline before it is repaired [68]. However, for screening purposes, a far more catastrophic event will be examined: the hazard of concern is a potential vapor cloud explosion following the rupture of the pipeline and a delay in ignition such that explosion rather than fire results. Noting that methane is a light gas, two scenarios were modeled in the screening analysis: the complete rupture of a pipeline and the blowdown of its contents in a jet; and the complete rupture of a pipeline and the discharge of its contents such that the methane rises in a plume.

The complete rupture of either methane pipeline will result in the escape of methane from the pressurized pipeline. Given the transmission pressure, the gas will escape at sonic velocity under choked conditions. While the flow rate will fall rapidly as gas leaves the pipeline [64], the initial discharge rate can be calculated to be 557 lb/s (253kg/s) in the case of the 26-in. line and 929 lb/s (422 kg/s) in the case of the 30-in. line [69]. Should the gas escape as a jet, these initial discharge rates will produce 977 ft (298-m.) and 1210 ft (369 m.) jets containing methane at a concentration above its lower flammable limit for the 26 and 30-in. lines, respectively. In these calculations, an ambient air temperature of 90°F was assumed. The explosion of the methane in these jets will result in a 1-psi overpressure at distances of 0.02 miles (164 m.) and 0.125 miles (200 m.) for the 26-in. and 30-in. lines, respectively. Given the separation between the pipeline and IP3, this may cause major damage to IP3. Alternatively, should the methane rise in a plume at an assumed initial velocity of 100 m/s having first created a crater about the rupture point, plumes of 170 m. (558 ft) and 187 m. (614 ft) in height will result for the 26-in. and 30-in. lines, respectively, assuming a 90°F ambient temperature, a 0.1 m/s wind speed and F-class stability. The neutrally buoyant dispersion of this plume will result in a large cloud of flammable vapor but one that will not result in flammable concentrations at ground level. Furthermore, as the rate at which methane escapes from the ruptured pipeline falls, the size of the cloud will shrink. Examining a range of wind speeds and air stabilities, it would appear that a continuous flammable cloud can extend several thousand meters from the point of release. Conservatively assuming that the entire contents of a pipeline between the Yorktown and Hudson River shut-off points are included in this cloud and that ignition and explosion occurs, a 1 psi overpressure may engulf IP3.

These large vapor cloud explosions can, however, be eliminated as a source of concern because their predicted frequency of occurrence combined with the 0.1 conditional probability of core damage is less than the 10^{-6}/year screening value [2]. The failure frequency of large diameter pipelines is 3.9×10^{-4} $mile^{-1}.yr^{-1}$ [64]. As only 3 percent of pipeline failures are characterized as being large [64], the probability of a large and rapid release of natural gas from either pipeline within 5 miles of IP3 is about 1.2×10^{-4}/yr. Given that methane clouds are far less likely to explode than are clouds of other hydrocarbons, a conservative estimate of the probability of a vapor cloud explosion following a major release from a pipeline is 0.01 [61]. The anticipated frequency of vapor cloud explosions is therefore predicted to be $\leq 1.2 \times 10^{-6}$/yr. Combined with the 0.1 conditional probability of core damage, the resulting contribution to the core damage frequency is less than the 10^{-6}/year screening value.

Gas transmission lines may also explode as a result of internal overpressure: in a 1965 incident in Natchitoches, LA, an overpressured line exploded throwing three pieces of metal with a total weight of ½ ton as far as 351 ft from the point of rupture [10, 61]. However, such an incident in the Algonquin transmission lines is unlikely to pose a significant risk to IP3 because of the differences between pipeline test and operating pressures, the use of line pressure monitors, and the distance between the pipelines and plant.

It can therefore be concluded that rupture of a natural gas pipeline crossing the plant site does not pose a major risk.

5.5.2.3 Aircraft Hazards

Section 3.5.1.6 of the SRP [17], Aircraft Hazards, states that the frequency of aircraft accidents that might result in radiological consequences can be considered to be less than 10^{-7}/year if the following requirements are met:

a) The plant to airport distance (D miles) is between 5 and 10 statute miles and the projected annual number of operations is less than $500D^2$, or the plant to airport distance is greater than 10 statute miles and the projected annual number of operations is less than $1000D^2$.

b) The plant is at least 5 statute miles from the edge of military training routes.

c) The plant is at least 2 statute miles beyond the edge of a federal airway, holding pattern, or approach pattern.

These criteria will now be examined in turn for IP3. If they are not met, more detailed analyses are required.

Airport Operations. Airports, heliports and seaplane bases within 26 miles of IP3 are listed in Table 5.5.2.6. While the list of facilities within 10 miles of IP3 is complete, the list of more distant facilities excludes private facilities with few operations.

The data in Table 5.5.2.6 indicate that the SRP criteria are met for all airports and heliports 5 miles or more from IP3. For the light planes and helicopters operating from the three facilities that are currently in use and within 5 miles of IP3, the annual probability of such a aircraft crashing on IP3 can be estimated using the equation:

$$\text{Frequency} = C \times A \times N$$

where:

C	is the probability/mile^2 of a crash per aircraft movement,
A	is the effective plant area for vulnerable safety-related structures, and
N	is the annual number of flight operations (it is conservatively assumed that all flight projectories pass over IP3).

General aviation data for C come from the SRP [17]. The determination of a value for A appropriate for IP3 was the subject of considerable discussion in the IPPSS [10]. It was concluded that the only direct impact of a light aircraft or helicopter that could lead to core melt was an impact on the control room. This conclusion would appear reasonable given that the probability of a light airplane or helicopter penetrating reinforced concrete walls surrounding safety-related structures on impact is < 0.003 (Table 6.4.2 of [23]). While other safety-related equipment susceptible to tornado damage (Section 5.3.1.1) might also be damaged by the impact of a light aircraft or helicopter, the anticipated crash frequency on this equipment would be subsumed into other initiating event or failure frequencies—damage would presumably be local and would be most unlikely to extend to safety-related equipment enclosed by reinforced concrete walls. Given the IP3 layout , it was concluded that the maximum exposure area for the IP3 control room is "substantially less" than 0.0004 mile^2 [10]. Accordingly, in this study, A was assigned a value of 0.0001 mile^2.

Table 5.5.2.6

Airports in Vicinity IP3

Airport	Location	Distance from IP3 (miles)	Operations (/year)*	SRP Criteria*** (Allowed number of operations/year)
Westchester Resco (Heliport)	Peekskill, NY	1	<24**	Not applicable
Peekskill Seaplane Base	Peekskill, NY	1	3,300	Not applicable
Haverstraw Heliport	Haverstraw, NY	4	500**	Not applicable
Bowline Point (Heliport)	Haverstraw, NY	4	0****	Not applicable
GE Management Development Institute (Heliport)	Ossining, NY	6	100**	18,000
TLI Heliport	Ossining, NY	8	<10**	32,000
Mahopac	Mahopac, NY	12	11,040	144,000
Stewart International	Newburgh, NY	17	148,904	289,000
Westchester County Airport	White Plains, NY	18	200,488	324,000
Warwick Muni	Warwick, NY	18	7,000	324,000
Orange County Airport	Montgomery, NY	22	92,500	484,000
Stormville	Stormville, NY	23	66,000	529,000
Dutchess County Airport	Poughkeepsie, NY	25	152,878	625,000
Danbury Muni	Danbury, CT	26	130,880	676,000
Kobelt Airport	Wallkill, NY	26	83,500	676,000

*From FAA data [71] unless marked otherwise.

**Direct communication with the operators of the facility.

***If distance between facility and IP3 is D miles, criterion is:

$1000D^2$ if $D>10$ or
$500D^2$ if $5 < D \leq 10$.

**** Not in use

The results of the risk calculations are presented in Table 5.5.2.7. It is concluded that all risks are below the 10^{-7}/year value deemed acceptable in the SRP. Accordingly, we can state that aircraft operations from airports and heliports in the vicinity of IP3 pose no significant risks to IP3.

Table 5.5.2.7

Risk Associated with Airports Within 5 miles of IP3

Airport	Distance from IP3 (miles)	Operations (/year)	Collision Frequency (Fatal accidents/year)
Westchester Resco (Heliport)	>1	<24	<3.6×10^{-10}
Peekskill Seaplane Base	>1	3,300	4.95×10^{-8}
Haverstraw Heliport	>4	500	6×10^{-10}
Total			5.0×10^{-8}

Military Training Routes. The are no military training routes within 5 miles of IP3. The SRP screening criteria are therefore satisfied in this respect.

Federal Airways. Two federal airways, V374 and V39-374, have their nearest edges within 2 miles of IP3. Assuming 20 flights/day along each airway [70], a 0.01 $mile^2$ vulnerable area at IP3 for which the impact of a commercial jet might cause core damage [10], an in-flight accident rate of 4×10^{-10}/mile for commercial aircraft [17], and an effective airway width of 13.2 miles (an airway width of 9.2 miles plus twice the 2-mile distance to the nearest edge of an airway), the probability of impact on a vulnerable area at IP3 is 4.4×10^{-9}/year [17]. As this predicted frequency is below the frequency of concern, SRP screening criteria are met. The 0.01 $mile^2$ vulnerable area assumed in this calculation is much larger than the 0.0001 $mile^2$ area assumed when evaluating the impact of light aircraft or helicopters from nearby airports because of the much greater probability that a heavy commercial aircraft descending from an airway will penetrate reinforced concrete structures on impact [23].

We therefore conclude that aircraft crashes on IP3 pose no significant risk of causing core damage.

5.5.3 Mitigating Measures for Hazardous Chemical, Transportation and Nearby Facility Incidents

Given that the cumulative core damage frequency from hydrogen explosions is approximately 10^{-6}/yr, mitigative measures for further reducing this risk were identified. One alternative would be to install an excess flow valve at the outside hydrogen storage facility to stop flow in the event of a hydrogen line rupture. This would significantly reduce the risk associated with hydrogen line ruptures. The risk posed by hydrogen explosions would be further reduced by installing hydrogen detectors in the ceiling areas below the turbine building mezzanine floor and above hydrogen lines, in the pipe trench between the PAB and containment, and on the 55-ft elevation of the containment access facility annex, or by placing hydrogen lines in these areas within guard pipes. These alternatives are under consideration.

No other scenario was identified that could lead to core damage with a probability in excess of 10^{-6}/year. Accordingly, no recommendations are made for measures to further mitigate the possibility of hazardous chemical, transportation, and nearby facility incidents at or near IP3.

5.6 CONCLUSIONS

The risk to the plant occasioned by high winds and tornadoes, external floods and hazardous chemical, transportation and nearby facility incidents was evaluated. While the risk due to hydrogen fires and explosions was estimated to result in a core damage frequency of approximately 10^{-6}/yr, this risk is believed to be conservative. Mitigative measures were identified to further reduce the probability and consequences of hydrogen releases within plant structures and are under evaluation.

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Section 6

UTILITY PARTICIPATION AND INTERNAL REVIEW TEAM

6.1 IPEEE PROGRAM ORGANIZATION

An important feature of the IPEEE is the involvement of the utility's staff in all aspects of the examination. This, the NRC believes, will benefit the utility by facilitating integration of the knowledge gained from the examination into procedures and training programs. The involvement of New York Power Authority staff was achieved by:

- Having New York Power Authority staff manage the IPEEE and perform the bulk of the examination.
- Having utility engineers who are familiar with design, controls, procedures and system configurations participate in the analysis as well as in the technical review.
- Having plant staff review insights gathered and recommendations made in the study.
- Ensuring that staff are well trained in relevant technology and methodologies.

As a result, the New York Power Authority's staff:

- Examined and understood the impact of external events upon the plant and pertinent plant operating procedures, design, operations, surveillance test and maintenance practices
- Developed potential severe accident sequence models for the plant
- Quantified the expected accident sequences
- Determined the leading contributors to core damage and poor containment performance
- Identified proposed plant improvements for the prevention and mitigation of severe accidents
- Examined each of the proposed improvements, including design modifications as well as changes in procedures, and training programs
- Identified proposed improvements to be considered for implementation.

While this IPEEE was conducted primarily by NYPA staff, outside consultants reviewed work completed by utility staff and provided guidance and expertise in specific areas.

The staff responsible for conducting this IPEEE are identified in Table 6.1.1.1; a partial listing of relevant courses, workshops, and seminars staff have attended is presented in Table 6.1.1.2.

6.2 COMPOSITION OF THE INDEPENDENT REVIEW TEAM

The methodology, data, results, and conclusions of this study were reviewed at several levels:

- NYPA Reactor Engineering Group staff and consultants examined each other's work at each stage of development. These reviews focused on the accuracy and consistency of areas of specialized expertise in the analysis of seismic events, fire and other external events and the response of the plant to them.

- NYPA staff from the licensing, operations, site engineering, and system engineering departments was kept apprised of the progress made and reviewed the data used in analyses and the conclusions drawn. Their reviews entailed the scrutiny of documents and plant site meetings to ensure the accuracy and adequacy of the models used. These reviews and meetings were an integral part of the information gathering process for the IPEEE. The consultations were comprehensive and conducted to the satisfaction of the authors of the IPEEE and plant and other NYPA staff.

A formal, independent, peer review was made of the draft final report. The outside peer review team comprised:

- Mr. Robert J. Budnitz, President, Future Resources Associates, Inc.

  Mr. Budnitz was the chairman of the expert panel that developed the NRC SMA methodology and the principal outside systems consultant to the NRC on the enhancement guidance in NUREG-1407. He also advised the NRC during their review of FIVE before it was endorsed. In this study, he reviewed both the fire and seismic portions of the IPEEE.

- Mr. Robert Bertucio, Consultant, Scientech, Inc.

  Mr. Bertucio reviewed the portion of the IPEEE that addresses high winds and tornadoes, external floods, and hazardous chemical, transportation and nearby facility incidents.

- Dr. John D. Stevenson, Structural-Mechanical Consulting Engineer.

  Dr. Stevenson is an expert in structural analysis. He reviewed the seismic portion of the IPEEE.

Table 6.1.1.1

IPEEE Program Organization

Task	Primary Responsibility	Review
Direction and management	NYPA-NSA	
Seismic analysis:		
Systems analysis	NYPA-NSA	NYPA/EQE/SAIC
Structural response analyses	SAIC/Stevenson/NYPA	NYPA
Fire analysis:		
Fire hazard database	NYPA-NSA	NYPA/Scientech
Ignition sources and frequencies	NYPA-NSA	NYPA/Scientech
Fire detection and suppression	NYPA-NSA	NYPA/Scientech
Detailed fire modeling	SAIC/NYPA-NSA	NYPA/ SAIC
Single zone analysis	NYPA-NSA	NYPA/Scientech
Multi-zone analysis	Scientech/NYPA-NSA	NYPA/ SAIC
Control room analysis	Scientech/NYPA-NSA	NYPA/ SAIC
Quantification	NYPA-NSA	NYPA/Scientech
Other events	RRG/NYPA-NSA	NYPA/Scientech
Insights and recommendations	NYPA-NSA	NYPA

NYPA	--	New York Power Authority staff
NYPA-NSA	--	New York Power Authority Reactor Engineering/Nuclear Systems Analysis Group staff
EQE	--	EQE Staff
RRG	--	The Risk Research Group, Inc., staff
SAIC	--	SAIC staff
Stevenson	--	Stevenson and Associates Staff
Scientech	--	Scientech Staff

Table 6.1.1.2

Training, Seminars and Workshops Recently Attended by NYPA Nuclear Systems Analysis Staff

Course	Date(s)	Sponsor
NRC Seismic Margin Training Course	6/95	Future Resources Associates, inc.
EPRI Fire PRA Training Course	10/94	SAIC
SQUG Training Course	11-12/93	SQUG/EPRI
IPEEE Training Course	12/91	NUS

6.3 MAJOR COMMENTS

The comments of the independent peer review team were conveyed orally, as mark-ups of the draft report, and in detailed reports that addressed individual items in the draft report. Major comments made by the reviewers are presented in this section of the report. Specific technical comments and their resolution are addressed in Section 6.4.

The reviewers' comments can be characterized as being technical or editorial. Editorial comments concerning the presentation of the methodology and results will not be detailed here. However, we would note that the reviewers' suggestions for changes that would clarify statements and make the task of the reviewers and readers easier were adopted for the most part.

6.3.1 Seismic IPEEE

6.3.1.1 Mr. R. J. Budnitz

Mr. Budnitz, an outside reviewer, conducted a review of the seismic IPEEE, attempting "*to determine whether the study team ... understood the underlying systems-analysis requirements for performing an IPEEE seismic review using the PRA method ... method; and whether the systems-analysis aspects of the review were executed in a satisfactory way.*" He concluded that "*My overview opinion are (1) that the quality of the work seems to be excellent, and (2) that the results are reasonable :*

- *The study team seems to have understood the IPEEE seismic-PRA requirements very well. This includes the guidance in Supplement 4 to NRC Generic Letter 88-20, the Supporting guidance in NUREG-1407. It also includes various bits of other back-up procedural guidance, such as in the NRC-margins, EPRI-margins and GIP reports, which in some areas provide more detailed guidance than is found in the NRC IPEEE documents themselves.*

- *I believe that the systems-analysis parts of the project have been executed very well.*

I have several other important overview findings:

- *Methodological assumptions are necessary in many key areas. I have attempted to review all of them that I know about, and in every case I think that the aproaches taken have been reasonable. Among the issues where methodological assumptions have been made that I agree with are how to approach relay chatter analysis; how to compile the list of safety equiopment to review; the method for treating human errors and other non-seismic-failures; and how the seismic event trees and fault trees were adapted from the IPE/PRA model, This includes how the seismic failures were integrated into the sysetms model, and how the issue of seismic correlations has been dealt with. Each of these areas is discussed below in more detail.*

- *I have reviewed how the seismic-capacity analysis and the systems analysis have been integrated* *together. I believe that this aspect has been done correctly.*

- *The draft report is written very well: it seems to satisfly NRC's seismic-IPEEE documentation requirements. I had no problem understanding what was done, and why, by the systems analysis team. Below, I will make a few suggestions for enhancing the documentation."*

These specific comments are presented in Section 6.4.

6.3.1.2 Dr. J. D. Stevenson

Dr. Stevenson concluded that those responsible for the seismic PRA "*were familiar with, and properly - implemented, the requirements of NP 6041 as related to fragility analysis.*" He further stated "*In summary, my review of the IPEEE seismic screening analysis and development of seismic median and HCLPF component capacities indicate that the effort was performed in a competent manner following the ground rules stated in NUREG 1407F and EPRI NP 6041, Rev. 0.*" His comments are addressed in Section 6.4.

6.3.2 Fire IPEEE

Mr. Budnitz, the outside reviewer, conducted a review of the fire IPEEE, attempting "*to ascertain whether the study team ... understand the underlying systems-analysis requirements for performing an IPEEE fire review using the chosen methodologies; and whether the review was executed in a satisfactory way.*" He concluded that "*My overview opinion is (i) that the quality of the work is excellent on both counts, and (ii) that the results are both reasonable and complete, albeit somewhat conservative in terms of the numerical values of the bottom-line core damage frequencies:*

- *I believe that this work is definitely a "state-of-the-art" analysis.*

- *The study team seems to have understood the IPEEE fire requirements very well. This includes the guidance in Supplement 4 to NRC Generic Letter 88-20, the supporting guidance in NUREG-1407, and the back-up procedural guidance in the EPRI-FIVE report and the EPRI Fire PRA Implementation Guide.*

- *The analysis seems to me to be very thorough. I tried to figure out whether the analysis team had enough understanding of the methodology to appreciate both its strong points and its weaknesses. I believe that the team has a good understanding of both the fire-PRA and FIVE methodologies, which are both inevitably limited in certain important ways.*

- *I did not find <u>any</u> issues, where I believe the analysis team has analyzed an issue erroneously, or has misunderstood the guidance. This is a high commendation and is intended to be so. <u>Thus I have no unresolved technical issues!</u>*

- *Therefore, most of my comments and questions ... were either directed at ways that the draft documentation could be improved, or are commenting on some details that are not adequately documented but that I believe are needed to understand the report's conclusions.*

- *I believe that the way the systems analysis and the fire analysis were integrated together is excellent.*

In my view the report has been clearly written, that the documentation is adequate, and it generally satisfies NRC's documentation requirements for the seismic IPEEE

I have several detailed comments .... but mostly these are suggestions for improvements in the documentation to enhance the report's readability or usability."

6.3.3 High Winds and Tornadoes, External Floods, and Hazardous Chemical Transportation and Nearby Facility Incidents

Mr. Bertucio, the outside reviewer of this section of the IPEEE, found *"the Other External Events analysis fully complies with the intent of the IPEEE as defined in NUREG 1407 and GL-88-20, supplement 4 and 5. All potential categories of external hazard were considered for their impact on the plant in a systematic screening process. Previous analysis or new analysis were used as appropriate to determine the potential impact of each hazard on the plant. Most of the hazards considered were found to be within the design basis of the plant. For those that weren't, probabilistic analysis showed they were minimal contribution to core damage (<1E-6/yr). The study correctly concluded there are no vulnerabilities at IP3, due to Other External Events."*

6.4 RESOLUTION OF COMMENTS

6.4.1 Seismic IPEEE

6.4.1.1 Mr. R. J. Budnitz

Mr. Budnitz had the following specific comments about the seismic IPEEE:

1. <u>*Compilation of the List of Equipment to be Included*</u>. *This is the tricky part of the analysis, because it is necessary to reduce the very long initial list to a more manageable one for analytical convenience, but there is the danger of removing an item incorrectly and prematurely. I reviewed the approach taken (pages 3-27 and 3-28), and it makes sense to me. I have one simple comment, which is that when the A-46 list was added in, I assume that this included all equipment for all trains of a given kind, even in cases where the A-46 review may have considered only the equipment on one train. If this is correct, the text on page 3-27 should be slightly amended to say so; if it is incorrect then the PRA analysis here is actually incorrect.*

   <u>Response.</u> The text was rewritten to address Mr. Budnitz concerns.

2. *<u>Relay Chatter</u>. I tried to figure out what was done here, and believe it to be acceptable, but the documentation (pages 3-61 to 3-62) is not detailed enough. This is not a big problem: only three relays, all associated with the diesel generators, come up (Table 3A.6) as having worrisome low seismic capacities.*

   <u>Response.</u> None needed. The text was deemed sufficient.

3. *<u>Generic Issue A-45, "Decay Heat Removal."</u> This discussion is also adequate. I was not surprised to learn that decay-heat-removal contribution to overall CDF are in the 20-percent range; this is typical. What was a surprise is the seemingly easy backfit, to upgrade the CST alternative supply from the city water, has not been done, because it could almost eliminate one quasi-important area of concern here without much argument. Of course, such an upgrade is not "necessary" <u>per se</u>, but it is mentioned only in passing (page 3-132) and might be a useful insight to bring forward to a higher-visibility part of the report.*

   Response. The seismic upgrade of the city water supply to the CST is not recommended as it is not a trivial fix: the city water storage tank would need to be upgraded.

4. *<u>Interactions with Indian Point Unit 2</u>. On page 3-13, one interaction with the other unit, Indian Point Unit 2, is discussed, in terms of the sharing of the 1,500,000-gal. city water storage tank for AFW emergency-water supply. Are there any other interactions with IP-2 of interest? This subject ought to be mentioned, one way or the other, someplace in this report. Does this AFW-supply issue make much difference? After all, an earthquake at IP-3 will also strike IP-2, won't it? Is this worth some analysis to supplement the brief mention-in-passing here on page 3-13?*

   <u>Response</u>. The city water storage tank is the only piece of equipment 'shared' between the two sites. However, this tank was assumed to have a low seismic capacity, and therefore would be unavailable following a seismic event.

6.4.1.2 Dr. J. D. Stevenson

Dr. Stevenson had the following specific comments about the seismic IPEEE.

1. *<u>Control and Diesel Generator Building</u>. Table 2-3 of EPRI-6041 states that Cat. I concrete frame structures can be screened if designed for a DBD of 0.1g pga or greater. It is not clear that screening conclusions applied to concrete frame structures is also applicable to concrete shear wall structures.*

   In the reference paragraph, the 6th entry in Table 2-3 of EPRI-6041 (Category I concrete frame structures) was cited as the basis for screening the Control and Diesel Generator Building, which is

[1]Kennedy, R.P., et al. "Assessment of Seismic Margin Calculation Methods", NUREG/CR-5270, prepared by Lawrence Livermore National Laboratory for U.S. Nuclear Regulatory Commission, 1989.

primarily a concrete shear wall structure. The 4^{th} and 5^{th} entries in Table 2-3 of EPRI-6041 (shear walls, footing and containment shield walls, and Diaphragms) cover concrete shear wall buildings with the caveats for the first screening lane. All three entries are discussed in Appendix A of EPRI-6041 under heading of "Category I Concrete Structures Designed for Seismic Loads".

Response. The review comment can be addressed by changing the appropriate text to read:

Table 2-3 of EPRI NP-6041 states that Category I reinforced concrete structures (including shear walls, footings, diaphragms, and concrete frames) can be screened if they were designed for a DBE of 0.1g or greater. The control and diesel generator building is seismic class I and was designed for a 0.15g pga DBE (section 16.1 of the FSAR). Therefore the control and diesel generator was screened, and is represented in the seismic PRA model by the surrogate element.

To maintain consistency, the phrase "Category I concrete frame structures" was changed to "Category I reinforced concrete structures" in the second paragraphs of the discussions for Electrical Tunnels, Fan House, Intake Structure, and Primary Auxiliary Building on pages 3-41 and 3-42.

2. *Soil Failure. It is noted that some buried piping is located in soil backfill. Therefore, an evaluation of soil foundation effects on piping rather than rock should be considered.*

Response. Indian Point 3 is a rock site. Some of the piping (section 16.3.4 of the FSAR specifically discussed two 24" service water lines) is buried in trenches which have been backfilled. Seismically induced failure of this soil is not credible because it is contained by the surrounding bedrock. Seismic shaking could induce some compaction, but if the soil was compacted during the backfilling (as normal would be done) the additional compaction should not be significant.

3. *Ref. Cat I Piping. It is noted that the reference to cast iron valves is associated with active valves. Cast iron valves and their potential to lose leak tight integrity is also a concern for inactive valves.*

Response. The intent of the subject statement was to bolster the conclusions from the piping walk down. Table 2-4 of EPRI NP-6041 does not require any evaluation to screen active or passive valves, however, the piping walk down guidelines do list cast iron valve bodies as a potential concern. Most active valves on the IPEEE equipment list were also on the A-46 equipment list. A-46 requires that all active valves be checked for cast iron bodies or yokes; A-46 does not require any evaluation of active valves. To maintain consistency, the additional active valves on the IPEEE list were also checked for cast iron (by reviewing valve drawings) and were specifically walked down and checked against A-46 caveats. Passive valves were evaluated only to the extent that they were generally walked down as part of the piping walk down.

To clarify this matter, the text was changed.

4. *Ref. Table 3.1.4.3. It is noted that a number of safety-related items in the Table have HCLPF's below 0.15g pga. It should be made clear that these low HCLPFs are the result of the UHS with high*

amplification in the high frequency range, and is not characteristic of the response to the design basis spectrum.

Response. The following was added to the discussion of Table 3.1.4.3.

"Note that some the median capacities listed in Table 3.1.4.3 are relatively low, particularly when compared to the DBE pga of 0.15g (an item of equipment designed for a 0.15g pga event would typically be expected to have a median capacity of least two to three times that value).

As shown in Figure 3.1.2.4, the Uniform Hazard Spectrum (UHS) and the Design Basis Earthquake (DBE) are quite different in frequency content. The peak content of the UHS occurs between 10 Hz and 25 Hz, while the peak content of the DBE occurs between 2 Hz and 8 Hz. The majority of the structures at Indian Point 3 are stiff – the control building, primary auxiliary building, intake structure, and interior containment structure all have fundamental frequencies between 12 Hz and 18 Hz. As a result, they amplify the UHS ground motion much more than the DBE ground motion - this is apparent in the high frequency peaks in the floor response spectra shown in Figures 3.1.4.2 through 3.1.4.6.

Due to the high frequency peaks in the UHS floor response spectra, relatively stiff equipment - pumps, squat tanks, heat exchangers - which could normally be evaluated using the ZPA of the floor response spectra, were instead evaluated using the peak of the UHS floor response spectra. This resulted in relatively low median capacities for some of the equipment, particularly for equipment high up in the structures. If these low capacities had a significant effect on the frequency of core melt, a more detailed (and less conservative) capacity analysis would have been performed, however, the system analysis showed that none of the equipment with low capacity was a significant contributor.

Due to the above, the median capacities calculated for the UHS spectrum are not representative of the DBE capacities."

5. Ref. Section 3.1.6.2, Containment Integrity. It is not clear in the text whether or not the quoted 0.75g pga median seismic capacity considered concurrent containment pressure or not. If the containment is not pressurized the seismic median value given is too low. If concurrently pressurized the seismic capacity appears too high.

   Response. There is no need to consider a seismic event concurrent with the containment being pressurized – if the containment is pressurized as the result of a seismic event, the pressurization would not occur until the seismic event itself had ended; another accident causing containment pressurization followed by a seismic event is not in the scope of this evaluation. Thus the capacity is for an unpressurized containment. The capacity is based on the first screening lane of Table 2-3 in EPRI-6041. The value may actually be low, but per Table 2-3, assigning a higher value would have at least required a detailed evaluation of the penetrations. As the plant's seismic capacity was governed by other equipment, a more detailed evaluation to increase the containment's capacity would not have been fruitful.

To clarify this matter, the text was changed.

6.4.2 Fire IPEEE

Mr. Budnitz, the outside reviewer, had the following specific comments about the fire IPEEE:

1. *<u>Elimination of the ATWS event tree</u>. In Section 4.3, the text says that the ATWS event tree was eliminated but does not explain why. A question arises: what if a fire damages the actuation circuitry so that a signal from some indicator in the plant cannot be received by the reactor protection system circuitry, and hence the plant won't scram. I believe that the redundancy and separation of the RPS circuitry preclude this failure but it does need to be discussed somewhere in my view.*

   <u>Response</u>. Appropriate text has been added to address the issues raised in this comment.

2. *<u>The Screening Criterion For Containment Bypass</u>. In Section 4.4.5, it is indicated that containment bypass sequences are screened using a 10-7/year criterion rather than the larger 10-6/year criterion used for screening all other issues. Then, in Section 4.8.1, indicates that no bypass vulnerabilities exist. But we never learn whether the 10-7/year criterion played any part in the analysis. The text needs to tell us about this, one way or the other.*

   <u>Response</u>. Appropriate text has been added to address the issues raised in this comment.

3. *<u>Fire Ignition Frequencies</u>. I studied this Section (4.4) to ascertain whether the various database frequencies have been applied sensibly to the many different zones and areas at IP3. I didn't see anything troubling: the use of the location weighting factors looks acceptable as does the way the specific frequencies for the various zones are handled.*

   <u>Response</u>. None needed.

4. *<u>HRA</u>. Except for the extensive control room discussion in Appendix 4A, there is essentially no documentation of how the HRA (human reliability analysis) was done in this IPEEE fire analysis—the assumption that I made in my review is that the same HRA approach was used here as for the internal initiators IPE/PRA. If my assumption is correct, this needs to be said someplace. However, this discussion alone would not satisfy me without some discussion of why the HRA error rates should not be increased during post-fire actions by the operating crew when higher stress could be a factor. Some discussion of this point is essential.*

   The text does refer to recovery actions and gives credit where these are appropriate. I think this part of the analysis makes sense and I like it, including how a screening value for recovery was used at first.

   <u>Response</u>. The human error probabilities used in the IPE were not in fact used in the quantification of fire-induced accident sequences. Rather, to address the possible impact of fire on operator performance, conservative screening values of 0.1 were assigned to the human error probabilities associated with all post-accident operator actions, excepting plant shutdown from outside the control room. For this last event, the detailed analysis presented in Appendix 4A was performed.

5. *<u>HRA Screening Values</u>. In Section 4.7.1 there is a discussion about how the screening analysis is done by setting fire-damage basic events to logical TRUE in the model. However, there is no mention here of how the HRA (human error) basic events are handled in the screening. This omission is easy to correct but without such a discussion the reader has no idea what was done.*

   <u>Response</u>. As is stated in Section 4.3, post-accident human error basic events were assigned probabilities of 0.1 in the screening analysis.

6. *<u>Fire-Size And Fire-Spread Analysis</u>. I believe that the analysis of fire size and fire spread, as described in Section 4.5 makes sense. However, the text could be enhanced by indicating the source for all of the many specific values for parameters. A few of them, such as cable-ignition characteristics, are presented without a citation as to their source.*

   <u>Response</u>. Appropriate text and citations have been added.

7. *<u>Manual Suppression</u>. In Sections 4.6.2 and 4.9.3 there are discussions of this aspect. However, in the several write-ups of specific scenarios (Section 4.7.2) there is not enough indication as to how uncertainties in fire brigade response are coped with. Uncertainties exist principally because the time to damage and its comparison with the time for fire-brigade action seem to be compared as if each time is known exactly. (Sometimes the text does clearly indicate that a conservative estimate is made of time to damage or fire brigade time). Because the numerical values for core damage frequency depend critically upon this comparison of times, the omission of any discussion of uncertainties here is important.*

   <u>Response</u>. Typically, the calculation of human error probabilities (HEPs) entails calculating best-estimate/conservative times to damage and human response (execution) times. Using human reliability analysis methodology, a median HEP is then derived from the difference between these two times. Finally, a mean HEP is calculated assuming an error factor of 10. Some degree of uncertainty is therefore accounted for in the derivation of the mean HEP. With regard to uncertainties in fire brigade response times (ie, human response times), no uncertainty analysis was performed. Rather, conservative estimates of the fire brigade response time and time to damage were used.

8. *<u>Automatic Suppression System Unavailabilities</u>. Section 4.6.2 gives the generic unavailabilities from FIVE for the various types of automatic systems (wet pipe, pre-action, deluge, carbon dioxide and halon). These are correct as taken from the analysis team but there is no indication as to whether the analysis team thinks that these generic numbers are thought to be realistic for IP3 or very conservative or only mildly so or what?*

   <u>Response</u>. Given that the design of IP3 fire suppression systems appears similar to that of other plants, the use of generic estimates seems reasonable. Because no plant-specific evaluation of automatic suppression systems was made, it would be inappropriate to comment on the degree to which the generic estimates are conservative.

9. *<u>Cable Spreading Room Analysis</u>. Section 4.7.2.4 has the cable-spreading room analysis. The discussion of fixed ignition sources is particularly well done, and because this is a tricky element of the overall project I am offering a compliment here. The assumptions on how long it takes to damage trays and the delay before carbon-dioxide discharge are particularly clearly written up.*

   <u>Response</u>. None needed.

10. *<u>Multi-Zone Analysis</u>. I studied this analysis (Section 4.7.3) and it makes sense to me, including the key assumptions in Section 4.7.3.2. The successive screening approach is a good way to do this aspect, because otherwise there would be a lot of work that, in the end, would not be necessary. The barrier-failure numbers in Table 4.7.3.1 make sense to me. I am not surprised by the result that only one zone was important enough to be in the "top ten" sequences.*

    <u>Response</u>. None needed.

11. *<u>Assumptions In The Control-Room Analysis</u>. In Section 4.7.4.3 there is a list of analysis assumptions. A few of them seem quite conservative to me and I would suggest that the text could be enhanced by indicating this where appropriate.*

    <u>Response</u>. The analysis was conducted in accord with the EPRI Fire PRA Implementation Guide and other state-of-the-art data and methodologies. It is intended to be conservative to reflect the very limited historical experience and experimental evidence upon which to base the modeling of control room fire scenarios. Even so, the contribution to the core damage frequency resulting from control room fires is small.

12. *<u>Shutting Down The Plant From Outside The Control Room</u>. In Section 4.7.4 and Appendix 4A, there is a detailed discussion of this part of the analysis. I studied it and think it is a thorough and well-reasoned piece of analysis. The text is also clear in describing the various elements of the event trees. However, one important piece of the analysis is the use of 15 minutes as the time required for a cabinet fire to create uninhabitable conditions in the control room, thereby forcing its evacuation. The analysis relies on Appendix M of the EPRI Fire PRA Implementation Guide, which determines that the mean probability of non-suppression of a control room fire in 15 minutes is 0.0034. The problem with this in my view is that the 15-minute estimate is totally unsupported except for some Sandia tests that are probably not typical of control rooms like that at IP3. I looked up the Appendix M material and found that, if uninhabitable conditions occur in only 10 minutes rather than 15, the non-suppression probability rises to a mean of 0.016, which is 5 times larger.*

    The number 0.0034 appears as a direct multiplicative factor in all core damage scenarios involving control room evacuation, and since these scenarios now produce a total CDF contribution of 1.73 x 10^{-6}/year, increasing them by a factor of five makes them a non-trivial contributor to the total CDF. No sensitivity analysis appears in the text. I suggest that one be done—it is very easy—and that it be written up. This is one of the most sensitive parts of the analysis in my view: why cannot at least some control room fires force evacuation in even shorter times like 5 minutes, which would drive the *multiplicative number up to a very high value?*

Response. We would agree that the contribution to the CDF resulting from control room fires is directly proportional to the probability of evacuation and that assuming evacuation in 10 minutes rather than 15 will increase this contribution by a factor of 5. However, a sensitivity analysis will not necessarily increase our understanding of what the actual contribution to the CDF will be—the important question is whether control room evacuation is required and for how long the control room will be unoccupied.

We believe that the important insights from this study are qualitative:

- Offsite power is lost only if one specific cabinet is damaged.
- Even if offsite power is lost, the diesel generators can be locally started and loaded on to emergency buses. Furthermore, complete bus control is available locally.
- All the systems needed to maintain the plant in a safe hot shutdown condition can be controlled locally should control from the control room be lost.
- A completely diverse shutdown capability is provided by the Appendix R diesel and MCC 312A should the diesel generators fail.

We would further note that the analysis performed utilizes the method and assumptions of the EPRI Fire PRA Implementation Guide. While the reasons for control room evacuation and the time that will elapse before reentry is possible are neither well documented nor well understood, it is apparent that the EPRI studies chose control board obscuration as the factor that would precipitate control room evacuation. Cabinet fire tests performed by Sandia in a 48,000-ft^3 room using 1970's vintage cabinets determined that the average control board will generate sufficient smoke to obscure control boards in 15 minutes. Given that IP3 was built in the 1970s and that the IP3 control room has a volume of 64,000 ft^3, we have no reason to believe that the 15-minute delay before evacuation is inappropriate. The 0.0034 conditional probability of control room evacuation is derived from the human error probability that the cabinet fire is not extinguished in 15 minutes.

13. *<u>Containment Performance</u>. This portion of the work, in Section 4.8, made good sense to me. One aspect, however, needs some additional justification: in Section 4.8.4, the text states that "fire-induced core damage sequences lead only to long-term overpressure failure." This statement is not supported well enough but is a very important finding of the overall study. It needs both to be supported here with more justification and to be elevated into the overall summary section as an important conclusion of the analysis.*

    Response. Section 4.8.4 of this report has been modified to address this issue.

14. *<u>Fire Risk Scoping Study Issues</u>. Section 4.9 contains the discussion on these issues. I believe that these discussions are similar to these discussions in many other IPEEE reviews and that these issues*

have been disposed of appropriately.

Response. None needed.

15. *USI A-45 Decay Heat Removal. Section 4.10 contains the discussion on disposing of A-45. I studied this aspect and I believe that the work is acceptable.*

    Response. None needed.

16. *Discussion of Overall Conclusions (Section 4.7.5). I think that the discussion of the half-dozen most important scenarios is well written and helps to put the overall results into perspective. However, there is not an adequate discussion of how large the numerical uncertainty might be in the bottom line core damage frequency numbers, where such uncertainties might arise or what they might mean. This is a serious omission.*

    Response. We would agree that significant insight into fire risk is lost if the impact of uncertainty on the predicted fire-induced CDF is not considered. Accordingly, a discussion of uncertainty is provided in Sections 1 and 8 of the IPEEE report.

6.4.3 High Winds, Floods, Transportation and Nearby Facility Incidents

Mr. Bertucio, the outside reviewer, had the following specific, non-editorial, comments about this portion of the IPEEE:

1 *External Hazards Evaluated. The NUS method for the investigation of other events in the IPEEE provides a comprehensive list of 39 different external hazards, some of which are not mentioned in the IP3 IPEEE. While I do not believe that any important hazards have been missed, you might want to incorporate this list to show comprehensive investigation.*

Response. The hazards addressed were those identified in NUREG-1407. A review of the list provided by Mr. Bertucio indicates that no pertinent hazard remains unaddressed.

2 *Combination of random mechanical failures with wind damage. The analysis presented in Section 5.2.1 did not address the effect of random mechanical failures in combination with damage caused by high winds. It is not sufficient to confirm that the plant has an adequate design basis. Core damage can be caused following a design basis event by random independent failures of equipment designed to mitigate the effects of the event. It is expected that the plant will protect safety-related equipment from design basis winds but the IPEEE needs to find the CDF resulting from scenarios which include initial damage plus random failures after the event.*

Response. The analysis did consider the effects of high winds and tornadoes in conjunction with other, random, equipment failures. The scenarios considered in detail are presented in Section 5.3.2.5. The text was changed to clarify this point and to address the probability of a tornado striking the plant within 24 hours of an initiating (scram) event.

3 *<u>Maximum Precipitation</u>. The maximum precipitation is a flood hazard and a building loading hazard.*

<u>Response</u>. In the IPPSS, precipitation was examined solely as a source of flooding and not as a roof load hazard. This omission was rectified in this study.

4 *<u>Redundancy of Power Supply</u>. The statement that "some of this redundancy is more apparent than real" should be removed. The sentence is obvious to a qualified PRA practitioner. The job of the IPEEE is to assess how much "real" redundancy there is.*

<u>Response</u>. We do not agree that the sentence should be removed. Other documents make explicit mention of the high level of redundancy in power supplies. We believe it to be important to point out that should a tornado strike this redundancy is eliminated.

5 *<u>Logic for Choice of Tornadoes as the Most Damaging Cause of High Wind</u>. The logic for choosing tornadoes as the most damaging high wind cause is flawed. The key to this argument is that the highest wind related core damage scenario is damage to the switchyard and failure of the diesels for 24 hours. If you have very high winds, there is likely severe damage to the grid and switchyard that cannot be repaired easily. Most switchyards are designed to standard building codes which provide protection to about 90-100 mph. You will need to find the vulnerability of the switchyard and find the frequency of that wind speed. If it (the wind speed at which the switchyard is vulnerable) is above 110 mph, tornadoes will be the most likely cause. If it is below 100 mph, it could be anything. You need to calculate a CCDP for extended loss of offsite power.*

<u>Response</u>. The calculations suggested by Mr. Bertucio were performed and are now documented in Section 5.3.2. They indicate that high winds caused by extra-tropical cyclones, hurricanes and thunderstorms should not make a significant contribution to the core damage frequency.

6 *<u>Hurricane Frequency</u>. Be careful of making this conclusion (that there has been a strong decrease in the number of intense hurricanes) based on this reference (Information presented by the University of Michigan, Department of Atmospheric, Oceanic and Space Sciences on http://groundhog.sprl.umich.edu/curriculum/hurricane_q&a. Accessed on June 14, 1996). Some documents state that there was a decrease in bad hurricanes from 1939 to 1979 but they have come back since then.*

<u>Response</u>. A reference to a more recent refereed paper has been provided as a source for the conclusions drawn about hurricane frequencies.

7 *<u>Calculation of Tornado Impact Frequency</u>. I cannot calculate the impact frequency.*

<u>Response</u>. The 1.59×10^{-4} year value comes from equation K-1 and Figure K-2 in Ref. 21, substituting the values given in the text into the equations.

8 *Water Tanks. What is the basis for saying that water tanks will not buckle if they are 2/3full? If they lose their roofs, what happens to the inventory?*

Response. The basis for the statements made about the water tanks is Section 7.5.3 of the IPPSS. The loss of a tank roof should not result in a loss of inventory.

9 *Switchyard Damage. When the IPE evaluates the loss of offsite power, it gives a lot of credit for offsite power recovery in 2-8 hours and uses a short mission time for the diesel generators. If you use a 24-hour mission time for the diesel generators and give no credit for the recovery of offsite power (which may be the case after a tornado), the answers may be quite different.*

Response. In response to Mr. Bertucio's comment, a distinction was made between the loss of offsite power occasioned by network instabilities or the failure of transmission lines beyond the switchyard (for which the recovery data used in the IPE may properly be applied) and the loss of offsite power resulting from switchyard damage (for which it was assumed no recovery within 24 hours is possible). For the latter case, analyses are presented in Section 5.3.2. They demonstrate that switchyard damage in itself does not pose a significant risk. The former case was addressed in detail in the IPE. Regarding the mission time for the emergency diesel generators following a loss of offsite power, the IPE in fact used a conservative mission time of 24 hours. A 24-hour mission time was also used in the analysis of other external events, with no credit taken for offsite (or onsite) power recovery.

10 *Morpholine Release. Why is a 0.01 ignition probability used for the hose leak but 0.001 used for the tank/pipe leak scenario?*

Response. The differing ignition probabilities reflect the dilution of morpholine with water in its storage tank.

11 *Halide Transport Down the Hudson. Why is it true that "any risk increased by multiple shipments is compensated for by a reduced probability of any one container rupturing"?*

Response. Given the small volume of halides and halide oxides shipped, it is assumed that these materials are shipped in containers aboard barges rather than as the sole cargo of the barge. It is also assumed that while the probability that a vessel carrying a halide container is involved in an accident is proportional to the number of separate shipments made, the likelihood that a halide container is ruptured given an accident is proportional to the number of halide containers on board (and thus, given that a fixed volume of halides is shipped per year, is inversely proportional to the number of separate shipments made). With this logic, we can draw the conclusion referred to above. To clarify this point, the text has been changed.

Section 7

PLANT IMPROVEMENTS AND UNIQUE SAFETY FEATURES

7.1 INTRODUCTION

In the course of this study, numerous important and unique plant safety features were identified together with a small number of improvements that would reduce risks. The improvements made, or to be made, as a result of the IPEEE or for which the IPEEE provided supporting arguments are described in Section 7.2; the unique features that significantly lower the risks posed by external events are documented in Section 7.3.

7.2 PLANT IMPROVEMENTS

The following improvements are being implemented or are under evaluation to reduce the risk of core damage resulting from external events.

Emergency Diesel Generator (EDG) Fan Feeder Changes. A proposed minor modification [1] would eliminate the susceptibility of multiple EDG exhaust fans (and thus multiple EDGs) to fire within a single fire zone by realigning the power feeds to the EDG exhaust fans and auxiliaries. At present, fire-induced short circuit failures of the power feeds to the sets of exhaust fans will trip the upstream breakers for these feeds at the MCCs. Thus a fire in an EDG room or the sump and pump room (fire zone 10, 101A, 102A or 36A) may result in the loss of all EDG exhaust fans.

Emergency Diesel Generator (EDG) CO_2 Auxiliary Control Panel. Based on the events reported in LER 97-010-00 (See Section 4.10.2]), a proposed modification is under evaluation to install a QA category I, seismic class I, actuation permissive auxiliary control panel for CO_2 discharge into the EDG building. The current CO_2 control panel was found to potentially impede the operation of all EDGs during a seismic event. (A seismic event was found to cause the spurious simulated operation of the CO_2 system and subsequent shutdown of the EDG ventilation system).

Hydrogen Supply Line Excess Flow Valve. An item has been proposed in the plant Action and Commitment Tracking System (ACTS) to evaluate installation of an excess flow valve on the hydrogen supply line to stop flow in the event of a hydrogen line rupture inside the turbine building or PAB.

7.3 UNIQUE SAFETY FEATURES

This section describes the safety features at IP3 that make a significant contribution to the reduction of risk from external events. These features and their impact are described below.

7.3.1 Seismic Events

IP3 possesses no unique safety features that serve to reduce the risk of core damage occasioned by seismic events.

7.3.2 Fire

Design. IP3 has an Appendix R dedicated shutdown path--the plant is equipped with an Appendix R diesel generator and separate 480-V switchgear, located in the turbine building, that are sized to operate the following loads essential for RCP seal cooling:

- component cooling water pump 32
- charging pumps 31 or 32
- service water pump 38.

The Appendix R diesel generator can also provide a limited supply of power to the 480-V safeguards buses (2A/3A, 5A and 6A) if the buses are available.

Use of the Appendix R diesel generator for alternative power was addressed as a recovery action should fire damage the control, cable spreading or 480-V switchgear rooms.

Procedures. Fire-related procedures serve to reduce risk. In particular, ONOP-FP-1, 1A and 1B address control room evacuation and shutdown from outside the control room, and other procedures address the inspection and maintenance of fire barriers.

7.3.3 High Winds and Tornadoes, External Floods, Ice, and Hazardous Chemical, Transportation and Nearby Facility Incidents

High Winds and Tornadoes. Most safety-related equipment in the plant is designed to resist tornadoes of greater severity than is anticipated. The risk of core damage is thus below the criterion for concern, even given the fact that damage to the switchyard and a loss-of-offsite power are assumed should a tornado strike IP3. The risk of core damage resulting from tornadoes is further reduced by the presence of the river (and absence of missiles) to the west of the plant, the physical separation of the service water and back-up service water pumps, and a procedure that calls for the alignment of back-up service water pumps in the event of a loss of service water. Also Technical Specifications require that high levels of water be maintained in the condensate storage and city water storage tanks, preventing significant wind load damage to the tanks and ensuring their availability should a tornado strike.

External Flooding. The risk posed by external flooding at IP3 is minimal because flooding at IP3 is controlled more by tides than by run-off from tributary watersheds. The maximum river flood levels should not impact the plant. Furthermore, such flood levels are unlikely to be of concern in an IPEEE as they are hurricane-induced and it is expected that the plant will be shut down prior to the arrival of a severe hurricane. Local precipitation also poses little risk as run-off from the plant site will be rapid and ponding is unlikely. Furthermore, the load capacity of the various plant roof areas is adequate to handle any accumulation that may result from probable maximum precipitation.

Toxic Gas Releases and Explosions Off-site. The risks posed by toxic gas releases and explosions off-site are limited by the absence of large quantities of hazardous materials close to the plant or the low frequencies with which such materials are shipped.

7.4 REFERENCES

1. New York Power Authority, Indian Point Unit 3, Minor Modification Package MMP 95-03-287, "EDG Exhaust Fan Motor/Starter/Feeder Changes", Approved April 22, 1997.

Section 8

CONCLUSIONS

An Individual Plant Examination of External Events (IPEEE) was performed for the New York Power Authority's Indian Point Unit 3 Nuclear Power Plant (IP3). A major objective of this study was to obtain a meaningful assessment of the risks to the plant and to the health and safety of the public occasioned by the occurrence of external events including seismic events, fires, high winds and tornadoes, external flooding, and hazardous chemical, transportation and nearby facility incidents. Other objectives were to develop an appreciation of severe accident behavior and to identify ways in which the overall probabilities of core damage and fission product releases could be reduced if this were deemed necessary. The achievement of these objectives is well documented in the preceding sections. While some results of this study may be uncertain on an absolute basis, there is reasonable confidence that the major contributors to total core damage frequency have been identified. Perhaps as important, a number of valuable qualitative insights into the design and operation of the plant were obtained.

This section presents the overall conclusions and recommendations that resulted from the study.

8.1 GENERAL CONCLUSIONS

8.1.1 Seismic Events

The conclusions of the seismic PRA are:

- There are no unique plant vulnerabilities: the safety-related systems provide effective and reliable means for reactor reactivity control, electrical power, reactor coolant system pressure control, decay heat removal, and containment pressure control.
- The total mean seismic core damage frequency for IP3 is 4.4 x 10^{-5}/year. This frequency applies to the plant as it is currently configured and operated.
- Seismic-induced station blackout sequences contribute 43.5 percent of the seismic core damage frequency; sequences initiated by a seismic-induced loss of component cooling and subsequent reactor coolant pump seal LOCA contribute 23.1 percent; seismic-induced loss-of-offsite power (non-blackout) sequences contribute 20.6 percent; the surrogate element contributes 7.7 percent; seismic-induced anticipated transients without scram sequences contribute 4.9 percent; and seismic-induced small LOCA sequences contribute 0.2 percent.
- Key components that influence the seismic core damage frequency were concentrated in the electrical distribution system, component cooling water system, control room panels and the residual heat removal system.

- Seismic-induced flooding does not pose major risk.
- Seismic-induced fires do not pose major risk.

Evaluations were made to resolve unresolved safety issue USI-A45 (Decay Heat Removal) with respect to seismic events. No unique decay heat removal vulnerabilities to seismic events at full power operation were found. It was predicted that the loss of decay heat removal function contributes 21% (9.2×10^{-6}/year) of the total seismic core damage frequency.

Other unresolved safety issues were also addressed in the seismic IPEEE. It was judged that USI A-17 (system interactions in nuclear power plants), USI A-40 (the seismic capacity of safety-related above-ground tanks at the safe shutdown earthquake level), USI A-46 (verification of seismic adequacy of equipment in operating plants), and GI-131 (potential seismic interaction involving the movable in-core flux mapping system used in Westinghouse plants) can be considered resolved for IP3. The Eastern U. S. Earthquake Issue was also judged to be adequately addressed in the IPEEE.

The conclusions drawn from the seismic containment performance analyses are very similar to those derived for the IPE study, and no unique containment failure mechanisms were identified.

8.1.2 Fire

The fire analysis concluded that the core damage frequency (CDF) resulting from fire-initiated accident sequences at IP3 is 5.64×10^{-5}/year. The major contributions to the fire-induced CDF come from fires in the 480-V switchgear, cable spreading, control, and diesel generator rooms -- the rooms containing the bulk of the control circuitry excepting remote shutdown circuitry. As fires in these four areas may require shutdown from outside the control room, human error and the random failure of safe shutdown components are the dominant active events. It should be stressed that the importance of fires in the 480-V switchgear, cable spreading, control, and diesel generator rooms is, to some extent, an artifact of the conservatism of the fire PRA methodology with regard to fire propagation and suppression. Accordingly, the CDF resulting from fires in the 480-V switchgear room may be reduced significantly if more realistic fire modeling techniques become available.

In the fire analysis, evaluations were also made to resolve unresolved safety issue USI-A45 (with respect to decay heat removal fire vulnerabilities), generic issue GI-57 (concerning the effects of inadvertent suppression) and generic issue GI-106 (addressing piping and the use of highly combustible gases). No significant vulnerabilities exist with respect to these issues.

The conclusions drawn from the fire containment performance analyses are very similar to those derived for the IPE study, and no unique containment failure mechanisms were identified.

8.1.3 High Winds and Tornadoes, External Floods and Hazardous Chemical, Transportation and Nearby Facility Incidents

No risks to the plant occasioned by high winds and tornadoes, external floods, ice, and transportation and nearby facility incidents were identified that might lead to core damage with a predicted frequency in excess of 10^{-6}/year. However, scenarios involving hydrogen explosions within the turbine building, the pipe trench between the PAB and containment, the hydrogen shed area in the containment access facility, and the pipe chase on the 73-ft elevation of the north-east corner of the PAB were identified that could result in core damage with a conservatively estimated frequency slightly above 10^{-6}/year.

Given the conclusion that external floods pose no significant risk, Generic Issue 103 (Design for Probable Maximum Precipitation) was judged to be resolved for IP3.

8.2 PLANT IMPROVEMENTS AND UNIQUE SAFETY FEATURES

Certain safety features, unique to IP3, and recent improvements make a significant contribution to the mitigation of the effects of seismic events, fire and other external events.

8.2.1 Seismic Events

A seismic vulnerability, in which a seismic event induces the spurious operation of the EDG room CO_2 system and subsequent shutdown of the EDG ventilation system, has been addressed by a temporary modification. A proposed permanent modification (to install a QA category I, seismic class I, actuation permissive auxiliary control panel for CO_2 discharge into the EDG building) is now under evaluation.

IP3 possesses no other unique safety features that serve to reduce the risk of core damage occasioned by seismic events.

8.2.2 Fire

The risks posed by fire at IP3 are mitigated by the Appendix R dedicated shutdown path that is independent of control circuitry susceptible to fire damage and by fire-related operating procedures that address control room evacuation and shutdown from outside the control room. In addition, procedures exist which address the inspection and maintenance of fire barriers. A proposed minor modification would eliminate the susceptibility of multiple EDG exhaust fans (and thus multiple EDGs) to fire within a single fire zone by realigning the power feeds to the EDG exhaust fans and auxiliaries.

8.2.3 High Winds and Tornadoes, External Floods and Hazardous Chemical, Transportation and Nearby Facility Incidents

High Winds and Tornadoes. Most safety-related equipment in the plant is designed to resist tornadoes of greater severity than is anticipated. The risk of core damage is thus below the criterion for concern, even given the fact that damage to the switchyard and a loss-of-offsite power are assumed should a tornado strike IP3. The risk of core damage resulting from tornadoes is further reduced by the presence of the river (and absence of missiles) to the west of the plant, the physical separation of the service water and back-up service water pumps, and a procedure that calls for the alignment of back-up service water pumps in the event of a loss of service water. Also Technical Specifications require that high levels of water be maintained in the condensate storage and city water storage tanks, preventing significant wind load damage to the tanks and ensuring their availability should a tornado strike.

External Flooding. The risk posed by external flooding at IP3 is minimal because flooding at IP3 is controlled more by tides than by run-off from tributary watersheds. The maximum river flood levels should not impact the plant. Furthermore, such flood levels are unlikely to be of concern in an IPEEE as they will be hurricane-induced and it is expected that the plant will be shut down prior to the arrival of a severe hurricane. Local precipitation also poses little risk as run-off from the plant site will be rapid and ponding is unlikely. Furthermore, the load capacity of the various plant roof areas is adequate to handle any accumulation that may result from probable maximum precipitation.

Toxic Gas Releases and Explosions Off-site. The risks posed by toxic gas releases and explosions off-site are limited by the absence of large quantities of hazardous materials close to the plant or the low frequencies with which such materials are shipped.

8.3 RECOMMENDATIONS

From the insights gained in this study, actions were identified that would reduce the risk of core damage and loss of containment heat removal following the occurrence of external events. The actions include implementing measures to:

- Reduce the susceptibility of the plant to switchgear room fires by restoring the area-wide, total flooding CO2 fire suppression system within the switchgear room to automatic actuation. This recommendation is currently being evaluated in a proposed modification.
- Reduce the risk associated with hydrogen explosions by installing an excess flow valve at the outside hydrogen storage facility to stop flow in the event of a hydrogen line rupture inside the turbine building or PAB. As a result of this analysis, an item has been proposed in the plant Action and Commitment Tracking System (ACTS) to implement this recommendation.