Catawba Nuclear Station
Extended Operation Test
of
Diesel Generator 1A
February 1984

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PURPOSE:

The purpose of this program is to expand the operating history of the Delaval Enterprise Engines built and operated as a safety-grade power supplies in Nuclear Power Plants.

This will help to clarify the technical concerns surrounding the DSRV-16-4 engines in this specific service. When reviewing the concerns associated with the DSRV-16-4 Diesel Generator, it is noted that few individual engines have significant operating hours. It is felt that it would be beneficial to the resolution of the concerns associated with the DSRV-16-4 in this specific service if this operational data base was expanded. Duke Power Company proposed to operate the 1A Diesel Generator at Catawba Nuclear Station to accumulate approximately 750 hours of documented running time. This running time would include the 197 hours of running time that the engine has had since the piston skirt inspection. The 750 hours will subject major parts of the engine to 10^7 stress cycles. A 4-cycle engine like the DSRV-16-4 is subject to 9 major stress cycles, compression and expansion, every 2 revolutions. The rated running speed for these engines is 450 RPM. To acquire 10^7 of these stress cycles, the engines will have to run for approximately 750 hours. The ability to operate through ten million stress cycles is a means to empirically demonstrate that a mechanical part has an indefinate fatigue lifetime.

Because the main concerns deal with the ability of the engine to carry rated load in a sustained fashion, the test is structured as a continuous run at 100% rated power. The engines ability to successfully start has been extensively demonstrated and no experience to date suggests that, this ability is in question.

Operation Test Procedures:

The diesel test program, operation and surveillance, will be governed by controlled Catawba Nuclear Station procedures. The controlling procedure for the surveillance is TP/1/B/1100/03 "Diesel Generator 1A Extended Run" (attachment 1). All procedures referenced by this procedure are also attached (attachment 2). The Catawba Nuclear Station procedures which control diesel operation are included as attachment 3.

1. OP/1/A/6350/02 "Diesel Generator Operation"
2. OP/1/A/6550/02 "D/G Lube Oil"
3. OP/1/A/6550/01 "Diesel Generator Fuel Oil System Operation"

Post Test Inspection:

The post operation inspection is intended to address the mechanical reliability concerns which are known presently and any concerns which may develope during the test time frame. The inspection plan will be flexible to allow for changes resulting from newly developed items. To envelope the scope of the inspection effort, as now understood, our present plans are as follows:

1) Remove four (4) cylinder heads.
   a. PT exhaust valve sets.
   b. Hydro test cooling passages.
   c. PT head studs and stud holes in block.
2) Remove four (4) sets of push rods.
   a. PT welds.
3) Remove four (4) pistons and connecting rods.
   a. PT piston skirt attachment boses.
   b. PT connecting rod bearings.
4) Inspect four (4) crank bearings for cracks and wear.
5) Inspect crank fillets for cracks.

All normal dimensional inspections associated with the components removed for this effort will be performed and recorded on the maintenance procedures used. All parts removed or made accessable will also be visually inspected for any signs of abnormal wear or damage. All fasteners, (i.e. nuts, bolts, capscrews) with specified torque values will be checked to verify as-found torque. These values will be recorded in the appropriate maintenance procedure notes. It is our intent to involve Transamerica Delaval International service personnel and Duke maintenance personnel with diesel maintenance experience in this inspection.

On January 26, 1984 the TDI Owners Group presented a proposed inspection program to the NRC staff. Following review by the Staff and finalization of the Inspection Program, Duke will address any additional tests and inspections in a future submittal.

ATTACHMENT 1

Form 34731 (10-81)
(Formerly SPD-1002-1)

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: TP/1/B/1100/03
Change(s) 0 to
0 Incorporated

(2) STATION: Catawba

(3) PROCEDURE TITLE: Diesel Generator 1A Extended Run

(4) PREPARED BY: [signature] DATE: 2/3/84

(5) REVIEWED BY: WJ Leaver DATE: 2/4/84

Cross-Disciplinary Review By: _____ N/R: WJS

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: [signature] Date: 2/4/84

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

CONTROL COPY FOR INFORMATION ONLY

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
DIESEL GENERATOR 1A EXTENDED RUN

1.0 PURPOSE

NOTE: This is the governing procedure for the Diesel Generator 1A Extended Run Program.

1.1 To collect data generated during the extended run of Catawba 1A Diesel Generator. The following surveillance programs are started.

1.1.1 Vibration data from thirty points around the engine base and near the turbo chargers taken daily. (See Section 9.1 for detailed description.)

1.1.2 Lubricating oil samples to be taken daily from Lube Oil Sump System before filtering. Daily tests to be made for % water viscosity and neutralization, weekly tests will be spectrographically or ferrographically analyzed by an off site vendor. (See Section 9.2 for detailed description.)

1.1.3 Fuel samples will be taken from each tanker unloaded (approximately 2 to 3 tanker trailers every two days). Each sample will be tested for viscosity, water and sediment, and specific gravity. Twice a week extra samples will be taken to a vendor lab to check for compliance with ASTM0975 and other required tests. (See Section 9.3 for detailed description.) The Operations Department will drain samples from the day tank hourly to virually inspect for water (See Section 9.4 for detailed description.)

1.1.4 Engine parameters such as load, exhaust temperatures, frequency will be monitored continuously and recorded hourly by Operations personnel. (See Section 9.4 for detailed description.)

1.1.5 Problems encountered during engine operation will be documented listing immediate action taken, proposed long term action, and to what extent the run was interrupted. (See Section 9.5 for details).

2.0 REFERENCES

None.

3.0 TIME REQUIRED

One (1) Test Coordinator	- 765 Hours
One (1) Operator	- 765 Hours
One (1) Chemistry Technician	- 272 Hours
Two (2) Mechanical Maintenance Engineers	- 272 Hours

4.0 PREREQUISITE TESTS

None.

5.0 TEST EQUIPMENT

5.1 TEC Monitor Model 1310 (ENP) Smart Meter System Consisting of:

5.1.1 TEC Accelerometer Model 154 (S/N 112) with a range of 5 Hz to 10,000 Hz and a 100 Hz sensitivity of 103 millivolts/"g".

5.1.2 Comparison and plots are provided by the "INTELLI-TREND" software package written by TEC (January 1984) for an IBM Personal Computer.

5.2 Nicolet Scientific Corporation Model 446A "Mini Ubiquitous" FFT Computing Spectrum Analyzer with a range of 1 Hz to 100,000 Hz.

5.3 Teac R-61 Digital Data Acquisition System using:

5.3.1 Three (3) IRD 544 Velocity Pickup Probes with a range of 12 Hz to 1000 Hz and an output of 764 ± 10 millivolts RMS per inch per second.

6.0 LIMITS AND PRECAUTIONS

6.1 Whenever the diesel is started, it should be run until temperatures are stabilized to eliminate carbon and sludge build-ups.

6.2 Minimum Lube Oil Sump Tank Level is 31½ inches.

6.3 Minimum Jacket Water Standpipe Level is 40 inches.

7.0 REQUIRED STATION STATUS

____/____ 7.1 Ensure that the 600 VAC Essential Power System is operational.

____/____ 7.2 Ensure that the 4160 VAC Essential Power System is operational.

____/____ 7.3 Ensure that the Diesel Generator 1A Auxiliary Support Systems are aligned and operating per OP/1/A/6350/02, Diesel Generator Operation.

____/____ 7.4 Ensure that the Nuclear Service Water System is operating and capable of supplying cooling water to Diesel Generator 1A components as needed.

____/____ 7.5 Ensure that the Diesel Generator Building 1A Fire Protection System is operable.

____/____ 7.6 Ensure that the Diesel Generator Building 1A Ventilation System is operable.

8.0 PREREQUISITE SYSTEM CONDITIONS

___/___ 8.1 Verify Diesel Generator 1A Unit Structures, supports and components are complete, with no identified exceptions or discrepancies which will affect the outcome of the test.

9.0 TEST METHOD

9.1 Vibration Analysis

9.1.1 Vibration data shall be taken at the following thirty points using either or both the Nicolet Spectrum Analysis System or TEC Monitoring System every day until the run is completed. Data will not be taken unless the engine has been running a minimum of six continuous hours during a normal work day.

POINT	DESCRIPTION
H01	Horz Generator Pedestal Bearing
V02	Vert Generator Pedestal Bearing
A03	Axial Generator Pedestal Bearing
H04	Horz Base LB at Cylinder-8L
H05	Horz Cam Cover Base at Cylinder-8L
H06	Horz Base LB Between Cylinders 4L & 5L
H07	Horz Cam Cover Base Between Cylinders 4L & 5L
H08	Horz Base LB at Cylinder-1L
H09	Horz Cam Cover Base at Cylinder-1L
A10	Axial LB Cam Cover Housing (Engine Front)
A11	Axial RB Cam Cover Housing (Engine Front)
A12	Auxial Crankshaft Gear Housing (Engine Front)
T13	Turbocharger LB Horizontal on Turbo
T14	Turbocharger LB Vertical on Support Base
T15	Turbocharger Front Support Bar LB at Intercooler
T16	Turbocharger RB Horizontal on Turbo
T17	Turbocharger RB Vertical on Support Base
T18	Turbocharger Front Support Bar RB at Intercooler
H19	Horz Sub-Base RB at Cylinder-8R
H20	Horz Cam Cover Base RB at Cylinder-8R
H21	Horz Sub-Base RB Between Cylinders 4R & 5R
H22	Horz Cam Cover Base RB Between Cylinders 4R & 5R
H23	Horz Sub-Base RB at Cylinder-1R
H24	Horz Cam Cover Base at Cylinder-1R
V25	Vert Block RB at Cylinder-1R
V26	Vert Block RB Between Cylinders 4R & 5R
V27	Vert Block RB at Cylinder-8R
V28	Vert Block LB at Cylinder-8L
V29	Vert Block LB Between Cylinders 4L & 5L
V30	Vert Block LB at Cylinder-1L

LB = Left Bank
RB = Right Bank

FOR INFORMATION ONLY

9.1.2 Baseline data for the Nicolet System shall be considered as follows:

0-50 Hz Range - 1/30/84
0-300 Hz Range - 2/1/84
0-800 Hz Range - 2/1/84

The Nicolet System shall be used to take daily readings through 2/2/84. Baseline data for the TEC system shall be considered that taken 2/1/84. The TEC system shall be used to take data on a daily basis from 2/1/84 until testing is complete. In the event one system fails, the remaining system shall be used for daily readings.

9.1.3 If the TEC system detects a significant change as programmed into the TEC system by the Maintenance Engineer, the Nicolet System shall be used to further document the condition. If the Nicolet system confirms the significant change, in the opinion of the Maintenance Engineer, a comparison plot between the Nicolet baseline data and the Nicolet data showing the significant change shall be made an enclosed with this procedure.

9.1.4 After February 2, 1984 Nicolet vibration samples shall be taken at least once a week to confirm the data taken with the TEC system. If 110% full load runs are made during normal working hours, an effort shall be made to take vibration samples using the Nicolet system.

9.2 Lube Oil Samples

Lube oil samples are taken to show that the oil still has those properties necessary to provide proper lubrication. A detailed analysis of the wear particles and combustion products in the oil can provide important clues concerning the mechanical condition of the engine and help identify possible failure mechanisms. A single sample will be taken from the "lube oil storage tank" (new oil) for a spectrum analysis baseline test.

9.2.1 Daily samples will be taken from the lube oil sump system at some point after the oil leaves the engine but before it is filtered. These samples shall be tested for percent water content per CP/0/A/8100/23 and for viscosity per CP/0/A/8100/24 "Zahn Cup Method". A neutralization number will also be determined for each daily sample. Results of daily sample tests that are done at the station shall be reported within 24 hours of sample collection time. Results of hose samples leaving the station shall be reported within 96 hours of collection time. A log of the results copied from the chemistry lab results log book shall be included as Enclosure 1.3.

9.2.2 A weekly sample of 500 ml shall be taken from the same point described in 9.2.1 for spectrographic or ferrographic analysis by out side vendors. Copies of the results shall be attached as Enclosure 13.4. An effort shall be made to have the results available within one week of the sample date. One 500 ml sample of "New Oil" from the lube oil storage tank shall be sent with the first sump sample for comparison.

9.3 Fuel Oil Samples

Fuel oil samples are taken to show that the fuel meets industry and company standards for Number 2 Diesel Fuel Oil.

Because the main fuel oil storage tanks cannot be recirculated while the fuel oil system is lined up for engine runs and because of the inventory turnover required for this continuous run, the samples taken from the tanker for delivery acceptance will very closely represent the contents of the main storage tank and will, therefore, be suitable.

9.3.1 Fuel oil samples will be taken from each tanker to be unloaded. The sample will be a composite of all compartments of the tanker. The fuel shall be tested on site for specific gravity per CP/0/A/8100/26. The results shall be obtained and found satisfactory before the fuel oil unloaded. A log of the results copied from the chemistry lab results log book shall be included as Enclosure 13.5.

9.3.2 One liter samples taken twice a week shall be sent to vendor labs to test for comparison with ASTM D975 "D2". Parameters to be tested are listed in CP/0/B/8800/05 "Oil Analysis Operating Specification", Table 2, "Analysis by Consultant", "Fuel Oil Tank Truck". Copies of the results shall be attached as Enclosure 13.6 of this procedure. An effort shall be made to have results available within seven days of sample date.

9.3.3 The Operations Department shall draw fuel oil from the bottom of the day tank once during each hour the engine is run and inspect it for obvious water and sediment. If significant quantities are found, the Test Coordinator will be notified for evaluation.

9.4 Operational Parameters

The operational parameters listed on Enclosure 13.7 shall be monitored and logged every hour. All strip charts used to monitor engine temperatures will be attached to this procedure. Daily, the results will be reviewed to determine any significant changes.

9.5 Diesel Generator 1A Extended Run Problem Reports

All significant or abnormal Diesel Generator 1A Parameters shall be described in detail on Enclosure 13.6. The problem report will include the following:

Description of Problem
Immediate Action Taken
Extent that D/G was out of service
Suggestions for long term action

10.0 DATA REQUIRED

10.1 Vibration Data Points

POINT	DESCRIPTION
H01	Horz Generator Pedestal Bearing
V02	Vert Generator Pedestal Bearing
A03	Axial Generator Pedestal Bearing
H04	Horz Base LB at Cylinder-8L
H05	Horz Cam Cover Base at Cylinder-8L
H06	Horz Base LB Between Cylinders 4L & 5L
H07	Horz Cam Cover Base Between Cylinders 4L & 5L
H08	Horz Base LB at Cylinder-1L
H09	Horz Cam Cover Base at Cylinder-1L
A10	Axial LB Cam Cover Housing (Engine Front)
A11	Axial RB Cam Cover Housing (Engine Front)
A12	Axial Crankshaft Gear Housing (Engine Front)
T13	Turbocharger LB Horizontal on Turbo
T14	Turbocharger LB Vertical on Support Base
T15	Turbocharger Front Support Bar LB at Intercooler
T16	Turbocharger RB Horizontal on Turbo
T17	Turbocharger RB Vertical on Support Base
T18	Turbocharger Front Support Bar RB at Intercooler
H19	Horz Sub-Base RB at Cylinder-8R
H20	Horz Cam Cover Base RB at Cylinder-8R
H21	Horz Sub-Base RB Between Cylinders 4R & 5R
H22	Horz Cam Cover Base RB Between Cylinders 4R & 5R
H23	Horz Sub-Base RB at Cylinder-1R
H24	Horz Cam Cover Base at Cylinder-1R
V25	Vert Block RB at Cylinder-1R
V26	Vert Block RB Between Cylinders 4R & 5R
V27	Vert Block RB at Cylinder-8R
V28	Vert Block LB at Cylinder-8L
V29	Vert Block LB Between Cylinders 4L & 5L
V30	Vert Block LB at Cylinder-1L

LB = Left Bank
RB = Right Bank

10.2 Lube Oil

10.2.1 "Results of Daily Sample", Enclosure 13.6

FOR INFORMATION ONLY

10.2.2 "Spectrographic or Ferrographic Test Results", "Results of Spectrographic Tests on Lubricating Oil", Enclosure 13.4.

10.3 Fuel Oil

10.3.1 "Results of Fuel Tests from Delivery Tankers", Enclosure 13.5.

10.3.2 "Results of Fuel Analysis by Consultant", Enclosure 13.6.

10.4 Operating Parameters

10.4.1 Load (KW)

10.4.2 Power Factor

10.4.3 Generator Volts (Volts)

10.4.4 Generator Amps (Amps)

10.4.5 Stator Temperature (°C)

10.4.6 Lube Oil Pressure (PSIG)

10.4.7 Lube Oil Filter D/P (PSID)

10.4.8 Right Bank Turbo Oil Pressure (PSIG)

10.4.9 Left Bank Turbo Oil Pressure (PSIG)

10.4.10 Fuel Oil Pressure (PSIG)

10.4.11 Fuel Oil Filter D/P (PSID)

10.4.12 Jacket Water Pressure (PSIG)

10.4.13 Right Bank Intake Manifold Pressure (In H_G)

10.4.14 Left Bank Intake Manifold Pressure (In H_G)

10.4.15 Lube Tank Level

10.4.16 1L Cylinder Temperature (°F)

10.4.17 2L Cylinder Temperature (°F)

10.4.18 3L Cylinder Temperature (°F)

10.4.19 4L Cylinder Temperature (°F)

10.4.20 5L Cylinder Temperature (°F)

10.4.21 6L Cylinder Temperature (°F)

10.4.22 7L Cylinder Temperature (°F)

10.4.23 8L Cylinder Temperature (°F)

10.4.24 1R Cylinder Temperature (°F)

10.4.25 2R Cylinder Temperature (°F)

10.4.26 3R Cylinder Temperature (°F)

10.4.27 4R Cylinder Temperature (°F)

10.4.28 5R Cylinder Temperature (°F)

10.4.29 6R Cylinder Temperature (°F)

10.4.30 7R Cylinder Temperature (°F)

10.4.31 8R Cylinder Temperature (°F)

10.4.32 Left Bank Exhaust Temperature (°F)

10.4.33 Right Bank Exhaust Temperature (°F)

11.0 ACCEPTANCE CRITERIA

This procedure is used for documentation purpose only, therefore, no acceptance criteria are needed.

12.0 PROCEDURE

12.1 Diesel Generator 1A Extended Run

____/____ 12.1.1 Ensure that Prerequisite Tests, Required Station Status, and Prerequisite System Conditions for this test are met.

____/____ 12.1.2 Ensure that any previous data concerning this extended run is attached as Enclosure 13.12.

NOTE: The following steps may be performed in any order at the Test Coordinator's discretion.

NOTE: The following steps may be "N/A" at the Test Coordinator's discretion.

The following steps will be signed off on Enclosure 13.1.

12.1.3 Vibration Analysis

____/____ 12.1.3.1 On a daily basis, using the TEC system (Described in Section 5.0), monitor the following points:

POINT	DESCRIPTION
H01	Horz Generator Pedestal Bearing
V02	Vert Generator Pedestal Bearing

POINT	DESCRIPTION
A03	Axial Generator Pedestal Bearing
H04	Horz Base LB at Cylinder-6L
H05	Horz Cam Cover Base at Cylinder-6L
H06	Horz Base LB Between Cylinders 4L & 5L
H07	Horz Cam Cover Base Between Cylinders 4L & 5L
H08	Horz Base LB at Cylinder-1L
H09	Horz Cam Cover Base at Cylinder-1L
A10	Axial LB Cam Cover Housing (Engine Front)
A11	Axial RB Cam Cover Housing (Engine Front)
A12	Auxial Crankshaft Gear Housing (Engine Front)
T13	Turbocharger LB Horzontal on Turbo
T14	Turbocharger LB Vertical on Support Base
T15	Turbocharger Front Support Bar LB at Intercooler
T16	Turbocharger RB Horizontal on Turbo
T17	Turbocharger RB Vertical on Support Base
T18	Turbocharger Front Support Bar RB at Intercooler
H19	Horz Sub-Base RB at Cylinder-8R
H20	Horz Cam Cover Base RB at Cylinder-8R
H21	Horz Sub-Base RB Between Cylinders 4R & 5R
H22	Horz Cam Cover Base RB Between Cylinders 4R & 5R
H23	Horz Sub-Base RB at Cylinder-1R
H24	Horz Cam Cover Base at Cylinder-1R
V25	Vert Block RB at Cylinder-1R
V26	Vert Block RB Between Cylinders 4R & 5R
V27	Vert Block RB at Cylinder-8R
V28	Vert Block LB at Cylinder-8L
V29	Vert Block LB Between Cylinders 4L & 5L
V30	Vert Block LB at Cylinder-1L

LB = Left Bank
RB = Right Bank

___/___ 12.1.3.2 If the TEC system shows a significant change in any of the parameters, use the Nicolet System (described in Section 5.0) to monitor the point in question.

___/___ 12.1.3.3 If the Nicolet System confirms the significant change, record on Enclosure 13.8 the necessary information. Prepare a comparison plot between the Nicolet Baseline Data and the Nicolet Data showing the significant change. Attach this plot the procedure as Enclosure 13.9.

___/___ 12.1.3.4 If the Nicolet System does not confirm the significant change, record on the Procedure Discrepancies Process Record the necessary information.

___/___ 12.1.3.5 If the Diesel Generator 1A is loaded to 7700 KW during normal working hours, use the Nicolet System to monitor the following points:

POINT	DESCRIPTION
H01	Horz Generator Pedestal Bearing
V02	Vert Generator Pedestal Bearing
A03	Axial Generator Pedestal Bearing
H04	Horz Base LB at Cylinder-8L
H05	Horz Cam Cover Base at Cylinder-8L
H06	Horz Base LB Between Cylinders 4L & 5L
H07	Horz Cam Cover Base Between Cylinders 4L & 5L
H08	Horz Base LB at Cylinder-1L
H09	Horz Cam Cover Base at Cylinder-1L
A10	Axial LB Cam Cover Housing (Engine Front)
A11	Axial RB Cam Cover Housing (Engine Front)
A12	Auxial Crankshaft Gear Housing (Engine Front)
T13	Turbocharger LB Horizontal on Turbo
T14	Turbocharger LB Vertical on Support Base
T15	Turbocharger Front Support Bar LB at Intercooler
T16	Turbocharger RB Horizontal on Turbo
T17	Turbocharger RB Vertical on Support Base
T18	Turbocharger Front Support Bar RB at Intercooler
H19	Horz Sub-Base RB at Cylinder-8R
H20	Horz Cam Cover Base RB at Cylinder-8R
H21	Horz Sub-Base RB Between Cylinders 4R & 5R
H22	Horz Cam Cover Base RB Between Cylinders 4R & 5R
H23	Horz Sub-Base RB at Cylinder-1R
H24	Horz Cam Cover Base at Cylinder-1R
V25	Vert Block RB at Cylinder-1R
V26	Vert Block RB Between Cylinders 4R & 5R
V27	Vert Block RB at Cylinder-8R
V28	Vert Block LB at Cylinder-8L
V29	Vert Block LB Between Cylinders 4L & 5L
V30	Vert Block LB at Cylinder-1L

LB = Left Bank
RB = Right Bank

____/____ 12.1.3.6 On a weekly basis using the Nicolet System monitor the following points:

POINT	DESCRIPTION
H01	Horz Generator Pedestal Bearing
V02	Vert Generator Pedestal Bearing
A03	Axial Generator Pedestal Bearing
H04	Horz Base LB at Cylinder-8L
H05	Horz Cam Cover Base at Cylinder-8L
H06	Horz Base LB Between Cylinders 4L & 5L
H07	Horz Cam Cover Base Between Cylinders 4L & 5L
H08	Horz Base LB at Cylinder-1L
H09	Horz Cam Cover Base at Cylinder-1L
A10	Axial LB Cam Cover Housing (Engine Front)

FOR INFORMATION ONLY

POINT	DESCRIPTION
A11	Axial RB Cam Cover Housing (Engine Front)
A12	Auxial Crankshaft Gear Housing (Engine Front)
T13	Turbocharger LB Horzontal on Turbo
T14	Turbocharger LB Vertical on Support Base
T15	Turbocharger Front Support Bar LB at Intercooler
T16	Turbocharger RB Horizontal on Turbo
T17	Turbocharger RB Vertical on Support Base
T18	Turbocharger Front Support Bar RB at Intercooler
H19	Horz Sub-Base RB at Cylinder-8R
H20	Horz Cam Cover Base RB at Cylinder-8R
H21	Horz Sub-Base RB Between Cylinders 4R & 5R
H22	Horz Cam Cover Base RB Between Cylinders 4R & 5R
H23	Horz Sub-Base RB at Cylinder-1R
H24	Horz Cam Cover Base at Cylinder-1R
V25	Vert Block RB at Cylinder-1R
V26	Vert Block RB Between Cylinders 4R & 5R
V27	Vert Block RB at Cylinder-8R
V28	Vert Block LB at Cylinder-8L
V29	Vert Block LB Between Cylinders 4L & 5L
V30	Vert Block LB at Cylinder-1L

LB = Left Bank
RB = Right Bank

___/___ 12.1.3.7 Record on Enclosure 13.2 the necessary information.

___/___ 12.1.3.8 If analysis indicates significant changes in any monitored vibration point, record on Enclosure 13.8 the necessary information.

12.1.4 Lube Oil Samples

___/___ 12.1.4.1 On a daily basis, draw a lube oil sample from the Lube Oil System before the lube oil filters and test for "Percent Water Content" per CP/0/A/8100/23. Record results on Enclosure 13.3.

___/___ 12.1.4.2 On a daily basis, draw a lube oil sample from the Lube Oil System before the lube oil filters and test for "Viscosity" per CP/0/A/8100/24. Record results on Enclosure 13.3.

___/___ 12.1.4.3 On a daily basis, draw a lube oil sample from the Lube Oil System before the lube oil filters and test for "Neutralization Number". Record results on Enclosure 13.3.

NOTE: This test will be performed at the Environmental Lab.

___/___ 12.1.4.4 On a daily basis, draw a lube oil sample from the Lube Oil System before the lube oil filters and send to an outside vendor for either a spectrographic or ferrographic analysis. Attach the results as Enclosure 13.4.

___/___ 12.1.4.5 If any analysis indicates significant changes in the Lube Oil, record on Enclosure 13.8 the necessary information.

12.1.5 Fuel Oil Sample

___/___ 12.1.5.1 Draw a fuel oil sample from each tanker to be unloaded and test for "Specific Gravity" per CP/0/A/8100/10. Record the results on Enclosure 13.5.

___/___ 12.1.5.2 Draw a fuel oil sample from each tanker to be unloaded and test for "Water and Sediment" per CP/0/A/8100/26. Record the results on Enclosure 13.5.

___/___ 12.1.5.3 Draw a one (1) liter sample twice a week from the Fuel Oil System and send to an outside vendor for a comparison analysis with respect to ASTM D975. Parameters to be tested can be found in CP/0/B/8800/05. Attach the results as Enclosure 13.6.

___/___ 12.1.5.4 If any analysis indicates significant changes in the Fuel Oil, record on Enclosure 13.8 the necessary information.

12.1.6 Operational Parameters

___/___ 12.1.6.1 On an hourly basis, record the necessary parameters listed on Enclosure 13.7.

___/___ 12.1.6.2 Attach as Enclosure 13.10 all strip charts that are recording Diesel Generator 1A parameters.

___/___ 12.1.6.3 If daily review of the parameters indicates any significant changes, record on Enclosure 13.8 the necessary information.

___/___ 12.1.6.4 At the conclusion of the extended run attach a copy of the Diesel Generator 1A Log Book as Enclosure 13.11.

13.0 ENCLOSURES

13.1 Sign Off Sheet

13.2 Vibration Sample Data Log

13.3 Lube Oil Daily Sample Results

13.4 Lube Oil Spectrographic or Ferrographic Analysis Results

13.5 Results of Fuel Oil Tests from Delivery Tankers

13.6 Fuel Oil ASTM D975 Comparison Analysis Results

13.7 Operational Parameters

13.8 Diesel Gererator 1A Extended Run Significant Problem Report

13.9 Vibration Data Comparison Plots

13.10 Strip Charts

13.11 Diesel Generator 1A Log Book

13.12 Data Collected Prior to Implementation of This Procedure

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
DIESEL GENERATOR 1A EXTENDED RUN
TP/1/B/1100/03
ENCLOSURE 13.1

SIGN-OFF SHEET

12.1.3.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.5	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.6	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.7	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.8	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.5	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___

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SIGN-OFF SHEET

12.1.3.1	____/____	____/____	____/____	____/____	____/____	____/____	____/____	____/____
12.1.3.2	____/____	____/____	____/____	____/____	____/____	____/____	____/____	____/____
12.1.3.3	____/____	____/____	____/____	____/____	____/____	____/____	____/____	____/____
12.1.3.4	____/____	____/____	____/____	____/____	____/____	____/____	____/____	____/____
12.1.3.5	____/____	____/____	____/____	____/____	____/____	____/____	____/____	____/____
12.1.3.6	____/____	____/____	____/____	____/____	____/____	____/____	____/____	____/____
12.1.3.7	____/____	____/____	____/____	____/____	____/____	____/____	____/____	____/____
12.1.3.8	____/____	____/____	____/____	____/____	____/____	____/____	____/____	____/____
12.1.4.1	____/____	____/____	____/____	____/____	____/____	____/____	____/____	____/____
12.1.4.2	____/____	____/____	____/____	____/____	____/____	____/____	____/____	____/____
2.1.4.3	____/____	____/____	____/____	____/____	____/____	____/____	____/____	____/____
12.1.4.4	____/____	____/____	____/____	____/____	____/____	____/____	____/____	____/____
12.1.4.5	____/____	____/____	____/____	____/____	____/____	____/____	____/____	____/____
12.1.5.1	____/____	____/____	____/____	____/____	____/____	____/____	____/____	____/____
12.1.5.2	____/____	____/____	____/____	____/____	____/____	____/____	____/____	____/____
12.1.5.3	____/____	____/____	____/____	____/____	____/____	____/____	____/____	____/____
12.1.5.4	____/____	____/____	____/____	____/____	____/____	____/____	____/____	____/____
12.1.6.1	____/____	____/____	____/____	____/____	____/____	____/____	____/____	____/____
12.1.6.2	____/____	____/____	____/____	____/____	____/____	____/____	____/____	____/____
12.1.6.3	____/____	____/____	____/____	____/____	____/____	____/____	____/____	____/____
12.1.6.4	____/____	____/____	____/____	____/____	____/____	____/____	____/____	____/____

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SIGN-OFF SHEET

12.1.3.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.5	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.6	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.7	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.8	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.5	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___

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12.1.3.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.5	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.6	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.7	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.8	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.5	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___

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12.1.3.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.5	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.6	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.7	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.8	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.5	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___

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12.1.3.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.5	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.6	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.7	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.8	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.5	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___

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12.1.3.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.5	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.6	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.7	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.8	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
.1.4.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.5	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
DIESEL GENERATOR 1A EXTENDED RUN
TP/1/B/1100/03
ENCLOSURE 13.1

SIGN-OFF SHEET

12.1.3.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.5	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.6	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.7	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.8	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.5	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___

FOR INFORMATION ONLY

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
DIESEL GENERATOR 1A EXTENDED RUN
TP/1/B/1100/03
ENCLOSURE 13.1

SIGN-OFF SHEET

12.1.3.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.5	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.6	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.7	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.8	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.5	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___

FOR INFORMATION ONLY

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
DIESEL GENERATOR 1A EXTENDED RUN
TP/1/B/1100/05
ENCLOSURE 13.1

SIGN-OFF SHEET

12.1.3.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.5	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.6	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.7	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.3.8	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.4.5	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.5.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.1	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.2	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.3	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___
12.1.6.4	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___	___/___

FOR INFORMATION ONLY

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
DIESEL GENERATOR 1A EXTENDED RUN
TP/1/B/1100/03
ENCLOSURE 13.2

VIBRATION SAMPLE DATA LOG

SAMPLE NUMBER	DATE AND TIME SAMPLE WAS TAKEN	VIBRATION TEST EQUIPMENT USED	WAS SIGNIFICANT CHANGE FOUND?	NAME OF ENGR TAKING DATA	COMMENTS

FOR INFORMATION ONLY

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
DIESEL GENERATOR 1A EXTENDED RUN
TP/1/B/1100/02
ENCLOSURE 13.3

LUBE OIL DAILY SAMPLE RESULTS

SAMPLE DATE/TIME	VISCOSITY (SUS) CP/0/A/8100/24 OPAQUE	% WATER (%V) CP/0/A/8100/23	ACCEPTED PER CP/0/B/8800/057	NAME OF TESTING CHEMIST	NEUTRALIZATION NUMBER mgKOH/gram	NAME OF TESTING CHEMIST

FOR INFORMATION ONLY

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
DIESEL GENERATOR 1A EXTENDED RUN
TP/1/B/1100/03
ENCLOSURE 13.4

LUBE OIL SPECTROGRAPHIC OR FERROGRAPHIC ANALYSIS RESULTS

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
DIESEL GENERATOR 1A EXTENDED RUN
TP/1/B/1100/03
ENCLOSURE 13.5

RESULTS OF FUEL OIL TESTS FROM DELIVERY TANKERS

SAMPLE DATE/TIME	SPECIFIC GRAVITY CP/0/A/8100/10	% WATER AND SEDIMENT CP/0/A/8100/26	NAME OF TESTING CHEMIST	WAS DELIVERY ACCEPTED?

FOR INFORMATION ONLY

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
DIESEL GENERATOR 1A EXTENDED RUN
TP/1/B/1100/03
ENCLOSURE 13.8

FUEL OIL ASTM D975 COMPARISON ANALYSIS RESULTS

Date

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
DIESEL GENERATOR 1A EXTENDED RUN
TP/1/B/1100/53
ENCLOSURE 13
OPERATIONAL PARAMETERS

TIME													
LOAD, Wattmeter on 1DGCPA (KW)													
POWER FACTOR, Power Factor Meter on 1DGCPA													
GENERATOR VOLTS, Incoming Voltmeter on 1DGCPA (Volts)													
GENERATOR AMPS, Ammeter on 1DGCPA (AMPS)													
STATOR TEMPERATURE, Temperature Meter on 1DGCPA (°C)													
LUBE OIL PRESSURE, 1LDPG5140 on 1DECPA (PSIG)													
LUBE OIL FILTER D/P, 1LDPG5160 on 1DECPA (PSID)													
RIGHT BANK TURBO OIL PRESSURE, 1LDPG5220 on 1DECPA (PSIG)													
LEFT BANK TURBO OIL PRESSURE, 1LDPG5220 on 1DECPA (PSIG)													
FUEL OIL PRESSURE, 1FDPG5111 on 1DECPA (PSIG)													
FUEL OIL FILTER D/P, 1FDPG5110 on 1DECPA (PSID)													
JACKET WATER PRESSURE, 1KDPG5180 on 1DEGPA (PSIG)													
RIGHT BANK INTAKE MANIFOLD PRESSURE, 1VNPG5120 on 1DECPA (in HG)													
LEFT BANK INTAKE MANIFOLD PRESSURE, 1VNPG5120 on 1DECPA (in HG)													
LUBE TANK LEVEL, 1LDP5000 on 1DECPA													
MARK TIME ON STRIP CHART RECORDER (INITIAL)													
DRAW ACCUMULATED WATER FROM FUEL OIL DAY TANK (INITIAL)													

FOR INFORMATION ONLY

Date

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
DIESEL GENERATOR 1A EXTENDED RUN
TP/1/B/1160/03
ENCLOSURE 13.7
OPERATIONAL PARAMETERS

TIME														
1L CYLINDER TEMPERATURE, Temperature Scanner on 1DGCPA (°F)														
2L CYLINDER TEMPERATURE, Temperature Scanner on 1DGCPA (°F)														
3L CYLINDER TEMPERATURE, Temperature Scanner on 1DGCPA (°F)														
4L CYLINDER TEMPERATURE, Temperature Scanner on 1DGCPA (°F)														
5L CYLINDER TEMPERATURE, Temperature Scanner on 1DGCPA (°F)														
6L CYLINDER TEMPERATURE, Temperature Scanner on 1DGCPA (°F)														
7L CYLINDER TEMPERATURE, Temperature Scanner on 1DGCPA (°F)														
8L CYLINDER TEMPERATURE, Temperature Scanner on 1DGCPA (°F)														
1R CYLINDER TEMPERATURE, Temperature Scanner on 1DGCPA (°F)														
2R CYLINDER TEMPERATURE, Temperature Scanner on 1DGCPA (°F)														
3R CYLINDER TEMPERATURE, Temperature Scanner on 1DGCPA (°F)														
4R CYLINDER TEMPERATURE, Temperature Scanner on 1DGCPA (°F)														
5R CYLINDER TEMPERATURE, Temperature Scanner on 1DGCPA (°F)														
6R CYLINDER TEMPERATURE, Temperature Scanner on 1DGCPA (°F)														
7R CYLINDER TEMPERATURE, Temperature Scanner on 1DGCPA (°F)														
8R CYLINDER TEMPERATURE, Temperature Scanner on 1DGCPA (°F)														
LEFT BANK EXHAUST TEMPERATURE, Temperature Scanner on 1DGCPA (°F)														
RIGHT BANK EXHAUST TEMPERATURE, Temperature Scanner on 1DGCPA (°F)														

FOR INFORMATION ONLY

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
DIESEL GENERATOR 1A EXTENDED RUN
TP/1/B/1100/03
ENCLOSURE 13.9

VIBRATION DATA COMPARISON PLOTS

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
DIESEL GENERATOR 1A EXTENDED RUN
TP/1/B/1100/03
ENCLOSURE 13.8

DIESEL GENERATOR 1A EXTENDED RUN SIGNIFICANT PRO

Report # _____

Date/Time ____/____

Description of Problem _____

_____

_____

_____

_____

Immediate Action Taken _____

_____

_____

_____

Time Diesel Generator was Out-of-Service (Hours) _____

Suggestions for Long Term Action _____

_____

_____

_____

Comments _____

_____

_____

_____

Prepared By _____/_____

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
DIESEL GENERATOR 1A EXTENDED RUN
TP/1/B/1100/03
ENCLOSURE 13.10

STRIP CHARTS

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
DIESEL GENERATOR 1A EXTENDED RUN
TP/1/B/1100/03
ENCLOSURE 13.11

DIESEL GENERATOR 1A LOG BOOK

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
DIESEL GENERATOR 1A EXTENDED RUN
TP/1/B/1100/03
ENCLOSURE 13.12

DATA COLLECTED PRIOR TO IMPLEMENTATION OF THIS PROCEDURE

ATTACHMENT 2

Form 34811 (7-81)
(Formerly SPD-1003-2)

DUKE POWER COMPANY
PROCEDURE MAJOR CHANGE
PROCESS RECORD

(1) ID No: CP/01/A/1001 23
Change No: 1
Permanent/Restricted To
Permanent

(2) STATION: Catawba Nuclear Station

(3) PROCEDURE TITLE: Chemistry Procedure For The Determination Of Percent Water In C.L

(4) SECTION(S) OF PROCEDURE AFFECTED: 4.1.4

(5) DESCRIPTION OF CHANGE: (Attach additional pages, if necessary.)
Change Second Sentence To Read: Continue distillation until the volume of water in the trap remains constant for about 5 minutes.

(6) REASON FOR CHANGE:
In Accordance with ASTM D-95-70 Part 23, Page 578

(7) PREPARED BY: Lewis La Caser DATE: 10/11/83

(8) SAFETY EVALUATION FOR PROCESS CONTROL

This change:

Yes ___ No ✓ Represents a change to the station or procedures as described in the FSAR, or a test or experiment not described in the FSAR?
Yes ___ No ✓ Requires a change to the station Technical Specifications?
Yes ___ No ✓ Involves an unreviewed safety question?

If the answer to any of the above is "Yes", attach a detailed explanation. As appropriate attach a completed "Nuclear Safety Evaluation Check List" form.

By: Lewis La Caser Date: 10/11/83

(9) REVIEWED BY: YD Evans RHC DATE: 10/13/83

Cross-Disciplinary Review By: (N/R) YDE

(10) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____
By: _____ Date: _____

(11) APPROVED BY: RS Tuckerman DATE: 10/11/83

(12) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____
Reviewed/Approved By: _____ Date: _____

(13) Page 1 of 1

Rev 14
9/20/77

Form SPD-1002-1

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: CH/O/A/8100/23
Change(s) 0 to
0 Incorporated

(2) STATION: Catawba

(3) PROCEDURE TITLE: Chemistry Procedure for the Determination of Percent Water in Oil

(4) PREPARED BY: C. Bolin DATE: 5/21/82

(5) REVIEWED BY: F.D. Dans DATE: 6-22-82

Cross-Disciplinary Review By: J.W. Lee 6/22/82 N/R: SRC 6/22

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: M.S. Tuckman Date: 7/14/82

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

MASTER FILE

FORM SPD-1001-2

DUKE POWER COMPANY
NUCLEAR SAFETY EVALUATION CHECK LIST

(1) STATION: Catawba UNIT: 1 X 2 X 3 _____
OTHER: _____

(2) CHECK LIST APPLICABLE TO: CP/O/A/8100/23

(3) SAFETY EVALUATION - PART A

The item to which this evaluation is applicable represents:

Yes ____ No ✓ A change to the station or procedures as described in the FSAR; or a test or experiment not described in the FSAR?

If the answer to the above is "Yes", attach a detailed description of the item being evaluated and an identification of the affected section(s) of the FSAR.

(4) SAFETY EVALUATION - PART B

Yes ____ No ✓ Will this item require a change to the station Technical Specifications?

If the answer to the above is "Yes," identify the specification(s) affected and/or attach the applicable pages(s) with the change(s) indicated.

(5) SAFETY EVALUATION - PART C

As a result of the item to which this evaluation is applicable:

Yes ____ No ✓ Will the probability of an accident previously evaluated in the FSAR be increased?

Yes ____ No ✓ Will the consequences of an accident previously evaluated in the FSAR be increased?

Yes ____ No ✓ May the possibility of an accident which is different than any already evaluated in the FSAR be created?

Yes ____ No ✓ Will the probability of a malfunction of equipment important to safety previously evaluated in the FSAR be increased?

Yes ____ No ✓ Will the consequences of a malfunction of equipment important to safety previously evaluated in the FSAR be increased?

Yes ____ No ✓ May the possibility of malfunction of equipment important to safety different than any already evaluated in the FSAR be created?

Yes ____ No ✓ Will the margin of safety as defined in the bases to any Technical Specification be reduced?

If the answer to any of the preceding is "Yes", an unreviewed safety question is involved. Justify the conclusion that an unreviewed safety question is or is not involved. Attach additional pages as necessary.

(6) PREPARED BY: _____ DATE: 5/21/82

(7) REVIEWED BY: _____ DATE: 6-22-82

Form 18855 (3-80)

DUKE POWER COMPANY

ALARA EVALUATION CHECKLIST

(1) Station Catawba Unit: 1 X 2 X 3 _____

Other: _____

(2) Checklist Applicable to: CP/O/A/8100/23

(3) ALARA Evaluation

Check those items below which were considered applicable during the preparation and review of this document.

_____ Flushing and draining were used to minimize source - strength and contamination levels prior to performing an operation.

_____ Permanent and/or movable shielding was specified for reduction of levels.

_____ Use of permanent or temporary local exhaust ventilation systems was used for control of airborne contamination.

_____ Operation was designed to be completed with the least practicable time spent in the radiation field.

_____ Appropriate tools and equipment were specified for the operation to be performed.

_____ The operation was designed considering the minimum number of people necessary for safe job completion.

_____ Remote handling equipment and other special tools were specified to reduce external dose.

_____ Contamination - control techniques were specified.

_____ The operation was designed to be conducted in areas of as low an exposure as practicable.

_____ Additional ALARA considerations were:

_____

_____

_____

✓ ALARA Principles were not considered since the procedure did not involve work in a radiation area.

(5) Prepared by: Carl Bolin Date 5/21/92

(6) Reviewed by: K O Evans Date 6-22-92

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
CHEMISTRY PROCEDURE FOR THE DETERMINATION OF
PERCENT WATER IN OIL

1.0 DISCUSSION

1.1 Scope

This procedure describes the analysis of water content of petroleum and other bituminous materials by distillation with a volatile, water-immiscible solvent.

1.2 Principle

This method is suitable for a variety of bituminous materials but is especially applicable to fuel oil and lubricating oil. The apparatus used in this procedure consists of a heating mantle and glass still. The still itself is comprised of a distilling flask, a graduated trap, and a Liebig (or West) condenser (shown assembled in Enclosure 6.1). The sample is introduced into the distilling flask and heated under reflux with a water-immiscible solvent which co-distills with the water in the sample. The condensed solvent and water are continuously separated in the trap; the water settles in the graduated section of the trap and the solvent returns to the still.

1.3 Precision and Interferences

This procedure detects 96% of the water in the sample, as determined in the laboratory.

Volatile water-soluble materials present in the sample are measured as water which decreases the accuracy of this determination.

A loose cotton plug must be inserted in the top of the condenser to prevent false readings due to condensation of atmospheric moisture within the condenser.

1.4 Limits and Precautions

The portion of the sample used for the test must be thoroughly representative of the total sample. If the material is liquid, stir the sample as received, warming if necessary to ensure uniformity. When there is doubt as to the uniformity of the material, run a number of samples and average the data.

The rate of boiling must be controlled to prevent the condenser from over pressurizing and breaking.

This test incorporates the use of benzene and xylene, both of which are highly flammable and toxic solvents. Therefore, this test must be performed in a fume hood and no open flames are to be permitted in the area while these solvents are in use.

A face shield and a labcoat must be worn when working with benzene or xylene.

2.0 APARATUS

2.1 A distillation unit (still) consisting of:

2.2.1 A 1000 ml round bottom distilling flask (pyrex)

2.2.2 Trap (pyrex) graduated in 0.1 ml increments (Fisher #9-145) or equivalent

2.2.3 Condenser, Liebig (or West) type (400mm long)

2.2 Heating mantle, electric (Fisher #11-425) or equivalent

2.3 500 ml and 100 ml graduated pyrex cylinders

2.4 Boiling chips (carbon type)

2.5 Glass rod

3.0 REAGENTS

3.1 Xylene, reagent grade

3.2 Benzene, reagent grade

3.3 Distillation solvent, prepared by mixing 20 ml of benzene with 80 ml xylene.

4.0 PROCEDURE

4.1 Distillation Procedure

4.1.1 Transfer 500 ml of sample, measured with an accuracy of ± 1% to the still. Measurements can be made in an ordinary graduated cylinder.

4.1.2 Rinse the material adhering to the cylinder into the still with one 50 ml, and two 25 ml portions of distillation solvent (Section 3.3). Drain the cylinder thoroughly after the sample transfer and each rinsing. When very viscous samples are being analyzed, a distillation solvent volume in excess of 100 ml may be necessary. When the sample is No. 2 Fuel Oil, 100 ml of distillation solvent should be sufficient.

4.1.3 Place about 6 or 8 carbon boiling chips in the boiling flask and assemble the still.

4.1.4 Circulate cold water through the jacket of the condenser, and apply heat (Electric Mantle - No Flame) to achieve a reflux rate of 2-5 drops/second to the trap. Continue distillation until the contents of the trap are no longer cloudy and the volume of water in the trap remains constant for about 5 minutes. If there is a persistent ring of water in the condenser tube, cut off the condenser cooling water for a few minutes. When the evolution of water is completed, allow the trap and contents to cool to room temperature and dislodge any drops of water adhering to the sides of the trap with a glass rod. Read the volume of the water in the trap to the nearest scale division unless the volume is $\leq$ 0.1 ml. If the volume is $\leq$ 0.1 ml, then read to the nearest 0.05 ml as the trap is tapered and can be read more easily.

4.2 Calculation

Report the water in the sample as percent of volume, calculated as follows:

$$\text{Percent water} = \frac{\text{vol. of water in trap}}{\text{vol. of sample}} \times 100$$

NOTE: When using 500 ml of sample, if less than 0.1 ml of water is collected, report the % water as < 0.02%.

5.0 REFERENCES

5.1 ASTM (D-95-70) Part 23, page 58, Water in Petroleum and other Bituminous Materials (1978).

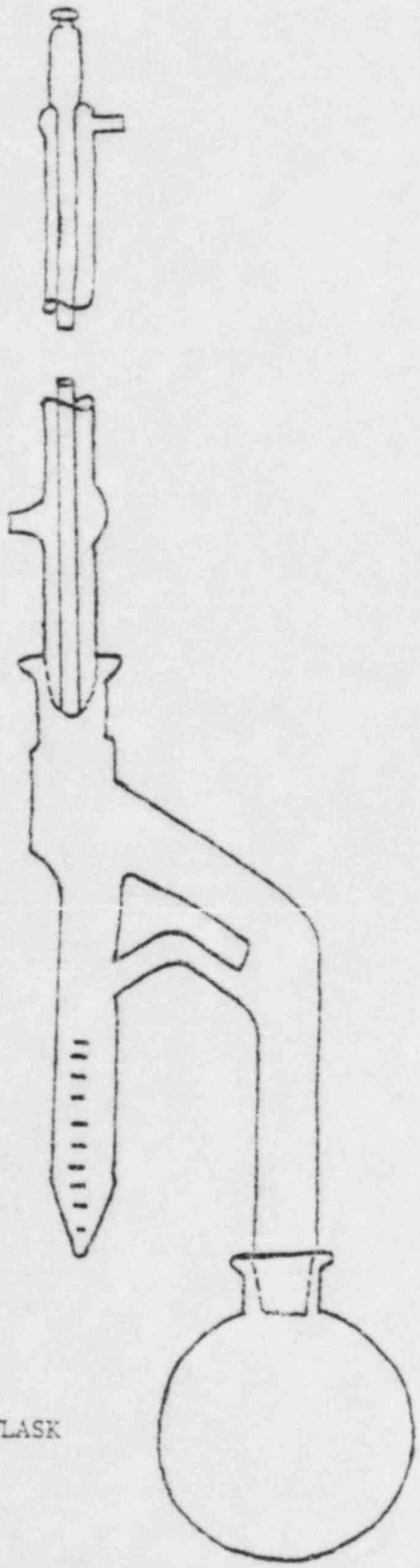
5.2 McGuire Nuclear Station Chemistry Procedure, CP/0/A/8100/38.

5.3 Steam Production Department System Power Chemistry Procedure CP/83.

6.0 ENCLOSURES

6.1 Distillation Assembly

CP/O/A/8100/23
ENCLOSURE 6.1
DISTILLATION ASSEMBLY



Form 34811 (7-81)
(Formerly SRD-1003.2)

DUKE POWER COMPANY
PROCEDURE MAJOR CHANGE
PROCESS RECORD

(1) ID No: CP/O/A/8100/24
Change No: 4
Permanent ~~Restricted To~~

(2) STATION: Catawba

(3) PROCEDURE TITLE: Chemistry Procedure for the Determination of Kinematic Viscosity of Oil

(4) SECTION(S) OF PROCEDURE AFFECTED: Enclosure 6.8

(5) DESCRIPTION OF CHANGE: (Attach additional pages, if necessary.)
Add 6.8 Kinematic Viscosity (Centistokes) to Saybolt Universal Seconds (SUS) at 100°F Range: 30 to 45
Add Enclosure 6.8 — See Attachment

(6) REASON FOR CHANGE:
Accuracy in reading Fuel Oil Sample

(7) PREPARED BY: Cintia Henson DATE: 1-4-84

(8) SAFETY EVALUATION FOR INFORMATION ONLY

This change:

Yes ___ No X Represents a change to the station or procedures as described in the FSAR, or a test or experiment not described in the FSAR?
Yes ___ No X Requires a change to the station Technical Specifications?
Yes ___ No X Involves an unreviewed safety question?

If the answer to any of the above is "Yes", attach a detailed explanation.
As appropriate attach a completed "Nuclear Safety Evaluation Check List" form.

By: Cintia Henson PREPARED Date: 1-4-84

(9) REVIEWED BY: AF Rate 7.02 DATE: 1/5/84

Cross-Disciplinary Review By: ___ (N/R) REF

(10) TEMPORARY APPROVAL (IF NECESSARY):

By: ___ (SRO) Date: ___
By: ___ Date: ___

(11) APPROVED BY: JW by DATE: 1/6/84

(12) MISCELLANEOUS:

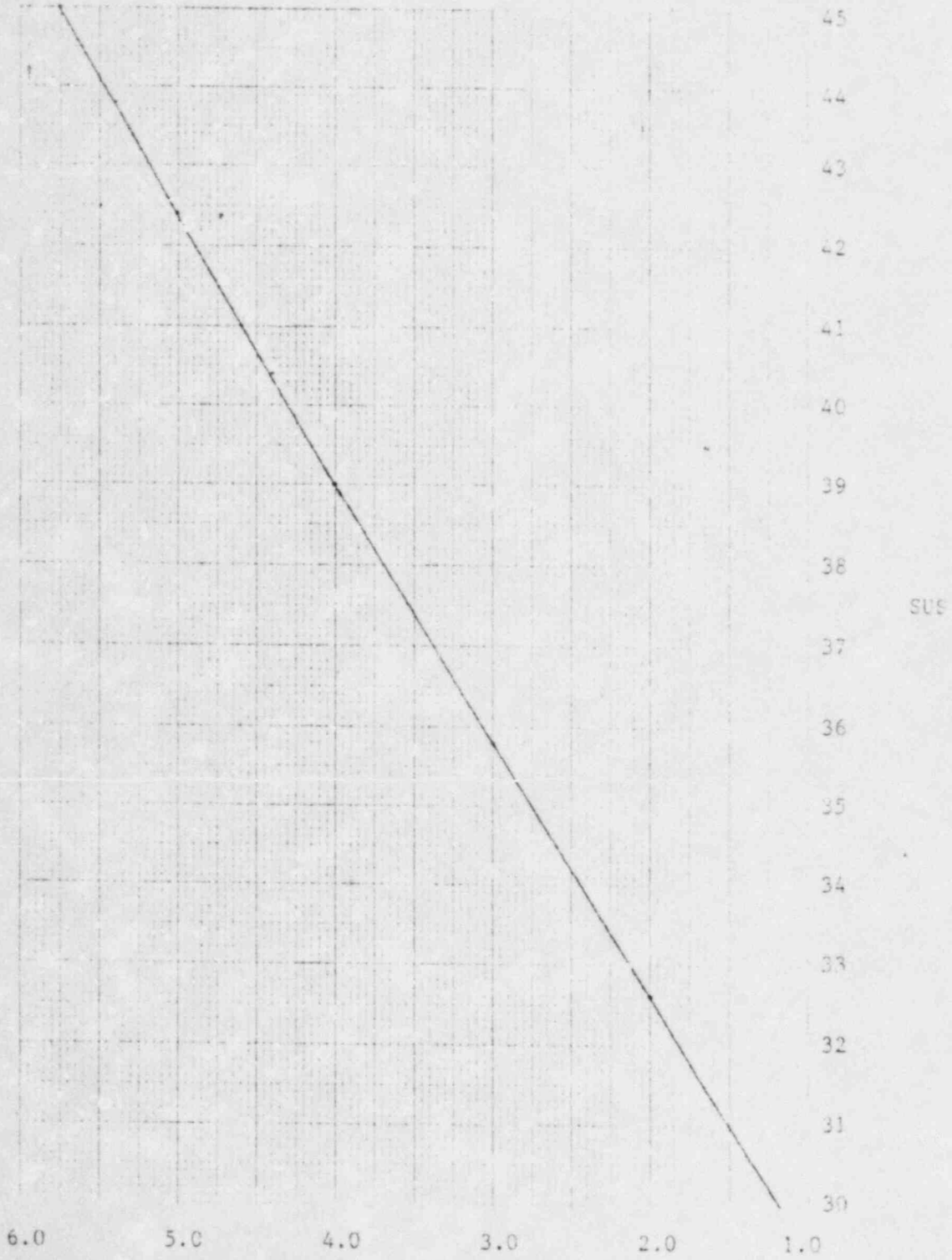
Reviewed/Approved By: ___ Date: ___
Reviewed/Approved By: ___ Date: ___

(13) Page 1 of 2

Rev 14
9/20/77

CP/O/A/8100/24
Change #4
page 292

ENCLOSURE 6.8
CP/O/A/8100/24
KINEMATIC VISCOSITY (CENTISTOKES) TO
SAYBOLT UNIVERSAL SECONDS (SUS) AT
100°F RANGE; 30-45 SUS



Form 34811 (7-81)
(Formerly SRD 1003-2)

DUKE POWER COMPANY
PROCEDURE MAJOR CHANGE
PROCESS RECORD

(1) ID No: CP/0/A/8120/24
Change No: 3
(Permanent) ~~Restricted To~~

(2) STATION: Catawba

(3) PROCEDURE TITLE: Chemistry Procedure for the Determination of Kinematic Viscosity of Oil

(4) SECTION(S) OF PROCEDURE AFFECTED: Procedure Process Record Form

(5) DESCRIPTION OF CHANGE: (Attach additional pages, if necessary.)
Change the Procedure Title to read "Chemistry Procedure for the Determination of Kinematic Viscosity of Oil".

(6) REASON FOR CHANGE:
Title correction

(7) PREPARED BY: Angela Crisp DATE: 12/5/83

(8) SAFETY EVALUATION

This change:

Yes ____ No X Represents a change to the station or procedures as described in the FSAR, or a test or experiment not described in the FSAR?
Yes ____ No X Requires a change to the station Technical Specifications?
Yes ____ No X Involves an unreviewed safety question?

If the answer to any of the above is "Yes", attach a detailed explanation. As appropriate attach a completed "Nuclear Safety Evaluation Check List" form.

By: Angela Crisp Date: 12/5/83

(9) REVIEWED BY: R.H. Chavet DATE: 12-5-83

Cross-Disciplinary Review By: _____ (N/R:) RHC

(10) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____
By: _____ Date: _____

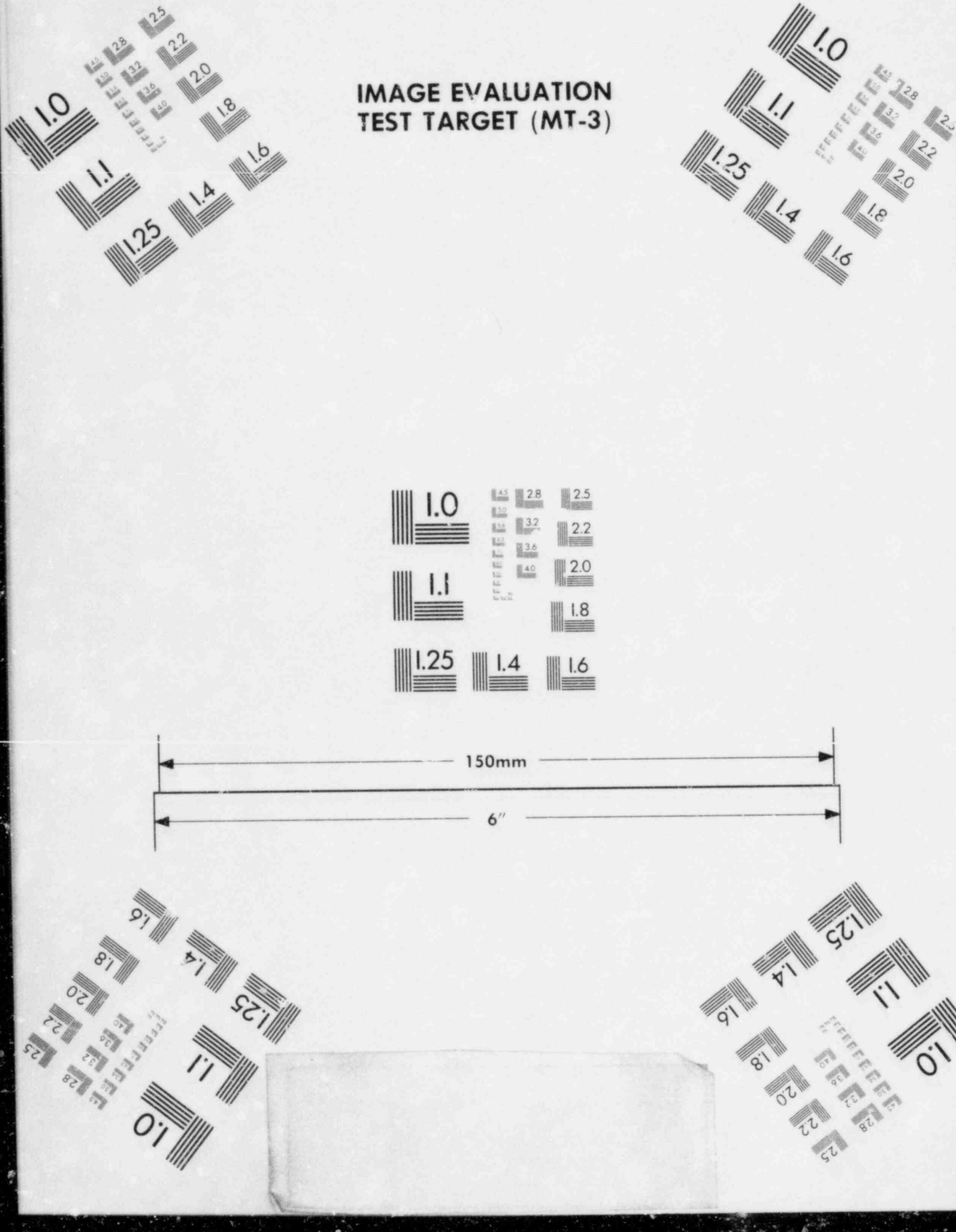
(11) APPROVED BY: [signature] DATE: 12/6/83

(12) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____
Reviewed/Approved By: _____ Date: _____

(13) Page 1 of 1

Rev 14
9/20/77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TEST TARGET (MT-3)
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1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5
5.0
5.6
6.3
7.1
150mm
6"

Form 34811 (7-81)
(Formerly SPD-1003-2)

DUKE POWER COMPANY
PROCEDURE MAJOR CHANGE
PROCESS RECORD

(1) ID No: CP/0/A/8100/24
Change No: 2
Permanent/~~Restricted To~~ _____

(2) STATION: Catawba

(3) PROCEDURE TITLE: Chemistry Procedure for the Determination of Kinematic Viscosity of Oil

(4) SECTION(S) OF PROCEDURE AFFECTED: 4.1.12

(5) DESCRIPTION OF CHANGE: (Attach additional pages, if necessary.)
Change 4.1.12 to read - Repeat sections 4.1.10 and 4.1.11; the difference of the two efflux times must be ≤ 0.35% of their mean.

(6) REASON FOR CHANGE:
To agree with statement of procedure precision in section 1.3

(7) PREPARED BY: RZ Pruitt DATE: 6/14/83

(8) SAFETY EVALUATION

This change:

Yes ____ No ✓ Represents a change to the station or procedures as described in the FSAR, or a test or experiment not described in the FSAR?
Yes ____ No ✓ Requires a change to the station Technical Specifications?
Yes ____ No ✓ Involves an unreviewed safety question?

If the answer to any of the above is "Yes", attach a detailed explanation.
As appropriate attach a completed "Nuclear Safety Evaluation Check List" form.

By: RZ Pruitt Date: 6/14/83

(9) REVIEWED BY: LD Evans RHE DATE: 6-15-83

Cross-Disciplinary Review By: _____ (N/R) TDE

(10) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____
By: _____ Date: _____

(11) APPROVED BY: M.S. Tuckman DATE: 6/15/83

(12) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____
Reviewed/Approved By: _____ Date: _____

(13) Page 1 of 1

Rev 14
9/20/77

Form 34811 (7-81)
(Formerly SPD-1003-2)

DUKE POWER COMPANY
PROCEDURE MAJOR CHANGE
PROCESS RECORD

(1) ID No: CP/0/A/8100/24
Change No: 1
Permanent/Restricted To
Permanent

(2) STATION: CATAWBA

(3) PROCEDURE TITLE: Chemistry Procedure For The Determination of Kinematic Viscosity of Petroleum Products

(4) SECTION(S) OF PROCEDURE AFFECTED: 4.1.7, 4.2.4, 4.3.1

(5) DESCRIPTION OF CHANGE: (Attach additional pages, if necessary.)

SEE ATTACHED.

(6) REASON FOR CHANGE:
CLARIFICATION OF ANALYTICAL procedure AND CALCULATION

(7) PREPARED BY: Lewis K Carr DATE: 10 May 83

(8) SAFETY EVALUATION

This change:

Yes ___ No ✓ Represents a change to the station or procedures as described in the FSAR, or a test or experiment not described in the FSAR?
Yes ___ No ✓ Requires a change to the station Technical Specifications?
Yes ___ No ✓ Involves an unreviewed safety question?

If the answer to any of the above is "Yes", attach a detailed explanation.
As appropriate attach a completed "Nuclear Safety Evaluation Check List" form.

By: RL Pointe Date: 5/16/83

(9) REVIEWED BY: HD Davis RHE DATE: 5-16-83

Cross-Disciplinary Review By: _____ (N/R): YES

(10) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____
By: _____ Date: _____

(11) APPROVED BY: M.S. Tuckman DATE: 5/20/83

(12) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____
Reviewed/Approved By: _____ Date: _____

(13) Page 1 of _____

Rev 14
9/20/77

Official Etoc 124
Change 1
Permanent
5/10/83

CTION 4.1.7 Should Read: Secure the viscometer in the holder and place it in the hot water bath until bulb B is submersed.
NOTE: The viscometer is to remain submersed during the entire Analysis.

ections 4.2.4 Should Read: Secure the viscometer in the holder and place it in the hot water bath until bulb B is submersed. Allow a minimum of 10 minutes for the viscometer to reach Temperature equilibrium at 100°F.
NOTE: The viscometer is to remain submersed during the entire ANALYSIS.

TION 4.3.1 Should Read: Calculate the Kinematic Viscosity using the following equation:

$$\text{Kinematic Viscosity (Centistokes)} = Ct$$

Where:

C = The calibration constant of the viscometer in centistokes per second.
t = The efflux time in seconds.

NOTE: Temperature must accompany viscosity data when reporting in centistokes

Form 34731 (10-81)
(Formerly SPD-1002-1)

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: CP/0/A/8100/24
Change(s) 0 to
0 Incorporated

(2) STATION: Catawba

(3) PROCEDURE TITLE: Chemistry Procedure for the Determination of Kinematic Viscosity of Petroleum Products

(4) PREPARED BY: C.C. Baker DATE: 2-3-83

(5) REVIEWED BY: R.Z. Lewis DATE: 3-22-83

Cross-Disciplinary Review By: J.W. Lee 3/22/83 N/R: SRG 83/22

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: M.S. Tuckerman Date: 3/31/83

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

MASTER FILE

Form 34834 (4-81)

SPD-1001-2

DUKE POWER COMPANY
NUCLEAR SAFETY EVALUATION CHECK LIST

(1) STATION: Catawba UNIT: 1 X 2 X 3 _____
OTHER: _____

(2) CHECK LIST APPLICABLE TO: CP/0/A/8100/24

(3) SAFETY EVALUATION - PART A

The item to which this evaluation is applicable represents:

Yes ____ No ✓ A change to the station or procedures as described in the FSAR; or a test or experiment not described in the FSAR?

If the answer to the above is "Yes", attach a detailed description of the item being evaluated and an identification of the affected section(s) of the FSAR.

(4) SAFETY EVALUATION - PART B

Yes ____ No ✓ Will this item require a change to the station Technical Specifications?

If the answer to the above is "Yes," identify the specification(s) affected and/or attach the applicable pages(s) with the change(s) indicated.

(5) SAFETY EVALUATION - PART C

As a result of the item to which this evaluation is applicable:

Yes ____ No ✓ Will the probability of an accident previously evaluated in the FSAR be increased?

Yes ____ No ✓ Will the consequences of an accident previously evaluated in the FSAR be increased?

Yes ____ No ✓ May the possibility of an accident which is different than any already evaluated in the FSAR be created?

Yes ____ No ✓ Will the probability of a malfunction of equipment important to safety previously evaluated in the FSAR be increased?

Yes ____ No ✓ Will the consequences of a malfunction of equipment important to safety previously evaluated in the FSAR be increased?

Yes ____ No ✓ May the possibility of malfunction of equipment important to safety different than any already evaluated in the FSAR be created?

Yes ____ No ✓ Will the margin of safety as defined in the bases to any Technical Specification be reduced?

If the answer to any of the preceding is "Yes", an unreviewed safety question is involved. Justify the conclusion that an unreviewed safety question is or is not involved. Attach additional pages as necessary.

(6) PREPARED BY: C W Rabon DATE: 3-3-83

(7) REVIEWED BY: R L Rainey DATE: 3-22-83

(8) Page 1 of 1

Form 18855 (3-80)

DUKE POWER COMPANY

ALARA EVALUATION CHECKLIST

(1) Station Catawba Unit: 1 X 2 X 3

Other:

(2) Checklist Applicable to: CP/O/A/8100/24

(3) ALARA Evaluation

Check those items below which were considered applicable during the preparation and review of this document.

_____ Flushing and draining were used to minimize source - strength and contamination levels prior to performing an operation.

_____ Permanent and/or movable shielding was specified for reduction of levels.

_____ Use of permanent or temporary local exhaust ventilation systems was used for control of airborne contamination.

_____ Operation was designed to be completed with the least practicable time spent in the radiation field.

_____ Appropriate tools and equipment were specified for the operation to be performed.

_____ The operation was designed considering the minimum number of people necessary for safe job completion.

_____ Remote handling equipment and other special tools were specified to reduce external dose.

_____ Contamination - control techniques were specified.

_____ The operation was designed to be conducted in areas of as low an exposure as practicable.

_____ Additional ALARA considerations were:

_____

_____

_____

__/__ ALARA Principles were not considered since the procedure did not involve work in a radiation area.

(5) Prepared by: _____ Date 8-3-83

(6) Reviewed by: _____ Date 8-22-83

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
CHEMISTRY PROCEDURE FOR THE DETERMINATION OF KINEMATIC VISCOSITY OF OIL

1.0 DISCUSSION

1.1 Scope

This method describes the determination of kinematic viscosity of transparent or opaque oils in the range of 30 to 1000 Saybolt Universal Seconds.

1.2 Principle

Viscosity is defined as the internal resistance to flow exhibited by a fluid. A liquid has a viscosity of one "poise" if a force of one dyne (See note below) per square centimeter causes two parallel liquid surfaces one square centimeter in area, and one centimeter apart to move past one another at a velocity of one centimeter per second. One poise equals 100 centipoises. Viscosity in centipoises divided by the liquid's density at the same temperature gives kinematic viscosity in centistokes (CS). 100 centistokes equal 1 stoke.

To determine the kinematic viscosity, the time is measured for a fixed volume of liquid (oil) to flow through the orifice of a calibrated viscometer under an accurately reproducible head, and at a closely controlled temperature. The kinematic viscosity is then calculated from the efflux time and the viscometer calibration factor. The kinematic viscosity in centistokes, is then converted to Saybolt Universal Seconds (SUS) and reported as SUS at 100°F.

NOTE: Dyne - The force necessary to give acceleration of one centimeter per second to one gram of mass.

1.3 Precision and Interferences

Accuracy is not defined for this procedure.

Duplicate results should be considered suspect if their difference is greater than 0.35% of their mean.

Samples with high particulate matter must be filtered through a 200 mesh screen to prevent clogging of the viscometer orifice.

The viscometer must be flushed with sample to coat the inside of the tubes, so the sample will flow smoothly (transparent oils only).

Air bubbles must be kept from entering the viscometer or the final volume will be in error.

The viscometer must be clean and dry to obtain good results.

1.4 Limits and Precautions

A specified temperature of 100° ± 0.1°F will be used for all samples. Thermometers must be ASTM approved with graduations to 0.1°F.

The viscometer must be used in a vertical position.

The timing device used to record efflux time must be graduated in divisions of at least 0.2 seconds.

The efflux time must be greater than 200 seconds for viscometer sizes (ASTM) greater than 150.

Reporting of kinematic viscosity in centistokes must be accompanied by the specified temperature or interpretation of the data will be invalid.

2.0 APPARATUS

2.1 Cannon - Fenske Viscometers with known calibration constant for transparent liquids. ASTM sizes 50, 100, 150, 200 and 300, Enclosure 6.1, Figure A

2.2 Cannon - Fenske Viscometers with known calibration constant for dark or opaque liquids. ASTM sizes 150, 200 and 300, Enclosure 6.2, Figure A

2.3 ASTM Thermometer

2.4 Constant temperature heating unit

2.5 Heavy duty Pyrex glass jar with a capacity of 3 gallons

2.6 Miscellaneous tubing and clamps

2.7 Stop watch (with subdivisions of 0.2 seconds or better)

3.0 REAGENTS

3.1 Petroleum Ether, Reagent Grade

3.2 Acetone, Reagent Grade

4.0 PROCEDURE

4.1 Determination of Viscosity of Transparent Liquid

4.1.1 Turn on the hot water bath and set at required temperature of 100° ± 0.1°F.

4.1.2 Filter samples as required.

4.1.3 Sample volume required will depend on the viscometer used.

4.1.4 Measure the sample into the inverted viscometer as shown in Enclosure 6.1 (Figure B).

4.1.5 Apply suction to tube K, which causes the sample to rise through bulbs B and D to the etched line E on the viscometer.

4.1.6 Turn the viscometer back to its normal vertical position, as shown in Enclosure 6.1 (Figure A) and wipe tube A clean.

NOTE: The oil will now flow by gravity, through tube F into bulb G, coating the inner surfaces of the viscometer.

4.1.7 Secure the viscometer in the holder and place it in the hot water bath.

4.1.8 Allow a minimum of 10 minutes to reach temperature equilibrium.

4.1.9 Check veritical alignment of the viscometer.*

*NOTE: The large tube of the viscometer must be veritical.

4.1.10 Apply suction to tube A and bring sample into bulb D a short distance above etched line C.

4.1.11 Measure the efflux time for the meniscus to pass from etched line C to etched line E.

4.1.12 Repeat Sections 4.1.10 and 4.1.11; the two efflux times must agree within ± 0.2%.

4.1.13 Calculate the viscosity as described in Section 4.3, using the average of the two efflux times.

4.1.14 Viscometer must be thoroughly cleaned after each use with petroleum ether followed by acetone. It must then be either air dried or dried with filtered air until the last trace of solvent is removed. If organic deposits build up on the surface of the viscometer, periodic cleaning with chromic acid may be required.

4.2 Procedure for Kinematic Viscosity for Opaque Liquids

4.2.1 Invert the clean viscometer, as shown in Enclosure 6.2, (Figure B) with tube A in the prepared sample.

4.2.2 Apply suction to tube K and draw the sample into bulb B up to line G.

4.2.3 Turn the viscometer back to its normal vertical position as shown in Enclosure 6.2 (Figure A) and wipe tube A clean rapidly.

When the sample travels through tube I and fills bulb B approximately half full, place a 5 to 6 cm length of rubber tubing on tube A and seal with a pinch clamp. This stops the flow of liquid.

NOTE: The viscometer cannot be coated with the oil sample for opaque liquids between lines F and J.

4.2.4 Secure the viscometer in the holder and place it in the constant temperature bath. Allow a minimum of 10 minutes for the viscometer to reach temperature equilibrium at 100°F.

4.2.5 Check the vertical alignment of the viscometer. (See note on page 3.)

4.2.6 Open the pinch clamp and measure the efflux time from etched line F to etched line H, and from etched line H to etched line J; this allows a check on both bulbs without recharging the viscometer.

NOTE: The flow times for bulbs C and D must agree within ± 0.35%.

4.2.7 Calculate the viscosity as described in Section 4.3 using the average of the two efflux times.

4.2.8 Viscometers for opaque liquids will be cleaned as prescribed in Section 4.1.14.

4.3 Calculations

4.3.1 Calculate the Kinematic Viscosity using the following equation:

Kinematic Viscosity, CS = Ct

where: C = the calibration constant of the viscometer in centistokes per second

t = the efflux time in seconds

NOTE: Temperature must accompany viscosity data when reporting in centistokes.

4.3.2 Convert the viscosity in centistokes to Saybolt Universal Seconds (SUS) using Enclosures 6.3 - 6.7 and report as SUS at 100°F.

5.0 REFERENCES

5.1 ASTM (D-445-74) Part 23; 1978. Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculations of Dynamic Viscosity).

5.2 Chemistry Procedure for the Determination of Kinematic Viscosity of Petroleum Products, McGuire Nuclear Station

5.3 Steam Production Department System Power Chemistry Procedure CP/80

6.0 ENCLOSURES

6.1 Cannon-Fenske Viscometer for Transparent Liquids

6.2 Cannon-Fenske Viscometer for Opaque Liquids

6.3 Kinematic Viscosity (Centistokes) to Saybolt Universal Seconds (SUS) at 100°F.

Range: 20-200 SUS

6.4 Kinematic Viscosity (Centistokes) to Saybolt Universal Seconds (SUS) at 100°F.

Range: 200-400 SUS

6.5 Kinematic Viscosity (Centistokes) to Saybolt Universal Seconds (SUS) at 100°F.

Range: 400-600 SUS

6.6 Kinematic Viscosity (Centistokes) to Saybolt Universal Seconds (SUS) at 100°F.

Range: 600-800 SUS

6.7 Kinematic Viscosity (Centistokes) to Saybolt Universal Seconds (SUS) at 100°F.

Range: 800-1000 SUS

ENCLOSURE 6.1
CP/O/A/0100/24

Cannon-Fenske Viscometer for
Transparent Liquids

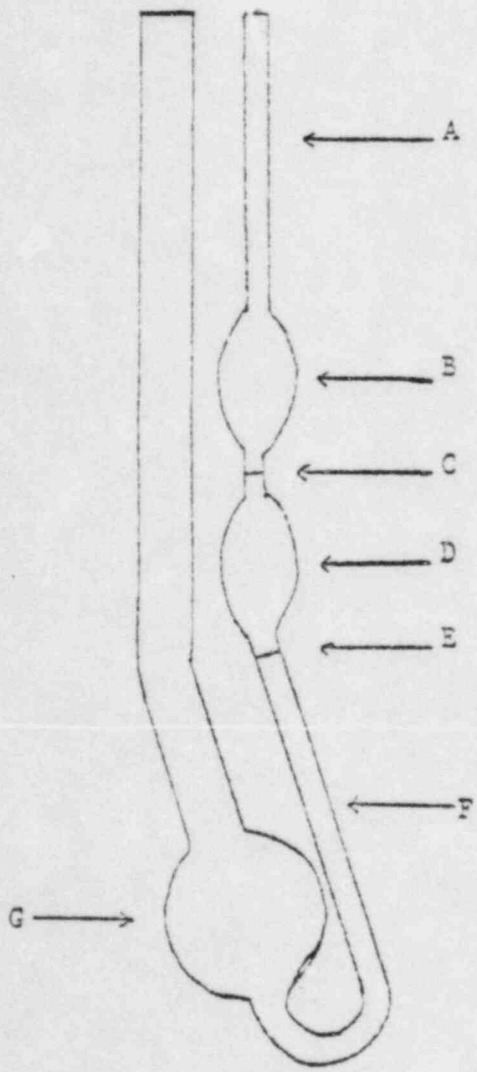


Figure A, Viscometer in
Vertical Position

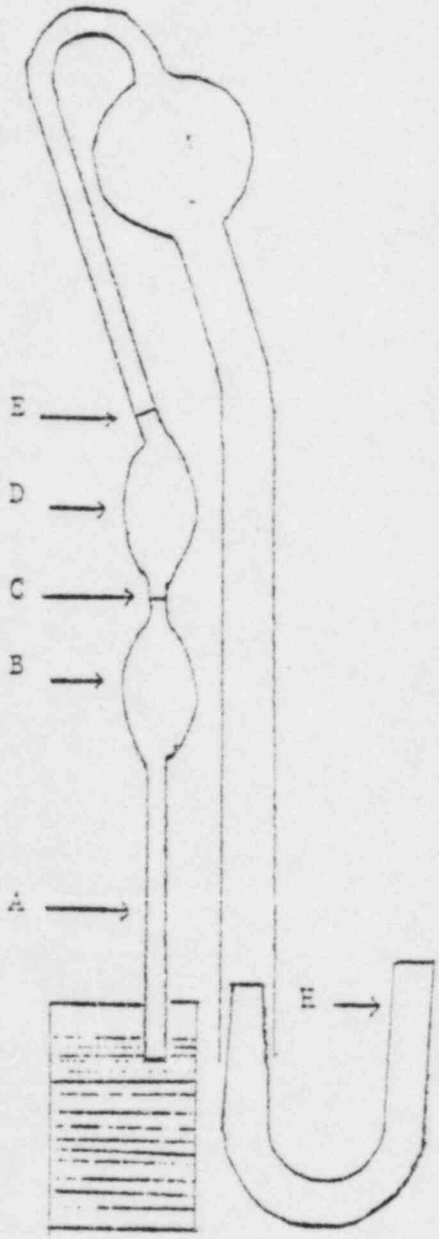


Figure B, Position for
Sample Induction

ENCLOSURE 6.2
CP/O/A/8100/ 24
Cannon-Fenske Viscometer for
Opaque Liquids

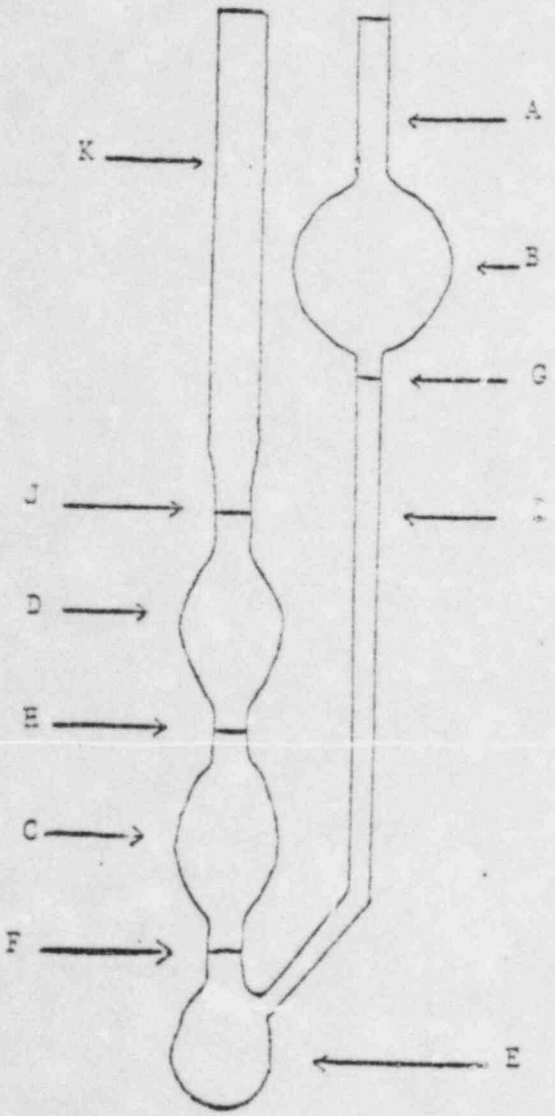


Figure A, Viscometer in
Vertical Position

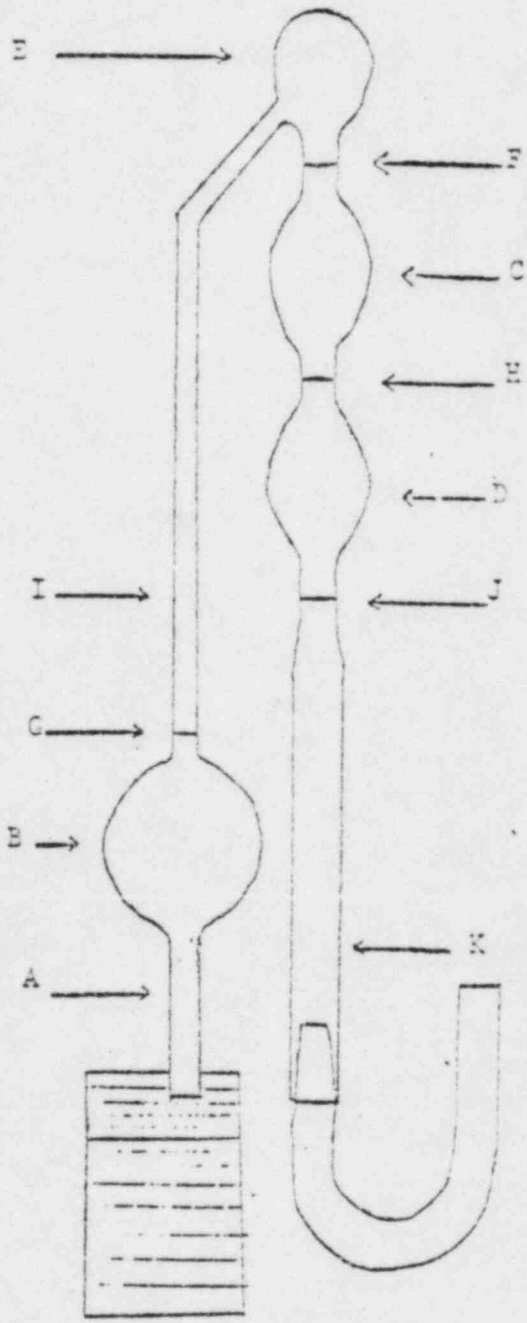
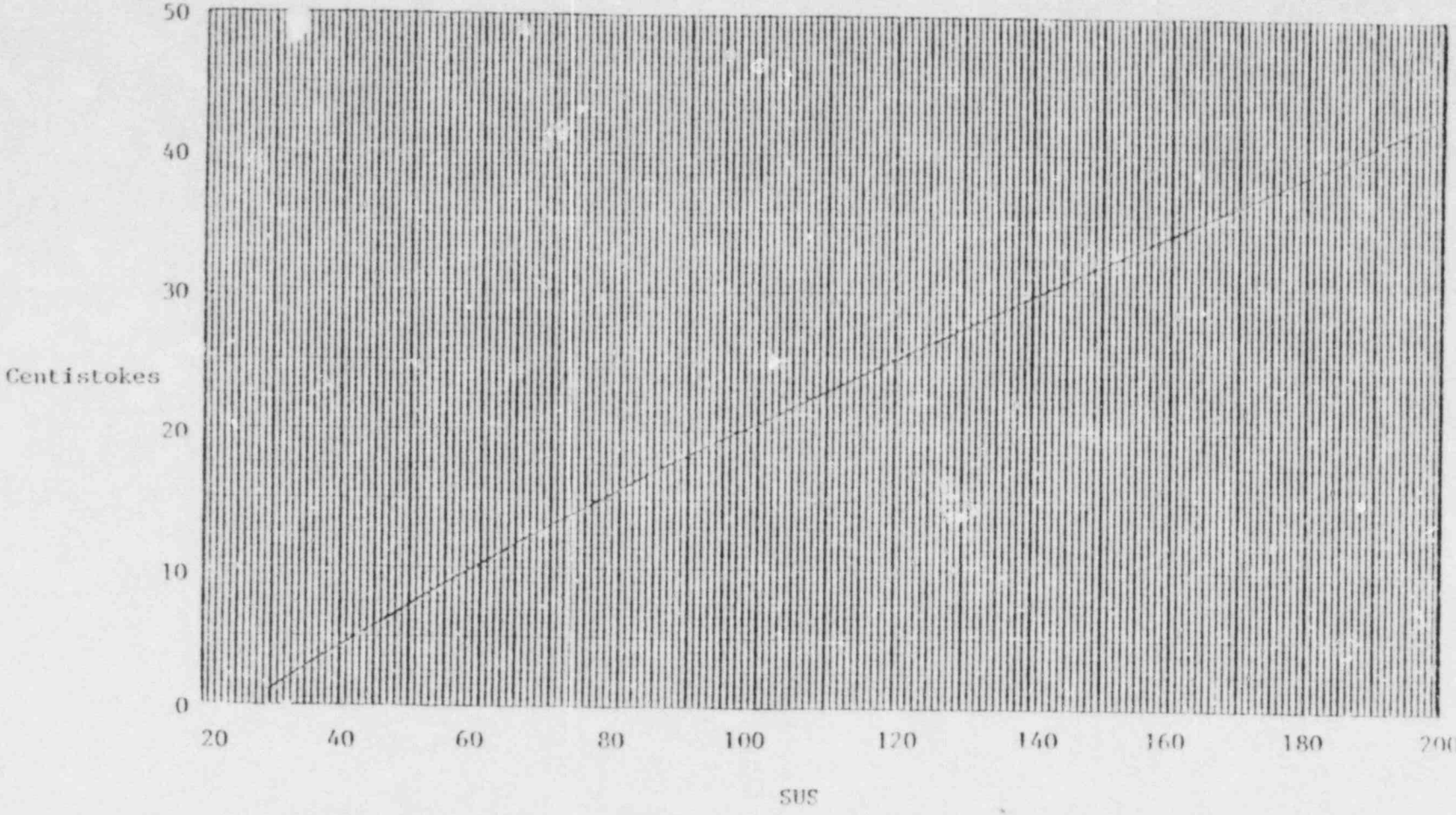


Figure B, Position for
Sample Induction



ENCLOSURE 6.3
CP/O/A/8100/224
KINEMATIC VISCOSITY (CENTISTOKES) TO
SAYBOLT UNIVERSAL SECONDS (SUS) AT
100°F PARTS 20-200 SUS

ENCLOSURE 6.4
CP/O/A/8100/24

KIN. ATIC VISCOSITY (CENTISTOKES)
SAYBOLT UNIVERSAL SECONDS (SUS) AT
100°F RANGE: 200-400 SUS

ENCLOSURE 6.5
CP/O/A/8100/24

KINEMATIC VISCOSITY (CENTISTOKES) TO
SAYBOLT UNIVERSAL SECONDS (SUS) AT
100°F RANGE: 400-600 SUS

ENCLOSURE 6.6
CP/O/A/8100/24

KINEMATIC VISCOSITY (CENTISTOKES) TO
SAYBOLT UNIVERSAL SECONDS (SUS) AT
100°F RANGE: 600-800 SUS

ENCLOSURE 6.7
CT/O/A/8100/24

KINEMATIC VISCOSITY (CENTISTOKES) TO
SAYBOLT UNIVERSAL SECONDS (SUS) AT
100° F RANGE; 800-1000 SUS

Form 34731 (10-81)
(Formerly SPD-1002-1)

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: CP/0/A/8100/26
Change(s) 0 to
0 Incorporated

(2) STATION: Catawba

(3) PROCEDURE TITLE: Chemistry Procedure for the Determination of Water and Sediment in Oil

(4) PREPARED BY: C. Curtis DATE: 2-1-83

(5) REVIEWED BY: R L Pointer DATE: 2-22-83

Cross-Disciplinary Review By: [illegible] 2/22/83 N/R: IRC 83 17

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: M. S. Tuckman Date: 2/27/83

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

FOR INFORMATION ONLY

MASTER FILE

Form 34634 (4-81)

SPD-1001-2

DUKE POWER COMPANY
NUCLEAR SAFETY EVALUATION CHECK LIST

(1) STATION: Catawba UNIT: 1 X 2 X 3 _____
OTHER: _____

(2) CHECK LIST APPLICABLE TO: CP/O/A/8100/26

(3) SAFETY EVALUATION - PART A

The item to which this evaluation is applicable represents:

Yes ____ No ✓ A change to the station or procedures as described in the FSAR; or a test or experiment not described in the FSAR?

If the answer to the above is "Yes", attach a detailed description of the item being evaluated and an identification of the affected section(s) of the FSAR.

(4) SAFETY EVALUATION - PART B

Yes ____ No ✓ Will this item require a change to the station Technical Specifications?

If the answer to the above is "Yes," identify the specification(s) affected and/or attach the applicable pages(s) with the change(s) indicated.

(5) SAFETY EVALUATION - PART C

As a result of the item to which this evaluation is applicable:

Yes ____ No ✓ Will the probability of an accident previously evaluated in the FSAR be increased?

Yes ____ No ✓ Will the consequences of an accident previously evaluated in the FSAR be increased?

Yes ____ No ✓ May the possibility of an accident which is different than any already evaluated in the FSAR be created?

Yes ____ No ✓ Will the probability of a malfunction of equipment important to safety previously evaluated in the FSAR be increased?

Yes ____ No ✓ Will the consequences of a malfunction of equipment important to safety previously evaluated in the FSAR be increased?

Yes ____ No ✓ May the possibility of malfunction of equipment important to safety different than any already evaluated in the FSAR be created?

Yes ____ No ✓ Will the margin of safety as defined in the bases to any Technical Specification be reduced?

If the answer to any of the preceding is "Yes", an unreviewed safety question is involved. Justify the conclusion that an unreviewed safety question is or is not involved. Attach additional pages as necessary.

(6) PREPARED BY: C W Robinson DATE: 2-1-83

(7) REVIEWED BY: RF Foster DATE: 2.22.83

(8) Page 1 of 1

Form 18855 (3-80)

DUKE POWER COMPANY

ALARA EVALUATION CHECKLIST

(1) Station Catawba Unit: 1 X 2 X 3

Other:

(2) Checklist Applicable to: CP/O/A/8100/26

(3) ALARA Evaluation

Check those items below which were considered applicable during the preparation and review of this document.

_____ Flushing and draining were used to minimize source - strength and contamination levels prior to performing an operation.

_____ Permanent and/or movable shielding was specified for reduction of levels.

_____ Use of permanent or temporary local exhaust ventilation systems was used for control of airborne contamination.

_____ Operation was designed to be completed with the least practicable time spent in the radiation field.

_____ Appropriate tools and equipment were specified for the operation to be performed.

_____ The operation was designed considering the minimum number of people necessary for safe job completion.

_____ Remote handling equipment and other special tools were specified to reduce external dose.

_____ Contamination - control techniques were specified.

_____ The operation was designed to be conducted in areas of as low an exposure as practicable.

_____ Additional ALARA considerations were:

_____

_____

_____

✓ ALARA Principles were not considered since the procedure did not involve work in a radiation area.

(5) Prepared by: C W Balis Date 2-1-83

(6) Reviewed by: R V Poole Date 2-22-83

CF/O/A/8100/26

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
CHEMISTRY PROCEDURE FOR THE DETERMINATION
OF WATER AND SEDIMENT IN OIL

1.0 DISCUSSION

1.1 Scope

This procedure describes the centrifuge method for the determination of combined water and sediment in oil.

1.2 Principle

The centrifuge method for the determination of water and sediment in oil is a separation analysis by which water and sediment are separated from the oil and quantified. Sufficient relative centrifugal force is attained in the centrifuge to separate both water and suspended sediment from the oil. A graduated, conical tip centrifuge tube is used to enhance detectability. The addition of a solvent, (water saturated toluene) to a representative sample helps decrease the solubility of water in oil and serves to reduce the sample viscosity, allowing both water and sediment to separate rapidly. Heating this mixture to 120°F (49°C) helps to reduce the viscosity of the sample mixture enhancing the separation process.

1.3 Precision and Interference

Accuracy is not defined for this procedure. The precision of this method is given in ASTM Method D 1796-68 (See Enclosure 6.1).

1.4 Limits and Precautions

When handling toluene, a labcoat, gloves, and eye protection are to be worn.

The vapor pressure of toluene at 140°F is approximately double that at 100°F; therefore, extreme caution should be observed when shaking the heated oil-solvent mixture.

2.0 APPARATUS

2.1 Centrifuge, with a head capacity for two or more filled centrifuge tubes and velocity to achieve a relative centrifugal force (rcf) of between 500 and 800 at the tip of the tubes

2.2 2 or more 8-inch, cone shaped centrifuge tubes (Fisher #5-605 or equivalent) with rubber stoppers and cushions

2.3 Thermometer with a range to 100°C

2.4 1000 ml pyrex beaker

2.5 Water bath

2.6 Phase-separation paper

3.0 REAGENTS

3.1 Toluene, saturated with water

Add 2.0 ± 0.1 ml demineralized water to 1000 ± 50 ml Toluene in a 1 liter glass bottle. Insert a magnetic stir-bar and stir 4 hours. Filter through phase-separation paper into a clean, dry glass bottle.

4.0 PROCEDURE

4.1 Sample preparation

NOTE: All samples shall be run in duplicates.

4.1.1 Fill each centrifuge tube to the 50-ml mark with solvent; then immediately pour the well-shaken sample directly from the sample container into the centrifuge tubes until the total volume in each tube is 100 ml. Read the top of the meniscus at both the 50 and 100 ml marks.

4.1.2 Stopper the tubes tightly and shake vigorously until the contents are thoroughly mixed.

4.1.3 Immerse the tubes to the 100-ml mark for 10 minutes in a water bath maintained at 120° ± 2°F (49 ± 1°C).

4.1.4 Invert the tubes to assure that the oil and the solvent are uniformly mixed and shake cautiously.

4.1.5 Place the tubes in trunnion cups containing centrifuge cushions on opposite sides of the centrifuge head to establish a balanced condition, and spin 10 minutes (begin timing after centrifuge has come up to speed = 30 seconds) at a rate of approximately 1500 rpm; this will be a dial setting of 90.

4.1.6 Read and record the combined volume of water and sediment at the bottom of each set of tubes to the nearest 0.05 ml from 0.1 to 1.0 ml graduations. Below 0.1 ml, estimate to the nearest 0.025 ml (Enclosure 6.2).

4.1.7 Return the tubes without aggitation to the centrifuge and spin for 10 minutes at the same rate. Repeat this operation until the combined volume of water and sediment remains constant for two consecutive readings.

4.2 Calculations

4.2.1 Record the final volume of water and sediment in each of the duplicate sample tubes and report the sum of these two readings as the percentage of water and sediment. Report results lower than 0.05% either as zero or 0.05%, whichever is closer.

5.0 REFERENCES

5.1 American Society for Testing and Materials. 1978. Annual Book of ASTM Standards. Part 24. Designation D 1796-68.

5.2 Operating Instructions, Precision Scientific Company. Issue CS-67310-AJ-11.

5.3 Chemistry Procedure for The Determination Of Water And Sediment In Crude Oils And Fuel Oils, McGuire Nuclear Station.

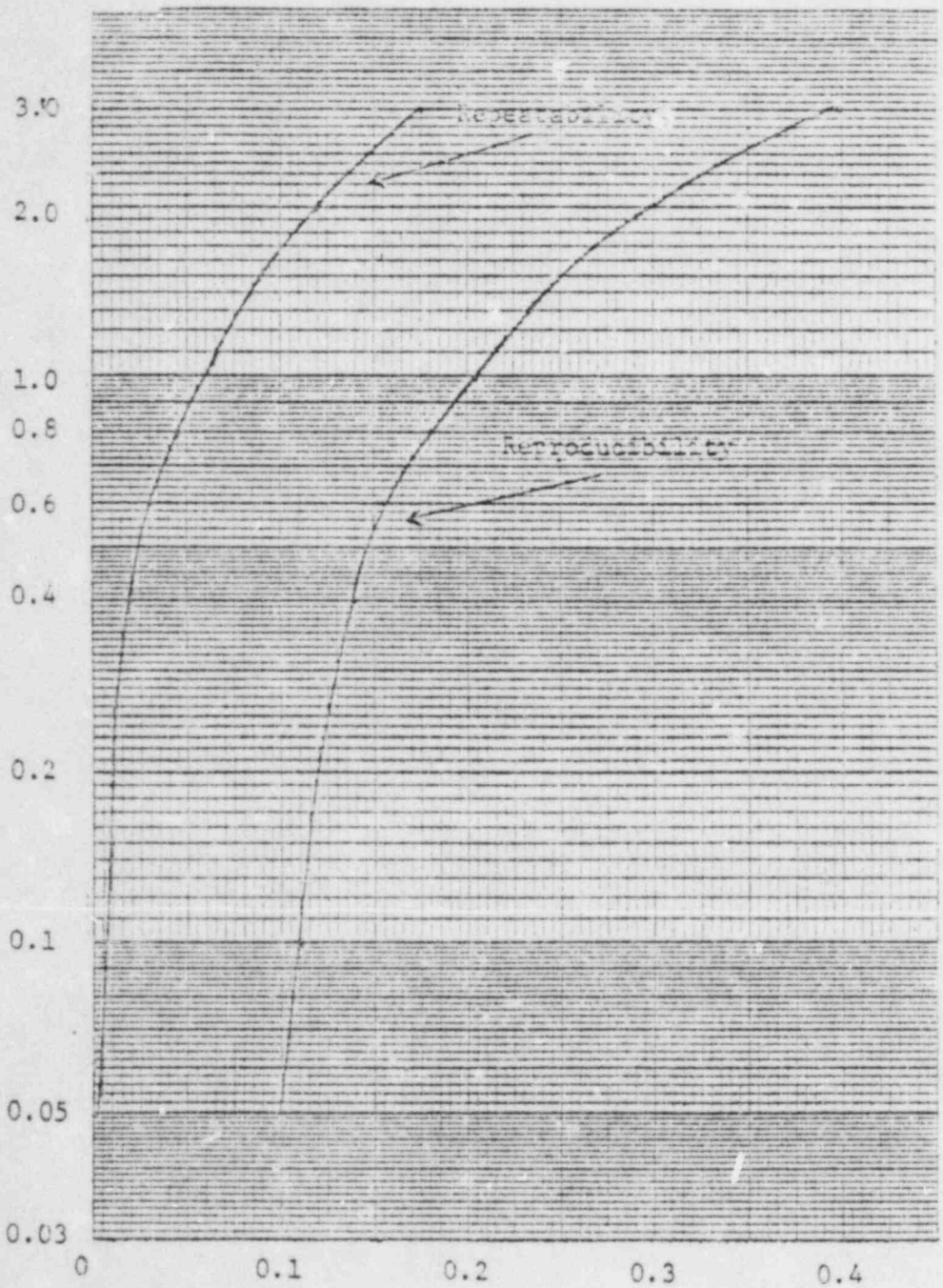
6.0 ENCLOSURES

6.1 Precision Curves for Centrifuge Tube Methods

6.2 Method of Reading the Tip of a Centrifuge Tube

ENCLOSURE 6.1
CP/O/A/8100/26

Precision Curves for Centrifuge Tube Methods



Percentage of Water and Sediment

Precision, 95 percent Confidence Limit

This graph is redrawn from Reference 5.1

ENCLOSURE 6.1
CP/O/A/8100/26

The following criteria should be used for judging the acceptability of results (95% probability).

REPEATABILITY

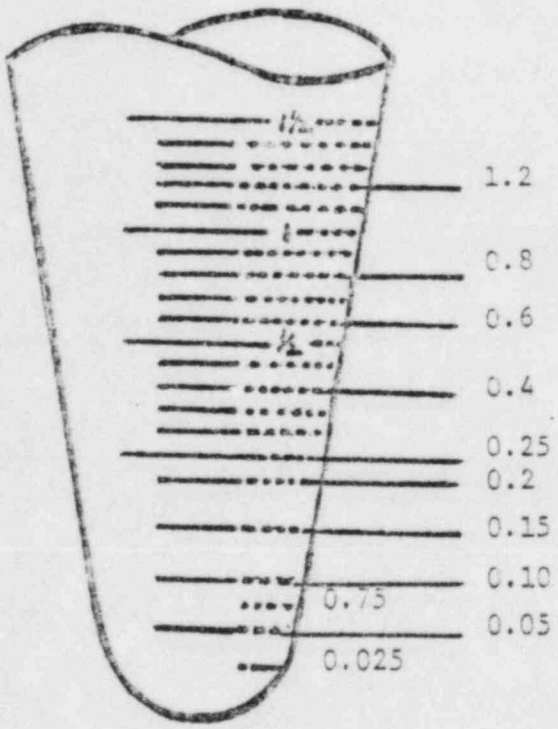
Duplicate results by the same technician should be considered suspect if they differ by more than the value shown on the repeatability curve.

REPRODUCIBILITY

The results submitted by each of two laboratories should be considered suspect if they differ by more than the values shown on the reproducibility curve.

ENCLOSURE 6.2
CP/0/8100/26

Method of Reading the Tip of a Centrifuge Tube



FOR INFORMATION ONLY

Should have change
2 (not 1, as shown)
new change being
issued to correct
sequence.

1 13.84 288

Form 34811 (7-81)
(Formerly SPD-1003-2)

DUKE POWER COMPANY
PROCEDURE MAJOR CHANGE
PROCESS RECORD

(1) ID No: CP/0/B/1600/
Change No: 1
Permanent/~~Restricted To~~

(2) STATION: Catawba

(3) PROCEDURE TITLE: Chemistry Procedure for the Recording and Management of Data

(4) SECTION(S) OF PROCEDURE AFFECTED: 4.2

(5) DESCRIPTION OF CHANGE: (Attach additional pages, if necessary.)
Add another paragraph - "Prior to fuel load for the respective unit, the responsible Chemistry Supervisor may ~~also~~ RW authorize a deviation from the normal frequency/specification in order to accomodate changing conditions.

(6) REASON FOR CHANGE:
Specs/frequencies don't always apply during startup

(7) PREPARED BY: R C Carter DATE: 12/30/87

(8) SAFETY EVALUATION

This change:

FOR INFORMATION ONLY

Yes ____ No ✓ Represents a change to the station or procedures as described in the FSAR, or a test or experiment not described in the FSAR?
Yes ____ No ✓ Requires a change to the station Technical Specifications?
Yes ____ No ✓ Involves an unreviewed safety question?

If the answer to any of the above is "Yes", attach a detailed explanation.
As appropriate attach a completed "Nuclear Safety Evaluation Check List" form.

By: R C Carter Date: 12/30/87

(9) REVIEWED BY: KD Davis DATE: 12-29-87

Cross-Disciplinary Review By: _____ (N/R) DATE: _____

(10) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____
By: _____ Date: _____

(11) APPROVED BY: J. W. Hampton DATE: 12/29/87

(12) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____
Reviewed/Approved By: _____ Date: _____

(13) Page 1 of 1

Rev 14
9/20/77

Form 3473-1 (10-81)
(Formerly SPD-1002-1)

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: CP/0/B/8800/05
Change(s) C to
2 Incorporated

(2) STATION: Catawba

(3) PROCEDURE TITLE: Chemistry Procedure for the Recording and Management of Data

(4) PREPARED BY: [signature] DATE: 11/1/83

(5) REVIEWED BY: [signature] DATE: 11-1-83

Cross-Disciplinary Review By: N/R [signature]

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: M.S. Tuckman Date: 11/7/83

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

MASTER FILE

Form 34634 (4-81) SPD-1001.2

DUKE POWER COMPANY
NUCLEAR SAFETY EVALUATION CHECK LIST

(1) STATION: Catawba UNIT: 1 ____ 2 ____ 3 ____
OTHER: Shared

(2) CHECK LIST APPLICABLE TO: CP/O/A/8800/05

(3) SAFETY EVALUATION - PART A

The item to which this evaluation is applicable represents:

Yes ____ No ✓ A change to the station or procedures as described in the FSAR or a test or experiment not described in the FSAR?

If the answer to the above is "Yes", attach a detailed description of the item being evaluated and an identification of the affected section(s) of the FSAR.

(4) SAFETY EVALUATION - PART B

Yes ____ No ✓ Will this item require a change to the station Technical Specifications?

If the answer to the above is "Yes," identify the specification(s) affected and/or attach the applicable pages(s) with the change(s) indicated.

(5) SAFETY EVALUATION - PART C

As a result of the item to which this evaluation is applicable:

Yes ____ No ✓ Will the probability of an accident previously evaluated in the FSAR be increased?

Yes ____ No ✓ Will the consequences of an accident previously evaluated in the FSAR be increased?

Yes ____ No ✓ May the possibility of an accident which is different than any already evaluated in the FSAR be created?

Yes ____ No ✓ Will the probability of a malfunction of equipment important to safety previously evaluated in the FSAR be increased?

Yes ____ No ✓ Will the consequences of a malfunction of equipment important to safety previously evaluated in the FSAR be increased?

Yes ____ No ✓ May the possibility of malfunction of equipment important to safety different than any already evaluated in the FSAR be created?

Yes ____ No ✓ Will the margin of safety as defined in the bases to any Technical Specification be reduced?

If the answer to any of the preceding is "Yes", an unreviewed safety question is involved. Justify the conclusion that an unreviewed safety question is or is not involved. Attach additional pages as necessary.

(6) PREPARED BY: [signature] DATE: 11/83

(7) REVIEWED BY: H B Barron DATE: 11-1-83

(8) Page 1 of 1

Form 18855 (3-80)

DUKE POWER COMPANY

ALARA EVALUATION CHECKLIST

(1) Station Catawba Unit: 1____ 2____ 3____

Other: Shared

(2) Checklist Applicable to: CP/O/B/8800/05

(3) ALARA Evaluation

Check those items below which were considered applicable during the preparation and review of this document.

_____ Flushing and draining were used to minimize source - strength and contamination levels prior to performing an operation.

_____ Permanent and/or movable shielding was specified for reduction of levels.

_____ Use of permanent or temporary local exhaust ventilation systems was used for control of airborne contamination.

_____ Operation was designed to be completed with the least practicable time spent in the radiation field.

_____ Appropriate tools and equipment were specified for the operation to be performed.

_____ The operation was designed considering the minimum number of people necessary for safe job completion.

_____ Remote handling equipment and other special tools were specified to reduce external dose.

_____ Contamination - control techniques were specified.

_____ The operation was designed to be conducted in areas of as low an exposure as practicable.

_____ Additional ALARA considerations were:

_____

_____

_____

__✓__ ALARA Principles were not considered since the procedure did not involve work in a radiation area.

(5) Prepared by: R. L. Gambrell Date 11/1/83

(6) Reviewed by: M D Evans Date 11-8-83

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
CHEMISTRY PROCEDURE FOR THE
RECORDING AND MANAGEMENT OF DATA

1.0 DISCUSSION

The purpose of this procedure is to outline steps taken by the Chemistry section in sampling, recording of analytical results, and transmittance of data to various members of the Catawba Nuclear Station organization during normal operation.

2.0 APPARATUS

Not applicable

3.0 REAGENTS

Not applicable

4.0 PROCEDURE

4.1 Routine Sampling Schedule

The Power Chemistry and Radwaste Chemistry units of the Chemistry section will collect, analyze, and record samples according to their jurisdictional responsibilities. Enclosures 6.1 through 6.9 describe the sampling schedules for Power Chemistry and Radwaste Chemistry. Frequency of sampling is determined by system operation, as well as State, Federal, and Company requirements.

4.2 Normal Operating Sampling Specifications

Enclosures 6.10 through 6.18 give the normal operating specifications for Power Chemistry and Radwaste Chemistry. Samples are to be analyzed using the appropriate chemistry analytical procedure.

4.3 Interlaboratory Sample Processing

Requests for sample analysis may be made to the Chemistry section whenever needed by filling out a Sample Requisition Form (Enclosure 6.19), and submitting it to the appropriate lab. Sample requests originating from within the Chemistry section for analysis to be performed by another unit of the Chemistry section must be accompanied by a Sample Requisition Form. Requests for radiochemical counting are made by submitting a Sample Requisition Form to the Health Physics Count Room. The form is filled out by the requesting lab and submitted to the appropriate lab along with the sample.

The lab performing the analysis will record the data in the appropriate space on the form and return the original copy to the requesting lab. The requesting lab will record the analysis in their Sample Data Legal Log Book. This is depicted schematically in Enclosure 6.20.

4.4 Sample Documentation

The Sample Data Legal Log Book will be the basic document for recording all samples taken and the results of the analysis performed. Each lab will maintain its own Legal Log Book for samples collected by that particular group. Each sample is given a number which consists of the last digit of the present year, the page number, and the line number that the sample is recorded on, in that respective order. An example would be sample number 2608, where 2 is the last digit in 1982, 6 is the log book page the sample is recorded on, and 08 is the line number the sample is recorded on. The results of analysis, date, and time of sample collection are recorded in the appropriate columns along with the technicians initials who performed the analysis. All entries will be made in black ink; the use of "liquid paper" to white out incorrect entries is not permitted. Instead, a single line will be drawn through the incorrect entry and initialed. The correct entry is then written above the incorrect entry. Enclosures 6.21 through 6.26 are copies of a page from each Legal Log Book.

4.5 Document Control

The Station Chemist shall have the responsibility of administratively maintaining the legal ledger and submitting it to the Master File. Copies of chemical and radiochemical records are kept on Master File for a minimum of six (6) years. Copies of records of radioactive releases and waste disposal are kept on Master File for the life of the station.

5.0 REFERENCES

5.1 Oconee Nuclear Station Chemistry Procedures

5.2 McGuire Nuclear Station Chemistry Procedures

5.3 System Power Chemistry Manual

5.4 Catawba Nuclear Station Directives Manual, Volume I

5.5 Westinghouse Chemistry Criteria and Specifications

5.6 NPDES Permit #SC0004278

6.0 ENCLOSURES

6.1 Primary Sampling and Analysis Schedule

6.2 Oil Sampling and Analysis Schedule

6.3 Secondary Sampling and Analysis Schedule - Hot Standby

PRIMARY SAMPLING AND ANALYSES SCHEDULE
C2/0/B/5800/05
ENCLOSURE 6.1

SYSTEM	SAMPLE	Cl⁻ ppb	F⁻ ppb	O_2 ppb	Boron ppm	pH @ 25°C	Cond. μmho/cm @ 25°C	Susp. Sol. ppb	Turbidity NTU	Nitrogen cc/kg	Hydrogen cc/kg	Fission Gases μCi/ml	Gross γ μCi/ml	G. E. Iodine μCi/ml	γ Isotopic I-131	γ Isotopic Iod	Rb μCi/ml	Gross Activity	SiF_{90}	SiO_2 ppb	Mg ppb	Ca ppb	Al ppb	Fe ppb	Cr ppb	OTHER
NC	Loop "A"									S/W	S/W							Q (T)								
NC	Pzr - Liquid	D	D	D	D	D	D						W											D		
NC	Pzr - Gas											W														
NC	PRT - Liquid			N/S																						
NC	PRT - Gas			W						W	W	W														
NC	NCDT - Gas			W						W	W	W														
NV	Letdown Hx Outlet	D (T)	D (T)	D (T)	D	D	D	D					D	S/W (T)	D		S/W		M	W	W	W	W		D/W	
NV	Mixed Bed Outlet	W	W										D		D											
NV	VCT - Gas			W						W	W	W														
NV	Boric Acid Tanks	W	W		2/W (T)	W	W	W											M	M	M	M	M			
NV	Boric Acid Batch Tanks				N/S																					
NI	Cold Leg Accumulators	M	M		2/M (T)*																					
NI	UHI Accumulator	M	M		2/M (T) **					(T) ***																
ND	Decay Heat Removal	D (T) ϕ	D (T) ϕ	D (T) ϕ	D (T) ϕ **	D ϕ	D ϕ	D ϕ											W ϕ	W ϕ	W ϕ	W ϕ		D/W ϕ		
NB	BWST	S/W	S/W	S/W		D	D	S/W					W				W			W	W	W	W			

(T) - Denotes Tech. Spec. item; frequency given may be more conservative than actual spec.
*- Also, within 6 hrs. after a solution volume increase of ≥ 1% Tank Volume
**- Also, within 6 hrs. after vol. increase of ≥138.3 gal
***- Total Dissolved Gas - D/W.
****- Tech. Spec. item during refueling
*****- Increase frequency if there has been a large change in inhibitor concentration.
S/S - Not scheduled.
ϕ - when in service

PRIMARY SAMPLING AND ANALYSIS SCHEDULE
CT/O/B/8200/05
ENCLOSURE 6.1

SYSTEM	SAMPLE	Cl^- ppb	F^- ppb	O_2 ppb	Boron ppb	pH @ 25°C	Cond. umho/cm @ 25°C	Susp. Sol. ppb	Turbidity NTU	Nitrogen cc/kg	Hydrogen cc/kg	Fission Gases uCi/ml	Gross β uCi/ml	D.F. I-131 uCi/ml	γ Isotopic I-131	γ Isotopic Cesd	H_3 uCi/ml	Gross Activity	Glycol %	SiO_2 ppb	Fe ppb	Cu ppb	Al ppb	Inhibitor ppm	SET ppm	Bacteria cells/ml	Chromates ppm	Phosphates ppm	OTHERS
NR	Demineralizer Outlet	W #	W #		D #	D #							W/W #																
FW	FWST	W	W		2/W (T)	W		W					W							M	M	M	M						
SF	Spent Fuel Pool	W	W		W/W	W			W				W		M						** M	** M	** M						
CF	SFP IX Outlet	W	W												W														
NF	Glycol Mix Tank					2/M		2/M											2/M										
NF	Glycol Pump Disc					2/M		2/M											2/M										
NF	Ice Making Solution Mix Tank				N/S	N/S																							
NF	Ice Condenser				Q (T)	Q (T)																							
CC	Component Cooling	W	W			W	W		W				W											W	M *****	M			
NR	Chiller Hx Shell	W	W			W	W		W				W											W	M *****	M			
ED	D/G Eng. Cool. Water					2/M																					2/M	2/M	
W7	Groundwater Drng. Sump												W																

(T)-Denotes Tech. Spec. item; frequency given may be more conservative than actual spec.
*-Also, within 6 hrs. after a solution volume increase of ≥ 1% Tank Volume
**-Also, within 6 hrs. after vol. increase of ≥119.3 gal.
***-Total Dissolved Gas - 1/yr.

*****-Tech. Spec. item during refueling
******-Increase frequency if there has been a large change in inhibitor concentration.
N/S-Not scheduled.
-when in service

OIL SAMPLING AND ANALYSIS SCHEDULE
CP/0/B/8300/05
ENCLOSURE 6.2

Table 1 - Analysis at Station

System	Sample	Viscosity	Neut. #	% Water	Water and Sediment	Specific Gravity	Particle Count					
LT	Main Turbine Lube Oil	M	M		M		M	M	M	M	M	M
LT	FWPT (A&B) Lube Oil	M	M		M		M	M	M	M	M	M
MC	MC Pump Motor Oil (A,B,C,D)	SD	SD		SD							
MC	MC Pump Motor Oil (Spare)		2/y		2/y							
	Fuel Oil Tank Truck	PTA (T)			PTA (T)	PTA (T)	See Table 2 also; no analysis necessary if fuel is for AD diesel only.					
FD	Fuel Oil Storage Tanks (A1,A2,B1,B2)						See Table 2					
	Lube Oil Tank Truck	PTA ***	Each Load ***	Each Load ***								
LD	Clean Lube Oil Storage Tank	M	M	M								
LD	Lube Oil Sump Tank	M	M	M								
AD	Fuel Oil Storage Tank	Q			Q							
AD	Oil Pan	Q	Q	Q								

Table 2 - Analysis by Consultant

System	Sample	Viscosity	Distillation Temp	Water and Sediment	Carbon Residue on 10% Residuum	Copper Strip Corrosion	Flash Point	Cloud Point	Pour Point	Ash	Sulfur	Cetane Number	Insoluble	Specific Gravity
	Fuel Oil Tank Truck		*(T)		*(T)	*(T)	*(T)	*(T)	*(T)	*(T)	*(T)	*(T)	**(T)	
AD	Fuel Oil Storage Tanks(A1,A2,B1,B2)	BM *(T)	BM *(T)	BM *(T)	BM *(T)	BM *(T)	BM *(T)	BM *(T)	BM *(T)	BM *(T)	BM *(T)	BM *(T)	BM **(T)	BM *(T)

BM - Bi-monthly
M - Monthly
Q - Quarterly
Y - Yearly
SD - Shutdown
PTA - Prior to Addition
T - Tech Spec

* - Must be verified within 2 weeks of sampling
** - Must be verified within 1 week of sampling
*** - Viscosity must be within specification prior to addition to the tank; other analysis may be done later

SECONDARY CHEMISTRY SAMPLING &'B: ANALYSIS SCHEDULE -
HOT STANDBY
CP/0/B/8800/05
ENCLOSURE 6.3

	pH	Cond umhos	Cat Cond.	O_2 ppb	Na ppb	N_2H_4 ppb	Cl ppb	Sus. S. ppb	SiO_2 ppb	Tot. Fe ppb	Cu ppb	Pb ppb	NH_3 ppb	
Steam Generator Blowdown A-D	S		C	S	C		S	S	S	3/W	3/W		3/W	
Main Steam A-D	S	S			D*				D					
Hotwell Pump Discharge	S	C	C	C	C		D	S	S	3/W	3/W			
Polisher (Main) Influent	D	D	C					S						
Polisher (Main) Effluent	S		C		C			S	S	3/W	3/W			
Polisher Cell Effluent A-E			C											
Main Feedwater	S	S	C	C	S	C	D	S	S	3/W	3/W		3/W	
Upper Surge Tank	D	D						D						
Condensate Storage Tank	D	D							D					

S = 1/Shift
D = 1/day
C = Continuous
3/W = 3/week
*To be run on AA

WATER TREATMENT ROOM SAMPLE AND ANALYSIS SCHEDULE
CP/O/B/8800/05
ENCLOSURE 6.4

Sample	Turb.	Cond.	Mill Susp. Solids	SiO_2	Cl^-	F^-	Free Cl_2	TSS	Color	pH	TOC	Total Coliform	O_2
Raw Water	D	D		W				D	D	D		D*	
YF "A" Eff.	D	D		W			D	D		D			
YF "B" EFF.	D	D		W			D	D		D			
Finished YD	D						D		D	D		D*	
YM Carbon Filters Inf.											W*		
YM Carbon Filter "A" Eff.							W				W*		
YM Carbon Filter "B" Eff.							W				W*		
YM Demin. "A" Eff.		D	D	S	D	D				D			
YM Demin. "B" Eff.		D	D	S	D	D				D			
YD Carbon Filter Inf.											W*		
YD Carbon Filter "A" Eff.							W				W*		
YD Carbon Filter "B" Eff.							W				W*		

WATER TREATMENT ROOM SAMPLING AND ANALYSIS SCHEDULE
CP/O/B. 300/05
ENCLOSURE 6.4

* - Off site analyses (a) - Dissolved Oxygen monitored as operation requires

Sample	Turb.	Cond.	Mill Susp. Solids	SiO_2	Cl^-	F^-	Free Cl_2	TSS	Color	pH	TOC	Total Coliform	O_2
Finished YD Distribution	D						D		D	D		* S/M	
YH Deaerator "A"													(a)
YH Deaerator "B"													(a)

ENCLOS E 6.5
CP/O/B/3800/05
HVAC SAMPLING AND ANALYSIS SCHEDULE

SAMPLE	pH	CONDUCTIVITY	TURBIDITY	INHIBITOR	BACTERIA	BZT	
YB, YC, YH (Admin. Bldg.) YJ, YK, YR, YV, YW, YN	1/W	1/W	1/W	1/W	1/M		
KR	1/W	1/W	1/W	1/W	1/M	1/M	

SAMPLE	CONDUCTIVITY	GLYCOL	SUSPENDED SOLIDS				
YH (Service Turbine, and Auxiliary Bldg. Loops)		2/M	2/M				

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CHEMISTRY PROCEDURE FOR THE
RECORDING AND MANAGEMENT OF DATA
CP/0/B/8800/05
ENCLOSURE 6.6

Steam Generator Wet Lay-Up Sampling Schedule

1. Generators are to be sampled and all analysis run three (3) times per week until stable, then once (1) a week.

ENVIRONMENTAL SAMPLING AND ANALYSIS SCHEDULE
CP/0/B/8800/05
ENCLOSURE 6.7

RL	Ambient Temp. °C/°F	Flow MGD	pH at 25°C	Spec Cond µmhos/cm	Turb NTU	Total Cl_2 ppm	Free Cl_2 ppm	DO ppm	BOD ppm	TSS ppm	Volatile Solids o/o	Alk ppm $CaCO_3$	Acidity ppm $CaCO_3$	Soluble Silica ppm	Oil and Grease ppm	Fecal Coliform Bacteria Colonies/ 100 ml	Boron ppm	Hydrazine ppm	Saccharate Solids mil	Li & Mg ppm
Intake (Lake Wylie)	D		W	W	W	D				W		W	W	W						
Discharge	D		W																	
WC																				
Initial Holdup Pond			D																	
Settling Basin A			D																	
Settling Basin B			D																	
Final Holdup Pond			D																	
CHP In Sys Out Fit			D		D	D				D							D	D		
System Discharge		D	W							W					2/M*					
WT																				
Influent			D						3/W											
Cell A			D					D		D		W	W							
Cell B			D					D		D		W	W						W	
Cell C			D					D		D		W	W						W	
Cell D	D		D					D	3/W	D		W	W						W	
Effluent Polishing Basin			D					D	3/W	D		W	W							
System Discharge		D	W			D	D		H*	W						H*				
RC																				
Unit 1 Cooling Towers	D		D	D	D	D	D			D		W	W	D						W

*Off-site Analysis

ENCLOSURE 6.8
CP/O/B/8800/05

To Be Added Later

ENCLOSURE 6.9
CP/O/B/8800/05

To Be Added Later

SYSTEM	SAMPLE	Cl^- ppb	F^- ppb	O_2 ppb	Boron ppm	pH @ 25°C	Cond. μmho/cm @ 25°C	Susp. Sol. ppb	Turbidity NTU	Nitrogen cc/kg	Hydrogen cc/kg	Fission Gases μCi/ml	Gross β μCi/ml	D. E. I_{131} μCi/ml	γ Isotopic I_{131}	γ Isotopic Crud	Mn^{54} μCi/ml	Gross Activity	Sr^{90}	SiO_2 ppb	Mg ppb	Ca ppb	Al ppb	Fe ppb	Li ppm					OTHER
NC	Loop "A"									N/S	25-50							≤100/ml											
NC	Pzr - Liquid	≤150	≤150	F	A	4.2-10.5	N/S						N/S												See Page 3				
NC	Pzr - Gas											N/S																	
NC	PRT - Liquid			≤100																									
NC	PRT - Gas			≤4.5%						N/S	N/S	N/S																	
NC	RCDT - Gas			≤4.5%																									
NV	Letdown Hx Outlet	≤150 (T)	≤150 (T)	F (T)	0-2000	4.2-10.5	N/S	≤100					N/S	≤1.0 (T)	N/S		N/S		N/S	≤200	C	G	≤30		See Page 3					
NV	Mixed Bed Outlet	B	B										B		B														
NV	VCT - Gas			C						N/S	N/S	N/S																	
NV	Boric Acid Tanks	≤150	≤150		7000-7700 (T)	N/S	N/S	≤200					N/S							≤600	≤5	≤10	≤ 50	≤150					
NV	Boric Acid Batch Tanks				7000-7700																								
NI	Cold Leg Accumulators	≤150	≤150		1900-2100 (T)																								
NI	HHI Accumulator	≤150	≤150		1900-2100 (T)					D (T)																			
ND	Decay Heat Removal	(I) ≤150	(I) ≤150	(I) C	N/S E	4.2-10.5	N/S	≤200					N/S							≤200	≤10	≤20	≤60		See Page 3				
NB	RMWST	≤50	≤50	≤100		6.0-8.0	≤2.0	≤5					≤0.00?				≤1.0			≤50	≤2	≤2	≤15						

N/S-No Spec.
(I)-denotes Tech. Spec. item; value given may be lower than actual spec.
A -within 50 ppm of NV Letdown Hx Outlet boron concentration
B - ≤ IX inlet
C - ≤ minimum detectable amount
D - ≤ 90 Std. Cu. Ft. Total dissolved gas/1900 cu. ft. H_2O
E - Tech. Spec. Item during refueling: ≥ 2000
F - No Spec. @ < 180°F; ≤ 100 between 180°F and 250°F
G - Ca ≤10 and Mg ≤ 5 @ ≤ 85% power
Ca and Mg combined ≤ 5 @ > 85% power

SYSTEM	SAMPLE	Cl^- ppb	F^- ppb	O_2 ppb	Boron ppm	pH @ 25°C	Cond. umho/cm @ 25°C	Susp. Sol. ppb	Turbidity NTU	Nitrogen cc/kg	Hydrogen cc/kg	Fission Gases uCi/ml	Gross B uCi/ml	G.E. I-131 uCi/ml	γ Isotopic uCi/ml	γ Isotopic Cs-134	H_3 uCi/ml	Gross Activity	Glycol %	SiO_2 ppb	Na ppb	Ca ppb	Al ppb	Ammonia ppm	SBT ppm	Bacteria col/ml	Chromates ppm	Phosphates ppm	OTHER
NR	Demineralizer Outlet	≤150	≤150		N/S	N/S							N/S																
FW	FWST	≤150	≤150		2000-2100 (T)	4.0-4.7		≤200					N/S		NS					≤200	≤10	≤20	≤60						
FF	Spent Fuel Pool	≤150	≤150		>2000	4.0-4.7			≤10				N/S		B						≤50	≤100	≤300						
KF	SFP IX Outlet	B	B										N/S																
NF	Glycol Mix Tank					>7.5		N/S											49-59										
NF	Glycol Pump Disc					>7.5		N/S											49-59										
NF	Ice Making Solution Mix Tank				1950-2250	9.0-9.5																							
NF	Ice Condenser				>1800 (T)	9.0-9.5 (T)																							
FC	Component Cooling	≤1000	≤1000			8.2-10	≤5000		≤30				N/S											2000-3000	20-80	≤50,000			
NR	Chiller Hx Shell	≤1000	≤1000			8.2-10	≤5000		≤30				N/S											2000-3000	20-80	≤50,0			
RD	D/G Eng. Cool. Water					8.2-9.2																					700-1700	100-300	
WZ	Groundwater Drng. Sump												C																

N/S - No Spec.
(T) - denotes Tech. Spec. item; value given may be lower than actual spec.
A - within 50 ppm of NV letdown Hx Outlet boron concentration
B - ≤ IX inlet
C - ≤ minimum detectable amount
D - ≤ 80 Std. Cu. Ft. Total dissolved gas/1000 cu. ft. H_2O
E - Tech. Spec. item during refueling; ≥ 2000
F - No Spec. @ <180°F; ≤100 between 180°F and 250°F
G - Ca ≤ 10 and Mg ≤5 @ ≥85% power
Ca and Mg combined ≤5 @ ≥85% power

RECOMMENDED Li CONCENTRATION RANGE AS A FUNCTION OF BORON CONCENTRATION

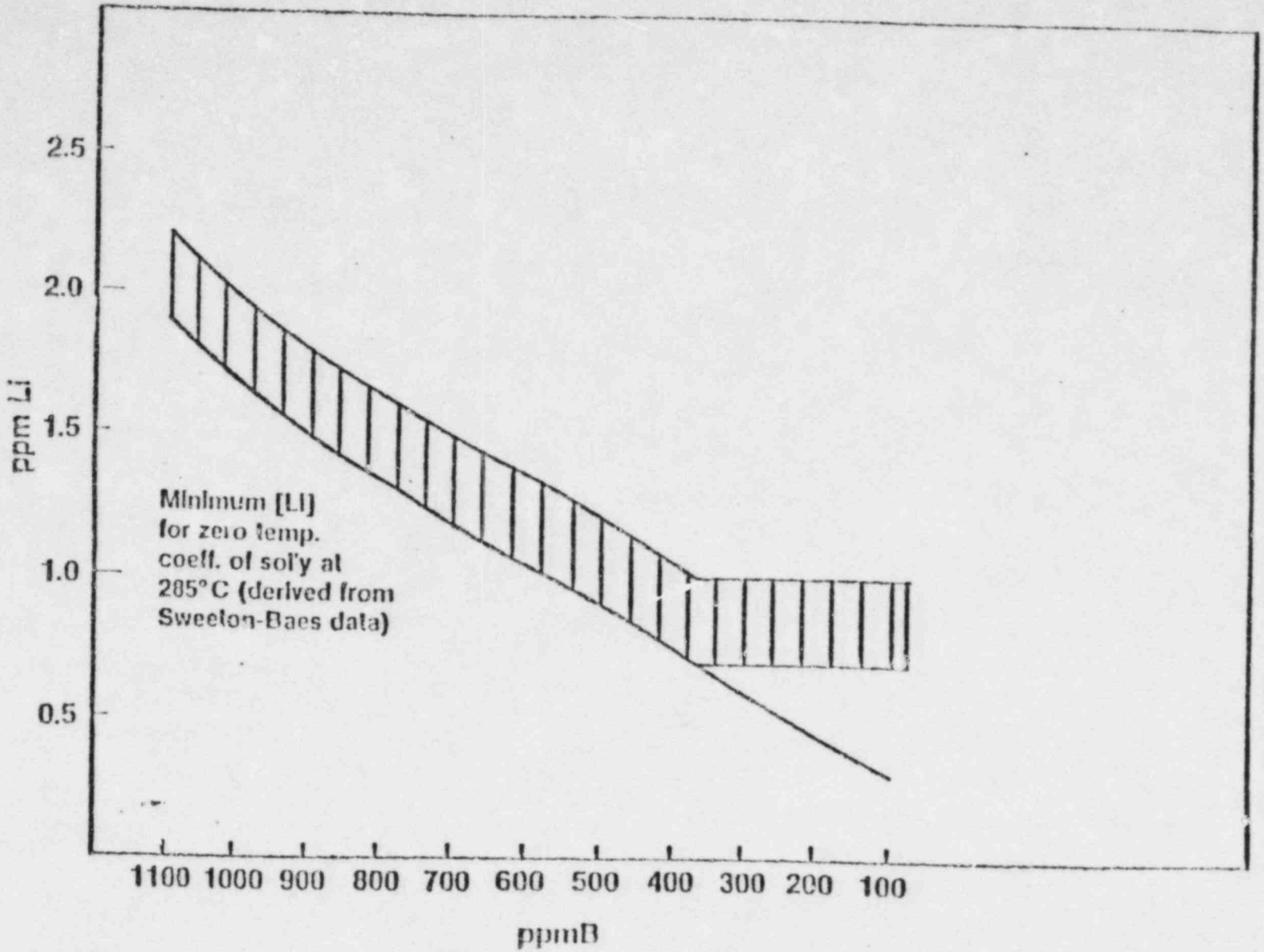

FIGURE 1

OIL ANALYSIS OPERATING SPECIFICATIONS
CP/0/B/6800/05
ENCLOSURE 6.11

Table 1 - Analysis at Station

System		Viscosity Sus @ 100°F	Neut. # mg KOH/gm	Water v/v%	Water and Sediment v/v%	Specific Gravity	Particle Count					
							6-11 μ	12-20 μ	21-60 μ	61-100 μ	106-250 μ	>250 μ
LT	Main Turbine Lube Oil	140-170	<0.2		<0.2		210,000	6500	2370	112	18	0
LF	FWPT (A & B) Lube Oil	140-170	<0.2		<0.2		210,000	6500	2370	112	18	0
SC	SC Pump Motor Oil (A, B, C, D)	143-175	<0.4*		nil							
SC	SC Pump Motor Oil (Spare)		<0.4*		nil							
	Fuel Oil Tank Truck	(T) 32.6-40.1			(T) ≤0.05	(T) 0.83-0.89	See Table 2 also.					
FD	Fuel Oil Storage Tanks (A1, A2, B1, B2)						See Table 2.					
	Lube Oil Tank Truck	649-812	later	≤0.1								
LD	Clean Lube Oil Storage Tank	649-812	later	<0.1								
LD	Lube Oil Sump Tank	649-812	later	<0.1								
AD	Fuel Oil Storage Tank	30-45			≤0.1							
AD	Oil Pan	459-702			≤0.1							

Table 2 - Analysis by Consultant

System	Sample	Viscosity Sus @ 100°F		Distillation Temp °C(°F) 90% Point		Water and Sediment v/v%	Carbon Residue on 10% Residuum %	Copper Strip Corrosion	Flash Point °C(°F)	Cloud Point °F	Pour Point °F	Ash w/w%	Sulfur w/w%	Cetane Number	Insolubles mg/100ml	Specific Gravity	
		Min	Max	Min	Max											Min	Max
	Fuel Oil Tank Truck			(T) 283(540)	(T) 338(640)		(T) ≤0.35	(T) ≤3	(T) >52(125)	(T) ≥24	(T) ≤13	(T) <0.01	(T) ≤0.50	(T) ≥40	(T) <2		
FD	Fuel Oil Storage Tanks (A1, A2, B1, B2)	(T) 32.6	(T) 40.1	(T) 283(540)	(T) 338(640)	(T) <0.05	(T) ≤0.35	(T) <3	(T) >52(125)	(T) <24	(T) ≤13	(T) <0.01	(T) <0.50	(T) ≥40	(T) <2	(T) 0.83	(T) 0.89

T - Tech Spec

* - Difference from new oil

SECONDARY CHEMISTRY OPERATING SPECIFICATIONS -
HOT STANDBY
CP/O/B/8800/05
ENCLOSURE 6.12

	pH	Cond. μmho	Cat. Cond.	O_2 ppb	Fe ppb	N_2H_4 ppb	Cl ppb	Sus. Sol. ppb	SiO_2 ppb	Tot. Fe	Cu ppb	Pb ppb	NH_3 ppb	
Steam Generator Blowdown A-D	8.5-9.3		≤2.0	≤5	≤100		≤100	<1000	<1000	<1000	<100		<250	
Main Steam A-D	8.8-9.3	2-7			<3				<20					
Hotwell Pump Discharge	8.8-9.3	2-7	<0.8	<100	<20			<100	<300	<100	<5			
Polisher (Main) Influent	8.8-9.3	2-7	<0.8					<100						
Polisher (Main) Effluent	8.8-9.3		<0.8		<20			<100	<300	<100	<5			
Polisher Cell Effluent A-E			<0.8											
Main Feedwater	8.8-9.3	2-7	<0.8	<100	<20	≥3 X DO or >50	<25	<100	<300	<100	<5		100-250	
Upper Surge Tank	8.8-9.3	2-7						<100						
Condensate Storage Tank	8.0-9.3	1-7							<300					

Sample	NTU Turb.	umhos Cond.	ppb Mill Susp. Solids	ppb SiO_2	ppb Cl^-	ppb F	ppm Free Cl_2	ppm TSS	C.U. COLOR	pH	TOC	Total Coliform	ppb O_2
Raw Water	N/S	N/S		N/S				N/S	N/S	N/S		N/S	
YF Filter Eff. "A"	<1.0	N/S		N/S			0.5-2.0	N/S		N/S			
YF Filter Eff. "B"	<1.0	N/S		N/S			0.5-2.0	N/S		N/S			
Finished YD	5/Two Day avg. 1/mo. avg.						<2.0		<15	6.5-8.5		0	
YM Carbon Filters Inf.											N/S		
YM Carbon Filter "A" Eff.							<0.1				N/S		
YM Carbon Filter "B" Eff.							<0.1				N/S		
YM Demin "A" Eff.		<0.2	<100	<20	<100	<100				5.8-8.0			
YM Demin "B" Eff.		<0.2	<100	<20	<100	<100				5.8-8.0			
YD Carbon Filter Inf.											N/S		
YD Carbon Filter "A" Eff.							<0.1				N/S		
YD Carbon Filter "B" Eff.							<0.1				N/S		

WATER TREATMENT ROOM OPERATING SPECIFICATIONS
CP/O/B/8800/05
ENCLOSURE 6.13

Sample	NTU Turb.	umhos Cond.	ppb Mill Susp. Solids	ppb SiO_2	ppb Cl^-	ppb F^-	ppm Free Cl_2	ppm TSS	C.U. Color	pH	TOC	Total Coliform	ppb O_2
Finished YD Distribution	5/two Day *avg. 1/mo. avg.						<2.0		<15	6.5-8.5		0	
YM Deaerator "A"													<100
YM Deaerator "B"													<100

ENCLOS. . 6.14
CP/O/B/8800/05
HVAC SAMPLING AND ANALYSIS SPECIFICATIONS

SAMPLE	pH @ 25°C	CONDUCTIVITY µmhos/cm	TURBIDITY NTU	INHIBITOR ppm	BACTERIA Colonies/ml	BZT ppm	
YB, YC, YH (Admin. Bldg.) YJ, YK, YR, YV, YW, YN	8.2 - 10	<5000	<30	2000 - 3000	<250,000		
ER	8.2 - 10	<5000	<30	2000 - 3000	<250,000	>20	

SAMPLE	CONDUCTIVITY µmhos/cm	GLYCOL wt. %	SUSPENDED SOLIDS				
YH (Service, Turbine, and Aux. Bldg. Loops)		35-60	<2000				

DUKE POW' COMPANY
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CHEMISTRY PROCEDURE FOR THE
RECORDING AND MANAGEMENT OF DATA
CP/0/B/8800/05
ENCLOSURE 6.15

Steam Generator Wet Lay-Up Specifications

	pH	Na ppb	Cat. Con. umhos	Cl^- ppb	N_2H_4 ppm	D.O. ppb	Sus. Solids ppb	NH_3 ppb	REMARKS
Steam Generators A-D	9.8-10.5	<1000	≤10	<500	75-200	<100	<100	5-30	

ENVIRONMENTAL CHEMISTRY OPERATING SPECIFICATIONS
CP/O/B/3800/05
ENCLOSURE 6.16

RL	Ambient Temp. Δ °F	Flow MGD	pH at 25°C	Spec Cond umhos/cm	Turb NTU	Total Cl_2 ppm	Free Cl_2 ppm	BOD ppm	TOC ppm	TSS ppm	Volatile Solids %	Alk ppm $CaCO_3$	Acidity ppm $CaCO_3$	Soluble Silica ppm	Oil and Grease ppm	Fecal Coliform Colonies/100 ml	Boron ppb	Hydrazine ppb	Suspended Solids ml/l	K_a x Mg ppm
Intake (Lake Wylie)	NS		NS	NS	NS	NS				NS		NS	NS	NS						
Discharge	NS		6-9																	
WC																				
Initial Holdup Pond			NS																	
Settling Basin A			6-9																	
Settling Basin B			6-9																	
Final Holdup Pond			6-9																	
PUP In Sys Out Plt			6-9		NS	<.02				<30										
System Discharge		NS	6-9							<30					<15		<10		<.43	
WT																				
Influent			NS						NS											
Cell A			NS					1-3		NS		NS	NS						NS	
Cell B			NS					2-4		NS		NS	NS						NS	
Cell C			NS					3-5		NS		NS	NS						NS	
Cell D	NS		NS					4-6	NS	NS		NS	NS						NS	
Effluent Polishing Basin			6-9					5-7	<30	<90		NS	NS							
System Discharge		NS	6-9			NS	.5		<30	<90						200				
HC																				
Unit 1 Cooling Towers	NS		7.5-7.8	12XRI	NS	NS	>.5 1 hr max			<150		NS	NS	<100						<50
Cooling Tower Blowdown			6-9			0 (1)	0 (2)													

(1) 2 hr/24 hr exception
(2) 2 hr/24 hr exception of 0.2 average

ENCLOSURE 6.17
CP/O/B/8800/05

To Be Added Later

ENCLOSURE 6.18
CP/O/B/8800/05

To Be Added Later

FORM 18675

ENCLOSURE 6.19
CP/O/B/8800/05
CATAWBA NUCLEAR STATION
SAMPLE REQUISITION

HEALTH PHYSICS SAMPLE NUMBER _____

CHEMISTRY'S SAMPLE NUMBER _____

DATE/TIME SAMPLE TAKEN __/__/__ __:__

DATE/TIME RESULTS RECEIVED __/__/__ __:__

GWR # _____ LWR # _____ RWR # _____

REQUISITION SUBMITTED BY:

	PHONE EXT.
PERSON _____	_____
RADWASTE CHEM	_____
ENVIRON CHEM	_____
SECONDARY CHEM	_____
PRIMARY CHEM	_____
CONTROL ROOM	_____
HEALTH PHYSICS	_____
OTHER GROUP	_____

SUBMIT REQUISITION TO:

HOT LAB	_____	( )
COLD LAB	_____	( )
AA LAB	_____	( )
CT LAB	_____	( )
RADWASTE BENCH	_____	( )
WATER TRT. LAB	_____	( )
HP LAB REQUEST (SAMPLE TO BE TAKEN)	_____	( )
HP COUNT ROOM (ANALYSIS ONLY)	_____	( )

PRIORITY: _____

(1) Personnel Safety, Reactor Safety, Secondary Operational Requirement

(2) High Radwaste Subsystem Inventory

(3) Results in 4 hours

(4) Results in 8 hours

(5) Results in 24 hours

(6) Information - Specify Results in _____ hours

SAMPLE TYPE/ORIGIN _____

SAMPLE PREPARED BY _____

FOR AA SAMPLES, SPECIFY FLAME ( ) OR FURNACE ( )

DETERMINE CONFORMANCE TO SPECIFICATIONS FOR _____

DISCHARGE DOCUMENTATION REQUESTED YES ( ) NO ( )

SERVICES REQUESTED

CHECK BOX ABOVE APPROPRIATE ITEM. THE LABORATORY WILL ENTER RESULTS IN THE BOX BELOW THE ITEM OR ATTACH RESULTS AS REQUIRED.

ANALYSIS PERFORMED BY CHEMISTRY

TAKE SAMPLE	O2 ppb/g	Cl ppb	F ppb	B ppb	pH	Cu ppb	Fe ppb	Ni ppb	Al ppb	Pb ppb	SiO2 ppb	Ca ppb	Mg ppb

OXIDIZING ppm	APPROX. µCi/ml	FILTER µCi/ml	ABS µCi/ml	(X + Y) µCi/ml	CAUS ADD (gal)

ANALYSIS PERFORMED BY HEALTH PHYSICS

TAKE SAMPLE AND ROUTE TO HP LAB

GeLi SPECTRUM _____ (Attach Results)

JOB STREAM INITIATED _____

PERSON ANALYZING SAMPLE _____

COUNTING TIME _____

TIME SAMPLE BEGAN COUNTING _____

GROSS β _____

GROSS γ _____

GROSS α _____

TRITIUM _____

OTHER _____ (Attach Results)

SAMPLE VOLUME _____

FOR AIR ANALYSIS

VOLUME = TIME x FLOW

_____ = _____ x _____

RELEASE RATE (gpm or cfm) _____

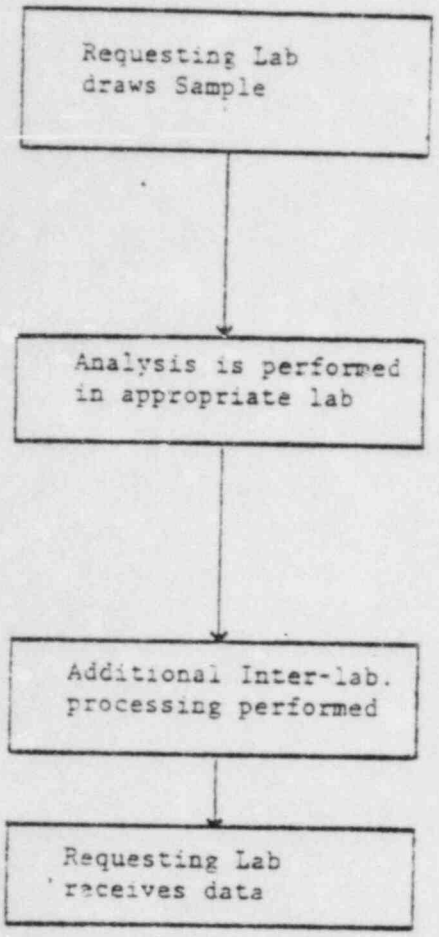
REMARKS/ADDITIONAL SAMPLE REQUEST:

PERFORMED BY: _____ DATE _____ TIME COMPLETED _____

REVIEWED BY LAB SUPERVISOR(s) _____ CONTROL ROOM NOTIFIED YES ( ) NO ( )

ENCLOSURE
CP 0/B/880(3

INTERLABORATORY SAMPLE PROCESSING



1) Requesting Lab draws sample and assigns sample number.

2) Sample Requisition Form is filled out.

3) Sample and Form routed to appropriate lab.

4) The lab receives form and sample and performs requested analysis.

5) Results are recorded in appropriate space on Sample Requisition Form.

6) If additional interlaboratory analyses required, sample and form are routed to next requested lab, where additional analysis performed.

7) Once all analyses completed, original copy of Requisition Form with all required data entered is returned to Requesting Lab.

8) Requesting Lab transfers data into their Lab Log Book; appropriate actions as indicated by results are initiated.

Form 1E72E

CATAWBA NUCLEAR STATION – PRIMARY CHEMISTRY

Sample No.	Sample	Tech	Date/Time	pH	Spec Cor umho/cm	B ppm	Cl ppb	F ppb	O_2^- ppb	Sus. Solids ppb	H_2 cc/kg	T_2 cc/kg

Page

Li^+ ppm	Al^{+3} ppb	Cu^{+2} ppb	Mg^{+2} ppb	Na^+ ppb	SiO_2 ppb	NO_3^- ppm	Gross Alpha uCi/ml	Gross Beta uCi/ml	Gamma Spectral	H^3 uCi/ml	Remarks

ENCLOSURE 6.11
CP/0/B/8800/05

Form 34721 (10-81)

PETROLIUM PRODUCTS

Page No.

Sample No.	Sample	Tech	Date	Time	Visc. Sus. @ 100°F	Neut. No. mgKOH/g	% Water	Color Astm-1500	% Ash	Sediment ppm
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
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39										

Form 2-727 (11-81)

Page No.

	Cl⁻ ppb	F⁻ ppb	Total Iron ppb	Suspend. Solids ppb	Copper ppb	NH_3 ppb	Lead ppb	SiO_2 ppb	Residc. Cl_2 ppm	P_{4---} ppb
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
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Form 3472! (10-81)

PARTICULATE COUNT MICRONS

Page No.

Line No.	5 - 10	10 - 25	25 - 50	50 - 100	> 100	6 - 11	12 - 20	21 - 60	61 - 105	105 - 250	> 250
1											
2											
3											
4											
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6											
7											
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Form 3472T (11-81)

CATAWBA NUCLEAR STATION SECONDARY CHEMISTRY

Page No.

Sample No.	Sample	Tech.	Date	Time	N_2H_4 ppb	$NaHA_4$ ppb	pH @ 25°C	Spec. Cond. umhos/cm	Cat. Cond. umhos/cm	Turbid. NTU	D.O. ppb
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
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38											
39											

CATAWBA NUCLEAR STATION – CLOSED COOLING SYSTEMS

SAMPLE NO.	SAMPLE	TECH.	DATE	TIME	INHIBITOR ppm	TURBIDITY FTU	pH 25°C	CONDUCTIVITY umhos	

PAGE #

	BACTERIAL COUNT	SUSPENDED SOLIDS ppm	INHIBITOR ADDITION	MICROBIOCIDE ADDITION	

CATAWBA NUCLEAR STATION WASTEWATER CHEMISTRY

SAMPLE NO	SAMPLE	TECH	DATE	TIME	TEMP °C	FLOW gpm	pH	SPEC COND umhos	TURBID FTU	RESID Cl ppm	D O ppm

PAGE #

BOD ppm	FECAL COLI Col/100 ml	SET. MATTER	SUSPEND. SOLIDS ppm	VOLATILE SOLIDS ppm	ALK. ppm	ACIDITY ppm	Cu ppm	Fe ppm	Cl ppm	OIL & GREASE ppm

ENCLOSURE 6.26
CP/O/B/8800/05

To Be Added Later

ATTACHMENT 3

Form 34731 (10-81)
(Formerly SPD-1002-1)

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: OP/1/A/6350/02
Change(s) 1 to
1 Incorporated

(2) STATION: CATAWBA NUCLEAR STATION

(3) PROCEDURE TITLE: DIESEL GENERATOR OPERATION

(4) PREPARED BY: R Kevin Seavey DATE: 12-20-83

(5) REVIEWED BY: [signature] DATE: 12-21-83

Cross-Disciplinary Review By: _____ N/R: N/A

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: [signature] Date: 12/21/83

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

FOR INFORMATION ONLY

FOR INFORMATION ONLY

OP/1/A/6350/02

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
DIESEL GENERATOR OPERATION

1.0 PURPOSE

The purpose of this procedure is to outline the operation of the Emergency Diesels in the following modes:

3.0 Diesel Alignment for ES Actuation

4.0 Local Diesel Startup and Shutdown

5.0 Remote Diesel Startup and Shutdown

6.0 Emergency Stop

7.0 Removing and Returning Diesel Generator From Service

8.0 Purging Diesel Buildings

9.0 Shutdown of the Diesel Generator After an Automatic Start

2.0 LIMITS AND PRECAUTIONS

2.1 The Diesel Generator should be operated at $\geq$ 3500 KW (50% of rated load) for a minimum of thirty (30) minutes after it has accumulated four (4) hours of no load/light load operation. The D/G log should be reviewed prior to operating the diesel to ensure that this guideline is followed.

2.2 Maximum exhaust temperature on Turbochargers is 1200 Deg. F.

2.3 Lube oil and cooling water at the engine outlets should be approximately 150 Deg. F while the engine is shutdown.

2.4 Starting the D/G will trip the fuel oil recirc pump if running and block it from starting until the D/G is shutdown.

3.0 DIESEL ALIGNMENT FOR ES ACTUATION

Date
Time/Initial

3.1 Initial Conditions

_____ 3.1.1 The Electrical Distribution Lineup has been completed per OP/1/A/6350/01 (Normal Power Checklist).

_____ 3.1.2 Nuclear Service Water System in operation per OP/0/A/6400/06C (Nuclear Service Water).

FOR INFORMATION ONLY

Date
Time/Initial

_____ 3.1.3 D/G Battery Charger is in operation per OP/1/A/6350/06 (125 VDC Diesel Auxiliary Power System).

_____ 3.1.4 Diesel Generator Fuel Oil System in normal alignment per OP/1/A/6550/01 (Diesel Generator Fuel Oil System Operation).

_____ 3.1.5 Diesel Generator Lube Oil System in normal alignment per OP/1/A/6550/02 (Diesel Generator Lube Oil System).

3.2 Procedure

3.2.1 For Diesel Generator 1A:

_____ 3.2.1.1 Complete or verify complete valve lineup and independent verification per Enclosures 10.1 and 10.2.

_____ 3.2.1.2 Complete ES Checklist and independent verification per Enclosures 10.5 and 10.6.

3.2.2 For Diesel Generator 1B:

_____ 3.2.2.1 Complete or verify complete valve lineup and independent verification per Enclosures 10.3 and 10.4.

_____ 3.2.2.2 Complete ES Checklist and independent verification per Enclosures 10.7 and 10.8.

4.0 LOCAL DIESEL STARTUP AND SHUTDOWN

Refer to Enclosure 10.11 for completion of this section.

5.0 REMOTE DIESEL STARTUP AND SHUTDOWN

Refer to Enclosure 10.12 for completion of this section.

6.0 EMERGENCY STOP

6.1 Initial Conditions

6.1.1 Diesel Generator is running and will not stop by normal means.

6.2 Procedure

6.2.1 Perform one of the following actions to stop the engine in an emergency situation.

6.2.1.1 Push the stop button which is located on the left hand side of the governor.

6.2.1.2 Manually trip both of the overspeed trips.

7.0 REMOVING AND RETURNING DIESEL GENERATOR FROM SERVICE

Refer to Enclosure 10.13 for completion of this section.

8.0 PURGING DIESEL BUILDINGS

Refer to Enclosure 10.14 for completion of this section.

9.0 SHUTDOWN OF THE DIESEL GENERATOR AFTER AN AUTOMATIC START

9.1 Initial Conditions

9.1.1 Diesel Generator is in operation and was started by an automatic signal.

9.2 Procedure

9.2.1 To shutdown the Diesel Generator locally, refer to Enclosure 10.11 (Local Diesel Startup and Shutdown) Step 4.2.15.

9.2.2 To shutdown the Diesel Generator remotely, refer to Enclosure 10.12 (Remote Diesel Startup and Shutdown) Step 5.2.16.

10.0 ENCLOSURES

10.1 D/G 1A Valve Checklist

10.2 D/G 1A Independent Verification Valve Checklist

10.3 D/G 1B Valve Checklist

10.4 D/G 1B Independent Verification Valve Checklist

10.5 D/G 1A Checklist For ES Actuation

10.6 D/G 1A Independent Verification Checklist For ES Actuation

10.7 D/G 1B Checklist For ES Actuation

10.8 D/G 1B Independent Verification Checklist For ES Actuation

10.9 D/G 1A Operating Parameters

10.10 D/G 1B Operating Parameters

10.11 Local Diesel Startup and Shutdown

10.12 Remote Diesel Startup and Shutdown

10.13 Removing and Returning Diesel Generator From Service

10.14 Purging Diesel Building

FOR INFORMATION ONLY

VALVE NO.	VALVE NAME		POSITION	INITIAL
	1A D/G STARTING AIR			
1VG-3	D/G Starting Air Aftercooler 1A1 Drain	DB	Closed	
1VG-137	D/G Starting Air Tnk X-Conn Drn	DB	Closed	
1VG-95	D/G Starting Air Tnk X-Conn Drn	DB	Closed	
1VG-138	D/G Starting Air Tnk X-Conn Drn	DB	Open	
1VG-97	D/G Starting Air Dryer 1A1 Purge Isol	DB	Throttled	
1VG-9	D/G Starting Air Tank 1A1 Inlet	DB	Open	
1VG-13	D/G Starting Air Tank 1A1 Drain	DB	Closed	
1VG-17	D/G Starting Air Tank 1A1 Outlet	DB	Open	
1VG-19	D/G Starting Air Lo Point Drain	DB	Closed	
1VG-4	D/G Starting Air Aftercooler 1A2 Drain	DB	Closed	
1VG-96	D/G Starting Air Dryer 1A2 Purge Isol	DB	Open	
1VG-98	D/G Starting Air Dryer 1A2 Purge Isol	DB	Throttled	
1VG-10	D/G Starting Air Tank 1A2 Inlet	DB	Open	
1VG-14	D/G Starting Air Tank 1A2 Drain	DB	Closed	
1VG-18	D/G Starting Air Tank 1A2 Outlet	DB	Open	
1VG-20	D/G Starting Air Lo Point Drain	DB	Closed	
1VG-36	D/G 1B Barring Device Inlet	DB	Open	
1VN-1	1A D/G Engine Exh Silencer Drain		Open	

FOR INFORMATION ONLY

VALVE NO.	VALVE NAME		POSITION	INITIAL
1ZD-1	1A D/G Engine Crankcase Vent Drip Leg	DB	Throttled	
	1A D/G COOLING WATER			
1KD-5	D/G Eng Driven Jacket Water Circ Pump 1A Suct	DB	Open	
1KD-7	D/G Eng Driven Jacket Water Circ Pump 1A Disch	DB	Open	
1KD-13	D/G Eng Lube Oil Cooler 1A Outlet	DB	Open	
1KD-12	D/G Eng Lube Oil Cooler 1A Inlet	DB	Open	
1KD-15	D/G Eng Jacket Water Standpipe 1A Drain	DB	Closed	
1KD-2	D/G Eng Jacket Wawter Keep Warm Pump 1A Suct	DB	Open	
1KD-4	D/G Eng Jack Water Keep Warm Pump 1A Disch	DB	Open	
1KD-9	D/G Eng Jacket Water Cooler 1A Inlet	DB	Open	
1KD-10	D/G Eng Jacket Water Cooler 1A Outlet	DB	Open	
1KD-11	D/G Eng Jacket Water Cooler 1A Drain	DB	Closed	
1KD-33	D/G Eng Jacket Water Cooler 1A Vent	DB	Closed	
1KD-1	D/G Eng Jacket Water Standpipe 1A Fill	DB	Closed	
1KD-14	D/G Eng Lube Oil Cooler 1A Drain	DB	Closed	
1KD-31	D/G Eng Lube Oil Cooler 1A Drain	DB	Closed	
1KD-35	D/G 1A Eng Jacket Water Standpipe Drain	DB	Closed	
1KD-36	D/G 1A Eng Driven Jacket Water Circ Pump Suct Vent	DB	Closed	
1KD-37	D/G 1A Eng Driven Jacket Water Circ Pump Disch Drn	DB	Closed	

FOR INFORMATION ONLY

VALVE NO.	VALVE NAME		POSITION	INITIAL
1KD-38	D/G 1A Eng Driven Jacket Water Circ Pump Disch Vent	DB	Closed	
1KD-39	D/G 1A Eng Lube Oil Clr Vent	DB	Closed	
1KD-40	Supply To D/G 1A Engine Lube Oil Clr Vent	DB	Closed	
1KD-41	D/G 1A Clng Water Inlet Vent	DB	Closed	
1KD-42	Supply To D/G 1A Left Bank Inter Clr Vent	DB	Closed	
1KD-43	Ret To D/G 1A Eng Jacket Water Standpipe Vent	DB	Closed	
1KD-44	Ret To D/G 1A Eng Jacket Water Standpipe Drn	DB	Closed	
1KD-56	D/G 1A Eng Driven Jacket Wtr Circ Pmp Disch Drn	DB	Closed	
1KD-64	D/G Eng 1A Jacket Drain	DB	Closed	
1KD-65	D/G Eng 1A Jacket Drain	DB	Closed	
1KD-68	D/G Keep Warm Pmp 1A Outlet Vent	DB	Closed	
1KD-70	Jacket Wtr S/Pipe 1A Inlet Vent	DB	Closed	
1KD-73	Jacket Wtr Stor Tank Inlet To 1A S/Pipe	DB	Closed	
1KD-75	Jacket Wtr Stor Tank 1A Inlet	DB	Closed	
1KD-77	Jacket Wtr Stor Tank 1A Outlet	DB	Closed	
1KD-79	Jacket Wtr Stor Tanks Outlet Isol	DB	Closed	
1KD-80	Jacket Wtr Stor Tank Containment Dike Drn	DB	Open	
1KD-81	Jacket Wtr Stor Tank Inlet Isol	DB	Closed	
1KD-82	Jacket Wtr Stor Tank Inlet Isol	DB	Closed	

FOR INFORMATION ONLY

VALVE NO.	VALVE NAME		POSITION	INITIAL
1KD-83	Jacket Wtr Stor Tank Inlet Drn	DB	Closed	
1KD-84	Jacket Wtr Stor Tank Inlet Drn	DB	Closed	
1KD-88	KD Chem Pot Feeder A Inlet	DB	Closed	
1KD-89	KD Chem Pot Feeder A Outlet	DB	Closed	
1KD-93	KD Chem Pot Feeder A Drain	DB	Closed	
1KD-87	KD Chem Pot Feeder A Bypass	DB	Open	

DIESEL GENERATOR OPERATION

OP/1/A/6350/02

D/G 1A INDEPENDENT VERIFICATION VALVE CHECKLIST

ENCLOSURE 10.2

FOR INFORMATION ONLY

VALVE NO.	VALVE NAME		POSITION	INITIAL
	1A D/G STARTING AIR			
1VG-17	D/C Starting Air Tank 1A1 Outlet	DB	Open	
1VG-18	D/G Starting Air Tank 1A2 Outlet	DB	Open	
	1A D/G COOLING WATER			
1KD-5	D/G Eng Driven Jacket Water Circ Pump 1A Suct	DB	Open	
1KD-7	D/G Eng Driven Jacket Water Circ Pump 1A Disch	DB	Open	
1KD-13	D/G Eng Lube Oil Cooler 1A Outlet	DB	Open	
1KD-12	D/G Eng Lube Oil Cooler 1A Inlet	DB	Open	
1KD-15	D/G Eng Jacket Water Standpipe 1A Drain	DB	Closed	
1KD-9	D/G Eng Jacket Water Cooler 1A Inlet	DB	Open	
1KD-10	D/G Eng Jacket Water Cooler 1A Outlet	DB	Open	

FOR INFORMATION ONLY

VALVE NO.	VALVE NAME		POSITION	INITIAL
	1B D/G COOLING WATER	DB		
1KD-16	D/G Eng Jacket Water Standpipe 1B Fill	DB	Closed	
1KD-17	D/G Eng Jacket Water Keep Warm Pump 1B Suct	DB	Open	
1KC-19	D/G Eng Jacket Water Keep Warm Pump 1B Disch	DB	Open	
1KD-20	D/G Eng Driven Jacket Water Circ Pump 1B Suct	DB	Open	
1KD-24	D/G Eng Jacket Water Cooler 1B Inlet	DB	Open	
1KD-25	D/G Eng Jacket Water Cooler 1B Outlet	DB	Open	
1KD-26	D/G Eng Jacket Water Cooler 1B Drain	DB	Closed	
1KD-34	D/G Eng Jacket Water Cooler 1B Vent	DB	Closed	
1KD-22	D/G Eng Driven Jacket Water Circ Pump 1B Disch	DB	Open	
1KD-27	D/G Eng Lube Oil Cooler 1B Inlet	DB	Open	
1KD-28	D/G Eng Lube Oil Cooler 1B Outlet	DB	Open	
1KD-30	D/G Eng Jacket Water Standpipe 1B Drain	DB	Closed	
1KD-29	D/G Eng Lube Oil Cooler 1B Drain	DB	Closed	
1KD-32	D/G Eng Lube Oil Cooler 1B Drain	DB	Closed	
1KD-45	D/G 1B Eng Jacket Water Standpipe Drain	DB	Closed	
1KD-46	D/G 1B Eng Driven Jacket Water Circ Pump Suct Vent	DB	Closed	
1KD-47	D/G 1B Eng Driven Jacket Water Circ Pump Disch Drain	DB	Closed	
1KD-48	D/G 1B Eng Driven Jacket Water Circ Pump Disch Vent	DB	Closed	

FOR INFORMATION ONLY

VALVE NO.	VALVE NAME		POSITION	INITIAL
1KD-49	D/G 1B Eng Lube Oil Clr Vent	DB	Closed	
1KD-50	Supply To D/G 1B Left Bank Inter Clr Vent	DB	Closed	
1KD-51	D/G 1B Supply Vent	DB	Closed	
1KD-52	Supply To D/G 1B Engine Lube Oil Clr Vent	DB	Closed	
1KD-53	Ret to D/G 1B Jacket Water Standpipe Vent	DB	Closed	
1KD-54	Ret to D/G 1B Jacket Water Standpipe Drain	DB	Closed	
1KD-59	D/G 1B Eng Driven Jacket Wtr Circ Pmp Disch Drn	DB	Closed	
1KD-66	D/G Eng 1B Jacket Drain	DB	Closed	
1KD-67	D/G Eng 1B Jacket Drain	DB	Closed	
1KD-69	D/G Keep Warm Pmp 1B Outlet Vent	DB	Closed	
1KD-74	Jacket Wtr Stor Tank Inlet to 1B S/Pipe	DB	Closed	
1KD-76	Jacket Wtr Stor Tank 1B Inlet	DB	Closed	
1KD-78	Jacket Wtr Stor Tank 1B Outlet	DB	Closed	
1KD-90	KD Chem Pot Feeder B Bypass	DB	Open	
1KD-91	KD Chem Pot Feeder B Inlet	DB	Closed	
1KD-92	KD Chem Pot Feeder B Outlet	DB	Closed	
1KD-94	KD Chem Pot Feeder B Drain	DB	Closed	
	1B D/G STARTING AIR			
1VG-47	D/G Starting Air Aftercooler 1B1 Drain	DB	Closed	

FOR INFORMATION ONLY

VALVE NO.	VALVE NAME		POSITION	INITIAL
1VG-139	D/G 1B Starting Air Tnk X-Conn Drn	DB	Closed	
1VG-117	D/G Starting Air Dryer 1B1 Purge Isol	DB	Open	
1VG-140	D/G 1B Starting Air Tank X-Conn Drn	DB	Closed	
1VG-119	D/G Starting Air Dryer 1B1 Purge Isol	DB	Throttled	
1VG-53	D/G Starting Air Tank 1B1 Inlet	DB	Open	
1VG-57	D/G Starting Air Tank 1B1 Drain	DB	Closed	
1VG-61	D/G Starting Air Tank 1B1 Outlet	DB	Open	
1VG-63	D/G Starting Air Lo Point	DB	Closed	
1VG-48	D/G S arting Air Aftercooler 1B2 Drain	DB	Closed	
1VG-120	D/G Starting Air Dryer 1B2 Purge Isol	DB	Throttled	
1VG-118	D/G Starting Air Dryer 1B2 Purge Isol	DB	Open	
1VG-54	D/G Starting Air Tank 1B2 Inlet	DB	Open	
1VG-58	D/G Starting Air Tank 1B2 Drain	DB	Closed	
1VG-62	D/G Starting Air Tank 1B2 Outlet	DB	Open	
1VG-64	D/G Starting Air Lo Point Drain	DB	Closed	
1VG-80	D/G 1B Barring Device Inlet	DB	Open	
1VN-2	1B D/G Engine Exh Silencer Drain	DB	Open	
1ZD-2	1B D/G Eng Crankcase Vent Drip Leg	DB	Throttled	

DIESEL GENERATOR OPERATION
OP/1/A/6350/02
D/G 1B INDEPENDENT VERIFICATION VALVE CHECKLIST
ENCLOSURE 10.4

FOR INFORMATION ONLY

VALVE NO.	VALVE NAME		POSITION	INITIAL
	1B D/G COOLING WATER			
1KD-20	D/G Eng Driven Jacket Water Circ Pump 1B Suct	DB	Open	
1KD-24	D/G Eng Jacket Water Cooler 1B Inlet	DB	Open	
1KD-25	D/G Eng Jacket Water Cooler 1B Outlet	DB	Open	
1KD-22	D/G Eng Driven Jacket Water Circ Pump 1B Disch	DB	Open	
1KD-27	D/G Eng Lube Oil Cooler 1B Inlet	DB	Open	
1KD-28	D/G Eng Lube Oil Cooler 1B Outlet	DB	Open	
1KD-30	D/G Eng Jacket Water Standpipe 1B Drain	DB	Closed	
	1B D/G STARTING AIR			
1VG-61	D/G Starting Air Tank 1B1 Outlet	DB	Open	
1VG-62	D/G Starting Air Tank 1B2 Outlet	DB	Open	

FOR INFORMATION ONLY

DIESEL GENERATOR OPERATION
OP/1/A/6350/02
D/G 1A CHECKLIST FOR ES ACTUATION
ENCLOSURE 10.5

Date
Time/Initial

NOTE: The following checklist items may be verified in any desired sequence.

_____ 1. Check level in 1A D/G Fuel Oil Stor Tanks to be ≥ 82,068 gal (Tank 1A1 ≥ 90%, Tank 1A2 ≥ 90%).

_____ 2. Close or verify closed the following breaker:

1MXM - F02E (Diesel Building Normal Ventilation Heater 1A)

_____ 3. Close or verify closed 1ERPA BKR 21 power supply to 1FD-22 (D/G Eng Fuel Oil Day Tank 1A Fill).

_____ 4. 1A1, 1A2 Diesel Generator Bldg. vent fans in "AUTO" position (as indicated on Diesel Bldg 1A Vent Control Panel).

_____ 5. 1A Diesel Bldg. normal vent fan running (as indicated on Diesel Bldg 1A Vent Control Panel).

_____ 6. Check D/G Engine Jacket Water Standpipe Water level to be ≥ 1/2 on level indication (as indicated by gauge located on standpipe).

_____ 7. LD Transfer Pump 1A switch is in the Stop position (as indicated on Diesel Engine 1A LD Transfer Pump Loc Box).

_____ 8. Power Switch on both 1A Starting Air Solenoid Panels is On.

_____ 9. Check governor oil level to be at or above the line on the sightglass.

_____ 10. Close or verify closed the following breakers on 1EMXE:

F01D - D/G Engine Jacket Keep Warm Pump Motor 1A
F02A - Diesel Generator Jacket Water Heater 1A
F02B - Diesel Gen Engine Prelube Oil Pump Motor 1A
F02C - Diesel Gen Engine Lube Oil Transfer Pump Motor 1A
F02D - Diesel Gen Engine Lube Oil Sump Tank Heater 1A
F03B - Diesel Starting Air Compressor Motor 1A1
F03C - Diesel Starting Air Compressor Motor 1A2
F03D - Diesel Generator Room Sump Pump Motor 1A2
F04A - Diesel Building Generator Vent Fan Motor 1A1
F05A - Diesel Building Generator Vent Fan Motor 1A2
F05E - Diesel Generator Room Sump Pump Motor 1A1
F05F - Diesel Generator Space Heater 1A

FOR INFORMATION ONLY

DIESEL GENERATOR OPERATION
OP/1/A/6350/02
D/G 1A CHECKLIST FOR ES ACTUATION
ENCLOSURE 10.5

Date Time/Initial		
_____	11.	D/G 1A Room Sump Pumps 1A1 and 1A2 in operation per OP/1/A/6500/05 (Diesel Generator Rooms Sump System).
_____	12.	Check generator bearing oil level.
_____	13.	Check Starting Air Pressures (4 total) at approximately 250 psig (gauges on D/E Control Panel 1A).
_____	14.	Check control pressure at 60 psig (gauge on D/E Control Panel 1A).
_____	15.	A/C Control power on (as indicated on D/E Control Panel 1A).
_____	16.	D/C Control power on (as indicated on D/E Control Panel 1A).
_____	17.	Mode Select Switch in Reset position (lockout relay on D/E Control Panel 1A not tripped).
_____	18.	Jacket Water Pump and Heater in Auto (as indicated on D/E Control Panel 1A).
_____	19.	Lube Oil Pump and Heater in Auto (as indicated on D/E Control Panel 1A).
_____	20.	Check Fuel Oil Day Tank level at $\geq$ 3/4 on level indication (gauge on D/E Control Panel 1A).
_____	21.	Check Diesel Lube Oil Sump Tank level to be $\geq$ 3/4 on level indication (gauge on D/E Control Panel 1A).
_____	22.	D/G 1A Synchroscope selector switch is in the Off position (as indicated on D/G Control Panel 1A).
_____	23.	Jacket Water temp. maintained at approximately 150°F (as indicated by Strip Chart Recorder or Temp Scanner on D/G Control Panel 1A).
_____	24.	Lube Oil temp. maintained at approximately 150°F (as indicated by Strip Chart Recorder or Temp Scanner on D/G Control Panel 1A).

FOR INFORMATION ONLY

DIESEL GENERATOR OPERATION
OP/1/A/6350/02
D/G 1A INDEPENDENT VERIFICATION FOR ES ACTUATION
ENCLOSURE 10.6

Date
Time/Initial

NOTE: The following checklist items may be verified in any desired sequence.

_____ 1. Check level in 1A D/G Fuel Oil Stor Tanks to be ≥ 82,068 gal (Tank 1A1 ≥ 90%, Tank 1A2 ≥ 90%).

_____ 2. Close or verify closed the following breaker:

1MXM - F02E (Diesel Building Normal Ventilation Heater 1A)

_____ 3. Close or verify closed 1ERPA BKR 21 power supply to 1FD-22 (D/G Eng Fuel Oil Day Tank 1A Fill).

_____ 4. 1A1, 1A2 Diesel Generator Bldg. vent fans in "AUTO" position (as indicated on Diesel Bldg 1A Vent Control Panel).

_____ 5. 1A Diesel Bldg. normal vent fan running (as indicated on Diesel Bldg 1A Vent Control Panel).

_____ 6. Check D/G Engine Jacket Water Standpipe Water level to be ≥ 1/2 on level indication (as indicated by gauge located on standpipe).

_____ 7. LD Transfer Pump 1A switch is in the Stop position (as indicated on Diesel Engine 1A LD Transfer Pump Loc Box).

_____ 8. Power Switch on both 1A Starting Air Solenoid Panels is On.

_____ 9. Check governor oil level to be at or above the line on the sightglass.

_____ 10. Close or verify closed the following breakers on 1EMXE:

F01D - D/G Engine Jacket Keep Warm Pump Motor 1A
F02A - Diesel Generator Jacket Water Heater 1A
F02B - Diesel Gen Engine Prelube Oil Pump Motor 1A
F02C - Diesel Gen Engine Lube Oil Transfer Pump Motor 1A
F02D - Diesel Gen Engine Lube Oil Sump Tank Heater 1A
F03B - Diesel Starting Air Compressor Motor 1A1
F03C - Diesel Starting Air Compressor Motor 1A2
F03D - Diesel Generator Room Sump Pump Motor 1A2
F04A - Diesel Building Generator Vent Fan Motor 1A1
F05A - Diesel Building Generator Vent Fan Motor 1A2
F05E - Diesel Generator Room Sump Pump Motor 1A1
F05F - Diesel Generator Space Heater 1A

FOR INFORMATION ONLY

DIESEL GENERATOR OPERATION
OP/1/A/6350/02
D/G 1A INDEPENDENT VERIFICATION CHECKLIST FOR ES ACTUATION
ENCLOSURE 10.6

Date Time/Initial		
_____	11.	D/G 1A Room Sump Pumps 1A1 and 1A2 in operation per OP/1/A/6500/05 (Diesel Generator Rooms Sump System).
_____	12.	Check generator bearing oil level.
_____	13.	Check Starting Air Pressures (4 total) at approximately 250 psig (gauges on D/E Control Panel 1A).
_____	14.	Check control pressure at 60 psig (gauge on D/E Control Panel 1A).
_____	15.	A/C Control power on (as indicated on D/E Control Panel 1A).
_____	16.	D/C Control power on (as indicated on D/E Control Panel 1A).
_____	17.	Mode Select Switch in Reset position (lockout relay on D/E Control Panel 1A not tripped).
_____	18.	Jacket Water Pump and Heater in Auto (as indicated on D/E Control Panel 1A).
_____	19.	Lube Oil Pump and Heater in Auto (as indicated on D/E Control Panel 1A).
_____	20.	Check Fuel Oil Day Tank level at $\geq$ 3/4 on level indication (gauge on D/E Control Panel 1A).
_____	21.	Check Diesel Lube Oil Sump Tank level to be $\geq$ 3/4 on level indication (gauge on D/E Control Panel 1A).
_____	22.	D/G 1A Synchroscope selector switch is in the Off position (as indicated on D/G Control Panel 1A).
_____	23.	Jacket Water temp. maintained at approximately 150°F (as indicated by Strip Chart Recorder or Temp Scanner on D/G Control Panel 1A).
_____	24.	Lube Oil temp. maintained at approximately 150°F (as indicated by Strip Chart Recorder or Temp Scanner on D/G Control Panel 1A).

DIESEL GENERATOR OPERATION
OP/1/A/6350/02
D/G 1B CHECKLIST FOR ES ACTUATION
ENCLOSURE 10.7

Date
Time/Initial

NOTE: The following checklist items may be verified in any desired sequence.

_____ 1. Check level in 1B D/G Fuel Oil Stor Tanks to be ≥ 82,068 gal (Tank 1B1 ≥ 90%, Tank 1B2 ≥ 90%).

_____ 2. Close or verify closed 1ERPD BKR 21 power supply to 1FD-62 (D/G Eng Fuel Oil Day Tank 1B Fill).

_____ 3. Close or verify closed the following breaker:

1MXZ - F05B (Diesel Building Normal Ventilation Heater 1B)

_____ 4. 1B1, 1B2 Diesel Generator Bldg. vent fans in "AUTO" position (as indicated on Diesel Bldg 1B Vent Control Panel).

_____ 5. 1B Diesel Bldg. normal vent fan running (as indicated on Diesel Bldg 1B Vent Control Panel).

_____ 6. Check D/G Engine Jacket Water Standpipe Water level to be ≥ 1/2 on level indication (as indicated by gauge located on standpipe).

_____ 7. LD Transfer Pump 1B switch is in the Stop position (as indicated on Diesel Engine 1B LD Transfer Pump Loc Box).

_____ 8. Power Switch on both 1B Starting Air Solenoid Panels is On.

_____ 9. Check governor oil level to be at or above the line on the sightglass.

_____ 10. Close or verify closed the following breakers on 1EMXF:

F01D - D/G Engine Jacket Keep Warm Pump Motor 1B
F02A - Diesel Generator Jacket Water Heater 1B
F02B - Diesel Gen Engine Prelube Oil Pump Motor 1B
F02C - Diesel Gen Engine Lube Oil Transfer Pump Motor 1B
F02D - Diesel Gen Engine Lube Oil Sump Tank Heater 1B
F03B - Diesel Starting Air Compressor Motor 1B1
F03C - Diesel Starting Air Compressor Motor 1B2
F03D - Diesel Generator Room Sump Pump Motor 1B2
F04A - Diesel Building Generator Vent Fan Motor 1B1
F05A - Diesel Building Generator Vent Fan Motor 1B2
F05E - Diesel Generator Room Sump Pump Motor 1B1
F05F - Diesel Generator Space Heater 1B

FOR INFORMATION ONLY

DIESEL GENERATOR OPERATION
OP/1/A/6350/02
D/G 1B CHECKLIST FOR ES ACTUATION
ENCLOSURE 10.7

Date Time/Initial		
_____	11.	D/G 1B Room Sump Pumps 1B1 and 1B2 in operation per OP/1/A/6500/05 (Diesel Generator Rooms Sump System).
_____	12.	Check generator bearing oil level.
_____	13.	Check Starting Air Pressures (4 total) at approximately 250 psig (gauges on D/E Control Panel 1B).
_____	14.	Check control pressure at 60 psig (gauge on D/E Control Panel 1B).
_____	15.	A/C Control power on (as indicated on D/E Control Panel 1B).
_____	16.	D/C Control power on (as indicated on D/E Control Panel 1B).
_____	17.	Mode Select Switch in Reset position (lockout relay on D/E Control Panel 1B not tripped).
_____	18.	Jacket Water Pump and Heater in Auto (as indicated on D/E Control Panel 1B).
_____	19.	Lube Oil Pump and Heater in Auto (as indicated on D/E Control Panel 1B).
_____	20.	Check Fuel Oil Day Tank level at $\geq$ 3/4 on level indication (gauge on D/E Control Panel 1B).
_____	21.	Check Diesel Lube Oil Sump Tank level to be $\geq$ 3/4 on level indication (gauge on D/E Control Panel 1B).
_____	22.	D/G 1B Synchroscope selector switch is in the Off position (as indicated on D/G Control Panel 1B).
_____	23.	Jacket Water temp. maintained at approximately 150°F (as indicated by Strip Chart Recorder or Temp Scanner on D/G Control Panel 1B).
_____	24.	Lube Oil temp. maintained at approximately 150°F (as indicated by Strip Chart Recorder or Temp Scanner on D/G Control Panel 1B).

FOR INFORMATION ONLY

DIESEL GENERATOR OPERATION
OP/1/A/6350/02
D/G 1B INDEPENDENT VERIFICATION CHECKLIST FOR ES ACTUATION
ENCLOSURE 10.8

Date
Time/Initial

NOTE: The following checklist items may be verified in any desired sequence.

_____ 1. Check level in 1B D/G Fuel Oil Stor Tanks to be ≥ 82,068 gal (Tank 1B1 ≥ 90%, Tank 1B2 ≥ 90%).

_____ 2. Close or verify closed 1ERPD BKR 21 power supply to 1FD-62 (D/G Eng Fuel Oil Day Tank 1B Fill).

_____ 3. Close or verify closed the following breaker:

1MXZ - F05B (Diesel Building Normal Ventilation Heater 1B)

_____ 4. 1B1, 1B2 Diesel Generator Bldg. vent fans in "AUTO" position (as indicated on Diesel Bldg 1B Vent Control Panel).

_____ 5. 1B Diesel Bldg. normal vent fan running (as indicated on Diesel Bldg 1B Vent Control Panel).

_____ 6. Check D/G Engine Jacket Water Standpipe Water level to be ≥ 1/2 on level indication (as indicated by gauge located on standpipe).

_____ 7. LD Transfer Pump 1B switch is in the Stop position (as indicated on Diesel Engine 1B LD Transfer Pump Loc Box).

_____ 8. Power Switch on both 1B Starting Air Solenoid Panels is On.

_____ 9. Check governor oil level to be at or above the line on the sightglass.

_____ 10. Close or verify closed the following breakers on 1EMXF:

F01D - D/G Engine Jacket Keep Warm Pump Motor 1B
F02A - Diesel Generator Jacket Water Heater 1B
F02B - Diesel Gen Engine Prelube Oil Pump Motor 1B
F02C - Diesel Gen Engine Lube Oil Transfer Pump Motor 1B
F02D - Diesel Gen Engine Lube Oil Sump Tank Heater 1B
F03B - Diesel Starting Air Compressor Motor 1B1
F03C - Diesel Starting Air Compressor Motor 1B2
F03D - Diesel Generator Room Sump Pump Motor 1B2
F04A - Diesel Building Generator Vent Fan Motor 1B1
F05A - Diesel Building Generator Vent Fan Motor 1B2
F05E - Diesel Generator Room Sump Pump Motor 1B1
F05F - Diesel Generator Space Heater 1B

DIESEL GENERATOR OPERATION
OP/1/A/6350/02
D/G 1B INDEPENDENT VERIFICATION CHECKLIST FOR ES ACTUATION
ENCLOSURE 10.8

Date Time/Initial		
_____	11.	D/G 1B Room Sump Pumps 1B1 and 1B2 in operation per OP/1/A/6500/05 (Diesel Generator Rooms Sump System).
_____	12.	Check generator bearing oil level.
_____	13.	Check Starting Air Pressures (4 total) at approximately 250 psig (gauges on D/E Control Panel 1B).
_____	14.	Check control pressure at 60 psig (gauge on D/E Control Panel 1B).
_____	15.	A/C Control power on (as indicated on D/E Control Panel 1B).
_____	16.	D/C Control power on (as indicated on D/E Control Panel 1B).
_____	17.	Mode Select Switch in Reset position (lockout relay on D/E Control Panel 1B not tripped).
_____	18.	Jacket Water Pump and Heater in Auto (as indicated on D/E Control Panel 1B).
_____	19.	Lube Oil Pump and Heater in Auto (as indicated on D/E Control Panel 1B).
_____	20.	Check Fuel Oil Day Tank level at $\geq$ 3/4 on level indication (gauge on D/E Control Panel 1B).
_____	21.	Check Diesel Lube Oil Sump Tank level to be $\geq$ 3/4 on level indication (gauge on D/E Control Panel 1B).
_____	22.	D/G 1B Synchroscope selector switch is in the Off position (as indicated on D/G Control Panel 1B).
_____	23.	Jacket Water temp. maintained at approximately 150°F (as indicated by Strip Chart Recorder or Temp Scanner on D/G Control Panel 1B).
_____	24.	Lube Oil temp. maintained at approximately 150°F (as indicated by Strip Chart Recorder or Temp Scanner on D/G Control Panel 1B).

FOR INFORMATION ONLY

DIESEL GENERATOR OPERATION
OP/1/A/6350/02
D/G 1A OPERATING PARAMETERS
ENCLOSURE 10.9

Cylinder Exhaust Temp	400°F at idle to 1000°F at 100%
Generator Stator Temp.	If Room Temp < 122°F (50°C), then Stator Temp < (95°C + Room Temp*) If Room Temp ≥ 122°F (50°C), then Stator Temp < 125°C
Engine Lube Oil Temp.	170°F - 180°F
Crankcase Vacuum	0 + 1.5 in. H2O at 100%
Lube Oil Filter ΔP	< 20 psid
Lube Oil Pressure	44-55 psi
Fuel Oil Filter ΔP	< 20 psid
Fuel Oil Pressure	20-30 psi
Jacket Cooling Water Temp.	170°F - 180°F
Jacket Cooling Water Press	10-30 psi
Control Air Pressure	60 psi
Lube Oil Press at Turbocharger Inlet	25-35 psi
Manifold Air Pressure	Increases with load
Color of Smoke from Stack	Clear, after initial start.

*Room temperature can be read on the thermometer located beind the Diesel Engine Control Panel. Note that this temperature is given in °F, and must be converted to °C.

FOR INFORMATION ONLY

DIESEL GENERATOR OPERATION
OP/1/A/6350/02
D/G 1B OPERATING PARAMETERS
ENCLOSURE 10.10

Cylinder Exhaust Temp.	400°F at idle to 1000°F at 100%
Generator Stator Temp.	If Room Temp < 122°F (50°C), then Stator Temp < (95°C + Room Temp*) If Room Temp ≥ 122°F (50°C), then Stator Temp < 125°C
Engine Lube Oil Temp.	170°F - 180°F
Crankcase Vacuum	0 + 1.5 in. H20 at 100%
Lube Oil Filter ΔP	< 20 psid
Lube Oil Pressure	44-55 psi
Fuel Oil Filter ΔP	< 20 psid
Fuel Oil Pressure	20-30 psi
Jacket Cooling Water Temp.	170°F - 180°F
Jacket Cooling Water Press.	10-30 psi
Control Air Pressure	60 psig
Lube Oil at Turbocharger Inlet	25-35 psi
Manifold Air Pressure	Increases with load.
Color of Smoke from Stack	Clear, after initial start.

*Room temperature can be read on the thermometer located beind the Diesel Engine Control Panel. Note that this temperature is given in °F, and must be converted to °C.

4.0 LOCAL DIESEL STARTUP AND SHUTDOWN

Date
Time/Initials

4.1 Initial Conditions

_____ 4.1.1 Diesel Generator is aligned per Section 3.0 (Diesel Alignment for ES Actuation).

_____ 4.1.2 Lube oil temperature and jacket water temperature are ~ 150 Deg. F.

_____ 4.1.3 The Control Room has been informed that a Local Start of the Diesel is being performed.

_____ 4.1.4 The Diesel Generator being started locally is ___.

_____ 4.1.5 Obtain key for Manual Test Start Key Switch from Shift Supervisor.

4.2 Procedure

_____ 4.2.1 If permissible, roll the diesel with air prior to starting. If not, proceed to Step 4.2.2.

NOTE: This step should be performed during routine tests and starts where time permits. It will be eliminated during emergency situations due to the nature of the start. This step is primarily a pre-start check to help prolong engine life.

_____ 4.2.1.1 Depress "MAINTENANCE" pushbutton on Local D/E Control Panel and Control Room. Note annunciator F/3 (Return to Operational Mode) on D/G annunciator panel to verify the diesel is in the Maintenance Mode.

_____ 4.2.1.2 Open indicator cocks on all cylinder heads.

_____ 4.2.1.3 Depress "ENGINE ROLL" pushbutton on Local D/E Control Panel. Allow engine to crank for at least two revolutions, then release pushbutton.

FOR INFORMATION ONLY

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Time/Initials

_____ 4.2.1.4 Inspect all indicator cocks. If liquid has been ejected from any of the cocks, the source must be found and corrected before proceeding.

_____ 4.2.1.5 Close indicator cocks on all cylinders.

_____ 4.2.1.6 Reset Mode Selector Switch (Lockout Relay) to place Diesel in "OPERATIONAL" mode.

4.2.2 Transfer starting control to the local control panel:

_____ 4.2.2.1 If possible, have the Control Room Operator place the "REMOTE/LOCAL" pushbutton in the Control Room in the LOCAL position.

_____ 4.2.2.2 If there is an emergency or remote circuitry malfunction and the above step cannot be performed, actuate the Control Room Override at the Break Glass Station on the Local Control Panel.

_____ 4.2.3 On Local Engine Control Panel, place key in the Manual Test Start Switch and turn to the "START" position (this switch will spring return to the "OFF" position).

_____ 4.2.3.1 Ensure Diesel starts.

_____ 4.2.3.2 Ensure that the associated D/G Hx Inlet opens:

1RN-232A (D/G 1A Hx Inlet)
1RN-292B (D/G 1B Hx Inlet)

_____ 4.2.3.3 Ensure D/G Engine Driven Lube Oil Pump increases oil pressure and the Prelube Oil Pump stops.

_____ 4.2.3.4 Ensure the Diesel Gen. Engine Driven Cooling Water Pump increases water pressure and the Jacket Keep Warm Pump stops.

_____ 4.2.4 Ensure Shutdown System Active light is illuminated on Engine Control Panel.

_____ 4.2.5 Adjust D/G voltage ("Voltage Control") to approximately 4160 volts.

_____ 4.2.6 Turn on Synchroscope.

_____ 4.2.7 Adjust Governor ("Speed Control") to allow Synchroscope to move slowly in the "Fast" direction.

_____ 4.2.8 Adjust Voltage ("Voltage Control") to allow D/G voltage to be slightly higher than line voltage.

FOR INFORMATION ONLY

Date Time/Initials		
_____	4.2.9	Have the Control Room Operator notify Area Dispatcher of Unit coming on the line.
_____	4.2.10	With the Synchroscope rotating slowly in the "Fast" direction, and the pointer approaching vertical position, but within 5 min. before vertical position, close the Generator Breaker.
_____	4.2.11	Increase generator load ("Speed Control") to 1750 KW while adjusting voltage ("Voltage Control") to maintain ~ 0.98 lagging power factor.
_____	4.2.12	Turn off Synchroscope.
_____	4.2.13	During D/G operation, check the parameters on Enclosure 10.9 for D/G 1A and Enclosure 10.10 for D/G 1B against normal operating values.
_____	4.2.14	Increase generator load ("Speed Control") to desired amount while adjusting voltage ("Voltage Control") to maintain ~ 0.98 lagging power factor.
	NOTE:	The Diesel is now in operation. The following steps should be performed when it is desired to shutdown the diesel locally.
	NOTE:	If the Diesel Generator was started by an automatic signal and it is desired to shutdown the diesel locally, proceed with Step 4.2.15.
_____	4.2.15	Verify another power source is available to the 4160 volt bus.
_____	4.2.16	Have the Control Room Operator notify Area Dispatcher of pending shutdown of D/G unit.
_____	4.2.17	If the normal and alternate feeder breakers are open, proceed to step 4.2.18. If either the normal or alternate feeder breakers is closed, proceed to step 4.2.21.
_____	4.2.18	Turn on Synchroscope.
_____	4.2.19	Adjust D/G speed such that the Synchroscope is moving slowly in the fast direction. As the indicator reaches 5 min. before vertical position, close the normal or alternate breaker.
_____	4.2.20	Turn off the Synchroscope.
_____	4.2.21	Reduce D/G load to 200 KW and ~ 0 VARS, then trip the D/G breaker.
_____	4.2.22	Allow Diesel to idle unloaded until jacket water and lubricating oil temperatures are ~ 160 Deg. F.

FOR INFORMATION ONLY

Date
Time/Initials

_____ 4.2.23 Depress the "STOP" pushbutton on the Local D/E Control Panel and remove the key from the Manual Test Start Key Switch.

_____ 4.2.24 Ensure the following occurs when the diesel stops:

_____ 4.2.24.1 The associated D/G Hx Inlet closes:

1RN-232A (D/G 1A Hx Inlet)
1RN-292B (D/G 1B Hx Inlet)

_____ 4.2.24.2 Prelube oil pump starts.

_____ 4.2.24.3 Jacket Keep Warm pump starts.

_____ 4.2.25 Have the Control Room Operator place D/G control in REMOTE position on 1MC11.

_____ 4.2.26 Start the Diesel Building Normal Vent Fan 1A (1B).

_____ 4.2.27 If the D/G was in operation for $\geq$ 1 hour, drain any accumulated water from the Fuel Oil Day Tank by performing the following steps:

NOTE: Repeat Steps 4.2.27.1 through 4.2.27.5 until the drained fuel oil is free of water.

4.2.27.1 Place a container at the applicable D/G Fuel Oil Day Tank Drain Outlet.

4.2.27.2 Slowly open the appropriate drain valve to fill the container:

1FD-24 (D/G Eng Fuel Oil Day Tnk 1A Drain)
1FD-64 (D/G Eng Fuel Oil Day Tnk 1B Drain)

4.2.27.3 Close the appropriate drain valve:

1FD-24 (D/G Eng Fuel Oil Day Tnk 1A Drain)
1FD-64 (D/G Eng Fuel Oil Day Tnk 1B Drain)

4.2.27.4 Inspect the container for water.

4.2.27.5 Dump container contents in waste oil drum.

_____ 4.2.28 Complete ES Checklist and independent verification per Enclosures 10.5 and 10.6 for D/G 1A or Enclosure 10.7 and 10.8 for D/G 1B.

NOTE: Place the ES Checklist and the IV Checklist in the Control Copy Folder and route the outdated enclosures with this enclosure.

Date
Time/Initials

_____ 4.2.29 Return the key for the Manual Test Start Key Switch to the Shift Supervisor.

NOTE: The Diesel Generator is now aligned per Section 3.0 (Diesel Alignment for ES Actuation).

5.0 REMOTE DIESEL STARTUP AND SHUTDOWN

Date
Time/Initials

5.1 Initial Conditions

_____ 5.1.1 Diesel Generator is aligned per Section 3.0 (Diesel Alignment for ES Actuation).

_____ 5.1.2 Lube oil temperature and jacket water temperature are ~ 150 Deg. F.

_____ 5.1.3 The Diesel Generator being started remotely is _____.

5.2 Procedure

_____ 5.2.1 If permissible, roll the diesel with air prior to starting. If not, proceed to Step 5.2.2.

NOTE: This step should be performed during routine tests and starts where time permits. It will be eliminated during emergency situations due to the nature of the start. This step is primarily a pre-start check to help prolong engine life.

_____ 5.2.1.1 Depress "MAINTENANCE" pushbutton on Local D/E Control Panel and Control Room simultaneously. Note annunciator indicating system's mode.

_____ 5.2.1.2 Open indicator cocks on all cylinder heads.

_____ 5.2.1.3 Depress "ENGINE ROLL" pushbutton on Local D/E Control Panel. Allow engine to crank for at least two revolutions, then release pushbutton.

_____ 5.2.1.4 Inspect all indicator cocks. If liquid has been ejected from any of the cocks, the source must be found and corrected before proceeding.

_____ 5.2.1.5 Close indicator cocks.

_____ 5.2.1.6 Reset Mode Selector Switch (Lockout Relay at D/E Control Panel) to place Diesel in OPERATIONAL Mode.

Date Time/Initials		
_____	5.2.2	Verify the "REMOTE/LOCAL" switch on 1MC11 in the REMOTE position.
_____	5.2.3	Depress "ON" pushbutton, insure the Engine starts by noting that the Diesel Running Status light is illuminated.
_____	5.2.4	Dispatch an operator to ensure that the associated D/G Hx Inlet opens: 1RN-232A (D/G Hx 1A Inlet) 1RN-292B (D/G Hx 1B Inlet)
_____	5.2.5	Ensure the Prelube Oil Pump and Jacket Keep Warm Pump stop.
_____	5.2.6	Adjust D/G voltage ("D/G 1A/1B Volt Adjust") to 4160V.
_____	5.2.7	Turn on D/G Synchroscope.
_____	5.2.8	Adjust Governor ("D/G 1A/1B Gov Cntl") to allow the Synchroscope to move slowly in the "FAST" direction.
_____	5.2.9	Adjust Voltage ("D/G 1A/1B Volt Adjust") to allow Generator Voltage to be slightly higher than Line Voltage.
_____	5.2.10	Notify Area Dispatcher of Unit coming on the line.
_____	5.2.11	With the synchroscope rotating slowly in the "FAST" direction, and the pointer approaching the vertical position, but within 5 minutes before the vertical position, close the D/G breaker.
_____	5.2.12	Increase generator load ("D/G 1A/1B Gov Cntl") to 1750 KW while adjusting voltage ("D/G 1A/1B Volt Adjust") to maintain ~ 0.98 lagging power factor.
_____	5.2.13	Turn off Synchroscope.
_____	5.2.14	During D/G operation, check the parameters on Enclosure 10.9 for D/G 1A and Enclosure 10.10 for D/G 1B against normal operating values.
_____	5.2.15	Increase Generator load ("D/G 1A/1B Gov Cntl") to desired amount while adjusting voltage ("D/G 1A/1B Volt Adjust") to maintain ~ 0.98 lagging power factor.
	NOTE:	The DIESEL is now in operation. The following steps should be performed when it is desired to shutdown the diesel remotely.
	NOTE:	If the Diesel Generator was started by an automatic signal and it is desired to shutdown the diesel remotely, proceed with Step 5.2.16.

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Date Time/Initials		
_____	5.2.16	Verify another power source is available to the 4160 V Bus.
_____	5.2.17	Notify Area Dispatcher of pending shutdown of D/G Unit.
_____	5.2.18	If the normal and alternate incoming feeder breakers are open, proceed to step 5.2.19. If either the normal or alternate Feeder breakers is closed, proceed to step 5.2.22.
_____	5.2.19	Turn on Synchroscope.
_____	5.2.20	Adjust D/G speed such that the Sychroscope is moving slowly in the "FAST" direction. As the indicator reaches 5 min. before vertical position, close the normal or alternate incoming breaker.
_____	5.2.21	Turn off the Synchroscope.
_____	5.2.22	Reduce D/G load to 200 KW and ~ 0 VARS, then trip the D/G breaker.
_____	5.2.23	Allow Diesel to idle unloaded until jacket water temperatures and lubricating oil temperatures are ~ 160 Deg. F.
_____	5.2.24	Depress D/G "OFF" pushbutton to stop the engine.
_____	5.2.25	Ensure the following occurs when the engine stops. Dispatch Operators as necessary.
_____		5.2.25.1 The associated D/G Hx Inlet closes: 1RN-232A (D/G 1A Hx Inlet) 1RN-292B (D/G 1B Hx Inlet)
_____		5.2.25.2 Prelube Oil Pump starts.
_____		5.2.25.3 Jacket Keep Warm Pump starts.
_____	5.2.26	Have an operator start the Diesel Building Normal Vent Fan 1A (1B).
_____	5.2.27	If the D/G was in operation for ≥ 1 hour, drain any accumulated water from the Fuel Oil Day Tank by performing the following steps:
	NOTE:	Repeat Steps 5.2.27.1 through 5.2.27.5 until the drained fuel oil is free of water.
		5.2.27.1 Place a container at the applicable D/G Fuel Oil Day Tank Drain Outlet.

Date
Time/Initials

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5.2.27.2 Slowly open the appropriate drain valve to fill the container:

1FD-24 (D/G Eng Fuel Oil Day Tnk 1A Drain)
1FD-64 (D/G Eng Fuel Oil Day Tnk 1B Drain)

5.2.27.3 Close the appropriate drain valve:

1FD-24 (D/G Eng Fuel Oil Day Tnk 1A Drain)
1FD-64 (D/G Eng Fuel Oil Day Tnk 1B Drain)

5.2.27.4 Inspect the container for water.

5.2.27.5 Dump container contents in waste oil drum.

_____ 5.2.28 Complete ES Checklist and independent verification per Enclosures 10.5 and 10.6 for D/G 1A or Enclosure 10.7 and 10.8 for D/G 1B.

NOTE: Place the ES Checklist and the IV Checklist in the Control Copy Folder and route the outdated enclosures with this enclosure.

NOTE: The Diesel Generator is now aligned per Section 3.0 (Diesel Alignment For ES Actuation).

FOR INFORMATION ONLY

7.0 REMOVING AND RETURNING DIESEL GENERATOR FROM SERVICE

Date
Time/Initials

7.1 Initial Conditions

_____ 7.1.1 Diesel Generator aligned per Section 3.0 (Diesel Alignment For ES Actuation).

_____ 7.1.2 Unit Supervisor's permission has been obtained to remove Diesel from service.

_____ 7.1.3 The Diesel Generator being removed from service is _____.

7.2 Procedure

_____ 7.2.1 Comply with action statements of Tech Spec 3.8.1.1 and 3.8.1.2.

_____ 7.2.2 If D/G 1A is to be removed from service, transfer the power supply for essential MCC 1EMXG from 1ELXA to 2ELXA per OP/1/A/6350/05 (Alternate A/C Power Sources) provided that D/G 2A is operable.

_____ 7.2.3 If D/G 1B is to be removed from service, verify that Essential MCC 2EMXH is receiving power from 2ELXB.

_____ 7.2.4 Depress "MAINTENANCE" pushbuttons on Local D/E Control Panel and in the Control Room on 1MC-11 simultaneously.

NOTE: The D/G is now out of service. The following step will return the D/G to service.

_____ 7.2.5 Manually reset the "MODE SELECTOR SWITCH" (Lockout Relay) located on the Local D/E Control Panel.

_____ 7.2.6 If D/G 1A is being returned to service, transfer the power supply for essential MCC 1EMXG from 2ELXA to 1ELXA per OP/1/A/6350/05 (Alternate A/C Power Sources).

_____ 7.2.7 If D/G 1B is being returned to service and D/G 2B is inoperable, transfer the power supply for Essential MCC 2EMXH from 2ELXB to 1ELXB per OP/2/A/6350/05 (Alternate A/C Power Sources).

FOR INFORMATION ONLY

Date
Time/Initials

_____ 7.2.8 Complete ES Checklist and independent verification per Enclosures 10.5 and 10.6 for D/G 1A or Enclosures 10.7 and 10.8 for D/G 1B.

NOTE: Place the ES Checklist and the IV Checklist in the Control Copy Folder and route the outdated enclosures with this enclosure.

NOTE: The Diesel Generator is now aligned per Section 3.0 (Diesel Alignment For ES Actuation).

8.0 PURGING DIESEL BUILDING

FOR INFORMATION ONLY

Date
Time/Initials

8.1 Initial Conditions

_____ 8.1.1 1A (1B) Diesel Building Ventilation System in operation per Enclosure 10.5 for 1A and/or Enclosure 10.7 for 1B.

_____ 8.1.2 The Diesel Generator Building being purged is _____.

8.2 Procedure

_____ 8.2.1 On Diesel Building 1A (1B) Ventilation Control Panel, place Diesel Engine Room 1A (1B) Purge Control in "START".

NOTE: This will stop the Normal Vent Fan start and start the Diesel Building Generator Vent Fans.

_____ 8.2.2 Place Diesel Building 1A (1B) Dampers "MIN POSITION CONTROL SWITCH" in "ON" and set RHEOSTAT to 20 milliamperes.

_____ 8.2.3 When purging is complete, place Diesel Building 1A (1B) purge controls in "STOP".

_____ 8.2.4 Start the Diesel Building Normal Vent Fan 1A (1B).

NOTE: This will return Diesel Building Ventilation System to normal operation.

Form 34731 (10-81)
(Formerly SPD-1002-1)

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: OP/1/A/6550/02
Change(s) 0 to
2 Incorporated

(2) STATION: CATAWBA NUCLEAR STATION

(3) PROCEDURE TITLE: D/G LUBE OIL SYSTEM

(4) PREPARED BY: R. Kevin Leach DATE: 9-13-83

(5) REVIEWED BY: Thomas G. Ratliff DATE: 9/14/83

Cross-Disciplinary Review By: _____ N/R: N/A

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: Clarences W/ltr Date: 9-14-83

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

FOR INFORMATION ONLY

FOR INFORMATION ONLY

OP/1/A/6550/02

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
D/G LUBE OIL SYSTEM

1.0 PURPOSE

To outline the operation of the D/G Lube Oil System in the following modes.

3.0 Normal Alignment

4.0 Receiving Clean D/G Lube Oil

5.0 Draining and Filling of D/G Engine 1A Lube Oil System

6.0 Draining and Filling of D/G Engine 1B Lube Oil System

7.0 Transfer of Used Oil From the Used Lube Oil Storage Tank to a Tanker

8.0 Removing spilled Fuel Oil from Fuel Oil Day Tank Retaining Wall

9.0 Adding Makeup Oil to Engine 1A

10.0 Adding Makeup Oil to Engine 1B

11.0 Swapping 1A D/G Lube Oil Filters

12.0 Swapping 1B D/G Lube Oil Filters

2.0 LIMITS AND PRECAUTIONS

2.1 In the event of an oil spill, notify the Shift Supervisor immediately. Refer to Station Directive 3.1.21 (Oil Spill Prevention, Control and Counter Measure Plan).

2.2 An operator shall be present during any operation noted in this procedure.

2.3 The operator shall verify correct increasing/decreasing levels in the applicable tanks, and check for any leakage in temporary connections made after flow has been established.

3.0 NORMAL ALIGNMENT

3.1 Initial Conditions

3.1.1 None

3.2 Procedure

_____ 3.2.1 Complete or verify complete valve lineup per Enclosure 13.1.

4.0 RECEIVING CLEAN D/G LUBE OIL

Refer to Enclosure 13.2 for completion of this section.

5.0 DRAINING AND FILLING OF D/G ENGINE 1A LUBE OIL SYSTEM

Refer to Enclosure 13.4 for completion of this section.

6.0 DRAINING AND FILLING OF D/G ENGINE 1B LUBE OIL SYSTEM

Refer to Enclosure 13.5 for completion of this section.

7.0 TRANSFER OF USED OIL FROM THE USED LUBE OIL STORAGE TANK TO A TANKER

Refer to Enclosure 13.6 for completion of this section.

8.0 REMOVING SPILLED FUEL OIL FROM FUEL OIL DAY TANK RETAINING WALL

8.1 Initial Conditions

8.1.1 The D/G Lube Oil System is in normal alignment per Section 3.0 of this procedure.

8.1.2 Sufficient volume available in Used Lube Oil Storage Tank.

8.2 Procedure

8.2.1 To remove spilled fuel oil from D/G 1A Fuel Oil Day Tank Retaining Wall.

8.2.1.1 Open 1FD-81 (D/G Engine Fuel Oil Day Tank 1A Retaining Wall Drain).

8.2.1.2 Start D/G 1A Engine Lube Oil Transfer Pump.

NOTE: The Transfer Pump will automatically stop on Lo Level in the retaining wall. Pump must be restarted to complete draining.

8.2.1.3 When retaining wall is empty, stop D/G 1A Lube Oil Transfer Pump.

8.2.1.4 Close 1FD-81 (D/G Engine Fuel Oil Day Tank 1A Retaining Wall Drain).

8.2.2 To remove spilled fuel oil from D/G 1B Fuel Oil Day Tank Retaining Wall.

8.2.2.1 Open 1FD-83 (D/G Engine Fuel Oil Day Tank 1B Retaining Wall Drain).

8.2.2.2 Start D/G 1B Engine Lube Oil Transfer Pump.

NOTE: The Transfer Pump will automatically stop on Lo Level in the retaining wall. Pump must be restarted to complete draining.

8.2.2.3 When Retaining Wall is empty, stop D/G 1B Lube Oil Transfer Pump.

8.2.2.4 Close 1FD-83 (D/G Engine Fuel Oil Day Tank 1B Retaining Wall Drain).

9.0 ADDING MAKEUP OIL TO ENGINE 1A

Refer to Enclosure 13.7 for completion of this section.

10.0 ADDING MAKEUP OIL TO ENGINE 1B

Refer to Enclosure 13.8 for completion of this section.

11.0 SWAPPING 1A D/G LUBE OIL FILTERS

Refer to Enclosure 13.9 for completion of this section.

12.0 SWAPPING 1B D/G LUBE OIL FILTERS

Refer to Enclosure 13.10 for completion of this section.

13.0 ENCLOSURES

13.1 Valve Checklist

13.2 Receiving Clean D/G Lube Oil

13.3 D/G Clean Lube Oil Inventory

13.4 Draining and Filling of D/G Engine 1A Lube Oil System

13.5 Draining and Filling of D/G Engine 1B Lube Oil System

13.6 Transfer of Used Lube Oil From the Used Lube Oil Storage Tank to a Tanker

13.7 Adding Makeup Oil to Engine 1A

13.8 Adding Makeup Oil to Engine 1B

13.9 Swapping 1A D/G Lube Oil Filters

13.10 Swapping 1B D/G Lube Oil Filters

FOR INFORMATION ONLY

VALVE NO.	VALVE NAME		POSITION	INITIAL
	1A D/G LUBE OIL			
1LD-21	1A Lube Oil Sump Tank Drain	DB	Closed	
1LD-25	1A Lube Oil Sump Tank Drain	DB	Closed	
1LD-22	1A Lube Oil Sump Tank Drain	DB	Locked Closed	
1LD-23	1A Lube Sump Tank Drain Low Point Drain	DB	Closed	
1LD-69	Clean Lube Oil Storage Tank To D/G 1A Sump	DB	Closed	
1LD-75	1A Lube Oil Cooler Outlet Sample Isol	DB	Closed	
1LD-9	1A1 Lube Oil Filter Drain	DB	Closed	
1LD-11	1A1 Lube Oil Filter Drain	DB	Closed	
1LD-13	1A1 Lube Oil Filter Vent	DB	Closed	
1LD-10	1A2 Lube Oil Filter Drain	DB	Closed	
1LD-12	1A2 Lube Oil Filter Drain	DB	Closed	
1LD-14	1A2 Lube Oil Filter Vent	DB	Closed	
1LD-6	1A Lube Oil Cooler Drain	DB	Closed	
1LD-15	1A Lube Oil Filter Crossover	DB	Closed	
	*Select the Desired Filter and Strainer			
1LD-7	1A Lube Oil Filter 3-Way Inlet	DB	*1A1 or 1A2	
1LD-8	1A Lube Oil Filter 3-Way Outlet	DB	*1A1 or 1A2	
1LD-26	1A Lube Oil Strainer 3-Way Inlet	DB	*1A1 or 1A2	

FOR INFORMATION ONLY

VALVE NO.	VALVE NAME		POSITION	INITIAL
1LD-76	1A Lube Oil Filter Outlet Sample Isol	DB	Closed	
1LD-20	1A Lube Oil Sump Tank Vent Drip Leg	DB	Closed	
1LD-74	1A Pre-Lube Oil Pump Suction	DB	Open	
1LD-29	1A Pre-Lube Oil Filter Drain	DB	Closed	
1LD-77	1A Pre-Lube Oil Filter Drain	DB	Closed	
1LD-30	1A Pre-Lube Oil Filter Vent	DB	Closed	
1LD-90	Clean Lube Oil Transfer Pump Disch Drn	DB	Closed	
1LD-93	D/G 1A Eng Lube Oil Filter 1A1 & 1A2 Outlet Drn	DB	Closed	
1LD-91	D/G 1A Lube Oil Cooler Inlet Low Point Drn	DB	Closed	
1LD-92	D/G 1A Lube Oil Cooler Outlet Low Point Drn	DB	Closed	
1LD-98	D/G 1A Lube Oil Cooler Vent	DB	Closed	
1LD-103	1A D/G Engine Oil Fill From Pre-Lube Pump	DB	Closed	
1LD-102	1A D/G Engine Pre-Lube Oil Pump Discharge	DB	Open	
1LD-100	D/G 1A Lube Oil Strnr 1A1 & 1A2 Outlet Sample	DB	Closed	
1LD-108	1A D/G Eng Pre-Lube Oil Filter Inlet Drn	DB	Closed	
1LD-110	1A D/G Eng Lube Oil Clr Inlet Line Drn	DB	Closed	
	1B D/G LUBE OIL			
1LD-70	Clean Lube Oil Storage Tank To D/G 1B Sump Tank	DB	Closed	
1LD-51	1B Lube Oil Sump Tank Drain	DB	Closed	

FOR INFORMATION ONLY

VALVE NO.	VALVE NAME		POSITION	INITIAL
1LD-55	1B Lube Oil Sump Tank Drain	DB	Closed	
1LD-52	1B Lube Oil Sump Tank Drain	DB	Locked Closed	
1LD-53	1B Lube Oil Sump Tank Drain Low Point Drn	DB	Closed	
1LD-50	1B Lube Oil Sump Tank Vent Drip Leg	DB	Closed	
1LD-82	1B Lube Oil Cooler Outlet Sample Isol	DB	Closed	
1LD-39	1B1 Lube Oil Filter Drain	DB	Closed	
1LD-41	1B1 Lube Oil Filter Drain	DB	Closed	
1LD-43	1B1 Lube Oil Filter Vent	DB	Closed	
1LD-40	1B2 Lube Oil Filter Drain	DB	Closed	
1LD-42	1B2 Lube Oil Filter Drain	DB	Closed	
1LD-44	1B2 Lube Oil Filter Vent	DB	Closed	
1LD-45	1B Lube Oil Filter X-Over	DB	Closed	
	*Select the Desired Filter and Strainer			
1LD-37	1B Lube Oil Filter 3-Way Inlet	DB	*1B1 or 1B2	
1LD-38	1B Lube Oil Filter 3-Way Outlet	DB	*1B1 or 1B2	
1LD-56	1B Lube Oil Strainer 3-Way Inlet	DB	*1B1 or 1B2	
1LD-83	1B Lube Oil Filter Outlet Sample Isol	DB	Closed	
1LD-81	1B Pre-Lube Oil Pump Suction	DB	Open	
1LD-59	1B Pre-Lube Oil Filter Drain	DB	Closed	

FOR INFORMATION ONLY

VALVE NO.	VALVE NAME		POSITION	INITIAL
1LD-60	1B Pre-Lube Oil Filter Vent	DB	Closed	
1LD-84	1B Pre-Lube Oil Filter Drain	DB	Closed	
1LD-36	1B Lube Oil Cooler Drain	DB	Closed	
1LD-94	Clean Lube Oil Transfer Pump Disch Drn	DB	Closed	
1LD-97	D/G 1B Eng Lube Oil Filt 1B1 & 1B2 Outlet Drn	DB	Closed	
1LD-95	D/G 1B Lube Oil Cooler Inlet Low Point Drain	DB	Closed	
1LD-96	D/G 1B Lube Oil Cooler Outlet Low Point Drain	DB	Closed	
1LD-99	D/G 1B Lube Oil Cooler Vent	DB	Closed	
1LD-105	1B D/G Engine Pre-Lube Oil Pump Discharge	DB	Open	
1LD-106	1B D/G Engine Oil Fill From Pre-Lube Pump	DB	Closed	
1LD-101	D/G 1B Lube Oil Strnr 1B1 & 1B2 Outlet Sample	DB	Closed	
1LD-109	D/G 1B Eng Pre-Lube Oil Filter Inlet Drn	DB	Closed	
1LD-111	D/G 1B Eng Lube Oil Clr Inlet Line Drn	DB	Closed	
	YARD			
1LD-86	Used Lube Oil Tank Transfer Pump Disch	Yard	Locked Closed	
1LD-61	Clean D/G Lube Oil Storage Tank Fill	Yard	Locked Closed	
1LD-62	Clean Lube Oil Storage Tank To D/G 1A Sump Tank	Yard	Closed	
1LD-63	Clean Lube Oil Storage Tank To D/G 1B Sump Tank	Yard	Closed	
1LD-64	Clean Lube Oil Storage Tank To D/G 2A Sump Tank	Yard	Closed	

FOR INFORMATION ONLY

VALVE NO.	VALVE NAME		POSITION	INITIAL
1LD-65	Clean Lube Oil Storage Tank D/G 2B Sump Tank	Yard	Closed	
1LD-85	Clean Lube Oil Tank Transfer Pump To Truck Connection	Yard	Locked Closed	
1LD-112	Clean Lube Oil Transfer Filter Inlet Isol	Yard	Open	
1LD-113	Clean Lube Oil Transfer Filter Outlet Isol	Yard	Open	
1LD-114	Clean Lube Oil Transfer Filter Bypass	Yard	Closed	
1LD-115	Clean Lube Oil Transfer Filter Inlet Sample	Yard	Closed	
1LD-116	Clean Lube Oil Transfer Filter Outlet Sample	Yard	Closed	
1LD-117	Clean Lube Oil Transfer Filter Vent	Yard	Closed	
1LD-118	Clean Lube Oil Transfer Filter Drain	Yard	Closed	
1LD-119	Clean Lube Oil Storage Tank Drain Isol	Yard	Closed	
1LD-120	Clean Lube Oil Storage Tank Transfer Pump Isol	Yard	Open	

FOR INFORMATION ONLY

4.0 RECEIVING CLEAN D/G LUBE OIL

4.1 Initial Conditions

Date
Time/Initial

_____ 4.1.1 D/G Lube Oil System is in normal alignment per Section 3.0 of this procedure.

4.2 Procedure

_____ 4.2.1 Complete Enclosure 13.3 (D/G Clean Lube Oil Inventory).

_____ 4.2.2 Notify Chemistry to place D/G Catchment Sump Pumps in "OFF" to prevent pumping any spilled oil.

_____ 4.2.3 Connect tanker lines to tank fill connection.

_____ 4.2.4 Unlock and open 1LD-61 (Clean D/G Lube Oil Storage Tank Fill), and start filling tank.

_____ 4.2.5 When the clean Lube Oil Tank is full, close and lock 1LD-61 (Clean D/G Lube Oil Storage Tank Fill).

_____ 4.2.6 Disconnect Tanker Fill Lines.

_____ 4.2.7 Compare Clean Lube Oil Tank indication to value obtained on Enclosure 13.3 (D/G Clean Lube Oil Inventory) Step 2.C, to verify level increase is equivalent to amount stated on Receiving Ticket.

_____ 4.2.8 Clean up any lube oil that may have been spilled, and notify Chemistry to place D/G Catchment Sump Pumps in "AUTO".

_____ 4.2.9 Route Receiving Ticket to Shift Supervisor.

NOTE: At this point D/G Lube Oil System is back in normal alignment per Section 3.0 of this procedure.

D/G CLEAN LUBE OIL INVENTORY
OP/1/A/6550/02
ENCLOSURE 13.3

FOR INFORMATION ONLY

Receiving Checklist

Date
Time/Initial

_____ 1. Verify shipping invoice states that the tanker load consists of XD-3-40 Lube Oil.

_____ 2. Insure sufficient volume in clean lube oil tank to receive tanker load by performing calculation below:

(A) Vol. of Oil in tanker (Shipping invoice) _____

_____

(B) Vol. of Oil in Lube Oil Storage Tank as read on Enclosure 8.2, Graph 7.19 (Clean Lube Oil Stor Tank) in OP/1/A/6700/01 (Unit 1 Data Book). _____

(C) Total of A and B must be less than 8,000 gal.

_____ 3. Prior to unloading tanker, notify Chemistry to sample tanker and verify that the Lube Oil is XD-3-40 by viscosity testing.

Date _____

Time _____

Signature _____

DRAINING AND FILLING OF D/G ENGINE 1A LUBE OIL SYSTEM
ENCLOSURE 13.4

FOR INFORMATION ONLY

5.0 DRAINING AND FILLING OF D/G ENGINE 1A LUBE OIL SYSTEM

5.1 Initial Conditions

Date Time/ Initials	Date Time/ Initials		
_____		5.1.1	D/G 1A not on Barring Gear or in operation.
_____		5.1.2	D/G Lube Oil System is in normal alignment per Section 3.0 of this procedure.
_____		5.1.3	Sufficient volume in Used Lube Oil Storage Tank to receive oil from D/G.

5.2 Procedure

		5.2.1	To prevent Diesel Engine 1A from operating (starting or rolling), open the following DC Control Power Breakers. These breakers are located inside of Diesel Engine Control Panel 1A and supply power to the starting air solenoid valves.
_____	_____		CB1 & CB2 - Located on left side of panel
_____	_____		CB3 & CB4 - Located on right side of panel
_____		5.2.2	Open the following breakers:
			1EMXE-F02B (Diesel Gen Engine Pre-Lube Oil Pump Motor 1A)
			1EMXE-F02D (Diesel Gen Engine Lube Oil Sump Tank Heater 1A)
_____		5.2.3	Open the following valves:
			1LD-21 (1A Lube Oil Sump Drn)
			1LD-25 (1A Lube Oil Sump Drn)
_____		5.2.4	Unlock and open 1LD-22 (1A Lube Oil Sump Tank Drain).
_____		5.2.5	Start the 1A D/G Engine Lube Oil Transfer Pump.
_____		5.2.6	When the D/G Lube Oil Sump Tank is empty, stop the 1A D/G Engine Lube Oil Transfer Pump.

DRAINING AND FILLING OF D/G ENGINE 1A LUBE OIL SYSTEM
ENCLOSURE 13.4

FOR INFORMATION ONLY

Date
Time/Initials

_____ 5.2.7 To complete draining of the D/G Engine Lube Oil System, attach a portable pump to the following low point drains, one at a time, and pump to the Lube Oil Sump Tank or drums.

1LD-9 (1A1 Lube Oil Filter Drain)
1LD-10 (1A2 Lube Oil Filter Drain)
1LD-6 (1A Lube Oil Clr Drain)
1LD-92 (D/G 1A Lube Oil Clr Outlet Lo Point Drn)
1LD-91 (D/G 1A Lube Oil Clr Inlet Lo Point Drn)
1LD-29 (1A Pre-Lube Oil Filt Drain)

_____ 5.2.8 If the oil was pumped to the D/G Engine Lube Oil Sump Tank in Step 5.2.7, start the 1A D/G Engine Lube Oil Transfer Pump.

_____ 5.2.9 When the D/G Engine Lube Oil Sump Tank is empty, stop the 1A D/G Engine Lube Oil Transfer Pump.

_____ 5.2.10 To complete draining of the D/G Engine Lube Oil Sump Tank, attach a portable pump to following drains and pump the oil to a drum: .

1LD-20 (1A Lube Oil Sump Tank Vent Drip Leg)
1LD-23 (1A Lube Oil Sump Tank Drn Lo Point Drn)

5.2.11 When draining has been completed, perform the following:

_____ 5.2.11.1 Close: 1LD-21 (1A Lube Oil Sump Drn)
1LD-25 (1A Lube Oil Sump Drn)
1LD-20 (1A Lube Oil Sump Tank Vent Drip Leg)
1LD-23 (1A Lube Oil Sump Tank Drn Lo Point Drn)

_____ 5.2.11.2 Close and lock 1LD-22 (1A Lube Oil Sump Tank Drain).

NOTE: At this point, D/G Engine 1A Lube Oil System is drained. Subsequent steps in this enclosure are to refill this system.

_____ 5.2.12 Ensure that there is a sufficient volume of oil in the Clean Lube Oil Storage Tank to fill the D/G Engine Lube Oil System.

_____ 5.2.13 Open the following valves:

1LD-69 (Clean Lube Oil Stor Tank to D/G 1A Sump Tank Isol)
1LD-62 (Clean Lube Oil Stor Tank to D/G 1A Sump Tank Isol)

DRAINING AND FILLING OF D/G ENGINE 1A LUBE OIL SYSTEM
ENCLOSURE 13.4

Date
Time/Initials

FOR INFORMATION ONLY

CAUTION: Monitor level on D/G 1A Lube Oil Sump Tank during fill using 1LDPG5530 (D/G 1A Engine Lube Oil Sump Tank Level Gauge) as a guide. Should overfill of tank become imminent, close 1LD-62 (Clean Lube Oil Stor Tank To D/G 1A Sump Tank).

NOTE: Tank level indication for D/G 1A Engine Lube Oil Sump Tank is also available on Diesel Engine Control Panel 1A.

_____ 5.2.14 Start the Clean Lube Oil Tank Transfer Pump to begin filling the 1A D/G Engine Lube Oil Sump Tank.

_____ 5.2.15 When the desired oil level in the 1A D/G Engine Lube Oil Sump Tank is reached, stop the Clean Lube Oil Tank Transfer Pump.

_____ 5.2.16 Close breaker 1EMXE-F02B (Diesel Gen Engine Pre-Lube Oil Pump Motor 1A).

5.2.17 To fill the lube oil system, perform the following:

_____ 5.2.17.1 Open 1LD-30 (1A Prelube Oil Filter Vent).

_____ 5.2.17.2 Start the D/G Engine Prelube Oil Pump.

_____ 5.2.17.3 When Prelube Oil Filter is vented, close 1LD-30 (1A Prelube Oil Filter Vent).

_____ 5.2.17.4 Slowly open 1LD-103 (1A D/G Eng Oil Fill From Prelube Pump), to begin filling Oil Header.

_____ 5.2.17.5 Close 1LD-102 (1A D/G Eng Prelube Oil Pump Disch).

_____ 5.2.17.6 Open 1LD-98 (D/G Eng Lube Oil Cooler 1A Vent) to vent the oil cooler and close it when vented.

_____ 5.2.17.7 Vent the Lube Oil Filter which is aligned for flow by opening its vent valve:

1LD-13 (1A1 Lube Oil Filter Vent)
1LD-14 (1A2 Lube Oil Filter Vent)

_____ 5.2.17.8 When the filter is properly vented, close the vent valve opened in Step 5.2.17.7.

_____ 5.2.17.9 Vent the remaining Lube Oil Filter by positioning valves 1LD-7 (1A Lube Oil Filter 3-Way Inlet) and 1LD-8 (1A Lube Oil Filter 3-Way Outlet) to the filter and open its vent valve:

1LD-13 (1A1 Lube Oil Filter Vent)
1LD-14 (1A2 Lube Oil Filter Vent)

DRAINING AND FILLING OF D/G ENGINE 1A LUBE OIL SYSTEM
ENCLOSURE 13.4

FOR INFORMATION ONLY

Date Time/ Initials	Date Time/ Initials		
_____		5.2.17.10	While venting the filter in the above step, position valve 1LD-26 (1A Lube Oil Strainer 3-Way Inlet) to the Lube Oil Strainer which is not aligned for flow.
_____		5.2.17.11	When the Lube Oil Filter is properly vented, close the vent valve opened in Step 5.2.17.9.
_____		5.2.17.12	When system is filled, stop the D/G Engine Prelube Oil Pump.
_____		5.2.17.13	Open 1LD-102 (1A D/G Eng Prelube Oil Pump Disch).
_____		5.2.17.14	Close 1LD-103 (1A D/G Eng Oil Fill From Prelube Pump).
_____	5.2.18		Start the Clean Lube Oil Tank Transfer Pump to refill the D/G Engine Lube Oil Sump Tank to desired level.
	5.2.19		When the D/G Engine Lube Oil Sump Tank is filled:
_____		5.2.19.1	Stop the Clean Lube Oil Tank Transfer Pump.
_____		5.2.19.2	Close: 1LD-69 (Clean Lube Oil Stor Tank to D/G 1A Sump Tank Isol) 1LD-62 (Clean Lube Oil Stor Tank to D/G 1A Sump Tank Isol).
_____	5.2.20		Close breaker 1EMXE-F02D (Diesel Gen Engine Lube Oil Sump Tank Heater 1A).
	5.2.21		Close the DC Control Power breakers opened in Step 5.2.1 which are located inside of Diesel Engine Control Panel 1A:
_____ _____			CB1 & CB2 - Located on left side of panel
_____ _____			CB3 & CB4 - Located on right side of panel
	NOTE:		At this point, D/G 1A Lube Oil system is filled and vented. D/G Lube Oil System is now returned to normal alignment per Section 3.0 of this procedure.

DRAINING AND FILLING OF D/G ENGINE 1B LUBE OIL SYSTEM
ENCLOSURE 13.5

FOR INFORMATION ONLY

6.0 DRAINING AND FILLING OF D/G ENGINE 1B LUBE OIL SYSTEM

Date Time/ Initials	Date Time/ Initials		
		6.1	Initial Conditions
_____		6.1.1	D/G 1B not on Barring Gear or in operation.
_____		6.1.2	D/G Lube Oil System is in normal alignment per Section 3.0 of this procedure.
_____		6.1.3	Sufficient volume in Used Lube Oil Storage Tank to receive oil from D/G.
		6.2	Procedure
		6.2.1	To prevent Diesel Engine 1B from operating (starting or rolling), open the following DC Control Power Breakers. These breakers are located inside Diesel Engine Control Panel 1B and supply power to the starting air solenoid valves.
_____	_____		CB1 & CB2 - Located on left side of panel
_____	_____		CB3 & CB4 - Located on right side of panel
_____		6.2.2	Open the following breakers:
			1EMXF-F02B (Diesel Gen Engine Prelube Oil Pump Motor 1B)
			1EMXF-F02D (Diesel Gen Engine Oil Sump Tank Heater 1B)
_____		6.2.3	Open the following valves:
			1LD-51 (1B Lube Oil Sump Tank Drn)
			1LD-55 (1B Lube Oil Sump Tank Drn)
_____		6.2.4	Unlock and open 1LD-52 (1B Lube Oil Sump Tank Drn).
_____		6.2.5	Start the 1B D/G Engine Lube Oil Transfer Pump.
_____		6.2.6	When the D/G Lube Oil Sump Tank is empty, stop the 1B D/G Engine Lube Oil Transfer Pump.

DRAINING AND FILLING OF D/G ENGINE 1B LUBE OIL SYSTEM
ENCLOSURE 13.5

FOR INFORMATION ONLY

Date
Time/Initials

_____ 6.2.7 To complete draining of the D/G Engine Lube Oil System, attach portable pump to the following low point drains, one at a time and pump to the Lube Oil Sump Tank or drums.

1LD-39 (1B1 Lube Oil Filt Drain)
1LD-40 (1B2 Lube Oil Filt Drain)
1LD-96 (D/G 1B Lube Oil Clr Outlet Lo Point Drn)
1LD-95 (D/G 1B Lube Oil Clr Inlet Lo Point Drn)
1LD-36 (1B Lube Oil Clr Drn)
1LD-59 (1B Prelube Oil Filt Drain)

_____ 6.2.8 If the oil was pumped to the D/G Engine Lube Oil Sump Tank in Step 6.2.7, start the 1B D/G Engine Lube Oil Transfer Pump.

_____ 6.2.9 When the D/G Engine Lube Oil Sump Tank is empty, stop the 1B D/G Lube Oil Transfer Pump.

_____ 6.2.10 To complete draining of D/G Engine Lube Oil Sump Tank, attach a portable pump to following drains and pump the oil to a drum:

1LD-50 (1B Lube Oil Sump Tank Vent Drip Leg)
1LD-53 (1B Lube Oil Sump Tank Drn Lo Point Drn)

6.2.11 When draining has been completed, perform the following:

_____ 6.2.11.1 Close: 1LD-50 (1B Lube Oil Sump Tank Vent Drip Leg)
1LD-53 (1B Lube Oil Sump Tank Drn Lo Point Drn)
1LD-51 (1B Lube Oil Sump Tank Drn)
1LD-55 (1B Lube Oil Sump Tank Drn)

_____ 6.2.11.2 Close and lock 1LD-52 (1B Lube Oil Sump Tank Drn).

NOTE: At this point, D/G Engine 1B Lube Oil System is drained. Subsequent steps in this enclosure are to refill the system.

_____ 6.2.12 Ensure that there is a sufficient volume of oil in the Clean Lube Oil Storage Tank to fill the D/G Engine Lube Oil System.

_____ 6.2.13 Open the following valves:

1LD-70 (Clean Lube Oil Stor Tank to D/G 1B Sump Tank Isol)
1LD-63 (Clean Lube Oil Stor Tank to D/G 1B Sump Tank Isol)

DRAINING AND FILLING OF D/G ENGINE 1B LUBE OIL SYSTEM
ENCLOSURE 13.5

FOR INFORMATION ONLY

Date
Time/Initials

CAUTION: Monitor level in D/G 1B Lube Oil Sump Tank during fill using 1LDPG5540 (D/G 1B Engine Lube Oil Sump Tank Level Gauge) as a guide. Should overfill of tank become imminent, close 1LD-63 (Clean Lube Oil Stor Tank To D/G 1B Sump Tank Isol).

NOTE: Tank level indication of D/G 1B Engine Lube Oil Sump Tank is also available on Diesel Engine Control Panel 1B.

_____ 6.2.14 Start the Clean Lube Oil Tank Transfer Pump to begin filling the 1B D/G Engine Lube Oil Sump Tank.

_____ 6.2.15 When the desired oil level is reached in the 1B D/G Engine Lube Oil Sump Tank, stop the Clean Lube Oil Tank Transfer Pump.

_____ 6.2.16 Close breaker 1EMXF-F02B (Diesel Gen Engine Prelube Oil Pump Motor 1B).

6.2.17 To fill the lube oil system, perform the following:

_____ 6.2.17.1 Open 1LD-60 (1B Prelube Oil Filt Vent).

_____ 6.2.17.2 Start the D/G Engine Prelube Oil Pump.

_____ 6.2.17.3 When Prelube Oil Filter is vented, close 1LD-60 (1B Prelube Oil Filt Vent).

_____ 6.2.17.4 Slowly open 1LD-106 (1B D/G Eng Oil Fill from Prelube Pump) to begin filling Oil Header.

_____ 6.2.17.5 Close 1LD-105 (1B D/G Eng Prelube Oil Pump Disch).

_____ 6.2.17.6 Open 1LD-99 (D/G Eng Lube Oil Clr 1B Vent) to vent the oil cooler and close it when vented.

_____ 6.2.17.7 Vent the Lube Oil Filter which is aligned for flow by opening its vent valve:

1LD-43 (1B1 Lube Oil Filter Vent)
1LD-44 (1B2 Lube Oil Filter Vent)

_____ 6.2.17.8 When the filter is properly vented, close the vent valve opened in Step 6.2.17.7.

_____ 6.2.17.9 Vent the remaining Lube Oil Filter by positioning valves 1LD-37 (1B Lube Oil Filter 3-Way Inlet) and 1LD-38 (1B Lube Oil Filter 3-Way Outlet) to the filter and open its vent valve:

1LD-43 (1B1 Lube Oil Filter Vent)
1LD-44 (1B2 Lube Oil Filter Vent)

DRAINING AND FILLING OF D/G ENGINE 1B LUBE OIL SYSTEM
ENCLOSURE 13.5

FOR INFORMATION ONLY

Date Time/ Initials	Date Time/ Initials		
_____		5.2.17.10	While venting the filter in the above step, position valve 1LD-56 (1B Lube Oil Strainer 3-Way Inlet) to the Lube Oil Strainer which is not aligned for flow.
_____		6.2.17.11	When the Lube Oil Filter is properly vented, close the vent valve opened in Step 6.2.17.9.
_____		6.2.17.12	When system is filled, stop the D/G Engine Prelube Oil Pump.
_____		6.2.17.13	Open 1LD-105 (1B D/G Eng Prelube Oil Pump Disch).
_____		6.2.17.14	Close 1LD-106 (1B D/G Eng Oil Fill from Prelube Pump).
_____		6.2.18	Start the Clean Lube Oil Tank Transfer Pump to refill the D/G Engine Lube Oil Sump Tank to desired level.
		6.2.19	When the D/G Engine Lube Oil Sump Tank is filled:
_____		6.2.19.1	Stop the Clean Lube Oil Tank Transfer Pump.
_____		6.2.19.2	Close: 1LD-63 (Clean Lube Oil Stor Tank to D/G 1B Sump Tank Isol)
			1LD-70 (Clean Lube Oil Stor Tank To D/G 1B Sump Isol)
_____		6.2.20	Close breaker 1EMXF-F02D (Diesel Gen Engine Lube Oil Sump Tank Heater 1B).
		6.2.21	Close the DC Control Power Breakers opened in Step 6.2.1 which are located inside of Diesel Engine Control Panel 1B:
_____	_____		CB1 & CB2 - Located on left side of panel
_____	_____		CB3 & CB4 - Located on right side of panel
		NOTE:	At this point, D/G 1B Lube Oil System is filled and vented. D/G Lube Oil System is now returned to normal alignment per Section 3.0 of this procedure.

TRANSFER OF USED OIL FROM THE USED LUBE OIL STORAGE TANK TO A TANKER
ENCLOSURE 13.6

FOR INFORMATION ONLY

7.0 TRANSFER OF USED OIL FROM THE USED LUBE OIL STORAGE TANK TO A TANKER

Date
Time/Initials

7.1 Initial Conditions

_____ 7.1.1 D/G Lube Oil System is in normal alignment per Section 3.0 of this procedure.

7.2 Procedure

_____ 7.2.1 Notify Chemistry to place D/G Catchment Sump Pumps in "OFF" to prevent pumping any spilled oil.

_____ 7.2.2 Connect tanker lines to the Used Lube Oil Tank Truck connection.

_____ 7.2.3 Unlock and open 1LD-86 (Used Lube Oil Tank Transfer Pump Disch).

_____ 7.2.4 Start the Used Lube Oil Tank Transfer Pump (switch located at N.E. corner of the Lube Oil Storage House) and monitor level in the used Lube Oil Storage Tank.

7.2.5 When the tank is empty or the tanker truck is full:

_____ 7.2.5.1 Stop the Used Lube Oil Transfer Pump.

_____ 7.2.5.2 Close and lock 1LD-86 (Used Lube Oil Tank Transfer Pump Disch).

_____ 7.2.5.3 Disconnect Tanker truck.

_____ 7.2.6 Clean up any spilled oil and notify Chemistry to place D/G Catchment Sump Pumps in "AUTO".

NOTE: At this point, D/G Lube Oil System is back in normal alignment per Section 3.0 of this procedure.

FOR INFORMATION ONLY

9.0 ADDING MAKEUP OIL TO ENGINE 1A

Date
Time/Initials

NOTE: If it is necessary to add makeup oil to the D/G Engine during a loss of all A. C. power, then oil can be added through the sump tank vent on the Diesel Building roof from oil drums using hand operated pumps.

NOTE: If D/G Engine Lube Oil consumption rises above 5 gal/hr, notify Shift Supervisor immediately. (3 gal/hr is normal consumption)

9.1 Initial Conditions

_____ 9.1.1 D/G Lube Oil System aligned per Section 3.0 of this procedure.

_____ 9.1.2 Low level in D/G 1A Lube Oil Tank.

NOTE: The D/G Engine may be operating while makeup oil is added.

9.2 Procedure

_____ 9.2.1 Prior to adding makeup oil, record the following information:

Clean Lube Oil Storage Tank Level _____%
Sump Tank Level _____

_____ 9.2.2 Open: 1LD-62 (Clean Lube Oil Stor Tank to D/G 1A Sump Tank Isol)
1LD-69 (Clean Lube Oil Stor Tank to D/G 1A Sump Tank Isol)

_____ 9.2.3 Start the Clean Lube Oil Transfer Pump to begin filling the 1A D/G Engine Lube Oil Sump Tank.

9.2.4 When the D/G Engine Oil Sump Tank is filled:

_____ 9.2.4.1 Stop the Clean Lube Oil Tank Transfer Pump.

_____ 9.2.4.2 Close: 1LD-69 (Clean Lube Oil Stor Tank to D/G 1A Sump Tank Isol)
1LD-62 (Clean Lube Oil Stor Tank to D/G 1A Sump Tank Isol)

Date
Time/Initials

FOR INFORMATION ONLY

_____ 9.2.5 Record new levels in the Clean Lube Oil Storage Tank and Sump Tank and ensure that the increase in the Sump Tank Volume is equal to the decrease in the Clean Lube Oil Storage Tank Volume by using the tank volume level curves 7.18 (D/G Lube Oil Sump Tank) and 7.19 (D/G Clean Lube Oil Storage Tank) in OP/1/A/6700/01 (Unit 1 Data Book).

Sump Tank Level ____
Clean Lube Oil Storage Tank Level _____%

NOTE: At this point, D/G Lube Oil System is back in normal alignment per Section 3.0 of this procedure.

FOR INFORMATION ONLY

10.0 ADDING MAKEUP OIL TO ENGINE 1B

Date
Time/Initials

NOTE: If it is necessary to add makeup oil to the D/G Engine during a loss of all A. C. power, then oil can be added through the sump tank vent on the Diesel Building roof from oil drums using hand operated pumps.

NOTE: If D/G Engine Lube Oil consumption rises above 5 gal/hr, notify Shift Supervisor immediately. (3 gal/hr is normal consumption)

10.1 Initial Conditions

_____ 10.1.1 D/G Lube Oil System aligned per Section 3.0 of this procedure.

_____ 10.1.2 Low level in D/G 1B Lube Oil Tank.

NOTE: The D/G Engine may be operating while makeup oil is added.

10.2 Procedure

_____ 10.2.1 Prior to adding makeup oil, record the following information:

Clean Lube Oil Storage Tank Level _____%
Sump Tank Level _____

_____ 10.2.2 Open: 1LD-70 (Clean Lube Oil Stor Tank to D/G 1B Sump Tank Isol)
1LD-63 (Clean Lube Oil Stor Tank to D/G 1B Sump Tank Isol)

_____ 10.2.3 Start the Clean Lube Oil Transfer Pump to begin filling the 1B D/G Engine Lube Oil Sump Tank.

10.2.4 When the D/G Engine Oil Sump Tank is filled:

_____ 10.2.4.1 Stop the Clean Lube Oil Tank Transfer Pump.

_____ 10.2.4.2 Close: 1LD-70 (Clean Lube Oil Stor Tank to D/G 1B Sump Tank Isol)
1LD-63 (Clean Lube Oil Stor Tank to D/G 1B Sump Tank Isol)

FOR INFORMATION ONLY

Date
Time/Initials

_____ 10.2.5 Record new levels in the Clean Lube Oil Storage Tank and Sump Tank and ensure that the increase in the Sump Tank Volume is equal to the decrease in the Clean Lube Oil Storage Tank Volume by using the tank volume level curves 7.18 (D/G Lube Oil Sump Tank) and 7.19 (D/G Clean Lube Oil Storage Tank) in OP/1/A/6700/01 (Unit 1 Data Book):

Sump Tank Level ____
Clean Lube Oil Storage Tank Level _____%

NOTE: At this point, D/G Lube Oil System is back in normal alignment per Section 3.0 of this procedure.

11.0 SWAPPING 1A D/G LUBE OIL FILTERS

FOR INFORMATION ONLY

Date
Time/Initials

11.1 Initial Conditions

11.1.1 D/G Lube Oil System is aligned per Section 3.0 of this procedure.

11.2 Procedure

_____ 11.2.1 Open valve 1LD-15 (1A Lube Oil Filter Crossover) to equalize pressure between the lube oil filters.

_____ 11.2.2 Position the following 3-Way valves to the lube oil filter which is to be placed in service:

1LD-7 (1A Lube Oil Filter 3-Way Inlet)
1LD-8 (1A Lube Oil Filter 3-Way Outlet)

_____ 11.2.3 Close valve 1LD-15 (1A Lube Oil Filter Crossover).

NOTE: The D/G Lube Oil System is now returned to normal alignment per Section 3.0 of this procedure.

12.0 SWAPPING 1B D/G LUBE OIL FILTERS

FOR INFORMATION ONLY

Date
Time/Initials

12.1 Initial Conditions

12.1.1 D/G Lube Oil System is aligned per Section 3.0 of this procedure.

12.2 Procedure

_____ 12.2.1 Open valve 1LD-45 (1B Lube Oil Filter Crossover) to equalize pressure between the lube oil filters.

_____ 12.2.2 Position the following 3-Way valves to the lube oil filter which is to be placed in service:

1LD-37 (1B Lube Oil Filter 3-Way Inlet)
1LD-38 (1B Lube Oil Filter 3-Way Outlet)

_____ 12.2.3 Close valve 1LD-45 (1B Lube Oil Filter Crossover).

NOTE: The D/G Lube Oil System is now returned to normal alignment per Section 3.0 of this procedure.

Form 34731 (10-81)
(Formerly SPD-1002-1)

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: OP/1/A/6550/01
Change(s) 1 to
1 Incorporated

(2) STATION: CATAWBA NUCLEAR STATION

(3) PROCEDURE TITLE: DIESEL GENERATOR FUEL OIL SYSTEM OPERATION

(4) PREPARED BY: R Kevin Sandy DATE: 9-13-83

(5) REVIEWED BY: Thomas S. Pettit DATE: 9/14/83

Cross-Disciplinary Review By: _____ N/R: N/A

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: CW Grimes 9/14/83 Date: 9-14-83

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

FOR INFORMATION ONLY

FOR INFORMATION ONLY

OP/1/A/6550/01

DUKE POWER COMPANY
CATAWBA NUCLEAR STATION
DIESEL GENERATOR FUEL OIL SYSTEM OPERATION

1.0 PURPOSE

The purpose of this procedure is to guide the operator through the following system operations:

3.0 Normal alignment

4.0 Filling Diesel Fuel Oil Storage Tank 1A1

5.0 Filling Diesel Fuel Oil Storage Tank 1A2

6.0 Filling Diesel Fuel Oil Storage Tank 1B1

7.0 Filling Diesel Fuel Oil Storage Tank 1B2

8.0 Shifting Fuel Oil Storage Tanks for D/G 1A

9.0 Shifting Fuel Oil Storage Tanks for D/G 1B

10.0 Recirculating Fuel Oil Storage Tank 1A1

11.0 Recirculating Fuel Oil Storage Tank 1A2

12.0 Recirculating Fuel Oil Storage Tank 1B1

13.0 Recirculating Fuel Oil Storage Tank 1B2

14.0 Removal of Condensate from Fuel Oil Storage Tanks

15.0 Draining Diesel Fuel Oil Storage Tank 1A1

16.0 Draining Diesel Fuel Oil Storage Tank 1A2

17.0 Draining Diesel Fuel Oil Storage Tank 1B1

18.0 Draining Diesel Fuel Oil Storage Tank 1B2

2.0 LIMITS AND PRECAUTIONS

2.1 Only one Fuel Oil Storage Tank will be filled at a time.

2.2 Only one Fuel Oil Tank may be recirculated at a time.

2.3 A Fuel Oil Storage Tank must settle 24 hours after recirculation or fill before returning to service.

2.4 Fuel Oil Storage Tank outlets shall not be opened simultaneously unless tank levels are equal.

2.5 Fuel Oil Recirculation Filter D/P should not exceed 10 psid as monitored by the difference in pressure between 1FDPG5031 (DG Fuel Oil Recirc Filt Inlet Press) and 1FDPG5030 (DG Fuel Oil Recirc Outlet Press).

2.6 Notify Shift Supervisor of any oil spills. Notify Chemistry and refer to Station Directive 3.1.21 (Oil Spill Prevention, Control and Countermeasure Plan).

2.7 Do not expose the fuel oil to sparks or open flame.

2.8 During receiving of fuel oil, an operator must be present at all times.

2.9 Only one Fuel Oil Tank may be lined up for Condensate Removal at a time.

3.0 NORMAL ALIGNMENT

Date
Time/Initial

3.1 Initial Conditions

3.1.1 None

3.2 Procedure

_____ 3.2.1 Complete or verify complete valve lineup and independent verification per Enclosures 19.1 and 19.2.

3.2.2 Open and White Tag the remote starter breakers for the D/G Fuel Oil Booster Pumps:

_____ Diesel Generator Fuel Oil Booster Pump 1A Starter

_____ Diesel Generator Fuel Oil Booster Pump 1B Starter

4.0 FILLING DIESEL FUEL OIL STORAGE TANK 1A1

Refer to Enclosure 19.3 for completion of this section.

5.0 FILLING DIESEL FUEL OIL STORAGE TANK 1A2

Refer to Enclosure 19.4 for completion of this section.

6.0 FILLING DIESEL FUEL OIL STORAGE TANK 1B1

Refer to Enclosure 19.5 for completion of this section.

7.0 FILLING DIESEL FUEL OIL STORAGE TANK 1B2

Refer to Enclosure 19.6 for completion of this section.

8.0 SHIFTING FUEL OIL STORAGE TANKS FOR D/G 1A

Refer to Enclosure 19.7 for completion of this section.

9.0 SHIFTING FUEL OIL STORAGE TANKS FOR D/G 1B

Refer to Enclosure 19.8 for completion of this section.

10.0 RECIRCULATING FUEL OIL STORAGE TANK 1A1

Refer to Enclosure 19.9 for completion of this section

11.0 RECIRCULATING FUEL OIL STORAGE TANK 1A2

Refer to Enclosure 19.10 for completion of this section.

12.0 RECIRCULATING FUEL OIL STORAGE TANK 1B1

Refer to Enclosure 19.11 for completion of this section.

13.0 RECIRCULATING FUEL OIL STORAGE TANK 1B2

Refer to Enclosure 19.12 for completion of this section.

14.0 REMOVAL OF CONDENSATE FROM FUEL OIL STORAGE TANKS

Refer to Enclosure 19.13 for completion of this section.

15.0 DRAINING DIESEL FUEL OIL STORAGE TANK 1A1

Refer to Enclosure 19.15 for completion of this section.

16.0 DRAINING DIESEL FUEL OIL STORAGE TANK 1A2

Refer to Enclosure 19.16 for completion of this section.

17.0 DRAINING DIESEL FUEL OIL STORAGE TANK 1B1

Refer to Enclosure 19.17 for completion of this section.

18.0 DRAINING DIESEL FUEL OIL STORAGE TANK 1B2

Refer to Enclosure 19.18 for completion of this section.

19.0 ENCLOSURES

19.1 Valve Checklist

19.2 Independent Verification Valve Checklist

19.3 Filling Diesel Fuel Oil Storage Tank 1A1

19.4 Filling Diesel Fuel Oil Storage Tank 1A2

19.5 Filling Diesel Fuel Oil Storage Tank 1B1

19.6 Filling Diesel Fuel Oil Storage Tank 1B2

19.7 Shifting Fuel Oil Storage Tanks For D/G 1A

19.8 Shifting Fuel Oil Storage Tanks For D/G 1B

19 9 Recirculating Fuel Oil Storage Tank 1A1

19.10 Recirculating Fuel Oil Storage Tank 1A2

19 11 Recirculating Fuel Oil Storage Tank 1B1

19.12 Recirculating Fuel Oil Storage Tank 1B2

19.13 Removal of Condensate From Fuel Oil Storage Tanks

19.14 Receiving Checklist

19.15 Draining Diesel Fuel Oil Storage Tank 1A1

19.16 Draining Diesel Fuel Oil Storage Tank 1A2

19.17 Draining Diesel Fuel Oil Storage Tank 1B1

19.18 Draining Diesel Fuel Oil Storage Tank 1B2

FOR INFORMATION ONLY

VALVE NO.	VALVE NAME	COL LINE/ ELEV	POSITION	INITIAL
1FD-1	D/G Eng Fuel Oil Stor Tnk 1A1 Fill	YD	Locked Closed	
1FD-2	D/G Eng Fuel Oil Stor Tnk 1A2 Fill	YD	Locked Closed	
1FD-16	D/G Eng Fuel Oil Disposal	YD	Locked Closed	
1FD-12	D/G Eng Fuel Oil Stor Tnk 1A1 Recirc Inlet	YD	Closed	
1FD-13	D/G Eng Fuel Oil Stor Tnk 1A2 Recirc Inlet	YD	Closed	
1FD-11	D/G Eng Fuel Oil Recirc Filt 1 Byp	YD	Closed	
1FD-9	D/G Eng Fuel Oil Recirc Filt 1 Inlet	YD	Open	
1FD-10	D/G Eng Fuel Oil Recirc Filt 1 Outlet	YD	Open	
1FD-5	D/G Eng Fuel Oil Stor Tnk 1A1 Recirc Pmp Suct	YD	Closed	
1FD-6	D/G Eng Fuel Oil Stor Tnk 1A2 Recirc Pmp Suct	YD	Closed	
1FD-8	D/G Eng Fuel Oil Recirc Pmp Disch Drain	YD	Locked Closed	
1FD-41	D/G Eng Fuel Oil Stor Tnk 1B1 Fill	YD	Locked Closed	
1FD-42	D/G Eng Fuel Oil Stor Tnk 1B2 Fill	YD	Locked Closed	
1FD-52	D/G Eng Fuel Oil Stor Tnk 1B1 Recirc Inlet	YD	Closed	
1FD-53	D/G Eng Fuel Oil Stor Tnk 1B2 Recirc Inlet	YD	Closed	
1FD-45	D/G Eng Fuel Oil Stor Tnk 1B1 Recirc Pmp Suct	YD	Closed	
1FD-46	D/G Eng Fuel Oil Stor Tnk 1B2 Recirc Pmp Suct	YD	Closed	
*	One of the following tank outlets Open, one Closed			
1FD-20	D/G Eng Fuel Oil Stor Tnk 1A1 Outlet	DB	*Open/ Closed	

FOR INFORMATION ONLY

VALVE NO.	VALVE NAME	COL LINE/ ELEV	POSITION	INITIAL
1FD-21	D/G Eng Fuel Oil Stor Tnk 1A2 Outlet	DB	*Open/ Closed	
1FD-23	D/G Eng Fuel Oil Day Tnk 1A Fill Vlv Byp	DB	Closed	
1FD-47	D/G Eng Fuel Oil Day Tnk 1A Fill Vlv Isol	DB	Open	
1FD-48	D/G Eng Fuel Oil Day Tnk 1A Fill Vlv Isol	DB	Open	
1FD-24	D/G Eng Fuel Oil Day Tnk 1A Drain	DB	Closed	
1FD-30	D/G Eng Mtr Driven Fuel Oil Bstr Pmp 1A Suct	DB	Closed	
1FD-33	D/G Eng Mtr Driven Fuel Oil Bstr Pmp 1A Disch	DB	Closed	
1FD-85	D/G Eng Fuel Oil Stor Tnk 1A1 Isol	DB	Locked Open	
1FD-86	D/G Eng Fuel Oil Stor Tnk 1A2 Isol	DB	Locked Open	
1FD-89	D/G Fuel Oil Stor Tnk 1A1 and 1A2 Outlet Lo Point Drain	DB	Closed	
1FD-91	1A D/G Eng Fuel Oil Stor Tanks Outlet Hdr Vent	DB	Closed	
	* One of the following tank outlets Open, one Closed			
1FD-60	D/G Eng Fuel Oil Stor Tnk 1B1 Outlet	DB	*Open/ Closed	
1FD-61	D/G Eng Fuel Oil Stor Tnk 1B2 Outlet	DB	*Open/ Closed	
1FD-63	D/G Eng Fuel Oil Day Tnk 1B Fill Vlv Byp	DB	Closed	
1FD-49	D/G Eng Fuel Oil Day Tnk 1B Fill Vlv Isol	DB	Open	
1FD-50	D/G Eng Fuel Oil Day Tnk 1B Fill Vlv Isol	DB	Open	
1FD-64	D/G Eng Fuel Oil Day Tnk 1B Drain	DB	Closed	
1FD-70	D/G Eng Mtr Driven Fuel Oil Bstr Pmp 1B Suct	DB	Closed	

Form 18768 (RB-81)

OP/1/A/6550/01
VALVE CHECKLIST
ENCLOSURE 19.1

FOR INFORMATION ONLY

VALVE NO.	VALVE NAME	COL LINE/ ELEV	POSITION	INITIAL
1FD-73	D/G Eng Mtr Driven Fuel Oil Bstr Pmp 1B Disch	DB	Closed	
1FD-87	D/G Eng Fuel Oil Stor Tnk 1B1 Isol	DB	Locked Open	
1FD-88	D/G Eng Fuel Oil Stor Tnk 1B2 Isol	DB	Locked Open	
1FD-90	D/G Fuel Oil Stor Tnk 1B1 and 1B2 Outlet Lo Point Drain	DB	Closed	
1FD-92	D/G Fuel Oil Stor Tanks Outlet Hdr Vent	DB	Closed	

OP/1/A/6550/01

INDEPENDENT VERIFICATION VALVE CHECKLIST

ENCLOSURE 19.2

FOR INFORMATION ONLY

VALVE NO.	VALVE NAME	COL LINE/ ELEV	POSITION	INITIAL
*	One of the following tank outlets Open, one Closed. Ensure that the tank outlet verified in the Open			
	position corresponds to the same valve selected as Open on the valve checklist (Enclosure 19.1).			
1FD-20	D/G Eng Fuel Oil Stor Tnk 1A1 Outlet	DB	*Open/ Closed	
1FD-21	D/G Eng Fuel Oil Stor Tnk 1A2 Outlet	DB	*Open/ Closed	
1FD-23	D/G Eng Fuel Oil Day Tnk 1A Fill Vlv Byp	DB	Closed	
1FD-47	D/G Eng Fuel Oil Day Tnk 1A Fill Vlv Isol	DB	Open	
1FD-48	D/G Eng Fuel Oil Day Tnk 1A Fill Vlv Isol	DB	Open	
1FD-24	D/G Eng Fuel Oil Day Tnk 1A Drain	DB	Closed	
1FD-30	D/G Eng Mtr Driven Fuel Oil Bstr Pmp 1A Suct	DB	Closed	
1FD-33	D/G Eng Mtr Driven Fuel Oil Bstr Pmp 1A Disch	DB	Closed	
1FD-85	D/G Eng Fuel Oil Stor Tnk 1A1 Isol	DB	Locked Open	
1FD-86	D/G Eng Fuel Oil Stor Tnk 1A2 Isol	DB	Locked Open	
1FD-89	D/G Fuel Oil Stor Tnk 1A1 and 1A2 Outlet Lo Point Drain	DB	Closed	
*	One of the following tank outlets Open, one Closed. Ensure that the tank outlet verified in the Open			
	position corresponds to the same valve selected as Open on the valve checklist (Enclosure 19.1).			
1FD-60	D/G Eng Fuel Oil Stor Tnk 1B1 Outlet	DB	*Open/ Closed	
1FD-61	D/G Eng Fuel Oil Stor Tnk 1B2 Outlet	DB	*Open/ Closed	
1FD-63	D/G Eng Fuel Oil Day Tnk 1B Fill Vlv Byp	DB	Closed	
1FD-49	D/G Eng Fuel Oil Day Tnk 1B Fill Vlv Isol	DB	Open	

OP/1/A/6550/01
INDEPENDENT VERIFICATION VALVE CHEC. SHEET
ENCLOSURE 19.2

FOR INFORMATION ONLY

VALVE NO.	VALVE NAME	COL LINE/ ELEV	POSITION	INITIAL
1FD-50	D/G Eng Fuel Oil Day Tnk 1B Fill Vlv Isol	DB	Open	
1FD-64	D/G Eng Fuel Oil Day Tnk 1B Drain	DB	Closed	
1FD-70	D/G Eng Mtr Driven Fuel Oil Bstr Pmp 1B Suct	DB	Closed	
1FD-73	D/G Eng Mtr Driven Fuel Oil Bstr Pmp 1B Disch	DB	Closed	
1FD-87	D/G Eng Fuel Oil Stor Tnk 1B1 Isol	DB	Locked Open	
1FD-88	D/G Eng Fuel Oil Stor Tnk 1B2 Isol	DB	Locked Open	
1FD-90	D/G Fuel Oil Stor Tnk 1B1 and 1B2 Outlet Lo Point Drain	DB	Closed	

4.0 FILLING DIESEL FUEL OIL STORAGE TANK 1A1

FOR INFORMATION ONLY

Date Time/Initial	Date Time/Initial		
		4.1	Initial Conditions
		NOTE:	Initial Condition 4.1.1 may require shifting tanks per Section 8.0.
_____	_____	4.1.1	1FD-20 (D/G Eng Fuel Oil Stor Tnk 1A1 Outlet) is closed.
	_____	4.1.2	Recirculation of Tank 1A1 is not in progress.
	_____	4.1.3	D/G Fuel Oil System aligned per Section 3.0 of this procedure.
		4.2	Procedure
	_____	4.2.1	Complete Enclosure 19.14 (Receiving Checklist).
	_____	4.2.2	Ground the tanker to the fuel oil piping.
	_____	4.2.3	Notify Chemistry to place D/G Catchment Sump Pumps in "OFF" to prevent pumping any spilled oil.
	_____	4.2.4	After Chemistry has verified the fuel oil to be acceptable, obtain the flexible fill line hose from the lube oil storage house and connect it between the outlet of the fuel oil fill line filter located on the fill station pad and the fill line for Storage Tank 1A1. Also connect the tanker lines to the inlet of the fuel oil fill line filter.
	_____	4.2.5	Unlock and open 1FD-1 (D/G Eng Fuel Oil Storage Tank 1A1 Fill) and start filling tank.
	_____	4.2.6	When tanker empties or fuel oil tank is full, stop fill operation. Drain any fuel oil that remains in the fill lines into the fuel oil tank.
	_____	4.2.7	Close and lock 1FD-1 (D/G Eng Fuel Oil Storage Tank 1A1 Fill).
	_____	4.2.8	Disconnect tanker lines and flexible fill hose from fuel oil fill line filter and applicable fill line.
	_____	4.2.9	Compare tank level indications to value obtained on Enclosure 19.14 (5C) to verify level increase is equivalent to amount stated on receiving ticket.
	_____	4.2.10	Notify Chemistry to return the D/G Catchment Sump Pumps control switches to the "AUTO" position. This will return the pumps to their normal alignment.
	_____	4.2.11	Clean up any fuel oil that may have been spilled.

FOR INFORMATION ONLY

Date
Time/Initials

_____ 4.2.12 Route receiving ticket to Shift Supervisor.

_____ 4.2.13 Allow 24 hours for the fuel oil tank contents to settle before signing off this step as complete. At that time the fuel oil storage tank may be considered available for normal service.

NOTE: At this point, the D/G Fuel Oil System has been returned to normal alignment per Section 3.0 of this procedure.

5.0 FILLING DIESEL FUEL OIL STORAGE TANK 1A2

FOR INFORMATION ONLY

Date Time/Initial	Date Time/Initial		
		5.1	Initial Conditions
		NOTE:	Initial Condition 5.1.1 may require shifting tanks per Section 8.0.
_____	_____	5.1.1	1FD-21 (D/G Eng Fuel Oil Stor Tnk 1A2 Outlet) is closed.
	_____	5.1.2	Recirculation of Tank 1A2 is not in progress
	_____	5.1.3	D/G Fuel Oil System aligned per Section 3.0 of this procedure.
		5.2	Procedure
	_____	5.2.1	Complete Enclosure 19.14 (Receiving Checklist).
	_____	5.2.2	Ground the tanker to the fuel oil piping.
	_____	5.2.3	Notify Chemistry to place D/G Catchment Sump Pumps in "OFF" to prevent pumping any spilled oil.
	_____	5.2.4	After Chemistry has verified the fuel oil to be acceptable, obtain the flexible fill line hose from the lube oil storage house and connect it between the outlet of the fuel oil fill line filter located on the fill station pad and the fill line for Storage Tank 1A2. Also connect the tanker lines to the inlet of the fuel oil fill line filter.
	_____	5.2.5	Unlock and open 1FD-2 (D/G Eng Fuel Oil Storage Tank 1A2 Fill) and start filling tank.
	_____	5.2.6	When tanker empties or fuel oil tank is full, stop fill operation. Drain any fuel oil that remains in the fill lines into the fuel oil tank.
	_____	5.2.7	Close and lock 1FD-2 (D/G Eng Fuel Oil Storage Tank 1A2 Fill).
	_____	5.2.8	Disconnect tanker lines and flexible fill hose from fuel oil fill line filter and applicable fill line.
	_____	5.2.9	Compare tank level indications to value obtained on Enclosure 19.14 (5C) to verify level increase is equivalent to amount stated on receiving ticket.
	_____	5.2.10	Notify Chemistry to return the D/G Catchment Sump Pumps control switches to the "AUTO" position. This will return the pumps to their normal alignment.
	_____	5.2.11	Clean up any fuel oil that may have been spilled.

FOR INFORMATION ONLY

Date
Time/Initials

_____ 5.2.12 Route receiving ticket to Shift Supervisor.

_____ 5.2.13 Allow 24 hours for the fuel oil tank contents to settle before signing off this step as complete. At that time the fuel oil storage tank may be considered available for normal service.

NOTE: At this point, the D/G Fuel Oil System has been returned to normal alignment per Section 3.0 of this procedure.

FILLING DIESEL FUEL OIL STORAGE TANK 1B1
ENCLOSURE 19.5

FOR INFORMATION ONLY

6.0 FILLING DIESEL FUEL OIL STORAGE TANK 1B1

Date Time/Initial	Date Time/Initial		
		6.1	Initial Conditions
		NOTE:	Initial condition 6.1.1 may require shifting tanks per Section 9.0.
_____	_____	6.1.1	1FD-60 (D/G Eng Fuel Oil Stor Tnk 1B1 Outlet) is closed.
	_____	6.1.2	Recirculation of Tank 1B1 is not in progress
	_____	6.1.3	D/G Fuel Oil System aligned per Section 3.0 of this procedure.
		6.2	Procedure
	_____	6.2.1	Complete Enclosure 19.14 (Receiving Checklist).
	_____	6.2.2	Ground the tanker to the fuel oil piping.
	_____	6.2.3	Notify Chemistry to place D/G Catchment Sump Pumps in "OFF" to prevent pumping any spilled oil.
	_____	6.2.4	After Chemistry has verified the fuel oil to be acceptable, obtain the flexible fill line hose from the lube oil storage house and connect it between the outlet of the fuel oil fill line filter located on the fill station pad and the fill line for Storage Tank 1B1. Also connect the tanker lines to the inlet of the fuel oil fill line filter.
	_____	6.2.5	Unlock and open 1FD-41 (D/G Eng Fuel Oil Storage Tank 1B1 Fill) and start filling tank.
	_____	6.2.6	When tanker empties or fuel oil tank is full, stop fill operation. Drain any fuel oil that remains in the fill lines into the fuel oil tank.
	_____	6.2.7	Close and lock 1FD-41 (D/G Eng Fuel Oil Storage Tank 1B1 Fill).
	_____	6.2.8	Disconnect tanker lines and flexible fill hose from fuel oil fill line filter and applicable fill line.
	_____	6.2.9	Compare tank level indications to value obtained on Enclosure 19.14 (5C) to verify level increase is equivalent to amount stated on receiving ticket.
	_____	6.2.10	Notify Chemistry to return the D/G Catchment Sump Pumps control switches to the "AUTO" position. This will return the pumps to their normal alignment.
	_____	6.2.11	Clean up any fuel oil that may have been spilled.

FOR INFORMATION ONLY

_____ 6.2.12 Route receiving ticket to Shift Supervisor.

_____ 6.2.13 Allow 24 hours for the fuel oil tank contents to settle before signing off this step as complete. At that time the fuel oil storage tank may be considered available for normal service.

NOTE: At this point, the D/G Fuel Oil System has been returned to normal alignment per Section 3.0 of this procedure.

FOR INFORMATION ONLY

7.0 FILLING DIESEL FUEL OIL STORAGE TANK 1B2

Date Time/Initial	Date Time/Initial		
		7.1	Initial Conditions
		NOTE:	Initial condition 7.1.1 may require shifting tanks per Section 9.0.
_____	_____	7.1.1	1FD-61 (D/G Eng Fuel Oil Stor Tnk 1B2 Outlet) is closed.
	_____	7.1.2	Recirculation of Tank 1B1 is not in progress
	_____	7.1.3	D/G Fuel Oil System aligned per Section 3.0 of this procedure.
		7.2	Procedure
	_____	7.2.1	Complete Enclosure 19.14 (Receiving Checklist).
	_____	7.2.2	Ground the tanker to the fuel oil piping.
	_____	7.2.3	Notify Chemistry to place D/G Catchment Sump Pumps in "OFF" to prevent pumping any spilled oil.
	_____	7.2.4	After Chemistry has verified the fuel oil to be acceptable, obtain the flexible fill line hose from the lube oil storage house and connect it between the outlet of the fuel oil fill line filter located on the fill station pad and the fill line for Storage Tank 1B2. Also connect the tanker lines to the inlet of the fuel oil fill line filter.
	_____	7.2.5	Unlock and open 1FD-42 (D/G Eng Fuel Oil Storage Tank 1B2 Fill) and start filling tank.
	_____	7.2.6	When tanker empties or fuel oil tank is full, stop fill operation. Drain any fuel oil that remains in the fill lines into the fuel oil tank.
	_____	7.2.7	Close and lock 1FD-42 (D/G Eng Fuel Oil Storage Tank 1B2 Fill).
	_____	7.2.8	Disconnect tanker lines and flexible fill hose from fuel oil fill line filter and applicable fill line.
	_____	7.2.9	Compare tank level indications to value obtained on Enclosure 19.14 (5C) to verify level increase is equivalent to amount stated on receiving ticket.
	_____	7.2.10	Notify Chemistry to return the D/G Catchment Sump Pumps control switches to the "AUTO" position. This will return the pumps to their normal alignment.
	_____	7.2.11	Clean up any fuel oil that may have been spilled.

FOR INFORMATION ONLY

_____ 7.2.12 Route receiving ticket to Shift Supervisor.

_____ 7.2.13 Allow 24 hours for the fuel oil tank contents to settle before signing off this step as complete. At that time the fuel oil storage tank may be considered available for normal service.

NOTE: At this point, the D/G Fuel Oil System has been returned to normal alignment per Section 3.0 of this procedure.

DIESEL GENERATOR FUEL OIL SYSTEM OPERATION
OP/1/A/6550/01
SHIFTING FUEL OIL STORAGE TANKS FOR D/G 1A
ENCLOSURE 19.7

FOR INFORMATION ONLY

8.0 SHIFTING FUEL OIL STORAGE TANKS FOR D/G 1A

Date Time/Initial	Date Time/Initial		
		8.1	Initial Conditions
_____		8.1.1	D/G Fuel Oil System aligned per Section 3.0 of this procedure.
_____		8.1.2	The tank to be aligned for service has not been filled or recirculated within the last 24 hours.
		8.2	Procedure
		CAUTION:	If The fuel oil storage tank has been recirculated or filled within the past 24 hours, do not align to the day tank.
		8.2.1	Shift from 1A1 to 1A2 as follows:
_____	_____	8.2.1.1	Close 1FD-20 (D/G Eng Fuel Oil Stor Tnk 1A1 Otlt)
_____	_____	8.2.1.2	Open: 1FD-21 (D/G Eng Fuel Oil Stor Tnk 1A2 Otlt)
		NOTE:	At this point the 1A2 fuel oil tank is in service. Shifting D/G Fuel Oil Storage Tanks does not alter alignment per Section 3.0 of this procedure.
		8.2.2	Shift from 1A2 to 1A1 as follows:
_____	_____	8.2.2.1	Close: 1FD-21 (D/G Eng Fuel Oil Stor Tnk 1A2 Otlt)
_____	_____	8.2.2.2	Open: 1FD-20 (D/G Eng Fuel Oil Stor Tnk 1A1 Otlt)
		NOTE:	At this point the 1A1 Fuel Oil Storage Tank is in service. Shifting D/G Fuel Oil Storage Tanks does not alter alignment per Section 3.0 of this procedure.

DIESEL GENERATOR FUEL OIL SYSTEM OPERATION
OP/1/A/6550/01
SHIFTING FUEL OIL STORAGE TANKS FOR D/G 1B
ENCLOSURE 19.8

FOR INFORMATION ONLY

9.0 SHIFTING FUEL OIL STORAGE TANKS FOR D/G 1B

Date Time/Initial	Date Time/Initial		
		9.1	Initial Conditions
	_____	9.1.1	D/G Fuel Oil System aligned per Section 3.0 of this procedure.
	_____	9.1.2	The tank to be aligned for service has not been filled or recirculated within the last 24 hours.
		9.2	Procedure
			CAUTION: If The fuel oil storage tank has been recirculated or filled within the past 24 hours, do not align to the day tank.
		9.2.1	Shift from 1B1 to 1B2 as follows:
_____	_____	9.2.1.1	Close:
			1FD-60 (D/G Eng Fuel Oil Stor Tnk 1B1 Otlt)
_____	_____	9.2.1.2	Open:
			1FD-61 (D/G Eng Fuel Oil Stor Tnk 1B2 Otlt)
			NOTE: At this point the 1B2 fuel oil storage tank is in service. Shifting D/G Fuel Oil storage tanks does not alter alignment per Section 3.0 of this procedure.
		9.2.2	Shift from 1B2 to 1B1 as follows:
_____	_____	9.2.2.1	Close:
			1FD-61 (D/G Eng Fuel Oil Stor Tnk 1B2 Otlt)
_____	_____	9.2.2.2	Open:
			1FD-60 (D/G Eng Fuel Oil Stor Tnk 1B1 Otlt)
			NOTE: At this point the 1B1 Fuel Oil Storage Tank is in service. Shifting D/G Fuel Oil Storage Tanks does not alter alignment per Section 3.0 of this procedure.

10.0 RECIRCULATING FUEL OIL STORAGE TANK 1A1

FOR INFORMATION ONLY

Date Time/Initial	Date Time/Initial		
		10.1	Initial Conditions
			CAUTION: Initial Condition 10.1.1 may require shifting tanks per Section 8.0.
_____	_____	10.1.1	1FD-20 (D/G Eng Fuel Oil Stor Tnk 1A1 Outlet) is closed.
	_____	10.1.2	D/G Fuel Oil System aligned per Section 3.0 of this procedure.
	_____	10.1.3	Neither D/G 1A nor D/G 1B are running.
			NOTE: D/G 1 A and D/G 1B engine controls are interlocked with the D/G Fuel Oil Recirc Pump Motor, so that whenever D/G 1A or D/G 1B is running or receiving a start signal from their respective D/G Load Sequencer, the D/G Fuel Oil Recirc Pump is automatically stopped and blocked from starting.
	_____	10.1.4	Level in 1A1, 1A2, 1B1 and 1B2 Fuel Oil Storage Tanks are above the Tech Spec limit as verified by the absence of "MAIN F. O. TANK TECH SPEC WARN" Annunciator alarm located on 1A D/G Panel C/7.
			NOTE: D/G Fuel Oil Recirc Pump Motor is interlocked with each Fuel Oil Storage Tank so that whenever any of the Fuel Oil Storage Tank levels have decreased to the Technical Specification point the D/G Fuel Oil Recirc Pump will be automatically stopped and blocked from starting.
		10.2	Procedure
	_____	10.2.1	Close Vent Valve (V-32) on the instrument line supplying 1FDPG5020 (D/G Fuel Oil Recirc Pmp Suct Press).
			NOTE: Vent Valve (V-32) will normally remain open to prevent overpressurization of the gauge as the fuel oil expands in the piping.
	_____	10.2.2	Open: 1FD-12 (D/G Eng Fuel Oil Stor Tank 1A1 Recirc Pump Inlet) 1FD-5 (D/G Eng Fuel Oil Stor Tank 1A1 Recirc Pump Suct)
	_____	10.2.3	Start D/G Eng Fuel Oil Recirc Pump.

Date
Time/Initials

FOR INFORMATION ONLY

_____ 10.2.4 Monitor Fuel Oil Recirc Filter D/P as indicated by the difference in pressure between 1FDPG 5031 (D/G Fuel Oil Recirc Filt Inlet Press) and 1FDPG 5030 (D/G Fuel Oil Recirc Filt Outlet Press) to insure flow.

_____ 10.2.5 Recirculate the fuel oil for 30 hours.

NOTE: At this point the D/G Fuel Oil Storage Tank 1A1 is in recirculation. Subsequent steps in this enclosure are to return the system to normal alignment.

_____ 10.2.6 At end of the recirculation period, stop the D/G Eng. Fuel Oil Recirc. Pump.

_____ 10.2.7 Close:

1FD-5 (D/G Fuel Oil Stor Tank 1A1 Recirc Pump Suct)
1FD-12 (D/G Fuel Oil Stor Tank 1A1 Recirc Inlet)

_____ 10.2.8 Open Vent Valve (V-32) on the instrument line supplying 1FDPG5020 (D/G Fuel Oil Recirc Pump).

_____ 10.2.9 Allow 24 hours for the Fuel Oil Storage Tank contents to settle before signing off this step as complete. At that time the Fuel Oil Storage Tank may be considered available for normal service.

NOTE: At this point, the D/G Fuel Oil System has been returned to normal alignment per Section 3.0 of this procedure.

11.0 RECIRCULATING FUEL OIL STORAGE TANK 1A2

FOR INFORMATION ONLY

Date Time/Initial | Date Time/Initial

11.1 Initial Conditions

CAUTION: Initial Condition 11.1.1 may require shifting tanks per Section 8.0.

_____ _____ 11.1.1 1FD-21 (D/G Eng Fuel Oil Stor Tnk Outlet) is closed.

_____ 11.1.2 D/G Fuel Oil System aligned per Section 3.0 of this procedure.

_____ 11.1.3 Neither D/G 1A nor D/G 1B are running.

NOTE: D/G 1 A and D/G 1B engine controls are interlocked with the D/G Fuel Oil Recirc Pump Motor, so that whenever D/G 1A or D/G 1B is running or receiving a start signal from their respective D/G Load Sequencer, the D/G Fuel Oil Recirc Pump is automatically stopped and blocked from starting.

_____ 11.1.4 Level in 1A1, 1A2, 1B1 and 1B2 Fuel Oil Storage Tanks are above the Tech Spec limit as verified by the absence of "MAIN F. O. TANK TECH SPEC WARN" Annunciator alarm located on 1A D/G Panel C/7.

NOTE: D/G Fuel Oil Recirc Pump Motor is interlocked with each Fuel Oil Storage Tank so that whenever any of the Fuel Oil Storage Tank levels have decreased to the Technical Specification point the D/G Fuel Oil Recirc Pump will be automatically stopped and blocked from starting.

11.2 Procedure

_____ 11.2.1 Close Vent Valve (V-32) on the instrument line supplying 1FDPG5020 (D/G Fuel Oil Recirc Pmp Suct Press).

NOTE: Vent Valve (V-32) will normally remain open to prevent overpressurization of the gauge as the fuel oil expands in the piping.

_____ 11.2.2 Open:

1FD-13 (D/G Eng Fuel Oil Stor Tank 1A2 Recirc Pump Inlet)
1FD-6 (D/G Eng Fuel Oil Stor Tank 1A2 Recirc Pump Suct)

_____ 11.2.3 Start D/G Eng Fuel Oil Recirc Pump.

FOR INFORMATION ONLY

Date
Time/Initial

_____ 11.2.4 Monitor Fuel Oil Recirc Filter D/P as indicated by the difference in pressure between 1FDPG 5031 (D/G Fuel Oil Recirc Filt Inlet Press) and 1FDPG 5030 (D/G Fuel Oil Recirc Filt Outlet Press) to insure flow.

11.2.5 Recirculate the fuel oil for 30 hours.

NOTE: At this point the D/G Fuel Oil Storage Tank 1A2 is in recirculation. Subsequent steps in this enclosure are to return the system to normal alignment.

_____ 11.2.6 At end of the recirculation period, stop the D/G Eng. Fuel Oil Recirc. Pump.

_____ 11.2.7 Close:

1FD-6 (D/G Fuel Oil Stor Tank 1A2 Recirc Pump Suct)
1FD-13 (D/G Fuel Oil Stor Tank 1A2 Recirc Inlet)

_____ 11.2.8 Open Vent Valve (V-32) on the instrument line supplying 1FDPG5020 (D/G Fuel Oil Recirc Pmp Suct Press).

_____ 11.2.9 Allow 24 hours for the Fuel Oil Storage Tank contents to settle before signing off this step as complete. At that time the Fuel Oil Storage Tank may be considered available for normal service.

NOTE: At this point, the D/G Fuel Oil System has been returned to normal alignment per Section 3.0 of this procedure.

12.0 RECIRCULATING FUEL OIL STORAGE TANK 1B1

FOR INFORMATION ONLY

Date Time/Initial | Date Time/Initial

12.1 Initial Conditions

CAUTION: Initial Conditions 12.1.1 may require shifting tanks per Section 9.0.

_____ _____ 12.1.1 1FD-60 (D/G Eng Fuel Oil Stor Tnk Outlet) is closed.

_____ 12.1.2 D/G Fuel Oil System aligned per Section 3.0 of this procedure.

_____ 12.1.3 Neither D/G 1A nor D/G 1B are running.

NOTE: D/G 1 A and D/G 1B engine controls are interlocked with the D/G Fuel Oil Recirc Pump Motor, so that whenever D/G 1A or D/G 1B is running or receiving a start signal from their respective D/G Load Sequencer, the D/G Fuel Oil Recirc Pump is automatically stopped and blocked from starting.

_____ 12.1.4 Level in 1A1, 1A2, 1B1 and 1B2 Fuel Oil Storage Tanks are above the Tech Spec limit as verified by the absence of "MAIN F. O. TANK TECH SPEC WARN" Annunciator alarm located on 1B D/G Panel C/7.

NOTE: D/G Fuel Oil Recirc Pump Motor is interlocked with each Fuel Oil Storage Tank so that whenever any of the Fuel Oil Storage Tank levels have decreased to the Technical Specification point the D/G Fuel Oil Recirc Pump will be automatically stopped and blocked from starting.

12.2 Procedure

_____ 12.2.1 Close Vent Valve (V-32) on the instrument line supplying 1FDPG5020 (D/G Fuel Oil Recirc Pmp Suct Press).

NOTE: Vent Valve (V-32) will normally remain open to prevent overpressurization of the gauge as the fuel oil expands in the piping.

_____ 12.2.2 Open:

1FD-45 (D/G Eng Fuel Oil Stor Tank 1B1 Recirc Pump Inlet)
1FD-52 (D/G Eng Fuel Oil Stor Tank 1B1 Recirc Pump Suct)

_____ 12.2.3 Start D/G Eng Fuel Oil Recirc Pump.

Date
Time/Initial

FOR INFORMATION ONLY

_____ 12.2.4 Monitor Fuel Oil Recirc Filter D/P as indicated by the difference in pressure between 1FDPG 5031 (D/G Fuel Oil Recirc Filt Inlet Press) and 1FDPG 5030 (D/G Fuel Oil Recirc Filt Outlet Press) to insure flow.

_____ 12.2.5 Recirculate the fuel oil for 30 hours.

NOTE: At this point the D/G Fuel Oil Storage Tank 1B1 is in recirculation. Subsequent steps in this enclosure are to return the system to normal alignment.

_____ 12.2.6 At end of the recirculation period, stop the D/G Eng. Fuel Oil Recirc. Pump.

_____ 12.2.7 Close:

1FD-52 (D/G Fuel Oil Stor Tank 1B1 Recirc Pump Suct)
1FD-45 (D/G Fuel Oil Stor Tank 1B1 Recirc Inlet)

_____ 12.2.8 Open Vent Valve (V-32) on the instrument line supplying 1FDPG5020 (D/G Fuel Oil Recirc Pmp Suct Press).

_____ 12.2.9 Allow 24 hours for the Fuel Oil Storage Tank contents to settle before signing off this step as complete. At that time the Fuel Oil Storage Tank may be considered available for normal service.

NOTE: At this point, the D/G Fuel Oil System has been returned to normal alignment per Section 3.0 of this procedure.

13.0 RECIRCULATING FUEL OIL STORAGE TANK 1B2

Date Time/Initial | Date Time/Initial

FOR INFORMATION ONLY

13.1 Initial Conditions

CAUTION: Initial Condition 13.1.1 may require shifting tanks per Section 9.0.

_____ _____ 13.1.1 1FD-61 (D/G Eng Fuel Oil Stor Tnk Outlet) is closed.

_____ 13.1.2 D/G Fuel Oil System aligned per Section 3.0 of this procedure.

_____ 13.1.3 Neither D/G 1A nor D/G 1B are running.

NOTE: D/G 1 A and D/G 1B engine controls are interlocked with the D/G Fuel Oil Recirc Pump Motor, so that whenever D/G 1A or D/G 1B is running or receiving a start signal from their respective D/G Load Sequencer, the D/G Fuel Oil Recirc Pump is automatically stopped and blocked from starting.

_____ 13.1.4 Level in 1A1, 1A2, 1B1 and 1B2 Fuel Oil Storage Tanks are above the Tech Spec limit as verified by the absence of "MAIN F. O. TANK TECH SPEC WARN" Annunciator alarm located on 1B D/G Panel C/7.

NOTE: D/G Fuel Oil Recirc Pump Motor is interlocked with each Fuel Oil Storage Tank so that whenever any of the Fuel Oil Storage Tank levels have decreased to the Technical Specification point the D/G Fuel Oil Recirc Pump will be automatically stopped and blocked from starting.

13.2 Procedure

_____ 13.2.1 Close Vent Valve (V-32) on the instrument line supplying 1FDPG5020 (D/G Fuel Oil Recirc Pmp Suct Press).

NOTE: Vent Valve (V-32) will normally remain open to prevent overpressurization of the gauge as the fuel oil expands in the piping.

_____ 13.2.2 Open:

1FD-46 (D/G Eng Fuel Oil Stor Tank 1B2 Recirc Pump Inlet)
1FD-53 (D/G Eng Fuel Oil Stor Tank 1B2 Recirc Pump Suct)

_____ 13.2.3 Start D/G Eng Fuel Oil Recirc Pump.

FOR INFORMATION ONLY

Date
Time/Initial

_____ 13.2.4 Monitor Fuel Oil Recirc Filter D/P as indicated by the difference in pressure between 1FDPG 5031 (D/G Fuel Oil Recirc Filt Inlet Press) and 1FDPG 5030 (D/G Fuel Oil Recirc Filt Outlet Press) to insure flow.

_____ 13.2.5 Recirculate the fuel oil for 30 hours.

NOTE: At this point the D/G Fuel Oil Storage Tank 1B2 is in recirculation. Subsequent steps in this enclosure are to return the system to normal alignment.

_____ 13.2.6 At end of the recirculation period, stop the D/G Eng. Fuel Oil Recirc. Pump.

_____ 13.2.7 Close:

1FD-46 (D/G Fuel Oil Stor Tank 1B2 Recirc Pump Suct)
1FD-53 (D/G Fuel Oil Stor Tank 1B2 Recirc Inlet)

_____ 13.2.8 Open Vent Valve (V-32) on the instrument line supplying 1FDPG5020 (D/G Fuel Oil Recirc Pmp Suct Press).

_____ 13.2.9 Allow 24 hours for the Fuel Oil Storage Tank contents to settle before signing off this step as complete. At that time the Fuel Oil Storage Tank may be considered available for normal service.

NOTE: At this point, the D/G Fuel Oil System has been returned to normal alignment per Section 3.0 of this procedure.

DI IL GENERATOR FUEL OIL SYSTEM O. ATION
OP/1/A/6550/01
REMOVAL OF CONDENSATE FROM FUEL OIL STORAGE TANKS
ENCLOSURE 19.13

FOR INFORMATION ONLY

14.0 REMOVAL OF CONDENSATE FROM FUEL OIL STORAGE TANKS

Date
Time/Initial

14.1 Initial Condition

_____ 14.1.1 Storage tank should not have been filled or recirculated in the last 24 hours.

_____ 14.1.2 D/G Fuel Oil System aligned per Section 3.0 of this procedure.

14.2 Procedure

_____ 14.2.1 Connect a barrel to the drain on 1FD-8 (D/G Eng Fuel Oil Recirc Pump Discharge Drain).

_____ 14.2.2 Close 1FD-9 (D/G Eng Fuel Oil Recirc Filt 1 Inlet).

_____ 14.2.3 Unlock and open 1FD-8 (D/G Eng Fuel Oil Recirc Pump Discharge Drain).

_____ 14.2.4 Close Vent Valve (V-32) on the instrument line supplying 1FDPG5020 (D/G Fuel Oil Recirc Pmp Suct Press).

NOTE: Vent Valve (V-32) will normally remain open to prevent overpressurization of the gauge as the fuel oil expands in the piping.

14.2.5 Open appropriate valve for tank that is going to have condensate removed from it:

_____ 14.2.5.1 For 1A1 Fuel Oil Tank:

Open 1FD-5 (D/G Eng Fuel Oil Stor Tank 1A1 Recirc Pump Suct).

_____ 14.2.5.2 For 1A2 Fuel Oil Tank:

Open 1FD-6 (D/G Eng Fuel Oil Stor Tank 1A2 Recirc Pump Suct).

_____ 14.2.5.3 For 1B1 Fuel Oil Tank:

Open 1FD-45 (D/G Eng Fuel Oil Stor Tank 1B1 Recirc Pump Suct).

_____ 14.2.5.4 For 1B2 Fuel Oil Tank:

Open 1FD-46 (D/G Eng Fuel Oil Stor Tank 1B2 Recirc Pump Suct).

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OP/1/A/6550/01
REMOVAL OF CONDENSATE FROM FUEL OIL STORAGE TANKS
ENCLOSURE 19.13

FOR INFORMATION ONLY

Date
Time/Initial

_____ 14.2.6 Start D/G Eng. Fuel Oil Recirc. Pump

_____ 14.2.7 Pump to barrel until clean fuel oil appears, then stop D/G Eng. Fuel Oil Recirc. Pump.

14.2.8 Close valve opened in Step 14.2.4 of this procedure.

_____ 14.2.8.1 For 1A1 Fuel Oil Tank:

Close 1FD-5 (D/G Eng Fuel Oil Stor Tank 1A1 Recirc Pump Suct).

_____ 14.2.8.2 For 1A2 Fuel Oil Tank:

Close 1FD-6 (D/G Eng Fuel Oil Stor Tank 1A2 Recirc Pump Suct).

_____ 14.2.8.3 For 1B1 Fuel Oil Tank:

Close 1FD-45 (D/G Eng Fuel Oil Stor Tank 1B1 Recirc Pump Suct).

_____ 14.2.8.4 For 1B2 Fuel Oil Tank:

Close 1FD-46 (D/G Eng Fuel Oil Stor Tank 1B2 Recirc Pump Suct).

_____ 14.2.9 Open Vent Valve (V-32) on the instrument line supplying 1FDPG5020 (D/G Fuel Oil Recirc Pmp Suct Press).

_____ 14.2.10 Close and lock 1FD-8 (D/G Eng Fuel Oil Recirc Pump Discharge Drain).

_____ 14.2.11 Open 1FD-9 (D/G Eng Fuel Oil Recirc Filt 1 Inlet).

_____ 14.2.12 Clean up any fuel oil that may have been spilled.

NOTE: At this point, the D/G Fuel Oil System has been returned to normal alignment per Section 3.0 of this procedure.

DIESEL GENERATOR FUEL OIL SYSTEM OPERATION
OP/1/A/6550/01
RECEIVING CHECKLIST
ENCLOSURE 19.14

FOR INFORMATION ONLY

Date
Time/Initial

_____ 1. Tank to be filled: 1A1, 1A2, 1B1 or 1B2 (Circle one).

_____ 2. Ensure outlet of tank to be filled is closed.

_____ 3. Verify shipping invoice states the tanker load consist of #2 Diesel Fuel Oil.

_____ 4. Prior to unloading tanker notify Chemistry to sample tanker and verify it contains #2 Diesel Fuel Oil per CP/0/B/8700/02 (Chemistry Procedure For Sampling Oil Systems).

_____ 5. Insure sufficient volume in tank to receive tanker by performing calculation below:

(A) Vol. of Oil in Tanker (Shipping invoice) _____
(B) Vol. of Oil in Storage Tank (+) _____
As read from Graph 7.10 (Diesel Generator Fuel Oil Stor Tank) in OP/1/A/6700/01 (Unit 1 Data Book).
(C) Total of A + B must be less than ~~43,000~~ 43000 gal. _____

Chg #2 Sta

DIESEL GENERATOR FUEL OIL SYSTEM OPERATION
OP/1/A/6530/01
DRAINING DIESEL FUEL OIL STORAGE TANK 1A1
ENCLOSURE 19.15

FOR INFORMATION ONLY

Date Time/Initial	Date Time/Initial		
_____	_____	15.2.7	Unlock and open: 1FD-16 (D/G Eng Fuel Oil Disposal)
	_____	15.2.8	Start D/G Eng Fuel Oil Recirc Pump
	_____	15.2.9	Ensure drainage occurs by monitoring tank level during draining using:
		15.2.9.1	1FDLT5000 (D/G Fuel Oil Stor Tnk 1A1 Level) until level indication reaches zero.
		NOTE:	Range of gauge does not encompass entire tank.
		15.2.9.2	1FDPG5020 (D/G Fuel Oil Recirc Pmp Suct Press). Note vacuum indication on gauge.
	_____	15.2.10	When vacuum sharply decreases or D/G Eng Fuel Oil Recirc Pump begins to make unusual noises, stop D/G Eng Fuel Oil Recirc Pump.
		NOTE:	Diesel Fuel Oil Storage Tank 1A1 is now drained. Subsequent steps are to secure the tank from draining.
_____	_____	15.2.11	Close and lock: 1FD-16 (D/G Eng Fuel Oil Disposal)
	_____	15.2.12	Close: 1FD-5 (D/G Eng Fuel Oil Stor Tnk 1A1 Recirc Pmp Suct)
	_____	15.2.13	Disconnect tanker lines and ground from Fuel Oil piping.
	_____	15.2.14	Open: 1FD-9 (D/G Eng Fuel Oil Recirc Filt Inlet) 1FD-10 (D/G Eng Fuel Oil Recirc Filt Outlet)
	_____	15.2.15	Close: 1FD-11 (D/G Eng Fuel Oil Recirc Filt 1 Bypass)
	_____	15.2.16	Open Vent Valve (V-32) on the instrument line supplying 1FDPG5020 (D/G Fuel Oil Recirc Pmp Suct Press).
		NOTE:	Diesel Fuel Oil Storage Tank 1A1 is now secured from draining.

DIESEL GENERATOR FUEL OIL SYSTEM OPERATION
OP/1/A/6550/01
DRAINING DIESEL FUEL OIL STORAGE TANK 1A1
ENCLOSURE 19.15

15.0 DRAINING DIESEL FUEL OIL STORAGE TANK 1A1

FOR INFORMATION ONLY

Date Time/Initial | Date Time/Initial

15.1 Initial Conditions

CAUTION: Draining Diesel Fuel Oil Storage Tank 1A1 can cause violation of Tech Spec 3.8.1.1.

CAUTION: Initial Condition 15.1.1 may require shifting tanks per Section 8.0.

_____ _____ 15.1.1 1FD-20 (D/G Eng Fuel Oil Stor Tank 1A1 Outlet) is closed.

_____ 15.1.2 D/G Fuel Oil System aligned per Section 3.0 of the procedure.

_____ 15.1.3 Neither D/G 1A nor D/G 1B are running.

15.2 Procedure

_____ 15.2.1 Close or verify closed:

1FD-9 (D/G Eng Fuel Oil Recirc Filt Inlet)
1FD-10 (D/G Eng Fuel Oil Recirc Filt Outlet)
1FD-12 (D/G Eng Fuel Oil Stor Tank 1A1 Recirc Pump Inlet)
1FD-13 (D/G Eng Fuel Oil Stor Tnk 1A2 Recirc Pump Inlet)
1FD-52 (D/G Eng Fuel Oil Stor Tnk 1B1 Recirc Pump Inlet)
1FD-53 (D/G Eng Fuel Oil Stor Tnk 1B2 Recirc Pump Inlet)

_____ 15.2.2 Ground the tanker to the Fuel Oil piping.

_____ 15.2.3 Open:

1FD-11 (D/G Eng Fuel Oil Recirc Filt 1 Bypass)

_____ 15.2.4 Connect tanker lines to tank disposal connection.

_____ 15.2.5 Close Vent Valve (V-32) on the instrument line supplying 1FDPG5020 (D/G Fuel Oil Recirc Pmp Suct Press).

NOTE: Vent Valve (V-32) will normally remain open to prevent overpressurization of the gauge as the fuel oil expands in the piping.

_____ 15.2.6 Open:

1FD-5 (D/G Eng Fuel Oil Stor Tnk 1A1 Recirc Pmp Suct)

DIESEL GENERATOR FUEL OIL SYSTEM OPERATION
OP/1/A/6550/01
DRAINING DIESEL FUEL OIL STORAGE TANK 1A2
ENCLOSURE 19.16

16.0 DRAINING DIESEL FUEL OIL STORAGE TANK 1A2

FOR INFORMATION ONLY

Date Time/Initial | Date Time/Initial

16.1 Initial Conditions

CAUTION: Draining Diesel Fuel Oil Storage Tank 1A2 can cause violation of Tech Spec 3.8.1.1.

CAUTION: Initial Condition 16.1.1 may require shifting tanks per Section 8.0.

_____ _____ 16.1.1 1FD-21 (D/G Eng Fuel Oil Stor Tank 1A2 Outlet) is closed.

_____ 16.1.2 D/G Fuel Oil System aligned per Section 3.0 of the procedure.

_____ 16.1.3 Neither D/G 1A nor D/G 1B are running.

16.2 Procedure

_____ 16.2.1 Close or verify closed:

1FD-9 (D/G Eng Fuel Oil Recirc Filt Inlet)
1FD-10 (D/G Eng Fuel Oil Recirc Filt Outlet)
1FD-12 (D/G Eng Fuel Oil Stor Tank 1A1 Recirc Pump Inlet)
1FD-13 (D/G Eng Fuel Oil Stor Tnk 1A2 Recirc Pump Inlet)
1FD-52 (D/G Eng Fuel Oil Stor Tnk 1B1 Recirc Pump Inlet)
1FD-53 (D/G Eng Fuel Oil Stor Tnk 1B2 Recirc Pump Inlet)

_____ 16.2.2 Ground the tanker to the Fuel Oil piping.

_____ 16.2.3 Open:

1FD-11 (D/G Eng Fuel Oil Recirc Filt 1 Bypass)

_____ 16.2.4 Connect tanker lines to tank disposal connection.

_____ 16.2.5 Close Vent Valve (V-32) on the instrument line supplying 1FDPG5020 (D/G Fuel Oil Recirc Pmp Suct Press).

NOTE: Vent Valve (V-32) will normally remain open to prevent overpressurization of the gauge as the fuel oil expands in the piping.

_____ 16.2.6 Open:

1FD-6 (D/G Eng Fuel Oil Stor Tnk 1A2 Recirc Pmp Suct)

DIESEL GENERATOR FUEL OIL SYSTEM OPERATION
OP/1/A/6550/01
DRAINING DIESEL FUEL OIL STORAGE TANK 1A2
ENCLOSURE 19.16

FOR INFORMATION ONLY

Date Time/Initial	Date Time/Initial		
_____	_____	16.2.7	Unlock and open: 1FD-16 (D/G Eng Fuel Oil Disposal)
	_____	16.2.8	Start D/G Eng Fuel Oil Recirc Pump
	_____	16.2.9	Ensure drainage occurs by monitoring tank level during draining using:
		16.2.9.1	1FDLT5010 (D/G Fuel Oil Stor Tnk 1A2 Level) until level indication reaches zero.
		NOTE:	Range of gauge does not encompass entire tank.
		16.2.9.2	1FDPG5020 (D/G Fuel Oil Recirc Pmp Suct Press). Note vacuum indication on gauge.
	_____	16.2.10	When vacuum sharply decreases or D/G Eng Fuel Oil Recirc Pump begins to make unusual noises, stop D/G Eng Fuel Oil Recirc Pump.
		NOTE:	Diesel Fuel Oil Storage Tank 1A2 is now drained. Subsequent steps are to secure the tank from draining.
_____	_____	16.2.11	Close and lock: 1FD-16 (D/G Eng Fuel Oil Disposal)
	_____	16.2.12	Close: 1FD-6 (D/G Eng Fuel Oil Stor Tank 1A2 Recirc Pmp Suct)
	_____	16.2.13	Disconnect tanker lines and ground from Fuel Oil piping.
	_____	16.2.14	Open: 1FD-9 (D/G Eng Fuel Oil Recirc Filt Inlet) 1FD-10 (D/G Eng Fuel Oil Recirc Filt Outlet)
	_____	16.2.15	Close: 1FD-11 (D/G Eng Fuel Oil Recirc Filt 1 Bypass)
	_____	16.2.16	Open Vent Valve (V-32) on the instrument line supplying 1FDPG5020 (D/G Fuel Oil Recirc Pump Suct Press).
		NOTE:	Diesel Fuel Oil Storage Tank 1A2 is now secured from draining.

DIESEL GENERATOR FUEL OIL SYSTEM OPERATION
OP/1/A/6550/01
DRAINING DIESEL FUEL OIL STORAGE TANK 1B1
ENCLOSURE 19.17

FOR INFORMATION ONLY

17.0 DRAINING DIESEL FUEL OIL STORAGE TANK 1B1

Date
Time/Initial Time/Initial

17.1 Initial Conditions

CAUTION: Draining Diesel Fuel Oil Storage Tank 1B1 can cause violation of Tech Spec 3.8.1.1.

CAUTION: Initial Condition 17.1.1 may require shifting tanks per Section 8.0.

_____ _____ 17.1.1 1FD-60 (D/G Eng Fuel Oil Stor Tank 1B1 Outlet) is closed.

_____ 17.1.2 D/G Fuel Oil System aligned per Section 3.0 of the procedure.

_____ 17.1.3 Neither D/G 1A nor D/G 1B are running.

17.2 Procedure

_____ 17.2.1 Close or verify closed:

1FD-9 (D/G Eng Fuel Oil Recirc Filt Inlet)
1FD-10 (D/G Eng Fuel Oil Recirc Filt Outlet)
1FD-12 (D/G Eng Fuel Oil Stor Tank 1A1 Recirc Pump Inlet)
1FD-13 (D/G Eng Fuel Oil Stor Tnk 1A2 Recirc Pump Inlet)
1FD-52 (D/G Eng Fuel Oil Stor Tnk 1B1 Recirc Pump Inlet)
1FD-53 (D/G Eng Fuel Oil Stor Tnk 1B2 Recirc Pump Inlet)

_____ 17.2.2 Ground the tanker to the Fuel Oil piping.

_____ 17.2.3 Open:

1FD-11 (D/G Eng Fuel Oil Recirc Filt 1 Bypass)

_____ 17.2.4 Connect tanker lines to tank disposal connection.

_____ 17.2.5 Close Vent Valve (V-32) on the instrument line supplying 1FDPG5020 (D/G Fuel Oil Recirc Pmp Suct Press).

NOTE: Vent Valve (V-32) will normally remain open to prevent overpressurization of the gauge as the fuel oil expands in the piping.

_____ 17.2.6 Open:

1FD-45 (D/G Eng Fuel Oil Stor Tnk 1B1 Recirc Pmp Suct)

DIESEL GENERATOR FUEL OIL SYSTEM OPERATION
OP/1/A/6550/01
DRAINING DIESEL FUEL OIL STORAGE TANK 1B1
ENCLOSURE 19.17

FOR INFORMATION ONLY

Date Time/Initial	Date Time/Initial		
_____	_____	17.2.7	Unlock and open: 1FD-16 (D/G Eng Fuel Oil Disposal)
	_____	17.2.8	Start D/G Eng Fuel Oil Recirc Pump
	_____	17.2.9	Ensure drainage occurs by monitoring tank level during draining using:
		17.2.9.1	1FDLT5160 (D/G Fuel Oil Stor Tnk 1B1 level) until level indication reaches zero.
		NOTE:	Range of gauge does not encompass entire tank.
		17.2.9.2	1FDPG5020 (D/G Fuel Oil Recirc Pmp Suct Press). Note vacuum indication on gauge.
	_____	17.2.10	When vacuum sharply decreases or D/G Eng Fuel Oil Recirc Pump begins to make unusual noises, stop D/G Eng Fuel Oil Recirc Pump.
		NOTE:	Diesel Fuel Oil Storage Tank 1B1 is now drained. Subsequent steps are to secure the tank from draining.
_____	_____	17.2.11	Close and lock: 1FD-16 (D/G Eng Fuel Oil Disposal)
	_____	17.2.12	Close: 1FD-45 (D/G Eng Fuel Oil Stor Tank 1B1 Recirc Pmp Suct)
	_____	17.2.13	Disconnect tanker lines and ground from Fuel Oil piping.
	_____	17.2.14	Open: 1FD-9 (D/G Eng Fuel Oil Recirc Filt Inlet) 1FD-10 (D/G Eng Fuel Oil Recirc Filt Outlet)
	_____	17.2.15	Close: 1FD-11 (D/G Eng Fuel Oil Recirc Filt 1 Bypass)
	_____	17.2.16	Open Vent Valve (V-32) on the instrument line supplying 1FDPG5020 (D/G Fuel Oil Recirc Pmp Suct Press).
		NOTE:	Diesel Fuel Oil Storage Tank 1B1 is now secured from draining.

DIESEL GENERATOR FUEL OIL SYSTEM OPERATION
OP/1/A/6550/01
DRAINING DIESEL FUEL OIL STORAGE TANK 1B2
ENCLOSURE 19.18

18.0 DRAINING DIESEL FUEL OIL STORAGE TANK 1B2

FOR INFORMATION ONLY

Date Time/Initial	Date Time/Initial		
		18.1	Initial Conditions
		CAUTION:	Draining Diesel Fuel Oil Storage Tank 1B2 can cause violation of Tech Spec 3.8.1.1.
		CAUTION:	Initial Condition 18.1.1 may require shifting tanks per Section 8.0.
_____	_____	18.1.1	1FD-61 (D/G Eng Fuel Oil Stor Tank 1B2 Outlet) is closed.
	_____	18.1.2	D/G Fuel Oil System aligned per Section 3.0 of the procedure.
	_____	18.1.3	Neither D/G 1A nor D/G 1B are running.
		18.2	Procedure
	_____	18.2.1	Close or verify closed: 1FD-9 (D/G Eng Fuel Oil Recirc Filt Inlet) 1FD-10 (D/G Eng Fuel Oil Recirc Filt Outlet) 1FD-12 (D/G Eng Fuel Oil Stor Tank 1A1 Recirc Pump Inlet) 1FD-13 (D/G Eng Fuel Oil Stor Tnk 1A2 Recirc Pump Inlet) 1FD-52 (D/G Eng Fuel Oil Stor Tnk 1B1 Recirc Pump Inlet) 1FD-53 (D/G Eng Fuel Oil Stor Tnk 1B2 Recirc Pump Inlet)
	_____	18.2.2	Ground the tanker to the Fuel Oil piping.
	_____	18.2.3	Open: 1FD-11 (D/G Eng Fuel Oil Recirc Filt 1 Bypass)
	_____	18.2.4	Connect tanker lines to tank disposal connection.
	_____	18.2.5	Close Vent Valve (V-32) on the instrument line supplying 1FDPG5020 (D/G Fuel Oil Recirc Pmp Suct Press).
		NOTE:	Vent Valve (V-32) will normally remain open to prevent overpressurization of the gauge as the fuel oil expands in the piping.
	_____	18.2.6	Open: 1FD-46 (D/G Eng Fuel Oil Stor Tnk 1B2 Recirc Pmp Suct)

DIESEL GENERATOR FUEL OIL SYSTEM OPERATION
OP/1/A/6550/01
DRAINING DIESEL FUEL OIL STORAGE TANK 1B2
ENCLOSURE 19.18

FOR INFORMATION ONLY

Date Time/Initial	Date Time/Initial		
	_____	18.2.7	Unlock and open: 1FD-16 (D/G Eng Fuel Oil Disposal)
	_____	18.2.8	Start D/G Eng Fuel Oil Recirc Pump
	_____	18.2.9	Ensure drainage occurs by monitoring tank level during draining using:
		18.2.9.1	1FDLT5170 (D/G Fuel Oil Stor Tnk 1B2 level) until level indication reaches zero.
		NOTE:	Range of gauge does not encompass entire tank.
		18.2.9.2	1FDPG5020 (D/G Fuel Oil Recirc Pmp Suct Press). Note vacuum indication on gauge.
	_____	18.2.10	When vacuum sharply decreases or D/G Eng Fuel Oil Recirc Pump begins to make unusual noises, stop D/G Eng Fuel Oil Recirc Pump.
		NOTE:	Diesel Fuel Oil Storage Tank 1B2 is now drained. Subsequent steps are to secure the tank from draining.
_____	_____	18.2.11	Close and lock: 1FD-16 (D/G Eng Fuel Oil Disposal)
	_____	18.2.12	Close: 1FD-46 (D/G Eng Fuel Oil Stor Tank 1B2 Recirc Pmp Suct)
	_____	18.2.13	Disconnect tanker lines and ground from Fuel Oil piping.
	_____	18.2.14	Open: 1FD-9 (D/G Eng Fuel Oil Recirc Filt Inlet) 1FD-10 (D/G Eng Fuel Oil Recirc Filt Outlet)
	_____	18.2.15	Close: 1FD-11 (D/G Eng Fuel Oil Recirc Filt 1 Bypass)
	_____	18.2.16	Open Vent Valve (V-32) on the instrument line supplying 1FDPG5020 (D/G Fuel Oil Recirc Pmp Suct Press).
		NOTE:	Diesel Fuel Oil Storage Tank 1B2 is now secured from draining.