ENCLOSURE 11 CONTAINS ~~PROPRIETARY INFORMATION –~~
~~WITHHOLD FROM PUBLIC DISCLOSURE IN ACCORDANCE WITH 10 CFR 2.390~~

2807 West County Road 75
Monticello, MN 55362

800.895.4999
xcelenergy.com

Xcel Energy®
RESPONSIBLE BY NATURE®

April 5, 2018

L-MT-18-013
10 CFR 72.7

ATTN: Document Control Desk
Director, Division of Spent Fuel Management
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Monticello Nuclear Generating Plant
Docket No. 50-263
Renewed Facility Operating License No. DPR-22
Independent Spent Fuel Storage Installation Docket No. 72-58

Response to Request for Additional Information Regarding Exemption Request for Nonconforming Dye Penetrant Examinations of Dry Shielded Canisters (DSCs) 11 through 15 (CAC No. 001028, EPID L-2017-LLE-0029)

References:

1) Letter from NSPM to NRC, "Exemption Request for Nonconforming Dye Penetrant Examinations of Dry Shielded Canisters (DSCs) 11 through 15", dated October 18, 2017 (ADAMS Accession No. ML17296A205)

2) Letter from NRC to NSPM, "First Request for Additional Information for Review of Exemption Request for Five Nonconforming Dry Shielded Canisters 11 through 15 (CAC No. 001028, Docket No. 72-58, EPID L-2017-LLE-0029)", dated March 6, 2018 (ADAMS Accession No. ML18065A545)

In accordance with 10 CFR 72.7, Northern States Power Company, a Minnesota corporation (NSPM), doing business as Xcel Energy, requested in Reference 1, a permanent exemption from the requirements of 10 CFR 72.212(a)(2), 10 CFR 72.212(b)(3), 10 CFR 72.212(b)(5)(i), 10 CFR 72.212(b)(11), and 10 CFR 72.214 for five NUHOMS® Dry Shielded Canisters (DSCs), designated DSCs 11-15, due to nonconforming dye penetrant (PT) examinations performed during the loading campaign that started in September 2013 at the Monticello Nuclear Generating Plant (MNGP). In Reference 2, the NRC provided a Request for Additional Information (RAI) regarding NSPM's application in Reference 1. Enclosure 1 to this letter provides NSPM's response to the NRC RAIs.

NMSS20
NMSS26

As detailed in Reference 1, NSPM determined that the integrity of the field closure welds for DSCs 11-15 can be reasonably assured. The dry shielded canister system employed by NSPM for MNGP provides multiple layers of defense in depth, for example fuel selection criteria, fuel cladding, approved designs, use of qualified materials, qualified multi-pass welding processes, qualified personnel and helium leak checks to assure weld integrity and confinement. NSPM has extensively analyzed all available evidence of the welds and welding process and identified potential indications, then postulated conservative hypothetical indications to assess uncertainties under design loading conditions to reveal the extensive available margin. Further, NSPM has utilized an independent industry weld expert to ensure a thorough understanding of the welds and welding processes. The enclosed RAI responses provide additional details that address NRC questions related to the exemption request and supporting analyses. These responses further exemplify the NSPM position that reasonable assurance exists that the canister welds are structurally acceptable and can perform all intended functions notwithstanding the nonconforming PT examinations on the closure welds.

Furthermore, NSPM maintains that with DSCs 11-15 loaded in their respective horizontal storage modules, the canisters are in their safest possible configuration.

Enclosure 2 provides Welding Procedure Specification (WPS) SS-8-M-TN, Revision 10. This WPS was used for the inner top cover plate (ITCP) and outer top cover plate (OTCP) welds on DSCs 11-16.

Enclosure 3 provides WPS SS-8-A-TN, Revision 8. This WPS was used for the ITCP and OTCP welds on DSCs 11-16.

Enclosure 4 provides Procedure Qualification Record (PQR) PQR-1, Revision 2. This PQR documents qualification of the welding procedure specifications used for the ITCP and OTCP welds on DSCs 11-16.

Enclosure 5 provides certified material test reports for the weld filler material heats used in the closure welding on DSCs 11-15.

Enclosure 6 provides procedure 12751-MNGP-OPS-01, "Spent Fuel Cask Welding: 61BT/BTH NUHOMS Canisters", Revision 0. This procedure was used to perform the closure welding on DSCs 11-16.

Enclosure 7 provides procedure 12751-MNGP-QP-9.201, "Visual Weld Examination", Revision 0. This procedure was used to perform the visual examinations of the closure welding performed on DSCs 11-16.

Enclosure 8 provides Structural Integrity Associates, Inc. (SIA) Report 1301415.403, "Assessment of Monticello Spent Fuel Canister Closure Plate Welds Based on Welding Video Records", Revision 2. This report documents the SIA assessment of the closure welding performed on DSCs 11-16 based on the review of weld head video records.

Enclosure 9 provides SIA Report 130415.402, "Review of TRIVIS INC Welding Procedures Used for Field Welds on the Transnuclear NUHOMS 61BTH Type 1 & 2 Transportable Canisters for BWR Fuel", Revision 0. This report documents the SIA assessment of the welding procedures used to perform the closure welding on DSCs 11-16.

Enclosure 10 provides welding data sheets and inspection records for the closure welding on DSCs 11-16.

Enclosure 11 provides a computer hard drive which contains the ANSYS files used to analyze DSCs 11-15 in Enclosures 6 and 7 to Reference 1. The files provided in Enclosure 11 contain proprietary information and are sought to be withheld from public disclosure in accordance with 10 CFR 2.390.

Enclosure 12 provides an affidavit executed by TN Americas, LLC (TN). As the owner of the proprietary information submitted in Enclosure 11, TN certifies that the enclosed proprietary information has been handled and classified as proprietary, is customarily held in confidence, and has been previously withheld from public disclosure. TN requests that the enclosed information be withheld from public disclosure in accordance with 10 CFR 2.390.

Enclosure 13 provides TN Calculation 11042-0207, "NUHOMS® 61BTH Type 1 DSC ITCP and OTCP Margin Evaluation for Maximum Weld Flaw", Revision 1. As a result of the response to the RAIs provided in Reference 2, NSPM determined it was necessary to revise the modeling descriptions presented in Section 4.1 of the calculation.

Enclosure 14 provides markup pages for the exemption request submitted in Reference 1. While developing the response to RAI ST-2, it was determined that it was necessary to revise the description of using stress in lieu of strain margin(s) of safety as a basis for demonstrating structural performance of DSCs 11-15 using the limit load and elastic-plastic analysis methodology in multiple places throughout the exemption request.

If there are any questions or if additional information is required, please contact Mr. Shane Jurek at (612) 330-5788.

Summary of Commitments

This letter makes no new commitments and no revisions to existing commitments.

Michael Jesse VP-Ops Support for

Timothy J. O'Connor
Senior Vice President and Chief Nuclear Officer
Northern States Power Company – Minnesota

Enclosures (14)

cc: Administrator, Region III, USNRC
NMSS Project Manager, USNRC
NRR Project Manager, Monticello, USNRC
Resident Inspector, Monticello, USNRC

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

EXEMPTION REQUEST FOR NONCONFORMING DYE PENETRANT EXAMINATIONS OF DRY SHIELDED CANISTERS (DSCS) 11 THROUGH 15

On October 18, 2017, Northern States Power Company, a Minnesota corporation (NSPM), doing business as Xcel Energy, submitted a request for a permanent exemption for the Monticello Nuclear Generating Plant (MNGP). Specifically, NSPM requested a permanent exemption from the requirements of 10 CFR 72.212(a)(2), 10 CFR 72.212(b)(3), 10 CFR 72.212(b)(5)(i), 10 CFR 72.212(b)(11), and 10 CFR 72.214 for five NUHOMS® Dry Shielded Canisters (DSCs), designated DSCs 11-15, due to nonconforming dye penetrant (PT) examinations performed during the loading campaign that started in September 2013. By letter dated March 6, 2018, the NRC requested the following additional information. The response to this request for additional information (RAI) is provided below.

Materials RAIs

RAI M-1

Provide the procedure qualification records for the welding procedure specifications (WPSs) used for the Inner Top Cover Plate (ITCP) and Outer Top Cover Plate (OTCP) welds. In Enclosure 3, these are listed as WPS SS-8-M-TN Revision 10 (machine GTAW) and SS-8-A-TN Revision 8 (manual GTAW).

Enclosure 1 of the exemption request states:

> Notwithstanding the nonconforming PT examinations, the weld closures of DSCs 11-15 were performed under a 10 CFR 50 Appendix B QA [Quality Assurance] program, such that the canister integrity is otherwise assured. Accordingly, welding materials were procured to quality requirements, welding processes were developed and qualified for the given configuration, and welders were appropriately qualified to the Code requirements.

The use of a qualified welding procedure is relied on to support the exemption request. However, observations from the review of the weld head videos appear to be inconsistent with expected observations when using a qualified welding procedure.

This information is needed to determine compliance with 10 CFR 72.122(a).

NSPM Response

WPSs SS-8-M-TN, Revision 10, and SS-8-A-TN, Revision 8, were used in the closure welding for DSCs 11-16. These documents are provided in Enclosures 2 and 3, respectively. Procedure qualification record (PQR) PQR-1, Revision 2, is identified as the supporting PQR for these two WPSs. PQR-1, Revision 2, is provided in Enclosure 4.

NSPM concludes that the welds were performed under a 10 CFR 50, Appendix B, Quality Assurance program such that the canister integrity is otherwise assured. The welds were performed by qualified welders using qualified welding procedures. Structural Integrity Associates (SIA), an engineering consulting firm with over 20 years of experience resolving spent fuel storage issues which employs industry experts in the areas of structural analysis and materials engineering among others, reviewed the welding performed via available video records and determined that the welding was performed consistent with the qualified procedures.

Welding procedures were qualified in accordance with Section IX of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code. As required by the Code, a test sample was welded and destructively tested to meet specific minimum requirements for procedure qualification. The WPS was prepared subsequently based on specific values of the essential variables used to weld the procedure qualification sample(s) having acceptable mechanical properties. The Code provides allowable ranges of the essential variables that can be used based on the parameters tested. Weld data sheets documented that the qualified and approved welding procedures were followed for all welds.

Machine weld head video files (VIDs) were reviewed by the chief welding engineer at SIA who is a fellow of the American Welding Society, has a doctorate in materials science engineering and 50 years of experience in the application of materials science to the electric utility industry, primarily in the nuclear power industry. The VID review examined the welding conditions used and determined, based on the chief welding engineer's extensive nuclear welding experience, that the welding arc length, the wire feed entry, the arc lengths achieved, and the molten weld puddle and deposit characteristics were consistent with expectations for the specified welding parameters.

The eight tack welds and all circumferential closure welds (both for the ITCP and OTCP that were available for review) utilized the WPS SS-8-M-TN, Revision 10, gas tungsten arc welding (GTAW) machine welding procedure. The use of the manual GTAW welding procedure was limited to localized repairs and for cleaning up the corners of the keyway welds. Manual welds had no arc video records for review; therefore, their review relied on viewing from long range shop floor cameras. It was determined that manual welding was used in some instances based on the observed arc shine.

Based on the preceding discussion, NSPM concludes that the observations from the review of the weld head videos are consistent with the use of qualified welding procedures.

RAI M-2

Provide the certified material test reports (CMTRs) for the weld filler material heats used in the closure lid welding for DSCs 11-15.

These heat numbers are identified as 737880, 736908 and 527221 in Enclosure 3: Structural Integrity Associates, INC. Report 700388.401, Revision 1, Evaluation of the Welds on

DSC 11-15, Page 3-23, Table 3-1, Welder ID numbers and filler metal heat numbers used [4, 5, 6, 7, 8, 9].

The use of a certified welding filler materials is relied on to support the exemption request. The CMTRs for these filler metals were not provided in the exemption request.

This information is needed to determine compliance with 10 CFR 72.122(b).

NSPM Response

Weld filler material heat numbers 527221, 736908, and 737880 were used in the closure lid welding for DSCs 11-16. The CMTRs for these weld filler material heats are provided in Enclosure 5.

RAI M-3

Provide the technical basis and evidence, such as measurements, of the actual thickness of the weld deposits on DSCs 11-15 to support the use of a weld deposit thickness that is greater than the weld design dimension.

The applicant stated that the inner top cover plate weld size (dimension of the weld throat) for DSC 16 was determined to be between 0.25 to 0.4" which is considerably larger than the minimum design thickness of 3/16 inch (i.e., 0.188"). The applicant stated that the increased ITCP weld size was considered applicable to DSCs 11-15. However, no evidence such as actual measurements of the ITCP welds were provided to support this assertion.

This information is needed to determine compliance with 10 CFR 72.122(b).

NSPM Response

NSPM determined there is a reasonable expectation that the ITCP welds on DSCs 11-15 have an actual thickness of 0.25". The technical basis supporting use of a weld deposit thickness greater than the weld design dimension of 3/16" is derived from the following items: the actual phased array ultrasonic testing (PAUT) weld measurements for DSC 16, review of the VIDs for the ITCP welds on DSCs 13 and 16 by the SIA chief welding engineer, the weld design/geometry and component fit-up as well as the physical requirements to accomplish the weld per the qualified welding process using the same GTAW machine, and use of a limited number of welders.

The NRC has previously reviewed and accepted the DSC 16 PAUT data including the understanding of the actual weld measurements by way of granting an exemption for DSC 16 on June 15, 2016 (Agencywide Document Access and Management System (ADAMS) Accession No. ML16167A035).

SIA's chief welding engineer reviewed the VIDs for the ITCP welds for DSCs 13 and 16. The chief welding engineer also provided an assessment of the physical welding process for this

weld design and geometry. The procedures used for the welding and visual examination (VT) inspections are included as Enclosure 6 and 7, respectively. For the ITCP welds, the weld groove volume is small and the deposition rate nearly fills the groove with the root pass alone. The chief welding engineer noted that the weld root gap varied slightly around the circumference due to fit-up and unequal weld shrinkage as a result of root tacking (eight equally spaced tacks applied by machine welding). The small changes in weld groove volume resulting from the root gap variation appeared to cause small fluctuations in the groove fill observed on the plate side of the groove edge. The observations supporting this effect were minor variations from slight underfill to slight overfill at the plate edge during the root bead. During welding, the tungsten position frequently was adjusted to manage the molten deposit. The root bead crown appeared to be relatively flat and fused into the shell wall. It was noted that the welding arc was positioned approximately midway across the groove during root bead welding.

The welding arc for the second weld bead was repositioned closer to the shell wall resulting in a deposit profile that is thickest at the shell wall tapering downward to the ITCP surface such that the molten material slightly washes over the edge of the ITCP. Weld pass 2, the cap pass, clearly overfilled the groove. The completed weld geometry is a partial penetration groove weld having an unequal leg length fillet cap. The SIA chief welding engineer also noted that the deposition rates for all beads appeared consistent based on a visual assessment of the welding travel speed and molten weld puddle size.

NSPM determined there is a reasonable expectation that the ITCP welds for DSCs 11-15 have an actual thickness of 0.25" because the weld groove height is 0.25", the confirmation from the as-measured data from DSC 16 PAUT, the consistency resulting from the adherence to the qualified weld procedure and techniques, a limited set of qualified welders using the same GTAW machine while implementing a controlled fit-up for the small weld groove volume, and maintenance of a consistent weld deposition rate. These considerations are supported by the PAUT measurements and assessment provided by the SIA chief welding engineer VID review of the DSCs 13 and 16 ITCP welds.

RAI M-4

Provide the following:

1. "Assessment of Monticello Spent Fuel Canister Closure Plate Welds based on Welding Video Records", R. Smith and N. Mohr, SI Report 1301415.403.R2, dated May 22, 2014.

2. Letter report from R. Smith (SI) to J. Becka (Xcel) on "Review of TRIVIS INC Welding Procedures used for Field Welds on the Transnuclear NUHOMS 61BTH Type 1 & 2 Transportable Canister for BWR Fuel", SI Report 1301415.402.R0, dated January 30, 2014.

3. The "welding data sheets" referenced in Enclosure 3 (Report 1700388.401.R1) Page 1-1, Section 1.0 INTRODUCTION, 4th paragraph.

References 1 and 2 are cited in multiple instances in Enclosure 3 and are used to support the assessment of potential defects in the DSC 11-15 welds. The summary of the weld head videos provided in Enclosure 3 Appendix C is a summary of the assessment and is also incomplete as there is no specific comments associated with the DSC-16 weld. A more detailed assessment of the welding videos and weld data sheets beyond what is summarized in the exemption request Enclosure 3 is necessary [to] assess the analysis provided for DSCs 11 through 15.

This information is needed to complete the review in accordance with 10 CFR 72.122(b).

NSPM Response

The requested documents identified as items 1 and 2 above are provided in Enclosures 8 and 9, respectively. The requested welding data sheets (item 3), in addition to inspection results, are provided in Enclosure 10.

The requested documents form part of the independent expert review of the welding that was performed by SIA. SIA was selected to perform these reviews based on their extensive knowledge and experience with the welding processes employed. Based on this expert review, NSPM determined that there is a reasonable expectation to conclude the closure welds performed on DSCs 11-15 are of sufficient quality to protect the health and safety of the public. This conclusion is based on the fact that the welding process used is expected to provide adequate quality welds, a video review confirmed that appropriate welding practices were used, the closure welds on DSC 16, as found by the NRC, provide reasonable assurance of adequate protection to the health and safety of the public, and the flaws identified via PAUT of DSC 16 are considered representative of potential flaws in DSCs 11-15. A description of the SIA review is provided below.

Enclosure 9 provides SIA report 1301415.402, Revision 0. This report documents a review of the welding procedures to determine if the welding process associated with the closure welds would produce suitable quality welds. The report concludes that the GTAW welds in DSCs 11-15 can reasonably be expected to be of good quality and free of injurious defects. This conclusion is based on the characteristics of the GTAW weld, the controls outlined for the welding program, and the fact that the welds and base metals are austenitic stainless steels.

Enclosure 8 provides SIA report 13014145.403, Revision 2. A summary of this report was included in the exemption request in Appendix C to Enclosure 1. This report documented a review of the weld quality by using the available weld head videos. This report provides a sampling of typical welding practices across the industry. Evidence of good welds being applied is ample and dominates the video. DSC 16 was demonstrated through PAUT and analysis to be acceptable even though SIA concluded, based on the review of available video records, it had the greatest likelihood for defects.

Appendix B to Enclosure 2 of the exemption request provided SIA report 1301415.405, Revision 0. This report performed a qualitative assessment of the likelihood that the welds

might contain unacceptable defects. The report concluded it was reasonable to expect the welds were free from large discontinuities based on many factors including the application of a proven and robust welding system designed specifically to support these canister field welds, use of ductile and easily weldable base materials, and the use of solid wire filler material designed for welding these base materials. The report included a review of literature regarding generation of defects in stainless steel weldments and concluded that the likelihood for large defects was not supported. The report concluded the most likely lack of fusion (LOF) defects would be intermittent in nature and not expected to have a through thickness dimension greater than one weld bead. These conclusions were confirmed by the PAUT performed on DSC 16.

Enclosure 3 to the exemption request provided SIA report 700388.401, Revision 1. A summary of this report was provided in Appendix C to Enclosure 1 of the exemption request. This report performed an evaluation using all available data including the shop floor videos and the available PAUT results to determine if the types and extent of flaw distributions found in DSC 16 were representative of DSCs 11-15. This report concluded that, based on the evidence developed by reviewing the videos and the rest of the available evidence, it was reasonable to conclude that the conditions determined for the closure welds in DSC 16 are representative of the welds in DSCs 11-15. The tabulated details for DSC 16 weld beads have been updated for the ITCP to separate the original start of bead 2 (VID-2) and the restart from the original keyway position after grinding (VID-3) and are provided below as Table 1 to better summarize the observations.

Table 1 – Updated DSC 16 Description of the ITCP to Shell Weld Beads Separating VID-2 and VID-3 [Note: VID-3 was a restart welded over the original keyway start of VID-2]

ITCP is Inner Top Cover Plate - 0.75" Thick Weld 3/16"high X 0.31"wide Weld Length (OTCP 66.25 x PI = 208") & (ITCP = 197") OTCP - Outer Top Cover Plate - 1.25" Thick Weld 5/8"high X 1.0"wide Siphon Vent Block 80.5" to 91.5" location of Weld starts)										
Weld Location	VID File Name	Date	Time Start	Time End	Duration (min)	Length (in)	TS (in/min) comp	Layer No.	Tungsten Bias	Comments
DSC-16 (VIDs Inner and Outer 16)										
ITCP to Shell	1	10/16/2013	9:24:19	10:29:42	65.5	197	3.0	1 (Root)	Lid	Some lack of fill to shell side wall.
ITCP to Shell	2	10/16/2013	11:14:48	11:20:04	6	18	3.0	2	Shell	Difficulties with wire feed guide position. Stopped and restarted from beginning at keyway.
ITCP to Shell	3	10/17/2013	11:26:40	12:32:08	66	197	3.0	2	Shell	Weld pool running ahead of arc. Electrode wanders away from sidewall.
OTCP to Shell	3	10/17/2013	9:39:40	10:50:18	70	208	3.0	1 (Root)	Lid	Visible surface oxidation of weld bead.
OTCP to Shell	5	10/17/2013	11:50:32	12:56:10	66	208	3.2	2	Shell	Visible surface oxidation of weld bead. Gaps in crown of first bead along shell side wall.
OTCP to Shell	6	10/17/2013	13:01:57	14:10:25	68	208	3.1	3	Lid	Weld observed running ahead of the electrode. Trough along side of bead.
OTCP to Shell	9	10/17/2013	14:47:30	15:46:40	59	208	3.5	4	Shell	Observable trough from previous bead along shell side. Non uniform filling observed. Bead runs ahead of arc.
OTCP to Shell	11	10/17/2013	15:52:11	16:49:41	57.5	208	3.6	5	Lid	Weld ran smoothly.

RAI M-5

Provide an explanation for why the information summarized from the weld head videos (Enclosure 3 Appendix C) and the shop floor videos (Enclosure 3 Appendix D) appear to be inconsistent and in some cases contradictory For example:

1. Appendix C Page C-2 and Appendix D Page D-7 Table 5-8: DSC-16:
    a. ITCP and OTCP welding start and stop times are not in agreement.
2. Appendix C Page C-3 and Appendix D page D-5 Table 5-4: DSC-12:
    a. OTCP welding start and stop times are not in agreement.
    b. Appendix C Page C-3 identifies grinding in layer #2 that is not identified in Table 5-4.
3. Appendix C Pages C-4 and C-5 and Appendix D Page D-5 Table 5-5: DSC-13:
    a. ITCP and OTCP welding start and stop times are not in agreement.
    b. Table 5-5 indicated no grinding of the OTCP weld but Appendix C Page C-5 indicated that the weld in pass 4 appeared to have been ground.
4. Appendix C Page C-6 and Appendix D Page D-6 Table 5-6: DSC-14:
    a. OTCP welding start and stop times are not in agreement.
    b. Table 5-6 indicated no grinding of the OTCP weld but Appendix C Page C-6 indicated that the weld in pass 5a appeared to have been ground.
5. Appendix C Pages C-7 and C-8 and Appendix D Page D-6 Table 5-7: DSC-15:
    a. OTCP welding start and stop times (and dates) are not in agreement.

This information is needed to complete the review in accordance with 10 CFR 72.122(b).

NSPM Response

The weld head video clock was approximately 1 hour and 17 minutes behind the shop floor video clock. This difference between the clocks account for the majority of the inconsistencies between start and stop times noted in the RAI. For the remainder of the inconsistencies, it should be noted that judgment was required to identify the exact weld start and stop times because it had to take into consideration such factors as camera angles, stripper bead activities, etc. Furthermore, grinding was confirmed to have occurred in all cases where it was

identified during the weld head video review but not the shop floor video review. The initial shop floor video review inadvertently missed the grinding that was performed.

The weld head videos and the shop floor videos were both used for the evaluation performed by SIA. The information sought from each information source is different and were never intended to be tracked against each other. Therefore, the time stamps for each information source were never synchronized nor were they intended to be synchronized. The information derived from the review of the shop floor videos and weld head videos was used to identify the types and extent of activities being conducted for each canister, and to corroborate these activities where possible. The shop floor videos were used in a qualitative sense to infer weld related activities for the canister and were available for all canister welds except for the ITCP on DSC 12; however weld head VIDs were incomplete and portions were unavailable for review (i.e., DSC 11 and certain segments in several of the other canisters). The principal value was to examine the types and frequencies of weld-related activities to look for similarities or significant differences. In some cases, periodic grinding was apparent and in other cases, local weld repairs were observed. However, no significant differences were seen in work activity or frequency. This information was used as supporting information for the evaluations.

RAI M-6

Provide additional information to support the assumed flaw size and location of the potential lack of fusion flaws in the ITCP welds for the "Reasonable Assurance of Weld Integrity" and the "Additional Stress Margins in Welds" analyses.

For the "Reasonable Assurance of Weld Integrity" analysis Enclosure 1, Page 30 of 75 states the following:

> LOF [lack of fusion] defects of similar sizes and locations seen in DSC 16 are reasonable assumptions for the other ITCP closure welds. The assumptions made for the ITCP closure weld bounding analysis in DSC 16 are considered reasonable for all ITCP canister closure welds, the conditions of the ITCP welds are judged as similar for all canisters.

Additional statements in this paragraph indicate lack of fusion defects that might form would likely be located on the vertical sidewall because of the weld groove geometry and because there is limited room to tilt the tungsten electrode towards the side wall. The lack of fusion defects in the sidewall of the ITCP weld on DSC 16 were modeled as a defect in the root pass or layer 1 of 2. It is unclear why weld layer 2 would not also contain lack of fusion defects. Weld head video is limited to DSCs 13 and 16, and additional review of the welding process to qualitatively assess the potential for lack of fusion defects for the remaining DSC ITCP welds is not possible. In addition, the initial DSCs would have little to no benefit from any "learning curve" for the ITCP welds.

In the "Additional Stress Margins in Welds" analysis, the assumed flaw size of 0.14" is used for ITCP weld flaw-2 in Enclosure 6, "NUHOMS® 61BTH Type 1 DSC ITCP and OTCP Maximum Weld Flaw Evaluation," AREVA Calculation 11042-0207, Revision 0.

However, Enclosure 3 Section 3.1.4.1 (page 3-9 or 142/461 of ML17296A205) states:

> The video welding records (VIDs) reviewed for this weld did not show evidence of electrode tilt (working angle) towards the vertical sidewall to facilitate optimum tie-in to the vertical wall of the weld joint [...]. Regardless, the VIDs suggested a nearly vertical tungsten orientation that required the molten weld metal to flow to the side wall with sufficient heat to fuse the bottom of the machined groove to the shell sidewall. The sluggish nature of weld metal flow (lava flow) and the issues encountered with maintaining the proper wire entry location due to the filler wire cast created variability in fusion conditions on the sidewall.

The ITCP weld is 2 passes with a design thickness of 3/16" (0.188"). The maximum flaw size observed at the ITCP weld/DSC shell interface in DSC 16 was 0.09" according to the Phased Array Ultrasonic Testing (PAUT) results. Because ITCP weld video is limited to DSCs 13 and 16, additional review of the welding process to assess the welding practices and qualitatively assess the potential for lack of fusion defects for the remaining DSC ITCP welds is not possible.

Based on the review of the welding video records in Enclosure 3, it appears that the ITCP weld joint would be susceptible to lack of fusion flaws at the ITCP weld to shell interface. Given the limited information provided on the ITCP welds and the combination of the weld joint geometry, unfavorable electrode position and the sluggish nature of the weld metal observed during the welding of DSCs 11-16, it is unclear if the modeled lack of fusion defects in the ITCP weld would be representative of the possibility that lack of fusion defects located at weld to DSC shell interfaces could be present in both of the ITCP weld passes. Because it is not possible to assess through weld head videos whether DSCs 11, 12, 14, and 15 may have lack of fusion defects in both weld passes that comprise the ITCP weld, it is unclear whether the modeled flaw size of 0.14 inches would account for the potential for the ITCP welds to have aligned lack of fusion defects (i.e., lack of fusion defects in each of the two weld passes) located at the DSC shell to ITCP weld interface.

This information is needed to complete the review in accordance with 10 CFR 72.122(b).

NSPM Response

Enclosure 1 to the exemption request, Page 29 of 75, describes the applicability of the DSC 16 PAUT results and the structural analysis of those results to DSCs 11-15 (Enclosure 5 to the exemption request). As noted in the exemption request, NSPM determined that there is a reasonable expectation that LOF defects seen in DSC 16 are representative of the potential flaws in the other ITCP closure welds. These conclusions were supported by SIA evaluations as more fully described in the response to RAI M-4, which included the potential benefits of any learning curve. The following additional information regarding the ITCP welding is provided to support these conclusions.

During the review of the available video records, SIA noted several observations regarding susceptibility for LOF defects located at the DSC shell interfaces being present in both the ITCP passes (root and cap passes). The root is established using an open root welding technique and the welding torch is positioned on the lid side of the open root joint such that the root is bridged with molten material that washes onto the canister shell wall. This is a common practice for open root geometries to control the weld puddle and avoid dropping molten metal through the gap between the two pieces being joined and blowing out the root. If too much of the molten puddle is directed toward the lid side, then insufficient washing onto the sidewall occurs and LOF defects can occur along the shell wall. Review of the VIDs that captured the root passes of the ITCP for DSCs 13 and 16 (the only ITCP VID information available) observed a potential for LOF at locations around the circumference where the welding arc position did not remain centered on the weld groove. The fixed radial position of the weld head coupled with out-of-roundness of the shell wall caused the welding arc to drift away from the shell wall. This behavior is due to a lack of concentricity between the canister shell and the radial position of the weld head as it travels around the circumference. As the shell wall moved further away from the welding arc, the molten weld puddle does not properly wash onto the shell wall, and LOF is favored and the welding arc must be repositioned. This behavior is consistent with the observed intermittent LOF indications that were seen along the shell wall associated with the root pass in DSC 16 PAUT inspection results.

The second bead or cap pass was deposited with the welding arc positioned closer to the shell wall as an expected good welding practice with the intention of facilitating good sidewall tie-in and to minimize any potential for LOF defects. The deposit was seen to build preferentially along the shell wall and tapers uniformly downward across the top surface of the root pass as it flows over the edge of the ITCP. The second pass will remelt a small amount of the top of the root bead and recast that material with the second bead. The second pass deposit on the shell side is clearly above the locations where the LOF was suspected. Consistent with the intended purpose of repositioning the welding arc, the results of the PAUT inspection on DSC 16 identified sidewall LOF defects located in the lower portion of the weld commensurate with the root pass tie-in to the sidewall. Further, all DSCs were welded using the same processes, procedures, equipment and welders. Shop floor video reviews confirmed similar practices were applied to all canisters. Thus, it is reasonable to expect that the welding arc positioning target would be similar for all canister ITCP welds.

The potential for alignment and stack-up of any LOF defects is further reduced by the remelting which will occur when the second pass remelts a small amount of the top of the root bead and recasts that material with the second bead.

From the SIA review of the shop floor videos, it was observed that DSCs 11-15 experienced a greater amount of rework during the welding process than was observed for DSC 16 for both the ITCP and OTCP. These details are tabulated in Enclosure 3 to the exemption request. The performance of rework is an indication that the welding operators were alert to identifying unfavorable conditions as they developed during welding so that they could be corrected in-process. Therefore, it is reasonable to conclude that the probability for flaws in the closure welds of DSCs 11-15 should be no greater, and perhaps lower than DSC 16 due to observed in-process of the repairs to correct undesirable features.

There were no observations suggesting that the second bead (cap pass) would produce additional sidewall flaws that might stack-up along the shell wall. To the contrary, significant and effective sidewall tie-in was observed at the shell wall for the second bead in both DSCs 13 and 16 ITCP closure welds. This effective tie-in was due to the closer proximity of the welding arc during the second pass.

NSPM determined that there is a reasonable expectation that flaws would not stack up along the canister shell wall in successive weld layers. This determination is based on the consistency in welders and processes, and associated shift in welding torch position towards the shell wall for its intended purpose of improved side-wall tie-in. The improved side-wall tie-in from the second layer will minimize potential for any possible flaw stack up along the canister shell wall. Beyond this conclusion, NSPM provided additional analyses to evaluate flaws maximized to identify the maximum flaw size that can be tolerated at the design thickness of the welds while still meeting the acceptable design limits.

PAUT examination on DSC 16 identified an actual weld thickness of 0.25" – 0.40" and an actual maximum flaw height of 0.11" in the ITCP weld. This maximum flaw was extended to account for flaw uncertainties in DSCs 11-15 up to 0.14". The analyses determined that a connected ligament of 0.05" (e.g., 0.14" flaw in a 0.19" thick weld, 0.20" flaw in a 0.25" thick weld) is sufficient to meet the design limits. Thus, the flaws modeled in Enclosures 4-8 to the exemption request were based on the PAUT results for DSC 16 and expanded to account for flaw uncertainties. Additionally, margin is demonstrated in the fact that the flaws identified via PAUT in DSC 16 were all intermittent in nature whereas the conservatively modeled flaws are full circumferential. Further margin is identified in Enclosures 7 and 8 to the exemption request which account for as-loaded temperature and pressure conditions and site-specific side-drop accident conditions.

RAI M-7

Clarify the size of the ITCP weld analyzed in the Enclosure 6, "NUHOMS® 61BTH Type 1 DSC ITCP and OTCP Maximum Weld Flaw Evaluation," AREVA Calculation 11042-0207, Revision 0.

Enclosure 6 Section 3 (Design Input/Data) and Section 4 (Methodology) both reference Enclosure 5 ("61BTH ITCP and OTCP Closure Weld Flaw Evaluation" AREVA Document No. 11042-0205 Revision 3). Enclosure 5 Section 3 (Design Input/Data) states the following:

> The ITCP is 0.75" nominal thickness. Per the Reference 5.5 drawing, it is welded to the DSC shell and vent/siphon block with a 3/16" groove weld. However, the ITCP lid groove (weld prep) is 0.25" minimum, and it was confirmed that the weld is also 0.25."

Enclosure 1 (Exemption Request for Nonconforming Dry Shielded Canister Dye Penetrant Examinations) page 29 of 75 states:

> For the ITCP weld [...] The analysis calculates the critical flaw size for a weld size of 0.25 inch per the PAUT results for DSC 16 (which indicated a distance between the root and crown at the canister wall from 0.25 to 0.40 inches) in lieu of the design thickness of 3/16 inch. This increased weld size is considered equally applicably to DSCs 11-15 based on the joint configuration and same welding process application.

Subsequently, Enclosure 1 page 32 of 75 references the analysis in Enclosure 6. However, in the discussion of the results contained in Enclosure 6, page 33 of 75 of Enclosure 1 states:

> The maximum modeled weld flaws for OTCP to DSC shell weld are 0.43 inch and 0.42 inch in height, which represents about 85% through-wall of the 0.5-inch minimum weld throat. The maximum modeled full-circumferential weld flaws for the ITCP to DSC shell weld are 0.16 * cos(45°) = 0.11 inch and 0.14 inch in height, which represents respectively 58% and 74% through-wall of the 0.19-inch minimum weld throat as shown in Figure 7 (note that in Figure 7, weld heights are labeled as weld lengths).

These statements appear to be provide contradictory information and it is not clear whether the ITCP weld is modeled as the minimum design thickness or as the minimum measured thickness from the PAUT results for DSC 16.

This information is needed to complete the review in accordance with 10 CFR 72.122(b).

NSPM Response

The calculation provided as Enclosure 4 to the exemption request evaluated the critical flaw size based on the maximum radial stresses in the welds due to design loads. This analysis modeled a 0.25" weld. The calculation performed in Enclosure 5 to the exemption request evaluated DSC 16 flaw conditions. These analyses modeled the weld groove as 0.25"; however, the weld was modeled using the weld design thickness of 3/16". The detailed dimensions of the model are shown in Figure 4 of Enclosure 5 to the exemption request. Conservatively, 0.09" and 0.11" full circumferential flaws were modeled. Enclosures 6, 7, and 8 to the exemption request used the model developed in Enclosure 5 and, therefore, used an ITCP weld thickness of 3/16".

Structural RAIs

RAI ST-1

Provide the following ANSYS files used to analyze DSCs 11-15 in Enclosures 6 and 7, including load cases Internal Pressure 2D-Axisymmetric model and Side Drop 3D-Half-Symmetric model with extensions: .db, .inp, .err, .mntr, .out, .db, and .rst, and revise modeling descriptions presented in Section 4.1 of Enclosure 6 accordingly.

The aforementioned files are needed to verify modeling details which are not being sufficiently captured in a text format (exemption description). Modeling details regarding element type, distribution (mesh), flaw depiction, constitutive material properties, and loading in both 2D and 3D space are most directly presented in the ANSYS files themselves. As an example on the need for clarifying modeling details description, the staff noted that, on page 6 of the enclosure, the applicant states (underscores added):

> Initial ANSYS finite element iterations were performed by increasing all the four flaws by a very small length resulting in a negligible increase in plastic strain. In the second step very large flaws where considered (leaving only one element of the model connected at each flaw) resulting in excessive strain for the elastic-plastic side drop analysis. Similarly, few more iterations were performed such that the weld flaw reaches close to acceptable strain limit for the elastic-plastic side drop analysis. Only the final flaw configuration is presented in the document.

Specifically, to add clarity to the above modeling description, the applicant needs to consider: (1) If finite element iterations are not ANSYS inherent for a limit load analysis, describe the process of selecting and monitoring the flaw length increment, which resulted in a "negligible increase" in plastic strain, (2) Clarify whether or not the resulting "one element" configurations are realized to the limit load plastic hinge formation at the welds with maximized flaws by presenting appropriate finite element meshing annotation, which depicts nodal displacements for all the adjacent elements connected to the element incipient to the plastic hinges formation for the collapse load determination, (3) Revise, as appropriate, the statement, "[f]ew more iterations were performed ... for the elastic-plastic side drop analysis," to recognize the "iteration" in context is ANSYS inherent for an elastic-plastic analysis methodology, and (4) Revise, as appropriate, the statement, "[s]uch that the weld flaw reaches close to acceptable strain limit," by recognizing that the elastic-plastic analysis is performed to demonstrate large strain ductility demand to be within the American Society of Mechanical Engineers (ASME) Code strain acceptance limits.

NSPM Response

The requested ANSYS files are contained on a computer hard drive and are provided as Enclosure 11. The model from the calculation provided in Enclosure 5 to the exemption request was also used in the calculation provided in Enclosure 6 to the exemption request.[1] Therefore, model details like element types, mesh distribution, material properties, and loads were not repeated in Enclosure 6. Only the details of the variations were provided.

The intent of the word "iteration" was not the internal iterations ANSYS uses to obtain convergence in a non-linear analysis. Rather, the use of the word "iteration" was meant to illustrate the repetition of the analyses that were performed to obtain the largest flaw that can exist in DSCs 11-15 while ensuring maximum plastic strain remains below the ASME code acceptance limit. Section 4.1 of the calculation provided in Enclosure 6 to the exemption

[1] The methodology used in Enclosures 4-8 to the exemption request is the same as used in Enclosures 2 and 4 to the exemption request for DSC 16 submitted on September 29, 2015 (ADAMS Accession No. ML15275A023), which was granted by the NRC on June 15, 2016 (ADAMS Accession No. ML16167A035).

request has been revised to clarify this point, and to make the further changes requested in this RAI. Revision 1 of TN Calculation 11042-0207 is provided as Enclosure 13.

RAI ST-2

Regarding Exemption Request Enclosure 1, revise the description of using stress in lieu of strain margin(s) of safety as a basis for demonstrating structural performance of DSCs 11-15 using the limit load and elastic-plastic analysis methodology. Page 2 of the enclosure noted that reasonable assurance of weld integrity is demonstrated by adequate stress margin in welds to accommodate flaws. The use of the word, "stress" does not reflect, in context, that only "strain" acceptance criteria in terms of ductility demands were considered in the closure weld evaluation. Similar descriptions in this and other enclosures may also need to be revised, as appropriate.

This information is needed to complete the review in accordance with 10 CFR 72.236(l).

NSPM Response

Enclosure 14 provides a markup of the affected pages to reflect the requested changes. While preparing the mark up pages being provided in response to RAI ST-2, NSPM discovered a reference to an incorrect enclosure on pages 2 and 29 of 75 in Enclosure 1 to the exemption request. Mark-ups to reflect the proper references are included in Enclosure 14.

ENCLOSURE 2

TRIVIS, INC. WELDING PROCEDURE SPECIFICATION

SS-8-M-TN, REVISION 10

2 pages follow

TRIVIS INC. - WELDING PROCEDURE SPECIFICATION

SCOPE: This document is to provide essential and non-essential variables that will be used for the GTAW machine welding of Spent Fuel Cask assemblies.

SUPPORTING PQR(s): PQR-1, Rev. 2

WELDING PROCEDURE NO.

WPS: SS-8-M-TN

REVISION: 10

PAGE 1 OF 2

WELDING PROCESS QW401	1.	GTAW	TYPE	Machine – Cold wire
	2.	N/A	TYPE	N/A

JOINT DESIGN – QW402

Joint Design	Groove and Fillet Welds
Backing	With or without
Backing Material	P8, weld material, ceramic
Retainers	No
Root Spacing	When specified per design drawing or code

BASE METALS – QW403

P-No 8 Group. No All to P-No 8 Group. No All

Thickness Range (Base Metal):	
Groove	0.1875" to 8.0"
Fillet:	Unlimited
Pipe Diameter Range:	N/A
Groove: N/A	Fillet: N/A
Other	N/A
Maximum Pass Thickness	0.500"

FILLER METALS – QW404

F-No.	1.	6	2.	N/A
A-No.	1.	8	2.	N/A
SFA Spec. No.	1.	5.9	2.	N/A
AWS Class No.	1.	ER308	2.	N/A

Use of Flux: Not allowed

Size of Filler Metal: 1. .035" 2. N/A

Maximum Weld Deposit Thickness: Groove 1. 8.0" max 2. N/A

Consumable Insert: No Fillet size allowed: Unlimited

Other: NOTE – Autogenous welding is not permitted.
NOTE- All filler metal used shall be solid, bare wire.

POSITION – QW405

Welding Position(s): Groove 1G Fillet 2F

Welding Progression: N/A

PREHEAT – QW406

Preheat Temp. Min.	60	°F
Interpass Temp. Max.	350	°F
Preheat Maintenance	N/A	
Other	N/A	

POSTWELD HEAT TREATMENT – QW407

Temperature Range	N/A	°F
Time Range	N/A	
Other	N/A	
	N/A	
	N/A	

GAS – QW408

Shielding Gas	Argon			
Percent Comp. (Mixtures)	100% Argon			
Shielding Gas Flow Rate	10-50			CFH
Purge Gas	N/A	Flow Rate	N/A	CFH
Trailing Shielding Gas & Composition	N/A			
Other	N/A			

ELECTRICAL CHARACTERISTICS – QW409

Current & Polarity	1.	DCSP	2.	N/A
Amps Range	1.	150-350	2.	N/A
Volts Range	1.	9-13	2.	N/A

Tungsten Elect. Size 1/8" Type 1 or 2% thoriated (Note 3)

Tungsten Extension: As Required

Transfer Mode: N/A

Pulsing Current: Allowed

Wire Feed Speed: 40-200 IPM

TECHNIQUE – QW410

String or Weave Bead: 1. Stringer 2. N/A

Orifice or Gas Cup Size	4-12
Initial & Interpass Cleaning	Per project specific procedure
Method of Back Gouging	None
Oscillation	0.0" to 0.3"
Contact Tube to Work Distance	N/A

Multiple or Single Pass (per side): 1. Multiple 2. N/A

Multiple or Single Electrodes	Single
Travel Speed Range:	
1. As Required IPM 2. N/A IPM	
Peening	Not allowed
Other	None

REMARKS:

(1) DELETED
(2) The AWS Manufacturer's Operating Manual may be used throughout production, as needed, to ensure proper equipment operation.
(3) All final welds joints to contain a minimum of 2 weld passes.
(4) N/A as used in this WPS means Not Applicable, Not Used, or Not Permitted as appropriate.

PREPARED: Terry L Kenny 4-27-2011

REVIEWED: Ramona Lee Heller 4-27-2011

APPROVED: Morgan R Rush 4-27-2011

CODE(s) QUALIFIED TO: ASME IX

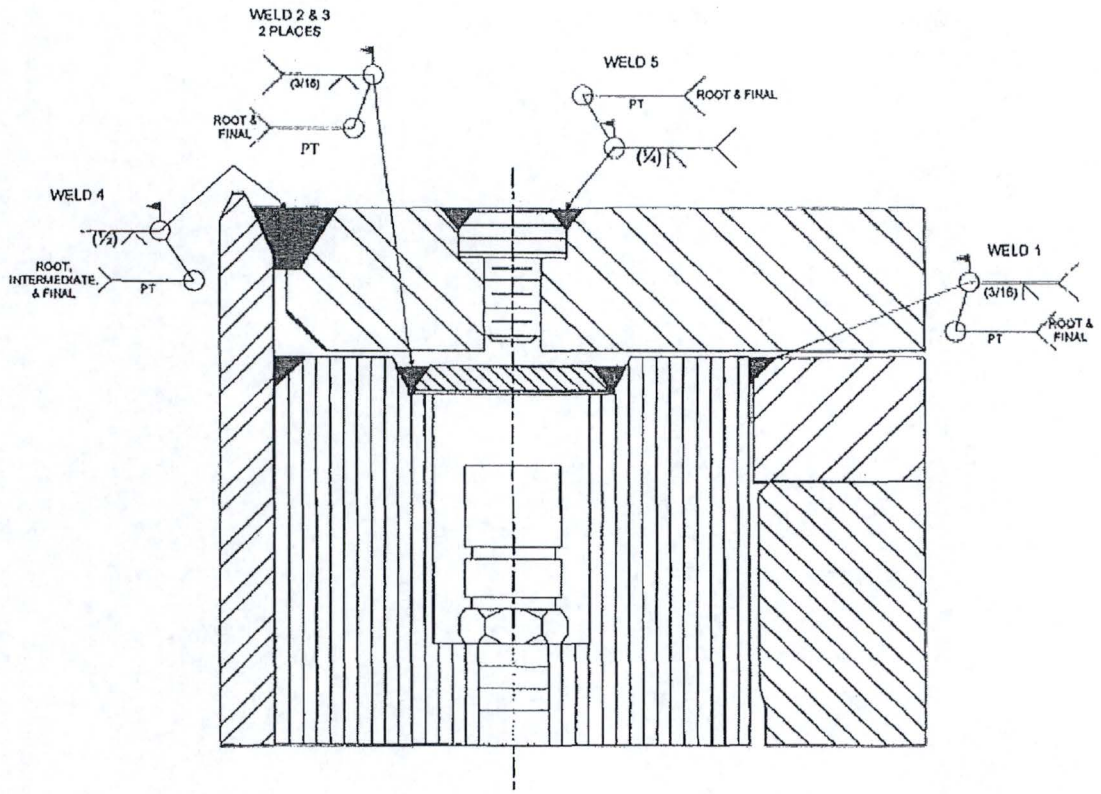
CODE USAGE: B31.1, ASME VIII, ASME III, ASME XI

TRIVIS INCORPORATED WELDING PROCEDURE SPECIFICATION	WELDING PROCEDURE NO. WPS SS-8-M-TN REVISION 10 PAGE 2 OF 2

WELD LAYER(s)	WELDING PROCESS	FILLER METAL		GAS			ELECTRICAL DATA			TRAVEL SPEED (IPM)	MAX. SINGLE BEAD WIDTH (in.)
		SIZE (in.)	AWS CLASS	TYPE	FLOW RATE (CFH)		TYPE/ POLAR	AMPERAGE RANGE	VOLTS RANGE		
					SHIELD	PURGE					
All	GTAW	.035"	ER308	Argon	10-50	N/A	DCSP	150-350	9-13	As required	1.0"

Notes:

1. This WPS shall be used in conjunction with the current project specific procedure.
2. Other joint details and weld repairs may be welded with this WPS.
3. Other Lanthanated and Ceriated Tungsten may be used. Pure tungsten (100%) electrodes are not approved for use.
4. For dissimilar base material thicknesses, there shall be no limitation on the maximum thickness of the thicker production member in joints of similar P-Number materials per QW-202.4.



ENCLOSURE 3

TRIVIS INC. WELDING PROCEDURE SPECIFICATION

SS-8-A-TN, REVISION 8

2 pages follow

TriVis Incorporated

WELDING PROCEDURE SPECIFICATION

SCOPE: This document is to provide essential and non-essential variables that will be used for the GTAW and SMAW manual welding of Spent Fuel Cask assemblies.

SUPPORTING PQR(s): PQR-1, Rev. 2

WELDING PROCEDURE NO.
WPS: SS-8-A-TN
REVISION: 8
PAGE 1 OF 2

WELDING PROCESS QW401	1.	GTAW	TYPE	Manual
	2.	N/A	TYPE	N/A

JOINT DESIGN – QW402

Joint Design	Groove and Fillet Welds
Backing	With or without
Backing Material	P8, weld metal, ceramic
Retainers	No
Root Spacing	See project specific procedure for detail

BASE METALS – QW403

P-No 8 Group. No All to P-No 8 Group. No All

Thickness Range (Base Metal):
GTAW 0.1875" to 8.0" SMAW N/A

Pipe Diameter Range:
Groove All Fillet All

Maximum Pass Thickness	0.500"
Other	N/A

FILLER METALS – QW404

F-No.	1.	6	2.	N/A
A-No.	1.	8	2.	N/A
SFA Spec. No.	1.	5.9	2.	N/A
AWS Class No.	1.	ER308	2.	N/A

Size of Filler Metal:
1. 1/16", 3/32", 1/8" 2. N/A

Maximum Weld Deposit Thickness:
Groove 1. 8.0" max 2. N/A
Fillet 1. Unlimited 2. N/A

Consumable Insert	No
Other	Flux is not permitted for GTAW applications. Note: All filler metal shall be solid, bare wire.

POSITION – QW405

Welding Position(s):
Groove All Fillet All

Welding Progression	Uphill

PREHEAT – QW406

Preheat Temp. Min.	60	°F
Interpass Temp. Max.	350	°F
Preheat Maintenance	N/A	
Other	N/A	

POSTWELD HEAT TREATMENT – QW407

Temp Range.	N/A	°F
Time Range	N/A	
Other	N/A	
	N/A	
	N/A	

GAS – QW408

Shielding Gas	Argon			
Percent Comp. (Mixtures)	100% Argon			
Shielding Gas Flow Rate	10-50			CFH
Purge Gas	N/A	Flow Rate	N/A	CFH
Trailing Shielding Gas & Composition	N/A			
Other	N/A			

ELECTRICAL CHARACTERISTICS – QW409

Current & Polarity	1.	DCSP	2.	N/A
Amps Range	1.	40-140	2.	N/A
Volts Range	1.	Manual	2.	N/A
Tungsten Elect. Size	1/8"	Type	EWTh-2	
Tungsten Extension	¼" to ¾"			
Transfer Mode	1.	N/A	2.	N/A
Pulsing Current	1.	N/A	2.	N/A
Electrode Wire Feed Speed	1.	N/A	2.	N/A

Other: Other Lanthanated and Ceriated Tungsten may be used.

TECHNIQUE – QW410

String or Weave Bead:
1. String and/or Weave 2. N/A

Orifice or Gas Cup Size	4-12
Initial & Interpass Cleaning	See Project Procedure
Method of Back Gouging	None
Oscillation	N/A
Contact Tube to Work Distance	N/A

Multiple or Single Pass (per side):
1. Multiple 2. N/A

Multiple or Single Electrodes: Single

Travel Speed Range:
1. One to Four IPM 2. N/A IPM

Peening	Not allowed
Other	The maximum weaving width is restricted to 0.625"

REMARKS:
(1) DELETED
(2) DELETED
(3) Autogenous welding is not permitted.
(4) N/A as used in this WPS means Not Applicable, Not Used, or Not Permitted as appropriate.
(5) DELETED

PREPARED: Tracy Byrd 4-27-2011
REVIEWED: Ramona A. Hallum 4.29.2011
APPROVED: Morgan R Rush 4-27-2011

CODE(s) QUALIFIED TO: ASME IX

CODE USAGE: B31.1, ASME VIII, ASME III, ASME XI

TriVis Incorporated

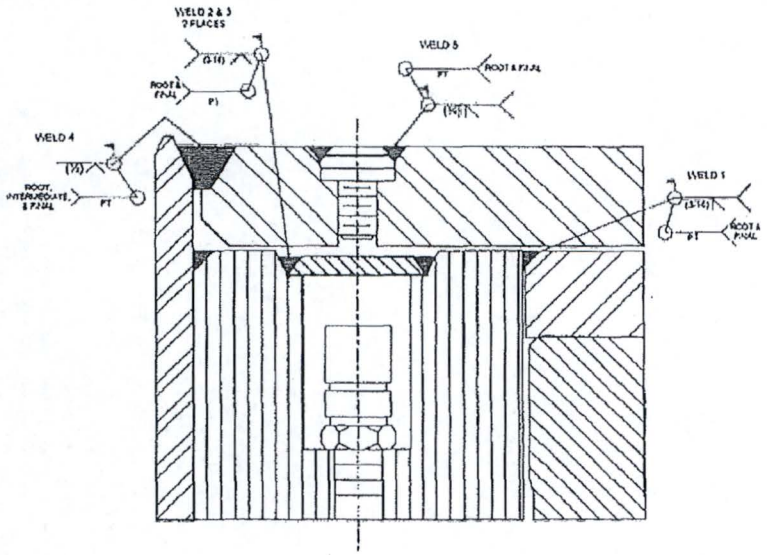
WELDING PROCEDURE SPECIFICATION

WELDING PROCEDURE NO.
WPS SS-8-A-TN
REVISION 8
PAGE 2 OF 2

WELD LAYER(s)	WELD PROCESS	FILLER METAL		GAS			ELECTRICAL DATA			TRAVEL SPEED (IPM)	MAX. SINGLE BEAD WIDTH (in.)
		SIZE (in.)	AWS CLASS	TYPE	FLOW RATE (CFH)		TYPE/ POLAR.	AMPERAGE RANGE	VOLTS RANGE		
					SHIELD	PURGE					
Root	GTAW	1/16"	ER308	Argon	10-50	N/A	DCSP	40-70	Manual	Manual	1.00"
to	GTAW	3/32"	ER308	Argon	10-50	N/A	DCSP	50-140	Manual	Manual	1.00"
remainder	GTAW	1/8"	ER308	Argon	10-50	N/A	DCSP	60-140	Manual	Manual	1.00"
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Notes:

1. This WPS shall be used in conjunction with the current project specific procedure.
2. For dissimilar base material thicknesses, there shall be no limitation on the maximum thickness of the thicker production member in joints of similar P-Number materials per QW-202.4.
3. The sum of the root and hot pass(es) thickness are to be approximately 0.125" to 0.1875" for open root welding only.
4. DELETED
5. Other joint details and weld repairs may be welded with this WPS.



ENCLOSURE 4

TRIVIS, INC. PROCEDURE QUALIFICATION RECORD

PQR-1, REVISION 2

3 pages follow

QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORD (PQR)
(SEE QW-201.2, SECTION IX, ASME BOILER AND PRESSURE VESSEL CODE)
RECORD ACTUAL CONDITIONS USED TO WELD TEST COUPON

COMPANY NAME **TriVis Inc**

PROCEDURE QUALIFICATION RECORD NO. 1 Revision 2 DATE 08/04/2010

WPS NO. SS-8-M for GTAW and SS-8-C for SMAW

WELDING PROCESS (ES) GTAW and SMAW

TYPES (MANUAL, AUTOMATIC, SEMI-AUTO) MACHINE and Manual

JOINTS (QW-403)

SEE PAGE 3

Groove Design of Test Coupon
(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used)

BASE METALS (QW-403)	**POSTWELD HEAT TREATMENT (QW-407)**
Material Spec. A240	*Temperature* NONE
Type or Grade 304	*Time*
P-No. 8 *to P-No.* 8	*Other*
Thickness of Test Coupon 1.5"	
Diameter of Test Coupon PLATE	
Other Heat Number HT-604433-A	**GAS (QW-408)**
	Type of Gas or Gases Argon
	Composition of Gas Mixture Welding Grade
	Other
FILLER METALS (QW-404)	
Weld Metal Analysis A-No. 8	
Size of Filler Metal .035" and 1/8"	**ELECTRICAL CHARACTERISTICS (QW-409)**
Filler Metal F-No. 6 and 5	*Current* DC
SFA Specification 5.9 and 5.4	*Polarity* EN for GTAW and EP for SMAW
AWS Classification ER316 and E316L	*Amps* See Page 3 Volts – See page 3
Other No pass exceeded ½" deposit thickness and no autogenous	*Tungsten Electrode Size* See page 3
welding was permitted	*Other*
POSITION (QW-505)	
Position of Groove 1G	
Weld Progression (Uphill, Downhill) NA	**TECHNIQUE (QW-410)**
Other	Travel Speed 1" – 3.5" per minute
	String or Weave Bead Both
	Oscillation 1.25"
	Multipass or Single Pass (per side) Multipass
PREHEAT (QW-406)	Other
Preheat Temp. 50 F	
Interpass Temp. 350 F	
Other	

Tensile Test (QW-150)

SPECIMEN NO.	WIDTH	THICKNESS	AREA	ULTIMATE TOTAL LOAD LB.	ULTIMATE UNIT STRESS PSI	TYPE OF FAILURE AND LOCATION
T1	.6685	.7535	.5022	43,809	87,000	WM - Ductile
T2	.5747	.7500	.4310	38,591	89,500	WM – Ductile
B1	.7265	.7520	.5478	47,236	86,000	WM - Ductile
B2	.7237	.7550	.5484	47,412	87,000	WM – Ductile

Guided-Bend Tests (QW-160)

TYPE AND FIGURE NO.	RESULT
Side Bend 1	SAT
Side Bend 2	SAT
Side Bend 3	SAT
Side Bend 4	SAT

Toughness Tests (QW-170)

SPECIMAN NO.	NOTCH LOCATION	NOTCH TYPE	TEST TEMP	IMPACT VALUES	LATERAL EXP		DROP WEIGHT	
					% SHEAR	MILS	BREAK	NO-BREAK

Fillet-Weld Test (QW-180)

Results – Satisfactory: Yes ☐ No ☐ Penetration into Parent Metal: Yes ☐ No ☐

Macro – Results _____

Other Tests

Type of Test _____

Deposit Analysis _____

Other _____

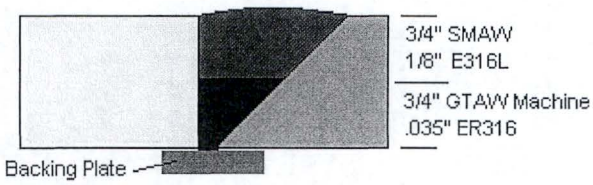
Welders Names: Al Ferguson **Stamp No:** WS-1

Tests Conducted by: LABORATORY TESTING INC. Laboratory Test No. TII037-05-11-29957-1

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Code.

Manufacturer TriVis Incorporated

Date: 08/04/2010 By: / David Bland



BG=Back Ground
Pri= Primary
HW= Hot Wire
WFS=Wire Feed Speed
IPM= Inches Per Minute

Bead Layer	HW Amp	HW Volts	Pri Amps	BG Amps	Pri Volts	Primary WFS	BG WFS	Travel IPM	Temp F at start	Welder ID	Notes
Root	11	12.2	300	270	9.5	80	70	1.20	70	WS-1	5 lag-10 tilt
2	12	12.2	320	300	9.5	120	100	1.25	180	WS	
3	12	12.2	320	300	9.5	130	120	1.25	200	WS	
4	14	12.2	320	300	9.5	150	120	1.25	220	WS	
5	14	12.2	340	330	9.7	150	140	1.25	230	WS	
6	12	12.2	320	300	9.7	130	120	1.25	230	WS	split bead
7	12	12.2	320	300	9.7	130	120	1.25	250	WS	
8	NA	NA	125	NA	24-26	NA	NA	NR	225	WS	SMAW
9	NA	NA	125	NA	24-26	NA	NA	NR	225	WS	SMAW
10	NA	NA	125	NA	24-26	NA	NA	NR	225	WS	SMAW
11	NA	NA	125	NA	24-26	NA	NA	NR	260	WS	SMAW
12	NA	NA	125	NA	24-26	NA	NA	NR	260	WS	SMAW
13	NA	NA	125	NA	24-26	NA	NA	NR	260	WS	SMAW
14	NA	NA	125	NA	24-26	NA	NA	NR	260	WS	SMAW
15	NA	NA	125	NA	24-26	NA	NA	NR	250	WS	SMAW
16	NA	NA	125	NA	24-26	NA	NA	NR	250	WS	SMAW
17	NA	NA	125	NA	24-26	NA	NA	NR	250	WS	SMAW
18	NA	NA	125	NA	24-26	NA	NA	NR	250	WS	SMAW
19	NA	NA	125	NA	24-26	NA	NA	NR	250	WS	SMAW
20	NA	NA	125	NA	24-26	NA	NA	NR	230	WS	SMAW
21	NA	NA	125	NA	24-26	NA	NA	NR	230	WS	SMAW
22	NA	NA	125	NA	24-26	NA	NA	NR	230	WS	SMAW
23	NA	NA	125	NA	24-26	NA	NA	NR	230	WS	SMAW
24	NA	NA	125	NA	24-26	NA	NA	NR	230	WS	SMAW
25	NA	NA	125	NA	24-26	NA	NA	NR	230	WS	SMAW
26	NA	NA	125	NA	24-26	NA	NA	NR	230	WS	SMAW
27	NA	NA	125	NA	24-26	NA	NA	NR	230	WS	SMAW
28	NA	NA	125	NA	24-26	NA	NA	NR	230	WS	SMAW
29	NA	NA	125	NA	24-26	NA	NA	NR	230	WS	SMAW
30	NA	NA	125	NA	24-26	NA	NA	NR	230	WS	SMAW
31	NA	NA	125	NA	24-26	NA	NA	NR	230	WS	SMAW
32	NA	NA	125	NA	24-26	NA	NA	NR	230	WS	SMAW
33	NA	NA	125	NA	24-26	NA	NA	NR	230	WS	SMAW
34	NA	NA	125	NA	24-26	NA	NA	NR	230	WS	SMAW
35	NA	NA	125	NA	24-26	NA	NA	NR	230	WS	SMAW
36	NA	NA	125	NA	24-26	NA	NA	NR	230	WS	SMAW
37											

Revision 1 consisted of editorial changes to correct the thickness of the test coupon, clarify polarity for GTAW and SMAW, and add a statement regarding the thickness of weld passes.

ENCLOSURE 5

CERTIFIED MATERIAL TEST REPORTS FOR WELDING FILLER MATERIAL HEAT NUMBERS 527221, 736908, AND 737880

13 pages follow

WELDSTAR®

OLD VALUES...NEW IDEAS

www.weldstar.com

CERTIFICATE OF COMPLIANCE / CONFORMANCE

ISSUED: April 25, 2013

SOLD TO: **Xcel Energy**
Monticello Nuclear Generating Plant
2807 West County Road 75
Monticello, MN 55362-9637

SHIP TO: **SAME**

CUSTOMER PO#: 00046850 Rev. 002
NUCLEAR SHIPPING #: N991450

DESCRIPTION:

ITEM #2: Ordered:800 lbs Shipped:800 lbs
Electrodes, 3/32" x 50 lb containers, ESAB, E7018H4R
Heat# T123497, Lot# 2C315E01, Control# OOO007

ITEM #3: Ordered:300 lbs Shipped:300 lbs
Spooled wire, .035" x 30 lb spools, Arcos, ER308/308L
Heat# 527221, Lot# XF9689

The attached CMTR(s), one copy per item, cover the material supplied against the above referenced purchase order number.

The above material will meet code requirements of ASME Section II, Part C, and Section III, 2010 Edition, 2011 Addenda, NB2400 for Class 1 material, and is in compliance with the above referenced purchase order number. We certify that the material supplied has been handled in compliance with our identification and verification program.

All vendors on Weldstar's approved vendors list have been audited by Weldstar.

Weldstar's Quality Assurance Program Revision R, dated September 10, 2012 meets the requirements of ASME Section III, NCA-3800, 2010 Edition, 2011 Addenda and the applicable parts of NQA-1 and 10 CFR Part 50 Appendix B.

The recording of false, fictitious, or fraudulent statements or entries may be punishable as a felony under Federal Statute. This material has not come in contact with Mercury while at Weldstar.

All items furnished under this Purchase Order/Subcontract are genuine (I.e., not counterfeit) and match the quality, test reports, markings and/or fitness for use required by the Purchase Order/Subcontract.

The provisions of NRC 10CFR Part 21 apply to this order.

Josh Rogers 4/25/13

Josh Rogers **Date:**
QUALITY ASSURANCE MANAGER

WELDSTAR COMPANYS
QUALITY SYSTEM CERTIFICATE
(MATERIALS) QSC 229
EXPIRATION DATE JAN. 5, 2015

Weldstar Aurora
1750 Mitchell Road, PO Box 1150
Aurora, IL 60505
Phone 630.859.3100
Fax 630.859.3199

Weldstar Logansport
1000 East Main Street
Logansport, IN 46947
Phone 574.722.1177
Fax 574.753.3113

Weldstar University Park
1100 Hamilton Avenue
University Park, IL 60484
Phone 708.534.8561
Fax 708.534.8569

ARCOS INDUSTRIES, LLC
394 ARCOS DRIVE
MT. CARMEL, PA 17851

ASME CERTIFICATE NO: QSC-448
EXPIRATION DATE: 10/23/2014

DATE 7/23/2012

CERTIFIED MATERIAL TEST REPORT

EN 10204 3.1.B

SOLD TO: Weldstar Company
P.O. Box 1150
Aurora, IL 60507

SHIP TO: Weldstar Company
1750 Mitchell Road
Aurora, IL 60504

ARCOS S.O	CUSTOMER ORDER NO.	CONSIGNEE ORDER NO.	DATE SHIPPED
127040	906005	N/A	7/23/2012

ITEM	SIZE	GRADE	LOT NO. - HEAT NO.	QUANTITY
	.035" X 30# SPL	ARCOS 308/308L	XF9689 - 527221	1500#

SPECIFICATION ASME SFA 5.9 CLASS ER308/308L ASME SECTION II, PART C, ASME B&PVC SECTION III, SUBSECTION NB-2400, 2010 EDITION, UP TO AND INCLUDING 2011 ADDENDA 10CFR21 & 10CFR50, APPX. B APPLIES. ASME NCA 3800

WELDSTAR COMPANYS QUALITY SYSTEM CERTIFICATE (MATERIALS) QSC 229 EXPIRATION DATE JAN. 5, 2015

CHEMICAL ANALYSIS Wire

C	Mn	Si	S	P	Cr	Ni	Mo	Cu	Fe	Nb + Ta	Ti
0.012	1.8	0.38	0.005	0.01	20.1	10.6	0.04	0.05	BAL	0.006	0.002
Co	**V**	**N**									
0.03	0.05	0.046									

CHEMICAL ANALYSIS Weld GTAW

C	Mn	Si	S	P	Cr	Ni	Mo	Cu	Fe	Nb + Ta	Ti
0.012	1.8	0.38	0.006	0.01	20.1	10.6	0.04	0.04	BAL	0.005	0.002
Co	**V**	**N**									
0.03	0.05	0.047									

FERRITE - NB-2433.1:

	WIRE	GTAW
WRC Diagram	10 FN	10 FN
Schaeffler	9 %	8 %
Magne Gage		10 FN

TENSILE

	GTAW As-Welded
Yield (psi)	53,000
Tensile (psi)	82,000
Elongation (%)	50
Red. of Area (%)	77

OTHER INFORMATION

Lot Classification - S3
BD Process
Country of Origin: Sweden
Preheat 60°F, Interpass 300°F
Direct Current Straight Polarity (DCEN)
GTAW 100% Argon

Intensity of Testing - Schedule K

This CMTR covers Xcel Energy PO# 00046850 Rev. 002; Weldstar Nuclear Shipping# N991450

WELDSTAR JR QA 7-25-12

THIS MATERIAL IS FREE FROM MERCURY, RADIUM, OR ALPHA PARTICLE CONTAMINATION. MATERIAL MADE IN THE USA.
Quality Systems Manual, Edition 4, Revision 0, dated 4/2/2012

We hereby affirm that the reported results on this certification are correct and accurate. All tests and results and operations performed by Arcos or its subcontractors are in compliance with the applicable material/customer specification.

Glb Gratti
QA Manager

Quality Assurance Department

R.I.N. 13-607

WELDSTAR

OLD VALUES...NEW IDEAS

www.weldstar.com

CERTIFICATE OF COMPLIANCE

ISSUED: July 8, 2008

CUSTOMER: NMC / Monticello Nuclear Gen
CUSTOMER PO#: 00023633
SHIP TICKET #: N807743-01
DESCRIPTION: **ITEM #1**: 420 lbs of Spool Wire
.035 x 30 lb spools, Arcos, ER308/308L
Heat # 736908, Lot # XT8882, Control # 8882

The attached CMTR(s), one copy per item, cover the material supplied against the above referenced purchase order number.

The above material will meet code requirements of ASME Section II, Part C, and Section III, 2007 Edition, NB2400 for Class 1 material, and is in compliance with the above referenced purchase order number. We certify that the material supplied has been handled in compliance with our identification and verification program.

All vendors on Weldstar's approved vendors list have been audited by Weldstar.

Weldstar's Quality Assurance Program Revision N, dated November 9, 2005 meets the requirements of ASME Section III, NCA-3800, 1989 and 2007 Edition, and the applicable parts of NQA-1 and 10 CFR Part 50 Appendix B.

The provisions of NRC 10CFR Part 21 apply to this order.

QUALITY ASSURANCE MANAGER

WELDSTAR COMPANYS
QUALITY SYSTEM CERTIFICATE
(MATERIALS) QSC 229
EXPIRATION DATE JAN. 5, 2009

R.I.N.#

08-310

Weldstar Aurora
1750 Mitchell Road, PO Box 1150
Aurora, IL 60505
Phone 630.859.3100
Fax 630.859.3199

Weldstar Logansport
1000 East Main Street
Logansport, IN 46947
Phone 574.722.1177
Fax 574.753.3113

Weldstar University Park
1100 Hamilton Avenue
University Park, IL 60466
Phone 708.534.8561
Fax 708.534.7819

ARCOS INDUSTRIES, LLC
ONE ARCOS DRIVE
Mt. Carmel, PA 17851

This CMTR covers NMC Po # 00023633; Weldstar Nuclear Shipping Ticket # N807743-01

DATE 07/01/08

ASME CERTIFICATE QSC-448

CERTIFICATION OF TESTS

EXPIRATION DATE:10/23/08

SOLD TO
WELDSTAR COMPANY
P.O. BOX 1150
AURORA, IL 60507

SHIP TO:
WELDSTAR COMPANY
1750 MITCHELL ROAD
AURORA, IL 60504

ARCOS S.O.	CUSTOMER ORDER NO.	CONSIGNEE ORDER NO.	DATE SHIPPED
100224	904689 C/O 1	N/A	7/1/2008

ITEM	SIZE	GRADE	LOT NO. - HEAT NO.	QUANTITY
	.035" X 30# SPL	ARCOS 308/308L	XT8882 - 736908	420#

SPECIFICATION: ASME SFA 5.9 CLASS ER308/308L ASME SECTION II, PART C 1995 EDITION. ASME B&PVC SECTION III, NB2400 1989 EDITION AND NO ADDENDA
10CFR21 & 10CFR50 APPX. B APPLIES ASME NCA 3800

CHEMICAL ANALYSIS:

C	Mn	Si	S	P	Cr	Ni	Mo		Cb + Ta	
0.017	2.0	0.50	0.003	0.02	20.0	10.4	0.09		0.007	WIRE
0.011	1.9	0.44	0.004	0.02	19.7	9.8	0.11		0.007	WELD
	Ti		Co	Cu	Fe	V		N		
	0.002		0.04	0.07	BAL	0.12		0.072		WIRE
	0.002		0.07	0.13	BAL	0.09		0.072		WELD

ADDITIONAL TEST RESULTS

Ferrite - NB2433.1-1: 8FN WRC WIRE, 9FN WRC WELD
Magna Gage: 8FN
X-ray:
Bends:

TENSILE	As Welded	Heat Treated
Yield	57,000psi	
Tensile	84,000psi	
Elongation	50%	
Red.of Area	74%	

OTHER INFORMATION: Lot Classification - S3 Intensity of Testing - Schedule K

Preheat 60°F, Interpass 300°F
GTAW, 100% ARGON, DIRECT CURRENT
STRAIGHT POLARITY (DCSP)

CONTROL #8882

THIS MATERIAL IS FREE FROM MERCURY, RADIUM OR ALPHA PARTICLE CONTAMINATION.

We hereby affirm that the reported results on this certification are correct and accurate. All test and results and operations performed by Arcos or its subcontractors are in compliance with the applicable material/customer specification.

R.I.N.# 08-310

ARCOS

QUALITY ASSURANCE DEPARTMENT
Gib Gratti, QA Manager

WELDSTAR COMPANYS
QUALITY SYSTEM CERTIFICATE
(MATERIALS) QSC 229
EXPIRATION DATE JAN. 5, 2009

WELDSTAR

OLD VALUES...NEW IDEAS

www.weldstar.com

CERTIFICATE OF COMPLIANCE

ISSUED: February 24, 2009

CUSTOMER: Xcel Energy / Monticello Nuclear
CUSTOMER PO#: 00027173
SHIP TICKET #: N833572
DESCRIPTION: **ITEM #1:** 100 lbs Cutlengths
3/32" X 36", 10 lb containers, Arcos, ER308/308L
Heat #737880, Lot #CT9023, Control #9023

ITEM #2: 120 lbs Cutlengths
1/8" X 36", 10 lb containers, ESAB, ER70S-2
Heat #065905

Weldstar Company's Quality System Certificate (Materials) QSC 229
Expiration Date March 27, 2009

The attached CMTR(s), one copy per item, cover the material supplied against the above referenced purchase order number.

The above material will meet code requirements of ASME Section II, Part C, and Section III, 2007 Edition, 2008 Addenda, NB2400 for Class 1 material, and is in compliance with the above referenced purchase order number. We certify that the material supplied has been handled in compliance with our identification and verification program.

All vendors on Weldstar's approved vendors list have been audited by Weldstar.

Weldstar's Quality Assurance Program Revision N, dated November 9, 2005 meets the requirements of ASME Section III, NCA-3800, 2007 Edition, 2008 Addenda and the applicable parts of NQA-1 and 10 CFR Part 50 Appendix B.

The provisions of NRC 10CFR Part 21 apply to this order.

James F. Bevis

QUALITY ASSURANCE MANAGER

R.I.N. #

09-0199

Page 3 of 7

Weldstar Aurora
1750 Mitchell Road, PO Box 1150
Aurora, IL 60505
Phone 630.859.3100
Fax 630.859.3199

Weldstar Logansport
1000 East Main Street
Logansport, IN 46947
Phone 574.722.1177
Fax 574.753.3113

Weldstar University Park
1100 Hamilton Avenue
University Park, IL 60466
Phone 708.534.8561
Fax 708.534.7819

ARCOS INDUSTRIES, LLC
ONE ARCOS DRIVE
MT. CARMEL, PA 17851

This CMTR covers Xcel PO# 00027173; Weldstar Nuclear Shipping Ticket #N833572

DATE 12/29/08

ASME CERTIFICATE NO. QSC-448
EXPIRATION DATE 10/23/11

CERTIFICATION OF TESTS

SOLD TO:
WELDSTAR CO.
P.O. BOX 1150
AURORA, IL 60507

SHIP TO:
WELDSTAR CO.
1750 MITCHELL ROAD
AURORA, IL 60504

ARCOS S.O.	CUSTOMER ORDER NO.	CONSIGNEE ORDER NO.	DATE SHIPPED
103825	904840	N/A	1/22/2009

ITEM	SIZE	GRADE	LOT NO. - HEAT NO.	QUANTITY
	3/32" X 36"	ARCOS 308/308L	CT9023 - 737880	1620#

SPECIFICATION: ASME SFA 5.9 CLASS ER 308/308L ASME SECTION II, PART C, ASME B&PVC SECTION III, SUBSECTION NB 2400, 2007 EDITION, UP TO AND INCLUDING 2008 ADDENDA 10CFR21 &10CFR50 APPX. B APPLIES ASME NCA 3800

CHEMICAL ANALYSIS:

C	Mn	Si	S	P	Cr	Ni	Mo		Cb+Ta	
0.017	2.0	0.42	0.003	0.014	20.1	10.4	0.09		0.007	WIRE
0.002	1.8	0.42	0.002	0.017	20.0	10.0	0.13		0.004	WELD
	Ti	Co		Cu	Fe	V	N			
	0.002	0.032		0.07	BAL	0.10	0.067			WIRE
	0.001	0.044		0.11	BAL	0.10	0.066			WELD

ADDITIONAL TEST RESULTS

Ferrite - NB2433.1-1: 9FN Wire, 10FN Weld
Magna Gage: 9FN
X-Ray:
Bends:

TENSILE	As Welded	Heat Treated
Yield	59,000psi	
Tensile	90,000psi	
Elongation	48%	
Red.of Area	77%	

OTHER INFORMATION:
Lot Classification - S3
Preheat 60°F, Interpass 300°F
Control# 9023
Intensity of Testing - Schedule K
GTAW (DCEN) 100% Argon
MADE IN THE USA

THIS MATERIAL IS FREE FROM MERCURY, RADIUM OR ALPHA PARTICLE CONTAMINATION

R.I.N. # 09-0199

We hereby affirm that the reported results on this certification are correct and accurate. All test and results and operations performed by Arcos or its subcontractors are in compliance with the applicable material/customer specification.

Weldstar Company's Quality System Certificate (Materials) QSC 229 Expiration Date March 27, 2009

QUALITY ASSURANCE DEPARTMENT
Gib Gratti, QA Manager

WELDSTAR

OLD VALUES...NEW IDEAS

www.weldstar.com

CERTIFICATE OF COMPLIANCE

ISSUED: March 13, 2009

CUSTOMER: Xcel Energy / Monticello Nuclear
CUSTOMER PO#: 00027410 Rev. 1
SHIP TICKET #: N835189
DESCRIPTION: **ITEM #1:** 1200 lbs Electrode
1/8", 50 lb containers, ESAB, E7018H4R
Heat #31347, Lot #4H829A05, Control #MMM051

ITEM #2: 550 lbs Electrode
5/32", 50 lb containers, ESAB, E7018H4R
Heat #52413, Lot #2K808C02, Control #MMM054

ITEM #3: 50 lbs Electrode
1/8", 50 lb containers, Lincoln, E6010
Lot #842M

Item #4: 650 lbs Cutlengths
1/8" X 36", 10 lb containers, ER308/308L
Heat #737880, Lot #DT9023, Control #9023

Weldstar Company's Quality System Certificate (Materials) QSC 229
Expiration Date March 27, 2009

The attached CMTR(s), one copy per item, cover the material supplied against the above referenced purchase order number.

The above material will meet code requirements of ASME Section II, Part C, 2007 Edition, 2008 Addenda and Section III, 2007 Edition, 2008 Addenda, NB2400 for Class 1 material, and is in compliance with the above referenced purchase order number. We certify that the material supplied has been handled in compliance with our identification and verification program.

All vendors on Weldstar's approved vendors list have been audited by Weldstar.

Weldstar's Quality Assurance Program Revision N, dated November 9, 2005 meets the requirements of ASME Section III, NCA-3800, 2007 Edition, 2008 Addenda and the applicable parts of NQA-1 and 10 CFR Part 50 Appendix B.

The provisions of NRC 10CFR Part 21 apply to this order.

R.I.N. # 09-249

James P. Berrett
QUALITY ASSURANCE MANAGER

Weldstar Aurora
1750 Mitchell Road, PO Box 1150
Aurora, IL 60505
Phone 630.859.3100
Fax 630.859.3199

Weldstar Logansport
1000 East Main Street
Logansport, IN 46947
Phone 574.722.1177
Fax 574.753.3113

Weldstar University Park
1100 Hamilton Avenue
University Park, IL 60466
Phone 708.534.8561
Fax 708.534.7819

ARCOS INDUSTRIES, LLC
ONE ARCOS DRIVE
MT. CARMEL, PA 17851

This CMTR covers Excel PO#00027410
Rev 1; Weldstar Nuclear Shipping Ticket
#N835189

DATE 01/28/09

ASME CERTIFICATE NO. QSC-448
EXPIRATION DATE 10/23/11

CERTIFICATION OF TESTS

SOLD TO:
WELDSTAR CO.
P.O. BOX 1150
AURORA, IL 60507

SHIP TO:
WELDSTAR CO.
1750 MITCHELL ROAD
AURORA, IL 60504

ARCOS S.O.	CUSTOMER ORDER NO.	CONSIGNEE ORDER NO.	DATE SHIPPED
103825	904840	N/A	1/28/2009

ITEM	SIZE	GRADE	LOT NO. - HEAT NO.	QUANTITY
	1/8" X 36"	ARCOS 308/308L	DT9023 - 737880	1620#

SPECIFICATION: ASME SFA 5.9 CLASS ER 308/308L ASME SECTION II, PART C,
ASME B&PVC SECTION III, SUBSECTION NB 2400,
2007 EDITION, UP TO AND INCLUDING 2008 ADDENDA
10CFR21 &10CFR50 APPX. B APPLIES ASME NCA 3800

CHEMICAL ANALYSIS:

C	Mn	Si	S	P	Cr	Ni	Mo		Cb+Ta	
0.017	2.0	0.42	0.003	0.014	20.1	10.4	0.09		0.007	WIRE
0.002	1.8	0.42	0.002	0.017	20.0	10.0	0.13		0.004	WELD
	Ti	Co		Cu	Fe	V	N			
	0.002	0.032		0.07	BAL	0.10	0.067			WIRE
	0.001	0.044		0.11	BAL	0.10	0.066			WELD

ADDITIONAL TEST RESULTS

Ferrite - NB2433.1-1: 9FN Wire, 10FN Weld
Magna Gage: 9FN
X-Ray:
Bends:

TENSILE

	As Welded	Heat Treated
Yield	59,000psi	
Tensile	90,000psi	
Elongation	48%	
Red.of Area	77%	

OTHER INFORMATION:
Lot Classification - S3
Preheat 60°F, Interpass 300°F
Control# 9023
Intensity of Testing - Schedule K
GTAW (DCEN) 100% Argon
MADE IN THE USA

THIS MATERIAL IS FREE FROM MERCURY, RADIUM OR ALPHA PARTICLE CONTAMINATION.

We hereby affirm that the reported results on this certification are correct and accurate. All test and results and operations performed by Arcos or its subcontractors are in compliance with the applicable material/customer specification.

Weldstar Company's Quality System Certificate (Materials) QSC 229 Expiration Date March 27, 2009

R.I.N. # 09-249

QUALITY ASSURANCE DEPARTMENT
Gib Gratti, QA Manager

WELDSTAR

OLD VALUES...NEW IDEAS

www.weldstar.com

CERTIFICATE OF COMPLIANCE

ISSUED: April 2, 2009

CUSTOMER: Monticello Nuclear Generating
CUSTOMER PO#: 00027722 Rev. 1
SHIP TICKET #: N837513
DESCRIPTION: **ITEM #1:** 280 lbs Cutlengths
1/8" x 36", 10 lb containers, Arcos, ER308/308L
Heat# 737880, Lot# DT9023, Control# 9023

ITEM #2: 500 lbs Cutlengths
3/32" x 36", 10 lb containers, Arcos, ER308/308L
Heat# 737880, Lot# CT9023, Control# 9023

ITEM #3: 600 lbs Electrodes
3/32", 50 lb containers, ESAB, E7018H4R
Heat# 082324, Lot# 2B919C03, Control# MMM061

The attached CMTR(s), one copy per item, cover the material supplied against the above referenced purchase order number.

The above material will meet code requirements of ASME Section II, Part C, and Section III, 2007 Edition, 2008 Addenda, NB2400 for Class 1 material, and is in compliance with the above referenced purchase order number. We certify that the material supplied has been handled in compliance with our identification and verification program.

All vendors on Weldstar's approved vendors list have been audited by Weldstar.

Weldstar's Quality Assurance Program Revision O, dated January 29, 2009 meets the requirements of ASME Section III, NCA-3800, 2007 Edition, 2008 Addenda and the applicable parts of NQA-1 and 10 CFR Part 50 Appendix B.

The provisions of NRC 10CFR Part 21 apply to this order.

James B Bessey

QUALITY ASSURANCE MANAGER

R.I.N. # 09-380

Page 4 of 8

WELDSTAR COMPANYS
QUALITY SYSTEM CERTIFICATE
(MATERIALS) QSC 229
EXPIRATION DATE JAN. 5, 2012

Weldstar Aurora
1750 Mitchell Road, PO Box 1150
Aurora, IL 60505
Phone 630.859.3100
Fax 630.859.3199

Weldstar Logansport
1000 East Main Street
Logansport, IN 46947
Phone 574.722.1177
Fax 574.753.3113

Weldstar University Park
1100 Hamilton Avenue
University Park, IL 60466
Phone 708.534.8561
Fax 708.534.7819

ARCOS INDUSTRIES, LLC
ONE ARCOS DRIVE
MT. CARMEL, PA 17851

This CMTR covers XCEL PO# 00027722 Rev. 1; Weldstar Nuclear Shipping Ticket #N837513

DATE 01/28/09

ASME CERTIFICATE NO. QSC-448
EXPIRATION DATE 10/23/11

CERTIFICATION OF TESTS

BEST AVAILABLE COPY

SOLD TO:
WELDSTAR CO.
P.O. BOX 1150
AURORA, IL 60507

SHIP TO:
WELDSTAR CO.
1750 MITCHELL ROAD
AURORA, IL 60504

ARCOS S.O.	CUSTOMER ORDER NO.	CONSIGNEE ORDER NO.	DATE SHIPPED
103825	904840	N/A	1/28/2009

ITEM	SIZE	GRADE	LOT NO. - HEAT NO.	QUANTITY
	1/8" X 36"	ARCOS 308/308L	DT9023 - 737880	1620#

SPECIFICATION: ASME SFA 5.9 CLASS ER 308/308L ASME SECTION II, PART C, ASME B&PVC SECTION III, SUBSECTION NB 2400, 2007 EDITION, UP TO AND INCLUDING 2008 ADDENDA 10CFR21 &10CFR50 APPX. B APPLIES ASME NCA 3800

CHEMICAL ANALYSIS:

C	Mn	Si	S	P	Cr	Ni	Mo		Cb+Ta	
0.017	2.0	0.42	0.003	0.014	20.1	10.4	0.09		0.007	WIRE
0.002	1.8	0.42	0.002	0.017	20.0	10.0	0.13		0.004	WELD
	Ti	Co		Cu	Fe	V	N			
	0.002	0.032		0.07	BAL	0.10	0.067			WIRE
	0.001	0.044		0.11	BAL	0.10	0.066			WELD

ADDITIONAL TEST RESULTS

Ferrite - NB2433.1-1: 9FN Wire, 10FN Weld
Magna Gage: 9FN
X-Ray:
Bends:

TENSILE	As Welded	Heat Treated
Yield	59,000psi	
Tensile	90,000psi	
Elongation	48%	
Red.of Area	77%	

OTHER INFORMATION:
Lot Classification - S3
Preheat 60°F, Interpass 300°F
Control# 9023
Intensity of Testing - Schedule K
GTAW (DCEN) 100% Argon
MADE IN THE USA

THIS MATERIAL IS FREE FROM MERCURY, RADIUM OR ALPHA PARTICLE CONTAMINATION.

We hereby affirm that the reported results on this certification are correct and accurate. All test and results and operations performed by Arcos or its subcontractors are in compliance with the applicable material/customer specification.

WELDSTAR COMPANYS QUALITY SYSTEM CERTIFICATE (MATERIALS) QSC 229 EXPIRATION DATE JAN. 5, 2012

QUALITY ASSURANCE DEPARTMENT
Gib Gratti, QA Manager

R.I.N.# 09-380

This CMTR covers XCEL PO# 00027722 Rev. 1; Weldstar Nuclear Shipping Ticket #N837513

ARCOS INDUSTRIES, LLC
ONE ARCOS DRIVE
MT. CARMEL, PA 17851

DATE 12/29/08 Amended

ASME CERTIFICATE NO. QSC-448
EXPIRATION DATE 10/23/11

CERTIFICATION OF TESTS

SOLD TO:
WELDSTAR CO.
P.O. BOX 1150
AURORA, IL 60507

SHIP TO:
WELDSTAR CO.
1750 MITCHELL ROAD
AURORA, IL 60504

ARCOS S.O.	CUSTOMER ORDER NO.	CONSIGNEE ORDER NO.	DATE SHIPPED
103825	904840 C/O 2	N/A	1/22/2009

ITEM	SIZE	GRADE	LOT NO. - HEAT NO.	QUANTITY
	3/32" X 36"	ARCOS 308/308L	CT9023 - 737880	1620#

SPECIFICATION: ASME SFA 5.9 CLASS ER 308/308L ASME SECTION II, PART C, ASME B&PVC SECTION III, SUBSECTION NB 2400, 2007 EDITION, UP TO AND INCLUDING 2008 ADDENDA 10CFR21 &10CFR50 APPX. B APPLIES ASME NCA 3800

CHEMICAL ANALYSIS:

C	Mn	Si	S	P	Cr	Ni	Mo		Cb+Ta	
0.017	2.0	0.42	0.003	0.014	20.1	10.4	0.09		0.007	WIRE
0.002	1.8	0.42	0.002	0.017	20.0	10.0	0.13		0.004	WELD
	Ti	Co		Cu	Fe	V	N			
	0.002	0.032		0.07	BAL	0.10	0.067			WIRE
	0.001	0.044		0.11	BAL	0.10	0.066			WELD

ADDITIONAL TEST RESULTS

Ferrite - NB2433.1-1: 9FN Wire,Sch. 9% Wire, 10FN Weld, Sch.11% Weld
Magna Gage: 9FN
X-Ray:
Bends:

TENSILE As Welded / Heat Treated

Yield 59,000psi
Tensile 90,000psi
Elongation 48%
Red.of Area 77%

OTHER INFORMATION:
Lot Classification - S3
Preheat 60°F, Interpass 300°F
Control# 9023
Intensity of Testing - Schedule K
GTAW (DCEN) 100% Argon
MADE IN THE USA

THIS MATERIAL IS FREE FROM MERCURY, RADIUM OR ALPHA PARTICLE CONTAMINATION.

We hereby affirm that the reported results on this certification are correct and accurate. All test and results and operations performed by Arcos or its subcontractors are in compliance with the applicable material/customer specification.

WELDSTAR COMPANYS QUALITY SYSTEM CERTIFICATE (MATERIALS) QSC 229 EXPIRATION DATE JAN. 5, 2012

Len Slovinsky
QUALITY ASSURANCE DEPARTMENT
Len Slovinsky QA Specialist

RIR #
09-380

WELDSTAR

OLD VALUES...NEW IDEAS

www.weldstar.com

CERTIFICATE OF COMPLIANCE

ISSUED: April 22, 2009

CUSTOMER: XCEL Energy/Monticello Nuclear
CUSTOMER PO#: 00027722 Rev. 1
SHIP TICKET #: N837513-01
DESCRIPTION: **ITEM #1:** 220 lbs Cutlengths
1/8" x 36", 10 lb containers, Arcos, ER308/308L
Heat# 737880, Lot# DT9023, Control# DT9023
**This order is complete*

The attached CMTR(s), one copy per item, cover the material supplied against the above referenced purchase order number.

The above material will meet code requirements of ASME Section II, Part C, and Section III, 2007 Edition, 2008 Addenda, NB2400 for Class 1 material, and is in compliance with the above referenced purchase order number. We certify that the material supplied has been handled in compliance with our identification and verification program.

All vendors on Weldstar's approved vendors list have been audited by Weldstar.

Weldstar's Quality Assurance Program Revision O, dated January 29, 2009 meets the requirements of ASME Section III, NCA-3800, 2007 Edition, 2008 Addenda and the applicable parts of NQA-1 and 10 CFR Part 50 Appendix B.

The provisions of NRC 10CFR Part 21 apply to this order.

QUALITY ASSURANCE MANAGER

R.I.M.#
09-513
Page 5 of 6

WELDSTAR COMPANYS
QUALITY SYSTEM CERTIFICATE
(MATERIALS) QSC 229
EXPIRATION DATE JAN. 5, 2012

Weldstar Aurora
1750 Mitchell Road, PO Box 1150
Aurora, IL 60505
Phone 630.859.3100
Fax 630.859.3199

Weldstar Logansport
1000 East Main Street
Logansport, IN 46947
Phone 574.722.1177
Fax 574.753.3113

Weldstar University Park
1100 Hamilton Avenue
University Park, IL 60466
Phone 708.534.8561
Fax 708.534.7819

ARCOS INDUSTRIES, LLC
ONE ARCOS DRIVE
MT. CARMEL, PA 17851

This CMTR covers Xcel PO# 00027722 Rev. 1; Weldstar Nuclear Shipping Ticket #N837513-01

DATE 04/15/09

ASME CERTIFICATE NO. QSC-448
EXPIRATION DATE 10/23/11

CERTIFICATION OF TESTS

SOLD TO:
WELDSTAR CO.
P.O. BOX 1150
AURORA, IL 60507

SHIP TO:
WELDSTAR CO.
1750 MITCHELL ROAD
AURORA, IL 60504

ARCOS S.O.	CUSTOMER ORDER NO.	CONSIGNEE ORDER NO.	DATE SHIPPED
105605	904931	N/A	4/15/2009

ITEM	SIZE	GRADE	LOT NO. - HEAT NO.	QUANTITY
	1/8" X 36"	ARCOS 308/308L	DT9023 - 737880	750#

SPECIFICATION: ASME SFA 5.9 CLASS ER 308/308L ASME SECTION II, PART C,
ASME B&PVC SECTION III, SUBSECTION NB 2400
2007 EDITION UP TO AND INCLUDING 2008 ADDENDA
10CFR21 &10CFR50 APPX. B APPLIES ASME NCA 3800

CHEMICAL ANALYSIS:

C	Mn	Si	S	P	Cr	Ni	Mo		Cb+Ta	
0.017	2.0	0.42	0.003	0.014	20.1	10.4	0.09		0.007	WIRE
0.002	1.8	0.42	0.002	0.017	20.0	10.0	0.13		0.004	WELD
	Ti	Co		Cu	Fe	V	N	Total Others		
	0.002	0.032		0.07	BAL	0.10	0.067	<0.50		WIRE
	0.001	0.044		0.11	BAL	0.10	0.066	<0.50		WELD

ADDITIONAL TEST RESULTS

Ferrite - NB2433.1-1: 9FN Wire, 10FN Weld
Magna Gage: 9FN
X-Ray:
Bends:
Hardness:

TENSILE	**As Welded**	**Heat Treated**
Yield	59,000psi	
Tensile	90,000psi	
Elongation	48%	
Red.of Area	77%	

OTHER INFORMATION: Lot Classification - S3 Intensity of Testing - Schedule K
MADE IN THE USA
PREHEAT 60°F, INTERPASS 300°F
GTAW, 100% ARGON, DIRECT CURRENT
STRAIGHT POLARITY (DCSP)
CONTROL# DT9023
THIS MATERIAL IS FREE FROM MERCURY, RADIUM OR ALPHA PARTICLE CONTAMINATION.

RIN # 09-513

We hereby affirm that the reported results on this certification are correct and accurate. All test and results and operations performed by Arcos or its subcontractors are in compliance with the applicable material/customer specification.

Len Slovinsky

QUALITY ASSURANCE DEPARTMENT
Len Slovinsky QA Specialist

WELDSTAR COMPANYS
QUALITY SYSTEM CERTIFICATE
(MATERIALS) QSC 229
EXPIRATION DATE JAN. 5, 2012

ENCLOSURE 12

TN AMERICAS LLC AFFIDAVIT

Affidavit #	Enclosure # - Document Number & Name
E-51228	Enclosure 11 – ANSYS Files Used to Analyze the Closure Welds on DSCs 11-15

1 page follows

AFFIDAVIT PURSUANT
TO 10 CFR 2.390

TN Americas LLC)
State of Maryland) SS.
County of Howard)

I, Jeff Isakson, depose and say that I am a Vice President of TN Americas LLC, duly authorized to execute this affidavit, and have reviewed or caused to have reviewed the information that is identified as proprietary and referenced in the paragraph immediately below. I am submitting this affidavit in conformance with the provisions of 10 CFR 2.390 of the Commission's regulations for withholding this information.

The information for which proprietary treatment is sought meets the provisions of paragraph (a) (4) of Section 2.390 of the Commission's regulations and is listed below:

- Computer files associated with calculations 11042-0207 Rev. 1, 11042-0208 Rev. 0, and 11042-0209 Rev. 0

I have personal knowledge of the criteria and procedures utilized by TN Americas LLC in designating information as a trade secret, privileged or as confidential commercial or financial information.

Pursuant to the provisions of paragraph (b) (4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure, included in the above referenced document, should be withheld.

1) The information sought to be withheld from public disclosure involves computer files related to calculations associated with the structural analysis of 61BTH Dry Shielded Canister (DSC) in the Standardized NUHOMS® System, which are owned and have been held in confidence by TN Americas LLC.

2) The information is of a type customarily held in confidence by TN Americas LLC, and not customarily disclosed to the public. TN Americas LLC has a rational basis for determining the types of information customarily held in confidence by it.

3) Public disclosure of the information is likely to cause substantial harm to the competitive position of TN Americas LLC, because the information is related to the design and analysis of the dry spent fuel storage system, the application of which provides a competitive economic advantage. The availability of such information to competitors would enable them to modify their product to better compete with TN Americas LLC, take marketing or other actions to improve their product's position, or impair the position of TN Americas LLC's product, and avoid the development of similar data and analyses in support of their processes, methods, or apparatus.

Further the deponent sayeth not.

Jeff Isakson
Vice President,
TN Americas LLC

Subscribed and sworn before me this 23th day of March, 2018.

Notary Public

My Commission Expires 10 / 16 / 19

RONDA JONES
NOTARY PUBLIC STATE OF MARYLAND
My Commission Expires October 16, 2019

ENCLOSURE 10

WELDING DATA SHEETS AND INSPECTION RECORDS FOR THE CLOSURE WELDS ON DSCS 11-16

60 pages follow

Weld Data Sheet							
Quality Level	2	**DSC Serial No.:** MNP-61BTH-1-B-2-011			**Welder Qualification Verified:**		
Const/Design Code	ASME III Sub NB	**WPS/Rev:** SS-8-M-TN Rev 10 & SS-8-A-TN Rev 8				**WPS Verified:**	
Backing Ring:	N/A	**Preheat Minimum:**	60 F	**Interpass Maximum:**	350 F	**Drawing/Revision:**	NUH61BTH-4008 Rev.1

INSPECTION REQUIREMENTS

Attribute	Weld # 1	Weld # 1 Keyway	Weld # 2	Weld # 3	Weld # 4	Weld # 5
Hydrogen Check	Required	Required	Not Required	Not Required	Not Required	Not Required
Fit Up Inspection	Required	Required	Required	Required	Required	Required
Preheat Verified	94° by RTS	93° by PB	100 by [illegible]	100 by [illegible]	89° by EW	150° by PB
Maximum Reinforcement	0.250 inch	0.060 inch	0.060 inch	0.060 inch	0.060 inch and not to exceed the top of the shell course.	0.060 inch and not to exceed the top of the shell course.
Preheat/Inter-pass Temp	(See WPS)	(See WPS)	(See WPS)	(See WPS)	(See WPS)	(See WPS)
Interpass Verified	94 by ES	94 by ES	107° by PB	107° by PB	98° by EW	155° by PB
Interpass Verified	by	by	by	by	170° by EW	by
Interpass Verified	by	by	by	by	172° by RB	by
VT Fit up	Required	Required	Required	Required	Required	Required
Initiate Attachment 9.3	Required	Required	Required	Required	Required	Required
Initiate Attachment 9.4	Not Required	Not Required	Not Required	Not Required	Required	Not Required
Tack VT Only	Required	Required	Required	Required	Required	Required
Root VT / PT	Required	Required	Required	Required	Required	Required
Filler Pass VT/PT	N/A	N/A	N/A	N/A	Required	N/A
***At Flush*: Complete Attachment 9.4**	Not Required	Not Required	Not Required	Not Required	Required	Not Required
Welding Supervisor sign off, prior to NDE	Required	Required	Required	Required	Required	Required
Final VT /PT	Required	Required	Required	Required	Required	Required
Helium Leak Test	Required	Required	Required	Required	Not Required	Not Required
Welder ID	BM-31 / BM-1	BM- 18 / 11	BM-31/18	BM-31/18	BM- 21/18, 31	BM- 18
Welder ID	BM- 18	BM- 31 / 43	BM-	BM-	BM- 43 / 11 / 01/55	BM-
Filler Metal Type	ER308	ER308	ER308	ER308	ER308	ER308
Filler Metal Size	(See WPS)	(See WPS)	(See WPS)	(See WPS)	(See WPS)	10-2-13 (See WPS)
Trace No (Heat/Lot)	~~527221/XF9689~~ 736908/XT8882	~~527221/XF9689~~ 736908/XT8882 737880/CT9023 737880/DT9023	737880/CT or DT9023	737880/CT or DT9023	~~527221/XF9689~~ 736908/XT8882	737880/CT or DT9023

VT/PT EXAMINATION

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956 - 20
DSC Number: MNP-61BTH-1-B-2-011

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP-QP-9.201 Rev. 0
☑ Dye Penetrant: 12751-MNGP-QP-9.202 Rev. 1

Examination Date: 09-05-13
Exam Surface: Inner Lid Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10-05-12
Calibration Due Date: 10-05-14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date
Weld 1 Inner Top Cover To Shell: Fit up & Tack Weld	N/A	N/A	735	Accept	LMY	09-05-13	N/A	N/A	N/A	N/A	N/A
Weld 1 Inner Top Cover To Shell: Root Weld	Keyway 4	N/A	760	Accept	LMY	09-05-13	756	106°F	Accept	LMY	09-05-13
	Lid/Shell 4	N/A	760	Accept	LMY	09-05-13	756	104°F	Accept	LMY	09-05-13
Weld 1 Inner Top Cover To Shell Final Weld	Keyway 4	N/A	730	ACCEPT	MWL	09-05-13	730	110	ACCEPT	MWL	09-05-13
	Lid/Shell 4	N/A	730	ACCEPT	MWL	09-05-13	730	105	ACCEPT	MWL	09-05-13

EXAMINER: Larry M Yeates (Print Name) LEVEL: II (Signature) 09-05-13 (Date)

EXAMINER: Mickey W. Lovell (Print Name) LEVEL: II (Signature) 09-05-13 (Date)

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956 - 20
DSC Number: MNP-61BTH-1-B-2-011

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP -QP-9.201 Rev. Ø
☑ Dye Penetrant: 12751-MNGP -QP-9.202 Rev. 1

Examination Date: 09-07-13
Exam Surface: Keyway Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10-05-12
Calibration Due Date: 10-05-14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface Temperature	Accept or Reject	Examiner Initials	Date
Weld 2 Siphon Port: Fit up & Tack Weld	5	N/A	765	Accept	LMY	09-07-13	N/A	N/A	N/A	N/A	N/A
Weld 2 Siphon Port: Root Weld	5	N/A	765	Accept	LMY	09-07-13	763	149°F	Accept	LMY	09-07-13
Weld 2 Siphon Port: Final Weld	5	N/A	780	Accept	LMY	09-07-13	780	146°F	Accept	LMY	09-07-13

EXAMINER: Larry M Yeates (Print Name) LEVEL: II Larry M Yeates (Signature) 09-07-13 (Date)

EXAMINER: _____ (Print Name) LEVEL: ___ _____ (Signature) _____ (Date)

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956-20
DSC Number: MNP-61BTH-1-B-2-011

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP-QP-9.201 Rev. 0
☑ Dye Penetrant: 12751-MNGP-QP-9.202 Rev. 1

Examination Date: 09-07-13
Exam Surface: Keyway Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10-05-12
Calibration Due Date: 10-05-14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface Temperature	Accept or Reject	Examiner Initials	Date
Weld 3 Vent Port: Fit up & Tack Weld	5	N/A	765	Accept	LMY	09-07-13	N/A	N/A	N/A	N/A	N/A
Weld 3 Vent Port: Root Weld	5	N/A	780	Accept	LMY	09-07-13	786	148°F	Accept	LMY	09-07-13
Weld 3 Vent Port: Final Weld	5	N/A	780	Accept	LMY	09-07-13	788	146°F	Accept	LMY	09-07-13

EXAMINER: Larry M Yeates (Print Name) LEVEL: II Larry M Yeates (Signature) 09-07-13 (Date)

EXAMINER: _____ (Print Name) LEVEL: ___ _____ (Signature) _____ (Date)

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956-26
DSC Number: MNP-61BTH-1-B-2-011

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP-QP-9.201 Rev. 0
☑ Dye Penetrant 12751-MNGP -QP-9.202 Rev. 1

Examination Date: 09-07-13
Exam Surface: Outer Lid Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 600350k2
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 600284-32
Date Calibrated: 10-05-12
Calibration Due Date: 10-05-14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date
Weld 4 Outer Top Cover To Shell: Fit up & Tack Weld	6	N/A	784	ACCEPT	MWL	09-07-13	N/A	N/A	N/A	N/A	N/A
Weld 4 Outer Top Cover To Shell: Root Weld	6	N/A	784	ACCEPT	MWL	09-07-13	784	97°	ACCEPT	MWL	09-07-13
Weld 4 Outer Top Cover To Shell: Intermediate Weld	6	N/A 20099	784	ACCEPT	MWL	09-07-13	784	168°	ACCEPT	MWL	09-07-13
Weld 4 Outer Top Cover To Shell: Final Weld	6	600257731 cal due 10-09-14 LM4 /OK	768	ACCEPT	LM4	09-08-13	768	207°F	ACCEPT	LM4	09-08-13

EXAMINER: MickeyW. Lovell LEVEL: II — Signature — 09-07-13
Print Name — Date

EXAMINER: Larry M Yeates LEVEL: II — Signature — 09-08-13
Print Name — Date

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956-20
DSC Number: MNP-61BTH-1-B-2-011

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP-QP-9.201 Rev. 0
☑ Dye Penetrant: 12751-MNGP-QP-9.202 Rev. 1

Examination Date: 09-08-13
Exam Surface: Outer Lid Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10-05-12
Calibration Due Date: 10-05-14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

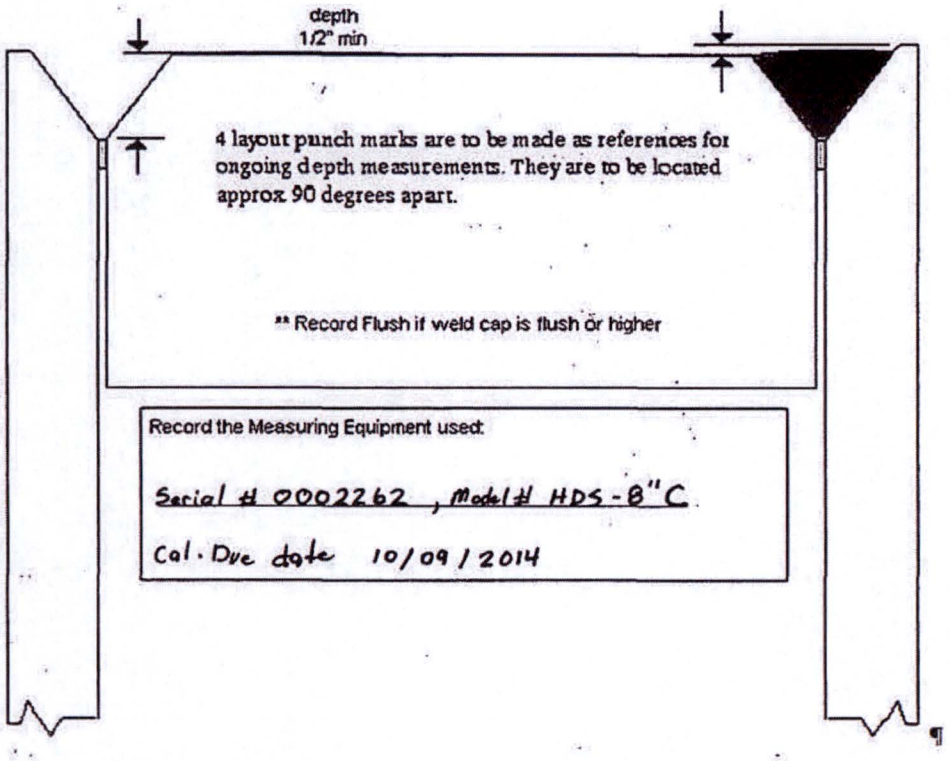
Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date
Weld 5 Test Plug: Install Plug	6	N/A	783	ACCEPT	LMY	09-08-13	N/A	N/A	N/A	N/A	N/A
Weld 5 Test Plug: Root Weld	6	N/A	783	ACCEPT	LMY	09-08-13	783	209°F	ACCEPT	LMY	09-08-13
Weld 5 Test Plug: Final Weld	6	N/A	763	ACCEPT	LMY	09-08-13	763	235°F	ACCEPT	LMY	09-08-13

EXAMINER: Larry M Yeates (Print Name) LEVEL: II Larry M Yeates (Signature) 09-08-13 (Date)

EXAMINER: _____ (Print Name) LEVEL: ___ _____ (Signature) _____ (Date)

ATTACHMENT 9.4: Fit up / High-Low / Depth Record

DSC Serial Number MNP-61BTH-1-B-2-011



Depth Measurements for Weld				
Weld #4	0 degree	90 degree	180 degree	270 degree
Initial Depth	-0.622	-0.640	-0.660	-0.628
Root Layer	-.503	-.471	-.437	-.430
Intermediate Layer	.242	.231	.217	.208
Final Crown	-0.045	-0.022	-0.031	-0.044

NOTE: "N/A" all of the sections that do not apply.

ATTACHMENT 9.5
Page 1 of 3
Field Comment and/or Repair Log

*Note: **Major Weld Repair** is defined in Section 8.10.3.*

WELD REPAIR LOG
(Additional sheets may be attached if necessary)

DSC No	Weld No.	Welder ID	WPS	Weld Filler Metal

Weld Repair Details and Sketch

DSC No	Weld No	Welder ID	WPS	Weld Filler Metal

Weld Repair Details and Sketch

LMY 09-08-13
N A NO REPAIRS

DSC No	Weld No	Welder ID	WPS	Weld Filler Metal

Weld Repair Details and Sketch

ATTACHMENT 9.5
Page 2 of 3
Field Comment and/or Repair Log

WELD INFORMATION		INSPECTION REQUIREMENTS			
Quality Level	**Const/Design Code** ASME III Sub NB	**Attribute**	**Repair No.** _____	**Repair No.** _____	**Repair No.** _____
Drawing/Revision NUH61BTH-4008 Rev.1	**Preheat Minimum** 60 F	**Base Material 1 Specification**			
WPS/Rev	**Interpass Maximum** 350 F	**Base Material 1 Traceability**			
Backing Ring N/A	**Purge**	**Base Material 2 Specification**			
WPS Verified::		**Base Material 2 Traceability**			
Welder Qualification Verified:		**Hydrogen Check**			
NOTES:		**Fit Up Inspection**			
		Nominal Plate Thickness			
		Effective Throat			
		Maximum Reinforcement			
Repair # _____		**Preheat/Interpass Temperature**	LMY	09-08-13 NO REPAIRS	
		Root Gap Limit			
	N	**Purge**	A		
		Tack VT Only			
Repair # _____		**Root VT / PT**			
		Final VT / PT			
		Helium Leak Test after PT			
		Welder ID			
Repair # _____		**Welder ID**			
		Filler Metal Type			
		Filler Metal Size			
		Trace No. (Heat/Lot)			

ATTACHMENT 9.5: Field Comment and/or Repair Log

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-011

EXAMINATION METHOD AND PROCEDURE
☐ Direct Visual: 12751-MNGP-QP-9.201 Rev. ____
☐ Dye Penetrant 12751-MNGP-QP-9.202 Rev. ____

Examination Date: ____
Exam Surface: ____
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: ____
Date Calibrated: ____
Calibration Due Date: ____

COMPONENT TEMPERATURE
Device Number: ____
Date Calibrated: ____
Calibration Due Date: N A

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: ____
Remover: KO19 Batch: ____
Developer: D350 Batch: ____

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date
					LMY						
					09-08-13						
					NO REPAIRS						

EXAMINER: ____ LEVEL: ____ ____ ____
Print Name Signature Date

EXAMINER: ____ LEVEL: ____ ____ ____
Print Name Signature Date

Weld Data Sheet							
Quality Level	2	**DSC Serial No.:** MNP-61BTH-1-B-2-012				**Welder Qualification Verified:** Morgan Rush	
Const/Design Code		ASME III Sub NB	**WPS/Rev:** SS-8-M-TN Rev 10 & SS-8-A-TN Rev 8			**WPS Verified:** MR	
Backing Ring:	N/A	**Preheat Minimum:**	60 F	**Interpass Maximum:**	350 F	**Drawing/Revision:**	NUH61BTH-4008 Rev.1

INSPECTION REQUIREMENTS

Attribute	Weld # 1	Weld # 1 Keyway	Weld # 2	Weld # 3	Weld # 4	Weld # 5
Hydrogen Check	Required	Required	Not Required	Not Required	Not Required	Not Required
Fit Up Inspection	Required	Required	Required	Required	Required	Required
Preheat Verified	97°F by CD	97°F by ES	108 by CD	108 by CD	98 by ER	110° by PB
Maximum Reinforcement	0.250 inch	0.060 inch	0.060 inch	0.060 inch	0.060 inch and not to exceed the top of the shell course.	0.060 inch and not to exceed the top of the shell course.
Preheat/Inter-pass Temp	(See WPS)	(See WPS)	(See WPS)	(See WPS)	(See WPS)	(See WPS)
Interpass Verified	110°F by CD	110°F by ES	140 by CD	140 by CD	110 by GB	117° by PB
Interpass Verified	120°F by ER	120°F by ES	by	by	112° by PB	135° by PB
Interpass Verified	by	by ES	by	by	148° by PB	by
VT Fit up	Required	Required	Required	Required	Required	Required
Initiate Attachment 9.3	Required	Required	Required	Required	Required	Required
Initiate Attachment 9.4	Not Required	Not Required	Not Required	Not Required	Required	Not Required
Tack VT Only	Required	Required	Required	Required	Required	Required
Root VT / PT	Required	Required	Required	Required	Required	Required
Filler Pass VT/PT	N/A	N/A	N/A	N/A	Required	N/A
***At Flush*: Complete Attachment 9.4**	Not Required	Not Required	Not Required	Not Required	Required	Not Required
Welding Supervisor sign off, prior to NDE	Required	Required	Required	Required	Required	Required
Final VT /PT	Required	Required	Required	Required	Required	Required
Helium Leak Test	Required	Required	Required	Required	Not Required	Not Required
Welder ID	BM-31	BM-31	BM-31	BM-31	BM-31	BM-18
Welder ID	BM-11	BM-11	BM-11	BM-11	BM-18	BM-
Filler Metal Type	ER308	ER308	ER308	ER308	ER308	ER308
Filler Metal Size	(See WPS)	(See WPS)	(See WPS)	(See WPS)	(See WPS)	(See WPS)
Trace No (Heat/Lot)	736908/ XT8882	736908/ XT8882	737880/CT or DT9023	737880/CT or DT9023	736908/ XT8882	737880/CT or DT9023

~~Blank~~ ES 7-15-13
CT9023/737880
DT9023/737880

CT9023/737880
DT9023/737880

CT0923/737880

CT0923/737880

CT0923 /737880

VT/PT EXAMINATION

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956 - 21
DSC Number: MNP-61BTH-1-B-2-012

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP -QP-9.201 Rev. ____
☑ Dye Penetrant: 12751-MNGP -QP-9.202 Rev. ____

Examination Date: 09-13-13
Exam Surface: Inner Lid Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 6002 ~~4932~~ 8432 MWL 9-14-13
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: LY 9-19-13 ~~535962~~ 315 BSH
Remover: KO19 Batch: LY 9-14-13 ~~535964~~ 319 ASL
Developer: D350 Batch: LY 9-14-13 ~~535963~~ 311-187

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date
Weld 1 Inner Top Cover To Shell: Fit up & Tack Weld	N/A	N/A	735	ACCEPT	MWL	09-13-13	N/A	N/A	N/A	N/A	N/A
Weld 1 Inner Top Cover To Shell: Root Weld	Keyway 4	N/A	735	ACCEPT	MWL	09-13-13	735	151	ACCEPT	MWL	09-13-13
	Lid/Shell 4	N/A	735	ACCEPT	MWL	09-13-13	735	149	ACCEPT	MWL	09-13-13
Weld 1 Inner Top Cover To Shell Final Weld	Keyway 4	N/A	735	ACCEPT	MWL	09-13-13	735	150	ACCEPT	MWL	09-13-13
	Lid/Shell 4	N/A	735	ACCEPT	MWL	09-13-13	735	149	ACCEPT	MWL	09-13-13

EXAMINER: Mickey W. Lovell (Print Name) LEVEL: II (Signature) 09-13-13 (Date)

EXAMINER: _____ (Print Name) LEVEL: ____ (Signature) _____ (Date)

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956 -21
DSC Number: MNP-61BTH-1-B-2-012

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP -QP-9.201 Rev. ~~0~~
☑ Dye Penetrant: 12751-MNGP -QP-9.202 Rev. 1

Examination Date: 9-14-13
Exam Surface: Keyway Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 6002 ~~4832~~ 8437 9-14-13 MWL
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: ~~535962~~ LH 9-14-13 315 B54
Remover: KO19 Batch: ~~535964~~ LH 9-14-13 319A56
Developer: D350 Batch: ~~535962~~ LH 9-14-13 311 B71

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface Temperature	Accept or Reject	Examiner Initials	Date
Weld 2 Siphon Port: Fit up & Tack Weld	5	N/A	753	ACCEPT	MWL	9-14-13	N/A	N/A	N/A	N/A	N/A
Weld 2 Siphon Port: Root Weld	5	N/A	753	ACCEPT	MWL	9-14-13	753	152	Accept	MWL	9-14-13
Weld 2 Siphon Port: Final Weld	5	N/A	753	ACCEPT	MWL	9-14-13	753	160	ACCEPT	MWL	9-14-13

EXAMINER: Mickey W. Lovell LEVEL: II Mickey W. Lovell 9-14-13
Print Name Signature Date

EXAMINER: _____ LEVEL: ___ _____ _____
Print Name Signature Date

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956 -21
DSC Number: MNP-61BTH-1-B-2-012

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP -QP-9.201 Rev. Ø
☑ Dye Penetrant: 12751-MNGP -QP-9.202 Rev. 1

Examination Date: 9-14-13
Exam Surface: Keyway Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 60024832 MWL 9-14-13
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

PENETRANT MATERIAL
Brand: Sherwin LH 9-14-13
Penetrant: KO17 Batch: ~~535962~~ 315 B54
Remover: KO19 Batch: LH 9-14-13 ~~535964~~ 319 456
Developer: D350 Batch: LH 9-14-13 ~~535963~~ 311-B71

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface Temperature	Accept or Reject	Examiner Initials	Date
Weld 3 Vent Port: Fit up & Tack Weld	5	N/A	753	ACCEPT	MWL	9-14-13	N/A	N/A	N/A	N/A	N/A
Weld 3 Vent Port: Root Weld	5	N/A	753	ACCEPT	MWL	9-14-13	753	162	ACCEPT	MWL	9-14-13
Weld 3 Vent Port: Final Weld	5	N/A	753	ACCEPT	MWL	9-14-13	753	161	ACCEPT	MWL	9-14-13

EXAMINER: Mickey W. Lovell (Print Name) LEVEL: II Mickey W. Lovell (Signature) 9-14-13 (Date)

EXAMINER: _____ (Print Name) LEVEL: ___ _____ (Signature) _____ (Date)

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956 - 21
DSC Number: MNP-61BTH-1-B-2-012

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP-QP-9.201 Rev. Ø
☑ Dye Penetrant 12751-MNGP -QP-9.202 Rev. 1

Examination Date: 9-14-13
Exam Surface: Outer Lid Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 60024832 8432 9-14-13 MWL
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date
Weld 4 Outer Top Cover To Shell: Fit up & Tack Weld	6	N/A	753	ACCEPT	MWL	9-14-13	N/A	N/A	N/A	N/A	N/A
Weld 4 Outer Top Cover To Shell: Root Weld	6	N/A	753	ACCEPT	MWL	9-14-13	753	157	Accept	MWL	9-14-13
Weld 4 Outer Top Cover To Shell: Intermediate Weld	6	N/A	763	Accept	LM4	09-16-13	763	156°F	Accept	LM4	09-16-13
Weld 4 Outer Top Cover To Shell: Final Weld	6	60025731 20099 LM4/OK	767	Accept	LM4	09-16-13	767	190°F	Accept	LM4	09-16-13

EXAMINER: Mickey W. Lovell LEVEL: II — Print Name / Signature / Date: 9-14-13
EXAMINER: Larry M Yeates LEVEL: II — Print Name / Signature / Date: 09-16-13

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956 - 21
DSC Number: MNP-61BTH-1-B-2-012

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP-QP-9.201 Rev. 0
☑ Dye Penetrant: 12751-MNGP-QP-9.202 Rev. 1

Examination Date: 09-16-13
Exam Surface: Outer Lid Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10-05-12
Calibration Due Date: 10-05-14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

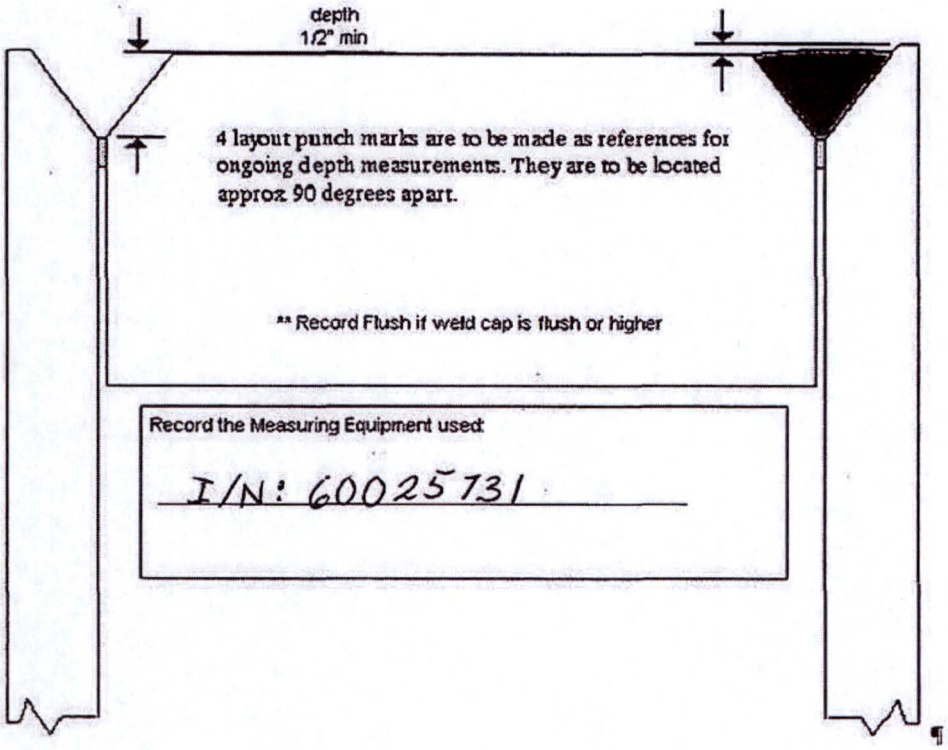
Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date
Weld 5 Test Plug: Install Plug	6	N/A	756	Accept	LMY	09-16-13	N/A	N/A	N/A	N/A	N/A
Weld 5 Test Plug: Root Weld	6	N/A	754	Accept	LMY	09-16-13	754	193°F Accept LMY 9-16-13	Accept	LMY	09-16-13
Weld 5 Test Plug: Final Weld	6	N/A	767	Accept	LMY	09-16-13	767	190°F	Accept	LMY	09-16-13

EXAMINER: Larry M Yeates (Print Name) LEVEL: II Larry M Yeates (Signature) 09-16-13 (Date)

EXAMINER: _____ (Print Name) LEVEL: ___ _____ (Signature) _____ (Date)

ATTACHMENT 9.4: Fit up / High-Low / Depth Record

DSC Serial Number MNP-61BTH-1-B-2-012



Depth Measurements for Weld				
Weld #4	0 degree	90 degree	180 degree	270 degree
Initial Depth	.624	.635	.642	.685
Root Layer	.453	.475	.440	.459
Intermediate Layer	-.190	-.215	-.239	-.228
Final Crown	-.091	-.101	-.075	-.048

NOTE: "N/A" all of the sections that do not apply.

ATTACHMENT 9.5
Page 1 of 3
Field Comment and/or Repair Log

*Note: **Major Weld Repair** is defined in Section 8.10.3.*

WELD REPAIR LOG (Additional sheets may be attached if necessary)				
DSC No	**Weld No.**	**Welder ID**	**WPS**	**Weld Filler Metal**
Weld Repair Details and Sketch				
DSC No	**Weld No**	**Welder ID**	**WPS**	**Weld Filler Metal**
Weld Repair Details and Sketch N/A MR 9-20-13				
DSC No	**Weld No**	**Welder ID**	**WPS**	**Weld Filler Metal**
Weld Repair Details and Sketch				

ATTACHMENT 9.5
Page 2 of 3
Field Comment and/or Repair Log

WELD INFORMATION		INSPECTION REQUIREMENTS			
Quality Level	**Const/Design Code** ASME III Sub NB	**Attribute**	**Repair No.** _____	**Repair No.** _____	**Repair No.** _____
Drawing/Revision NUH61BTH-4008 Rev.1	**Preheat Minimum** 60 F	**Base Material 1 Specification**			
WPS/Rev	**Interpass Maximum** 350 F	**Base Material 1 Traceability**			
Backing Ring N/A	**Purge**	**Base Material 2 Specification**			
WPS Verified::		**Base Material 2 Traceability**			
Welder Qualification Verified:		**Hydrogen Check**			
NOTES:		**Fit Up Inspection**			
		Nominal Plate Thickness			
		Effective Throat			
		Maximum Reinforcement		N/A mR	
Repair # _____		**Preheat/Interpass Temperature**			
		Root Gap Limit		9-20-13	
		Purge			
		Tack VT Only			
Repair # _____		**Root VT / PT**			
		Final VT / PT			
		Helium Leak Test after PT			
		Welder ID			
Repair # _____		**Welder ID**			
		Filler Metal Type			
		Filler Metal Size			
		Trace No. (Heat/Lot)			

ATTACHMENT 9.5: Field Comment and/or Repair Log
Page 3 of 3

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-012

EXAMINATION METHOD AND PROCEDURE
☐ Direct Visual: 12751-MNGP-QP-9.201 Rev. ____
☐ Dye Penetrant 12751-MNGP-QP-9.202 Rev. ____

Examination Date: ____
Exam Surface: ____
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: ____
Date Calibrated: ____
Calibration Due Date: ____

COMPONENT TEMPERATURE
Device Number: ____
Date Calibrated: N/A
Calibration Due Date: N/A
mc 9-20-13

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: ____
Remover: KO19 Batch: ____
Developer: D350 Batch: ____

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date

EXAMINER: ____ LEVEL: ____ ____ ____
Print Name Signature Date

EXAMINER: ____ LEVEL: ____ ____ ____
Print Name Signature Date

Weld Data Sheet							
Quality Level	2	**DSC Serial No.:** MNP-61BTH-1-B-2-013				**Welder Qualification Verified:** Monyca Rush	
Const/Design Code		ASME III Sub NB	**WPS/Rev:** SS-8-M-TN Rev 10 & SS-8-A-TN Rev 8			**WPS Verified:** MR	
Backing Ring:	N/A	**Preheat Minimum:**	60 F	**Interpass Maximum:**	350 F	**Drawing/Revision:**	NUH61BTH-4008 Rev.1

INSPECTION REQUIREMENTS

Attribute	Weld # 1	Weld # 1 Keyway	Weld # 2	Weld # 3	Weld # 4	Weld # 5
Hydrogen Check	Required	Required	Not Required	Not Required	Not Required	Not Required
Fit Up Inspection	Required	Required	Required	Required	Required	Required
Preheat Verified	125° by CB	125° by CB	130 by CB	130 by CB	120 by CB	120° by PB
Maximum Reinforcement	0.250 inch	0.060 inch	0.060 inch	0.060 inch	0.060 inch and not to exceed the top of the shell course.	0.060 inch and not to exceed the top of the shell course.
Preheat/Inter-pass Temp	(See WPS)	(See WPS)	(See WPS)	(See WPS)	(See WPS)	(See WPS)
Interpass Verified	125° by CB	125° by CB	179 by CB	179 by CB	140° by RJB	140 by RJB
Interpass Verified	149° by CB	149° by CB	by	by	142° by RJB	142 by RJB
Interpass Verified	by	by	by	by	170° by RJB	170 by RJB
VT Fit up	Required	Required	Required	Required	Required	Required
Initiate Attachment 9.3	Required	Required	Required	Required	Required	Required
Initiate Attachment 9.4	Not Required	Not Required	Not Required	Not Required	Required	Not Required
Tack VT Only	Required	Required	Required	Required	Required	Required
Root VT / PT	Required	Required	Required	Required	Required	Required
Filler Pass VT/PT	N/A	N/A	N/A	N/A	Required	N/A
***At Flush*: Complete Attachment 9.4**	Not Required	Not Required	Not Required	Not Required	Required	Not Required
Welding Supervisor sign off, prior to NDE	Required	Required	Required	Required	Required	Required
Final VT /PT	Required	Required	Required	Required	Required	Required
Helium Leak Test	Required	Required	Required	Required	Not Required	Not Required
Welder ID	BM- 11	BM- 11	BM- 11	BM- 11	BM- 11 Bm1	BM- 55
Welder ID	BM- 43	BM- 43	BM- 43	BM- 43	BM- 43 Bm55	BM-
Filler Metal Type	ER308	ER308	ER308	ER308	Bm-18 ER308 Bm-31	ER308
Filler Metal Size	(See WPS)	(See WPS)	(See WPS)	(See WPS)	(See WPS)	(See WPS)
Trace No (Heat/Lot)	736908/ XT8882	736908/ XT8882	737880/CT or DT9023	737880/CT or DT9023	736908/ XT8882	737880/CT or DT9023

737880/CT9023
737880/DT9023

737880
CT9023/DT9023
Bm-18
Bm-31

VT/PT EXAMINATION

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-013

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP-QP-9.201 Rev. 0
☑ Dye Penetrant: 12751-MNGP-QP-9.202 Rev. 1

Examination Date: 9-23-13
Exam Surface: Inner Lid Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10/5/2012
Calibration Due Date: 10/5/2014

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date
Weld 1 Inner Top Cover To Shell: Fit up & Tack Weld	N/A	N/A	80H	Accept	MWL	9-23-13	N/A	N/A	N/A	N/A	N/A
Weld 1 Inner Top Cover To Shell: Root Weld	Keyway 4	N/A	804	Accept	MWL	9-23-13	804	187°	Accept	MWL	9-23-13
	Lid/Shell 4	N/A	804	Accept	MWL	9-23-13	804	183°	Accept	MWL	9-23-13
Weld 1 Inner Top Cover To Shell Final Weld	Keyway 4	N/A	80H	Accept	MWL	9-23-13	80H	179°	Accept	MWL	9-23-13
	Lid/Shell 4	N/A	80H	Accept	MWL	9-23-13	80H	178°	Accept	MWL	9-23-13

EXAMINER: Mickey W. Lovell (Print Name) LEVEL: II Mickey W. Lovell (Signature) 9-23-13 (Date)

EXAMINER: _____ (Print Name) LEVEL: ___ _____ (Signature) _____ (Date)

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-013

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP -QP-9.201 Rev. Ø
☑ Dye Penetrant: 12751-MNGP -QP-9.202 Rev. 1

Examination Date: 9-24-13
Exam Surface: Keyway Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10/15/12
Calibration Due Date: 10/15/14

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10/5/12
Calibration Due Date: 10/5/14 MWL 9-24-13

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-M56
Developer: D350 Batch: 311-B71

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface Temperature	Accept or Reject	Examiner Initials	Date
Weld 2 Siphon Port: Fit up & Tack Weld	5	N/A	847	ACCEPT	MWL	9-24-13	N/A	N/A	N/A	N/A	N/A
Weld 2 Siphon Port: Root Weld	5	N/A	847	ACCEPT	MWL	9-24-13	847	174°	ACCEPT	MWL	9-24-13
Weld 2 Siphon Port: Final Weld	5	N/A	847	ACCEPT	MWL	9-24-13	847	176°	ACCEPT	MWL	9-24-13

EXAMINER: Mickey W. Lovell (Print Name) LEVEL: II (Signature) Mickey W. Lovell 9-24-13 (Date)

EXAMINER: _____ (Print Name) LEVEL: ___ (Signature) _____ (Date)

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-013

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP-QP-9.201 Rev. 0
☑ Dye Penetrant: 12751-MNGP-QP-9.202 Rev. 1

Examination Date: 9-24-13
Exam Surface: Keyway Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10/15/12
Calibration Due Date: 10/15/14

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10/5/12
Calibration Due Date: 10/5/14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface Temperature	Accept or Reject	Examiner Initials	Date
Weld 3 Vent Port: Fit up & Tack Weld	5	N/A	847	ACCEPT	MWL	9-24-13	N/A	N/A	N/A	N/A	N/A
Weld 3 Vent Port: Root Weld	5	N/A	847	ACCEPT	MWL	9-24-13	847	169°	ACCEPT	MWL	9-24-13
Weld 3 Vent Port: Final Weld	5	N/A	847	ACCEPT	MWL	9-24-13	847	189°	ACCEPT	MWL	9-24-13

EXAMINER: Mickey W. Lovell (Print Name) LEVEL: II Mickey W. Lovell (Signature) 9-24-13 (Date)

EXAMINER: _____ (Print Name) LEVEL: ___ _____ (Signature) _____ (Date)

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-013

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP-QP-9.201 Rev. 0
☑ Dye Penetrant 12751-MNGP -QP-9.202 Rev. 1

Examination Date: 9-24-13
Exam Surface: Outer Lid Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10/15/12
Calibration Due Date: 10/15/14

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10/5/12
Calibration Due Date: 10/5/14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date
Weld 4 Outer Top Cover To Shell: Fit up & Tack Weld	6	N/A	847	ACCEPT	MWL	9-24-13	N/A	N/A	N/A	N/A	N/A
Weld 4 Outer Top Cover To Shell: Root Weld	6	N/A	847	ACCEPT	MWL	9-24-13	847	194	ACCEPT	MWL	9-24-13
Weld 4 Outer Top Cover To Shell: Intermediate Weld	6	N/A	784	ACCEPT	LM4	09-24-13	784	190°F	ACCEPT	LM4	09-24-13
Weld 4 Outer Top Cover To Shell: Final Weld	6	60025731 / 20099 OK LM4	784	ACCEPT	LM4	09-25-13	784	188°F	Accept	LM4	09-25-13

EXAMINER: Mickey W. Lovell LEVEL: II — Signature — 9-24-13 Date
Print Name

EXAMINER: Larry M Yeates LEVEL: II — Signature — 09-24-13 Date
Print Name

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-013

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP-QP-9.201 Rev. Ø
☑ Dye Penetrant: 12751-MNGP-QP-9.202 Rev. 1

Examination Date: 09-24-13
Exam Surface: Outer Lid Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10-05-12
Calibration Due Date: 10-05-14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

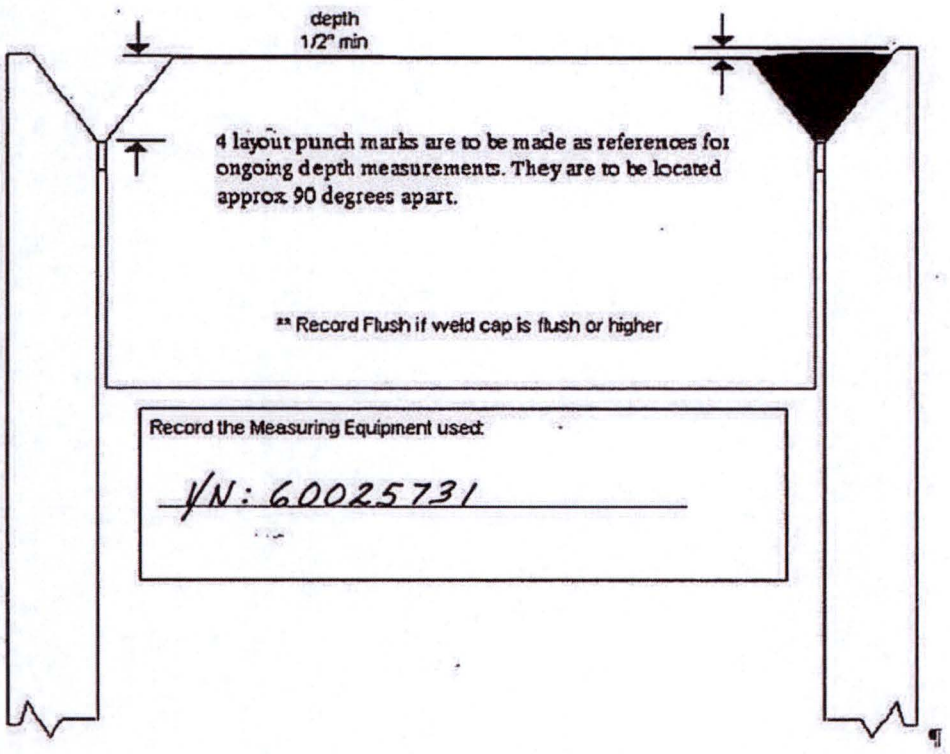
Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date
Weld 5 Test Plug: Install Plug	6	N/A	784	ACCEPT	LMY	09-24-13	N/A	N/A	N/A	N/A	N/A
Weld 5 Test Plug: Root Weld	6	N/A	784	ACCEPT	LMY	09-24-13	784	158°F	ACCEPT	LMY	09-24-13
Weld 5 Test Plug: Final Weld	6	N/A	784	ACCEPT	LMY	09-25-13	784	162°F	ACCEPT	LMY	09-25-13

EXAMINER: Larry M Yeates (Print Name) LEVEL: II Larry M Yeates (Signature) 09-24-13 (Date)

EXAMINER: _____ (Print Name) LEVEL: ___ _____ (Signature) _____ (Date)

ATTACHMENT 9.4: Fit up / High-Low / Depth Record

DSC Serial Number MNP-61BTH-1-B-2-013



Depth Measurements for Weld				
Weld #4	0 degree	90 degree	180 degree	270 degree
Initial Depth	-.611	-.622	-.608	-.614
Root Layer	-.380	-.398	.386	.378
Intermediate Layer	-.118	-.133	.126	.121
Final Crown	-0.064	-0.090	-0.086	-0.054

NOTE: "N/A" all of the sections that do not apply.

ATTACHMENT 9.5
Page 1 of 3
Field Comment and/or Repair Log

*Note: **Major Weld Repair** is defined in Section 8.10.3.*

WELD REPAIR LOG (Additional sheets may be attached if necessary)				
DSC No	**Weld No.**	**Welder ID**	**WPS**	**Weld Filler Metal**
Weld Repair Details and Sketch				
DSC No	**Weld No**	**Welder ID**	**WPS**	**Weld Filler Metal**
Weld Repair Details and Sketch				
N/A MR 9-26-13				
DSC No	**Weld No**	**Welder ID**	**WPS**	**Weld Filler Metal**
Weld Repair Details and Sketch				

ATTACHMENT 9.5
Page 2 of 3
Field Comment and/or Repair Log

WELD INFORMATION		INSPECTION REQUIREMENTS			
Quality Level	**Const/Design Code** ASME III Sub NB	**Attribute**	**Repair No.** _____	**Repair No.** _____	**Repair No.** _____
Drawing/Revision NUH61BTH-4008 Rev.1	**Preheat Minimum** 60 F	**Base Material 1 Specification**			
WPS/Rev	**Interpass Maximum** 350 F	**Base Material 1 Traceability**			
Backing Ring N/A	**Purge**	**Base Material 2 Specification**			
WPS Verified::		**Base Material 2 Traceability**			
Welder Qualification Verified:		**Hydrogen Check**			
NOTES:		**Fit Up Inspection**			
		Nominal Plate Thickness			
		Effective Throat			
		Maximum Reinforcement			
Repair # _____		**Preheat/Interpass Temperature**			
		Root Gap Limit			
		Purge			
		Tack VT Only			
Repair # _____		**Root VT / PT**			
		Final VT / PT			
		Helium Leak Test after PT			
		Welder ID			
Repair # _____		**Welder ID**			
		Filler Metal Type			
		Filler Metal Size			
		Trace No. (Heat/Lot)			

N/A mr 9-26-13

ATTACHMENT 9.5: Field Comment and/or Repair Log

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-013

EXAMINATION METHOD AND PROCEDURE
☐ Direct Visual: 12751-MNGP-QP-9.201 Rev.____
☐ Dye Penetrant12751-MNGP-QP-9.202 Rev. ____

Examination Date: _____
Exam Surface: _____
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: _____
Date Calibrated: _____
Calibration Due Date: _____

COMPONENT TEMPERATURE
Device Number: _____
Date Calibrated: N/A
Calibration Due Date: 9-26-13 M.R.

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: _____
Remover: KO19 Batch: _____
Developer: D350 Batch: _____

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date

EXAMINER: _____ LEVEL: ___ _____ _____
Print Name Signature Date

EXAMINER: _____ LEVEL: ___ _____ _____
Print Name Signature Date

Weld Data Sheet							
Quality Level	2	**DSC Serial No.:** MNP-61BTH-1-B-2-014				**Welder Qualification Verified:** Morgan Rush	
Const/Design Code		ASME III Sub NB	**WPS/Rev:** SS-8-M-TN Rev 10 & SS-8-A-TN Rev 8			**WPS Verified:** MR	
Backing Ring:	N/A	**Preheat Minimum:**	60 F	**Interpass Maximum:**	350 F	**Drawing/Revision:**	NUH61BTH-4008 Rev.1

INSPECTION REQUIREMENTS

Attribute	Weld # 1	Weld # 1 Keyway	Weld # 2	Weld # 3	Weld # 4	Weld # 5
Hydrogen Check	Required	Required	Not Required	Not Required	Not Required	Not Required
Fit Up Inspection	Required	Required	Required	Required	Required	Required
Preheat Verified	87 by CD	87 by CD	99° by PB	160° by PB	85° by CD	121 by MR
Maximum Reinforcement	0.250 inch	0.060 inch	0.060 inch	0.060 inch	0.060 inch and not to exceed the top of the shell course.	0.060 inch and not to exceed the top of the shell course.
Preheat/Inter-pass Temp	(See WPS)	(See WPS)	(See WPS)	(See WPS)	(See WPS)	(See WPS)
Interpass Verified	89 by CD	89 by CD	107° by PB	110° by PB	108 by ER	160 by MR
Interpass Verified	97 by CD	97 by CD	130 by GHT	130° by PB	165 by MR	by
Interpass Verified	by	by	by	by	172 by MR	by
VT Fit up	Required	Required	Required	Required	Required	Required
Initiate Attachment 9.3	Required	Required	Required	Required	Required	Required
Initiate Attachment 9.4	Not Required	Not Required	Not Required	Not Required	Required	Not Required
Tack VT Only	Required	Required	Required	Required	Required	Required
Root VT / PT	Required	Required	Required	Required	Required	Required
Filler Pass VT/PT	N/A	N/A	N/A	N/A	Required	N/A
***At Flush*: Complete Attachment 9.4**	Not Required	Not Required	Not Required	Not Required	Required	Not Required
Welding Supervisor sign off, prior to NDE	Required	Required	Required	Required	Required	Required
Final VT /PT	Required	Required	Required	Required	Required	Required
Helium Leak Test	Required	Required	Required	Required	Not Required	Not Required
Welder ID	BM- 11	BM- 11	BM- 31 / BM 18	BM- 31 / BM 18	BM- 11 BM 1	BM- 55
Welder ID	BM- 43	BM- 43	BM-	BM-	BM- 43 Bm 55	BM- 11 · BM 43
Filler Metal Type	ER308	ER308	ER308	ER308	ER308	ER308
Filler Metal Size	(See WPS)	(See WPS)	(See WPS)	(See WPS)	(See WPS)	(See WPS)
Trace No (Heat/Lot)	736908/ XT8882	736908/ XT8882	737880/CT or DT9023	737880/CT or DT9023	736908/ XT8882	737880/CT or DT9023

737880/CT9023
737880/DT9023

VT/PT EXAMINATION

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-014

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP -QP-9.201 Rev. 0
☑ Dye Penetrant: 12751-MNGP -QP-9.202 Rev. ____

Examination Date: 10/1/13
Exam Surface: Inner Lid Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-2012
Calibration Due Date: 10-15-2014

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10/5/2012
Calibration Due Date: 10/5/2014

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date
Weld 1 Inner Top Cover To Shell: Fit up & Tack Weld	N/A	N/A	838	Accept	MWL	10/1/13	N/A	N/A	N/A	N/A	N/A
Weld 1 Inner Top Cover To Shell: Root Weld	Keyway 4	N/A	838	Accept	MWL	10/1/13	838	131	Accept	MWL	10/1/13
	Lid/Shell 4	N/A	838	Accept	MWL	10/1/13	838	129	Accept	MWL	10/1/13
Weld 1 Inner Top Cover To Shell Final Weld	Keyway 4	N/A	838	Accept	MWL	10/1/13	838	140	Accept	MWL	10/1/13
	Lid/Shell 4	N/A	838	Accept	MWL	10/1/13	838	145	Accept	MWL	10/1/13

EXAMINER: Mickey W Lovell (Print Name) LEVEL: II (Signature) Mickey W. Lovell 10/1/13 (Date)

EXAMINER: _____ (Print Name) LEVEL: ____ (Signature) _____ (Date)

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-014

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP-QP-9.201 Rev. Ø
☑ Dye Penetrant: 12751-MNGP-QP-9.202 Rev. 1

Examination Date: 10-02-13
Exam Surface: Keyway Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10-05-12
Calibration Due Date: 10-05-14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface Temperature	Accept or Reject	Examiner Initials	Date
Weld 2 Siphon Port: Fit up & Tack Weld	5	N/A	755	ACCEPT	LMY	10-02-13	N/A	N/A	N/A	N/A	N/A
Weld 2 Siphon Port: Root Weld	5	N/A	755	ACCEPT	LMY	10-02-13	755	130°F	ACCEPT	LMY	10-02-13
Weld 2 Siphon Port: Final Weld	5	N/A	755	ACCEPT	LMY	10-02-13	755	190°F	ACCEPT	LMY	10-02-13

EXAMINER: Larry M Yeates (Print Name) LEVEL: II Larry M Yeates (Signature) 10-02-13 (Date)

EXAMINER: _____ (Print Name) LEVEL: ___ _____ (Signature) _____ (Date)

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-014

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP -QP-9.201 Rev. Ø
☑ Dye Penetrant: 12751-MNGP -QP-9.202 Rev. 1

Examination Date: 10-02-13
Exam Surface: Keyway Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10-05-12
Calibration Due Date: 10-05-14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface Temperature	Accept or Reject	Examiner Initials	Date
Weld 3 Vent Port: Fit up & Tack Weld	5	N/A	755	ACCEPT	LMY	10-02-13	N/A	N/A	N/A	N/A	N/A
Weld 3 Vent Port: Root Weld	5	N/A	755	ACCEPT	LMY	10-02-13	755	180°F	ACCEPT	LMY	10-02-13
Weld 3 Vent Port: Final Weld	5	N/A	755	ACCEPT	LMY	10-02-13	755	190°F	ACCEPT	LMY	10-02-13

EXAMINER: Larry M Yeates (Print Name) LEVEL: II Larry M Yeates (Signature) 10-02-13 (Date)

EXAMINER: _____ (Print Name) LEVEL: ___ _____ (Signature) _____ (Date)

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-014

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP-QP-9.201 Rev. 0
☑ Dye Penetrant 12751-MNGP -QP-9.202 Rev. 1

Examination Date: 10/2/13
Exam Surface: Outer Lid Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10-5-12
Calibration Due Date: 10-5-14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date
Weld 4 Outer Top Cover To Shell: Fit up & Tack Weld	6	N/A	750	ACCEPT	MWL	10/2/13	N/A	N/A	N/A	N/A	N/A
Weld 4 Outer Top Cover To Shell: Root Weld	6	N/A	750	ACCEPT	MWL	10/2/13	750	161°	ACCEPT	MWL	10/2/13
Weld 4 Outer Top Cover To Shell: Intermediate Weld	6	N/A	750	ACCEPT	MWL	10/2/13	750	158°	ACCEPT	MWL	10/2/13
Weld 4 Outer Top Cover To Shell: Final Weld	6	20099 OK LM4	750	ACCEPT	LM4	10-02-13	750	149°F	ACCEPT	LM4	10-02-13

EXAMINER: Mickey W. Lovell (Print Name) LEVEL: II — Mickey W. Lovell (Signature) — 10/2/13 (Date)

EXAMINER: Larry M Yeates (Print Name) LEVEL: II — Larry M Yeates (Signature) — 10-02-13 (Date)

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-014

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP-QP-9.201 Rev. 0
☑ Dye Penetrant: 12751-MNGP-QP-9.202 Rev. 1

Examination Date: 10-02-13
Exam Surface: Outer Lid Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10-05-12
Calibration Due Date: 10-05-14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

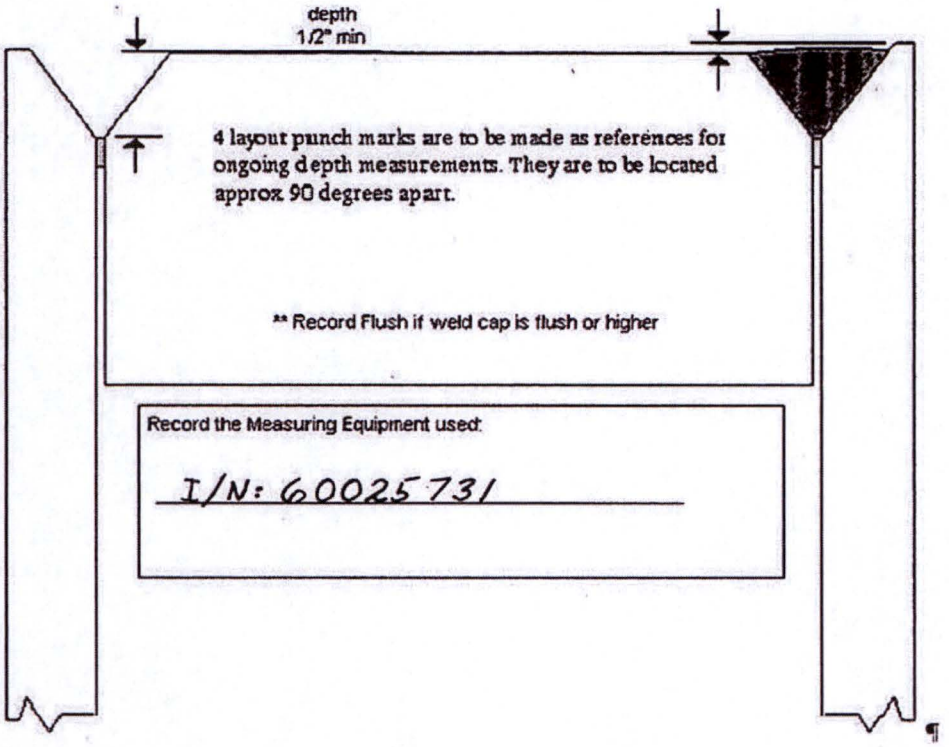
Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date
Weld 5 Test Plug: Install Plug	6	N/A	759	ACCEPT	LMY	10-02-13	N/A	N/A	N/A	N/A	N/A
Weld 5 Test Plug: Root Weld	6	N/A	759	ACCEPT	LMY	10-02-13	759	160°F	ACCEPT	LMY	10-02-13
Weld 5 Test Plug: Final Weld	6	N/A	750	ACCEPT	LMY	10-02-13	750	145°F	ACCEPT	LMY	10-02-13

EXAMINER: Larry M Yeates (Print Name) LEVEL: II Larry M Yeates (Signature) 10-02-13 (Date)

EXAMINER: _____ (Print Name) LEVEL: ___ _____ (Signature) _____ (Date)

ATTACHMENT 9.4: Fit up / High-Low / Depth Record

DSC Serial Number MNP-61BTH-1-B-2-014



Depth Measurements for Weld				
Weld #4	0 degree	90 degree	180 degree	270 degree
Initial Depth	.642	.636	.633	.636
Root Layer	.458	.393	.422	.417
Intermediate Layer	.198	.183	.231	.219
Final Crown	.111	.092	.121	.081

NOTE: "N/A" all of the sections that do not apply.

ATTACHMENT 9.5
Page 1 of 3
Field Comment and/or Repair Log

*Note: **Major Weld Repair** is defined in Section 8.10.3.*

WELD REPAIR LOG
(Additional sheets may be attached if necessary)

DSC No	Weld No.	Welder ID	WPS	Weld Filler Metal

Weld Repair Details and Sketch

DSC No	Weld No	Welder ID	WPS	Weld Filler Metal

Weld Repair Details and Sketch

N A LMY 10-02-13

DSC No	Weld No	Welder ID	WPS	Weld Filler Metal

Weld Repair Details and Sketch

ATTACHMENT 9.5
Page 2 of 3
Field Comment and/or Repair Log

WELD INFORMATION		INSPECTION REQUIREMENTS			
Quality Level	**Const/Design Code** ASME III Sub NB	**Attribute**	**Repair No.** _____	**Repair No.** _____	**Repair No.** _____
Drawing/Revision NUH61BTH-4008 Rev.1	**Preheat Minimum** 60 F	**Base Material 1 Specification**			
WPS/Rev	**Interpass Maximum** 350 F	**Base Material 1 Traceability**			
Backing Ring N/A	**Purge**	**Base Material 2 Specification**			
WPS Verified::		**Base Material 2 Traceability**			
Welder Qualification Verified:		**Hydrogen Check**			
NOTES: N/A MR 10-2-13		**Fit Up Inspection**			
		Nominal Plate Thickness			
		Effective Throat			
		Maximum Reinforcement			
Repair # _____		**Preheat/Interpass Temperature**			
		Root Gap Limit			
		Purge			
		Tack VT Only			
Repair # _____		**Root VT / PT**			
		Final VT / PT			
		Helium Leak Test after PT			
		Welder ID			
Repair # _____		**Welder ID**			
		Filler Metal Type			
		Filler Metal Size			
		Trace No. (Heat/Lot)			

ATTACHMENT 9.5: Field Comment and/or Repair Log
Page 3 of 3

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-014

EXAMINATION METHOD AND PROCEDURE
☐ Direct Visual: 12751-MNGP-QP-9.201 Rev. ____
☐ Dye Penetrant12751-MNGP-QP-9.202 Rev. ____

Examination Date: ____
Exam Surface: ____
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: ____
Date Calibrated: ____
Calibration Due Date: ____

COMPONENT TEMPERATURE
Device Number: ____
Date Calibrated: ____
Calibration Due Date: ____

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: ____
Remover: KO19 Batch: ____
Developer: D350 Batch: ____

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date
					N	A	CMY	10-02	13		

EXAMINER: ____ LEVEL: ____ ____ ____
Print Name Signature Date

EXAMINER: ____ LEVEL: ____ ____ ____
Print Name Signature Date

Weld Data Sheet

Quality Level	2	**DSC Serial No.:** MNP-61BTH-1-B-2-015				**Welder Qualification Verified:** Morgan Rush	
Const/Design Code		ASME III Sub NB	**WPS/Rev:** SS-8-M-TN Rev 10 & SS-8-A-TN Rev 8			**WPS Verified:** MR	
Backing Ring:	N/A	**Preheat Minimum:**	60 F	**Interpass Maximum:**	350 F	**Drawing/Revision:**	NUH61BTH-4008 Rev.1

INSPECTION REQUIREMENTS

Attribute	Weld # 1	Weld # 1 Keyway	Weld # 2	Weld # 3	Weld # 4	Weld # 5
Hydrogen Check	Required	Required	Not Required	Not Required	Not Required	Not Required
Fit Up Inspection	Required	Required	Required	Required	Required	Required
Preheat Verified	89° by Eh	95° by CD	97° by PB	* 97° by PB	91° by MR	91° by MR
Maximum Reinforcement	0.250 inch	0.060 inch	0.060 inch	0.060 inch	0.060 inch and not to exceed the top of the shell course.	0.060 inch and not to exceed the top of the shell course.
Preheat/Inter-pass Temp	(See WPS)	(See WPS)	(See WPS)	(See WPS)	(See WPS)	(See WPS)
Interpass Verified	103° by CD.	103° by CD	120° by PB	* 118° by PB	105° by PB	131° by MR
Interpass Verified	by	by	128° by GB	137° by GB	137° by CD	by
Interpass Verified	by	by	by	by	224° by CD.	by
VT Fit up	Required	Required	Required	Required	Required	Required
Initiate Attachment 9.3	Required	Required	Required	Required	Required	Required
Initiate Attachment 9.4	Not Required	Not Required	Not Required	Not Required	Required	Not Required
Tack VT Only	Required	Required	Required	Required	Required	Required
Root VT / PT	Required	Required	Required	Required	Required	Required
Filler Pass VT/PT	N/A	N/A	N/A	N/A	Required	N/A
***At Flush*: Complete Attachment 9.4**	Not Required	Not Required	Not Required	Not Required	Required	Not Required
Welding Supervisor sign off, prior to NDE	Required	Required	Required	Required	Required	Required
Final VT /PT	Required	Required	Required	Required	Required	Required
Helium Leak Test	Required	Required	Required	Required	Not Required	Not Required
Welder ID	BM- 11	BM- 43	BM- 31 . BM-18	BM- 55 BM-18	BM- one 1 / BM-18 BM 31	BM- 55 BM-18
Welder ID	BM- 43	BM- 11	BM- 55	BM- 31 BM-11	BM- 55 / BM 11	BM- 11
Filler Metal Type	ER308	ER308	ER308	ER308	BM-43 ER308	ER308
Filler Metal Size	(See WPS)	(See WPS)	(See WPS)	(See WPS)	(See WPS)	(See WPS)
Trace No (Heat/Lot)	527221/XF9689	527221/XF9689	737880/CT or DT9023	737880/CT or DT9023	527221/XF9689	737880/CT or DT9023
Trace No (Heat/Lot)	737880 / DT9023 CT9023	737880/CT or DT9023				

* SURFACE TEMP ON NOW VENT PORT CAP - 127° GB

VT/PT EXAMINATION

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-015

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP -QP-9.201 Rev. 0
☑ Dye Penetrant: 12751-MNGP -QP-9.202 Rev. 1

Examination Date: 10-9-13
Exam Surface: Inner Lid Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10·5·12
Calibration Due Date: 10·5·14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date
Weld 1 Inner Top Cover To Shell: Fit up & Tack Weld	N/A	N/A	773	ACCEPT	MWL	10·9·13	N/A	N/A	N/A	N/A	N/A
Weld 1 Inner Top Cover To Shell: Root Weld	Keyway 4	N/A	773	ACCEPT	MWL	10-9-13	773	154°	ACCEPT	MWL	10·9·13
	Lid/Shell 4	N/A	773	ACCEPT	MWL	10·9·13	773	151°	ACCEPT	MWL	10.9.13
Weld 1 Inner Top Cover To Shell Final Weld	Keyway 4	N/A	773	ACCEPT	MWL	10-9-13	773	144°	ACCEPT	MWL	10.9.13
	Lid/Shell 4	N/A	773	ACCEPT	MWL	10-9-13	773	140°	ACCEPT	MWL	10.9.13

EXAMINER: Mickey W. Lovell (Print Name) LEVEL: II Mickey W. Lovell (Signature) 10-9-13 (Date)

EXAMINER: _____ (Print Name) LEVEL: ___ _____ (Signature) _____ (Date)

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-015

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP-QP-9.201 Rev. 0
☑ Dye Penetrant: 12751-MNGP-QP-9.202 Rev. 1

Examination Date: 10-10-13
Exam Surface: Keyway Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10-05-12
Calibration Due Date: 10-05-14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface Temperature	Accept or Reject	Examiner Initials	Date
Weld 2 Siphon Port: Fit up & Tack Weld	5	N/A	765	ACCEPT	LMY	10-10-13	N/A	N/A	N/A	N/A	N/A
Weld 2 Siphon Port: Root Weld	5	N/A	763	Accept	MWL	10-10-13	763	128°	Accept	MWL	10-10-13
Weld 2 Siphon Port: Final Weld	5	N/A	785	ACCEPT	LMY	10-10-13	785	128°F	ACCEPT	LMY	10-10-13

EXAMINER: Larry M Yeates (Print Name) LEVEL: II Larry M Yeates (Signature) 10-10-13 (Date)

EXAMINER: MicKey W. Lovell (Print Name) LEVEL: II MicKey W. Lovell (Signature) 10-10-13 (Date)

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-015

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP-QP-9.201 Rev. Ø
☑ Dye Penetrant: 12751-MNGP-QP-9.202 Rev. 1

Examination Date: 10-10-13
Exam Surface: Keyway Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10-05-12
Calibration Due Date: 10-05-14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface Temperature	Accept or Reject	Examiner Initials	Date
Weld 3 Vent Port: Fit up & Tack Weld	5	N/A	763 765	ACCEPT ACCEPT	MWL LM4	10-10-13 10-10-13	N/A	N/A	N/A	N/A	N/A
Weld 3 Vent Port: Root Weld	5	N/A	763	ACCEPT	MWL	10-10-13	763	137°	ACCEPT	MWL	10-10-13
Weld 3 Vent Port: Final Weld	5	N/A	785	ACCEPT	LM4	10-10-13	785	130°F	ACCEPT	LM4	10-10-13

EXAMINER: Larry M Yeates (Print Name) LEVEL: II Larry M Yeates (Signature) 10-10-13 (Date)

EXAMINER: Mickey W. Lovell (Print Name) LEVEL: II Mickey W. Lovell (Signature) 10-10-13 (Date)

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-015

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP-QP-9.201 Rev. Ø
☑ Dye Penetrant 12751-MNGP -QP-9.202 Rev. 1

Examination Date: 10-11-13
Exam Surface: Outer Lid Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10-05-12
Calibration Due Date: 10-05-14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date
Weld 4 Outer Top Cover To Shell: Fit up & Tack Weld	6	N/A	785	ACCEPT	LMY	10-11-13	N/A	N/A	N/A	N/A	N/A
Weld 4 Outer Top Cover To Shell: Root Weld	6	N/A	785	ACCEPT	LMY	10-11-13	785	148°F	ACCEPT	LMY	10-11-13
Weld 4 Outer Top Cover To Shell: Intermediate Weld	6	N/A	785	ACCEPT	LMY	10-11-13	785	146°F	ACCEPT	LMY	10-11-13
Weld 4 Outer Top Cover To Shell: Final Weld	6	20099	723	ACCEPT	MWL	10-11-13	723	175°F	ACCEPT	MWL	10-11-13

EXAMINER: Larry M Yeates LEVEL: II — Print Name — Signature — 10-11-13 Date

EXAMINER: Mickey W. Lovell LEVEL: II — Print Name — Signature — 10-11-13 Date

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-015

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP-QP-9.201 Rev. 0
☑ Dye Penetrant: 12751-MNGP-QP-9.202 Rev. 1

Examination Date: 10-11-13
Exam Surface: Outer Lid Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10-05-12
Calibration Due Date: 10-05-14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

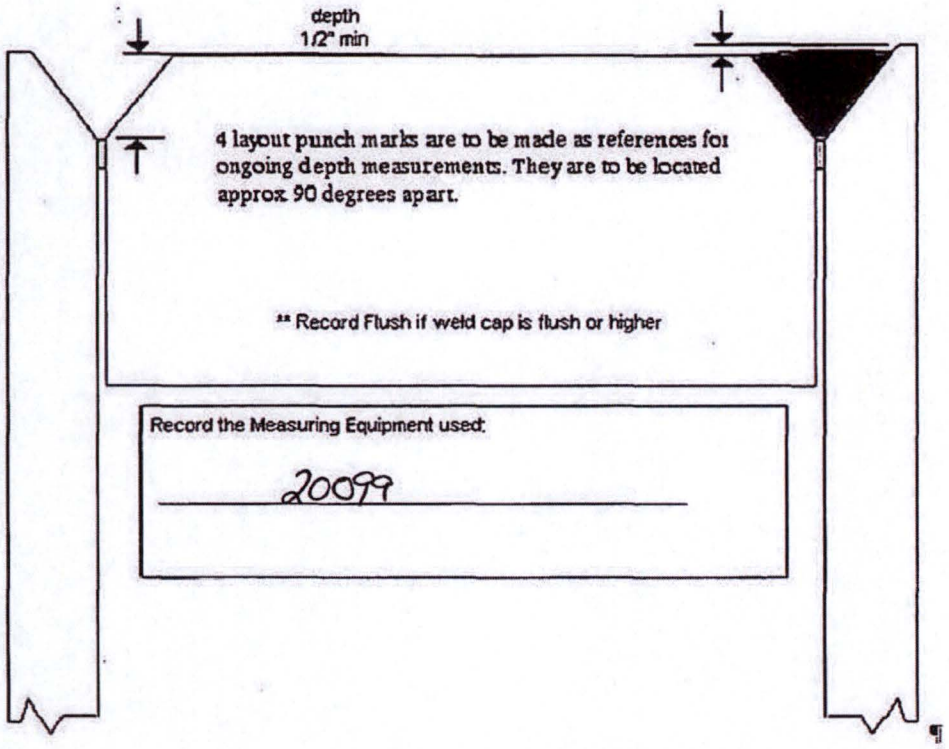
Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date
Weld 5 Test Plug: Install Plug	6	N/A	785	ACCEPT	LMY	10-11-13	N/A	N/A	N/A	N/A	N/A
Weld 5 Test Plug: Root Weld	6	N/A	723	ACCEPT	MWL	10-11-13	723	184°	ACCEPT	MWL	10-11-13
Weld 5 Test Plug: Final Weld	6	N/A	723	ACCEPT	MWL	10-11-13	723	244°	ACCEPT	MWL	10-11-13

EXAMINER: Larry m Yeates (Print Name) LEVEL: II (Signature) 10-11-13 (Date)

EXAMINER: Mickey W. Lovell (Print Name) LEVEL: II (Signature) 10-11-13 (Date)

ATTACHMENT 9.4: Fit up / High-Low / Depth Record

DSC Serial Number MNP-61BTH-1-B-2-015



Depth Measurements for Weld				
Weld #4	0 degree	90 degree	180 degree	270 degree
Initial Depth	.674	.637	.653	.632
Root Layer	.585	.511	.561	.494
Intermediate Layer	.325	.325	.332	.263
Final Crown	.133	.075	.123	.058

NOTE: "N/A" all of the sections that do not apply.

ATTACHMENT 9.5
Page 1 of 3
Field Comment and/or Repair Log

*Note: **Major Weld Repair** is defined in Section 8.10.3.*

WELD REPAIR LOG (Additional sheets may be attached if necessary)				
DSC No	**Weld No.**	**Welder ID**	**WPS**	**Weld Filler Metal**
Weld Repair Details and Sketch				
DSC No	**Weld No**	**Welder ID**	**WPS**	**Weld Filler Metal**
Weld Repair Details and Sketch				
DSC No	**Weld No**	**Welder ID**	**WPS**	**Weld Filler Metal**
Weld Repair Details and Sketch				

N/A MR 10-14-13

ATTACHMENT 9.5
Page 2 of 3
Field Comment and/or Repair Log

WELD INFORMATION		INSPECTION REQUIREMENTS			
Quality Level	**Const/Design Code** ASME III Sub NB	**Attribute**	**Repair No.** _____	**Repair No.** _____	**Repair No.** _____
Drawing/Revision NUH61BTH-4008 Rev.1	**Preheat Minimum** 60 F	**Base Material 1 Specification**			
WPS/Rev	**Interpass Maximum** 350 F	**Base Material 1 Traceability**			
Backing Ring N/A	**Purge**	**Base Material 2 Specification**			
WPS Verified::		**Base Material 2 Traceability**			
Welder Qualification Verified:		**Hydrogen Check**			
NOTES:		**Fit Up Inspection**			
		Nominal Plate Thickness			
		Effective Throat	N/A		
		Maximum Reinforcement			
Repair # _____		**Preheat/Interpass Temperature**	MR	10-14-13	
		Root Gap Limit			
		Purge			
		Tack VT Only			
Repair # _____		**Root VT / PT**			
		Final VT / PT			
		Helium Leak Test after PT			
		Welder ID			
Repair # _____		**Welder ID**			
		Filler Metal Type			
		Filler Metal Size			
		Trace No. (Heat/Lot)			

ATTACHMENT 9.5: Field Comment and/or Repair Log
Page 3 of 3

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-015

EXAMINATION METHOD AND PROCEDURE
☐ Direct Visual: 12751-MNGP-QP-9.201 Rev.____
☐ Dye Penetrant12751-MNGP-QP-9.202 Rev. ____

Examination Date: _____
Exam Surface: _____
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: _____
Date Calibrated: _____
Calibration Due Date: _____

COMPONENT TEMPERATURE
Device Number: _____
Date Calibrated: _____
Calibration Due Date: _____

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: _____
Remover: KO19 Batch: _____
Developer: D350 Batch: _____

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date
						MR	N/A				
						10-14-13					

EXAMINER: _____ LEVEL: ___ _____ _____
Print Name Signature Date

EXAMINER: _____ LEVEL: ___ _____ _____
Print Name Signature Date

Weld Data Sheet

Quality Level	2	**DSC Serial No.:** MNP-61BTH-1-B-2-016		**Welder Qualification Verified:** Morgan Rush	
Const/Design Code	ASME III Sub NB	**WPS/Rev:** SS-8-M-TN Rev 10 & SS-8-A-TN Rev 8		**WPS Verified:** MR	
Backing Ring:	N/A	**Preheat Minimum:** 60 F	**Interpass Maximum:** 350 F	**Drawing/Revision:**	NUH61BTH-4008 Rev.1

INSPECTION REQUIREMENTS

Attribute	Weld # 1	Weld # 1 Keyway	Weld # 2	Weld # 3	Weld # 4	Weld # 5
Hydrogen Check	Required	Required	Not Required	Not Required	Not Required	Not Required
Fit Up Inspection	Required	Required	Required	Required	Required	Required
Preheat Verified	87 by ff	89 by CD	94 by GHT	95 by GHT	85 by CD	120 by CD
Maximum Reinforcement	0.250 inch	0.060 inch	0.060 inch	0.060 inch	0.060 inch and not to exceed the top of the shell course.	0.060 inch and not to exceed the top of the shell course.
Preheat/Inter-pass Temp	(See WPS)	(See WPS)	(See WPS)	(See WPS)	(See WPS)	(See WPS)
Interpass Verified	98 by CD	98 by CD	108 by GHT	111 by GHT	92 by CD	130 by CD
Interpass Verified	by	by	by	by	130 by CD.	by
Interpass Verified	by	by	by	by	240 by CD	by
VT Fit up	Required	Required	Required	Required	Required	Required
Initiate Attachment 9.3	Required	Required	Required	Required	Required	Required
Initiate Attachment 9.4	Not Required	Not Required	Not Required	Not Required	Required	Not Required
Tack VT Only	Required	Required	Required	Required	Required	Required
Root VT / PT	Required	Required	Required	Required	Required	Required
Filler Pass VT/PT	N/A	N/A	N/A	N/A	Required	N/A
***At Flush*: Complete Attachment 9.4**	Not Required	Not Required	Not Required	Not Required	Required	Not Required
Welding Supervisor sign off, prior to NDE	Required	Required	Required	Required	Required	Required
Final VT /PT	Required	Required	Required	Required	Required	Required
Helium Leak Test	Required	Required	Required	Required	Not Required	Not Required
Welder ID	BM-18 - 11	BM- 11	BM- 18	BM- 18	BM- 11	BM- 11
Welder ID	BM- 43	BM- 43	BM-	BM-	BM- 43	BM-
Filler Metal Type	ER308	ER308	ER308	ER308	ER308	ER308
Filler Metal Size	(See WPS)	(See WPS)	(See WPS)	(See WPS)	(See WPS)	(See WPS)
Trace No (Heat/Lot)	527221/XF9689	527221/XF9689	737880/CT or DT9023	737880/CT or DT9023	527221/XF9689	737880/CT or DT9023
Trace No (Heat/Lot)		737880/CT or DT9023				

VT/PT EXAMINATION

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-016

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP-QP-9.201 Rev. 0
☑ Dye Penetrant: 12751-MNGP-QP-9.202 Rev. 1

Examination Date: 10-16-13
Exam Surface: Inner Lid Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 600250162
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10-05-12
Calibration Due Date: 10-05-14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date
Weld 1 Inner Top Cover To Shell: Fit up & Tack Weld	N/A	N/A	563	ACCEPT	LMY	10-16-13	N/A	N/A	N/A	N/A	N/A
Weld 1 Inner Top Cover To Shell: Root Weld	Keyway 4	N/A	563	ACCEPT	LMY	10-16-13	563	136°F	ACCEPT	LMY	10-16-13
	Lid/Shell 4	N/A	563	ACCEPT	LMY	10-16-13	563	128°F	ACCEPT	LMY	10-16-13
Weld 1 Inner Top Cover To Shell Final Weld	Keyway 4	N/A	563	ACCEPT	LMY	10-16-13	563	133°F	ACCEPT	LMY	10-16-13
	Lid/Shell 4	N/A	563	ACCEPT	LMY	10-16-13	563	138°F	ACCEPT	LMY	10-16-13

EXAMINER: Larry m Yeates (Print Name) LEVEL: II Larry m Yeates (Signature) 10-16-13 (Date)

EXAMINER: _____ (Print Name) LEVEL: ___ _____ (Signature) _____ (Date)

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-016

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP -QP-9.201 Rev. Ø
☑ Dye Penetrant: 12751-MNGP -QP-9.202 Rev. 1

Examination Date: 10-17-13
Exam Surface: Keyway Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10-05-12
Calibration Due Date: 10-05-14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface Temperature	Accept or Reject	Examiner Initials	Date
Weld 2 Siphon Port: Fit up & Tack Weld	5	N/A	546	ACCEPT	LM4	10-17-13	N/A	N/A	N/A	N/A	N/A
Weld 2 Siphon Port: Root Weld	5	N/A	546	ACCEPT	LM4	10-17-13	546	131°F	ACCEPT	LM4	10-17-13
Weld 2 Siphon Port: Final Weld	5	N/A	546	ACCEPT	LM4	10-17-13	546	136°F	ACCEPT	LM4	10-17-13

EXAMINER: Larry m Yeates (Print Name) LEVEL: II Larry m Yeates (Signature) 10-17-13 (Date)

EXAMINER: _____ (Print Name) LEVEL: ___ _____ (Signature) _____ (Date)

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-016

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP-QP-9.201 Rev. Ø
☑ Dye Penetrant: 12751-MNGP-QP-9.202 Rev. 1

Examination Date: 10-17-13
Exam Surface: Keyway Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 600 25062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 600 28432
Date Calibrated: 10-05-12
Calibration Due Date: 10-05-14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface Temperature	Accept or Reject	Examiner Initials	Date
Weld 3 Vent Port: Fit up & Tack Weld	5	N/A	546	ACCEPT	LM4	10-17-13	N/A	N/A	N/A	N/A	N/A
Weld 3 Vent Port: Root Weld	5	N/A	546	ACCEPT	LM4	10-17-13	546	134°F	ACCEPT	LM4	10-17-13
Weld 3 Vent Port: Final Weld	5	N/A	546	ACCEPT	LM4	10-17-13	546	148°F	ACCEPT	LM4	10-17-13

EXAMINER: Larry M Yeates (Print Name) LEVEL: II Larry M Yeates (Signature) 10-17-13 (Date)

EXAMINER: _____ (Print Name) LEVEL: ___ _____ (Signature) _____ (Date)

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-016

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP-QP-9.201 Rev. Ø
☑ Dye Penetrant 12751-MNGP -QP-9.202 Rev. 1

Examination Date: 10-17-13
Exam Surface: Outer Lid Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10-05-12
Calibration Due Date: 10-05-14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date
Weld 4 Outer Top Cover To Shell: Fit up & Tack Weld	6	N/A	546	ACCEPT	LMY	10-17-13	N/A	N/A	N/A	N/A	N/A
Weld 4 Outer Top Cover To Shell: Root Weld	6	N/A	546	ACCEPT	LMY	10-17-13	546	144°F	ACCEPT	LMY	10-17-13
Weld 4 Outer Top Cover To Shell: Intermediate Weld	6	N/A	539	ACCEPT	LMY	10-17-13	539	149°F	ACCEPT	LMY	10-17-13
Weld 4 Outer Top Cover To Shell: Final Weld	6	20099 60025731 LMY 101713	539	ACCEPT	LMY	10-17-13	539	156°F	ACCEPT	LMY	10-17-13

EXAMINER: Larry m Yeates (Print Name) LEVEL: II Larry m Yeates (Signature) 10-17-13 (Date)

EXAMINER: _____ (Print Name) LEVEL: ___ _____ (Signature) _____ (Date)

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-016

EXAMINATION METHOD AND PROCEDURE
☑ Direct Visual: 12751-MNGP-QP-9.201 Rev. Ø
☑ Dye Penetrant: 12751-MNGP-QP-9.202 Rev. 1

Examination Date:
Exam Surface: Outer Lid Components
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: 60025062
Date Calibrated: 10-15-12
Calibration Due Date: 10-15-14

COMPONENT TEMPERATURE
Device Number: 60028432
Date Calibrated: 10-05-12
Calibration Due Date: 10-05-14

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: 315-B54
Remover: KO19 Batch: 319-A56
Developer: D350 Batch: 311-B71

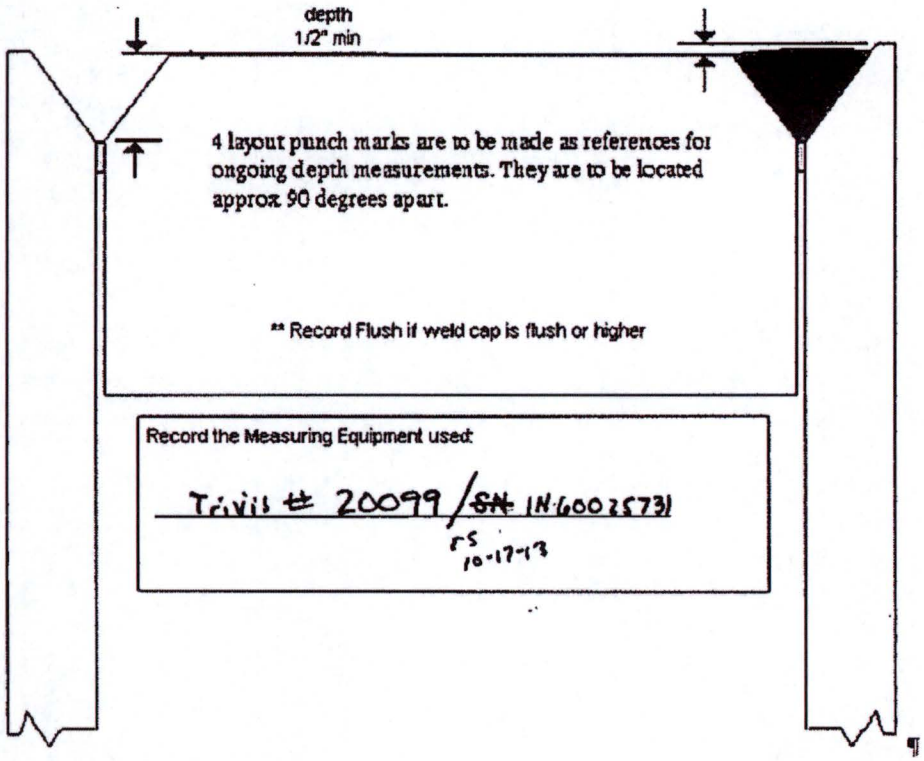
Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date
Weld 5 Test Plug: Install Plug	6	N/A	539	ACCEPT	LMY	10-17-13	N/A	N/A	N/A	N/A	N/A
Weld 5 Test Plug: Root Weld	6	N/A	539	ACCEPT	LMY	10-17-13	539	189°F	ACCEPT	LMY	10-17-13
Weld 5 Test Plug: Final Weld	6	N/A	539	ACCEPT	LMY	10-17-13	539	178°F	ACCEPT	LMY	10-17-13

EXAMINER: Larry M Yeates (Print Name) LEVEL: II Larry M Yeates (Signature) 10-17-13 (Date)

EXAMINER: _____ (Print Name) LEVEL: ___ _____ (Signature) _____ (Date)

ATTACHMENT 9.4: Fit up / High-Low / Depth Record

DSC Serial Number MNP-61BTH-1-B-2-016



Depth Measurements for Weld				
Weld #4	0 degree	90 degree	180 degree	270 degree
Initial Depth	.639	.635	.652	.622
Root Layer	.479	.466	.437	.408
Intermediate Layer	.224	.214	.216	.178
Final Crown	.132	.121	.128	.074

NOTE: "N/A" all of the sections that do not apply.

ATTACHMENT 9.5
Page 1 of 3
Field Comment and/or Repair Log

*Note: **Major Weld Repair** is defined in Section 8.10.3.*

WELD REPAIR LOG (Additional sheets may be attached if necessary)				
DSC No	**Weld No.**	**Welder ID**	**WPS**	**Weld Filler Metal**
Weld Repair Details and Sketch				
DSC No	**Weld No**	**Welder ID**	**WPS**	**Weld Filler Metal**
Weld Repair Details and Sketch				
DSC No	**Weld No**	**Welder ID**	**WPS**	**Weld Filler Metal**
Weld Repair Details and Sketch				

ATTACHMENT 9.5
Page 2 of 3
Field Comment and/or Repair Log

WELD INFORMATION		INSPECTION REQUIREMENTS			
Quality Level	**Const/Design Code** ASME III Sub NB	**Attribute**	**Repair No.** _____	**Repair No.** _____	**Repair No.** _____
Drawing/Revision NUH61BTH-4008 Rev.1	**Preheat Minimum** 60 F	**Base Material 1 Specification**			
WPS/Rev	**Interpass Maximum** 350 F	**Base Material 1 Traceability**			
Backing Ring N/A	**Purge**	**Base Material 2 Specification**			
WPS Verified::		**Base Material 2 Traceability**			
Welder Qualification Verified:		**Hydrogen Check**			
NOTES:		**Fit Up Inspection**			
		Nominal Plate Thickness			
		Effective Throat			
		Maximum Reinforcement			
Repair # _____		**Preheat/Interpass Temperature**			
		Root Gap Limit			
		Purge			
		Tack VT Only			
Repair # _____		**Root VT / PT**			
		Final VT / PT			
		Helium Leak Test after PT			
		Welder ID			
Repair # _____		**Welder ID**			
		Filler Metal Type			
		Filler Metal Size			
		Trace No. (Heat/Lot)			

ATTACHMENT 9.5: Field Comment and/or Repair Log
Page 3 of 3

VT/PT EXAMINATION REPORT

Customer/Project: Excel/Monticello---12751
Work Order Number: 464956
DSC Number: MNP-61BTH-1-B-2-016

EXAMINATION METHOD AND PROCEDURE
☐ Direct Visual: 12751-MNGP-QP-9.201 Rev.____
☐ Dye Penetrant12751-MNGP-QP-9.202 Rev. ____

Examination Date: _____
Exam Surface: _____
Drawing No: NUH61BTH-4008 Rev.1

ILLUMINATION
Light Meter Number: _____
Date Calibrated: _____
Calibration Due Date: _____

COMPONENT TEMPERATURE
Device Number: _____
Date Calibrated: _____
Calibration Due Date: _____

PENETRANT MATERIAL
Brand: Sherwin
Penetrant: KO17 Batch: _____
Remover: KO19 Batch: _____
Developer: D350 Batch: _____

Weld No	VT						PT				
	Weld Note	Gauge	Foot Candles	Accept or Reject	Examiner Initials	Date	Foot Candles	Surface. Temperature	Accept or Reject	Examiner	Date

EXAMINER: _____ LEVEL: ___ _____ _____
Print Name Signature Date

EXAMINER: _____ LEVEL: ___ _____ _____
Print Name Signature Date

ENCLOSURE 14

MARKUP PAGES FROM EXEMPTION REQUEST FOR RAI ST-2

AFFECTED PAGES OF EXEMPTION REQUEST COVER LETTER

2 of 4
3 of 4

AFFECTED PAGES OF EXEMPTION REQUEST, ENCLOSURE 1

2 of 75
28 of 75
29 of 75
32 of 75
34 of 75
35 of 75
37 of 75

9 pages follow

License Issued under 10 CFR 72.210, for the Storage of Spent Fuel", dated November 4, 2013 (ADAMS Accession No. ML13310A568)

7) NSPM letter to NRC, "Project Plan Progress Toward Restoring 10 CFR 72 Compliance to Dry Shielded Canisters Designated 11 through 16", dated June 6, 2017

Pursuant to 10 CFR 72.7, "Specific Exemptions", the Northern States Power Company, a Minnesota corporation (NSPM), doing business as Xcel Energy, requests an exemption from the requirements of 10 CFR 72.212(a)(2), 10 CFR 72.212(b)(3), 10 CFR 72.212(b)(5)(i), 10 CFR 72.212(b)(11), and 10 CFR 72.214 for five NUHOMS® Dry Shielded Canisters (DSCs) designated DSCs 11-15 due to nonconforming dye penetrant (PT) examinations performed during the loading campaign that started in September 2013. These nonconforming PT examinations are the subject of a Confirmatory Order (Reference 1).

Please note that an earlier submittal (Reference 2) was made to request an exemption for all six canisters (designated DSCs 11-16) that were originally found to be nonconforming. However, that request was withdrawn (Reference 3) in 2014.

Pursuant to the NSPM corrective action program and the Confirmatory Order, DSC 16 was restored to compliance with the regulations by an exemption granted in June 2016 (Reference 4). Currently, the subject five DSCs are loaded into Horizontal Storage Modules (HSMs), as reported in References 5 and 6. The enclosed exemption request is structured as discussed in NSPM's most recent project plan update (Reference 7).

strain

In summary, the exemption request has determined that the integrity of the field closure welds for DSCs 11-15 can be reasonably assured even though the Technical Specification required dye penetrant examinations were nonconforming. The fuel cladding integrity, weld design, materials, welding process, tests performed, adequate ~~stress~~ margin in the welds to accommodate maximized representative flaws, and demonstration of additional ~~stress~~ margins to address any remaining uncertainties demonstrates the closure weld integrity of DSCs 11-15 is sufficient to ensure that the affected closure welds will continue to perform their design basis functions over the service lifetime of these canisters. In addition, the exemption request demonstrates that the consequences of non-mechanistic weld failures are very low and that the overall risk to the public is also very low. Enclosure 1 provides the exemption request including a description of the basis and technical justification for granting an exemption. The exemption request provides the basis and technical justification to permit continued storage of DSCs 11-15 in their respective HSMs.

Enclosure 2 provides Structural Integrity Associates, Inc. (SIA) Report 1301415.301, "Development of an Analysis Based Stress Allowable Reduction Factor (SARF) – Dry Shielded Canister (DSC) Top Closure Weldments", which provides an analysis-based Stress Allowable Reduction Factor, which supports the values used in the analysis of record for the NUHOMS® 61BTH model canister, the canister design used at the Monticello Nuclear Generating Plant.

Enclosure 3 provides SIA Report 700388.401, "Evaluation of the Welds on DSCs 11-15", which evaluates the available weld head video, general area video, documentation, and DSC 16 Phased Array Ultrasonic Testing (PAUT) results determining that the types of flaws and extent of flaw distributions found in DSC 16 are considered representative of the comparable closure welds of DSCs 11-15.

Enclosure 4 provides AREVA Calculation 11042-0204, "Allowable Flaw Size Evaluation in the Inner Top Cover Plate Closure Weld for DSC #16", which calculates a maximum allowable flaw size in the Inner Top Cover Plate (ITCP) weld for DSC 16 assuming a weld depth of 0.25 inches.

Enclosure 5 provides AREVA Calculation 11042-0205, "61BTH ITCP and [Outer Top Cover Plate] OTCP Closure Weld Flaw Evaluation", which evaluates the DSC 16 closure weld flaw indications discovered by PAUT examination. This calculation uses the limit load analysis methodology of the American Society of Mechanical Engineers (ASME) Operation and Maintenance Code, Section III. Additionally, elastic-plastic analyses were performed to document the actual predicted strains in the welds and to demonstrate adequate margin against plastic collapse.

Enclosure 6 provides AREVA Calculation 11042-0207, "NUHOMS® 61BTH Type 1 DSC ITCP and OTCP Maximum Weld Flaw Evaluation", which evaluates the DSCs 11-15 closure welds per ASME Section III criteria using design bases loads with flaws located based on DSC 16 PAUT results and maximized such that the weld flaws are close to acceptable design limits.

strain

Enclosure 7 provides AREVA Calculation 11042-0208, "Site Specific NUHOMS® 61BTH Type 1 DSC ITCP and OTCP Margin Evaluation for Maximum Weld Flaw", which evaluates the ~~stress~~ margins for DSCs 11-15 with the maximized flaws in the ITCP and OTCP closure welds based on as-loaded temperature and pressure conditions.

Enclosure 8 provides AREVA Calculation 11042-0209, "Site Specific NUHOMS® 61BTH Type 1 DSC ITCP and OTCP Margin Evaluation for Maximum Weld Flaw with Side Drop Loads", which evaluates the ~~stress~~ margins for DSCs 11-15 with the maximized flaws in the ITCP and OTCP closure welds based on the as-loaded temperature and pressure conditions and site-specific side-drop loads.

Enclosure 9 provides AREVA Calculation 11042-0400, "Site-Specific Thermal Evaluation of 61BTH Type 1 DSCs Stored in HSM-H at Monticello Nuclear Generating Plant", which evaluates the bounding DSC shell temperature and internal pressure during storage based on as-loaded conditions. This calculation provides an input to the calculations submitted as Enclosures 7 and 8, which are used to establish the actual safety margins based on the as-loaded conditions of DSCs 11-15. This calculation provided in Enclosure 9 contains proprietary information and is sought to be withheld from public disclosure in accordance with 10 CFR 2.390. As the entirety of the calculation is considered to be the intellectual property of AREVA, a redacted version of the calculation has not been included. The affidavit for the enclosure is provided in Enclosure 12.

is not a credible phenomenon. Service-induced flaws under normal and off-normal conditions of storage are not credible.

c. Material and Welding Process: Shell, lid, and weld filler quality requirements were met. Austenitic stainless steels do not have a nil ductility transition temperature and thus the weld can sustain "large" flaws without a concern for flaw growth. Weld process qualification, welder qualification, and the automated welding processes designed for the specific application all ensure a quality weld.

d. Tests Performed: In-process visual inspections of welds performed by the welders, Quality Control (QC) visual examination (VT) inspections of fit-ups and welds and the vacuum hold, helium pressure and helium leak test all ensured confinement and quality of the welds.

strain

e. Adequate ~~Stress~~ Margin in Welds to Accommodate Flaws: ~~Stress~~ margins were demonstrated by structural analysis ~~using an analysis-based stress allowance reduction factor, theoretically bounding full-circumferential flaws, and a structural analysis~~ assuming flaw distributions conservatively derived from Phased Array Ultrasonic Testing (PAUT) examination of DSC 16. A review of the weld head video, general area video, welding records, and DSC 16 was performed and determined that the indications found on DSC 16 are representative of those that might be found on DSCs 11-15. Additionally, it was determined that the same bounding analyses performed for DSC 16 should provide similar conservative results for the closure welds on DSCs 11-15. Regardless, further analyses have been performed to maximize the flaws located based on DSC 16 PAUT to demonstrate substantial margin to account for potential flaw uncertainties. These analyses are provided in Enclosures 2 through ~~5.~~ 6

f. Additional ~~Stress~~ Margins in Welds: DSCs 11-15 heat loads and site-specific side drop conditions were applied to demonstrate additional margin exists and is available to account for any remaining flaw uncertainty that may exist. These analyses are provided in Enclosures ~~6~~ through 9.

7

2. Low Dose Consequences for a DSC in Storage: Notwithstanding the weld integrity demonstrated for DSCs 11-15, a reasonable assurance of safety is further supported by a radiological dose analysis. The dose analysis concludes that a non-mechanistic failure of the weld and a postulated release would result in no danger to the public as the dose consequences would be far below the regulatory limit of 5 rem Total Effective Dose Equivalent (TEDE) (Note: unless otherwise specified, all dose quantities identified in this Enclosure are TEDE). The dose analysis is provided in Enclosure 10.

3. Low Risk to the Public: Notwithstanding the weld integrity demonstrated for DSCs 11-15, a reasonable assurance of safety is further supported by a probabilistic risk assessment (PRA). This assessment concludes the risk of a potential Latent Cancer Fatality (LCF) for all five DSCs with noncompliant PT exams over a 20 year storage period is extremely unlikely (1.39E-12 LCF) and the risk associated with the

examination (i.e., PT) vs. volumetric examination technique (i.e., PAUT), and the potential for subsurface flaws to exist when only surface examinations are performed. Additionally, the maximum weld deposit depth for intermediate layers is kept smaller than the critical flaw depth in accordance with ISG-15.

b. Methodology for Assessing DSC 11-15 Closure Weld Structural Functions

Previous analyses that demonstrated ~~stress~~ margins for the DSC 16 closure welds were provided to the NRC in Reference 6.7, and again in Enclosures 2, 4 and 5 to this letter. These evaluations included (1) structural analysis using an analysis-based stress allowance reduction factor and theoretically-bounding full-circumferential flaws, and (2) a structural analysis assuming flaw distributions conservatively derived from the DSC 16 PAUT examination.

To further evaluate the structural integrity of DSCs 11-15, evaluations were performed to determine if it was reasonable to expect that the types and extent of flaw distributions found in DSC 16 could be used to represent the comparable closure welds of DSCs 11-15 (Enclosure 3) and additional analysis was performed using design basis loads with flaws located based on DSC 16 PAUT and maximized such that the weld flaws reached close to acceptable design limits (Enclosure 6). Following these evaluations, additional analysis was performed using site-specific heat load and side drop conditions to demonstrate additional margin exists and is available to account for any remaining uncertainty related to the welds (Enclosures 7 and 8). A description of each of these evaluations follows:

i. DSC 16 Closure Weld Flaw Evaluation

a. Analysis-Based Structural Analysis with Theoretical Flaws

For the OTCP, the original design basis calculations determined critical flaw sizes. Per ISG-15, the stress reduction factor of partial penetration welds with PT examination is 0.80. Since these welds are noncompliant with the PT requirements, the weld reduction factor is reduced beyond 0.80 based on a set of theoretical flaw distributions that might conceivably have gone undetected during DSC closure weld examinations. Thus, an analysis-based stress allowable reduction factor of 0.7 was calculated. The analysis is included in its entirety in Enclosure 2. Since the original design basis critical flaw calculations already uses a reduction factor of 0.7, the original analysis remains applicable. These design basis analyses determined for a 360° circumferential flaw, an allowable flaw depth of 0.19 inch and 0.29 inch could exist for surface connected and sub-surface flaws respectively. The flaw sizes determined by these calculations bound any of the indications found on DSC 16 by PAUT.

For the ITCP weld, the calculation provided in Enclosure 4 documents the critical flaw size based on the maximum radial stresses in the welds due to

design loads. The analysis calculates the critical flaw size for a weld size of 0.25 inch per the PAUT results for DSC 16 (which indicated a distance between the root and crown at the canister wall from 0.25 to 0.40 inches) in lieu of the design thickness of 3/16 inch. This increased weld size is considered equally applicable to DSCs 11-15 based on the joint configuration and same welding process application. The calculation assumes both a buried (sub-surface) and a surface flaw. A 360° circumferential flaw was modeled and the critical flaw depth was calculated using ASME Section XI criteria. The critical flaw depth determined, 0.15 inches, is larger than the half of the weld which would exceed the typical weld layer. The original design basis calculation already considered a 0.7 stress reduction factor; therefore, no further analyses were performed to show that all component stresses remain below the stress allowable limits.

The flaw sizes determined by these calculations bound any of the indications found on DSC 16 by PAUT. Therefore, these calculations demonstrate that sufficient margin is included in the welds and indicates a reasonable expectation of satisfactory performance of each DSC for the design service lifetime of the DSC.

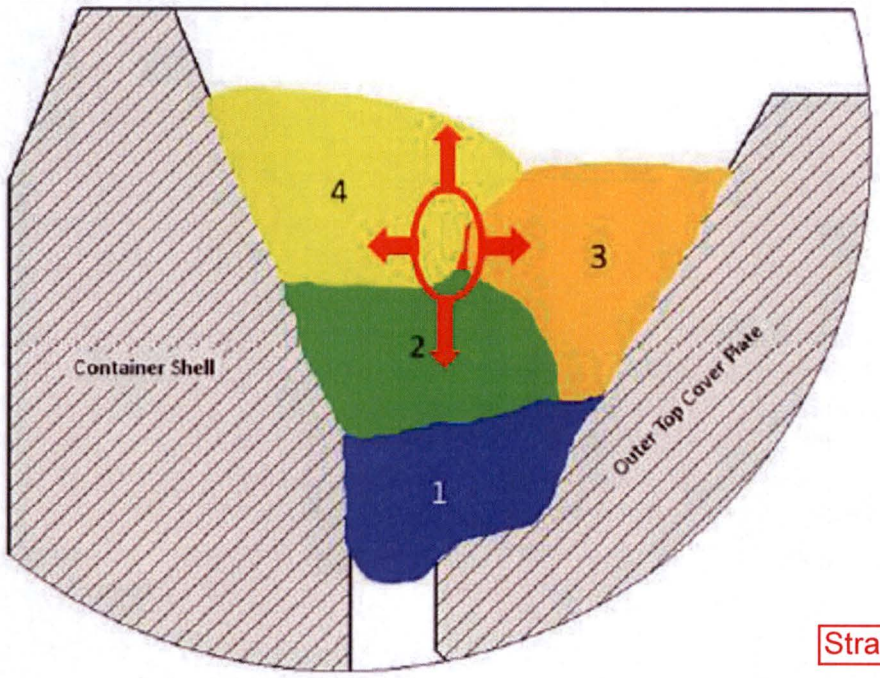
b. Structural Analysis Using PAUT Flaw Distribution: Enclosure 5

A structural analysis was performed assuming flaw distributions conservatively derived from DSC 16 PAUT examination by applying bounding flaw heights and modeling the intermittent flaws as full circumferential. This structural analysis is fully described in ~~Enclosure 6~~ and concludes that DSC 16 will continue to perform its function due to the adequate margins for the accident pressure and drop loads with the presence of the ITCP and OTCP weld flaw indications documented in the PAUT exam.

ii. Applicability of DSC 16 PAUT to DSCs 11-15

As part of the original extent of condition review, weld head videos were reviewed by SIA in 2014. This review determined that good welding practices were used. However, the video also shows infrequent indications of areas where the potential for small weld flaws could exist. Both inner and outer cover plate closure welds were recorded in some cases, but the video coverage was incomplete for all weld beads. Specifically, the video review covered the ITCP root and cover weld layers; the OTCP tack, root, intermediate and cover weld layers for DSCs 13 and 16; and the OTCP tack, root, intermediate and cover weld layers for DSCs 12, 14 and 15. No weld head video was available for DSC 11. The DSC 16 outer closure weld was concluded to be the most vulnerable to potential defects, because a greater frequency of irregular surface conditions was generated during welding.

Figure 6 – LOF Between Bead 3 and Bead 4



iii. Structural Analyses of DSCs 11-15 for Maximum Weld Flaw and ~~Stress~~ Margin Evaluation

a. Maximized Representative Flaw Evaluation

Notwithstanding the conclusions reached by SIA that the bounding flaws used to model the DSC 16 PAUT results would be reasonable to assume for all canisters (DSCs 11-15), NSPM contracted with AREVA to evaluate DSCs 11-15 closure welds per ASME Section III criteria. The analysis used design basis loads with flaws located based on DSC 16 PAUT results and maximized such that the weld flaws reach close to acceptable design limits. The purpose of this analysis was to address uncertainties related to the potential flaws that may be present in DSCs 11-15 by demonstrating the maximum flaws that could be shown to still meet the code limits. The analysis is provided in its entirety in Enclosure 6.

All of the applicable design bases loading conditions are considered in accordance with the requirements of ASME Section III Subsection NB. Similar to previous analysis, the uncertainties in the PAUT examination were accounted for by using a 0.8 reduction factor on the limit load and elastic plastic analyses.

The DSC design used in the calculation was typical of MNGP DSCs 11-16, and the modeled baseline flaws were representative of those indications

one weld bead. These flaws were located based on DSC 16 PAUT results and are considered representative locations for DSCs 11-15.

Strain

b. Additional ~~Stress~~ Margins in Welds

Notwithstanding the conclusions reached by SIA that the bounding flaws used to model the DSC 16 PAUT results would be reasonable to assume for DSCs 11-15, and the analysis by AREVA showing large flaws that could still be shown to meet the code limits, additional analyses were performed by AREVA to demonstrate additional ~~stress~~ margin exists using site-specific heat loads and side drop conditions. The purpose of these analyses was to address any remaining uncertainties related to potential flaws that may be present in DSCs 11-15 by demonstrating additional ~~stress~~ margins. These analyses are provided in their entirety in Enclosures 7 and 8.

Enclosure 7 evaluates the margins for DSCs 11-15 with the maximum flaws in the ITCP and OTCP closure welds based on the as–loaded temperature and pressure conditions.

Load Limit Analysis: The lower bound collapse pressure for Service Level A/B criteria was found to be 98.4 psi which is greater than the limiting pressure of 60 psi. Therefore the Service Level A/B criterion is satisfied. The lower bound collapse pressure for Service Level D criteria was found to be 144.1 psi which is greater than the limiting pressure of 90.2 psi. The lower bound collapse G-Load for Service Level D side drop criteria was found to be 204 g which is greater than the limiting G-Load of 104 g. Therefore the Service Level D criterion is satisfied.

Elastic-Plastic Analyses: The peak strains predicted by the elastic-plastic analyses for the bounding Service Level D event are shown to remain below the material ductility limits (28%) at the specified loading conditions, and also at one and a half times the specified loads, with a minimum margin of safety of 1.86. Therefore the elastic plastic analyses criteria are satisfied.

Enclosure 8 evaluates margins for the DSCs with the maximum flaws in the ITCP and OTCP closure welds based on the as-loaded temperature and pressure conditions, and the site specific side drop loads (i.e., actual approach slab parameters).

Limit Load Analysis: The lower bound collapse G-Load for Service Level D side drop criteria was found to be 204 g which is greater than the limiting G-Load of 104 g. Therefore the Service Level D criterion is satisfied.

Elastic-Plastic Analysis: The peak strain values remain below the material ductility limits at the specified loading conditions with a minimum margin of

safety of 3.83. Therefore the elastic plastic analyses criteria are satisfied. It should be noted that with the as-loaded temperature and pressure conditions, and site specific side drop loads the margin of safety is higher than the margin of safety in similar analyses for DSC 16 (3.83 vs. 3.60).

Additionally, the analysis used to determine the bounding DSC shell temperature and internal pressure during storage operations based on the as-loaded configuration of DSCs 11-15 is included as Enclosure 9.

3.7 Conclusion

Based on the technical assessment presented previously, the proposed activity does not adversely affect the criticality safety, shielding/radiological safety, heat removal, confinement integrity or structural support functions of DSCs 11-15 as described in the UFSAR. In summary, the requested exemption results in continued safe operation of the MNGP ISFSI.

strain

The integrity of the field closure welds for DSCs 11-15 can be assured with confidence even though the TS-required PT examinations were nonconforming. The fuel cladding integrity, weld design, materials, welding process, tests performed, adequate ~~stress~~ margins in the welds to accommodate the maximized representative flaws, and demonstration of additional ~~stress~~ margins to address any remaining uncertainties demonstrates the closure weld integrity of DSCs 11-15 is sufficient to ensure that the affected closure welds will continue to perform their design basis functions over the service lifetime of these canisters.

Application of the alternatives described in Section 4.3 would increase the radiological dose to workers, generate additional radiological waste, potentially create foreign material concerns and increase other operational risks to the station without a commensurate increase in safety as compared to receipt of the exemption request.

4.0 Basis for Approval

The proposed exemption is limited in scope in that it only relates to compliance with the inspection of certain field closure welds. The proposed exemption involves a change in compliance, but no physical change to the canister design, and no change to the canister materials or the loading operation. In this regard, the proposed activity cannot affect the frequency of any accident caused by the loading process (e.g., dropped TC or jammed DSC). It has no bearing on the frequency of natural events (flood, earthquake, tornado) that are natural phenomena. Therefore, the proposed activity does not result in an increase in the frequency of any previously evaluated accident. Furthermore, since the exemption does not affect the canister design and procedures this ensures that no new type of malfunction would be created.

The Technical Assessment herein provides the basis for the conclusion that a reasonable assurance of safety exists for the service lifetime of DSCs 11-15. Even though regulations

c. Material and Welding Process: The shell, lid, and weld filler quality requirements were met. Austenitic stainless steels do not have a nil ductility transition temperature and thus the weld can sustain "large" flaws without a concern for flaw growth. Weld process qualification, welder qualification, and automated welding processes designed for the specific application all ensure a quality weld.

d. Tests Performed: The welding procedures used for this campaign required welder in-process inspections prior to each QC NDE examination to ensure a weld surface free of coarse ripples, arc strikes, coarse grooves, overlap, abrupt ridges and valleys, cracks, porosity or fish-eyes, lack of fusion, lack of penetration, undercut in excess of 1/32 inch or root concavity that results in less than minimum wall. QC VTs were required for fit-up and tack welds of the ITCP, siphon cover, vent cover, and OTCP joints. QC VTs were also required prior to the PT exams on the ITCP, siphon cover, vent cover, TPP and OTCP root and cover weld layers, and the OTCP intermediate weld layer. Strain

e. Adequate ~~Stress~~ Margin in Welds to Accommodate Flaws: ~~Stress~~ margins were demonstrated by structural analysis ~~using an analysis-based stress allowance reduction factor and theoretically-bounding full-circumferential flaws and a structural analysis~~ assuming flaw distributions conservatively derived from PAUT examination. A review of weld head video, general area video, welding records and DSC 16 PAUT was performed that has determined that the indications found on DSC 16 are representative of those that may be found on DSCs 11-15 and that the same bounding analyses performed for DSC 16 should provide for similar conservative results for the other DSC closure welds. Regardless, additional analysis has been performed to maximize the flaws located based on DSC 16 PAUT to demonstrate substantial margin to account for potential flaw uncertainties.

f. Additional ~~Stress~~ Margins in Welds: DSCs 11-15 heat loads and site-specific side drop conditions were applied to demonstrate additional weld margin exists and is available to account for any remaining flaw uncertainty that may exist.

2. Low Dose Consequences for a DSC in Storage: Notwithstanding the weld integrity that is demonstrated for DSCs 11-15, a reasonable assurance of safety is further supported by a radiological dose analysis which concludes that a non-mechanistic failure of the weld and a postulated release would result in dose consequences that would be far below the regulatory limit (5 rem). The dose analysis is provided as Enclosure 10.

   In general, the analysis used the guidance contained within NUREG-1567 (and other relevant guidance documents as described in Enclosure 10) to develop the dose acceptance criteria, source term isotopes of concern, isotopic fuel rod activity released from the rods to the DSC, DSC deposition rates, and calculated