SMUD
SACRAMENTO MUNICIPAL UTILITY DISTRICT □ P. O. Box 15830, Sacramento CA 95852-1830, (916) 452-3211
AN ELECTRIC SYSTEM SERVING THE HEART OF CALIFORNIA

MPC&D 02-048

May 8, 2002

U.S. Nuclear Regulatory Commission
Attn.: Document Control Desk
Washington, DC 20555

Docket No. 72-11
Rancho Seco Independent Spent Fuel Storage Installation
License No. SNM-2510
REQUEST FOR ASME CODE EXCEPTION

Attention: Randy Hall

Rancho Seco ISFSI FSAR, Appendix A "ASME Code Exception List" documents and justifies deviations from the ASME Code Section III, Division 1 requirements for the NUHOMS MP187 Cask and the FO, FC, and FF Dry Shielded Canisters (DSCs). In accordance with Rancho Seco ISFSI Technical Specification Section 4.3.4, we are requesting authorization for a one-time exception to ASME Paragraph NB-4121.3 "Repetition of Surface Examination After Machining" regarding a liquid penetrant test on the FF-DSC bottom forging that was not performed.

The FF-DSC is the last canister to be loaded at Rancho Seco. Loading the FF-DSC into our Independent Spent Fuel Storage Installation (ISFSI) would mark the end of our fuel transfer campaign and allow us to proceed with decommissioning the spent fuel pool (SFP). Our current schedule shows that we begin loading the FF-DSC on August 12, 2002. We will begin decommissioning the SFP as soon as we have removed the last fuel assemblies and the pool becomes available.

In addition, from a security perspective, we believe that it is preferable to have all of the fuel in dry storage at the ISFSI rather than to have it stored in both wet and dry storage for any longer than necessary. Accordingly, we ask that the NRC expedite its review of this exception request so that we can maintain our current schedule for completing dry fuel storage and decommissioning.

We apologize for the short notice in asking for this exception; however, this issue has just recently come to our attention. There was an apparent breakdown in the planning process at RANOR where this ASME Code requirement was not identified in the shop travelers.

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Transnuclear (TN) had also identified this problem with the fabrication of their TN-68 casks. In an NRC letter dated May 6, 2002 (TAC No. L23452), the NRC approved a similar exception to ASME Paragraph NB-4121.3 for the TN-68 casks.

Requested Exception

We request to revise ISFSI FSAR, Appendix A, Table 2 as follows:

- Add a reference to ASME Code Section NB-4121.3.
- ASME Code requirement NB-4121.3 states:

  If, during the fabrication or installation of an item, materials for pressure containing parts are machined, then the Certificate Holder shall reexamine the surface of the material in accordance with NB-2500 when:

  (a) The surface was required to be examined by the magnetic particle or liquid penetrant method in accordance with NB-2500; and

  (b) The amount of material removed from the surface exceeds the lesser of 1/8 in. or 10% of the minimum required thickness of the part.

- The "Exception" column of Table 2 would add the following:

  "A nonconforming condition exists for the FF-DSC bottom forging because a liquid penetrant test on the forging was not performed following final machining as required. Based on other examinations performed on the forging and additional technical analysis, the nonconformance has no significant adverse affect on the ability of the FF-DSC to perform its design function and the canister is acceptable for use."

Technical Specifications Requirement

Rancho Seco ISFSI Technical Specification Section 4.3.4 "Fabrication Exceptions to Codes and Standards" states:

The ISFSI SAR, Appendix A, lists the ASME Code exceptions found acceptable by the NRC staff for the MP187 Cask and the DSCs. Proposed alternatives to the ASME code, including additional exceptions listed in Appendix A of the SAR, and deviations from ACI 349-85, may be used when authorized by the Director, Office of Nuclear Material Safety and Safeguards or designee. The licensee should demonstrate that:

1. *The proposed alternative provides an acceptable level of quality and safety, or*

2. *Compliance with the specified requirements of the following ASME Code Sections, 1992 Edition with 1993 Addenda, or with ACI 349-85, would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.*

Requests for relief specified in this section will be submitted in accordance with 10 CFR 72.4.

Justification for the Exception

The material supplier performed complete NB-compliant volumetric (UT) and surface (PT) examinations of the bottom forging material. The canister fabricator (RANOR) performed additional machining on the forging but did not repeat the surface examination of all forging surfaces as required by ASME Paragraph NB-4121.3. When RANOR discovered the nonconformance, they conducted surface examinations of the accessible areas of the forging in accordance with NB-4121.3. However, RANOR had already installed the forging in the canister shell and had welded the basket and bottom shield plug in place. This prevented access to the inside surface of the forging making a surface examination impossible.

The attached Transnuclear (TN) Nonconformance Report (TN NCR 02.046) provides a detailed discussion of the nonconformance. Based on additional examinations performed on the bottom forging and engineering analysis by outside experts, the NCR concludes that the FF-DSC can continue to perform its design function and is acceptable for use as is.

In addition, in an NRC letter dated May 6, 2002 (TAC No. L23452), the NRC approved a similar exception to ASME Paragraph NB-4121.3 for the TN-68 casks. In that letter, the NRC concluded that the performance of the required surface examination would not provide a significant increase in safety or quality commensurate with the hardship and risks involved in requiring the tests to be performed upon the completed casks.

Conclusions

Although a nonconforming condition exists for the FF-DSC bottom forging because the fabricator did not perform a required liquid penetrant test, other examinations performed on the forging and additional technical analysis by outside experts demonstrate that the nonconformance has no significant adverse affect on the ability of the FF-DSC to perform its design function.

Specifically, TN contracted Structural Integrity Associates, Inc. to perform a flaw evaluation for potential defects in the FF-DSC bottom forging to determine if the FF-DSC would still be acceptable for operation without the final PT examination on the bottom forging. The evaluation determined the maximum credible defect in the forging and compared it to the ASME Code Section XI allowable flaw size. The evaluation also determined the most credible surface indication that could be on the forging and then determined if the surface indication could grow to the ASME Code allowable flaw size during the service life of the canister.

The evaluation concluded that the maximum credible defect in the forging is relatively small compared to the ASME Code Section XI allowable flaw size. Further, there are no potential flaw growth mechanisms that would propagate the defect to encroach upon the ASME Code Section XI allowables. Therefore, although RANOR did not fully perform the PT on the final machined surfaces of the bottom forging, the canister will be able to provide an acceptable level of quality and safety and is acceptable for use.

Further, being required to comply with ASME Paragraph NB-4121.3 would result in hardship and unusual difficulty without a compensating increase in the level of quality and safety because we would be required to disassemble the canister to complete the inspection. This would cause a significant delay in completing the removal of all of the spent fuel from the spent fuel pool and significant additional expense with the potential for ruining some of the canister components. Accordingly, granting the requested exception to ASME Paragraph NB-4121.3 is acceptable.

If you, or members of your staff, have questions requiring additional information or clarification, please contact Bob Jones at (916) 732-4843.

Sincerely,

Steve Redeker
Manager, Plant Closure & Decommissioning

TRANSNUCLEAR

NONCONFORMANCE REPORT (NCR)

1. NONCONFORMANCE REPORT (NCR) NO.: **02.046**	2. ☐ TN NCR ☒ SUPPLIER NCR NCR#: 02-101 SUPPLIER: RANOR, Inc ADDRESS: Bella Drive, Westminster, MA 01473 TN P.O. #: 2001-022

3. SIGNIFICANCE LEVEL: ☐ 1 CAT. ____ CAR # ____ ☐ 2 CAT. F3 CAR # ____ ☒ 3 CAT. F4

4. PROJECT NUMBER/TITLE: 2069 SMUD DSCs	5. ISSUE DATE: 4/29/02
6. DRAWING/DOCUMENT NO. & REV.: NUH-05-113 Revision 0, NUH-05-1032 Rev. 4 — UNCONTROLLED COPY FOR INFORMATION ONLY	7. RESPONSE DUE DATE: 5/29/02

8. COMPONENT & SERIAL NO.:	QUANTITY:	9a. PROJECT ENGINEER: James W. Axline
DSC Assembly FF13P-R21, Bottom End Forging	1	9b. PROJECT MANAGER: Robert Grenier/Lance Hunter

10. APPLICABLE REQUIREMENTS: ☐ DESIGN ☒ FABRICATION

The fabrication specification NUH-05-113 specifies that machining operations required in the fabrication of the FF-DSC be performed in accordance with the requirements of the ASME Code Section III, Article NB-4000, as applicable.

11. NONCONFORMANCE DESCRIPTION:
(Include what happened, when it happened, and how it happened, if applicable)

The material for the bottom end forging was volumetrically (UT) and surface examined (PT) by the material supplier. RANOR performed additional machining of the forging, but did not repeat the surface examination of all forging surfaces after machining in accordance with ASME Paragraph NB-4121.3. See attached RANOR NCR 02-101 for additional details.

12. TAGGING REQUIREMENTS: ☒ NA ☐ HOLD ☐ REJECT BY: ☐ TN ☐ SUPPLIER ☐ CUSTOMER

H. Ilisko [signature] — ORIGINATOR 05/02/02 — DATE

13. DISPOSITION: ☒ USE-AS-IS ☐ REPAIR ☐ REWORK ☐ REJECT

14. DISPOSITION DETAIL TECHNICAL JUSTIFICATION: SRS # 71-7165 & 72-1753 (IF USE-AS-IS OR REPAIR)

See the attached disposition.

H. Ilisko [signature] — PREPARED BY 05/02/02 — DATE V. P. Abayan [signature] — VERIFIED BY 05/03/02 — DATE

15. ANI Concurrence ☐ YES ☒ NO IF YES ____ Authorized Nuclear Inspector ____ DATE

16. CLIENT APPROVAL REQUIRED? ☒ YES ☐ NO IF YES, CLIENT DOCUMENT #

17. APPROVED:

____ PROJECT ENGINEER ____ DATE ____ QUALITY ASSURANCE ENGINEER ____ DATE

18. DISPOSITION ACTION COMPLETED AND ACCEPTABLE:

☐ CLOSED ____ / ____ AUTHORIZED NUCLEAR INSPECTOR/QUALITY ASSURANCE ENGINEER ____ DATE/DATE

TRANSNUCLEAR

NONCONFORMANCE REPORT (NCR)

DISPOSITION DISCUSSION

The fabrication specification NUH-05-113 specifies that machining operations required in the fabrication of the FF-DSC be performed in accordance with the requirements of the ASME Code Section III, Article NB-4000, as applicable.

The bottom end forging is to be fabricated to Subsection NB in accordance with procurement drawing NUH-05-1032. While the material supplier examined the bottom forging material using PT and UT, additional machining of the forging (approximately 1/8 in. removed from all surfaces) was performed during the fabrication process. Subsequent to the additional machining, surface examination of some forging surfaces was not performed in accordance with ASME Paragraph NB-4121.3. Once this nonconformance was discovered, accessible areas of the forging were PT examined in accordance with NB-4121.3. Areas that were and were not PT examined after final machining are shown in the following figure.

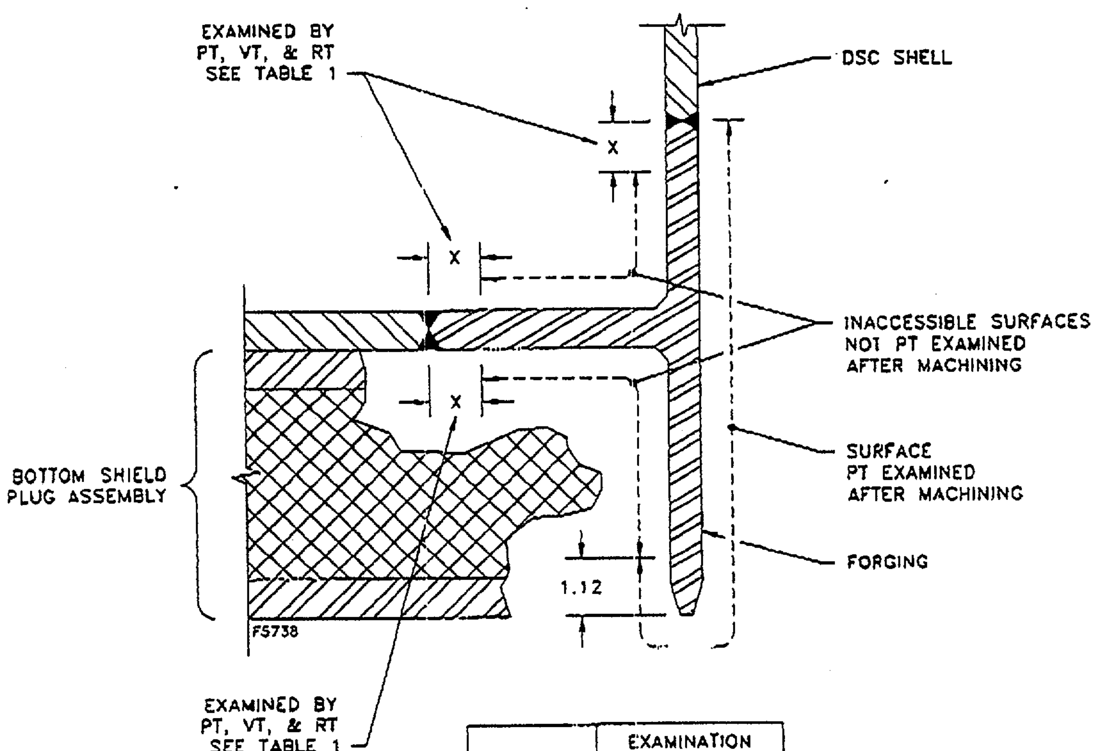

TABLE 1	EXAMINATION TYPE		
	PT	VT	RT
DIMENSION	0.5	0.5	2.0

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NONCONFORMANCE REPORT (NCR)

NONCONFORMANCE: **Fabrication Process**

TN Requirement: PT examination of the bottom end forging per NB-4121.3 following machining.

Nonconformance: Some areas were not PT examined after machining (See attached RANOR NCR).

Disposition: Use-as-is

DISPOSITION JUSTIFICATION:

Although a PT examination of some areas of the post-machined bottom forging was not performed in accordance with NB-4121.3, the existing configuration is deemed acceptable and is dispositioned "Use-as-is" for the following reasons:

1.0 Examinations performed by the fabricator during fabrication.

1.1 The material supplier performed a complete NB compliant surface PT and UT volumetric examination of the bottom forging material.

1.2 All the weld joint preparations on the bottom end forging passed PT and visual examinations after machining.

1.3 The weld joints between the bottom end forging and the DSC shell and the bottom inner cover plate and forging surfaces adjacent to these weld joints passed PT (within 0.5 in.), visual (within 0.5 in.) and RT (within 2 in.) examinations after final machining.

1.4 The forging formed part of a shell that was successfully pressure tested and helium leak tested.

1.5 The bottom end forging joints to the shell and inner bottom cover plate were visually examined after pressure and leak testing.

2.0 Engineering Evaluations, Analysis and Justification

2.1. Brittle failure of the forging is not credible owing to the lack of cyclic loads and excellent fracture toughness behavior of the austenitic stainless steel material.

2.2 The consequences of an undetected surface flaw have been evaluated and shown to have no effect on the structural design margins. This evaluation is documented in Attachment 2. Attachment 2, SIA technical evaluation (TN File No. 2069.0103) report, concludes that in spite of the fact that PT was not performed on the final machined surface of the FF-DSC forging, the canister is acceptable for use.

2.3 The consequences of any surface imperfections that could possibly go undetected without a PT exam would be minimized due to the excellent fracture toughness of the austenitic stainless steel material of the forging.

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NONCONFORMANCE REPORT (NCR)

2.4 The most critical loading that is analyzed for the bottom end forging is the side drop event. The stresses in the forging are predominantly compressive in nature and therefore are not conducive to crack propagation.

2.5 The nonconformance does not impact the following FF-DSC analyses:

- Thermal: The material properties and geometry of the bottom end forging are unchanged, so there is no impact on the thermal evaluation.
- Shielding: The material properties and geometry of the bottom end forging are unchanged, so there is no impact on the shielding evaluation.
- Criticality: The material properties and geometry of the bottom end forging are unchanged, so there is no impact on the criticality evaluation.
- Confinement: There is no impact on the confinement capabilities of the FF-DSC as there are no new leak paths introduced.

Based on the above considerations that demonstrate the extensive examinations that have been performed on the forging and that the consequences of a flaw do not affect the structural design basis, it is justified to accept the PT nonconformance with a "Use-as-is" disposition.

Conclusion:

The nonconforming condition does not result in a significant adverse impact on the structural, thermal, shielding, criticality, or confinement capability of the FF-DSC.

ATTACHMENTS:

1.0 RANOR NCR 02-101 & Material Certifications (10 Pages)

2.0 SIA Report, TN File Number 2069.0103 (13 Pages)

NCR.02.046
ATTACHMENT 1.0
(PAGE 1 OF 10)

RANOR, inc
One Bella Drive • Westminster, MA 01473

NONCONFORMANCE REPORT

FORM QA 15.1 REV. 0 (04/01/02)

NCR NUMBER	PAGE 1 OF 7
NCR- 02-101	☐ SKETCH ATTACHED

JOB NUMBER	CUSTOMER	PURCHASE ORDER NUMBER	QUANTITY
010267FM	Transnuclear West (SMUD)	2001-022	1

PART DESCRIPTION	DOCUMENT NUMBER AND REVISION	SERIAL NUMBER
SMUD FF DSC Shell – Bottom Forging	Routing Level 1C, Revision B	14-1

CODE/SPECIFICATION ☐ ASME SECTION III ■ SAFETY RELATED ☐ ASME SECTION VIII ☐ MIL SPEC ☐ COMMERCIAL

DESCRIPTION OF NONCONFORMANCE

ITEM	REQUIREMENT	NONCONFORMANCE
1	ASME Code Section III, Division 1 Subsection NB (1992 Ed. 1993 Add) Paragraph NB-4121.3 – Repetition of Surface Examination After Machining states, "If, during the fabrication or installation of an item, materials for pressure containing parts are machined, then the Certificate Holder shall reexamine the surface of the material in accordance with NB-2500 when: (a) the surface was required to be examined by the magnetic particle or liquid penetrant method in accordance with NB-2500; and (b) (b) the amount of material removed from the surface exceeds the lesser of 1/8 in. or 10% of the minimum required thickness of the part.	Liquid Penetrant Examination of the final machined surfaces of the Forged Cylinder, Part 14 was not identified in the Routing Level 1C, or completed per Code requirements. Corrected Copy: PDW 5-1-02 [signature]

REMARKS:	ROUTING SHEET IDENTIFIED WITH NCR NO. AND DATE OF ISSUE:	ORIGINATOR/INSPECTOR/DATE:
NCR to be identified in the Parent Level Routing at Sequence 155 adjacent to line "QC to prepare Documentation Package".	[signature] BY: PDW DATE: 4-25-02	[signature] BY: PDW DATE: 4-25-02

RESPONSIBILITY FOR NONCONFORMANCE

RESPONSIBILITY	SUPPLIER / MATERIAL	CUSTOMER / DESIGN	ENGINEERING	FABRICATION	MACHINING	MATERIAL HANDLING / SERVICE	ASSEMBLY / TEST	QA/QC
DEFECT CODE								X

DISPOSITION OF NONCONFORMANCE

☐ ACCEPT AS IS ☐ USE AS IS ☐ REPAIR ☐ REWORK ☐ REJECT

10CFR21 EVALUATION REQUIRED	CORRECTIVE ACTION REQUIRED	CUSTOMER APPROVAL REQUIRED
YES ☐ NO ☐	YES ☐ NO ☐	YES ■ NO ☐

TECHNICAL JUSTIFICATION / DISPOSITION

ITEM	TECHNICAL JUSTIFICATION	DISPOSITION
1	Submit NCR to TN West for review, Technical Justification and written disposition. See Page 2 for continuation of Technical Justification providing additional information.	

BY: DATE: BY: DATE:

RECOMMENDED DISPOSITION:	☐ ACCEPTED	☐ NOT ACCEPTED	CONDITIONAL RELEASE	CR No. 02-101

APPROVAL OF DISPOSITION:	ENGINEERING: BY: DATE:	QUALITY: BY: DATE:	ANI/CUSTOMER: BY: DATE:
VERIFICATION OF DISPOSITION:	ACCEPTED BY: BY: DATE:	QUALITY: BY: DATE:	ANI/CUSTOMER: BY: DATE:

NCR.02.046
ATTACHMENT 1.0
(PAGE 2 OF 10)

RANOR, INC
One Bells Drive • Westminster, MA 01473

NONCONFORMANCE REPORT
FORM QA 15.1 REV. 0 (04/01/02)

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TECHNICAL JUSTIFICATION (CONTINUED):

A review of the Level 1C Routing Sheet identifies the following fabrication activities:

RANOR P.O. No. 501643: Forging was Liquid Penetrant examined by GULFCO (Heat No. 2F830, FO No. 6376H) as a rough-machined component – 67.420" OD x 57.180" ID (rib) x 11.250" long. Specification – NB-2546, Acceptance Criteria – NB-2546.3. See Page 3 of NCR for GULFCO Liquid Penetrant Examination Report, MO# 15746-001

Sequence 45: Machine the Inner Plate & Forged Cylinder per Sketch #3 (Rev. 0).

Note: Material removal per sketch: 0.115"/ wall on OD, 0.15"/per wall on ID, 0.13" on Rib Top surface, 0.12" on Rib Bottom surface.

Sequence 60: (In part) PT Inspect the weld joint WJ-4 and record on the NDE Report Page 2. PT Inspect the weld bevel on both ends of the machined cylinder and record on the NDE Report Page 2, Level 1C. PT completed 11-27/28-01, and include a surface minimum of 1 in. from area to be examined (Procedure No. TNW/FF-PTE-2 Rev. 0). No indications identified. See Page 4 of NCR for RANOR Inspection/Nondestructive Examination Record - Liquid Penetrant Examination Report, Level 1C Page 2.

(5-1-02):

Per e-mail from JW Axline, TN West dated 4-26-02, a Liquid Penetrant Examination of the accessible surfaces of the Outside Diameter of the Forging is to be performed per Procedure No. TNW/FF-PTE-2. See Page 5 for Rework Routing Sheet for performance of this activity.

CONDITIONAL RELEASE

CR No. 02-101

Conditional Release issued to allow continuation of fabrication activities to continue through Parent Level Sequence 155, operation "QC to prepare Documentation Package". NCR to be closed before final acceptance and signature of Certificate of Compliance.

Approved By:	PEF	PDW [signature]
	Engineering Manager	Quality Assurance Manager
Date:	4-25-02	4-25-02

NCR.02.046
ATTACHMENT 1.0
(PAGE 3 OF 10)

RANOR, INC
One Bella Drive • Westminster, MA 01473

NONCONFORMANCE REPORT
FORM QA 15.1 REV. 0 (04/01/02)

NCR NUMBER	PAGE 3 OF 7
NCR- 02-101	☐ SKETCH ATTACHED

Gulfco
GULF COAST MACHINE & SUPPLY COMPANY | GENERAL OFFICES & PLANT - @ I-10 East & SMITH ROAD | P. O. BOX 26002 | BEAUMONT, TEXAS 77720-6002 | WORK PH# (409)842-1313 | FAX PH# (409)842-4021

LIQUID PENETRANT EXAMINATION REPORT

CUSTOMER: RANOR P.O. #: 501643 DATE: 100101
SPECIFICATION: NB-2546-ACC. NB-2546.3 GULFCO M/O #: 15746-001
PROCEDURE: N-PT-0004 REV.4 ADD:3 REV.1 SCOPE of EXAM: 100% SURFACE
SIZE: 67.420" x 57.180" x 11.25" F/O #: 6376H HEAT #: 2F830 QUANTITY: 1

TEST PARAMETERS

LIQUID PENETRANT USED
A-FLUORESCENT: ____ B-VISIBLE: YES
VENDOR: MAGNAFLUX

	PENETRANT	REMOVER / EMULSIFIER	DEVELOPER
TYPE:	SKL-WP	SKC-S	SKD-S2
BATCH:	00A02K	00M01K	00J14K
TIME:	15MIN.	15MIN.	15MIN.

LIGHT SOURCE
MANUFACTURER: ____________ DATE CALIBRATED: ________
INTENSITY @ 15": ______ micron W/cm² MODEL: ____________

TEST RESULTS

DISPOSTION OF PARTS: ALL FORGINGS SHOWN ON REPORT WERE INSPECTED AND FOUND TO BE: ACCEPTABLE IN ACCORDANCE WITH THE SPECIFICATION OR PROCEDURE SHOWN ABOVE.

NOTE: ______________________________

LIQUID PENETRANT EXAMINATION PERFORMED BY GULFCO

RAYMOND STEELEY LEVEL II

LE
RANOR
10-08-01

NCR.02.046
ATTACHMENT 1.0
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RANOR, INC
One Bella Drive • Westminster, MA 01473

NONCONFORMANCE REPORT
FORM QA 15.1 REV. 0 (04/01/02)

NCR NUMBER	PAGE 4 OF 7
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RANOR, INC Final Acceptance: By: [signature] Date: 11-29-01

INSPECTION/NONDESTRUCTIVE EXAMINATION RECORD

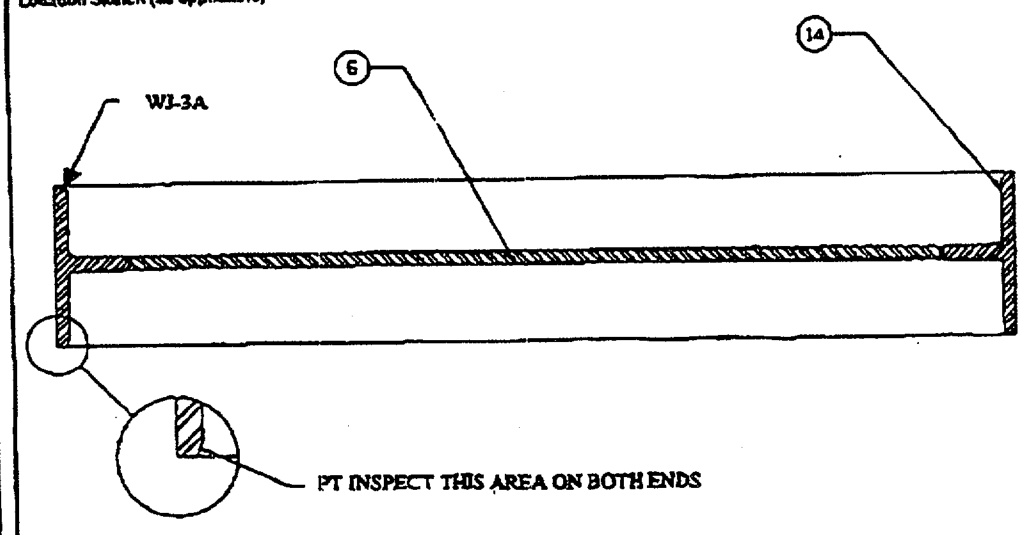
CUSTOMER: TN West (SMUD)	CUSTOMER PO: 2001-022	JOB NO.: 010267FM	LEVEL NO.: 1C	PAGE 2 CONT.–
DESCRIPTION: FORGED CYLINDER TO INNER BOTTOM COVER, SKETCH #1, REV. 0			ACCEPTANCE CRITERIA ASME Section III NB-5350; 1992 Ed 1993 Add	SERIAL NO.: 14-1

LIQUID PENETRANT EXAMINATION REPORT – PROCEDURE NO. TNW/FF-PTE-2, REV. 0

AREA EXAMINED: "P" – PLATE SURFACE "B" – BEVELED EDGES "O" – OTHER ____ SURFACE CONDITION: "S" – ACTUAL SURFACE "G" – GROUND "M" – MACHINED										
	PART NUMBER	WJ-4		WT-7 Removal 4-Places		WJ-3A BEVELED EDGE		BOTTOM PLUG BEVEL		
	NDE EXAMINER LEVEL DATE	LPK III 11-27-01		RD II 11-28-01		RD II 11-28-01		RD II 11-28-01		
	CUSTOMER QUALITY REP. DATE	SMUD TNW 11-27-01								
Record Area Examined		F		P		B		B		
Record Surface Condition		M		G		M		M		
Liquid Penetrant Indications		0		0		0		0		
Indications Repaired by Grinding		0		0		0		0		
Indications Repaired by Welding		0		0		0		0		
Total Accumulated Length of Indications		0"		0"		0"		0"		
Liquid Penetrant Indications After Repairs		0		0		0		0		
Final Weld Joint Acceptance:		Accept		Accept		Accept		Accept		

Liquid Penetrant Material: Batch Numbers: MET-L-CHEK VP-31A Penetrant: 3944 MET-L-CHEK D-70 Developer: 4202 MET-L-CHEK E-59 Cleaner: 4080

Location Sketch (as applicable)



NCR.02.046
ATTACHMENT 1.0
(PAGE 5 OF 10)

RANOR, INC

One Bella Drive • Westminster, MA 01473

NONCONFORMANCE REPORT
FORM QA 15.1 REV. 0 (04/01/02)

NCR NUMBER	PAGE 5 OF 7
NCR- 02-101	☐ SKETCH ATTACHED

Rework Routing Sheet (Rev. 1)
NCR No. 02-101

Sequence 60: PT Inspect the accessible final machined Outside Surfaces of the Forging, Part 14, including the weld joint WJ-3A and record on the NDE Report, attached. Procedure No. TNW/FF-PTE-2 Rev. 0

Record time to Parent Level 010267FM, Sequence 75.

Inspected By: GPK – CONAM Date: 5.1.02

If Surface Indications are identified, they are to be removed by grinding smooth.
Perform UT Thickness Inspection of the area prior to grinding. Procedure No. TNW/FF-UTIP-2. .668 SMB 5-1-02
Grind area smooth to remove surface indications. DO NOT UNDERCUT THE SHELL.

QC to PT & UT Inspect the ground areas. Procedure Nos. TNW/FF-PTE-2 Rev. 0 and TNW/FF-UTIP-2 Rev. 2

Inspected By: SMB - CONAM Date: 5-1-02

Final Acceptance: By:______ Date:______

INSPECTION/NONDESTRUCTIVE EXAMINATION RECORD

CUSTOMER: TN West (SMUD)	CUSTOMER PO: 2001-022	JOB NO.: 010267FM	LEVEL NO.: PL	PAGE 1 CONT. —
DESCRIPTION: DSC Shell Assembly – Bottom Forging Part No. 14			ACCEPTANCE CRITERIA ASME Section III NB-5350; 1992 Ed 1993 Add	SERIAL NO.: 010267-___

LIQUID PENETRANT EXAMINATION REPORT - PROCEDURE NO. TNW/FF-PTE-2, REV. 0

AREA EXAMINED: "R" - ROOT "L" - LAYER "F" - FINAL SURFACE CONDITION: "A" – AS WELDED "G" - GROUND "M" - MACHINED										
WELD JOINT NUMBER	OD Mach Surf	~~WJ-4~~ 5-1-02	WJ-3A							
NDE EXAMINER LEVEL DATE	GPK III 5.1.02		GPK III 5.1.02							
CUSTOMER QUALITY REP. DATE										
Record Area Examined	F		F							
Record Surface Condition	M		M							
Liquid Penetrant Indications	1		0							
Indications Repaired by Grinding	1		0							
Indications Repaired by Welding	0		0							
Total Accumulated Length of Indications	3/8"		0"							
Liquid Penetrant Indications After Repairs	0		0							
Final Weld Joint Acceptance:	Accept		Accept							

Liquid Penetrant Material: MET-L-CHEK VP-31A MET-L-CHEK D-70 MET-L-CHEK E-59
Batch Numbers: Penetrant: 3944 Developer: 4251 Cleaner: 4151

NCR.02.046
ATTACHMENT 1.0
(PAGE 6 OF 10)

RANOR, INC

One Bella Drive • Westminster, MA 01473

NCR NUMBER	PAGE 6 OF 7
NCR- 02-101	☐ SKETCH ATTACHED

NONCONFORMANCE REPORT

FORM QA 15.1 REV. 0 (04/01/02)

NUHOMS ® SMUD FF DRY SHIELDED CANISTER ASSEMBLIES – FF DSC SHELL ASSEMBLY
ULTRASONIC THICKNESS INSPECTION REPORT – DSC SHELL GROUND AREAS

Page 1 of 2

Transnuclear West, Inc.
NUHOMS ® SMUD FF DSC Shell Assembly
Rancho Seco Nuclear Station
TN West Serial No. FF13P-R21

P.O. No. 2001-022
RANOR Job No. 010267FM
RANOR Serial No. 010267-1

EQUIPMENT USED FOR ULTRASONIC THICKNESS INSPECTION:

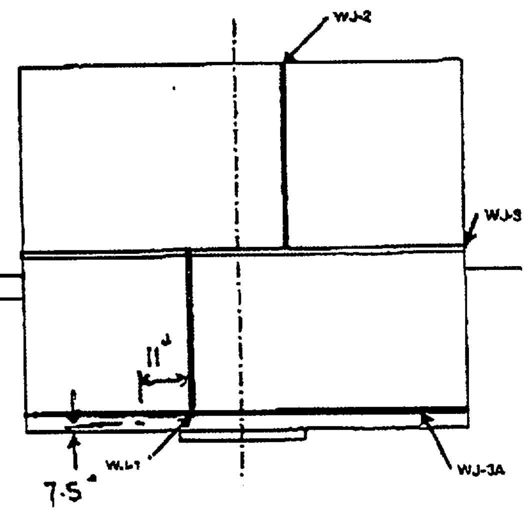
Equipment Description	Serial No.	Calibration Date:	Calibration Due:
Ultrasonic Inspection Thickness Tester: Panametrics Model 25DL, Digital Multi-Mode Ultrasonic Thickness Gage	99049?308	2-27-02	5-31-02
Transducer: Panametrics Model V125, Microscan Contact Transducer, right angle microdot connector, 2.25 MHz, 0.375 diameter	280633	5-1-02	NEXT USE
UT Calibration Block:	DSC.UT1GC1	4-30-02	7-30-02
Temperature Indicating Device:	T-85	1-7-02	7-7-02
Micrometer:	N/A	N/A	N/A

LAYOUT FOR ULTRASONIC THICKNESS INSPECTION:

Surface Condition to be Inspected:	___ As-Welded ___ Plate	✓ Ground	___ Machined
Inspection Temperature:	Calibration Block 68 °F	Component 68 °F	Couplant Used: ULTRAGEL
Inspection Requirements: Forging Outside Shell	Material Thickness: .625 +.05; -.01 in.	High Level Alarm: .675 in.	Low Level Alarm: .615 in.

ULTRASONIC THICKNESS INSPECTION DATA:

Location	Ultrasonic Inspection Report
DSC Shell – Surface Indications	Filename: FFR21SHELL.CM.TXT



OUTSIDE OF SHELL

RESULTS OF ULTRASONIC THICKNESS INSPECTION:

ACCEPT

Inspection Performed By: [signature]
Level II Date 5-1-02
Inspection Witnessed By: S Baton
Level TN Date 5-1-02

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ATTACHMENT 1.0
(PAGE 7 OF 10)

RANOR, INC

One Bella Drive • Westminster, MA 01473

NONCONFORMANCE REPORT

FORM QA 15.1 REV. 0 (04/01/02)

NCR NUMBER	PAGE 7 OF 7
NCR- 02-101	☐ SKETCH ATTACHED

NUHOMS ® SMUD FF DRY SHIELDED CANISTER ASSEMBLIES – FF DSC SHELL ASSEMBLY ULTRASONIC THICKNESS INSPECTION REPORT – DSC SHELL GROUND AREAS

Transnuclear West, Inc.
NUHOMS ® SMUD FF DSC Shell Assembly
Rancho Seco Nuclear Station
TN West Serial No. FF13P-R21

Page 2 of 2
P.O. No. 2001-022
RANOR Job No. 010267FM
RANOR Serial No. 010267-1

LOCATION OF INSPECTION: DSC Shell Clamp Marks etc. on Surfaces Filename: FFR21SHELL CM BY: SmB DATE: 5-1-02

Nominal Thk.	Actual Thk.	CALIBRATION PRIOR TO START OF INSPECTION: TIME 1505 A	B	C	CALIBRATION DURING/AFTER INSPECTION: TIME 1526 A	B	C
.500	.495	.497	–	–	.496	–	–
.625	.621	.622	–	–	.622	–	–
.750	.747	.749	–	–	.749	–	–

Position of points on Shell Location ______" above end of DSC Shell	Micrometer Readings	UT Calibration Readings prior to Inspection – on the Micrometer Points. Velocity = ______	UT Calibration Readings after Inspection – on the Micrometer Points. Velocity = ______
°			
°			
°			
°			
°			
°			
°			
°			

KEY TO ULTRASONIC INSPECTION REPORT

Inspection Report Information:

The following information shall be shown on the Ultrasonic Thickness Inspection Report:
Filename: Operator: Location: Date; Time; Setup ID; Comments

Filename: "FFR21" is the Unit Serial Number or the part designation (determined by RANOR); and "WJYY" is the Weld Joint Number (i.e. "WJ-1"). "FFR21" is the Unit Serial Number (designated by TN West) or the part designation (determined by RANOR); and "NNN" is the location where the data is being recorded (i.e. "SHL" = shell).

Identifiers: Data for each Weld Joint will be recorded with sequential number beginning with "001" and continuing to the last point identified on the specific Weld Joint.

FILENAME	INSPECTION LOCATION	IDENTIFIER NUMBERS
FFR21SHELL CM .TXT	DSC Shell Ground Areas on O.D. Surfaces	001 through 001

FLAGS: L1 - low thickness alarm; M1 - median alarm; H1 - high thickness alarm

SU#: The SU# (Setup No.) establishes the parameters required for the material velocity, zero, pulser voltage, maximum gain, initial gain, TVG slope, main bang blank, echo window, and detection modes for the selected transducer against the type of material (i.e. base metal or weld metal) being inspected.
SU#X - Setup ID: PAN-2B (Base Metal) SU#Y - Setup ID: PAN-2W (Weld Metal) SU#Z - Setup ID: PAN-2F (Forging Material)

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(PAGE 8 OF 10)

Filename: PFR21SHELLCM.TXT
Operator: SHAWN BALLOU
Location: RANOR
Date: 5/1/2002
Time: 15:50
Setup ID: PAN-2B for SU# 17
Comments:
010267FM, SN 010267-1
NCR 02-101
GROUND AREA

IDENTIFIER	THICKNESS	UNITS	FLAGS	SU #
GND 001	0.665	IN	M1A-	17
OK				

SU #	VEL (/uS)	DIFF	LO-ALM	HI-ALM	UNITS	BASE MEAS-SETUP
17	0.22850	0.000	0.615	0.675	IN	PAN-2B
OK						

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Pg 1 of 2

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Phil Ferland

From: Axline, James [James.Axline@tn-west.com]
Sent: Friday, April 26, 2002 9:09 PM
To: 'Phil Ferland'; 'Paul Watts'
Cc: 'tony giannuzi'; 'nat cofie'; Grenier, Robert; Hunter, Lance; Campbell, Don; Ilisko, Harry; Manrique, Miguel; Chopra, U.B.
Subject: Requested PT of SMUD FF DSC OD - RANOR NCR 02-101

DOC007.PDF

The purpose of this e-mail is to provide direction on a corrective action for RANOR NCR 02-101.

This NCR addresses the surface inspection requirements of NB4121.3, which were not satisfied for the bottom T-forging of the FF13P-R21 DSC. The T-forging is now installed in the DSC and both the basket and BSPA are welded in place.

This prevents access to the inside surfaces of the forging and no surface examination is possible. However the external (OD) surface of the forging is available for surface examination. Performance of this surface examination, and the successful results, will assist in justifying the "Use-As-Is" disposition for the inner surfaces.

RANOR is therefore directed to perform a surface examination of the OD section of the forging as shown in the attached figure. This inspection may be performed @ any time prior to cleaning and packaging.

This inspection shall use approved procedure, TNW/FF-PTE-2 and qualified personnel. The inspection shall be documented on an NDE form and that documentation shall be included as part of NCR 02-101 in the final data package.

<<DOC007.PDF>>

ATTACHMENT TO NCR 02-101
Pg 2 of 2

NCR.02.046
ATTACHMENT 1.0
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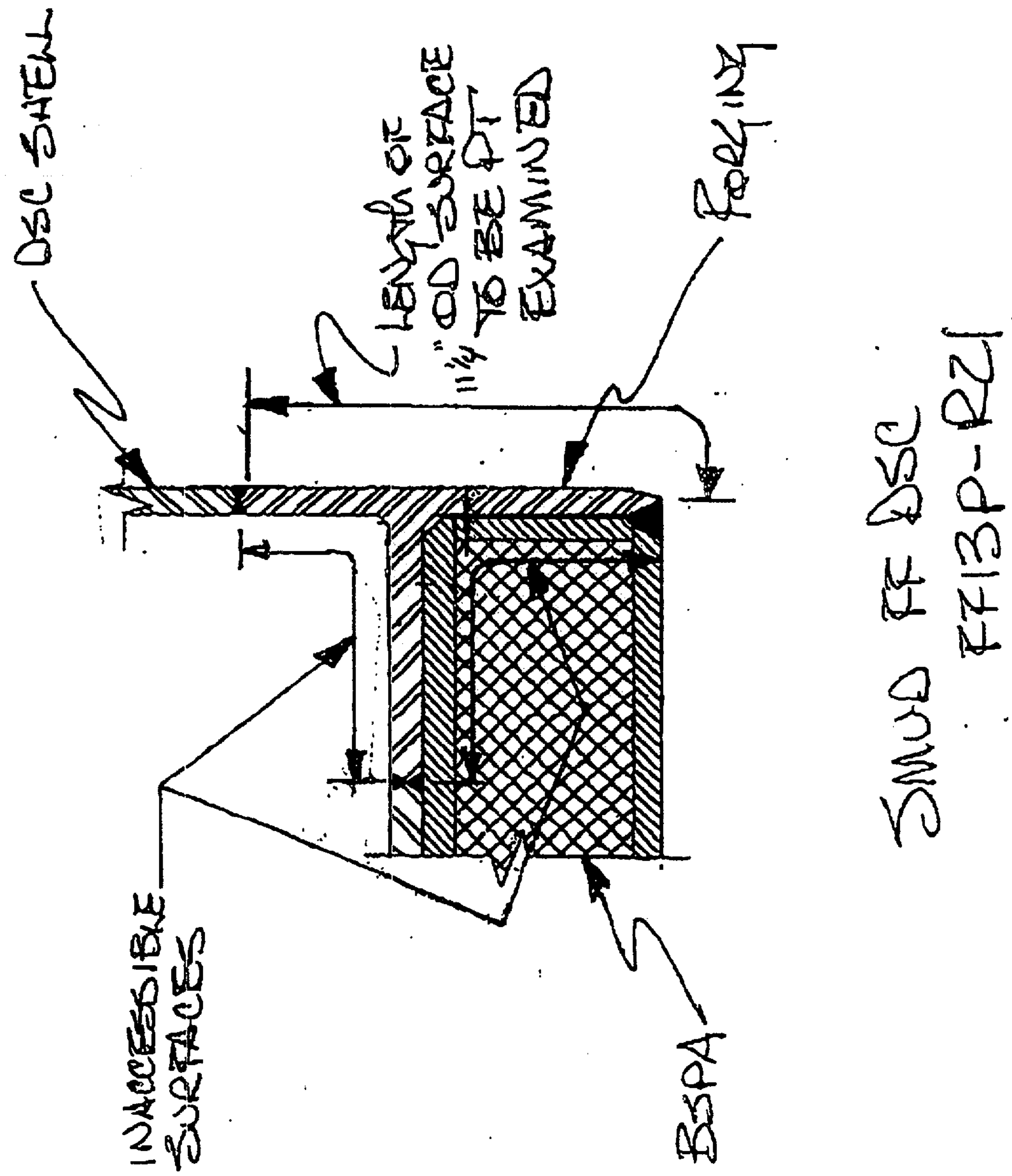
NCR 02-101



Structural Integrity Associates, Inc.

SMRT Structural & Materials Reliability Technology, Inc.

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San Jose, CA 95118-1557
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May 3, 2002
SIR-02-059
NGC-02-025

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NCR.02.046
ATTACHMENT 2.0
(PAGE 1 OF 13)

Mr. Jim Axline
Transnuclear, Inc.
39300 Civic Center Drive, Suite 280
Fremont, CA 94538-2324

Subject: Flaw Evaluation of Potential Defects in the NUHOMS® FF DSC Stainless Steel Bottom Forging

Dear Jim:

This letter documents the flaw evaluations performed by Structural Integrity Associates (SI) to address the acceptability of potential indications in a NUHOMS® FF dry shielded canister (DSC) stainless steel bottom forging. This evaluation became necessary because liquid penetrant examination (PT) of final machined surfaces of the forging was not performed as required. Hence, there is concern that there may be potential indications on the surface of the forging.

BACKGROUND

It is our understanding that the fabrication process of the forging required inspection of all final machined surfaces by PT. Although PT was performed on the rough machined surfaces of the forging, PT was not performed as required on the final machined surfaces. Because of this, there is a possibility that a flaw may exist on the final machined surface that could challenge the integrity of the canister under certain loading conditions. It is the intention of Transnuclear, Inc. (TN) to examine the accessible surfaces of the canister by PT to ensure that those surfaces are free from defects. However, there are some surfaces that are not accessible for inspection. The objective of the evaluation contained herein is to perform flaw evaluations to demonstrate the acceptability of the canister for operations without the final PT examination of the bottom forging.

TECHNICAL APPROACH

The forging is fabricated from SA-182 Type 304 stainless steel. Several studies performed on stainless steel bare metal (wrought and forgings) have shown this material to be very ductile and tough [1]. As such, the net-section plastic collapse methodology (limit load) can be used to determine critical and allowable flaw sizes [1]. This methodology is therefore used to determine the allowable flaw size in the NUHOMS® FF canister bottom forging. In addition, the most credible surface indication that could be on the forging is determined. Flaw growth evaluation is performed to determine if the most credible surface indication can grow to the ASME Code allowable flaw size during the service life of the canister.

EVALUATION

Flaw Model

The maximum stress in the forging occurs in the cylindrical shell portion, and so a flaw was postulated at this location. The flaw could either be oriented in the axial direction (parallel to the length of the cylinder), or in the circumferential direction. The geometry of the forging makes circumferential flaw size more critical because the length of the forging limits an axial flaw in the cylinder. Also, an axial flaw in the cylinder eventually becomes intercepted by the "web" of the forging, which is the portion of the forging welded to the bottom of the canister. As will be discussed later, there is no active growth mechanism that would drive a flaw beyond the forging boundary. As such, a circumferential flaw in the cylindrical portion of the forging is evaluated as the bounding flaw.

The flaw model considered for this evaluation is shown in Figure 1. It consists of part through-wall, part-circumference flaw in a cylinder. At the point of plastic collapse, the applied load has to be resisted by the un-cracked ligament in the section that is fully plastified. The classic net-section plastic collapse equations that form the basis for the ASME Code Section XI flaw evaluation procedures [1] can be used to determine the allowable flaw size in the forging. These equations are expressed as:

For $(\theta+\beta)\leq\pi$:

$$P'_b = \frac{6S_m}{\pi}\left(2\sin\beta - \frac{a}{t}\sin\theta\right) \qquad (1)$$

where:

$$\beta = \frac{1}{2}\left(\pi - \frac{a}{t}\theta - \pi\frac{P_m}{3S_m}\right)$$

For $(\theta+\beta)>\pi$

$$P'_b = \frac{6S_m}{\pi}\left(2 - \frac{a}{t}\right)\sin\beta \qquad (2)$$

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where:

$$\beta = \frac{\pi}{2 - \frac{a}{t}}\left(1 - \frac{a}{t} - \frac{P_m}{3S_m}\right)$$

$\theta = half\ flaw\ angle$

P'_b *is the failure bending stress*

Figure 1 provides definition of the geometric terms used in the above equations.

Stresses

Stress analyses for several load cases have been performed by TN. They include:

- 10 psi internal pressure
- horizontal deadweight
- 60 kip retrieval
- 80 kip retrieval
- side drop
- side drop plus internal pressure.

The maximum stresses associated with these loads were provided by TN [2] and are shown in Table 1. It should be noted that all stress components are provided since the components, rather than the stress intensity, are the driving force for crack extension and are therefore used in fracture mechanics evaluations to determine the allowable flaw size.

As can be seen from Table 1, the maximum stresses occur in the axial direction in the shell (z-direction) for all load cases. This justifies the use of a circumferential flaw in the shell as the bounding flaw for this evaluation. In the flaw evaluation, the most conservative load combination for the various service loads is used. For the Service Level A/B load combination, internal pressure plus deadweight plus 60 kip retrieval stresses are considered. This results in a maximum axial tensile stress in the shell of 13.4 ksi. For Service Level C combination, internal pressure plus deadweight plus 80 kip retrieval stresses are considered. The resulting axial stress in the shell is 17.5 ksi. For Service Level D, the side drop load cases are considered. As noted in Table 1, these stresses were obtained from elastic-plastic analysis and as such, they cannot be used directly in limit load analysis since the methodology is based on applied levels being elastically determined. In lieu of this, maximum factored stresses of 2.7, 2.8, and 2.9 S_m are considered for Service Level D case. These stresses are considered very conservative since they are very close to the allowable Code value of $3S_m$. The results of the TNI elastic-plastic analysis verifies that the stress is well below the collapse point.

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Material Properties

The material of the forging is SA-182 Type 304 stainless steel [3]. The most important material property required in the limit load analysis is the flow stress, σ_f. In ASME Section XI flaw evaluations, the flow stress is equal to three times the basic material stress intensity factor, S_m [1] for austenitic steels. Table 2 shows S_m as a function of temperature obtained from the ASME Code [4] and the corresponding flow stress. For this evaluation, the operating temperature of the canister is conservatively chosen at 400°F. The corresponding S_m is 18.7 ksi, which results in σ_f = 56.1 ksi.

Allowable Flaw Size

The allowable flaw size is determined using Equations 1 and 2. The evaluation is performed separately for Service Levels A/B, C and D. For Service Level A/B, a safety factor of 2.77, consistent with ASME Code Section XI, Appendix C is used. For Service Level C and D, ASME Code Section XI safety factor of 1.39 is used. The results of the allowable flaw size determination plotted as *a/t* as a function of fraction of the canister circumference, are shown in Figures 2, 3, and 4 for Service Level A/B, C and D, respectively for the stresses discussed above.

As can be seen from these allowable flaw size figures, the maximum acceptable defect per ASME Code Section XI in the forging, (*a/t* = 0.15 and fracture circumference of <1%) to be discussed below is far smaller than the allowable flaw sizes for all the Service Levels. This indicates that this defect can be accommodated in forging without challenging its structural integrity.

It should be noted that even if a flaw was through-wall, the maximum allowable through-wall flaw length is approximately 2.5 inches.

Maximum Credible Indication in Forging

As presented in Reference 5, the ultrasonic inspection (UT) requirements for the as machined forging is to meet the requirements of paragraph NB-2542 of Section III of the ASME Boiler and Pressure Vessel Code. This paragraph and the supporting calibration standards on ASME Section V allow that the maximum acceptable flaw consists of a flat bottom hole which is 3/32-inch diameter (15% of nominal thickness) and 1-1/2-inches long (less than one percent of total circumference of canister). This flaw is identified as the largest subsurface or surface flaw that can exist in the forging as the component is put into service. For purposes of crack growth analyses, the defect is evaluated as a surface connected semi-circular crack with a length of 1-1/2 inches and a depth of 3/32-inch.

In order to provide additional evidence as to the quality of the final machined forging, the specified surface examinations have been performed on all accessible surfaces. These examinations revealed no surface defects approaching the maximum acceptable flaw. These results provide assurance that indications in the un-inspected regions are not likely.

Flaw Growth Considerations

For comparison with the ASME Code Section XI allowable flaw size, possible growth of the maximum credible defect in the forging must be considered. Potential crack growth mechanisms that could be acting on the defect are discussed in the following paragraphs.

For environmental assisted degradation to occur, including general corrosion, corrosion fatigue, or stress corrosion cracking (SCC), the flaw must be exposed to a corrosive environment. As identified in Reference 6, and illustrated in Figure 5 [7], there are three surfaces that may be subjected to environmental assisted degradation either during final fabrication or in service. These surfaces are identified from Figure 5 as surface A-C, from weld A to weld C on the outside of the forging, surface A-B, on the inside of the forging, and surface B-C, on the inside of the forging. Surface A-C is accessible following all machining and welding and will be subjected to a PT surface examination following the completion of all fabrication activities, in accordance with the ASME Code requirements. Surface A-B has never been wetted, has been sealed as a result of the welding of the plug to the forging, and will not be exposed to any environment, other than the minute air or inert gas environment to which it was exposed during welding. The maximum temperature seen by this surface is 300°F and the nominal temperature is less than 200°F. Surface B-C is the inside surface of the canister and will see a mild boric acid environment representative of the PWR primary environment at the fuel pool at a maximum temperature of 110°F. The surface is then dried and exposed to an inert helium overpressure, then it is vacuum dried twice, and back-filled with helium as its final environment. The maximum temperature of this surface is 300°F.

Based upon the examinations performed and the environmental conditions to which each of these three surfaces are exposed, it is extremely unlikely that any environmental degradation is possible. The only surface to be exposed to an aqueous environment following a final surface examination is surface B-C. The exposure of surface B-C to a dilute boric acid environment is of no concern, as stainless steel is not susceptible to boric acid SCC or boric acid wastage. Any sensitization associated with welding of this surface should be minimal as this heat of Type 304 stainless steel forging contains very low carbon, of the order of 0.017 wt % [3]. This carbon level would meet the requirements for nuclear grade austenitic stainless steel, which has been approved by the NRC as acceptable material for nuclear power plant application even in high temperature oxidizing environments [8].

There are no postulated fatigue loads to which this forging is to be subjected, so any crack propagation by fatigue or corrosion assisted fatigue is not credible. The only significant reversible loading on the canister during service is thermal loads due to slight variations in ambient temperature and seismic loads. The number of cycles associated with these events and/or the magnitude of the stresses is such that fatigue over the service life of the canister is not a concern.

CONCLUSION

The maximum credible defect in the forging is relatively small compared with ASME Code Section XI allowable flaw size shown in Figures 2, 3, and 4. There are no potential flaw growth mechanisms identified which will propagate this defect to encroach upon the ASME Code Section XI allowables. It is therefore concluded that in spite of the fact that PT was not performed on the final machined surfaces of the bottom forging of TN's NUHOMS® FF DSC, the canister is acceptable for use.

REFERENCES

1. ASME Section XI Task Group for Piping Flaw Evaluation, "Evaluation of Flaws in Austenitic Steel Piping," Journal of Pressure Vessel Technology, Vol. 108, August 1986, pp 352-366.
2. E-mail from Ward Ingles (TN) to Nat Cofie (SI), "Additional Stresses for FF DSC Bottom End," with attached Excel spreadsheet, "forgingstresses2.xls," dated April 30, 2002.
3. Gulf Coast Machine & Supply Co. Material Test Report No. 88673, dated 07/25/01. Attached to E-mail from J. Axline to T. Giannuzzi, N. Cofie, P. Ferland and P. Watts, "More Information and Direction," April 26, 2002.
4. ASME Boiler and Pressure Vessel Code, Section XI, 1992 Edition with 1993 Addenda.
5. "Acceptance Standards for UT Requirements for the GULFCO Forging," E-mail from J. Axline to T. Giannuzzi and N. Cofie. April 26, 2002.
6. "Environmental Conditions for FF DSC Forging," E-mail from J. Axline to T. Giannuzzi and N. Cofie, April 30, 2002.
7. RANOR Drawing No. 05-1032, Rev. 0, Sheet 1, Attached to E-mail from J. Axline to Nat Cofie and Tony Giannuzzi, "Sketched of Forging," April 26, 2002.
8. NUREG-0313, Rev. 2, "Technical Report on Material Selection and Processing Guidelines for BWR Coolant Pressure Boundary Piping," U.S. Nuclear Regulatory Commission, January 1988.

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ATTACHMENT 2.0
(PAGE 7 OF 13)

Structural Integrity Associates appreciates the opportunity to be of assistance to TN on this project. If you have any questions, please do not hesitate to call any of the undersigned.

Prepared by:

N. G. Cofie

Prepared by:

A. J. Giannuzzi

Reviewed by:

M. L. Herrera

Approved by:

N. G. Cofie

ml
cc: W-TNI-13Q-102/401

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Mr. Jim Axline
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May 3, 2002
SIR-02-059/NGC-02-025

Table 1

Maximum Stresses in Canister Bottom Forging [2]

Load Case	Stresses (ksi)					
	Shell			Bottom Cover Plate		
	σ_x	σ_y	σ_z	σ_x	σ_y	σ_z
10 psi internal pressure	0.263	0.323	0.837	0.854	0.401	0.502
Horizontal deadweight	0.267	0.062	0.274	0.027	0.028	0.057
60 kip retrieval	2.100	7.709	12.294	4.061	4.331	5.023
80 kip retrieval	2.800	10.279	16.392	5.415	5.775	6.698
Side Drop (1)	7.875	20.840	27.734	7.772	2.079	7.437
Side Drop + Pressure (1)	7.568	21.289	28.609	6.930	2.097	8.723
Note: (1) The stress analysis for this case was performed using elastic-plastic analysis.						

x = radial, y = tangential, z = axial

Table 2

Design Stress Intensity and Flow Stress

Temp	S_m (ksi)	σ_f (ksi)
100	20.0	60.0
200	20.0	60.0
300	20.0	60.0
400	18.7	56.1
500	17.5	52.5
600	16.4	49.2

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Mr. Jim Axline
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SIR-02-059/NGC-02-025

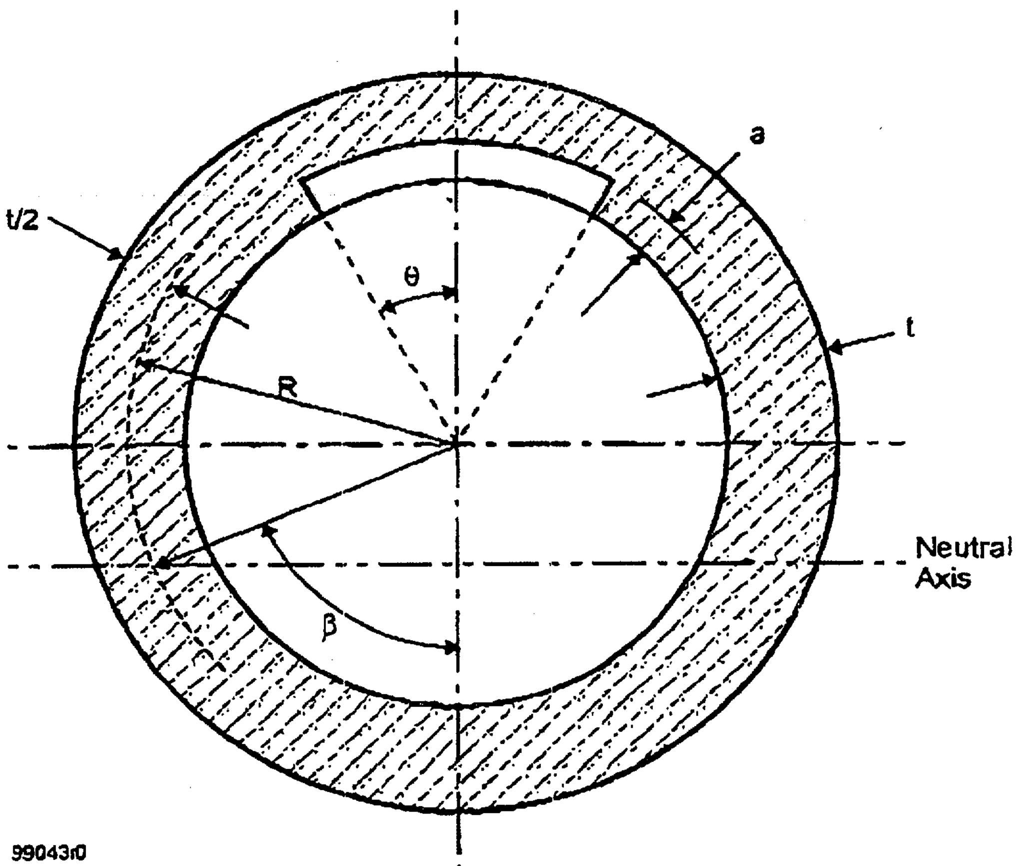

Figure 1. Flaw Model used in Evaluation

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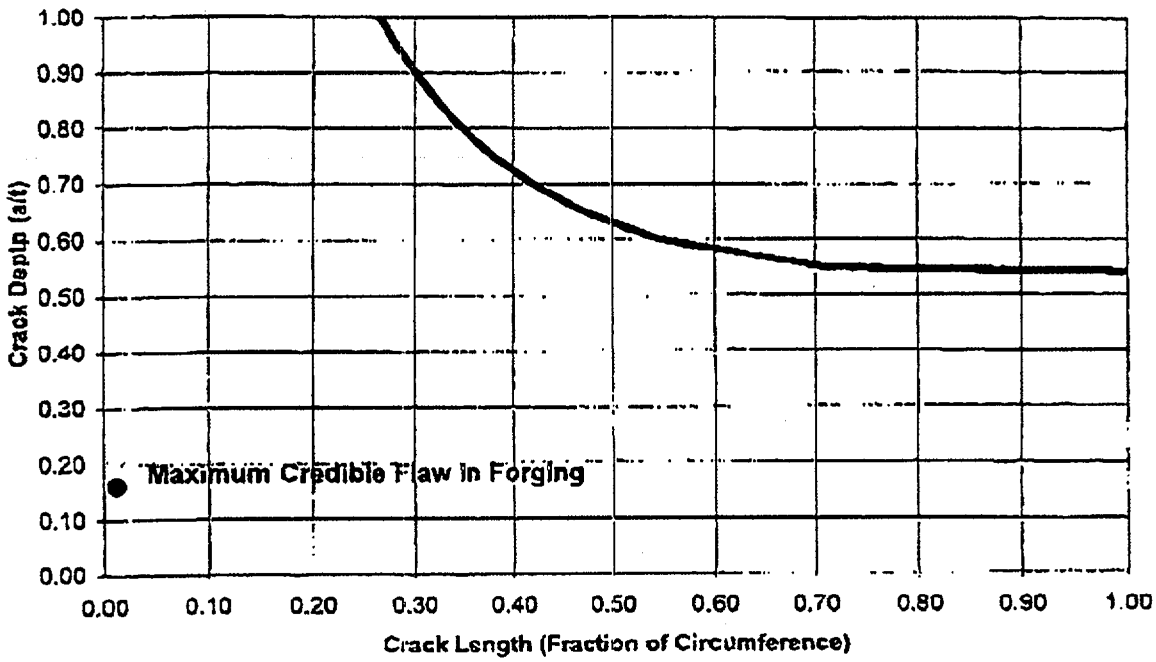

Figure 2. Allowable Flaw Sizes for Service Level A/B

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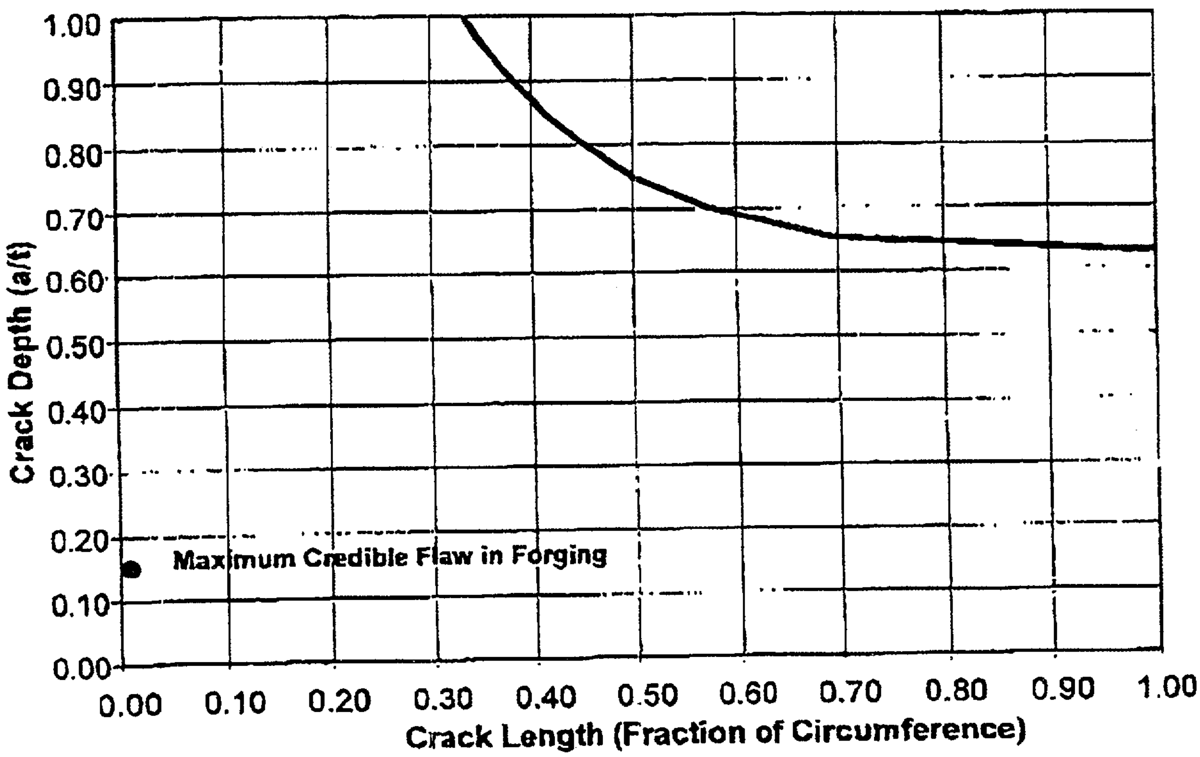

Figure 3. Allowable Flaw Sizes for Service Level C

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Mr. Jim Axline
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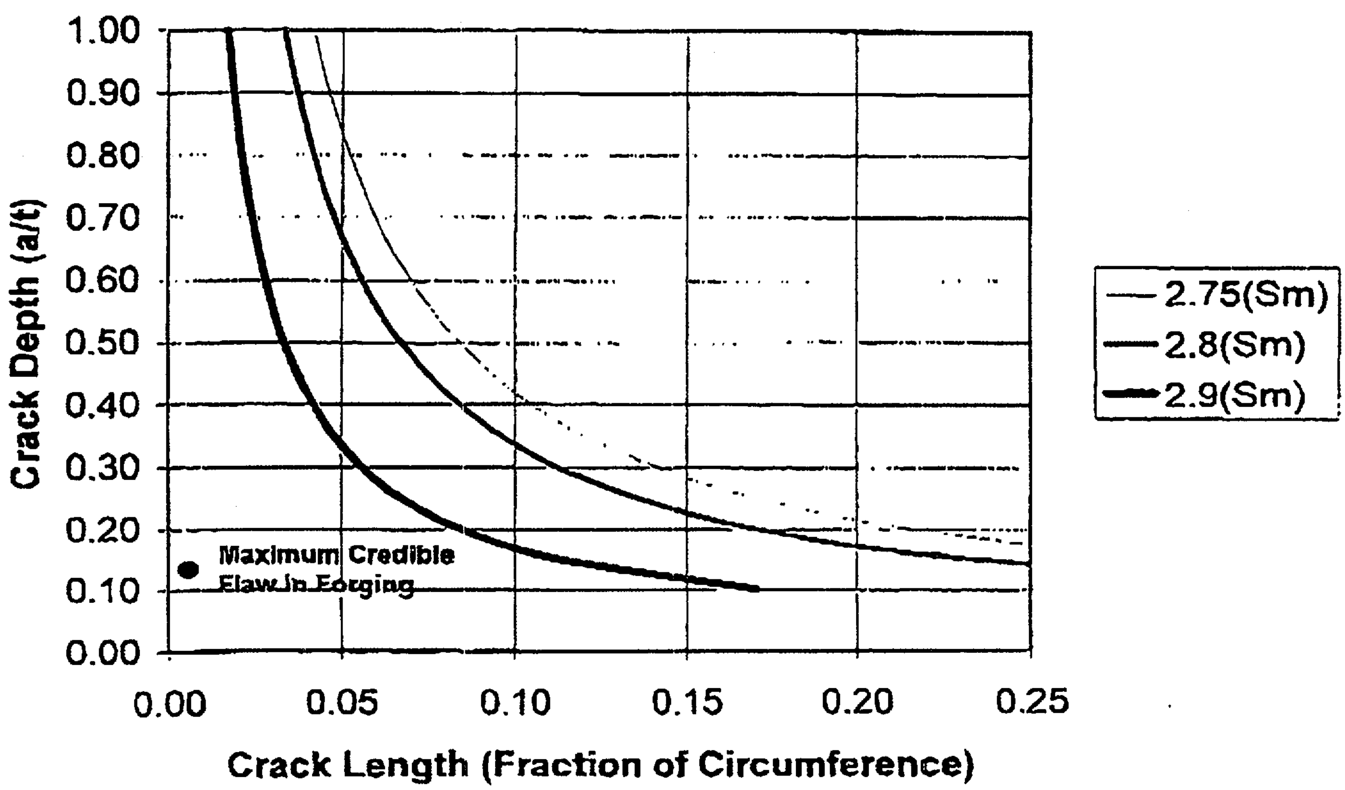

Figure 4. Allowable Flaw Sizes for Service Level D

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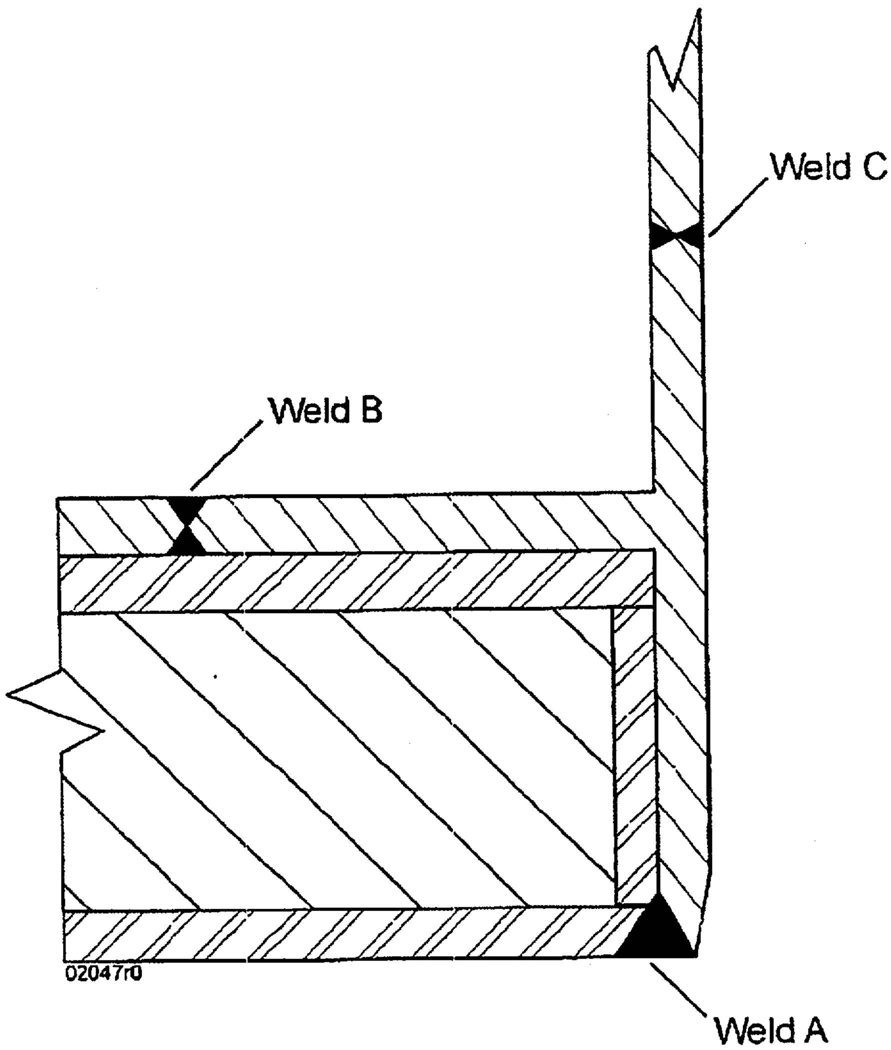

Figure 5. Section of Bottom Flange of NUHOMS® FF Canister

TRANSNUCLEAR WEST	SAFETY REVIEW SCREENING FORM	SRS Sequence No.: SRS 71-7165 Initiating Doc. No.: NCR 02.046 Page 1 of 2

SMUD FF-DSC

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FOR INFORMATION ONLY

Brief Description of Change:

This SRS screens TN NCR.02.046 (RANOR NCR 02-101)

The FF-DSC fabrication specification, NUH-05-113, specifies that machining operations required in the fabrication of the FF-DSC be performed in accordance with the requirements of the ASME Code Section III, Article NB-4000, as applicable.

The material for the bottom end forging was volumetrically (UT) and surface examined (PT) by the material supplier. RANOR performed additional machining of the forging, but did not repeat the surface examination of all forging surfaces after machining in accordance with ASME Paragraph NB-4121.3.

Preparer: H. Ilisko	**Qualified Reviewer:** V. P. Abayan
Signature [signature] Date: 05/02/02	Signature [signature] Date: 5/03/02

Question #1
Does the proposed change alter the package design as described on the drawings as listed in the CoC?

Conclusion: ☒ YES ☐ NO

If YES, indicate the affected drawings listed in the CoC (an Amendment to the C of C is required):

NUH-05-4005, Revision 13 shows the bottom end of the FF-DSC that is fabricated from plate material. The option to use an ASME Code Section III Subsection NB forging for the bottom end was submitted as Amendment 7 to the MP187 SAR. The nonconformance identified in TN NCR 02.101 pertained to a noncompliance to the ASME Code requirement associated with the use of a forging. Therefore, the nonconformance is considered a change for this screening.

If NO, provide justification and list the documents reviewed:

Reviewed NUH-05-4005 R/13

Question #2
Does the proposed change alter the authorized contents of the package as listed in the CoC?

Conclusion: ☐ YES ☒ NO

If YES, indicate the affected CoC section (an Amendment to the CoC is required).

If NO, provide justification and list the CoC sections reviewed:

The CoC section was reviewed, and the "use-as-is" disposition to the nonconformance does not alter or affect the authorized contents as listed in the CoC. The maximum payload as specified in Section 5.b.(2).(b) is not affected by this condition.

Reviewed CoC 71-9255, Revision 6, Section 5.b.

TRANSNUCLEAR WEST	SAFETY REVIEW SCREENING FORM	SRS Sequence No.: SRS 71-7165 Initiating Doc. No.: NCR 02.046 Page 2 of 2 SMUD FF-DSC

Question #3 Does the proposed change alter the package operating controls and procedures as listed in the CoC?	**Conclusion:** ☐ YES ☒ NO

If YES, indicate the CoC sections affected (an Amendment is required):

If NO, provide justification and list the CoC sections reviewed:

The CoC section was reviewed and this "use-as-is" disposition does not alter or affect the MP 187 Cask transfer, procedures or operations. This nonconformance does not involve a change to the operating controls and procedures.

Reviewed CoC 71-9255, Revision 6, Section 7

Question #4 Does the proposed change alter the package fabrication acceptance tests as listed in the CoC?	**Conclusion:** ☐ YES ☒ NO

If YES, indicate the CoC sections affected (an Amendment to the CoC is required):

IF NO, provide justification and list the CoC sections reviewed:

The PT nonconformance is on the bottom end of the FF-DSC and is not related to any type of test or experiment described in the CoC. There are no fabrication acceptance tests listed in the CoC that are affected by this nonconformance.

Reviewed CoC 71-92255, Revision 6, Section 7.b.

If the answer to question 1, 2, 3, or 4 above is YES, prepare a CoC Amendment and submit it to the NRC for approval.	SE No.:

Licensing Manager Approval*:

Signature UBC Date: ___________

U. B. Chopra – Licensing Manager

* Subject to NRC approval of Amendment to CoC 9255.

TRANSNUCLEAR	**72.48 APPLICABILITY & SCREENING FORM**	**SRS Sequence No.:** **SRS 72-1753** **Initiating Doc. No.:** **NCR.02.046** Page 1 of 2

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Brief Description of Change:

This SRS screens TN NCR.02.046 (RANOR NCR 02-101)

The FF-DSC fabrication specification, NUH-05-113, specifies that machining operations required in the fabrication of the FF-DSC be performed in accordance with the requirements of the ASME Code Section III, Article NB-4000, as applicable.

The material for the bottom end forging was volumetrically (UT) and surface examined (PT) by the material supplier. RANOR performed additional machining of the forging, but did not repeat the surface examination of all forging surfaces after machining in accordance with ASME Paragraph NB-4121.3.

Preparer: H. Ilisko Signature [signature] Date: 05/02/02	**Qualified Reviewer:** Signature [signature] Date: 5/3/02

PART A: SAFETY REVIEW APPLICABILITY

Question #1A
Does the change involve a change to the terms, conditions or Technical Specifications incorporated in the Certificate of Compliance?

Conclusion:
☒ **YES**
☐ **NO**

If YES, indicate the COC sections affected (an Amendment to the CoC is required):

SMUD Site Specific License SNM 2510, Technical Specification 4.3.4 refers to SMUD SAR, Appendix A, which lists ASME Code exceptions for the FF-DSC. These exceptions have been approved by the NRC. The new exception to the ASME Code for the FF-DSC requires NRC approval.

If NO, provide justification and list the documents reviewed:

If Yes, the 72.48 screening does not apply. The change cannot be implemented until a COC Amendment (10CFR72.244) incorporating the change has been approved by the NRC.

Question #1B
Is the change subject to more specific criteria other than 10CFR72.48?

Conclusion:
☐ **YES**
☐ **NO**

If YES, indicate the specific regulation that controls the change.

If NO, provide justification.

If Yes, 72.48 screening does not apply and the change cannot be implemented under 72.48.

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PART B: SAFETY REVIEW SCREENING

Question #2
Does the change involve a change to the system design as described in the FSAR?

Conclusion:
☐ YES
☐ NO

If YES, indicate the FSAR sections affected. Give a description of revision required for each affected section:

If NO, provide justification and list the FSAR sections reviewed:

Question #3
Does the change affect the method of performing or controlling a design function as described in the FSAR?

Conclusion:
☐ YES
☐ NO

If YES, indicate the FSAR sections affected:

If NO, provide justification and list the FSAR sections reviewed:

Question #4
Does the change affect the methods of evaluation described in the FSAR, that demonstrate that the intended design function will be accomplished?

Conclusion:
☐ YES
☐ NO

If YES, indicate the FSAR sections affected.

IF NO, provide justification and list the FSAR sections reviewed:

Question #5
Does the change involve a test or experiment NOT described in the FSAR?

Conclusion:
☐ YES
☐ NO

If YES, identify and describe the basis for the yes answer:

IF NO, provide justification and list the FSAR sections reviewed:

If the answer to each of the Questions 2, 3, 4 and 5 above is a NO, implement the change without a Safety Evaluation (SE). If the answer to any ONE of the Questions 2, 3, 4, or 5 is a YES, prepare the applicable SE. Note the SE No. here for reference.

SE No.:

Licensing Manager Approval:

Signature See Note Date: ________

U. B. Chopra – Licensing Manager

Note: 72.48 Screening and Safety Evaluation does not apply since this change requires NRC approval as determined by response to Question 1A.