

L-MT-16-003
Enclosure 3

ENCLOSURE 3

AREVA, INC.

Technical Report Document 51-9234641-001

TITLE:

**Technical Report of the Demonstration of
UT NDE Procedure 54-UT-114-000,
“Phased Array Ultrasonic Examination of Dry Storage Canister Lid Welds”**

7 pages follow



20004-021 (01/30/2014)



AREVA Inc.

EIR

Document No.: 51 - 9234641 - 001

**TECHNICAL REPORT OF THE DEMONSTRATION OF UT NDE PROCEDURE
54-UT-114-000 "Phased Array Ultrasonic Examination of Dry Storage
Canister Lid Welds"**





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54-UT-114-000 "Phased Array Ultrasonic Examination of Dry Storage Canister Lid Welds"

Safety Related? ☐ YES ☒ NODoes this document establish design or technical requirements? ☐ YES ☒ NODoes this document contain assumptions requiring verification? ☐ YES ☒ NODoes this document contain Customer Required Format? ☐ YES ☒ NO**Signature Block**

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A-CRF designates Project Manager Approver of Customer Required Format (A-CRF)

A designates Approver/RTM – Verification of Reviewer Independence

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N/A			



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Record of Revision

Revision No.	Pages/Sections/ Paragraphs Changed	Brief Description / Change Authorization
000	All	Initial issue
	1.1	Re-worded to remove references to PT
	1.3	Re-worded to more accurately describe the control over the blind mockup
	1.4	Changed "6.a" to "5.2.1"
		Change "Table 4.1" to "Table 1.4"
	2.1	Added " with modifications resulting in issuance of revision -001"



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54-UT-114-000 "Phased Array Ultrasonic Examination of Dry Storage Canister Lid Welds"

1.0 NARRATIVE SUMMARY

1.1 Overall Task Description

Northern States Power Company, a Minnesota corporation (NSPM), doing business as Xcel Energy, tasked AREVA Inc. with performing a Phased Array Ultrasonic (PAUT) examination of the subject Dry Storage Canister (DSC) inner and outer lid welds for the detection and characterization of fabrication flaws.

1.2 PAUT Procedural Capability Assessment

AREVA has developed a PAUT procedure for examining inner and outer lid welds from the canister OD. This procedure was developed using an "open" Mockup of the weld joints with known flaws embedded within it. It is necessary to distinguish between indications of actual flaws and the indications from component geometry. This report documents the effort and results achieved by AREVA to detect and characterize flaws in a "blind" mockup of the DSC joint configuration. This procedure was demonstrated in Lynchburg, VA at the AREVA facility on Mill Ridge Road during January 21 & 22, 2015.

1.3 Mockup development and control

The mockup for the "blind" demonstration was designed, built and controlled by personnel from AREVA NDE Engineering. All efforts were made to keep the "blind" mockup information hidden from all but "need to know" personnel. After the demonstration in Lynchburg, the blind mockup and all associated data were locked in a secure area in the AREVA facility.

1.4 Demonstration Execution

On January 21, 2015, the PAUT procedure demonstration for examination of DSC inner and outer cask lid welds began with the following personnel present:

<u>NAME</u>	<u>ORGANIZATION REPRESENTED</u>
Mike Baumann	Xcel Energy
Jerry Wren	Xcel Energy
Gary Larson	NOS
Ted Kendrick	NOS
Matt Learn	USNRC
Tony Cinson	USNRC
Marlone Davis	USNRC
Robert Davis	USNRC
Mike Hacker	AREVA
Rick Rose	AREVA
Walter Persinger	AREVA
Kris Cecil	AREVA
Steve Herman (Demonstration Administrator or "DA")	AREVA
Bret Flesner	EPRI

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Prior to performing the detection and sizing scans, as required by 5.2.1 of the demonstration protocol (reference 2.2), each item of equipment and software setting (identified as an essential variable in reference 2.1) was verified by the DA as being in compliance with the procedure (reference 2.1).

A scan of the open mockup was then made to verify equipment and software performance, after which the blind mockup was installed in the scanning fixture. The EPRI representative provided the blind mockup fabrication report from Sonaspection along with the EPRI mockup fingerprint report to the DA (for grading purposes) and were immediately made secure.

Detection and sizing scans were then acquired on the inner and outer canister lid welds in the blind mockup. The data from the detection and sizing scans was copied to a new thumb drive provided by the DA and loaded onto a second analysis computer, the first being the system used for acquisition. The analysts, "A" and "B" were physically placed in the room such that neither could see the other's display during analysis. Upon completion of the data analysis in accordance with the procedure (reference 2.1), the results (detection and sizing) were then turned over to the DA.

The DA, along with EPRI personnel, reviewed the results provided by the analysts. The data from analyst "A" and analyst "B" were independently graded with the Sonaspection and EPRI fingerprint data to assist in indication characterization. The results of the detection scans showed the probability of detection (POD), as calculated in accordance with reference 2.2, as 97% with no missed detections and one (1) false call.

The flaw sizing accuracy was calculated, in accordance with reference 2.2, for length and through wall sizing (TWS) for both the inner and outer lid welds as well as combined. Those results are presented in Table 1.4

TABLE 1.4

ANALYST "A"	RMS	ANALYST "B"	RMS
Length RMS Outer Lid Weld	0.110"	Length RMS Outer Lid Weld	0.053"
Length RMS Inner Lid Weld	0.118"	Length RMS Inner Lid Weld	0.096"
TWS RMS Outer Lid Weld	0.051"	TWS RMS Outer Lid Weld	0.043"
TWS RMS Inner Lid Weld	0.035"	TWS RMS Inner Lid Weld	0.040"
Combined Length Sizing RMS	0.112"	Combined Length Sizing RMS	0.077"
Combined TWS Sizing RMS	0.043"	Combined TWS Sizing RMS	0.041"

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2.0 REFERENCES

References identified with an (*) are maintained within the AREVA Records System and are not retrievable from AREVA Records Management.

- 2.1 54-UT-114-000 "Phased Array Ultrasonic Examination of Dry Storage Canister Lid Welds" with modifications resulting in issuance of revision -001
- 2.2 51-9234666-000 "Protocol for Dry Shielded Canister (DSC) Inner and Outer Closure Lid Weld Ultrasonic Examination -Capability Assessment"
- 2.3 Truth sheets/data for Blind demonstration Mockup Sample # 5575-2-01*
- 2.4 EPRI "Fingerprint" report for Blind Demonstration Mockup Sample # 5575-2-01*