



SAFETY INSPECTION REPORT AND COMPLIANCE INSPECTION

1. CERTIFICATE/QUALITY ASSURANCE PROGRAM (QAP) HOLDER: AREVA TN/Americas, Areva Inc. 7135 Minstrel Way, Suite 300 Columbia, Maryland 21045		2. NRC/REGIONAL OFFICE Headquarters U. S. Nuclear Regulatory Commission Mail Stop TWFN 4B-34 Washington, DC 20555-0001	
REPORT NUMBER(S) 072-1004/2016-201			
3. CERTIFICATE/QAP DOCKET NUMBER(S) 72-0003, 72-0010, 72-0020, 72-1004, 72-1021, 72-1022, 72-1027, 72-1029, 72-1030/ 71-0250	4. INSPECTION LOCATION 7135 Minstrel Way, Suite 300 Columbia, Maryland 21045	5. DATE(S) OF INSPECTION April 4-8, 2016	

CERTIFICATE/QUALITY ASSURANCE PROGRAM HOLDER:

The inspection was an examination of the activities conducted under your QAP as they relate to compliance with the Nuclear Regulatory Commission (NRC) rules and regulations and the conditions of your QAP Approval and/or Certificate(s) of Compliance. The inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the inspector. The inspection findings are as follows:

- ☐ 1. Based on the inspection findings, no violations were identified.
- ☐ 2. Previous violation(s) closed.
- ☒ 3. The violation(s), specifically described to you by the inspector as non-cited violations, are not being cited because they were self-identified, non-repetitive, and corrective action was or is being taken, and the remaining criteria in the NRC Enforcement Policy, to exercise discretion, were satisfied.

1 Non-cited violation(s) was/were discussed involving the following requirement(s) and Corrective Action(s):

Title 10 CFR 72.242 paragraph (d), under "Recordkeeping and reports," states, in part, that each certificate holder shall submit a written report to the NRC within 30 days of discovery of a design or fabrication deficiency, for any spent fuel storage cask which has been delivered to a licensee, when the design or fabrication deficiency affects the ability of structures, systems, and components important to safety to perform their intended safety function.

Contrary to the requirements of 10 CFR 72.242 paragraph (d), from December 1999 to January 2016, AREVA

- ☐ 4. During this inspection, certain of your activities, as described below and/or attached, were in violation of NRC requirements and are being cited in accordance with NRC Enforcement Policy. This form is a NOTICE OF VIOLATION, which may be subject to posting in accordance with 10 CFR 19.11.
(Violations and Corrective Actions)

Statement of Corrective Actions

I hereby state that, within 30 days, the actions described by me to the Inspector will be taken to correct the violations identified. This statement of corrective actions is made in accordance with the requirements of 10 CFR 2.201 (corrective steps already taken, corrective steps which will be taken, date when full compliance will be achieved). I understand that no further written response to NRC will be required, unless specifically requested.

TITLE	PRINTED NAME	SIGNATURE	DATE
CERTIFICATE/QAP REPRESENTATIVE	Chris Lloyd, VP of Quality Assurance	<i>Chris Lloyd</i>	4/25/16
NRC INSPECTOR	Jon N. Woodfield	<i>Jon N. Woodfield</i>	4/29/16
BRANCH CHIEF	Patricia Silva	<i>Patricia Silva</i>	5/5/16

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1. CERTIFICATE/QUALITY ASSURANCE PROGRAM (QAP) HOLDER:

AREVA TN/Americas, Areva Inc.
7135 Minstrel Way, Suite 300
Columbia, Maryland 21045

2. NRC/REGIONAL OFFICE

Headquarters
U. S. Nuclear Regulatory Commission
Mail Stop TWFN 4B-34
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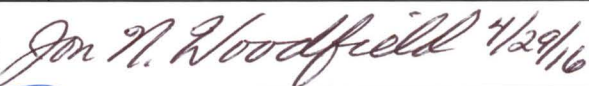

April 4-8, 2016

(Continued)

TN did not submit written reports to the NRC within 30 days of discovery of a design or fabrication deficiency for spent fuel storage casks delivered to a licensee, when the design or fabrication deficiency affected the ability of structures, systems, and components important to safety to perform their intended safety function for the spent fuel storage cask. AREVA TN initiated a corrective action report (CAR) and restored compliance.

The NRC inspection team determined this issue to be within the traditional enforcement process because it had the potential to impact the NRC's ability to perform its regulatory oversight function. The team used the NRC Enforcement Policy to evaluate the significance of this violation. The inspection team determined that the violation was a non-cited Severity Level IV violation because it was similar to an example provided in Section 6.9 of the NRC Enforcement Policy. Specifically, Section 6.9(d)(1), states, in part, had required reports been submitted, would have resulted in, for instance, increasing the inspection scope of the next regularly scheduled inspection.

INSPECTOR NOTES COVER SHEET

Licensee/Certificate Holder (name and address)	AREVA TN/Americas, Areva Inc. 7135 Minstrel Way, Suite 300 Columbia, Maryland 21045
Licensee/Certificate Holder contacts	Chris Lloyd, AREVA/TN Corporate VP of Quality Assurance
Docket No.	72-1004
Inspection Report No.	72-1004/2016-201
Inspection Date(s)	April 4-8, 2016
Inspection Location(s)	AREVA/TN Headquarters, Columbia, Maryland
Inspectors	Jon Woodfield, Team Leader, Safety Inspector Earl Love, Senior Safety Inspector Marlone Davis, Senior Safety Inspector Jeremy Tapp, Safety Inspector
Summary of Findings and Actions	<p>This inspection was a routine periodic assessment of AREVA/TN's (TN) Quality Assurance (QA) program implementation at their corporate office in Columbia, Maryland.</p> <p>The team assessed TN's management, design, and fabrication interface controls for compliance to 10 CFR Part 72, 10 CFR Part 21, and TN's NRC approved QAP; as related to TN CoC's 72-0003, 72-0010, 72-0020, 72-1004, 72-1021, 72-1022, 72-1027, 72-1029, and 72-1030.</p> <p>No significant findings or concerns were identified during the inspection. Overall, the team assessed that TN was adequately implementing their QA program with regard to QA, Management Controls, Design Controls, and the associated fabrication interface. TN continues to effectively implement their NRC approved Quality Assurance Program for activities subject to 10 CFR Part 72.</p> <p>A Non-cited Violation regarding 72.242 reportability for when design or fabrication deficiencies affect the ability of SSCs important to safety to perform their intended safety function was identified by the NRC and is described in these inspector notes and discussed in the attached Form 591S. A minor violation for not following procedures was also identified by the NRC. TN acknowledged the two issues and captured them in Corrective Action Reports.</p>
Lead Inspector Signature/Date	Jon N. Woodfield  4/29/16
Inspector Notes Approval Branch Chief Signature/Date	Patricia Silva  5/5/16

Inspection History

Since their last programmatic inspection in April of 2013 (ML13142A078) the NRC has conducted seven fabrication inspections at AREVA/TN fabrication facilities.

In May of 2013 the NRC conducted a fabrication inspection at AREVA/TN steel fabricator Hitachi Zosen Mechanical Corporation in Kumamoto, Japan. In inspection report 072-1004/2013-202 (ML13183A230) the inspection team assessed that fabrication activities were in compliance with NRC requirements and no violations of Part 72 regulatory requirements were identified.

In August of 2013 the NRC conducted a fabrication inspection at AREVA/TN steel fabricator Premier Technology, Inc. (PTI) in Blackfoot Idaho. In inspection report 072-1004/2013-203 (ML13267A145) the inspection team assessed that overall the implementation of AREVA/TN's QAP for fabrication activities at PTI was satisfactory. The team identified some issues with regard to performance of quality activities by PTI personnel without appropriate procedure controls and some examples of failure to follow quality procedures. Based on the results, the NRC determined that a Severity Level IV violation of NRC requirements had occurred. AREVA/TN was required to provide a written statement addressing the notice of violation (NOV).

In October of 2014 the NRC conducted a follow-up inspection of PTI in Idaho to verify and assess the adequacy of corrective actions taken by AREVA/TN and PTI to address the NOV issued to AREVA/TN in Inspection Report 72-1004/2013-203. In inspection report 072-1004/2014-203 (ML14342A321) the team assessed that AREVA/TN and PTI had taken appropriate and adequate actions to address the findings cited in the August 2013 NOV.

In February of 2015 the NRC conducted a fabrication inspection at AREVA/TN steel fabricator Larsen & Toubro Limited (L&T) Heavy Engineering Division at L&T's Ranoli Works and Powal Works located in Vadodara and Mumbai, India, respectively. In inspection report 072-1004/2015-201 (ML15086A109) the inspection team assessed that fabrication activities were in compliance with NRC requirements and no violations of Part 71 and 72 regulatory requirements were identified. Overall, the quality of fabrication, quality controls, and QA oversight by the CoC holder and the licensees at both India facilities were adequate.

In August of 2015 the NRC conducted a fabrication inspection at AREVA/TN concrete NUHOMS Horizontal Storage Module fabricator Bayshore Concrete Products (BCP) in Cape Charles, Virginia. In inspection report 072-1004/2015-202 (ML15278A302) the inspection team assessed that AREVA/TN through BCP was adequately implementing their QA program with regard to QA, Management Controls, Design Controls, and Fabrication Controls. The team concluded that fabrication activities were in compliance with NRC requirements and no violations of Part 72 regulatory requirements were identified.

In September of 2015 the NRC conducted an onsite fabrication inspection of AREVA/TN concrete NUHOMS Horizontal Storage Modules at the Limerick Generating Station. In inspection report 072-1004/2015-203 (ML15317A450) the team assessed AREVA/TN's management of the project and fabrication controls to determine if AREVA/TN conducted these activities in accordance with their QA program. The team observed selected activities, reviewed procedures and instructions, examined documents, records, drawings; verified personnel

training and qualifications, and interviewed personnel responsible for various activities. The team concluded that fabrication activities were in compliance with NRC requirements and no violations of Part 72 regulatory requirements were identified.

In October of 2015 the NRC conducted a fabrication inspection of AREVA/TN steel fabricator Columbiana HI Tech, LLC (CHT) in Kernersville, North Carolina. In inspection report 072-1004/2015-204 (ML15349A981) the inspection team assessed fabrication activities from examining and witnessing selected fabrication, assembly, test activities, quality procedures, and quality records. The team determined that CHT's fabrication activities and AREVA/TN's oversight of the fabrication activities were adequate in meeting their QA program requirements and regulations. No violations of Part 72 regulatory requirements were identified.

From April 22, through April 25, 2013, the NRC conducted the last programmatic inspection at AREVA/TN offices in Columbia, Maryland. The purpose of the inspection was to examine design and quality assurance (QA) activities to determine if they were performed in accordance with the requirements of 10 CFR Part 21, 10 CFR Part 71, 10 CFR Part 72, the various certificate of compliances (CoCs) AREVA/TN holds, and the applicable Safety Analysis Reports (SAR). The team noted various observations during the inspection and AREVA/TN understood the observations and captured them on Corrective Action Reports (CARs). In inspection report 072-1021/2013-201 (ML13142A078) the CARs are described. Overall, the team assessed that AREVA/TN was adequately implementing their QA program with regard to QA, Management Controls, Design Controls, and the associated fabrication interface with fabricators.

Inspection Purpose

The purpose of the inspection was to assess AREVA/TN's compliance with 10 CFR Parts 21 & 72, and to verify that the storage systems for which AREVA/TN is the holder of a CoC, can be verified to comply with Part 72 in design, procurement, and fabrication requirements, as applicable. The focus of the inspection was to determine whether AREVA/TN activities associated with the storage of radioactive materials are in accordance with their NRC-approved QA program requirements.

Primary Inspection Procedures/Guidance Documents

IP-60851, "Design Control of ISFSI Components"

IP-60857, "Review of 10 CFR 72.48 Evaluations"

NUREG/CR-6314, "Quality Assurance Inspections for Shipping and Storage Containers"

INSPECTOR NOTES: APPLICABLE SECTIONS FROM IP 60851 AND IP 60857 WERE PERFORMED DURING THE INSPECTION WITH RESULTS DOCUMENTED BELOW UNDER THE BASIC HEADINGS OUTLINED IN NUREG-6314. A SECTION CALLED OTHER ADDRESSES OTHER SPECIFIC ISSUES REVIEWED BY THE TEAM.

4.1 Management Controls

4.1.1 Quality Assurance Policy

The team reviewed AREVA/TN's Quality Assurance Program Description Manual (QAPDM), Revision 14 and TN Implementing Procedures (TIPs) and assessed the effectiveness of the QA

program implementation at AREVA/TN. The team conducted reviews of AREVA/TN's quality program, policies, and procedures, and discussed portions of the reviewed documents with selected personnel to determine whether activities subject to 10 CFR Part 72 were adequately controlled and implemented under AREVA/TN's NRC-approved QA program. Further, the team reviewed the AREVA/TN organization charts and interviewed QA personnel to assess their organizational independence from cost, schedule, and production activities.

The team reviewed procedures and documents regarding training and certification of personnel involved in quality activities. Specifically, the team reviewed TIPs:

TIP 2.1, "Indoctrination and Training," Revision 21

TIP 5.6, "Implementing Procedures and QA Manual Control," Revision 23

The team noted that AREVA/TN evaluated the most recent proposed changes to the QAPDM per the requirements of 10 CFR 71.106. It was determined that several of the proposed changes constituted a reduction in program commitment or effectiveness. Therefore, the changes were submitted to the NRC for prior review and approval as required.

The team reviewed the initial QA indoctrination and job-specific QA training for selected personnel in the areas of Quality, Project Management, Procurement, Document Control, Services, and Design and Fabrication Engineering to determine if they met the requirements stated in the QA program. For the job-specific QA training, the team compared the training documented to the training required in the Master Training List. The team found that for all records reviewed, each AREVA/TN employee had completed the required indoctrination training and job-specific training.

The team also reviewed the following AREVA/TN procedures which address a graded approach to quality components and commercial grade dedication (CGD) of components when required:

TIP 3.6, "Quality Classification," Revision 7

TIP 7.3, "Dedication of Commercial Grade Items," Revision 11

The team verified that AREVA/TN established a graded approach to quality, which is documented in the QAPDM and implemented through TIP 3.6. The team noted the procedure requires an evaluation to justify the reasons why when components or services are not classified as Important to Safety (ITS) Category A and that the evaluation must be independently reviewed. The material dedication program/procedure TIP 7.3 also included requirements for the identification, documentation, and implementation of the applicable ITS levels in dedication plans. The team noted the procedure provided additional guidance on the identification of potential critical characteristics needed during the dedication process. Guidance on the method(s) used to dedicate the commercial grade component or service is also provided in the procedure.

The team reviewed the CGD log for the past three years and reviewed four randomly selected CGD plans and reports. The team focused on the procurement of ITS Category A components and services, specifically, 1) lid O-rings, 2) pressure gauge calibration services, and 3) hardware for Transfer Cask restraints at Beaver Valley Power Station. For the lid O-rings, the team found AREVA/TN developed the CGD plan per procedure with appropriate critical characteristics identified. No O-rings had been procured at the time of the inspection. The team found the pressure gauge calibration services CGD report to be completed as required and show all critical characteristics reviewed and verified, ensuring the quality of the pressure

gauge calibrations performed.

Lastly, the team reviewed the CGD plan and report for the hardware for Transfer Cask restraints to be used at the Beaver Valley Power Station. The hardware consisted of three shackles, one turnbuckle, and three slings. The team found the CGD plan to be completed as required and contain appropriate critical characteristics for the hardware being procured. During the review of the CGD report, the team identified that although the report was completed as required and stated the acceptance criteria for the critical characteristics was acceptable, the supporting information attached was not adequate to support that conclusion. Specifically, the testing reports for the turnbuckle and one shackle did not contain any unique identifiers so as to show traceability for the component procured to the associated testing report. After discussion of this issue with AREVA/TN, AREVA/TN was able to produce additional documentation from the supplier to show traceability, but it had not been part of the CGD report package. TIP 7.3, Step 5.3.3 states, in part, that the CGD report shall reference any supporting documentation such as laboratory test reports and inspection records, as applicable. These supporting documents shall be attached to the CGD report unless the documents are available as a standalone record in the records management system. This is a violation of 10 CFR 72.150 for failure to follow quality procedures. The team determined this violation was of minor safety significance because traceability was maintained but was not adequately documented. AREVA/TN entered this issue into their Corrective Action Program (CAP) as CAR No.: 2016-109.

Overall, the team assessed that the quality assurance controls at AREVA/TN were adequate and in accordance with their NRC-approved QA program. One minor violation in the area of CGD documentation was identified by the team, for which AREVA/TN promptly entered it into their CAP.

4.1.2 Nonconformance Controls and Corrective Action Controls

The team reviewed selected records and interviewed personnel to verify that AREVA/TN is effectively implementing nonconformance control and their CAP. Specifically, the team reviewed AREVA/TN's policies and the following approved implementing procedures that govern the nonconformance and Corrective Action Programs to verify compliance with applicable requirements to 10 CFR Part 72:

TIP 15.2, "Control of Nonconforming Items," Revision 14

TIP 16.1, "Corrective Action," Revision 24

TIP 16.3, "Corrective Action Review Committee," Revision 15

The team discussed the nonconformance and CAP controls with the AREVA/TN staff and reviewed a sample of nonconformance reports (NCRs), and corrective action reports (CARs) for appropriate disposition. The team also reviewed measures used to keep track of the status of nonconforming items and ensure that AREVA/TN completed CARs for identified deficiencies in a technically sound and timely manner. The team evaluated a sample of cause analyses, trend analyses, and verified that the NCRs and CARs provided a connection to the 10 CFR Part 21 program.

The team sampled nine NCRs from the past three years which consisted of a variety of component types and suppliers, and included a mix of accept-as-is, repair, and reject component dispositions. The team determined that AREVA/TN appropriately dispositioned the nonconformances reviewed and closed them in a timely manner, in accordance with the quality procedure. The team noted the trend codes to be inconsistent for various nonconformances of

measuring and test equipment (M&TE), which could lead to inaccurate trending. This observation was discussed with AREVA/TN personnel and they entered it into their CAP for further review.

The team sampled nine CARs from the past three years which included a review of supplier discrepancies, failures of provided equipment, audit findings, M&TE calibration issues, and nonconformances that needed a CAR. AREVA/TN classifies their CARs into four different levels depending on the significance of the issue with Level 1 being the most significant. The sample chosen by the team consisted of a mix of Level 1 and Level 2 CARs. The team found that the corrective actions taken by AREVA/TN were adequate and closed out in a timeframe commensurate with the safety significance of the issue, when possible. The team noted an observation during the review of a CAR that documented an issue that had the potential for a dry fuel storage system user to operate it in an unanalyzed condition. In the CAR, the team noted that it was not documented whether the affected users were notified of this potential issue. The team discussed this observation with AREVA/TN personnel and they stated that notification of affected users was discussed but determined not to be necessary. AREVA/TN acknowledged the need to document this determination and entered this observation into the CAP as CAR No.: 2016-113 for further review and evaluation.

In addition, the team reviewed a sample of Corrective Action Review Committee (CARC) minutes from 2016 and the latest Semi-Annual Supplier Performance Trend Report from the latter part of 2015. The purpose of the CARC is to monitor effectiveness of the CAP, ensure that corrective actions receive the management attention needed to be effective, evaluate trends, and identify improvements in program, process, and performance. The team found that the CARC meetings were performed as required by TIP 16.3 with at least the minimum number of attendees and more often than the required quarterly frequency, typically monthly. The team also found the supplier trend report to be comprehensive and provide valuable information to identify areas for improvement for each supplier.

Further, the team reviewed AREVA/TN program controls for addressing 10 CFR Part 21, "Reporting of Defects and Noncompliances," including TIP 15.1, "Reportability Determinations and Postings," Revision 13. The team verified that AREVA/TN's procedure adequately implemented the requirements of the regulation. The team verified that AREVA/TN was meeting the 10 CFR Part 21 posting requirements of both the regulations and TIP 15.1. The team found that AREVA/TN posted the 10 CFR Part 21 regulations, Section 206 of the Energy Reorganization Act of 1974, and TIP 15.1 on a board where employees could readily see them. No issues were identified by the team regarding 10 CFR Part 21 program controls or implementation at AREVA/TN.

Overall, the team concluded that AREVA/TN had an adequate nonconformance control and CAP in place to identify, track and resolve quality related deficiencies and deviations.

4.1.3 Documentation Controls

AREVA/TN's corporate headquarters in Columbia, Maryland has the primary responsibility for document controls at AREVA/TN. AREVA/TN fabricators only receive controlled electronic copies of design documents from the AREVA/TN Document Control Administrator. The manufacturing facilities are generally not responsible for entering quality records associated with the manufacturing of products directly into the AREVA/TN document control system.

The team reviewed the document control section of the AREVA/TN QAPDM and the TIPs that

address document controls to verify they are being properly implemented. The team specifically reviewed the following procedures associated with document control:

TIP 4.1, "Procurement Document Control," Revision 24

TIP 6.1, "Document Control," Revision 13

TIP 17.1, "Control of Quality Assurance Records," Revision 17

The team reviewed a sample of documents issued and revised by AREVA/TN to determine if the controls on those documents were adequate and performed in accordance with approved quality procedures. The team reviewed TIP 6.1 and discussed the document control process with Project Engineer and Project Management personnel. The team determined that adequate controls were in place to ensure that 1) document approval could only be performed by qualified personnel; 2) all technical departments reviewed the original issuance of a quality document for applicability to their discipline; 3) revisions are approved by the original signatories; and 4) old document revisions are clearly separated from the current revision and a database is kept up to date with the current revision number. New or revised document notification is sent out to AREVA/TN staff and fabricators by AREVA/TN Project Managers through the Document Control Administrator. The distribution list is generally the individuals associated with the project for which the document applies and is maintained by the responsible Project Manager. If the new or revised document is not project specific, such as a TIP procedure; it will be electronically distributed throughout AREVA/TN for staff reading and electronic acknowledgement back to AREVA/TN headquarters. The team also reviewed a sample of documents transmitted to AREVA/TN fabrication facilities and determined the process was adequately controlled and performed as required by TIP 6.1.

The team also discussed the requirements of TIP 17.1 with the Document Control Administrator (DCA). The team verified that only designated staff have access to quality records. The team verified with the DCA, as described in TIP 17.1, which records are considered to be Lifetime records and which records are considered to be nonpermanent. Duplicate electronic copies of records are stored in two separate locations. As demonstrated by the DCA, all quality records reviewed were readily retrievable and legible. Printed copies of documents automatically have "uncontrolled if printed" shown on them. All engineering related documents are down loaded each day onto back-up servers at Columbia, Maryland and Lynchburg, Virginia. Other documents are backed-up on tape media each day. The tape media is removed from AREVA/TN once a week and taken to an Iron Mountain facility for storage. The team determined that AREVA/TN's quality record controls were adequate and met the requirements stated in TIP 17.1 and the applicable regulations.

Overall, the team assessed that document and records management controls at AREVA/TN were adequate.

4.1.4 Audit Program

The team of inspectors reviewed the AREVA/TN audit program to determine if AREVA/TN scheduled and performed internal and external supplier audits in accordance with approved implementing procedures. Specifically, the team reviewed:

TIP 7.1, "Supplier Evaluations," Revision 15

TIP 7.2, "Supplier Audits," Revision 11

TIP 18.1, "Internal Audits," Revision 14

The team reviewed TIP 7.1 to determine how AREVA/TN evaluated supplier audits performed by other organizations for when AREVA/TN utilized those audits to qualify a Supplier for AREVA/TN's Approved Supplier's List. The team selected internal and supplier audits from the last three years. As part of the external supplier audit review, the team selected supplier audits related to Important to Safety Category A vendor supplied equipment. The team also reviewed the audit results to determine if AREVA/TN identified deficiencies.

Overall, the team identified no concerns with AREVA/TN's internal and external supplier audit program. The team verified that for the audits sampled, AREVA/TN generally conducted audits with qualified and certified personnel, scheduled and evaluated applicable elements of the QA program, and resolved those deficiencies in a timely manner.

4.2 Design Controls

4.2.1 Design Development

The team reviewed the sections of the AREVA/TN QAPDM and the TIPs specifically related to design development/control and modification activities. The team also had discussions with the AREVA/TN engineering staff and other personnel associated with design control. The team focused its review on AREVA/TN design activities related to Part 72 CoC 1042 NUHOMS EOS Amendment Request 0, which was currently under NRC review.

The team specifically reviewed the following TIPs associated with design control:

TIP 2.5, "Order Entry and Project Planning," Revision 11

TIP 3.1, "Design Control," Revision 13

TIP 3.2, "Calculations," Revision 10

TIP 3.3, "Computer Software Test Control," Revision 11

TIP 3.4, "Identification and Control of Computer Software Error Messages," Revision 4

TIP 3.6, "Quality Classification," Revision 7, Interim Procedure Change #1

TIP 5.1, "Drawing Control," Revision 9

TIP 5.2, "Specifications," Revision 8, Interim Procedure Change #1

TIP 5.4, "Control of Licensing Documents," Revision 15

The team reviewed the project plan associated with the CoC 1042 NUHOMS EOS Amendment Request 0, which was under NRC review at the time of the inspection. The team found the project plan reviewed to use the proper forms, be compliant with TIP 2.5 procedural requirements, signed off by the project manager and project engineer, and have proper approval authority by a quality assurance specialist.

The team reviewed a sampling of the design criteria documents, design review meeting agendas, design review meeting minutes, design review checklists, and design reports for the NUHOMS EOS project plan. The team found all the documents reviewed to use the proper forms, be compliant with TIP 3.1 procedural requirements, signed off by the originator, signed off by the checker, and have proper approval authority when applicable.

The team also reviewed a sampling of design specifications, calculations, and design drawings for the NUHOMS EOS Amendment 0. The team found all the documents reviewed to use the proper forms, be in compliance with the respective TIPs 5.2, 3.2, and 5.1, signed off by the originator, signed off by the checker, and have proper approval authority. In addition, the team verified that reviewer check prints for these documents were properly sent to and stored with the

Document Control Administrator as per the procedures. The team found the sampled calculation checkprints to have attached TIP 3.2 form 3.2-2, (Calculation Review Checklist) as required by TIP 3.2. The checklists were all properly filled out and signed off by the calculation originator and checker.

The team specifically focused its review of calculations on those that utilized commercially available computer software analytical programs. This led the team to review additional documents associated with the QA validation of the software on specific AREVA/TN computer hardware platforms/servers. Commercially available software validation is controlled by TIPs 3.3 and 3.4. The team reviewed software Test Reports and computer program error reports as required by TIPs 3.3 and 3.4 for commercially available analytical programs LS-DYNA and ANSYS. The team found the Test Reports, Computer Program Error Report Review Sheet, and associated documentation to use the proper forms, be procedurally compliant with TIPs 3.3 and 3.4, signed off by the originator, signed off by the checker, and have proper approval authority when applicable.

AREVA/TN provides on its design drawings an itemized parts list which shows the quality category for each of the parts on the drawings. The team reviewed a sampling of design drawings and traced the quality category designations for a sampling of parts back to the design basis documents to verify procedural compliance with TIP 3.6. For every part quality category reviewed, the team found in accordance with TIP 3.6 a Quality Classification Form (QCF) justifying the category designation. All QCFs reviewed by the team were filled out properly and had the required preparer, reviewer and approver signatures. In every sample case reviewed by the team, the AREVA/TN drawing number and part item was properly identified on the QCF per TIP 3.6 requirements.

The team verified the AREVA/TN process for converting the CoC 1042 NUHOMS EOS Amendment 0 design drawings into licensing drawings by reviewing design drawings against the equivalent licensing drawings and reviewing TIP 5.4 for procedural compliance. Licensing (or SAR drawings) go through the same review process as design drawings as designated in TIP 5.1. The title blocks for the licensing drawings contained the designation Safety Analysis Report and utilized a drawing numbering system identifying them as licensing drawings. All the licensing drawings reviewed received the proper reviews with reviewer names, initials and dates shown. The revision identification methodology is different for licensing drawings from design drawings and was in compliance with TIP 5.4. The team also reviewed the Licensing Document Record of Review form for Amendment 0 (Form 5.4-1 of TIP 5.4) which is procedurally required by TIP 5.4. The team found the amendment 0 Licensing Document Record of Review to be comprehensive in its documenting the review of the licensing documents; with all preparers, independent reviewers, and management approvers identified and their associated signatures provided.

The team found that AREVA/TN was effectively implementing its design control procedures. Overall, no concerns were identified by the team in the design control area.

4.2.2 Modifications

The team reviewed the procedure in TIP 3.1 for making design changes. When approved Design Documents require revision, a Design Change Request (DCR) form is initiated. The team reviewed a sampling of design drawings associated with the NUHOMS EOS Amendment 0 Request that had been revised by DCR. Every time a drawing is revised, the revision block on the drawing lists the DCR responsible for the revision to the drawing. The team requested

several DCR packages to review that were listed in the revision blocks on NUHOMS EOS design drawings. The team reviewed the filled out DCR form 3.1-2 (available in TIP 3.1) for each sample DCR and the associated documentation behind the form. The team found all parts of the DCR forms to be properly filled out in accordance with TIP 3.1; with also the proper and required signatures for all the samples reviewed. The team also found the attached supporting documentation justifying the change to be adequate.

As part of the design change process (modification) for 10 CFR Part 72 designs, AREVA/TN performs 72.48 screenings and evaluations. The team reviewed AREVA/TN's implementing procedure, TIP 3.5, "Licensing Reviews," Revision 8 and noted that the procedure satisfactorily established requirements for performing and documenting Licensing Reviews (LRs) pursuant to 10 CFR Part 72.48. The team noted references throughout to NEI 96-07 Appendix B for guidance. The team assessed a sample of eleven AREVA/TN documented Licensing Reviews pursuant to 10 CFR Part 72.48 requirements for various Certificate of Compliances (CoC's) for which AREVA/TN is the Certificate holder.

Licensing Documents reviewed as part of the team's 72.48 review included CoCs and associated Technical Specifications, Updated Final Safety Analysis Reports (UFSARs), and NRC Safety Evaluation Reports (SERs). The team noted that licensees are responsible for performing Evaluations/Screens pursuant to 10 CFR Part 50.59 for AREVA/TN design, fabrication, examination, testing, and installation activities subject to 10 CFR Part 50 or 10 CFR Part 52 requirements. With regard to 72.48 evaluations, the team noted that when proposed activities "screen in," the eight evaluation criteria of 10 CFR Part 72.48(c)(2) are applied in order to determine if a CoC Amendment must be obtained for any change. With respect to the eleven LR's that were reviewed, the team noted two LR's (721004-1432 and 721027-028) required a full evaluation to determine if CoC Amendments were required. In both cases, the team noted that AREVA/TN concluded that changes could be implemented without requiring an amendment to the respective CoC. With the exception of 721004-1432 (currently under staff review, see next paragraph), the team concluded that AREVA/TN had adequately followed their process and provided sufficient basis for their screening and evaluation determinations, as applicable.

Concerning LR 721004-1432, the inspection team reviewed AREVA/TN's response to the NRC technical staff input (Note that prior to the inspection, Region I had submitted LR 721004-1432 to NRC headquarters for technical staff review and comment due to its complexity) and their overall 72.48 process regarding AREVA/TN changes that involve the introduction of a new 32PTH1 Type 2-W Basket Assembly for the NUHOMS 32PTH1 DSC Cask System. The team noted that the new basket assembly option consisted of thinner poison plates and support plates. The thinner plates are intended to create larger basket cell sizes to accept a corresponding larger spent fuel assembly gauge size. The changes to the basket plate thicknesses are just design modifications to an existing cask system basket design as supported by the following NRC approved licensing documents:

- Certificate of Compliance for Spent Fuel Storage Casks, No. 1004, Amendment 13
- Attachment A to Certificate of Compliance No. 1004, Technical Specifications
- NUH003.0103, Updated Final Safety Analysis Report for the Standardized NUHOMS® Horizontal Modular Storage System for Irradiated Nuclear Fuel, Revision 14

The team assessed AREVA/TN's response to the NRC's technical staff comments on its 72.48 Thermal evaluation. The NRC technical staff noted two cases (noted below) where AREVA/TN used a code/method in their 72.48 evaluation that is different from what is in the NUHOMS 32PTH1 FSAR.

1. AREVA/TN's evaluation discusses the computational fluid dynamics (CFD) analysis methods used for analyzing storage conditions and transient transfer conditions that resulted in AREVA/TN performing evaluations using the NUHOMS 32PTH1 DSC (CoC 72-1004) [ANSYS analysis] and comparing it to the Advanced NUHOMS 24PT4 DSC (CoC 72-1029) [FLUENT analysis].
2. AREVA/TN's Thermal analysis performed for 32PTH1 Type 2-W utilized the same computer code (ANSYS, version 10), modeling assumptions, geometric model and nominal configuration as that utilized in the previously approved 37PTH Basket system under Amendment 13 to the CoC 1004. Accordingly, the methodologies used in the supporting calculations for the design changes for the 32PTH1 Type 2-W are the same as those described in the UFSAR and utilized for the initial analyses for 32PTH1 Types 1 and 2 or are previously approved methodologies.

Contrary to the above, the team noted that the methods of evaluation approved for each CoC and amendment are applicable only for that CoC and Amendment and that they cannot be used for other CoCs. Only methods of evaluation approved through FSAR's can be used between different CoCs.

With respect to the first concern, the team noted that AREVA/TN will revise the LR to include an additional discussion on the similarities between the two systems. The OS200 transfer cask used in CoC 1029 is identical to the OS200 transfer cask used for 32PTH1 DSC in CoC 1004. Also, the 32PTH2 DSC in CoC 1029 is a variant of the 32PTH1 DSC with minor changes to the basket design. Based on these similarities and the fact that the methodology used to evaluate the transfer conditions is identical between CoC 1029 and this LR, AREVA/TN concluded that the intended application between the two CoCs is identical and there is no departure to the method of evaluation for transfer conditions.

With respect to the second concern, the team noted AREVA/TN's position such that the use of a CFD code to explicitly model all modes of heat transfer reduces uncertainty and provides more precise results. In addition, based on the NEI guidance, this is not considered a departure from the methodology. Further, a confirmatory CFD evaluation of the 32PTH1 DSC in a HSM-H storage module, as documented in the SER for Amendment 10, has been used by the NRC staff to evaluate the thermal performance and also to understand the conservatism in the ANSYS models. When the confirmatory studies performed by the NRC staff are compared to the ANSYS model, additional evidence is provided that the margins relied upon by the staff within the SER are not reduced.

Accordingly, AREVA/TN, in their revised LR to incorporate the NRC technical staff comments, will expand this discussion further to clarify the definition of methodology, the intended application of the methodology, and to illustrate the similarities between the applications (CoC 1029 vs CoC 1004). Additionally, the CFD evaluation for the LR incorporated the guidance provided in NUREG 2152, "Computational Fluid Dynamics Best Practice Guidelines for Dry Cask Applications." AREVA/TN's revised discussion will provide more information on the inputs used for the CFD modeling and will demonstrate compliance to NUREG 2152. In addition, a reference to the 37PTH basket system and Amendment 13 was made in reference to the use of ANSYS Version 10 versus 8.1. Version 8.1 had been used in the original application for 32PTH1 DSC basket evaluation and the version used will be clarified in the revised LR. ANSYS Version 10.0 is also being used to evaluate changes to the 32PTH1 DSC in the Amendment 14 application currently under NRC review. The revised LR will also clarify that

there are no changes to the 32PTH1 DSC thermal model from that described in the UFSAR.

In summary, AREVA/TN will issue a revision to their original LR 721004-1432 revision 0 to address the NRC staff comments, lessons learned, and enhance overall readability. AREVA/TN is of the position that none of the conclusions of the Applicability, Screening, or Evaluation for LR 721004-1432 Revision 0 will change in Revision 1 and the overall conclusion is that no NRC review and approval is needed.

The team noted that AREVA/TN on occasion has performed Licensing Reviews of systems that have been submitted to the NRC for initial licensing or revision/amendment under 10 CFR Part 72, but whose CoC, revision or Amendment has not yet been issued. The team noted that this typically occurs due to design changes or nonconformances discovered during “at-risk” fabrication. After the CoC revision or amendment is issued, the LR is revised to enter the final licensing references as part of a reconciliation process. Also, when a proposed activity results in a change to the FSAR text or drawings, a Functional Change Notice (FCN) is prepared and that the FCN number corresponds to the LR number. FCNs for proposed activities, which change FSAR information associated with new CoC applications or amendment applications to existing CoCs under NRC review, are considered contingent FCNs. These FCN’s are not considered to be changes to the current UFSAR revision. Further, FCN distribution to Licensees does not occur until the new CoC or amendment to an existing CoC is NRC approved and the LR is revised and reconciled. FCNs associated with a previously approved amendment are not considered contingent. FCNs shall not contain both changes to currently NRC approved UFSAR information and information associated with CoC Amendments under NRC review. Lastly, the team noted that proposed activities of this nature are split into two LRs, each with their associated FCN.

The team reviewed the training records of the AREVA/TN personnel that were involved in preparing, checking, and approving the 72.48 determinations. The team determined that the AREVA/TN personnel involved had received the proper training within the required 2-year interval and that the training materials were adequate for the purpose intended.

4.3 Fabrication Controls

The team reviewed the AREVA/TN QAPDM to determine the role of AREVA/TN headquarters during fabrication activities at its suppliers. During the review of TIP 15.3, “Review of Supplier Nonconformances,” Revision 15 the team found that certain supplier nonconformance reports during ongoing fabrication activities were required to be evaluated by AREVA/TN headquarters. Specifically, those supplier nonconformance reports with a proposed disposition of “Use-as-is” or “Repair.” AREVA/TN headquarters generates a Supplier Nonconformance Evaluation to review and document whether AREVA/TN agrees or not with the supplier’s disposition and basis. AREVA/TN can also issue a Supplier Finding Report if during the review of the supplier nonconformance report a condition adverse to quality is identified. The team found AREVA/TN’s headquarters involvement in the fabrication control process adequate.

OTHER ISSUES REVIEWED BY THE INSPECTION TEAM

AREVA/TN 72.242(d) Reportability Determination Issue

Based on identified fabrication deficiencies and discussions with AREVA/TN during a telephone conference call that occurred prior to the inspection, the NRC inspection team decided to increase the scope of this AREVA/TN corporate inspection. The increase in scope was due to two instances of DSC siphon and vent block fabrication deficiencies being discovered after the DSC had been delivered to a licensee's facilities that had the potential to affect the ability of the component to perform its intended safety function. In addition, AREVA/TN had discussed by teleconference with the NRC the reporting requirements of 10 CFR 72.242(d) and determined that they may not have been historically in compliance with these requirements. AREVA/TN captured the potential reportability issue along with other potential issues gathered from the telephone conference discussion by placing the issues in their corrective action program.

The team reviewed AREVA/TN's corrective action report cause evaluation, extent of condition evaluation, and corrective actions regarding compliance with 10 CFR 72.242(d). The team interviewed selected personnel to determine how AREVA/TN evaluated the extent of condition review for the twelve missed reports since 1999 of design or fabrication deficiencies discovered after delivery of storage system components to licensees. The team noted that AREVA/TN did include one of these fabrication deficiencies in a report to the NRC. Following the review of the cause evaluation, the team determined that a violation of NRC requirements occurred because AREVA/TN had not made the required reports associated with 10 CFR 72.242(d).

Title 10 CFR 72.242(d) under "Recordkeeping and report," states, in part, that each certificate holder shall submit a written report to the NRC within 30 days of discovery of a design or fabrication deficiency, for any spent fuel storage cask which has been delivered to a licensee, when the design or fabrication deficiency affects the ability of structures, systems, and components important to safety to perform their intended safety function. Contrary to the requirements of 10 CFR 72.242(d), from December 1999 to January 2016, AREVA/TN did not submit written reports to the NRC within 30 days of discovery of a design or fabrication deficiency for spent fuel storage casks delivered to a licensee, when the design or fabrication deficiency affected the ability of structures, systems, and components important to safety to perform their intended safety function for the spent fuel storage cask.

AREVA/TN initiated corrective action report 2015-280 and restored compliance through the submittal of a letter (E-43748), dated January 15, 2016. The team determined this issue to be within the traditional enforcement process because it had the potential to impact the NRC's ability to perform its regulatory oversight function. The team used the NRC Enforcement Policy to evaluate the significance of this violation. The inspection team determined that the violation was a non-cited Severity Level IV violation because it was similar to a Severity Level IV example provided in Section 6.9 of the NRC Enforcement Policy. Specifically, section 6.9(d)(1), states, in part, had required reports been submitted, would have resulted in, for instance, increasing the inspection scope of the next regularly scheduled inspection.

AREVA/TN DSC Pressure Test

As a part of a technical question associated with required pressure testing of the confinement barrier (i.e. DSC) for the AREVA/TN dry cask storage systems, the team decided to increase the scope of this AREVA/TN corporate inspection. Therefore, the team reviewed the design

and licensing basis of the AREVA/TN dry cask storage systems to determine how AREVA/TN met the DSC pressure test requirements in accordance with ASME B&PV Code, Section III, NB-6000. The team also interviewed selected AREVA/TN personnel and reviewed applicable NRC interim staff guidance ISG-18 and ISG-25.

The team discovered that AREVA/TN provided alternative methods to meet the DSC pressure test requirements from Amendments 0 to 9 for the NUHOMS 72-1004 systems. The certificate of compliance for the earlier NUHOMS 72-1004 systems described the alternative to the ASME Code. The team noted that starting at Amendment 10 for the NUHOMS 72-1004 systems, the NRC technical review staff followed the interim guidance of ISG-18 and ISG-25. The alternative methods approved in the earlier amendments 0 to 9 were no longer accepted, which had allowed AREVA/TN to perform a pneumatic test in lieu of a hydrostatic test, with hydrostatic testing being the preferred method. The team determined there were no violations of 10 CFR 72 regulations since the NRC had approved alternative test methods in CoC 1004 amendments 0 through 9.