



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

February 10, 2011

Mr. Kelly D. Trice
President and Chief Operating Officer
Shaw AREVA MOX Services
Savannah River Site
P.O. Box 7097
Aiken, SC 29804-7097

**SUBJECT: MIXED OXIDE FUEL FABRICATION FACILITY- NRC INSPECTION REPORT
NO. 70-3098/2010-004 AND NOTICE OF VIOLATION**

Dear Mr. Trice:

During the period of October 1 through December 31, 2010, the US Nuclear Regulatory Commission (NRC) completed inspections of construction activities related to the construction of the Mixed Oxide Fuel Fabrication Facility. The purpose of the inspections was to determine whether activities authorized by the construction authorization were conducted safely and in accordance with NRC requirements. The enclosed inspection report documents the inspection results. At the conclusion of the inspections, the findings were discussed with those members of your staff identified in the enclosed report.

The inspections examined activities conducted under your construction authorization as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your authorization. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of these inspections, five violations of NRC requirements were identified: (A) failure to ensure that design changes were governed by control measures commensurate with those applied to the original design; (B) failure to segregate nonconforming material; (C) failure to ensure that applicable American Welding Society (AWS) code requirements were correctly translated into design documents; (D) failure to properly implement a procurement change for embed plate studs; and (E) failure to verify that stud welding of carbon steel studs to stainless steel embed plates was in accordance with applicable AWS code requirements. The violations were evaluated in accordance with the NRC Enforcement Policy available on the NRC's Web site at www.nrc.gov. The violations are cited in the enclosed Notice of Violation (Notice) and are being cited in the Notice because they were identified by the NRC. The circumstances surrounding the violations are described in detail in the subject inspection report.

In addition, this report documents one licensee identified finding which was determined to involve a violation of NRC requirements.

However, because this finding was a Severity Level IV violation, was licensee identified, and entered into your corrective action program, the NRC is treating it as a non-cited violation in accordance with Section 2.3.2 of the NRC Enforcement Policy.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. For your consideration, NRC Information Notice 96-28, "SUGGESTED GUIDANCE RELATING TO DEVELOPMENT AND IMPLEMENTATION OF CORRECTIVE ACTION," is available on the NRC's Web site. The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

In accordance with 10 CFR 2.390 of NRC's "Rules of Practice," a copy of this letter and its enclosures may be accessed through the NRC's public electronic reading room, Agency-Wide Document Access and Management System (ADAMS) on the Internet at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction.

Should you have any questions concerning this letter, please contact us.

Sincerely,

/RA/

Deborah A. Seymour, Chief
Construction Projects Branch 1
Division of Construction Projects

Docket No. 70-3098
Construction Authorization No.: CAMOX-001

Enclosures: 1. Notice of Violation
2. NRC Inspection Report 70-3098/2010-004 w/attachment

cc w/encls: (See next page)

cc w/encl:

Mr. Clay Ramsey, Federal Project Director
NA-262.1
P.O. Box A
Aiken, SC 29802

Mr. Sam Glenn, Deputy
Federal Project Director
NA-262.1
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Aiken, SC 29802

A.J. Eggenberger, Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Ave., NW, Suite 700
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Mr. Joseph Olencz, NNSA/HQ
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Glendale Springs, NC 28629

However, because this finding was a Severity Level IV violation, was licensee identified, and entered into your corrective action program, the NRC is treating it as a non-cited violation in accordance with Section 2.3.2 of the NRC Enforcement Policy.

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- Enclosures: 1. Notice of Violation
2. NRC Inspection Report 70-3098/2010-004 w/attachment

cc w/encls: (See next page)

PUBLICLY AVAILABLE NON-PUBLICLY AVAILABLE SENSITIVE NON-SENSITIVE
ADAMS: Yes ACCESSION NUMBER: ML110410628 _____ SUNSI REVIEW COMPLETE

OFFICE	RII:DCP	RII:DCP	RII:DCP	RII:DCI	RII:DCP		
SIGNATURE	/RA/	/RA Via email/	/RA Via email	/RA Via email /	/RA Via email/		
NAME	W Gloersen	M. Shannon	B. Adkins	B. Davis	M. Sheikh		
DATE	2/3/2011	2/3/2011	2/7/2011	2/3/2011	2/9/2011		
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

Letter to Kelly Price from Deborah A. Seymour dated February 10, 2011.

SUBJECT: MIXED OXIDE FUEL FABRICATION FACILITY- NRC INSPECTION REPORT
NO. 70-3098/2010-004 AND NOTICE OF VIOLATION

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PUBLIC

NOTICE OF VIOLATION

Shaw AREVA MOX Services
Aiken, South Carolina

Docket No. 70-3098
Construction Authorization No. CAMOX-001

During Nuclear Regulatory Commission (NRC) inspection activities conducted October 1 through December 31, 2010, violations of NRC requirements were identified. In accordance with the NRC Enforcement Policy, the violations are listed below:

- A. Condition 3.A of NRC Construction Authorization No. CAMOX-001, Rev. 2, dated June 12, 2008, authorizes, in part, the applicant to construct a plutonium processing and mixed oxide fuel fabrication plant, known as the Mixed Oxide Fuel Fabrication Facility (MFFF) located at the Department of Energy's Savannah River Site, in accordance with the statements, representations, and conditions of the MOX Project Quality Assurance Plan (MPQAP) dated March 26, 2002, and supplements thereto (MPQAP, Rev. 9, Change 1, dated June 9, 2010).

Section 3.1, General, of the Mixed Oxide (MOX) MPQAP requires, in part, that design changes are governed by control measures commensurate with those applied to the original design.

Section 15.2.4, Disposition of Nonconforming Items, of the MPQAP requires MOX Services to invoke design control measures commensurate with those applied to the original design for non-conforming conditions that are dispositioned as "use as is" or "repair." If changes to the specifying document are required to reflect the as-built condition, the disposition shall require action to change the specifying document to reflect the accepted nonconformance.

Contrary to the above, MOX Services failed to ensure that design changes were governed by control measures commensurate with those applied to the original design. Specifically, MOX Services authorized a "use as is" disposition to increase the allowable fissile thickness for KCD-TK1000 (annular tank) without changing the specifying input documents or posting the nonconformance report against the specifying input documents to reflect the "as-built" condition of the tank as required by Sections 3.1 and 15.2.4 of the MPQAP.

This is a Severity Level IV violation (Enforcement Policy 6.5.d) (Violation (VIO) 70-3098/2010-004-001)

- B. Condition 3.A of NRC Construction Authorization No. CAMOX-001, Rev. 2, dated June 12, 2008, authorizes, in part, the applicant to construct a plutonium processing and mixed oxide fuel fabrication plant, known as the MFFF located at the Department of Energy's Savannah River Site, in accordance with the statements, representations, and conditions of the MPQAP dated March 26, 2002, and supplements thereto (MPQAP, Rev. 9, Change 1, dated June 9, 2010).

MPQAP, Revision 9, Change 1, Section 15, Nonconforming Materials, Parts, or Components, Paragraph 15.2.3, Segregating Nonconforming Items, states, in part, that nonconforming items shall be segregated, when practical, by placing them in a clearly identified and designated hold area until properly dispositioned and if segregation is impractical or impossible, then other precautions shall be employed to preclude inadvertent use.

Contrary to the above, a nonconforming embed plate was not segregated by placing it in a designated holding area until properly dispositioned and other precautions were not employed to preclude inadvertent use. Specifically, following identification of a nonconforming condition on August 26, 2010, the embed plate was not properly segregated and on October 20, 2010, it was found installed on a wall form prior to the issue being properly dispositioned.

This is a Severity Level IV violation (Enforcement Policy 6.5.d) (VIO 70-3098/2010-004-002)

- C. Condition 3.C of NRC Construction Authorization No. CAMOX-001, Rev. 1, dated November 30, 2006, authorizes, in part, MOX Services to construct the facility in accordance with the design bases of the Principal Structures, Systems, and Components (PSSCs) described in the Construction Authorization Request (CAR).

The design basis for PSSCs described in Section 11.1.7 of the CAR states in part that welded connections are designed in accordance with American Institute of Steel Construction (AISC) N690, American Welding Society (AWS) D1.1, Structural Welding Code, and AWS D1.6, Structural Welding Code – Stainless Steel.

Condition 3.A of NRC Construction Authorization No. CAMOX-001, Rev. 1, dated November 30, 2006, authorizes, in part, the applicant to construct a plutonium processing and mixed oxide fuel fabrication plant, known as the MFFF located at the Department of Energy's Savannah River Site, in accordance with the statements, representations, and conditions of the MPQAP dated March 26, 2002, and supplements thereto (MPQAP, Rev. 5, dated June 20, 2007).

MPQAP, Rev. 5, Section 3, Design Control, states, in part, that measures are established in the MOX Services quality assurance (QA) procedures to assure that applicable requirements are correctly translated into design documents.

Contrary to the above, on December 6, 2007, MOX Services failed to ensure that applicable AWS code requirements were correctly translated into design documents. Specifically, the AWS D1.6-1999, Structural Welding Code for Stainless Steel, Section 7.3, requires a minimum yield strength of 35 thousand pounds per square inch (ksi) for stainless steel studs. Contrary to the AWS D1.6-1999 code, MOX Services' Design Specification DCS01-XGA-DS-TRD-B-09053-C, December 6, 2007, Technical Requirements Document for the Design of Concrete Embedments, specified a yield strength of 30 ksi to be used as the design basis for embed plates containing Nelson H4L stainless steel studs. In addition, Table 2-1 of DCS01-XGA-DS-TRD-B-09053-C also required the stainless steel Nelson H4L anchors to receive post-annealing, further reducing the yield strength to nearly 25 ksi. The post-annealed yield strength is lower than that specified in the specification and was used in design calculations.

This is a Severity Level IV violation (Enforcement Policy 6.5.d) (VIO 70-3098/2010-004-003)

- D. Condition 3.A of NRC Construction Authorization No. CAMOX-001, Rev. 1, dated November 30, 2006, authorizes, in part, the applicant to construct a plutonium processing and mixed oxide fuel fabrication plant, known as the MFFF located at the Department of Energy's Savannah River Site, in accordance with the statements, representations, and conditions of the MPQAP dated March 26, 2002, and supplements thereto (MPQAP, Rev. 4, dated December 15, 2005).

MPQAP, Rev. 4, Section 4, Procurement Document Control, states, in part, that the Duke Cogema Stone and Webster (DCS) QA Program described in this section and associated QA procedures implement the committed requirements of Criterion 4, Procurement Document Control of 10 CFR 50, Appendix B; and Basic Requirement 4 and Supplement 4S-1 of NQA-1-1994, Quality Assurance Requirements for Nuclear Facility Applications, Part 1, as revised by NQA-1a-1995 addenda; and Regulatory Guide 1.28, Quality Assurance Program Requirements (Design and Construction), Rev. 3.

Project Procedure (PP) 10-15, Rev. 1, Supplier/Subcontractor Requests, Section 3.2.4, Supplier/Subcontractor Request for Information (SRFI), states, in part, in the event a change is required as a result of the SRFI, the change shall be processed in accordance with PP10-10, Procurement Change Management.

PP10-10, Rev. 2, Procurement Change Management, Section 3.3.1, states, in part, that requests by the Supplier/Subcontractor to deviate from the procurement requirements shall be processed as follows: 3.3.1.1.B) The Subcontract administrator (SA) shall forward a copy of the request to the Responsible Requisitioning Group (RRG) Technical Representative for consideration. If the deviation is acceptable to Duke Cogema Stone & Webster (DCS), the Responsible Requisitioning Group (RRG) Technical Representative shall file a new purchase requisition in accordance with PP10-8, Requisitioning Items and Services, to incorporate the changes into the Purchase Order/Blanket Purchase Order.

Contrary to the above, MOX Services failed to change Purchase Order/Subcontract Number 10888-S1381 on February 19, 2007, after agreeing with the supplier's/contractor's request to deviate from material requirements. Specifically, on November 16, 2006, Specialty Maintenance and Construction, Inc. (SMCI) submitted SRFI 1381-0025 Rev. 0, to MOX Services requesting a material deviation from Purchase Order/Subcontract Number 10888-S1381. SMCI requested to use 316L Nelson Studs (H4L) as supplied by Nelson instead of post annealing the studs as required by Specification DCS01-BAA-DS-SPE-B-09352-0, Section 2.2.5.E, which was referenced in the procurement contract. On February 19, 2007, MOX Services concurred with SMCI's request to deviate from material requirements through SRFI 1381-0025., Rev. 1. Although MOX Services concurred with the material deviation, MOX Services failed to change the procurement contract as required by PP 10-15, Rev. 1.

This is a Severity Level IV violation (Enforcement Policy 6.5.d) (VIO 70-3098/2010-004-004)

- E. Condition 3.A of NRC Construction Authorization No. CAMOX-001, Rev. 2, dated June 12, 2008, authorizes, in part, the applicant to construct a plutonium processing and mixed oxide fuel fabrication plant, known as the MFFF located at the Department of Energy's Savannah River Site, in accordance with the statements, representations, and conditions of the MPQAP dated March 26, 2002, and supplements thereto (MPQAP, Rev. 9, Change 1, dated June 9, 2010).

MPQAP, Rev. 9, Change 1, Section 7, Control of Purchased Material, Equipment, and Services, subsection 7.2.6, Acceptance of Items or Services, states, in part, that methods are established with the Supplier/Subcontractor to verify that items or services comply with the procurement document (technical and quality) requirements.

Contrary to the above and prior to the August 23-27, 2010, MOX Services failed to verify that the stud welding of carbon steel studs to stainless steel embed plates performed by SMCI was in accordance with the applicable AWS code requirements as specified by Subcontract 10888-S13181. Specifically, AWS D1.1-1998, Structural Welding Code for Steel, Section 7.6.1(3), requires welding procedure qualification for carbon steel studs welded to other than Group I or II steels listed in Table 3.1. Contrary to this, SMCI welded carbon steel studs to stainless steel embed plates, where the stainless steel is not a Group I or II material listed in Table 3.1, without a qualified stud welding procedure.

This is a Severity Level IV violation (Enforcement Policy 6.5.d) (VIO 70-3098/2010-004-005)

Pursuant to the provisions of 10 CFR 2.201, Shaw AREVA MOX Services is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, Region II, and a copy to the NRC Resident Inspector at the Mixed Oxide Fuel Fabrication Facility construction project, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include: (1) the reason for the violation, or, if contested, the basis for disputing the violation, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. Your response may reference or include previously docketed correspondence if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an Order or Demand for Information may be issued as to why the authorization should not be modified, suspended, or revoked, or why such other actions as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001.

Because your response will be made available electronically for public inspection in the NRC Public Document Room (PDR), or from the NRC's document system (ADAMS), which is accessible from the NRC web site at <http://www.nrc.fob/reading-rm/adams.html>, to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld, and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21. In accordance with 10 CRR 19.11, you may be required to post this Notice within two working days.

Dated at Atlanta, Georgia this 10th day of February 2011.

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 70-3098

Construction Authorization No.: CAMOX-001

Report No.: 70-3098/2010-004

Applicant: Shaw AREVA MOX Services

Location: Savannah River Site
Aiken, South Carolina

Inspection Dates: October 1 – December 31, 2010

Inspectors: M. Shannon, Senior Resident Inspector, Construction Projects Branch 1 (CPB1), Division of Construction Projects (DCP), Region II (RII)
B. Adkins, Resident Inspector, CPB1, DCP, RII
A. Artayet, Senior Construction Inspector, Construction Inspection Branch 3, Division of Construction Inspection (DCI), RII
B. Davis, Senior Construction Inspector, Construction Inspection Branch 2 (CIB2), DCI, RII
J. Lizardi, Construction Inspector, CIB2, DCI, RII
M. Sheikh, (Lead) Senior Construction Project Inspector, Construction Inspection Branch 4, DCP, RII
S. Atack, Quality Assurance Engineer, Mixed Oxide and Uranium Deconversion Branch (MOUDB), Fuel Cycle Safety and Safeguards (FCSS), Nuclear Materials Safety and Safeguards (NMSS)
D. Edwards, Construction Project Inspector, CPB1, DCP, RII
W. Gloersen, Senior Construction Project Inspector, CPB1, DCP, RII

Accompanying Personnel: D. Wright, Construction Project Inspector (trainee), Construction Projects Branch 2 (CPB2)
S. Soto, Chemical Engineer (trainee), MOUDB, FCSS, NMSS
R. Brien, Center for Nuclear Waste and Regulatory Analysis
R. Jackson, Acting Branch Chief, CIB2, DCI
J. Kent, Construction Inspector (trainee), Construction Inspection Branch 1
D. Seymour, Branch Chief, CPB1, DCP
J. Moorman, Deputy Division Director, DCP

Approved by: D. Seymour, Branch Chief, CPB1, DCP

EXECUTIVE SUMMARY

Shaw AREVA MOX Services
Mixed Oxide (MOX) Fuel Fabrication Facility (MFFF)
NRC Inspection Report No. 70-3098/2010-004

Routine inspections were conducted by the resident inspectors from October 1 – December 31, 2010, and by regional specialists from October 4 – 6, 2010, November 1-5, 2010, and December 13 – 17, 2010. The inspections involved the observation and evaluation of the applicant's programs for facility construction of principal structures, systems, and components (PSSCs) and included quality assurance (QA) activities related to design and document control; structural concrete activities; program development and implementation; control of materials; inspection, test control and control of measuring equipment; Title 10 of the Code of Federal Regulations (CFR) Part 21 inspection – facility construction; supplier/vendor inspection – construction phase; inspection of safety function interfaces, piping systems relied on for safety; piping installation; piping supports and restraints; nuclear welding general inspection; mechanical components, and control of the electronic management of data. Inspection activities also focused on follow-up of previously identified items.

The inspections discussed in this inspection report include: PSSC-009 (Criticality Control); PSSC-010 (Double Walled Pipe); PSSC-024 (Gloveboxes); and PSSC-036 (MOX Fuel Fabrication Building Structure (including vent stack)).

The scope of the inspections encompassed a review of various MFFF activities related to Quality Level (QL)-1 construction for conformance to NRC regulations, the Construction Authorization Request (CAR), the MOX Project Quality Assurance Plan (MPQAP), and applicable industry standards. This included, as applicable, quality assurance programs, material procurement, material storage, 10 CFR Part 21 compliance, electronic data management control, safety function interface control, structural concrete, process tank installation, pipe installation, pipe support fabrication, welding, inspection, testing, and design control. The inspections also focused on Shaw AREVA MOX Services' (MOX Services') oversight of subcontractor activities. The inspectors reviewed applicable portions of MOX Services' program to assess the adequacy of the program and whether it was effectively implemented. The inspections identified the following aspects of the applicant's programs as outlined below.

Resident Inspection Program for On-Site Construction Activities (Inspection Procedure (IP) 88130)

Except for the improper installation of an embed plate noted in Section 6.a of this report, construction activities related to PSSC-009, PSSC-010, PSSC-024, PSSC-036, and PSSC-053 as described in Table 5.6-1 of the MFFF CAR were adequately performed and included installations of embedded plates and ground cables, heavy lifts of equipment and supplies, verification of equipment placements by surveys, rebar installation, placement of concrete, welding, non-destructive testing, installation and fabrication of gloveboxes, installation of tanks, and receipt of materials. These construction activities were performed in a safe and quality related manner and in accordance with procedures and work packages. No findings of significance were identified. (Section 2).

Design and Document Control (IP 88107)

Resident Inspector Review of Premiere Technology, Inc. (Annular Tanks)

Violation (VIO) 70-3098/2010-004-001 was identified for failure to ensure that design changes were governed by control measures commensurate with those applied to the original design (PSSC-009, 010) (Section 3.a).

Region Based Programmatic Review of Design and Document Control

Except for the design control problem noted in Section 15.a of this report, design and document control, documentation, and engineering activities were performed in accordance with the MPQAP and implementing procedures. No findings of significance were identified (Section 3.b).

Structural Concrete Activities (IP 88132)

Resident Inspector Review of Structural Concrete Activities

Except for the improper installation of an embed plate noted in Section 6.a of this report, the inspectors concluded that embedded plates were properly installed, rebar was properly installed, concrete testing activities were adequate, field preparation of concrete test cylinders and temporary storage of the cylinders was acceptable. In addition, no issues were identified concerning the field testing (slump, temperature, and air entrainment) of concrete. Concrete testing to date indicated that the concrete placed at the MFFF meets design strength requirements. No findings of significance were identified (PSSC-036) (Section 4.a).

Region Based Review of Epoxy Qualification

Non-Cited Violation (NCV) 70-3098-2010-004-006 was identified for failure to specify and/or perform the necessary inspection and/or testing to verify that the epoxy adhesive gel, used for installing steel reinforcing bars in hardened concrete, met the requirements of American Society of Testing and Materials (ASTM) C881, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete (PSSC-036) (Section 4.b).

Region Based Civil Review of Structural Concrete Activities

Construction activities related to PSSC-036 as described in Table 5.6-1 of the Mixed Oxide Fuel Fabrication Facility Construction Authorization Request were adequately performed. Structural concrete procedures and specifications were adequate and properly implemented in the field. No items of safety significance were identified (Section 4.c).

Quality Assurance: Program Development and Implementation (IP 88106)

The applicant's QA program pertaining to the organizational structure, functional responsibilities, delegation of authority and programmatic interfaces for the various functional areas was established, and adequately implemented in accordance with the MPQAP. No findings of significance were identified (Section 5).

Quality Assurance: Control of Materials, Equipment, and Services (IP 88108)**Resident Inspector Review of Control of Materials, Equipment, and Services**

VIO 70-3098/2010-004-002 was identified for failure to properly segregate a non-conforming embed plate (PSSC-036) (Section 6.a).

Region Based Programmatic Review of Control of Materials, Equipment, and Services

Except for the improper segregation of a non-conforming embed plate noted in Section 6.a of this report, the applicant maintained adequate control of materials, equipment and services related to the QL-1 items for the MFFF and implemented proper handling, storage and control of QL-1 equipment and material in its possession and installed at the MFFF. Activities reviewed by the inspectors for the acceptance and control of purchased items and services determined that applicable requirements were met. Control of materials, equipment and services were adequately performed in accordance with procedures and the MPQAP. No findings of significance were identified (Section 6.b).

Quality Assurance: Inspection, Test Control, and Control of Measuring Equipment (IP 88109)**Resident Inspector Review of Premiere Technology, Inc. (Annular Tanks)**

The applicant adequately performed activities related to inspection, test control, and control of measuring equipment for annular tanks (PSSC-009). No findings of significance were identified (Section 7.a).

Region Based Programmatic Review of Inspection, Test Control, and Control of Measuring Equipment

The applicant had adequately implemented established procedures and program activities associated with inspection, test control and control of measuring and test equipment (M&TE). Field activities were observed and documents were reviewed to ensure activities and procedures conformed to technical and quality requirements. Documents reviewed included M&TE procedures, a sample of certificates of calibration, nonconformance reports (NCRs) related to M&TE, and surveillance reports. No findings of significance were identified (Section 7.b).

10 CFR Part 21, Inspection Facility Construction (IP 88111)

The applicant had adequately implemented established procedures and program activities associated with the requirements of 10 CFR Part 21. MOX services project procedures adequately implemented the provisions of the MPQAP for 10 CFR Part 21, with regard to postings, identifying its applicability in procurement documents, identifying deviations, and identifying reporting requirements. No findings of significance were identified (Section 8).

Supplier/Vendor Inspection (Construction Phase) (IP 88115)

The applicant adequately specified the required regulatory, technical, and quality assurance requirements in the procurement documents between MOX Services and the annular tank vendor (PSSC-009). No findings of significance were identified (Section 9.a).

Inspection of Safety Function Interfaces for the Mixed Oxide Fuel Fabrication Facility (IP 88116)

The applicant had established a program and procedures for control of safety function interfaces associated with selected components in the areas of integrated safety, design, procurement, and quality assurance controls in accordance with the applicant's MPQAP. The applicant established and implemented appropriate management measures to verify the effectiveness of the safety function interfaces. No findings of significance were identified (Section 10).

Piping Systems Relied on for Safety (IP 88134), Pipe Supports and Restraints (IP 88143), and Nuclear Welding General Inspection Procedure (IP 55050)

For the samples chosen, all welding related activities associated with pipe supports and small bore tubing for use in the aqueous polishing area was acceptable. No findings of significance were identified (PSSC-010) (Section 11).

Mechanical Components (IP 88136)

Inspectors verified that annular tanks and associated components were procured, installed, and tested in accordance with the applicable regulatory, technical, and quality assurance requirements. No findings of significance were identified (PSSC-009) (Section 12).

Control of the Electronic Management of Data (IP 88113)

Inspectors verified that electronic data was properly controlled in accordance with the MPQAP. No findings of significance were identified (Section 13).

Problem identification, Resolution and Corrective Action (IP 88110)

The applicant had established a program and procedures that adequately implemented the corrective action program in accordance with the applicant's MPQAP. No findings of significance were identified (Section 14).

Follow-up of Previously Identified Items (IP 88131, 88133)

(Closed) URI 70-3098/2010-003-001: Review of Calculations Related to Design Specification for Concrete Embedments, was closed and dispositioned as violation 70-3098/2010-004-003: Failure to Accurately Translate Applicable Design Requirements into Design Documents (Section 15.a)

(Closed) URI 70-3098/2010-003-002: Design Control Review Related to Metal Fabrications Specifications, was closed based on the applicants corrective actions documented in Condition Report 10888-MOX-CR-10-458 (Section 15.b).

(Closed) URI 70-3098/2010-003-003: Corrective Actions Related to Concrete Embed Plate Procurement, was closed and dispositioned as violation 70-3098-2010-2004-004: Failure to Maintain Accurate Procurement Documents (Section 15.c).

(Closed) URI 70-3098/2010-003-004: Review of Stud Weld Procedure Qualification, was closed and dispositioned as violation 70-3098-2010-2004-005: Failure to Ensure Supplier Services were in Accordance with Procurement Requirements (Section 15.d).

(Closed) URI 70-3098/2010-003-005: Review of Potential Non-Conforming Stud Welds, was closed based on the applicant's adequate corrective actions documented in NCR QC-10-2310 (Section 15.e).

(Reviewed) IFI 70-3098/2010-003-010: Review of Final Evaluation of Anomalous Concrete Area Detected by Non-destructive Examination, will remain open. At the time of the inspection, the applicant was in the process of reviewing the anomalous concrete area. Further review will be conducted in future inspections after the applicant completes their evaluation (Section 15.f).

REPORT DETAILS

1. Summary of Facility Status

During the period, the applicant continued construction activities of principle structures systems, and components (PSSCs). Construction activities continued related to Release 2, 3A and 3B activities which included multiple inside and outside walls, elevated floors, and roof of the Mixed Oxide (MOX) Process Building (BMP), Aqueous Polishing Building (BAP), and the Shipping Receiving Building (BSR). The Mixed Oxide Fuel Fabrication Facility (MFFF) project continued installation of Quality Level (QL) QL-1 tanks during this inspection period. Approximately 38 tanks have been installed to date. Thirty-five tanks are presently stored in the Process Assembly Facility. The applicant has also started application of coatings on the walls and ceilings of the BMP and BAP lower level rooms and hallways. Other construction activities included installation of process piping and supports in the BAP and installation of ventilation system ductwork and supports in the BAP and BMP.

2. Resident Inspection Program for On-Site Construction Activities (Inspection Procedure (IP) 88130)

a. Routine Inspection Activities

(1) Scope and Observations

During the inspection period, the inspectors observed the following activities associated with PSSC-036 (MOX Fuel Fabrication Building Structure (MFFBS) (including vent stack)), PSSC-009 (Criticality Control); PSSC-010 (Double-walled pipes); and PSSC-024 (Gloveboxes) as described in Table 5.6-1 of the MFFF Construction Authorization Request (CAR):

- (a) Installation of structural reinforcing steel in the BMP, the BAP, and BSR;
- (b) Installation of embedded piping, embedded support plates, and plant grounding system in all three buildings;
- (c) Concrete placements in walls and floors of the BSR, BAP, and BMP and placement of the first roof section of the BMP;
- (d) Operation of the concrete batch plant;
- (e) Receipt of cement, fly ash, sand and gravel;
- (f) Concrete testing in the field (slump, air entrainment, and temperature);
- (g) Installation of building grounding cables in various floors and walls;
- (h) Surveys (proper positioning/location) of embedded piping and embedded plates;
- (i) Cleanliness of areas prior to concrete placement, and maintenance of cleanliness during the concrete placements;
- (j) Lifting and installation of QL-1 tanks;
- (k) Installation of coatings in the BAP and BMP;
- (l) Assembly of gloveboxes and associated equipment in the assembly building;
- (m) Installation of process piping and supports in the BAP;
- (n) Installation of ventilation system supports in the BAP and BMP.

The inspectors observed routine lifts conducted to position reinforcing steel and embedded plates; installation and removal of concrete retaining walls; and movement of equipment such as generators, pumps, temporary lighting, and toolboxes. The lifts were conducted in accordance with the applicant's procedures. The inspectors reviewed the applicable sections of MOX Project Quality Assurance Plan (MPQAP) and verified that installations of the structural reinforcing steel, embedded plates, embedded piping, and electrical grounding of the MFFF structures were in accordance with Quality Assurance (QA) programmatic requirements. Specifically, the inspectors verified that installations were in accordance with applicable field drawings and met the general construction notes detailed on the following drawings: (1) MFFF, Concrete and Reinforcing General Notes, DCS01-01352, Revision (Rev.) 9 (Sheet 1 of 2); and (2) MFFF, Concrete and Reinforcing General Notes and Tolerance Details, DCS-01352, Rev. 6 (Sheet 2 of 3) and Rev. 0 (Sheet 3 of 3).

The inspectors routinely attended the applicant's construction plan-of-the-day meetings and civil engineering meetings. The inspectors routinely held discussions with Shaw AREVA MOX Services' (MOX Services) civil engineers, field engineers, quality control/assurance personnel, batch plant personnel, steel workers, and Alberici Construction personnel in order to maintain current knowledge of construction activities and any problems or concerns.

The inspectors routinely reviewed the status of work packages maintained at various work sites. The inspectors monitored the status of work package completion to verify construction personnel obtained proper authorizations to start work, monitor progress and to ensure work packages were kept up-to-date as tasks were completed.

The inspectors routinely verified that adequate staffing was available for construction activities, changing weather conditions were taken into account for planned construction activities, and construction activities were conducted in a safe manner. The inspectors also observed proper communication in the work areas, observed that the work force was attentive, workers adhered to procedures, observed proper communication between supervisors and workers, noted adequate cleanliness of the construction areas, and noted that hazardous materials were properly stored and/or properly controlled when in the field.

The inspectors routinely reviewed various corrective action documents. The review included non-conformance reports (NCRs), condition reports (CRs), root causes and supplier deficiency reports (SDRs); and reviewed the closure of selected NCRs and CRs. The inspectors concluded that the applicant was appropriately identifying conditions adverse to quality in their corrective action system. The applicant identified these items during routine daily activities, special inspections, audits, and self assessments. The applicant routinely evaluated the significance of the adverse conditions, completed corrective actions in a timely manner, and properly evaluated adverse conditions for applicable reporting requirements. The inspectors noted that the applicant entered issues identified during self assessments into the corrective action system.

(2) Conclusions

Except for the improper installation of an embed plate noted in Section 6.a of this report, construction activities related to PSSC-009, PSSC-010, PSSC-024, and PSSC-036 as

described in Table 5.6-1 of the MFFF CAR were adequately performed and included installations of embedded plates and ground cables, heavy lifts of equipment and supplies, verification of equipment placements by surveys, rebar installation, placement of concrete, welding, non-destructive testing, installation of tanks, assembly of gloveboxes and receipt of materials. These construction activities were performed in a safe and quality related manner and in accordance with procedures and work packages. No findings of significance were identified.

3. Design and Document Control (IP 88107)

a. Resident Inspector Review of Premiere Technology, Inc. (Annular Tanks) (PSSC-009)

(1) Scope and Observations

The inspectors reviewed the Premiere Technology, Inc. (PTI) design control procedure for compliance with American Society of Mechanical Engineers (ASME) NQA-1-1994, Quality Assurance Requirements for Nuclear Facility Applications (NQA-1) requirements regarding design control. The inspectors reviewed DCS01-KKJ-DS-SPE-L-16264-4, Procurement Specification for Annular Tanks, including requirements for quality assurance, design, materials, fabrication, inspection, testing, and delivery. The inspectors reviewed DCS01-KCD-CG-PLG-L-06446-3, Equipment Data Sheet Annular Tank KCD TK1000 Assembly, to determine the design requirements for pressure, temperature, materials, dimensions, configuration, fluid transport system (FTS) category, code requirements, and interfaces/connections. The inspectors reviewed the PTI detailed design drawings showing the KCD-TK1000 vessel assembly and details to determine if PTI's design process adequately translated the design inputs into plant design, fabrication, testing, inspection, and examination requirements. The inspectors reviewed the procurement specification, purchase order and subcontract between MOX Services and PTI to ensure the documents contained adequate technical and quality assurance requirements. In the area of design analysis, the inspectors verified that the ANSYS and MathCad software used by PTI and its sub-vendors met quality assurance requirements for software design control. The inspectors verified that the vendors selected to perform design analysis were on the PTI Approved Suppliers List (ASL) for engineering services.

The inspectors reviewed a sampling of design deliverables to ensure that PTI followed design control process requirements including the drawing approval process and design verification. The inspectors reviewed the fissile thickness measurement data for KCD-TK1000 and noted that the manufacturer was unable to meet the fissile thickness fabrication tolerances identified on DCS01-KCD-CG-PLG-L-06446-3, Equipment Data Sheet Annular Tank KCD TK1000 Assembly. This nonconformance was documented in NCR 10-066-R3. The inspectors reviewed this NCR including the "use as is" disposition. The inspectors noted in the NCR that the MOX Services Nuclear Criticality Safety Group performed a technical evaluation to justify the increase in the fissile thickness for KCD-TK1000; however, the inspectors determined that MOX Services failed to revise the input specifications to reflect the "use as is" disposition as required by the MPQAP. Specifically, the applicant failed to revise the specifying input documents to document that a portion of the tank wall thickness must remain intact to stay within the assumptions of the criticality analysis. The inspectors noted that there was no requirement to maintain a certain tank wall thickness for prevention of a criticality. The inspectors also determined that the PTI NCR 10-066-R3 was not posted against the

MOX Services design input documents (Equipment Data Sheet or Criticality Calculation) or the detailed design drawings developed by PTI for KCD-TK1000.

Section 3.1, General, of the MOX MPQAP requires, in part, that design changes are governed by control measures commensurate with those applied to the original design. Section 15.2.4, Disposition of Nonconforming Items, of the MPQAP requires MOX Services to invoke design control measures commensurate with those applied to the original design for non-conforming conditions that are dispositioned as “use as is” or “repair.” This section also states, in part, that if changes to the specifying document are required to reflect the as-built condition, the disposition shall require action to change the specifying document to reflect the accepted nonconformance.

Contrary to the above, as noted in NCR 10-066-R3, MOX Services approved a “use as is” disposition to increase the allowable fissile thickness for KCD-TK1000 from 63.5 millimeters (mm) to 75.99 mm without changing the specifying design input documents to reflect the accepted nonconformance. Specifically, MOX Services failed to revise the specifying documents or post the “use as is” NCR against the specifying documents to reflect the “as-built” condition of the tank. Failure to meet MPQAP requirements to ensure that design changes are governed by control measures commensurate with those applied to the original design is considered to be a violation and is identified as VIO 70-3098/2010-004-001: Failure to Ensure That Design Changes Were Governed by Control Measures Commensurate with Those Applied to the Original Design. This issue was entered into MOX Service’s corrective action program as 10888-MOX-CR-10-662.

(2) Conclusions

VIO 70-3098/2010-004-001 was identified for failure to ensure that design changes were governed by control measures commensurate with those applied to the original design.

b. Region Based Programmatic Review of Design and Document Control

(1) Scope and Observations

This inspection was conducted to verify that design and document control measures were implemented in accordance with the MPQAP. This was accomplished through document review and discussions with MOX personnel. The inspectors reviewed project procedures (PP) 9-21, Engineering Change Request, and PP3-5, Control of Non-Conforming Items. The inspectors sampled engineering change requests (ECRs) and NCRs, and the design documents related to these records to verify adequate disposition and engineering evaluations, and to verify the adequacy of the documentation of ECRs and NCRs.

The inspectors verified that QA records produced as required by PP9-21, were received, classified and processed in accordance with the procedure and the MQPAP. The inspectors reviewed the basis of design documents, the system design descriptions, design drawings and procurement specifications, as applicable, to determine if the documents included the appropriate licensing and QA requirements. The inspectors verified that the design documents incorporated applicable design basis requirements and that documents were prepared, verified, approved, and controlled in accordance with the MPQAP. Additionally, the inspectors verified that changes to the documents had been controlled in a manner equivalent to the original design.

Inspectors reviewed PP7-4, Document Control, which identified the requirements for the identification, distribution, and maintenance of controlled documents. The inspectors verified that MOX maintained a list of controlled documents, the MPQAP and the Regulatory Management Plan (RMP). The inspectors verified that controlled documents were identified by revision level and included a comprehensive description of changes made under each revision as required by the procedure.

PP1-2, Preparation of Project Procedures, described the requirements for the preparation, review, approval, issuance, revision, and cancellation of MOX Services procedures and guidance documents. The inspectors examined a sample of controlled documents and verified that (1) the document identifier and current revision number were identified on each page of the document; (2) documents specifying QA requirements were clearly marked as QA documents and were approved by the QA Organization; and (3) each document clearly identified the document preparer and the associated organization responsible for the document, as required by PP1-2. Although the inspectors observed a wide degree of variance in the implementation of Interim Change Notices (ICNs) (such as in the level of detail of ICN content or the length of changes made via ICNs), the inspectors found that ICNs and procedures met the document control requirements identified in PP1-2.

PP9-8, Technical Documents, defined the requirements for content, preparation, review, design verification, approval, certification, revision and control of technical documents such as calculations, basis of design documents, system description documents, and specifications. The inspectors reviewed a sample of technical documents and verified that the documents met the document control requirements identified in PP9-8.

PP3-4, Records Management, identified the requirements for records management, including submittal, receipt, processing, retention, maintenance, and storage. The inspectors verified that records: (1) were not maintained in temporary storage for a period of greater than 30 days; (2) were stored in Underwriters Laboratory (UL) certified cabinets having a fire rating of at least one hour; and (3) for media not suitable for entry into Electronic Data Management System (EDMS) such as radiographic films, were maintained as permanent records in two hour UL certified fire rated cabinets, as required by the procedure. The inspectors reviewed a sample of archive logs and verified that the nightly and weekly required backups of EDMS data were performed and recorded on the log and that the MOX Information Technology (IT) Manager had reviewed the log on a weekly basis in accordance with PP3-4.

(2) Conclusion

Except for the design control problem noted in Section 15.a., design and document control, documentation, and engineering activities were performed in accordance with the MPQAP and implementing procedures. No findings of significance were identified.

4. **Structural Concrete Activities (IP 88132)**

a. Resident Inspector Review of Concrete Placement Activities (PSSC-036)

(1) Scope and Observations

The inspectors evaluated the adequacy of ongoing concrete activities conducted by Alberici, Soil and Materials Engineers, Inc. (S&ME), and MOX Services. The inspection of these activities focused on reinforcing steel bar installation, formwork preparation, pre-placement testing, and placement procedures associated with QL-1 concrete construction of the MFFBS. Table 5.6-1 of the CAR specifies the MFFBS as PSSC-036.

The inspectors observed various activities prior to and during each major concrete placement. Prior to selected placements, the inspectors selectively checked for proper placement of reinforcing steel, including proper lap splices, supports, and bar spacing, alignment, and proper clear cover. The inspectors selectively checked for proper embed plate placement by observing ongoing surveys, and verified embed plate support structures were properly restrained; observed placement of embedded piping, installation of piping supports, mounting of piping to supports, installation of galvanic sleeves between piping and supports; and verified cleanliness of the placement area.

The inspectors observed the installation of the grounding system for the reinforcing steel including embedded grounding posts for future equipment installation. During the placements, the inspectors observed proper lift heights and observed MOX Services' field engineers and quality control (QC) personnel performing inspections of the reinforcing steel, embed plates, embed piping, cleanliness prior to placements, and detailed observations of the placements.

The inspectors observed that concrete samples were collected at the prescribed frequency and noted that the slump and air content met the acceptance criteria or were appropriately dispositioned with NCRs, and that the concrete test cylinders were collected and temporarily stored per procedure prior to transport to S&ME for curing and later testing. Batch plant operators correctly implemented procedural requirements and were in constant communication with the concrete placement crews. The inspectors visited S&ME where they performed direct observation of cylinder break tests.

The following list is a summary of the reviewed concrete placement activities:

September 16, 2010, BMP-W 219, BMP Interior Wall, 68 cubic yards
 September 24, 2010, BMP Gabion Wall 005, 87 cubic yards
 September 24, 2010, BSR-F201, BSR Elevated Floor, 182 cubic yards
 September 30, 2010, BAP-W201.1, BAP Interior Wall, 259 cubic yards
 September 30, 2010, BMP-W210.1, BMP Interior Wall, 185 cubic yards
 October 5, 2010, BSR-W208.1, BSR Interior Wall, 155 cubic yards
 October 7, 2010, BMP Gabion Wall 002, 88 cubic yards
 October 8, 2010, BMP -W315.2, BMP Interior Wall, 226 cubic yards
 October 14, 2010, BMP Gabion Wall 006.1, 60 cubic yards
 October 20, 2010, BSR-W206.1, BSR Interior Wall, 79 cubic yards
 October 22, 2010, BMP-W221.3, BMP Interior Wall, 250 cubic yards
 October 23, 2010, BSR-W207.2, BSR Interior Wall, 180 cubic yards
 October 29, 2010, BMP Gabion Wall 004, 130 cubic yards

October 29, 2010, BMP-W316.1, BMP Interior Wall, 23 cubic yards
 November 3, 2010, BMP-W222.1/220.3, BMP Interior Wall, 202 cubic yards
 November 4, 2010, BMP-W316A.1, BMP Interior Wall, 28 cubic yards
 November 9, 2010, BAP-W111.4, BAP Interior Wall, 210 cubic yards
 November 11, 2010, BAP-F205, BAP Elevated Floor, 155 cubic yards
 November 11, 2010, BMP Gabion Wall 009.1, 95 cubic yards
 November 18, 2010, BSR-W208.1, BSR Interior Wall, 225 cubic yards
 November 20, 2010, BMP-W221.1 BMP Interior Wall, 100 cubic yards
 December 2, 2010, BMP-W316.2, BMP Interior Wall, 34 cubic yards
 December 2, 2010, BMP-W313.4, BMP Interior Wall, 34 cubic yards
 December 8, 2010, BMP Gabion Wall 006/007, 170 cubic yards
 December 9, 2010, BMP-R4.1 1st Lift, BMP Roof, 226 cubic yards
 December 10, 2010, BAP-W203/204.1, BAP Interior Wall, 231 cubic yards
 December 16, 2010, BAP-W107B, BAP Interior Wall, 68 cubic yards
 December 16, 2010, BSR-W208.1, BSR Interior Wall, 48 cubic yards

The inspectors performed various reviews for the above placements, which included walk downs with the field engineers, walk downs with QC personnel, verification of reinforcing bar (rebar) by use of field drawings, work package reviews and routinely performed walk downs of the area to verify adequate cleanliness prior to concrete placement.

(2) Conclusions

Except for the improper installation of an embed plate noted in Section 6.a of this report, the inspectors concluded that embedded plates were properly installed, rebar was properly installed, concrete testing activities were adequate, field preparation of concrete test cylinders and temporary storage of the cylinders was acceptable. In addition, no issues were identified concerning the field testing (slump, temperature, and air entrainment) of concrete. Concrete testing to date indicated that the concrete placed at the MFFF meets design strength requirements. No items of safety significance were identified.

b. Region Based Review of Epoxy Qualification (PSSC-036)

(1) Scope and Observations

This portion of the inspection was conducted to review the applicant's use of epoxy gel for installing reinforcing bars in hardened concrete. The review was performed by NRC regional inspectors and resident inspectors. The inspectors interviewed MOX Services personnel to verify that the necessary tests and/or inspections for verification of critical characteristics were appropriately performed. The inspectors reviewed PP9-18, Commercial Grade Item Evaluations, Rev. 4, to determine whether MOX Services adequately implemented a Commercial Grade Dedication for the epoxy adhesive gel.

The inspectors reviewed MOX Services Construction Specification DCS01-BKA-DS-SPE-B-09339-5, Placing Concrete and Reinforcing Steel for Quality Level 1, 2, 3, and 4, to determine whether the technical basis developed by MOX Services was adequate to provide reasonable assurance that the material will be capable of performing its intended safety function. During a review of NCR AC-10-2254 concerning a missing beam pocket, the inspectors questioned the applicant regarding the qualification of the epoxy

adhesive used for post installed rebar. Based on discussions with the applicant and a review of the epoxy commercial grade dedication plan, the inspectors concluded that MOX Services failed to specify and/or perform the necessary inspection and/or testing to verify that the epoxy adhesive gel, used for installing steel reinforcing bars in hardened concrete, met the requirements of American Society of Testing and Materials (ASTM) C881, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete. Specifically, MOX Services failed to adequately verify that the physical properties, including bond strength and tensile strength, were in accordance with the ASTM C881 Standard along with other requirements. The commercial grade dedication for the epoxy adhesive gel only addressed compressive strength tests.

The inspectors were subsequently informed by MOX Services that the epoxy issue was previously identified in CR-10-513. The inspectors reviewed the CR including the description of the condition and associated corrective actions. With regards to the corrective actions, the condition report placed (1) a hold on all procurements or material release of the epoxy until all issues related to the use of the material were resolved; (2) required a revision to the commercial grade dedication plan (DCS01-WWJ-DS-CGD-M-65828) to add additional critical characteristics related to physical properties and tensile strength; (3) revised specification DCS01-BKA-DS-SPE-B-09330 to include limitations and requirements for use; (4) identified specific locations and conditions where the epoxy was used on post installed rebar; and (5) evaluated and provided adequate technical justification for the installed conditions. The inspectors concluded that MOX Services has developed adequate corrective actions to (1) prevent recurrence and (2) evaluate the extent of condition. This non-repetitive, licensee-identified and corrected violation is being treated as a non-cited violation (NCV), consistent with Section 2.3.2 of the NRC Enforcement Policy. The NCV is identified as NCV 70-3098/2010-004-006: Failure to Verify That Epoxy Adhesive Meets ASTM C881 Requirements.

(2) Conclusion

One finding of significance was identified and is documented as NCV 70-3098/2010-004-006: Failure to Verify That Epoxy Adhesive Meets ASTM C881 Requirements. This violation was identified due to the failure to specify and/or perform the necessary inspection and/or testing to verify that the epoxy adhesive gel, used for installing steel reinforcing bars in hardened concrete, meets the requirements of ASTM C881, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.

c. Region Based Civil Review of Concrete Placement Activities (PSSC-036)

(1) Scope and Observations

This portion of the inspection focused on the structural concrete activities associated with safety related construction of PSSC-036. The purpose of the inspection was to determine if work and inspection performance related to the QL-1 structural concrete construction activities were accomplished in accordance with design specifications, drawings, procedures, and regulatory requirements. The inspection focused on reinforcing steel installation, concrete pre-placement preparation, and post-placement procedures.

The inspectors observed concrete pre-placement activities for the BAP-F206 slab and BAP W107B wall on December 14 and December 15, 2010, respectively. For these

selected placements, the inspectors randomly checked for proper placement of reinforcing bars and embed plates, including proper lap splices, supports, and bar spacing and alignment. The inspectors verified cleanliness of the placement area, and observed placement of embedded piping. The inspectors observed MOX Services field engineers and QC personnel performing inspections of the reinforcing bars, embed plates, embed piping, cleanliness prior to placements, and detailed observations of the placements.

The inspectors also observed concrete post-placement activities, including concrete curing, for BMP-R4. PP 11-12, Placement of Concrete, Embedded Structural Items and Accessories, and DSC01-BKA-DS-SPE-B-09330-4, Section 03301, Placing Concrete and Reinforcing Steel for Quality Level 1, 2, 3, and 4, Rev. 4, were reviewed to determine if provisions for cold weather concreting were incorporated.

(2) Conclusion

The inspectors concluded that observed reinforcing bars were properly installed, and cleanliness was adequate. Concrete post-placement activities were found to be appropriate. No findings of significance were identified (PSSC-036).

5. Quality Assurance: Program Development and Implementation (IP 88106)

a. Scope and Observations

The inspectors reviewed program documentation which adequately described the MFFF organization, roles, and responsibilities. Procedures and design documents indicated consistent quality assurance categorization of systems, structures, components (SCCs) and identification of quality levels. The applicant applied QA grading to QL-2 commercial items. QA training records adequately supported qualification of personnel performing activities affecting quality. Assessments and audits adequately evaluated implementation of the QA program and administrative controls. Based on the samples reviewed, the applicant developed, maintained, and implemented an adequate QA program at the MFFF in accordance with the approved MPQAP.

b. Conclusion

The applicant's QA program pertaining to the organizational structure, functional responsibilities, delegation of authority and programmatic interfaces for the various functional areas was established, and adequately implemented in accordance with the MPQAP. No findings of significance were identified.

6. Quality Assurance: Control of Materials, Equipment, and Services (IP 88108)

a. Resident Inspector Review - Failure to Segregate Non-Conforming Material (PSSC-036)

(1) Scope and Observations

During the week of August 23, 2010, inspectors identified potential defective Nelson stud welds on an embed plate in a MOX laydown area. NCR QC-10-2310 was written to resolve this issue and the plate with the potentially defective welds was tagged with a non-conforming material tag. Subsequently, engineering provided guidance for bend

testing the suspect welded studs (as required by welding code requirements). On October 18, 2010, the inspectors were following up on this issue and noted that the embed plate in question could not be found. On October 20, 2010, the inspectors along with field engineering located the embed plate. It had been installed on a wall form for a future concrete placement in the BAP. The embed plate was removed from the form and placed in a segregation area designated for non-conforming material.

ASME NQA-1, Basic Requirement 15, Control of Nonconforming Items, Section 3a, and MPQAP, Section 15, Nonconforming Materials, Parts, or Components, paragraph 15.2.3 both require that nonconforming items shall be segregated, when practical, by placing them in a clearly identified and designated hold area until properly dispositioned. In addition, both documents state that when segregation is impractical, other precautions shall be employed to prevent inadvertent use. The failure to segregate the nonconforming embed plate to prevent its inadvertent use is considered to be a violation of ASME NQA-1 and the MPQAP requirements and is identified as VIO 70-3098/2010-004-002: Failure to Segregate Non Conforming Material. This issue was entered into MOX Service's corrective action program on October 20, 2010, as MOX CR-10-577.

(2) Conclusion

VIO 70-3098/2010-004-002 was identified for failure to properly segregate a non-conforming embed plate.

b. Region Based Programmatic Review of Control of Materials, Equipment, and Services

(1) Scope and Observations

The inspectors reviewed the MPQAP implementing procedures PP10-00, Integrated Procurement Process of Material Management Overview, PP3-12, Supplier Evaluation, and PP3-5, Control of Non-Conforming Items to verify procurement controls were established to assure purchased materials and services conformed to technical and quality requirement, and that measures were established to prevent inadvertent use of nonconforming items. The inspectors examined records of audit activities and a sample of suppliers' deficiency reports; reviewed procurement records, NCRs, and hold point records; and interviewed responsible engineering and procurement personnel.

The inspectors found purchase order packages outlined the technical and quality requirements for purchases of materials and services. Records of audit plans, audit reports, and survey reports indicated that supplier activities and programs conformed to applicable requirements. The inspectors found that restrictions were imposed to address supplier deficiency reports, and NCRs were issued to control the dispositions of nonconforming items received at the applicant's facility.

Inspectors reviewed MOX's handling, storage, and shipping procedures. Specifically, inspectors reviewed PP11-24, Shipping and Receiving Material, which defines the methods and processes for packing, handling, shipping, receiving, testing, and processing material for MOX construction material. The specific levels of storage, methods of preservation, and transportation were also specified in this procedure. The inspectors observed several storage areas within MFFF, including the lay down yard and found that materials were stored according to MFFF procedures.

Inspectors reviewed PP3-28, Quality Control Receiving Inspection, which identified the receiving inspection process of QL-1, QL-2, and QL-3 items. The inspectors observed receiving inspection activities associated with QL-1 items and verified that (1) items procured as QL-1 were procured from suppliers that were listed on the MOX Services ASL; (2) receiving inspections were performed with acceptable measuring devices and in an environment that met the cleanliness and storage requirements of the material; (3) receiving inspectors used appropriate reference materials such as procurement documents, product specifications, and industry codes and standards in the conduct of inspection activities; and (4) receiving inspectors verified that materials were free of damage and had appropriate markings to maintain traceability.

(2) Conclusion

Except for the improper segregation of a non-conforming embed plate noted in Section 6.a of this report, the applicant maintained adequate control of materials, equipment and services related to the QL-1 items for the MFFF and implemented proper handling, storage and control of QL-1 equipment and material in its possession and installed at the MFFF. Activities reviewed by the inspectors for the acceptance and control of purchased items and services determined that applicable requirements were met. Control of materials, equipment and services were adequately performed in accordance with procedures and the MPQAP. No findings of significance were identified.

7. **Quality Assurance: Inspection, Test Control, and Control of Measuring Equipment (IP 88109)**

a. Resident Inspector Review of Annular Tanks

(1) Scope and Observations

Fissile Thickness Testing (PSSC-009)

The inspectors reviewed the PTI procedure for conducting annular tank fissile thickness inspections for KCD-TK1000 to ensure the procedure met the requirements established in DCS01-KKJ-DS-SPE-L-16264-4, Procurement Specification for Annular Tanks, and DCS01-KKJ-CG-NTE-L-03510-0, AP Welded Equipment Fissile Thickness Inspection. The inspectors reviewed the fissile thickness data report submitted by PTI to ensure the test data met the acceptance criteria and established tolerances for fissile thickness as required contained in DCS01-KCD-CG-PLG-L-06446, Equipment Data Sheet Annular Tank KCD TK1000 Assembly.

Helium Leak Testing (PSSC-009)

The inspectors reviewed the helium leak test procedure and test report for KCD-TK1000 to ensure that helium leak testing was conducted in accordance with ASME Section V, Article 10 Leak Testing. The inspectors reviewed calibration records, vendor documentation, test procedure, test data, and personnel qualification records. The inspectors verified that the leak test results met the established acceptance criteria established by the ASME code and that personnel responsible for performance of the leak test were qualified in accordance with ASNT SNT-TC-1A, Personnel Qualification and Certification in Nondestructive Testing.

Hydrostatic Testing (PSSC-009)

The inspectors reviewed the PTI Hydrostatic Leak Test Procedure and Hydrostatic Test Report for KCD-TK1000. The inspectors verified that the test procedure was in compliance with the requirements of ASME Section VIII, Division 1, UG-99, Standard Hydrostatic Test. Specifically, the inspectors verified that the required test pressure, test duration, and pressure gauge range were in accordance with ASME Section VIII requirements. The inspectors reviewed measuring and test equipment calibration records to ensure the test equipment had been calibrated within the past 12 months. The inspectors reviewed the completed hydrostatic test report to ensure the pressure test results met the established acceptance criteria. The inspectors verified that the test report was signed by the Authorized Nuclear Inspector (ANI). The inspectors reviewed the chloride inspection report for the test water to ensure contaminant limits for chlorides/halides were not exceeded.

Neutron Absorption Panel Testing (PSSC-009)

The neutron absorption panels (containing colemanite (calcium borate ($\text{CaB}_3\text{O}_4(\text{OH})_3 \cdot \text{H}_2\text{O}$) grout)) provided a significant criticality control function by limiting the reflection of neutrons emitted from the annular tank back into the fissile material containing region of the tank. The inspectors reviewed DCS01-KKJ-DS-NTE-L-16284-1, Specification for Neutron Absorption Panels of Annular Tanks, including the design requirements for the colemanite (borated concrete) group mix, qualification and test requirements of the colemanite mix, and test and inspection requirements during neutron absorption panel construction. The inspectors reviewed calibration procedures and reports for the neutronic inspection gauge and mock-up as well as the actual neutronic inspection results for KCD-TK1000. The inspectors reviewed the procedure used to manufacture the colemanite grout mix as well as inspection reports for the grout raw materials and grout test samples. The inspectors reviewed PTI NCR 09-77 Rev. 2, which documented problems with the verification of boron content in the colemanite annular panels for KCD-TK1000. As part of this review, the inspectors reviewed the technical justification provided by the MOX Services Nuclear Criticality Safety Group for the "use as is" disposition of the NCR. The technical justification concluded that there is a low sensitivity of plutonium nitrate solutions in MOX Services' annular tanks to changes in boron content in the colemanite grout panels.

(2) Conclusion

The applicant adequately performed activities related to inspection, test control, and control of measuring equipment for annular tanks. No violations of safety significance were identified (PSSC-009).

b. Region Based Programmatic Review of Inspection, Test Control, & Control of Measuring Equipment

(1) Scope and Observations

Inspectors reviewed MFFF implementing procedures associated with inspection, test control and control of measuring and test equipment (M&TE) documents and activities to ensure they conformed to technical and quality requirements of the MPQAP. Specifically, the inspectors reviewed M&TE procedures, a sample of certificates of

calibration, NCRs related to M&TE, and surveillance reports. The inspectors interviewed MOX staff to discuss in detail the overall process to control M&TE to verify that controls are being implemented according to MPQAP procedures. In addition, the inspectors reviewed selected documents to determine if the documents were reviewed, approved, and released by authorized personnel in accordance with MOX Services M&TE program.

The M&TE NCRs, the recall for calibration, surveillance reports, the inspection plan, and the inspection report template reviewed were found to be consistent with MOX Services QA procedures. The inspectors noted through interviews and documentation review that surveillance reports were performed monthly.

(2) Conclusion

The applicant had adequately implemented established procedures and program activities associated with inspection, test control and control of M&TE. Field activities were observed and documents were reviewed to ensure activities and procedures conformed to technical and quality requirements. Documents reviewed included M&TE procedures, a sample of certificates of calibration, NCRs related to M&TE, and surveillance reports. No findings of significance were identified.

8. **10 CFR Part 21 - Facility Construction (IP 88111)**

a. Scope and Observations

The inspectors reviewed PP8-3, Evaluation and Reporting of Defects and Noncompliance, that provided guidance related to the identification, evaluation, and reporting of defects and noncompliance in accordance with 10 CFR Part 21. The procedure identified personnel responsibilities under 10 CFR 21 and defined the evaluation process, notification requirements, and evaluation and reporting timelines. The procedure also identified requirements for posting the regulations of 10 CFR Part 21 and Section 206 of the Energy Reorganization Act in locations where safety-related work is being performed, in addition to posting information identifying the MOX Services point of contact and procedure references for 10 CFR Part 21.

The inspectors verified that the timeliness requirements for discovery, evaluation, notification to the responsible manager, and interim reporting to the NRC identified in the procedure were consistent with those of 10 CFR Part 21.

The inspectors verified that the postings required by 10 CFR Part 21 were present in the facility and conspicuously posted. However, the inspectors observed several inconsistencies with the postings regarding content and shared these observations with the applicant. The applicant implemented immediate corrective actions.

The inspectors reviewed the provisions for interim reporting and notifications to customers in PP8-3 and verified that these controls were consistent with the regulations of 10 CFR Part 21. In addition, the inspectors reviewed a sample of 10 CFR Part 21 evaluations conducted during the past year and found that the evaluations were generally descriptive of the condition(s) and that the evaluation resulted in an appropriate identification of reportability. The inspectors also reviewed a sample of

procurement documents for QL-1 items and confirmed that the requirements of 10 CFR Part 21 were invoked on suppliers of safety-related items and services.

b. Conclusion

The applicant had adequately implemented established procedures and program activities associated with the requirements of 10 CFR Part 21. MOX services project procedures adequately implemented the provisions of the MPQAP for 10 CFR Part 21, with regard to postings, identifying its applicability in procurement documents, identifying deviations, and identifying reporting requirements. No findings of significance were identified.

9. **Supplier/Vendor Inspection (IP 88115)**

a. Scope and Observations

Annular Tanks (PSSC-009)

The inspectors reviewed the Purchase Order 10888-2-00002140 between MOX Services and PTI to determine if the applicable regulatory requirements including ASME NQA-1 and 10 CFR Part 21 and controls for documenting and reporting deficiencies and maintaining adequate quality, were specified. The inspectors reviewed DCS01-KKJ-DS-SPE-L-16264-4, Procurement Specification for Annular Tanks, to determine if MOX Services adequately specified the necessary (1) applicable regulatory, design, technical, administrative, and reporting requirements, (2) drawings, (3) specifications, (4) codes and standards, (5) test and acceptance requirements, (6) access for audit or inspection by the purchaser, (7) identification of documentation to be submitted to the purchaser or retained by the supplier (including retention times), and (8) special process instructions that should be completed by the supplier(s).

b. Conclusion

The applicant adequately specified the required regulatory, technical, and quality assurance requirements in the procurement documents between MOX Services and the annular tank vendor (PSSC-009). No findings of significance were identified.

10. **Inspection of Safety Function Interfaces for the Mixed Oxide Fuel Fabrication Facility (IP 88116)**

a. Scope and Observations

The inspectors reviewed PP9-20, Integrated Safety Analysis Process. This procedure describes the overall Integrated Safety Analysis (ISA) process and controls for implementing the ISA requirements. The inspectors verified that results of the ISA were incorporated in the design of specific components sampled. Specifically, the inspectors verified that the results of the associated Nuclear Criticality Safety Evaluations were incorporated into the design of the sampled components. The inspectors reviewed PP9-3, Design Control, and verified that the procedure included guidance to incorporate design information so that it can be communicated across functional interfaces. It should be noted, however, that Section 15.a of this report discusses a design control problem with concrete embedments that occurred in 2007.

Additionally, the inspectors reviewed PP8-6, Licensing Basis Configuration Management. This procedure established the process used to identify potential impacts to the licensing basis when making changes to the MFFF design and associated programs. Inspectors also verified that the QA program was applied to changed designs in a manner equivalent to the original design. The inspectors reviewed PP9-1, Quality Levels and Marking Design Documents, which, provided guidance on the identification of quality level and quality level markings pertaining to design documents.

The inspectors reviewed PP9-9, Engineering Specifications, which provided guidance for revision and control of engineering specifications. A sample of procurement specifications was reviewed to evaluate the adequacy of the design engineering and procurement interface and to verify selected design requirements were incorporated into the procurement specifications. The inspectors confirmed that the procurement specification document discussed functional and technical requirements from design documents, identified relevant codes, standards and design documents, and determined quality assurance requirements.

Section 18 of the MPQAP required that, during the design and construction phases of the MOX Project, regularly scheduled internal audits of each MOX Services functional area performing quality-affecting activities be performed annually. PP3-7, Audits, provided implementing guidance for this requirement and delineated guidance for audit scheduling, planning, conduct, and follow-up. The inspectors found that audits were scheduled and implemented on an annual basis for activities affecting quality; in instances in which there was negligible work being performed in an activity, audits were postponed to the next year and the basis for the schedule change was documented on an interoffice memorandum. The inspectors verified that internal audits assessed the functional interfaces between organizations performing safety-related activities.

PP3-11, Assessments, defined the process for the conduct of assessments performed by management to evaluate the scope, status, adequacy, programmatic compliance, and implementation effectiveness of QA and other management measures and the efficiency of project work processes, products, and the QA program. The inspectors verified that assessments were conducted in accordance with PP3-11 to assess the adequacy of QA program implementation as well as the overall effectiveness of MOX project processes and programs. The inspectors reviewed a sample of assessments and found that the assessments (1) had been conducted on an annual basis, (2) presented an evaluation of each organization's effectiveness, and (3) included an assessment of the interfaces between organizations having related responsibilities, such as the interface between electrical, mechanical, and civil engineering disciplines responsible for design.

b. Conclusion

The applicant established a program and procedures for control of safety function interfaces in the areas of integrated safety, design, procurement, and quality assurance controls in accordance with the MPQAP. No findings of significance were identified.

11. Piping Systems Relied on for Safety (IP 88134), Pipe Supports and Restraints (IP88143) & Nuclear Welding General Inspection Procedure (IP 55050)

a. Scope and Observations (PSSC-010)

The inspectors observed autogenous (no weld filler metal used) welds on stainless steel small bore pipes (1/4" diameter (dia.)) and fillet welds and single-flare groove welds on stainless steel hangers for QL-1 Items Relied on For Safety (IROFS). The bent small bore piping spools were assembled by using square-groove butt welds and joined by automatic welding. Piping was either supported on partially completed (some with only weld tacks) or temporary hangers using stainless steel tie wire. During this inspection, there was no work activity on either piping or hangers. The pipe fabrication shop was being set up for future work. No welding was observed or performed in the field or fabrication shop. Developmental work was in progress for using a flux (added to the face of square-groove butt welds) for the purpose of affecting weld penetration with automatic welding of thicker small bore pipe welds.

This inspection was performed to verify that the various stages of welding were in accordance with the 1996 Edition, including 1998 addenda of the ASME B31.3 Process Piping code for piping, American Welding Society (AWS) D1.6 Structural Welding Code – Stainless Steel for hangers, and associated site construction procedures, piping isometric drawings, and hanger drawings.

The following sample welds (in various stages of completion) were observed in the field:

- 1/4" nominal pipe size (NPS) automatic autogenous welds with approximately 1/32" external concavity/underfill:
 KCD-0259315A-0250-QL1-01-FW002
 KWD-DS-PLI-T-5347212B-FW001 (Room C151 & welding operator P026)
 KWD-DS-PLI-T-5329312B-01-FW001 (welding operator P026)
 KWD-DS-PLI-T-5347112B-01-FW001
 KWD-DS-PLI-T-0211812A-01-FW001
- Pipe hangers:
 C121-PS00024-FW002 (welder P024)
 C121-PS00036-FW001 (welder P024)
 C121-PS00042-FW002
 C141-PS00152-FW001
 C141-PS00094-FW001

b. Conclusion

For the samples chosen, all welding related activities associated with pipe supports and small bore tubing for use in the aqueous polishing area was acceptable (PSSC-010). No findings of significance were identified.

12. Mechanical Components (IP 88136)**a. Scope and Observations****Annular Tanks (PSSC-009)**

The inspectors reviewed DCS01-KKJ-DS-SPE-L-16264-4, Procurement Specification for Annular Tanks, to determine if MOX Services adequately specified the applicable technical, ASME code, and quality assurance requirements. The inspectors reviewed Receiving Inspection Report (RIR)-10-9343 for KCD-TK1000 to determine if MOX Services performed an adequate receipt inspection as required by MOX Services QC procedures. The inspectors reviewed the Certificate of Conformance provided by PTI to document that the tank was fabricated in accordance with the purchase order and the procurement specification. The inspectors reviewed certified material test reports for annular tank materials to ensure the materials met the appropriate material specifications for chemical and physical properties. The inspectors reviewed helium and hydrostatic test requirements and reports to ensure the tank was tested in accordance with ASME Section VIII Division 1 Rules for Construction of Pressure Vessels requirements. The inspectors reviewed the ASME U1 Code data report KCD-TK1000 including verification that (1) design pressure, maximum allowable working pressure, and hydrostatic test pressure conformed to design specification requirements and, (2) the data report was signed by the ANI. The inspectors verified that the tank materials were procured and tested from suppliers on the PTI ASL. The inspectors reviewed the work package, design drawings, and procedures for installation of KCD-TK1000 into the MOX Facility. The inspectors observed installation of KCD-TK1000 into the lower level of the BAP.

b. Conclusion

Inspectors verified that annular tanks and associated components were procured, installed, and tested in accordance with the applicable regulatory, technical, and quality assurance requirements (PSSC-009). No items of safety significance were identified.

13. Quality Assurance: Control of the Electronic Management of Data (Inspection Procedure (IP) 88113)**a. Scope and Observations**

The inspectors evaluated the applicant's program to determine compliance with Section 17, Quality Assurance Records, of the MPQAP (Rev. 9). The inspectors reviewed QA procedures for the management of QA records, and for the administration of the EDMS. The inspectors toured the Project Records Center (PRC) associated with the MOX project. The inspectors also toured the computer network operating center for the EDMS located in the satellite storage facility.

Additionally, the inspectors noted the transfer and storage of EDMS back-up tapes. In addition to the monthly back-up tapes, the applicant performed weekly tape back-ups of recent changes to documents stored on the EDMS. The retrieval of a back-up tape was observed to confirm data could be retrieved.

b. Conclusions

Inspectors verified that electronic data was properly controlled in accordance with the MOX Project QAP. No findings of significance were identified.

14. Problem identification, Resolution and Corrective Action (IP 88110)

a. Scope and Observations

NCRs, CRs, and ECRs generated by the applicant were reviewed to verify the proper documentation and resolutions of problems identified onsite. The inspectors noted that these items were adequately documented in the Corrective Action Program. Review of MOX Services' procedures and interviews with the applicant's staff confirmed that a process exists for documenting and reporting conditions adverse to quality to appropriate levels of management responsible for the conditions, and to the organization responsible for the condition.

The inspectors determined that the applicant had established adequate procedures for the identification and resolution of conditions adverse to quality, as required by Section 16, Corrective Action, of the MPQAP.

b. Conclusions

The applicant had established a program and procedures that adequately implemented the corrective action program in accordance with the applicant's MPQAP. No findings of significance were identified.

15. Follow-up of Previously Identified Items (IP88132, 88133)

a. (Closed) URI 70-3098/2010-003-001: Review of Calculations Related to Design Specification for Concrete Embedments

- (1) This portion of the inspection was conducted to review the applicant's corrective actions and documentation related to Unresolved Item (URI) 70-3098/2010-003-001: Review of Calculations Related to Design Specification for Concrete Embedments. This item was opened during a previous inspection in order to verify the adequacy of a design deviation from the requirements stated in AWS D1.6-1999, Section 7.3.

As part of this evaluation, the inspectors reviewed the following documents: (1) PP9-21, Engineering Change Requests, (2) PP9-3, Design Control, and (3) DCS01-XGA-DS-TRD-B-09053-C, Technical Requirements Document for the Design of Concrete Embedments, QL-1a-IROFS, December 6, 2007. Table 2-1, located in Section 2.1.2 of DCS01-XGA-DS-TRD-B-09053-C, specified a yield strength of 30 thousand pounds per square inch (ksi) to be used in the design basis for embed plates containing stainless steel Nelson H4L, A276 Type 316L studs. Table 2-1 also required the stainless steel Nelson H4L studs receive post annealing, further reducing the yield strength to approximately 25 ksi.

AWS D1.6-1999, Section 7.3, requires a minimum yield strength of 35 ksi for stainless steel studs. Contrary to this, on or before July 9, 2007, specification DCS01-XGA-DS-TRD-B-09053-C, Technical Requirements Document for the Design of Concrete

Embedments, was signed as complete; however, the applicant failed to verify that the design requirements of AWS D1.6-1999, Section 7.3, were accurately translated into the design specification. Failure to verify design requirements translated into design documents is a violation of NRC requirements and is identified as VIO 70-3098/2010-004-003: Failure to Accurately Translate Applicable Design Requirements into Design Documents.

(2) Conclusion

URI 70-3098/2010-003-001: Review of Calculations Related to Design Specification for Concrete Embedments, was closed and dispositioned as VIO 70-3098/2010-004-003: Failure to Accurately Translate Applicable Design Requirements into Design Documents.

b. (Closed) URI 70-3098/2010-003-002: Design Control Review Related to Metal Fabrications Specification

(1) Scope and Observations

On August 23-27, 2010, inspectors reviewed construction specification DCS01-BAA-DS-SPE-B-09352, Metal Fabrications for Quality Level 1, 2, 3 and 4, Quality Level 1a Items Relied on for Safety (IROFS), Rev. 0. Section 2.2.A.5e of the construction specification specified stainless steel headed studs to be A276 Type 316L post annealed Nelson H4L studs. AWS D1.6-1999, Section 7.3, requires a minimum yield strength of 35 ksi for stainless steel studs. The stainless steel post annealed studs specified in the specification had yield strengths of 25 ksi, which did not meet the requirements of AWS D1.6-1999.

During this inspection, inspectors reviewed CR 10888-MOX-CR-10-458, which documented MOX Services evaluation of the construction specification. The inspectors also evaluated MOX Services' use of the construction specification and method by which it was established. The inspectors determined that the parent document used to establish the basis for the construction specification was DCS01-XGA-DS-TRD-B-09053-C, Technical Requirements Document for the Design of Concrete Embedments, QL-1a-IROFS, December 6, 2007. As discussed in Section 15.a.(1) of this report, it was determined that the material properties for Nelson H4L stainless steel studs specified in Technical Requirements Document for the Design of Concrete Embedments did not meet the requirements of AWS D1.6-1999. Therefore the same design error was translated from Technical Requirements Document for the Design of Concrete Embedments to construction specification Metal Fabrications for Quality Level 1, 2, 3, 4, Quality Level 1a IROFS. Given that the same design error was translated from the parent document to the subsequent construction specification and both documents are being evaluated by CR 10888-MOX-CR-10-458, URI 70-3098/2010-2003-002: Design Control Review Related to Metal Fabrications Specification, is closed based on the corrective actions in CR 10888-MOX-CR-10-458 and previously identified VIO 70-3098/2010-2004-003.

(2) Conclusions

Based on the corrective actions documented in CR 10888-MOX-CR-10-458 and observations associated with VIO 70-3098/2010-004-003, URI 70-3098/2010-003-002: Design Control Review Related to Metal Fabrications Specification, is closed.

c. (Closed) URI 70-3098/2010-003-003: Corrective Actions Related Concrete Embed Plate Procurement

(1) Scope and Observations

URI 70-3098/2010-003-003: Corrective Actions Related to Concrete Embed Plate Procurement was opened to evaluate MOX Services' process for use and handling of Supplier/Contractor Requests for Information (SRFIs). Construction specification DCS01-BAA-DS-SPE-B-09352, Rev. 0, was referenced in procurement contract, No. 10888-S1381, with Specialty Maintenance and Construction Incorporated (SMCI) who procures and fabricates embed plates for MOX Services. SMCI submitted SRFI 1381-0025, Rev. 0, on November 16, 2006, to MOX Services, to request a material deviation from Purchase Order/Subcontract Number 10888-S1381. SMCI requested to use 316L Nelson Studs (H4L) as supplied by Nelson instead of post annealing the studs as required by Specification DCS01-BAA-DS-SPE-B-09352-0, Section 2.2.5.E, referenced in the procurement contract. MOX Services initially rejected the request in their reply dated November 27, 2006.

On January 22, 2007, SMCI submitted SRFI 1381-0027, Rev. 0, to request the requirement to meet AWS D1.6-1999, Section 7.1, Material Properties, be waived from the procurement contract given the material properties of the stainless steel studs specified in the procurement contract did not meet the AWS code. On February 19, 2007, MOX Services concurred with SRFI 1381-0027, Rev. 0, and amended SRFI 1381-0025, Rev. 1, to state "post annealed studs are not required." Although MOX Services concurred with the material deviation, MOX Services failed to change the procurement contract as required by PP 10-15, Rev. 1. Based on MOX Services reply to the SRFI, SMCI purchased material outside of the requirements stated in the procurement contract.

PP 10-15, Rev. 1, Supplier/Subcontractor Requests, Section 3.2.4, SRFI, states, in part, in the event a change is required as a result of the SRFI, the change shall be processed in accordance with PP10-10, Procurement Change Management.

PP10-10, Rev. 2, Procurement Change Management, Section 3.3.1, states, in part, requests by the Supplier/Subcontractor to deviate from the procurement requirements shall be processed as follows: 3.3.1.1.B) If the deviation is acceptable to Duke Cogema Stone & Webster (DCS), a new purchase requisition shall be filed in accordance with PP10-8, Requisitioning Items and Services, to incorporate the changes into the Purchase Order/Blanket Purchase Order.

Contrary to the above, on February 19, 2007, MOX Services concurred with a Supplier's/Subcontractor's request to deviate from procurement requirements; however, the applicant failed to file a new purchase requisition as required by MOX Services project procedures. Although the reason for the material deviation was due to the same design error discussed in VIO 70-3098/2010-004-003, a separate QA process failed to initiate a review and perform the necessary changes as required by the MQAP. Therefore, the failure to maintain procurement documents in accordance with project procedures is considered a violation of NRC requirements and is identified as VIO 70-3098/2010-2004-004: Failure to Maintain Accurate Procurement Documents.

In reviewing the applicant's documentation for procurement and receipt inspection for embed plates, the inspectors identified several inconsistencies between procurement documentation, receipt inspection documentation, and actual material received on site. This was identified by the applicant in CRs 10888-MOX-CR-10-495, 496, and 499 as a result of their evaluation of previous NRC identified items documented in CR 10888-MOX-CR-10-458. Several of the receipt inspection packages used to verify embed plates received from SMCI were either missing Certified Mill Test Reports (CMTRs), or contained CMTRs from non NQA-1 suppliers that were not validated, or contained CMTRs with heat numbers that did not match the heat numbers of the material received. Further review of this is necessary and is being identified as URI 70-3098/2010-004-007: Review of Receipt Inspection Documentation.

During interviews with the applicant and personnel from SMCI, the inspectors identified that Nelson was testing the mechanical properties of their studs in either the raw material form or in the finished product form. The test data was then supplied to SMCI within CMTRs or Certificates of Compliance (CoC). AWS D1.1-1998 and AWS D1.6-1999, Section 7.3, allows the manufacturer to supply the mechanical properties of the studs by testing the material after cold finishing or the full diameter finished studs. Although either method is acceptable by code, the process of manufacturing the studs often includes annealing, cold drawing, hot finishing, or other processes that alter the properties of the material during the fabrication process. The differences in mechanical properties between the raw material and post-fabrication could impact the design basis of the embed plates. URI 70-3098/2010-004-008: Review of Embed Procurement Requirements, is being opened to further evaluate the issue.

The inspectors reviewed SDR SMCI-10-VS285-01 and noted MOX Services identified several deficiencies with SMCI's commercial grade dedication plan. Two deficiencies included in the report were as follows: (1) SMCI failed to properly identify that deformation size and depth of deformed bars were critical characteristics; and (2) SMCI provided MOX Services CMTRs that were not independently validated and were from a lab that was not audited as part of SMCI's dedication process. During interviews with SMCI personnel, the inspectors noted that some of the critical characteristics, such as size, contained in SMCI's commercial grade dedication plan for studs, were verified using instruments that were not capable of measuring within the accuracy of the required tolerances. Further review of this issue is necessary and is being opened as Inspector Follow-Up Item (IFI) 70-3098/2010-004-009: Review of Commercial Grade Dedication Plan for Nelson Studs.

(2) Conclusions

URI 70-3098-2010-003-003: Corrective Actions Related to Concrete Embed Plate Procurement, was closed and subsequently identified as VIO 70-3098/2010-004-004: Failure to Maintain Accurate Procurement Documents.

URI 70-3098/2010-004-007: Review of Receipt Inspection Documentation, was opened to further evaluate the applicant's documentation and receipt inspection process associated with embed plates and studs.

URI 70-3098/2010-004-008: Review of Embed Procurement Requirements, was opened to further evaluate Nelson's process for determining the mechanical properties of studs, determine if the reported mechanical properties impact the design basis, and

determine if procurement requirements should have specified which mechanical properties were required.

IFI 70-3098/2010-004-009: Review of Commercial Grade Dedication Plan for Nelson Studs, was opened to further evaluate SMCI's commercial grade dedication process for studs.

d. (Closed) URI 70-3098/2010-003-004: Review of Stud Weld Procedure Qualification

(1) Scope and Observations

URI 70-3098/2010-003-004: Review of Stud Weld Qualification was opened during the August 23-27, 2010, NRC inspection to verify adequacy of compliance to the AWS D1.1-1998 and AWS D1.6-1999 code requirements for stud welding procedure qualification. As part of this evaluation, the inspectors reviewed documents provided by MOX Services and subcontractor SMCI.

The inspectors reviewed Purchase Order 10888-CP20-2C (Section G) for fabrication of embedded plates that included the DCS Construction Specification DCS01-BAA-DS-SPE-B-09352-0, Section 05501, Metal Fabrication for QL-1a (IROFS), paragraphs 1.5(E) and 2.7(A) which required that the welding procedures and qualifications shall be in accordance with AWS D1.1-1998 for carbon steel studs and AWS D1.6-1999 for stainless steel studs.

The inspectors reviewed a stud base qualification by Herron Testing Laboratories, Inc. (HTLI), Test Report 1974-19, dated September 23, 1974, for 5/8" diameter ASTM A108 Grade 1015 carbon steel studs to a 304 stainless steel plate. During review of this stud base qualification, the inspectors requested a stud welding procedure for welding dissimilar metals (carbon steel studs to stainless steel base plates). The inspectors were provided a copy of welding procedure SMCI-SWP-001, Rev. 0, Quality Assurance Procedure for Stud Welding and Nelson Stud Welding Nelweld® 4000 and 6000 Operations and Service Manual, Version 1.17. SMCI indicated that the two documents combined served as their procedure for stud welding. The inspectors determined that the procedures were satisfactory for welding pre-qualified materials listed in ASW D1.1-1998 and AWS D1.6-1999, but were not qualified for welding carbon steel studs to stainless steel plates. When requested by the inspectors, SMCI and MOX Services indicated procedure qualification tests for welding carbon steel studs to stainless steel plates were not performed.

AWS D1.1-1998, Structural Welding Code for Steel, Section 7.6.1(3), requires welding procedure qualification for carbon steel studs welded to stainless steel plate. AWS D1.1-1998, Section 7.6.4 and 7.6.6.1, requires procedure qualification to be conducted by consecutively welding ten specimens for each diameter, position, and surface geometry using the recommend welding settings. Subsequently, the ten specimens shall be tested by alternately bending 30 degrees in opposite directions in a typical test fixture shown as shown in Annex IX (ASW D1.1) until failure occurs. Alternatively, the studs may be bent 90 degrees from their original axis.

Contrary to the above and prior to the August 23-27, 2010, NRC inspection, MOX Services failed to verify that the stud welding of carbon steel studs to stainless steel embed plates performed by SMCI was in accordance with applicable AWS code

requirements as specified by Subcontract 10888-S13181. Specifically, AWS D1.1-1998, Structural Welding Code for Steel, Section 7.6.1(3), requires welding procedure qualification for carbon steel studs welded to a base material other than Group I or II steels listed in Table 3.1 of AWS D1.1-1998. Contrary to this, SMCI welded carbon studs to stainless steel embed plates, which was not a Group I or II material listed in Table 3.1, without a qualified stud welding procedure. Without a qualified welding procedure, the quality of the welding performed by SMCI is rendered indeterminate. To correct this condition, SMCI had to perform application tests to qualify the welding procedures. This violation is considered greater than minor because the quality of the welding activity was indeterminate without a qualified welding procedure and the welding activity required requalification. The failure to qualify a welding procedure for carbon studs to stainless steel plate is a violation of NRC requirements and is identified as VIO 70-3098/2010-004-005: Failure to Ensure Supplier Services were in Accordance with Procurement Requirements.

(2) Conclusion

URI 70-3098/2010-003-004: Review of Stud Weld Procedure Qualification, was closed and dispositioned as VIO 70-3098/2010-004-005: Failure to Ensure Supplier Services were in Accordance with Procurement Requirements.

e. (Closed) URI 70-3098/2010-003-005: Review of Potential Nonconforming Stud Welds

(1) Scope and Observations

This portion of the inspection was conducted to review MOX Services' corrective actions and documentation related to URI 70-3098/2010-003-005: Review of Potential Nonconforming Stud Welds. During the August 23-27, 2010, NRC inspection, inspectors identified an embed plate in the construction lay down area that contained suspect stud welding. By visual examination, it appeared that the weld flash was not a full 360 degrees around two of the studs. MOX Services originated a NCR QC-10-2310 to evaluate the acceptability of the studs and embed plate. Part of the evaluation requested by NCR QC-10-2310 was to perform bend tests on the studs. On August 30, 2010, the studs were bent 15 degrees from their original axis in the direction opposite of the missing flash in accordance with the AWS welding code. The studs were deemed acceptable based on the results of the bend tests.

The inspectors performed further inspections in the laydown area of several SMCI completed embed plates with welded studs received by MOX Services. The inspectors found no further evidence of suspect stud welding and determine the original suspect stud welds to be an isolated incident. Based on the incident being isolated and that the stud welding was determined to be satisfactory, URI 70-3098/2010-003-005: Review of Potential Nonconforming Stud Welds, is closed.

(2) Conclusion

URI 70-3098-2010-003-005: Review of Potential Nonconforming Stud Welds, is closed based on the corrective actions documented in NCR QC-10-2310 and it being an isolated incident.

f. (Reviewed) IFI 70-3098/2010-003-010: Review of Final Evaluation of Anomalous Concrete Area Detected by Non-destructive Examination

(1) Scope and Observations

In a previous evaluation of the applicant's corrective actions associated with VIO 70-3098/2009-010-001, the inspectors found that the non-destructive examination (NDE) test report, Document No. 08716-10888-S-00003274_0003, recommended further analysis of an anomalous concrete area identified near concrete wall intersection BMP P-2.4. This condition was already captured in the applicant's Corrective Action Program under CR-10-0274 and NCR-EN-10-2114 to address the issue of not promptly identifying the condition, and to perform further analysis of the anomalous area in the wall.

The anomalous concrete area is still under review by the applicant and corrective actions are not complete. Based on this, the inspectors were unable to complete the inspection for IFI 70-3098/2010-003-010: Review of Final Evaluation of Anomalous Concrete Area Detected by Non-destructive Examination.

(2) Conclusions

IFI 70-3098/2010-003-010: Review of Final Evaluation of Anomalous Concrete Area Detected by Non-destructive Examination, will remain open based on the applicants ongoing corrective actions development and evaluations.

16. Exit Interviews

The inspection scope and results were summarized throughout this reporting period and by the senior resident inspector on January 6, 2011 and region based inspectors on October 6, November 5 and December 17, 2010. During the exit meeting, the applicant provided dissenting comments in regard to VIO 70-3098/2010/004-003 and VIO 70-3098/2010-004-004 being separate violations. The applicant also provided dissenting comments in regard to the severity level associated with VIO 70-3098/2010-004-005. Although proprietary documents and processes may have been reviewed during this inspection, the proprietary nature of these documents or processes was not included in the report.

1. **PARTIAL LIST OF PERSONS CONTACTED**

MOX Services

R. Bailey, Field Engineer
R. Bruce, Engineer
F. Cater, Civil/Structural Manager
E. Chassard, Executive Vice President & Deputy Project Manager
R. Daniels, Lead Chemical and Mechanical Manager
T. Garret, Sub Contract Administrator
M. Gober, Vice President Engineering
J. Gomez, Electrical/I&C Manager
D. Gwyn, Licensing Manager
W. Hennessey, Nuclear Safety Analysis Manager
D. Ivey, Quality Assurance Manager
D. Kehoe, Compliance Manager
L. Lamb, Vice President Facility Design and Construction
H. Lawrence, Vice President Construction
F. Maranda, Manager Construction Procurement
O. Mendiratta, Compliance
J. Peregory, Quality Control Manager
J. O'Dell, Engineering Assurance
G. Shell, Vice President Project Assurance
N. Simpson, Compliance
T. Tate, Quality Control Inspector
K. Trice, President and COO
K. Trosen, Materials Engineer
P. Vaughn, Engineer
R. Whitley, Quality Assurance/Control Manager
P. Wilkie, Welding Engineering
J. Yon, Quality Control Inspector

Alberici Constructors Inc.:

L. Hutchison, Construction Supervisor
C. Williams, Construction Labor

Specialty Maintenance and Construction, Inc.

K. Hissem, President
G. Lynn, Quality Assurance Manager
J. Shine, Project Manager

2. **INSPECTION PROCEDURES (IPs) USED**

IP 55050	Nuclear Welding General Inspection Procedure
IP 88106	Quality Assurance: Program Development and Implementation
IP 88107	Design and Documentation Control
IP 88108	Quality Assurance: Control of Materials, Equipment and Services
IP 88109	Inspection, Test Control, and Control of Measuring and Test Equipment
IP 88111	Quality Assurance: 10 CFR, Part 21, Inspection-Facility Construction

IP 88113	Control of the Electronic Management of Data
IP 88115	Supplier/Vendor Inspection (Construction Phase)
IP 88116	Inspection of Safety Function Interfaces for the Mixed Oxide Fuel Fabrication Facility
IP 88130	Resident Inspection Program For On-Site Construction Activities at the Mixed-Oxide Fuel Fabrication Facility
IP 88132	Structural Concrete Activities
IP 88133	Structural Steel and Supports Activities
IP 88134	Piping Systems Relied on for Safety
IP 88136	Mechanical Components
IP 88143	Pipe Supports and Restraints (formerly IP 88135)

3. **LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

<u>Item Number</u>	<u>Status</u>	<u>Description</u>
70-3098/2010-004-001	Opened	VIO: Failure to Ensure that Design Changes Were Governed by Control Measures Commensurate With Those Applied to the Original Design (Section 3.a)
70-3098/2010-004-002	Opened	VIO: Failure to Segregate Non Conforming Material (Section 7.a).
70-3098/2010-004-003	Opened	VIO: VIO: Failure to Accurately Translate Applicable Design Requirements into Design Documents (Section 15.a)
70-3098/2010-004-004	Opened	VIO: Failure to Maintain Accurate Procurement Documents (Section 15.c)
70-3098/2010-004-005	Opened	VIO: Failure to Ensure Supplier Services were in Accordance with Procurement Requirements (Section 15.d)
70-3098/2010-004-006	Closed	NCV: Failure to Verify that Epoxy Adhesive Meets ASTM C881 Requirements (Section 4.b)
70-3098/2010-004-007	Opened	URI: Review of Receipt Inspection Documentation (Section 15.c)
70-3098/2010-004-008	Opened	URI: Review of Embed Procurement Requirements (Section 15.c)
70-3098/2010-004-009	Opened	IFI: Review of Commercial Grade Dedication Plan for Nelson Studs (Section 15.c)

70-3098/2010-003-001	Closed	URI: Review of Calculations Related to Design Specification for Concrete Embedments (Section 15.a)
70-3098/2010-003-002	Closed	URI: Design Control Review Related to Metal Fabrications Specifications (Section 15.b)
70-3098/2010-003-003	Closed	URI: Corrective Actions Related to Concrete Embed Plate Procurement (Section 15.c)
70-3098/2010-003-004	Closed	URI: Review of Stud Weld Procedure Qualification (Section 15.d)
70-3098/2010-003-005	Closed	URI: Review of Potential Non-Conforming Stud Welds (Section 15.e)
70-3098/2010-003-010	Reviewed	IFI: Review of Final Evaluation of Anomalous Concrete Area Detected by Non-destructive Examination (Section 15.f)

4. **LIST OF ACRONYMS USED**

ADAMS	Agency-Wide Document Access and Management System
AISC	American Institute of Steel Construction
ANI	Authorized Nuclear Inspector
ASL	Authorized Supplier List
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
AWS	American Welding Society
BAP	Aqueous Polishing Building
BMP	MOX Processing Building
BSR	Shipping and Receiving Building
CA	Construction Authorization
CAR	Construction Authorization Request
CFR	Code of Federal Regulations
CIB1	Construction Inspection Branch 1
CIB2	Construction Inspection Branch 2
CIB3	Construction Inspection Branch 3
CMTR	Certified Mill Test Report
CNWRA	Center for Nuclear Waste and Regulatory Analysis
CoC	Certificate of Compliance
CPB1	Construction Projects Branch 1
CPB2	Construction Projects Branch 2
CPB4	Construction Projects Branch 4
CR	Condition Report
DCI	Division of Construction Inspection
DCP	Division of Construction Projects
DCS	Duke, Cogema, Stone & Webster

ECR	Engineering Change Request
EDMS	Electronic Document Management System
FCSS	Fuel Cycle Safety and Safeguards
FTS	Fluid Transport System
HTLI	Herron Testing Laboratories, Inc.
ICN	Interim Change Notice
IFI	Inspector Follow Up Item
IPs	Inspection Procedures
IROFS	Item Relied on for Safety
ISA	Integrated Safety Analysis
IT	Information Technology
ksi	kilo pound-force per square inch
MFFF	MOX Fuel Fabrication Facility
MFFBS	MOX Fuel Fabrication Building Structure
mm	millimeter
MOUDB	Mixed Oxide and Uranium Deconversion Branch
MOX	Mixed Oxide
MOX Services	Shaw AREVA MOX Services
MPQAP	MOX Project Quality Assurance Plan
M&TE	Measuring and Test Equipment
NCR	Non-conformance Report
NCSE-D	Nuclear Criticality Safety Evaluation-Design
NCV	Non-cited Violation
NDE	Non Destructive Examination
NMSS	Nuclear Material Safety and Safeguards
NPS	Nominal Pipe Size
NQA-1	NQA-1-1994, Quality Assurance Requirements for Nuclear Facility Applications,
NRC	Nuclear Regulatory Commission
NOV	Notice of Violation
PDR	Public Document Room
PP	Project Procedure
PRC	Project Records Center
PSSC	Principal System, Structure, and Component
PTI	Premiere Technology, Inc.
QA	Quality Assurance
QC	Quality Control
QL	Quality Level
QL-1	Quality Level 1
Rebar	Reinforcing bar
RII	Region II
Rev.	Revision
RIR	Receiving Inspection Report
RMP	Regulatory Management Plan
RRG	Responsible Requisitioning Group
SA	Subcontract Administrator
S&ME	Soils and Materials Engineering Inc.
SDR	Supplier Deficiency Report
SMCI	Specialty Maintenance and Construction Incorporated
SRFI	Supplier Request for Information
SSCs	Systems, Structures, and Components

UL	Underwriters Laboratory
URI	Unresolved Item
VIO	Violation

5. **LIST OF PSSCs REVIEWED**

PSSC-009	Criticality Control
PSSC-010	Double Walled Pipe
PSSC-024	Gloveboxes
PSSC-036	MOX Fuel Fabrication Building Structure (including vent stack)

6. **PARTIAL LIST OF DOCUMENTS REVIEWED**

Shaw Areva MOX Services Documents:

Procedures:

IT14-11, Back-up and Recovery, Rev. 2, October 23, 2009
 PP1-1, Quality Assurance Grading, Rev. 2
 PP1-2, Preparation of Project Procedures, Rev. 10
 PP1-3, Project Training, Rev. 11
 PP1-7, MOX Fuel Fabrication Lessons Learned Program, Rev. 2
 PP1-10, Subcontractor Training and Qualification, Rev. 1
 PP2-1, Project Organization, Roles, and Responsibilities, Rev. 14
 PP3-2, Trend Analysis, Rev. 3
 PP3-4, Records Management, Rev. 6
 PP3-5, Control of Non-Conforming Items, Rev. 6
 PP 3-5A, Nonconformance Report (Forms), Rev. 7
 PP3-6, Corrective Action Process, Rev. 13
 PP3-7, Audits, Rev. 6
 PP3-11, Assessments, Rev. 8
 PP3-12, Supplier Evaluation, Rev. 9
 PP3-15, Control of M & TE, Rev. 3
 PP3-21, NDE Personnel Certification Under a Central Certification Program, Rev. 0
 PP3-27, Quality Control Personnel Certification, Rev. 3
 PP3-28, Quality Control Receiving Inspection, Rev. 2
 PP3-30, QC Inspection Plans and Inspection Reports, Rev. 2
 PP3-31, QC Inspection Exception Report, Rev. 0
 PP7-4, Document Control [includes Form PP7-4A], Rev. 6
 PP 7-9, Electronic Data Management System, Rev. 3, September 25, 2008
 PP8-3, Evaluation and Reporting of Defects and Noncompliance, Rev. 4
 PP8-6, Licensing Basis Configuration Management, Rev. 8
 PP9-1, SSC Quality Levels & Marking Design Documents, Rev. 11
 PP9-3, Design Control, Rev. 17
 PP9-9, Engineering Specifications, Rev. 9
 PP9-14, Design Process, Rev. 5
 PP9-16, Basis of Design Documents, Rev. 7
 PP9-20, Integrated Safety Analysis Process, Rev. 4
 PP9-21, Engineering Change Requests, Rev. 7
 PP10-0, Integrated Procurement Process of Material Management Overview, Rev. 1

PP10-5, Supplier/Subcontractor Prequalification, Rev. 4
 PP10-8, Requisitioning Items and Services, Rev. 8
 PP10-10, Procurement Change Management, Rev. 2
 PP10-13, Offer/Proposal Evaluation and Award Recommendation, Rev. 3
 PP10-15, Supplier/Subcontractor Requests, Rev. 1
 PP11-24, Shipping and Receiving Material, Rev. 2
 PP11-35, Construction Inspection and Acceptance Testing
 PP11-3, Batch Plant Operating Instructions, Rev. 2
 PP11-12, Placement of Concrete, Embedded Structural Items and Accessories, Rev. 1
 PP11-25, Vendor Evaluation, Rev. 0
 PP14-3, Storage for Digital Archive Media, Rev. 1
 PP 14-3, Storage for Digital Archive Material, Rev. 1, April 7, 2008
 MOX Submittal Review Form (Traveler) 08716-00002575_-0194-A (for SMCI QA
 Procedure for Stud Welding, SMCI SWP-001, R0
 Weld Technique Sheet WTS-D1.1-SM-I-II-01, Rev. 0
 Weld Technique Sheet WTS- D1.1-SM-I-II-01, Rev. 1

Specifications

DCS01-AAJ-DS-DOB-M-40108-3, Basis of Design for Fire Protection and Detection
 Systems
 DCS01-AAJ-DS-DOB-E-401111-3, Basis of Design for Electrical Systems
 DCS01-EEJ-DS-SDD-E-25028-1, System Description Document for Backup Power
 Supply
 DCS01-EEJ-DS-SPE-E-25236-0, Specification for Emergency Diesel Generators
 DCS01-VHD-DS-SPE-V-13500-0, Specification for Glovebox HEPA Filters
 DCS01-VHD-DS-SPE-13500-1, Process Equipment Specification – Glove Box HEPA
 Filter
 DCS01-BAP-DS-M-15260-1, Specification for Emergency Scavenging Air System
 Package, ECRs 003243 and 003396
 DCS01-KKJ-DS-SPE-M-15120-3, Procurement Specification for Double Wall Piping
 DCS01-BAA-DS-CAL-B-01255-0, Structural Steel Platform Room C-149
 DCS01-KCA-CG-NTE-F-61257-1, Aqueous Polishing KCA Furnace FUR 8000 Set
 Points Analysis
 DCS01-BAP-DS-SPE-M-15260-1, Specification for Emergency Scavenging Air System,
 Rev. 1, dated January 21, 2009
 DCS01-KKJ-DS-SPE-L-16264-4, Procurement Specification for Annular Tanks
 DCS01-KKJ-DS-NTE-L-16284-1, Specification for Neutron Absorption Panels of Annular
 Tanks
 DCS01-KKJ-CG-NTE-L-03510-0, AP Welded Equipment Fissile Thickness Inspection
 DCS01-BKA-DS-SPE-B-09330-5, Construction Specification Section 03301 – Placing
 Concrete and Reinforcing Steel for Quality Level 1, 2, 3, and 4.
 DCS01-BKA-DS-SPE-B-09325-4, Construction Specification Section 03051 - Mixing and
 Delivering for Quality Level QL-1a (IROFS) and QL-2 Concrete
 DCS01-BKA-DS-SPE-B-09329-0, Construction Specification Section 03150 – Structural
 Anchors in Concrete and Spacing Requirements for Attaching to Embedded
 Plates for Quality Level QL-1 (IROFS)
 DCS01-XGA-DS-TRD-B-09053-C, Technical Requirements Document for the Design of
 Concrete Embedments QL 1a IROFS.
 DCS01-BAA-DS-SPE-B-09352-0, Construction Specification Section 05501 – Metal
 Fabrication for Quality Level 1, 2, 3, and 4.

Commercial Grade Item Evaluations:

Commercial Grade Item Evaluation for Hilti HIT-RE and HIT-RE 500-SD Epoxy Adhesives, DCS01-WWJ-DS-CGD-M-65973-1, Rev. 1
Commercial Grade Item Evaluation for Epoxy Grout, Quality Level 1, IROFS, DCS01-WWJ-DS-CGD-M-65828-1, Rev. 1

Drawings

DCS01-KCD-CG-PLG-L-06446, Equipment Data Sheet Annular Tank KCD TK1000 Assembly

Purchase Orders:

Purchase Order 10888-2-00002140, Premiere Technology

Condition Reports

10888-MOX-CR-10-148
10888-MOX-CR-10-603
10888-MOX-CR-10-538
10888-MOX-CR 10-322
10888-MOX-CR 10-304
10888-MOX-CR-10-482
10888-MOX-CR-10-300
10888-MOX-CR-10-513
10888-MOX-CR-10-458
10888-MOX-CR-10-494
10888-MOX-CR-10-495
10888-MOX-CR-10-496
10888-MOX-CR-10-499
10888-MOX-CR-10-500
10888-MOX-CR-10-501
10888-MOX-CR-10-582
10888-MOX-CR-10-672

Non-Conformance Reports

QC-10-2386
CE-10-2263
QC-10-2000
QC-10-2073
CE-10-2456
QC-10-2507
QC-10-2489
QC-10-2173
QC-09-1422
QC-09-1424
QC-10-2451

QC-10-1499
QC-10-1980
QC-10-2299
QC-10-2423
QC-10-2174
CE-10-2450
QC-10-2696, Hilti Epoxy QC-RIR-10-15428 P.O. Lines 1, 2 and QC-RIR-10-15430 P.O.
Lines 3, 4, Rev. 2
NCR AC-10-2254, Beam Pocket Left Out of Wall, Rev. 2
QC-10-2310, Aug. 26, 2010
NCR BK-08-0509

Engineering Change Request (ECR):

ECR 009582, Rev. 0

Audit Plans and Reports:

SMCI-06-VE12, Specialty Maintenance & Construction Incorporated
SMCI-09-VE38, Specialty Maintenance & Construction Incorporated

Supplier Deficiency Reports (SDR):

SOURIAU-10-VE16-01
SOURIAU-10-VE16-02
SOURIAU-10-VE16-03
SOURIAU-10-VE16-04
SOURIAU-10-VE16-05
SOURIAU-10-VE16-06
SOURIAU-10-VE16-07
SOURIAU-10-VE16-08
SOURIAU-10-VE16-09
SMCI-10-VE294-01

Supplier Evaluation Summary Reports:

SMCI-06-VE12
SMCI-07-VE43
SMCI-07-VE84

Supplier/Subcontractor Request for Information

SRFI 1381-0025, Rev. 0
SRFI 1381-0025, Rev. 1
SRFI 1381-0027, Rev. 0

Surveillance Reports:

SMCI-07-VS-16
SMCI-07-VS-17
SMCI-10-VS239

Calculations

DCS01-KKJ-CG-NTE-L-07657-0, Aqueous Polishing Area Annular and Slab Tank Sizing

Receipt Inspection Reports:

QC-RIR-10-9343, KCD-TK-1000 (Aqueous Polishing Area Oxalic Mother Liquor Tank)
Line Item# 0004

Nuclear Criticality Safety Evaluations

DCS01-KCD-DS-ANS-H-35007-4, Nuclear Criticality Safety Evaluation (NCSE-D) of the
KCD Unit

Miscellaneous Documents

IROFS (Q) List

Record of DCS Auditor/Lead Auditor Qualifications: S. Smeal, R. Morrison

NDE Certification: J. Lyons

Student Training History Forms: J. White, S. Smeal, J. Lyons, R. Morrison, F. Duncan,
B. Spires, S. Smith, E. Duncan, D. Cole, H. Millwood, J. Yon, D. Lowery, A. Walczak,
D. Harper, D. Livernois, J. Harrison, J. Davis

Nuclear Criticality Safety Evaluation (NCSE-D) of Sintering Furnaces in Pellet Process
Area DCS01-PFE-ANS-H-35012-3

Aqueous Polishing Nuclear Criticality Safety Evaluation (NCSE-D) of Purification Unit
DCS01-KPA-DS-ANS-H-35031-3

Quality Assurance Grading Evaluation for QL-2 Commercial Items DCS01-AAJ-DS-
QAG-Q-65909-2

Audit Plan PUDC French Platform, SA-10-A05

Quality Assurance Audit Reports:

- SA-10-A04 Incident Investigation & Corrective Action Process
- SA-09-A07, Procurement
- SA-09-A07, Corrective Action Process
- SA-09-A05, Engineering
- SA-09-A04, Construction
- SA-10-A03, MOX Construction
- SOU-10-VE16, Audit of SOURIAU
- ANP-10-VE35

Supplier Deficiency Log

CY 2010 Vendor Audit/Surveillance/Evaluation Schedule

2009 Project Assessment Report Number: CY10-P-011

Shaw/AREVA MOX Project Services 2008 Project Assessment Report Number: CY09-
P-002

Assessment Log CY2009

CY2009 Internal Audit Schedule – Completed

CY2010 Internal Audit Schedule

Status of Shaw/AREVA MOX Project Services, LLC Quality Assurance Program,
Reporting Period 026 Covering 1 April 2010 through 30 June 2010

MFFF Lessons Learned Identification and Screening: LL-2010-256, LL-2010-258,
LL-2010-260, LL-2010-259, LL-2010-264, LL-2010-261, LL-2010-262, LL-2010-263,
LL-2010-255

PAR/PAD Process Unit Fabrication, Assembly and Test Pilot Project Lessons
Learned/Process Improvement Report 24 September 2010

MOX Services Subcontract # 10888-DCS-0004 to Areva NP

Part 21 Evaluation Log Number 2010-01, dated January 12, 2010

Part 21 Evaluation Log Number 2010-02, dated May 6, 2010

Part 21 Evaluation Log Number 2010-03, dated June 10, 2010

DCS01-ADR-DS-PRG-A-40000-0, MOX Fuel Fabrication Facility Regulatory
Management Plan, Rev. 6, dated December 2007

DCS01-ADR-DS-PRG-A-40000-G, MOX Fuel Fabrication Facility Regulatory
Management Plan, Rev. 6, dated December 2005

DCS01-ADR-DS-PRG-A-40000-H, MOX Fuel Fabrication Facility Regulatory
Management Plan, Rev. 6, dated December 2006

DCS01-KCA-CG-NTE-F-61257-1, KCA Furnace FUR8000 Set Points Analysis, Rev. 1,
dated June 30, 2008

DCS01-BAA-DS-CAL-B-012555-0, Structural Steel Platform Room C-149, Rev. 0, dated
April 26, 2010

DCS01-AAJ-DS-DOB-M-40108-3, Basis of Design for Fire Protection and Detection
Systems, Rev. 3, dated April 2, 2008

MOX QAP Sections 10 Inspection, Section 11 Test Control, and Section 14 Inspection,
Test, and Control of M & TE, Rev. 9

M & TE Calibration logs for May 2010 and June 2010

Recall for Calibration memos: November 18, 2009 and March 16, 2010

Inspection Plan S562, Rev. 3 Piping Installation and Welding, Inspection Report
Template S562

Certificates of Calibration: Q13202, QC0003, QC7040, NDE31250733680, Q12811,
Q13339, QC66770733596, QC84750733967, Q13294, Q13336, Q13343, Q13339,
QC09000105-1, QC09000105-1, QC09000102-2, and Q13342

DCS Approved Suppliers List, August 28, 2006, Rev. 47

Nelson Stud Welding Survey, April 23, 2007

SMCI Dedication Plan for Nelson Stud Headed Concrete Anchors H4L, Mild Steel (MS)
or Stainless Steel (SS) in Various Sizes, November, 19, 2010

SMCI Quality Assurance Procedure for Commercial Grade Item Dedication, QAP-16A,
11/9/09

SMCI Commercial Grade Dedication Plan, Nelson Weld Studs, NSW-1, Rev. 4
SMCI QA Procedure for Stud Welding, SMCI SWP-001, R0

Nelson Stud Welding Nelweld 4000 and 6000 Operations and Service Manual Version
1.17 (October 2007)

MOX Project 900S08 190 Series Carbon Steel Embed Traveler for SMCI Dwg. # 190CD
Rev. 3 for Nest ID E026-1 Plate Heat # 9105134-06 to Stud Heat # E.

AWS Qualification Tests, 5/8" Diameter, ASTM A-108, GR. 1015 Stud Base to 304
Stainless Steel Plate for Nelson Stud Welding Company, Test Report No. 1974-19,
Project 151, dated 23 September 1974

- AWS Qualification Tests, 3/4" Diameter, ASTM A-108, GR. 1015 Stud Base to 304 Stainless Steel Plate for Nelson Stud Welding Company, Test Report No. 1976-20, Project 151, dated 22 October 1976
- AWS Qualification Tests, 3/4" Diameter, Stainless Stud Base to 304 Stainless Steel Plate for Nelson Stud Welding Company, Test Report No. 1976-14, Project 151, dated 14 June 1976
- AWS Qualification Tests, 1/2" Diameter, Stainless Stud Base to 304 Stainless Steel Plate for Nelson Stud Welding Company, Test Report No. 1976-17, Project 151, dated 9 August 1974
- AWS Qualification Tests, 5/8" Diameter, Stainless Stud Base to 304 Stainless Steel Plate for Nelson Stud Welding Company, Test Report No. 1976-13, Project 151, dated 15 June 1976
- Nelson Stud Welding Nelweld 4000 and 6000 Operations and Service Manual Version 1.17 (October 2007) MOX Project 900S08 190 Series Carbon Steel Embed Traveler for SMC I Dwg. # 190CD Rev. 3 for Nest ID E026-1 Plate Heat # 9105134-06 to Stud Heat # E.
- AWS Qualification Tests, 5/8" Diameter, ASTM A-108, GR. 1015 Stud Base to 304 Stainless Steel Plate for Nelson Stud Welding Company, Test Report No. 1974-19, Project 151, dated 23 September 1974
- AWS Qualification Tests, 3/4" Diameter, ASTM A-108, GR. 1015 Stud Base 304 Stainless Steel Plate for Nelson Stud Welding Company, Test Report No. 1976-20, Project 151, dated 22 October 1976
- AWS Qualification Tests, 3/4" Diameter, Stainless Stud Base to 304 Stainless Steel Plate for Nelson Stud Welding Company, Test Report No. 1976-14, Project 151, dated 14 June 1976
- AWS Qualification Tests, 1/2" Diameter, Stainless Stud Base to 304 Stainless Steel Plate for Nelson Stud Welding Company, Test Report No. 1976-17, Project 151, dated 9 August 1974
- AWS Qualification Tests, 5/8" Diameter, Stainless Stud Base to 304 Stainless Steel Plate for Nelson Stud Welding Company, Test Report No. 1976-13, Project 151, dated 15 June 1976

Vendor Documents

Procedures

- Premiere Technology T.P-1.5.1, Helium Leak Test Procedure, Rev. 4
- CEA Procedure LIST/DETECS/SSTM/RAP/07-051, Calibration Procedure of the Neutronic Inspection Gauge, April 7, 2008
- CEA Procedure LIST/DETECS/SSTM/RAP/08-014, Neutronic Inspection Procedure for the Mock-Up Panel, April 7, 2008
- CEA Procedure LIST/DETECS/SSTM/RAP/08-023, Calibration Report of the Neutronic Inspection Gauge, May 9, 2008
- CEA Procedure LIST/DETECS/SSTM/RAP/08-032, Neutronic Inspection Report of the Mock-Up Panel, May 9, 2008

Miscellaneous Documents

- Vacuum Technology Certificate of Calibration TP2118-ACAL-COMP-2-48184
- Vacuum Technology Certificate of Calibration 3519-ACAL-COMP-2-48160
- Western States Certificate of Calibration WSC 329351

Western States Certificate of Calibration WSC 322939
Premiere Technology Ultrasonic Calibration Report 10-1561, KCD-TK-1000
Premiere Technology Approved Suppliers List, November 16, 2010
Premiere NDE Report # 10-1528, Chloride Inspection Report for KCD-TK000
Premiere NDE Report # 10-1518, Fissile Thickness Measurement – UT Calibration
Mockup Calibration Record
CEA Neutronic Inspection Report of the Annular Panels, KDB TK7000, KCA TK1000,
KCA TK2000, KCD TK1000, KCD2000, December 19, 2008
Robatel Industries Quality Plan PFA0003, Manufacture of Colemanite Grout Mix, Rev. G
Premiere Nonconformance Report 08-342 Rev. 1
Premiere Nonconformance Report 09-077 Rev. 2
Premiere Nonconformance Report 10-066 Rev. 3
Premiere Nonconformance Report 09-013 Rev. 1
FAT-6314-FT-001, Premiere Fissile Thickness Verification Procedure, Rev. 2
Premiere Technology Quality Control Training Records
Premiere Technology Design Drawings for KCD TK1000 Vessel
Premiere Procedure PHS-6314-001, Packaging, Handling, Storage, Installation
Procedure, Rev. 8
Premiere Technology ASME SA240 TP316L Plate/Sheet Inspection Plan and Certified
Material Test Reports, P.O. Number 67638, Energy & Process, July 25, 2007, NA07-
1244