



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

February 2, 2017

Mr. David Del Vecchio
President and Chief Operating Officer
CB&I AREVA MOX Services
Savannah River Site
P.O. Box 7097
Aiken, SC 29804-7097

**SUBJECT: MIXED OXIDE FUEL FABRICATION FACILITY- NRC INSPECTION REPORT
NUMBER 70-3098/2016-004 AND NOTICE OF VIOLATION**

Dear Mr. Del Vecchio:

During the period from October 1, 2016, through December 31, 2016, the U. S. Nuclear Regulatory Commission (NRC) completed inspections pertaining 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 and license application 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 and license application 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 this inspection, the NRC has determined that one Severity Level IV violation of NRC requirements occurred.

The violation was evaluated in accordance with the NRC Enforcement Policy. The current Enforcement Policy is included on the NRC's Web site at (<http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>). The violation is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding it are described in detail in the subject inspection report. The violation is being cited in the Notice because it does not meet the criteria for a non-cited violation as given in the Enforcement Policy. Specifically, the violation does not meet condition 2.3.2.a.2 of the Enforcement Policy because, although the original NRC-identified violation was entered into the corrective action program, the loose bolts on flanged connections for safety-related HVAC Supply Air (HSA) ductwork (PSSC-050) were not brought into compliance and no objective evidence of plans to restore compliance was provided to demonstrate the bolts would be tightened within a reasonable period of time. In addition, the violation does not meet condition 2.3.2.a.3 of the enforcement policy for noncited violations because the failure to implement adequate corrective action for the previous violation represented a repetitive violation which was subsequently identified by the NRC, and could reasonably be expected to have been prevented by the licensee's corrective action program.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. If you have additional information that you believe the NRC should consider, you may provide it in your response to the Notice. The NRC review of your response to the Notice will also determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure(s), and your response, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy or proprietary 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/

Michael Ernstes, Chief
Construction Inspection Branch 3
Division of Construction Oversight

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

Enclosures: 1. Notice of Violation
2. NRC Inspection Report No. 70-3098/2016-004
w/attachment: Supplemental Information

cc w/encls: (See next page)

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. If you have additional information that you believe the NRC should consider, you may provide it in your response to the Notice. The NRC review of your response to the Notice will also determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

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Michael Ernstes, Chief
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cc w/encls: (See next page)

☒ PUBLICLY AVAILABLE ☐ NON-PUBLICLY AVAILABLE ☐ SENSITIVE ☒ NON-SENSITIVE
ADAMS: ☒ Yes ACCESSION NUMBER: **ML17037A321** ☒ SUNSI REVIEW COMPLETE ☒ FORM 665 ATTACHED

OFFICE	RII: DCO	RII: DCO	RII: DCO	RII: DCO	RII: DCO	RII: DCO	
SIGNATURE	/RA via Email/	/RA via Email/	/RA via Email/	/RA via Email/	/RA via Email/	/RA/	
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DATE	01/25/2017	01/30/2017	01/24/2017	01/25/2017	01/25/2017	02/02/2017	
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	

OFFICIAL RECORD COPY

cc w/encl:

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NOTICE OF VIOLATION

Shaw AREVA MOX Services
Aiken, South Carolina

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

During an NRC inspection conducted from October 24 to 28, 2016, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

Condition 3.A of the NRC Construction Authorization No. CAMOX-001, Revision (Rev.) 2, dated June 12, 2008, authorizes, in part, the applicant to construct a plutonium processing and mixed oxide fuel fabrication plant 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. 15).

The MPQAP, Section 5.1 states in part that, "Quality-affecting activities are prescribed by and performed in accordance with documented, approved QA procedures and other approved implementing documents (drawings, specifications, etc.) appropriate to the MOX Project work scope."

MOX Services DCS01-QGA-DS-SPE-V-15890-8, Construction Specification, Ductwork Fabrication and Installation Quality Level 1 (IROFS), Section 3.3.1.22 states in part that, "Fasteners for all ductwork shall be snug tight and provide for even compression of the gaskets. Snug tight shall be defined as the condition that exists when all of the plies in a connection have been pulled into firm contact by the bolts in the joint, and all the bolts in the joint have been tightened sufficiently to prevent the removal of the nuts without the use of a wrench."

Contrary to the above, from on or around December 23, 2015 to October 28 2016, MOX Services failed to adhere to specification DCS01-QGA-DS-SPE-V-15890-8, in that bolts used in assembling HSA ductwork in Room B-360 were found to be less than snug tight after final assembly. Specifically, at least one bolt was found to spin freely by hand alone as previously identified in NRC NCV 70-3098/2016-01-02 and documented in the applicant's corrective action program as condition report CR-2016-132 on March 22, 2016.

This is a Severity Level IV violation (VIO), 70-3098/2016-004-001 (Enforcement Policy 6.5.d).

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 MOX Fuel Fabrication Facility, 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 for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken; and (4) the date when full compliance will be achieved. Your response may reference or include previous 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 a Demand for Information may be issued requiring

information as to why the license should not be modified, suspended, or revoked, or why such other action 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, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Your response will be made available electronically for public inspection in the NRC Public Document Room or in the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy, proprietary, classified, 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. If Classified Information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR Part 95. In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days of receipt.

Dated this 2nd day of February 2017.

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 70-3098

Construction
Authorization No.: CAMOX-001

Report No.: 70-3098/2016-004

Applicant: CB&I AREVA MOX Services

Location: Savannah River Site
Aiken, South Carolina

Inspection Dates: October 1 – December 31, 2016

Inspectors: N. Karlovich, (Acting) Senior Resident Inspector, Construction
Inspection Branch (CIB) 3, Division of Construction Oversight
(DCO)
A. Artayet, Senior Construction Inspector, CIB2, DCO
C. Jones, Senior Construction Inspector, CIB4, DCO
C. Oelstrom, Construction Inspector, CIB4, DCO
D. Harmon, Construction Inspector, CIB2, DCO

Accompanying Personnel: M. Ernstes, Branch Chief, CIB3, DCO
W. Gloersen, Senior Construction Inspector, CIB3, DCO
D. Tiktinsky, Senior Project Manager, Fuel Manufacturing Branch
(FMB), Division of Fuel Cycle Safety and Environmental
Review (FCSE), Office of Nuclear Materials Safety and
Safeguards (NMSS)

Approved by: Michael Ernstes, Chief
Construction Inspection Branch 3
Division of Construction Oversight

EXECUTIVE SUMMARY

CB&I AREVA MOX Services (MOX Services)
Mixed Oxide (MOX) Fuel Fabrication Facility (MFFF)
NRC Inspection Report (IR) Number (No.) 70-3098/2016-004

The scope of the inspections encompassed a review of various MFFF activities related to Quality Level (QL)-1 (safety-related) construction for conformance to U.S. Nuclear Regulatory Commission (NRC) regulations, the Construction Authorization Request (CAR), the MOX Project Quality Assurance Plan (MPQAP), applicable sections of the license application (LA) and applicable industry codes and standards. This inspection included, as applicable, the following inspection attributes: Corrective action program, test control, special processes, procedures, and installation.

The following principle systems, structures and components (PSSCs) are discussed in this inspection report:

- PSSC-010, Double-Walled Pipe
- PSSC-011, Electrolyzer Structure
- PSSC-016, Emergency Generator Building Structure
- PSSC-021, Fire Barriers
- PSSC-026, Guide Sleeves
- PSSC-039, PTFE Insulator

Routine Resident Inspections

The inspectors routinely reviewed the applicant's weekly construction status package, reviewed the status of work packages maintained at various work sites, conducted daily tours of work and material storage areas, observed installation of mechanical equipment, and reviewed various corrective action documents to assess the adequacy of the MOX Services' corrective action program. Construction activities were performed in a safe and quality-related manner. No findings were identified. (Section 2.)

PSSC Inspections

PSSC-010, Double Walled Pipe

Demisters

The inspectors reviewed welding, inspection, and testing documents related to PSSC-010, Double-walled Pipe, as described in Table 5.6-1 of the MFFF CAR for demister KWD*DMST3030. The inspection attributes reviewed were control of special processes (welding and NDE) and pressure testing. No findings were identified.

Scrubbing Columns

The inspectors reviewed welding and inspection documents related to PSSC-010, Double-walled Pipe, as described in Table 5.6-1 of the MFFF CAR for scrubbing column KWG*CLMN2000. The inspection attributes reviewed were control of special processes (welding and NDE). No findings were identified.

PSSC-011, Electrolyzer Structure, PSSC-026, Guide Sleeves, and PSSC-039, PTFE Insulator

The inspectors reviewed construction activities related to PSSC-011, Electrolyzer Structure as described in Table 5.6-1 of the MFFF CAR. As these inspections were related to the installation of the Electrolyzer as a whole unit, the internal components of the electrolyzer were also within the scope of the inspection. The internal components of the electrolyzer include PSSC-026, Guide Sleeves, and PSSC 39, Polytetrafluoroethylene (PTFE) Insulator, as described in Table 5.6-1 of the MFFF CAR. The inspection attribute observed was installation. The inspectors independently measured the installation of the electrolyzer glovebox KDD *GB1000 in room C-340 to verify whether the location, placement, and orientation of the glovebox was in accordance with design drawings. No findings were identified.

PSSC-016, Emergency Generator Building Structure

The inspectors reviewed construction activities related to PSSC-016, Emergency Generator Building Structure, as described in Table 5.6-1 of the MFFF CAR. The inspection attributes observed were procedures and installation. The associated IROFS component was the basemat of the Emergency Generator Building (BEG) structure. Procedures and specifications associated with rebar installation and concrete placement of the BEG basemat conformed to the commitments contained in the CAR. Construction activities related to PSSC-016 were performed in accordance with procedures and specifications. The construction of the BEG basemat met the requirements of the project specifications and relevant industry standards. No findings were identified.

PSSC-021, Fire Barriers

The inspectors reviewed welding, inspection, and testing documents related to PSSC-021, Fire Barriers, as described in Table 5.6-1 of the MFFF CAR for IROFS fire damper MDE*DMPF0301C-02. The inspection attributes reviewed were control of special processes (welding and NDE) and bubble leak pressure testing. No findings were identified.

Programmatic Inspections

Corrective Action Program

In most instances, the requirements for problem identification and resolution specified in the MPQAP were implemented in a manner that provided reasonable assurance of quality. The detailed inspection activities identified SL IV VIO 70-3098/2016-04-01, Repeated Failure to Adequately Install HSA Ductwork Bolting. For the samples selected for this inspection, measures implemented by the applicant generally assured that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances were promptly identified and corrected. Documentation and reporting of conditions adverse to quality were performed in accordance with procedures and specifications. Quality Assurance records associated with these activities were maintained in accordance with project procedures. The inspectors also determined that the applicant had a functioning Employee Concerns Program and interviews indicated that management communications and training have emphasized the importance of maintaining a safety conscious work environment. All of the employees interviewed in this inspection exhibited a willingness to raise issues that may arise with workplace safety or nuclear quality assurance.

REPORT DETAILS

1. Summary of Facility Status

During the inspection period, the applicant (CB&I AREVA MOX Services (MOX Services)) continued construction activities of principal systems, structures and components (PSSCs). Construction activities continued related to closure of temporary construction openings (TCOs) related to walls in the MOX Processing Building (BMP). Other construction activities included staging of process piping and installation of supports in the Aqueous Polishing Building (BAP) and BMP; installation of process piping in the BAP; installation of ventilation system ductwork and supports in the BAP and BMP; installation of drip trays in the BAP; installation of fire dampers in the BAP and BMP; and installation of various gloveboxes in the BAP and BMP. The applicant continued to receive, store, assemble, and test glove boxes and process equipment at the Process Assembly Facility (PAF).

2. Routine Resident Inspection Activities; (Inspection Procedure (IP) 88130, Construction: Resident Inspection Program for On-Site Construction Activities at the Mixed Oxide Fuel Fabrication Facility)

a. Scope and Observations

The inspectors routinely reviewed the applicant's construction weekly status meeting notes. The inspectors held discussions with MOX Services design engineers, field engineers, quality assurance (QA) and quality control (QC) personnel, and subcontractor construction personnel in order to maintain current knowledge of construction activities and any problems or concerns.

The inspectors reviewed the status of work packages (WPs) maintained at various work sites.

The inspectors reviewed various corrective action documents. The review included non-conformance reports (NCRs) and condition reports (CRs). The inspectors also reviewed the closure of a selected NCR.

The inspectors routinely performed tours of the MOX Fuel Fabrication Facility (MFFF) work areas to observe ongoing work activities and communications.

b. Conclusions

Construction activities were performed in a safe and quality-related manner. No findings were identified.

3. PSSC Inspections

a. PSSC-010, Double-walled Pipe (IP 55050, Nuclear Welding; and IP 88136, Construction: Mechanical Components)

(1) Demisters

(a) Scope and Observations

The inspectors reviewed welding, inspection, and testing documents related to PSSC-010, Double-walled Pipe, as described in Table 5.6-1 of the MFFF CAR for demister KWD*DMST3030. The inspection attributes reviewed were control of special processes (welding and NDE) and pressure testing. The inspectors reviewed a selection of Diversified Metal Products (DMP) shop fabrication records from QC-RIR-14-50547 for the demister noted above located in the BAP. The inspectors reviewed the following completed quality records:

- engineering drawings;
- pipe and weld filler material records;
- welding procedure with supporting qualification records;
- welder qualification records;
- NDE personnel qualification record;
- liquid penetrant and radiographic examination reports; and
- reports for pneumatic helium leak and hydrostatic testing.

The inspectors verified that welding, inspections, and testing of the demister met the requirements of the ASME Section VIII, Division 1, Rules for Construction of Pressure Vessels. Specifically, the inspectors verified the following:

- traceable pipe and weld filler materials met applicable chemical analysis, mechanical properties, and intergranular corrosion testing;
- qualifications of a welding procedure and welders met essential variables;
- QC inspections were signed-off as acceptable by the proper level of qualified NDE personnel;
- liquid penetrant and radiographic examinations comply with ASME Section V, Nondestructive Examination, Articles 6 and 2, respectively; and
- pneumatic helium leak and hydrostatic pressure testing were deemed acceptable.

(b) Conclusion

No findings were identified.

(2) Scrubbing Columns

(a) Scope and Observations

The inspectors reviewed welding and inspection documents related to PSSC-010, Double-walled Pipe, as described in Table 5.6-1 of the MFFF CAR for scrubbing column KWG*CLMN2000. The inspection attributes reviewed were control of special processes (welding and NDE). The inspectors reviewed a selection of Newport News Industrial Corporation (NNI) shop fabrication records from QC-RIR-13-47898 for the scrubbing column noted above located in the BAP. The inspectors reviewed the following completed quality records:

- engineering drawings;
- weld history data reports;
- plate and weld filler material records;
- welding procedure with supporting qualification records;
- welder qualification records; and

- radiographic and ultrasonic examination reports.

The inspectors verified that welding and inspections of the scrubbing column met the requirements of the ASME Section VIII, Division 1, Rules for Construction of Pressure Vessels. Specifically, the inspectors verified the following:

- traceable pipe and weld filler materials met applicable chemical compositions and mechanical properties;
- qualifications of a welding procedure and welders met essential variables;
- QC inspections were signed-off as acceptable by the proper level of qualified NDE personnel; and
- radiographic and ultrasonic examinations comply with ASME Section V, Nondestructive Examination, Articles 2 and 5, respectively.

(b) Conclusions

No findings were identified.

b. PSSC-011, Electrolyzer Structure, PSSC-026, Guide Sleeves, and PSSC 39, PTFE Insulator (IP 88136, Construction: Mechanical Components)

(1) Scope and Observations

The inspectors reviewed construction activities related to PSSC-011, Electrolyzer Structure as described in Table 5.6-1 of the MFFF CAR. As these inspections were related to the installation of the electrolyzer as a whole unit, the internal components of the electrolyzer were also within the scope of the inspection. The internal components of the electrolyzer include PSSC-026, Guide Sleeves, and PSSC 39, Polytetrafluoroethylene (PTFE) Insulator, as described in Table 5.6-1 of the MFFF CAR. The inspection attribute observed was installation.

Specifically, the inspectors independently measured the installation of the electrolyzer glovebox KDD *GB1000 in room C-340 to verify whether the location, placement, and orientation of the glovebox was in accordance with design drawings. The inspectors also made independent measurements of the electrolyzer from the outside of the glovebox to verify that location, placement, and orientation of the electrolyzer was in accordance with design drawings and associated engineering change requests. The inspectors reviewed an NCR associated with the electrolyzer to verify that the disposition was adequately justified. The guide sleeves and PTFE Insulator are internally installed in the electrolyzer and were directly observed in IR 2011-004.

(2) Conclusion

No findings were identified.

c. PSSC-016, Emergency Generator Building (IP 88107, Design Control and IP 88132, Structural Concrete Activities)

(1) Scope and Observations

The inspectors reviewed construction activities related to PSSC-016, Emergency Generator Building Structure, as described in Table 5.6-1 of the MFFF CAR. The inspection attributes observed were procedures and installation. The associated IROFS component was the basemat of the Emergency Generator Building (BEG) structure.

The inspectors reviewed construction documents and inspected the rebar installation and concrete placement for the BEG basemat for PSSC 016. The inspectors reviewed the applicable sections of the MPQAP and verified QA procedures implemented the committed construction requirements.

Specifically, the inspectors observed rebar and form placement, walked down the batch plant and material storage areas, and observed the concrete placement to verify:

- the batch plant was inspected and certified to National Ready Mixed Concrete Association standards;
- materials were properly qualified and traceable to approved sources.
- storage and handling of materials were controlled;
- reinforcing steel and embed plates, were installed in accordance with specifications, codes, drawings, and procedures;
- concrete was sampled at the proper frequency for determination of temperature, slump, air content, and unit weight;
- test specimens (cylinders), for concrete strength testing were sampled at the required location and frequency;
- concrete batch tickets were reviewed for verification of proper mix, time, and amount of water;
- placement drop distances did not exceed specification requirements;
- vibrators were approved, and were used properly by trained individuals; and
- inspections during placement were performed as required and by qualified personnel.

In addition, the inspectors reviewed construction drawings, project procedures (PPs) and construction specifications associated with structural concrete work activities to determine whether the technical requirements were consistent with the commitments contained in the CAR, applicable codes and standards, and the BEG basemat design.

The inspectors also reviewed 28-day concrete strength test records to verify whether the records for the BEG Basemat pour contained the mix, location, time placed, water additions, and temperature of the concrete mix and ambient conditions and that the temperatures were in accordance with the specification. Additionally, the inspectors reviewed the test records to verify they met the strength for the mix used per the mixing and delivering specification.

(2) Conclusions

Procedures and specifications associated with rebar installation and concrete placement of the BEG basemat conformed to the commitments contained in the CAR. Construction activities related to PSSC-016 were performed in accordance with procedures and specifications. The construction of the BEG basemat met the requirements of the project specifications and relevant industry standards. No findings were identified.

d. PSSC-021, Fire Barriers (IP 55050, Nuclear Welding; and IP 88136, Construction: Mechanical Components)

(1) Scope and Observations

The inspectors reviewed welding, inspection, and testing documents related to PSSC-021, Fire Barriers, as described in Table 5.6-1 of the MFFF CAR for IROFS fire damper MDE*DMPF0301C-02. The inspection attributes reviewed were control of special processes (welding and NDE) and bubble leak pressure testing. The inspectors reviewed a selection of Superior Air Handling, Flanders, and Greenheck shop fabrication records from QC-RIR-13-45150 for the IROFS component fire damper noted above located in the BMP. The inspectors reviewed the following completed quality records:

- process traveler;
- weld map drawing;
- sheet metal and weld filler material records;
- welding procedure with supporting qualification record;
- welder qualification records;
- NDE personnel qualification records; and
- reports for visual inspection and bubble leak pressure testing.

The inspectors verified that welding, inspections, and testing of the fire damper met the requirements of the American Welding Society (AWS) D9.1, Sheet Metal Welding Code, and Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) standards and practices. Specifically, the inspectors verified the following:

- sheet metal and weld filler materials met applicable chemical compositions and mechanical properties;
- qualifications of a welding procedure and welders met essential variables;
- QC inspections were signed-off as acceptable by the proper level of qualified NDE personnel; and
- bubble leak pressure testing was deemed acceptable.

(2) Conclusion

No findings were identified.

4. Programmatic Inspections

a. Quality Assurance: Problem Identification, Resolution and Corrective Actions (IP 88110)

(1) Scope and Observations

The inspection scope provided a review of the applicant's corrective action program to assess its adequacy and to determine whether it was effectively implemented. Inspection activities included a review of procedures associated with problem identification, resolution, and corrective actions. In addition, program implementation was evaluated by sampling Condition Reports (CRs) and Nonconformance Reports (NCRs) that were initiated by the applicant to verify that there was proper documentation, prioritization, and resolution of problems identified. The review scope

included assessments of the classifications of conditions, timeliness, and adequacy of corrective actions.

(a) Procedures

The inspectors reviewed implementing procedures for the identification, evaluation, and correction of conditions adverse to quality. The review specifically examined changes made to the procedures since October 2015 to determine whether the procedures maintained by the applicant followed the MOX Project Quality Assurance Plan (MPQAP) requirements and applicable License Application commitments. The review scope included an evaluation of whether the following corrective action program performance attributes were addressed:

- complete and accurate identification of problems in a timely manner commensurate with their significance and ease of discovery;
- classification and prioritization of conditions adverse to quality;
- screening of items entered into the corrective action program as necessary to determine the proper level of evaluation;
- program considerations for extent of conditions, generic implications, common causes, and previous occurrences, as appropriate;
- for significant conditions adverse to quality, identification of root and contributing causes, as well as actions to preclude recurrence;
- identification and timely completion of corrective actions that were appropriately focused to correct the problems; and
- overview of trends in conditions adverse to quality and provisions for follow-up action and reporting to higher management where corrective action program implementation is indicated to be ineffective.

The inspection of procedures for the corrective action program, including the employee concerns program (ECP), confirmed the most current versions of the procedures followed the MPQAP requirements and applicable License Application commitments.

(b) Identification and Classification of Conditions Adverse to Quality

The inspectors evaluated the implementation of measures to promptly identify conditions adverse to quality such as failures, malfunctions, deficiencies, deviations, nonconformances, and significant conditions adverse to quality. A diverse sample of corrective action program records completed since October 2015 were reviewed to verify that conditions adverse to quality were appropriately classified according to their significance and corrective actions were defined accordingly. The inspection sample included issues related to conditions adverse to quality and items that had been determined to not represent conditions adverse to quality in order to evaluate the threshold for entry of problems into the corrective action program. The review by the inspectors also determined whether issues entered into the corrective action program included findings and adverse conditions identified in audit reports, internal surveillance reports, corrective action trend reports, and management assessments. Direct observations of a management review committee meeting were conducted to verify responsible management, including senior management were informed and engaged in assuring the proper handling of corrective action program items.

The inspectors determined that the Mixed Oxide Fuel Fabrication Facility (MFFF) had an appropriately low threshold for entering issues into the corrective action program. The inspectors noted that problems and issues were being identified and corrected using a variety of processes such as CRs, NCRs, Unsatisfactory Inspection Reports, Engineering Change Requests, and Field Change Requests.

(c) Documentation and Reporting of Conditions Adverse to Quality

The inspectors reviewed corrective action program records completed since October 2015 and interviewed responsible personnel to determine whether the following measures were implemented in accordance with procedures:

- determination of the extent of condition for conditions adverse to quality;
- designation of appropriate priority for conditions adverse to quality corrective actions and timely implementation of interim preventive measures in instances where extended periods may be necessary to accomplish remediation of problems;
- screening for potentially significant conditions to determine whether reviewers adequately considered risk, safety significance, consequence of malfunctions or failures, complexity of design and fabrication, needs for special controls or surveillance over activities;
- designation of appropriate investigation methods to ensure the proper determination of root, apparent, and/or contributing causes; and
- implementation of timely and effective corrective actions, including actions to prevent recurrence where required by procedure.

The inspectors reviewed a sample of records for completed NCRs to determine whether nonconformances were correctly and clearly identified, documented conditions were appropriately screened for non-hardware related conditions adverse to quality; dispositions were properly identified and documented; dispositions of use-as-is or repair were subjected to design control measures commensurate with those applied to the original design, and repaired or reworked items were re-examined in accordance with applicable procedures and with the original acceptance criteria.

Based on the inspection sample, the inspectors determined screenings for safety significance were properly conceived and performed in accordance with procedure. In most cases, evaluations for extent of condition covered appropriate scope and were reasonably documented. Causal evaluations met the requirements of the project procedure.

(d) Follow-up, Closure, and Trending

The inspectors reviewed documented results of corrective action effectiveness reviews, reports of corrective action program audits and surveillances, and records of program assessments to determine whether the effectiveness of program activities was determined and reported to the appropriate organizations and management. The scope of review included verifications that findings identified in previous NRC inspections had been entered into the corrective action program and had been remediated as required.

The inspectors reviewed a sample of recent trend reports to determine whether the reports were issued within the time frames established by procedures; the content of the

trend reports contained information and analysis of corrective action program performance; and corrective action program inputs were generated for adverse trends or recommendations as required by program procedures.

The inspectors also compared the results of the audits, self-assessments, and trending to the results of this inspection to determine if there were any discrepancies between the results of the inspection and the applicant's conclusions.

In most cases, corrective actions were found to address the identified issues and were completed within time frames authorized by responsible management. Assessments and trending of corrective action performance were being performed in accordance with management expectations and were consistent with observations from this inspection. No significant adverse trends were currently identified by the applicant.

An NRC-identified Severity Level (SL) IV violation of the MPQAP Section 5, Instructions, Procedures, and Drawings, was identified for a failure to perform activities in accordance with documented instructions and procedures. Specifically, the applicant failed to perform installation of an IROFS in accordance with the specifications.

i. Description

In March 2016, NRC inspectors identified multiple instances of loose bolts on flanged connections for safety-related HVAC Supply Air (HSA) ductwork (PSSC-050). The installation of the bolts had been inspected and documented as complete, but had not been tightened in accordance with specifications. This was found to be a SL IV non-cited violation and documented in NRC inspection report 70-3098/2016-001. The licensee entered the finding into their corrective action program as condition report CR-16-132 which subsequently was completed, verified, and authenticated as a quality record in August 2016.

During NRC review of condition reports in October 2016, the inspectors noted that CR-16-132 did not identify actions to tighten the loose bolts in accordance with specifications. In addition, the applicant had not identified an alternative corrective action process, such as a nonconformance report to properly tighten the bolts. When the inspectors conducted a partial field walk-down of the previously cited ductwork, they identified that the bolts were still not installed in accordance with the specifications.

The inspectors reviewed procedure PP11-29, HVAC Duct and Housing Testing for Nuclear Clean Air Systems to determine if future activities were likely to correct the condition. However, PP11-29 did not require a 100% verification of bolt torque and installation, it only directed the applicant to correct bolting if a leak is identified during the leak test. The inspectors were not able to find justification or objective evidence from the applicant for using a leak test to determine bolt engagement. Additionally, a leak test would not give reasonable assurance that the bolted connections, which might not leak during the test, would not come loose from vibration during service or that it would be able to withstand a design basis earthquake.

ii. Analysis

The detailed inspection activities identified a failure to perform IROFS installation in accordance with the written specifications, as required by MPQAP Section 5, Instructions, Procedures, and Drawings, where bolted connections did not meet requirements for HSA ductwork. The existence of nonconforming bolted connections had previously been identified by NRC inspectors as more than minor because it resulted in an adverse impact to the quality of the construction of safety-related components and could result in the inability of the Seismic Category 1 system to maintain pressure boundary integrity.

The inspectors determined that the repeated failure to install the ductwork in accordance with the specification was more than minor because it represented a failure to follow procedures that resulted in an adverse effect on the quality of the construction of IROFS components.

This finding was screened as SL IV in accordance with NRC enforcement policy section 6.5 d, example 1, which states, "A licensee fails to meet regulatory requirements, including one or more QA criteria that have more than minor safety or security significance."

iii. Enforcement

Condition 3.A of the NRC Construction Authorization No. CAMOX-001, Revision (Rev.) 2, dated June 12, 2008, authorizes, in part, the applicant to construct a plutonium processing and mixed oxide fuel fabrication plant 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. 15).

MPQAP, Section 5.1 states in part that, "Quality-affecting activities are prescribed by and performed in accordance with documented, approved QA procedures and other approved implementing documents (drawings, specifications, etc.) appropriate to the MOX Project work scope."

MOX Services DCS01-QGA-DS-SPE-V-15890-8, Construction Specification, Ductwork Fabrication and Installation Quality Level 1 (IROFS), Section 3.3.1.22 states in part that, "Fasteners for all ductwork shall be snug tight and provide for even compression of the gaskets. Snug tight shall be defined as the condition that exists when all of the plies in a connection have been pulled into firm contact by the bolts in the joint, and all the bolts in the joint have been tightened sufficiently to prevent the removal of the nuts without the use of a wrench."

Contrary to the above, from on or around December 23, 2015 to October 28 2016, MOX Services failed to adhere to specification DCS01-QGA-DS-SPE-V-15890-8, in that bolts used in assembling HSA ductwork in Room B-360 were found to be less than snug tight after final assembly. Specifically, at least one bolt was found to spin freely by hand alone.

This is a violation of MPQAP, Section 5.1, and is being treated as a severity level IV violation using Section 6.5 of the NRC Enforcement policy. Because this violation was identified by the NRC and was repetitive as a result of inadequate corrective action, it is treated as a cited violation, consistent with Sections

2.3.2.a.2 and 2.3.2.a.3 of the NRC Enforcement Policy. In summary, the violation is identified as an SL IV violation (VIO) 70-3098/2016-04-01, Repeated Failure to Adequately Install HSA Ductwork (PSSC-050) Bolting.

The applicant initiated Condition Report 16-396 and Nonconformance Report 16-7242 to address the finding.

(e) Employee Concerns Program

The inspectors conducted reviews to provide insight into whether a safety conscious work environment was being maintained. The review also assessed the effectiveness of the employee concerns program, and evaluated management oversight of the corrective action process in regards to handling of anonymous corrective action program entries.

The inspection scope included interviews with a diverse sample of twelve applicant and contracted employees including craft workers, crew leads, foremen, quality control inspectors, engineers, and MOX Services managers. The interviews were performed to determine whether there were factors at the construction project that would produce a "chilling" effect or reluctance to report issues.

Feedback obtained in the interviews consistently indicated management has not discouraged identification of problems or expression of concerns. Specifically:

- employees reported that when issues were identified, management was responsive in addressing them;
- most persons interviewed stated they were aware of and knew how to contact the employee Concerns Program (e.g. Hot Line telephone and Drop Boxes);
- employees felt comfortable raising safety concerns to either management or the employee Concerns Program. For perspective, very few individuals indicated they had any direct interactions with the Employee Concerns Program; and
- in regards to perspectives about safety conscious work environment (SCWE) everyone interviewed had observed frequent and positive management emphasis on maintaining workplace safety. On the other hand, very few individuals exhibited an understanding that a properly scoped SCWE should also provide assurance of nuclear safety. Although most did not directly associate the use of quality assurance program measures with SCWE, everyone was aware of the expectation to reliably implement quality program controls for items relied for safety.

Documents reviewed for the inspection of problem identification, resolution, and corrective action are listed in the Attachment.

(2) Conclusions

In most instances, the requirements for problem identification and resolution specified in the MPQAP were implemented in a manner that provided reasonable assurance of quality. The detailed inspection activities identified SL IV VIO 70-3098/2016-04-01, Repeated Failure to Adequately Install HSA Ductwork Bolting. For the samples selected for this inspection, measures implemented by the applicant generally assured that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances were promptly identified and

corrected. Documentation and reporting of conditions adverse to quality were performed in accordance with procedures and specifications. Quality Assurance records associated with these activities were maintained in accordance with project procedures. The inspectors also determined that the applicant had a functioning Employee Concerns Program and interviews indicated that management communications and training have emphasized the importance of maintaining a safety conscious work environment. All of the employees interviewed in this inspection exhibited a willingness to raise issues that may arise with workplace safety or nuclear quality assurance.

5. Exit Interview

The inspection scope and results were summarized throughout this reporting period and by the Senior Resident Inspector at an exit meeting with applicant management on January 12, 2017. The applicant expressed dissenting views concerning (VIO) 70-3098/2016-04-01, Repeated Failure to Adequately Install HSA Ductwork (PSSC-050) Bolting. Although proprietary documents and processes may have been reviewed during this inspection, the proprietary nature of these documents or processes was not included in this report.

SUPPLEMENTAL INFORMATION

1. PARTIAL LIST OF PERSONS CONTACTED

A. Chiaramonte, QA Programs Manager
D. Del Vecchio, President and Chief Operating Officer
P. Duvall, Nuclear Safety
R. Eble, Nuclear Safety
M. Gober, Vice President, Engineering
D. Gwyn, Licensing/Nuclear Safety Manager
D. Ivey, Project Assurance Manager
A. Johnston, Quality Control, Mechanical & Structural Lead
J. Keklak, QA Manager
D. Livernois, Quality Control Manager
R. Morgan, System One
R. Nash, Operations Manager
A. Olorunniwo, Engineering Manager
F. Pinkston, ECP Manager
E. Radford, Regulatory Compliance Manager
J. Starling, Nuclear Safety
G. Rousseau, Executive Vice President, Deputy Project Manager
D. Yates, Licensing
B. Ward, VP Construction (Acting)

2. INSPECTION PROCEDURES (IPs) USED

IP 88110	Quality Assurance: Problem Identification, Resolution and Corrective Action
IP 88130	Resident Inspection Program For On-Site Construction Activities at the Mixed-Oxide Fuel Fabrication Facility
IP 88132	Structural Concrete Activities
IP 88136	Mechanical Components

3. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

<u>Item Number</u>	<u>Status</u>	<u>Description</u>
70-3098/2016-04-01	Opened	VIO: Repeated Failure to Adequately Install HSA Ductwork Bolting (Section 4.d).

4. LIST OF ACRONYMS USED

ADAMS	Agency-Wide Document Access and Management System
ASME	American Society of Mechanical Engineers
AWS	American Welding Society
BAP	Aqueous Polishing Building
BEG	Emergency Diesel Generator Building
BMP	MOX Processing Building
CAR	Construction Authorization Request

CB&I	Chicago Bridge and Iron
CFR	Code of Federal Regulations
CIB 2	Construction Inspection Branch 2
CIB3	Construction Inspection Branch 3
CIB 4	Construction Inspection Branch 4
CR	Condition Report
DCO	Division of Construction Oversight
DMP	Diversified Metal Products
ECP	Employee Concerns Program
FCSE	Fuel Cycle Safety and Environmental Review
FMB	Fuel Manufacturing Branch
HVAC	Heating, Ventilation, and Air Conditioning
IP	Inspection Procedure
IR	Inspection Report
IROFS	Items Relied on for Safety
LA	License Application
MFFF	MOX Fuel Fabrication Facility
MOX	Mixed Oxide
MOX Services	CB&I AREVA MOX Services
MPQAP	MOX Project Quality Assurance Plan
NCR	Non-conformance Report
NDE	Non-destructive Examination
NMSS	Office of Nuclear Materials Safety and Safeguards
NNI	Newport News Industrial Corporation
No.	Number
NRC	Nuclear Regulatory Commission
PAF	Process Assembly Facility
PP	Project Procedure
PSSC(s)	Principle System(s), Structure(s), and Component(s)
PTFE	Polytetrafluoroethylene Insulator
QA	Quality Assurance
QAP	Quality Assurance Program
QC	Quality Control
QL-1	Quality Level 1
SCWE	Safety Conscience Work Environment
SL	Severity Level
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
TCO	Temporary Construction Opening
WP	Work Package

5. **LIST OF PSSCs REVIEWED**

PSSC-010, Double-Walled Pipe
 PSSC-011, Electrolyzer Structure
 PSSC-016, Emergency Generator Building Structure
 PSSC-021, Fire Barriers
 PSSC-026, Guide Sleeves
 PSSC-039, PTFE Insulator

6. **RECORDS AND DOCUMENTS REVIEWED**

Condition Reports

10888-MOX-CR-15-316, (NRC Identified) Minimum weld size code requirements not met
 10888-MOX-CR-15-385, Wrong grade of stainless steel used in fabrication of spool
 10888-MOX-CR-15-393, (Level B) Safe tack-welding practices
 10888-MOX-CR-15-395, Incorrect weld filler material
 10888-MOX-CR-15-423, Root cause analysis performed without following criteria Of PP3-25
 10888-MOX-CR-15-440, Material used not meeting design Specification

10888-MOX-CR-15-441, (NRC Identified) Pipe support relocation without authorization
 10888-MOX-CR-15-469, Preventive Maintenance System Ineffective for Equipment in MFFF
 10888-MOX-CR-15-499, Failure to meet random drug testing requirement
 10888-MOX-CR-16-004, (NRC Identified) Intermittent Groove Welds for Stainless Steel Equipment Support
 10888-MOX-CR-16-008, Control of nonconforming items
 10888-MOX-CR-16-036 (Level B), RAX*1000-8000 Storage Conditions
 10888-MOX-CR-16-038, Welded 100% X-rayed stainless steel 304L pipe was used in lieu of seamless stainless steel 304L pipe
 10888-MOX-CR-16-042, Inadequate Storage of QL-1 Materials
 10888-MOX-CR-16-049, Bypassed hold points for WP 14-C145-ZMS-S-2003-M-2224
 10888-MOX-CR-16-077, Over-torque of Bolts
 10888-MOX-CR-16-123, Damage to Torqued Bolts from Weld Prep Work
 10888-MOX-CR-16-126, Final Accepted Pipe Supports Removed Without Work Package / Approval
 10888-MOX-CR-16-132, (NRC Identified) Fasteners
 10888-MOX-CR-16-151, Incomplete CRs Submitted for Record
 10888-MOX-CR-16-152, Design Verification performed by incorrect person
 10888-MOX-CR-16-158, Failure to follow design output drawings
 10888-MOX-CR-16-193, Lost QL-1 material
 10888-MOX-CR-16-195, Conflicting information on drawing
 10888-MOX-CR-16-271, Potential Trend in Superior Air Handling CRs
 10888-MOX-CR-16-274, HVAC Bolted Connection Nut Orientation
 10888-MOX-CR-16-396, CR 16-132 identified a CAQ but did not implement corrective actions
 10888-MOX-CR-16-397, CR 15-441 did not contain required cause or extent of condition investigations or actions to prevent recurrence

Drawings

DCS01-BMF-DS-PLF-B-01352, MOX Fuel Fabrication Facility BMF Area Concrete and Reinforcing General Notes, Rev. 16
 Sheet 1 of 4
 Sheet 2 of 4
 Sheet 3 of 4
 Sheet 4 of 4

DCS01-BMF-DS-PLF-B-05355, MOX Fuel Fabrication Facility BEG Area Concrete and Reinforcing Floor and Roof Plans, Rev. 1

DCS01-BEG-DS-PLS-B-15355, MOX Fuel Fabrication Facility BEG Area Embedded Plate Locations Floor Plant 272'-6", Rev. 5

DCS01-BMF-DS-PLS-B-01772, MOX Fuel Fabrication Facility BAP, BMP, & BSR Areas Embedded Plate Schedule, Rev. 5

DCS01-BMF-DS-PLS-B-01772, MOX Fuel Fabrication Facility BAP, BMP, & BSR Areas Standard Dedicated Embedded Plates Typical Details, Rev. 6

Sheet 3 of 12

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Sheet 6 of 12

Shaw/AREVA MOX Services, Aqueous Polishing Area Demister 100M3/H Type 100-1 Equipment Data Sheet, 07866, Rev. 1

CBI/AREVA MOX Services, Piping & Instrument Diagram Aqueous Polishing Area Unit KWG – Off Gas Treatment Scrubbing CLMN2000, MFFF Processing Plant, 16774, Rev. 4

Superior Air Handling, 13" Diameter Inline Fire Damper Sleeve, 53144, Rev. 0

DCS01-KDD-MG-PLI-M-10150, KDD *GB1000 Electrolyzer Glovebox, Rev. 2

DCS01-KDD-MG-PLI-M-02101, Electrolyzer KDD*EZR1000 and KDD*EZR2000 Electrolyzer EZR Subassembly View, Rev. 1

DCS01-KDD-MG-PLI-M-10100, KDD*GB1000 Electrolyzer Glovebox General Arrangement, Rev. 2

DCS01-ZMU-MG-PLI-M-70674, Electrolyzer Glovebox Electrolyzer EZR Sub-Critical Geometry Drawing, Rev. 1

Engineering Change Requests (ECRs)

ECR 028454, Rev. 2

ECR 000821, Rev. 1

ECR 011013, Rev. 6

ECR-024588, KDD*GB1000 Heat Detector Relocation, Rev. 0

ECR-016028, ECR for documenting Redline Changes, Rev. 0

ECR-028256, Update Several Sub-critical Dimensions, Rev. 0

Nonconformance Reports (NCRs)

10888-MOX-NCR-16-14-5782, Standing water BMP Rm 186

10888-MOX-NCR-16-14-5784, Leaking Water BMP Rm 186

10888-MOX-NCR-16-15-6516, Welding without filler metal

10888-MOX-NCR-16-15-6554, Embedment plates not installed prior to concrete pour

10888-MOX-NCR-16-15-6570, Grinding activities reduced component beyond thickness tolerances

10888-MOX-NCR-16-15-6581, Insufficient grout area

10888-MOX-NCR-16-15-6600, Undersized weld
 10888-MOX-NCR-16-15-6611, Welding performed after QC signed off
 10888-MOX-NCR-16-15-6634, Vertical Welding Pipe Support
 10888-MOX-NCR-16-15-6673, Cracks behind anchor holes
 10888-MOX-NCR-16-16-6715, Pipe slope out of tolerance
 10888-MOX-NCR-16-7245, Electrolyzer Insulators/Isolators, Entered 10/31/16
 10888-MOX-NCR-16-7242, Signed off HVAC connection bolt was found loose during NRC walkdown

Miscellaneous

BASF Admixture Dispensing System Calibration Letter, dated October 12, 2016
 Inspection Plan C112, Pre-Placement Inspection, Rev. 24
 Lab Report number 73933, BEG Basemat Sample for ticket number 7752, report dated 12/1/16
 Lab Report number 73935, BEG Basemat Sample for ticket number 9059, report dated 12/1/16
 Lab Report number 73936, BEG Basemat Sample for ticket number 9063, report dated 12/1/16
 Lab Report number 73937, BEG Basemat Sample for ticket number 7771, report dated 12/1/16
 Lab Report number 73938, BEG Basemat Sample for ticket number 7776, report dated 12/1/16
 Lab Report number 73939, BEG Basemat Sample for ticket number 7784, report dated 12/1/16
 Lab Report number 73940, BEG Basemat Sample for ticket number 7791, report dated 12/1/16
 Lab Report number 73941, BEG Basemat Sample for ticket number 9085, report dated 12/1/16
 Lab Report number 73942, BEG Basemat Sample for ticket number 7800, report dated 12/1/16
 Lab Report number 73943, BEG Basemat Sample for ticket number 9095, report dated 12/1/16
 Lab Report number 73944, BEG Basemat Sample for ticket number 7811, report dated 12/1/16
 SQAP-42, Status of the CBI/AREVA MOX Services, LLC Quality Assurance Program, Reporting Period 042 (2nd 6 months of Calendar Year 2015), dated 2/29/2016
 SQAP-043, Status of the CB&I/ AREVA MOX Services, LLC Quality Assurance Program Reporting Period 043 (01 January 2016 through 30 June 2016), dated August 31, 2016
 Training Status Report QAQC 1047, CR Investigation, dated 10/25/2016

Other IROFS Specific Documents

Demister KWD*DMST3030:

Lincoln Structural Solutions (LSS), Certificate of Conformance, PO Number 48327 for 1/2" dia. SA312 Type 316L Schedule 80S Seamless pipe 20' RL, Heat/Lot # V30340, January 17, 2014

LSS, CMTR L0488AS-0, Heat/Lot # V30340, 2 pages, 1/15/2014

Laboratory Testing Inc., Certified Test Report LSS001-14-01-00139-1, Intergranular Corrosion Test ASTM A262-13 Practice A, Heat/Lot # V30340, 2 pages, 1/8/2014

Kobe Special Tube Co., Ltd., Mill Certificate 130723-F011-01/01, Heat/Lot # V30340, 12/27/13

Sandvik, Material Certificate 201200201, Work Order/Lot 848367, SFA-5.9, ER316/ER316L, .063" dia., Heat # 529035, 1/3/2012

American Metallurgical Services, Report of Analysis, PO# 45546, Heat # 529035, Items # 2, 6, and 9 (3 pages), 1/31/2012

Sandvik, Material Certificate 201110377, Work Order/Lot 840436, SFA-5.9, ER316Si/ER316LSi, .035" dia., Heat # E101311, 3/18/2011

American Metallurgical Services, Report of Analysis, PO# 44132, Heat # E101311, 1/16/2011

Diversified Metal Products, WPS SS 2.0 with PQRs SS 2.0 & SS 2.0G, GTAW, Rev. 7

Diversified Metal Products, WPS SS 4.0 with PQR SS 4.1, GMAW Tri-Mix gas, Rev. 8

Diversified Metal Products, three GMAW WPQRs, Welder IDs: DJ-04-57 (8/10/04), SS-00-141 (12/21/00), and JCN-12-40 (6/27/2012)

Diversified Metal Products, three GTAW WPQRs, Welder IDs: DJ-11-86 (9/22/2011), SS-13-30 (12/30/2013), and JCN-12-41 (6/27/2012)

Diversified Metal Products, NDE Personnel Certification Record, K. Staker, PT (Level II), 8/27/2013

Diversified Metal Products, NDE PT Examination Report # 14-0422, Weld Map KWD*DMST3030-WM, for two Weld-Nos. ID W13 & W16, signed by Level II on 3/31/2014

Quality Inspection Services, Radiographic Inspection Report # 14-0408 (6 pages) for six Weld-Nos. W1, W2, W3, W6 (with repair W6R1), W8, and W9, signed by Level II between 2/19/2014 and 3/25/2014

Diversified Metal Products, Helium Leak Test Report 14-0411, Detector Probe Technique, KWD*DMST3030, 3/27/2014

Diversified Metal Products, Hydrostatic Test Report 14-0413, KWD*DMST3030, 3/31/2014

Scrubbing Column KWG*CLMN2000:

Lincoln Structural Solutions (LSS), Certificate of Conformance, PO Number 013499 for 5 mm X 48" X 96" SA240 Type 304L Plate, Heat/Lot # A1HX, Rev. 1, 8/8/2012

LSS, CMTR L02992A5-0, Heat/Lot # A1HX, 2 pages, Rev. 2, 11/28/2012

Laboratory Testing Inc., Certified Test Report LSS001-12-11-43191-1, Intergranular Corrosion Test ASTM A262-10 Practice A, Heat/Lot # A1HX, 11/15/2012

Olson Associates, Ultrasonic Inspection Report 012-0243 per ASTM A577 using 9" grid, Part-No. L02992AS, Heat-No. A1HX, 5 mm X 48" X 96", signed by Level III 7/16/2012

Sandvik, Material Certificate 201243070, Work Order/Lot 858685, SFA-5.9, ER308/ER308L, .035", Heat # 532297, 11/20/2012

Laboratory Testing Inc., Certified Test Report NNI004-13-02-06474-1, SFA-5.9, ER308L, .035" dia., Heat # 13NNI075/532297, LI20000, 2/21/2013

Laboratory Testing Inc., Certified Test Report NNI004-13-02-06474-2, SFA-5.9, ER308L, .045" dia., Heat # 13NNI075/532297, LI30000, 2/21/2013

Newport News Industrial Corporation (NNI), Liaison No. 6820-F-13-068, Weld Map MC2000 Sheet 12 of 15, Off Gas Scrubbing Column, Rev. 2

NNI, Structural Weld History Data Report for Joint-Nos. G2000-001, -005, -006, -019, -021, -022, and -127 with acceptable fit-up/tack and final PT inspections between 3/5/2013 and 6/11/2013

NNI, Instruction 6820-F-W005 for CH 703-2 (QL-1) Pulsed and Misc. 304 SST Columns – Welding Procedure Specifications, Rev. H

NNI, WPS 8.5-001 with PQR 00032, GTAW, Rev. 7

NNI, WPS 8.5-012 with PQR 00104-1, GTAW, Rev. 6

NNI, WPS 8.5-025 with PQR 00222, GTAW, Rev. 1

NNI, WPS 8.5-026 with PQR 00104-1, GTAW, Rev. 5

NNI/Northrop Grumman, nine GTAW WPQRs, Welder Stamps: 10621, 11630, 14926, 21875, 46015, 50538, 54746, 60137, and 73428

Advex Corporation, Radiographic Technique and Interpretation Reports, for five Weld-Nos. P002, P003 (with repairs P003R1 and R2), P005, P006, and P007

Advex Corporation, NDE Inspection Report, Ultrasonic Inspection Records 2617, 2618, 2623, 2624, 2627, 2628, 2630, and 2631 for Weld-Nos. P001 and P021 for angle and longitudinal beams (including repairs)

Fire Damper MDE*DMPF0301C-02:

Element Materials Technology, Test Report 98-1291, A5.9-06, ER308/308L, Heat # 734815, 8/10/2012

Element Materials Technology, Test Report 98-1292, A5.9-06, ER308/308L, Heat # 742336, 8/10/2012

Superior Air Handling, Process Traveler 0387 (3 pages) with 22 Process Steps, Weld Map Detail and VT Inspection Report for Fire Damper with QA sign-offs (dimensional check, recording of material heat numbers, visual inspection of all welds, recording of WPS-No. 11, Welder IDs 37 and 85, and Filler Heat-Nos. 734815 and 742336)

Greenheck, AWS D9.1 WPS 11-GM-GV-H with 11-GM-GV-PQR, GMAW-S Tri-Mix gas, Rev. 1

Flanders, AWS D9.1 Welder Qualification Record, GMAW (STT), 11 gauge, Stamp-No. 118, 11/3/2011

Flanders, ASME IX WPQ, GTAW, all positions, Welder Stamp 455, 7/1/2011

Superior Air Handling, four AWS D9.1 WPQR, GMAW-SC and GTAW both 3G and 4G, 10 gauge, Welder ID 37

Flanders, Nondestructive Testing Personnel Qualification Record, Leak Test/Bubble Test, Employee IDs 16054, 59162, and 59237

Flanders, Nondestructive Testing Personnel Qualification Record, Visual Inspection, Employee IDs 59162

Flanders, Certificate of Requalification, A. Cooper (VT Level II, 1/20/2012); J. Williams (VT, 1/20/2012); JK Pollard (VT Level II, 1/20/2012); T. Drake (VT Level II, 1/20/2012); and B. Walker (VT Level II, 5/24/2012)

Flanders, Leak Test Report (pressure decay method using soap bubble leak detection), Housing Model No. 13" Dia. Inline MDE-DMPF0301C-02, 1026030-53144, 2/15/2013

Project Procedures

PP3-01, Rev. 9, Employee Concerns Program
 PP3-02, Rev. 5, ICN01, Trend Analysis
 PP3-05, Rev. 11, ICN04, Control of Nonconforming Items
 PP3-06, Rev. 17, ICN04, Corrective Action Process
 PP3-25, Rev. 4, ICN03, Root Cause Analysis
 PP11-33, Rev. 0, Housekeeping and Work Area Cleanliness

Specifications

DCS01-BKA-DS-SPE-B-09330-8, Placing Concrete and Reinforcing Steel for Quality Level 1, 2, 3, and 4, Rev. 8
 DCS01-BKA-DS-SPE-B-09325-6, Mixing and Delivering for Quality Level QL-1 and QL-2 Concrete, Rev. 6

Letter to D. Del Vecchio from Mike Ernstes dated February 2, 2017.

SUBJECT: MIXED OXIDE FUEL FABRICATION FACILITY- NRC INSPECTION REPORT
NUMBER 70-3098/2016-004 AND NOTICE OF VIOLATION

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