



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

October 17, 2016

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 70-3098/2016-003**

Dear Mr. Del Vecchio:

During the period from July 1, 2016 through September 30, 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, no violations or deviations were identified. In accordance with 10 CFR 2.390 of NRC's "Rules of Practice and Procedure," a copy of this letter and its enclosure 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>.

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

Enclosure: NRC Inspection Report No. 70-3098/2016-003  
w/attachment: Supplemental Information

cc w/encl: (See next page)

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

Enclosure: NRC Inspection Report No. 70-3098/2016-003  
 w/attachment: Supplemental Information

cc w/encl: (See next page)

PUBLICLY AVAILABLE  NON-PUBLICLY AVAILABLE  SENSITIVE  NON-SENSITIVE  
 ADAMS:  Yes ACCESSION NUMBER: **ML16292A868**  SUNSI REVIEW COMPLETE  FORM 665 ATTACHED

|              |             |            |             |             |            |            |            |
|--------------|-------------|------------|-------------|-------------|------------|------------|------------|
| OFFICE       | RII: DCO    | RII: DCO   | RII: DCO    | RII: DCO    | RII: DCO   | RII: DCO   | RII: DCO   |
| SIGNATURE    | /RA/        | /RA/       | /RA/        | /RA/        | /RA/       | /RA/       | /RA/       |
| NAME         | W. Gloersen | P. Carman  | C. Oelstrom | T. Steadham | K. McCurry | J. Vasquez | M. Ernstes |
| DATE         | 10/13/2016  | 10/11/2016 | 10/06/2016  | 10/07/2016  | 10/11/2016 | 10/12/2016 | 10/17/2016 |
| E-MAIL COPY? | YES NO      | YES NO     | YES NO      | YES NO      | YES NO     | YES NO     | YES NO     |

cc w/encl:

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

Ms. Joyce Connery, Chairman  
Defense Nuclear Facilities Safety Board  
625 Indiana Ave., NW, Suite 700  
Washington, DC 20004

Mr. Joseph Olencz, NNSA/HQ  
1000 Independence Ave., SW  
Washington, DC 20585

Ms. Susan Jenkins  
Division of Radioactive Waste Management  
Bureau of Health and Environmental Control  
2600 Bull St.  
Columbia, SC 29201

D. Silverman  
Morgan, Lewis, and Bockius  
1111 Penn. Ave., NW  
Washington, DC 20004

G. Carroll  
Nuclear Watch South  
P.O. Box 8574  
Atlanta, GA 30306

Ms. Diane Curran  
Harmon, Curran, Spielburg and Eisenberg, LLP  
1726 M St., NW, Suite 600  
Washington, DC 20036

L. Zeller  
Blue Ridge Environmental Defense League  
P.O. Box 88  
Glendale Springs, NC 28629

Mr. Dealis Gwyn, Licensing Manager  
CB&I AREVA MOX Services  
Savannah River Site  
P.O. Box 7097  
Aiken, SC 29804-7097

**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

Docket No.: 70-3098

Construction  
Authorization No.: CAMOX-001

Report No.: 70-3098/2016-003

Applicant: CB&I AREVA MOX Services

Location: Savannah River Site  
Aiken, South Carolina

Inspection Dates: July 1 - September 30, 2016

Inspectors: C. Huffman, Senior Resident Inspector, Construction Projects  
Branch 1 (CPB1), Division of Construction Projects (DCP)  
P. Carman, Construction Inspector (Team Leader), Construction  
Inspection Branch 3 (CIB3), Division of Construction  
Inspection (DCI)  
W. Gloersen, Senior Project Inspector, CPB1, DCP  
C. Oelstrom, Construction Inspector, Construction Inspection  
Branch 2 (CIB2), DCI  
T. Steadham, Senior Construction Inspector, CIB3, DCI  
K. Steddenbenz, Construction Inspector, CIB3, DCI  
J. Vasquez, Construction Inspector, CIB2, DCI

Accompanying Personnel: M. Ernstes, Acting Branch Chief, CPB1, DCP  
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)  
A. Chowdhury, Staff Engineer, Southwest Research Institute

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.) 70-3098/2016-003

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: quality assurance program (QAP) implementation, corrective action program, control of material, equipment, and services, design control, test control, and control of measuring equipment, 10 CFR Part 21 reports, records storage, supplier/vendor oversight, special processes, procedures, and installation.

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

- PSSC-009, Criticality Control
- PSSC-016, Emergency Generator Building Structure
- PSSC-023, Fluid Transport Systems
- PSSC-024, Gloveboxes
- PSSC-036, MOX Fuel Fabrication Building
- PSSC-041, Process Cells

### **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 of significance were identified. (Section 2.)

### **PSSC Inspections**

#### **PSSC-009, Criticality Control**

The inspectors observed construction activities related to PSSC-009, Criticality Control, as described in Table 5.6-1 of the MFFF CAR. The inspection attributes observed were installation and special processes. The associated item relied on for safety (IROFS) component was stainless steel drip tray material in Room C-141. Specifically, the inspectors observed drip tray installation and inspection including vacuum box testing. The inspectors also reviewed documentation associated with the inspection results. No findings of significance were identified. (Section 3.a.)

#### **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 attribute observed was design control. The associated IROFS component was the basemat of the Emergency Generator Building (BEG) structure. Procedures and specifications associated with

structural concrete design of the BEG basemat conformed to the commitments contained in the CAR. Design activities related to PSSC-016 were performed in accordance with procedures and specifications. The design of the BEG basemat met the requirements of the project specifications and relevant industry standards. No findings of significance were identified. (Section 3.b.)

#### PSSC-023, Fluid Transport Systems

The inspectors observed construction activities related to PSSC-023, Fluid Transport Systems, as described in Table 5.6-1 of the MFFF CAR. The inspection attribute observed was installation. The associated IROFS components were the Active Gallery, Aqueous Polishing Building (BAP), and Room C-134 piping and pipe supports. Specifically, the inspectors observed installed piping, pipe support frames, welding activities and reviewed documentation associated with installation and applicant identified non-conformances of damaged piping. No findings of significance were identified. (Section 3.c.)

#### PSSC-024, Gloveboxes

The inspectors reviewed construction activities related to PSSC-024, Gloveboxes, as described in Table 5.6-1 of the MFFF CAR. The inspection attributes observed were fabrication and special processes. The associated IROFS component was glovebox NPH\*GB2000 (hydraulic press). Specifically, the inspectors reviewed welding and other fabrication documents associated with the vendor's fabrication of glovebox NPH\*GB2000. The glovebox welds and associated records met the applicable code, procurement, and quality requirements. No findings of significance were identified. (Section 3.d.)

#### PSSC-036, MOX Fuel Fabrication Building

The inspectors observed construction activities related to PSSC-036, MOX Fuel Fabrication Building, as described in Table 5.6-1 of the MFFF CAR. The inspection attribute observed was installation. The associated IROFS components were the steel platform supporting equipment in Room C-123 and seismic sway struts in Rooms B-140B and B-252. Specifically, the inspectors observed installed components and their associated welding and reviewed documentation associated with its installation. No findings of significance were identified. (Section 3.e.)

#### PSSC-041, Process Cells

The inspectors reviewed construction activities related to PSSC-041, Process Cells, as described in Table 5.6-1 of the MFFF CAR. The inspection attributes observed were special processes and fabrication. The associated IROFS components were oxidation and stripping columns. Specifically, the inspectors observed the welding and configuration of Purification Unit (KPA) Oxidation Column 6500 and KPA Stripping Column 6000 to determine whether the components were fabricated in accordance with design drawings and met applicable welding requirements. No findings of significance were identified. (Section 3.f.)

### **Programmatic Inspections**

Quality Assurance: Program Development and Implementation (IP 88106)

Classification of IROFS

Based on the program, procedures, and evaluations reviewed as well personnel interviewed, the inspectors concluded that MOX Services adequately evaluated the relative importance to safety rankings for low importance to safety IROFS and provided reasonable assurance that the rankings were defensible and designated to the appropriate quality level 1 (QL-1) or quality level 1 low risk (QL-1LR) ranking category in accordance with Attachment B of the MPQAP. No findings of significance were identified. (Section 4.a. (1))

#### Quality Assurance Training

Based on the review of the applicant's procedures and qualification records for personnel performing quality-affecting activities, including auditors, inspection and test personnel, welders, and non-destructive examination (NDE) personnel, the inspectors concluded that MOX Services' quality assurance training programs were consistent with the commitments and requirements of the MPQAP and industry codes and standards. No findings of significance were identified. (Section 4.a. (2))

#### Quality Assurance: Design and Documentation Control (IP 88107)

The inspectors concluded that the applicant adequately implemented quality assurance (QA) requirements into drawings, calculations, and design specifications. The inspectors also verified that the design change control program was implemented in accordance with the MPQAP requirements. The inspectors determined that design inputs and process for translating them into fabrication activities was adequately followed in accordance with MPQAP commitments and consistent with the regulatory requirements. No findings of significance were identified. (Section 4.b.)

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

The inspectors reviewed the applicant's procedures on commercial grade dedication, certified material test reports (CMTRs), receipt inspection records, and verified that suppliers performing the dedication were evaluated by the applicant at the required frequency. The inspectors determined that the applicant has the appropriate processes in place to control and evaluate the procurement of commercial grade items. In addition, the inspectors verified that the applicant is providing suitable storage conditions and appropriate maintenance for items acquired through the dedication process. No findings of significance were identified. (Section 4.c.)

#### Quality Assurance: Inspection, Test Control, and Control of Measuring Equipment (IP 88109)

The inspectors reviewed requirements for inspection, test control, and control of measuring and test equipment (M&TE) specified in the MPQAP to determine if they were implemented adequately. The inspectors concluded that inspection and testing activities were documented and performed in accordance with approved procedures, and that the techniques used during inspections and tests were appropriate for the activities observed. The inspectors determined that these activities were completed by qualified personnel using appropriate M&TE, and that the equipment used for measuring and testing was adequately controlled by procedures that contained the appropriate acceptance criteria. No findings of significance were identified. (Section 4.d.)

#### Quality Assurance: 10 CFR, Part 21, Inspection-Facility Construction (IP 88111)

The inspectors reviewed the MPQAP and procedures and verified the applicant's commitments to Part 21 during construction activities. The inspectors determined that the applicant had the controls and processes in-place to evaluate safety related items for non-conformances. The



inspectors also verified that the applicant meets the notification time-limit requirements, as described by 10 CFR Part 21.21 and project documents, when a condition is reportable to the NRC. No findings of significance were identified. (Section 4.e.)

Quality Assurance: Control of Electronic Management of Data (IP 88113)

The inspectors concluded the applicant adequately controlled electronic data in accordance with commitments and requirements in the MPQAP. Additionally, the inspectors determined that electronic data was adequately protected, stored, identified, complete, accurate, and secured in accordance with the MPQAP requirements. No findings of significance were identified. (Section 4.f.)

Quality Assurance: Supplier / Vendor Inspection (IP 88115)

Based on a review of audits, surveillances, and evaluations of 11 suppliers, the inspectors concluded that the applicant has performed audits and surveillances within the required periodicity, using qualified personnel, and to support the scope of work authorized for the vendor to remain on the Qualified Suppliers List (QSL) in accordance with the MPQAP and applicable MOX Services procedures. No findings of significance were identified. (Section 4.g.)

10 CFR 70.72 Facility Change and Change Control Process (IP 88106; IP 88107)

The change process, as outlined in Chapter 16 of the LA, was performed by the applicant in accordance with project procedures. The inspectors had reasonable assurance that the evaluations properly screened changes to assure that the applicant's commitments related to the regulatory requirements of 10 CFR Part 70 were met. For the changes reviewed, a license amendment was not needed. Audit findings from Quality Assurance Audit Report No.: SA-15-A03 associated with the facility change process were appropriately captured as action tracking items and corrected. No findings of significance were identified. (Section 4.h.)

## **REPORT DETAILS**

### **1. Summary of Facility Status**

During the inspection period, the applicant (CB&I AREVA MOX Services (MOX Services)) continued construction activities of principle 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 minutes. 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 monitored the status of WP entries to verify construction personnel obtained proper authorizations to start work. The inspectors conducted daily tours of material storage and work areas to verify that materials and equipment were properly stored in accordance with QA requirements.

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 selected NCRs and CRs.

The inspectors routinely performed tours of the MOX Fuel Fabrication Facility (MFFF) work areas to verify that MOX Services' staging of piping, pipe supports, installation of ductwork, and installation of glove-boxes, installation of fire dampers and fire doors met regulatory commitments and procedural requirements. The inspectors conducted tours of material storage areas at the MFFF, PAF, and A-Area to determine if MOX Services was properly storing equipment and materials in accordance with MOX Project Quality Assurance Plan (MPQAP) storage requirements. Specifically, the inspectors assessed MOX Services compliance with Project Procedure (PP) 10-38, Storage and Control of Material.

b. Conclusions

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

3. **PSSC Related Inspections**

a. PSSC-009, Criticality Control

(1) Scope and Observations

The inspectors observed construction activities related to PSSC-009, Criticality Control, as described in Table 5.6-1 of the MFFF Construction Authorization Request (CAR). The inspection attributes observed were installation and special processes. The associated IROFS component was stainless steel drip tray material in Room C-141. Specifically, the inspectors observed drip tray installation and inspection including vacuum box testing. The inspectors also reviewed documentation associated with the inspection results.

The inspectors observed the weld quality of stainless steel drip trays in BAP Room C-141 to determine whether the welds were free from visual rejectable weld indications. The inspectors observed the performance of a vacuum box testing on the following welds:

15-C141-DRIP-V-0002-3186-FW082-C0R0  
 15-C141-DRIP-V-0002-3186-FW083-C0R0  
 15-C141-DRIP-V-0002-3186-FW084-C0R0  
 15-C141-DRIP-V-0002-3186-FW131-C0R0  
 15-C141-DRIP-V-0002-3186-FW074-C0R0  
 15-C141-DRIP-V-0002-3186-FW073-C0R0  
 15-C141-DRIP-V-0002-3186-FW076-C0R0  
 15-C141-DRIP-V-0002-3186-FW077-C0R0  
 15-C141-DRIP-V-0002-3186-FW078-C0R0  
 15-C141-DRIP-V-0002-3186-FW079-C0R0  
 15-C141-DRIP-V-0002-3186-FW080-C0R0  
 15-C141-DRIP-V-0002-3186-FW081-C0R0

The inspectors observed the vacuum box testing to determine whether System One employees performed the examination in accordance with procedure M-NDE-010, Leak Testing Bubble Test Vacuum Box Technique. Specifically, the inspectors observed the System One personnel clean the welds prior to inspection, use adequate lighting to perform the inspection, and use calibrated equipment to verify surface temperature and system pressure. The inspectors reviewed inspection reports associated with work package 15-C141-DRIP-V-0002-3186 to determine whether MOX Services inspection results were properly documented.

(2) Conclusions

No findings of significance were identified.

b. PSSC-016, Emergency Generator Building

(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 attribute observed was design control. The associated IROFS component was the basemat of the Emergency Generator Building (BEG) structure. The inspectors reviewed the design and design controls for the BEG basemat for PSSC-016. The inspectors reviewed the applicable sections of the MPQAP and verified QA procedures implemented the committed design control requirements.

Specifically, the inspectors reviewed the BEG basemat structural design to determine that a system for control of design inputs documentation, review and approval commitments were being met. The inspectors verified that design analyses are documented in accordance with QA plan commitments and requirements. In addition, the inspectors reviewed the design calculations and a selection of design aids and programs to verify the calculations were in accordance with applicable industry standards, project procedures and specifications. The inspectors reviewed construction drawings, project procedures 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.

(2) Conclusions

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

c. PSSC-023, Fluid Transport Systems

(1) Scope and Observations

The inspectors observed construction activities related to PSSC-023, Fluid Transport Systems, as described in Table 5.6-1 of the MFFF CAR. The inspection attribute observed was installation. The associated IROFS components were the Active Gallery, BAP, and Room C-234 piping and pipe supports. Specifically, the inspectors observed installed piping, pipe support frames and observed welding activities and reviewed documentation associated with applicant identified non-conformances of damaged piping.

The inspectors observed portions of the assembly of pipe support modules prior to installation in the Active Gallery (Room C-234) to determine whether the modules were fabricated in accordance with American Welding Society (AWS) D1.1, Structural Welding Code – Steel; and AWS D1.6 welding code. Specifically, the inspectors reviewed the weld quality of completed welds on structural stainless steel members to determine whether they met the requirements of AWS D1.6 and PP 11-51, AWS D1.1 and D1.6 General Welding Procedure.

The inspectors reviewed NCR-16-7003 and NCR-16-7035 to determine whether pipes damaged during construction activities were adequately documented and tagged in the field. The inspectors reviewed the extent of condition results and corrective actions to prevent additional piping damage.

(2) Conclusions

No findings of significance were identified.

d. PSSC-024, Gloveboxes

(1) Scope and Observations

The inspectors reviewed construction activities related to PSSC-024, Gloveboxes, as described in Table 5.6-1 of the MFFF CAR. The inspection attributes observed were fabrication and special processes. The associated IROFS component was glovebox NPH\*GB2000 (hydraulic press). Specifically, the inspectors reviewed welding and other fabrication documents associated with the vendor's fabrication of glovebox NPH\*GB2000. The glovebox welds and associated records met the applicable code, procurement, and quality requirements.

The inspectors observed structural and seal welds on the upper and lower portions of hydraulic press glovebox NPH-2000. The inspectors performed a visual inspection of the welds to determine whether the welds met the acceptance criteria of AWS D1.6, Structural Welding Code – Stainless Steel, and those specified on DCS01-NPH-MG-PD-M-21205, Homogenizing and Pelletizing Unit Process Glovebox – NPH\*GB2000, Revision (Rev.) 2. The inspectors examined the welds to determine whether they were of the correct size, continuous and sealed.

(2) Conclusions

No findings of significance were identified.

e. PSSC-036, MOX Fuel Fabrication Building

(1) Scope and Observations

The inspectors observed construction activities related to PSSC-036, MOX Fuel Fabrication Building, as described in Table 5.6-1 of the MFFF CAR. The inspection attribute observed was installation. The associated IROFS components were the steel platform supporting equipment in Room C-123 and seismic sway struts in Rooms B-140B and B-252. Specifically, the inspectors observed installed components and their associated welding and reviewed documentation associated with its installation.

The inspectors observed the in process installation of seismic sway bars supporting gloveboxes in Rooms B-140B and B-252. The inspectors observed weld profile and dimensions on sway bars, clevis plates and tube steel to determine whether they met the requirements of AWS D1.1 – Structural Welding Code – Steel.

The inspectors observed completed structural welding of the steel platform in Room C-

123. Specifically, the inspectors performed a visual inspection of welds on embed plates, sheer tubes and tube steel to determine whether welds met the profile and size requirements of AWS D1.1 – Structural Welding Code – Steel.

(2) Conclusions

No findings of significance were identified.

f. PSSC-041, Process Cells

(1) Scope and Observations

The inspectors reviewed construction activities related to PSSC-041, Process Cells, as described in Table 5.6-1 of the MFFF CAR. The inspection attributes observed were special processes and fabrication. The associated IROFS components were oxidation and stripping columns. Specifically, the inspectors observed the welding and configuration of the Purification Unit (KPA) Oxidation Column 6500 and KPA Stripping Column 6000 to determine whether the components were fabricated in accordance with design drawings and met applicable welding requirements.

The inspectors observed the welds on oxidation column KPA 6000 to determine whether the structural welds were in accordance with AWS D1.6, MOX Services drawing DCS01-KPA-CG-PG-L-02043, Aqueous Polishing Area Purification Oxidation Column KPA CLMN 6000 Assembly and Details, Rev. 0, and Marks Brothers drawing 111945-1.

The inspectors observed the welds on gas stripping column KPA 6500 to determine whether the structural welds were in accordance with AWS D1.6, MOX Services drawing DCS01-KPA-CG-PG-L-02044, Aqueous Polishing Area Purification Gas Stripping Column KPA CLMN 6500 Assembly and Details, Rev. 0, and Marks Brothers drawing 111945-2.

(2) Conclusions

No findings of significance were identified.

**4. Programmatic Inspections**

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

(1) Classification of IROFS

(a) Scope and Observations

The inspectors reviewed MOX Services' augmented quality assurance program for quality level 1 low risk (QL-1LR) IROFS as defined in Attachment B of the MPQAP. Specifically, the inspectors reviewed procedure PP9-41, IROFS Relative Importance to Safety (RITS) Ranking, and selected a sample of IROFS components with both high (QL-1) and low (QL-1LR) RITS rankings. The inspectors noted that the applicant maintained an IROFS component database with a RITS ranking and correlating evaluation(s) assigned to each component. The inspectors reviewed the following RITS

evaluations for the selected IROFS components to verify adequate implementation of PP9-41 and the applicant's MPQAP:

- DCS01-AAS-DS-ANS-H-38487-0, Criticality Safety Piping
- DCS01-AAS-DS-ANS-H-38511-0, Welded Process Vessels and Pipes
- DCS01-AAS-DS-ANS-H-38525-0, NTM Trolley - Criticality
- DCS01-AAS-DS-ANS-H-38584-0, Sintering Furnace Shell
- DCS01-AAS-DS-ANS-H-38598-0, Pneumatic Transfer Room Air Supply HEPA Filters
- DCS01-AAS-DS-ANS-H-38626-0, Fire Detection and Fire Suppression
- DCS01-KKJ-DS-ANS-H-38592-2, Process Vessels and Pipes Credited for Loss of Confinement and Explosion Events
- DCS01-KKJ-DS-CAL-H-38485-2, Double Walled Pipe Credited to Prevent Explosion and Loss of Confinement Events
- DCS01-RRJ-DS-ANS-H-38469-4, Temperature Controls Credited for Loss of Confinement and Explosion Events

The inspectors verified that the applicant performed the RITS evaluations listed above in accordance with their program and procedures. Specifically, the inspectors verified that the IROFS RITS ranking evaluation process included the following: (1) IROFS ranking bases; (2) normal operation review; (3) initiating event identification; (4) ranking criteria evaluations including justifications with reasonable engineering judgement; (5) IROFS ranking results; (6) overall risk summary; (7) final RITS category; (8) final RITS ranking evaluation report; and (9) review and approval by the discipline reviewer, peer review committee, design verifier, lead engineer, and nuclear safety manager.

The inspectors also interviewed two individuals responsible for preparing and reviewing the evaluations to verify they were knowledgeable of PP9-041, the IROFS component database, the evaluation ranking criteria, and ultimately the basis for the RITS ranking of IROFS components.

(b) Conclusions

Based on the program, procedures, and evaluations reviewed as well personnel interviewed, the inspectors concluded that MOX Services adequately evaluated the relative importance to safety rankings for low importance to safety IROFS and provided reasonable assurance that the rankings were defensible and designated to the appropriate QL-1 or QL-1LR ranking category in accordance with Attachment B of the MPQAP. No findings of significance were identified.

(2) Quality Assurance Training

(a) Scope and Observations

The inspectors reviewed project procedures for qualification and certification of personnel performing quality-affecting activities, including auditors, inspection and test personnel, welders, and nondestructive examination (NDE) personnel, to verify these programs met the requirements of the MPQAP and industry codes and standards. The inspectors also reviewed qualification and training records for personnel in those programs to determine whether they completed the appropriate training and

qualifications to perform their scope of work, as well as uniquely identified and traceable, in accordance with the applicable procedures and code requirements.

Specifically, the inspectors reviewed qualifications of auditors and lead auditors to verify the individuals completed the required training, participated in the minimum number of quality assurance audits, and maintained proficiency within the required 12-month periods in accordance with the MPQAP and PP3-08, Qualification and Certification of Auditors.

The inspectors reviewed qualification records for inspection, test, welding, and NDE personnel performing construction activities for the work packages sampled in Section 4.d to ensure personnel performing activities related to quality were properly trained and qualified for the scope of work they performed. Specifically, the inspectors verified that inspections and tests were performed by properly qualified personnel other than those who performed or directly supervised the work being inspected in accordance with the MPQAP and PP3-27, Quality Control Personnel Certification / Construction Department Inspection Certification.

The inspectors reviewed three welding qualification records to verify they demonstrated the proper essential variables, mechanical testing, and NDE, for the welded configuration and process in accordance with the MPQAP and PP11-60, Welder / Welding Operator Qualification. The inspectors also reviewed the welder / welding operator qualification summary report to verify the welders maintained qualification by demonstrating proficiency for each qualified welding process every six months.

The inspectors also reviewed the qualification record and eye exam for the NDE personnel observed in the field to ensure the training and qualification requirements of System One procedure NDE-1, Training, Examination & Certification of Nondestructive Examination Personnel, were met. The inspectors compared these procedures to the recommended practices of SNT-TC-1A, Personnel Qualification and Certification in Nondestructive Testing.

(b) Conclusions

Based on the review of the applicant's procedures and qualification records for personnel performing quality-affecting activities, including auditors, inspection and test personnel, welders, and NDE personnel, the inspectors concluded that MOX Services' quality assurance training programs were consistent with the commitments and requirements of the MPQAP and industry codes and standards. No findings of significance were identified.

b. Quality Assurance: Design and Documentation Control (IP 88107)

(1) Scope and Observations

This inspection was conducted to verify whether design changes were controlled in accordance with commitments and requirements in the MPQAP. Through both design document reviews and interviews with MOX Services personnel, the inspectors reviewed the design control program to determine if it:



- was adequately defined;
- included effective procedures to identify design input controls, processes, analyses, verifications, and change controls;
- included effective procedures to translate quality standards into design documents;
- controlled deviations from standards; and
- adequately translated quality standards into design documents.

The inspectors reviewed five design changes to determine if the design changes were accomplished in accordance with applicable procedures and the MPQAP. Specifically, for each design change, the inspectors reviewed:

- the applicant's control and translation of design inputs (such as design bases, performance requirements, regulatory requirements, codes, and standards) into the design documents;
- the selection of materials, parts, equipment, and processes, as applicable, to determine if those selections were appropriate for the intended design;
- the translation of requirements into specifications, drawings, procedures, and instructions to determine if they were accomplished accurately;
- verification of the adequacy of the design change to determine if the design changes were justified properly and in accordance with QA requirements;
- control of design changes to determine if the changes were controlled in accordance with QA plan commitments and requirements and whether the design changes were subject to design control measures commensurate with those applied to the original design; and
- documents (such as drawings, calculations, and procurement documents) that were affected by design changes to determine if the changes were adequately translated into affected design documents and procedurally controlled in accordance with MPQAP requirements..

The inspectors performed these reviews for the following five Engineering Change Requests (ECRs):

- ECR-022275, Evaluation of Pellet Storage Units Without Neutron Absorber, Rev. 1;
- ECR-025262, Addition of Dump Valve for KWD\*GB4000 Glovebox, Rev. 0;
- ECR-025553, Use of Short Radius Elbows in KDB\*GB1200 and KDD\*GB1200, Rev. 0;
- ECR-025807, Modify MOX Internal Documents for Valve VCF-121 Due to Vendor Provided Data, Rev. 1; and
- ECR-026833, Slope Deviations for Three Acid Lines, Rev. 0.

(2) Conclusions

The inspectors verified that the design change control program was implemented in accordance with the MPQAP requirements. The inspectors determined that the design inputs and process for translating them into fabrication activities and applicable controlled documents was adequately followed in accordance with MPQAP commitments and consistent with the regulatory requirements. No findings of significance were identified.

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

(1) Scope and Observations

The inspectors reviewed the applicant's procedures and documentation associated with the commercial grade dedication of safety related items over the past two years. The inspectors sampled records of audits, evaluations, and surveillances of vendors and suppliers of QL-1 items to determine if program definitions were established and consistent with regulatory requirements.

The inspectors reviewed the applicant's methods for evaluating suppliers' performance when providing items, equipment, or services for safety related activities. The inspectors verified that those suppliers were part of the Qualified Suppliers List (QSL) in accordance with MPQAP. The inspectors also reviewed receipt inspection reports, certified material test reports (CMTRs), and interviewed personnel in-charge of commercial grade dedication to determine if commercial grade items were dedicated in accordance with the applicant procedures.

The inspectors also performed a walk down through storage areas containing safety related items to determine if the applicant is providing appropriate environmental conditions and preventive maintenance in accordance with shipping instructions, storage procedures, and the MPQAP.

(2) Conclusions

The inspectors reviewed the applicant's procedures on commercial grade dedication, CMTRs, receipt inspection records, and verified that suppliers performing the dedication were evaluated by the applicant at the required frequency. The inspectors determined that the applicant has the appropriate processes in place to control and evaluate the procurement of commercial grade items. In addition, the inspectors verified that the applicant is providing suitable storage conditions and appropriate maintenance for items acquired through the dedication process. No findings of significance were identified.

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

(1) Scope and Observations

The inspectors reviewed selected procedures to determine if inspection, test control, and measuring and test equipment (M&TE) processes were established and consistent with regulatory and MPQAP requirements. The inspectors reviewed QL-1LR work packages and observed inspection and testing activities related to the following:

- welding and leak testing of Room C-141 drip trays;
- pipe welding in the active gallery; and
- ultrasonic testing (UT) of heating, ventilation, and air conditioning (HVAC) systems.

The inspectors reviewed MOX PP3-30, Quality Control Inspection Plans & Inspection Reports; PP3-32, Visual Welding Inspection Criteria; PP11-35, Construction Inspection

and Acceptance Testing; and S562, Piping Process Welding Inspections. For the work packages selected, the inspectors verified inspection and testing planning documents included the following:

- identification of each work activity where inspection and testing was necessary to ensure quality;
- identification of documents that were used to perform inspections and tests;
- identification of the characteristics for inspections and the identification of when, during the work process, inspections were to be performed for those characteristics;
- identification of acceptance criteria;
- specific hold points for inspection and testing; and
- controls that established and documented the coordination and sequencing of the work at established inspection and testing points.

The inspectors witnessed a UT wall thickness inspection of HVAC ducting. The inspectors reviewed System One procedure M-NDE-006, Ultrasonic Thickness Measurement to ensure the techniques observed during the inspection met the following:

- equipment was calibrated prior to the examination and checked against an approved reference block;
- requirements for surface conditions and preparation prior to the examination were met;
- the area of examination and number of measurements was conducted in accordance with procedures; and
- inspection results and acceptance criteria were documented on approved test reports.

The inspectors observed vacuum box leak tests conducted on welds FW012, FW013, and FW014 for Room C-141 drip trays. The inspectors inspected the test gauge and bubble forming solution to ensure they were selected in accordance with System One procedure M-NDE-010, Leak Testing / Bubble Test – Vacuum Box Technique, and that the gauge was within range and calibration. The inspectors observed techniques of the testers to ensure minimum pressure and hold time requirements were met and proper overlap of the vacuum box was used.

The inspectors reviewed the test reports for the UT wall thickness inspection and the vacuum box leak tests to ensure test results were documented and conformed to the acceptance criteria. The inspectors reviewed these reports to ensure documentation contained traceability to the work package and the item being tested or inspected, M&TE used, the individual evaluating the results, and the results and acceptability of the test or inspection.

The inspectors reviewed procedures and documentation associated with the receipt and inspection of QL-1 items. The inspectors sampled receipt inspection reports to determine that purchased QL-1 items conform to the applicable procurement document requirements. The inspectors also reviewed vendor documentation to determine if they were included in the QSL. In addition, the inspectors verified that the applicant had the proper guidance to identify characteristics for inspection and the identification of when, during the fabrication process, inspections had to be performed for those characteristics.

Also, the inspectors reviewed inspection planning procedures to determine if they included the following:

- sufficient information from the inspection, to provide a conclusion regarding conformance of the item to specified requirements;
- identification of acceptance criteria; and
- identification of sampling requirements.

The inspectors reviewed qualification records for inspection, testing, NDE, and welding personnel performing construction activities for the work packages sampled. These records were reviewed to ensure personnel performing inspection, testing, and other activities related to quality were properly trained and qualified for the scope of work they performed; and that inspections were performed by personnel other than those who performed or directly supervised the work being inspected.

The inspectors reviewed MOX project procedure PP3-15, Control of Measuring and Test Equipment to verify that the program for the control of M&TE was conducted and documented in accordance with the MPQAP. The inspectors performed direct inspection of the M&TE control area to ensure that equipment was properly stored and maintained in accordance with approved procedures. The inspectors reviewed a sample of M&TE, including those used for the test and inspections discussed in this section, to determine if items contained appropriate identification markings, calibration date, and calibration due date.

The inspectors reviewed a sample of calibration certificates to verify that the records contained identification of the M&TE calibrated, as-found and as-left calibration data, results of the calibration, required calibration intervals, and that M&TE was calibrated using procedures traceable to known industry standards. The inspectors also reviewed three nonconformance reports related to M&TE to verify proper action was taken for out-of-calibration or suspect M&TE.

(2) Conclusions

The inspectors concluded that inspection and testing activities were documented and performed in accordance with approved procedures, and that the techniques used during inspections and tests were appropriate for the activities observed. The inspectors determined that these activities were completed by qualified personnel using appropriate M&TE, and that the equipment used for measuring and testing was adequately controlled by procedures that contained the appropriate acceptance criteria. No findings of significance were identified.

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

(1) Scope and Observations

The inspectors reviewed procedures and documentation associated with evaluations of non-conforming items and failures to comply. The inspectors reviewed the applicant's procedures and interviewed personnel associated with the evaluations of non-conforming items to determine if procedures and controls to evaluate deviations were established in accordance with 10 CFR Part 21 and the MPQAP. In addition, the inspectors reviewed 10 CFR Part 21 evaluations to determine the following:

- the information and data used in the evaluation appeared to be factual and complete;
- the finding of the evaluation that a substantial safety hazard does not exist was a logical conclusion of the evaluation;
- procedures identified a responsible officer to notify of identified defects and failures to comply; and
- procedures accurately reflected the provisions of 10 CFR 21.21, regarding timeframes for reporting non-conformances.

The inspectors sampled 10 CFR Part 21 evaluations where the evaluation was not completed within the required 60 day period to determine if the responsible officer notified the commission of a defect in a safety related item within the timeframe required by regulations and the applicant procedures. The inspectors also verified that the applicant met the notification time-limit requirements, as described by 10 CFR Part 21.21 and project documents, when a condition is reportable to the NRC.

(2) Conclusions

The applicant had the controls and processes in-place to evaluate safety related items for non-conformances. No findings of significance were identified.

f. Control of Electronic Management of Data (IP 88113)

(1) Scope and Observations

This inspection was conducted to verify whether the management and maintenance of electronic data included a life-cycle management process from the creation and receipt of records through active life, storage, and final disposition. The inspectors also verified whether electronic data was properly controlled in accordance with commitments and requirements in the MPQAP.

Through procedure reviews, document storage walk-downs, and interviews with MOX Services personnel, the inspectors determined if electronic data was adequately protected, stored, identified, complete, accurate, and secure by verifying whether:

- data were suitably protected from damage and destruction during their prescribed lifetime, and was readily retrievable;
- a description was prepared of how data would be stored, with respect to media, conditions, location, retention time, security, and access;
- storage and transfer media were properly identified as to source, physical and logical formats, and relevant date (i.e., date written); and
- completeness and accuracy of the data input and any subsequent changes were maintained.

Conclusions

No findings of significance were identified.

g. Supplier / Vendor Inspection (IP 88115)(1) Scope and Observations

The inspectors reviewed the QSL and selected a sample of 11 suppliers to verify the applicant performed the required audits, surveillances, and evaluations in accordance with the MPQAP and procedures PP3-12, Supplier Evaluation and PP3-13, Supplier Surveillance. Specifically, the inspectors reviewed a sample of triennial audits, annual evaluations, and periodic surveillances either performed or credited by MOX Services to verify the following:

- audits and surveillances were performed within the required periodicity, or extensions were properly requested and approved when necessary;
- the scope of the audits and surveillances was appropriated for the work performed and annotated on the approved QSL;
- suppliers were evaluated by using one or more of these methods: QA program review, performance history review, independent agency accreditation, first article inspection or test source surveillance, audit, and/or commercial grade survey.
- all audit team members were qualified in accordance with PP3-08, Qualification and Certification of Auditors;
- audit plans and checklists were developed by a certified Lead Auditor;
- identified deficiencies were properly captured and corrected through Supplier Deficiency Reports (SDRs); and
- audit and evaluation summary reports were reviewed and approved by the Lead Auditor and Supplier Quality Manager.

(2) Conclusions

Based on a review of audits, surveillances, and evaluations of 11 suppliers, the inspectors concluded that the applicant has performed audits and surveillances within the required periodicity, using qualified personnel, and to support the scope of work authorized for the vendor to remain on the QSL in accordance with the MPQAP and applicable MOX Services procedures. No findings of significance were identified.

h. 10 CFR 70.72 Facility Change and Change Control Process (IP 88106, Quality Assurance: Program Development and Implementation; and IP 88107, Quality Assurance: Design and Documentation Control)(1) Scope and Observations

The inspectors evaluated the implementation of MOX Services change processes for the License Application (LA) and the Integrated Safety Analyses Summary (ISAS) as defined in Chapter 16 of the LA. The summary of facility changes was provided in a letter to NRC dated January 20, 2016, and consisted of facility changes made since the last LA and ISAS update submitted to the NRC in January 2015.

The inspectors reviewed the current facility change and change control program. MOX Services defined its licensing basis configuration management program in Project Procedure (PP) 8-6, Licensing Basis Configuration Management, Rev. 13, dated August 14, 2015. PP 8-6 specifies the applicant's responsibilities pertaining to implementing the

change process. PP 8-6 also refers to PP9-3, Design Control, which specifies the process for reviewing design changes prior to the evaluating the change under PP 8-6. The documentation of the evaluation in the change process is performed using an Applicability Determination Form (ADF). These forms are filled out based on a change to any of the documents referenced in Attachment A of PP8-6, Documents Requiring Evaluation For Licensing Basis Impact. The inspectors reviewed changes made to PP 8-6 since the last inspection of the program and determined that the procedure was adequate for evaluating the range of changes that require evaluation. In addition, the inspectors verified that the ADF was treated as a permanent QA record in accordance with the records retention requirements specified in PP 3-4, Records Management.

The inspectors selected a sample of the changes submitted by MOX Services as part of the January 2016 update to the LA and ISAS noted above. The selected samples represented a variety of disciplines related to the changes with a higher degree of safety significance, including fluid mechanics, HVAC, piping, chemical safety, criticality safety, fire safety, the structure, and the sintering furnace. The inspectors verified that the samples selected did not result in a change to the LA or ISAS. The ADFs selected for review are listed in the Supplemental Information section of this inspection report. The inspectors verified that the applicant provided a technical basis for the changes, the impacts of the changes and provided a satisfactory rationale for why the changes did not require prior NRC approval. The inspectors also verified that the changes to the nuclear criticality safety evaluations (NCSEs) selected for review did not create new types of accident sequences, were being made to existing processes as currently presented in the ISAS. The inspectors verified that the changes did not remove an IROFS or alter a sole IROFS as presented in ISAS Chapter 5. The inspectors also interviewed engineering and licensing staff responsible for completing and reviewing the ADFs to get an overview of the MOX Services' change process and any updates or improvements of the process since the last inspection. The inspectors verified that the documentation in the revised NCSEs selected for review showed that the safety strategy continued to ensure compliance with the performance requirements in 10 CFR 70.61.

The inspectors reviewed the portion of Quality Assurance Audit Report No.: SA-15-A03 (Engineering), dated July 21, 2015, pertaining to ADFs and the PP 8-6 process. The audit identified eight documents that did not have a PP 8-6A ADF generated. CR 15-250 was generated to capture this issue. The inspectors reviewed CR 15-250 and the action tracking (AT) items (MOX-AT-15-1341 to 1344) and verified that the corrective actions were acceptable and should prevent recurrence.

(2) Conclusions

The change process, as outlined in Chapter 16 of the LA, was performed by the applicant in accordance with project procedures. The inspectors had reasonable assurance that the evaluations properly screened changes to assure that the applicant's commitments related to the regulatory requirements of 10 CFR Part 70 were met. For the changes reviewed, a license amendment was not needed. Audit findings from Quality Assurance Audit Report No.: SA-15-A03 associated with the facility change process were appropriately captured as action tracking items and corrected. No findings of significance were identified.

## 5. Follow-up of Previously Identified Items

### a. (Closed) Unresolved Item (URI) 70-3098/2013-03-03: Potentially Inadequate Corrective Actions Regarding Quality of Work Package Guidance

#### (1) Scope and Observations

During a previous review of a fire damper WP 12-CP23-C153-SA-L-T-M-0001 and associated work steps, the inspectors observed that a number of work steps listed in the WP were performed. However, there were no signoff blanks for the performer or the verifier ensuring who, when or if the work had been accomplished in accordance with the documented work step. CR 13-412 was generated to capture this issue. The inspectors reviewed the actions taken and the improvement program implemented by the applicant to address work package implementation. This effort was documented in IR 70-3098/2015-001. In addition, the inspectors reviewed the corrective actions taken to address the condition captured in CR 13-412.

#### (2) Conclusions

The inspectors determined that the corrective actions taken in CR 13-412 were adequate and addressed the condition in URI 70-3098/2013-03-03. Therefore, based on the review above, URI 70-3098/2013-03-03 is closed.

### b. (Closed) Inspector Follow-up Item (IFI) 70-3098/2012-03-04: Review Fire Damper Seismic Report

#### (1) Scope and Observations

The inspectors performed a review of the seismic qualification of fire dampers performed by MOX Services. The inspection included a review of the similarity report, seismic test plan, seismic qualification reports, and various summaries and clarifications. The seismic qualification of fire dampers also included a detailed test plan for conducting pressure Test 9 and review of the relevant test results to evaluate the pressure resistance capability of penetration seal designs for the sealing of HVAC penetrations that contain fire dampers. An onsite review was conducted on seismic qualification of fire dampers, including pressure Test 9 results. The activities included a review of fire damper penetration barrier design and seismic qualification of fire dampers that used a similarity analysis and seismic test results; interviewing the structural, mechanical, and fire protection engineers; and inspecting a sample of installed fire dampers in the BMP.

#### Seismic Qualification of Fire Dampers

The inspectors reviewed the detailed test plan for pressure Test 9 that defined the test assembly, test methods, and acceptance criteria for conducting pressure tests. The test plan identified and discussed specific critical characteristics and associated limiting parameters. It also established the minimum quality requirements for the materials and specified acceptance criteria for acceptable performance of penetration seals and seal assembly. The inspectors also reviewed the applicant's implementation of pressure Test 9 and the relevant test results. The inspectors found that the test plan adequately



defined the test assembly, test methods, and acceptance criteria for conducting pressure Test 9. The inspectors also found that the pressure testing was conducted with the same objectives and purpose as described in the test plan. Further, the inspectors found that the two HVAC penetrations used in the test were the same as those described in the test plan. The inspectors found that the pressure test procedure followed the test plan. The test results included a summary of results and observations for the differential pressures, any observed leakage, and the maximum leakage rate. The inspectors found that the seals and seal assembly in pressure Test 9 met the acceptance criteria as defined in the test plan.

The inspectors reviewed the similarity analysis conducted by MOX Services to select three units under testing (UUTs) to envelope the seismic-related characteristics of 43 fire dampers listed in the seismic qualification report. IEEE 323-1983, IEEE 382-1996, and IEEE 344-1987 were used as guidance for the similarity analysis, including the use of six criteria to determine the similarity of fire dampers: material, size, shape, stress, aging mechanisms, and functionality. The inspectors reviewed the seismic test plan that defined the test set-up and test procedure for conducting seismic testing of fire dampers. The test was used to qualify the fire dampers for the seismic requirements specified in the MOX Services statement of work for fire dampers to maintain their functionality during and after the design earthquake in accordance with the equipment seismic qualification specifications. The inspectors reviewed the seismic testing of the three UUTs and the test results for seismic qualification of the 43 fire dampers. The seismic testing was conducted using conservative envelope response spectra curves. The inspectors found that the similarity analysis was conducted following IEEE standards and the selection method of the three UUTs to represent the batch of 43 fire dampers was adequate. The inspectors found that the seismic test plan adequately defined the test set-up and test procedure that met the intent of IEEE Standard 344-1987 for seismic testing of equipment. The inspectors also found that the seismic testing of the UUTs followed the test methodology presented in the seismic test plan. Based on the description of the similarity analysis and the seismic testing results of three UUTs, the design of the 43 fire dampers meet this project's seismic requirements because they are able to maintain the pressure boundary and their functionality during and after a design earthquake in accordance with equipment seismic qualification specifications. Furthermore, based on the summary and clarifications provided by MOX Services, the inspectors noted that the multitude of fire dampers (1250+ damper tag numbers/catalog identifications) to be installed in BMP are enveloped by the seismically qualified fire dampers.

The inspectors reviewed the applicant's fire damper penetration barrier design. The inspectors found that the design of these barriers is based on appropriate codes and standards and design methodology and are acceptable.

(2) Conclusions

The inspectors reviewed the adequacy of seismic qualification of fire dampers. The inspectors found that the seismic qualification of 43 fire dampers is adequate because: (a) the qualification study was conducted following industry accepted codes, standards and procedures and (b) the fire dampers are able to maintain the pressure boundary and their functionality during and after a design earthquake in accordance with equipment

seismic qualification specification. The inspector also noted that the multitude of fire dampers to be installed in the BMP are enveloped by the seismically qualified fire dampers. Therefore, based on the review above, IFI 70-3098/2012-03-04, Review Fire Damper Seismic Report, is closed.

**6. Exit Interview**

The inspection scope and results were summarized throughout this reporting period and by the Senior Project Inspector at an exit meeting with applicant management on October 13, 2016. Dissenting views were not expressed by the applicant. 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**

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  
D. Livernois, Quality Control Manager  
R. Morgan, System One  
A. Olorunniwo, Engineering Manager  
E. Radford, Regulatory Compliance  
J. Starling, Nuclear Safety  
D. Yates, Licensing

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

IP 88106      Quality Assurance: Program Development and Implementation (Pre-licensing and Construction)  
IP 88107      Quality Assurance: Design and Documentation Control (Pre-licensing and Construction)  
IP 88108      Quality Assurance: Control of Materials, Equipment, and Services (Pre-licensing and Construction)  
IP 88109      Quality Assurance: Inspection, Test Control, and Control of Measuring and Test Equipment (Pre-licensing and Construction)  
IP 88111      10 CFR, Part 21, Inspection-Facility Construction  
IP 88113      Control of Electronic Management of Data  
IP 88115      Supplier / Vendor Inspection (Construction Phase)  
IP 88130      Resident Inspection Program For On-Site Construction Activities at the Mixed-Oxide Fuel Fabrication Facility  
IP 88132      Structural Concrete Activities  
IP 88134      Quality Assurance Piping Relied on for Safety  
IP 88139      Ventilation and Confinement Systems  
IP 55050      Nuclear Welding General Inspection Procedure

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

| <u>Item Number</u> | <u>Status</u> | <u>Description</u>   |
|--------------------|---------------|--|
| 70-3098/2013-03-03 | Closed        | URI: Potentially Inadequate Corrective Actions Regarding Quality of Work Package Guidance (Section 5.a). |
| 70-3098/2012-03-04 | Closed        | IFI: Review Fire Damper Seismic Report (Section 5.b)   |

#### 4. **LIST OF ACRONYMS USED**

|              |   |
|--------------|---|
| ADF          | Applicability Determination Form                    |
| AT           | Action Tracking                                     |
| AWS          | American Welding Society                            |
| BAP          | Aqueous Polishing Building                          |
| BEG          | Emergency Diesel Generator Building                 |
| BMF          | Fuel Manufacturing Building                         |
| BMP          | MOX Processing Building                             |
| CAR          | Construction Authorization Request                  |
| CIB2         | Construction Inspection Branch 2                    |
| CIB3         | Construction Inspection Branch 3                    |
| CMTR         | Certified Material Test Report                      |
| CPB1         | Construction Projects Branch 1                      |
| CR           | Condition Report                                    |
| DCI          | Division of Construction Inspection                 |
| DCP          | Division of Construction Projects                   |
| ECR          | Engineering Change Request                          |
| FMB          | Fuel Manufacturing Branch                           |
| HDE          | High Depressurization Exhaust                       |
| HVAC         | Heating, Ventilation, and Air Conditioning          |
| IEEE         | Institute of Electrical and Electronics Engineers   |
| IFI          | Inspector Follow-up Item                            |
| IP           | Inspection Procedure                                |
| IR           | Inspection Report                                   |
| IROFS        | Items Relied on for Safety                          |
| ISAS         | Integrated Safety Analyses Summary                  |
| KCD          | Oxalic Mother Liquors Recovery                      |
| KPA          | Purification Unit                                   |
| LA           | License Application                                 |
| MDE          | Medium Depressurization Exhaust                     |
| MFFF         | MOX Fuel Fabrication Facility                       |
| MOX          | Mixed Oxide   |
| MOX Services | CB&I AREVA MOX Services                             |
| MPQAP        | MOX Project Quality Assurance Plan                  |
| M&TE         | Measuring and Test Equipment                        |
| NCR          | Non-conformance Report                              |
| NCSE         | Nuclear Criticality Safety Evaluation               |
| NDE          | Non-destructive Examination                         |
| NMSS         | Office of Nuclear Materials Safety and Safeguards   |
| No.          | Number  |
| NPH          | Homogenization and Pelletizing Units                |
| NRC          | Nuclear Regulatory Commission                       |
| PAF          | Process Assembly Facility                           |
| PP           | Project Procedure                                   |
| PSSC(s)      | Principle System(s), Structure(s), and Component(s) |
| QA           | Quality Assurance                                   |
| QAP          | Quality Assurance Program                           |
| QC           | Quality Control                                     |
| QL           | Quality Level                                       |
| QL-1         | Quality Level 1                                     |

|          |                                |
|----------|--------------------------------|
| QL-1(LR) | Quality Level 1 (Low Risk)     |
| QSL      | Qualified Suppliers List       |
| RII      | Region II                      |
| Rev.     | Revision                       |
| RIR      | Receipt Inspection Report      |
| RITS     | Relative Importance to Safety  |
| SDD      | System Description Document    |
| SDR      | Supplier Deficiency Reports    |
| TCO      | Temporary Construction Opening |
| URI      | Unresolved Item                |
| UT       | Ultrasonic Testing             |
| UUT      | Units Under Testing            |
| WP       | Work Package                   |

## 5. **LIST OF PSSCs REVIEWED**

PSSC-009, Criticality Control  
PSSC-016, Emergency Generator Building Structure  
PSSC-023, Fluid Transport Systems  
PSSC-024, Gloveboxes  
PSSC-036, MOX Fuel Fabrication Building  
PSSC-041, Process Cells

## 6. **RECORDS AND DOCUMENTS REVIEWED**

### **Action Trackers (ATs)**

AT No. MOX-AT-15-603  
AT No. MOX-AT-15-1765

### **Applicability Determination Forms (ADFs)**

ADF 005913, DCS01 KRA DS SCH F 14732, Update the oxalic acid system process flow diagram to incorporate DCR 09-0348 R1 and miscellaneous changes, October 7, 2014.

ADF 005972, DCS01 PRE DS ANS H 35011 4, Revision to PuO2 can receiving and emptying Unit (NDD) NCSE to address outstanding ECR's and updates to controlled parameters, hazards, and engineered and administrative controls to reflect current design and safety strategy, February 15, 2015

ADF 005986, DCS01 NDD DS ANS H 35024 4, ion to PRE NCSE to address ECR's, CR items, and make it consistent with newer design references, February 15, 2015

ADF 005987, DCS01 KDD DS ANS H 35046 R4, Update the Dechlorination/Dissolution Unit (KDD) NCSE to incorporate outstanding ECRs and update controlled parameters, hazards, and engineered and administrative controls to reflect current design and safety strategy, January 12, 2015

ADF 005996, ECR-022275 R1, Update the Pellet Storage Units (PPJ) NCSE and the associated Ground and Sorted Pellet Storage Unit (PSJ) criticality safety calculation to reflect removal of the pellet vertical and horizontal pitch requirements, January 21, 2015

ADF 005999, DCS01 KCA DS ANS H 35027 4, Revision to KCA NCSE to incorporate outstanding ECR's and updates to controlled parameters, hazards, and engineered and administrative controls to reflect current design and safety strategy, February 27, 2015.

ADF 006004, ECR-025462 R0, ECR combines two rooms, which are currently separated fire areas, into a single fire area, March 19, 2015

ADF 006016, ECR-025304 R0, Update various HVAC system's (HDE, HSA, MDE) P&IDs to reflect the addition of fire wrap from the ceiling of various rooms to the associated fire damper to extend the barrier, February 5, 2015

ADF 006023, ECR-025509 R0, Incorporates ECR's and defined equivalency, as related to fire protection issues, including requirements to obtain NRC approval, February 16, 2015

ADF 006028, ECR-025262 R0, Update the very high depressurization exhaust (VHD) system P&ID to reflect the addition of a dump valve to meet the 125 fpm face velocity design criteria across the bag port opening, February 13, 2015

ADF 006033, DCS01 LGF DS ANS H 35059 R4, Update the Laboratory Liquid Waste Receipt Unit (LGF) NCSE to incorporate outstanding ECRs and update controlled parameters, hazards, and engineered and administrative controls to reflect current design and safety strategy, March 19, 2015

ADF 006034, ECR-025484 R0, Update the Mixed Oxide Powder and Pellet Auxiliary Systems (RCA) NCSE to incorporate design changes and the results of additional engineering review of Very High Depressurization Exhaust (VHD) system P&IDs, March 2, 2015

ADF 006040, ECR 025502 0, Updates the Drip Tray Nuclear Criticality Safety Evaluation (NCSE) to reflect removal of Colemanite concrete (neutron absorber) from drip tray C-134, February 27, 2015

ADF 006041, Design changes reflect deletion of redundant fans, March 25, 2015

ADF 006051, ECR-025690 R0, Update the Fire NSE to remove the IROFS control group VHD exhaust glovebox HEPA filters (outer filters) from Fire Event F-02a, March 16, 2015.

ADF 006052, DCS01 NCR DS ANS H 35022 R4, Update the Scrap Processing Unit NCSE to reflect the current design and safety strategy, March 18, 2015.

ADF 006055, DCS01 GDE DS ANS H 35033 R4, GDE NCSE revision to address, ECRs, CR items, and consistency with newer design references, March 25, 2015

ADF 006061, DCS01 PTE DS ANS H 35025 R4, PTE NCSE revision to address confirmation required items and ECR's, April 7, 2015

ADF 006062, DCS01 PFE DS ANS H 35012 R4, Update the Sintering Furnace Units (PFE/PFF) NCSE to reflect the current design and safety strategy, April 9, 2015

ADF 006063, ECR-025586 R0, Update the Loss of Confinement NSE to remove LOC-05f and LOC-05g due to events considered not credible. April 10, 2015.

ADF 006069, DCS01 NBX DS ANS H 35008 R4, NBX NCSE revision to incorporate changes to IROFS and hazards that require an update to the ISAS, March 30, 2015

ADF 006070, DCS01 KKJ DS ANS H 35053 R4, Revision to AP Auxiliary Units (KPB, KPC, KPG, KWD, KWS, KWG) Nuclear Criticality Safety Evaluation (NCSE) incorporates outstanding ECRs and updates controlled parameters, hazards, and engineered and administrative controls, April 1, 2015.

ADF 006071, DCS01-KCD-DS-ANS-H-35007, Update the Oxalic Mother Liquor Recovery Unit (KCD) NCSE to reflect the current design and safety strategy, April 8, 2015

ADF 006072, DCS01 NXR DS ANS H 35010 R4, Update the Powder Auxiliary Unit (NXR) NCSE to reflect the current design and safety strategy, March 31, 2015

ADF 006074, ECR-025814 R0, Update the Fire Protection and Detection Systems Basis of Design (BOD), the Fire Nuclear Safety Evaluation (NSE), the Fire Hazards Analysis (FHA), the System Description Document (SDD) for the Assembly Rod Loading and Fabrication Units (TGM/TGV), and the Laboratory SDD to reflect a change from NFPA 482 (1996 Edition) to NFPA 484 (2015 Edition), May 21, 2015

ADF 006075, ECR-024270 R0, Update the solvent recovery unit project documentation to reflect implementation of a redesigned performed to use peristaltic pumps versus internal recycling. March 31, 2015.

ADF 006088, ECR-025907 R0, Update Dissolution Units (KDB/KDD) Hazop, the Loss of Confinement Nuclear Safety Evaluation(NSE), and the Explosion NSE to reflect the results of DCS01 KDJ DS ANS H 38494 1, Process Vessel Overflow Analysis Units KDB and KDD, June 2, 2015.

ADF 006098, ECR-025615 R1, Update the MFFF Deviations Log to add a clarification regarding the project's position on equipment separation requirements per IEEE 384-1992, April 28, 2015

ADF 006123, ECR-026017 R0, ECR that makes an entry into the deviation log to document vendor's deviation form radiography requirements in ASME Section VIII, September 14, 2015

ADF 006136, ECR-025975 R0, NCSE for NCR update to revise key hand switches and campaign switches in unit NCR. June 10, 2015

ADF 006200, ECR-025907 R1, Changes to DCS01 AAS DS ANS H 28372 5, NSE of loss of confinement, and DCS01 AAS DS ANS H38390 7, NSE of Facility Explosion Events, September 16, 2015

ADF 006214, ECR-026802 R0, Update the aqueous waste reception (KWD) P&ID and associated isometrics to reflect pipe routing changes to KWD low level condensate drains, September 22, 2016.

ADF 006217, ECR-026811 R0, Update the MFFF Deviations Log to reflect a deviation to the Energy Research and Development Administration (ERDA) 76-21, Table 5.6, Level 4 leak test, October 20, 2015.

ADF 006228, ECR-026159 R0, ECR that creates a change to NCR NCSE DCS01 NCR DS ANS H 35022, October 6, 2015

ADF 006233, ECR-026634 R0, Removal of designation of IROFS for specified elevator doors that are not needed to demonstrate compliance with 10 CFR 70.61, October 21, 2015

ADF 006239, ECR-025807 R1, Revise ECR 025807 to modify the Piping Material Specification and Valve Technical Specification regarding the use of certain materials in the impacted check valves, October 19, 2015.

ADF 006280, DCS01 AAS DS ANS H 38372 R6, Update the Loss of Confinement NSE to incorporate outstanding ECRs and to provide a general update and address changes associated with revised input documents, December 17, 2015

### **Calculations**

DCS01-PPJ-CG-CAL-H-06424, Criticality Safety of the Pellet Storage and Handling Units PSE, PSF, and PSI, Rev. D

DCS01-PSJ-CG-CAL-H-06442, Criticality Safety of the Pellet Storage and Handling Unit PSJ, Rev. D

DCS01-PPJ-DS-ANS-H-35031, Nuclear Criticality Safety Evaluation of the Pellet Storage Units, Rev. 4

DCS01-VHD-DS-CAL-V-13039, VHD Glovebox Dump Valve Sizing, Rev. 2

DCS01-VHD-DS-CAL-V-13402, VHD System Networking Analysis Models – BAP 2nd Floor, Rev. 0

DSC01-XGA-DS-CAL-B-01086-1, Structural Analysis and Design of BEG Structure, Rev. 1

### **Drawings**

DCS01-dci-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-BMF-DS-PLF-A-04509-sh03\_Rev 3: MOX Fuel Fabrication Facility ABC Construction of Typical Fire Damper Penetration Details



DCS01-BRA-DS-PLG-A-01000-sh1 of 22\_Rev 0: MOX Fuel Fabrication Facility Penetration Seals Typical Details Cover Sheet  
DCS01-BRA-DS-PLG-A-01000-sh16 of 22\_Rev 0: MOX Fuel Fabrication Facility Penetration Seals Typical Detail H-1  
DCS01-BRA-DS-PLG-A-01000-sh20 of 22\_Rev 0: MOX Fuel Fabrication Facility Penetration Seals Typical Detail R-1  
DCS01-BRA-DS-PLG-A-01000-sh21 of 22\_Rev 0: MOX Fuel Fabrication Facility Penetration Seals Typical Detail R-2  
DCS01-BRA-DS-PLG-A-01000-sh22 of 22\_Rev 0: MOX Fuel Fabrication Facility Penetration Seals Typical Detail R-3  
DCS01-DCS-DS-PLI-T-7189400, Piping Isometric Decontamination System, Sheet 7, Rev. 1  
DCS01-DCS-DS-SCH-K-15015, Piping & Instrument Diagram Decontamination Solution System MADS2260/MADS2150, Sheet 11, Rev. 1  
DCS01-DCS-DS-SCH-K-15015, Piping & Instrument Diagram Decontamination Solution System MADS2160/MADS2190, Sheet 12, Rev. 1  
DCS01-DCS-DS-SCH-K-15015, Piping & Instrument Diagram Decontamination Solution System MADS2280, Sheet 13, Rev. 1  
DCS01-KPC-DS-PLI-T-5059400, Piping Isometric Nitric Acid Recovery, Sheet 1, Rev. 1  
DCS01-KPC-DS-SCH-D-16758, Piping & Instrument Diagram Aqueous Polishing Area Unit KPC – Acid Recovery Nitric Acid TK4000/TK4500, Sheet 8, Rev. 5  
DCS01-RNA-DS-SCH-K-14750, Piping & Instrument Diagram Nitric Acid System, Sheet 5, Rev. 3  
DCS01-VHD-DS-PLI-T-8304007, Piping Isometric VHD, Sheet 1, Rev. 2  
DCS01-VHD-DS-PLI-T-8304010, Piping Isometric VHD, Sheet 1, Rev. 2  
DCS01-VRM-DS-PLI-T-6940800, Piping Isometric Radiation Monitoring Vacuum, Sheet 2, Rev. 1  
DCS01-VRM-DS-PLI-T-6941400, Piping Isometric Radiation Monitoring Vacuum, Sheet 2, Rev. 1  
DCS01-VRM-DS-PLI-T-6942000, Piping Isometric Radiation Monitoring Vacuum, Sheet 2, Rev. 1  
DCS01-VHD-DS-SCH-V-10081, P&ID Glove Box Exhaust System KWD\*GB4000, Sheet 4, Rev. 6  
DCS01-VRM-DS-SCH-K-14985, Piping & Instrument Diagram Radiation Monitoring Vacuum Pumps, Sheet 1, Rev. 1

### **Engineering Change Requests (ECRs)**

ECR-022275, Evaluation of Pellet Storage Units without Neutron Absorber, Rev. 1  
ECR-025262, Addition of Dump Valve for KWD\*GB4000 Glovebox, Rev. 0  
ECR-025553, Use of Short Radius Elbows in KDB\*GB1200 and KDD\*GB1200, Rev. 0  
ECR-025634, Revise Dump Valve Sizing Calculation, Rev. 0, dated March 11, 2015  
ECR-025807, Modify MOX Internal Documents for Valve VCF-121 Due to Vendor Provided Data, Rev. 1  
ECR-026833, Slope Deviations for Three Acid Lines, Rev. 0

### **Evaluations**

DCS01-AAS-DS-ANS-H-38487-0, IROFS Relative Importance to Safety Ranking Evaluation for Criticality Safety Piping, 03/14/2014

DCS01-AAS-DS-ANS-H-38511-0, IROFS Relative Importance to Safety Ranking Evaluation for Welded Process Vessels and Pipes, 02/05/2014  
 DCS01-AAS-DS-ANS-H-38525-0, IROFS Relative Importance to Safety Ranking Evaluation for NTM Trolley - Criticality, 02/19/2015  
 DCS01-AAS-DS-ANS-H-38584-0, IROFS Relative Importance to Safety Ranking Evaluation for Sintering Furnace Shell, 08/06/2015  
 DCS01-AAS-DS-ANS-H-38598-0, IROFS Relative Importance to Safety Ranking Evaluation for Pneumatic Transfer Room Air Supply HEPA Filters, 06/27/2016  
 DCS01-AAS-DS-ANS-H-38626-0, IROFS Relative Importance to Safety Ranking Evaluation for Fire Detection and Fire Suppression, 06/02/2016  
 DCS01-AQG-DS-ANS-H-35683-2, QL-1LR Spreadsheet, 11/06/2014  
 DCS01-BKA-DS-CGD-M-65865-2, QL-1, Commercial Grade Item Evaluation for Repair Mortar  
 DCS01-KKJ-DS-ANS-H-38592-2, RITS Ranking Evaluation of IROFS Process Vessels and Pipes Credited for Loss of Confinement and Explosion Events, 05/14/2016  
 DCS01-KKJ-DS-CAL-H-38485-2, RITS Ranking Evaluation of IROFS Double Walled Pipe Credited to Prevent Explosion and Loss of Confinement Events, 05/09/2016  
 DCS01-RRJ-DS-ANS-H-38469-4, RITS Ranking Evaluation of IROFS Temperature Controls Credited for Loss of Confinement and Explosion Events, 03/26/2014  
 DCS01-ZMJ-DS-CGD-M-65819-5 QL-1, Commercial Grade Item Evaluation for Metallic Bellows  
 DCS01-ZMJ-AG-CGD-M-65840-5 QL-1, Commercial Grade Item Evaluation for Seals and Gaskets

### **Licensing Documents**

Mixed Oxide Fuel Fabrication Facility License Application, January 2016

Mixed Oxide Fuel Fabrication Facility Integrated Safety Analyses Summary, January 2016

### **Measuring and Test Equipment (M&TE) Records**

Certificate of Calibration #1353060, Asset Number CEURS0003, Step Wedge  
 Certificate of Calibration #1549634, Asset Number CE1279SS-30-2, 0-30 psig Pressure Gauge  
 Certificate of Calibration #1579175, Asset Number BTS836517, 0-1500 psig Pressure Transducer  
 Certificate of Calibration #1579176, Asset Number BTS836603, 0-200 psig Pressure Transducer  
 Certificate of Calibration #1579178, Asset Number BTS836566, 0-30 psig Pressure Transducer  
 Certificate of Calibration #1592101, Asset Number CE1147, IR Thermometer  
 Certificate of Calibration #1910860, Asset Number Q07277374, 0-6 in Digital Caliper  
 Certificate of Calibration #1910893, Asset Number SUP3556, 5-75 lbf-ft Torque Wrench  
 Certificate of Calibration #1910908, Asset Number CE0673, Digital Multimeter  
 Certificate of Calibration #1919692, Asset Number QC5561, 6-30 kgf-m Torque Wrench

### **Miscellaneous**

CY 2016 Qualified Suppliers List (QSL)

MOX Project Quality Assurance Plan (MPQAP), Rev. 14

**Nonconformance Reports**

10888-MOX-NCR-15-6191  
 10888-MOX-NCR-15-6368  
 10888-MOX-NCR-16-6896  
 10888-MOX-NCR-16-6988

**Notification Letters to the Commission**

DCS-NRC-000411  
 DCS-NRC-000413  
 DCS-NRC-000424  
 DCS-NRC-000426  
 DCS-NRC-000428

**Part 21 Evaluation Reports**

Log No. 2015-20, Evaluations of repairs performed by vendor on Elevator Glovebox PMLGB700K, Supplied by Oregon Iron Works  
 Log No. 2015-23, Evaluation of welds performed by vendor on Gloveboxes KDAGB7000, KDMGB6200, KDMGB7000, KDMGB7200, DCPRAX5000 and NDSGB1000, Supplied by Byers Precision Fabricators  
 Log No. 2015-24, Evaluation of material cleanliness on structural tubes found in NBX and NBY gloveboxes, Supplied by Flanders Corporation  
 Log No. 2015-26, Evaluation of design discrepancies for Glovebox 2000B (PML GB2000B), Supplied by Vigor Works, LLC.  
 Log No. 2016-01, Evaluation of a weld performed by vendor on Very High Depressurization Exhaust (VHD) ductwork piping in B-387, Weld was performed by Shaw.  
 Log No. 2016-10, Evaluation of shoulder studs for Gloveboxes PTEGB2000, PTFGB2000, and PTFGB1000, Supplied by Major Tool and Machine  
 Log No. 2016-16, Evaluation of welds on the internal cross bracing of High Depressurization Exhaust (HDE) system, supplied by Flanders Corporation  
 Log No. 2016-19, Evaluation of inadequate NDE documentation provided by vendor on several gloveboxes, Supplied by Vigor Works  
 Log No. 2016-20, Evaluation of fillet welds for slab tank KCDTK4200, Supplied by Premier Technology Inc.

**Procedures**

M-NDE-006, Ultrasonic Thickness Measurement, Rev. 5  
 M-NDE-010, Leak Testing / Bubble Test – Vacuum Box Technique, Rev. 2  
 M335-1, Mechanical Piping Inspection, Rev. 5  
 NDE-1, Training, Examination & Certification of Nondestructive Examination Personnel, Rev. 23  
 PP3-04, Records Management, Rev. 8  
 PP3-05, Control of Non-Conforming Items, Rev. 11  
 PP3-08, Qualification and Certification of Auditors, Rev. 8  
 PP3-12, Supplier Evaluation, Rev. 14

PP3-13, Supplier Surveillance, Rev. 8  
 PP3-15, Control of Measuring & Test Equipment, Rev. 6  
 PP3-27, Quality Control Personnel Certification / Construction Department Inspection  
 Certification, Rev. 6  
 PP3-28, Quality Control Receipt Inspection, Rev. 5  
 PP3-30, Quality Control Inspection Plans & Inspection Reports, Rev. 5  
 PP3-32, Visual Welding Inspection Criteria, Rev. 0  
 PP8-03, Evaluation and Reporting of Defects and Non-Compliance (10 CFR Part 21),  
 Rev. 7  
 PP8-06, Licensing Basis Configuration Management, Rev. 13  
 PP9-03, Design Control, Rev. 23  
 PP9-06, Engineering Calculations, Rev. 10  
 PP9-08, Technical Documents, Rev. 11  
 PP9-14, Design Process, Rev. 6  
 PP9-18, Commercial Grade Item Evaluations, Rev. 8  
 PP9-21, Engineering Change Request, Rev. 13  
 PP9-41, IROFS Relative Importance to Safety (RITS) Ranking, Rev. 0  
 PP11-20, Field Change Requests, Rev. 5  
 PP11-35, Construction Inspection and Acceptance Testing, Rev. 9  
 PP11-40, Preventive Maintenance of In-Storage/ Installed Equipment During The  
 Construction Phase, Rev. 4  
 PP11-60, Welder / Welding Operator Qualification, Rev. 1  
 PP14-03, Storage for Digital Archive Media, Rev. 3  
 S562, Piping Process Welding Inspections, Rev. 18

### **Qualification Records**

Maintenance of Proficiency for Lead Auditor, 05/18/2016  
 PP11-06H, Welder/Welding Operator Qualification Summary Report, 07/18/2016  
 Record of Auditor/Lead Auditor Qualifications for Lead Auditor, 06/17/2008, 05/20/2015,  
 11/04/2015  
 Record of Auditor/Lead Auditor Qualifications for Auditor, 01/15/2015, 05/18/2015  
 Record of Ultrasonic Testing (UT) Thickness Measurement, Dated 6/30/2016  
 Record of Ultrasonic Testing (UT) Thickness Measurement, Dated 9/28/2015  
 Record of Leak Testing (LT) Bubble Test, Dated 3/10/2016  
 Record of Visual Testing (VT) Pipe Welding/Braze, Dated 3/23/2016  
 Record of Welder or Welding Operator Qualification for AWS D1.6 for Welder No. B008,  
 02/01/2013, 06/25/2015, 07/01/2015  
 Record of Welder or Welding Operator Qualification for AWS D1.6 for Welder No. B010,  
 04/15/2013, 01/09/2014, 06/01/2015  
 Record of Welder or Welding Operator Qualification for AWS D1.6 for Welder No. B020,  
 02/26/2016, 03/04/2016, 03/18/2016

### **Receipt Inspection Reports (RIRs)**

RIR # QC-RIR-16-57754, Glovebox, Subassemblies, Circular Metallic Bellows, 2/8/2016

RIR # QC-RIR-15-55887, Seal O-Ring, Viton, Fluoroelastomer, FMP, 0.671 IN ID X  
0.139 IN, 9/28/2015

RIR # QC-RIR-16-57785, Master Emaco Mortar T454 HT, 2/16/2016

### **Supplier Audits / Evaluations**

ATS- 14-VE80, Supplier Evaluation Summary Report (Annual Evaluation), 6/12/2014

ATS- 15-VE70, Supplier Evaluation Summary Report (Annual Evaluation), 6/29/2015

ATS- 16-VE06, Supplier Evaluation Summary Report (Annual Evaluation), 1/27/2016

BPF-14-VE29, Supplier Evaluation Summary Report (Annual Evaluation), 3/13/2014

BPF-15-VE33, Supplier Evaluation Summary Report (Annual Evaluation), 3/12/2015

BPF-16-VS17 / BPF-16-VE18, Quality Assurance Audit Report, 7/06/2016

BPF-16-VS17 / BPF-16-VE18, Supplier Evaluation Summary Report (Audit), 7/06/2016

BPF-16-VS17 / BPF-16-VE18, NIAC/Supplier Audit Checklist, Rev. 0, 7/05/2016

CDI-15-VE20, NIAC Audit No. 20098, Audit Plan Checklist, and Report, 3/13/2015

CDI-15-VE20, Supplier Evaluation Summary Report (Performance History Review),  
5/27/2015

CDI-16-VE24, Supplier Evaluation Summary Report (QA Program Review/Performance  
History Review), 2/11/2016

CPS-15-VE81, Supplier Evaluation Summary Report (Triennial Evaluation, NIAC Audit  
#20007), 11/06/2015

DMP-14-VE44, Supplier Evaluation Summary Report (Annual Evaluation), 4/22/2014

DMP-15-VE44, Supplier Evaluation Summary Report (Triennial Evaluation, NIAC Audit  
#20132), 7/28/2015

DMP-16-VE112, Supplier Evaluation Summary Report (Notification to DMP), 3/22/2016

FLO-15-VE07, NIAC 20071 Checklist, 2/25/2015

FLO-15-VE07, Supplier Evaluation Summary Report (Triennial Evaluation, NIAC Audit  
#20071), 4/02/2015

FLO-15-VS133, Surveillance Report, 4/24/2015

FMC-14-VE90, Quality Assurance Audit Report, 9/08/2014

HPP-14-VE17, Supplier Evaluation Summary Report (Annual Evaluation), 4/2/2014

JOC-14-VE84, Supplier Evaluation Summary Report (Annual Evaluation), 7/15/2014

JOC-14-VE143, Supplier Evaluation Summary Report (Update Scope of Supply on  
ASL), 4/09/2014

JOC-15-VE74, Supplier Evaluation Summary Report (Performance History Review),  
10/29/2015

SME-16-VE71, Quality Assurance Audit Report, 7/14/2016

STO-16-VE30, NIAC Audit No. 21049. Concurrence Letter, Audit Plan, Audit Checklist &  
Audit Report, 5/27/2016

STO-16-VE30, Supplier Evaluation Summary Report (Audit, NIAC #21049), 4/13/2016

WES-2015-078, NIAC #20007, Audit Package for Consolidated Power Supply, August  
2015

WES-2015-128, NIAC #20017, Audit Package for Joseph Oat Corporation, August 2015

WGI-13-VE91, Quality Assurance Audit Report, 8/08/2013

WGI-14-VE88, Supplier Evaluation Summary Report (Annual Evaluation), 7/16/2014

WGI-15-VE79, Supplier Evaluation Summary Report (Annual Evaluation), 7/31/2015

WGI-16-VE124, Supplier Evaluation Summary Report (QA Program Review), 6/02/2016

### **System Description Documents (SDDs)**

DCS01-DCS-DS-SDD-K-15834, Decontamination Solution System Description Document, Rev. 1  
 DCS01-KPC-CG-SDD-F-06264, Acid Recovery System Description Document, Rev. 4  
 DCS01-PSP-CG-SDD-M-06578, Pellet Storage Units System Description Document, Rev. 3  
 DCS01-RNA-DS-SDD-K-15800, Nitric Acid System Description Document, Rev. 1  
 DCS01-VRM-DS-SDD-K-15830, Radiation Monitoring Vacuum System Description, Rev. 0

### **Technical Reports**

DCS01-AAJ-DS-DOB-M-40121, Basis of Design for the Fluid Transport Systems – Equipment and Piping, Rev. 3  
 DCS01-AAJ-DS-DOB-V-40106, Basis of Design for HVAC Systems, Rev. 3  
 DCS01-AAJ-DS-DOB-Z-40120, Basis of Design for Radiation Protection, Rev. 2  
 DCS01-BMF-DS-CAL-B-01385-0: Fire Damper Penetration Barrier, Quality Level 1  
 DCS01-KKJ-CG-NTE-D-06645, Design Rules Gravity Flow Pipework, Rev. A  
 DCS01-KKJ-DS-NTE-T-10326, Fluid Transport System: Piping and valves, Technical Guideline for Manual Valves, Rev. 2  
 DCS01-QGA-DS-NDS-M-65765: Statement of Work Fire Dampers, Rev. 6  
 DCS01-UFJ-DS-SPE-T-16252, Piping Material Specification, Rev. 9  
 DCS01-ZMJ-DS-SPE-M-21402: Equipment Seismic Qualification Specification Quality Level 1, Rev. 2  
 Document No.: 08716-00008791\_00000-1112-C: Seismic Qualification Report – Fire Dampers  
 Document No.: 08716-00003307\_00003-0261-G: Seismic Qualification Report –MOX Fire Dampers and Sleeves  
 Document No.: 08716-00008791\_00000-0893-D: Similarity Report – Fire Dampers.  
 Document No.: 08716-00008791\_00000-0917-C: Seismic Test Plan for Fire Dampers.  
 Document No.: 08716-AREVANP-0039, Rev. B: Detailed Test Plan for Conducting MOX Pressure Test 9.  
 Document No.: 08716-00008791\_00000-0622-D: Installation, Operation and Maintenance Manual.  
 Document No.: 08716-AREVANP-0013-B: Installation Instruction Manual for MOX Penetration Seal Test Program.  
 DCS01-BRA-DS-TRD-B-01365-01: Technical Requirements Document for MFFF Penetration Seals

### **Test Reports**

Leak Test Report VB-MOX-0163, 7/18/2016  
 Leak Test Report VB-MOX-0164, 7/18/2016  
 Leak Test Report VB-MOX-0167, 7/19/2016  
 Report No.: 101276459SAT-018\_Rev. 1: Test Report, Pressure Resistance (Pressure Test 9).  
 Ultrasonic Thickness Measurement Report UT-MOX-0280, 7/19/2016

### **Weld Data Sheets**

Weld Data Sheet for weld 15-C141-DRIP-3186-FW012-C0R0  
Weld Data Sheet for weld 15-C141-DRIP-3186-FW013-C0R0  
Weld Data Sheet for weld 15-C141-DRIP-3186-FW014-C0R0  
Weld Data Sheet for weld KWG-0012900-01-FW002-C0R0

**Work Packages**

14-C234-P-M-2003-09C-2150  
15-C141-DRIP-V-0002-3186  
15-C302-HAS-0002-V-3595

Letter to D. Del Vecchio from Michael Ernstes dated October 17, 2016.

SUBJECT: MIXED OXIDE FUEL FABRICATION FACILITY- NRC INSPECTION REPORT  
NO. 70-3098/2016-003

Distribution w/encl:

---

R. Johnson, NMSS

D. Tiktinsky, NMSS

M. Diaz, NMSS

W. Jones, RII

M. Ernstes, RII

R. Musser, RII

R. Nease, RII

J. Heisserer, RII

W. Gloersen, RII

PUBLIC