



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
245 PEACHTREE CENTER AVENUE N.E., SUITE 1200
ATLANTA, GEORGIA 30303-1200

March 19, 2019

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 70-3098/2018-004

Dear Mr. Del Vecchio:

During the period from July 1, 2018, through February 8, 2019, the U. S. Nuclear Regulatory Commission (NRC) completed inspections pertaining to the construction of the Mixed Oxide Fuel Fabrication Facility (MFFF). The purpose of the inspections was to determine whether activities authorized by the construction authorization (CA) and license application were conducted safely and in accordance with NRC requirements. By letter dated November 1, 2018 (Agencywide Documents Access and Management System [ADAMS] Accession Number ML18305A356), you notified the NRC that as of October 12, 2018 that CB&I AREVA MOX Services (MOX Services) ceased NRC regulated construction activities on the MFFF. By letter dated February 8, 2019 (ADAMS Accession Number ML18324A665), the NRC issued Revision 5 of the CA, which terminated NRC regulated activities at the MFFF. On February 8, 2019, the NRC ended inspection and oversight of the MFFF project. The enclosed inspection report documents the inspection results for the period between July 1, 2018, and February 8, 2019. 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 NRC's rules and regulations and with the conditions of your authorization. The inspectors reviewed selected procedures and records, observed construction activities, and interviewed personnel.

NRC inspectors documented two findings of very low safety significance (SL IV) in this report. These findings involved violations of NRC requirements. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the Enforcement Policy. If you contest the violation or significance of this NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the United States Nuclear Regulatory Commission, ATTENTION: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; and the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

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

Sincerely,

/RA/

Steven D. Rose, Chief
Construction Inspection Branch 2
Division of Construction Oversight

Docket No. 70-3098

Construction Authorization No.: CAMOX-001

Enclosure: NRC Inspection Report No. 70-3098/2018-004
w/attachment: Supplemental Information

cc w/encl: (See next page)

cc w/encl:

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Letter to D. Del Vecchio from Steven D. Rose dated March 19, 2019.

SUBJECT: MIXED OXIDE FUEL FABRICATION FACILITY- NRC INSPECTION REPORT
NO. 70-3098/2018-004

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ADAMS: Yes ACCESSION NUMBER: **ML19078A223** SUNSI REVIEW COMPLETE FORM 665 ATTACHED

OFFICE	RII: DCO	RII: DCO	RII: DCO	RII: DCO	RII: DCO	RII: DFFI	RII: DFFI	HQ: NMSS
NAME	P. Carman	J. Eargle	D. Harmon	J. Kent	G. Crespo	B. Adkins	T. Vukovinsky	D. Tiktinsky
DATE	3/6/2019	3/12/2018	10/31/2018	10/31/2018	10/31/2018	11/9/2018	11/17/2018	3/4/2019
OFFICE	RII: DCO							
NAME	S. Rose							
DATE	03/19/2019							

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 70-3098

Construction Authorization No.: CAMOX-001

Report No.: 70-3098/2018-004

Applicant: CB&I AREVA MOX Services

Location: Savannah River Site
Aiken, South Carolina

Inspection Dates: July 1, 2018 – February 8, 2019

Inspectors: B. Adkins, Senior Fuel Facility Inspector, Safety Branch, Division of Fuel Facility Inspection (DFFI)
P. Carman, Project Manager, Construction Inspection Branch 2 (CIB2), Division of Construction Oversight (DCO)
G. Crespo, Senior Construction Inspector, CIB2, DCO
J. Eargle, Senior Project Manager, CIB2, DCO
D. Harmon, Construction Inspector, CIB2, DCO
J. Kent, Construction Inspector, CIB2, DCO
T. Vukovinsky, Senior Fuel Facility Inspector, Projects Branch 2 (PB2), DFFI

Accompanying Personnel: D. Tiktinsky, Senior Project Manager, Fuel Manufacturing Branch (FMB), Division of Fuel Cycle Safety, Safeguards and Environmental Review (FCSE), Office of Nuclear Materials Safety and Safeguards (NMSS)

Approved by: Steven D. Rose, Chief
Construction Inspection Branch 2
Division of Construction Oversight

Enclosure

EXECUTIVE SUMMARY

CB&I AREVA MOX Services (MOX Services)
Mixed Oxide (MOX) Fuel Fabrication Facility (MFFF)
NRC Inspection Report (IR) Number (No.) 70-3098/2018-004

The scope of the inspections encompassed a review of various MFFF activities related to quality level (QL)-1 (safety-related) construction for conformance to U.S. Nuclear Regulatory Commission (NRC) regulations, the Construction Authorization Request (CAR), the MOX Project Quality Assurance Plan (MPQAP), applicable sections of the License Application (LA) and applicable industry codes and standards. This inspection included, as applicable, the following inspection attributes: 10 CFR 21 – construction; control of materials, equipment, and services; fabrication; installation; procurement; test control; quality assurance (QA) interfaces; and vendor oversight / inspection.

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

- PSSC-005, C3 Confinement System
- PSSC-009, Criticality Controls
- PSSC-034, MFFF Tornado Dampers
- PSSC-036, MOX Fuel Fabrication Building Structure
- PSSC-041, Process Cells

By letter dated November 1, 2018 (Agencywide Documents Access and Management System [ADAMS] Accession Number ML18305A356), the NRC was notified that as of October 12, 2018 that MOX Services ceased NRC regulated construction activities on the MFFF. By letter dated February 8, 2019 (ADAMS Accession Number ML18324A665), the NRC issued Revision 5 of the CA, which terminated NRC regulated activities at the MFFF. At this time, the NRC ended inspection and oversight of the MFFF project. This report is the final inspection report for MOX Services.

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. The detailed inspection activities identified two non-cited violations (NCVs): NCV 70-3098/2018-004-01, Failure to Ensure Penetration Plate Bolting Was Inspected to Meet Design Requirements, and NCV 70-3098/2018-004-02, Failure to Perform Manufactures Maintenance Instructions. (Section 2)

PSSC Inspections

PSSC-005, C3 Confinement System

The inspectors performed an inspection of the factory acceptance test for the high depressurization exhaust (HDE) variable frequency drives (VFDs) (HDE*VFD0001A and HDE*VFD0001B) to determine if MOX Services provided adequate oversight of their suppliers

and subcontractors in accordance with the MPQAP; and to determine if the VFDs were procured and tested in accordance with MOX specifications, purchase orders, and MPQAP requirements. No violations of more than minor significance were identified. (Section 3.a)

PSSC-009, Criticality Controls

The inspectors reviewed documents associated with demister KPA-DMST8000, performed a field walk down, and took independent measurements to determine if critical dimensions met design and licensing basis requirements and was installed within analyzed distances from structural concrete walls and other equipment. No violations of more than minor significance were identified. (Section 3.b)

PSSC-034, MFFF Tornado Dampers

The inspectors reviewed the procurement specification for the design, fabrication, inspection, test and delivery of tornado dampers for use in the MFFF. The purpose of the review was to ensure that MOX Services adequately specified the applicable technical and quality assurance requirements as committed to in the design bases section of the Integrated Safety Analysis (ISA) Summary. No violations of more than minor significance were identified. (Section 3.c)

PSSC-036, MOX Fuel Fabrication Building Structure

The inspectors observed concrete batching activities for a new heating, ventilation, and air conditioning (HVAC) supply air (HSA) wall penetration in room B-398 of the MOX processing building (BMP), and concrete batching and placement activities for two sections of the roof slab in Room C-234 of the aqueous polishing building (BAP). No violations of more than minor significance were identified. (Section 3.d)

PSSC-041, Process Cells

The inspectors observed construction activities and reviewed records related to quality control (QC) inspections of welds performed on oxalic mother liquors recovery (KCD) drip tray KCD-Drip 7900 to verify construction activities were conducted in accordance with project procedures. No violations of more than minor significance were identified. (Section 3.e)

Programmatic Inspections

10 CFR 70.72 Facility Changes and Change Process

The inspectors evaluated the implementation of MOX Services' change processes for the LA and the ISA Summary as defined in the LA. The summary of facility changes was provided in a letter to NRC dated January, 22 2018, and consisted of facility changes made in calendar year 2017. The inspectors reviewed the current facility change and change control program and a sampling of the changes and applicability determination forms (ADF). No violations of more than minor significance were identified. (Section 4.a)

10 CFR Part 21, Inspection-Facility Construction

The inspectors evaluated several 10 CFR Part 21, "Reporting of Defects and Noncompliance," evaluations completed by the applicant against the quality assurance program to determine whether the applicant's procedures and program activities effectively implement the

requirements of 10 CFR Part 21. No violations of more than minor significance were identified. (Section 4.b.(1))

Quality Assurance: Inspection, Test Control, and Control of Measuring and Test Equipment

The inspectors reviewed project procedure PP3-15, "Control of Measuring & Test Equipment," Revision 8, interviewed the technical program manager for the measuring and test equipment (M&TE) program, and performed direct inspection of M&TE in the field and in the M&TE control area. The inspectors conducted these activities to verify that the applicant established controls for tools, instruments, gauges, and other M&TE used for quality-affecting activities; and to verify that M&TE is controlled, calibrated (at specified periods), and adjusted to maintain accuracy within necessary limits in accordance with the MPQAP. No violations of more than minor significance were identified. (Section 4.b.(2))

REPORT DETAILS

1. Summary of Facility Status

During the inspection period, the applicant (CB&I AREVA MOX Services (MOX Services)) performed construction activities of principal systems, structures and components (PSSCs). Other construction activities included staging of process piping and installation of supports in the aqueous polishing area (BAP); installation of process piping in the BAP; installation of ventilation system ductwork and supports in the BAP and MOX processing area (BMP); installation of fire dampers in the BAP and BMP; installation of various gloveboxes in the BAP and BMP; and concrete placement 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). By letter dated November 1, 2018 (Agencywide Documents Access and Management System [ADAMS] Accession Number ML18305A356), the NRC was notified that as of October 12, 2018 that MOX Services ceased NRC regulated construction activities on the MFFF. By letter dated February 8, 2019 (ADAMS Accession Number ML18324A665), the NRC issued Revision 5 of the CA, which terminated NRC regulated activities at the MFFF. At this time, the NRC ended inspection and oversight of the MFFF project.

2. Routine Resident Inspection Activities

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

(1) Scope and Observations

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

The inspectors reviewed the status of work packages (WPs) maintained at various work sites. The inspectors reviewed various corrective action documents. The review included non-conformance reports (NCRs) and condition reports (CRs). The inspectors routinely performed tours of the MOX Fuel Fabrication Facility (MFFF) work areas to observe ongoing work activities and communications.

The inspectors performed a routine inspection of the Level "A" Storage area at the Process Assemble Facility (PAF) to determine if the licensee was meeting the requirements of Project Procedure PP10-38, "Storage and Control of Material," and PP12-40, "Preventive Maintenance of In-Storage or Installed Equipment During the Construction Phase." The inspectors reviewed monthly logs to verify that temperature and humidity readings were within the specified acceptance criteria for Level "A" Storage. The inspectors reviewed storage areas to determine if they were access controlled as required by PP10-38 and Subpart 2.2 of American Society of Mechanical Engineers (ASME) NQA-1. The inspectors reviewed records to verify that the temperature and humidity instrumentation was properly calibrated to standards traceable to the National Institute of Standards and Technology (NIST). The inspectors reviewed records to verify that monthly compliance inspections were performed as required by

PP10-38. The inspectors reviewed records to verify that the licensee conducts evaluations to assess the impact of non-conforming environmental conditions on Level "A" storage items.

(2) Conclusions

Introduction: The NRC identified a severity level (SL) IV non-cited violation (NCV) for the applicant's failure to ensure that penetration plate bolting was snug tightened per the design drawings, and failure to ensure that work performed subsequent to final inspection contained direction to ensure bolting was snug tightened per design drawings and the MPQAP-2017-0001, "MOX Project Quality Assurance Plan," Revision 17 (MPQAP).

Description: The inspectors performed a walk down of the active gallery in the BAP, and noted that some bolts on penetration plates were loose and or missing. These penetration plates are stay in place forms that contain the concrete which will be poured between the walls. These penetration plates are used where piping penetrates the walls, and are quality level (QL)-1 items relied on for safety (IROFS) in part because of their seismic functions.

The inspectors and the applicant identified that there were approximately 37 penetration plates that had been signed off by QC personnel. The work packages associated with these plates indicated that during the final verification of penetration plate installation, the QC inspector, craft installer, and construction engineer verified that the final installation of penetration plates was in accordance with the design drawings and applicable design documents. The inspectors noted that the drawings associated with these penetration plates contained notes that directed tie rods to be snug tightened. Per procedure PP11-6, "Installation Of Structural And Miscellaneous Steel," Revision 3: "The snug-tightened condition is the tightness that is attained with a few impacts of an impact wrench or the full effort of an ironworker using an ordinary spud wrench to bring the connected plies into firm contact."

The inspectors and the applicant inspected all 37 penetration plates that were identified as QC signed off and found that eight of them had loose hex nuts (could be freely turned by hand) and one of them was missing a hex nut completely. Subsequently, the applicant initiated CR 10888-MOX-CR-18-272. During the time of the inspection, the applicant was performing an extent of condition and evaluating appropriate corrective actions. It should be noted that CR 10888-MOX-CR-18-059, "Potential Trend On Bolting," was in process during the inspection period to address bolting issues identified in National Nuclear Security Administration (NNSA) assessment number MOX-AR-0146. Through interviews with the applicant, it was determined that the loose bolting was a result of a combination of individuals not understanding the direction of the work package to verify the requirements contained in the drawings, and work performed on the penetration plates after final verification without a work step to return the bolts to the specified condition.

Analysis: Using the guidance contained in Inspection Manual Chapter 0613 "Power Reactor Construction Inspection Reports," dated 10/01/2018, the inspectors determined that the applicant's failure to ensure that penetration plate bolting was snug tightened per the design drawings, and failure to ensure that work performed subsequent to final inspection contained direction to ensure bolting was snug tightened per design drawings

and the MPQAP was a more than minor finding. Specifically, the deficiency represented a substantive failure to establish or implement a quality oversight function. This finding was determined to be a SL IV violation using Section 6.5, "Facility Construction (10 CFR Parts 50 and 52 Licensees and Fuel Cycle Facilities)" of the NRC Enforcement Policy, dated 05/15/2018, because the applicant failed to implement QA processes or procedures as required by the MPQAP. The finding was determined to have very low safety significance because as of the inspection, the penetration plates had not been backfilled with concrete, which could represent an additional opportunity to properly tighten the bolts.

Enforcement: MPQAP, section 10.2.6, "Final Inspection," requires, in part, that: "A. Finished items shall be inspected for completeness, markings, calibration, adjustments, protection from damage or other characteristics as required in order to verify the quality and conformance of the item to specified requirements," and "D. Modifications, repairs, or replacement of items performed subsequent to final inspection shall require re-inspection or retest, as appropriate, to verify acceptability."

Contrary to the above, since 02/11/2015, the applicant failed to verify finished items be inspected to the specified requirements, and failed to ensure that modifications performed subsequent to final inspection be re-inspected to verify acceptability. Specifically, the applicant failed to ensure that penetration plate bolting was snug tightened per the design drawings, and failed to ensure that work performed subsequent to final QC inspection contained direction to ensure bolting was snug tightened per design drawings. This finding was determined to be a SL IV violation using Section 6.5 of the NRC Enforcement Policy. This violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. The violation was entered in the applicant's corrective action program as CR 10888-MOX-CR-18-272, and the applicant was evaluating appropriate corrective actions during the time of the inspection. (NCV 70-3098/2018-004-01, Failure to Ensure Penetration Plate Bolting Was Inspected To Meet Design Requirements)

Introduction: The NRC identified an SL IV NCV for the applicant's failure to perform all maintenance requirements specified by the manufacturer's instructions as required by the MPQAP-2016-0001, "MOX Project Quality Assurance Plan," Revision 16. Specifically, the applicant's procedure PP10-38, "Storage And Control Of Material," Revision 2, incorrectly allowed these instructions to be evaluated and specified by engineering, in addition to the applicant not following these instructions for equipment in layup and storage.

Description: The inspectors evaluated the layup and storage of equipment in various storage locations at the facility. The inspectors reviewed the procedural requirements for the equipment and noted that procedure PP10-38 allowed the applicant to evaluate and specify the maintenance requirements specified in vendor documents. The inspectors noted that this was contrary to the guidance from NQA-1-1994 / NQA-1-1995a, "Quality Assurance Requirements for Nuclear Facility Applications, Part I, Basic Requirements and Supplementary Requirements for Nuclear Facilities," which was specified by the applicant's MPQAP. The inspectors questioned the procedural guidance along with attempting to verify that manufacturer's guidance was being followed for equipment stored onsite. Subsequently, the applicant initiated CR 10888-MOX-CR-17-289 to capture the inspector's concerns and perform an extent of condition.

The extent of condition documented a failure to perform all the manufacturer's specified instructions on numerous QL-1 equipment, such as, fans, motors, valves, and dampers.

The inspectors noted that as part of the corrective actions, the applicant applied for an amendment to the MPQAP, which was subsequently approved by the NRC, to add, in part:

- Section 6.4.2, Subparagraph (h): MOX Project will follow either vendor recommendations for preventive maintenance, an engineering evaluation, or engineering requirements documents delineating appropriate maintenance requirements, for items in storage. Engineering evaluations and engineering requirements documents will consider vendor recommendations.
- Section 6.5: During a period of layup after release of an item from storage, vendor recommendations for preventive maintenance, or an engineering evaluation or an engineering requirements document delineating appropriate maintenance requirements will be followed. Engineering evaluations and engineering requirements documents will consider vendor recommendations.

Analysis: Using the guidance contained in Inspection Manual Chapter 0613 "Power Reactor Construction Inspection Reports," dated 10/01/2018, the inspectors determined that the applicant's failure to perform all maintenance requirements specified by the manufacturer's instructions as required by the MPQAP was a more than minor finding. Specifically, the deficiency represented a substantive failure to establish or implement an adequate program. This finding was determined to be a SL IV violation using Section 6.5, "Facility Construction (10 CFR Parts 50 and 52 Licensees and Fuel Cycle Facilities)," of the NRC Enforcement Policy, dated 05/15/2018, because the applicant failed to meet regulatory requirements specified in their MPQAP that have more than minor safety significance. The finding was determined to have very low safety significance because the applicant applied for an amendment to the MPQAP, which was approved by the NRC, allowing the applicant to perform engineering evaluations when determining appropriate maintenance requirements for items in storage.

Enforcement: MPQAP, Attachment A, "Commitment To Quality Assurance Standards," states, in part, that The MPQAP will follow NQA-1-1994 / NQA-1-1995a, "Quality Assurance Requirements for Nuclear Facility Applications," Part II, "Quality Assurance Requirements for Nuclear Facility Applications," Subpart 2.2, "Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage, and Handling of Items for Nuclear Power Plants," with the exception of Sections 4.5.2 and 4.5.3. NQA-1-1994 / NQA-1-1995a, Part II, Section 6.4.2, "Care of Items," states, in part, that "h) Other maintenance requirements specified by the manufacturer's instructions for the item shall be performed."

Contrary to the above, since 08/23/2011, the applicant had failed to perform all maintenance requirements specified by the manufacturer's instructions. This finding was determined to be a SL IV violation using Section 6.5 of the NRC Enforcement Policy. This violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. The violation was entered in the applicant's corrective action program as CR 10888-MOX-CR-17-289, and the applicant has implemented corrective actions to ensure that maintenance requirements specified by the manufacturer's instructions are evaluated and implemented appropriately. (NCV 70-3098/2018-004-02, Failure to Perform Manufacturers Maintenance Instructions)

3. PSSC Inspections

a. PSSC-005, C3 Confinement System

(1) Scope and Observations

The inspectors observed construction activities related to PSSC-005, C3 Confinement System, as described in Table 5.6-1 of the MFFF Construction Authorization Request (CAR). The inspection attributes observed were control of materials, equipment, and services; procurement; test control; and vendor oversight / inspection.

The inspectors performed an inspection of the factory acceptance test for the high depressurization exhaust (HDE) variable frequency drives (VFDs) (HDE*VFD0001A and HDE*VFD0001B). MOX Services procured the VFDs from their vendor, SSMI Industries (SSMI), who used a subcontractor, Yaskawa, to perform the factory acceptance testing. The inspection was performed to determine if MOX Services provided adequate oversight of their suppliers and subcontractors in accordance with the MPQAP, and to determine if the VFDs were procured and tested in accordance with MOX specifications, purchase orders, and MPQAP requirements.

The inspectors reviewed a sample of audit reports of SSMI performed by MOX Services to determine if audits were performed within the required periodicity of MOX project procedures. The inspectors reviewed the audit reports to determine if the audit was appropriate for the scope of work and included an assessment of the supplier's implementation of applicable regulations, codes and standards, and MOX Services' procedures in accordance with project procedures.

The inspectors reviewed SSMI's commercial grade survey to determine if Yaskawa's QA implementing procedures received the appropriate level of managerial review and covered applicable portions of the MPQAP. The inspectors reviewed SSMI's material dedication plan to determine if critical characteristic identified in MOX's specification were incorporated into the dedication plan and if the dedication plan was appropriate for commercial dedication of a basic component in accordance with the MPQAP and 10 CFR Part 21. The inspectors reviewed the critical characteristics checklist to determine if critical characteristics reports such as structural material, seismic qualification, frequency response, and voltage response were performed or reviewed during the factory acceptance test and documented in accordance with the material dedication plan.

The inspectors observed testing, reviewed test procedures, and reviewed test results to determine if the VFDs met safety function requirements in accordance with the VFD specification, License Application (LA), and Institute of Electrical and Electronics Engineers (IEEE) standards. Specifically, the inspectors observed testing and reviewed reports to determine if the VFDs had the appropriate ratings and operating characteristics such as voltage ratings, capacity ratings, step controls for required motor speeds, maximum harmonic distortion content, and surge protection in accordance with design documents, the VFD specification, and IEEE standards. The inspectors observed testing to determine if test controls such as wiring verifications, power checks, and torque requirements were performed in accordance with the test procedure.

The inspectors reviewed a sample of measuring and test equipment (M&TE) and calibration records to determine if M&TE used for testing was properly identified, traceable, and calibrated in accordance with the MPQAP. The inspectors reviewed a sample of training and qualification records to determine if the experience, proficiency, training, and testing of personnel performing and supervising testing was appropriate for the scope of the tests being performed.

(2) Conclusions

No violations of more than minor significance were identified.

b. PSSC-009, Criticality Controls

(1) Scope and Observations

The inspectors observed construction activities related to PSSC-009, Criticality Controls, as described in Table 5.6-1 of the MFFF CAR. The inspection attributes observed were fabrication, installation, and QA interfaces

The inspectors reviewed documents associated with demister KPA-DMST8000 to determine if critical dimensions met design and licensing basis requirements. The inspectors reviewed the applicant's subcritical evaluation forms, vendor drawings, criticality analyses, and non-conformance reports to determine the critical dimensions. The work package was reviewed to determine that work steps were followed to install the demister according to the drawings and specifications. The receipt inspection report was reviewed to determine if the slab thickness of the demister was within the allowable maximum thickness specified. The inspectors then performed a field walk down and took independent measurements to ensure that the demister was installed within analyzed distances from structural concrete walls and other equipment.

(2) Conclusions

No violations of more than minor significance were identified.

c. PSSC-034, MFFF Tornado Dampers

(1) Scope and Observations

The inspectors reviewed construction activities related to PSSC-034, MFFF Tornado Dampers, as described in Table 5.6-1 of the MFFF CAR. The inspection attribute observed was procurement.

The inspectors reviewed DCS01-QGA-DS-SPE-V-15912-4, "Procurement Specification for Tornado Dampers," to determine if MOX Services adequately implemented the necessary procurement controls to protect IROFS ventilation systems and facility structures (i.e., walls and doors) from the differential pressure of a tornado.

The inspectors reviewed the procurement specification to verify that ASME AG-1, "Code on Nuclear Air and Gas Treatment," was specified as the code of record for the design and fabrication of tornado dampers as stated in Section 5.3.8.3.1 of the integrated safety analysis (ISA) summary. The inspectors reviewed the specification to determine if it

contained specific requirements for special processes such as welding and non-destructive examination (NDE) in accordance with code requirements. Specifically, the inspectors reviewed the specification to determine if welding was required to meet the requirements of ASME AG-1, Section AA-6000 and weld inspection and testing was required to meet the requirements of ASME AG-1, Section AA-6630, with the exception that only Level II or Level III NDE personnel are allowed. The inspectors reviewed the specification to verify that it included the necessary requirements for functional testing, seismic design and testing, shipping, handling and storage, marking and labeling, and nuclear quality assurance.

The inspectors reviewed vendor submittals and records to determine if the vendor complied with the requirements of the procurement specification. Specifically, the inspectors reviewed the certificate of conformance to determine if the dampers were constructed in accordance with the code of record and procurement specification. The inspectors reviewed welding records such as weld travelers, welder qualifications, and welding procedures to determine if the welding met the requirements of ASME AG-1. The inspectors reviewed fabrication drawings and equipment datasheets to determine if the dampers met the general functional requirements listed in Section 2.1 of the procurement specification. Specifically, the inspectors reviewed records for tornado dampers HVG*DMPT0603 and HVC*DMPT0607A. Examples of functional requirements that were reviewed include duty service (heavy), air flow ratings, temperature and pressure ratings, leakage rates, actuation type (self), pressure drop ratings, and closure set-points. The inspectors reviewed performance test records to verify that the testing met the requirements of Air Movement and Control Association (AMCA) 500-1989, "Test Method for Louvers Dampers and Shutters." The inspectors reviewed the seismic certificate of compliance to verify that the equipment furnished was capable of performing its intended safety function for the specified seismic requirements. The inspectors reviewed NCR and submittal records to verify that MOX Services provided adequate vendor oversight and approval of submittals during fabrication. The inspectors reviewed the vendor's procedure governing commercial grade dedication to ensure that the procedure met the requirements of the MPQAP and 10 CFR Part 21, "Reporting of Defects and Noncompliance."

(2) Conclusions

No violations of more than minor significance were identified.

d. PSSC-036, MOX Fuel Fabrication Building Structure

(1) Scope and Observations

The inspectors observed construction activities related to PSSC-036, MOX Fuel Fabrication Building Structure, as described in Table 5.6-1 of the MFFF CAR. The inspection attributes observed were installation and procurement.

Room B-398 Installation Attribute

The inspectors observed concrete batching operations in support of a new wall penetration (B-398-N01-HOO) in room B-398 of the BMP. Specifically, the inspectors observed batch plant start-up and operations including loading of base materials such as sand and coarse aggregate, input of mix design MC400/R3 into the software control

system, drum mixing operations, and loading of concrete mixer trucks to verify compliance with MOX project procedures and specifications. The inspectors observed concrete testing activities performed by the independent test lab (ITL) to ensure compliance with MOX project specifications and American Concrete Institute (ACI) codes and standards. Specifically, the inspectors observed testing for slump, air content, temperature, and aggregate moisture. The inspectors observed activities of the ITL technician to verify concrete break test cylinders were prepared in accordance with American Society for Testing of Materials (ASTM) C31. The inspectors reviewed records to verify that the coarse aggregate met the gradation requirements specified in ASTM C33. The inspectors reviewed records to ensure that the scale used to weigh coarse aggregate was properly calibrated. The inspectors reviewed certified material test reports (CMTRs) for the cement and fly ash to ensure that the materials met the requirements of ASTM C-150, and ASTM C-618, respectively.

Room C-234 Installation Attribute

The inspectors observed construction activities and reviewed documents related to the concrete slab pour of the roof of room C-234 of the BAP. The inspectors observed activities at the concrete batch plant and performed inspections of pre- and in process pour activities to verify construction activities were conducted in accordance with project procedures and applicable codes and standards.

The inspectors observed concrete testing activities at the batch plant performed by the ITL to ensure compliance with MOX project specifications and ACI codes and standards. Specifically, the inspectors observed testing for slump, air content, temperature, and aggregate moisture. The inspectors observed activities of the ITL technician to verify concrete break test cylinders were prepared in accordance with ASTM C31.

The inspectors reviewed the concrete placement pre-pour checklist contained in work package 16-CP20-BAP-C234-CON-C-5747-01 to verify that all pre-placement inspections including cleanliness were signed off by QC in accordance with inspection plans. The inspectors conducted a walk down of the room to (1) ensure that the forms and reinforcement steel was installed in accordance with design drawings and (2) concrete clear cover and rebar spacing met project procedures and ACI specifications. The inspectors reviewed concrete batch tickets to ensure that the concrete mix design listed on the ticket was consistent with the mix design specified on the pre-pour checklist. The inspectors verified that the quantities of cement, coarse aggregate, fly ash, sand, and admixtures listed on the ticket were consistent with the quantities specified in specifications for mix MC400R3. The inspectors observed concrete placement to verify proper consolidation through the use of pencil type vibratory mixers, that the concrete was placed within 90 minutes of batching, the number of mixing truck revolutions did not exceed 300, and that the concrete temperature did not exceed 90 °F in accordance with specifications, inspection plans, and project procedures. The inspectors reviewed the concrete test cylinder reports to verify that test specimens for concrete strength testing were sampled at the required location and frequency and that the 28 day design strength was in accordance with the concrete mixing and delivering specification.

Rooms B-398 and C-234 Procurement Attribute

The inspectors reviewed vendor submittal forms 008716-00003467-0014 and 08716-10888-B-00003467_00000-0005-A for changes associated with the MC400 mix design used in both the B-398 wall penetration and C-234 roof slab pours. The purpose of the review was to ensure that MOX Services performed the required contractual and technical review and approval of vendor submittals as specified in project procedure PP10-14, "Supplier/Subcontractor Technical Document Submittal Management," and project construction specifications DCS01-BKA-DS-SPE-B-09330 and DCS01-BKA-DS-SPE-B-09325.

(2) Conclusions

No violations of more than minor significance were identified.

e. PSSC-041, Process Cells

(1) Scope and Observations

The inspectors observed construction activities related to PSSC-041, Process Cells, as described in Table 5.6-1 of the MFFF CAR. The inspection attribute observed was installation.

The inspectors observed QC inspections and reviewed qualification records related to welds performed on oxalic mother liquors recovery (KCD) drip tray KCD-Drip 7900. The inspectors observed QC inspections of welds FW41, FW104, FW105, FW106, and FW107 to determine if QC hold points were observed and documented in accordance with the QC inspection plan. The inspectors reviewed qualification records for the welders to determine if the welders were qualified for the welding process performed and within periodicity.

(2) Conclusions

No violations of more than minor significance were identified.

4. Programmatic Inspections

a. 10 CFR 70.72 Facility Changes and Change Process

(1) Scope and Observations

The inspectors evaluated the implementation of MOX Services change processes for the LA and the ISA Summary as defined in the LA. The summary of facility changes was provided in a letter to NRC dated January, 22 2018, and consisted of facility changes made in calendar year 2017.

The inspectors reviewed the current facility change and change control program. MOX Services defined its licensing basis configuration management program in project procedure PP8-6, "Licensing Basis Configuration Management." The documentation of the evaluation in the change process was performed using an applicability determination form (ADF) specified in PP8-6. The inspectors reviewed changes made to PP8-6 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 PP3-4, "Records Management."

The inspectors selected a sampling of the changes submitted by MOX Services as part of the January 2018 update to the LA and ISA Summary. These 25 samples were selected in a variety of disciplines and with an emphasis on the changes with a higher degree of safety significance. The inspectors verified that the selected samples did not result in a change to the LA or ISA Summary. The inspectors also evaluated selected ADFs to determine whether the change process outlined Chapter 16 of the LA functioned as required and whether the evaluations were properly screening changes in order to assure that the applicants commitments related to the regulatory requirements of Part 70 have been met. The ADFs that were evaluated by the inspectors are listed in the records section of this inspection report.

(2) Conclusions

No violations of more than minor significance were identified.

b. Quality Assurance Program

(1) 10 CFR Part 21, Inspection-Facility Construction

(a) Scope and Observations

The inspectors evaluated a sample of 10 CFR Part 21 evaluations completed by the applicant against the quality assurance program to determine whether the applicant's procedures and program activities effectively implemented the requirements of 10 CFR Part 21. The inspectors reviewed and inspected evaluations that either did not result in the identification of a defect, or failure to comply, or evaluations that did result in the identification of a defect, or failure to comply. These evaluations were reported to the NRC under 10 CFR Part 21, or the applicant chose not to notify the NRC and instead resolved with acceptable actions.

The 10 CFR Part 21 reports were related to the following IROFS components and the associated PSSCs:

- pellet handling (PML) gloveboxes (PSSC-024) PML*GB3100 and PML*GB3300;
- PML unit system (evaluation determined this was not applicable to an IROFS or PSSC); and
- green pellet storage (PSE) system (PSSC-024), PSE*RLY9015A associated with PSE*GB1000.

The inspectors reviewed documents to verify that the applicant effectively implemented the requirements of 10 CFR Part 21.21(a), regarding evaluating identified deviations by determining if:

- the procedures and controls to evaluate identified deviations had been established,
- the procedures and controls were effective in meeting these requirements, and
- the procedures and controls identified a specific director or responsible officer to notify of identified defects or failures to comply.

Specifically, the inspectors reviewed these procedures and controls against 10 CFR Part 21 evaluations that did not result in the identification of a defect, or failure to comply, to verify that:

- the items were identified for evaluation consistent with established procedures or by other means,
- the information and data used in the evaluations appeared to be factual and complete, and
- the findings of the evaluations that a substantial safety hazard or failure to comply did not exist was a logical conclusion of the evaluations.

The inspectors reviewed a sample of 10 CFR Part 21 evaluation records in which the identified director or responsible officer was notified of a defect or failure to comply. The inspectors reviewed the records to verify that the applicant implemented the requirements of 10 CFR Part 21.21, regarding directors or responsible officers notifying NRC of identified defects, or failures to comply, related to significant safety hazards, by:

- determining if the controls and procedures accurately reflected the provisions of 10 CFR Part 21.21, regarding time frames for reporting identified defects or failures to comply;
- determining if the 10 CFR Part 21 report notifications to the NRC complied with the provisions of 10 CFR Part 21.21, regarding time frames for reporting identified defects or failures to comply; and
- determining if the 10 CFR Part 21 report notifications for which the applicant chose not to notify the NRC were adequately evaluated and had acceptable associated actions.

(b) Conclusions

No violations of more than minor significance were identified.

(2) Quality Assurance: Inspection, Test Control, and Control of Measuring and Test Equipment

(a) Scope and Observations

The inspectors reviewed project procedure PP3-15, "Control of Measuring & Test Equipment," Revision 8, interviewed the technical program manager for the M&TE program, and performed direct inspection of M&TE in the field and in the M&TE control area. The inspectors conducted these activities to verify that the applicant established controls for tools, instruments, gauges, and other M&TE used for quality-affecting activities; and, to verify that M&TE is controlled, calibrated (at specified periods), and adjusted to maintain accuracy within necessary limits in accordance with the MPQAP.

The inspectors focused on the following aspects of the M&TE program to determine if the program was conducted and documented in accordance with the MPQAP:

- calibration,
- document use of measuring and test equipment,
- out-of-calibration measuring and test equipment,
- handling and storage, and
- measuring and test equipment documentation.

Calibration

The inspectors reviewed project procedure PP3-15 to determine if the requirements for verifying that the M&TE is calibrated, adjusted, and maintained in accordance with the MPQAP. Specifically, the inspectors reviewed a sample of certifications of conformance associated with M&TE to verify that:

- M&TE was calibrated, adjusted, and maintained at prescribed intervals, or before use, against reference calibration standards having traceability to nationally recognized standards such as NIST or ASTM,
- M&TE calibration standards have a greater accuracy than the required accuracy of the M&TE being calibrated, and
- if the calibration standards cannot be used, the basis for the calibration and the estimated uncertainty of the results of a less accurate standard was documented in accordance with the M&TE program.

The inspectors performed direct inspection of a sample of M&TE items in the field and in the M&TE controlled area to verify that calibrated M&TE was labeled, tagged, or suitably marked or documented to indicate a due date or interval of the next calibration and uniquely identified to provide traceability to its calibration data in accordance with M&TE program procedures and the MPQAP.

The inspectors reviewed project procedure PP3-15 and performed direct inspection of the M&TE controlled area to determine if the requirements for verifying that calibration was performed when the accuracy of calibrated M&TE is suspect was in accordance with the M&TE program.

Documenting Use of Measuring and Test Equipment

The inspectors evaluated a sample of Form PP3-15B, "M&TE Use Logs," associated with M&TE items that were in use in the field to determine if the craft were documenting their usage in accordance with M&TE project procedures. Specifically, the inspectors reviewed the M&TE use logs to determine if all uses of the M&TE in quality-affecting (QL-1, QL-1 low risk (LR), or QL-2) activities were recorded until the M&TE was returned to the M&TE Technician.

Out-of-Calibration Measuring and Test Equipment

The inspectors reviewed procedure PP3-15, interviewed the technical programs manager for M&TE, and evaluated a sample of M&TE torque wrenches and hygrometers used in the field to verify that out-of-calibration M&TE was controlled in accordance with the M&TE program. The inspectors reviewed a sample of NCRs for out-of-calibration M&TE and condition report 10888-MOX-CR-18-318, "Technical Justification for Out-of-Tolerance M&TE NCR," to determine if a re-evaluation performed for an NCR documenting out of calibration M&TE was appropriate for the condition, and received an appropriate level of managerial review in accordance with project procedures and the MPQAP.

Handling and Storage

The inspectors performed direct inspection of the storage conditions of M&TE in the field and in the M&TE controlled area to determine if the M&TE was adequately stored to maintain accuracy in accordance with M&TE project procedures.

Measuring and Test Equipment Documentation

The inspectors reviewed a sample of M&TE certificates of conformance to verify the following information was included in accordance with M&TE project procedures:

- identification of the measuring or test equipment calibrated;
- traceability to the calibration standard used for calibration;
- calibration data, including the results of the calibration and statement of acceptability;
- identification of the date of calibration and the recalibration due date or interval;
- identification of the individual performing the calibration;
- identification of the document and revision number used in performing the calibration; and
- reference to any actions taken in connection with out-of-calibration or nonconforming M&TE including evaluation results.

(b) Conclusions

No violations of more than minor significance were identified.

5. Exit Meeting

The inspection scope and results were summarized throughout this reporting period and by the Project Manager at an exit meeting with Ben Parks on March 5, 2019. 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

J. Anderson, Technical Program Manager
J. Baima, Project Lead (NuCo Drives)
D. Del Vecchio, President
D. Gwyn, Licensing Manager
D. Ivey, Project Assurance Manager
S. Ottesen, Manager, Test Engineering Medium Voltage (Yaskawa)
B. Parks, Project Engineer – Special Projects & Licensing
E. Radford, Regulatory Compliance Manager
L. Reda, QA Manager (SSM Industries, Inc.)
G. Rousseau, Deputy Project Manager / Executive Vice President
J. Starling, Licensing
S. Warden, Subcontract Technical Representative
D. Yates, Licensing

2. INSPECTION PROCEDURES (IPs) USED

IP 55050 Nuclear Welding General Inspection Procedure
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 88115 Supplier/Vendor Inspection (Construction Phase)
IP 88117 Facility Changes (License Application) and Change Process (10 CFR 70.72) (Pre-Licensing and Construction)
IP 88130 Resident Inspection Program For On-Site Construction Activities at the Mixed-Oxide Fuel Fabrication Facility
IP 88132 Structural Concrete Activities
IP 88136 Mechanical Components
IP 88139 Ventilation and Confinement Systems
IP 88140 Instrumentation and Control Systems

3. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

<u>Item Number</u>	<u>Status</u>	<u>Description</u>
70-3098/2018-004-01	Opened/Closed	NCV: Failure to Ensure Penetration Plate Bolting Was Inspected To Meet Design Requirements (Section 2)
70-3098/2018-004-02	Opened/Closed	NCV: Failure to Perform Manufacturers Maintenance Instructions (Section 2)

4. LIST OF ACRONYMS USED

ACI American Concrete Institute
ADAMS Agency-Wide Document Access and Management System
ADF Applicability Determination Form

AMCA	Air Movement and Control Association
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing of Materials
BAP	Aqueous Polishing Building
BMP	MOX Processing Building
CAR	Construction Authorization Request
CB&I	Chicago Bridge and Iron
CFR	Code of Federal Regulations
CIB2	Construction Inspection Branch 2
CMTR	Certified Material Test Report
CR	Condition Report
DCO	Division of Construction Oversight
DFFI	Division of Fuel Facility Inspection
ECR	Engineering Change Request
FCSE	Division of Fuel Cycle Safety and Environmental Review
FMB	Fuel Manufacturing Branch
HDE	High Depressurization Exhaust
HSA	HVAC Supply Air
HVAC	Heating, Ventilation, and Air Conditioning
IEEE	Institute of Electrical and Electronics Engineers
IP	Inspection Procedure
IR	Inspection Report
IROFS	Items Relied on for Safety
ISA	Integrated Safety Analysis
ILT	Independent Test Lab
KCD	Oxalic Mother Liquors Recovery
LA	License Application
LR	Low Risk
M&TE	Measuring and Test Equipment
MOX	Mixed Oxide
MOX Services	CB&I AREVA MOX Services
MFFF	MOX Fuel Fabrication Facility
MPQAP	MOX Project Quality Assurance Plan
NCR	Non-conformance Report
NCV	Non-cited Violation
NDE	Non-destructive Examination
NIST	National Institute of Standards and Technology
NMSS	Office of Nuclear Materials Safety and Safeguards
NNSA	National Nuclear Security Administration
No.	Number
NRC	U.S. Nuclear Regulatory Commission
PAF	Process Assembly Facility
PB2	Projects Branch 2
PML	Pellet Handling
PP	Project Procedure
PSE	Green Pellet Storage
PSSC	Principal System, Structure and Component
QA	Quality Assurance
QC	Quality Control
QL	Quality Level
RII	Region II

SL	Severity Level
VFD	Variable Frequency Drive
WP	Work Package

5. LIST OF PSSCs REVIEWED

- PSSC-004, C2 Confinement System Passive Barrier
- PSSC-005, C3 Confinement System
- PSSC-006, C4 Confinement System
- PSSC-009, Criticality Controls
- PSSC-050, Supply Air System

6. RECORDS AND DOCUMENTS REVIEWED

Applicability Determination Forms (ADFs)

- ADF 005995, DCS01 AAJ DS DOB D 40101 R3 is a revision to the Design Requirements Document which incorporates ECRs, feedstock revisions, and contract modifications since the previous revision in October 2009, 5/24/2017
- ADF 006414, Revision to ECR-28709, update to jar storage and handling system design description to address non-conformances related to the excessive gap between the NTM firelock barrel and shell weldment, 11/1/2016
- ADF 006434, Temporary storage of 3013 containers in DCP, 9/18/2017
- ADF 006441, Update Liquid Waste Processing NCSE to reflect removal of criticality events that are caused as a result of a radiolysis explosion, 1/24/2017
- ADF 006453, updates the PuO₂ buffer storage (DCE) unit Safety Requirements Document and System design description to address system design and test group comments. These changes related to software revisions, 1/9/2017
- ADF 006456, ECR-026474 updated the KPA unit P&IDs and the KPA NCAW to reflect Coriolis flowmeters in lieu of plate orifice flowmeters, 2/6/2017
- ADF 006459, Changes to KDA NCSE to delete KLO unit per DCR-13-0051, 1/30/2017
- ADF 006474, ECR-029166, Revision to the NPH and EMMH NSE to clarify the IROFS and non-IROFS boundaries associated with the Seismic Monitoring and Trip system process trip breakers and the SMT event recorders, 3/15/2017
- ADF 006479, ECR-029202 revises the MFFF Basis of Design for Structures to reflect a deviation to AISC N690-1994, 3/15/2017
- ADF 006485, Update the Mixed Oxide Powder and Pellet Auxiliary Systems NCSE, 1/30/2017
- ADF 006489, Update the AP Auxiliary Units NCSE, 4/3/2017
- ADF 006493, ECR-029386, Upgrade the KCB SDD to change the SOV's from QL-4 to QL-1, 4/18/2017
- ADF 006534, Update to DCS01-DS-DOB-V-40106 R5 to reflect miscellaneous changes to the Basis of Design, 5/17/2017
- ADF 006535, Incorporation of ECRs into the Basis of Design document related to fire protection and detection systems, 5/18/2017
- ADF 006541, Update the Basis of Design for MOX Fuel Fabrication to provide a general update and address changes associated with revised input documents, 7/5/2017
- ADF 006553, Update the Dechlorination and Dissolution NCSE and the Decanning/Milling NCSE to reflect crediting existing mass controls, 7/20/2017

- ADF 006561, Revises the Basis of Design for Mechanical Utility, Bulk Gas, and Reagent Systems to incorporate ECRs, DCRs, and address changes associated with revised input documents, 7/6/2017
- ADF 006565, ECR 029790 NFPA equivalency to the deviation log and fire protection BOD, 8/3/2017
- ADF 006569, DCR-17-0587 modifies the operation of DDP Gloveboxes to eliminate the atmosphere switching between room air and nitrogen, 8/10/2017
- ADF 006570, MFFF Deviations Log Entry for NFPA-90a-1996 Equivalency, 8/3/2017
- ADF 006575, Increase Powder Column for Forced Sieve Sizing, 7/24/2017
- ADF 006584, Previous Versions of KDB and KDD NCSEs Combined into one NCSE, 9/20/2017
- ADF 006586, Update the LA to add a new chapter 017 to document the PSSC completion process, 8/8/2017
- ADF 006623, Update of DCS01-KCB-CG-SDD-F-06259-2 in accordance with DOE directive, 9/28/2017
- ADF 006654, Update the Basis of Design for Structures and associated construction specifications to add ASTM F3125 as an alternative, 1/02/2018

Audit and Surveillance Reports

- SSMI-17-VE82 Audit Checklist, SSM Industries, Inc. (SSMI), Revision 1
- SSMI-17-VE82 Audit Report, SSM Industries, Inc. (SSMI), Revision 1
- SSMI-17-VE82 Supplier Evaluation Summary Report, SSM Industries, Inc. (SSMI), Revision 1
- SSM Industries, Inc. Surveillance# 2016.04.28 Yaskawa Oak Creek WI Vendor# 949, 5/11/2016

Calibration Records

- Certificate of Calibration #2199177, 9/1/2017
- Certificate of Calibration #2199178, 9/6/2017
- Certificate of Calibration #2199191, 9/5/2017
- Certificate of Calibration #2238111, 12/1/2017
- Certificate of Calibration #2238137, 12/5/2017
- Certificate of Calibration #2286816, 1/15/2018
- Certificate of Calibration #2332545, 4/27/2018
- Certificate of Calibration #2348402, 7/5/2018
- Certification Number 1002112283, Gage ID 00617, 2/22/2018
- Certification Number 1002154718, Gage ID 01041, 6/12/2018
- Certification Number 1002154926, Gage ID 00641, 6/12/2018
- Certification Number 1002133904, Gage ID 00595, 7/5/2018

Condition Reports (CRs)

- 10888-MOX-CR-15-250, PP8-6A not initiated, 7/7/2015
- 10888-MOX-CR-18-299, CE added extra scope to WP without proper approval nor having the Planning Group and QC involvement, 8/21/2018
- 10888-MOX-CR-18-300, Long Radius Elbows Received with Dimensions, 8/22/2018
- 10888-MOX-CR-18-301, Construction Accrual File Over Accrual, 8/21/2018
- 10888-MOX-CR-18-302, Missing Material Issues Tickets for Grout Placement, 8/23/2018

10888-MOX-CR-18-303, Additional work steps worked without prior review by QA,
8/23/2018

10888-MOX-CR-18-304, Missing Weld Data Sheet in B1115B, 8/23/2018

10888-MOX-CR-18-306, Failure to follow procedure instructions, 8/24/2018

CRs Generated as a Result of NRC Inspection

10888-MOX-CR-17-289, PP10-38 and Layup and Storage Maintenance, 7/27/2017

10888-MOX-CR-18-272, Loose Hex Nuts, 8/1/2018

10888-MOX-CR-18-283, Inadequate Applicability Determination, 8/7/2017

10888-MOX-CR-18-318, Technical Justification for Out-of-Tolerance M&TE NCR,
9/4/2018

10888-MOX-CR-18-362, PP9-39 Process, 9/19/2018

Criticality Safety Evaluation

DCS01 KPA DS ANS H 3501 3, Nuclear Criticality Safety Evaluation (NCSE-D) Of
Purification Unit (KPA), 6/28/2007

Design Documents

DCS01-AAJ-DS-DOB-D-40101-3, Design Requirements Document, Revision 3

Drawings

01002, MOX Fuel Fabrication Facility BRP Design General Site Plan, Revision 1

08716-00003405_-0275, Schematic Diagram – Typical Yaskawa MV1000 FR2A Medium
Voltage AC Drive, Revision H

14825, Piping & Instrument Diagram Nitrogen Tetroxide System, Revision 1

16754, Piping & Instrument Diagram AP Area Unit KPA – Purification Cycle CLMN 6000-
CLMN6500, Revision 2

1001512, Vendor Drawing Subcritical Flat Demister QL-1, Revision 1

DCS01-BMF-DS-PLD-B-12000, MOX Fuel Fabrication Facility BAP Gallery Area
Penetration Closure Plates Fabrication And Installation General Notes, Revision
1

DCS01-BMF-DS-PLD-B-12180, MOX Fuel Fabrication Facility Wall Penetration Closure
Details Stay In Place Forms & Penetrations, Revision 2

DCS01-BMF-DS-PLD-B-12001, MOX Fuel Fabrication Facility Wall Closure Plates WP-
C-134-NO7-MOO-A (C-234) & WP-C-134-NO&-MOO-B (C-134) Stay In Place
Forms & Penetrations, Revision 3

DCS01-BMF-DS-PLI-B-00101, MOX Fuel Fabrication Facility BAP Gallery Area (C-234)
Penetration Closure Plates Location Layout Wall Elevation At 3.9, Revision 0

DCS01-EAC-DS-SCE-E-26005, MOX Fuel Fabrication Facility 4.16KV Emergency Bus
“A” SWGR EAC*SWG1000 One Line Diagram, Revision 14

DCS01-EAC-DS-SCE-E-26006, MOX Fuel Fabrication Facility 4.16KV Emergency Bus
“B” SWGR EAC*SWG1000 One Line Diagram, Revision 13

DCS01-ZMU-DS-NTE-N-65107 Sheet 5, Technical Engineering Information Torque
Table General Notes, Revision 9

Engineering Change Requests (ECRs)

ECR-023155, Study of Discrepancies in Fissile Width of KCD*DMST6010, Revision 0
 ECR-024656, Concrete Infill For Penetrations In Walls, Revision 0
 ECR-024656, Concrete Infill For Penetrations In Walls, Revision 5
 ECR-025740, Wall Cut between B-316 and B-398 for HSA Duct, Revision 2
 ECR-026060, Additional Configurations for RRJ-CAL-06008-D, Revision 0
 ECR-026380, Update DCE SDD and SRD in response to SDG RFIs, Revision 1
 ECR-026474, KPA and GNO Flow Transmitters, Revision 0
 ECR-028830, Update the AP Auxiliary Units NCSE, Revision 0
 ECR-028700, Update LGF NCSE Scavenging Air Flow Controls, 1/19/2017
 ECR-028709, NTM – Firelock barrel home position requirement, Revision 0
 ECR-028899, Establish NCS IROFS Dimensions for 3013 Containers, 9/18/2017
 ECR-029202, Sway Strut used Structural Support Requires Additional Documentation,
 Revision 0
 ECR-029632, Increase Powder Column for Forced Sieve Sizing, Revision 0

Evaluations

82021-302, Seismic Qualification of AWW Models NBD-70 and NBD-71, Revision B
 08716-00003405_0456, MOX VFD Technical Evaluation – Material Dedication Plan,
 Revision E
 08716-00007232_00000-0054, ESR-1546 HDA Undercut Anchors, Revision A
 NSE DCS01-AAS-DS-ANS-H-38390, Nuclear Safety Evaluation of Facility Explosion
 Events for MOX Fuel Fabrication, Revision 8
 NSE DCS01-LGF-DS-ANS-H-35059, Nuclear Criticality Safety Evaluation (NCSE)
 Laboratory Liquid Waste Receipt Unit (LGF), Revision 4

Inspection Plans and Records

C103, Concrete Placement Inspection, Revision 16
 C112, Pre-Placement Inspection, Revision 25
 C520, Installation of Hilti Undercut Concrete Anchors, Revision 14
 Form PP11-12A, Concrete Placement Pre-Pour Checklist, 8/29/2018
 QC-RIR-14-52070, Receiving Inspection Report KPA-DMST8000 & 8500, 9/23/2014
 QC-RIR-17-62137, 6/12/2017
 Reed Air Products AWW, ABI Final Inspection Record – MOX Damper Tag#
 HW#DMPT0603, 3/28/2017
 Reed Air Products Group, Document No. P-7.3, Visual Weld Inspection, Revision 2
 S562, Process Piping Weld Inspections, Revision 23

Licensing Documents

DCS01-AAJ-DS-ECA-D-40124-6, MFFF Deviation Log, 8/8/2017
 DCS01-ZMJ-DS-NTE-N-65108-0, MOX Storage Facility Conditions Related To NQA-1
 Requirements, 10/24/2014
 Mixed Oxide Fuel Fabrication Facility Integrated Safety Analyses Summary, January
 2018
 Mixed Oxide Fuel Fabrication Facility License Application, January 2018
 MPQAP-2016-0001, “MOX Project Quality Assurance Plan,” Revision 16
 MPQAP-2017-0001, “MOX Project Quality Assurance Plan,” Revision 17

Material Records

008716-00003467-0014, Schedule of Project Mixes, Revision A, 12/7/2011
 08716-10888-B-00003467_00000-0005-A, Revision to MC400 Mix Design, 4/20/2009
 82021-001-101, NBD-70 Bill of Materials & Notes, Revision F
 Aggregate Moisture Form (Form PP11-5D), 7/17/2018
 Fine Aggregate Gradation Report, 10/17/2017
 Holcim Portland Cement Material Certification Report, 10/12/2017
 Lincoln Electric Company Certified Material Test Report Lot 1266G, 11/16/2015
 No. 89 Coarse Aggregate Gradation Report, 10/17/2017
 S&ME Concrete Cylinder Report, Ticket No. 75223, 8/29/2018
 Scale Systems In. Test Record & Calibration Report – Hopper Scale Serial # 070322
 TEC Services Report of Fly Ash Tests, 9/8/2017
 Weldstar Certificate of Compliance – Customer PO#00719944

Miscellaneous Documents

Concrete Placement Log Report No. 75223 and 75224, 8/29/2018
 Shaw Areva MOX Services, LLC, Concrete Batch Ticket 009199, 7/17/2018
 Shaw Areva MOX Services, LLC, Concrete Batch Tickets 009200 – 009210, 7/18/2018
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