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DCS-NRC-000431
17 August 2016

Subject: Docket No. 070-03098
CB&I AREVA MOX Services
Mixed Oxide Fuel Fabrication Facility
Response to Apparent Violations in NRC Inspection Report 70-3098/2016-005,
EA-16-010

Reference: Letter from William B. Jones to David Del Vecchio dated July 25, 2016 entitled
“Mixed Oxide Fuel Fabrication Facility – NRC Inspection Report 70-
3098/2016-005 and Apparent Violations”

As requested, CB&I AREVA MOX Services hereby submits its response to the Apparent Violations (AVs) contained in the above Reference. The two AVs relate to a single work activity performed at one of MOX Services’ vendors’ (structural welding of ledger plate assemblies) during the 2008 – 2010 time frame that were later delivered and installed as part of the ongoing construction of the Mixed Oxide Fuel Fabrication Facility (MFFF). As discussed in the attached response, MOX Services promptly addressed the issue through our corrective action program and is in the process of restoring full compliance with the MOX licensing basis. Subsequent to, and independent of, the delivery of the subject ledger plate assemblies, MOX Services had recognized the need for increased oversight of our vendors. While the scope, experience and complexity of supplied components can vary significantly, it should be noted that similar issues were not identified at other suppliers during our comprehensive investigation of this issue as documented in Condition Report 15-112.

If you have any questions, please contact me at (803) 442-6485, or Eric Radford Regulatory Compliance Manager, at (803) 819-8625.

Sincerely,



David Del Vecchio
President and Project Manager

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Enclosure:

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Enclosure
CB&I AREVA MOX Services
Response to Apparent Violations

Apparent Violations (AVs)

AV 70-3098/2016-005-001: Failure to Adequately Perform Measures to Verify the Validity of Certificates of Conformance (CoCs) for Quality Level-1 Welded Ledger Assemblies. The ledgers were purchased from Specialty Maintenance and Construction, Inc. (SMCI) between November 2008 and June 2010. Specifically, MOX Services failed to verify that the CoCs identified MOX Services' specific procurement requirements for the ledgers and that the purchased ledgers met the requirements.

AV 70-3098/2016-005-002: Failure to Conduct Adequate Audits of SMCI. Specifically, the audit reports for the ledger assembly supplier (SMCI) did not document objective evidence of inspections or surveillances related to manual welding during their audits.

Response to Apparent Violations

MOX Services does not dispute the Apparent Violations (AVs). Upon notification from the NRC Senior Resident Inspector of a concern with the weld size on ledger assemblies in the BAP, MOX Services initiated Condition Report (CR) 15-112. An immediate, comprehensive investigation confirmed issues with welding associated with ledger plates supplied by SMCI. Nonconformance Reports (NCRs) 15-6088 and 15-6134 were generated for disposition of the hardware issues. A Root Cause Analysis (RCA) was commissioned by the Management Review Committee. There were two key focus areas for the extent of condition investigation: 1) determine if other ledger plates provided by SMCI had similar issues and 2) identify other vendors to evaluate if there were similar issues. The RCA identified two root causes associated with the vendor performance with contributing factors (consistent with the identified AVs) related to vendor oversight and receipt inspection. With respect to the contributing factors, the RCA acknowledged previous actions taken by MOX Services in 2010 to enhance vendor oversight (i.e., establishment of dedicated vendor surveillance group, increased presence in vendor shops [QA and engineering], and enhanced receipt inspection process). As a result, the extent of condition focused on vendors authorized to proceed prior to 2010. The extent of condition for ledger plates identified 12 interior BAP rooms where compliance with the design basis could not be validated. The disposition of the associated NCRs was to develop an engineering solution that restored compliance with the licensing design basis. The review of other vendors did not identify similar issues.

Additional details are provided in the response below. A common aspect of the subject AVs is related to ensuring acceptable vendor performance (i.e., compliance with MOX Services specification requirements) and therefore, the MOX licensing design basis. Since the issues were investigated in one CR as well as one RCA, the response to the AVs are combined below. The comprehensive CR investigation, the common aspects of the AVs, and the overlapping corrective actions support MOX Services' conclusion the AVs represent a single issue where two barriers did not identify the issue prior to installation in the MFFF.

1. Reason for the AVs

During the time period associated with the fabrication of the ledger plate assemblies, it was common practice to accept products from approved QL-1 vendors based on physical inspection of the commodity and on the scope of supply as documented on the Approved Supplier's List (ASL). This inspection also verified that all restrictions and limitations placed on the supplier were in compliance. Inspection criteria included the following:

- Compliance with design requirements for construction materials based on CMTR reviews
- Visual verification of configuration
- Workmanship
- Dimensional verification
- Required documentation in the final record package
- Verification of identification and marking
- Damage
- Suspect and counterfeit

Welding was an attribute specified on the receipt inspection checklist. The inspection consisted of reviewing signed documentation and inspection records accepting the welding as compliant. In this particular case, a review of welding documentation versus actual inspection of welds was not conducted. This resulted in a lack of verification to substantiate welding met design requirements. While the actual documentation provided by the supplier provided reasonable assurance that the ledger plates met design requirements; the as-received condition of the ledger plates did not meet design requirements. SMCI was on the ASL without restrictions and the shipments were accepted based on the final record package, the Certificate of Conformance provided by the vendor and physical inspection by MOX Receipt. Since neither the associated design specification nor the Approved Suppliers List established quality hold points and the components are relatively simple passive features, MOX Services did not perform onsite vendor oversight during manufacture of the ledger plates and there was no MOX Services final release of the ledger plates. The RCA identified two root causes: 1) a failure by the vendor welder to produce welds meeting the approved design configuration and size and 2) the AWS Certified Welding inspector failed to perform a 100% visual inspection of each weld, ensuring that the MOX approved engineering design and AWS acceptance were met. The AVs relate to opportunities that MOX Services may have been able to identify the vendor issues during fabrication (i.e., vendor oversight) and/or receipt inspection. As discussed previously, during this time period, MOX oversight was based predominantly on acceptance on the QL-1 approved suppliers list (i.e., vendor oversight) and physical inspection of the commodity of the ledger plates along with a review of vendor documentation (i.e., receipt inspection). Based on the issues identified with the ledger plates, it is apparent additional oversight was required to ensure a compliant delivered ledger plate. As discussed above, MOX Services had already determined in 2010 that additional controls were necessary for QL-1 vendors. These controls are discussed in the response section related to corrective actions taken.

2. Potential consequences of ledger failures during operations

Upon identification of the issue, MOX Services promptly investigated potential impacts of the welding issue associated with the ledger plates. It was recognized early while evaluating NCRs 15-6088 and 15-6134 that the inadequate ledger plate welds would adversely affect the load bearing and structural capacity of these components. While the impacted rooms represent a small fraction of the rooms within the MFFF (less than 4%), the impacted rooms would contain IROFS components with a variety of credited safety functions during operations. Since MOX Services could not ensure that all credited safety functions could be performed for all event scenarios, MOX Services developed corrective actions to restore compliance with the design basis (i.e., load bearing and structural capacity). Since MOX Services' approach was to restore the design basis, analysis of the consequences of operating with the as-found ledger plates was not performed. Following a review of the Integrated Safety Analysis and considering other factors (e.g., defense in depth, likely inventories and component failure), MOX Services has concluded the health and safety of the public would not have been jeopardized based on: 1) the rooms with ledger plates are interior rooms and do not impact the BMF confinement safety function and 2) a review of the potential events did not identify any events that would impair the ventilation system's filtering safety function. However, the performance requirements of 10 CFR 70.61 could potentially have been exceeded for the facility worker primarily based on the potential interaction between ventilation zones and the potential for facility workers to be located in these areas if a ledger plate failure were to occur. No actual consequences (worker or public) resulted from the deficient ledger plate welds.

3. Corrective steps that have been taken and the results achieved

The defective ledger plates were procured during the 2008-2010 time frame. Prior to discovery of the ledger plate welding issues in 2015, MOX Services initiated additional enhancements to improve vendor quality starting in the spring of 2010. This effort was the result of an analysis of project NCRs that identified supplier performance issues. Enhancements included:

- Recalling shop inspection personnel for refresher training as to management expectations, process tools to be used, and inspector responsibilities.
- Developing a MOX Quality Assurance Source Inspection Process Checklist that was provided to all MOX Shop Inspection Personnel. Both the checklist and the management expectations for checklist use were discussed with the shop inspectors.
- Developing a Shop Inspection Expectations document. The purpose of the expectation document was to clearly communicate to the shop inspection personnel the expectations for verification of design compliance, verification of materials of constructions, verification during the fabrication process, verification of test and inspection performance, and product acceptance, packaging and testing.

In addition to the above stated changes, the shop inspection resources were increased as well as the number of in-process inspections at the supplier shops. The purposes for the in-process inspections were to:

- Establish confidence that suppliers were implementing their approved QA program.
- Provide reasonable assurance that supplier product would be in compliance with specification requirements at final release.

In September 2011, the Receipt Inspection Plan was revised to address sampling of structural welds for size and configuration.

On the basis of these actions, supplier nonconformances were reduced by 50% over a 2-year period.

While these actions predated the identification of the ledger plate issue, they are also actions directly related to issues identified in the AVs (i.e., vendor oversight and receipt inspection). MOX Services has also completed the following additional corrective actions for CR-15-112:

- Confirmation that subcontract submittals required by the procurement specification were provided and reviewed by the appropriate parties. Specifically, a comprehensive review of submittals from 27 Vendors was performed that verified that required submittals were received, reviewed, and approved in accordance with the specification submittal requirements.
- Confirmation that Receipt Inspection Packages contain the documentation required by the procurement specification:
 - a) Receipt Inspection Reports (RIR) were checked to ensure that MOX had received the appropriate documentation. (Examples of appropriate documentation included drawings, welder qualifications, shop travelers, weld maps, inspector qualifications, CMTRs, radiographs, hydro tests, etc.)
 - b) Receipt Inspection Reports (RIR) for 12 vendors supplying tanks, cables, pipe supports, etc. were reviewed. Required submittals were found to be acceptable.
 - c) Receipt Inspection Reports (RIR) for 12 vendors supplying pipe spools, duct, rebar, etc. were reviewed. The reviews yielded one minor issue with suppliers' personnel qualifications which was corrected per Engineering Change Request. There were no other issues of concern or adverse trends.
- Confirmation that receipt inspectors have completed an 8-hour training course in weld inspection
- Establishment of criteria for progressive shop inspections and implementation of quality "Hold Points" to confirm technical and quality attributes throughout manufacturing.
 - a) Development of guidelines for performing surveillances using a vertical slice of MOX Services work activities to confirm that the Supplier is performing as expected.
 - b) Development of guidelines for record reviews based on results of a sampling of each record type.
 - c) Dedication of two inspectors for the performance of in-process inspections.

- d) Added requirement for Final Receipt Inspections to ensure documented objective evidence of what was inspected and the criteria evaluated against (design, code, and standard acceptance criteria).
 - e) Developed QC Program Vertical Slice Inspections QOP-008, Rev.0.
 - f) Developed “Shop Inspection Expectations” document
- Conducted an audit of SMCI on 4 June 2015, SMCI-15-VE50 R1. Based on the results of the audit:
 - a) SMCI is maintained on the MOX Services Approved Supplier List as a QL-1 supplier of supply Metal Fabrication (i.e. embed plates, beams), supply of raw materials, (i.e. plates, pipe, and bar stock).
 - b) Added following ASL restriction for SMCI:
“MOX Services Supplier Deficiency Reports (SDRs), (SMCI-15-VE50-01 through 12) to be satisfactorily addressed, accepted, and verified by MOX Services prior to issuance of additional procurements for the MOX Project.” This is in addition to the current restrictions which still apply:
 1. SMCI’s qualification for welding is limited to automatic stud welding. MOX approval is required prior to any other types of welding being performed.
 2. SMCI is not authorized to perform Design Activities.

4. Corrective steps that will be taken

In addition to the actions taken, the additional items below are either in progress or planned consistent with CR-15-112 corrective action plan.

To ensure there are no issues with other SMCI supplied components, SMCI fabricated welds in inventory will be evaluated for compliance with specification requirements consistent with a defined sampling plan. NCRs will be initiated for any identified non-conformances.

While there is no evidence that a similar issue exists with other vendor supplied welded equipment, a physical inspection of all welded equipment installed in the MFFF will be performed. Consistent with MOX procedures, NCRs will also be initiated for any identified non-conformances.

To further enhance the vendor oversight process at MOX Services, Project Assurance in collaboration with Engineering will update the Quality Inspection Plan to capture engineering design attributes to be inspected both in the vendor facility as well as during receipt inspection. These enhanced inspection plans will address:

- Surface finish for powder
- Flatness
- Weld sizing and weld location
- Verification of critical dimensions
- Verification of mounting footprint
- Surface and flatness of electrical penetrations

- Specification guidance on weld map review
- Verification that inspectors/welders are performing work approved by MOX
- Verification that work is being performed utilizing approved MOX procedures

In addition, receipt inspectors will be required to obtain 10 hours of on-the-job weld inspection with a certified weld inspector.

The above completed and planned corrective actions will restore compliance with the licensing design basis, further improve MOX Services vendor oversight, and enhance the receipt inspection process to minimize the potential of a recurrence of a similar issue. In addition to these actions, MOX Services is also utilizing the issue to spotlight the need for a questioning attitude when working in a nuclear environment. This will be done through a video entitled “Spotlight on HPI – A Questioning Attitude” which will be required of MOX staff during annual CAT training.

5. *Date when full compliance was or will be achieved*

MOX Services will be in compliance by 31 March 2017.