



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

October 30, 2009

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

SUBJECT: MIXED OXIDE FUEL FABRICATION FACILITY- NRC INSPECTION REPORT
70-3098/2009-003 AND NOTICE OF VIOLATION

Dear Mr. Stinson:

During the period of July 1 through September 30, 2009, the US Nuclear Regulatory Commission (NRC) completed inspections of construction activities related to the construction of the Mixed Oxide Fuel Fabrication Facility. The purpose of the inspections was to determine whether activities authorized by the construction authorization were conducted safely and in accordance with NRC requirements. The enclosed inspection report documents the inspection results. At the conclusion of the inspections, the findings were discussed with those members of your staff identified in the enclosed report.

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

Based on the results of these inspections, four violations of NRC requirements were identified regarding the failure to implement Section 3, Design Control, of the MOX Project Quality Assurance Plan (MPQAP), specifically in the area of design change control. The violations were evaluated in accordance with the NRC Enforcement Policy available on the NRC's Web site at www.nrc.gov. The violations are cited in the enclosed Notice of Violation (Notice) and are being cited in the Notice because they were identified by the NRC. The circumstances surrounding the violations are described in detail in the subject inspection report.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. For your consideration, NRC Information Notice 96-28, "SUGGESTED GUIDANCE RELATING TO DEVELOPMENT AND IMPLEMENTATION OF CORRECTIVE ACTION," is available on the NRC's Web site.

The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

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

Sincerely,

/RA/

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

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

Enclosures: 1. Notice of Violation
2. NRC Inspection Report 70-3098/2009-003 w/attachment

cc w/encls: (See next page)

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

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 NON-PUBLICLY AVAILABLE
 SENSITIVE
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 ADAMS: Yes
 ACCESSION NUMBER: ML093030499
 SUNSI REVIEW COMPLETE

OFFICE	RII:DCP	RII:DCP					
SIGNATURE	Via Phone	WBG					
NAME	MShannon	WGloersen					
DATE	10/30/2009	10/29/2009					
E-MAIL COPY?	YES NO	YES NO					

D. Stinson

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cc w/encl:

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Letter to David Stinson from Deborah A. Seymour dated October 30, 2009.

SUBJECT: MIXED OXIDE FUEL FABRICATION FACILITY- NRC INSPECTION
REPORT 70-3098/2009-003

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PUBLIC

NOTICE OF VIOLATION

Shaw AREVA MOX Services
Aiken, South Carolina

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

During Nuclear Regulatory Commission (NRC) inspection activities conducted July 1 through September 30, 2009, violations of NRC requirements were identified. In accordance with the NRC Enforcement Policy, the violations are listed below:

- A. Condition 3.A of NRC Construction Authorization (CA) No. CAMOX-001, Revision 2, dated June 12, 2008, authorizes, in part, the applicant to construct a plutonium processing and mixed oxide fuel fabrication plant, known as the Mixed Oxide Fuel Fabrication Facility (MFFF) located at the Department of Energy's Savannah River Site, in accordance with the statements, representations, and conditions of the MOX Project Quality Assurance Plan (MPQAP) dated March 26, 2002, and supplements thereto (MPQAP, Revision 6, Change 1, dated July 28, 2008).

MPQAP, Revision 6, Change 1, Section 3, Design Control, requires that measures are established in MOX Services quality assurance procedures to assure that applicable requirements are correctly translated into design documents.

MOX Services Project Procedure (PP) 9-3, Design Control, Section 3.4.3, requires, in part, that the design shall consider the design considerations of PP 9-3 Attachment C, line item 5) loading conditions such as seismic, and line item 10) structural requirements, as applicable.

Contrary to the above, on or before August 5, 2009, the applicant failed to ensure that the design considerations of PP 9-3 Attachment C, line item 5) loading conditions such as seismic, and line item 10) structural requirements, were considered for the relocation of penetrations B-126-W-M00 and B-126-W05-M00 in manufacturing building (BMP) wall BMP W-123, when the design change for drawing DCS01-BMF-DS-PLF-B-01396, Revision 3 was implemented on December 18, 2007. Specifically, the design change did not consider the seismic or loading impact of placing the two penetrations directly above a wall pier.

This is a Severity Level IV violation (Supplement II)

- B. Condition 3.A of NRC CA No. CAMOX-001, Revision 2, dated June 12, 2008, authorizes, in part, the applicant to construct a plutonium processing and mixed oxide fuel fabrication plant, known as the MFFF located at the Department of Energy's Savannah River Site, in accordance with the statements, representations, and conditions of the MPQAP dated March 26, 2002, and supplements thereto (MPQAP, Revision 6, Change 1, dated July 28, 2008).

MPQAP, Revision 6, Change 1, Section 3, Design Control, Section 3.1, requires the method of design verification and results to be documented.

Contrary to the above, prior to September 30 2009, MOX Services design control procedures did not require that the method of design verification, or the results, be adequately documented when design verifications were performed. Specifically, MOX Services PP 9-3, Design Control, Revision 16 and PP 9-21, Engineering Change Procedure, Revision 6, did not require documentation of the required design verifications performed for design changes to calculations, drawings, and engineering change requests.

This is a Severity Level IV violation (Supplement II)

- C. Condition 3.A of NRC CA No. CAMOX-001, Revision 2, dated June 12, 2008, authorizes, in part, the applicant to construct a plutonium processing and mixed oxide fuel fabrication plant, known as the MFFF located at the Department of Energy's Savannah River Site, in accordance with the statements, representations, and conditions of the MPQAP, dated March 26, 2002, and supplements thereto (MPQAP, Revision 6, Change 1, dated July 28, 2008).

MPQAP, Revision 6, Change 1, Section 3, Design Change Control, Section 3.2.5.A, requires that changes to final designs shall have documented justification for use and are subject to the same design control measures and reviews as those applied to the original design. Section 3.2.5.B, requires that design control measures for changes shall include provisions to ensure that the design analyses for the item are still valid.

MOX Services PP 9-3, Design Control, Section 3.11.5, requires that the explanation for revision shall be documented on a Revision Description Sheet.

MOX Services PP 9-21, Engineering Change Request, Section 3.4.2, requires that the preparer is responsible for providing a technical justification for the problem solution and that the technical justification shall contain enough information so that a qualified individual can validate the adequacy of the change.

Contrary to the above, on or before August 20, 2009, the applicant failed to provide a technical justification for the problem solution for engineering change request (ECR) 2730. Specifically, the preparer failed to provide a technical justification for the original ECR 2730 issued on June 22, 2009, Revision 1 issued on August 5, 2009 or Revision 2 issued on August 20, 2009, for a design change that added 9-inch by 40-inch floor penetrations in BMP floor placement BMP F-204. In addition, the explanation for the revision was not documented on a Revision Description Sheet. Specifically, the revision for drawing DCS01-BMF-DS-PLF-B-01367, Sheet 1 Revision 2, dated May 18, 2009, did not have a Revision Description Sheet necessary to provide a justification for the problem solution or provide information so that a qualified individual could validate the adequacy of the change that added 40 inch floor penetrations to BMP floor placement BMP F-204.

This is a Severity Level IV violation (Supplement II)

- D. Condition 3.A of NRC CA No. CAMOX-001, Revision 2, dated June 12, 2008, authorizes, in part, the applicant to construct a plutonium processing and mixed oxide fuel fabrication plant, known as the MFFF located at the Department of Energy's Savannah River Site, in accordance with the statements, representations, and conditions of the MPQAP, dated March 26, 2002, and supplements thereto (MPQAP, Revision 6, Change 1, dated July 28, 2008).

MPQAP, Revision 6, Change 1, Section 5, Instructions, Procedures, and Drawings, Section 5.2.2, Content of Implementing Procedures, requires that implementing documents shall include a sequential description of the work to be performed including controls for altering the sequence of the required inspections, tests and other operations.

Contrary to the above, on or before August 20, 2009, implementing documents did not include a sequential description of the work to be performed in accordance with work package 09-1088-C-1935-BMP-W-116/118B-C. Specifically, in mid August 2009, a Lenton coupler and associated number 11 rebar were disconnected from BMP W-116/118 column N-10. The original Lenton coupler installation was a quality control hold point in the work package. The applicant had not revised the original work package to show that the Lenton coupler was removed and that the quality assurance hold point inspection was no longer valid.

This is a Severity Level IV violation (Supplement II)

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

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

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

NOV

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In accordance with 10 CRR 19.11, you may be required to post this Notice within two working days.

Dated in Atlanta, Georgia this 30th day of October 2009.

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 70-3098

Construction
Authorization No.: CAMOX-001

Report No.: 70-3098/2009-003

Applicant: Shaw AREVA MOX Services

Location: Savannah River Site
Aiken, South Carolina

Inspection Dates: July 1 – September 30, 2009

Inspectors: M. Shannon, Senior Resident Inspector, Construction Projects Branch 1
(CPB1), Division of Construction Projects (DCP), Region II (RII)
W. Gloersen, Senior Project Inspector, CPB1, DCP, RII

Accompanying
Personnel: D. Edwards, Project Inspector Trainee, CPB1, DCP, RII
D. Seymour, Chief, CPB1, DCP, RII
M. Sheikh, Project Inspector, CPB1, DCP, RII

Approved: Deborah A. Seymour, Chief, CPB1, DCP

EXECUTIVE SUMMARY

Shaw AREVA MOX Services
Mixed Oxide Fuel Fabrication Facility (MFFF)
NRC Inspection Report No. 70-3098/2009-003

Routine inspections were conducted by the senior resident inspector from July 1-September 30, 2009, and by regional specialists during the week of September 14-17, 2009. The inspections involved the observation and evaluation of the applicant's programs for facility construction of principle structures, systems, and components (PSSCs) and included quality assurance (QA) activities related to design verification and documentation control; problem identification, resolution, and corrective actions; structural steel and support activities; structural concrete activities; and geotechnical foundation activities.

The scope of the inspections encompassed a review of various Mixed Oxide (MOX) Fuel Fabrication Facility (MFFF) activities related to Quality Level (QL)-1 construction for conformance to NRC regulations, the Construction Authorization Request (CAR), the MOX Project Quality Assurance Plan (MPQAP), and applicable industry standards. This included, as applicable, material procurement, fabrication and assembly, testing and inspection, and records management. The inspectors reviewed applicable portions of MOX Services' programs to assess the adequacy of those programs and whether it was effectively implemented. The inspections identified the following aspects of the applicant's programs as outlined below:

Resident Inspection Program for On-Site Construction Activities (Inspection Procedure (IP) 88130), Structural Concrete Activities (IP 88132), Quality Assurance: Piping Relied on for Safety (IP 88134)

- Construction activities related to PSSC-036 (MOX Fuel Fabrication Building Structure (MFFBS) (including the vent stack)) as described in Table 5.6-1 of the MFFF CAR were performed and included installations of embedded plates and ground cables, heavy lifts of equipment and supplies, verification of equipment placements by surveys, welding, non-destructive testing, and receipt of materials. These construction activities were performed in a safe and quality related manner and in accordance with procedures and work packages, (PSSC-036) (Section 2.a.)
- A violation was identified for an inadequate design change related to the improper relocation of wall penetrations to a location above a wall pier. The design drawing was improperly revised on December 18, 2007, (PSSC-036) (Section 2.b. (1)).
- A violation was identified for inadequate procedural guidance for documentation of methods and results of design verification reviews related to design drawing revisions and engineering change requests (PSSC-036) (Section 2.b.(2)).
- A violation was identified for inadequate technical justifications in an engineering change request and a design drawing revision, both related to the addition of penetrations in manufacturing building placement (BMP) F-204 without providing sufficient information to validate the adequacy of the change (PSSC-036) (Section 2.b. (3)).

- A violation was identified for undocumented work activities that did not show that a Lenton coupler had been removed from column N-10 or that a quality control (QC) hold point inspection was no longer valid (PSSC-036) (Section 2.b) (4).
- Geotechnical backfill procedures and specifications were adequate. QA records associated with these activities were properly maintained in accordance with project procedures. No findings of significance were identified (PSSC-036) (Section 2.c).
- Observed rebar and embedded plates were properly installed, cleanliness was adequate, concrete testing activities were adequate and concrete placement activities were appropriate (PSSC-036) (Section 2.d.(1)).
- Field preparation of concrete test cylinders and temporary storage of the cylinders was acceptable. No issues were identified concerning the field testing (slump, temperature, and air entrainment). Testing indicated that the concrete placed at the MFFF met design strength requirements (PSSC-036) (Section 2.d.(2)).

Problem Identification, Resolution, and Corrective Action (IP 88110)

- The inspectors concluded that the applicant had established a program and procedures that adequately implemented the corrective action program in accordance with the applicant's MPQAP (Section 3).

Inspection of Safety Function Interfaces (IP 88116)

- The applicant had established a program and procedures for control of safety function interfaces associated with the one of the components of PSSC-024 (glove box - pellet process area scrap box loading unit (PAR)) in the areas of integrated safety, design, procurement, and quality assurance controls in accordance with its CAR requirements, and the applicant's MPQAP (Section 4).

REPORT DETAILS

1. Summary of Facility Status

During the period, the applicant continued construction activities of principle structures systems, and components (PSSCs) related to building construction up to ground level (Release 1). The applicant also continued Release 2 activities which included multiple inside and outside walls of the Manufacturing Building (BMP) and the Receiving Building (BSR). The Mixed Oxide (MOX) Fuel Fabrication Facility (MFFF) project continued installation of Quality Level (QL)-4 and QL-1 processing tanks during this inspection period. Approximately 30 tanks were received, stored, and tested in the Process Assembly Building until they are installed in the MFFF. Other construction activities included civil foundation activities related to construction of the secure warehouse next to the MFFF.

2. Resident Inspection Program for On-Site Construction Activities (Inspection Procedure (IP) 88130), Structural Concrete Activities (IP 88132), Quality Assurance: Piping Relied on for Safety (IP 88134)

a. Routine Inspection Activities

(1) Scope and Observations

During the inspection period, the inspectors observed the following activities associated with PSSC-0036 (MOX Fuel Fabrication Building Structure (MFFBS) (including vent stack)) as described in Table 5.6-1 of the MFFF Construction Authorization Request (CAR):

- (a) Installation of structural reinforcing steel in the BMP, the Aqueous Polishing Building (BAP), and the BSR;
- (b) Installation of embedded piping and embedded support plates in the three buildings;
- (c) Concrete placements in walls and floors of the BMP, BAP and BSR;
- (d) Operation of the concrete batch plant;
- (e) Receipt of cement, fly ash, sand and gravel;
- (f) Concrete testing in the field (slump, air entrainment, and temperature);
- (g) Installation of building grounding cables in various base mats and walls;
- (h) Surveys (proper positioning/location) of embedded piping and embedded plates;
- (i) Cleanliness of areas prior to concrete placement, and maintenance of cleanliness during the concrete placements.

The inspectors observed routine lifts conducted to position reinforcing steel and embedded plates; installation and removal of concrete retaining walls; and movement of equipment such as generators, pumps, temporary lighting, and toolboxes. The lifts were conducted in accordance with the applicant's procedures. The inspectors reviewed the applicable sections of MOX Project Quality Assurance Plan (MPQAP) and verified that the installations of the structural reinforcing steel, embedded plates embedded piping, and electrical grounding of the MFFF structures were in accordance with Quality Assurance (QA) program requirements. Specifically, the inspectors verified that installations were in accordance with applicable field drawings and met the general construction notes detailed on the following drawings: (1) MOX Fuel Fabrication Facility,

Concrete and Reinforcing General Notes, DCS01-01352, Revision (Rev.) 9 (Sheet 1 of 2); and (2) MOX Fuel Fabrication Facility, Concrete and Reinforcing General Notes and Tolerance Details, DCS-01352, Rev. 6 (Sheet 2 of 3 and Sheet 3 of 3).

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

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

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

(2) Conclusions

Construction activities related to PSSC-036 as described in Table 5.6-1 of the MFFF CAR were performed and included installations of embedded plates and ground cables, heavy lifts of equipment and supplies, verification of equipment placements by surveys, welding, non-destructive testing, and receipt of materials. These construction activities were performed in a safe and quality related manner and in accordance with procedures and work packages.

b. Design Change Control Issues

During the inspection period, the inspectors followed up with specific inspection activities related to control of design changes and implementation of those design changes during construction activities. The following civil/structural design change control issues were identified:

(1) Improper Design Change for Wall Penetration Location (PSSC-036)

(a) Scope and Observations

On August 5, 2009, the inspectors identified that penetrations had been placed directly above a wall pier in placement BMP-W-123. The locations of the penetrations appeared to interfere with the load bearing ability of the pier. The inspectors' notified civil engineering personnel and condition report (CR) CR-2009-0261 was issued. Subsequently, an engineering change request (ECR), ECR-3745 was issued and the penetrations were moved. MOX Services QA Surveillance Report QC-09-0298 stated that, "Verified through engineering that moving this penetration did in fact negatively

impact design requirements of the wall. Engineering issued ECR 3745 to change the location of two penetrations in the wall to relieve any deficient areas.”

The inspectors reviewed the design drawing associated with the initial relocation of the two penetrations in question. The design change was implemented on December 18, 2007, for design drawing DCS01-BMF-DS-PLF-B-01396, Rev. 3. The design change did not provide any evidence that the structural or seismic requirements had been considered when changing the size and position of the penetrations.

The MPQAP, Rev. 6, Change 1, Section 3, Design Control, requires that applicable requirements are correctly translated into design documents. Contrary to this requirement, MOX Services did not correctly translate applicable requirements into design documents in that structural and seismic requirements were not properly considered for relocation of penetrations B-126-W-M00 and B-126-W05-M00 in wall BMP W-123. The failure to properly translate design requirements into the design change for drawing DCS01-BMF-DS-PLF-B-01396, Rev. 3, on December 18, 2007, is considered to be a violation (VIO) and is identified as VIO 70-3098/2009-003-001, Inadequate Design Change. This issue was captured in the applicant’s corrective action program as CR-2009-0261.

(b) Conclusions

A violation was identified for an inadequate design change related to the improper relocation of wall penetrations to a location above a wall pier. The design drawing was improperly revised on December 18, 2007, (PSSC-036).

(2) Failure to Document Design Verifications (PSSC-036)

(a) Scope and Observations

During the inspection period, the inspectors reviewed various design drawings and ECRs. Specifically ECR 3603, dated July 21, 2009; ECR 2730, dated August 20, 2009; design drawing DCS01-BMF-DS-PLF-B-01396 Rev. 2, dated January 8, 2007; design drawing DCS01-BMF-DS-PLF-B-01396 Rev. 3 dated December 18, 2007; and design drawing DCS01-BMF-DS-PLF-B-01367 Rev. 2, dated May 15, 2009, were reviewed. The inspectors noted that MOX Services had failed to document the method and results of the design verifications. All of the documents had been “Design Verified.”

The inspectors reviewed the Design Control Procedure, PP 9-3, Rev. 16, dated April 13, 2009, and Engineering Change Procedure, PP 9-21, Rev. 6, dated April 21, 2009 and noted that the procedures did not require the documentation of the methods and results of design verifications.

The MPQAP, Section 3, Design Control, requires the method of design verification and the results to be documented. Contrary to this requirement, Project Procedure PP9-3, Design Control, and Project Procedure PP 9-21, Engineering Change, were considered to be inadequate in that they did not require that the methods and results of design verifications be documented. The failure to provide adequate procedures to ensure proper documentation of design verifications was considered to be a violation and is identified as violation VIO 70-3098/2009-003-002, Inadequate Procedures for

Documentation of Design Verifications. This issue was captured in the applicant's corrective action program as CR- 2009-0247, Rev 1.

(b) Conclusions

A violation was identified for inadequate procedural guidance for documentation of methods and results of design verification reviews related to design drawing revisions and engineering change requests (PSSC-036).

(3) Failure to Properly Justify Design Changes (PSSC-036)

(a) Scope and Observations

During late August 2009, the inspectors reviewed Engineering Change Request ECR-2730, related to the design change to placement BMP F-204. The design change added a 9 inch by 40 inch penetration in the floor. The original ECR-2730 was issued on June 22, 2009. Rev. 1 was issued on August 5, 2009 and Rev. 2 was issued on August 20, 2009. Neither the original nor the two revisions provided a technical justification for the change. The actual change cut multiple floor structural support bars and the inspectors questioned the applicant as to whether or not a seismic review of the change was necessary.

ECR-2730 also listed three other identical penetrations in floor placement BMP F-204. However, these changes were implemented with a drawing revision instead of an ECR. The inspectors noted that the drawing revision for drawing DCS01-BMF-DS-PLF-B-01367, Sheet 1, Rev. 2, did not provide a justification for making the change nor documentation to show that the design analyses for the floor areas were still valid. MOX Services MPQAP, Section 3.2.5, Design Change Control, requires that changes to final design shall have documented justifications and that design control measures for changes shall include provisions to ensure that the design analyses for items are still valid. The actual change cut multiple floor structural support bars and it was determined that a seismic review of the drawing revision was necessary.

MOX Services Project Procedure (PP) 9-21, Engineering Change Request, Section 3.4.2, states that "The preparer is responsible for providing a technical justification for the problem solution. The technical justification shall contain enough information so that a qualified individual can validate the adequacy of the change." MOX Services MPQAP, Section 3.2.5, Design Change Control, requires that changes to final designs shall have documented justification for use and that design control measures for changes shall include provisions to ensure that the design analyses for items are still valid. Contrary to this requirement, ECR-2730 did not provide information to validate the adequacy of the change in that no information was documented to show that the cutting of the floor structural steel did not impact the design requirements related to the seismic design, and drawing DCS01-BMF-DS-PLF-B-01367 Sheet 1, Rev. 2, did not provide documented justification for use and did not provide documentation that the design analyses for the item was still valid. The failures to provide adequate technical justifications for ECR-2730 and design drawing DCS01-BMF-DS-PLF-B-01367 Sheet 1, Rev. 2, and the lack of documentation to justify that the design analyses were still valid, were considered to be examples of a violation and are identified as VIO 70-3098/2009-003-003, Inadequate Technical Justification for Engineering Design Changes. MOX Services was initiating a

CR to capture these issues in the corrective action program at the close of this inspection.

(b) Conclusions

A violation was identified for inadequate technical justifications in an Engineering Change Request and a design drawing revision, both related to the addition of penetrations in placement BMP F-204 without providing sufficient information to validate the adequacy of the change.

(4) Improper Documentation of Work Activities (PSSC-036)

(a) Scope and Observations

During mid August 2009, the inspectors inspected areas of the BMP elevated floors and walls. During the review, it was noted that a Lenton coupler and associated number 11 rebar had been disconnected and removed from BMP W-116/118 column number N-10. The Lenton coupler installation had previously been torqued and documented in work package 09-1088-C-1935-BMP-W-116/118B-C. The torquing of the Lenton coupler was also a quality control (QC) hold point in the work package. The inspectors noted that the work package had not been revised to show that the Lenton coupler had been removed and that the QC hold point inspection was no longer valid.

MOX Services MPQAP, Section 5.2.2, Content of Implementing Documents, requires that implementing documents shall include a sequential description of the work to be performed including controls for altering the sequence of the required inspections, tests and other operations. Contrary to this requirement, on August 20, 2009, the inspectors observed that a Lenton coupler in column N-10 had been removed and the work package had not been revised to capture the work activity. The failure to provide a sequential description of work activities was considered to be a violation and is identified as VIO 70-3098/2009-003-004, Inadequate Documentation of Work Activities. This issue was captured in the applicant's corrective action program as CR-2009-0319.

(b) Conclusions

A violation was identified for work activities that did not show that a Lenton coupler had been removed from column N-10 or documentation that a QC hold point inspection was no longer valid.

c. Geotechnical/Foundation Activities

(1) Scope and Observations

This portion of the inspection focused on the applicant's implementation of QL-1 backfill activities and included discussions with personnel performing backfill for QL-1 structures. The intent of the inspection was to determine if geotechnical activities were accomplished in accordance with the applicants design specifications, drawings, and procedures. Backfilling activities included backfilling of fire system piping, electrical conduits and precast distribution boxes, foundation for the secure warehouse, electrical vaults, piping vaults, and areas adjacent to MOX facility base mats.

The inspectors reviewed controlled low strength material (CLSM) specifications and testing procedures to determine the technical requirements associated with the backfill activity. This inspection verified the proper installation of CLSM through the review of pre-placement and compression test records.

(2) Conclusions

Geotechnical backfill procedures and specifications were adequate. QA records associated with these activities were properly maintained in accordance with project procedures. No findings of significance were identified.

d. Structural Concrete Activities

(1) Concrete Placement Activities (PSSC-036)

(a) Scope and Observations

The inspectors evaluated the adequacy of ongoing concrete activities conducted by Baker, QORE, and MOX Services. The inspection of these activities focused on reinforcing steel bar installation, formwork preparation, pre-placement testing, and placement procedures associated with QL-1 concrete construction of the MFFBS. Table 5.6-1 of the CAR specifies the MFFBS as one of the PSSCs (PSSC-036).

The inspectors observed various activities prior to and during each major concrete placement. Prior to each placement, the inspectors randomly checked for proper placement of reinforcing steel, including proper lap splices, supports, and bar quantity. The inspectors randomly checked for proper embed plate placement by observing ongoing surveys, and verified embed plate support structures were in place; verified cleanliness of the placement area; observed placement of embedded piping, installation of piping supports, mounting of piping to supports, and installation of galvanic sleeves between piping and supports. The inspectors also observed the installation of the grounding system for the reinforcing steel including embedded grounding posts for future equipment installation. During the placements, the inspectors observed proper lift heights and observed MOX Services' field engineers and QC personnel performing inspections of the reinforcing steel, embed plates, embed piping, cleanliness prior to placements, and detailed observations of the placements.

During the concrete placements, inspectors observed operations at the batch plant and at the point of placement. Concrete placement and onsite testing activities were in accordance with procedural requirements. Minor difficulties observed during the placements were independently identified by on-going QC inspections and corrected by the applicant.

The inspectors observed that concrete samples were collected at the prescribed frequency and noted that the slump and air content met the acceptance criteria or were appropriately dispositioned with nonconformance reports (NCRs), and that the concrete test cylinders were collected and temporarily stored per procedure prior to transport to the off-site materials laboratory (QORE) for curing and later testing. Batch plant operators correctly implemented procedural requirements and were in constant communication with the concrete placement crews.

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

July 9, 2009, BAP Precast Panel 135.3, BAP Floor, 8 cubic yards
 July 16, 2009, BMP F-113C, BMP floor, 10 cubic yards
 July 21, 2009, BMP W-213A.1, BMP Interior Wall, 14 cubic yards
 July 23, 2009, BMP W-124A.2, BMP Interior Wall, 33 cubic yards
 July 27, 2009, BMP F-202, BMP Intermediate Floor, 249 cubic yards
 July 28, 2009, BMP W-119B.1, BMP Interior Wall, 40 cubic yards
 July 30, 2009, BAP W-104, BAP Interior Wall, 232 cubic yards
 August 4, 2009, BSR W-107.3, BSR Wall, 20 cubic yards
 August 5, 2009, BAP W-108/107.2, BAP Interior Wall, 168 cubic yards
 August 6, 2009, BMP W-117B.2, BMP Interior Wall, 56 cubic yards
 August 6, 2009, BMP W-124A.5, BMP Interior Wall, 36 cubic yards
 August 11, 2009, BAP Precast Panel 140, BAP Floor, 5 cubic yards
 August 18, 2009, BMP W-124A.3, BMP Interior Wall, 33 cubic yards
 August 20, 2009, BMP W-211/213, BMP Exterior Wall, 100 cubic yards
 August 20, 2009, BMP W-116B, BMP Interior Wall, 59 cubic yards
 August 20, 2009, BAP Precast Panel 151.1, BAP Floor, 16 cubic yards
 August 20, 2009, BMP W-124A.3.2, BMP Interior Wall, 48 cubic yards
 August 21, 2009, BSR W-103, BSR Interior Wall, 57 cubic yards
 August 26, 2009, BAP W-101, BAP Exterior Wall, 350 cubic yards
 August 27, 2009, BMP W-116/118, BMP Interior Walls, 80 cubic yards
 August 28, 2009, BSR W-109.1, BSR Interior Wall, 158 cubic yards
 August 28, 2009, BMP F-118B.2, BMP Interior Wall, 73 cubic yards
 September 1, 2009, BMP F-204, BMP Floor, 351 cubic yards
 September 9, 2009, BMP W-213.3, BMP Exterior Wall, 280 cubic yards
 September 10, 2009, BMP F-205, BMP Floor, 106 cubic yards
 September 11, 2009, BMP W21.1.2/211.1.3, BMP Interior Walls, 72 cubic yards
 September 11, 2009, BSR W-107.1, BSR Interior Wall, 121 cubic yards
 September 14, 2009, BAP W-107.3, BSR Interior Wall, 27 cubic yards
 September 14, 2009, BMP W-117B.3, BMP Interior Wall, 48 cubic yards
 September 15, 2009, BAP W-103, BAP Exterior Wall, 264 cubic yards
 September 16, 2009, BMP W-202, BMP Exterior Wall, 323 cubic yards
 September 17, 2009, BSR W-103A.3, BSR Interior Wall, 89 cubic yards
 September 22, 2009, BMP W-204, BMP Exterior Wall, 229 cubic yards
 September 23, 2009, BMP W-125A, BMP Interior Wall, 125 cubic yards
 September 23, 2009, BAP W-105/106, BAP Exterior Wall, 240 cubic yards
 September 24, 2009, BMP W-205, BMP Exterior Wall, 178 cubic yards
 September 29, 2009, BSR W-105.1, BSR Interior Wall, 18 cubic yards
 September 30, 2009, BSR W-103.4, BSR Interior Wall, 35 cubic yards
 September 30, 2009, BMP W-124A.4, BMP Interior Wall, 22 cubic yards

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

During the inspection period, the inspectors evaluated the adequacy of ongoing structural concrete activities conducted by Baker Concrete Construction Inc., QORE, and MOX Services. This inspection focused primarily on steel reinforcement storage and handling, steel reinforcement specifications, and the concrete testing laboratory.

MOX Services' Construction Specification, DCS01-BKA-DS-SPE-B-09328-3, Section 03201, Concrete Reinforcement for Quality Level 1a (item relied on for safety (IROFS)), 2, 3, and 4, Rev. 3, and DSC01-BKA-DS-SPE-B-09330-4, Section 03301, Placing Concrete and Reinforcing Steel for Quality Level 1, 2, 3, and 4, Rev. 4, were reviewed for adequacy. QA documentation and implementation procedures were also reviewed by the inspectors to verify whether activities performed onsite were in accordance with internal procedures, specifications and NRC regulations.

Baker Concrete Construction Project Procedure BPP-115, Work Package Planning and Approval, Rev. 3, was reviewed. The work package (WP) documentation was in accordance with procedures and current with adequate information for the stage of construction of the associated construction activities and concrete placement for that section.

(b) Conclusions

The inspectors concluded that observed rebar and embedded plates were properly installed, cleanliness was adequate, concrete testing activities were adequate and concrete placement activities were appropriate (PSSC-036).

(2) Concrete Testing (PSSC-036)

(a) Scope and Observations

Since the start of construction activities, the inspectors have observed the field testing of the concrete prior to placement and the field preparation of the concrete compressive test cylinders. No issues were identified concerning the field testing (slump, temperature, and air entrainment) and no significant issues were identified concerning storage of the cylinders prior to testing. The inspectors reviewed the "Concrete Statistical Summaries" used to trend the results of the compressive test of the concrete cylinder specimens. The summaries indicated that the concrete installed at the MOX facility met the design strength requirements.

(b) Conclusions

Field preparation of concrete test cylinders and temporary storage of the cylinders was acceptable. No issues were identified concerning the field testing (slump, temperature, and air entrainment). Testing to date indicated that the concrete placed at the MOX facility met design strength requirements (PSSC-036).

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

a. Scope and Observations

The inspectors routinely reviewed various corrective action documents. The review included NCRs, CRs, root causes and supplier deficiency reports (SDRs); and reviewed the closure of selected NCRs and CRs. Except as noted in Section 2 of this inspection report, the inspectors concluded that the applicant was appropriately capturing conditions adverse to quality in their corrective action system. The applicant identified these items during routine daily activities, special inspections, audits, and self assessments. The applicant routinely evaluated the significance of the adverse

conditions, completed corrective actions in a timely manner, and properly evaluated adverse conditions for applicable reporting requirements. The inspectors noted that the applicant entered issues identified during self assessments into the corrective action system.

Review of MOX Services' procedures and interviews with the applicant's staff confirmed that a process exists for documenting and reporting conditions adverse to quality to appropriate levels of management responsible for the conditions, and to the organization responsible for the condition.

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

b. Conclusions

The applicant had established a program and had procedures that adequately implemented the corrective action program in accordance with the applicant's MPQAP.

4. **Inspection of Safety Function Interfaces (IP 88116)**

a. Scope and Observations

The inspectors reviewed selected aspects of the integrated safety process, design process and interface controls, procurement process and interface controls, and quality assurance controls as they related to the design, procurement, and assembly of the pellet process area scrap box loading unit (PAR). The PAR was one of the items relied on for safety (IROFS) associated with PSSC-024 (glove boxes). The PAR was fabricated by Robatel Industries. The safety function of this PSSC, as described in the CAR, was to maintain nuclear material confinement integrity during and after design basis impacts or events. This system and the associated components were described in the Pellet Process Area Scrap Box Loading Unit System Description Document (SDD), Quality Level 1A-IROFS, DCS01-PAR-CG-SDD-M-065680-2, Rev. 2.

The inspectors toured the Process Unit Assembly Building (PAF) and observed component assembly activities associated with the PAR. The PAR assembly area was controlled to minimize unnecessary foot traffic while critical dimensional measurement verifications were being performed. No issues were observed regarding the PAR component measurement verification or assembly activities.

The inspectors also reviewed the component classification summary of the PAR specified in DCS01-PAR-DS-NTE-M-22485-0, dated July 22, 2008, which provided unit specific technical classifications for the components (IROFS) associated with the PAR. The following components were classified as quality level (QL-1): (1) glove box frame; (2) glove box anchorage and support structure; (3) ventilation supply duct (including the high efficiency particulate air (HEPA) filters); (4) very high depressurization (VHD) system (glove box ventilation exhaust duct and HEPA filters); (5) dump valve ducts (emergency exhaust ducts and HEPA filters); (6) differential pressure instrumentation; (7) fire suppression piping (upstream of the orifice); (8) fire suppression piping flow orifice; and (9) fire suppression piping

support. The inspectors noted that the quality levels assigned to the components were commensurate with the safety and risk significance associated with the pellet process area scrap box loading unit.

The inspectors verified that the Integrated Safety Analysis (ISA) results were incorporated into the design of the pellet process area scrap box loading unit noted above in accordance with project procedure PP 9-20, Safety and Design Integration, Rev. 3. Specifically, the inspectors focused on the portion of the ISA that identified the IROFS noted above and verified that the results of the associated Nuclear Criticality Safety Evaluation (NCSE-D) of the Scrap Box Loading Unit, Quality Level 1A-IROFS, DCS01-PAR-DS-ANS-H-350173 were incorporated into the design of the scrap box loading unit. The inspectors also verified that applicable sections of the Fire Hazards Analysis for the Mixed Oxide Fuel Fabrication Facility, Quality Level 1A-IROFS, DCS-ASI-DS-ANS-R-1048, Rev. 2 were incorporated into the design of the PAR. The inspectors verified that selected design requirements noted above were incorporated into the procurement specifications of the PAR in accordance with applicable project procedures and the MPQAP.

Lastly, the inspectors reviewed selected aspects of the audits, management assessments, and other management controls had been established and implemented to confirm that safety-function interfaces were effective as they related to the PAR glove box. The inspectors reviewed audits conducted in the following activity areas: engineering, procurement, and quality assurance. The inspectors verified that the applicant performed the audits and assessments in accordance with PP 3-7, Audits. The audits reviewed were thorough and identified deficiencies were captured in CRs.

b. Conclusions

The applicant had established a program and procedures for control of safety function interfaces associated with the one of the components of PSSC-024 (pellet process area scrap box loading unit-PAR) in the areas of integrated safety, design, procurement, and quality assurance controls in accordance with its CAR requirements, and the applicant's MPQAP.

5. **Exit Interviews**

The inspection scope and results were summarized throughout this reporting period by the senior resident inspector on October 1, 2009, and with the regional specialist inspectors on September 17, 2009, at the MFFF site. No dissenting comments were received from 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.

1. **PARTIAL LIST OF PERSONS CONTACTED**

Applicant Personnel

J. Adair, Civil - Mechanical Engineering Manager
C. Allen, Engineering Manager
R. Alley, Engineering Services Manager
W. Elliott, Engineering Vice- President
D. Gwyn, Regulatory Affairs Manager
D. Kehoe, Quality Assurance (QA) Engineer
O. Mendiratta, Licensing Engineer
G. Shell, QA Manager
D. Stinson, President and Chief Operating Officer
R. Whitley, Quality Control (QC) Manager

Other individuals contacted included supervisors, engineers, and inspection, measurement, and testing technicians.

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

IP 88110 Quality Assurance: Problem Identification, Resolution and Corrective Action
IP 88116 Inspection of Safety Function Interfaces
IP 88130 Resident Inspection Program for On-Site Construction Activities
IP 88132 Structural Concrete Activities
IP 88134 Quality Assurance: Piping Relied on for Safety

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

<u>Item Number</u>	<u>Status</u>	<u>Description</u>
70-3098/2009-03-01	Open	VIO: Inadequate Design Change (Section 2.b.(1))
70-3098/2009-03-02	Open	VIO: Inadequate Procedures for Documentation of Design Verifications (Section 2. b.(2))
70-3098/2009-03-03	Open	VIO: Inadequate Technical Justification for Engineering Design Changes (Section 2. b.(3))
70-3098/2009-03-04	Open	VIO: Inadequate Documentation of Work Activities (Section 2. b.(4))

4. **LIST OF ACRONYMS USED**

ADAMS Agency-Wide Document Access and Management System
BAP Aqueous Polishing Building
BMF Fuel Manufacturing Building

BMP	Manufacturing Building
BPP	Baker Concrete Construction project procedure
BSR	Receiving Building
CAR	Construction Authorization Request
CFR	Code of Federal Regulations
CLSM	Controlled Low Strength Material
CR	Condition Report
ECR	Engineering Change Request
HEPA	high efficiency particulate air (filter)
IP	Inspection Procedure
IROFS	item relied on for safety
ISA	integrated safety analysis
M	MOX
MFFBS	MOX Fuel Fabrication Building Structure
MFFF	MOX Fuel Fabrication Facility
MOX	Mixed Oxide
MPQAP	MOX Project Quality Assurance Plan
NCR	Nonconformance Report
NCSE	nuclear criticality safety evaluation
NMSS	Nuclear Materials Safety and Safeguards
PAF	Process Unit Assembly Building
PAR	Pellet Process Area Scrap Box Loading Unit
PP	Project Procedure
PSSC	Principle Structures, Systems, and Components
PSSC-024	Glove Boxes
PSSC-036	MOX Fuel Fabrication Building Structure (including vent stack)
QA	Quality Assurance
QC	Quality Control
QL	Quality Level
QORE	Construction Materials Testing Laboratory
Rebar	Reinforcing bar
Rev.	Revision
SDD	System Description Document
SDR	Supplier Deficiency Report
VHD	Very High Depressurization (system)
WP	Work Package

5. **LIST OF DOCUMENTS REVIEWED**

Specifications

- Shaw Areva MOX Services Specification, DSC01-BKA-DS-SPE-B-09328-3, Section 03201 – Concrete Reinforcement for Quality Level 1a (IROFS), 2, 3, and 4, Rev. 3
- Shaw Areva MOX Services Specification, DSC01-BKA-DS-SPE-B-09330-4, Section 03301 – Placing Concrete and Reinforcing Steel For Quality Level 1, 2, 3, and 4, Rev. 4
- Shaw Areva MOX Services, Construction Specification DCS01-BMF-DS-SPE-B-092100, Specification Section 01415 – ITL Requirements for Construction Contract CP-20 BMF Structural Work, Rev. 0

Audit and Assessments

DCS-08-A02 Engineering Audit Plan, April 9, 2008
DCS-08-A02 Engineering Report
DCS-08-A08 Engineering Audit Plan, October 13, 2008
DCS-08-A08 Engineering Report
DCS-08-A11 Procurement Audit Plan, October 27, 2008
DCS-08-A11 MOX Project Procurement Report, February 7, 2009
DCS-09-A03 Quality Assurance Audit Plan, April 21, 2009
DCS-09-A03 Quality Assurance Audit Report, June 18, 2009
CY09-P-002 2008 Project Assessment
CY-M-ENG-022 MOX Fuel Fabrication Facility Engineering Management Assessment
Report for 2008, December 15, 2008
FY 2008 Audit/Surveillance/Evaluation Schedule, April, 9, 2009

Project Procedures

PP 3-6, Corrective Action Process, Rev. 10
PP 3-7, Audits, Rev.6
PP3-26, Surveillance Activities, Rev. 1

Work Packages

BPP 103, Ground Grid System Installation, Rev. 4
BPP 115, Work Package Planning and Development and Approval, Rev. 3