



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION II

SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

January 29, 2010

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
NO. 70-3098/2009-004**

Dear Mr. Stinson:

During the period of October 1 through December 31, 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 this inspection, no violations or deviations were identified.

In accordance with 10 CFR 2.390 of NRC's "Rules of Practice," a copy of this document and its enclosures may be accessed through the NRC's public electronic reading room, Agency-Wide Document Access and Management System (ADAMS) on the Internet at <http://www.nrc.gov/reading-rm/adams.html>.

D. Stinson

2

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

Sincerely,

/RA William B. Gloersen acting for/

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

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

Enclosure: NRC Inspection Report 70-3098/2009-004 w/attachment

cc w/encls: (See next page)

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

Sincerely,

/RA William B. Gloersen acting for/

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

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

Enclosure: NRC Inspection Report 70-3098/2009-004 w/attachment

cc w/encl: (See next page)

PUBLICLY AVAILABLE NON-PUBLICLY AVAILABLE SENSITIVE NON-SENSITIVE

ADAMS: Yes ACCESSION NUMBER: SUNSI REVIEW COMPLETE

OFFICE	RII: DCP	RII: DCP	RII: DCI	RII: DCI	RII: DCI		
SIGNATURE	Via Email	WBG					
NAME	M. Shannon	W. Gloersen	J. Bartleman	R. Jackson	B. Davis		
DATE	1/28/2010	1/28/2010	Approved feeder 1/8/2010	Approved feeder 1/25/2010	Approved feeder 1/25/2010		
E-MAIL COPY?							

D. Stinson

3

cc w/encl:

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

Mr. Sam Glenn, Deputy
Federal Project Director
NA-262.1
P.O. Box A
Aiken, SC 29802

A.J. Eggenberger, Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Ave., NW, Suite 700
Washington, DC 20004

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

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

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

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

Diane Curran
Harmon, Curran, Spielberg & Eisenberg, LLP
1726 M St., NW, Suite 600
Washington, DC 20036

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

Letter to David Stinson from Deborah A. Seymour dated January 29, 2010.

SUBJECT: MIXED OXIDE FUEL FABRICATION FACILITY- NRC INSPECTION
REPORT 70-3098/2009-004

DISTRIBUTION w/encl:

M. Kotzalas, NMSS

D. Tiktinsky, NMSS

R. Croteau, RII

D. Seymour, RII

K. O'Donohue, RII

J. Moorman, RII

M. Lesser, RII

W. Gloersen, RII

M. Shannon, RII

PUBLIC

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 70-3098

Construction
Authorization No.: CAMOX-001

Report No.: 70-3098/2009-004

Applicant: Shaw AREVA MOX Services

Location: Savannah River Site
Aiken, South Carolina

Inspection Dates: October 31 – December 31, 2009

Inspectors: M. Shannon, Senior Resident Inspector, Construction Projects Branch 1
(CPB1), Division of Construction Projects (DCP), Region II (RII)
R. Jackson, Senior Construction Inspector, Construction Inspection
Branch 2 (CIB2), Division of Construction Inspection (DCI), RII
J. Lizardi, Construction Inspector, CIB2, DCI, RII
B. Davis, Senior Construction Inspector, CIB2, DCI, RII
J. Calle, Senior Construction Inspector, CIB3, DCI, RII
E. Heher, Construction Inspector, CIB2, DCI, RII
J. Bartleman, Senior Construction Inspector, CIB3, DCI, RII
G. Khouri, Senior Project Inspector, CPB2, DCP, RII
C. Jones, Senior Construction Inspector, CIB1, DCI, RII
C. Abbott, Construction Inspector, CIB2, DCI, RII
J. Seat, Construction Inspector, CIB2, DCI, RII

Accompanying
Personnel: A. Chowdhury, Ph.D., Center for Nuclear Waste Regulatory Analyses
(CNWRA)

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

Enclosure

EXECUTIVE SUMMARY

Shaw AREVA MOX Services
Mixed Oxide (MOX) Fuel Fabrication Facility (MFFF)
NRC Inspection Report No. 70-3098/2009-004

Routine inspections were conducted by the senior resident inspector from October 1- December 31, 2009, and by regional specialists from October 19-23, 2009 and December 7-11, 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 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 inspections also focused on Shaw AREVA MOX Services' (MOX Services) oversight of subcontractor activities. The inspectors reviewed applicable portions of MOX Services' program to assess the adequacy of the program and whether it was effectively implemented. The inspectors reviewed procedures associated with problem identification and corrective actions to resolve previous problems with materials and components. 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)

Construction activities related to PSSC-007 (Chemical Safety Controls), PSSC-009 (Criticality Control), PSSC-036 (MOX Fuel Fabrication Building Structure (including vent stack)), and PSSC-053 (Waste Transfer Line) as described in Table 5.6-1 of the MFFF CAR were adequately 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 (Section 2).

Geotechnical/Foundation Activities (IP 88131)

Geotechnical backfill activities were adequately performed in accordance with procedures and specifications. QA records associated with these activities were properly maintained in accordance with project procedures. No findings of significance were identified (PSSC-0036) (Section 3).

Structural Concrete Activities (IP 88132)

Rebar and embedded plates were properly installed, cleanliness was adequate, concrete testing activities were adequate and concrete placement activities were appropriate (PSSC-036) (Section 4.a).

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). The inspectors noted that the temporary storage boxes were properly heated for the cold weather conditions. Testing to date indicates that the concrete placed at the MOX facility met design strength requirements (PSSC-036) (Section 4.b).

Structural concrete procedures, specifications, and placement activities associated with PSSC-036 were adequate and properly implemented in the field. QA records associated with these activities were properly maintained in accordance with procedures. No items of safety significance were identified in this area (PSSC-036) (Section 4.c).

Quality Assurance: Program Development and Implementation (Pre-licensing and Construction) (IP 88106)

Applicant personnel adequately implemented the QA program at MFFF. The applicant's Corrective Action Program (CAP) provided adequate follow up and closure of conditions adverse to quality in accordance with requirements. The applicant developed, maintained and implemented an adequate QA program at the MFFF in accordance with their Construction Authorization No. CAMOX-001 and approved MPQAP, Revision (Rev.) 8. No findings of significance were identified (Section 5).

Quality Assurance: Design and Documentation Control (Pre-licensing and Construction) (IP 88107)

Design control activities and procedures were adequate and properly implemented. A representative sample of engineering change requests (ECRs) and condition reports (CRs) related to PSSC-036 were reviewed (PSSC-036) (Section 6.a).

Quality Assurance: Control of Materials, Equipment, and Services (Pre-licensing and Construction) (IP 88108)

The applicant maintained adequate control of materials, equipment and services related to the QL-1 conventional, annular and slab tanks; piping for the MFFF and the first two (2) glove boxes received at the facility. The applicant maintained and implemented proper handling, storage and control of QL-1 equipment and material in its possession and installed at the MFFF. Activities reviewed by the inspectors for the acceptance and control of purchased items and services determined that applicable requirements were met. Control of materials, equipment and services were adequately performed in accordance with procedures and the MPQAP. No findings of significance were identified (PSSC-007, PSSC-009, PSSC-010 (Double-walled pipe), PSSC-023 (Fluid Transport Systems) and PSSC-024 (Glovebox)) (Section 7).

Quality Assurance: Inspection, Test Control & Control of Measuring Equipment (Pre-licensing and Construction) (IP 88109)

The inspectors determined that applicant activities associated with inspection, test control, and control of measuring and test equipment, were performed in accordance with the MPQAP. The inspectors performed document reviews and personnel interviews, and inspected the measuring and test equipment (M&TE) storage facility. The applicant maintained and performed adequate inspections, testing and control of measuring equipment related to the QL-1 equipment and construction activities (PSSC-036) (Section 8).

Quality Assurance: 10 CFR 21 Inspection – Facility Construction (Pre-licensing and Construction) (IP 88111)

The applicant had adequately established procedures and program activities to effectively implement the requirements of 10 CFR Part 21. MOX Services project procedures (PPs) adequately implemented the provisions of the MPQAP for 10 CFR Part 21, with regard to: postings, identifying its applicability in procurement documents, identifying deviations, and reportability requirements. No findings of significance were identified (Section 9).

Quality Assurance: Control of the Electronic Management of Data (Pre-licensing and Construction) (IP 88113)

The review of provisions for control and protection of QA records maintained in electronic format determined that program procedures and associated activities met applicable requirements. The inspectors verified that the applicant's control of managing electronic data and associated activities were performed in accordance with the MPQAP. No findings of significance were identified (Section 10).

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

The applicant had established a program and procedures that adequately implemented the corrective action program in accordance with the applicant's MPQAP. Further review of the column evaluations is necessary (Section 11.a).

The licensee properly implemented their Quality Assurance Program with respect to conducting root cause assessments of previously identified issues associated with concrete construction activities. Based on review of the root causes identified in RCA-09-004, Revision (Rev.) 2, inspectors requested documentation establishing the acceptability of the as-built configuration of applicable structures at the MFFF (Section 11.b).

REPORT DETAILS

1. Summary of Facility Status

During the period, the applicant continued construction activities of principle structures systems, and components (PSSCs). Construction activities continued related to Release 2 and 3A activities which included multiple inside and outside walls of the Manufacturing Building (BMP), Aqueous Polishing Building (BAP), and the Receiving Building (BSR). The Mixed Oxide Fuel Fabrication Facility (MFFF) project continued installation of Quality Level (QL) QL-1 tanks during this inspection period. Approximately 23 tanks have been installed to date. Fifteen tanks are presently stored in the Process Assembly Facility. The applicant has also started application of coatings on the walls and ceilings of the BAP lower level rooms and hallways. 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) and Piping Systems 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-007 (Chemical Safety Controls), PSSC-009 (Criticality Control), PSSC-036 (MOX Fuel Fabrication Building Structure (including vent stack)), and PSSC-053 (Waste Transfer Line) as described in Table 5.6-1 of the MFFF Construction Authorization Request (CAR):

- (a) Installation of structural reinforcing steel in the BMP, the 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 floors 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;
- (j) Lifting and installation of QL-1 tanks.
- (k) Installation of coatings in the BAP;
- (l) Assembly of first two glove boxes and associated equipment;
- (m) Installation of waste transfer lines from BAP to waste process facility;

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) programmatic 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 Rev. 0 (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, batch plant 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.

The inspectors routinely reviewed various corrective action documents. The review included non-conformance reports (NCRs), condition reports (CRs), root causes and supplier deficiency reports (SDRs); and reviewed the closure of selected NCRs and CRs. The inspectors concluded that the applicant was appropriately identifying 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.

(2) Conclusions

Construction activities related to PSSC-007, PSSC-009, PSSC-036, and PSSC-053 as described in Table 5.6-1 of the MFFF CAR were adequately 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. No items of safety significance were identified.

3. Geotechnical/Foundation Activities (IP 88131)

a. 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 waste transfer lines (PSSC-053) from the BAP to the Waste Processing Building, fire system piping, electrical conduits and precast distribution boxes, electrical vaults, piping vaults and areas adjacent to MFFF 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.

b. Conclusions

Geotechnical backfill activities were adequately performed in accordance with procedures and specifications. QA records associated with these activities were properly maintained in accordance with project procedures. No items of safety significance were identified.

4. Structural Concrete Activities (IP 88132)

a. Resident Inspector Review of Concrete Placement Activities (PSSC-036)

(1) 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 MOX Fuel Fabrication Building Structure (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 selected placements, the inspectors randomly checked for proper placement of reinforcing steel, including proper lap splices, supports, and bar spacing and alignment. The inspectors randomly checked for proper embed plate placement by observing ongoing surveys, and verified embed plate support structures were properly restrained; 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 quality control (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, the 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 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. The inspectors noted that the storage containers were properly heated for cold weather storage. 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:

October 6, 2009, BAP Panel 133, 6 cubic yards
 October 6, 2009, BAP Panel 137, 7 cubic yards
 October 7, 2009, BMP W-124A.9, BMP Interior Wall, 20 cubic yards
 October 7, 2009, BAP Panel 110, 7 cubic yards
 October 7, 2009, BAP Panel 138, 6 cubic yards
 October 9, 2009, BMP W-116/118/122. Interior Walls, 92 cubic yards
 October 9, 2009, BMP F-209, BMP Elevated Floor, 40 cubic yards
 October 9, 2009, BMP W-119B.2, BMP Interior Wall, 64 cubic yards
 October 9, 2009, BMP W 119B.3, BMP Interior Wall, 24 cubic yards
 October 13, 2009, BAP W-101.3/102.2, BAP Interior Wall, 65 cubic yards
 October 13, 2009, BMP W-123A.2, BMP Interior Wall, 251 cubic yards
 October 20, 2009, BMP W-118.6, BMP Interior Wall, 55 cubic yards
 October 20, 2009, BSR W-103.6, BSR Interior Wall, 87 cubic yards
 October 23, 2009, BMP W-124.7, BMP Interior Wall, 132 cubic yards
 October 28, 2009, BAP F-107, BAP Intermediate Floor, 67 cubic yards
 October 29, 2009, BAP W-101A/103.2., BAP Interior Walls, 165 cubic yards
 October 29, 2009, BSR W-109.4, BSR Interior Wall, 53 cubic yards
 October 30, 2009, BSR W-109.1, BSR Interior Wall, 132 cubic yards
 October 30, 2009, BSR W-110.1, BSR Interior wall, 117 cubic yards
 November 2, 2009, BSR F-201, BSR Elevated Floor, 236 cubic yards
 November 4, 2009, BMP F-206, BMP Elevated Floor, 236 cubic yards
 November 4, 2009, BSR W 109.2/109.3, BSR interior wall, 93 cubic yards
 November 6, 2009, BMP W-119B.4, BMP interior wall, 81 cubic yards
 November 6, 2009, BMP W-127A, BMP interior wall, 20 cubic yards
 November 11, 2009, BSR W-110.2, BSR interior wall, 53 cubic yards
 November 13, 2009, BSR W-105.1, BSR interior wall, 37 cubic yards
 November 17, 2009, BAP Panel 151.3, 8 cubic yards
 November 17, 2009, BSR W-109, BSR interior wall, 3 cubic yards
 November 18, 2009, BSR W-103.7, BSR interior wall, 23 cubic yards
 November 19, 2009, BMP W-127.2, BMP interior wall, 205 cubic yards
 November 20, 2009, BAP panel 151.3, 8 cubic yards
 November 20, 2009, BAP W-110.2/111.1, BAP interior wall, 141 cubic yards
 November 20, 2009, BMP W-122, BMP interior wall, 30 cubic yards
 November 23, 2009, BMP W-212, BMP Exterior wall, 185 cubic yards

November 24, 2009, BMP F-205/209, BMP elevated floor, 320 cubic yards
 November 30, 2009, BAP Panel 141.2, 14 cubic yards
 December 1, 2009, BMP W-207, BMP exterior wall, 126.5 cubic yards
 December 3, 2009, BMP W-122 column A.4.1, BMP Column, 9 cubic yards
 December 3, 2009, BAP W-111.2/112.1, BAP interior walls, 98 cubic yards
 December 3, 2009, BAP Panel 110.2, 8 cubic yards
 December 9, 2009, BMP W-214.2, BMP exterior wall, 112 cubic yards
 December 10, 2009, BMP W-206, BMP exterior wall, 150 cubic yards
 December 15, 2009, BMP W-127.3, BMP interior wall, 143 cubic yards
 December 15, 2009, BSR W-110.3, BSR interior wall, 116 cubic yards
 December 16, 2009, BMP W-123A.3.2, BMP interior wall, 43 cubic yards
 December 19, 2009, BMP W-214.2, BMP exterior wall, 200 cubic yards
 December 22, 2009, BSR W-201, BSR exterior wall, 273 cubic yards
 December 23, 2009, BMP W-209A, BMP exterior wall, 107 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 (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.

(2) Conclusions

The inspectors concluded that rebar and embedded plates were properly installed; cleanliness was adequate, concrete testing activities were adequate and concrete placement activities were appropriate (PSSC-036). No items of safety significance were identified.

b. Concrete Testing (PSSC-036)

(1) Scope and Observations

During this inspection period, the inspectors 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 cylinder storage containers were observed to be properly heated for cold weather conditions. 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 MFFF met the design strength requirements.

(2). 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). The inspectors noted that the temporary storage boxes were properly heated for the cold weather conditions. Testing to date indicates that the concrete placed at the MFFF met design strength requirements (PSSC-036). No items of safety significance were identified.

c. Region Based Inspections of Concrete Placement Activities

(1) Scope and Observations

This portion of the inspection focused on the structural concrete activities associated with safety related construction of PSSC-036, the MFFBS. The intent of the inspection was to determine, by direct observation and independent evaluation, whether work, testing, and inspection performance related to the QL-1 structural concrete construction activities were accomplished in accordance with design specifications, drawings, procedures, and regulatory requirements. The inspection focused on reinforcing steel installation, concrete pre-placement preparation, materials testing, and placement procedures.

The inspectors observed a receipt inspection of QL-1 embed plates performed by a Quality Control (QC) Inspector. This inspection included a review of an embed plates' receipt documentation from delivery to acceptance, and verification of critical characteristics of embed plates. MOX Services procedure PP3-28, Quality Control Receiving Inspection, Rev. 2 was reviewed by the inspectors for adequacy. No significant issues were identified.

The inspectors observed concrete pre-placement and placement activities for BSR W103 A.6 and BMP W118.6 walls on October 19 and October 20, 2009, respectively. Work Packages 09-10888-C-1935-BSR-W103-C and 09-10888-C-1935-BMP-W116B/W118B-C associated with these concrete placements were reviewed and found to be adequate. Records within the sampled work packages were being properly maintained, reviewed, and approved. Training records of QC inspectors assigned to these concrete pours were reviewed and found to be complete and current. The field engineer and QC inspection checklists were signed and maintained within the work packages. Prior to each of these concrete placements, the inspectors checked the as-built reinforcing steel installation using MOX Services field and design drawings. Reinforcing steel was properly installed in the areas verified by the inspectors. Exceptions to design were documented by the applicant within the engineering change request (ECR) program and copies maintained within the work packages. MOX Services Construction Specifications DCS01-BKA-DS-SPE-B-09328-3, Section 03201, Concrete Reinforcement for QL 1a (IROFS), 2, 3, and 4, Rev. 3, and DSC01-BKA-DS-SPE-B-09330-4, Section 03301, Placing Concrete and Reinforcing Steel for QL 1, 2, 3, and 4, Rev. 4 were reviewed for adequacy. MOX Services procedure PP11-12, Placement of Concrete, Embedded Structural Items and Accessories, Rev. 0, was reviewed and found to be adequate. No items of significance were identified in this area.

During the concrete placements, the 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 addressed by the applicant. The inspectors observed that test specimens (concrete cylinders) were collected at the prescribed frequency and noted that the slump and air content met the acceptance criteria. Concrete test cylinders were collected and temporarily stored per procedure prior to transport to the off-site materials laboratory (QORE) for curing and testing.

The inspectors observed activities at the off-site independent concrete testing laboratory, QORE. QORE is the contracted independent testing lab that performs concrete sampling and strength testing for MOX Services. The inspectors observed two concrete cylinder compressive strength tests. The concrete cylinder compressive strength tests were in accordance with the American Society for Testing and Materials (ASTM) C 39 Standard. The inspectors reviewed QORE training records, testing lab certifications, and equipment calibration logs. No items of significance were identified in this area.

The inspectors observed activities at the Savannah River Site independent testing laboratory, Washington Savannah River Company (WSRC). WSRC laboratory performs multiple services for MOX Services, including testing of QL-1 mechanical rebar splices. The inspectors observed two tension tests on rebar mechanical splices. The rebar splices were tested in accordance with the ASTM A370 Standard. The inspectors reviewed WSRC testing lab certifications and equipment calibration logs, as well as technician training records. MOX Services procedure PP3-12, Supplier Evaluation, Rev. 9 was reviewed and found to be adequate. The inspectors reviewed surveillance, evaluation, and audit reports previously performed at the WSRC testing laboratory.

(2) Conclusion

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). No items of safety significance were identified.

5. **Quality Assurance: Program Development and Implementation (Pre-licensing and Construction) (IP 88106)**

a. Scope and Observations

This portion of the inspection focused on the applicant's QA activities and processes established to assure that PSSCs and items relied on for safety (IROFS) have been characterized and classified in accordance with NRC-approved QA program requirements. This inspection also focused on the applicant's policies and processes established to assure that the necessary indoctrination, training, and qualification of personnel performing or managing quality affecting activities are identified, provided, and suitable proficiency is achieved and maintained.

(1) Procedures

The inspectors conducted this review by independent evaluation of project procedures (PPs), CRs, NCRs, ECRs and interviews of responsible personnel were conducted to verify whether adequate controls and measures were established. MOX Services procedures PP 1-1 Rev. 2, Quality Assurance Grading, and PP 9-1 Rev. 10, SSC Quality Levels and Marking Design Documents, established requirements regarding proper documentation and control of PSSCs and IROFS were properly documented and controlled. Interviews of Licensing and Nuclear Safety personnel were conducted as well.

Management Assessments were reviewed per PP 3-11 Rev. 7, Assessments, to evaluate the applicant's management assessments and audits of QA program elements. This was done to evaluate the effectiveness and implementation of QA program elements and management measures. The inspectors reviewed a total of eight (8) Assessment reports for adequacy.

PP2-1 Rev. 13, Project Organization Role and Responsibilities, was reviewed to verify that the organizational structure and functional responsibilities were in accordance with the approved QA Plan.

QA indoctrination, training, and qualification of personnel were reviewed per PP1-3, Rev. 11 Program Training, and PP3-8, Rev. 6, Qualification and Certification of Auditors. The inspectors reviewed a sampling of the training records for QA Auditors, QA Lead Auditors and NDE personnel to verify compliance with these procedures. In addition, Shaw AREVA MOX Services QA Audit Report, WGI-07-VE41, was reviewed to verify the qualification process and records of NDE personnel was compliant.

The inspectors reviewed changes made to the applicant's corrective action program (CAP) implementing procedures since the last Problem Identification and Resolution (PI&R) inspection to determine if they were appropriately approved and implemented. Specifically, the inspectors reviewed a recent revision made to CA-3-1000-01, Performance Improvement Program and Nonconformance Reports.

(2) Identification and Classification of Conditions Adverse to Quality

The inspectors conducted reviews of several CRs to determine if measures were established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances and significant conditions adverse to quality were promptly identified. The inspectors also conducted reviews to verify that any conditions adverse to quality were appropriately classified according to their significance and that corrective actions were taken accordingly.

(3) Documentation and Reporting of Conditions Adverse to Quality

The inspectors conducted reviews of selected CRs to determine if the applicant's processes and instructions for reporting conditions adverse to quality were adequate and to determine if they were being reported to the appropriate levels of management responsible for the conditions, and to the organization responsible for tracking them.

The inspectors also conducted reviews to determine if the results of reviews conducted on audit reports, internal surveillance reports, corrective action reports, or management assessments were reported to management.

The inspectors determined that overall the applicant adequately documented, reported, evaluated, and corrected conditions adverse to quality in the following areas: audits, procurement, handling, storage, receipt inspection, steel reinforcement installations, and concrete placements.

b. Conclusion

QA program development and implementation procedures and activities were found to be adequate and properly implemented. QA records associated with these activities were properly maintained in accordance with project procedure. No items of safety significance were identified in the areas of PSSCs and IROFS documentation and control.

6. Design and Documentation Control (IP 88107)

a. Review of MFFF Column Design Changes

(1) Scope and Observations

From October 19-22, 2009, the inspectors reviewed MOX Services design and document controls for proper implementation in accordance with MPQAP, Rev. 8. The inspectors reviewed a sample of controlled design documents including ECRs, NCRs, and CRs in civil engineering related areas. The sample of documents reviewed was selected from those associated with PSSC-036 construction and design activities.

The inspectors reviewed design specifications and procedures to verify proper implementation of requirements necessary to control design activities for the MFFBS. The inspectors reviewed MOX Services procedures, PP9-21, Engineering Change Request, Rev. 5; PP9-3, Design Control, Rev. 16; PP3-6, Corrective Action Process, Rev. 10; PP9-6, Calculations, Rev. 8 and PP3-5, Control of Nonconforming Items, Rev. 4. Through discussions with MOX Services staff and review of quality assurance (QA) documentation, the inspectors verified the implementation of procedures related to design control.

From review of the selected design control documents, the inspectors identified several columns within the MFFBS that were constructed differently from the original design. Some of the columns were accepted "use as is" and some of the columns were modified through the engineering change process. At the time of the inspection, it was not clear that the applicant had completed all of the necessary evaluations related to the load bearing capability of the modified columns. Further review of these evaluations is necessary. Therefore this issue is being identified as Unresolved Item (URI) 70-3098/2009-004-001: Review of Applicant's Evaluation of Column Design Changes.

(2) Conclusion

Design control and documentation activities were performed in accordance with project procedures and specifications. Further review of the column evaluations is necessary

and is being tracked as URI 70-3098/2009-004-001, Review of Applicant's Evaluation of Column Design Changes. No items of safety significance were identified.

b. Review of MOX Design Change Process

(1) Scope and Observations

On December 9, 2009, the inspectors conducted a follow up review of an April 2009 issue pertaining to the implementation of MPQAP requirements for control of design changes. The condition was identified in URI 70-3098/2009-02-03, Review of Design Change Process. The inspectors evaluated five additional design change packages that had been issued for final design. The inspectors noted that two of the packages contained issues of minor significance associated with the provisions of MPQAP 3.2.2.G and 3.2.5.A, specifically, pertaining to details of purpose, design inputs, design assumptions, and justifications for changes. The inspectors did not identify any design output errors in either of the packages. The Applicant initiated Condition Report CR-09-477 to evaluate and correct the conditions of minor significance identified by the inspectors.

Based upon the lack of identified errors in the two design change products, the inspectors determined that URI 70-3098/2009-02-03, Review of Applicant's Design Change Process, is closed in this inspection report.

(2) Conclusions

The review of design change controls identified two issues of minor significance associated with the provisions of MPQAP 3.2.2.G and 3.2.5.A. Subsequently, URI 70-3098/2009-02-03 was closed in this inspection report. No items of safety significance were identified.

7. **Quality Assurance: Control of Materials, Equipment, and Services (Pre-licensing and Construction) (IP 88108)**

a. Scope and Observations

The inspectors conducted a review to verify procurement controls were established to assure purchased materials and services conformed to technical and quality requirements, and that measures were established to prevent inadvertent use of nonconforming items. Program procedures were reviewed, records of inspection and audit activities were examined, procurement records were reviewed, nonconformance reports were examined, and personnel responsible for specification and verification of program requirements were interviewed.

The inspectors found purchase order packages outlined the technical and quality requirements for purchases of materials and services. Records of inspection plans, audit reports, and survey reports indicated that supplier activities and programs conformed to applicable requirements. The inspectors found that restrictions were imposed to address supplier nonconformances, and nonconformance reports were issued to control the dispositions of nonconforming items received at the applicant's facility. The results of commercial grade item evaluations were adequately documented

and records of commercial grade dedication activities demonstrated that dedication activities identified and verified critical characteristics for acceptance of items.

b. Conclusions

The review of controls for purchased materials and services identified that controls were established in accordance with applicable requirements. No items of safety significance were identified.

8. **Quality Assurance: Inspection, Test Control & Control of Measuring Equipment (Pre-licensing and Construction) (IP 88109)**

a. Scope and Observations

The inspectors reviewed work package WP 09-108880-B2272-RWP-H-M-2, Hydrostatic Testing of Priority 2 Waste Transfer Lines. The review focused on test control and QC inspections of the tests. The QC personnel associated with these tests were interviewed to assess their knowledge of and compliance with procedures and specifications. Inspections and tests were correctly planned and documented by appropriately qualified individuals.

Activities were inspected for conformance to MOX procedure PP3-15, Rev. 2, Control of Measuring and Test Equipment (M&TE). M&TE was stored correctly and segregated based upon operational status. Equipment documentation and logs were accurate and up to date. Issued equipment was easily retrievable and accompanying documentation accurately reflected equipment usage history in accordance with the applicable procedure.

The inspectors reviewed MOX procedures PP11-46, Rev.0, Hydrostatic/Pneumatic Test Procedure; PP11-35, Rev. 3, Construction Inspection and Testing; and PP3-30, Rev. 1, Quality Control Inspection Plans. M&TE activities were inspected for their conformance to MOX procedure PP3-15, Rev.2, Control of Measuring and Test Equipment.

b. Conclusions

Inspection and test activities were properly documented and controlled in accordance with applicable procedures and acceptance criteria. Measuring and test equipment was properly stored, documented, and tracked. No items of safety significance were identified.

9. **Quality Assurance: 10 CFR 21 Inspection – Facility Construction (Pre-licensing and Construction) (IP 88111)**

a. Scope and Observations

The applicant had adequately established procedures and program activities to effectively implement the requirements of 10 CFR Part 21. Applicant procedures addressing 10 CFR Part 21 posting requirements, procurement documents, evaluation of deviations, notifications, and maintenance of records were reviewed to verify compliance.

The inspectors performed walk-downs of the several building on site including the new administration building, receipt inspection warehouse, and purchasing offices. MOX Services had adequately implemented the postings requirement of 10 CFR 21.6.

Procurement documents were reviewed and found to be in compliance with the requirements of 10CFR 21.31 regarding specifying the applicability of Part 21.

CRs addressing issues at MFFF were reviewed and found to have effectively implemented the requirements of 10 CFR 21.21(a).

The inspectors verified the implementation of the requirements of 10CFR 21.51, regarding maintenance of records, by determining that MOX Services had appropriate controls to assure proper maintenance of required records.

b. Conclusions

The applicant's procedures, activities, documentation and CAP satisfied 10 CFR Part 21 requirements. No items of safety significance were identified.

10. **Quality Assurance: Control of the Electronic Management of Data (Pre-licensing and Construction) (IP 88113)**

a. Scope and Observations

The inspectors conducted a review to verify QA records maintained in electronic formats were controlled and protected against loss, alteration, or change and those records were available to provide evidence of the implementation of quality program requirements. Program procedures were reviewed; personnel responsible for implementing program requirements were interviewed; and examples of records in storage and transition to storage were accessed and examined.

The inspectors found procedure PP 7-9, Rev. 3, Electronic Data Management System, provided very general guidance for management of data created and maintained in electronic formats. The procedure addressed applicable requirements contained in MPQAP Section 17. Inspectors conducted interviews and direct observations of storage repositories and confirmed records were authenticated, verified to meet quality standards, retrievable, legible, protected against loss, and protected against degradation from fire, moisture, and electromagnetic fields.

b. Conclusions

The review of the management of QA records maintained in electronic formats were adequately controlled and protected to meet applicable program requirements. No items of safety significance were identified.

11. **Problem identification. Resolution and Corrective Action (IP 88110)**

a. Routine Review of Corrective Action Program Documents
(1) Scope and Observations

NCRs, CRs, and ECRs generated by the applicant were reviewed to verify the proper documentation and resolutions of problems identified onsite. The inspectors noted that these items were adequately documented in the Corrective Action Program. 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.

(2) Conclusions

The applicant had established a program and procedures that adequately implemented the corrective action program in accordance with the applicant's MPQAP. No items of safety significance were identified.

b. Regional Review of Root Cause Assessments

(1) Scope and Observations

The inspectors reviewed two root cause assessments performed by the applicant in response to previously identified issues associated with structural concrete and reinforcement installed in the MFFBS (PSSC-036). The inspectors reviewed RCA-09-004, Rev. 2; RCA-09-001, Rev. 1; and various supporting documents. RCA-09-004 was performed in response to CR 2009-0168 and specifically discussed concrete defects incurred during placement; clear cover issues that resulted in the impacting of the design "d" (effective depth) dimension; and discrepancies between design calculations, design drawings and vendor drawings. RCA-09-001 was performed in response to CR 2009-0007 and specifically discussed the issue of voiding in concrete. The inspectors discussed the review of the root cause assessments with various site personnel, including those that conducted the root cause assessments and representatives from the applicant's civil engineering group.

Based on the root causes identified in RCA-09-004, Rev. 2, the inspectors requested the applicant provide documentation establishing the acceptability of the as-built configuration of the applicable structures at the MFFF, taking into account the various non-conformances identified from a bounding perspective. The applicant informed the inspectors that MOX Services had evaluated the acceptability of the as-built configuration with documentation provided in several condition reports and associated design documents. The inspectors were given several of the aforementioned documents and were informed of additional documents to follow. The inspectors opened inspector follow-up item (IFI) 70-3098/2009-004-002: Review and Evaluate Responses from RCA-09-04, to review and evaluate the applicant's response and documentation related to RCA 09-04.

(2) Conclusion

IFI 70-3098/2009-004-002 was opened to further evaluate the applicant's response to questions regarding the as-built configuration of the applicable structures at the MFFF based on review of RCA-09-004, Rev. 2.

12. Follow-up of Previously Identified Items

The following previously documented violations (VIOs) were reviewed for completion of corrective actions:

a. (Closed) VIO 70-3098/2008-002-001: Failure to Identify Conditions Adverse to Quality and Failure to Implement the MPQAP and Requirements(1) Scope and Observations

On and before June 19, 2008, the applicant failed to implement certain MPQAP and requirements, as enumerated in the following examples:

MPQAP, Rev. 5, Section 16, Corrective Action, requires in part, that conditions adverse to quality be promptly identified.

- a. On June 3, 2008, the applicant failed to identify a condition adverse to quality in that during the BMP-F111 basemat concrete placement, the previously placed concrete had lost its plasticity prior to making the next concrete placement, thus creating a cold joint.
- b. On June 19, 2008, the applicant failed to identify during BMP-F112 basemat construction joint inspection activities that foreign material had been left in the construction joint and that there was voiding behind the stay forms.

On December 7-10, 2009, NRC inspectors reviewed NCR CE-08-0322 which documented this violation. After reviewing this document the inspectors determined that adequate corrective actions had been taken by the applicant to close this violation.

For the examples (stated above), the prescribed corrective action taken, in NCR CE-08-0322, was to perform an evaluation of a horizontal cold joint observed in concrete placement BMP-F111 basement pour. The inspectors found NCR CE-08-0322 to be completed and closed on June 11, 2008. Based on the review of this documentation the inspectors determined that the corrective actions prescribed by CR 20080234 adequately corrected the condition adverse to quality documented in VIO 70-3098/2008-002-001. Based on these reviews, this violation is closed.

(2) Conclusion

VIO 70-3098/2008-002-001: Failure to Identify Conditions Adverse to Quality and Failure to Implement the MPQAP and Requirements, is closed based on the documentation reviewed and interviews held with MOX Services' personnel.

b. (Closed) VIO 70-3098/2009-007-001: Several examples of MOX Services Failure to Verify Supplier and Subcontractor Performance

(1) Scope and Observations

The inspectors reviewed CRs 20090096, 20090101, 20090115, 20090116, 20090135, 20090147, 20090149 and 20090202; and ECRs 002143 and 002242, which documented this violation. The NRC inspectors also reviewed Supplier Deficiency Report (SDR) BFS-09-VS159-01, which was initiated on June 12, 2009, to document incorrect scoring associated with several NDE personnel records.

The prescribed corrective actions taken in the following CRs were:

20090096 – NCRs submitted by the vendor did not contain a reason for the use ‘as-is’ disposition.

20090101 – Submittal from vendor received an insufficient review resulting in MOX Services accepting an inadequate document.

20090115 – Weld repair requirements in specification DCS01-KKJ-DS-SPE-L-16265 are not clear.

20090116 – Specification DCS01-KKJ-DS-SPE-L-16265 requires weld repair procedures to be submitted to MOX Services for approval, but was not.

20090135 – MOX procedure PP10-14, Rev. 3 requires that the Subcontract Technical Representative (STR) indicate which submittals require review by other MOX Services’ departments, however, vendor submittals were not completed in accordance with the procedure.

20090147 – Procurement specifications require vendor submittals for review and approval and/or project records, however, some required submittals could not be located.

20090149 – Several vendor submittals contained deficiencies. Similar conditions were noted in other CRs.

20090202 – 12 vendor supplied tanks did not have the required Penetrant Testing (PT) exams completed on repaired areas.

NRC inspectors also reviewed ECRs 002143 and 002242 for corrective actions relating to NRC issued VIO 70-3098/2009-007-001. ECR 002143 provides multiple clarifications and modifications to the inspection and test plan(s) in specification DCS01-KKJ-DS-SPE-L-16265, Rev. 3. ECR 002143 provides multiple clarifications to specification DCS01-KKJ-DS-SPE-L-16265, Rev. 3 to the weld repair requirements. The inspectors determined that the corrective actions prescribed in CRs 20090096, 20090101, 20090115, 20090116, 20090135, 20090147, 20090149 and 20090202; and ECRs 002143 and 002242, adequately corrected the condition adverse to quality documented in VIO 70-3098/2009-007-001. Based on this review the violation is closed.

(2) Conclusion

VIO 70-3098/2009-007-001: Several examples of MOX Services Failure to Verify Supplier and Subcontractor Performance, is closed based on the documentation reviewed and interviews held with MOX Services’ personnel.

c. Assessment of Safety Conscious Work Environment

(1) Scope and Observations

The applicant's Safety Conscious Work Environment (SCWE) was evaluated by the inspectors through a review of training in this area, a review of the applicant's Employee Concerns Program (ECP) procedure, implementation of the ECP and through random interviews of applicant staff to gain their perceptions and experience with and knowledge of the applicant's ECP. The inspectors interviewed 12 site workers, across various work groups and various levels of responsibility. The inspectors conducted the interviews using the guidance provided in Appendix 1 of NRC Inspection Procedure 71152, Suggested Questions for Use in Discussions with Applicant Individuals Concerning PI&R Issues.

The inspectors noted that every person coming onto the MFFF site was provided training on SCWE, the applicant's CAP, and the applicant's ECP process as part of the General Employee Training (GET). The inspectors determined that the applicant's SCWE training appeared to be comprehensive based on a review of the slides used for the training.

The ECP manager was interviewed, and all the open and closed cases for the past 12 months were reviewed.

(2) Conclusion

Most of the applicant's staff and contractors interviewed were knowledgeable of the applicant's ECP, understood how to use it, and indicated that they felt comfortable identifying issues and discussing concerns with supervision without fear of reprisal. The participants indicated that employees were encouraged to identify safety concerns, management visibly supported SCWE, methods to report concerns were readily accessible, and no pushback or retaliation had been observed as a result of employee concerns.

The inspectors found that most personnel interviewed were aware of the different methods available through which they could express safety concerns, including the CAP, informing their supervision, contacting the ECP coordinator, or contacting the NRC.

13. Exit Interviews

The inspection scope and results were summarized throughout this reporting period by the senior resident inspector on January 6, 2010 and region based inspectors on October 22, 2009 and December 10, 2009. A re-exit was conducted on January 25, 2010 to discuss (URI) 70-3098/2009-004-001. 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

C. Allen, Engineering Manager
F. Carter, Civil - Mechanical Engineering Manager
R. Daniels, Lead Chemical and Mechanical Engineer Manager
W. Elliott, Engineering Vice- President
D. Gwyn, Regulatory Affairs Manager
R. Justice, Quality Assurance Programs Manager
H. Lawrence, Construction Manager
G. Shell, QA Manager
D. Stinson, President and Chief Operating Officer
R. Whitley, QC Manager

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

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

IP 88106 Quality Assurance: Program Development and Implementation (Pre-Licensing and Construction)
IP 88107 Quality Assurance: Design and Documentation Control [Pre-licensing and Construction]
IP 88108 Quality Assurance: Control of Materials, Equipment and Services (Pre-Licensing and Construction)
IP 88109 Quality Assurance: Inspection, Test Control & Control of Measuring Equipment (Pre-Licensing and Construction)
IP 88110 Quality Assurance: Problem Identification, Resolution and Corrective
IP 88111 Quality Assurance: 10 CFR 21 Inspection - Facility Construction (Pre-Licensing and Construction)
IP 88113 Quality Assurance: Control of the Electronic Management of Data (Pre-Licensing and Construction)
IP 88130 Resident Inspection Program for On-Site Construction Activities
IP 88131 Geotechnical/Foundation Activities
IP 88132 Structural Concrete Activities
IP 88134 Piping Systems Relied on for Safety

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

<u>Item Number</u>	<u>Status</u>	<u>Description</u>
70-3098/2008-02-01	Closed	VIO: Failure to Identify Conditions Adverse to Quality (Section 12.a)
70-3098/2009-07-01	Closed	VIO: Several Examples of MOX Services Failure to Verify Supplier and Subcontractor Performance (Section 12.b)

70-3098/2009-02-03	Closed	URI: Review of Applicant's Design Change Process (Section 6.b)
70-3098/2009-04-01	Open	URI: Further Review the Certificate Holder's Acceptance and Evaluation of Building Columns. (Section 6.a)
70-3098/2009-04-02	Open	IFI: Review and Evaluate Responses from RCA-09-04 (Section 11.b)

4. **LIST OF ACRONYMS USED**

ADAMS	Agency-Wide Document Access and Management System
ASTM	American Society of Testing and Materials
BAP	Aqueous Polishing Building
BMF	Fuel Manufacturing Building
BMP	Manufacturing Building
BPP	Baker Concrete Construction project procedure
BSR	Receiving Building
CAP	Corrective Action Program
CAR	Construction Authorization Request
CFR	Code of Federal Regulations
CLSM	Controlled Low Strength Material
CR	Condition Report
ECP	Employee Concerns Program
ECR	Engineering Change Request
GET	General Employee Training
ICN	Interim Change Notice
IFI	Inspector Follow-up Item
IP	Inspection Procedure
IROFS	Item Relied on for Safety
MFFBS	MOX Fuel Fabrication Building Structure
MFFF	MOX Fuel Fabrication Facility
MOX	Mixed Oxide
MPQAP	MOX Project Quality Assurance Plan
M&TE	Measuring and Test Equipment
NCR	Nonconformance Report
NDE	Non-Destructive Examination
NMSS	Nuclear Materials Safety and Safeguards
PI&R	Problem Identification and Resolution
PP	Project Procedure
PSSC	Principle Structures, Systems, and Components
PT	Liquid/Dye Penetrant Testing
QA	Quality Assurance
QC	Quality Control
QL	Quality Level
QORE	Construction Materials Testing Laboratory
Rebar	Reinforcing bar
Rev.	Revision
SCWE	Safety Conscious Work Environment
SDR	Supplier Deficiency Report

SR	Surveillance Report
URI	Unresolved Item
VIO	Violation
WP	Work Package

5. **LIST OF PSSCs REVIEWED**

PSSC-007	Chemical Safety Controls
PSSC-009	Criticality Control
PSSC-010	Double-Walled Pipe
PSSC-023	Fluid Transport Systems
PSSC-024	Glovebox
PSSC-036	MOX Fuel Fabrication Building Structure (including vent stack)
PSSC-053	Waste Transfer Line

6. **LIST OF DOCUMENTS REVIEWED**

Shaw/Areva MOX Services' Procedures:

PP 1-1, Quality Assurance Grading, Rev. 2
 PP 3-1, Employee Concerns Program, Rev. 6
 PP 3-4, Records management, Rev. 6
 PP 3-6, Corrective Action Process, Rev. 10
 PP 3-5, Control of Nonconforming Items, Rev. 5
 PP 3-11, Assessments, Rev. 7
 PP 3-12, Supplier Evaluation, Rev. 9
 PP 3-13, Supplier Verification, Rev. 6
 PP 3-15, Control of Measuring and Test Equipment, Rev. 2
 PP 3-26, Surveillance Activities, Rev. 1
 PP 3-28, Quality Control Receiving Inspection, Rev. 2
 PP 3-29, Inspection at Supplier Facilities, Rev. 0
 PP 3-30, Quality Control Inspection Plans, Rev. 1
 PP 4-36, Inspections of Oil Storage Areas and Observations of Petroleum Handling Operations, Rev. 0
 PP 7-4, Document Control, Rev. 6
 PP 7-9, Electronic Document Management System, Rev. 3
 PP 7-14, Subcontractor Management, Rev. 2
 PP 9-1, SSC Quality Levels and Marking Design Documents, Rev. 10
 PP 9-3, Design Control, Rev. 16
 PP 9-6, Calculations, Rev. 9
 PP 9-18, Commercial Grade Item Evaluations, Rev. 3
 PP 9-21, Engineering Change Requests, Rev. 6
 PP 10-00, Integrated Procurement Process and Material Management Overview, Rev. 1
 PP 10-8, Requisitioning Items and Services, Rev. 8
 PP 10-13, Offer/Proposal Evaluation and Award Recommendation, Rev. 8
 PP 10-14, Supplier/Subcontractor Submittal Document Management, Rev. 4
 PP 10-16, Vendor Payment Authorization, Rev. 1
 PP 10-25, Vendor Evaluation, Rev. 0
 PP 11-11, Construction Subcontract Management, Rev. 2
 PP 11-12, Placement of Concrete, Embedded Structural Items and Accessories, Rev.0
 PP 11-24, Shipping and Receiving of Material, Rev. 2

PP 11-25, Control of Issued QL-1 and QL-2 Material, Rev. 0
 PP 11-26, ICN-01, MOX Construction Material Management Storage, Handling, and Control of Material, Rev. 2
 PP11-28, MOX Construction Material Management Reservation, Issue, and Return of Material, Rev. 2
 PP 11-35, Construction Inspection and Acceptance Criteria, Rev. 3
 PP 11-46, Hydrostatic/Pneumatic Test Procedure, Rev. 0
 PP 11-50, General Welding Program Instructions, Rev. 0
 PP 11-51, AWS D1.1 and D1.6 General Welding Procedure, Rev. 0
 PP 11-53, ASME B31.3 General Welding Procedure, Rev. 1
 PP 11-59, Procedure Qualification and Welding Technique Sheets, Rev. 1
 PP 14-3, Storage for Digital Archive Media, Rev. 1
 CA 3-1000-01, Performance Improvement Program and Nonconformance Reports
 BPP 103, Ground Grid System Installation, Rev. 4
 BPP 115, Work Package Planning and Development and Approval

Specifications:

DCS01-KKJ-DS-SPE-L-16265-3, Procurement Specification for Conventional Tanks, dated September 6, 2006
 DSC01-BKA-DS-SPE-B-09328-3, Section 03201 – Concrete Reinforcement for Quality Level 1a (IROFS), 2, 3, and 4, Rev. 3
 DSC01-BKA-DS-SPE-B-09330-4, Section 03301 – Placing Concrete and Reinforcing Steel For Quality Level 1, 2, 3, and 4, Rev. 4
 DCS01-BMF-DS-SPE-B-092100, Specification Section 01415 – ITL Requirements for Construction Contract CP-20 BMF Structural Work, Rev. 0

Condition Reports:

CR 20080233, dated June 11, 2008 - Clarification needed for certification of Electrical QC Inspectors
 CR 20080234, dated June 11, 2008 – Receiving inspection reports were not stored in one-hour fire rated container as required by MPQAP, Section 17
 CR 20080236, dated June 11, 2008 – Specification did not require vendor guide(s) to be submitted for review & approval as required by MPQAP, Sections 5 & 10
 CR 20090074, dated 02/26/09 – Improper EDMS Documentation
 CR 20090096, dated March 16, 2009 – Vendor’s NCRs did not contain a reason for the ‘use as-is’ disposition
 CR 20090101, dated March 18, 2009 – Vendor performed insufficient review resulting in MOX Services accepting inadequate documentation
 CR 20090115, dated March 31, 2009 – Specification is not clear on weld repair requirements with respect to reporting of defects
 CR 20090116, dated March 31, 2009 – Vendor did not submit weld repair procedure to MOX Services for approval as required by the Specification
 CR 20090135, dated April 6, 2009 – STR did an inadequate job of identifying the appropriate reviewers from other departments
 CR 20090147, dated April 21, 2009 – Vendors did not provide submittals for review and approval by MOX Services as required per procurement specifications
 CR 20090149, dated April 21, 2009 – Deficiencies were identified with vendor submittals not meeting NQA_1 requirements
 CR 20090155, dated 04/23/09 – Record Submission to PRC

CR 20090167, dated May 4, 2009 – Verifier of CR was the same individual as the one performing the remedial action
CR 20090202, dated June 2, 2009 – Vendor did weld repairs to multiple tanks without performing the required PT NDE on the repairs
CR 20090206, dated 06/03/09 – Temporary Storage Records
CR 20090466, dated 12/08/09 – FM-200 Inspection Documentation

Additional Condition Reports Reviewed:

CR 2008-0295
CR 2009-0007
CR 2009-0050
CR 2009-0104
CR 2009-0138
CR 2009-0168
CR 2009-0243
CR 2009-0398

Non-Conformance Reports:

NCR CE-08-0322
NCR QC-09-1188
NCR QC-09-1191
NCR QC-09-1192
NCR QC-09-1194
NCR BK-08-0371
NCR BK-09-1011
NCR BK-09-1289
NCR BK-09-1299
NCR BK-09-0828
NCR CE-09-0799
NCR EN-08-0368
NCR EN-09-0734
NCR EN-09-0865
NCR QC-09-1235
NCR QC-09-1301
NCR QC-09-1274

Engineering Change Requests:

ECR 001276
ECR 001485
ECR 002143
ECR 002242
ECR 002755
ECR 004389
ECR 000944
ECR 001057
ECR 001486
ECR 001792
ECR 001833

ECR 002172
ECR 002249
ECR 002281
ECR 002447
ECR 004178
ECR 004302
ECR 003688
ECR 003595
ECR 002708
ECR 003883
ECR 002882
ECR 001804

Shaw/Areva MOX Services, LLC Design Drawings:

DCS01 BMF DS PLF B 03361, Rev. 6
DCS01 BMF DS PLF B 03382, Rev. 5
DCS01 BMF DS PLF B 03374, Rev. 6
DCS01 BMF DS PLF B 03378, Rev. 5
DCS01 BMF DS PLF B 01361, Rev. 3
DCS01 BMF DS PLF B 01387, Rev. 5
DCS01 BMF DS PLF B 01353, Rev. 9
DCS01 BMF DS PLF B 01386, Rev. 5
DCS01 BMF DS PLF B 01399, Rev. 5
DCS01 BMF DS PLF B 01354, Rev. 6
DCS01- KCB-DS-SCH-D-16766, Rev. 2

Condor Rebar Consultants, Inc. Vendor Drawings:

1601 Rev. 2
1602 Rev. 2
1611 Rev. 1
1612 Rev. 1

Energy & Process, Corp. and CMC Rebar Carolinas Vendor Drawings:

BMP WR06
BMP WR07
BMP WR12
BMP WR06

Commercial Grade Item Evaluation Documents:

DCS01-KCB-AG-CGD-M-65856, Rev. 0, Tyco Butterfly Valves
DCS01-NPG-DS-CGD-M-65854, Rev. 0, NPG/H/I Homogenizers
DCS01-ZMJ-DS-CGD-E-65884, Rev. 0, Electrical Panels

Supplier Evaluation Documents:

ATI-09-VE257
BGM-09-VE240

BPF-09-VE276
 DIN-09-VE238
 WSRC-07-VE80
 WSRC-08-VE174
 WSRC-07-VE72

Supplier Deficiency Reports (SDR):

SDR WSRC-07-VE-101-01
 SDR WSRC-07-VE-101-02

Supplier Surveillance Reports (SRs):

SR-WSRC-08-VS03
 SR-WSRC-07-VE101
 SR-WSRC-07-VS80

Receipt Inspection Reports:

QC-RIR-09-7146, Rev. 1, Purchase Order 10888 P-2141/10888-S1415, Job J-2656-9,
 Joseph Oat Corporation
 QC-RIR-09-8034, Rev. 1, Purchase Order 4263, Cherokee Steel Supply
 QC-RIR-09-8275, Rev. 1, Purchase Order P-1623, Release 1, Souriau

Assessment/Audit Reports:

CY09-M-CON-001, Construction Management Assessment, dated 06/17/09
 CY08-M-BM-023, Business Management Assessment, dated 12/02/08
 CY08-M-ENG-022, Engineering Management Assessment, dated 12/03/08
 CY08-M-FS-011, Fuel Services Management Assessment, dated 07/01–23/08
 CY09-A-SDG-006, SDG Activity Assessment Report, dated 05/11/09
 CY09-A-SDG-007, SDG Activity Assessment Report, dated 05/11/09
 CY09-A-SDG-008, SDG Activity Assessment Report, dated 05/11/09
 CY09-A-SDG-009, SDG Activity Assessment Report, dated 05/12/09
 WGI-07-VE41
 WSRC-06-VE26
 WGI-07-VE41

Root Cause Analysis (RCA):

RCA 09-004, Rev. 2
 RCA 09-001, Rev. 1

Purchasing Documents:

10888-B-1572, June 2007, Cables
 10888-B-1964, Nov. 2007, Safety PLCs
 10888-B-3599, Sep. 2009, Glove boxes
 10888-B-27774, Feb. 2009, Glove boxes & Ventilation systems
 10888-P-3962, Aug. 2009, M&TE Cal services
 10888-S-1482, Jan. 2007, Homogenizer

Miscellaneous Documents:

Supplier Deficiency Report (SDR) No. BFS-09-VS159-01, Discrepancies were identified with vendor NDE personnel examination records
DCS01 XGA DS CAL B 01104-1, MFFF Evaluation of Limited Number of Areas Where Concrete Poured with Reinforcement Bars Spaced Closer than the ACI-349-97 Minimum Spacing of 1-inch, Rev. 1
DCS01 XGA DS CAL B 01108-0, MFFF Evaluation of Wall and Elevated Slab Reinforcement Bars Spaced Closer than the ACI-349-97 Section 7.6 Minimum Spacing, Rev. 0
DCS01 XGA DS CAL B 01108-1, MFFF Evaluation of Wall and Elevated Slab Reinforcement Bars Spaced Closer than the ACI-349-97 Section 7.6 Minimum Spacing, Rev. 1
DCS01 AAJ DX PQIX 40012, MFFF Configuration Management Plan, Rev. 1

Work Packages:

WP 09-10888-B2272-RWP-H-M-2
WP 09-10888-C-1935-BSR-W103-C
WP 09-10888-C-1935-BMP-W116B/W118B-C

Other:

DCS01 XGA DS CAL B 01078, BMF Interior, Exterior Walls and Columns Reinforced Concrete Design, Rev.4
DCS01 XGA DS CAL B 01104-0, MFFF Evaluation of Limited Number of Areas Where Concrete Poured with Reinforcement Bars Spaced Closer than the ACI-349-97 Minimum Spacing of 1-inch, Rev. 0