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

July 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 70-3098/2009-002 AND NOTICE OF VIOLATION

Dear Mr. Stinson:

During the period of April 1 through June 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, a violation of NRC requirements was identified regarding the failure to translate electrical design requirements into design documents. The violation was evaluated in accordance with the NRC Enforcement Policy available on the NRC's Web site at www.nrc.gov. The violation is cited in the enclosed Notice of Violation (Notice) and is being cited in the Notice because it was identified by the NRC. The circumstances surrounding the violation 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 by Cynthia Taylor Acting For/

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 70-3098/2009-002 w/attachment

cc w/encls: (See next page)

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 by Cynthia Taylor Acting For/

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 70-3098/2009-002 w/attachment

cc w/encls: (See next page)

☐ PUBLICLY AVAILABLE ■ NON-PUBLICLY AVAILABLE ☐ SENSITIVE ■ NON-SENSITIVE

ADAMS: ☐ Yes ACCESSION NUMBER: ■ SUNSI REVIEW COMPLETE

OFFICE	RII: DCPCPB1	RII: DCP/CPB1	RII: DCI/CIB1	RII: DCI/CIB2	RII: DCI/CIB3		
SIGNATURE	via email	Via email	Via e-mail	Via e-mail	Via e-mail		
NAME	M.Shannon	W. Gloersen	C. Jones	J. Lizardi	J. Calle		
DATE	7/29/2009	7/29/2009	7/21/2009	7/23/2009	7/21/2009		
E-MAIL COPY?	YES	YES	YES	YES	YES		

OFFICIAL RECORD COPY DOCUMENT NAME: G:\CCI\DCP\CPB1\MOX FFF\INSPECTION\INSPECTION REPORTS\DRAFTS\IR 2009-002\MOX IR2009-002 DRAFT8-WITH URI AND NOV.DOC

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, Spielburg & 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 July 30, 2009.

SUBJECT: MIXED OXIDE FUEL FABRICATION FACILITY- NRC INSPECTION REPORT 70-3098/2009-002 AND NOTICE OF VIOLATION

DISTRIBUTION w/encl:
M. Kotzalas, NMSS
D. Tiktinsky, NMSS
R. Crouteau, RII
W. Gloersen, RII
M. Lesser, RII
D. Seymour, RII
K. O'Donohue, RII
M. Shannon, RII
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 April 1 through June 30, 2009, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

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 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).

Condition 3.C of the CA authorizes MOX Services to construct the facility in accordance with the design bases of the PSSCs (Principle Structures, Systems, and Components) described in the Construction Authorization Request (CAR) dated October 31, 2002.

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

PP9-3, Design Control, Section 3.4.2, states that sources of design information include the Design Requirements Document, Basis of Design Documents, regulatory requirements, codes and standards, and other design documents.

(1) Design requirements in the Basis of Design (BOD) for Electrical Systems, Revision 2, dated December 20, 2007, Section 2.3.9.3, state that a redundant electric starting system, with redundant starting batteries, shall be provided for each emergency diesel generator. The design basis in CAR Section 11.5.7.1, Emergency AC Power System requires each emergency generator unit to be provided with a redundant electric starting system with redundant batteries.

(2) CAR Section 11.5.7.1, Design Basis for Principal SSCs (Emergency AC Power System), includes a requirement for the fundamental design of the emergency AC power system to be in accordance with Institute for Electrical and Electronic Engineers (IEEE) 308-1991 IEEE Standard Criteria for Class 1E Power Systems for Nuclear Generating Stations. Requirement 5.4 of IEEE 308 states that the design basis for Class 1E power systems shall include the sequence for start-up and the loading profile of the Class 1E power sources.

(3) The BOD for Electrical Systems, Section 2.3.4.2.5, requires inverter systems to power critical instrumentation and control loads (essential and vital) that cannot tolerate any power interruptions.

(4) CAR Section 11.5.7.1, Design Basis for Principal SSCs (Emergency AC Power System), includes a requirement for the design and procurement of uninterruptible power supplies (UPS) to comply with the guidance of IEEE 944-1986, IEEE Recommended Practice for the Application and Testing of UPS for Power Generating Stations. IEEE 944-1986 establishes component requirements under Section 6.2 that include static transfer switches and manual bypass/maintenance switches.

Contrary to the above, on and before April 13, 2009, the applicant failed to correctly translate applicable requirements into design documents as enumerated in the following examples:

(1) On December 18, 2008, engineering specification DCS01-EEJ-DS-SPE-25236, Revision (Rev.) 0, Specification for Emergency Diesel Generators, was finalized and approved for procurement without including a requirement for each Emergency Diesel to possess redundant electric starting systems and redundant starting batteries.

(2) On and before January 20, 2009, design documents failed to include the sequence for start-up and the loading profile of the emergency diesel generators. Schematic electrical logic drawings DCS01-EAC-DS-SCE-C-29150, Sheet 1, DCS01-EAC-DS-SCE-C-29151, Sheet 1, DCS01-EAC-DS-SCE-C-29154, Sheet 2, and DCS01-ECC-DS-SCE-C-29326, Sheet 1, were issued for final design without providing circuitry to shed unnecessary emergency bus loads and sequence load startup. Also drawing DCS01-ECC-DS-SCE-E-26012, Rev. 1 was issued for final design on December 4, 2008 containing design features that lacked a sequence for startup by incorrectly tripping open the breakers feeding the emergency load centers, the emergency converter/chargers, and the UPS for the Very High Depressurization exhaust fans.

(3) On April 9, 2009, a design change to an inverter system, 208/120 V Essential Power Inverters, was documented and issued for final design in Revision 2 to drawing DCS01-EEA-DS-SCE-E-26058, Sheet 1, that would allow power interruptions to critical instrumentation and control loads. The design included automatic static transfer switches without a power source feed into the alternate source input, thereby creating an output power interruption upon any failure of the inverter system, and a maintenance bypass switch configuration which would momentarily interrupt power when actuated.

(4) Drawing DCS01-ECC-DS-SCE-E-26063, Sheet 1 of 2, Revision 2, issued for final design on November 4, 2008 for the design of a UPS system, did not provide component requirements for static transfer switches and manual bypass/maintenance switches.

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.

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

Dated at Atlanta, Georgia this **30th day** of July 2009.

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.:	70-3098
Construction Authorization No.:	CAMOX-001
Report No.:	70-3098/2009-002
Applicant:	Shaw AREVA MOX Services
Location:	Savannah River Site Aiken, South Carolina
Inspection Dates:	April 1 – June 30, 2009
Inspectors:	M. Shannon, Senior Resident Inspector, Construction Projects Branch 1 (CPB1), Division of Construction Projects (DCP), Region II (RII) J. Bartleman, Senior Construction Inspector, Construction Inspection Branch 3 (CIB3), Division of Construction Inspection (DCI), RII J. Blake, Senior Construction Inspector, CIB3, DCI, RII J. Calle, Senior Construction Inspector, CIB3, DCI, RII G. Crespo, Senior Construction Inspector, CIB1, DCI, RII G. Gardner, Construction Project Inspector, Construction Projects Branch 2, (CPB2), DCP, RII W. Gloersen, Senior Project Inspector, CPB1, DCP, RII J. Heisserer, Construction Inspector, CIB3, DCI, RII C.Julian, Senior Project Manager, CIB1, DCI, RII C. Jones, Senior Construction Inspector, CIB1, DCI, RII S. Lewis, Construction Inspector, CIB1, DCI, RII J. Lizardi, Construction Inspector, CIB2, DCI A. Masters, Senior Construction Inspector, CIB2, DCI, RII
Accompanying Personnel:	B. Davis, Construction Inspector, CIB2, DCI, RII D. Harmon, Construction Inspector, CIB3, DCI, RII P. Heher, Construction Inspector, CPB2, DCP, RII J. Seat, Construction Inspector, CIB2, DCI N. Karlovich, Construction Inspector, CIB1, DCI, RII J. Kent, Construction Inspector, CIB1, DCI, RII D. Rahn, Senior Electrical Engineer, Office of Nuclear Materials Safety and Safeguards
Approved:	Deborah A. Seymour, Branch Chief, CPB1, DCP, RII

EXECUTIVE SUMMARY

Shaw AREVA MOX Services
Mixed Oxide Fuel Fabrication Facility (MFFF)
NRC Inspection Report No. 70-3098/2009-002

Routine inspections were conducted by the senior resident inspector from April 1 through June 30, 2009, and by regional specialists. The inspections involved the observation and evaluation of the applicant's programs for facility construction of principle structures, systems, and components (PSSCs). The PSSCs discussed in this inspection report include: PSSC-009, Criticality Control; PSSC-12, Emergency Alternating Current (AC) Power System; PSSC-15, Emergency Direct Current (DC) Power System; PSSC-023, Fluid Transport System; PSSC-036, the MOX Fuel Fabrication Building Structure (MFFBS); PSSC-038, Off-gas Treatment System; PSSC-041, Process Cells; PSSC-043, Process Cell Fire Prevention Features; and PSSC-053, Waste Transfer Line. The inspections also 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; and also included observations and evaluations of the applicant's electrical design activities (PSSC-012 and PSSC-015) and mechanical design activities for construction activities associated with PSSC-009, PSSC-023, PSSC-036, PSSC-038, PSSC-041, PSSC-043 and PSSC-053.

The scope of the inspections encompassed a review of various MFFF activities related to Quality Level (QL)-1 and Quality Level 2 items for construction activities 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-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. No findings of significance were identified. (Section 2.)

Geotechnical/Foundation Activities (IP 88131)

Geotechnical backfill procedures and specifications related to PSSC-036 were adequate. Quality Assurance (QA) records associated with these activities were properly maintained in accordance with project procedures. No findings of significance were identified (Section 3).

Structural Concrete Activities (IP 88132)

Except as noted in Section 4.c of this report, reinforcing bar (rebar) and embedded plates were properly installed, cleanliness was adequate, concrete testing activities were adequate and concrete placement activities were appropriate. No findings of significance were identified (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). Testing to date indicates that the concrete placed at the MFFF facility met design strength requirements. No findings of significance were identified (Section 4.b).

An unresolved item (URI) 70-3098/2009-02-01 was identified for failure to identify and document an adverse condition. The applicant failed to identify that the requirements of American Concrete Institute (ACI) 349-97, Code Requirements for Nuclear Safety-Related Concrete Structures and Commentary, for clear spacing between parallel bars were not met (Section 4.c).

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

MOX Services implemented civil engineering design and documentation control in accordance with procedural requirements and the MPQAP. No findings of significance were identified (Section 5.a).

The review of engineering drawings and procurement specifications for QL-1 electrical systems and components (PSSC-012 and PSSC-015) identified Violation (VIO) 70-3098/2009-02-02 with four examples of failures to meet requirements for design control. An unresolved item was identified to determine the extent of condition of failures to implement design change control provisions of the MPQAP (Section 5.b).

The applicant performed design and engineering activities related to PSSC-009, PSSC-023, PSSC-038, PSSC-041, PSSC-043, and QL-1 tanks and piping (PSSC-053) in accordance with their procedures and MPQAP. The applicant performed design and engineering activities in a quality-related manner and in accordance with procedures and specifications. MFFF documents and procedures adequately controlled the translation of design basis requirements into construction and fabrication documents. No findings of significance were identified (Section 5.c).

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

Except as noted in Sections 4.c and 6.b in this report, the applicant had established a program and procedures that adequately implemented the corrective action program in accordance with the applicant's MPQAP. No findings of significance were identified (Section 6.a).

The second example of URI 70-3098/2009-02-01 was identified for failure to identify and document an adverse condition. The applicant failed to promptly document that American Concrete Institute (ACI) 349-97, Section 7.6.1 requirements for clear spacing between parallel bars were not met (Section 6.b).

Quality Assurance: Control of Materials, Equipment, and Services (Pre-licensing and Construction) (IP 88108); Quality Assurance: Inspection, Test Control, and Control of Measuring and Test Equipment (IP 88109)

The applicant maintained adequate control of materials, equipment and services related to the QL-1 conventional, annular and slab tanks and piping for the MFFF (PSSC-009, PSSC-023, PSSC-038, PSSC-041, PSSC-043, and PSSC-053). The applicant maintained and implemented proper handling, storage and control of QL-1 mechanical equipment and material in its possession and installed at the MFFF. Control of materials, equipment and services were adequately performed in accordance with procedures and the MPQAP. No findings of significance were identified (Section 7).

Piping Relied on For Safety (IP 88134)

MOX Services performed design and engineering activities related to PSSC-053 waste transfer line piping in a quality-related manner and in accordance with procedures, specifications, and the MPQAP. The applicant adequately maintained the physical condition of their quality-related piping through the use of proper handling, storage and control techniques. In addition, the applicant properly maintained the associated records and documentation for the quality-related piping. No findings of significance were identified (Section 8).

Mechanical Components (IP 88136)

MOX Services performed design and engineering activities related to QL-1 tanks (PSSC-009, PSSC-023, PSSC-038, PSSC-041, and PSSC-043) in accordance with their procedures and the MPQAP. The applicant performed design and engineering activities in a quality-related manner and in accordance with procedures and specifications. The applicant adequately maintained the physical condition of quality-related tanks through the use of proper handling, storage and control techniques of mechanical equipment. In addition, the applicant properly maintained the associated records and documentation for these quality-related tanks. No findings of significance were identified (Section 9).

Attachments:
Persons Contacted
Inspection Procedures
List of Items Opened, Closed, and Discussed
List of Acronyms Used
List of Documents Reviewed

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 above ground level (Release 2). The applicant also continued Release 3 activities which included multiple inside and outside walls of the Manufacturing Building (BMP) 23 feet above ground level. The Mixed Oxide Fuel Fabrication Facility (MFFF) project continued installation of Quality Level (QL)-1, QL-2 and QL-4 stainless steel tanks during this inspection period. Approximately 32 tanks were received and stored at the Process Assembly Building as of June 30, 2009. Several of the tanks were tested and approximately seven tanks were set in place in the MFFF. QL-1 piping for the waste transfer line has also been received at the site and stored in a laydown area to be prepared for installation. Inspectors reviewed documentation associated with the following QL-1 tanks: 1) slab tank KPA-TK-8500 associated with PSSC-009 (Criticality Control), PSSC-023 (Fluid Transport System), PSSC-038 (Off-gas Treatment System), PSSC-041 (Process Cells) and PSSC-043 (Process Cell Fire Prevention Features); 2) conventional tanks KWS-TK-4000 (Organic Solvent Tank), KPC-TK-4000 (Nitric Acid Recovery Tank), and KWD-TK-4050 (High Alpha Buffer Tank) associated with PSSC-023, PSSC-038, PSSC-041 and PSSC-043; and 3) annular tanks KPA-TK-5200 and KPA-TK-9100 associated with PSSC-009, PSSC-023, PSSC-038, PSSC-041 and PSSC-043. Inspectors also reviewed documentation for piping associated with PSSC-053 (Waste Transfer Line). 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)) (PSSC-036)

a. Routine Inspection Activities

(1) Scope and Observations

During the inspection period, the inspectors observed the following activities associated with PSSC-036 (the MOX Fuel Fabrication Building Structure (MFFBS)) 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 Shipping/Receiving Building (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 (rebar) 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 lift of the 91,000-pound QL-1 annular tank was the heaviest lift to date (PSSC-009, PSSC-023, PSSC-038, PSSC-041, and PSSC-043). Except as noted in Sections 4.c of this report, 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 selected 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 2).

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 and 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 included review of the closure of selected NCRs and CRs. Except as noted in Section 4.c of this report, 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-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. No findings of significance were identified.

3. Geotechnical/Foundation Activities (IP 88131) (PSSC-036)

(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 applicant's design specifications, drawings, and procedures. Backfilling activities during this period included backfilling of fire system piping, electrical conduits and precast distribution boxes, foundation for the BAP construction elevator, 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.

(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.

4. Structural Concrete Activities (IP 88132)

a. Concrete Placement Activities (PSSC-036)

(1) Scope and Observations

This portion of the inspection focused on the structural concrete work associated with safety related construction of PSSC-036. 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 evaluated the adequacy of the concrete batch plant operated by the applicant. The inspection focused on the batching process, National Ready Mix Concrete Association (NRMCA) plant and truck certification, equipment calibration, add-mixture certification, and mixing and delivery procedures. The inspectors also observed the receipt inspection of sand and fly ash used as concrete constitutes in the applicants mix design. MOX Services' Project Procedure (PP)11-5, Batch Plant Testing and Calibration Instructions; PP11-4, Batch Plant Mix Design and Validation Instructions; and PP11-3, Batch Plant Operating Instructions; were reviewed by the inspectors for adequacy with the associated batch plant operations. No significant issues were identified.

The inspectors also observed a receipt inspection of QL-1 reinforcement bars. This inspection included a review of rebar receipt documentation from delivery to acceptance, in addition to visual observation of Quality Control (QC) inspectors verifying critical characteristics of reinforcements bars located in the east lay down yard. PP3-28, Quality Control Receiving Inspection; PP11-26, Material Handling, Storage and Control; and PP11-30, Control of Material Shipping; were reviewed by the inspectors for adequacy. No significant issues were identified.

The inspectors observed concrete placements for the BAP pre-cast slabs 150.2 and 150.1 on April 21 and April 23, 2009 respectively. Work Packages 09-10888-C-1935-BAP-RM-150-C associated with these concrete placements were reviewed and found to have required documentation adequately maintained within. The field engineer (FE) and Quality Control Inspection (QCI) checklist were signed and maintained within the work packages. For these placements, the vendor drawings were compared to the design drawings and found to be accurately translated. Exceptions to design were accurately documented within the Engineering Change Request (ECR) program and copies maintained within the work packages. In addition, the inspectors also completed a visual inspection of reinforcement placement for the BMP 126 concrete slab. PP1-44, Work Package Planning, Development, Approval and Closure; and PP11-12, Placement of Concrete, Embedded Structural Items and Accessories; were reviewed and found to be adequate.

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. MOX Table 5.6-1 of the CAR specifies the MFFBS as PSSC-036.

The inspectors observed various activities prior to and during each major concrete placement. Prior to various placements, 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 addressed 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. 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:

April 3, 2009, BMP W-108B, BMP Interior Wall, 266 cubic yards
April 3, 2009, BMP F-110C, BMP Floor, 10 cubic yards
April 8, 2009, BMP W-121.1, BMP Interior Wall, 32 cubic yards
April 9, 2009, BSR W-108A.1, BSR/Truck Bay Interior Wall, 307 cubic yards
April 15, 2009, BAP Panel 141.2, BAP precast floor, 10.5 cubic yards
April 15, 2009. BAP F-101/102, BAP Elevated Floor, 178 cubic yards
April 16, 2009, BMP W-107B, BMP Interior Wall, 293 cubic yards
April 22, 2009, BAP Panel 150.1, BAP precast floor, 8 cubic yards
April 22, 2009, BAP Panel 150.2, BAP precast floor, 10.5 cubic yards
April 22, 2009, BMP F-114D, BMP Elevated Floor, 40 cubic yards
April 27, 2009, BMP F-126, BMP Elevated Floor, 30 cubic yards
April 29, 2009, BMP F-117.2, BMP Elevated Floor, 213 cubic yards
April 30, 2009, BMP W-122A.2, BMP Interior Wall, 100 cubic yards
May 6, 2009, BAP F-103, BAP Elevated Floor, 123 cubic yards
May 7, 2009, BMP W-115, BMP Exterior Wall, 101 cubic yards
May 12, 2009, BAP W-102, BAP Exterior Wall, 312 cubic yards
May 14, 2009, BSR W-104, BSR Exterior Wall, 280 cubic yards
May 18, 2009, BMP W-115.2, BMP Exterior Wall, 235 cubic yards
May 19, 2009, BMP W-109B.2, BMP Interior Wall, 100 cubic yards
May 20, 2009, BMP F-127, BMP Elevated Floor, 27 cubic yards
May 20, 2009, BAP F-104, BAP Elevated Floor, 150 cubic yards
May 20, 2009, BMP W-122.A3, BMP Interior Wall, 228 cubic yards
May 21, 2009, BMP F-203, BMP Elevated Floor, 307 cubic yards
May 28, 2009, BMP W-124A.1, BMP Interior Wall, 385 cubic yards
May 28, 2009, BMP W-109B.1, BMP Interior Wall, 68 cubic yards
June 3, 2009, BMP W-123.A1, BMP Interior Wall, 35 cubic yards

June 8, 2009, BMP W-120B, BMP Interior Wall, 139 cubic yards
June 8, 2009, BSR W-102, BSR/BAP Interior Wall, 99 cubic yards
June 8, 2009, BMP W-116B, BMP Interior Wall, 139 cubic yards
June 10, 2009, BSR W-103.1, BSR Interior Wall, 100 cubic yards
June 11, 2009, BMP W-117B.1, BMP Interior Wall, 80 cubic yards
June 11, 2009, BAP Panel 135.2, BAP precast floor, 8 cubic yards
June 15, 2009, BAP W-107, BAP Interior Wall, 50 cubic yards
June 17, 2009, BAP F-105/106, BAP Elevated Floors, 295 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 reinforcing bar (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 Items 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. The work package 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.

(2) Conclusions

The inspectors concluded that, except as noted in Section 4.c of this report, observed rebar and embedded plates were properly installed, cleanliness was adequate, concrete testing activities were adequate, and concrete placement activities were appropriate. No findings of significance were identified.

b. Concrete Testing (PSSC-036)

(1) 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. The inspectors observed that due to high ambient temperatures, QORE technicians were properly using ice to maintain the temperatures in the test cylinder storage boxes. 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 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 reviewed the "Concrete Statistical Summaries" used to trend the results of the compressive test of the concrete cylinder specimens. Testing to date indicates that the concrete placed at the MFFF met design strength requirements. No findings of significance were identified.

c. Improper Clearances Between Rebar Reinforcement (PSSC-036)

(1) Scope and Observations

On April 22, 2009, prior to placement of BMP F-126 (BMP elevated floor), the inspectors noted that the rebar placement at the interface of the floor beam and the floor structural rebar was congested, in that there was very little clearance between the various pieces of rebar. American Concrete Institute (ACI) 349-97, Code Requirements for Nuclear Safety-Related Concrete Structures and Commentary, Section 7.6.1, requires that the clear spacing between parallel bars in a layer be at least one bar diameter but not less than one inch. Discussions with NRC headquarters personnel indicated that if the clear cover requirement can not be met, then an analysis is required to show that the rebar still meets the strength requirements. At the end of the inspection period, the certificate holder had not completed the analyses.

On April 22, 2009, the inspectors identified that BMP F-126 did not have code required clear spacing between parallel layers of rebar. The failure to identify that the reinforcement was installed contrary to ACI 349-97 code requirements is identified as an unresolved item (URI) and is being tracked as URI 70-3098/2009-02-01**:** Failure to Identify and Document an Adverse Condition (Failure to Meet ACI 349-97 Code Requirements for Clear Spacing Between Parallel Rebars). This issue was captured in the applicant's corrective action program as CR-20090244. The issue is unresolved since the applicant's justification for deviation from the ACI code requirements was not completed by the end of this inspection.

(2) Conclusions

An URI was identified for failure to document an adverse condition (failure to meet ACI 349-97 code requirements for clear spacing between parallel rebars).

5. Quality Assurance: Design and Documentation Control [Pre-licensing and Construction] (IP 88107) (PSSC-036)

a. Review of Civil Design Control Documents

(1) Scope and Observations

On April 20-23, 2009, the inspectors reviewed whether MOX Services' design and document controls were implemented in accordance with the MPQAP, Rev. 7. The inspectors reviewed a sample of controlled design documents in civil engineering related areas, and held discussions with appropriate applicant and contractor staff. The inspectors evaluated the adequacy of a sample of ECRs, CRs, NCRs associated with QL-1 construction and design activities. The inspectors noted that ECR-1804, Revise Minimum Clear Cover to Include Tolerances set forth in American Concrete Institute (ACI) 117-90, Rev. 1, was written to clarify the ACI code requirements and to increase the tolerance threshold for the minimum concrete clear cover and effective depth specified in ACI 117-90 and ACI 349-97, respectively for 3 of the 16 specified tolerances.

NRC inspectors reviewed a sample of design and field drawings related to the MFFF BMP. Field observations were made of two concrete slabs and the associated documentation was reviewed. The inspectors observed some very minor drawing discrepancies, but none that could lead to safety significant errors in construction. These discrepancies were turned over to the certificate holder for resolution.

The inspectors reviewed design specifications and procedures to verify the applicant maintained the necessary requirements to control the design aspects for MFFF. The inspectors reviewed MOX Services' specifications DCS01-AAJ-DS-DOB-M-40110-0, Basis of Design for Seismic Systems and Components, Quality Level 1a, Items Relied on for Safety (IROFS); and DCS01-AAJ-DS-DOB-B-40103-2, Basis of Design for Structures, Quality Level 1a, IROFS. NRC inspectors also reviewed PP9-21, Engineering Change Request, Rev. 5; PP9-3, Design Control, Rev. 16; PP3-25, Root Cause Analysis, Rev. 3; PP3-6, Corrective Action Process, Rev. 10; PP9-6, Calculations, Rev. 8; PP10-14, Vendor Submittal Management, Rev. 3; PP3-5, Control of Nonconforming Items, Rev. 4; PP7-9, Electronic Document Management System, Rev. 3; PP9-9, Engineering Specifications, Rev. 9; and PP9-7, Drawings, Rev. 12. Through discussions with MOX Services' staff and the review of QA documentation, the inspectors also verified the implementation of procedures related to design control.

(2) Conclusions

MOX Services implemented design and documentation control in accordance with procedural requirements and with the MPQAP. No findings of significance were identified.

b. Electrical Design Control Inspection Activities

Design controls were reviewed for PSSC-12, Emergency Alternating Current (AC) Power System; and PSSC-15, Emergency Direct Current (DC) Power System; to assess the applicant's translation of design basis requirements into engineering documents. A

sample of nine procurement specifications of the twenty four issued to date were reviewed to verify that critical attributes included in the MFFF design bases were included in the specifications. Also inspected were a sample of drawings, calculations, and other engineering documents that support the accuracy of the procurement specifications.

(1) Emergency Diesel Generators

(a) Scope and Observations

Inspectors conducted a review to verify that design documents for the emergency diesel generators (EDGs) were prepared in accordance with requirements from the MPQAP, design control procedures, and referenced industry standards. The inspectors interviewed responsible electrical design engineers, procurement engineering staff, and QA management. Documents reviewed included a technical specification for procurement of the EDGs, a vendor evaluation report, a procurement solicitation package, ECRs used to control changes to the generator specifications, applicable CRs, electrical single line drawings, and logic schematic drawings for the emergency electrical distribution system.

In general, the design features described in the Electrical System Bases of Design (BOD) and the CAR were found to be correctly translated into the design documents. The inspectors determined that the engineering documents correctly implemented requirements to control the emergency electrical system as Class 1E, support sustained operation of emergency loads for seven days, support five cranking cycles of the emergency diesel start system, provide hard-wired start logic for the EDGs, and provide remote and local system controls.

The inspectors noted design features for the EDGs, as described in CAR Section 11.5.7.1, Design Basis for Principal SSCs (Emergency AC Power Systems), required each emergency diesel to be provided with a redundant electrical starting system with redundant batteries. Similarly, BOD Section 2.3.9.3 stated that a redundant electric starting system, with redundant batteries, shall be supplied. Contrary to this, inspectors found that Procurement Specification DCS01-EEJ-DS-SPE-E-25236, Specification for Emergency Diesel Generators, Rev. 0, was finalized and issued for procurement without incorporating the redundant starting design features. Specifically, the specification failed to require the EDGs to possess redundant electrical starting systems and redundant start batteries. The failure to correctly translate the requirements into the design documents was a violation of the MPQAP, Section 3, Design Control, and is identified as example 1 to violation (VIO) 70-3098/2009-02-02. MOX Services initiated CR 20090146 to address this condition.

The inspectors interviewed electrical design staff and reviewed schematic electrical logic drawings issued for final design to evaluate conformance to Institute for Electrical and Electronic Engineers (IEEE) 308-1991, IEEE Standard Criteria for Class 1E Power Systems for Nuclear Generating Stations. The industry standard is committed as a PSSC design basis in CAR 11.5.7.1. Section 5.4 of the IEEE standard requires the design basis of Class 1E systems to include the sequence for startup and the loading

profile of the 1E power sources. Similarly, CAR Section 11.5.4 stated the four 160-volt (V) loads are stripped from the bus in the event power is lost from the normal and standby power system. Hard-wired circuitry then sequences emergency loads onto the generators in an orderly fashion. Contrary to the requirement, inspectors found the MFFF engineering drawings did not provide circuitry to shed any of the 4,160 V Emergency Bus loads upon loss of the normal sources of power and did not define a startup sequence for the loads.

In addition, inspectors found that Drawing DCS01-ECC-DS-SCE-E-26012, 480 VAC Emerg. Bus A & B Switch Gear (SWGR) ECC*SWG1100 & ECC*SWG2100 One Line Diagram, Rev. 1, was issued for final design on December 4, 2008, containing design features that lacked a sequence for startup required by the IEEE standard. The drawing depicted breakers with under-voltage trip devices that would incorrectly trip open the breakers feeding the emergency load centers, the emergency converter/chargers, and the uninterruptible power supplies (UPS) for the Very High Depressurization (VHD) exhaust fans upon loss of voltage.

The failures to correctly translate requirements into the design documents were violations of the MPQAP, Section 3, Design Control, and are identified as example 2 to VIO 70-3098/2009-02-02. MOX Services initiated CR 20090162 to address this condition.

(b) Conclusions

The review of engineering drawings and procurement specifications for the emergency generator and emergency power distribution system identified two examples of a violation for inadequate translation of design requirements into design documents.

(2) Inverters

(a) Scope and Observations

The scope for this inspection was to verify that design and procurement documents for Vital and Essential 208/120 volt inverter power distribution systems were prepared following established requirements from the Construction Authorization, the MPQAP, CAR design basis, project procedures controlling drawings and specifications, and referenced industry standards. The inspectors interviewed responsible electrical design engineers. Documents reviewed included DCS01-EEJ-DS-SPE-E-25130, Specification for 208/120 Volt AC Three Phase Vital Power and Essential Power Inverters, Rev. 0; calculations; electrical single line drawings; the Integrated Safety Analysis Summary; the Basis of Design for Electrical Systems; approved suppliers lists; and a manufacturer's published information on inverter technical characteristics and functional descriptions. The inspectors' review of drawing DCS01-EEA-DS-SCE-E-26058 found that Rev. 2 was "Issued for Final Design," and specified:

(a) A configuration for static transfer switches which would prevent transfer to a bypass source. The transfer would not occur due to lack of a source feeder to the inverter

output static transfer switch. The requirement for this design is to provide a regulated voltage bypass source; and

(b) A configuration for a standard automatic maintenance bypass switch based on a break-before-make operation that would momentarily interrupt essential power when actuated. The design requirement for this system is to provide a manual transfer switch with make-before-break uninterruptible switch operation.

The design document (drawing DCS01-EEA-DS-SCE-E-26058) was not consistent with Section 2.3.4.2.5 of the Electrical Systems BOD which states that critical instrumentation and control loads (essential and vital) served by the inverters cannot tolerate any power interruptions. Similarly, CAR, Section 11.5.2.2, states that the 120/208 V Essential Power Inverters are arranged in a configuration which functions as an UPS. The equipment configuration depicted in this drawing would not function as an UPS. A review of a one-line diagram generated by the electrical calculations software package, Electrical Transient Analysis Program (ETAP), shows the Essential System (EEA) contained a number of 120/208 volt panels classified as IROFS fed from these essential inverter systems.

The inspectors determined that the failure to correctly translate the design requirements into drawing DCS01-EEA-DS-SCE-E-26058 was a violation of the MPQAP, Section 3, Design Control, and is identified as example 3 of VIO 70-3098/2009-02-02. MOX Services initiated CR 20090163 to address this condition.

The inspectors reviewed the design change controls that were implemented for Rev. 2 of drawing DCS01-EEA-DS-SCE-E-26058. An examination of the drawing and interviews with design engineering management established that Rev. 2 implemented a change to the configuration of the inverters (discussed above), an increase in capacities of the inverters and bypass transformer, and an increase in inverter supply voltage from 125 volts direct current (VDC) to 250 VDC. As permitted by PP9-3, Design Control, Section 3.9, the changes to the drawing were processed as a “document revision” where the single drawing provided the only quality record of the design change process controls. No records were created to document the reason and justification for the new inverter system configuration. Applicable design inputs were not recorded and exceptions to the inputs were not justified. No information was available to identify the full scope of affected engineering drawings and specifications that must be revised to implement the design changes. For example, Section 2.1.2 and other sections of DCS01-AAJ-DS-DOB-E-4011, Basis of Design for Electrical Systems, and DCS01-EBA-DS-SCE-E-26060, Sheet 2, 125 VDC Power, Normal EBA-SWBD2000 One Line Diagram, were affected by the new design, yet still required revision to reflect the higher voltage.

The omitted information on the drawing was not consistent with MPQAP Section 3.2.2.G, which requires design documents to contain details of purpose, assumptions, design inputs, and references such that a person technically qualified in the subject can understand the document and verify their adequacy without recourse to the originator of the document. MPQAP Section 3.2.5.A states that changes to final designs shall have documented justifications for use and are subject to the same design control measures and reviews as those applied to the original design.

Inspectors determined that further review of the design change control process, including use of ECRs, is needed to determine if MFFF PPs are correctly implementing design changes for electrical design and other engineering disciplines. Accordingly, Unresolved Item (URI) 70-3098/2009-02-03, Review of Design Change Process, was identified for this issue. The URI will determine the extent of condition for failures to implement design control provisions of the MPQAP.

(b) Conclusions

The review of engineering drawings and procurement specifications for the essential inverter power distribution system identified a third example of a violation for inadequate translation of requirements into design documents (PSSC-012). An URI was identified to determine the extent of condition of failures to implement MPQAP requirements in the preparation of design documents.

(3) Uninterruptible Power Supply (UPS) Systems

(a) Scope and Observations

The scope for this inspection was to verify that design and procurement documents produced to support purchasing UPS systems were prepared following established requirements from the Construction Authorization, CAR design basis, project procedures directing drawings and specifications, and referenced industry standards. The inspectors interviewed responsible electrical design engineers.
Documents reviewed included DCS01-EEJ-DS-SPE-E-25232, Specification for 480 Volt AC Three Phase Static Uninterruptible Power Supplies QL1, Rev. 0, dated: March 30, 2009; project procedures; applicable calculations; electrical single line drawings; the Integrated Safety Analysis Summary; American National Standards Institute/IEEE Std. 944-1986, IEEE Recommended Practice for the Application and Testing of UPS for Power Generating Stations; and DCS01-AAJ-DS-DOB-E-4011, Basis of Design for Electrical Systems. Rev. 2.

Sections 6.2.4 and 6.2.5 of IEEE standard 944-1986 require designs to include a static transfer switch and a manual bypass/maintenance switch. The inspectors' review of drawing DCS01-ECC-DS-SCE-E-26063 Sheet 1 of 2 found that Rev. 2 contained a one-line diagram configuration for the UPS systems that did not include required components such as static transfer switches and manual bypass/maintenance switches for the UPS systems. Thus, the design document was not consistent with CAR Section 11.5.7, Design Basis for Principal SSCs, which states that UPS design and procurement comply with the guidance of IEEE standard 944-1986.

The inspectors determined that the failure to correctly translate the design requirements into drawing DCS01-ECC-DS-SCE-E-26063 Sheet 1, is a violation of the MPQAP, Section 3, Design Control, and is identified as example 4 to VIO 70-3098/2009-02-02. MOX Services initiated CR 20090169 to address this condition.

(b) Conclusions

The review of engineering drawings and procurement specifications for the vital UPS power distribution systems identified a fourth example of a violation for inadequate translation of design requirements into design documents.

(4) Batteries

(a) Scope and Observations

The scope for this inspection was to verify that calculations produced to define design requirements for batteries, associated 125 VDC monitoring and control power systems, inverters, and UPS systems, were sufficient to provide the operational support required for the systems served. In addition, inspectors assessed whether design and procurement documents produced for these systems were prepared following established requirements from the Construction Authorization, CAR design basis, project procedures controlling drawings and specifications, and referenced industry standards. The inspectors interviewed responsible electrical design engineers. Documents reviewed included technical specifications issued for procurement of 250/125 VDC Batteries and Chargers, calculations, and the BOD for Electrical Systems document.

The design basis in CAR 11.5.7 requires the 125 VDC Batteries to be configured in a 60 cell battery string to support the vital and essential loads. The inspectors' review of calculations prepared by a battery supplier for batteries EBA-BAT1100 and EBA-BAT2100 indicated the final discharged cell voltage to be 1.75 volts per cell. This would provide an effective final discharge battery terminal voltage of 105 VDC. In comparison, the inspectors noted that industry standard Underwriters Laboratory (UL) 489 – Molded Case Circuit Breakers, Molded Case Switches and Circuit Breaker Enclosures, which is the standard manufacturers will presumably use, defines an allowable voltage tolerance for molded case electrical motor operators of +10% / -15% from a nominal 125 VDC control voltage, indicating the minimum voltage at the equipment can not be less than 106 VDC. It is expected that breakers would be supplied from the industry with these limits. Furthermore, design requirements at the MFFF establish a maximum additional voltage drop contributed by the DC distribution system wiring not to exceed 2%, or 2.5 VDC. The inspectors calculated the allowable voltage at the battery terminal should be established at a minimum of 109 VDC instead of the 105 VDC identified in the calculation. Therefore, based upon equipment manufacturing and industry standards, this design may not provide sufficient voltage capacity at the end of the battery discharge period for proper equipment operation.

In addition, the inspectors' review of Procurement Specification for 250/125 VDC Batteries and Chargers, DCS01-EEJ-DS-SPE-E-25134-0 Attachment B: Datasheets, found a number of instances where nominal voltages such as 220 VDC and 400 VDC were specified in contradiction to the basic voltage levels specified in the body of the specification.

(b) Conclusions

The review of calculations and procurement specifications for the batteries to be used with vital and essential power distribution systems found the documents were inconsistent and contained unsubstantiated conclusions (PSSC-015). The applicant initiated CR 20090163 to document the inspectors' concerns on the battery specification. The inspectors will follow the resolution of this CR during a future inspection as Inspector Followup Item (IFI) 70-3098/2009-02-04.

(5) Other Specifications

(a) Scope and Observations

Inspectors reviewed procurement documents DCS01-EEJ-DS-SPE-E-25144-0, Specification for Low Voltage Metal Enclosed Switchgear (Emergency); DCS01-EEJ-DS-SPE-E-25148-2, Procurement Specification Variable Frequency Drives (VFD); DCS01-EEJ-DS-SPE-E-25118-2, Specification for 480V Dry Type Distribution Transformers; DCS01-EEJ-DS-SPE-E-25332, Specification for Emergency Power Distribution Control Panels 1000/2000 (Trains A and B); and DCS01-EEJ-DS-SPE-E-25348, Specification for Enclosed Circuit Breakers. The inspectors compared specification characteristics from each procurement document to other design bases documents and industry standards referenced in each document. Interviews were conducted by inspectors of the engineers who authored these documents. Applicable drawings were reviewed to determine the accuracy of the associated procurement documents.

(b) Conclusion

No findings of significance were identified.

c. Mechanical Design Control Inspection Activities

(1) Scope and Observations

The inspectors reviewed the applicable sections of the MPQAP and verified that design engineering, procurement and receipt inspection activities, and documentation associated with QL-1 tanks (annular, slab and conventional - PSSC-009, PSSC-023, PSSC-038, PSSC-041, and PSSC-043), and piping (PSSC-053) for the MFFF were in accordance with regulatory and QA programmatic requirements and industry standards. The inspectors verified that the documentation for these mechanical components and equipment were in accordance with applicable procedures and procurement specifications.

The inspectors reviewed the licensing basis, CAR, and the MFFF documents and procedures used to produce construction specifications. The inspectors traced requirements from the licensing documents to the CAR, to the BOD, to the system design descriptions, to piping system piping and instrumentation diagrams

(P&ID)/isometric drawings, to construction specifications, to approved shop fabrication drawings.

The inspectors interviewed MOX Services' engineers, QC and QA personnel, and Baker Construction personnel, in order to understand current construction activities and any problems or concerns.

The inspectors reviewed several Suppliers and Subcontractor Deviation Disposition Requests (SDDRs) included in the documentation packages associated with QL-1 quality-related tanks #KPA-TK-8000, #KWD-TK-4040 and #KPA-TK-7000 (PSSC-009, PSSC-023, PSSC-038, PSSC-041, and PSSC-043). The inspectors verified that applicant adequately dispositioned and documented these SDDRs. In addition, the inspectors reviewed the closure of selected ECRs, many of which were generated as a result of a SDDR. The inspectors concluded that the applicant properly identified conditions affecting the quality of their design-related activities. The applicant resolved self-identified engineering design-related issues and those identified by their manufacturers, vendors or suppliers.

The inspectors verified that the requirements contained in the licensing basis for particular sections of high alpha waste piping (PSSC-053) in the Aqueous Polishing System were accurately translated into the shop fabrication documents used by the piping vendor to procure and assemble the piping sections ordered by MFFF.

(2) Conclusions

The applicant performed design and engineering activities related to PSSC-009, PSSC-023, PSSC-038, PSSC-041, and PSSC-043 QL-1 tanks and piping (PSSC-053) in accordance with their procedures and MPQAP. The applicant performed design and engineering activities in a quality-related manner and in accordance with procedures and specifications. MFFF documents and procedures adequately controlled the translation of design basis requirements into construction and fabrication documents. No findings of significance were identified.

6. 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 existed 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.

Except for as noted in Section 4.c and 6.b of this report, 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

Except as noted in Sections 4.c and 6.b in this report, 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. No findings of significance were identified.

b. Failure of Civil Engineering Personnel to Promptly Initiate and Document an Adverse Condition

(1) Scope and Observations

On April 21, 2009, the inspectors identified that rebar placement at the interface of the floor beam and floor structural rebar (placement BMP F-126) was congested and had very little clearance between the various pieces of rebar. ACI 349-97, Section 7.6.1, requires that the clear spacing between parallel bars in a layer be at least one bar diameter but not less than one inch. This non-conformance was turned over to civil engineering personnel for resolution. On June 22, 2009, the inspectors noted that civil engineering had failed to document the deficiency in the corrective action program.

The MPQAP, Revision 6, Change 1, Section 16, Corrective Action, Section 6.2, Requirements, Subsection 16.2.1. A. 2), states, "Conditions adverse to quality shall be documented and reported to the appropriate levels of management responsible for the conditions and to the MOX Services Quality Assurance organization for tracking and trending." Contrary to these requirements, MOX Services' personnel failed to document the failure to meet ACI 349-97, Section 7.6.1 code requirements during the period of April 21 to June 22, 2009. The failure to document the deficiency is identified as an additional example of a URI and is being tracked as (URI) 70-3098/2009-02-01: Failure to Identify and Document an Adverse Condition (Failure to Meet ACI 349-97 Code Requirements for Clear Spacing Between Parallel Rebars). The issue is unresolved since the applicant's justification for deviation from the ACI code requirements was not completed by the end of this inspection.

(2) Conclusions

A second example of URI 70-3098/2009-02-01 was identified for failure to identify and document a condition adverse to quality, in that the applicant failed to document that ACI 349-97, Section 7.6.1 requirements for clear spacing between parallel bars were not met.

7. Quality Assurance: Control of Materials, Equipment, and Services (Pre-licensing and Construction) (IP 88108); Quality Assurance: Inspection, Test Control, and Control of Measuring and Test Equipment (IP 88109)

a. Scope and Observations

The inspectors reviewed the applicable sections of the applicant's QA program and verified that procedures and processes were in place that maintained adequate control over materials, equipment and services in use at the MFFF. The inspectors verified that the applicant implemented and maintained proper handling, storage and control of QL-1 mechanical equipment and material at the MFFF, such as QL-1 tanks (annular, slab and conventional (PSSC-009, PSSC-023, PSSC-038, PSSC-041, and PSSC-043)) and piping (PSSC-053). The applicant maintained documentation associated with these mechanical components in accordance with applicable procedures, procurement specifications and the QA program.

The inspectors interviewed MOX Services' personnel to verify that the applicant controlled materials, equipment, services, and associated documentation in accordance with design and procurement specifications and procedures. The inspectors reviewed the drawings, the construction specifications, the approved shop fabrication drawings, the material receipt reports, the quality control receiving inspection reports, the ECRs, and NCRs to verify that the applicant followed approved procedures for procuring, receiving and resolving issues related to QL-1 piping sections (PSSC-053) and chemical processing tanks (PSSC-009, PSSC-023, PSSC-038, PSSC-041, and PSSC-043). Piping sections specific to imbedded piping associated with the high alpha waste piping (PSSC-053) in the Aqueous Polishing system were examined.

b. Conclusions

The applicant maintained adequate control of materials, equipment and services related to the QL-1 conventional, annular and slab tanks and piping for the MFFF. The applicant maintained and implemented proper handling, storage and control of QL-1 mechanical equipment and material in its possession and installed at the MFFF (PSSC-009, PSSC-023, PSSC-038, PSSC-041, PSSC-043, and PSSC-053). Control of materials, equipment and services were adequately performed in accordance with procedures and the MPQAP. No findings of significance were identified.

8. Piping Relied on For Safety (IP 88134)

a. Scope and Observations

The inspectors reviewed the applicable sections of the applicant's QA program and verified that design engineering, procurement and receipt inspection activities, and documentation associated with QL-1 waste transfer piping (PSSC-053) for the MFFF was in accordance with regulatory and QA programmatic requirements and industry

standards. The inspectors verified that the documentation for the piping were in accordance with applicable procedures and procurement specifications.

The inspectors reviewed the closure of selected ECRs and NCRs referenced in the receipt inspection packages. The inspectors concluded that the applicant properly identified conditions affecting the quality of their design-related activities. The applicant resolved self-identified engineering design-related issues and those identified by their manufacturers, vendors or suppliers.

The inspectors also reviewed P&IDs, fabrication isometric drawings, welding and bending procedures, and a work package for installation of buried piping to determine whether technical requirements from the licensing basis were adequately addressed. The inspectors also performed inspection activities of field fabrication and installation of waste transfer line work. In addition the inspectors interviewed personnel and performed walk downs of the welding filler metal control/issue room and the welding assembly area.

b. Conclusions

MOX Services performed design and engineering activities related to PSSC-053 waste transfer line piping in a quality-related manner and in accordance with procedures, specifications, and the MPQAP. The applicant adequately maintained the physical condition of their quality-related piping through the use of proper handling, storage and control techniques. In addition, the applicant properly maintained the associated records and documentation for the quality-related piping. No findings of significance were identified.

9. Mechanical Components (IP 88136)

a. Scope and Observations

The inspectors reviewed the applicable sections of the applicant's QA program and verified that design engineering, procurement and receipt inspection activities, installation activities and documentation associated with QL-1 tanks annular, slab and conventional (PSSC-009, PSSC-023, PSSC-038, PSSC-041, and PSSC-043) for the MFFF were in accordance with regulatory and QA programmatic requirements and industry standards.

During the inspection period, the inspectors observed the transportation and installation of conventional tank, #KWD-TK-4040 (associated with PSSC-023, PSSC-038, PSSC-041, and PSSC-043), into the BAP. The inspectors reviewed the project record submittals, inspection test plans, and receipt inspection packages associated with three tanks: 1) Slab Tank # KPA-TK-8000 (PSSC-009, PSSC-023, PSSC-038, PSSC-041, and PSSC-043); 2) Conventional Tank #KWD-TK-4040 (PSSC-023, PSSC-038, PSSC-041, and PSSC-043); and 3) Annular Tank #KPA-TK-7000 (PSSC-009, PSSC-023, PSSC-038, PSSC-041, and PSSC-043). For these three QL-1 tanks, the inspectors evaluated the adequacy of the documentation packages against the procurement specifications and other engineering related documents. The inspection of these

documentation packages focused on ensuring that the vendor met specification requirements associated with these QL-1 mechanical components.

During the inspection period, the inspectors reviewed the project record submittals, inspection test plans, and receipt inspection packages associated with six tanks: 1) Slab Tank KPA-TK-8500 (PSSC-009, PSSC-023, PSSC-038, PSSC-041, and PSSC-043); 2) Conventional Tanks KWD-TK-4050, KWS-TK-4000 and KPC-TK-4000 (PSSC-023, PSSC-038, PSSC-041, and PSSC-043); and 3) Annular Tanks KPA-TK-5200 and KPA-TK-9100 (PSSC-009, PSSC-023, PSSC-038, PSSC-041, and PSSC-043).

The documentation packages reviewed contained the following records and reports associated with each tank, as applicable: (1) Receipt Inspection Report; (2) Suppliers Certificate of Compliance; (3) Seismic Certificate of Compliance; (4) Certified Material Test Reports (CMTRs); (5) Final Design Drawing; (6) Final Assembly and Fabrication Drawing; (7) Deviation Notices (DNs); (8) ECRs; (9) NCRs; (10) SDDRs; and (11) Supplier/Subcontractor Request for Information (SRFI).

The inspectors verified that selected aspects of the integrated safety process, design process, procurement process, and quality assurance controls were incorporated into the design and procurement of the QL-1 tanks noted above. The inspectors also reviewed PP 9-20, Safety and Design Integration, Rev. 3, and verified that the Integrated Safety Analysis (ISA) results were incorporated into the design of the conventional tanks noted above. Specifically, the inspectors focused on the portion of the ISA that identified IROFS and verified that the results of the associated Nuclear Criticality Safety Evaluation (NCSE-D), AP Auxiliary Units, Quality Level 1a IROFS, DCS01-KKJ-DS-ANS-H-35053, Rev. 3, dated May 16, 2007, were incorporated into the design of the tanks, as applicable. In addition, the inspectors verified that ECRs and SDDRs were appropriately dispositioned and documented in the documentation packages associated with each of the QL-1 tanks noted above. Nonconformances that were reviewed were documented in NCRs and were adequately evaluated and dispositioned.

b. Conclusions

MOX Services performed design and engineering activities related to QL-1 tanks (PSSC-009, PSSC-023, PSSC-038, PSSC-041, and PSSC-043) in accordance with their procedures and the MPQAP. The applicant performed design and engineering activities in a safe and quality-related manner and in accordance with procedures and specifications.

The applicant adequately maintained the physical condition of quality-related tanks and piping through the use of proper handling, storage and control techniques of mechanical equipment. In addition, the applicant properly maintained the associated records and documentation for these quality-related tanks. No findings of significance were identified.

10. Follow-up of Previously Identified Items

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

a. (Closed) VIO 70-3098/2008-03-01: Failure to Incorporate Design Requirements to Field Drawings.

(1) Scope and Observations

On July 9, 2008, an NRC technical reviewer was onsite reviewing seismic calculations. During the review, the technical reviewer asked to review the civil (reinforcing steel) design and field drawings related to Manufacturing Building base mat BMP-F-103. When the applicant obtained the drawings, the applicant noted a deficiency in one of the field drawings in which the design drawing required the reinforcing steel spacing to be on 9 inch centers and the field drawings specified reinforcing steel spacing to be on 11 inch centers. This issue was captured in the applicant's corrective action program in CR 20080254 R1 and non-conformance report (NCR) EN-08-368.

On April 20-23, 2009, the inspectors reviewed CR 20080254 R1 and NCR EN-08-368 which documented this violation. NRC inspectors reviewed CR 20080172, ECR 000866, ECR 000865, and CR 20080295 which provided supplemental information related to this violation. After reviewing CR 20080254 R1 the inspectors learned that on July 17, the Management Review Committee revised 2008 CR 20080254 R1 to upgrade its significance level from level "C" to level "B," and also required an apparent root cause determination. The apparent cause was determined to be a combination of inadequate drawing preparation and review by the rebar vendor, and inadequate vendor drawing review by MOX Services. The prescribed corrective actions, in CR 20080254 R1, for this issue were: (1) complete and close NCR EN-08-368, (2) provide training for rebar vendor drawing reviewers, and (3) evaluate the impact of the improper spacing of the rebar in the affected area of the building (justification for "use-as-is"). The inspectors found NCR EN-08-368 to be completed and closed on September 24, 2008. In CR 20080254 R1, page number 76, a training attendance record sheet was included. This sheet had the signatures of the attendees to the MOX Services' Rebar training provided to the vendor drawing reviewers. NRC inspectors also reviewed ECR 0000944, which was initiated on July 31, 2008, to document the justification that the non-conforming rebar placement was acceptable for "use-as-is" and no modification of installed rebar was necessary. Based on the review of this documentation and interviews held with MOX Services' personnel, the inspectors determined that the corrective actions prescribed by CR 20080254 R1 adequately corrected the condition adverse to quality documented in VIO 70-3098/2008-03-01. Based on this review, the violation is closed.

(2) Conclusion

VIO 70-3098/2008-03-01, Failure to Incorporate Design Requirements to Field, is closed based on the documentation reviewed and interviews held with MOX Services' personnel.

b. (Closed) VIO 70-3098/2008-01-02: Inadequate Disposition of Non-Conforming Rebar Splices

(1) Scope and Observations

The inspectors reviewed CR 20080199 and CR 20080047, which documented this violation. The NRC inspectors also reviewed NCR EN-07-0110, which was initiated on October 17, 2007, to document the justification that the non-conforming rebar splices were acceptable for "use-as-is" and no modification of installed rebar splice was necessary.

NRC inspectors identified that NCR EN-08-0178, which were written after this violation was issued, did not fully correct the condition adverse to quality documented in VIO 70-3098/2008-01-02. The applicant issued CR 20080199, which documented that NCR EN-07-0110 and NCR EN-08-0178 provided insufficient information to adequately resolve concerns stated in the violation. The inspectors reviewed ECR 000874 and determined that the actual engineering approach to justify the "use-as-is" of the rebar splices was adequate to address a deviation of that magnitude. The inspectors determined that the corrective actions prescribed by CR 20080199 adequately corrected the condition adverse to quality documented in VIO 70-3098/2008-01-02. Based on this review the violation is closed.

(2) Conclusion

VIO 70-3098/2008-01-02, Inadequate Disposition of Non-Conforming Rebar Splices, is closed based on the documentation reviewed and interviews held with MOX Services' personnel.

8. Exit Interviews

The inspection scope and results were summarized throughout this reporting period by the senior resident inspector on July 6, 2009, and with the regional specialist inspectors on April 23, April 30, and June 4, 2009, at the MFFF site and subsequently presented again in another exit meeting by telephone on June 15. 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
R. Bett, Lead Designer
M. Brickey, Manager Electrical and Instrumentation and Controls (I&C) Design
D. Bruyninckx, Electrical Procurement Engineering Lead
C. Burke, Piping Design Supervisor
J. Collins, Manager Electrical Design
W. Cordle, Mechanical Engineer
R. Daniels, Lead Chemical and Mechanical Engineer Manager
D. DePriest, Electrical Design Engineer
D. Dyar, I & C Procurement Engineer
W. Elliott, Engineering Vice-President
J. Firestone, Electrical Procurement Engineer
D. Gwyn, Regulatory Affairs Manager
D. Ivey, Quality Control Engineer
M. Johnson, Welded Equipment Engineer
V. Joshi, Electrical Design Engineer
R. Justice, Quality Assurance Programs Manager
D. Kehoe, Quality Assurance Engineer
T. Lavin, Piping Engineer
D. McCready, Electrical Design Engineer
O. Mendiratta, Licensing Engineer
C. Murray, Mechanical Engineer
B. Park, Procurement Engineering Group
B. Pemberton, I & C Design Engineer
J. Peregoy, Quality Assurance Specialist
R. Phillips, Assistant Lead Materials Engineer Specialist
J. O'Dell, Engineering Assurance Specialist
G. Shell, Quality Assurance Manager
N. Simpson, Licensing engineer
D. Stinson, President and Chief Operating Officer
J. Tanner, I & C Design Engineer
S. Townsend, Procurement Engineering Group
F. Voshell, Heating, Ventilation, and Air Conditioning (HVAC) Engineer
R. Whitley, Quality Control Manager

NRC Personnel

S. Freeman, Acting Branch Chief, Construction Inspection Branch 3 (CIB3), Division of Construction Inspection (DCI), Region II (RII)
M. Lesser, Branch Chief, CIB1, DCI, RII
K. O'Donohue, Branch Chief, CIB2, DCI, RII

D. Tiktinsky, Licensing Project Manager, Office of Nuclear Materials Safety and Safeguards

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

2. INSPECTION PROCEDURES (IPs) USED

IP 88107	Quality Assurance: Design and Documentation Control (Pre-licensing and Construction)
IP 88108	Quality Assurance: Control of Materials, Equipment, and Services (Pre-licensing and Construction)
IP 88109	Quality Assurance: Inspection, Test Control, and Control of Measuring and Test Equipment
IP 88110	Quality Assurance: Problem Identification, Resolution and Corrective
IP 88130	Resident Inspection Program for On-Site Construction Activities
IP 88131	Geotechnical/Foundation Activities
IP 88132	Structural Concrete Activities
IP 88134	Piping Relied on For Safety
IP 88136	Mechanical Components

3. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Item Number	Status	Description
70-3098/2009-02-01	Open	URI: Failure to Identify and Document an Adverse Condition (Failure to Meet ACI 349-97 Code Requirements for Clear Spacing Between Parallel Rebars) (two examples) (Sections 4.c and 6.b)
70-3098/2009-02-02	Open	VIO: Failure to Correctly Translate Electrical Design Requirements into Design Documents (four examples) (Sections 5.b.(1), 5.b.(2), and 5.b(3))
70-3098/2009-02-03	Open	URI: Review of Design Change Process (Section 5.b(2))
70-3098/2009-02-04	Open	IFI: Follow-up resolution of CR 20090163 on technical deficiencies of procurement specifications for batteries. (Section 5.b.(4))
70-3098/2008-03-01	Closed	VIO: Failure to Incorporate Design Requirements to Field (Section 10.a)

70-3098/2008-01-02	Closed	VIO: Inadequate Disposition of Non-Conforming Rebar Splices (Section 10.b)

4. LIST OF ACRONYMS USED

AC	Alternating Current
ACI	American Concrete Institute
ADAMS	Agency-Wide Document Access and Management System
BAP	Aqueous Polishing Building
BKR	Breaker
BMF	Fuel Manufacturing Building
BMP	Manufacturing Building
BOD	Basis of Design
BSR	Shipping/Receiving Building
CAR	Construction Authorization Request
CFR	Code of Federal Regulations
CLSM	Controlled Low Strength Material
CMTR	Certified Material Test Report
CR	Condition Report
DC	Direct Current
DN	Deviation Notices
ECR	Engineering Change Request
EDG	Emergency Diesel Generator
ETAP	Electrical Transient and Analysis Program
FE	Field Engineer
HDE	High Depressurization Exhaust
HVAC	Heating, Ventilation, and Air Conditioning
IEEE	Institute for Electrical and Electronic Engineers
IFI	Inspector Follow-up Item
IP	Inspection Procedure
IROFS	Item Relied on for Safety
MFFBS	MOX Fuel Fabrication Building Structure
MFFF	Mixed Oxide Fuel Fabrication Facility
MPQAP	MOX Project Quality Assurance Plan
NCR	Nonconformance Report
NRC	Nuclear Regulatory Commission
NCSE	Nuclear Criticality Safety Evaluation
NMSS	Office of Nuclear Materials Safety and Safeguards
NRC	Nuclear Regulatory System
NRMCA	National Ready Mix Concrete Association
P&ID	Piping and Instrumentation Diagram
PP	Project Procedure
PSSC	Principal Structures, Systems, and Components
QA	Quality Assurance
QC	Quality Control
QCI	Quality Control Inspection
QL-1	Quality Level 1

QORE	Construction Materials Testing Laboratory
Rebar	Reinforcing bar
Rev.	Revision
SDDR	Supplier/Subcontractor Deviation Disposition Request
SDR	Supplier Deficiency Report
SRFI	Supplier/Subcontractor Request for Information
SWGR	Switchgear
UL	Underwriters Laboratory
UPS	Uninterruptible Power Supply
URI	Unresolved Item
V	Volt
VAC	Volts Alternating Current
VDC	Volts Direct Current
VHD	Very High Depressurization
VIO	Violation
VFD	Variable Frequency Drive

5. LIST OF DOCUMENTS REVIEWED

Shaw/Areva MOX Services' Procedures:

PP 3-5, Control of Nonconforming Items, Rev. 4
PP 3-6, Corrective Action Process, Rev. 10
PP 3-25, Root Cause Analysis, Rev. 3
PP 3-27, Quality Control Personnel Certification
PP 3-28, Quality Control Receiving Inspection, Rev. 2
PP 7-9, Electronic Document Management System, Rev. 3
PP 8-6, Licensing Basis Configuration Management, Rev. 7
PP 9-1, SSC Quality Levels and Marking Design Documents, Rev. 10
PP 9-3, Design Control, Rev. 16
PP 9-5, Supplier/Subcontractor Technical Document Control, Rev. 6
PP 9-6, Calculations, Rev. 2
PP 9-7, Drawings, Rev. 12
PP 9-8, Technical Documents, Rev. 9
PP 9-9, Engineering Specifications, Rev. 9
PP 9-14, Design Process, Rev. 3,
PP 9-16, Basis of Design Documents, Rev. 7,
PP 9-20, Safety and Design Integration, Rev. 3
PP 9-21, Engineering Change Request, Rev. 5
PP 10-00, Procurement Process and Material Management Overview, Rev. 4
PP 10-14, Vendor Submittal Management, Rev. 3
PP 11-4, Batch Plant Mix Design and Validation Instructions, Rev. 0
PP 11-3, Batch Plant Operating Instructions, Rev. 0
PP 11-5, Bath Plant Testing and Calibration Instructions, Rev. 0
PP 11-12, Placement of concrete, Embedded Structural Items and Accessories, Rev. 0
PP 11-24, Receiving and Processing Material, Rev. 1
PP 11-25, Control of Issued QL1 and QL-2 Material, Rev. 0

PP 11-26, Material Handling, Storage and Control, Rev. 1
PP 11-30, Control of Material Shipping, Rev. 0
PP 11-35, Construction Inspection and Acceptance Testing, Rev. 3
PP 11-44, Work Package Planning, Development, Approval, and Closure, Rev. 4
PP 11-50, General Welding Program Instructions, Rev. 0
PP 11-58, General Welding Program Instructions, Rev. 0
EG 05-4, Engineering Change Control

Contractor Procedures

TP-1.2 REV 9, Liquid Penetrant Testing Procedure for Type II Visible Dye, dated November 1, 2007 (Premier Technologies)
TP-1.2.1, Liquid Penetrant Testing Procedure for Type II Visible Dye, dated October 9, 2008 (Premier Technologies)
PQR SS Tig-01 (Premier Technologies)
QC-2656-34, Helium Mass Spectrometer Testing, Rev. 2, dated September 10, 2008 (Joseph Oat)
SP-BD-8, Standard Practice for Induction Bending of High Alloy Steels, (The Shaw Group, Inc.), Rev. 0, dated June 21, 2006.
WPS-102G, Welding Procedure with PQR, (BF Shaw Procedure)
WPS PTA-B-8A Rev. 1 (Premier Technologies)

URS:
Radiographic Testing, M-NDE-002, Rev. 1

Specifications

DCS01-EEJ-DS-SPE-E-25118, Specification for 480V Dry Type Distribution Transformers, Rev. 2

DCS01-EEJ-DS-SPE-E-25130, Specification for 208/120 Volt AC Three Phase Vital Power & Essential Power Inverters, Rev. 0

DCS01-EEJ-DS-SPE-E-25134, Procurement Specification for 250/125 VDC Batteries and Chargers, Rev. 0

DCS01-EEJ-DS-SPE-E-25144, Specification for Low Voltage Metal Enclosed Switchgear (Emergency), Rev. 0

DCS01-EEJ-DS-SPE-E-25148, Procurement Specification Variable Frequency Drives (VFD), Rev. 2

DCS01-EEJ-DS-SPE-E-25232, Specification for 480 Volt AC Three Phase Static Uninterruptible Power Supplies, Rev. 0

DCS01-EEJ-DS-SPE-E-25236, Specification for Emergency Diesel Generators, Rev. 0

DCS01-EEJ-DS-SPE-E-25332, Specification for Emergency Power Distribution Control Panels 1000/2000 (Trains A & B), Rev. 0

DCS01-EEJ-DS-SPE-E-25348, Specification for Enclosed Circuit Breakers

DCS01-BKA-DS-SPE-B-09330-4, Construction Specification Section 03301, Placing Concrete and reinforcing Steel for Quality Level 1, 2, 3, and 4

DCS01-BKA-DS-SPE-B-09328, Construction Specification Section 03201, Concrete Reinforcement for Quality Level 1a (IROFS), 2, 3, and 4

DCS01-BKA-DS-SPE-B-09327-1, Construction Specification Section 03102, Concrete Forms and Accessories Quality Level 4

DCS01-AAJ-DS-DOB-M-40110-0, Basis of Design for Seismic Systems and Components, Quality Level 1a, IROFS

DCS01-AAJ-DS-DOB-B-40103-2, Basis of Design for Structures, Quality Level 1a, IROFS

Procurement Specifications

DCS01-KKJ-DS-SPE-L-16263-2, Procurement Specification for Slab Tanks, dated September 6, 2006
DCS01-KKJ-DS-SPE-L-16264-3, Procurement Specification for Annular Tanks
DCS01-KKJ-DS-SPE-L-16265-3, Procurement Specification for Conventional Tanks, dated September 6, 2006
DCS01-KKJ-CG-NTE-L-03510-0, AP Welded Equipment Fissile Thickness Inspection, dated July 14, 2005
DCS01-KKJ-DS-NTE-L-10786-1, Specification for Neutron Absorption Panels of Slab Tank Modules, dated March 29, 2006
DCS01-KKJ-DS-NTE-L-12180-0, Technical Basis for Exempting Slab Tanks from Lethal Service Design Requirements, dated March 12, 2009
DCS01-KKJ-DS-NTE-L-16281-1, Welding Equipment and Piping General Specification for Titanium Grade 2 Materials, dated April 23, 2008
DCS01-KKJ-CG-NTE-L-03290-0, Welded Equipment
DCS01-ZMJ-DS-SPE-M-21402-1, Equipment Seismic Qualification Specification, dated December 16, 2008
DCS01-AAJ-DS-DOB-M-40121-1, Basis of Design Fluid Transport Systems – Equipment and Piping Quality Level 1a (IROFS)
DCS01-KPA-CG-SDD-F-06262-2, Aqueous Polishing – Unit KPA Purification System Document, Quality Level 1
DCS01-KKJ-DS-SPE-M-15120-1, Construction Specification - Division No. 15 – Mechanical Shop Fabrication of Piping, Quality Level 1 (IROFS)

DCS01-KKJ-DS-SPE-M-15115-0 (Construction Specification, Division No. 15 – Mechanical, Field Fabrication and Installation of Piping, Valves, and Specialty Items, Quality Level 1a (IROFS)
DCS01-AAJ-DS-DOB-M-40121-1, Applicability Determination, March 12, 2008.
DCS01-AAJ-DS-DOB-40101-1, Design Requirements Document Quality Level 1a (IROFS), dated May 15, 2007
DCS01-AAJ-CG-DOB-F-04628-1, Basis of Design for Aqueous Polishing Process Criteria Quality Level 1a (IROF), dated August 8, 2007
DCS01-KWD-DS-SDD-F-41022-1, Aqueous Polishing – Unit KWD System Description Document for the Liquid Waste Reception Unit Quality Level1a (IROFS), dated April 13, 2006

Drawings

DCS01-EAC-DS-SCE-C-29148, Sheet 1, 4.16 KV Emergency Bus A Swgr. EAC*SWG1000, Bkr. 1B EAC*SWG1000 Main Incoming Bkr. Schematic

DCS01-EAC-DS-SCE-C-29149, Sheet 1 of 3, 4.16 KV Emergency Bus A Swgr. EAC*SWG1000, Bkr. 2B EAC*GEN1000 Output Breaker Schematic, Rev. 0

DCS01-EAC-DS-SCE-C-29149, Sheet 2 of 3, 4.16 KV Emergency Bus A Swgr. EAC*SWG1000, Bkr. 2B EAC*GEN1000 Output Breaker Schematic, Rev. 1

DCS01-EAC-DS-SCE-C-29150, Sheet 1, 4.16KV Emergency Bus A Swgr. EAC*SWG1000, Bkr. 3A ECC*SW1100/ XS1100/ SWG1100 Schematic

DCS01-EAC-DS-SCE-C-29151, Sheet 1 of 2, 4.16 KV Emergency Bus A Swgr. EAC*SWG1000, Bkr. 3B HDE*VFD001A (HDE*FN0001A) Schematic, Rev. 1

DCS01-EAC-DS-SCE-C-29154, Sheet 1 of 3, 4.16 KV Emergency Bus A Swgr. EAC*SWG1000, Bus Protection Circuit Schematic, Rev. 1

DCS01-EAC-DS-SCE-C-29154, Sheet 2 of 3, 4.16 KV Emergency Bus A Swgr. EAC*SWG1000, Bus Protection Circuit Schematic, Rev. 1

DCS01-EAC-DS-SCE-E-26005, 4.16 KV Emergency Bus A Swgr. EAC*SWG1000 One Line Diagram, Rev. 1

DCS01-EAC-DS-SCE-E-26006, MFFF Electrical Distribution

DCS01-EBA-DS-SCE-E-26060, Sheet 1 of 2, QL2 125 VDC Power, Normal EBA-SWBD1000 One Line Diagram, Rev. 0

DCS01-EBA-DS-SCE-E-26060, Sheet 1, of 2, QL2 250 VDC Power, Normal EBA-SWBD1000 One Line Diagram, Rev.

DCS01-EBA-DS-SCE-E-26060, Sheet 2 of 2, QL2 125 VDC Power, Normal EBA-SWBD2000 One Line Diagram, Rev. 0

DCS01-EBA-DS-SCE-E-26060, Sheet 3, QL2 125 VDC Power, Normal EBA-PNL1000 & EBA-PNL2000 One Line Diagram, Rev. 0

DCS01-EBB-DS-SCE-E-26061, Sheet 1, 125 VDC Power, Emergency Train A EBB PNL1000 One-Line Diagram, Rev. 2

DCS01-EBB-DS-SCE-E-26061, Sheet 2, 125 VDC Power, Emergency Train B – EBB*PNL2000 One Line Diagram, Rev. 2

DCS01-ECC-DS-SCE-C-29326, Sheet 1 of 2, 480 VAC Emergency Bus A Swgr. EAC*SWG1100, Bkr. 3B ECC*MCC1120 Schematic, Rev. 2

DCS01-ECC-DS-SCE-E-26012, Sheet 1, QL1 (IROFS) 480 Volt Emergency Bus A & B SWGR ECC*SWG1100 & ECC*SWG2100 One Line Diagram, Rev. 1

DCS01-ECC-DS-SCE-E-26012, Sheet 2 of 2, QL1a (IROFS) 480 Volt Emergency Bus A & B SWGR ECC*SWG1100 & ECC*SWG2100 General Arrangement Diagram, Rev. 0

DCS01-ECC-DS-SCE-E-26049, Sheet 1, QL1 (IROFS) 480 Volt Emergency Train A MCC ECC*MCC1110 One Line Diagram, Rev. 5

DCS01-ECC-DS-SCE-E-26049, Sheet 2, QL1 (IROFS) 480 Volt Emergency Train A MCC ECC*MCC1110 One Line Diagram, Rev. 4

DCS01-ECC-DS-SCE-E-26050, Sheet 1 of 2, QL1 (IROFS) 480 Volt Emergency Train A MCC ECC*MCC1110 One Line Diagram, Rev. 5

DCS01-ECC-DS-SCE-E-26050, Sheet 2 of 2, QL1 (IROFS) 480 Volt Emergency Train A MCC ECC*MCC1120 One Line Diagram, Rev. 3

DCS01-ECC-DS-SCE-E-26051, Sheet 1, QL1 (IROFS) 480 Volt Emergency Train B MCC ECC*2110 One Line Diagram, Rev. 5

DCS01-ECC-DS-SCE-E-26051, Sheet 2, QL1 (IROFS) 480 Volt Emergency Train B MCC ECC*2110 One Line Diagram, Rev. 4

DCS01-ECC-DS-SCE-E-26052, Sheet 1 of 2, QL1 (IROFS) 480 Volt Emergency Train B MCC ECC*MCC2120 One Line Diagram, Rev. 5

DCS01-ECC-DS-SCE-E-26052, Sheet 2 of 2, QL1 (IROFS) 480 Volt Emergency Train B MCC ECC*MCC2120 One Line Diagram, Rev. 3

DCS01-ECC-DS-SCE-E-26063, Sheet 1 of 2, QL1 (IROFS) 480 Volt U.P.S. Emergency VHD*UPS0001A/B, 0002A/B One Line Diagram, Rev. 2

DCS01-ECC-DS-SCE-E-26063, Sheet 2 of 2, QL1 (IROFS) 480 Volt U.P.S. Emergency VHD*UPS0001A/B, 0002A/B One Line Diagram, Rev. 1

DCS01-ECC-DS-SCE-E-29326, Sheet 1 of 2, QL1 (IROFS) 480 Volt Emergency Bus A SWGR ECC*SWG1100, BKR 3B ECC*MCC1120 Schematic

DCS01-EEA-DS-SCE-E-26058, Sheet 1 of 3, QL2 120 Volt Essential Power EEA-PNL1000 One Line Diagram, Rev. 0

DCS01-EEA-DS-SCE-E-26058, Sheet 1, 208/120 Volt Essential Power EEA-PNL1000 One Line Diagram, Rev. 2

DCS01-EEA-DS-SCE-E-26058, Sheet 2 of 3, QL2 120 Volt Essential / Power EEA-PNL2000 One Line Diagram, Rev. 0

DCS01-EEA-DS-SCE-E-26058, Sheet 2, 208/120 Volt Essential Power EEA-PNL2000 One Line Diagram, Rev. 2

DCS01-EEA-DS-SCE-E-26058, Sheet 4, QL2 208 / 120 Volt Essential Power EEA-PNL2000 One Line Diagram, Rev. 0

DCS01-EEC-DS-SCE-E-26005, 4.16KV Emergency Bus A SWGR EAC*SWG1000 One Line Diagram, Rev. 2

DCS01-EEC-DS-SCE-E-26006, 4.16KV Emergency Bus B SWGR EAC*SWG2000 One Line Diagram, Rev. 2

DCS01-EEC-DS-SCE-E-26050, 480 VAC Emergency Train A MCC ECC*MCC1120 One Line Diagram, Rev. 5

DCS01-EEC-DS-SCE-E-26051, 480 VAC Emergency Train B MCC ECC*MCC2110 One Line Diagram, Rev. 5

DCS01-EEC-DS-SCE-E-26052, 480 VAC Emergency Train B MCC ECC*MCC2120 One Line Diagram, Rev. 5

DCS01-EEC-DS-SCE-E-26062, Sheet 1 of 1, QL1a (IROFS) 120 Volt Vital Power EEC*PNL1000 & 2000 One Line Diagram, Rev. 0

DCS01-EEC-DS-SCE-E-26062, Sheet 1, QL1 (IROFS) 208 / 120 VAC Vital Power EEC*PNL1000 & 2000 One Line Diagram, Rev. 2

DCS01-EED-DS-SCE-E-26059, MFFF 480 VAC UPS Lighting PWR DIST PNL EED-PNL1000 & 2000 One-Line Diagram, Rev. 2

DCS01-EEJ-DS-PLI-C-29975, Train A Emergency Distribution Panel EEJ*PNL1000 Layout, Rev. 0

DCS01-EEJ-DS-PLI-C-29976, Train B Emergency Distribution Panel EEJ*PNL2000 Layout, Rev. 0

DCS01-EEJ-DS-PLI-E-27901, MFFF BMP Electrical Rooms B-216, B217, B260, B-261 Equipment Plan

DCS01-EEJ-DS-PLI-E-27920, Sheet 1 of 2, , QL2 BSR Electrical Equipment Rooms D-104, D-106 Equipment Plan, Rev. 1, dated December 16, 2008

DCS01-EEJ-DS-PLI-E-27920, Sheet 1 of 2, QL2 BSR Electrical Equipment Rooms D-104, D-106 Equipment Plan, Rev. 2

DCS01-EEJ-DS-SCE-E-26000, Sheet 1 of 10, QL4 Electrical One Line Diagram Symbol Sheet, Rev. 0

DCS01-EEJ-DS-SCE-E-26001, Sheet 2 of 2, QL1 (IROFS) Main One Line Diagram, Rev. 2

DCS01-EEJ-DS-SCE-E-2601, Sheet 1 of 2, MFFF Main One Line Diagram, Rev. 2

DCS01-HDE-DS-SCE-C-29522, MFFF High Depressurization Exhaust (HDE) SYS-Train A HDE*VFD/FN0001A Schematic, Rev. 1

DCS01-HDE-DS-SCE-C-29715, MFFF High Depressurization Exhaust (HDE) System NPLC Instrument Loop Diagrams, Rev. 2

DCS01-HDE-DS-SCH-V-12510, Piping & Instrument Diagram High Depressurization Exhaust (HDE) System MFFF Processing Plant, Rev. 4

DCS01-VHD-DS-SCE-C-29073, Sheet 1, QL1 (IROFS) Very High Depressurization EXH. (VHD) Start / Stop VFD*FN0001A Logic Diagram, Rev. 1

DCS01-VHD-DS-SCE-C-29073, Sheet 2, QL1 (IROFS) Very High Depressurization EXH. (VHD) Start / Stop VFD*FN0001A Logic Diagram, Rev. 1

DCS01-VHD-DS-SCE-C-29073, Sheet 3, QL1 (IROFS) Very High Depressurization EXH. (VHD) Start / Stop VFD*FN0001A Logic Diagram, Rev. 1

DCS01-VHD-DS-SCE-C-29073, Sheet 4, QL1 (IROFS) Very High Depressurization EXH. (VHD) Start / Stop VFD*FN0001A Logic Diagram, Rev. 1

Other Drawings:

DCS01-BMF-DS-PLF-8-02361, Rev. 0
DCS01 BMF DS PLF B 01352, Rev. 12
DCS01 BMF DS PLF B 01431, Rev. 3
DCS01 BMF DS PLF B 01421, Rev. 4
DCS01 BMF DS PLF B 01411, Rev. 4
DCS01 BMF DS PLF B 01397, Rev. 4
DCS01 BMF DS PLF B 01396, Rev. 4
DCS01 BMF DS PLF B 01367, Rev. 1
DCS01 BMF DS PLF B 01382, Rev. 4
DCS01 BMF DS PLF B 01363, Rev. 3
DCS01 BMF DS PLF B 01366, Rev. 1
DCS01 BMF DS PLF B 01353, Rev. 9
DCS01 BMF DS PLF B 01352, Rev. 11
DCS01 BMF DS PLF B 01354, Rev. 6
DCS01 BMF DS PLF B 01362, Rev. 3
DCS01-KWD-DS-NOM-T-10222-7 (Line Designation Table)
KWD-DS-PLI-T-DP4022PM, Sheet 1, Rev. 3
KWD-DS-PLI-T-DP4022PM, Sheet 2, Rev. 2
KWD-TK3100-4.000-QL-2-001
KWD-DP4022-1.500-QL-2-001
KWD-DP4022-1.500-QL-2-002
KWD-DP4022-1.500-QL-2-003
KWD-DP4022-1.500-QL-2-004
KWD-DP4022-1.500-QL-2-001A
KWD-DP4022-1.500-QL-2-002A
KWD-DP4022-1.500-QL-2-003A
KWD-DP4022-1.500-QL-2-004A
DCS01-KWD-DS-NOM-T-45241-3 (Line Designation Table)
KWD-DS-PLI-T-DP4007PM, Sheet 1, Rev. 3
KWD-DS-PLI-T-DP4007PM, Sheet 2, Rev. 2
KWD-TK4080-4.000-QL-1-003
KWD-DP4007-1.500-QL-1-001
KWD-DP4007-1.500-QL-1-002
KWD-DP4007-1.500-QL-1-003
KWD-DP4007-1.500-QL-1-004
KWD-DP4007-1.500-QL-1-001A
KWD-DP4007-1.500-QL-1-002A
KWD-DP4007-1.500-QL-1-003A
KWD-DP4007-1.500-QL-1-004A
DCS01-KWD-DS-NOM-T-45461-3 (Line Designation Table)
KWD-DS-PLI-T-DP3012PM, Sheet 1, Rev. 2
KWD-DS-PLI-T-DP3012PM, Sheet 2, Rev. 2
KWD-TK3050-4.000-QL-2-002

KWD-DP3012-1.500-QL-2-001
KWD-DP3012-1.500-QL-2-002
KWD-DP3012-1.500-QL-2-003
KWD-DP3012-1.500-QL-2-004
KWD-DP3012-1.500-QL-2-001A
KWD-DP3012-1.500-QL-2-002A
KWD-DP3012-1.500-QL-2-003A
KWD-DP3012-1.500-QL-2-004A
DCS01-WWJ-DS-PLG-G-22673, Sheet 6, Rev. 0
DCS01-WWJ-DS-PLG-T-22674, Sheet 50, Rev. 1
DCS01-WWJ-DS-PLG-T-22674, Sheet 51, Rev. 2
DCS01-WWJ-DS-PLG-T-22674, Sheet 52, Rev. 1
DCS01-WWJ-DS-PLG-T-22674, Sheet 53, Rev. 1
DCS01-WWJ-DS-PLG-T-22674, Sheet 54, Rev. 2
DCS01-WWJ-DS-PLG-T-22674, Sheet 55, Rev. 3
P-PY-F-2174, Rev. 1
P-PY-F-2175, Rev. 1
P-PY-F-2176, Rev. 1
DCS01-KWD-DS-PLI-T-DP3012, Sheet 1, Rev. 1
DCS01-KWD-DS-PLI-T-DP3012, Sheet 2, Rev. 1
DCS01-KWD-DS-PLI-T-DP4022, Sheet 1, Rev. 2
DCS01-KWD-DS-PLI-T-DP4022, Sheet 2, Rev. 1
DCS01-KWD-DS-PLI-T-DP4007, Sheet 1, Rev. 2
DCS01-KWD-DS-PLI-T-DP4007, Sheet 2, Rev. 1
006315-M-1822-4 Rev. 1
006315-M-1822-1 Rev. 5
006315-WM-1870-1 Rev. 0
DCS01-KPA-CG-PLG-L-07176 Rev. 2
DCS01-KPA-CG-PLG-L-07160 Rev. 3
Joseph Oat Corporation Final Fabrication Drawings for KWS-TK-4000
Joseph Oat Corporation Final Fabrication Drawings for KPC-TK-4000
MFFF Final Design Drawing for Aqueous Polishing Area Waste Solvent: Organic Solvent Tank KWS-TK-4000, dated March 5, 2007

Condition Reports

Condition Report 20090142, dated April 14, 2009, Two conditions identified during an NRC inspection on 14 Apr 09.

Condition Report 20090144, dated April 16, 2009, CR documents conditions identified during an NRC inspection on April 15 and 16, 2009.

Condition Report 2009146, dated April 16, 2009, the procurement specification for the Emergency Diesel Generator does not require a redundant electric starting system with redundant starting batteries.

Condition Report 20090162, dated April 29, 2009, Documents detailing the Emergency Diesel Generator load shedding scheme are incongruent

Condition Report 20090163, dated April 29, 2009, Electrical design basis questions received from NRC

CR 20090104
CR 20090157
CR 20080295
CR 20080254
CR 20080172
CR 20080199
CR 20080047
CR 20090203
CR 20090208
CR 20090154
CR 20090156

Non-Conformance Reports (NCR):

NCR EN-07-01105
NCR EN-08-368
NCR EN-08-0434
NCR EN-07-0110
NCR EN-08-0178
NCR V2382 Rev. 2
NCR V2389 Rev. 2
NCR V2408
NCR V2413 Rev. 1A
NCR V2413 Rev. 1B
NCR V2409 Rev. 1
NCR V2417 Rev. 1
NCR V2431 Rev. 1
NCR V2440
NCR V2441 Rev. A
NCR V2443

Engineering Change Requests

ECR-001554, Revise Embedded Software Requirements in Specifications DCS01-EEJ-DS-SPE-E-25144 & 25332, Rev. 0

ECR-001706, Emergency Diesel Generator Specification DCS01-EEJ-DS-SPE-25236-0 Air Permit Requirements; approved February 17, 2009, Rev. 0

ECR-001750, Procurement of Regulating Transformers, EEA-XRC1000, EEA-XRC2000, EEC XRC1000, EEC XRC2000, EED-XRC1000, and EED-XRC2000, Rev. 0

ECR-001956, Clarify Equipment Requirements to Procurement Specification DCS01-EEJ-DS-SPE-25236-0, Rev. 0, approved March 3, 2009

ECR-002110, Quality Level Classification Change for Essential Power Transformers, EEA*IX1003, EEA*IX1004, EEA*IX1006, EEA*IX2003, EEA*IX2004, and EEA*IX2006, Rev. 0

ECR-002243, Add Requirements for EMI/RFI to specification DCS01-EEJ-DS-SPE- E-25332-0, Rev. 0

ECR-002355, Essential Power System EEA Inverters Procurement Specification Changes; approval pending, Rev. 0

ECR-002583, Design requirement omitted from specification DCS01-EEJ-DS-SPE-E-25236-0; approval pending, Rev. 0

ECR-002539, Drawings incorrectly identified in specification DCS01-EEJ-DS-SPE-E-25332-0; approval pending, Rev. 0

ECR-002308
ECR-001805
ECR-002515
ECR-002473
ECR-002000
ECR-001714
ECR-002308
ECR-002565
ECR-002511
ECR-002036
ECR-001804
ECR-000875
ECR-000865
ECR-000866
ECR-000944
ECR-000874
ECR 000173
ECR 000324
ECR 000703
ECR 000761
ECR 000770
ECR 000799, Rev. 1
ECR 000804
ECR 000880

ECR 000931, Rev. 1
ECR 000940
ECR 001046
ECR 001090
ECR 001092, Rev. 1
ECR 001155
ECR 001175
ECR 001207
ECR 001230
ECR 001248
ECR 001271
ECR 001273
ECR 001420
ECR 001558
ECR 001561
ECR 001621
ECR 001656
ECR 001661
ECR 001685
ECR 001688
ECR 001749
ECR 001907
ECR 001943
ECR 002005
ECR 002033
ECR 002034
ECR 002060
ECR 002268, Rev. 1
ECR 002269, Rev. 1
ECR 002276, Rev. 1
ECR 002327
ECR 002498
ECR 002621
ECR 002814
ECR 000173
ECR 000254
ECR 000391
ECR 000879
ECR 000881
ECR 000934
ECR 001127
ECR 001175
ECR 001183
ECR 001207
ECR 001384
ECR 001448
ECR 001557

ECR 001558
ECR 001561
ECR 001656
ECR 001685
ECR 001688
ECR 001759
ECR 001799
ECR 001840
ECR 001908
ECR 001943
ECR 002024

Inspection Exception Report (IER)

IER 09-134
IER 09-115

Nonconformance Reports (NCRs)

NCR QC-07-0061S
NCR BK-08-0218
NCR QC-08-0469
NCR QC-08-0523
NCR FC-09-0611

Surveillance Reports (SRs):

SR-QC-09-0086
SR-QA-07-0086
QA Source Surveillance Report #BFS-09-VS100
QA Source Surveillance Report #BFS-09-VS107
QA Source Surveillance Report #BFS-09-VS109
QA Source Surveillance Report #BFS-09-VS122
QA Source Surveillance Report #BFS-09-VS123
QA Source Surveillance Report #BFS-09-VS130
QA Source Surveillance Report #BFS-09-VS131
QA Source Surveillance Report #BFS-09-VS135
QA Source Surveillance Report #BFS-09-VS140
QA Source Surveillance Report #BFS-09-VS151

Miscellaneous Documents

Work Packages:

08-10888C-1935-BMP-W106B-C
09-10888-C-1935-BAP-RM-150-C

Vendor Review Forms:

08716-10888-P-00002532_-0311-B
08716-10888-P-00002532_-0310-B
08716-10888-P-00002664_-0295-B
08716-10888-P-00002664_-0294-B

Construction / Procurement Specifications

DCS01-KKJ-DS-SPE-L-16263-2, Procurement Specification for Slab Tanks, dated September 6, 2006
DCS01-KKJ-DS-SPE-L-16264-3, Procurement Specification for Annular Tanks
DCS01-KKJ-DS-SPE-L-16265-3, Procurement Specification for Conventional Tanks, dated September 6, 2006
DCS01-KKJ-CG-NTE-L-03510-0, AP Welded Equipment Fissile Thickness Inspection, dated July 14, 2005
DCS01-KKJ-DS-NTE-L-10786-1, Specification for Neutron Absorption Panels of Slab Tank Modules, dated March 29, 2006
DCS01-KKJ-DS-NTE-L-12180-0, Technical Basis for Exempting Slab Tanks from Lethal Service Design Requirements, dated March 12, 2009
DCS01-KKJ-DS-NTE-L-16281-1, Welding Equipment and Piping General Specification for Titanium Grade 2 Materials, dated April 23, 2008
DCS01-KKJ-CG-NTE-L-03290-0, Welded Equipment
DCS01-ZMJ-DS-SPE-M-21402-1, Equipment Seismic Qualification Specification, dated December 16, 2008
DCS01-AAJ-DS-DOB-M-40121-1, Basis of Design Fluid Transport Systems – Equipment and Piping Quality Level 1a (IROFS)
DCS01-KPA-CG-SDD-F-06262-2, Aqueous Polishing – Unit KPA Purification System Document, Quality Level 1
DCS01-KKJ-DS-SPE-M-15120-1, Construction Specification - Division No. 15 – Mechanical Shop Fabrication of Piping, Quality Level 1 (IROFS)
DCS01-AAJ-DS-DOB-M-40121-1, Applicability Determination, March 12, 2008.
DCS01-AAJ-DS-DOB-40101-1, Design Requirements Document Quality Level 1a (IROFS), dated May 15, 2007
DCS01-AAJ-CG-DOB-F-04628-1, Basis of Design for Aqueous Polishing Process Criteria Quality Level 1a (IROF), dated August 8, 2007
DCS01-KWD-DS-SDD-F-41022-1, Aqueous Polishing – Unit KWD System Description Document for the Liquid Waste Reception Unit Quality Level1a (IROFS), dated April 13, 2006

Drawings / Piping and Instrumentation Diagrams

DCS01-WWJ-DS-PLG-T-22674, Rev. 2, with ECR 001685.
DCS01-BMF-DS-PLS-B-01774 Sheet 3, Rev. 3
DCS01-BMF-DS-PLS-B-01772 Sheet1, Rev. 6
DCS01-BMF-DS-PLF-B-02360 Sheet 1, Rev. 4

DCS01-XGA-CG-PLG-D-00106 Sheet 1, Rev. 2
DCS01-XGA-DS-PLI-D-11741 Sheets 1-4, Rev. 0
DCS01-KWD-DS-SCH-D-16773, Rev. 1,
DCS01-KWD-DS-SCH-D-16776, Rev. 1,
DCS01-KWD-DS-PLI-T-CP3021, Sheet 01, Rev. 1
DCS01-KWD-DS-PLI-T-DP4007, Sheets 01 & 02, Rev. 2
DCS01-WWJ-DS-PLG-T-22674, Sheet 55, Rev. 3
DCS01-KKJ-DS-PLG-T-10076, Sheet 1, Rev. A
DCS01-KPA-DS-PL1-T-01 86500, Sheet 01, Rev. 0
DCS01-KPA-DS-PL1-T-6331700, Sheet 01, Rev.1
DCS01-KPA-DS-PL1-T-01 85601, Sheet 05, Rev. 0
DCS01-KBD-DS-PL1-T-5268502, Sheet 01, Rev. 0
DCS01-CHP-DS-PL1-T-6686900, Sheet 01, Rev. 0
DCS01-CHP-DS-PL1-T-6688700, Sheet 09, Rev. 0
DCS01-KPA-DS-SCH-D-16754, Sheet 03 of 24, Rev. 2
06593 Rev. 3
06594 Rev. 2
006314-M-600-4 Rev. 6
P&ID - DCS01-KPA-DS-SCH-D-16754, Sheet 20 of 24, Rev. 2
MFFF Construction Authorization Request Docket No. 070-03098, Figure 11.3-2 General Flow Diagram, dated June 12, 2004

Other Documents:

DCS01-ZMS-DS-CAL-M-12026, Required Response Spectra for Equipment and Components Seismic Qualification

DCS01-EEJ-DS-CAL-E-25093, Rev. 10, MFFF Electrical Distribution System Calculation

DCS01-EEJ-DS-SDD-E-25028, Rev. 1, System Description Document for Backup Power System

DCS01-EEJ-DS-SDD-E-25025, Rev. 1, System Description Document for 4.16 kV AC Power

EG05-4, Engineering Change Control, dated December 5, 2007

Solicitation 10888-R-24415, dated February 17, 2009, including Amendments 1, 2, and 3

Authorized Suppliers List, Rev. 69, Fairbanks Morse Corporation, dated April 9, 2009

FMC-08-VE97, Fairbanks Morse Corporation, dated October 17, 2008, including Form PP3-12C, Supplier Evaluation Summary Report, dated September 25, 2008

Approved Supplier’s List, Rev. 69 prepared by Stacey Rucker, dated April 9, 2009

Gutor Electronics Ltd. CH5430 Wettingen – Functional Description of Redundant Inverter System WEW / WDW with Static Switch EA & EN, with two 3-position manual bypass switches and 1 common bypass mains.

Basis of Design for Electrical Systems DCS01-AAJ-DS-DOB-E-40111-2, dated December 20, 2007, prepared by D. S. DePriest.

Electrical Transient Analysis Program (ETAP) generated Essential System EEA One Line Diagram.

DCS01-QJJ-DS-TRD-V-10953, Sequence of Operation for the HVAC Control Systems QL-1a-IROFS, Rev. 0, dated September 21, 2006

GNB Technologies – Drawing Number: 431419 – Title: 60 Cell Absolyte 100A17 2 Stacks/7 High + 1 Stack/6 High 3 Hours or Longer to 1.75 VPC

GNB Industrial Power IEEE Cell Sizing Worksheet v4.0 dated 30.03.2009 using 100G17

MOX Project Quality Assurance Plan, docket No. 070-03098, Rev. 6, Change 1
MFFF License Application Docket No. 070-03098, dated November 17, 2006, Section 11.7 Fluid Transport Systems
BF Shaw Project Record Submittal, Quality Record Package for Packing List (Shipping No.) S3917, PO No. 1088-P-2613-DCS-002, BF Shaw, Inc. Job No. 8754
Premier Technology, Inc Project Record Submittal for Tank KPA-TK-9100
Receiving Inspection Report, QC-RIR-09-6010, Tank TPA-TK-9100
Receipt inspection report for slab tank, QC-RIR-09-6388, KPA TK8500
CMTR Report NA 07-1899 from QC-RIR-09-6388
RT Report 08-5128 from QC-RIR-09-6388
PT Report 08-4910 from QC-RIR-09-6388
Aqueous Polishing Unit KWS, Waste Organic Solvent Unit System Description Document, Quality Level 1a (IROFS) DCS01-KWS-DS-10333-1, March 27, 2006
Documentation Package for ASME Section VIII, Division I, Nitric Acid Recovery: Recovered \Acid Reception Tank (FTS 2), Equipment No. KPC-TK-4000, Purchase Order No. 10888-S-1415, Joseph Oat Job No. 2656-12
Documentation Package for ASME Section VIII, Division I, High Alpha Buffer Tank (FTS 2), Equipment No. KWD-TK-4050, Purchase Order No. 10888-S-1415, Joseph Oat Job No. 2656-30
Nuclear Criticality Safety Evaluation (NCSE-D), AP Auxiliary Units, Quality Level 1a IROFS, DCS01-KKJ—DS-ANS-H-35053, Rev. 3, dated May 16, 2007
Work Package # 09-10888-C1935-RWP-M-1 (Installation of the KWD liquid waste transfer piping and leak pot sensors connecting to the existing lines coming out of the BAP)
MOX Project Quality Assurance Plan, docket No. 070-03098, Rev. 6, Change 1
MFFF License Application Docket No. 070-03098, Rev. dated November 17, 2006, Section 11.7 Fluid Transport Systems
Material Receipt Report, LG EPI 07-0007, MRR no. 15Aug07002

Project Record Submittal for Tank KWD-TK-4040 (Joseph Oat Corporation)
Project Record Submittal for Tank KPA-TK-7000 (Premier Technologies)
Quality Control Receiving Inspection Report, QC-RIR-07-135, dated August 14, 2007
Quality Control Receiving Inspection Report, QC-RIR-08-253, Rev. 1
Quality Control Receiving Inspection Report, QC-RIR-08-0349, Rev. 0
Supplier Request for Information (SRFI) # 1412-RFI-062-R0
Vendor Doc No. 008754 40 00048 0, approval of BF Shaw Fabrication Drawing
Vendor Doc No. 008754 40 00055 0, approval of BF Shaw Fabrication Drawing
Vendor Doc No. 008754 44 00077 3, approval of BF Shaw Fabrication Drawing
Vendor Doc No. 008754 44 00077 4, approval of BF Shaw Fabrication Drawing
Vendor Doc No. 008754 44 00078 4, approval of BF Shaw Fabrication Drawing
Vendor Doc No. 008754 44 00079 4, approval of BF Shaw Fabrication Drawing
Vendor Doc No. 008754 44 00080 5, approval of BF Shaw Fabrication Drawing
Vendor Doc No. 008754 40 00081 4, approval of BF Shaw Fabrication Drawing
Vendor Doc No. 008754 40 00082 4, approval of BF Shaw Fabrication Drawing
Vendor Doc No. 008754 40 00083 4, approval of BF Shaw Fabrication Drawing
Vendor Doc No. 008754 40 00084 5, approval of BF Shaw Fabrication Drawing
Vendor Doc No. 008754 44 00323 1, approval of BF Shaw Fabrication Drawing
Vendor Doc No. 008754 44 00324 1, approval of BF Shaw Fabrication Drawing
Vendor Doc No. 008754 44 00325 1, approval of BF Shaw Fabrication Drawing
Vendor Doc No. 008754 44 00326 1, approval of BF Shaw Fabrication Drawing
Vendor Doc No. 008754 44 00327 1, approval of BF Shaw Fabrication Drawing
Vendor Doc No. 008754 44 00328 1, approval of BF Shaw Fabrication Drawing
Vendor Doc No. 008754 44 00329 1, approval of BF Shaw Fabrication Drawing
Vendor Doc No. 008754 44 00330 1, approval of BF Shaw Fabrication Drawing
Work Package 07-10888-C-1609-BAP-F5B-M, Installation of all embedded mechanical piping, QL 1
Work Package 09-10888-C-1935-BAP-KPA-TK-7000-M, Installation of tank KPA-TK-7000
Work Package 09-10888-C-1935-KWD-TK-4040-M, Installation of tank KWD-TK-4040
08716-10888-S-00001415-0443C, Weight, Seismic and Lifting Calculation, KWD-TK-4000
08716-10888-S-00001415-0442C, Weight, Seismic and Lifting Calculation, KWD-TK-3000
08716-10888-S-00001415-0348C, Weight, Seismic and Lifting Calculation, KWD-TK-1000
PT Examination Reports (For Premier Tank 5200, from the QC-RIR-09-5979):

- 08-2573
- 08-2430
- 08-3158
- 08-3152
- 08-3156
- 08-3296
- 08-3286
- 08-3568
- 08-3566

- 08-3546
- 08-4432
- 08-4441
- 08-4453
- 08-4477
- 08-4011
- 08-4692
- 07-2747
- 07-2753
- 08-0066
- 08-0067
- 08-0076
- 08-0079
- 08-0123
- 08-0131
- 08-0183
- 08-0187
- 08-0193
- 08-0197
- 08-0199
- 08-0200
- 08-0213
- 08-0214
- 08-0216
- 08-0217
- 08-0254
- 08-0255
- 08-0295
- 08-0485
- 08-0492
- 08-0519
- 08-0574
- 08-0617
- 08-0656
- 08-0657
- 08-0659
- 08-0660
- 08-0661
- 08-0662
- 08-0663
- 08-0665
- 08-0666
- 08-0667
- 08-0742

- 08-0747
- 08-0776
- 08-0777
- 08-0781
- 08-0782
- 08-0783
- 08-0784
- 08-0785
- 08-1126
- 08-1132
- 08-1227
- 08-1228
- 08-1254
- 08-1384
- 08-1426
- 08-1427
- 08-1428
- 08-1600
- 08-2226
- 08-2241
- 08-2327
- 08-2328
- 08-2329
- 08-2330
- 08-2331
- 08-2430
- 08-2573
- 08-2576
- 08-2605
- 08-2754
- 08-2761
- 08-2993
- 08-3152
- 08-3156
- 08-3158
- 08-3286
- 08-3294
- 08-3295
- 08-3296
- 08-3348
- 08-3369
- 08-3375
- 08-3400
- 08-3454

- 08-3467
- 08-3547
- 08-3566
- 08-3568
- 08-3580
- 08-3582
- 08-3593
- 08-3639
- 08-3666
- 08-3672
- 08-3676
- 08-3677
- 08-3686
- 08-3765
- 08-3773
- 08-3777
- 08-3814
- 08-3816
- 08-3819
- 08-3957
- 08-3999
- 08-4011
- 08-4012
- 08-4015
- 08-4094
- 08-4097
- 08-4125
- 08-4140
- 08-4154
- 08-4155
- 08-4185
- 08-4291
- 08-4293
- 08-4324
- 08-4432
- 08-4441
- 08-4453
- 08-4477
- 08-4692
- 08-4843
- 08-5100
- 09-0014