



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

January 28, 2008

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
70-3098/2007-005

Dear Mr. Stinson:

During the period from October 1 through December 31, 2007, the U.S. Nuclear Regulatory Commission (NRC) conducted inspections associated with the construction activities of the Mixed Oxide Fuel Fabrication Facility (MFFF). 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, which were discussed on January 3, 2008, with you and other members of your staff.

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 the inspections no findings of concern were identified.

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

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

Sincerely,

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

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

Enclosure: NRC Inspection Report 07003098/2007005
w/attachment

cc: w/encl: (See page 2)

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ADAMS: Yes ACCESSION NUMBER: [ML080290671](#)

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Letter to D. Stinson from Deborah A. Seymour dated January 28, 2008.

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70-3098/2007-005

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 70-3098

Construction
Authorization No.: CAMOX-001

Report No.: 70-3098/2007-005

Certificate Holder: Shaw AREVA MOX Services

Location: Savannah River Site
Aiken, South Carolina

Inspection Dates: October 1 – December 31, 2007

Inspectors: M. Shannon, Senior Resident Inspector
W. Gloersen, Senior Project Inspector
J. Tapia, P.E., Senior Reactor Inspector
R. Carrion, Senior Reactor Inspector

Accompanying
Personnel: R. Jackson, Construction Inspector
C. I. Román-Cuevas, Construction Projects Inspector

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

Enclosure

EXECUTIVE SUMMARY

Shaw AREVA MOX Services
Mixed Oxide Fuel Fabrication Facility
NRC Inspection Report No. 70-3098/2007-005

These routine inspections included activities conducted by specialists from the Region II office during October 22-26, 2007, and the senior resident inspector during normal shifts, and involved the observation and evaluation of the certificate holder's programs for 10 CFR Part 21 related to facility construction; quality assurance (QA) related to problem identification, resolution, and corrective actions; inspection, test control, and control of measuring and test equipment; structural concrete activities; and geotechnical foundation activities. In addition, on October 25, specialists from the RII office observed audit activities of a Quality Level 1 vendor performed by the certificate holder. The inspections identified the following aspects of the certificate holder's programs as outlined below:

Resident Inspection Program for On-Site Construction Activities

- Construction activities during the inspection period, including installations of reinforcing steel, embedded plates, embedded piping, and ground cables; heavy lifts of equipment and supplies; verification of equipment placements by surveys; welding; non-destructive tests (NDT); receipt of materials; and concrete placements, were performed in a safe and quality related manner and in accordance with procedures and work packages (Section 2).

Inspection, Test Control, and Control of Measuring and Test Equipment

- Equipment and instruments used to perform concrete specimen strength testing were properly calibrated. Concrete specimens were properly prepared and stored under proper temperature and humidity conditions at the QORE testing laboratory (Section 3).
- The concrete plant chemical addition system was properly calibrated (Section 3).

Geotechnical/Foundation Activities

- Low strength concrete was used extensively in place of compacted engineered fill under the Mixed Oxide (MOX) fabrication building. The seismic analysis was still under review by the NRC, although initial review and discussions indicated only minimal changes in design stresses would result from the change. The excavation slopes were adequately prepared prior to placement of the low strength concrete (Section 4).

Problem identification, Resolution and Corrective Action

- The certificate holder appropriately identified conditions adverse to quality, aggressively resolved the issues, and had/or was implementing appropriate corrective actions (Section 5).

Structural Concrete Activities

- Reinforcing steel, piping and plates were properly installed, cleanliness was more than adequate, and concrete placement activities were appropriate (Section 6).

Supplier/Vendor Inspection

- Implementation of the QA program pertaining to the applicant's conduct of vendor surveillance activities was adequate. The applicant had attained planned surveillance objectives and clearly communicated the identified deficiencies to the vendor (Section 7).

10 CFR, Part 21, Inspection-Facility Construction

- MOX services concluded that Energy and Process Corporation failed to perform adequate QA oversight of their subcontractors, resulting in numerous nonconforming conditions. Energy and Process Corporation was listed on the NUPIC QL-1 supplier list as a qualified supplier. The applicant also concluded, and the NRC concurs, that the failure of Energy and Process Corporation to perform adequate QA oversight of its subcontractors was neither reportable under 10 CFR 21 nor 10 CFR 70 requirements. The applicant's actions in response to this issue were appropriate (Section 8).

Attachment:

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 certificate holder continued construction activities related to building construction up to ground level (Release 1). The certificate holder completed seven base mats out of 28 needed to bring building construction up to ground level. At the end of the inspection period, the certificate holder had placed approximately 10,000 cubic yards of concrete, finished the lower level base mats for the receiving building, finished three base mats of the aqueous polishing building, completed two of 16 base mats in the manufacturing building, and placed approximately 2,000 cubic yards of flowable concrete in place of engineered fill. During the period, the certificate holder awarded the contract for Release 2, which is scheduled to start construction activities in January 2008.

2. Resident Inspection Program for On-Site Construction Activities (Inspection Procedure (IP) 88130)

a. Scope and Observations

During the inspection period, the inspectors observed the following activities: (1) installation of structural reinforcing steel in the Mixed Oxide (MOX) fabrication building, aqueous polishing building, emergency egress tunnel, and receiving building; (2) installation of embedded piping and embedded support plates in all three buildings; (3) placements of concrete in basemats for the manufacturing building, aqueous polishing building, and receiving building, and placement of concrete in the walls of the egress tunnel; (4) operation of the concrete batch plants; (5) receipt of cement, fly ash, sand and gravel; (6) concrete testing in the field (slump, air entrainment, and temperature) and concrete testing in the lab (strength); (7) welding and non-destructive testing (NDT) of piping to be embedded; (8) installation of building grounding cables in various basemats and walls; and (9) surveys (proper positioning/location) of embedded piping and embedded plates. In addition, the inspectors verified the following activities: (1) cleanliness of areas prior to concrete placement and maintenance of cleanliness during the concrete placements; and (2) adequate consolidation of concrete during placement (vibration of concrete) in various basemats and walls. No items of concern were identified.

The inspectors observed routine lifts conducted to position reinforcing steel, embedded piping, 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 certificate holder's procedures. No items of concern were identified.

The inspectors reviewed the applicable sections of the certificate holder's Quality Assurance (QA) program and verified that the installations of the structural reinforcing steel, embedded plates, embedded piping, and electrical grounding of the MOX structures were in accordance with the program. Specifically, the inspectors verified that installations were in accordance with applicable design drawings and met the general

construction notes detailed on drawing, MOX Fuel Fabrication Facility, Concrete and Reinforcing General Notes, DCS01-01352, Revision 9 (Sheet 1 of 2) and MOX Fuel Fabrication Facility, Concrete and Reinforcing General Notes and Tolerance Details, DCS-01352, Revision 6 (Sheet 2 of 2). No items of concern were identified.

The inspectors routinely attended the certificate holder's construction plan of the day meetings in order to maintain current knowledge of construction activities. The inspectors also routinely held discussions with MOX Services civil engineers, field engineers and quality control/assurance personnel, US Concrete personnel, and Baker Construction personnel in order to maintain current knowledge of construction activities and to maintain current knowledge of any problems and concerns.

The inspectors routinely reviewed the work packages maintained at each work site to verify construction personnel obtained proper authorizations to start work and maintained the packages up to date as tasks were completed. No items of concern were identified.

b. Conclusions

Construction activities during the inspection period, including installations of reinforcing steel, embedded plates, embedded piping, and ground cables; heavy lifts of equipment and supplies; verification of equipment placements by surveys; welding; NDT; receipt of materials; and concrete placements, were performed in a safe and quality related manner and in accordance with procedures and work packages.

3. **Inspection, Test Control, and Control of Measuring and Test Equipment (IP 88109)**

a. Concrete Testing Lab

(1) Scope and Observations

The inspectors observed slump testing, air entrainment testing and monitoring of concrete temperature as various concrete placements occurred. The testing was performed by a geotechnical engineering and construction materials testing laboratory (QORE) personnel and observed by MOX Services Quality Control (QC) personnel. No items of concern were identified.

The inspectors observed QORE personnel preparing concrete specimens. The specimens were prepared and stored in accordance with the American Society for Testing and Materials (ASTM) C 31, Standard Practice for Making and Curing Concrete Test Specimens in the Field. No items of concern were identified.

The inspectors inspected the concrete specimen curing room located at the QORE test facility on October 25, December 18 and 25. The inspectors noted that the temperature was maintained at 73 degrees Fahrenheit (F) and that the specimens were properly sprayed with water as part of the curing process. The inspectors noted that the additional specimens generated from the flow-able fill concrete being used in place of engineered fill was resulting in the curing room approaching maximum specimen capacity. No items of concern were identified.

The inspectors verified that the testing equipment was calibrated and observed proper calibration stickers on equipment used to strength test concrete specimens at the QORE test facility. The inspectors witnessed concrete strength testing during the three time periods noted above. The inspectors also verified that the curing room for the concrete samples met the requirements of the American Concrete Institute (ACI) for temperature and humidity. The testing was performed in accordance with ASTM C 39, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens. On December 25, the inspectors observed that two test cylinders tested below the 4,000 pounds per square inch minimum strength requirement, but within the ACI allowable limits. This deficiency was documented as NCR-07-0155, dated December 31, 2007. The inspectors also routinely reviewed the "Concrete Statistical Summary" maintained by US Concrete for MOX concrete testing. This summary included all testing to date.

(2) Conclusions

Equipment and instruments used to perform concrete specimen strength testing were properly calibrated. Concrete specimens were properly prepared and stored under proper temperature and humidity conditions at the QORE testing laboratory.

b. Concrete Production Plant

(1) Scope and Observations

The inspectors observed proper/up to date calibration stickers on the concrete chemical addition systems.

In addition, the inspectors inspected the on-site concrete production facility. The inspectors noted that the discrepancies identified by the certificate holder's QA organization during the previous inspection period had been resolved. The inspectors reviewed the concrete supplier's National Ready Made Concrete Association (NRMCA) QC manual plant certification for truck numbers 101, 102, 103, 104, and 105, and determined that the documentation was in order. No items of concern were identified.

(2) Conclusions

The concrete plant chemical addition system was properly calibrated.

4. Geotechnical/Foundation Activities (IP 88131)

a. Scope and Observations

During the inspection period, the certificate holder began using flowable fill in place of compacted engineered fill under the MOX manufacturing building basemats. By the end of the inspection period, approximately 2,000 cubic yards of flowable fill had been placed. This design change was approved based on design document DCS01-XGA-DS-CAL-B-01101-0, Study for Using Controlled Low Strength Material (CLSM) Locally and Analysis Update of BMF Structure.

The inspectors reviewed the CLSM calculation and discussed the effects that changing the fill material had on the safety related MOX buildings. Discussions indicated that the changes in stress during a seismic event would be very small. The calculation documented that by using CLSM locally, instead of engineered fill, the effect on foundation design qualification would go up for the critical area by 6%. The applicant determined that the qualified foundation calculation had a margin of 17%. This was greater than the 6% increase. Hence, the applicant concluded that the BMF building foundation remained acceptable for using CLSM. At this time, the inspectors did not have any concerns regarding the use of the CLSM in place of compacted engineered fill. However, the calculation was forwarded to Region II specialists for further review.

The inspectors observed the removal of loose material and the tar based coatings from the excavation slopes prior to placement of the CLSM. Soil testing indicated that the soil was acceptable for placement of the CLSM without performing any further compaction activities. This subsurface area is roughly 6-14 feet below the bottom of the future BMF basemats. The final CLSM will be roughly 14 feet thick. No items of concern were identified.

b. Conclusions

Low strength concrete was used extensively in place of compacted engineered fill under the MOX fabrication building. The seismic analysis was still under review by the NRC, although initial review and discussions indicated only minimal changes in design stresses would result from the change. The excavation slopes were adequately prepared prior to placement of the low strength concrete.

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

a. Scope and Observations

The inspectors reviewed non conformance reports (NCRs) associated with receipt of piping, piping radiographs, and concrete strength testing. The inspectors noted that these items were clearly documented in the corrective action program (CAP).

In addition, the inspectors reviewed NCRs and condition reports (CRs) associated with prior on-site activities as well as a NCR and a CR which were generated during the construction activities observed by the inspectors. The inspectors reviewed how the identified issues were processed through the CAP and noted that the certificate holder was aggressively documenting, resolving, and implementing appropriate corrective actions. No issues of concern were identified.

b. Conclusions

The certificate holder appropriately identified conditions adverse to quality, aggressively resolved the issues, and had/or was implementing appropriate corrective actions.

6. **Structural Concrete Activities (IP 88132)**

a. Scope and Observations

The inspectors observed various activities prior and during each major concrete placement. Prior to each placement, the inspectors randomly checked for proper placement of reinforcing steel, including proper overlap, support, and number/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 sleeve between piping and support. The inspectors also observed the installation of the grounding system for the reinforcing steel including embedded grounding posts for future equipment ground installation. The inspectors also noted (with the exception of some movement in Aqueous Polishing Building (BAP)-F2) minimal movement of wall dowels (reinforcing steel) during the placement activities. During the placements, the inspectors observed proper lift heights and consolidation activities (vibration) and noted that the concrete mix did not separate as it flowed. During the period, the inspectors observed MOX Services field BAP engineers and QC personnel performing inspections of the reinforcing steel, embed plates, embed piping, cleanliness prior to placements, and detailed observations of all placements.

During the week of October 22 to 26, specialist inspectors observed three concrete placements: MOX Process Building (BMP) F-103B (basemat), BMP W-129 (wall), and BAP F-1B and -1C (basemat). Prior to the placements, the inspectors reviewed the concrete and reinforcing steel drawings for the scheduled work, and inspected the formwork and reinforcing steel to verify that ACI Code requirements were satisfied.

During the concrete placements, specialist inspectors observed operations at the batch plant and at the point of placement. Concrete placement and testing activities were in accordance with procedural requirements. Minor difficulties observed during the placements were independently identified and corrected by on-going Quality Control inspections. The inspectors observed that concrete samples were collected at the prescribed frequency and noted that the slump and air content met the acceptance criteria, and that the concrete test cylinders were taken and temporarily stored per procedure prior to being transported to the off-site materials laboratory for curing and later testing. Batch plant operators correctly implemented procedural requirements and were in constant communication with the concrete placement crews. After initial adjustments, the batch plant produced over 100 cubic yards per hour for the duration of the placements.

Following is a list of the observed concrete placement activities:

August 14, 2007, BMP F-103 Duct Bank, 20 cubic yards

August 16, 2007, BAP F-1A, Elevator Pit Basemat, 55 cubic yards

August 17, 2007, BMP F-102B, Egress Tunnel Basemat, 240 cubic yards, verified by drawings BMP-ET01, BMP-ET02, BMF-01776 and BMF-01719

August 22, 2007, BAP F-5A, Elevator Pit Basemat, 40 cubic yards

August 29, 2007, BMP F-104A, Ductbank and Pipe Encasement, 120 cubic yards

September 5, 2007, BMP F-101 Egress Tunnel Basemat, 280 cubic yards, verified by drawings BMP-ET01, BMP-ET02, BMF-01776, BMF-01719 and BMF-01406

September 6, 2007, BMP F-108, Ductbank, 50 cubic yards

September 7, 2007, BAP F-3A, Seal Pit Basemat, 185 cubic yards

(Note: the concrete pours listed above were observed during a previous inspection period and are listed here for documentation purposes.)

October 8, 2007, BMP F-131, Egress Tunnel Wall, 92 cubic yards, verified by drawings BMP-ET01, BMP-ET02, and BMF-11440

October 8, 2007, BMP F-132, Egress Tunnel Wall, 90 cubic yards, verified by drawings BMP-ET01, BMP-ET02, and, BMF-11440

October 10, 2007, BMP F-103A, Basemat, 690 cubic yards, verified by drawings BMP-RF103, BMP-RF103A, BMP-RF103B, and BMF-01776

October 23, 2007, BMP F-103B, Basemat, 800 cubic yards, verified by drawings BMP-RF103, BMP-RF103A, BMP-RF103B, and BMF-01776

October 24, 2007, BMP F-129, Egress Tunnel Wall, 90 cubic yards, verified by drawings BMPET01, BMP-ET02, and BMF 11441

October 26, 2007, BAP F-1B/C, Basemat, 870 cubic yards, verified by drawings BAP-FR01 and BMF-01774

October 30, 2007, BMP F 130, Egress Tunnel Wall, 360 cubic yards, verified by drawings BMF-11441

October 31, 2007, BMP F-125, Safe Haven Stairwell Basemat, 70 cubic yards

November 1, 2007, BMP F-114A, Elevator Pit Basemat, 40 cubic yards

November 8, 2007, BAP F-2A/B, Basemat, 900 cubic yards (did not observe pour), verified by drawings BAP-FR02 and BMF-01774

November 14, 2007, BMP F-133, Safe Haven Stairwell Walls, 50 cubic yards

November 15, 2007, BMP F-105A/B, Basemat, 1250 cubic yards, verified by drawings BMP-RF103, BMP-RF103A, BMP-RF103B, and BMF-01776

December 6, 2007, BSR F-1A, Basemat, 1350 cubic yards, verified by drawings BSR-RF01, and BMF-01778

December 11, 2007, BAP F-3B/C, Basemat, 990 cubic yards, verified by drawings BAP-FR03 and BMF-01774

December 13, 2007, BSR F-31B, Basemat, 880 cubic yards, verified by drawings BSR-RF01 and BMF-01778

No items of concern were identified.

b. Conclusions

Reinforcing steel, piping and plates were properly installed, cleanliness was more than adequate, and concrete placement activities were appropriate. No issues of concern were identified.

7. **Supplier/Vendor Inspection (IP 88115)**

a. Scope and Observations

The inspectors observed the applicant conduct surveillance activities at the Tucker, Georgia office of Energy and Process Corporation on October 25, 2007. The purpose of the applicant's surveillance was to evaluate implementation of Energy and Process Corporation's quality assurance program and oversight of Energy and Process Corporation's subcontractors, and verification of Energy and Process Corporation's corrective actions to MOX Services identified quality issues. Energy and Process Corporation and its subcontractors supplied reinforcing steel to the MOX Fuel Fabrication Facility (MFFF) construction project.

The inspectors reviewed the applicant's surveillance plan, scope, and overall surveillance objectives as well as information on previously identified deficiencies. The inspectors discussed the surveillance plan with the applicant. Two members of the applicant's QA organization conducted the surveillance. One individual was qualified as a lead auditor while the second individual was in training status. It should be noted that the deficiencies were identified by the applicant and not the applicant's vendor. The objectives of the surveillance plan were clearly stated and focused on the applicant

identified deficiencies. The surveillance checklist adequately covered the stated objectives.

The inspectors observed the applicant's conduct of the following activities: (1) pre-surveillance conference; (2) execution of the surveillance by the applicant's QA organization; (3) identification and summarization of deficiencies; and (4) the exit interview. The details of the vendor's deficiencies as identified by the applicant are summarized in Section 8 of this report. The inspectors noted that the surveillance was conducted adequately in that the planned surveillance objectives were attained and the safety message was clearly communicated to the vendor during the exit meeting. The vendor was in the process of developing corrective actions.

b. Conclusions

Implementation of the QA program pertaining to the applicant's conduct of vendor surveillance activities was adequate. The applicant had attained planned surveillance objectives and clearly communicated the identified deficiencies to the vendor.

8. **10 CFR, Part 21, Inspection-Facility Construction (IP 88111)**

a. Scope and Observations

During this inspection period, the inspectors noted that various problems were identified by the certificate holder throughout the year regarding the Quality Level (QL) -1 supplier of reinforcing steel and embedded piping (Energy and Process Corporation). On September 17, 2007, the licensee initiated surveillance report (SR), SR-QC-07-098. This surveillance found that 28 of 45 radiographs, submitted by a subcontractor were unsatisfactory. The surveillance noted that (1) in several cases the block was placed at a disproportionate distance away from the weld, (2) the radiographs consistently exhibited blemishes including fogging, streaks, water marks, chemical stains, scratches, finger marks, dirt, static marks, smudges, and film tears, which required additional radiographs in some cases, (3) the minimum density was not achieved in several cases, (4) the radiographs did not exhibit the required sensitivity in several cases, (5) MOX Services QA reviewers had rejected welds for nonconformance to the acceptance criteria that had been accepted by the vendor as acceptable, and (6) the majority of the reports failed to document any indications of defects.

On October 3, 2007, MOX Services initiated CR-07-099, which stated that Energy and Process Corporation had failed to perform adequate QA oversight of their subcontractors, resulting in numerous non-conforming conditions. The identified nonconforming conditions resulted in evaluation and disposition of NCRs, rework, returns to vendor, and additional testing.

On October 25, 2007, the licensee conducted a surveillance of Energy and Process Corporation and identified several additional deficiencies. These deficiencies were documented in Supplier Deficiency Reports, EAP-07-VS71-001 and 002, and were summarized as follows:

- (1) Energy and Process Corporation had not conducted the 2007 annual audit of one of its subcontractors. The last audit was performed on April 10, 2006.
- (2) Various inspection and surveillance reports for a subcontractor were not filed in a timely manner and were not present in the applicable vendor history file.
- (3) The information evaluated for a six-month period from July 2006 to December 2006 was not processed in a timely manner in that it was not reported until September 2007.
- (4) Information from the MOX project (NCRs, deficiencies, complaints, etc.) kept in Energy and Process Corporation's MOX File was not tracked and assessed properly and therefore lacked key performance indicators to determine and evaluate Energy and Process Corporation's performance, as well as the performance of their sub-contractors. This deficiency indicated that Energy and Process Corporation was not meeting the requirements of their Quality System Manual, or Criteria 16, Basic Requirements for Corrective Action, of American Society of Mechanical Engineers (ASME) NQA-1-1994, Quality Assurance Program Requirements for Nuclear Facilities.

During discussions with the MOX Services Quality Assurance organization, the inspectors noted that MOX Services QA was providing the necessary QA oversight of the sub-vendors and would continue to provide this oversight until Energy and Process Corporation implemented adequate corrective actions to bring their QA program back into compliance. Discussions with the applicant also indicated that Energy and Process Corporation was listed on the Nuclear Utilities Procurement Issues Committee (NUPIC) QL-1 supplier list as a qualified supplier. The applicant also concluded, and the inspectors concurred, that the failure of Energy and Process Corporation to perform adequate QA oversight of its subcontractors was neither reportable under 10 CFR 21 nor 10 CFR 70 requirements. The inspectors concluded that the applicant's actions in response to this issue were appropriate.

b. Conclusions

MOX Services concluded that Energy and Process Corporation failed to perform adequate QA oversight of their subcontractors, resulting in numerous nonconforming conditions. Energy and Process Corporation was listed on the NUPIC QL-1 supplier list as a qualified supplier. The applicant also concluded, and the NRC concurs, that the failure of Energy and Process Corporation to perform adequate QA oversight of its subcontractors was neither reportable under 10 CFR 21 nor 10 CFR 70 requirements. The applicant's actions in response to this issue were appropriate.

9. Follow-up of Previously Identified Items

a. Scope and Observations

The following items were reviewed for completion of corrective actions:

Closed: IFI 70-3098/2007-02-01, Use of Less than Adequate Hold Tags for Segregation of Structural Reinforcing Steel. The certificate holder documented the corrective actions in Deficiency Action Request (DAR) DAR-07-023. Corrective actions included several surveillances to ensure tags were properly placed/maintained and the purchasing of laminated tags for future use. The inspectors verified the new laminated tags were in use.

Closed: IFI 70-3098/2007-02-02, Less than Adequate Documentation to Dedicate Commercially Obtained Engineered Backfill Used in the MFFF Foundation. The certificate holder documented the corrective actions in DAR-07-026. Corrective actions included classification of engineered fill as QL-1a and completion of the commercial grade dedication package. The dedication package was prepared per the commercial dedication procedure PP9-18 and was documented as Commercial Grade Item Evaluation for Engineered Fill for Structures, DCS01-ASI-DS-CGD-R-65816, Revision 0, dated March 8, 2007. The inspectors reviewed the commercial grade dedication package for completeness.

Closed: IFI 70-3098/2007-02-03, Review CAP Improvements. The certificate holder documented the corrective action in DAR-07-028. Corrective actions included revisions to the corrective action program to make the process easier to use and to lower the threshold for reporting problems. The corrective action program procedure, PP3-06, was revised on July 2, 2007. The inspectors routinely reviewed items/issues placed in the corrective action program and all have been found to be acceptable.

Closed: IFI 70-3098/2007-02-04, Review of Certificate Holder's Actions to Preclude Unauthorized Personnel Access to the MOC Services Records Storage Facility. The certificate holder documented the corrective actions in DAR-07-027. Corrective actions included increased records area security and revisions to the Records Center Access Control Procedure. The records center access procedure was revised on April 17, 2007. The inspectors reviewed the access control procedure and found it to be acceptable.

Closed: IFI 70-3098/2007-02-05, Inadequate Implementation of the Dual Storage Facilities Provision Stated in the MPQAP, Revision 3. The certificate holder documented the corrective actions in DAR-07-029 and DAR-07-054. Corrective actions included purchasing an additional fire rated safe, providing guidance for storage and transporting documents. A procedure was written to address storage of the MOX Services project backup tapes, PP14-3, Storage for Digital Archive Media. The inspectors reviewed the procedure for storage of digital archive media and found it to be acceptable.

Closed: IFI 70-3098/2006-02-01, Review the Certificate Holder's FLAC Analysis and Resolve the Written Description of the Engineered Backfill Discrepancy Between Construction Drawings and the CAR, ISA and FSER. NRC headquarters personnel completed a review of MOX Services seismic calculation, DCS01-WRS-DS-CAL-G-00017-D, Estimates of Static Settlement of MFFF Structure Using FLAC Model. The inspectors concluded that the calculation was adequate and that it was acceptable to reduce the thickness of engineered backfill under the MOX structures. Corrective actions included revisions to the Construction Authorization Request (CAR), Integrated Safety Analysis (ISA), and Final Safety Evaluation Report (FSER), to document the acceptable thickness of engineered backfill.

b. Conclusions

Corrective actions for the IFIs noted above were adequately addressed and completed in a timely manner.

10. Exit Interview

The inspection scope and results were summarized on January 3, 2008. Although proprietary documents and processes may have been reviewed during this inspection, the proprietary nature of these documents or processes was deleted from this report. No dissenting comments were received from the certificate holder.

1. PARTIAL LIST OF PERSONS CONTACTED

Certificate Holder Personnel

J. Adair, Civil - Mechanical Engineering Manager
P. Bishop, Construction Supervisor
W. Crisler, QC Manager
D. Gwyn, Regulatory Affairs Manager
R. Justice, QA Programs Manager
D. Kehoe, QA Engineer
D. Leach, Deputy Director, MFFF Project
G. Shell, QA Manager
G. Sheppard, Civil Engineer
D. Stinson, President and Chief Operating Officer
J. Vaughn, Civil Engineer

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

National Nuclear Security Administration

K. Chacey, Assistant Deputy Administrator
S. Glenn, Project Engineer
C. Ramsey, MOX Site Project Manager
G. Smith, Project Manager

2. INSPECTION PROCEDURES (IPs) USED

IP 88109 Quality Assurance: Inspection, Test Control, and Control of Measuring and Test Equipment
IP 88110 Quality Assurance: Problem Identification, Resolution and Corrective Action
IP 88111 10 CFR, Part 21, Inspection-Facility Construction
IP 88115 Supplier/Vendor Inspection
IP 88130 Resident Inspection Program for On-Site Construction Activities
IP 88131 Geotechnical/Foundation Activities
IP 88132 Structural Concrete Activities

3. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

<u>Item</u>	<u>Status</u>	<u>Description</u>
70-3098/2007-02-01	Closed	IFI – Use of Less Than Adequate Hold Tags for the Segregation of Structural Reinforcing Steel.
70-3098/2007-02-02	Closed	IFI – Less than Adequate documentation to Dedicate Commercially Obtained Engineered Backfill Used in the MFFF Foundation.

70-3098/2007-02-03	Closed	IFI - Review CAP Improvements.
70-3098/2007-02-04	Closed	IFI – Review of Certificate Holder’s Actions to Preclude Unauthorized Personnel Access to the MOX Services Records Storage Facility.
70-3098/2007-02-05	Closed	IFI – Inadequate Implementation of the Dual Storage Facilities Provision Stated in the MPQAP, Revision 3.
70-3098/2006-01-01	Closed	IFI – Review the Certificate Holder’s FLAC Analysis and Resolve the Written Description of the Engineered Backfill Discrepancy Between Construction Drawings and the CAR, ISA, and FSER.

4. **LIST OF ACRONYMS USED**

ACI	American Concrete Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ASL	Approved Suppliers List
BAP	Aqueous Polishing Building
BMF	Manufacturing Facility Building
BMP	Manufacturing Building
BSR	Receiving Building
CA	Corrective Action
CAP	Corrective Action Program
CAR	Construction Authorization Request
CFR	Code of Federal Regulations
CR	Condition Report
CLSM	Controlled Low Strength Material
DAR	Deficiency Action Request
DCS	Duke, Cogema Stone and Webster
DAR	Deficiency Action Request
F	Fahrenheit
FLAC	Fast Lagrangian Analysis of Continua
FSER	Final Safety Evaluation Report
IFI	Inspector Followup Item
IP	Inspection Procedure
ISA	Integrated Safety Analysis
MFFF	MOX Fuel Fabrication Facility
MOX	Mixed Oxide
MPQAP	MOX Project Quality Assurance Plan
NCR	Non Conformance Report
NDT	Non Destructive Test
NNSA	National Nuclear Security Administration

NRC	Nuclear Regulatory Commission
NRMCA	National Ready Mix Concrete Association
NUPIC	Nuclear Utilities Procurement Issues Committee
PP	Project Procedure
psi	Pounds per Square Inch
QA	Quality Assurance
QC	Quality Control
QL	Quality Level
Rev	Revision
SR	Surveillance Report

5. **LIST OF DOCUMENTS REVIEWED**

Specifications & Procedures

Shaw Areva Mox Services, Construction Specification DCS01-BKA-DS-SPE-B-09330-3, Section 03301, Placing Concrete and Reinforcing Steel for Quality Level 1a, 2, 3 and 4, 6/4/07

Baker Concrete Construction, Inc., Specification BPP-110, Concrete Placement, 10/11/07.

Baker Concrete Construction, Inc., Project Procedure BPP-115, Work Package Planning Development and Approval, 08/01/07

Drawings

Drawing number DCS01-BMF-DS-PLS-B-01776, MOX Fuel Fabrication Facility, BMP Area, Embedded Plate Location, Enlarged Plan at El. 0'-0", Revision 3, Issue 3, Sheet 18 of 61

Drawing number DCS01-BMF-DS-PLS-B-01776, MOX Fuel Fabrication Facility, BMP Area, Embedded Plate Location, Enlarged Plan at El. 0'-0", Revision 2, Issue 2, Sheet 19 of 61

Drawing number DCS01-BMF-DS-PLS-B-01776, MOX Fuel Fabrication Facility, BMP Area, Embedded Plate Location, Enlarged Plan at El. 0'-0", Revision 3, Issue 3, Sheet 14 of 61

Drawing number DCS01-BMF-DS-PLF-B-02360, MOX Fuel Fabrication Facility, BAP Area, Concrete and Reinforcing, Plan at El. -17'-6", Revision 3

Drawing number DCS01-BMF-DS-PLF-B-02370, MOX Fuel Fabrication Facility, BAP Area, Concrete and Reinforcing, Elevation 1, Revision 3

Drawing number DCS01-BMF-DS-PLF-B-02371, MOX Fuel Fabrication Facility, BAP Area, Concrete and Reinforcing, Elevation 1.9, Revision 3

Drawing number DCS01-BMF-DS-PLF-B-02372, MOX Fuel Fabrication Facility, BAP Area, Concrete and Reinforcing, Elevation 2.4, Revision 2

Drawing number DCS01-BMF-DS-PLF-B-02373, MOX Fuel Fabrication Facility, BAP Area, Concrete and Reinforcing, Elevation 3.4, Revision 2

Drawing number DCS01-BMF-DS-PLF-B-02383, MOX Fuel Fabrication Facility, BAP Area, Concrete and Reinforcing, Elevation F, Revision 2

Drawing number DCS01-BMF-DS-PLF-B-02384, MOX Fuel Fabrication Facility, BAP Area, Concrete and Reinforcing, Elevation G, Revision 2

Drawing number DCS01-BMF-DS-PLF-B-02386, MOX Fuel Fabrication Facility, BAP Area, Concrete and Reinforcing, Intermediate Elevation 2.4.1, Revision 2

Drawing number DCS01-BMF-DS-PLF-B-02391, MOX Fuel Fabrication Facility, BAP Area, Concrete and Reinforcing, Intermediate Elevation F.2, Revision 2

Drawing number DCS01-BMF-DS-PLF-B-02392, MOX Fuel Fabrication Facility, BAP Area, Concrete and Reinforcing, Intermediate Elevation F.1, Revision 2

Drawing number DCS01-BMF-DS-PLF-B-02393, MOX Fuel Fabrication Facility, BAP Area, Concrete and Reinforcing, Intermediate Elevation G.2, Revision 2

Drawing number DCS01-BMF-DS-PLF-B-02394, MOX Fuel Fabrication Facility, BAP Area, Concrete and Reinforcing, Intermediate Elevation G.1, Revision 2

Drawing number BMP-RF103, BMP Area - North/East Quad, FDN Pour, F103, 105, 107 & 109 Bottom Bars, Revision 2

Drawing number BMP-RF103A, BMP Area - North/East Quad, FDN Pour, F103, 105, 107 & 109 - Wall Dowels, Revision 4

Drawing number BMP-RF103B, BMP Area - North/East Quad, FDN Pour, F103, 105, 107 & 109 Top Bars, Revision 2

Drawing number BMP-ET01, BMP Area - Egress Tunnel Foundation, Revision 3

Drawing number BMP-ET02, BMP Area - Egress Tunnel Walls, Revision 5

Miscellaneous Documents

Condition Report No. CR-07-0114, Failure to Follow Procedure for Addition of Water to Concrete

Non-Conformance Report No. QC-07-0116, Lift Thickness and Lateral Movement of Concrete Not Satisfactory

Work Package No. WP 07-10888-C-1069-BMP-F103-C, dated 8/29/07