



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

July 10, 2008

Gregory Smith, Chief Operating Officer
and Chief Nuclear Officer
National Enrichment Facility
P.O. Box 1789
Eunice, NM 88231

SUBJECT: NRC INSPECTION REPORT NO. 70-3103/2008-002 AND NOTICE OF VIOLATION

Dear Mr. Smith:

During the period from April 1 through June 30, 2008, the U.S. Nuclear Regulatory Commission (NRC) conducted inspections associated with the construction activities of the Louisiana Energy Services, National Enrichment Facility (LES NEF) gas centrifuge. The purpose of the inspections was to evaluate Quality Assurance Program implementation and construction activities. The enclosed inspection report, which documents the inspection results, was discussed with you and other members of your staff on April 24, June 12, and June 25, 2008.

These routine, announced inspections were an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspections consisted of examinations of selected calculations, drawings, procedures, and interviews with personnel.

Based on the results of these inspections, the NRC has determined that a violation of NRC requirements occurred. The violation was evaluated in accordance with the NRC Enforcement Policy. The current Enforcement Policy is available on the NRC's Web site at www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html. 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. In your response, please describe the extent of the condition and any root cause investigations that have resulted from this issue.

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," 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/readingrm/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. 70-3103

License No. SNM-2010

Enclosure: 1. Notice of Violation
 2. NRC Inspection Report 70-3103/2008-002 w/attachment

cc w/encl: (See next page)

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

Sincerely,

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Deborah A. Seymour, Chief
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cc w/encl: (See next page)

- PUBLICLY AVAILABLE
 NON-PUBLICLY AVAILABLE
 SENSITIVE
 NON-SENSITIVE
- ADAMS: Yes ACCESSION NUMBER: ML081930118
 SUNSI REVIEW COMPLETE

OFFICE	RII:DCI	RII:DCI	RII:DCI	RII:DCI	RII:DCI	RII:DCI	
SIGNATURE	CDT	Via Email	CDT for	CDT for	Via Email	Via Email	
NAME	CTaylor	JFuller	LCain	SLewis	RJackson	JCalle	
DATE	7/10 /2008	7/10/2008	7/ 10 /2008	7/ 10/2008	7/9/2008	7/ 9/2008	
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	

cc w/encl:

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Letter to Gregory Smith from Deborah A. Seymour dated July 10, 2008

SUBJECT: NRC INSPECTION REPORT NO. 70-3103/2008-002

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PUBLIC

NOTICE OF VIOLATION

Louisiana Energy Services, LLC
Eunice, NM

Docket No. 70-3103
License No. SNM-2010

During an NRC inspection conducted on April 21 through 24, 2008, a violation of Nuclear Regulatory Commission (NRC) requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

Special Nuclear Material License No. 2010 requires, in part, that the licensee shall conduct authorized activities at the Louisiana Energy Services, National Enrichment Facility (LES NEF) in accordance with statements, representations, and conditions in the approved Quality Assurance Program Description, dated November 12, 2007.

The LES NEF Quality Assurance Program Description states, "...the LES Quality Assurance Program conforms to the criteria established in Title 10 of the Code of Federal Regulations 10 CFR 50, Appendix B, Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants." The criteria in 10 CFR 50, Appendix B, are met by LES' implementation of the American Society of Mechanical Engineers Requirements for Nuclear Facilities," including supplements as revised by the American Society of Mechanical Engineers (ASME) NQA-1a-1995 Addenda.

NQA-1 Basic Requirement 5, "Instructions, Procedures, and Drawings," requires that activities affecting quality be prescribed by and performed in accordance with documented instructions, procedures, or drawings appropriate to the circumstances.

Contrary to the above, on April 21, 2008, LES NEF failed to perform activities affecting quality in accordance with documented instructions, procedures, or drawings appropriate to the circumstances in that, during construction activities, LES NEF positioned steel reinforcements that were not in accordance with Nuclear Technology Solutions, LLC (NTS) drawing 114489-1001-C-CON-005-02-3 and American Concrete Institute (ACI) Code 349-06. This resulted in the steel reinforcements being improperly positioned.

This is a Severity Level IV violation (Supplemental II)

Pursuant to the provisions of 10 CFR 2.201, Louisiana Energy Services, LLC is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555, with a copies to the Chief, Technical Support Group, Division of Fuel Cycle Safety and Safeguards, NMSS, and the Regional Administrator, Region II, 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 for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level, (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 previous

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 a

Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action 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, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because 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, it should not include any personal privacy, proprietary, classified, 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 CFR 19.11, you may be required to post this Notice within two working days.

Dated at Atlanta, Georgia this 10th day of July 2008.

**U.S. NUCLEAR REGULATORY COMMISSION
REGION II**

Docket: 70-3103

License: SNM-2010

Report: 70-3103/2008-002

Licensee: Louisiana Energy Services, LLC

Location: Louisiana Energy Services, LLC. National Enrichment Facility
Eunice, New Mexico

Inspection Dates: April 21-25, 2008
April 21-25, 2008 (at AREVA in Marlborough, Massachusetts)
June 11-14, 2008

Inspectors: Joseph Tapia, P.E., Senior (Sr.) Construction Inspector, Construction
Inspection Branch 2 (CIB2), Division of Construction Inspection (DCI),
Region II (RII)
Justin Fuller, Sr. Construction Inspector, CIB2, DCI, RII
Mike Cain, Sr. Construction Inspector, Construction Inspection Branch 1
(CIB1), DCI, RII
Shani Lewis, Construction Inspector, CIB1, DCI, RII

Accompanying
Personnel: R. Jackson, Construction Inspector, CIB2, RII
J. Calle, Sr. Construction Inspector, CIB2, RII
A. Master, Construction Inspector, CIB2, RII
D. Tregre, Office of Investigation, RII
D. Edwards, Nuclear Materials Safety and Safeguards (NMSS)
A. Chowdhury, Center for Nuclear Waste Regulatory Analysis (CNWRA)
S. Hsiung, CNWRA

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

EXECUTIVE SUMMARY

Louisiana Energy Services, L.P., National Enrichment Facility (LES NEF) NRC Inspection Report 70-3103/2008-002

This report covers a three-month period of announced inspections by regional inspectors for LES NEF. The inspections involved the observation and evaluation of selected aspects of the licensee's quality assurance (QA) program and construction activities. During this inspection period the following inspections were performed: On April 21 through April 25, 2008, in Marlborough, Massachusetts an inspection was performed on the designs of the electrical items relied on for safety (IROFS); on April 21 through April 25, 2008, at the LES NEF, an inspection was performed in the areas of design and document control, control of materials, equipment and services, geotechnical/foundation activities, structural concrete, and structural steel and supports activities; on June 11 through 12, 2008, at the LES NEF, an inspection planning site visit was performed on program development and problem identification, resolution and corrective action.

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

Appropriate information was collected to facilitate planning for a July 2008 quality assurance inspection (Section 2).

Design and Document Control

The licensee's in-structure acceleration response spectra developed by AREVA NP Inc. for seismic qualification of IROFS equipment and components at various locations of the separation building module (SBM) were developed using a broadening approach consistent with an acceptable standard. Additionally, Section 6.4 of LES structural design criteria document was modified to reflect appropriately that only permanent loads will be used in estimating structural settlements for determining compliance with structural settlement design limit (Section 3).

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

The licensee and their contractors were adequately controlling the procurement of materials, equipment and services as required by 10 CFR 50, Appendix B, Criterion VII, "Control of Purchased Material, Equipment, and Services," (Section 4).

Inspection of Safety Function Interfaces

The licensee's electrical design requirements as stated in the integrated safety analysis (ISA) for IROFS 1, 2, 4, 5, C15, and C16 were adequate and met the current design licensing basis commitments. From those licensee's and contractor's packages reviewed, the design control process requirements were appropriately translated into design documents and implementing procedures. The inspectors did not identify any issues or concerns requiring additional action by the licensee (Section 5).

Geotechnical and Foundation Activities

Geotechnical backfill procedures and specifications were found to be adequate and properly implemented in the field. No items of safety significance were identified in this area. QA records associated with these activities were properly maintained in accordance with procedures (Section 6).

Structural Concrete Activities

The inspectors identified improperly installed steel reinforcement in a section of roof slab that deviated from the design drawings, specifications, and ACI Code 349. This was identified as a (VIO) 70-3103/2008-002-001, "Failure to Follow NQA-1, Basic Requirement 5, During Installation of Reinforcement Steel," (Section 7).

Structural Steel and Support Activities

The licensee and their contractors were adequately controlling structural steel and bolting activities. No issues were identified (Section 8).

Structural Welding General Inspection

The licensee and their contractors were adequately controlling structural welding activities as required by 10 CFR 50, Appendix B, Criterion IX, "Control of Special Processes," (Section 9).

Attachment:

Persons Contacted

Inspection Procedures

List of Items, Opened, Closed and Discussed

List of Acronyms Used

List of Documents Reviewed

REPORT DETAILS

1.0 **Summary of Site Activities**

The licensee continued to perform ongoing geotechnical, concrete, structural steel and welding activities at the Louisiana Energy Services (LES) National Enrichment Facility (NEF) site.

2.0 **Quality Assurance: Program Development and Implementation (Pre-licensing and Construction) (Inspection Procedure (IP) 88106)**

a. Scope and Observations

From June 11 to June 12, 2008, inspectors were at the LES-NEF facility to plan for the upcoming quality assurance (QA) inspection, scheduled for July 2008. During the site visit, the inspectors held interviews with licensee quality assurance staff regarding the structure and organization of their QA program. Reports from the licensee's corrective action program system were generated to assist with the inspection team's sample selection of licensee generated condition reports (CRs). The inspectors observed work activities in the Centrifuge Assembly Building (CAB) and one of the Separations Building Modules (SBM). The inspectors also attended the licensee's Plan of The Day meeting on Thursday June 12, 2008.

b. Conclusion

Appropriate information was collected to facilitate planning for a July 2008 quality assurance inspection (Section 2). M,

3.0 **Design and Document Control (IP 88107)**

a. Scope and Observations

The scope of the onsite structural design review was to resolve the Inspection Follow-up Items (IFI) 70-3103/2007-004-001, "Review of Settlement and Soil/Structure Interaction Analyses," and 70-3103/2008-001-002, "Review of Soil Structure Interaction Analysis Related to Use of Concrete in Lieu of Backfill," identified during previous design inspections conducted at the design agency offices in Cherry Hill, New Jersey. The two IFIs are contained in Inspection Reports (IR) No. 70-3103/2007-004, dated March 7, 2008 and IR No. 70-3103/2008-001, dated April 24, 2008. More specifically, the inspectors focused on assessing:

- (i) Acceptability of the soil-structure interaction analyses conducted by AREVA NP Inc. for the SBM,
- (ii) Acceptability of the in-structure acceleration response spectra resulting from the soil-structure interaction analyses for seismic qualification of the items relied on for safety (IROFS) equipment and components,

- (iii) Acceptability review of soil-structure interaction analysis related to the use of low strength (lean) concrete in lieu of backfill, and
- (iv) Settlement calculations for footings of the SBM.

Soil-Structure Interaction Analyses

The NEF SBM Dynamic Analysis report (AREVA NP Inc., 2008a) documented the results of the soil-structure interaction analyses of the SBM of the LES NEF facility. The purpose of the analyses was to determine in-structure response spectra at specified locations for seismic qualification of IROFS equipment and components.

The soil-structure interaction analyses of the SBM structure were conducted using the computer code SASSI2000. To construct the SASSI2000 model, finite elements of the structure, soil profile, and site-specific ground motion were among the key input parameters. The soil profile used in the analyses was developed based on results of the geotechnical investigations performed at the site during the summer of 2005 (Nuclear Technology Solutions, LLC, 2005a). The staff reviewed the soil profile input to the SASSI2000 and found the soil profile input was consistent with that presented in the geotechnical investigation report. The soil profile modeled in SASSI2000 included 13 layers to an approximate depth of 107 feet. In accordance with recommendations for performing soil-structure interaction analysis (American Society of Civil Engineers [ASCE], 1999) average, lower and upper bound values of dynamic soil properties were used for the soil-structure interaction analyses. Because of limited site-specific data, AREVA NP Inc. developed the upper- and lower-bound dynamic soil properties using a C_v coefficient value of 1.0 that was consistent with the requirements specified by ASCE 4-98 (ASCE, 1999).

AREVA NP Inc. performed a site-response analysis with iterations on soil properties using SHAKE91 to account for the soil nonlinearity behavior and obtain strain-compatible free-field soil dynamic properties for input to the SASSI2000 analyses. The staff reviewed soil dynamic properties data for the lower and upper-bound cases and found:

- (i) The data used as input in the SHAKE91 analyses were consistent with those of the One-Dimensional Free-Field Site Response Analysis of the NEF report (Nuclear Technology Solutions, LLC, 2005b), and
- (ii) The soil dynamic properties input to the SASSI2000 analyses were consistent with those from the SHAKE91 results.

Some soil layers below a depth of 40 feet had a thickness exceeding the recommended maximum allowable layer thickness (Lysmer et al., 1999, publication). In response to the staffs' inquiry related to this issue, AREVA NP Inc. updated the LES NEF SBM Dynamic Analysis report (AREVA NP Inc., 2008b) to demonstrate that the effects of using soil layers thicker than the recommended maximum allowable thickness at a depth greater than 40 feet should be negligible because:

- (i) The ground motion was applied at the surface of the top soil layer in the SASSI2000 analyses,
- (ii) The surface wave mode shapes tended to decrease exponentially with depth, and
- (iii) Penetration depth of the surface wave mode shapes decreases as frequency increases.

The staff accepted the AREVA NP Inc. assessment that the effects of not following the maximum allowable layer thickness recommendation on the in-structure spectra responses for the SBM are negligible.

The acceleration time history ground motions used in the SASSI2000 and SHAKE91 analyses were developed using CARES by spectrally matching the seismic ground design response spectra for the NEF site documented in the Seismic Ground Design Response Spectra for Structures, Systems, and Components (SSC) report (Nuclear Technology Solutions, LLC, 2005c). This approach was acceptable to the staff.

The SASSI2000 results of the in-structure acceleration response spectra at selected locations were broadened 18 percent at each frequency in the amplified response region to account for variability in structural properties. This broadening approach was in general consistent with the guidance provided in Section 3.4.2.3(b) of ASCE 4–98 (ASCE, 1999), which required a ± 15 percent broadening to the best estimate case. Consequently, the broadened in-structure acceleration response spectra developed for seismically qualifying IROFS equipment and components was considered acceptable.

The original soil-structure interaction analyses (AREVA NP Inc., 2008a) were conducted with a layer of lean concrete fill. However, the fill material in the uranium hexafluoride (UF6) Handling Area varied between lean concrete fill and engineered soil fill. In response to staff question on the potential effects, AREVA NP Inc. performed additional soil-structure interaction analyses using engineered soil fill instead of the lean concrete fill (AREVA NP Inc., 2008b). By comparison, the differences in results between the two cases were negligible. The staff also reviewed calculations and discussed the use of lean concrete in lieu of backfill with the LES staff and determined that IFI 70-3103/2008-001-002 is closed.

Settlements of the Separation Building Modules

The staff reviewed the settlement calculation reports and confirmed that only settlements associated with the 7-foot footings exceeded the 1-inch settlement limit for load combination No. 30 (which included dead load, equipment load, and full live load). In the updated response to settlement topic dated May 15, 2008 [Correspondence from Tim Harney of LES NEF to Joseph Tapia of Nuclear Regulatory Commission (NRC), May 14, 2008], LES indicated that in this case, the settlement estimates should only consider permanent loading condition (i.e., dead weight of the structure and permanent equipment in the structure). The staff agreed that only permanent loads need consideration in assessing potential structural settlement. In addition, staff reviewed the

current version of the LES structural design criteria document (Nuclear Technology Solutions, LLC, 2008). Section 6.4 of this document was modified to read: “Based on good engineering practice, square and strip footings will be sized to limit the estimated settlements under permanent loads (i.e., the dead weight of the structure and permanent equipment) to 1 inch.” The staff determined that IFIs 70-3103/2007-004-001, “Review of Settlement and Soil/Structure Interaction Analysis of the SBM is closed.”

b. Conclusion

The staff reviewed the in-structure acceleration response spectra developed by AREVA NP Inc. for seismic qualification of IROFS equipment and components at various locations of the SBM and found the in-structure acceleration response spectra were developed using a broadening approach consistent with acceptable standard. Additionally, section 6.4 of LES structural design criteria document was modified to reflect appropriately that only permanent loads will be used in estimating structural settlements for determining compliance with structural settlement design limit.

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

a. Scope and Observations

The inspectors reviewed Washington Group International’s (WGI) procurement control process as it specifically pertained to Quality Level (QL)-1 rebar procured from Consolidated Power Supply (CPS) and WGI’s commercial grade dedication (CGD) process.

The inspectors held discussions with WGI personnel regarding the WGI procurement of QL-1 rebar from CPS. The inspectors also reviewed the WGI Project Quality Assurance Plan (PQAP), Revision 2, and project specific procedure (PSP) 09.01, “Procurement,” Revision 2E1. Receipt inspection documents associated with the rebar supply were also reviewed. The inspectors verified consistency between WGI’s PQAP, the procurement procedure, and the applicable receipt inspection documents.

In association with the licensee’s procurement process, WGI PSP 09.04, “Commercial Grade Dedication,” Revision 3, and relevant documents were evaluated and discussed with LES and WGI personnel. The inspectors noted that the licensee’s procurement and CGD procedures were inconsistent and appeared to be modeled after the power reactor sections of 10 CFR 21 rather than the fuel facility sections. As a result, the licensee issued condition report (CR) 2008-852 to take corrective actions, including revision of the applicable site procedures.

At the time of issuance of this report, LES NEF had not completed their review of the nonconforming reinforcing steel discussed in NRC Inspection Report 07-3103/2008-001, Section 3 and 8). The results of the NRC vendor oversight inspection will be detailed in a future NRC quarterly inspection report. Unresolved Item (URI) 07003103/2008-001-001, “Reinforcing Steel Minimum Bend Diameter Issue,” was identified as a follow-up item

b. Conclusion

The licensee and their contractors were adequately controlling the procurement of materials, equipment and services as required by 10 CFR 50, Appendix B, Criterion VII, "Control of Purchased Material, Equipment, and Services."

5.0 Inspection of Safety Function Interfaces (IP 88116)

a. Scope and Observations

The NRC inspection team conducted a technical design review of the available IROFS at the LES NEF contractor, AREVA, located in Marlborough, MA. The overall inspection objective was to determine whether LES NEF electrical design associated with specific IROFS was adequate. Specifically, the inspectors reviewed available design documents for IROFS 1, 2, 4, 5, C15, and C16. These IROFS are related to the automatic temperature controls for major and support systems of the lead cascade equipment and process. The inspectors verified design inputs were consistent with the design basis and other design information or criteria documented in the Integrated Safety Analysis (ISA). The inspectors also verified relevant design information was carried through into design changes. Documents reviewed included design packages, schematics, diagrams, engineering reports, calculations, qualification reports, and the failure modes and effects analysis.

The inspectors reviewed design documents of the safety processes associated with the UF6 Feed System, Product Take-Off System, Product Blending System, and the Tails Take-Off System to gain an overall understanding of the safety processes. Inspectors also reviewed the design documents to verify engineering standards were incorporated into documents and to verify that the designs met the intent of the ISA. Inspectors reviewed policies and procedures governing the licensee's design control processes to verify the overall extent and effectiveness of their program. The inspectors verified that the quality-related documents were developed, reviewed, approved, issued, used, and revised under an established program and in accordance with applicable quality assurance requirements.

The inspectors reviewed design control procedures and process for the control of design inputs associated with IROFS 1, 2, 4, 5, C15, and C16 and determined they were effective in establishing and maintaining configuration control. The inspectors also reviewed the process for translating design inputs into design documents and sampled various data sheets, schematics, and calculations to verify the process was effective.

The inspectors did, however, note that a commitment for time response testing of applicable IROFS safety functions, as stated in the Design Criteria Document (DCD), called for an overall time response of less than one second. The inspectors questioned the licensee on the ability to meet the requirement as stated for the associated thermocouple circuits, IROFS 2, 4, and C16. Further investigation revealed that maintenance procedures for the time response testing of thermocouple circuits had not been developed to verify time response. The licensee later responded that the commitment as stated in the DCD was overly conservative and that a revision to the

DCD would be initiated to change the required time to facilitate the use of thermocouples as diverse circuits to the resistance temperature detector (RTD) circuits.

The inspectors reviewed samples used for the verification of design control and verified that documents were reviewed, approved, issued, and revised consistent with procedures. The inspectors reviewed trip logics for the applicable IROFS and verified the adequacy of design as translated to associated wiring schematics and diagrams.

b. Conclusion

The licensee's electrical design requirements as stated in the integrated safety analysis (ISA) for IROFS 1, 2, 4, 5, C15, and C16 were adequate and met the current design licensing basis commitments. From those licensee's and contractor's packages reviewed, the design control process requirements were appropriately translated into design documents and implementing procedures. No significant issues were identified.

6.0 Geotechnical and Foundation Activities (IP 88131)

a. Scope and Observations

This portion of the inspection focused on the licensee's implementation of QL-1 backfill activities and berm construction. The intent of the inspection was to determine by direct observation and independent evaluation if geotechnical activities were accomplished in accordance with the design specifications, drawings, procedures, and regulatory requirements. In addition to field observations the inspection also included the review of specifications, quality assurance surveillances, and testing procedures implemented in the field.

WGI Work Plan 1100-1/39-CI-006, "Site Excavation and Backfill – Building 1100/1200 Centrifuge Receipt and Dispatch Building & Blending Liquid Sample Area," was reviewed to establish whether the backfill preparation was adequately implemented. This work plan referenced, PSP 11.05, "Soil Inspection and Testing," Revision 1, and specification 114489-S-S-02300, "Clearing, Grading, and Earthwork Material, Construction and Testing," Revision 8, which was also reviewed to determine the technical requirements associated with the activities. The inspectors directly observed the backfill preparatory work located along the north and east sides of the SBM 1001 building to confirm that proper procedures and specifications were implemented.

The inspectors determined that the berm was in design status and no construction activities had begun. No significant issues were identified.

b. Conclusion

Geotechnical backfill procedures and specifications were adequate and properly implemented in the field. No items of safety significance were identified in this area. QA records associated with these activities were properly maintained in accordance with procedures.

7.0 **Structural Concrete Activities (88132)**

a. **Scope and Observations**

This portion of the inspection focused on the structural concrete work associated with safety related construction. 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 attended a remedial training session provided by WGI for their construction superintendents and quality control personnel on the second shift regarding a licensee identified issue with traceability and tagging of reinforcing steel. The training provided new guidance for PSP 10.02, "Material Identification and Control," that resulted from condition report (CR) CR-08-781. The training session was one of several provided to supervisory personnel for each shift.

The inspectors evaluated the adequacy of the LES concrete batch plant, located north of the site. Since no QL-1 concrete had been produced, the inspection focused on the batching process, plant certification, equipment calibration, add-mixture certification, corrective action program, mixing and delivery procedures.

Procedure PSP 11.08, "Concrete Batch Plant Inspections and Testing," Revision 1, was reviewed along with all required records associated with this procedure. Nuclear Technology Solutions (NTS) Specification, 114489-S-S-03310-3, "Mixing and Delivery of Concrete," Revision 3, and NTS Specification 114489-S-S-03311-4, "Concrete Mix Design," Revision 4, were referenced by the procedure and were reviewed by the inspectors for adequacy. No significant issues were identified.

The inspectors directly observed a material receipt inspection of aggregate at the batch plant. Discussions regarding the material receipt inspections, procedures, documentation, and commercial grade dedication with WGI quality control personnel were conducted. No significant issues were identified.

The inspectors also observed Quality Inspection Services (QISI) perform a 7-day compressive strength test on a concrete cylinder sample taken from QL-1 concrete used in building SBM 1001. This observation confirmed proper use of American Society for Testing and Materials (ASTM) C31 and C39 requirements for preparation, curing, and testing of the cylindrical concrete specimens.

A QL-1 concrete pour for a roof slab section of building 1001 was planned for April 23. The placement number was 1001-254-MH1-5 & 6 RSL which was for the roof slab section between grid lines "A" and "E" and from grid lines 12.3 to 15. WGI PSP form 11.03-1, "Concrete Placement Report," indicated 175 cubic yards of 4000F-1 mix concrete would be used for the pour. The inspectors observed the field engineer (FE) and Quality Control Inspector (QCI) perform their pre-placement inspections and sign

the corresponding placement report certifying the area was ready for concrete placement. Subsequent to this QCI certification, but prior to proceeding with the concrete placement activities, the inspectors questioned the FE and QCI regarding two discrepancies between the reinforcing steel installation and the design drawings.

NTS design drawing 114489-1001-C-CON-005-02-3 specified additional #5 reinforcement between grid lines 14 and 15 be installed parallel to the wall at grid line "A." This rebar was properly installed; however, extra reinforcing bars were also installed perpendicular to line "A" in this area. This was contrary to what was specified in the design drawings. Similarly, the NTS drawing specified a 3/4 inch concrete cover over the top layer of reinforcing bars; however, measurements taken by the inspectors revealed the concrete cover ranged between 1-1/2 inches to as much as 3-1/2 inches along the wall at grid line "A." The ACI Code 349-06 specifies the tolerance on minimum concrete cover for this concrete slab depth as 3/8 inch. The 3/8 inch tolerance and the 3/4 inch cover specified in the design drawings equated to a maximum allowable concrete cover of 1-1/8 inches. These two examples were identified as failures to conform to design drawing requirements of NQA-1, Basic Requirement 5. These failures were identified as a violation (VIO) 70-3103/2008-002-001, "Failure to Follow NQA-1, Basic Requirement 5, During Installation of Reinforcement Steel."

As an immediate corrective action, the concrete placement was delayed while the design engineers were contacted regarding the questions raised and to get clarification on the specification. The design engineers confirmed the incorrect installation and the concrete placement was delayed while the licensee addressed the issue. The licensee generated nonconformance report, NCR-28683-162 to track this issue.

b. Conclusion

The inspectors identified improperly installed steel reinforcement in a section of roof slab that deviated from the design drawings, specifications, and ACI Code 349. This was identified as a (VIO) 70-3103/2008-002-001, "Failure to Follow NQA-1, Basic Requirement 5, During Installation of Reinforcement Steel."

8.0 Structural Steel and Support Activities (IP 88133)

a. Inspection Scope

This portion of the inspection was conducted to review the licensee's structural steel installation activities related to Inspection Follow-up Item (IFI 70-3103/2008-001-003), "Review of Structural Steel Bolt Inspections." This item was identified during a previous inspection in order to verify the adequacy of bolting inspections which had not been completed at the time. The licensee's structural steel installation activities did not appear to conform to the specified turn-of-the-nut method. Additional review was required to ascertain conformance.

During this inspection, the inspectors verified that all installed structural steel bolts were subsequently torque tested by the licensee and that they met the requirement for tensioning of structural steel bolts to at least 70% of the minimum tensile strength. Subsequent to the inspection conducted in January 2008, the licensee discontinued the use of standard nuts and bolts and began utilizing direct tension indicating bolts. Consequently the turn-of-the-nut method was no longer needed. This review closes IFI 70-3101/2008-001-003.

b. Conclusion

The licensee and their contractors were adequately controlling structural bolting activities.

9.0 Structural Welding General Inspection (IP 55100)

a. Scope and Observations

The inspectors reviewed LES' contractors use of the pre-qualified American Welding Society (AWS) welding procedure specification (WPS) for ongoing structural welding activities. The inspectors also verified that a sample of welders were properly qualified in accordance with the AWS structural welding code and the contractor's quality assurance program. Nondestructive examination procedures for magnetic particle and visual examinations were reviewed and compared to the requirements specified in American Society of Mechanical Engineers (ASME) Section V. The inspectors reviewed a sample of completed weld history cards, and verified that the base metals, filler metal, and welders were all qualified in accordance with AWS code requirements.

The inspectors conducted an independent walk down of the weld rod room and storage facility, and reviewed the contractor's procedure for the control of welding material. The inspectors verified that weld material was properly stored, identified, and controlled in accordance with 10 CFR 50, Appendix B and the WGI quality assurance program. The inspectors observed the in-process welding of weld number 220b, which was a 5/16 inch fillet weld.

The inspectors also conducted an independent visual inspection of three completed structural welds associated with IROFS construction activities. The three welds inspected were S2-2B, S2-1B, and 216A. The inspectors verified that the completed welds were in accordance with the design drawings and were acceptable per the contractor's visual examination inspection procedure.

b. Conclusion

The licensee and their contractor were adequately controlling structural welding activities as required by 10 CFR 50, Appendix B, Criterion IX, "Control of Special Processes."

10.0 Exit Meeting

The preliminary inspection results were presented to the licensee on the following dates: April 24, June 12, and June 25, 2008. The lead inspectors described the areas inspected and discussed the inspection results in detail with licensee staff. The licensee acknowledged the findings during each meeting and no dissenting comments were received. Although proprietary documents and processes were reviewed during this inspection, the proprietary nature of these documents or processes was not included in this report.

SUPPLEMENTAL INFORMATION

1. List of Persons Contacted

Louisiana Energy Services, L.P., National Enrichment Facility (LES NEF):

R. Butz, Design Engineer
S. Cowne, Licensing Manager
T. Eason, Director, Commissioning and Acceptance
T. Harney, Licensing Engineer
J. Gearhart, Quality Assurance (QA) Director
D. Lakin, Performance Assessment
P. Law, Design Engineering Supervisor
D. J. Mathis, Licensing Engineer
P. McCasland, Licensing Engineer
D. Neve, Engineering Manager
E. Parkes, Construction Hoffman, Construction
J. Potrier, Construction
K. Prasad, Design Management
B. Robinson, Field Engineering Manager
R. Schrauder, Design Manager
G. Schultz, Project Manager for Items Relied On for Safety
G. Sergent, Assistant Quality Assurance Director
D. Sexton, Vice President Engineering
G. Smith, LES Chief Operating Officer and Chief Nuclear Officer
E. Weiner, QA Engineer
E. Wenzinger, Licensing Engineer
D. VanDewalle, Director Support Services

Washington Group International (WGI)

M. Boden, WGI Engineering
R. Chandler, WGI QA Inspector
M. Erboe, WGI Project Welding Engineer
B. Melvin, WGI Construction Management
M. Melvin, WGI Engineering
T. Mudge, WGI QA Manager
G. Robinson, WGI QA Supervisor
G. Yadon, WGI Quality Control Inspector

AREVA Personnel:

J. Flaherty, Project Manager - Design
D. Pepe, Integrated Safety Analysis Consulting Engineer
Y. Leutwyler, Electrical/Instrumentation and Control Designer
S. Miltenberger, Manager - Core Equipment Installation Process & Support Systems,
Energy Engineering Resources, Inc.
C. Russom, Lead I&C
F. Sabadini, QA Supervisor

J. Williams, Assistant Project Manager
 R. Martinez, Engineer IV
 A. Vaysbord, Principal Engineer

2. Inspection Procedures Used

IP 88106 Quality Assurance: Program Development and Implementation (Pre-licensing and Construction)
 IP 88107 Quality Assurance: Design and Document Control
 IP 88108 Quality Assurance: Control of Materials, Equipment and Services (Pre-licensing and Construction)
 IP 88116 Safety Function Interfaces
 IP 88131 Geotechnical/Foundation Activities
 IP 88132 Structural Concrete Activities
 IP 88133 Structural Steel and Supports Activities
 IP 55100 Nuclear Welding General Inspection Procedures

3. List of Items Opened, Closed, and Discussed

<u>Item Number</u>	<u>Status</u>	<u>Description</u>
2007-004-001	Closed	IFI: Review of Settlement and Soil-structure interaction Analysis (Section 3.0)
2008-001-002	Closed	IFI: Review of Soil Structure Interaction Analysis Related to Use of Concrete in Lieu of Backfill (Section 3.0)
2008-001-001	Open	URI: Follow-up on Results of LES' Investigation into Nonconforming Reinforced Steel (Section 4.0)
2008-002-001	Open	VIO: Failure to Follow NQA-1, Basic Requirement 5, Improper Installation of Reinforcement Steel (Section 7.0)
2008-001-003	Closed	IFI: Review of Structural Steel Bolt Inspections (Section 8.0)

4. List of Acronyms Used

ADAMS Agency-Wide Document Access and Management System
 ACI American Concrete Institute
 ASCE American Society of Civil Engineers
 ASME American Society of Mechanical Engineers
 ASTM American Society for Testing and Materials

AWS	American Welding Society
CFR	Code of Federal Regulations
CPS	Consolidated Power Supply
CR	Condition Report
CRDB	Cylinder Receipt and Dispatch Building
FE	Field Engineer
IFI	Inspection Follow-up Item
IP	Inspection Procedure
IR	Inspection Report
IROFS	Item Relied on for Safety
ISA	Integrated Safety Analysis
LES	Louisiana Energy Services, L. P.
NCR	Nonconformance Report
NEF	National Enrichment Facility
NQA-1	Quality Assurance Program Requirements for Nuclear Facilities
NRC	Nuclear Regulatory Commission
NTS	Nuclear Technology Solutions, LLP
PQAD	Project Quality Assurance Plan
PSP	Project Specific Procedure
QA	Quality Assurance
QCI	Quality Control Inspector
QISI	Quality Inspection Services Inc.
QL	Quality Level
RTD	Resistance Temperature Detector
SAR	Safety Analysis Report
SBM	Separations Building Module
UF6	Uranium Hexafluoride
URI	Unresolved Item
WGI	Washington Group International
WPS	Welding Procedure Specification

5. Documents Reviewed

LES Procedures

EG-101, Owner Acceptance Reviews, Revision 0
 EG-3-2100-01, Configuration Change, Revision 1
 EG-3-4100-05, Engineering Change Request (ECR), Revision 0
 PSP 01.01, Organization and Responsibilities, Revision 1
 PSP 07.09, Field Change Request and Request for Information, Revision 1E1
 PSP 09.01, Procurement, Revision 2E1
 PSP 09.04, Commercial Grade Dedication, Revision 3
 PSP 11.01, Work Plans, dated October 20, 2006
 PSP 11.03, Concrete and Grout Placement, dated February 5, 2008
 PSP 11.08, Concrete Batch Plant Inspection and Testing, dated June 19, 2007
 PSP 11.03, Concrete and Grout Placement, dated October 20, 2006

PSP 12.03, Visual Examination, Revision 0
PSP 12.05, Magnetic Particle Examination, Revision 0
PSP 20.01, Control and Documentation of Welding, Revision 0
PSP 20.02, Welding Procedure Specification, Revision 0
PSP 20.04, Welder Performance Qualifications, Revision 0
PSP 20.05, Welding Material Control, Revision 0
PSP 20.08, AWS General Welding Requirements, Revision 1

LES Condition Reports

CR 2007-45
CR-2008-808
CR-2008-268
CR-2008-639
CR-2008-787
CR-2008-813
CR 2008-2270

Specifications

NTS 114489-S-S-05131-1, Specification for Erection of Structural and Miscellaneous Steel
NTS 114489-S-S-03312-4, Placing Concrete and Reinforcing Steel
NTS 114489-S-S-03310-3, Mixing and Delivering of Concrete
NTS 114489-S-S-02300-6, Clearing, Grading, and Earthwork Material, Construction and Testing
NTS 114489-S-S-05131-1, Specification for Erection of Structural and Miscellaneous Steel
NTS 114489-S-S-05130-3, Specification for Fabrication of Structural and Miscellaneous Steel
NTS 114489-S-S-03313-4, Project Specification Rebar Fabrication
NTS 114489-S-D-01410-1, Testing Lab Services, dated 10/4/06
NTS 114489-S-S-03311-4, Concrete Mix Design
NTS 114489-S-S-03313-4, Rebar Fabrication

Engineering & Design Change Requests:

E&DCR C-0168

Nonconformance Reports:

NCR 28683-017
NCR 28683-023
NCR 28683-102
NCR 28683-108
NCR 28683-114
NCR 28683-162

Drawings:

114489-1001-C-CON-005-02-3, Concrete - UF6 Area and Cascade Halls 1 & 2
 Reinforcement Location Plan
 114489-1001-C-CON-006-03-3, Concrete - Cascade Halls 1 & 2, Sections, Sheets 3

Miscellaneous:

SP 2.3, Qualification / Certification of Inspection and Test Personnel, Revision 4
 NDE-1, Qualification and Certification of NDE Personnel, Revision 19
 AWS-SM-01, AWS Welding Procedure Specification, Revision 0
 LES Quality Assurance Program Description (QAPD), 15
 WGI PSP 11.01, Work Plans, dated October 20, 2006
 WGI Project Quality Assurance Plan (PQAP), Revision 2
 WGI Form PSP 09.04-1, Commercial Grade Dedication Plan, No. 28683-28 R/1, Ready
 Mix Concrete
 WGI Form PSP 09.01-6, Supplier Document Transmittal, No. 2008-1881, Particle Size
 Analysis of Fine & Coarse Aggregate
 WGI Form PSP 9.01-6, Supplier Document Transmittal, No. 2008-1953, Concrete
 Compressive Strength Reports, Bldg 1001 – Process Corridor
 WGI Form PSP 09.01-6, Supplier Document Transmittal, No. 2008-1955, Concrete
 Compressive Strength Reports, Bldg 1001 – 1st lift along 15 line
 WGI Form PSP 10.01-1, Receipt Inspection Report, PO No. WC210-005, DIL No.
 JDU/4-16-08/01, Boral Fly Ash Type F
 WGI Form PSP 10.01-1, Receipt Inspection Report, PO No. WC210-003, DIL No.
 JDU/4-17-08/01, Cemex Cement
 WGI Form PSP 09.01-1, Receipt Inspection, Documentation, and Storage Requirement,
 Revision 1
 WGI Form PSP 09.04-1, Commercial Grade Dedication Plan, Revision 1

AREVA Procedures

0402-01, Calculations, Rev. 38
 0412-67, Engineering Information Reports
 51-9047614-001, Design Criteria Documents for NEF I&C Hardwired IROFS,
 Revision 01
 51-9058919-000, NEF IROFS Failure Modes and Effects Analysis, Revision 0
 51-9063408-000, Hardwired IROFS Installation Instructions, Revision 0

AREVA Drawings:

02-9050294E-000, LES National Enrichment Facility Schematic Diagram IROFS 1 and
 IROFS 2 (Typical), Revision 0
 02-9050295E-000, LES National Enrichment Facility Schematic Diagram IROFS 4 and
 IROFS 5 (Typical), Revision 0
 02-9065353E-000, LES National Enrichment Facility Schematic Diagram IROFS C15
 and IROFS C16, Revision 0

AREVA Requests-For-Information (RFIs)

RAI-07-[A]-0032

RAI-07-[A]-0036

RAI-07-[A]-0041

AREVA Engineering Documents:

32-9065499-000, UF6 Feed/Take Off Vessel Ring, Revision 0

34-9065711-000, IROFS1 and IROFS4, RTD Data Sheet, Revision 0

34-9065712-000, IROFS2 and IROFS5 Thermocouple Data Sheet, Revision 0

34-9065713-000, IROFSC15 Thermocouple Data Sheet, Revision 0

34-9065715-000, IROFSC16 RTD Data Sheet, Revision 0

51-9047614-001, Design Criteria Document for the NEF I&C Hardwired IROFS, Revision 1

51-9061257-000, Engineering Report for IROFS 1, 2, 4, and 5, Revision 0

51-9065405-000, Engineering Report for IROFS C15 and C16, Revision 0

51-9058919-000, National Enrichment Facility IROFS Failure Modes and Effects Analysis, Revision 0

102-9032998-003, "Project Plan Design, Engineering, Supply of Equipment and Other Services for the National Enrichment Facility," Revision 3

ETC Calculations

UPD0201667A, Time Required for a Solid Feed Station to Overheat and Liquefy

UPD0202962A, Time Required for LTTO to Overheat and Liquefy

UPD0202978B, Temperature at Which a Full Cylinder will Hydraulically Rupture