



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
MARQUIS ONE TOWER
245 PEACHTREE CENTER AVENUE, NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

March 31, 2011

David E. Sexton, Chief Nuclear Officer
and Vice President of Operations
National Enrichment Facility
P.O. Box 1789
Eunice, NM 88231

SUBJECT: NRC INSPECTION REPORT NO. 70-3103/2011-006 AND NOTICE OF VIOLATION

Dear Mr. Sexton:

The U.S. Nuclear Regulatory Commission (NRC) conducted an inspection associated with the construction activities of the Louisiana Energy Services, L. L. C., National Enrichment Facility on January 18-21 and February 7-10, 2011. The purpose of the inspection was to verify compliance to Quality Level 1 criteria for Commercial Grade Dedication of the Cascade 3 mechanical components that were part of Items Relied on for Safety 41 described in the Commercial Grade Dedication Plan D-2010-12, Revision 0.

The inspection focused on commercial grade dedication activities associated with the Cascade 3 critical characteristics for the centrifuges, uranium hexafluoride pipe work, and upper steelworks located in cascade Minihall 1A of the Separations Building Module 1001. The enclosed inspection report, which documents the inspection results, was discussed with you and other members of your staff on February 10, and again on March 22, 2011.

Based on the results of this inspection, the NRC has determined that three Severity Level IV violations of NRC requirements occurred. These violations were 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 violations are cited in the enclosed Notice of Violation (Notice), and the circumstances surrounding them are described in the subject inspection report. The violations are being cited in the Notice because they were identified by the NRC.

Except as noted in the following paragraph, 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. If you have additional information that you believe the NRC should consider, you may provide it in your response to the Notice. The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

The NRC has concluded that information regarding the reason for examples 1 and 2 of Violation A and Violation C of the enclosed Notice of Violation, corrective actions taken and planned to be taken to correct the violation and the date when full compliance was achieved is already adequately addressed on the docket in the attached report. Therefore, no response for

examples 1 and 2 of Violation A and Violation C is required. If you contest these violations or their significance, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to: (1) the Regional Administrator, Region II; and (2) the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure(s), and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC's public reading room, Agency-Wide Document Access and Management System on the internet 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 me at (404) 997-4437.

Sincerely,

/RA/

M. Scott Freeman, Chief
Construction Inspection Branch 3
Division of Construction Inspection

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

Enclosures:

1. Notice of Violation
2. NRC Inspection Report 70-3103/2011-006 w/attachments

cc w/encls: (See next page)

If you contest these violations or their significance, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to: (1) the Regional Administrator, Region II; and (2) the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC.

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Sincerely,

/RA/

M. Scott Freeman, Chief
Construction Inspection Branch 3
Division of Construction Inspection

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

Enclosures:

1. Notice of Violation
2. NRC Inspection Report 70-3103/2011-006 w/attachments

cc w/encls: (See next page)

☒ PUBLICLY AVAILABLE
 ☐ NON-PUBLICLY AVAILABLE
 ☐ SENSITIVE
 ☒ NON-SENSITIVE
 ADAMS: ☒ Yes
 ACCESSION NUMBER: ML11090A037
 ☒ SUNSI REVIEW COMPLETE

OFFICE	RII:DCI	RII: DCI	RII:DCI	RII:DCI	RII:DFFI	RII:DCI
SIGNATURE	Via Email	/RA/	/RA/	/RA/	/RA/	/RA/
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DATE	03/29/2011	03/30/2011	03/30/2011	03/30/2011	03/30/2011	03/30/2011
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

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D. Sexton

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cc w/encl:

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Letter to David Sexton from M. Scott Freeman, dated March 31, 2011

SUBJECT: NRC INSPECTION REPORT NO. 70-3103/2011-006 AND NOTICE OF
VIOLATION

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NOTICE OF VIOLATION

Louisiana Energy Services, L.L.C.
Eunice, N.M.

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

During a Nuclear Regulatory Commission (NRC) inspection conducted between January 18-21 and February 7-10, 2011, violations of NRC requirements were identified.

In accordance with the NRC Enforcement Policy, the violations are listed below:

- A. Special Nuclear Material (SNM) License No. 2010 requires, in part, that the licensee shall conduct authorized activities at the Louisiana Energy Services, L.L.C., National Enrichment Facility (LES NEF) in accordance with statements, representations, and conditions in the approved Quality Assurance Program Description (QAPD), dated April 9, 2004, and supplements thereto.

Section 2, Quality Assurance Program, of the LES NEF QAPD states, in part, that the Quality Assurance (QA) organization is responsible for selected reviews and oversight of Quality Level-1 (QL-1) processes and programs. In particular, the LES NEF QA organization reviews and concurs with the selection of the Items Relied on for Safety (IROFS) and the application of QA requirements to the IROFS, any items which are determined to be essential to the functions of the IROFS, and items required to satisfy regulatory requirements for which QL-1 requirements are applied.

LES NEF Procedure EG-3-2100-05, Revision 7, "Commercial Grade Dedication Process," states that QA organization shall review and concur with the Commercial Grade Dedication Plan, conduct the required inspections of critical characteristics, and review the verification results for completeness and acceptability.

Contrary to the above, prior to January 18, 2011, the licensee's QA organization failed to adequately conduct the required selected reviews and oversight of the commercial grade dedication (CGD) of IROFS. The licensee's QA organization failed to ensure that the acceptability of several critical characteristic specified for pipeworks and upper steelworks associated with the CGD of Cascade 3 components designated as IROFS 41 were adequately verified, as evidenced by the following examples:

1. LES NEF incorrectly performed hardness testing on the fixed pipe clamps (critical characteristic 1c). The fixed pipe clamps were made of rolled aluminum but the hardness testing equipment was used with the stainless steel setting.
2. LES NEF performed the Leeb hardness testing method without verifying the method's reliability on rolled aluminum (critical characteristic 1c). The equipment manufacturer's specification did not include rolled aluminum as a material that the hardness tester could be used reliably on.
3. LES NEF used an alternate acceptance criteria without adequate technical justification. The CGD plan for upper steelworks required that nondestructive examinations and welds meet the requirements of American Welding Society (AWS) D1.1, which required a bare metal visual inspection of welds prior to acceptance. However, LES NEF performed visual inspections without removing paint and invoked

paragraph 6.8 of D1.1 to use acceptance criteria alternative to Table 6.1 of D1.1 without adequate technical justification (critical characteristics 10c and 10e).

This is a Severity Level IV violation (Enforcement Policy 6.5.d)

- B. SNM License No. 2010 Condition 10b requires, in part, that the licensee shall conduct authorized activities at the LES NEF in accordance with statements, representations, and conditions in the approved Safety Analysis Report dated December 12, 2003, and supplements thereto.

Section 3.4.22, of the Safety Analysis Report (SAR) stated that American Institute of Steel Construction (AISC) /American National Standards Institute (ANSI) N690, 1994, Specification for the Design, Fabrication, and Erection of Steel Safety-Related Structures for Nuclear Facilities was “applicable to the structural design of the National Enrichment Facility.”

Section 11.1.6, Design Requirements, of the SAR states that the “NEF is designed and built to the NEF Licensing Code of Record identified in the Integrated Safety Analysis Summary.”

Table 3.0-1 of the Integrated Safety Analysis Summary lists the codes of record for design and construction of LES NEF, and includes AISC/ANSI N690, 1994.

Paragraph Q1.0.1 of AISC/ANSI N690 requires that “The provisions of this Specification shall apply to the design, fabrication, and erection of steel safety-related structures and structural elements for nuclear facilities...The engineers of any system of design or construction within the scope of this specification, the adequacy of which has been shown by successful use or by analysis or test, but which does not conform to or is not covered by this Specification, shall have the right to present the data on which their design is based to the Regulatory Authority for review and approval.” AISC/ANSI N690 Paragraph Q1.17.1 specifies that AWS D1.1, Structural Welding Code, applies to work performed within the scope of AISC/ANSI N690.

Contrary to the above, prior to March 22, 2011, LES NEF used a system of design or construction within the scope of AISC/ANSI N690, the adequacy of which was shown by analysis, but which did not conform to the code, without presenting the data to the NRC for review and approval. Specifically, LES NEF invoked paragraph 6.8 of AWS D1.1 to develop alternate acceptance criteria for visual inspection of welds through paint. AWS D1.1 required the welds to be visually accepted prior to painting. Since AISC/ANSI N690 was the governing code for design, fabrication, and erection of structures that invoked AWS D1.1, LES NEF was required to use the visual inspection requirements of AWS D1.1 or submit the alternate acceptance criteria for welds to the NRC for review and approval prior to the use of those criteria.

This is a Severity Level IV Violation (Enforcement Policy 6.5.d)

- C. Special Nuclear Material (SNM) License No. 2010 requires, in part, that the licensee shall conduct authorized activities at the Louisiana Energy Services, L.L.C., National Enrichment Facility (LES NEF) in accordance with statements, representations, and conditions in the approved Quality Assurance Program Description (QAPD), dated April 9, 2004, and supplements thereto.

Section 15, Nonconforming Items, of the QAPD states, in part, that "The disposition, such as "use-as-is," "reject," "repair," or "rework," of nonconforming items shall be identified and documented. The technical justification for the acceptability of a nonconforming item that has been dispositioned "repair" or "use-as-is" shall be documented."

LES procedure EG-3-2100-09 Rev. 5, Identification, Disposition, and Resolution of Nonconforming Items, states, in part, in paragraph 5.1.2 d. 1) "Dispositions of "repair" or "use-as-is" require technical justification for the acceptability of the nonconforming item to be documented and shall be subject to design control measures commensurate with those applied to the original design."

Contrary to the above, on January 5, 2011, LES NEF issued nonconformance reports 2010-3965 and 2010-3976 which documented five missing welds on the cascade 3 upper steel-works and dispositioned them for use-as-is without including the required technical justification.

This is a Severity Level IV Violation (Enforcement Policy 6.5.d)

Concerning Violation A examples 1 and 2, and Violation C, the NRC has concluded that information regarding the reasons, the corrective actions taken and planned to correct the violations and the date when full compliance was achieved is already adequately addressed on the docket in this letter and as documented in NRC Inspection Report No. 70-3103/2011-006. However, you are required to submit a written statement or explanation pursuant to 10 CFR 2.201 if the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to respond, clearly mark your response as a "Reply to a Notice of Violation," and send it to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555 with a copy to the Regional Administrator, Region II, within 30 days of the date of the letter transmitting this Notice.

Concerning Violation A example 3 and Violation B: 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 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 with a required response: (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.

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.

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.

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 such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withhold 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 31st day of March 2011.

NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 70-3103

License: SNM-2010

Report No.: 070-3103/2011-006

Licensee: Louisiana Energy Services, L.L.C. (LES)

Location: National Enrichment Facility (NEF)
Eunice, New Mexico

Inspection Dates: January 18 - 21, 2011 in Region II office
February 7 - February 10, 2011 at LES NEF

Inspectors: J. Heisserer, Construction Inspector, Construction Inspection Branch 3
(CIB3), Division of Construction Inspection (DCI), Region II (RII)
B. Davis, Senior Construction Inspector, Construction Projects Branch 1
(CPB1), Division of Construction Projects (DCP), RII
D. Failla, Construction Inspector, CIB3, DCI, RII
D. Harmon, Construction Inspector, CIB3, DCI, RII
T. Steadham, Construction Inspector, CIB3, DCI, RII

Accompanying
Personnel: None

Approved: M. Scott Freeman, Chief, CIB3, DCI, RII

EXECUTIVE SUMMARY

Louisiana Energy Services, L.L.C., National Enrichment Facility (LES NEF) Nuclear Regulatory Commission (NRC) Inspection Report No. 70-3103/2011-006

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

The NRC conducted an inspection to evaluate the procurement and installation of Items Relied on for Safety 41 mechanical components by verifying Quality Level-1 criteria. The inspection consisted of review of applicable commercial grade dedication (CGD) activities for critical characteristics of Cascade 3 centrifuges and header pipe work and upper steelworks located in cascade Minihall 1A of the Separations Building Module 1001.

The inspectors reviewed the CGD Plan, D-2010-012, Revision 0 (including applicable procedures and various documents) and the applicable acceptance method. Acceptance Method 1, "Special Test/Inspection and Standard Receipt Practices," Acceptance Method 2, "Commercial Grade Survey" (for mostly European suppliers and sub-suppliers), and Acceptance Method 3, "Source Verification," were selected by LES NEF for verification of 21 and 38 critical characteristics for the centrifuges and pipe works/upper steelworks, respectively.

Three Severity Level IV violations were identified. The first was cited against Section 2 of the LES NEF QAPD for failure to adequately verify the acceptability of critical characteristics specified for pipe works/upper steelworks commercial grade dedication of Cascade 3. The second was cited against Section 3.4.22 of the LES NEF Safety Analysis Report and Paragraph Q1.0.1 of American Institute of Steel Construction/American National Standards Institute N690 for failure to submit alternate acceptance criteria to the NRC for review and approval. The third was cited against Section 15 of the LES NEF QAPD for failure to document justification for use-as-is disposition of missing welds in the upper steelworks.

Mechanical Components (IP 88136)

The inspectors conducted an inspection to assess the fabrication and installation of the pipe works and upper steelworks for Cascade 3. The inspectors reviewed applicable CGD packages and supporting documentation (including drawings and work packages) to determine whether the critical characteristics specified were adequately verified. The inspectors reviewed documents and observed activities associated with the removal, receipt, and installation of turnbuckles.

Attachments:

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

REPORT DETAILS

1. Summary of Facility Status

The licensee continued to perform construction activities for Separations Building Module (SBM) 1001 and the Cylinder Receipt and Dispatch Building (CRDB), at the Louisiana Energy Services, L.L.C., National Enrichment Facility (LES NEF).

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

a. Scope and Observations

The inspectors evaluated the procurement and installation of Items Relied on for Safety (IROFS) 41 mechanical components to determine if commercial-grade dedication (CGD) was appropriately performed in accordance with the Quality Assurance (QA) plan. Emphasis was placed on CGD activities for critical characteristics associated with the key attributes of Cascade 3 centrifuges, header pipe works, and upper steelworks located in cascade Minihall 1A of SBM-1001. Critical Characteristics verified by Nuclear Regulatory Commission (NRC) inspections for earlier cascades (Inspection Reports 70-3103/2009-007 (ML101170813), 70-3103/2010-008 (ML100271177), 70-3103/2010-012 (ML102020385), and 70-3103/2010-013(ML102320298), were also applicable to Cascade 3 and are credited in this report where appropriate.

The inspectors reviewed the Cascade 3 CGD Plan, D-2101-012, Revision 0, as well as other implementing procedures to determine if they met requirements of the LES NEF Quality Assurance Program Description (QAPD). The chosen acceptance methods to verify critical characteristics were listed in critical characteristic verification packages that were reviewed by the inspectors. The acceptance methods were as follows: Method 1, "Special Test/Inspection and Standard Receipt Practices," Method 2, "Commercial Grade Survey," and Method 3, "Source Verification."

(1) Centrifuges (Methods 1 and 2 Verification, Note: Method 3 was not used)

The Cascade CGD Plan listed a total of 21 critical characteristics for centrifuges that included materials, wall thicknesses, tightening torque, weld filler materials, welding and nondestructive examination (NDE) process controls, leak tightness integrity, and correct installation of various parts.

Regarding acceptance Method 1, the Inspectors reviewed inspection and test data to confirm verification of critical characteristics. The inspectors reviewed chemical analysis test results to verify that actual materials used in key centrifuge parts met specified design requirements and were traceable to unique heat numbers. Ultrasonic thickness measurement data was reviewed to ensure that key centrifuge parts met or exceeded specified minimum thickness values to ensure the parts could withstand postulated accidents, such as a centrifuge crash.

The inspectors reviewed chemical test data taken from weld wire heats and weld test samples removed from the top and bottom weld joints to ensure the weld material met

design specifications. Rockwell Hardness C data was reviewed to confirm that centrifuge mounting bolts met physical property specifications including tensile strength. Chemical composition data from destructive testing of centrifuge mounting bolts was reviewed to verify that the bolt material met the required specifications. Receipt inspection records were reviewed, including the certificate of conformance which stated that critical characteristics were verified and that any deviation related to critical characteristics was addressed appropriately.

Regarding acceptance Method 2, the inspectors verified that the surveys credited for Cascade 3 were the same surveys credited in the CGD package for cascades subject to previous NRC inspections and documented in Inspection Reports 70-3103/2009-007, 70-3103/2010-008, 70-3103/2010-012, and 70-3103/2010-013. In those inspections, the inspectors reviewed the documents to verify that the LES NEF surveys adequately evaluated the applicable aspects of the suppliers that pertained to their scope of supply including organization, quality assurance, design control, document control, personnel training and qualifications, procurement controls and purchasing, materials controls, measuring, inspection and testing, chemistry controls, control of physical parameters such as dimensions, calibration controls, shipping, and control of non-conforming items.

(2) Pipe works/Upper Steelworks (Methods 1, 2 and 3 Verification, as applicable)

The Cascade CGD Plan listed 26 critical characteristics for the uranium hexafluoride (UF₆) pipe work and upper steelworks that could be verified through a review of reports and work packages. These included materials, wall thicknesses and diameters, pipe ovality, bending radius, hardness, tightening torque, weld filler materials, welding and NDE process controls, leak tightness integrity, and correct installation of various parts. The Licensee documented these critical characteristics in critical characteristic verification packages that the inspectors reviewed.

The Methods 1 and 3 verification documentation for the pipe works and upper steelworks critical characteristics in Cascade 3 were reviewed for correct tightening torque, positive material identification, and hardness testing. The proceeding list of critical characteristics applied to the pipe work clamps. Magnetic inspection, and destructive material testing results were reviewed to verify that materials used in pipe work and upper steelworks met specified design requirements. Ultrasonic thickness, ovality, and bend radius measurement data was reviewed to ensure those values met or exceeded specified requirements.

The inspectors reviewed hardness and tensile strength testing data to verify that steelwork nuts and bolts met the physical property specifications of the relevant bolt specifications and that the material properties assumed in the design calculation were consistent with the associated critical characteristics. The inspectors reviewed chemical composition data from destructive testing of upper steelworks mounting bolts to ensure bolting material met the required specifications. The inspectors reviewed tightening torque verification data to ensure that the upper steelworks mounting fasteners had the appropriate torque applied as specified in the associated work plans. The inspectors reviewed Skidmore Wilhelm pretension torque verification data to ensure that the bolt preloads assumed in the applicable design calculations were correctly translated into corresponding torque values in the work plans.

The inspectors reviewed work plans and receipt inspection records, including certificates of conformance. The certificates of conformance stated that critical characteristics were verified and that any deviation related to critical characteristics were addressed. The inspectors reviewed inspection data contained in work plans to confirm that dimensional and installation measurements for support components, pipe work configuration, and component types met specified requirements.

The inspectors reviewed the results of through paint visual weld inspection of the upper steelworks. These visual inspection results were compared to the visual inspection acceptance criteria of American Welding Society (AWS) D1.1, for verification. The inspectors reviewed magnetic inspection data that was used to verify the weld filler material of the upper steelworks was ferromagnetic. Dimensional measurements of the upper steelworks H-frames were reviewed to verify specified requirements were met.

Regarding acceptance Method 2, the inspectors reviewed the commercial grade surveys performed by LES NEF verifying the capability of suppliers and sub-suppliers to adequately control the critical characteristics associated with their specific scope of supply. A majority of the surveys reviewed were the same surveys credited in the CGD package for Cascade 1 subject to previous NRC inspections and documented in Inspection Reports 70-3103/2009-007 and 70-3103/2010-008. The inspectors reviewed the documents to verify that the LES NEF surveys adequately evaluated the applicable aspects of the suppliers that pertained to their scope of supply, including organization, quality assurance, design control, document control, personnel training and qualifications, procurement controls and purchasing, materials controls, measuring, inspection and testing, procedural compliance and documentation, chemistry controls, controls of physical parameters such as dimensions and physical strengths, calibration controls, shipping, and control of nonconforming items.

As part of previous NRC inspections (Inspection Reports 70-3103/2009-007 and 70-3103/2010-008), several supplier welding procedures and welder qualification records for various welding techniques were reviewed for compliance to the code requirements of American Society of Mechanical Engineers (ASME) Section IX, "Welding and Brazing Qualifications," for the UF₆ pipe work.

Findings Identified

VIO 70-3103/2011-006-001

Critical characteristic 1c of the pipe works and steelworks section of the Cascade 3 CGD package required the verification of the pipe work clamp hardness using the Method 3 verification process. When the inspectors inquired about the hardness testing equipment range, reliability, and accuracy of specific clamp material readings taken on the fixed pipe clamps, it was determined that the hardness testing was incorrectly performed. Specifically, the fixed pipe work clamps were made of rolled aluminum, but hardness testing equipment was set to test stainless steel during testing. This was identified as Example 1 of VIO 70-3103/2011-006-001, Failure to Verify Acceptability of Critical Characteristics.

The inspectors also determined, after reviewing the equipment manufacturer's specification that the licensee did not verify that the Leeb hardness testing method could

reliably be used on rolled aluminum. This was identified as Example 2 of VIO 70-3103/2011-006-001, Failure to Verify Acceptability of Critical Characteristics.

While reviewing critical characteristics 10c and 10e associated with the cascade upper steelworks, inspectors noted that LES credited a Method 2 commercial grade survey of Form Fabrications that was conducted in April 2009 to show compliance to AWS D1.1. The survey was supplemented by a Method 1 through-paint visual assessment on a sample of welds.

Through interviews with LES CGD personnel, inspectors learned that LES issued a stop work order to Form Fabrications in February 2010 for deficiencies related to the implementation of AWS D1.1. According to the interviews, those deficiencies included inadequate performance of the inspection requirements of AWS D1.1, specifically, visual inspection of welds to the criteria in Table 6.1 of D1.1 prior to coating or painting. Between March 2010 and October 2010, LES generated approximately 30 condition reports as welds defects were identified through the sampling inspections.

In October 2010, LES initiated Level 1 CR-2010-3400 to document the adverse trend of weld defects as a significant condition adverse to quality. In March 2010, Enrichment Technology Company issued a concession citing “knowledge that the Form Fab welds were not in compliance with AWS D1.1,” according to root cause evaluation (RCE) report RCE-2010-3400. The corrective actions described in CR-2010-3400 and RCE-2010-3400 included planned implementation of quality improvements at Form Fabrications to assure that welds and inspections on future cascades were performed in accordance with D1.1 for future Cascades. The RCE also noted that the root cause for the weld deficiencies “is that Form Fab welders and IMI-B inspectors were unfamiliar with how to comply with AWS D1.1 and American National Standards Institute (ANSI)/American Institute of Steel Construction (AISC) N690.” Based on that information, the inspectors concluded that LES improperly credited the survey to show compliance to D1.1 inspection requirements, and the Method 1 through-paint assessment did not meet the AWS D1.1 requirement that welds be accepted prior to painting. At the time of the stop work order and concession, Form Fabrications had already delivered upper steelworks for cascades 1 through 8.

LES invoked paragraph 6.8 of AWS D1.1 and performed an engineering evaluation to develop alternative visual acceptance criteria for the welds in the upper steelworks that were already installed instead of using the visual acceptance criteria listed in Table 6.1 of AWS D1.1. This evaluation, documented in TQ-2010-102, was completed in December 2010. The evaluation described a calculation which allowed defects up to a certain length, depending on the design utilization of the weld in the system. In other words, if the defective portion(s) of the weld were assumed missing and the weld still met its design strength, then the output of the calculation would allow a “use as-is” disposition.

The evaluation in TQ-2010-102 directed that the welds shall be inspected through paint. However, the inspectors determined that the analysis for the visual inspection through paint was insufficient to properly evaluate the welds for defects. Paragraph 6.8 of AWS D1.1 states that the alternate criteria may be based upon “evaluation of suitability for service using past experience, experimental evidence or engineering analysis considering material type, service load effects, and environmental factors.” The evaluation did not address past experience, experimental evidence or engineering

analysis for inspection of welds through paint. For example, the evaluation did not include an analysis of paint thickness or properties, did not include a statistical analysis demonstrating that defects could be adequately identified and evaluated through paint, and did not justify that any significant defects would be found through paint. In addition, the “battleship” steel, a highly utilized section of the upper steelworks, was excluded from the scope of the evaluation, although the alternate criteria were applied to welds located in the battleship steel. This was identified as Example 3 of VIO 70-3103/2011-006-001, Failure to Verify Acceptability of Critical Characteristics

Special Nuclear Material (SNM) License No. 2010 Condition 10f requires, in part, that the licensee shall conduct authorized activities at the Louisiana Energy Services, L.L.C., National Enrichment Facility in accordance with statements, representations, and conditions in the approved QAPD, dated April 9, 2004, and supplements thereto.

Section 2, Quality Assurance Program, of the LES NEF QAPD states, in part, that the QA organization is responsible for selected reviews and oversight of Quality Level-1 (QL-1) processes and programs. In particular, the LES NEF QA organization reviews and concurs with the selection of the IROFS and the application of QA requirements to the IROFS, any items which are determined to be essential to the functions of the IROFS, and items required to satisfy regulatory requirements for which QL-1 requirements are applied.

LES NEF Procedure EG-3-2100-05, Revision 7, “Commercial Grade Dedication Process,” states that QA organization shall review and concur with the Commercial Grade Dedication Plan, conduct the required inspections of critical characteristics, and review the verification results for completeness and acceptability.

Contrary to the above, prior to January 18, 2011, the licensee’s QA organization failed to adequately conduct the required selected reviews and oversight of the CGD of IROFS. The licensee’s QA organization failed to ensure that the acceptability of several critical characteristic specified for pipeworks and upper steelworks associated with the CGD of Cascade 3 components designated as IROFS 41 were adequately verified, as evidenced by the following examples:

1. LES NEF incorrectly performed hardness testing on the fixed pipe clamps (critical characteristic 1c). The fixed pipe clamps were made of rolled aluminum but the hardness testing equipment was used with the stainless steel setting.
2. LES NEF performed the Leeb hardness testing method without verifying the method’s reliability on rolled aluminum (critical characteristic 1c). The equipment manufacturer’s specification did not include rolled aluminum as a material that the hardness tester could reliably be used on.
3. The CGD plan for upper steelworks required that nondestructive examinations and welds meet the requirements of AWS D1.1, which required a bare metal visual inspection of welds prior to acceptance. However, the licensee performed visual inspections without removing paint and invoked paragraph 6.8 of D1.1 to use acceptance criteria alternative to Table 6.1 of D1.1 without adequate technical justification (critical characteristics 10c and 10e).

In response for Examples 1 and 2, the licensee issued Condition Report, CR-2011-241, performed hardness testing on the fixed clamps with the appropriate equipment settings to verify fixed clamp material critical characteristics. The licensee also verified the hardness testing equipment provided reliable readings on rolled aluminum by contracting an independent laboratory to perform hardness tests on the clamps with calibrated instruments. The inspectors witnessed the licensee perform hardness tests on the same clamps that the independent laboratory tested. The licensee then compared the data provided by the laboratory to the hardness measurements taken with the on-site equipment to verify reliable measurements could be taken on rolled aluminum with this equipment. The licensee also revised the hardness testing procedure, QA-3-3000-25, and associated personnel qualifications. The licensee completed their corrective actions and restored compliance on February 10, 2011.

VIO 70-3103/2011-006-002

The inspectors noted that the licensee applied the AWS D1.1 alternate acceptance criteria for visual weld inspections to Cascades 1, 2 and 3. The inspectors also noted that AISC/ANSI N690 is the governing code that invoked AWS D1.1 for the upper steelworks. AISC/ANSI N690 requires deviations from the code, such as D1.1 alternate acceptance criteria, to be submitted to the Regulatory Authority (i.e., NRC) for review and approval. This was identified as VIO 70-3103/2011-006-002, Failure to Submit Alternate Acceptance Criteria to NRC for Review and Approval.

SNM License No. 2010 Condition 10b requires, in part, that the licensee shall conduct authorized activities at the LES NEF in accordance with statements, representations, and conditions in the approved Safety Analysis Report dated December 12, 2003, and supplements thereto.

Section 3.4.22, of the Safety Analysis Report (SAR) stated that AISC/ANSI N690, 1994, Specification for the Design, Fabrication, and Erection of Steel Safety-Related Structures for Nuclear Facilities was “applicable to the structural design of the National Enrichment Facility.”

Section 11.1.6, Design Requirements, of the SAR states that the “NEF is designed and built to the NEF Licensing Code of Record identified in the Integrated Safety Analysis Summary.”

Table 3.0-1 of the Integrated Safety Analysis Summary lists the codes of record for design and construction of LES NEF, and includes AISC/ANSI N690, 1994.

Paragraph Q1.0.1 of AISC/ANSI N690 requires that “The provisions of this Specification shall apply to the design, fabrication, and erection of steel safety-related structures and structural elements for nuclear facilities...The engineers of any system of design or construction within the scope of this specification, the adequacy of which has been shown by successful use or by analysis or test, but which does not conform to or is not covered by this Specification, shall have the right to present the data on which their design is based to the Regulatory Authority for review and approval.” AISC/ANSI N690 Paragraph Q1.17.1 specifies that AWS D1.1, Structural Welding Code, applies to work performed within the scope of AISC/ANSI N690.

Contrary to the above, prior to March 22, 2011, LES NEF used a system of design or construction within the scope of AISC/ANSI N690, the adequacy of which was shown by analysis, but which did not conform to the code, without presenting the data to the NRC for review and approval. Specifically, LES NEF invoked paragraph 6.8 of AWS D1.1 to develop alternate acceptance criteria for visual inspection of welds through paint. AWS D1.1 required the welds to be visually accepted prior to painting. Since AISC/ANSI N690 was the governing code for design, fabrication, and erection of structures that invoked AWS D1.1, LES NEF was required to use the visual inspection requirements of AWS D1.1 or submit the alternate acceptance criteria for welds to the NRC for review and approval prior to the use of those criteria.

VIO 70-3103/2011-006-003

Critical characteristic 10b of the pipe works and steelworks section of the Cascade 3 CGD package required the verification of the upper steelworks welds by method 1 inspection. The commercial grade dedication plan specified visual examination of a sample of the painted welds. Upon identification of unacceptable weld defects, the licensee expanded the sample to 100% of the welds. The defects identified in those inspections were captured in nonconformance report (NCR) numbers 2010-3965, 2010-3976, 2010-3985, 2010-4004, 2010-4019, and 2010-4033.

The defects were dispositioned in accordance with Technical Question EG-TQ-2010-102, which assumed that the defective portion of the weld was not present and recalculated the weld utilization. All welds were accepted for use-as-is. The inspectors reviewed the inspections and results included in 3-CCVP-2010-012-USPW-10B and the listed NCRs to verify compliance with the commercial grade dedication plan and the applicable NCR procedure (EG-3-2100-09 Rev. 5). The inspectors noted the following inadequacy associated with the method 1 verification of critical characteristic 10b:

NCRs 2010-3965 & 2010-3976 identified that 5 welds shown in the design of the upper steel-works did not exist on the as-built structure. They were subsequently accepted for use-as-is. Procedure EG-3-2100-09 Rev. 5, "Identification, Disposition, and Resolution of Nonconforming Items" states in paragraph 5.1.2 d. 1) "Dispositions of "repair" or "use-as-is" require technical justification for the acceptability of the nonconforming item to be documented and shall be subject to design control measures commensurate with those applied to the original design." Contrary to this, the NCRs did not contain justification for acceptability of the missing welds, nor did a justification exist elsewhere.

The inspectors concluded that LES NEF failed to meet the requirements of 10 CFR Appendix B, Criterion 15, Nonconforming Materials, Parts, or Components, as described in procedure EG-3-2100-09 Rev. 5, "Identification, Disposition, and Resolution of Nonconforming Items." This was identified as VIO 70-3103/2011-006-003, Failure to Justify Nonconformance Disposition of Use-as-is.

SNM License No. 2010 Condition 10f requires, in part, that the licensee shall conduct authorized activities at the LES NEF in accordance with statements, representations, and conditions in the approved QAPD, dated April 9, 2004, and supplements thereto.

Section 15, Nonconforming Items, of the QAPD states, in part, that "The disposition, such as "use-as-is," "reject," "repair," or "rework," of nonconforming items shall be identified and documented. The technical justification for the acceptability of a

nonconforming item that has been dispositioned "repair" or "use-as-is" shall be documented."

Implementing procedure EG-3-2100-09 Rev. 5, "Identification, Disposition, and Resolution of Nonconforming Items," states, in part, in paragraph 5.1.2 d. 1) "Dispositions of "repair" or "use-as-is" require technical justification for the acceptability of the nonconforming item to be documented and shall be subject to design control measures commensurate with those applied to the original design."

Contrary to the above, LES NEF failed to document the justification for use-as-is disposition. Specifically, LES NEF documented 5 missing welds on the Cascade 3 upper steel-works in NCRs 2010-3965 & 2010-3976. LES NEF accepted them for use-as-is without a written justification of the disposition.

In response, the licensee issued Condition Report CR-2011-202. The action taken by the licensee to correct this was to contact the designer to determine if rework of the welds were necessary. The licensee revised NCRs 2010-3965 and 2010-3976 to include justification for the use-as-is disposition provided by the designer. The licensee completed their corrective actions and restored compliance on February 10, 2011.

b. Conclusions

The inspectors determined that several critical characteristics listed in CGD Plan D-2010-012, Revision 0 were adequately verified by acceptance Methods 1, 2, and 3. However, three Severity Level (SL) IV violations of the license were identified. Violation 70-3103/2011-006-001 was cited against section 2 of the LES NEF QAPD for failure to conduct the required selected reviews and oversight of the acceptability of critical characteristics specified for pipe works/upper steelworks commercial grade dedication of Cascade 3. Violation 70-3103/2011-006-002 was cited against Section 3.4.22 of the LES NEF SAR and Paragraph Q1.0.1 of AISC/ANSI N690 for failure to submit alternate acceptance criteria to the NRC for review and approval. Violation 70-3103/2011-006-003 was cited against Section 15 of the LES NEF QAPD for failure to document justification for use-as-is disposition for missing welds in the upper steelworks. Prior to issuance of this report, the licensee provided the required objective evidence to correct Violation A examples 1 and 2, and Violation C, and was verified to be acceptable by the inspectors.

3. **Mechanical Components (IP 88136)**

a. Scope and Observations

The Cascade CGD Plan listed 7 critical characteristics that were inspected through on-site verification. During the inspection at LES NEF the inspectors evaluated the manufacture and installation of IROFS 41 mechanical components for SBM-1001.

The inspectors conducted field inspections of installed components to determine whether specific activities associated with QL-1 mechanical components were controlled and performed in accordance with NRC requirements, license commitments, and the approved QAPD. The focus of the field inspection was on QL-1 components associated with the fabrication and installation of the pipe works and upper steelworks of Cascade 3. The Cascade 3 critical characteristics which were inspected included fixed clamp and

sliding clamp clearance, clamp positioning and diameter, cantilever support clearance, dimensions of H-frames, upper steelworks welds, pipe ovality, and pipe bend radius.

The inspectors reviewed Construction Work Plan 1001-CIVIL-843-031, Remove and Reinstall Turnbuckles in Cascade 3 1001, and applicable procedures to determine if the removal and installation of the turnbuckles was completed in accordance with the applicable requirements. LES Purchase Order 303782 and 303784, LES Approved Supplier List, and NIAC Quality Assurance Audit of MACKSON, report number 12551, was reviewed by the inspectors to verify the turnbuckles were purchased and provided in accordance with requirements of the LES QAPD.

The inspectors observed LES QC personnel perform a receipt inspection of the turnbuckles to ensure they met the requirements specified in LES Purchase Orders 303782 and 303784. After the turnbuckles were installed, the inspectors observed LES QC personnel perform inspections of the turnbuckles to ensure they would perform their safety function by verifying connecting bolts were adequately torqued and collars were adequately tensioned.

b. Conclusions

The inspectors determined that several critical characteristics listed in CGD Plan D-2010-012, Revision 0 were adequately verified by acceptance Method 1. No findings of significance were identified.

4. **Follow-up of Previously Identified Items**

a. Violation (VIO) 070-3103/2010-013-001

The inspectors reviewed licensee actions to restore compliance with NRC regulations for VIO 70-3103/2010-013-001, Failure to Verify Acceptability of Critical Characteristics. The violation involved the licensee's failure to conduct the required selected reviews and oversight of the acceptability of several critical characteristics specified for pipeworks and upper steelworks CGD of Cascade 3 components designated as IROFS 41.

Examples 1, 2, and 3 of VIO 70-3103/2010-013-001 identified that LES NEF did not have documented evidence of the Method 3 verification of bolt and clamp tightening torque. In response, the licensee conducted another surveillance to document the results of the torque verifications, developed a document to give instruction on verification of critical characteristics, and gave training to personnel associated with inspections of IROFS 41. The licensee also made various programmatic enhancements to prevent recurrence, including the assignment of a CGD project manager, assignment of quality control inspectors to the CGD team, and quarterly surveillances of the IROFS 41 CGD process. The inspectors reviewed the data contained in the torque verification surveillance, the procedural guidance on critical characteristic verification, and the training records.

Example 4 of VIO 70-3103/2010-013-001 identified that LES NEF did not complete destructive tests specified for all of the required samples of nuts and bolts. In response the licensee tested additional bolts, and replaced certain bolts. As part of this inspection, the inspectors reviewed the Critical Characteristic Verification Packages for

bolting to verify the incorporation of information associated with this violation and Example 1 of VIO 70-3103/2010-015-001.

Example 5 of VIO 70-3103/2010-013-001 identified that the size of fillet welds in the upper steelworks were not adequately verified by LES NEF. The inspectors reviewed the data collected by LES NEF in supplemental verifications.

Example 6 of VIO 70-3103/2010-013-001 identified that dimensions of subunit steel frames in the upper steelworks were not adequately verified by LES NEF. The inspectors reviewed CR 2010-2526 and the revised dimensional data.

The inspectors also reviewed the licensee's reply to the violation and determined that the licensee had appropriately restored compliance with NRC regulations and the conditions of their license. This violation is closed.

b. Violation (VIO) 070-3103/2010-015-001

The inspectors reviewed licensee actions to restore compliance with NRC regulations for VIO 70-3103/2010-015-001, Failure to Verify Acceptability of Critical Characteristics. The violation involved the licensee's failure to conduct the required selected reviews and oversight of the acceptability of several critical characteristics specified for pipeworks and upper steelworks CGD of Cascades 2 and 3 components designated as IROFS 41.

Example 1 of VIO 70-3103/2010-015-001 identified that contrary to LES NEF's formal response to VIO 70-3103/2010-013-001, not all of the required destructive testing of the fastener material had been performed.

The inspectors verified that critical characteristic 7a was adequately verified during this inspection. The inspectors also reviewed training for preparers and signers of Notice of Violation (NOV) response letters, as well as the routing traveler for NOV correspondence. The inspectors verified that the updates to the corrective action procedure described in the response were included. The inspectors verified that a project plan was developed for the CGD program. The inspectors confirmed that revised CGD procedure (EG-3-2100-05) included updates described in the response.

Example 2 of VIO 70-3103/2010-015-001 identified that certain material requirements for fixed clamp material were not adequately verified. In response the licensee wrote an NCR to evaluate the acceptability of the clamps that did not meet the material specification for manganese. The inspectors reviewed NCR 2010-3791 which evaluated the acceptability of the manganese content in the pipework clamps.

The inspectors also reviewed the licensee's reply to the violation and determined that the licensee had appropriately restored compliance with NRC regulations and the conditions of their license. This violation is closed.

5. Exit Meeting/Interviews

Issues identified during the inspection were summarized daily during the inspection period of January 18 through 21, 2011, and February 7 through 10, 2011, by the inspection team leader. A formal exit meeting was held on February 10, 2011, with the licensee's management team. A re-exit conference call was held on March 22, 2011.

The inspectors described the areas inspected and discussed the inspection results in detail with the licensee staff. Although proprietary documents were reviewed during this inspection, the proprietary nature of these documents is not included in this report.

SUPPLEMENTAL INFORMATION

1. List of Personnel Contacted

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

D. Cephus, Shipping and Receiving Manager
D. Dauner, Contract Engineer
E. Dawdy, Material Manager
S. Ellis, CGD Project Manager
R. Finney, Quality Control Inspector
G. Foster, Quality Control Inspector
J. Foster, Licensing
B. Hansen, Licensing
J. Laughlin, Technical Services Director
D. Lemons, Engineering
P. McCasland, Licensing Engineer
L. Maxwell, ETUS Engineer
W. Padgett, Licensing Manager
L. Parnell, ETUS QA Department
C. Questa, Quality Control Receipt Inspector
G. Sergent, Quality Control Manager
D. Sexton, Chief Nuclear Officer
P. Stichev, ETUS QA Department
T. Taylor, Licensing
O. Torres, Quality Control Supervisor

2. Inspection Procedure (IP) Used

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

IP 88136 Mechanical Components

3. List of Items Opened, Closed and Discussed

VIO 70-3103/2011-006-001	Opened and Partially Closed	Failure to Verify Acceptability of Critical Characteristics (Section 2)
VIO 70-3103/2011-006-002	Opened	Failure to Submit Alternate Acceptance Criteria to NRC for Review and Approval (Section 2)
VIO 70-3103/2011-006-003	Opened and Closed	Failure to Justify Nonconformance Disposition of Use-as-is (Section 2)

VIO 70-3103/2010-013-001	Closed	Failure to Verify Acceptability of Critical Characteristics (Section 4)
VIO 70-3103/2010-015-001	Closed	Failure to Verify Acceptability of Critical Characteristics (Section 4)

4. List of Acronyms Used

ADAMS	Agency Document Access and Management System
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
AWS	American Welding Society
CGD	Commercial Grade Dedication
CIB3	Construction Inspection Branch 3
CPB1	Construction Projects Branch 1
CR	Condition Report
CRDB	Cylinder Receipt and Dispatch Building
DBE	Design Basis Event
DCI	Division of Construction Inspection
DCP	Division of Construction Projects
IP	Inspection Procedure
IR	NRC Inspection Report
IROFS	Items Relied on For Safety
LES NEF	Louisiana Energy Services Nuclear Enrichment Facility
NCR	Nonconformance Report
NDE	Nondestructive Examination
NIAC	Nuclear Industry Assessment Committee
NOV	Notice of Violation
NRC	Nuclear Regulatory Commission
QA	Quality Assurance
QAPD	Quality Assurance Program Description
QC	Quality Control
QL-1	Quality Level 1
RCE	Root Cause Evaluation
RII	Region II
RII	Region 2
SAR	Safety Analysis Report
SBM	Separations Building Module
SL	Severity Level
SNM	Source and/or Special Nuclear Materials
UF6	Uranium Hexafluoride
VIO	Violation

5. List of Documents Reviewed

LES NEF Documents

Critical Characteristic Verification Packages

3-CCVP-2010-012-USPW-1a
 3-CCVP-2010-012-USPW-1b
 3-CCVP-2010-012-USPW-2a
 3-CCVP-2010-012-USPW-2b
 3-CCVP-2010-012-USPW-2c
 3-CCVP-2010-012-USPW-3
 3-CCVP-2010-012-USPW-4a
 3-CCVP-2010-012-USPW-4b
 3-CCVP-2010-012-USPW-5
 3-CCVP-2010-012-USPW-6a
 3-CCVP-2010-012-USPW-6b
 3-CCVP-2010-012-USPW-6c
 3-CCVP-2010-012-USPW-7
 3-CCVP-2010-012-USPW-8a
 3-CCVP-2010-012-USPW-8b
 3-CCVP-2010-012-USPW-9
 3-CCVP-2010-012-USPW-10
 3-CCVP-2010-012-USPW-11a
 3-CCVP-2010-012-USPW-11b
 3-CCVP-2010-012-USPW-12a
 3-CCVP-2010-012-USPW-12b
 3-CCVP-2010-012-USPW-1a
 3-CCVP-2010-012-USPW-1b
 3-CCVP-2010-012-USPW-1c
 3-CCVP-2010-012-USPW-2
 3-CCVP-2010-012-USPW-3a
 3-CCVP-2010-012-USPW-3b
 3-CCVP-2010-012-USPW-4
 3-CCVP-2010-012-USPW-5a
 3-CCVP-2010-012-USPW-5b
 3-CCVP-2010-012-USPW-5c
 3-CCVP-2010-012-USPW-6a
 3-CCVP-2010-012-USPW-6b
 3-CCVP-2010-012-USPW-6c
 3-CCVP-2010-012-USPW-6d
 3-CCVP-2010-012-USPW-6e
 3-CCVP-2010-012-USPW-6F
 3-CCVP-2010-012-USPW-6g
 3-CCVP-2010-012-USPW-7a, 7b, & 8a
 3-CCVP-2010-012-USPW-8b
 3-CCVP-2010-012-USPW-8c
 3-CCVP-2010-012-USPW-10a
 3-CCVP-2010-012-USPW-10b
 3-CCVP-2010-012-USPW-10c
 3-CCVP-2010-012-USPW-10d
 3-CCVP-2010-012-USPW-10e

3-CCVP-2010-012-USPW-11

Design Documents

ETC 4042788-1
ETC 4042790-1
ETC 4048255
ETC 4052668-2
ETC 4052670-1
ETC 4052671-1
ETC 4052678-2
ETC 4052682-2
ETC 4052684-4
ETC 4054392-4
ETC 4054392-5
ETC4054563, App. A, Issue 1
ETC4054564, App. D, Issue 1
ETC4068617
ETC4132054, Issue 2
QPS/Sk/09/019
EG-DCR-2009-040
EG-DCR-2009-171

Surveys, Audits and Surveillance Reports

2010-S-06-366
2009-S-04-057
2008-2876-EXT-AUD
CGS-2010-C-01-004
2009-S-04-057
2009-S-10-262
2009-S-08-1802009-A-04-025
2009-S-07-184
2009-A-03-019-EXT-AUD
2011-S-02-047
QA-3-2000-08, Rev. 2

Condition Reports (CR) & Nonconformance Reports (NCR)

CR 2010-1933
CR 2010-2515
CR 2010-3482
CR 2010-3729
CR 2011-3
CR 2011-98
CR 2011-102
CR 2011-241
CR 2011-386
CR 2011-493
NCR 2010-3683
NCR 2010-3791
NCR 2010-3965 Rev. 0
NCR 2010-3976 Rev. 0
NCR 2010-4004 Rev. 0

NCR 2011-386 Rev. 0
NCR 2011-0241 Rev. 0

Procedures

EG-3-2100-09 Rev. 5, "Identification, Disposition, and Resolution of Nonconforming Items"
QA-3-3000-25 Rev. 0, "Material Hardness Testing Using LEEB's Principle for the Equotip Bambino 2 Hardness Tester"

Miscellaneous Documents

EG-3-2100-05-F-2 CGD Plan, Dedication No.: D-2010-012, Revision 0
WO 1003571/3006237
MPR-3131
CC-EG-2010-0368
Technical Question EG-TQ-2010-068
Technical Question EG-TQ-2010-102
Technical Question EG-TQ-2011-004
Memorandum QA-11-0023
Test Plan 2011-QCTP-001, Hardness Tester Validation
Purchase Order 303784, 12/02/2010
Receipt Inspection Plan Report for PO# 303784, 1/26/2011
Receipt Inspection Plan Report for PO# 303782, 1/26/2011
Receipt Inspection Plan Report for PO# 303782, 2/1/2011
Construction Work Plan, 1001-CIVIL-843-031, Remove and Re-install Turnbuckles in Cascade 3 1001
Root Cause Evaluation 2010-3400-CR