



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

March 31, 2010

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

SUBJECT: NRC INSPECTION REPORT NO. 70-3103/2010-007 AND NOTICE OF VIOLATION

Dear Mr. Smith:

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 (LES NEF). The inspection was conducted on February 22 - 25, 2009. The purpose of the inspection was to conduct an inspection on the procurement and installation of Items Relied on for Safety (IROFS) 41 mechanical components by verifying Quality Level - 1 (QL-1) qualifications. Emphasis was placed on the applicable commercial grade dedication activities associated with the flomels, and the procurement and installation of the Cascade lower steelworks. The enclosed inspection report, which documents the inspection results, was discussed with you and other members of your staff on February 25, 2010.

Based on the results of this inspection, the NRC has determined that two 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.

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.

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," 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 me at (404) 562-4647.

Sincerely,

/RA/

James H. Moorman III, Chief
Construction Inspection Branch 3
Division of Construction Inspection

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

Enclosures:

1. Notice of Violations
2. NRC Inspection Report 70-3103/2010-007 w/attachments

cc w/encls: (See next page)

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 me at (404) 562-4647.

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James H. Moorman III, Chief
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1. Notice of Violations
2. NRC Inspection Report 70-3103/2010-007 w/attachments

cc w/encls: (See next page)

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NAME	B. Adkins	J. Heisserer	A. Aryayet	J. Calle	J. Bartleman	D. Seymour	
DATE	3/24/2010	3/24/2010	3/24/2010	3/24/2010	3/24/2010	3/31/2010	
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Letter to Gregory Smith from James H. Moorman III, dated March 31, 2010.

SUBJECT: NRC INSPECTION REPORT NO. 70-3103/2010-007

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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 on February 22 - 25, 2010, two 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. The LES NEF QAPD commits to American Society of Mechanical Engineers (ASME) NQA-1-1994, Quality Assurance Requirements for Nuclear Facility Applications, including supplements as revised by the ASME NQA-1a-1995 Addenda for implementation of 10 CFR 50 Appendix B.

Basic Requirement 10, Inspection, of ASME NQA-1-1994 and Section 10, Inspection, of the LES NEF QAPD both state, in part, that inspections required to verify conformance of an item or activity to specified requirements shall be planned and executed and that characteristics to be inspected and inspection methods to be employed shall be specified.

In addition, Paragraph 6.2 of ASME NQA-1-1994, Supplement 10S-1 and Section 10 of the LES NEF QAPD both state, in part, that completed items shall be inspected for completeness, markings, calibration, adjustments, protection from damage, or other characteristics as required to verify the quality and conformances of the item to specified requirements.

Contrary to the above, prior to February 25, 2010, inspections required to verify conformance of items to specified requirements were not adequately planned and executed in that the licensee failed to verify that applicable design requirements were correctly translated during field installation. The licensee failed to verify the quality and conformances of items associated with the cascade components and supports designated as Items Relied on for Safety (IROFS) 41 to specified requirements.

LES NEF failed to verify that design requirements were properly implemented during installation of IROFS 41 cascade lower steelworks, as was identified on multiple design and installation drawings. Installation of components used in the lower steelworks associated with Cascades 1-8 was not performed in accordance with design requirements. Gaps were found to exist at several lower steelworks structural member bolted joint connections. Since the individual bolted parts did not make substantial contact with one another to form a structurally sound bolted connection the design requirements of the cascade lower steelworks were not met. In addition, a loose turnbuckle assembly was found on a lower steelworks assembly for Cascade 4, after final torquing was completed on the fasteners. This condition also resulted in the cascade lower steelworks not meeting the design requirements.

This is a Severity Level (SL) IV violation (Supplement II)

- B. 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 QAPD, dated April 9, 2004, and supplements thereto. The LES NEF QAPD commits to ASME NQA-1-1994, Quality Assurance Requirements for Nuclear Facility Applications, including supplements as revised by the ASME NQA-1a-1995 Addenda for implementation of 10 CFR 50 Appendix B.

Basic Requirement 7, Control of Purchased Items and Services, of ASME NQA-1-1994 states, in part, that the procurement of items and services shall be controlled to assure conformance with specified requirements. It further states that "When receiving inspection is used, purchased items shall be inspected as necessary to verify conformance to specified requirements, taking into account source verification and audit activities and the demonstrated quality performance of the Supplier."

Section 7, Control of Purchased Material, Equipment and Services, of the LES NEF QAPD states, "Supplier generated documents shall be controlled, processed and accepted by LES in accordance with the requirements established in the applicable QA procedures. Measures shall be implemented to ensure that the submittal of supplier generated documents is accomplished in accordance with the procurement document requirements. These measures shall also provide for the acquisition, processing and recorded evaluation of technical, inspection and test data compared against the acceptance criteria."

Contrary to the above, prior to February 25, 2010, procurement of items and services were not controlled to assure conformance with specified requirements. LES NEF conducted less than adequate control of purchased items and services in that the data recorded on multiple Certified Material Test Reports (CMTRs) received and accepted by LES NEF from various suppliers did not meet chemical and/or mechanical properties specified in the applicable requirements or were not available, as demonstrated by the following examples:

1. LES NEF accepted CMTRs for four (4) different heats of weld filler metals used to weld structural members of the lower cascade steelworks that did not comply with chemical composition requirements of the American Welding Society (AWS) A5.20, as required by paragraph 5.3.4 of the AWS D1.1-2000 code for welding of structural steel and the applicable purchase order issued by LES NEF.
2. LES NEF obtained and used Quality Level 1 (QL-1) fasteners (bolts, nuts and washers) with CMTRs that failed to meet the chemical and/or physical property requirements, as specified by the applicable Codes and Standards, including International Organization for Standardization (ISO) 898-1 and ISO 898-2. There were 12 examples where a part's CMTR did not comply with applicable requirements.
3. LES NEF could not provide CMTRs for two (2) different lot numbers (3/32" and 1/8" diameters) of carbon steel welding electrodes used to fabricate the seismically designed stools (anchor base) embedded in concrete to secure the Lower Cascade Steelworks with a bolted connection near the floor level. LES indicated that these lot numbers of electrodes were no longer available on the NEF site.

This is a Severity Level (SL) IV violation (Supplement 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 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.

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 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 31st day of March 2010.

NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 70-3103

License: SNM-2010

Report No.: 70-3103/2010-007

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

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

Inspection Dates: February 22 – 25, 2010

Inspectors: J. Calle, Senior Construction Inspector, Construction Inspection Branch 3 (CIB3), Division of Construction Inspection (DCI), Region II (RII)
B. Adkins, Construction Project Inspector, Construction Projects Branch 4 (CPB4), Division of Construction Projects (DCP), RII
A. Artayet, Senior Construction Inspector, CIB3, DCI, RII
J. Bartleman, Senior Construction Inspector, CIB3, DCI, RII
J. Heisserer, Construction Inspector, CIB3, DCI, RII

Accompanying Personnel: J. Moorman III, Branch Chief, CIB3, DCI, RII

Approved: James H. Moorman III, Chief
Construction Inspection Branch 3
Division of Construction Inspection

EXECUTIVE SUMMARY

Louisiana Energy Services, L.L.C., National Enrichment Facility (LES NEF)
Nuclear Regulatory Commission (NRC) Inspection Report No. 70-3103/2010-007

The U.S. Nuclear Regulatory Commission (NRC) conducted a routine team inspection associated with the construction activities of the Louisiana Energy Services, L.L.C., National Enrichment Facility (LES NEF) on February 22 - 25, 2010. On February 25, 2010, a formal exit meeting was held with the licensee to discuss the inspection findings. The purpose of the inspection was to evaluate the procurement and installation of Items Relied on for Safety (IROFS 41) mechanical components by verifying Quality Level-1 (QL-1) criteria. Emphasis was placed on the applicable commercial grade dedication (CGD) activities associated with the Flomels, and the procurement and installation of Cascade Lower Steelworks.

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

The NRC inspectors reviewed the revised Flomel CGD Plan, D-2010-004, Revision 0 (including applicable procedures and various documents) and concluded that the Acceptance Method 1 "Special Test/Inspection and Standard Receipt Practices," and Acceptance Method 2 "Commercial Grade Survey" (for mostly European suppliers and sub-suppliers) selected by LES were adequately performed for verification of 12 critical characteristics. The inspectors verified that the applicant maintained adequate control of materials, equipment and services related to the QL-1 mechanical components installed for CGD of the Flomels associated with Cascade 1 of IROFS 41 mechanical components for SBM-1001. No findings of significance were identified. The licensee's commercial grade dedication of Cascade 1 flomels, as documented in CGD Plan 2010-004, Revision 0, was acceptable. (Section 2)

Mechanical Components, Inspection Procedure (IP) 88136

The NRC inspectors conducted an inspection to assess the fabrication and installation of the Lower Cascade Steelworks for Cascades 1 through 8 of IROFS 41 mechanical components for SBM-1001. The NRC inspectors reviewed procurement and construction documentation (specifications, drawings, and work procedures) 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 Quality Assurance (QA) Plan.

One Severity Level (SL) IV violation of Basic Requirement 10, "Inspection", of American Society of Mechanical Engineers (ASME) NQA-1-1994, Quality Assurance Requirements for Nuclear Facility Applications, and Section 10, "Inspection", of the LES NEF Quality Assurance Program Description (QAPD) was identified for failure to verify that design requirements were correctly implemented during installation. The NRC inspectors identified multiple gaps between bolted connections in the Lower Cascade Steelworks which did not meet design requirements. This was identified as Violation (VIO) 70-3103/2010-007-001 (Section 3).

The NRC inspectors reviewed nonconformances (NCRs) and performed walkdowns to verify proper dispositioning of four NCRs. The NRC inspectors reviewed receipt inspection procedures, reports, and documentation to verify compliance to material specification requirements. The review included, but was not limited to, fabrication drawings, a sample of nondestructive examination (NDE) reports, qualification records for NDE technicians, mechanical testing records, and certified material test reports (CMTRs).

One Severity Level (SL) IV violation of Basic Requirement 7, "Control of Purchased Items and Services", of ASME NQA-1-1994 and Section 7 "Control of Purchased Materials, Parts and Components" of the LES NEF QAPD was identified for failure to control supplier generated documentation in accordance with procurement requirements. The NRC inspectors identified multiple examples of CMTRs which did not meet specified mechanical and/or chemical properties for fasteners (bolts, nuts, and washers) and weld filler metal procured from various sources. This was identified as Violation (VIO) 70-3103/2010-007-002 (Section 3).

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 ongoing 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) (IP 88108)

a. Scope and Observations

The NRC inspectors reviewed the revised Flomel commercial grade dedication (CGD) plan, D-2010-004, Revision 0, as well as other implementing procedures to determine if it meets the intent of Section 3, "Design Control," of the Quality Assurance Program Description (QAPD), as well as applicable NRC and industry guidance regarding CGD, including Electric Power Research Institute (EPRI) NP-5652 and NRC Generic Letters (GL) 89-02, Actions to Improve the Detection of Counterfeit and Fraudulently Marketed Products, and GL 91-05, Licensee Commercial-Grade Procurement and Dedication Programs. The NRC inspectors reviewed CGD Plan D-2010-004, applicable procedures and various supporting documents to determine if the plan adequately identified the critical characteristics necessary to ensure that flomels were capable of performing their intended Items Relied on for Safety (IROFS) function. The Flomel CGD Plan listed a total of 12 critical characteristics including centrifuge anchor bolt dimensions, anchor bolt material, concrete material, rebar placement, steelworks part number, and flomel dimensions.

The NRC inspectors reviewed the acceptance methods selected by LES NEF for verification of critical characteristics. The acceptance methods selected by LES NEF were Acceptance Method 1, "Special Tests/Inspections and Standard Receipt Practices," and Acceptance Method 2, "Commercial Grade Survey." Regarding Acceptance Method 1, the NRC inspectors witnessed LES NEF quality control (QC) inspectors perform special tests and inspections identified in the Flomel CGD Plan D-2010-004. Regarding Acceptance Method 2, the NRC inspectors reviewed completed Quality Assurance (QA) audit, surveillance, and CGD survey reports to assess the ability of LES NEF to verify the capability of suppliers and sub-suppliers to control and verify critical characteristics.

Regarding Acceptance Method 1, the NRC inspectors reviewed the Civil Work Plan 1001-CIVIL-852-001 Volumes 1-4 and Mechanical Work Plan 1001-MECH-453-005, "Inspection of Minihall 1A, Cascade 1 Components Flomel Anchor Bolt Hardness Testing," to determine if LES NEF provided adequate work instructions to perform the special tests and inspections identified in the Flomel CGD Plan.

The NRC inspectors witnessed LES NEF QC inspectors perform special tests and inspections for two flomels selected at random in Mini-Hall 1B of Cascade 6 and one flomel selected at random in Cascade 1, Mini-Hall 1A for independent verification of critical characteristics. The NRC inspectors noted that for Cascade 1 many of the critical characteristics requiring verification were not accessible due to the installation of cascade equipment. Due to this limitation, the only critical characteristic witnessed by

NRC inspectors for Cascade 1 was material hardness of the flomel anchor bolts. However, the various methods used for verifying critical characteristics were the same for all cascades and the resultant data for Cascade 1 were reviewed for compliance to the applicable acceptance criteria. Specifically, the NRC inspectors witnessed QC inspectors perform measurements of anchor bolt and flomel dimensions including anchor bolt outer diameter, anchor bolt height above flomel surface, anchor bolt length, and flomel width. No discrepancies were noted and all anchor bolt and flomel measurements were verified to meet the acceptance criteria identified in the Flomel CGD Plan. The NRC inspectors witnessed QC inspectors perform positive material identification (PMI) and material hardness testing of flomel anchor bolts to ensure the material conforms to Enrichment Technology Corporation (ETC) material specifications. The results of the PMI and hardness testing were acceptable and confirmed that the anchor bolt material was consistent with ETC specifications. The NRC inspectors witnessed QC inspectors perform Ultrasonic Testing (UT) of anchor bolts to confirm flomel anchor bolt length. No discrepancies were noted.

The NRC inspectors confirmed that the measuring and test equipment (M&TE) used to perform the Acceptance Method 1 special tests and inspections were properly calibrated in accordance with the LES NEF M&TE program. The NRC inspectors reviewed qualification records to verify that the inspectors were qualified to perform their assigned duties in accordance with LES NEF QA program requirements.

The NRC inspectors reviewed completed Acceptance Method 1 documentation contained in the LES NEF civil and mechanical work plans for Cascade 1 to ensure the Acceptance Method 1 special test and inspection results conformed to acceptance criteria identified in the Flomel CGD Plan.

The NRC inspectors reviewed completed receipt inspection records for a sample of flomels in Cascade 1 and Cascade 6. LES NEF provided mold number and date information, material certifications, ENEV (the flomel bolt supplier) dimensional inspection records, and concrete compressive strength test reports to the NRC inspectors for review. The NRC inspectors noted that LES NEF has not finalized the process to complete receipt inspection of flomels and that the receipt inspection for the flomels was completed post-receipt and installation of the flomels into SBM-1001.

Regarding Acceptance Method 2, the NRC inspectors reviewed completed CGD surveys, QA audits, and QA surveillances to ensure that LES NEF has adequately evaluated the capability of suppliers and sub-suppliers to control and verify critical characteristics. Acceptance Method 2 is credited as the sole acceptance method for one flomel critical characteristic and as a co-acceptance method for seven other flomel critical characteristics. Specifically, the NRC inspectors reviewed the completed CGD surveys and QA audits and surveillances to ensure that LES NEF adequately evaluated the ability of Voorbij (flomel supplier) and its sub-suppliers (ENEV) to control the testing process, control of nonconforming items, control of assembly and fabrication, and control of M&TE.

The NRC inspectors reviewed corrective action reports associated with the CGD of flomels to ensure that identified deficiencies were properly dispositioned, corrected, and trended in accordance with the LES NEF corrective action procedure. Specifically, the NRC inspectors reviewed Condition Report (CR) CR 2009-2399, -2122, -2802, and -2197 which addressed deficiencies associated with oversized and undersized anchor bolt threads.

b. Conclusions

There were no findings of significance identified. The licensee's commercial grade dedication of Cascade 1 flomels, as documented in CGD Plan 2010-004, Revision 0, was acceptable.

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

a. Scope and Observations

On February 22 - 25, 2010, the NRC inspectors conducted an inspection at LES NEF to assess the manufacture and installation of IROFS 41 mechanical components for SBM-1001.

(a) Lower steelworks installation

The NRC inspectors reviewed construction documentation (specifications, drawings, and work procedures) and conducted field inspections of installed components to determine whether specific activities associated with Quality Level 1 (QL-1) mechanical components were controlled and performed in accordance with NRC requirements, license commitments, and the approved QAPD. The NRC inspectors focused on QL-1 components associated with the fabrication and installation of the lower cascade steelworks at LES NEF for Cascades 1 through 8. In addition, the NRC inspectors reviewed a sample of nonconformance reports (NCRs) related to lower steelworks in Mini-Halls 1A and 1B. Inspectors walked down Cascades 1-8 in Mini-Halls 1A and 1B to verify that the dispositions detailed in a sample of NCRs were implemented in the field as described. The NCRs walked down in the field included NCR 2009-350, NCR 2009-2795, NCR 2009-2842, and NCR 2009-3338.

SNM-2010 license requires activities at LES NEF to be conducted in accordance with the QAPD. The LES NEF QAPD commits to American Society of Mechanical Engineers (ASME) NQA-1-1994 for implementation of 10 CFR Part 50, Appendix B.

Basic Requirement 10, "Inspection", of ASME NQA-1-1994 and Section 10, "Inspection", of the LES NEF QAPD both state, in part, that inspections required to verify conformance of an item or activity to specified requirements shall be planned and executed and that characteristics to be inspected and inspection methods to be employed shall be specified.

In addition, Paragraph 6.2 of ASME NQA-1-1994, Supplement 10S-1 and Section 10 of the LES NEF QAPD both state, in part, that completed items shall be inspected for completeness, markings, calibration, adjustments, protection from damage, or other characteristics as required to verify the quality and conformances of the item to specified requirements.

Contrary to the above, and prior to January 25, 2010, the licensee failed to verify that the lower steelworks design was properly implemented. The licensee failed to verify the quality and conformances of items associated with the cascade components and supports designated as Items Relied on for Safety (IROFS) 41 to specified requirements.

LES NEF failed to verify that design requirements were properly implemented during construction and installation of IROFS 41 cascade lower steelworks. The design requirements were identified on multiple design and installation drawings. Installation of components used in the Cascades Lower Steelworks was not performed in accordance with the design. Gaps were present at several lower steelworks structural member bolted joint connections. The gaps resulted in individual bolted structural members not making substantial contact with one another which would not allow them to form a structurally sound bolted connection; therefore, the design requirements of the cascade lower steelworks were not met. A supplemental evaluation performed by the licensee of Cascades 1-4 revealed that gaps existed in 12 bolted joints out of a total of 96 bolted joints. In addition, a turnbuckle assembly on one of the lower steelwork structural members was found loose by the NRC inspectors after the steelworks installation and final torquing was completed. The licensee initiated CR-2010-707 in response to this issue. This was identified as Violation (VIO) 70-3103/2010-007-001, Failure to Verify Conformance to Specified Requirements.

(b) Lower steelwork component and material procurement

The NRC inspectors reviewed documentation between LES NEF, H-Y Tech, and Mid Columbia Engineering (MCE) to determine if technical and quality requirements were incorporated into purchase orders and procurement documentation. The NRC inspectors reviewed receipt inspection procedures, and receipt inspection reports to verify that applicable specification requirements were met.

SNM-2010 license requires activities at LES NEF to be conducted in accordance with the QAPD. The LES NEF QAPD commits to ASME NQA-1 for implementation of 10 CFR Part 50, Appendix B. Specifically, LES NEF commits to NQA-1 Basic Requirement 7 and Supplement 7S-1.

Basic Requirement 7 of ASME NQA-1-1994, "Control of Purchased Items and Services", states that "The procurement of items and services shall be controlled to assure conformance with specified requirements. Such control shall provide for the following as appropriate: source evaluation and selection, evaluation of objective evidence of quality furnished by the Supplier, source inspection, audit, and examination of items or services upon delivery or completion."

Supplement 7S-1, paragraph 8.2.3 "Receiving Inspection," states, in part "When receiving inspection is used, purchased items shall be inspected as necessary to verify conformance to specified requirements...Receiving inspection shall be performed in accordance with established procedures and inspection instructions..."

Section 7, "Control of Purchased Material, Equipment and Services", of the LES NEF QAPD states, "Supplier generated documents shall be controlled, processed and accepted by LES NEF in accordance with the requirements established in the applicable QA procedures. Measures shall be implemented to ensure that the submittal of supplier generated documents is accomplished in accordance with the procurement document requirements. These measures shall also provide for the acquisition, processing and recorded evaluation of technical, inspection and test data compared against the acceptance criteria."

LES NEF QAPD, Section 7, also states, “The supplier shall verify that furnished material, equipment or services comply with LES’ procurement requirements before offering the material, equipment or services for acceptance and shall provide to LES NEF objective evidence that material, equipment or services conform to procurement documents. Where required by code, regulations or contract provisions, documentary evidence that items conform to procurement documents shall be available at the site prior to installation or use.”

In addition, LES NEF QAPD, Section 7, states in part, under Receiving Inspection that “When receiving inspection is used to accept an item:

- The inspection shall verify, as applicable, proper configuration; identification; dimensional, physical and other characteristics; freedom from shipping damage; and cleanliness.
- Receiving inspection shall be coordinated with a review for adequacy and completeness of any required supplier documentation submittals.”

Initially, the receipt inspections were conducted under Washington Group International (WGI) procedure PSP 10.01, “Receipt Inspection,” which, in part, described applicable inspection characteristics. Specifically, for chemical properties, the procedure stated, “Verify that the chemical properties shown on the documentation and/or test reports conform to the indicated requirements.” For mechanical properties, the procedure stated, “verify that the mechanical properties shown on the documentation and/or test reports conform to the indicated requirements.”

This procedure was later replaced by LES NEF procedure QA-3-3000-18, “Receipt Inspection,” which also described receipt inspection criteria. For chemical properties, the procedure stated “chemical properties shown on documentation and test reports conform to indicated requirements.” For mechanical properties, the procedure stated, “mechanical properties shown on documentation and test reports conform to indicated requirements.”

Contrary to the above requirements, LES NEF conducted less than adequate control of purchased items and services in that the recorded test data contained in multiple Certified Material Test Reports (CMTRs) that were received and accepted from various suppliers did not meet chemical and/or mechanical properties specified in the indicated requirements or CMTRs were not available, as demonstrated by the following examples:

Example 1 – CMTRs for weld filler metal do not meet AWS A5.20

Purchase Order (PO) 2278, between Mid Columbia Engineering, Inc. (MCE) and LES NEF, specified that American Welding Society (AWS) D1.1, 2000 applied to the order. Additionally, prior to implementing QA Level 1 work, the PO required MCE to provide documentation for review and approval in accordance with the specification, including “Certified Material Test Reports (CMTRs) for all steel, weld filler metal, and threaded fasteners furnished.”

Paragraph 5.3.4 of AWS D1.1-2000 states, in part, “the electrodes and shielding for...flux cored arc welding (FCAW)...shall conform to the requirements of the latest edition of...AWS A5.20, Specification for Carbon Steel Electrodes for Flux Cored Arc Welding.”

AWS A5.20 described test methods for obtaining samples for chemical analysis, and included a table describing the required chemistry of the weld filler metal.

MCE procured the weld wire through a CGD process. In MCE's commercial grade item inspection plans for weld wire, chemical composition was a defined critical characteristic with an acceptance criterion of compliance with the applicable material specification. The plan further noted that, "weld joint integrity may be compromised if material chemistry and tensile strength was not within material specification limits." The plan also noted that AWS A5.20 was the applicable specification. Additionally, the plan noted that to take the sample, "cut at least one sample from each heat number and size combination and send to approved lab for product analysis. When the report is received verify chemical properties comply with material specification requirements for product analysis."

LES NEF did not control purchased items and services in that CMTRs for four heats of FCAW filler metal did not meet the chemical requirements of AWS A5.20. These CMTRs were included in multiple receipt inspection reports (RIRs) that were reviewed and approved by LES NEF. Specifically, these CMTRs included levels of titanium and magnesium that would preclude compliance with AWS A5.20. The noncompliance with AWS A5.20 was noted on two of the four CMTRs. Furthermore, the method used by MCE to obtain the samples for chemical analysis did not meet the requirements of AWS A5.20. The heat numbers of the weld filler metal, as well as the accompanying CMTRs in question, were referenced in RIRs for Cascades 1-8 in Mini-Halls 1A and 1B. The licensee initiated CR 2010-660 in response to this example.

Example 2 – CMTRs for fasteners (bolts, nuts, washers) did not meet chemical and/or mechanical property requirements, or no specific Code/Standard was specified.

Many different types and sizes of fasteners were procured through Purchase Order (PO) 2278, between MCE and LES NEF. Prior to implementing QA Level 1 work, the PO required MCE to provide documentation to LES NEF for review and approval in accordance with the specification, including "CMTRs for all steel, weld filler metal, and threaded fasteners furnished." The NRC inspectors identified several issues with CMTRs for a variety of fasteners where the chemical and/or physical property requirements were not met or other requirements were missing.

The NRC inspectors identified multiple examples of inaccurate CMTRs that were supplied by the vendor(s) for fasteners that were accepted and used in the Cascades Lower Steelworks. Over twelve (12) examples were identified where the requirements of Codes and Standards were not met or recorded on CMTRs supplied to LES. LES NEF obtained and used QL-1 fasteners (bolts, nuts and washers) with CMTRs that failed to meet the chemical and/or physical property requirements as specified in the applicable Codes and Standards, including ISO 898-1 and ISO 898-2. The NRC inspectors identified these issues after the Cascade Steelworks were released and accepted by LES NEF to support commercial operational service.

- Several RIRs were reviewed for PO no.: LES-PO-2278 and DIL Nos.: GLJ/03-31-09-02, GLJ/03-31-09-03 and GLJ/03-31-09-04 for Lower Cascade Steel bolts for Cascades 1-8 in Mini-Halls 1A and 1B. These RIRs contained information pertaining to MCE Data Packages K, M and R, Manufacturer Code Data Book Bolting.

- CMTR provided by Fabory USA Ltd. for Reference # 1517684 for D963-5.8 Slot Flat Head Machine Screw Zn M8 X 45; Material/Standard: ISO 898 Part 1 Cl. 5.8 does not list the amount of Boron (B) chemical composition for the tested part. In Table 2 – Steels in ISO 898-1, 1999 lists the B chemical composition requirement to be 0.003% max. for property class 5.8 steel. There is a note below Table 2 that allows the B concentration to go to 0.005% max. with the addition of aluminum (Al) and/or titanium (Ti), however, no Al or Ti materials were identified on the CMTR.
- CMTR provided by Stork Materials Testing & Inspection for; Work Order (W/O) No.: MID231-02-12-25044-3 for M8 X 45 Flathead Machine Screw; Specifications: ISO 2009 (1994), ISO 898-1 (1999), Gr. 5.8. This CMTR lists the mechanical property requirements from ISO 898-1 for material property class 5.8, yet the chemical property requirements listed were for material Class (Cl.) 5.6. The chemical and mechanical property requirements should be for the same material class and not mixed between different material/property classes.
- CMTR provided by Fabory USA Ltd. for Reference # 0070619280 for D934 (1987) [10] Zipl Hex Nut M12; Material/Standard: DIN 267 Part 4. The chemical composition requirements listed on this CMTR for the chemical elements for a Class 10 material was stated from ISO 898 Part 2. ISO 898 Part 2 listed a range of acceptable Vickers Hardness (HV) values for a Cl. 10 material to be 272 minimum (min.) to 353 maximum (max.). However, the mechanical property requirements stated on this CMTR only listed the HV maximum value of 353 HV. The measured HV tested values recorded on the CMTR are 212.1 and 209.9. These test results showed that the material's mechanical property requirements were not met since the test values were less than the 272 HV minimum requirement listed in ISO 898-2.
- CMTR provided by Fabory USA Ltd. for D6319D St Phs Conical Seat Washer M12 Material/Standard: Case Hardened Steel does not provide a reference to a standard or specification that provides the acceptable lists of chemical and mechanical property requirements. The CMTR listed an acceptable range of 550/650 HV for the mechanical requirements, yet there were no chemical property requirements listed, only the tested results of the various chemical elements.
- CMTR provided by Fabory USA Ltd. for Customer Contract No. 1264257 for D934 [10] Zipl Hex Nut M10; Material/Standard: DIN 267 Part 4 Cl. 10. The chemical composition requirements listed on this CMTR for the chemical elements for a Class 10 material was stated from ISO 898 Part 2. ISO 898 Part 2 listed a range of acceptable HV values for a Cl. 10 material to be 272 (min.) to 353 (max.). However, the mechanical property requirements stated on this CMTR only listed the HV maximum value of 353 HV. The measured HV tested value recorded on the CMTR was 246.7. This tested result showed that the material's mechanical property requirements were not met since the tested value was less than the 272 HV minimum, as listed in ISO 898-2.
- CMTR provided by Stork Materials Testing & Inspection for W/O No. MID231-03-19-29816-10 for M8 Structural Nut; Specifications: ISO 4032 (1999), ISO 898-2 (1999), Gr. 8. This CMTR listed the mechanical property requirements from ISO

- 898-2 for material property class 8, yet the chemical property requirements listed were for material Cl. 6. The chemical and mechanical property requirements should be for the same material class and not mixed between different material/property classes. In addition, the chemical concentration listed on the CMTR for Phosphorous (P) was 0.110% max., yet ISO 898-2 stated the maximum P concentration for either Cl. 6 or Cl. 8 material was 0.060% max. There were other examples where the maximum chemical concentration listed on CMTRs did not reflect what was listed in the ISO standards, but the actual tested results did not exceed the required chemical concentration value stated in the ISO standard.
- CMTR provided by Fabory USA Ltd. for Reference # 0002045906 for D6916 C45 HDG HS Structural Washer M20; Material/Standard: DIN 17 200 C50. ISO 898 Part 2 for M16 through M39 materials listed a range of acceptable HV range to be 233 (min.) to 353 (max.). However, the mechanical property requirements stated on this CMTR only listed the HV maximum value of 353 HV and did not list the minimum value.
- CMTR provided by Fabory USA Ltd. for Reference # 0002041075 for D6916 C45 HDG M20 Structural Washer; Material/Standard: DIN 17 200 C50. ISO 898 Part 2 for M16 through M39 materials listed a range of acceptable HV range to be 233 (min.) to 353 (max.). However, the mechanical property requirements stated on this CMTR only listed the HV maximum value of 353 HV and did not list the minimum value.
- CMTR provided by Fabory USA Ltd. Reference # 70000084508 for D6916 10.9 HDG HS Structural Bolt M24 X 65; Material/Standard: ISO 898 Part 1 Cl. 10.9 correctly listed the amount of Boron (B) chemical composition requirement of 0.003% max. However, the B chemical composition recorded from the test piece was 0.052% which exceeded the allowable amount of B in a Cl. 10.9 material.
- CMTR provided by Fabory USA Ltd. Reference # 70000084444 for D-125-1A St Zpl Flatwasher Sp M10; Material/Standard: Alloy Steel did not provide a reference to a standard or specification that provides the acceptable list of chemical and mechanical property requirements. The CMTR listed an acceptable range of 200/250 HV for the mechanical requirements, yet there were no chemical property requirements listed, only the tested results of the various chemical elements.
- CMTR provided by Fabory USA Ltd. for Customer PO # P0000957 for EN 14399-4 [10] HDG HS Structural Nut; Material/Standard: EN 20898-2 had incorrect chemical property requirements listed. The chemical composition requirements listed on this CMTR were:

Carbon (C):	0.58% max.
Manganese (Mn):	NS (<i>not specified</i>)
Phosphorous (P):	0.060% max.
Sulfur (S):	0.150% max.

However, the chemical composition requirements stated in ISO 898-2 for a Cl. 10 material were:

Carbon (C):	0.58% max.
Manganese (Mn):	0.30% min.
Phosphorous (P):	0.048% max.
Sulfur (S):	0.058% max.

The mechanical property requirements stated on this CMTR for a Class 10 material was in agreement with ISO 898 Part 2, and listed a range of acceptable HV values of 272 (min.) to 353 (max.).

- CMTR provided by Fabory USA Ltd.; Reference # 70000084509 for D963-5.8 Slot Flat Head Machine Screw Zn M8 X 45; Material/Standard: ISO 898 Part 1 Cl. 5.8 did not list the amount of Boron (B) chemical composition for the tested part. In Table 2 – Steels in ISO 898-1, 1999 listed the B chemical composition requirement to be 0.003% max. for property class 5.8 steel. There was a note below Table 2 that allowed the B concentration to go to 0.005% max. with the addition of aluminum and/or titanium.

Example 3 – CMTRs not provided for weld filler metal

The NRC inspectors reviewed several H-Y Tech “Weld Material Requisition” slips and “Weld Visual Inspection Forms” indicating the use of AWS A5.1 E7018 carbon steel electrodes with two different lot numbers 11741707 and 11751597 for 3/32” and 1/8” diameter, respectively. During this inspection, LES NEF could not provide evidence that CMTR(s) existed for these electrode lot numbers. LES NEF stated that these lot numbers of electrodes were no longer available on site. These welding documents and electrodes were used during the last quarter of 2008 for assembly of the seismically designed lower cascade steel flomel row stools, as shown on Drawing No. 4052597. These stools (anchor bases) were embedded in concrete to secure the lower cascade steelworks with bolted connections near the floor level.

This was identified as Violation (VIO) 70-3103/2010-007-002, Failure to Control Procurement.

b. Conclusions

One Severity Level (SL) IV violation of the LES NEF QAPD and ASME NQA-1-1994 was identified for failure to verify that the lower steelworks design was properly implemented in that NRC inspectors identified multiple gaps between bolted connections in the lower cascade steelworks which did not meet design requirements. This was identified as VIO 70-3103/2010-007-001, Failure to Verify Conformance to Specified Requirements.

One SL-IV violation of the LES NEF QAPD and ASME NQA-1-1994 was identified for failure to control supplier generated documentation in accordance with procurement requirements in that NRC inspectors identified multiple examples of CMTRs which did not meet specified mechanical and/or chemical properties for fasteners (bolts, nuts, and washers) and weld filler metal procured from various suppliers, and one example

where LES NEF could not provided evidence of CMTRs for weld filler metal. This was identified as VIO 70-3103/2010-007-002, Failure to Control Procurement.

4. Exit Meeting / Interviews

Issues identified during the inspection were summarized daily during this inspection period of February 22 through 25, 2010 by the inspection team leader. A formal exit meeting was held on February 25, 2010 with the licensee's management team. The NRC inspectors described the areas inspected and discussed the inspection results in detail with licensee staff. The licensee was receptive to the preliminary findings discussed. Although proprietary documents were reviewed during this inspection, the proprietary nature of these documents was not included in this report.

SUPPLEMENTAL INFORMATION

1. List of Personnel Contacted

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

Mike Boden, Process and Support Director
Mike Brown, Commercial Grade Dedication Lead
Albert Kemp, Procurement Engineer
Clark Fuhlage, Design Agency Professional Engineer
Ed Schulte, Project Building Manager
Kelvin Geis, Construction Engineer
Johnny Mathis, Licensing
Pat McCasland, Licensing
Ron Moya, Construction Engineer
Wyatt Padgett, Licensing
Jerome Reed, Plant Manager
Mike Rodier, Welding Engineer
Gary Sanford, Quality and Regulatory Affairs Director
Gary Schultz, Commercial Grade Dedication
Gene Sergent, Quality Assurance Manager
Olimpio Torres, Quality Control Supervisor
Ryan Whitford, Quality Assurance Engineer
John Wisniewski, Procurement Manager

MPR Associates:

John Simons, Commercial Grade Dedication Engineering Consultant
Robert Keating, Commercial Grade Dedication Engineering Consultant
Ben Frazier, Commercial Grade Dedication Engineering Consultant

Other Personnel:

James Kloosterman, ETC Mechanical Engineering Consultant
Kumar Nidathavolu, Quality Inspection Services, Inc., Level III Consultant

2. Inspection Procedures (IPs) 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 70-3103/2010-007-001	Opened	VIO: Failure to Verify Conformance to Specified Requirements (Section 3.0)
VIO 70-3103/2010-007-002	Opened	VIO: Failure to Control Procurement (Section 3.0)

4. List of Acronyms Used

AISC	American Institute of Steel Construction
ANSI	American National Standard
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
CGD	Commercial Grade Dedication
CL	Class
CMTR	Certified Material Test Report
CR	Condition Report
CRDB	Cylinder Receipt and Dispatch Building
DIN	Deutsches Institut für Normung e.V
ECR	Engineering Change Request
EPRI	Electric Power Research Institute
ETC	Enrichment Technology Corporation
GL	Generic Letter
HV	Vickers Hardness
IP	Inspection Procedure
IROFS	Items Relied on For Safety
ISO	International Standard
LES NEF	Louisiana Energy Services Nuclear Enrichment Facility
MCE	Mid Columbia Engineering, Inc.
M&TE	Measuring and Test Equipment
NCR	Non-Conformance Report
NDE	Non-destructive Examination
NOV	Notice of Violation
NRC	Nuclear Regulatory Commission
PMI	Positive Material Identification
PO	Purchase Order
QA	Quality Assurance
QAPD	Quality Assurance Program Description
QC	Quality Control
QL-1	Quality Level 1
RII	Region 2
RIR	Receipt Inspection Report
SBM	Separations Building Module
SL	Severity Level
SNM	Source and/or Special Nuclear Materials
UT	Ultrasonic Testing
VIO	Violation
WGI	Washington Group International
W/O	Work Order

5. List of Documents Reviewed

Licensee Procedures

SPP5.4, "Erection of Structural Steel and Miscellaneous Steel", Revision 2
 WGI Procedure PSP 10.01, "Receipt Inspection," dated 9-12-2008.
 QA-3-3000-18, "Receipt Inspection," Rev. 3, dated 1-8-2010

Design Documents

- ECR 2262A, Addition of an Installation Standard to ETC 5052597-4 and Associated Drawings, dated September 27, 2008
- ECR 2834A, Changes to ETC Specification for Lower Cascade Steel, dated July 14, 2009
- ECR 3239, Use of Ultrasonic Testing Standard ASTM A 435/A: 2007 in lieu of EN 10160: 1999, dated February 24, 2009
- ECR 4029, Change of Quality Assurance Level of Polypropylene Gliding Plates from OA level 1 to QA Level 3, dated June 10, 2009
- ECR 5218, Allowable Tolerances for Non-Critical Dimensions on Lower Cascade Steel, dated October 23, 2009
- ECR 5449, Change of Quality Assurance Level of Cable Tray Supports in PSC Wall – Minihall, dated December 4, 2009

Condition Reports

- 2009-1984
- 2009-3508
- 2009-2399
- 2009-2122
- 2009-2802
- 2009-2197

Nonconformance Reports

- NCR 2009-4034
- NCR 2009-2842
- NCR 2009-3338
- NCR 2009-2795
- NCR 2009-0181
- NCR 2009-350
- NCR 2009-3128

Construction / Procurement Specifications

- 114489-S-S-05131-0, Specification for Erection of Structural and Miscellaneous Steel, Rev. 0, dated October 25, 2006

Codes and Standards

- ACSE/SEI 43-05, Seismic Design Criteria for Structures, Systems and Components in Nuclear Facilities
- ANSI/AISC N690: 2006, Specification for Safety-Related Steel Structures for Nuclear Facilities
- ASME B31.3: 2004, Code for Pressure Piping - Process Piping
- ASTM A 36/A 36M - 08, Standard Specification for Carbon Structural Steel
 - ASTM A325/A325M- 00, Standard Specification for Structural Bolts, Steel, Heat-Treated, 120/105 ksi Minimum Tensile Strength

ASTM A490/A490M- 00, Standard Specification for Heat-Treated Steel Structural Bolts,
 150 ksi Minimum Tensile Strength
 ASTM A572/A572M - 06, Standard Specification for High-Strength Low-Alloy
 Columbium-Vanadium Structural Steel
 ASTM A709/A709M - 09a, Standard Specification for Structural Steel for Bridges
 ASTM A992/A992M - 06a, Standard Specification for Structural Steel Shapes
 DIN 913: December 1980, Hexagon Socket Set Screws with Flat Point
 DIN 931, Hexagon Bolts Metric Thread - Types m + mg
 DIN 934: October 1987, Hexagon Nuts with Metric Coarse and Fine Pitch Thread
 DIN 963: August 1990, Slotted Countersunk Head Screws
 DIN 6319: January 2007 -
 Corrigendum, Spherical Washers, Conical Seats
 DIN 6914: October 1989, High-Strength Hexagon Head Bolts
 DIN 6915: December 1999, Steel Hexagon Nuts with Big Width Across Flats for High-
 Strength Structural Bolting
 DIN 6916: October 1989, Round Washers for High-Strength Structural Bolting
 DIN 17200: March 1987, Steels for Quenching and Tempering
 DIN 1652-4
 DIN 10277-5
 DIN 7168
 EN 14399-2: April 2005, High-Strength Structural Bolting Assemblies for Preloading -
 Part 2: Suitability Testing for Preloading
 EN 14399-4: June 2006, High-Strength Structural Bolting Assemblies for Preloading -
 Part 4: System HV - Hexagon Bolt and Nut Assemblies
 EN 14399-5: April 2005, High-Strength Structural Bolting Assemblies for Preloading -
 Part 5: Plain Washers
 EN 14399-6: April 2005, High-Strength Structural Bolting Assemblies for Preloading -
 Part 6: Plain Chamfered Washers
 ISO 148-1: November 2009, Metallic Materials - Charpy Pendulum Impact Test - Part 1:
 Test Method
 ISO 148-2: December 2008, Metallic Materials - Charpy Pendulum Impact Test - Part 2:
 Verification of Testing Machines
 ISO 148-3: December 2008, Metallic Materials - Charpy Pendulum Impact Test - Part 3:
 Preparation and Characterization of Charpy V-Notch Test Pieces for Indirect
 Verification of Pendulum Impact Machines
 ISO 898-1: August 1999, Mechanical Properties of Fasteners Made of Carbon Steel and
 Alloy Steel - Part 1: Bolts, Screws and Studs
 ISO 898-2: November 1992, Mechanical Properties of Fasteners Made of Carbon Steel
 and Alloy Steel - Part 2: Nuts with Specific Proof Load Values - Coarse Thread
 ISO 2009: 1994, Slotted Countersunk Flat Head Screws - Product Grade A
 ISO 2768-1: November 1989, General Tolerances - Part 1: Tolerances for Linear and
 Angular Dimensions without Individual Tolerance Indications
 ISO 3269: June 2000, Fasteners - Acceptance Inspection
 ISO 4014: September 1999, Hexagon Head Bolts - Product Grades A and B
 ISO 4017: August 1989, Hexagon Head Screws - Product Grades A and B
 ISO 4032: 1999, Hexagon Nuts, Style 1 - Product Grades A and B
 ISO 7089: June 2000, Plain Washers – Normal Series - Product Grade A

Drawings

ETC 4052510-1, Cascade Hall 1 – Layout Drawing, Fixing Plates for Upper & Lower Steelwork
 ETC 4052588-1, Cascade Hall 1 – Layout Drawing, Section Row 2 Cascade
 ETC 4052591-1, Cascade Hall 1 – Layout Drawing, Section Row 5 Cascade
 ETC 4052597-5, NEF Cascade Steelwork Embedded Plates - Cascades 1-4
 ETC 4052599-2, Cascade Hall 1 - Workshop Drawing, Columns 001 & 006 Cascade Row 1, 2, 4
 ETC 4052600-2, Cascade Hall 1 - Workshop Drawing, Columns 002 & 007 Cascade Row 3, 5, 6
 ETC 4052605-1, Cascade Hall 1 - Workshop Drawing, Beam Pos. 26, 30, 36 Cascade Row 1, 2, 4
 ETC 4052607-1, Cascade Hall 1 - Workshop Drawing, Beam Pos. 27, 31, 37 Cascade Row 3, 5, 6
 ETC 4052611-3, Cascade Hall 1 - Workshop Drawing, Front Frames Pos. 202, 204, 206, 216, 225 Cascade
 ETC 4052653-2, Cascade Hall 1 – Workshop Drawing, Fixing Plates Pos. FP/028 & FP/031 – FP/036 for Lower Steelwork and 800MM Aisle
 ETC 4052611-3

Procurement and Receipt Documents

Data Package K, Contract # Lower Cascade Steel, Purchase Order # LES-PO-2278, Manufacturer Code Data Book Bolting, Rev. 1
 Data Package M, Contract # Lower Cascade Steel, Purchase Order # LES-PO-2278, Manufacturer Code Data Book Bolting, Rev. 1
 Data Package R, Contract # Lower Cascade Steel, Purchase Order # LES-PO-2278, Manufacturer Code Data Book Bolting, Rev. 1
 RIR LES-PO No.: LES-PO-2278, DIL No.: GLJ/03-31-09/02, Lower Cascade Steel Bolts for all 8 Cascades, date received March 31, 2009
 RIR LES-PO No.: LES-PO-2278, DIL No.: GLJ/03-31-09/03, Lower Cascade Steel Bolts for all 8 Cascades, date received March 31, 2009
 RIR LES-PO No.: LES-PO-2278, DIL No.: GLJ/03-31-09/04, Lower Cascade Steel Bolts for all 8 Cascades, date received March 31, 2009
 Receiver Report, Supplier: WGI, Purchase Order No.: 302155, dated October 13, 2008
 RIR LES-PO-2278-003 DIL-GLJ 3-06-09 03
 RIR LES-PO-2278-002 DIL-GLJ 3-06-09 04
 RIR LES-PO-2278-004 DIL-GLJ 3-06-09 04
 RIR LES-PO-2278-001 DIL-GLJ 3-06-09 03
 RIR LES-PO-2278-008
 RIR LES-PO-2278.1215091415.2 (Cascade #4)
 LES-FRAMEWORK-2278.1120091515 (Cascade #5)
 LES-FRAMEWORK-2278.1203091400 (Cascade #6)
 LES-FRAMEWORK-2278.1119091315 (Cascade #7)
 LES-PO-2278.1215091415 (Cascade #8)
 LES-PO-2278.1007091445
 RIR LES-PO-2278-005
 RIR LES-PO-2278-006
 ▪ RIR LES-PO-2278-007

Supplier Submittal Review, Supplier's Name: MCE, Transmittal No.: MCE-TRN-6340-015, PO/SA/SC No.: PO-6340, Submittal No.: 0007, dated July 24, 2008.

Supplier Submittal Review, Supplier's Name: MCE, Transmittal No.: MCE-TRN-E042-048, PO/SA/SC No.: LES-PO-2278, Submittal No.: Sub-0027, dated March 19, 2009.

Supplier Submittal Review, Supplier's Name: MCE, Transmittal No.: MCE-TRN-E042-049, PO/SA/SC No.: LES-PO-2278, Submittal No.: Sub-0028, dated March 25, 2009.

Miscellaneous Documents

EG-3-21000-05, Commercial Grade Dedication Process - EG-3-21000-05-F-2 CGD Plan, Dedication No.: D-2010-003, Rev. 0

ETC 4048255, Static & Dynamic Design of NEF-CS for Operations & DBE Loads, Rev. 2ETC2UC111519-3

ETC2UC11119-5

ETC1UC111122-4

ETC4023957, "Flomel Manufacture", Issue 1

ETC2UC111519-3

MPR Letter 0988-0014-01, Licensing Commitments for IROFS41 Components, Rev. 1
Scope of Work, Fabrication of Lower Cascade Steel, Cascade Hall1 (MH-1 and MH-2), Rev. 0

Surveillance Report 2009-S-10-239, Witness Receipt of Channel Steel by Mid Columbia Engineering (for Lower Cascade Steel Cascade Hall – MH-1 and MH-2)

D2010-004, Flomel Commercial Grade Dedication Plan, Rev. 0

QA-09-0931, "Inspection Report of Flomels for use in SBM1001" Rev. 0

QA Level Requirements Determination for the Cascade Hall Components, Rev. 4

EG-EVAL-01, "Evaluation of SBM-1001 Flomels for Acceptance as QL-1", Rev. 1

Commercial Grade Survey Report GQA/LES/Voorbij/5-8-2009

LES Surveillance 2009-C-05-003

LES Surveillance 2009-S-09-216

UPD/9801109, "Specification for the Manufacture and Delivery of Flomel Anchor Bolts"
UPD/9801072

0802.0192-r, "Work Instruction Flomel Quality Inspection Voorbij", Rev. B

0801.0673-r, "Work Instruction Flomel Sample Concrete", Rev. B

M&TE records (M&TE records from QA-09-0931)

QC Inspector Qualification Records

ENEV inspection records

LES Receipt Inspection Records

Voorbij "Mold Qualification" Records

"TOPS" Packages

Work Plan 1001-CIVIL-852-001, Volume 1 - 4

Work Plan 1001-MH2-RUST-Flomels-001

Work Plan-MECH-453-005, "Inspection of MH1A, Cascade 1 Components, Flomel Anchor Bolt Hardness Testing"

Personnel Qualification Records and Certification for D. Black, NorthWest Inspection.

Personnel Qualification Records and Certification for T. Landsman, NorthWest

Inspection.

MCE-CGI-WW-756

MCE-CGI-WW-1043