October 4, 2012

Mr. Aron Seiken, Vice President
General Manager
AZZ, Nuclear Logistics, Inc.
7410 Pebble Drive
Fort Worth, TX 76118

SUBJECT: NUCLEAR REGULATORY COMMISSION INSPECTION REPORT
NO. 99901298/2012-202

Dear Mr. Seiken:

From August 27 to August 30, 2012, the U.S. Nuclear Regulatory Commission (NRC) conducted an inspection at the AZZ Nuclear Logistics, Inc. (NLI), facility in Fort Worth, TX. The purpose of the limited-scope inspection was to assess NLI's compliance with the provisions of selected portions of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," and 10 CFR Part 21, "Reporting of Defects and Noncompliance."

This inspection specifically evaluated NLI's modification of the 480v safety-related breakers at the Fort Calhoun Station in 2009. The modification involved replacing the existing General Electric (GE AK-50) 480v breakers with Schneider Electric/Square-D Master pact breakers that NLI dedicated for safety-related applications. The enclosed report presents the results of the inspection. This NRC inspection report does not constitute NRC endorsement of your overall quality assurance (QA) or 10 CFR Part 21 programs.

Based on the inspection samples, the inspectors concluded NLI met all program requirements and no violations or nonconformances were identified within the scope of this inspection.

In accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's Rules of Practice, a copy of this letter, its enclosures, and your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system, Agencywide Documents Access and Management System (ADAMS), which is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction.

If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request that such material is withheld from public disclosure, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim (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 forwithholding 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, "Protection of Safeguards Information: Performance Requirements."

Sincerely,

/RA/

Richard A. Rasmussen, Chief
Electrical Vendor Branch
Division of Construction Inspection
and Operational Programs
Office of New Reactors

Docket No.: 99901298

Enclosures:
1. Inspection Report 99901298/2012-202

personal privacy or provide the information required by 10 CFR 2.390(b) to support a request forwithholding 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, "Protection of Safeguards Information: Performance Requirements."

Sincerely,

/RA/

Richard A. Rasmussen, Chief
Electrical Vendor Branch
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1. Inspection Report 99901298/2012-202

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OFFICE	NRO/DCIP/CEVB	NRO/DCIP/CEVB	NRO/DCIP/CEVB	RIV/DRS/EB2
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NAME	RRasmussen			
DATE	10/04/2012			

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U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NEW REACTORS
DIVISION OF CONSTRUCTION INSPECTION AND OPERATIONAL PROGRAMS
VENDOR INSPECTION REPORT

Docket No.:	99901298
Report No.:	99901298/2012-202
Vendor:	AZZ/Nuclear Logistics, Inc. 7410 Pebble Drive Fort Worth, TX 76118
Vendor Contact:	Mr. Aron Seiken Vice President, General Manager Phone: 817-284-0077 Aron.Seiken@nuclearlogistics.com
Background:	AZZ/Nuclear Logistics, Inc, is a provider of Environmental Qualifications services that specializes in replacement of obsolete equipment and supplies a broad range of electrical, mechanical, and instruments and control products.
Inspection Dates:	August 27 through 30, 2012
Inspection Team Leader:	Douglas Bollock, NRO/DCIP/CEVB
Inspectors:	Thomas Kendzia, NRO/DCIP/CQAB Shavon Edmonds, NRO/DCIP/CEVB Samuel Graves, RIV/DRS/EB2
Approved by:	Richard A. Rasmussen, Chief Electrical Vendor Branch Division of Construction Inspection and Operational Programs Office of New Reactors

EXECUTIVE SUMMARY

Nuclear Logistics, Inc.
99901298/2012-202

The U.S. Nuclear Regulatory Commission (NRC) conducted this vendor inspection to verify aspects of the implementation by AZZ/Nuclear Logistics, Inc. (NLI), of its quality assurance (QA) program as required by Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," and 10 CFR Part 21, "Reporting of Defects and Noncompliance."

This inspection specifically evaluated NLI's dedication and modification of 480v safety-related breakers for Fort Calhoun Station in June 2009. NLI was contracted to replace the existing GE AK-50 breakers inside the existing breaker cabinets. NLI used Schneider Electric/Square-D Masterpact breaker and cradle assemblies, which it dedicated for safety-related activities. The NRC inspection team reviewed the procurement, commercial grade dedication, and testing of the NLI modification, along with reviewing NLI's 10 CFR Part 21 evaluation of the fire event in one of the modified breaker cabinets in June 2011 at Fort Calhoun Station. The NRC conducted this inspection at NLI's facility in Fort Worth, TX.

The following regulations served as the bases for this NRC inspection:

- Appendix B to 10 CFR Part 50
- 10 CFR Part 21

The inspectors used Inspection Procedure (IP) 43002, "Routine Inspections of Nuclear Vendors," dated April 25, 2011, IP 43004, "Inspection of Commercial-Grade Dedication Programs," dated April 25, 2011, and IP 36100, "Inspection of 10 CFR Part 21 and Programs for Reporting Defects and Noncompliance" dated February 13, 2012.

The NRC last performed an inspection of NLI in June 2012 to inspect the qualification testing of the Westinghouse AP1000 JE52 Class 1E transmitters.

The information below summarizes the results of this inspection.

10 CFR Part 21

The inspectors determined that NLI appropriately translated the requirements of 10 CFR Part 21 into implementing procedures and, for those activities that the inspectors reviewed, implemented them as required by NLI procedures. No findings of significance were identified.

Procurement

The inspectors determined that NLI's procurement processes conformed to the requirements of Criteria IV, "Procurement Document Control," and VII, "Control of Purchased Material, Equipment, and Services," of Appendix B to 10 CFR Part 50 and that NLI's QA policy and procedures were being effectively implemented for the 480v safety-related breaker modification for Fort Calhoun Station in 2009. No findings of significance were identified.

Testing and Software

The inspectors determined that NLI's testing and software quality controls for the 480v safety-related breaker modification for Fort Calhoun Station satisfies the regulatory requirements set forth in Appendix B to 10 CFR Part 50. No findings of significance were identified.

Design Control

The inspectors determined, based on the samples reviewed, that the vendor design control process met the requirements of Criterion III, "Design Control," of Appendix B to 10 CFR Part 50. No findings of significance were identified.

Commercial Grade Dedication

The inspectors determined that NLI's commercial grade dedication of the Schneider Electric/Square-D 480v safety-related breaker modification for Fort Calhoun Station satisfies the regulatory requirements set forth in Appendix B to 10 CFR Part 50 and 10 CFR Part 21. No findings of significance were identified.

Nonconformances and Corrective Actions

The inspectors determined that the implementation of NLI's programs for control of nonconforming material, parts, or components and corrective action were consistent with the regulatory requirements in Criterion XV, "Nonconforming Materials, Parts, or Components," and Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. No findings of significance were identified.

REPORT DETAILS

1. 10 CFR Part 21 Program

a. Inspection Scope

The inspectors reviewed NLI's policies and implementing procedures that govern its 10 CFR Part 21 program to verify compliance with the requirements of 10 CFR Part 21. The inspectors also reviewed NLI's procedures that govern corrective action and the control and correction of nonconforming items to verify an adequate link to the 10 CFR Part 21 process.

b. Observations and Findings

NLI-QUAL-08, "10 CFR 21 Reporting," and NLI Quality Assurance Manual Section 19 establish the requirements for NLI's compliance with the requirements in 10 CFR Part 21. Also, the inspectors verified that NLI-QUAL-06, "Nonconformance Reporting, Corrective, and Preventative Action," provide a connection to the 10 CFR Part 21 program.

The inspectors reviewed NLI's 10 CFR Part 21 policy and procedures and related documentation, interviewed the QA director and staff members of NLI, and reviewed a sample of completed 10 CFR Part 21 evaluations. The inspection team also verified that NLI-QUAL-08 provides adequate guidance for the different timing requirements for 10 CFR Part 21 evaluations, notification, and reporting activities.

The inspectors reviewed two 10 CFR Part 21 evaluations. The first, under NLI NCR-259, involved cracks in the safety-related battery terminal posts. These cracks resulted in a 10 CFR Part 21 report to the NRC in 2008. The second, under NLI NCR-422, was the result of the switchgear fire at Fort Calhoun Station in June 2011. NLI initiated NCR-422 after receiving information from Fort Calhoun Station that the design change for the modification could have been the cause of the fire event. NLI conducted an evaluation, which showed, through engineering design review and testing of the new breaker design, that there was no defect in the new design. The inspectors concluded that NLI's Part 21 evaluations were adequate.

The inspectors observed that NLI maintained several postings in its facility to satisfy the posting requirements in 10 CFR 21.6, "Posting Requirements." The postings included a copy of Section 206 of the Energy Reorganization Act of 1974, as amended, a copy of 10 CFR Part 21, and a notice containing the information of NLI-QUAL-08.

The inspectors verified a sample of NLI's purchase orders (POs), and determined that NLI had implemented a program consistent with the requirements in 10 CFR 21.31, "Procurement Documents," for specifying the applicability of 10 CFR Part 21 in its POs for basic components.

c. Conclusions

The inspectors determined that NLI appropriately translated the requirements of 10 CFR Part 21 into implementing procedures and, for those activities that the

inspectors reviewed, implemented them as NLI procedures required. No findings of significance were identified.

2. Procurement

a. Inspection Scope

The inspectors reviewed NLI's policies and procedures for procurement processes to verify compliance with Criterion IV and Criterion VII of Appendix B to 10 CFR Part 50. Specifically, the inspection evaluated NLI's procurement controls to ensure they included the regulatory requirements, design basis, and other applicable requirements in procurement documents for the 480v safety-related breaker modification for Fort Calhoun Station in 2009. In addition, the inspectors reviewed NLI's applicable implementing procedures, along with samples of POs that contained work scopes, contract services requirements, supplier quality assurance program descriptions, and methods NLI used to dedicate suppliers of commercial items and services.

b. Observations and Findings

The inspectors reviewed NLI's approved vendor's list (AVL) entries and commercial grade surveys performed on NLI's supplier Schneider Electric/Square-D to ensure that quality controls have been established and to verify that specific procurement requirements were met and documented correctly. The inspectors also performed a detailed review of PO 00120857, "Fort Calhoun to NLI for 480v Load Center Main and Bus Tie Breakers," and PO 0026871, "NLI to Schneider Electric/Square-D Low Voltage Breaker Replacement for GE Safety-Related Circuit Breakers."

PO 00120857 details QA program and QA manual requirements, scope of work, right of access to facilities and records for source inspections and audits, reporting and approving disposition of nonconformances, as well as technical and QA requirements to lower tier suppliers. PO 00120857 includes technical requirements referencing specific drawings, codes, and specifications for the circuit breakers. PO 00120857 references and includes as an attachment Section H, "Fort Calhoun Station 480 Volt Load Center Main and Bus Tie Breakers Replacements Technical Specifications." This attachment includes technical specifications, such as electromagnetic interference (EMI)/radio frequency interference (RFI) emissions and susceptibility testing requirements, seismic and equipment qualification, maintenance, and other requirements. PO 0026871 provides technical details and applicable quality requirements that reflect the same requirements described in PO 00120857. The inspectors determined that all services NLI provided were procured under the NLI QA program, in compliance with Appendix B to 10 CFR Part 50.

NLI's Quality Assurance Manual (QAM) details the controls established to ensure purchased items and services meet applicable technical and quality requirements. NLI-PROC-05, "Control of Purchased Items and Services," describes how NLI's procurement process manages the control of purchased items and services. The inspectors determined that the technical and quality requirements from these documents accurately reflect PO documentation for the 480v safety-related breaker modification for Fort Calhoun Station and are contractually passed down to NLI suppliers through purchase orders.

c. Conclusions

The inspectors determined that NLI's procurement processes conform to the requirements of Criterion IV and VII of Appendix B to 10 CFR Part 50 and that NLI's QA policy and procedures were being effectively implemented for the 480v safety-related breaker modification for Fort Calhoun Station in 2009. No findings of significance were identified.

3. Test Software

a. Inspection Scope

The inspectors reviewed NLI's policies and procedures governing the implementation of its testing and software program to verify compliance with Appendix B to 10 CFR Part 50. Specifically, the NRC inspection team evaluated samples of equipment modifications and software testing related to the 480v safety-related breaker modification for Fort Calhoun Station in 2009. In addition, the inspectors sampled NLI's measuring and test equipment (M&TE) calibration records for test equipment to ensure that all requirements of instruments and testing devices used in activities affecting quality were properly controlled and satisfactory.

b. Observations and Findings

NLI-TECH-05, "Equipment Qualification Procedure," ensures that component identification, test sequences, functionality tests, EMI/RFI testing, and acceptance criteria are defined and implemented for specific equipment in accordance with NLI's QA plan. NLI-QUAL-05, "Control of Measuring and Test Equipment," provides detailed requirements of NLI's M&TE program, which ensures that M&TE used in safety-related applications are properly controlled and calibrated. NLI-QUAL-10, "QA Requirements for Software," provides detailed requirements for the Verification and Validation (V&V) of software products used in performing safety-related work under the NLI QA program.

The inspectors reviewed QR-09311002-1, "Equipment Qualification Report for Schneider Electric/Square-D Master Pact Replacement Circuit Breaker Model LGSB4," Revision 3, dated May 2011. QR-09311002-1 details the dedication activities NLI performed of test specimen breaker NW08N1, which serves as representation of the production circuit breakers related to the 480v safety-related breaker modification for Fort Calhoun Station. It describes the test sequences, seismic data, EMI/RFI testing data, anomalies, and modifications results from the testing activities performed. In addition, the inspectors performed walkdowns of storage areas, work areas, and the facility to inspect M&TE equipment for calibration history. The inspectors also observed ongoing testing as a part of dedication activities involved with NLI circuit breakers.

The inspectors reviewed Verification and Validation Report (VVR)-042181-1, "Master Pact Circuit Breaker Verification and Validation (V&V) Dedication Report," Revision 13, dated March 2012. VVR-042181-1 describes the software V&V dedication program for the Micrologic trip unit to demonstrate the acceptability and meet the requirements of these digital components in safety-related applications. NLI incorporated a software QA plan that included a dedicated configuration review of the software and a software lifecycle management plan. NLI also performed EMI/RFI testing, loss of power and

overcurrent testing, along with hardware failure mode analysis and effect analysis on the imbedded software of the Micrologic trip unit.

c. Conclusions

Based on the sample of documentation reviewed, the NRC inspection team determined that NLI's testing and software quality controls for the 480v safety-related breaker modification for Fort Calhoun Station satisfy the regulatory requirements set forth in Appendix B to 10 CFR Part 50. No findings of significance were identified.

4. Design Control

a. Inspection Scope

The inspectors reviewed NLI's design control processes to verify compliance with the requirements of Appendix B to 10 CFR Part 50. The inspectors assessed the implementation of design controls and design configuration controls by reviewing the vendor's design control process and procedures that delineate design activities. The inspectors verified that procedures provided controls for design inputs, outputs, design analyses, records, and organizational interfaces. The inspectors verified that design activities were accomplished in accordance with approved procedures. The inspectors also verified that NLI correctly translated its applicable design inputs into specifications, drawings, procedures, or instructions, and verified that the design translation was supported by engineering data, including verifying that design inputs were satisfied.

Specifically, the inspection evaluated NLI's design and modification process for NLI-NW16H1 circuit breakers and NLI-LGSB4-CRDL cradle assemblies, evaluated the translation of requirements and design parameters from Omaha Public Power District Purchase Order 00121849, and Section H, "480 Volt Load Center Main and Bus Tie Breakers Replacements Technical Specifications," to the purchase order. The team reviewed test data performed to the guidance in standards C37.50, "American National Standard for Switchgear—Low Voltage AC Power Circuit Breakers Used in Enclosures—Test Procedures," Institute of Electrical and Electronics Engineers (IEEE) C37.20.1, "IEEE Standard for Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear," and IEEE C37.59, "IEEE Standard Requirements for Conversion of Power Switchgear Equipment." The inspection team also observed physical testing of a sample of equivalent circuit breaker and cradle assemblies. The inspectors verified, through interviews with the breaker manufacturer, that the design changes were subject to design control measures commensurate with those applied to the original design. The inspectors reviewed samples of maintenance and test equipment calibration records used in the qualification of the breaker assemblies and performed walkdowns of the vendor work areas to compare actual equipment qualification to records.

b. Observations and Findings

NLI Procedure NLI-QUAL-01, "Design Control," Revision 9, describes the requirements for implementation of design control for safety-related projects and was used for the Omaha Public Power District circuit breaker replacement project. Procedure NLI-TECH-04, "Materials Engineering," Revision 6, provides technical direction for the performance of engineering evaluations, including standard verification plans and equivalency evaluations, which were used to verify critical characteristics and function of

Schneider Electric/Square-D circuit breakers. Inspectors reviewed samples of standard verification plans and equivalency evaluations to determine if the vendor correctly identified and tested the critical characteristics of the Schneider Electric/Square-D circuit breakers, and if the vendor correctly translated these design inputs into specifications, drawings, and procedures.

c. Conclusions

The inspectors determined, based on the samples reviewed, that the vendor design control process met the requirements of Criterion III of Appendix B to 10 CFR Part 50. No findings of significance were identified.

5. Commercial Grade Dedication

a. Inspection Scope

The NRC inspection of dedication activities focused on activities associated with dedication performed for Square-D replacement breakers and cradle assemblies used at Fort Calhoun Station. The inspectors reviewed NLI's procedures and associated documentation that governed the dedication. The NRC inspection team observed the dedication testing of a Square-D replacement breaker and cradle assemblies by NLI staff. The NRC inspection team observed the installation of a Square-D replacement breaker and cradle assembly in a switchgear representative of the Fort Calhoun Station switchgear. The NRC inspection team discussed the NLI dedication process with NLI's management, technical staff, and with a Schneider Electric/Square-D representative.

b. Observations and Findings

The inspectors reviewed NLI Technical Procedure, NLI-TECH-03, "Commercial Grade Item [CGI] Dedication," Revision 15, dated July 2012, which describes the methodology NLI implements to dedicate and control CGIs in safety-related applications. NLI-TECH-03 refers to NLI Technical Procedure, NLI-Tech-05, "Equipment Qualification," Revision 11, dated June 2008, for environmental (temperature, humidity, radiation, etc.), electromagnetic and radio frequency interference and seismic qualification of equipment. The inspectors noted that NLI-TECH-03, together with NLI-TECH-05, provides adequate controls for identification of the safety function, identification of the critical characteristics, and selection of critical characteristics to be verified for "reasonable assurance" that the CGI will perform the safety function and dedication activities. The inspectors confirmed that NLI implements the guidelines contained in Electric Power Research Institute (EPRI) 5652, "Guideline for the Utilization of Commercial Grade Items in Nuclear Safety-Related Applications," issued June 1988, and EPRI TR-112579, "Critical Characteristics for Acceptance of Seismically Sensitive Items (CCASI)," issued September 2000, for dedication activities.

NLI Technical Evaluation, TE-E-02, Revision 0, dated May 2012, documents a failure modes and effects analysis, and critical characteristics identification that apply to switchgear circuit breakers, including breakers similar to Square-D replacement breakers and cradle assemblies used at Fort Calhoun Station. NLI's standard verification plan (SVP), SVP-49, "Standard Verification Plan EQ Traceability and Component Experience Evaluation," Revision 7, dated August 2012, contains requirements for breakers similar to Square-D replacement breakers and cradle

assemblies used at Fort Calhoun Station. NLI's SVP-85, "Standard Verification Plan for NLI/Square-D Masterpact Circuit Breakers Type: NLI-NT08NI and NLI-NW16H1/NW16HA and NLI/Square D Masterpact Cradles Type: NLI-LGSB4-CRDL and NLI-LGSB7-CRDL," Revision 15, dated September 2011, details the verification requirements for Square-D replacement breakers and cradle assemblies. The inspectors confirmed that NLI implements the requirements for dedication activities established in NLI-TECH-03 and NLI-TECH-05 in these documents.

The Schneider Electric/Square-D replacement breakers and cradle assemblies dedicated by NLI and used at Fort Calhoun Station are not considered like-for-like replacements. NLI has prepared engineering reports to validate significant differences from original design. The inspectors reviewed VVR-042181-1, "Masterpact Circuit Breaker Verification and Validation (V&V) Dedication Report," Revision 13, dated March 2012, VVR-042181-1-SUPP-1, "Software V&V Report for Square D Masterpact Circuit Breaker (including the Micrologic trip unit)," Revision 2, dated November 2012, and VVR-042181-1-COIL, "V&V Report for Square D Masterpact Circuit Breaker (Coils Only)," Revision 0, dated October 2009. VVR-042181-1 describes the software V&V dedication program for the Micrologic trip unit to demonstrate the acceptability and meet the requirements of these digital components in safety-related applications. VVR-042181-1-SUPP-1 is a supplement to VVR-042181-1 to provide additional information based on client questions. VVR-042181-1-COIL describes the V&V dedication program for the shunt trip device, undervoltage trip device, and the close coil in the Masterpact NT and NW circuit breakers. The inspectors verified that these documents provide a reasonable assurance that these particular aspects of the Masterpact replacement breakers will perform their safety-related function.

The inspectors reviewed the mechanical fit up of the Square-D replacement breakers and cradle assemblies in the GE Switchgear used at Fort Calhoun Station. The Schneider Electric/Square-D replacement breaker is smaller than the original GE AK-50 breaker, and the Schneider Electric/Square-D breaker is installed in a cradle assembly that installs into the existing GE switchgear to properly match up with the GE switchgear. Fort Calhoun Station had identified a difference in the breaker cradle assembly fit up into the GE switchgear, compared to the original GE breaker, in the position of engagement to the bus stabs when the breaker or replacement cradle were fully racked in. In discussion with NLI and Schneider Electric/Square-D technical personnel, inspectors confirmed that a difference existed. The original GE breaker fingers would contact the stabs at 1/2 to 3/4 of an inch from the end of the stab and the replacement cradle assembly contact the stabs at 3/4 to 1 inch from the end of the stab. A difference also exists in the finger design in the original GE breaker design and the Schneider Electric/Square-D cradle design. The fingers for the original GE breakers were shaped similar to a flat bottom boat and could ride up on any potential corrosion while the breaker was racked in, while the Square D cradle fingers are designed to scrap the corrosion layer off as they are being racked in. The inspectors reviewed what the effect of these differences was and if the change was in a critical characteristic. The inspectors reviewed the original GE breaker and switchgear maintenance documents, which indicated that the silver plating of the bus stabs was to be maintained, but they did not indicate that the finger contact of the breakers had to be in the silver-plated portion of the stabs. The inspectors determined—based on the Schneider Electric/Square-D cradle assembly finger design, which provides a low-resistance connection by scrapping off the connection—that it is reasonable that the contact of the fingers in the silver-plated portion of the stabs is not a critical characteristic for maintaining a low resistance

connection for the GE design switchgear with Schneider Electric/Square-D cradle assembly installed.

The inspectors reviewed the Omaha Public Power District, Fort Calhoun Station, PO 0121849 to NLI for the GE AK-50 replacement Schneider Electric/Square-D breakers and cradle assemblies to determine if the GE critical characteristic of finger contact on the silver plating was specified. The most relevant section of the PO was Technical Specification Requirement 4.16, which states, "Each breaker/cradle assembly shall fit precisely into the existing switchgear compartment and line up exactly with existing compartment main bus stabs, secondary contact blocks, and cell switches. The breaker/cradle assembly shall fit into switchgear compartment such that no modification to secondary contact block, cell switch location or main bus stab connections shall be required." The inspectors determined that since no modification to the main bus stab was required to maintain the critical characteristic of a low resistance connection, this PO requirement was met.

The inspectors reviewed NLI QA Manual, Revision 11, to see if all the requirements related to commercial grade dedication were met for the Fort Calhoun Station GE AK-50 replacement Square D breakers and cradle assemblies. In Section 3, "Design and Design Control," step 3.5 states, "When commercial grade items are dedicated to requirements that are more restrictive than the manufacturer's published literature OR modified from the manufacturer's specifications, the NLI documentation, including the dedication plan, will identify the new requirements." NLI documentation for this step includes NLI IM-LGSB4-1, "Instruction Manual for NLI/Square D Masterpact Breaker/Cradle SDS Part No: lGSB4," Revision 7, dated July 2012, step 4.1.2.2, which specifically allows the fingers not to contact on the silver-plated portion of the bus stab. Updated instruction manuals have been issued to all the NLI customers for the associated products. The inspectors observed that Revision 1 of this procedure, which was in use at the time Fort Calhoun Station purchased the GE AK-50 replacement Square D breakers and cradle assemblies, did not address this aspect. NLI is tracking updates to its installation procedures under a corrective action request, NLI-CAR-2012-19, issued August 27, 2012.

The inspectors observed NLI technicians performing dedication activities on a Square D breaker and cradle assembly in accordance with SVP-123, "Standard Verification Plan for NLI/Square-D Masterpact AC NW Circuit Breakers in LGSB2 or LGSB2C Cradles," Revision 6, dated July 2012. The inspectors also reviewed several standard verification plans for NLI-NT08N1 and NLI-NW16H1 breaker and cradle assemblies associated with breakers supplied to Fort Calhoun in 2008.

c. Conclusions

The inspectors determined that NLI's commercial grade dedication of the Schneider/Square-D 480v safety-related breaker modification for Fort Calhoun Station satisfies the regulatory requirements set forth in Appendix B to 10 CFR Part 50 and 10 CFR Part 21. No findings of significance were identified.

6. Nonconformances and Corrective Actions

a. Inspection Scope

The inspectors reviewed NLI's policies and procedures governing the implementation of nonconforming components and corrective actions resulting from the modification of the Fort Calhoun Station breakers to verify compliance with Criterion XV, "Nonconforming Materials, Parts, or Components," and Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. In addition, the inspectors conducted several interviews of NLI's management and technical staff about the evaluation process of nonconforming components and corrective actions. The inspectors also verified that NLI's nonconformance process provides guidance to evaluate nonconformances for reportability under NLI's 10 CFR Part 21, "Reporting of Defects and Noncompliance," and also had a tie to the corrective action program.

The inspectors verified that, for the sample of nonconformances reviewed, NLI had: (1) dispositioned the nonconformances it identified in accordance with NLI-approved procedures, (2) presented an appropriate technical justification for various dispositions, (3) taken adequate action with regard to the nonconforming material or item, and (4) subjected all identified nonconformances, as appropriate, to a 10 CFR Part 21 assessment or evaluation. The inspectors also reviewed a sample of corrective action documents to ensure that conditions adverse to quality: (1) were properly identified and correctly dispositioned in the appropriate processes, (2) contained proper management review approval, and (3) were evaluated for their effect on the item's safety function or qualification, when applicable.

b. Observations and Findings

While conducting a review of NLI's nonconformance reports (NCRs) and corrective action reports (CARs), the inspectors noted that NLI takes extra steps in evaluating its NCR's to identify root causes, if available, and actions to prevent recurrence. Inspectors also noted the tie from NLI's CARs back to NLI nonconformances in the case of a CAR that would be reviewed for 10 CFR Part 21 reportability.

Section 1 of NLI-QUAL-06, "Nonconformance Reporting, Corrective, and Preventative Action," Revision 19, dated November 15, 2011, describes the requirements of the identification, documentation, evaluation, segregation, disposition, and control of nonconforming items. It also details how applicable discrepancy reports (DRs) or NCRs will be prepared for reporting of nonconformances. The inspectors identified that there was an NCR created for the fire event at Fort Calhoun Station in 2011 that contained a 10 CFR Part 21 evaluation and a root cause analysis report. The inspectors reviewed the root cause analysis and discussed the NLI root cause with management and Schneider Electric/Square-D engineering management as part of understanding NLI's 10 CFR Part 21 evaluation.

c. Conclusions

The inspectors determined that the implementation of NLI's programs for control of nonconforming material, parts, or components and corrective action were consistent with the regulatory requirements in Criterion XV and Criterion XVI of Appendix B to 10 CFR Part 50. No findings of significance were identified.

7. Entrance and Exit Meetings

On August 27, 2012, the NRC inspection team presented the inspection scope during an entrance meeting with Mr. Aron Seiken, President of NLI, and other NLI personnel. On August 30, 2012, the inspectors presented the inspection results during an exit meeting with Mr. Seiken and other NLI personnel.

ATTACHMENT

1. PERSONS CONTACTED AND NRC STAFF INVOLVED:

Name	Title	Affiliation	Entrance	Exit	Interviewed
Aron Seiken	President	NLI	X	X	X
Tracy Bolt	Director of Quality Assurance	NLI	X	X	X
Jim Hootman	Switchgear Engineering Supervisor	NLI	X	X	X
Chris Tribble	Engineering	NLI	X		X
Sione Fiefia	Test Technician	NLI			X
Jonathon Perez	Test Technician	NLI			X
Albert Livshitz	Director of Engineering-Scheider Electrical	Schneider/ Square-D			X
Douglas Bollock	Inspection Team Leader	NRC	X	X	
Samuel Graves	Inspection Team Member	NRC	X	X	
Thomas Kendzia	Inspection Team Member	NRC	X	X	
Shavon Edmonds	Inspection Team Member	NRC	X	X	

2. INSPECTION PROCEDURES USED:

IP 43002, “Routine Inspections of Nuclear Vendors”

IP 43004, “Inspection of Commercial-Grade Dedication Programs”

IP 36100, “Inspection of 10 CFR Part 21 and Programs for Reporting Defects and Noncompliance”

3. ITEMS OPENED, CLOSED, AND DISCUSSED:

None

4. DOCUMENTS REVIEWED:

NLI Procedures

NLI, Quality Assurance Manual, Revision 11, November 2010
NLI-QUAL-01, “Design Control,” Revision 9, January 2011

NLI-QUAL-05, “Control of Measuring and Test Equipment,” Revision 10, October 2011
NLI-QUAL-04, “Materials Engineering,” Revision 6
NLI-QUAL-06, “Nonconformance Reporting, Corrective, and Preventative Action,” Revision 19, November 15, 2011
NLI-QUAL-07, “Fabrication and Manufacturing Control,” Revision 16
NLI-QUAL-08, “10 CFR 21 Reporting,” Revision 10, September 2011
NLI-QUAL-10, “Quality Assurance Requirements for Software,” Revision 5, September 23, 2010
NLI-QUAL-12, “Preparation and Control of Safety-Related Documents,” Revision 17, September 2011
NLI-TECH-03, “Commercial Grade Item Dedication,” Revision 15, July 2012
NLI-TECH-04, “Materials Engineering,” Revision 6, May 2012
NLI-TECH-05, “Equipment Qualification,” Revision 11, June 2008
NLI-TECH-07, “Fabrication and Manufacturing Control,” Revision 16, September 2010
NLI-PROC-04, “Purchase Order Documentation File,” Revision 21, July 2012
NLI-PROC-05, “Control of Purchased Items and Services,” Revision 22, December 2011

NLI Nonconformance Reports and Corrective Actions

NLI-CAR-03, July 19, 2010
NLI-CAR-08, September 22, 2010
NLI-CAR-2011-05, May 25, 2011
NLI-CAR-2012-08, June 15, 2012
NLI-CAR-2012-19, August 27, 2012
NLI-CAR-2012-20, August 30, 2012
NCR-259, Revision 1 (with 10 CFR Part 21 Evaluation)
NCR-296
NCR-306
NCR-314, Revision 1
NCR-316
NCR-327
NCR-330
NCR-331
NCR-338, Revision 1
NCR-349
NCR-356
NCR-357
NCR-371, Revision 1
NCR-377, Revision 3
NCR-407
NCR-410
NCR-419
NCR-420
NCR-421
NCR-422 (with Root Cause Evaluation and 10 CFR Part 21 Evaluation)
NCR-432 (with 10 CFR Part 21 Evaluation)
NCR-434
NCR-437
NCR-440
NCR-444, Revision 0

NLI Procurement Documents

PO 00120857, "Purchase Order from Fort Calhoun to NLI for 480v Load Center Main and Bus Tie Breakers," Revision 0, May 28, 2008
Change Order 0011003093-11003 for PO 001211849, "Receipt of Parts Associated with Contract PO 00120857," Revision 1, March 17, 2009
PO 0026871, "Purchase Order from NLI to Square D for Low Voltage Breakers Direct Replacement for GE Circuit Breaker Safety Related," Revision 1, June 30, 2008
PO 00120857, "Purchase Order from Fort Calhoun to NLI for 480v Load Center Main and Bus Tie Breakers," Revision 0, May 28, 2008
Change Order 0011003093-11003 for PO 001211849, "Receipt of Parts Associated with Contract PO 00120857," Revision 1, March 17, 2009
PO 0026871, "Purchase Order from NLI to Square D for Low Voltage Breakers Direct Replacement for GE Circuit Breaker Safety Related," Revision 1, June 30, 2008
PO 00121849, "Purchase Order for Breaker, Circuit, Low Voltage, 480v, 1600A Frame, Interrupt Rating 50kA, Micrologic Trip Unit 5.0A, F/Load Center Main and Bus Tie Breakers," March 17, 2009

Calibration Certificates

2188380003, Fluke 233 True RMS Multimeter, Serial Number 13290020, May 15, 2012
2194660008, Fluke 87V Digital Multimeter, Serial Number 94150021, May 22, 2012
2232860007, Westward 1AAU4 Digital Caliper, Serial Number MTE-1737, July 5, 2012

NLI Commercial Grade Survey Reports

CGSR-AVL-191-03, "CGS Report of Square D," Revision 0, November 18, 2009
CGSR-AVL-191-06, "CGS Report of Schneider Electrical Service (previously Square D)," Revision 0, August 24, 2012

Miscellaneous Documents

Technical Evaluation, TE-E-02, Revision 0, May 2012
SVP-49, "Standard Verification Plan EQ Traceability and Component Experience Evaluation," Revision 7, August 2012
SVP-85, "Standard Verification Plan for NLI/Square-D Masterpact Circuit Breakers Type: NLI-NT08NI and NLI-NW16H1/NW16HA and NLI/Square D Masterpact Cradles Type: NLI-LGSB4-CRDL and NLI-LGSB7-CRDL," Revision 6, August 2008
SVP-85, "Standard Verification Plan for NLI/Square-D Masterpact Circuit Breakers Type: NLI-NT08NI and NLI-NW16H1/NW16HA and NLI/Square D Masterpact Cradles Type: NLI-LGSB4-CRDL and NLI-LGSB7-CRDL," Revision 15, September 2011
SVP-123, "Standard Verification Plan for NLI/Square-D Masterpact AC NW Circuit Breakers in LGSB2 or LGSB2C Cradles," Revision 6, July 2012
Standard Verification Plan for NLI/Square-D Masterpact Circuit Breakers Type: NLI-NT08N1 and NLI-NW16H1 and NLI/Square-D Masterpact Cradles Type: NLI-LGSB4-CRDL and NLI-LGSB7-CRDL, completed Fort Calhoun breakers, 08511333402 and 085440558901, September 11, 2008
NLI IM-LGSB4-1, "Instruction Manual for NLI/Square D Masterpact Breaker/Cradle SDS Part No: LGSB4," Revision 1, September 2008
NLI IM-LGSB4-1, "Instruction Manual for NLI/Square D Masterpact Breaker/Cradle SDS Part No: LGSB4," Revision 7, July 2012

QP-09311002-1, "Qualification for Square D Masterpact Replacement Circuit Breaker Model LGSB4," Revision 2, December 2008
NLI Approved Vendor Summary, Revision 9, September 29, 2011
EE-09311002-1, "Equivalency Evaluation for NLI/Square D Masterpact Breaker/ Cradle Part No: NLI-NW16H1-LGSB4," Revision 0
GEK-7303C, "Low-voltage Power Circuit Breakers Types AK-50/75/100"
GEI-90890A, "Instruction Manual – AKD-5 Powermaster Low Voltage Drawout Switchgear"
C37.59, Institute of Electrical and Electronics Engineers (IEEE) Standard Requirements for Conversion of Power Switchgear Equipment, 2002
C37.20.1, IEEE Standard for Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear, 2002
C37.50, American National Standard for Switchgear – Low Voltage AC Power Circuit Breakers Used in Enclosures – Test Procedures, 1989
C37.13, IEEE Standard for Low-Voltage AC Power Circuit Breakers Used in Enclosures, 1990

Test Reports

ANSI-LGSB4-1, "ANSI Design Test Report for Square-D Replacement Breakers, Type LGSB4," Revision 0
QR-042181-1, "NLI EMI/RFI Qualification Report for Square D Micrologic Trip Unit," Revision 1, July 5, 2012
VVR-042181-1, "Masterpact Circuit Breaker Verification and Validation (V&V) Dedication Report," Revision 13, March 2012
VVR-042181-1-SUPP-1, "Software V&V Report for Square D Masterpact Circuit Breaker (Including the Micrologic Trip Unit)," Revision 2, November 2012
VVR-042181-1-COIL, "V&V Report for Square D Masterpact Circuit Breaker (Coils Only)," Revision 0, October 2009
QR-09311002-1, "Qualification Report for Square D Master Pact Replacement Circuit Breaker Model LGSB4," Revision 3, May 2011

5. ACRONYMS USED:

AVL	approved vendor list
CEVB	Construction Electrical Vendor Branch
CFR	*Code of Federal Regulations*
DCIP	Division of Construction Inspection and Operational Programs
EMI	electromagnetic interference
EQ	environmental qualification
IEEE	Institute of Electrical and Electronics Engineers
IP	inspection procedure
MT&E	measuring and test equipment
NCR	nonconformance report
NLI	Nuclear Logistics, Inc.
NON	notice of nonconformance
NRC	(U.S.) Nuclear Regulatory Commission
NRO	Office of New Reactors
PO	Purchase Order
QA	quality assurance
QAM	Quality Assurance Manual

QP	qualification plan
RFI	radio frequency interference
V&V	verification and validation
VVR	verification and validation report