MEMO: NLI-QA-3754

DATE: 9/26/2019

TO: United States Nuclear Regulatory Commission

ATTN: Document Control Desk, Washington, DC 20555-0001

Reference: Docket Number 99901471
NRC Inspection Report No: 99901471/2019-201

Subject: Reply to a Notice of Nonconformance dated July, 3, 2019

To Whom It May Concern,

This letter is in response to the referenced NRC inspection report, dated July, 3, 2019. The report pertains to an inspection that was performed by the NRC from May 20 through 24, 2019, at the Fort Worth facility of AZZ | Nuclear Logistics (NLI).

The report identified one (1) Notice of Nonconformance. The report also includes reference to a previously identified NON that was not closed. The NONs are addressed in individual supplements to this letter.

NLI is committed to addressing the issues that have been identified in the NRC inspection report and improving our program. We appreciate the thoroughness and professionalism displayed by the NRC inspection team during their visit to our facility.

If any additional information is requested please contact myself at tracybolt@azz.com

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cc: United States Regulatory Commission, Chief, Quality Assurance Vendor Inspection Branch-1, Division of Construction Inspection and Operational Programs, Office of New Reactors

Supplement 1 – NLI Reply to Nonconformance 99901471/2019-201-01

Supplement 2 – NLI Reply to Nonconformance 99901471/2016-201-04

Supplement 1 - Reply to a Notice of Nonconformance

AZZ Nuclear Logistics Inc. (NLI) Docket No.:99901471
Fort Worth, TX

Based on the results of a U.S. Nuclear Regulatory Commission (NRC) inspection conducted at the AZZ Nuclear | NLI (NLI) facility located in Fort Worth, TX, on May 20 through May 24, 2019, certain activities were not conducted in accordance with NRC requirements which were contractually imposed on NLI by its customers or NRC licensees.

A. Criterion III, "Design Control," of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," states in part that, "Measures shall also be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions for the structures, systems and components." Criterion III also states in part that, "Where a test program is used to verify the adequacy of a specific design feature in lieu of other verifying or checking processes, it shall include suitable qualification testing of a prototype unit under the most adverse design conditions."

Contrary to the above, NLI failed to ensure the suitability of equipment that is essential to the safety-related functions for certain components supplied to the nuclear industry associated with the environmental qualification testing of certain relays. Specifically, as part of its process for performing qualification testing, NLI failed to justify the activation energies used in the thermal aging analysis/calculations. Also, NLI failed to fully evaluate anomalies that were identified during the functional testing portion of the qualification program.

This issue is identified as Nonconformance 99901471/2019-201-01.

NLI Response:

(1) The reason for the Nonconformance

There are two issues that are being identified in this NON.

1. "NLI failed to justify the activation energies used in the thermal aging analysis/calculations."
   NLI agrees that, the method of selection for the activation energies, as a standard practice for NLI, is not what was expected to be performed by the NRC inspector.

2. "NLI failed to fully evaluate anomalies that were identified during the functional testing portion of the qualification program."
   NLI agrees that, when the anomaly was dispositioned, the contact resistance for the relay was not fully evaluated to determine why the contacts were exhibiting a higher resistance than what was expected. It was further not evaluated why the high resistance was acceptable and to further explain why the resistance was back to normal after the conclusion of the tests.

Although the relay contacts were not fully evaluated to determine the cause of the higher than expected resistance, the relay was verified to be qualified for the specific application by utilizing the same type of equipment that the relay would be operating in the qualified configuration.

If the relay was being qualified for a generic application where all the possible loaded conditions were not known, this interpretation of the results would be warranted. However, since the relay was being qualified in the specific simulated application, additional analysis and evaluation was not necessary as the contacts demonstrated that they were capable of performing the safety related function.

(2) The corrective steps that have been taken and the results achieved:

1. NLI entered this NON into our corrective action program NLI-CAPA-539. The procedure that governs the qualification process (i.e. AZZ-ENG-03) was revised to add details of what is expected from engineering to complete the thermal aging step in qualification. This included new requirements for the selection and the independent review of activation energies.

2. NLI entered this NON into our corrective action program NLI-CAPA-543. An extent of condition review was performed that focused on the dispositions of several anomalies that were dispositioned as "acceptable as is". It was determined that additional training was necessary to ensure that the individuals who are writing the dispositions, understood that the anomalies needed to be able to stand alone and provide the necessary information in order to substantiate the decision to accept or reject an anomaly. Although additional training was administered to the Engineering staff the results of the qualification programs were not negatively impacted by the anomaly dispositions.

(3) The corrective steps that will be taken:

1. Per NLI-CAPA-539, the procedure that governs the qualification process at AZZ Nuclear is AZZ-ENG-03. This procedure has been revised to include details of the steps that are necessary to be performed before selecting an activation energy for any material. The changes were addressed in training with the engineering group following the revision to the procedure.

The summary of the revision is provided below:

a. A stand-alone document (that is prepared reviewed and approved by Engineering) is now required to be completed by the engineer in charge of the project qualification program after material identification has been performed. In it, each material that is identified as a sub-component is required to be evaluated as it affects the safety function of the item

being qualified. The reviewer and approver signature will serve as agreement that only those materials within this document are relevant to the qualification of the item.

b. In addition, justification is required to be provided regarding the selection of the activation energy of the material that is identified. This justification shall include a discussion as to why it is adequate to select the activation energy that is chosen.

c. The document described above shall be included in the qualification report to provide a documented justification for all activation energies selected.

2. Per NLI-CAPA-543, Training was administered to the Engineering department.

The training focused on the following points:

a.) Anomalies have to be well explained. A person, completely unfamiliar with project, needs to be able to understand why an anomaly is written.

b) Anomalies must be stand-alone documents. Description of the issue and resolution must be clear without the need to interview other stakeholders. Large amounts of data can be referenced and contained elsewhere, but in general, data should be stated in the anomaly/resolution for any reader to have the facts readily available.

c) Decisions must be explained. Logical thinking utilized to arrive at a conclusion must be written.

d) Resolution must be substantiated. If data is not available or deemed necessary, an explanation of this reasoning must be given to justify why the data to substantiate resolution is not required.

(4) The date when full compliance will be achieved:

All required actions have been completed.

End of Supplement 1 - Reply to a Notice of Nonconformance 99901471/2019-201-01

Supplement 2 - Reply to a Notice of Nonconformance 99901471/2016-201-04

Criterion III, "Design Control," of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," states in part that, "Measures shall also be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions for the structures, systems and components."

Contrary to the above, NLI failed to ensure the suitability of equipment that is essential to the safety-related functions for certain components supplied to the nuclear industry. There were two examples, one of which was closed, the other is further discussed below.

Regarding the second part of the NON, involving NLI's failure to identify and verify commercial interrupting ratings as a critical characteristic as part of its CGD process, the NRC inspectors identified that as a corrective action to the previously issued NON, that for circuit breakers and other similar devices, NLI now specifically states to their customers that they are not verifying the component's interrupting ratings as part of the dedication process. This is documented in NLI's Commercial-Grade Item Dedication Technical Evaluation and Test Plan, CGD-MCCB-1, Revision 5. This resolves the issue (from NLI's perspective) for individual replacement components, thus leaving it up to NLI's customers to determine whether the interrupting rating for a particular replacement component would be a critical characteristic for a given application.

Conversely, with regard to NLI's supply of more complete switchgear (replacement motor control center (MCC) buckets, complete MCCs, etc.), NLI typically certifies that the switchgear they supply meets certain customer requirements, including the capability to interrupt fault currents up to and including nameplate ratings. The NRC inspectors identified that for such equipment, NLI performs first article design testing which includes testing to verify the validity of the nameplate interrupting ratings on the commercial components. Such testing is considered destructive in nature and is performed only on the test specimens. For subsequently manufactured production equipment, NLI utilizes individual components that have gone through its CGD process. Consequently, although NLI has performed qualification/design testing to verify interrupting ratings on test samples, sufficient actions have not been taken to verify that replacement items are identical in form, fit, and function to those that were previously tested, particularly with regard to any changes to the devices that could impact its interrupting rating. This is of concern as NLI does not have control of the design process for these commercial devices and has not performed testing, inspections, surveys or other activities that might be sufficient to verify the validity of the commercial ratings (including interrupting ratings) on subsequently procured equipment. Based upon these concerns, this NON is being left open. NLI documented these concerns on CAPA No. NLI-CAPA-534.

This issue is identified as Nonconformance 99901471/2016-201-04.

NLI Response:

(1) The reason for the noncompliance, or, if contested, the basis for disputing the noncompliance or severity level;

AZZ maintains the position that the short circuit interrupt (SCI) and Short Circuit Withstand (SCW) ratings are design characteristics and are not always required to be verified for safety related applications to provide reasonable assurance that the component will perform its intended safety related function. Based on the application of the equipment, design characteristics may also be considered safety related critical characteristics.

Current Interrupt Rating (IR) is one of several tests that manufacturers generally perform to demonstrate their product meets or exceeds the requirements of national industry standards (IEEE, ANSI, UL, etc.). NLI design engineers have selected and approved all equipment utilized in safety related designs based on the subcomponents' design and ratings. In supplying replacement equipment (in a like-for-like procurement scenario), to be used in these applications, current industry guidance states that reasonable assurance by selection and verification of critical characteristics demonstrating the item has the capability to perform its required safety function, the same as the original qualified safety related item is permissible. Additionally, EPRI guidance allows the dedicating entity to take credit for a critical characteristic if a product is manufactured to a national industry code or standard with certain verifications.

The current interrupt or withstand capability of a breaker, fuse or switch is a design characteristic, and depending on the application, may also be a "Critical Characteristic" essential to the items safety function as defined by 10CFR Part 21.3. However, it does not necessarily need to be a "functionally tested" critical characteristic when performing CGD dedication on replacement equipment (in a like-for-like procurement scenario) in most instances. The selection and testing of other operational/functional critical characteristics that reflect other primary safety functions, such as full load current carrying capability and thermal/over-current trip testing, often tied to time functions, along with other critical characteristic verifications can provide reasonable assurance that the device will perform the operational safety functions. An applied destructive massive fault current often in the 40-300k Amp range for milliseconds, to demonstrate that the device will not catastrophically fail is deemed beyond the measure of reasonable assurance. However, when fault current interrupt rating is identified as a safety function, Method 4 verification of the UL marking for current interrupt rating should be considered an acceptable verification method, as it does demonstrate there is confidence that the item's design, manufacture and testing meets the published rating.

Although UL does not submit itself to nuclear "Approved Supplier" NUPIC audits or Commercial Grade Surveys, UL is a nationally recognized standards and testing laboratory that performs many types of tests for product manufacturers, including current interrupt rating testing for breakers, fuses and switching products. Their product testing is relied on by insurance companies, medical facilities, fire protection companies, federal and state agencies, as well as, private sector companies to ensure that products have been tested to strict national industry standards and have met the design and safety ratings published. UL does not have a 10CFR50 Appendix B Quality Program; however, they do comply fully with ISO/IEC 17065, "Conformity Assessment – Requirements for bodies certifying products, processes, and services (formally Guide 65). Some US licensees have interfaced with the UL test lab as recently as January 2016 regarding the testing of UL rated fuses. This interface with

UL test personnel along with the interview of the Lead UL staff member adds a level of confidence to the validity of the UL rating when on a product. Examination of internal and external Operating Experience (OE) and a web search for issues related to UL testing/rating deficiencies found no identified issues. UL maintains a certifications database that allows anyone to search and view UL Files to validate that an item's listing is legitimate, to confirm that it is correct by verification of the marking requirements contained in that UL File and also to confirm the ratings and conditions for which it was approved. For UL Listed control panels, the engineer is required to confirm all the information, including validating e.g. the current ratings and wire temperature ratings requirements. Thus, the basis to utilize Method 4 as allowed by EPRI 3002002982 for verification of current interrupt rating when specified as a critical characteristic by verification of the UL Listing or markings is made.

If an item is not UL Listed or rated for current interrupt ratings and that attribute is deemed a critical characteristic, other selected critical characteristics must be sufficient in providing reasonable assurance the item is like for like to the original item or the current interrupt rating can be verified by a CGD test.

(2) The corrective steps that have been taken and the results achieved;

NLI has entered the notice of noncompliance into our corrective action program to formally document the responses. NLI-CAPA-534

(3) The corrective steps that will be taken; and

Training has been administered to the engineering staff when creating the dedication plan, in regards to identifying Short Circuit Interrupt (SCI) or Short Circuit Withstand (SCW), when it is determined to be a safety related critical characteristic for the application specific safety function. The determination of whether the SCI or SCW is a critical characteristic is determined by the end user based on the application. In addition, for design projects, training was conducted to ensure that when the design changes the configuration where the established short circuit ratings are affected, the design tests are required to be performed on the final design.

(4) The date when full compliance will be achieved.

All required actions have been completed.

End of Supplement 2 - Reply to a Notice of Nonconformance 99901471/2016-201-04