



## QUALITY ASSURANCE MANUAL

## AUDIT REPORT

GENERAL OFFICE

Type Audit: ☐ Program Audit ☐ Product Inspection Point  
☐ Records ☒ Special

To: J. R. McFarland

Project Byron/Braidwood Visit Date 9/29-30/81 Report Date 10/2/81System Environmental Qualification Component Identification N/AMaterial Description Electrical EquipmentVendor Sargent & Lundy Location Chicago, ILSubcontractor N/A Location N/AContacts J.D. Regan, B.G. Treece, L.P. DolderP.O. No. N/A Spec. No. F/L 2773, 2804.01

Recommended Inspections: 6 mos 3 mos 1 mo

Other: As required

Notes: Please respond as indicated herein by October 28, 1981.

Auditor Robert B. Krueger Date 10/5/81  
Team Leader  
Reviewed G. J. Marone Date 10/6/81

cc: Manager of QA 10-6-81  
Manager of Projects  
Project Manager  
Eng. Manager  
Director QA (Engr.-Const.)

Site QA (Byron/Braidwood)  
Auditee  
Sta. Nuclear Engr. Mgr.  
Exec. Vice President  
Asst. Vice President  
V.P. (Nuclear Operations)

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COMMONWEALTH EDISON AUDIT  
OF

SARGENT & LUNDY  
September 29-30, 1981

The Commonwealth Edison General Office Quality Assurance Department conducted an audit of the Sargent & Lundy Byron/Braidwood Project Engineering Group on September 29th and 30th, 1981. The audit was conducted at the Chicago offices located at the Mid Continental Building. The scope of the audit was a review of Sargent & Lundy's evaluation/acceptance of environmental qualification documentation of Class 1E Electrical Equipment for Byron/Braidwood.

The purpose of this audit was to verify the conformance of the Sargent & Lundy review to that of the governing document:

NUREG 0588 for Comment - Interim staff position on Environmental Qualification of Safety Related Electrical Equipment.

The NUREG provides NRC positions and guidance to be followed for the environmental qualifications of items to the IEEE Standard 323, "Qualifying Class 1E Equipment for Nuclear Power Generating Stations." The applicable IEEE Standard 323 printing date of 1974 was used since Byron/Braidwood construction permits SER were issued subsequent to July 1, 1974.

The pre-approved audit checklist consisted of ten (10) questions from NUREG-0588 and one (1) dealing with the status of NSSS supplied equipment qualification review. The first ten (10) questions were generic and were asked of a sample of balance of plant Class 1E equipment. Equipment selected had different qualification zones both inside and outside the containment.

Of the four (4) specific pieces of BOP equipment chosen to be audited, Sargent & Lundy had two (2) packages available for review. The audit showed that only U/1 containment electrical penetrations and RCFC fan/motors had been reviewed to date.

The review of NSSS equipment qualification was found not to be done under the scope of Sargent & Lundy's contract. This work was let by CECO. to NEQ who will perform an umbrella review of all Class 1E equipment for Byron/Braidwood.

Both RCFC fan 1VP01CC and neutron monitoring electrical penetration qualification packages were examined by the audit team. The RCFC review work was in process and not complete whereas the Bunker Ramo penetration package had been reviewed and accepted by Sargent & Lundy. Of the twenty (20) audit questions asked, two (2) problem areas were discovered.

The first deficiency dealt with the complete and accepted electrical penetration 2NR04E. Contrary to NUREG 0588 Section 5(1), no description of the test setup and instrumentation used was available.

The RCFC package was clearly in process of being reviewed and accepted. Careful inspection of available correspondence and checklists showed that four (4) attributes were not in the qualification package. This deficiency is in the fact that the open NUREG requirements were not being tracked and corrected.

These two (2) findings in the area of 1) lack of testing setup/instrumentation description for electrical penetration and 2) lack of tracking missing performance characteristics, power supply variance, testing margins and testing failures are detailed in Appendix "A" of this report.

Overall quality of the review performed by Sargent & Lundy on these qualification packages is acceptable. The areas which were reviewed in the audit and found acceptable were: methods supported by test sequence of testing, radiation environment, aging acceleration rate, caustic spray and developed test plan. A project instruction with checklist is to be used in the near future which incorporates virtually all of the NUREG 0588 attributes.

The performance of the audit was as indicated in Appendix "B" (entrance briefing, exit debriefing). The audit team appreciated the cooperation shown by all Sargent & Lundy personnel involved.

Sargent & Lundy is requested to report in writing to this audit by October 28, 1981. The response should indicate the corrective action taken, the action needed to prevent recurrence and the date of implementation. The response is to be directed to:

Mr. G. F. Marcus  
Director of Quality Assurance  
Engineering and Construction

with copies to:

Mr. R. B. Klingler  
QA Supervisor  
Byron

Mr. T. R. Sommerfield  
QA Superintendent  
Braidwood

## APPENDIX "A"

### FINDING #1:

Contrary to NUREG 0588 Section 5(1), the design qualification report for electrical penetration 2NRO4E, did not contain a description of the test facilities (test setup) and instrumentation used (including calibration records reference).

### Discussion:

A review of Bunker Ramo report #123-2220, Rev. 4, revealed that there was no description of the test setup nor was there any mention of the specific instrumentation being utilized.

### FINDING #2:

Contrary to NUREG 0588 Sections 2.2(7), 2.2(10), 3(1) and 5(1), the Sargent & Lundy review of Joy Manufacturing environmental qualification report is not adequately tracking unresolved items.

### Discussion:

Review of Joy environmental qualification report X-604 (3/20/80) by the auditor showed various deficiencies for the Carrier RCFC unit 1VP01CC. Correspondence between Sargent & Lundy and Carrier Air Conditionery Co. dated June 23, 1980, April 23, 1981 and August 12, 1981 showed Sargent & Lundy was tracking many concerns regarding Joy Manufacturing qualification test #X-604 (revision dated April 20, 1980). The audit revealed the following initial items are either not being tracked as open or were questioned and closed.

1. Performance characteristics of LOCA - amperage and insulation resistance were not identified.
2. Power supply frequency variance ( $\pm 5\%$ ) was not applied during the test cycle.
3. Margins for ambient - temperature, pressure and time were not generated prior to testing. Sargent & Lundy questioned this item but closed the issue incorrectly in letter by F.A. Kosik dated 4/23/81. The vendor's response stated that no margins were used and reported parameter values were exact values. This does not address what are acceptable testing margins per IEEE 323 - 1974, and NUREG 0588.

If the IEEE 323 - 1974 margin of  $+15^{\circ}\text{F}$  for test temperature is invoked the measured test temperature of  $330^{\circ}\text{F}$  is  $10^{\circ}\text{F}$  below the marginal temperature of  $340^{\circ}\text{F}$  ( $325^{\circ}\text{F}$  required  $+15^{\circ}\text{F}$  margin) hence invalidating the test results.

4. During LOCA testing, twenty-eight (28) equipment outages occurred in the one (1) year and fifty-seven (57) days of continuous testing at Joy Manufacturing. Two (2) failures which occurred (3/19/76 for two (2) hours, 4/22/76 for five and one-half ( $5\frac{1}{2}$ ) hours) had no explanation of cause or what procedure was involved to restart the unit under test was documented in report X-604 or available correspondence.

APPENDIX "B"

PRE AUDIT CONFERENCE

DATE: Tuesday      September 29, 1981      TIME: 8:30 a.m. Room 24D35

<u>NAME</u>	<u>TITLE</u>	<u>COMPANY</u>
T.R. Sommerfield	QA Superintendent	CECo.
G.F. Marcus	Director of QA	CECo.
J.J. Dennehy	Project Engineer	CECo.
J.E. McFarland	Head QA Division	S&L
L.P. Dolder	QA Coordinator	S&L
R.B. Klingler	QA Supervisor	CECo.
J.D. Regan	Electrical Eng.	S&L
J.E. Szupillo		S&L
B.G. Treece	SEPE	S&L

POST AUDIT CONFERENCE

DATE: Wednesday      September 30, 1981      TIME: 2:10 p.m. Room 26018

<u>NAME</u>	<u>TITLE</u>	<u>COMPANY</u>
J.J. Dennehy	State Asst.	CECo.
B.G. Treece	SEPE	S&L
J.E. McFarland	Head QA Division	S&L
D.L. Leone	Project Director	S&L
L.E. Ackmann	Director of Services	S&L
D.C. McClintock	Mgr., Elec. Dept.	S&L
E.V. Abraham	Asst. Mgr. Mech. Dept.	S&L
J.D. Regan	Electrical Engineer	S&L
J.M. McLaughlin	Mgr. Str. Dept.	S&L
L.P. Dolder	QA Coordinator	S&L
R.B. Klingler	QA Supervisor	CECo.
T.R. Sommerfield	QA Superintendent	CECo.

Audit Conducted by:

R.B. Klingler	Team Leader
T.R. Sommerfield	Auditor