

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-373/86010(DRS)

Docket No. 50-373

License No. NPF-11

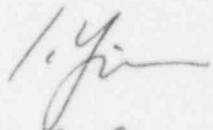
Licensee: Commonwealth Edison Company
P.O. Box 767
Chicago, IL 60690

Facility Name: LaSalle County Station, Unit 1

Inspection At: LaSalle Site, Marseilles, IL
USNRC Region III, Glen Ellyn, IL (RIII)
Sargent and Lundy Engineers (S&L)

Inspection Conducted: March 6-7 and 11-12, 1986, at the site
March 17, 1986, at RIII
March 26-27, 1986, at S&L

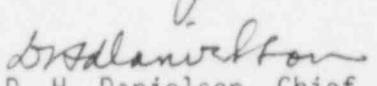
Inspector: I. T. Yin



Date

4/7/86

Approved By: D. H. Danielson, Chief
Materials and Processes Section



Date

4/7/86

Inspection Summary

Inspection on March 6 through 27, 1986 (Report No. 50-373/86010(DRP))

Areas Inspected: Special announced inspection of inservice inspection and functional testing of safety-related snubbers and licensee actions in response to previous inspection findings and a 50.55(e) deficiency report.

Results: No violations or deviations were identified.

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DETAILS

1. Persons Contacted

Commonwealth Edison Company (CECo)

T. A. Hammerich, Technical Staff, Compliance
G. J. Diederich, Station Manager
*D. R. Szumski, Technical Staff, Snubber Test Coordinator
D. S. Berkman, Assistant Superintendent, Technical Services
*R. D. Bishop, Services Superintendent
R. L. Scott, SNED Engineer
B. M. K. Wong, SNED Engineer
*R. M. Jeisy, QA Supervisor
*J. Merwin, Staff Assistant, Maintenance
*J. G. Marshall, Director of QA, Operations
*C. M. Allen, Nuclear License Administrator
*L. F. Gerner, Regulatory Assurance Superintendent
*H. L. Massin, SNED Engineer
*M. S. Turbak, Licensing Director, Operating Plants
*K. L. Graesser, Division Vice President
*D. L. Farrar, Nuclear Licensing Director
+J. T. Fox, Mechanical Engineer

Sargent and Lundy Engineers (S&L)

+*R. H. Pollock, Project Manager
*G. T. Kitz, Head, Engineering Mechanics Division
+R. B. Johnson, QA Coordinator
S. M. Kazmi, Supervising Design Engineer
+R. J. Janowiak, Structural Project Engineer
+S. A. Gibrael, EMD Engineer
+W. U. Choudhury, Mechanical Project Engineer
+A. Morcos, Assistant Head, QA Division
+H. G. S. McCullyh, Project QA Coordinator

US NRC

*C. J. Paperiello, Director, Division of Reactor Safety, RIII
*J. J. Harrison, Chief, Engineering Branch, RIII
*D. H. Danielson, Chief, Materials and Processes Section, RIII
*R. W. DeFayette, Project Manager, RIII
*J. A. Gavula, Mechanical Engineer, RIII
*I. T. Yin, Senior Mechanical Engineer, RIII
*R. J. Kiessel, IE-EGCB Staff
*H. K. Shaw, NRC-BWREB Staff
M. J. Jordan, Senior Resident Inspector, RIII

*Denotes those attending the management meeting at RIII on March 17, 1986.

+Denotes those attending the exit meeting at S&L on March 27, 1986.

2. Licensee Action on Previous Identified Items

- a. (Closed) Unresolved Item (373/82-11-08): The S&L system analysis criteria for separating header and branch connections was based on a moment of inertia ratio of seven or more. Questions were raised relative to branch connections that were close to equipment nozzles, and possible restraint design load increases of more than 10%. The NRC inspector reviewed the S&L Report EMD-035739, "Evaluation of the Effects of Branch Lines on the Header Restraint System for LaSalle County Unit 1," Revision 0, dated April 30, 1982, and considered the matter resolved.
- b. (Closed) Open Item (373/82-11-09): Potential weaknesses in pipe snubber design control were identified. S&L upgraded its program to include:
- ° Snubber selection criteria are included in S&L EMD-TP-1 "EMD Lesson Plan For Training Personnel in Piping Analysis," Volume 1, Revision 6, dated April 27, 1985.
 - ° The frequency of S&L engineering site visits and meetings to provide as-built reviews and evaluations has been increased.
 - ° A comprehensive piping analysis hardware optimization evaluation and snubber reduction program has been implemented.

The NRC inspector reviewed the pertinent records and considered the issue resolved.

- c. (Closed) Unresolved Item (373/82-15-01): A number of snubbers were installed close to rigid restraints. This could affect the operability of these snubbers because of restricted lockup motion. To date, more than 1000 snubbers were either deleted or replaced by rigid restraints. The NRC inspector reviewed some of the ECNs and "Addendums to Piping Stress Reports" generated for the snubber optimization effort and had no adverse comments. Revised snubber selection criteria are documented in S&L report EMD-035454, "Snubber Lock-Up Evaluation Report for LaSalle Units 1 and 2," Revision 0, dated April 1, 1982. The NRC inspector also reviewed these criteria and considered them acceptable.
- d. (Closed) Unresolved Item (373/82-31-01): Extra conservative system temperatures were used in some of the piping stress analyses. The number of snubbers could possibly be reduced if the actual design temperatures were applied. The NRC inspector reviewed an S&L letter to CECO "Thermal Mode Review - Snubber Reduction," dated July 25, 1983, and considered the matter resolved.
- e. (Closed) Unresolved Item (373/82-31-02): The NRC inspector requested CECO provide a copy of the energy absorbing material (EAM) design specification and qualification test data for his review. A followup review was conducted at Byron Station during construction. See RIII Inspection Report No. 50-454/84-51; 50-455/84-35 for details.

- f. (Closed) Violation (373/82-47-01): The QA program measures for the installation of pipe whip restraints (WRs) were not adequate. The NRC inspector reviewed the enclosure to the CECO response letter to RIII, dated May 4, 1983, "Response to Inspection Report 50-373/82-47, Item of Noncompliance, No. 1," and considered it acceptable. The NRC inspector also reviewed the following procedures and found them acceptable:
- ° Morrison Construction Company Standard Operating Procedure, PC-16, "Erection of Supports - Restraints and Final Installation Verification," Revision 10, dated October 1982.
 - ° CECO LSQP 3-2, "As-Built Data Gathering Interface Control," Revision 0, dated December 31, 1982.
- g. (Closed) Violation (373/82-47-02): The FCR system was used to document and resolve WR installation nonconformances. The NRC inspector reviewed the enclosure to the CECO response letter to RIII, dated May 4, 1983, "Response to Inspection Report 50-373/82-47, Item of Noncompliance, No. 2," and considered it acceptable. The NRC inspector also reviewed the site procedure developed as a part of the corrective action (LSQP 3-2, "As-Built Data Gathering Interface Control," Revision 0, dated December 31, 1982) and had no adverse comments.
- h. (Closed) Unresolved Item (373/82-47-03): Followup on the disposition of QA audit findings in the area of WR installation. The NRC inspector reviewed CECO Audit Report No. 1-82-54, "Whip Restraint Installation," Revision 1, dated September 13, 1982 including "LaSalle QA Followup Surveillance" reports. Audit findings were closed from February to November 1983. CECO QA actions to resolve WR installation deficiencies were considered adequate.
- i. (Closed) Unresolved Item (373-82-47-04): Questionable S&L design of WRs utilizing EAM. A generic design review for Byron, Braidwood, and LaSalle EAM installations was conducted by the RIII and NRC-NRR staff. All issues were resolved. See RIII Inspection Report No. 50-454/84-51; 50-455/84-35 for details.
- j. (Closed) Violation (373/82-47-05): CECO failed to implement some of the requirements contained in the "Hot Line Walk Inspection Procedure." The NRC inspector reviewed the enclosure to the CECO response letter to RIII, dated May 4, 1983, "Response to Inspection Report No. 50-373/82-47, "Item of Noncompliance, No. 3," and considered it acceptable. The NRC inspector also reviewed the following licensee corrective action documents.
- ° CECO letter to RIII, "LaSalle County Unit 1 Pipe Whip Restraints," dated January 18, 1983.
 - ° S&L report EMD-039304, "Verification of Pipe Whip Restraint Hot Gaps," Revision 1, dated March 23, 1983.

- ° S&L letter to CECO, "Unit 1 Pipe Whip Restraints," dated April 6, 1983.
 - ° S&L letter to CECO, "Unit 1 Pipe Whip Restraints," dated April 12, 1983.
- k. (Closed) Unresolved Item (373/82-47-06): Due to design configuration, several WRs could not be radiographed or ultrasonically examined in accordance with the S&L specification requirements. From a total of 145 WRs, 33 (51 reported previously) did not satisfy the specification requirements. A review of the records identified that of a total of 919 full penetration welds, 804 welds passed either RT or UT, and the remaining 115 welds passed a visual examination. This matter is considered resolved.

3. Licensee Action on 50.55(e) Items

(Closed) 50.55(e) Item (373/82-03-EE): On February 9, 1982 the licensee reported to RIII that due to a deficiency in design, approximately 113 snubbers in LaSalle Unit 1 might not lockup due to close proximity to rigid restraints. Corrective actions were documented and a report was sent from CECO to RIII in a letter, "LaSalle County Station Units 1 and 2 Mechanical Snubbers in Close Proximity to Rigid Restraints 10 CFR 50.55(e) Final Report No. 82-03," dated March 10, 1982. RIII review of this item is documented in paragraphs 2.b, 2.c and 2.d above. This item is considered closed.

4. Snubber Visual Inspection and Functional Testing

The NRC inspector performed followup inspections on safety-related large bore (L/B) and small bore (S/B) snubber visual inspections and functional testing performed by the licensee in accordance with the plant Technical Specification (TS). L/B snubbers are Pacific Scientific Pacific Shock Absorber (PSA) sizes 1 to 100. S/B snubbers are PSA sizes 1/4 to 1/2.

a. Review of Procedures

The NRC inspector reviewed the following procedures and supporting documents, and had no adverse comments:

- ° LMP-HO-01, "Removal and Installation of Pacific Scientific Mechanical Snubbers," Revision 1, dated August 28, 1985.
- ° LTS-500-14, "Mechanical Snubber Functional Testing Contractor Assisted," Revision 1, dated October 16, 1985.
- ° SNED Manager letter to LSCS Plant Manager, "Acceptance Criteria for Snubber Functional Test AIR-373-251-85-00053," dated November 26, 1985.
- ° S&L EMD Report No. 055187, "LaSalle Snubber Testing Criteria," Revision 00, dated November 25, 1985.

b. Snubber Failures and Probable Cause

There are 850 L/B snubbers and 401 S/B snubbers included in the LaSalle Unit 1 TS. As of March 11, 1986, of the 260 L/B snubbers that have been functionally tested, 10 did not meet the test acceptance criteria and of 374 S/B snubbers that have been functionally tested, 51 did not meet the test acceptance criteria. The nature and the probable cause of the failures are as follows:

TABLE 1

<u>L/B Snubbers</u>			
<u>Snubber No.</u>	<u>System</u>	<u>Failure</u>	<u>Probable Cause*</u>
HP02-1507S (PSA-3)	HPCS	Weld slag caused internal binding	1
RI24-1120S (PSA-10)	RCIC	Defect in thrust bearing	2
RH53-1512S (PSA-10)	RHR -(C)	Bent screw shaft	2, 4
HP08-1024S (PSA-10)	HPCS	Scored inner tube caused by high vibration	2
RH13-1154S (PSA-35)	RHR -(B)	Sediment and weld splatter found in internals	3
LP02-1059S (PSA-3)	LPCS	Cracked thrust bearing	1, 2
RH03-1047S (PSA-3)	RHR -(A)	Slightly bent screw shaft; thrust bearing pulled apart	2
LP02-1054S (PSA-1)	LPCS	Thrust bearing cracked; bent screw shaft with ball impressions	2
RH40-1572S (PSA-3)	RHR -(A)	Internals destroyed	2
RH40-1042S (PSA-10)	RHR -(A)	Bent screw shaft; dislocated thrust bearing	2

TABLE 2

S/B Snubbers

<u>Snubber No.</u>	<u>System</u>	<u>Failure</u>	<u>Probable Cause*</u>
MSC6-1016S (PSA-1/4)	MSIV instrument	Tape residue on inner tube	1
NB15-1002S (PSA-1/2)	Vessel head vent	Twisted internal	1
MS14-1048S (PSA-1/4)	MS drain	Bent inner tube	1
HP20-1402S (PSA-1/4)	HPCS pump relief	Overloaded in compression	2
NB13-1002S (PSA-1/4)	Vessel head vent	Bent torque carrier	1
FW11-1003S (PSA-1/2)	Reactor water clean up to FW	Dirt and debris	1, 3
MS14-1050S (PSA-1/4)	MS drain	Tape residue on inner tube	1
LP20-1028S (PSA-1/2)	LPCS water relief	Overloaded in compression	2
LP20-1030S (PSA-1/2)	LPCS water relief	Overloaded in compression	2
RHB4-1008S (PSA-1/4)	RHR shutdown cooling valve bypass	Overloaded in compression	2
RHB4-1011S (PSA-1/4)	RHR shutdown cooling valve bypass	Overload in compression; lubricant dried up	2, 3
MSC6-1005S (PSA-1/4)	MSIV instrument	Bent inner tube; external damage	3
NB11-1003S (PSA-1/4)	Vessel instrument	Tape residue on inner tube	1
FRH-1207-H095 (PSA-1/4)	RHR instrument	Bent inner tube	1

M1302-24-103 (PSA-1/4)	Recirc. pump seal injection	Lubricant dried up	3
LC01-1005S (PSA-1/2)	MSIV leakage control	Internal spring dislocated	1
FRH-1213-H025 (PSA-1/4)	RHR instrument	Slight bow in screw shaft	1, 2
RR17-1004S (PSA-1/4)	Recirc. drain	Overloaded in compression	2
M-1302-23-140 (PSA-1/4)	MSIV instrument	Overloaded in compression	1, 2
M-1302-24-149 (PSA-1/4)	Recirc. pump seal injection	Lubricant dried up	3
M-1302-24-151 (PSA-1/4)	Recirc. pump seal injection	External damage caused internal rubbing	1, 2
RR17-1003S (PSA-1/4)	Recirc. drain	Dirt and debris	1
RR17-1007S (PSA-1/4)	Recirc. drain	Tape residue on inner tube; corrosion	1, 3
M-1302-24-148 (PSA-1/4)	Recirc. pump seal injection	Overloaded in compression; corrosion	3
FRH-1209-H03S (PSA-1/4)	RHR instrument	Tape residue on inner tube	1
LC09-1031S (PSA-1/4)	MSIV leakage control	Dirt	1, 3
M-1302-36-154 (PSA-1/4)	RCIC instrument	Corrosion	3
RR17-1005S (PSA-1/2)	Recirc. drain	Corrosion; weld slag on inner tube	1, 3
RHB4-1007S (PSA-1/4)	RHR shutdown cooling valve bypass	Overloaded in compression; 3 lubricant dried up	
RR17-1008S (PSA-1/4)	Recirc. drain	Dirt	1, 3
RH52-H09S (PSA-1/4)	RHR instrument	Overloaded in compression	2

LC01-1058S (PSA-1/4)	MSIV leakage control	Loosened capstan spring	4
MS10-1013S (PSA-1/4)	MSIV instrument	Corrosion	3
LC01-1051S (PSA-1/4)	MSIV leakage control	Twisted internals	1
RR69-H095 (PSA-1/4)	Recirc. drain	Corrosion	3
RI09-1008S (PSA-1/4)	RCIC steam drain	Twisted internals	1
RI09-1026S (PSA-1/4)	RCIC steam drain	Overloaded in compression; internal spring dislocation	1
RI09-1005S (PSA-1/4)	RCIC steam drain	Twisted internals	1
RH23-H075 (PSA-1/4)	RHR instrument	Dirt and debris	1, 3
MS50-H025 (PSA-1/4)	MSIV instrument	Slight bend in head screw shaft	2
RT33-H105 (PSA-1/4)	Reactor water cleanup	Dirt and corrosion	3
RH25-H04S (PSA-1/4)	RHR valve leakoff	Corrosion; wear due to vibration	2, 3
RH25-H03S (PSA-1/4)	RHR valve leakoff	Overloaded in compression; corrosion	2, 3
RH25-H06S (PSA-1/4)	RHR valve leakoff	Overload in compression	2
M-1302-28-84 (PSA-1/4)	RHR instrument	Twisted internal	1
M-1302-22-110 (PSA-1/4)	RHR instrument	Corrosion	3
M-1302-28-76 (PSA-1/4)	RHR instrument	Dirt	3
M-1302-22-102 (PSA-1/4)	HPCS instrument	Corrosion	3

M-1302-28-74 (PSA-1/4)	RHR instrument	Dirt and corrosion	3
M-1302-30-52 (PSA-1/4)	RHR instrument	Corrosion	3
M-1302-21-40 (PSA-1/4)	RHR instrument	Internals rub due to external damage	3

* Tables 1 and 2 - Probable Cause of Failure

1. Improper handling or installation during construction.
2. Damage that could result from: (a) system dynamic transient loads, (b) a high magnitude of line vibration, and (c) steady state line vibration.
3. Inadvertent damage such as water/chemicals spraying on the snubber; or placement of the snubber in an adverse environment such as exposure to high temperature.
4. Manufacturing defect or mishandling during manufacturing.

c. Meeting with CECO at the Region III Office

RIII management met with CECO representatives at RIII on March 17, 1986 to discuss the snubber functional testing failures and CECO alternatives and courses of action. Matters discussed included: (1) number of snubber test failures, (2) causes of test failures, (3) status of system operability evaluations, (4) future preventative actions, and (5) impact on Unit 2.

At the conclusion of the meeting, the RIII staff indicated that:

- (1) Consideration should be given to functional testing of all L/B and S/B safety-related snubbers in LaSalle Unit 1.
- (2) Priority should be given to functional testing of the RHR Loop A and Loop B snubbers.
- (3) A formal inspection should be performed for the RHR Loop A and Loop B piping systems.
- (4) Operability evaluations and analyses performed for the RHR systems should be completed on an expeditious basis.
- (5) Removal of the Unit 2 RHR system snubbers for functional testing is acceptable provided no more than two snubbers are removed at any one time.

- (6) Region III would conduct further reviews into the CECO statement that some snubbers could have been damaged during maintenance work in the vicinity of the snubber after the IEB 81-01 required inspections. This is an Unresolved Item (373/86010-01).

The CECO representative stated that RHR snubber testing and evaluations should be completed before the end of April 1986.

5. Unresolved Items

An unresolved item is a matter about which more information is required in order to ascertain whether it is an acceptable item, an open item, a deviation, or a violation. One unresolved item disclosed during this inspection is discussed in Paragraph 4.c.(6).

6. Exit Interview

The NRC inspector met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection. The inspector summarized the scope and findings of the inspection. The inspector also discussed the likely informational content of the inspection report with regard to documents reviewed by the inspector during the inspection. The licensee representatives did not identify any such documents as proprietary.