

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-461/85027(DRS)

Docket No. 50-461

License No. CPPR-137

Licensee: Illinois Power Company
500 South 27th Street
Decatur, Illinois 62525

Facility Name: Clinton Nuclear Power Station, Unit 1

Inspection At: Sargent & Lundy Engineers, Chicago, Illinois

Inspection Conducted: April 29-30, May 1-3, and June 5-7, 10-11, 1985

Inspector: *D. H. Danielson*
James W. Muffett

7/10/85
Date

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

7/10/85
Date

Inspection Summary

Inspection on April 29-30, May 1-3, and June 5-7, 10-11, 1985 (Report No. 50-461/85027(DRS))

Areas Inspected: Unannounced special safety inspection to review licensee action on previous inspection findings. The inspection involved a total of 122 inspection hours by one NRC inspector.

Results: No violations or deviations were identified.

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DETAILS

1. Persons Contacted

Illinois Power Company (IP)

*George Buffington
*Wilfred Connell

Sargent & Lundy Engineers (S&L)

*Bryan Erler, Structural Design Director
*R. W. Hooks, Assistant Head, Structural Engineering Division
*John Kovach, Project Engineer
*Thomas Best, Structural Engineer
*A. Morcos, Assistant Head, QA Division
*T. Longlais, Head, Structural Engineering Division
*Phil Kasik, QA Coordinator
*E. B. Branch, Mechanical Design Director
*H. S. Taylor, Head, QA Division
*G. T. Kitz, Head, Engineering Mechanics Division
*K. T. Kostal, Assistant Manager, Structural Department
*H. M. Sroka, Project Director, Clinton
*M. O. Callahan, Supervisor, Engineering Mechanics Division

Illinois Attorney General

*Steve Moore, Assistant Attorney General

Schiff, Hardin & Waite

*Sheldon A. Zabel, Attorney

The inspector also contacted and interviewed other licensee and contractor employees.

*Denotes those attending the final exit interview at Sargent & Lundy's office on June 11, 1985.

2. Licensee Action on Previous Inspection Findings

(Closed) Open Item (461/84-37-02) Illinois Power Company notified the NRC RIII office on March 29, 1985, of their intention to modify the Implementing Procedures of the Overinspection Program. One of the modifications of the program was the termination of the Overinspection of large bore piping, small bore piping and pipe supports. Before termination of this portion of the program, a detailed NRC review of the discrepancies and the engineering dispositions of the discrepancies was performed.

On April 29, 1985, a review of the discrepancy evaluations was initiated

at Sargent & Lundy Engineers. The discrepancies reviewed were as follows:

<u>NCR Discrepancy Number</u>	<u>Discrepancies</u>
50666	Hardware loose; cold setting
50767	ID missing
50935	Tolerance
50949	Clearance
51058	Clearance
51088	Clearance
63999	Undercut; thread engagement
64016	Gouge; slope
51460	Gaps
64214	Arc strike; overlap; undercut
64527	Weld size; gaps
65235	Cap missing
65265	Tolerance
66667	Clearance
66843	Clearance
66961	Undercut; tolerance; clearance
67657	Hardware loose
67792	Cold setting; orientation
61669	Clearance; wrong hardware; gaps
61775	Weld size
62179	Arc strike; slag; reinforcement
63636	Hardware loose; orientation; undercut; tolerance; clearance
51544	Tolerance
51619	Tolerance
51632	Tolerance
51642	Tolerance; overlap
51648	Tolerance; gouge
51758	Hardware loose
60392	Hardware loose; cold setting; arc strike; ID missing
50076	Inspection error
51088	Slope
51307	Cold setting
51348	Lack of fusion
50077	ID missing
51528	Overlap; weld size; lack of fusion; arc strike; orientation
64552	Gaps
63763	Wrong hardware; tolerance thread engagement
51105	Hardware loose; dent
64485	Overlap; porosity
66342	Weld size; grinding
67104	Tolerance; clearance; overlap; porosity; dirt; arc strike; gouge
67257	Weld size
67152	Undercut; overlap; porosity; gouge

NCR Discrepancy NumberDiscrepancies

67257	Weld
67152	Undercut; overlap; porosity; gouge
67405	Weld size
66342	Weld size; grinding
65184	Tolerance
50578	Weld size; overlap
50634	Wrong welds; slag
51460	Gaps
51075	Gaps
51075	Weld size; overlap; tolerance; arc strike
51043	Weld size; overlap; undercut; slag
62687	Arc strike
63840	Weld size
64016	Gouge; slope
64401	Dent
64956	Tolerance
65517	Weld size
65673	Arc strike; tolerance; gaps defective material
50578	Overlap; weld size; hardware loose; tolerance
66063	Weld size
51108	Tolerance; arc strike
50621	Lack of fusion; overlap
50837	Wrong hardware; grinding
50057	Overlap; weld size
51192	Arc strike
51509	Lack of fusion
51587	Tolerance
60163	Undercut; overlap
51307	Cold setting
50949	Clearance
61680	Weld size; arc strike; gaps
61023	Weld size
62407	Bolt broken; arc strike; clearance
62888	Undercut; overlap
62179	Reinforcement; arc strike; slag
66185	Hardware loose
61545	Wrong welds
61542	Hardware loose; grinding
64214	Arc strike; overlap; undercut
63810	Slag; weld size; overlap
63637	Weld size; undercut; arc strike; slag
62984	Undercut; overlap

During this initial review, it was determined that in a number of the engineering evaluations there were inaccuracies due to either inattention

to detail or lack of proper engineering review. Some examples of the inaccuracies are:

- a. The evaluation for NCR 63636 stated that "two locations on the pipe did not meet code allowables because an inappropriate seismic response spectra was used".
- b. The evaluations for NCR 51528 stated that "there is no weld #9 and therefore no evaluation of weld #9 was performed." In fact, weld #9 did exist.
- c. The evaluation for NCR 62719 contained a mathematical error which changed the value of a force by 44%.
- d. The evaluations for NCRs 50949, 51058, 51088, 63636 all dealt with the problem of "box type" supports which had improper gaps. These gaps would not allow the supports to provide dead weight support to the piping system. This appears to be a recurring discrepancy which requires a more generic analysis.
- e. The evaluation for NCR 50076 which dealt with a missing "high point vent" contained no engineering analysis. Also, the evaluation stated "will not effect operations, but may make startup and testing difficult." It was impossible for the inspector to make a determination of the safety significance of this discrepancy.

At the conclusion of the initial review, it was determined that prior to the conclusion of the NRC review, a number of actions needed to be performed by Illinois Power. These actions were:

- a. Perform an improved technical review of the evaluations of discrepancies which resulted in more than a 10% reduction in strength.
- b. Perform an improved technical review of the evaluations which were evaluated based solely on engineering judgement.
- c. Perform an analysis to address the problem of gaps in "box type" supports.
- d. Review the discrepancy data base to determine if any other cases of missing vents or drains were discovered.

On June 5, 1985, the NRC inspector began the second phase of the review of the discrepancy evaluations. Illinois Power and Sargent & Lundy had concluded the necessary actions noted above and in addition Impell Corporation had performed an extensive independent review of the discrepancy evaluations. The NRC inspector reviewed a number of procedures and documents which controlled various aspects of the discrepancy evaluations. These documents were:

- a. "Technical Verification Procedure for Mechanical Department Overinspection and Field Verification Program NCR Evaluations for the Clinton Project," Revision 1, dated May 29, 1985.
- b. Design Control Summary for Calculation SDQ10960G22 (Structural Discrepancies).
- c. SED-EP6, "Structural Engineering Division Technical Evaluation Procedure for Resolution Calculations Performed for NCRs Based on Clinton Overinspection and Field Verification Program," dated May 20, 1985.
- d. Baldwin Associates Project Procedures Manual, Clinton Power Station checklists:
 - Form JV-693, Phase II, Hydraulic Snubbers
 - Form JV-694, Phase II, Variable Spring Hangers
 - Form JV-695, Phase II, Restraint Hanger
 - Form JV-696, Phase II, Rod Hanger
 - Form JV-697, Phase II, Mechanical Snubbers
 - Form JV-698, Phase II, Sway Strut
 - Form JV-1091, Phase III, Hydraulic Snubbers
 - Form JV-1092, Phase III, Variable Spring Hanger
 - Form JV-1093, Phase III, Restraint Hanger
 - Form JV-1094, Phase III, Rod Hanger
 - Form JV-1095, Phase III, Mechanical Snubber
 - Form JV-1096, Phase III, Sway Strut
 - Form JV-1097, Phase III, Constant Support Hangers
 - Form JV-1098, Phase III, Riser Clamps
 - Form JV-1099, Phase III, "U-bolt" Support
 - Form JV-1100, Phase III, Sliding Support
 - Form JV-1101, Phase III, Multi-directional Clamps
- e. "Baldwin Associates Project Procedures Manual, Clinton Power Station," BAP 3.2.5, Piping Component Supports.
- f. Sargent & Lundy Report on Internal Audit No. 127 (QA audit of Overinspection discrepancy evaluations).
- g. Sargent & Lundy Report No. EMD-053140, "Out of Tolerance Gaps at Box-type Pipe Supports," dated June 5, 1985.
- h. Impell Corporation, "Clinton Power Station Overinspection Independent Review," dated June 7, 1985. (Impell's review of 1,357 discrepancy evaluations).

Eleven of the evaluations reviewed initially were again reviewed in the second phase of the review to monitor the effect of the review performed in the interim. These were:

NCR No.

50949	64214
51015	51460
63840	62179
64401	62407
51509	63810
62888	

In addition, a new random sample of NCR discrepancy evaluations were selected. These were:

<u>NCR Discrepancy Number</u>	<u>Discrepancies</u>
50638	Cold setting; tolerance
50834	Tolerance; hardware loose; wrong hardware
50972	Weld size; overlap
51075	Gaps
51306	Clearance; gaps
51353	Weld size; overlap
51428	Weld size
51572	Weld size
51809	Weld size; overlap; lack of fusion
60462	Wrong welds
60542	Arc strike
60644	Orientation
60821	Defective material
60927	Undercut; overlap; lack of fusion; grinding; defective material
50076	Drawing incorrect; inspection error
61025	Weld size
61078	Weld size; gaps
61511	Weld size; lack of fusion; slag; gaps; arc strike
61871	Gaps
62079	Arc strike; gouge
62266	Undercut; arc strike; dent
62445	Weld size; undercut; slag; gouge
62523	Undercut; overlap; clearance; gaps; arc strike; gouge
62659	Arc strike
62657	Undercut; overlap; slag; arc strike; gouge

All of the NCR evaluations inspected in the second phase of the inspection were adequate to properly disposition the discrepancies. The Impell review, in addition to the second review by Illinois Power and Sargent and Lundy, was sufficient to demonstrate that the discrepancies were properly evaluated and that no safety or design significant discrepancies were discovered. Also, no pattern of potentially safety significant discrepancies was discovered.

In addition, the NRC inspector was able to determine that in the discrepancies reviewed:

- a. Linear elastic fracture mechanics was properly used where required to determine if cracks or linear indications would propagate.
- b. No instances of improper reliance on future actions to disposition the NCRs were discovered.
- c. In cases reviewed in which the discrepancy was reworked before Sargent & Lundy acquired sufficient information for the analysis, appropriate conservative assumptions were made or NDE techniques were employed so that an adequate disposition could be made.

As a method to determine the overall significance of the welding discrepancies reviewed by the NRC inspector, the discrepancies (which are discrepancies against AWS D1.1) were reviewed for compliance with Visual Weld Acceptance Criteria (VWAC) developed by the Nuclear Construction Issues Group (NCIG). This review determined that virtually all the weld discrepancies which resulted in a strength reduction of less than 10% (categories A and B1) would not have been identified as weld discrepancies under the NCIG Visual Weld Acceptance Criteria. This new acceptance criteria was approved by the NRC on June 26, 1985, in a letter from J. Knight, Acting Director, Division of Engineering, NRR, to Mr. D. E. Dutton, Chairman, Nuclear Construction Issues O Group, Southern Company Services. The use of this new acceptance criteria must be requested in a change to the Safety Analysis Report (SAR) and approved by the NRC.

Conclusion

During this inspection no violations or deviations were identified. This inspection revealed no violation of FSAR commitments as they pertain to design and analysis. Also, the procedures dealing with the dispositioning of the discrepancies were functioning properly. This open item is therefore closed.

3. Exit Interview

The inspector met with representatives (denoted in Persons Contacted paragraph) at the conclusion of the inspection. The inspector summarized the scope and findings of the inspection noted in this report. The inspector also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. The licensee did not identify any such documents/processes as proprietary.