

ILLINOIS POWER COMPANY



1605-L
U-10099

CLINTON POWER STATION, P.O. BOX 678, CLINTON, ILLINOIS 61727

September 30, 1983

Docket No. 50-461

Mr. James G. Keppler
Regional Administrator
Region III
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Subject: Potential Deficiency 55-82-09
10CFR50.55(e)
Small Bore/Instrumentation Piping, and
Conduit Support Design Calculations

Dear Mr. Keppler:

On September 2, 1982, Illinois Power notified Mr. P. Pelke, NRC Region III (Ref: IP memorandum Y-13910, 1605-L, dated September 2, 1982) of a potentially reportable deficiency concerning discrepancies identified by Illinois Power in a sample of small bore/instrumentation piping support design calculations performed by Sargent & Lundy (CPS Architect-Engineer). This initial notification was followed by four interim reports (Ref: IP letter, D. P. Hall to J. G. Keppler, U-0555, 1605-L, dated October 1, 1982, IP letter, D. P. Hall to J. G. Keppler, U-10014, 1605-L, dated December 21, 1982, IP letter, D. P. Hall to J. G. Keppler, U-10040, 1605-L, dated March 28, 1983 and IP letter, D. P. Hall to J. G. Keppler, U-10071, 1605-L, dated July 6, 1983). Illinois Power's investigation of the above matter continues. This letter is submitted as an interim report, in accordance with 10CFR50.55(e)(3), to keep you informed of our progress.

Statement of Potentially Reportable Deficiency

A review by Illinois Power Nuclear Station Engineering Department (NSED) of calculations performed by Sargent & Lundy (S&L) for small bore/instrumentation piping supports and electrical conduit supports identified errors in the calculations. Resolution of the errors could result in changes to the supports, or require the installation of additional supports. An evaluation is being performed to determine the magnitude and significance of these errors, the potential for errors in other areas of design performed by similar methods, the impact on installed hardware, and reportability as a deficiency in final design under 10CFR50.55(e).

8310120441 830930
PDR ADOCK 05000461
S PDR

OCT 5 1983

IE27
11

Background/Investigation ResultsSmall Bore/Instrumentation Piping Supports

During August, 1982, IP NSED reviewed a sample of twelve (12) small bore piping support calculations performed by S&L. The calculations are performed to determine small bore pipe support loads, spans between supports, and flexibility for thermal growth. In the course of the review, NSED discovered errors in the calculations. As a result of these findings, S&L performed a review of an additional thirty (30) calculations. This review found similar errors, of which several were in the non-conservative direction. Accordingly, an examination of the issue was started.

A hold was placed by S&L on the release of small bore piping support design documents until corrective action was implemented. S&L performed a review of the 324 safety-related small bore/instrumentation pipe calculations performed to date and identified 159 calculations which contain non-conservative discrepancies to the requirements of the S&L small piping procedure. To evaluate error significance, these piping designs were further evaluated by S&L using computer analysis or detailed hand calculations, and the results showed that 134 calculations were in compliance with the ASME Code. However, these calculations are being revised to conform with the rules of the small piping procedure in order to ensure that standard design parameters are used throughout the plant, and will result in some hardware changes. The remaining twenty-five (25) calculations were found to be out of compliance with both the small piping procedure and the ASME Code. Calculation revisions are being made, and will result in hardware changes to bring the affected subsystems into compliance with the procedure and the ASME Code. An S&L analysis of these 25 calculations was performed, which showed that none of the discrepancies would adversely affect the safety of operation of CPS.

A special surveillance was performed by Illinois Power QA and NSED which verified that the corrective actions taken by S&L were adequate to prevent recurrence of the types of errors detected in the calculations. As a result, IP authorized S&L to lift the hold on release of design documents for small bore/instrumentation piping supports.

NSED is continuing its review of the technical adequacy of S&L's work in the area of small bore/instrumentation piping design as follows:

1. NSED completed a review of S&L's calculations that support and validate the S&L small bore piping procedure. This review identified several areas of the procedure that require improvement or clarification. In addition, a potential problem was identified with S&L's span and load tables for piping runs between the

containment and the auxiliary building. The extent and impact, if any, of these problems is still under evaluation.

2. NSED will perform a review of S&L's justification and supporting calculations with regard to impact on plant safety for those subsystems which did not meet ASME Code allowables. In addition, an analysis as to the safety significance of these subsystems will be performed by NSED.
3. NSED has performed a review of selected small bore/instrumentation piping calculations performed under the original program that S&L assessed as technically adequate. Results from this review identified minor problems with the legibility of the calculations. As a result, all 324 calculations will be revised.

Conduit Supports

As a result of calculation errors identified with small bore piping supports, NSED performed a review of a sample of S&L's conduit support calculations. This review included a review of one-hundred-twenty-five (125) electrical conduit support calculations, comprised of twenty-five (25) selected from each of five (5) seismic category I buildings. The results of this review are tabulated as follows:

I. Calculation conservative, support suitable.....	68
II. Calculation discrepancy, support considered suitable.....	41
III. Calculation discrepancy, support not considered suitable.....	3
IV. Calculation discrepancy, support suitability indeterminate....	13
Total calculations reviewed.....	125

An evaluation of the discrepancies identified in categories II, III, and IV was completed by S&L and showed that, although discrepancies exist, the supports are adequate as designed. However, a hold was imposed by S&L on December 13, 1982 on conduit support calculation activities until corrective action was taken and verified to be acceptable by S&L QA, Illinois Power QA, and NSED.

S&L QA has performed an audit of conduit support calculation activities and identified errors of the same type as those identified by IP NSED in thirty-six (36) of forty-three (43) calculations reviewed. The results of both the IP NSED surveillance and the S&L audit identified a total of sixteen (16) errors in the calculations that resulted in support loads exceeding the limits of the standard design tables. Further evaluation of these errors by S&L and NSED found that the supports were adequate as designed.

An additional concern was raised during the S&L assessment of the identified calculation errors. It was found that certain base assumptions used in conduit support design were not clearly shown on design drawings or in the electrical installation specification, K-2999. As this information was not provided to Baldwin Associates (CPS Contractor), an inspection of the related hardware attributes to verify conformance with the design assumptions was not made. An Engineering Change Notice (ECN 3360) was issued and incorporated into design documents information required to assure that conduit support installation agrees with conduit design calculations. A reinspection of installed conduit is being performed to assure that the as-built hardware is in agreement with the new design information.

IP QA and NSED surveillances have been performed to verify adequacy of corrective action taken by S&L. These surveillances showed that the corrective action taken by S&L was adequate to prevent recurrence of the types of errors detected in the calculations. As a result, Illinois Power QA authorized S&L to release the hold on conduit support calculations.

IP is continuing its review of the technical adequacy of past S&L work in the area of conduit support design. S&L prepared a plan for reviewing conduit support calculations performed prior to December 13, 1982. This plan was reviewed and approved by Illinois Power QA and NSED. S&L has implemented the plan and a report documenting the review has been prepared. NSED is evaluating the results of this review for adequacy.

Corrective Action (Interim)

Corrective action measures have been established and are being taken by Illinois Power and Sargent & Lundy, as follows:

Small Bore/Instrumentation Piping Supports

1. S&L procedures for small bore/instrumentation support design were expanded and clarified. These enhancements include: instituting a checklist to be used by the independent reviewer of calculations to assure an adequate review; locating analysts on site to review and concur with procedural interpretations; and locating copies of piping system stress reports at the site for first-hand reference. As a result of NSED's technical reviews, these procedures are being further revised, and will be reviewed for adequacy and impact on completed work.
2. Personnel responsible for preparing and reviewing small bore/instrumentation piping support calculations were given training in the requirements of the revised procedures. Further training will be given upon completion of procedural revisions identified in 1. above.

3. Calculations which contain non-conservative errors or legibility problems will be reconciled or revised. This action was authorized by Illinois Power to begin on December 20, 1982, and is estimated to be completed by October 30, 1983. Affected design documents and hardware will be revised and corrected as necessary.
4. NSED is tracking the resolution and status of problems resulting from the calculation discrepancies. This action will continue until all calculations requiring revision have been completed and drawings are revised. Hardware changes will also be tracked by Illinois Power.
5. Technical reviews by IP NSED are being performed on an on-going, sampling basis to monitor technical adequacy of small bore piping support calculations performed by S&L.

Conduit Supports

6. S&L has issued a Project Instruction, PI-CP-045, "Electrical Conduit And Conduit Support Design" that describes how conduit support design rules are to be applied.
7. S&L has issued Electrical Administrative Procedure 35 that formalizes the training program required for conduit and conduit support designers. This training was given to conduit and conduit support design personnel.
8. IP NSED has developed and implemented a plan to perform on-going technical reviews of 10%, or a minimum of one (1) per building, of conduit support calculations performed by S&L during each month, to monitor technical adequacy of the calculations. This plan will be adjusted as experience is gained with the quality of the new calculations.

Generic Actions

9. Sargent & Lundy has initiated a program of technical reviews and quality assurance audits in other areas of the Clinton design that used procedures similar to the conduit support and small bore pipe support procedures to assure adequacy of the calculations. These areas include:
 - a. HVAC supports
 - b. Cable tray supports
 - c. Large bore pipe support auxiliary steel

- d. Reinforcement of branch connections in piping and welded attachments to piping
- e. Pipe whip restraints
- f. Expansion anchors

This program is expected to be complete by October 15, 1983.

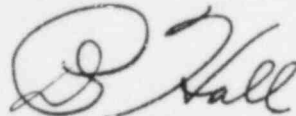
- 10. Illinois Power NSED and QA are expanding their technical review/audit activities of S&L's design. To date, reviews of cable tray support design and large bore piping design have been conducted with others scheduled for the future.

Safety Implications/Significance

A review of calculation discrepancies in the area of electrical conduit supports and small bore/instrumentation piping supports has been performed by S&L and has shown the errors do not impact plant safety. IP NSED is presently evaluating the results of the S&L analysis for technical adequacy. IP will also perform a review of the results of S&L's technical review/audit program for adequacy and significance, and the results will be analyzed for trends which will aid in evaluating the need for additional generic corrective action. An evaluation of this potential deficiency will be completed in approximately ninety (90) days.

We trust that this interim letter provides sufficient information to perform a general assessment of this deficiency and adequately describes our overall approach to resolve the problem.

Sincerely yours,



D. P. Hall
Vice President

REC/jf

cc: NRC Resident Office
Director, Office of I&E, USNRC, Washington, D.C. 20555
Illinois Department of Nuclear Safety
INPO Records Center