U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-237/90021(DRS); 50-249/90021(DRS)

Docket Nos: 50-237; 50-249 Licenses No. DPR-19; No. DPR-25

Licensee: Commonwealth Edison Company
Opus West III
1400 Opus Place
Downers Grove, IL 60515

Facility Name: Dresden Station - Units 2 and 3

Inspection At: Dresden Site - Morris, IL 60450
Commonwealth Edison Company Corporate Office -
Downers Grove, IL 60515

Inspection Conducted: August 21-22, 27-28, and September 17-21, 1990, at Dresden Site
October 11, 1990, at Commonwealth Edison Company Corporate Office

Inspector: for J. A. Gavula 10/18/90 Date

Approved By: D. H. Danielson, Chief 10/18/90 Date
Materials and Processes Section

Inspection Summary

Inspection on August 21-22, 27-28, September 17-21, and October 11, 1990 (Reports No. 50-237/90021(DRS); 50-249/90021(DRS))
Areas Inspected: Routine safety inspection of inservice inspection (ISI) component support inspection activities (70370).
Results: One violation was identified (inadequate corrective action - Paragraph 2.e.). During this inspection, the following strengths and weaknesses were noted:

- The critical aspects of the Section XI component support inspection program have improved significantly in recent years.
- The ISI staff member's technical competence, pride of ownership, and positive attitude have contributed to the observed program improvements.
- The current program is having to compensate for past weaknesses in both component support inspections and construction practices.

DETAILS

1. Persons Contacted

Commonwealth Edison Company (CECo)

*E. Eenigenburg, Dresden Station Manager
*L. Gerner, Technical Superintendent
*M. Strait, Technical Staff Supervisor
*G. Whitman, ISI Coordinator
M. Horbaczweski, ISI/IST Group Leader
*G. Frizzell, NED Site Engineer
*B. Viehl, Engineering Design Supervisor
*H. Do, PSD ISI/Materials Group
+Richter, Nuclear Licensing Administrator
P. Donavin, Design Supervisor

NUTECH Engineers

J. Young, ISI Inspector

ABB Impell Corporation (Impell)

B. Ramsey, Division Manager
+J. Ramuta, Section Manager
+J. Burghoffer, Supervising Engineer

U. S. Nuclear Regulatory Commission (U. S. NRC)

*D. Hills, Resident Inspector (Dresden)

*Denotes those attending the interim exit interview at the Dresden site on September 21, 1990.

+Denotes those attending the exit interview at CECo corporate offices on October 11, 1990.

2. ASME Section XI Component Support Inspections (70370)

a. Background

The Dresden inservice inspection (ISI) program is currently based on the 1977 Edition with the Summer 1979 Addenda of Section XI of the ASME Code. Since acceptance standards for component supports were not given in this edition or addenda, the acceptance standards from the 1980 Edition of the Code have been utilized in the program.

b. Procedure and Program Review

The following procedures were reviewed for compliance with NRC requirements and licensee commitments:

- DTP 2, "Inservice Inspection Plan," Revision 8, January 1990.
- CEDI No. 12-90-1, "Examination of Constant and Variable Spring Type Component Supports," Revision 1, January 1990.
- SPPM VT-3/4-1, "VT-3/4 Visual Inspection Performed for Section XI," Revision 1, November 1989.

No violations or deviations were identified.

The components included in the ISI Program are currently listed in the Inservice Inspection history binders. For each 10-year interval, a record of all inspections for each examination category and each class of system is kept. This record consists of marking a specific component when it receives an inspection. Efforts are currently underway to incorporate this information into a computer database for greater efficiency.

The information listed in the binders was generated using the Dresden Inservice Inspection Isometrics. These drawings show relative locations of items included in the ISI program. As a result of previously discovered inadequacies by the licensee and the NRC, these drawings were revised in 1987 to update the information contained in these drawings. In particular, pipe support information changes which resulted from IE Bulletin 79-14 and Mark I Reanalysis Programs were incorporated into the drawings. Prior to that revision, the ISI Program had not been systematically updated to account for modifications made to the facility.

A comparison between the isometric drawings and the component support information listed in the binders revealed that pipe supports designated as "guides" on the drawings were not included on the lists in the binders. Conversations with the licensee indicated that this was an interpretation carried over from the ISI program's initial implementation. According to the licensee, this interpretation was based on a concept that "guides" were pipe restraints which would only see loads during a seismic event and as such, would not see any normal operating loads. On that basis, there was no need to look for service induced problems with these supports unless a seismic event occurred. When questioned by the NRC inspector, the licensee could not provide the basis for this interpretation.

As an additional complication, the revision to the isometrics evidently did not use the above interpretation as a basis for designating supports as either "guides" or "hangers". Instead, this designation was based on how the support was constructed. If it contained any vendor supplied catalog item, it was designated as a

hanger; otherwise, if it was constructed using only structural members, it was designated as a guide. The licensee recently discovered this discrepancy and instead of attempting to evaluate each support to determine if it saw any normal operating loads, it was decided to include all of these "guides" in the ISI program. Although the correct decision was reached, the basis of this decision was questionable. Any pipe restraint may see an operational load if abnormal events such as waterhammer or severe vibration occur. Therefore, all pipe supports should be included in the program to look for these service induced problems.

The consequences of this deficiency were minimized for the following reasons. The percentage of component supports required to be inspected during each 10-year interval is approximately 25. By neglecting these supports, the licensee still has inspected over 50% of the total population of component supports which is well above the requirement. In addition, the only potential problem with not including these supports pertains to the expansion of the inspections due to an identified deficiency. In that case, the Code requires that adjacent supports also receive an inspection. If the adjacent supports happen to be guides, the program will skip these and go to the next supports identified as hangers. However, based on the latest ISI inspections, this shortcoming was eliminated when the ISI coordinator routinely expanded the inspection on very conservative bases and in many cases, included guides in these expansion populations. Based on the above, in the NRC inspector's opinion, the noted program weaknesses did not cause a significant safety impact.

A detailed review of the ISI isometrics by the NRC inspector disclosed that the flued head anchor structures associated with the drywell piping penetrations had not been incorporated on the drawings and as such, were not listed in the ISI history binders.

The consequences of this oversight were minimized since all of the flued head anchor structures were recently modified and had received a baseline ISI inspection as a now normal part of the CECo modification process. During the inspection, the licensee committed to upgrading the drawings in question by incorporating the flued head anchor structure designations in the upcoming ISI drawing review.

In addition, on Drawing No. ISI 212, Sheet 2 of 2, "CRD Scram Discharge Volume West Bank," Revision B, October 23, 1987, the designation for support M-1188D-1123 did not include an integral welded attachment (IWA) symbol. As such, the IWA for this support was not included in the Category C-C item in the ISI binder. According to the licensee, this error will also be corrected in the upcoming ISI drawing revision.

c. Pipe Support Surveillances

The NRC inspector accompanied an ISI contractor during inspections of the following component supports:

- M-3208-14 Rod Hanger, LPCI Discharge
- M-3208-08 Strut, Core Spray Test Line
- M-3209-02 Vertical Strut, Core Spray Discharge
- M-3209-04 Spring Hanger, Core Spray Discharge
- M-3209-23, U-Bolt Restraint, Core Spray Discharge
- M-3214-38 Rod Hanger, LPCI discharge
- M-11510-10 2-Way Guide, HPCI Discharge

The ISI inspector used individual support drawings during each inspection. The inspections were thorough and consisted of detailed hands-on reviews. The ISI inspector was familiar with the applicable procedures and used conservative acceptance standards. Recordable indications, if any, were appropriately documented.

d. Records Review

Visual inspection data forms for the Dresden 1989 Unit 3 component support examinations were reviewed by the NRC inspector. The level of detail documented on the forms gave a positive indication as to the extensive nature of the examinations. An initial sample of 130 supports was expanded by an additional 93 supports due to the possibility of service induced discrepancies. A total of 54 supports were identified as having recordable indications and required some form of corrective action. A significant portion of the discrepancies were not attributable to service induced problems and as such, were technically beyond the scope of the ISI inspections. However, since the comprehensive nature of the ISI inspections have identified these other issues, they have been resolved. The consequence of this, unfortunately, is that the ISI system has to deal with these other discrepancies which potentially detract from focusing on service induced problems.

The fundamental problem in the system is that there are no baseline ISI inspections on most of the supports. With nothing to compare to, it is difficult to determine if discrepancies are service induced problems or left over construction issues. Given no basis to the contrary, the ISI coordinator has had to assume discrepancies are service induced and has had to expand the ISI sample size. In this sense, the current program is paying the price for the weak ISI program of the past.

The recordable indications for the 54 supports can be categorized as follows:

4 minor miscellaneous discrepancies;
11 spring can settings out of tolerance;
12 as-built discrepancies (mainly spring can size differences);
11 loose or missing locking devices;
11 loose or misaligned clamps or misadjusted supports; and
5 inoperable supports due to missing bolts or deformed rod hangers.

All of the recordable indications classified as as-built discrepancies were reviewed and found to be insignificant. Deviation reports were initiated and the design documents were upgraded to reflect the as-built configuration. Work requests were initiated for all other discrepancies and the prescribed corrective actions were completed prior to declaring the systems operable for startup. Except for the minor discrepancies and loose locking devices, all of the discrepancies were reviewed by engineering for operability considerations. In most cases, even though the supports were structurally intact, analyses were performed assuming the supports were not there. In every case, the associated piping system was determined to be "operable" with the existing deficiency.

During the NRC inspector's review of the engineering evaluations, it was noted that most of the supports assumed to be inoperable could have performed their design function, and therefore could technically be considered operable. Based on this, the extent of the operability evaluations was conservative. However, two concerns were raised during the inspection regarding the content of these evaluations and the context in which these evaluations were performed.

For most of the supports with discrepancies, the engineering firm associated with the design calculations was contacted to evaluate the discrepancy. Although most of these discrepancies did not cause the support to be inoperable, there were at least two instances where supports were rendered inoperable. Supports M-3409-33 and M-1200D-105 had bolts and nuts completely missing from a pipe clamp and a U-bolt respectively.

The first concern identified was in regard to the context in which the evaluations were performed. The discrepancies were corrected through the Work Request system, but the evaluations were not performed under the Discrepancy Record system. According to Procedure SPPM VT-3/4-1, Paragraph 5.2.1, supports with a nonconforming condition require an evaluation of the discrepancy in accordance with Q.P. 15-53. Commonwealth Edison Company Quality Assurance Manual, Procedure Q.P. 15-53, "Nonconforming Materials, Parts and Components for Operations - Inspection and Test" specifies that a Discrepancy Report be initiated for equipment that does not conform with inspection requirements. This concern was previously identified during a licensee's QA audit in September 1988. Refer to Paragraph 2.e. of this inspection report for further disposition of this item.

The second concern pertained to the content of the operability evaluations. As directed by corporate engineering, the operability evaluations performed by the consulting engineering firms did not consider all design basis load cases. Instead, the only loads evaluated were those which had actually occurred. Using this approach, gravity, pressure and thermal loads were considered whereas seismic, LOCA or other design basis loads were not considered. This limited approach verified that the piping system was not damaged as a result of the as-found discrepancy but it did not determine if the system was operable when the discrepancy existed. This concern was also previously identified during the September 1988 QA audit. Refer to Paragraph 2.e. of this inspection report for further disposition of this item.

This approach is apparently a corporate policy and therefore will apply to all six CECo sites. The apparent source of this policy is corporate engineering's questionable interpretation of NUREG-1022, "Licensee Event Report System - Description of System and Guidelines for Reporting". Page C-10 of this document discusses inoperable snubbers and contains the statement, " . . . snubbers are designed for low probability seismic events which did not occur." Using this as a basis, corporate engineering concluded that the operability evaluations did not need to consider design loads which have not occurred when determining reportability. This policy, which is inconsistent with all previously encountered interpretations, has yet to be formally issued and is currently only in draft form.

e. Licensee Self-Assessments

The licensee initiated several activities to assess the adequacy and effectiveness of the Dresden ISI program. From Quality Assurance, QA Audit, Report Number 12-88-33 was conducted onsite in September 1988. The NRC inspector noted that several of the audit team members had significant ISI experience and as such, provided solid technical direction to the audit team. The finding and two open items documented during the audit demonstrated a good working knowledge of ASME Section XI requirements on the part of the audit team.

The audit finding given in the report had two parts. Item A stated: "Component supports requiring corrective actions were not documented on Deficiency Reports when engineering evaluation was required." Item B stated: "Specific criteria for evaluation of component supports requiring corrective action is not documented." These items are identical to the NRC inspector's two concerns previously discussed in Paragraph 2.d. of this inspection report.

The licensee responded to the QA audit finding on September 23, 1988. In the response, the corrective action to prevent recurrence was a revision to Procedure DTP-2, "Inservice Inspection Plan". The revision added a step to the procedure which delineates when an engineering evaluation was required and when a Discrepancy Record had to be initiated. To the extent that it was applicable, this action corrected a portion of the problem, but it still fell short of a complete solution.

The procedure revision addressed a specific situation when the as-built configuration would not or could not be returned to the as designed configuration. On this basis, there is a "change" to the design that had to be documented. The added step in the procedure assured that this would occur with an appropriate engineering evaluation to confirm its acceptability. However, the revised procedure did not assure that Discrepancy Records were initiated for inoperable supports and as such, did not provide for trending of the discrepancies, root cause determinations, notification of appropriate levels of management or corrective actions to prevent recurrence.

This is considered to be inadequate corrective action with regard to the QA Audit Finding Part A and is an example of a violation of 10 CFR 50, Appendix B, Criterion XVII, "Corrective Action" (237/90021-01A; 249/90021-01A).

In a similar manner, the revised procedure did not provide any documented direction for performing engineering evaluations except when the as-built configuration could not or would not be returned to the designed configuration. For inoperable supports, a determination must be made as to the operability of the system in the as-found configuration. Not only was there no guidance given as to when these evaluations were to be performed, but the methodology and criteria to be used in these evaluations was not documented. Since this aspect was not adequately corrected after being cited in the QA Audit Finding, Part B, this is considered another example of a violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action" (237/90021-01B; 249/90021-01B).

Beyond the normal self-assessment activity of a QA audit, the licensee had been aggressively pursuing more detailed reviews to determine the adequacy of the Dresden ISI program. Initially, a corporate overview of ISI activities was performed at all six CECo stations. The intent of this overview was to get a previously unavailable perspective on how each site conducts ISI activities. Eventually, a more uniform and consistent approach to ISI is expected from this effort.

As a result of this overview, a detailed and comprehensive review of the Dresden ISI program was initiated by the site. Using an outside engineering firm, a line by line, component by component review of the ISI classification and safety-related boundaries was performed on a P&ID basis. Two reports were issued with recommended changes and upgrades to the scope of the ISI program. The review efforts were basically a reconstitution of the bases for the ISI program at Dresden. The recommendations made by the reports are currently being reviewed by the licensee and any recommendations not followed, will be appropriately justified. The NRC inspector considered this review to be a very positive and proactive self-assessment effort.

3. Licensee Event Report (LER) Review

(Open) LER (237/89029-01): Elevated HPCI Discharge Piping Temperature Due to Reactor Feedwater Back Leakage.

This LER documents the October 1989 event in which leakage past the HPCI pump discharge valve and check valve occurred. An NRC Augmented Inspection Team (AIT) investigated the event and issued NRC Inspection Reports No. 50-237/89023 and No. 50-249/89022 with their results.

Section E of the LER discusses the licensee's immediate and long term corrective actions. Each corrective action was assigned a tracking number by CECo's Regulatory Assurance Department. The NRC inspector reviewed the AIT's report and confirmed that all of the licensee's commitments had been entered into the tracking system.

Of the 27 action items identified by the licensee, items 1-7, 9-10 and 14 were completed and closed out as of this inspection. The remaining 17 items are mainly outage related repairs or modifications to HPCI valves. These items are scheduled for completion during the 1990 Unit 2 outage and 1991 Unit 3 outage. Action Item 8 for verification of HPCI piping integrity using ultrasonic examination was completed for Unit 3 in February 1990. No recordable indications were identified. Comparable examinations for Unit 2 are scheduled for the current outage.

One programmatic action which has not been closed out is the routine monitoring of low pressure low temperature to high pressure high temperature interface boundaries. The licensee has completed an initial review of the LPCI and core spray systems using thermographic techniques. There were no indications of any valve back leakage at that time. The action item is still considered open because a long term program has not yet been developed. The licensee is incorporating these pressure isolation valve interface reviews into a much broader thermographic inspection program. This broader program is currently being developed but no firm date was given for completion.

Pending completion and review of the outstanding action items, this LER is considered open.

4. Review of Piping Analyses

During a followup inspection to address concerns about the HPCI event evaluation, the following analyses were reviewed by the NRC inspector:

- Impell Calculation, D2 HPCI Operability Evaluation, Revision 0, February 23, 1990.
- Impell Calculation, D2-HPCI-02C, Revision 10, February 23, 1990.

The first analysis evaluated the operation of the HPCI system at elevated temperatures due to the valve backleakage with the as-found condition of the degraded pipe supports. This was an historical evaluation since all of the degraded pipe supports had been repaired. A temperature of 350°F was assumed for the portion of the pipe within the steam tunnel and a temperature of 275°F was assumed for the rest of the discharge piping. The first iteration of the analysis concluded that a two-way restraint would exceed its operability capacity. A subsequent analysis demonstrated that without that support, the system still met the established operability criteria.

The second analysis established the basis for interim operation of the HPCI system with the revised valve lineup. Changes to the design basis analysis were not required since design pressures were used over the length of the HPCI discharge line. The thermal load case was not modified because the elimination of the system backflow prevented heating of the line. The analysis used an operating temperature of 165°F for piping outside the steam tunnel area.

No violations or deviations were noted during the reviews of these analyses.

5. Exit Interview

The Region III inspector met with the licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on October 11, 1990. The inspector summarized the purpose and findings of the inspection. The licensee representatives acknowledged this information. The inspector also discussed the likely information content of the inspection report with regard to documents or processes reviewed during the inspection. The licensee representatives did not identify any such documents/processes as proprietary.