

SSER

Task: Allegation A-242

Reference Number: 4-84-A-06-128

Characterization: The allegation is that hydrostatic tests were performed without the use of highpoint vents. This allegation raised additional concerns about the adequacy of instrument tubing installations relative to sloping requirements.

Assessment of Allegation: The NRC staff's review of LP&L's Final Safety Analysis Report (FSAR) and applicable procedures revealed that all hydrostatic tests were to conform to the requirements of ASME III, Classes 2 and 3, Article NC-6000, "Testing," which requires that "vents shall be provided at all highpoints of the component or system in the position in which the test is to be conducted, to purge air pockets while the component or system is filling." This requirement is restated in EBASCO Procedure ASP-IV-63 Section 7.4.4. The use of highpoint vents during hydrostatic testing was indeed a requirement, based upon an FSAR commitment to the applicable testing section of the ASME Code.

The NRC staff examination of 27 hydrostatic document test packages, including the applicable valve lineup sheets and isometrics, revealed that for each of the corresponding hydrostatic tests, highpoint vents had not been used. The staff also reviewed Field Change Request FCR-1CP-19, Rev. 2. This document, issued August 6, 1980, did not mention the use of highpoint vents. An examination of the hydrostatic test index reveals that all Waterford Unit 3 hydrostatic tests had been performed on dates subsequent to the issuance of the field change request (FCR), and would therefore have been performed in accordance with its requirements.

During the NRC examination of the hydrostatic test packages, it was observed that each of the 27 packages contained a "Test Instructions" sheet, which instructs workers to "Fill lines with root valve open until you can hear water running into the process pipe, then close the root valve." This instruction was found only on the test instructions sheet, and not as part of the approved procedures for performance of hydrostatic test. Discussions with LP&L revealed that this instruction was their preferred method of venting the system to be tested, and that this was an appropriate means of assuring that the system under test is full.

Although LP&L failed to implement the requirement for use of highpoint vents during hydrostatic tests, NRC considers the alternate method of venting systems through the root valve to the process line sufficient to preclude an invalidation of hydrostatic tests. Since a primary function of any hydrostatic test is to assure the integrity of the system tested, the verification of test parameters,

such as pressure and time, and the required physical inspection of components comprising the system, are essential keys to providing assurance of successful completion. The staff examination of the test data reports indicated that quality verification of these parameters had been accomplished. However, the staff was concerned about the effects an improperly vented system may have on the instruments performing an operational function. In particular, the affects of air entrapment upon instrument time response characteristics. This matter was discussed with LP&L personnel, who indicated that LP&L Maintenance Procedure MI-4-315, "Blowdown and Backfilling Instrument Impulse Lines," had been developed to alleviate any problems in this area, and that if, during operation, installations are identified which are susceptible to air entrapment, they will be reworked to correct the problem. A review of Sections 8.1 through 8.3 of this procedure revealed that appropriate controls had been established to minimize air entrapment.

A related issue of this allegation concerns the adequacy of instrument tubing installations in view of the elimination of slope requirements by engineering analysis. A staff review of EBASCO letter LW3-1191-82 revealed that in general it was LP&L's position that slope deviations have no effect on instrument function.

This documented position could be interpreted to be a generic acceptance of slope deviations. However, the NRC staff review of the applicable specification and procedures revealed that slope requirements of one-fourth inch per foot were consistently specified, and the review of an EBASCO memorandum of September 28, 1982, indicated that ESSE will continue to review each nonconformance report that identified a questionable slope in tubing installations. To confirm this, the staff examined 54 Mercury nonconformance reports. Each NCR examined that cited slope deviations was initiated between August 30, 1982, and May 31, 1983. The staff observed that disposition of slope deviations had been performed on a case-by-case basis. Dispositions included rework, use-as-is, or a combination of these categories. Many slope deviations were those which involve inadequate slope; that is, a slope which was less than the specific one-fourth-inch per foot, or no slope, indicating a level line.

In some instances, however, slope deviations exhibited negative or reverse configurations. NRC reviewed the dispositions for these conditions. Several installations were required to be reworked; however, a significant number were dispositioned use-as-is. The technical justification for this disposition was based on case-specific analysis. Consideration of variables, such as operating pressure, line configuration and instrument function, were evaluated by the engineer in determining the acceptability of each installation. In summary, NRC observed that deviations in instrument tubing slope requirements had been consistently documented and evaluated by the applicant.

The NRC staff found that the applicant had failed to comply with FSAR and procedural commitments for the use of highpoint vents during the performance of hydro-static test. However, based upon other factors, the technical significance of this issue was considered minimal in its effect upon hydrostatic testing. These findings were discussed with the allegor.

In addition, NRC finds no evidence that would indicate that slope requirements had been generically eliminated from design, construction, or inspection processes.

This allegation had neither safety significance nor generic implications.

Potential Violations: Contrary to 10 CFR 50, Appendix B, Criterion XI, EBASCO Procedure ASP-IV-63, and ASME III Class 2 and 3 Article NC-6211, hydrostatic tests were not performed in accordance with written test procedures which incorporate the requirements and acceptable limits contained in applicable design documents.

Actions Required: None.

References:

1. Waterford Unit 3 - Final Safety Analysis Report
2. EBASCO Procedure - ASP-IV-63, "H" Draft, July 24, 1982, "Guidelines for Hydrostatic and Pneumatic Integrity Test"
3. Mercury Quality Control Procedure - MCP-2170, Rev. 7, February 20, 1983, "Hydrostatic or Pneumatic Testing Procedure"
4. ASME III 1974 Edition, Summer 1976 Addenda, Article NC-6000 Testing
5. EBASCO Field Change Request - No. FCR-1CP-19, March 21, 1980; FCR-1CP-19, Rev. 1, April 28, 1980; FCR-1CP-19, Rev. 2, August 6, 1980
6. (27) Hydrostatic Document Test Packages
7. LP&L Maintenance Procedure - MI-4-315, Rev. 0, "Blowdown and Backfilling Instrument Impulse Lines," April 25, 1983
8. Hydrostatic Test Index, Final Issue, August 31, 1983
9. (54) Mercury Nonconformance Reports, detailing Tubing Slope Violations
10. EBASCO Letter No. LW3-1191-82, from R. K. Stampley to George B. Rogers dated September 17, 1982
11. EBASCO Interoffice Correspondence, File #ES-6369-82 from J. Debruin to J. Gutierrez dated September 28, 1982
12. LP&L Letter W3P84-0468 from R. W. Naylor to File #Q3-A17.02.04 dated February 24, 1984

Attachment 1 - Hydrostatic Test Package Sample  
 Attachment 2 - Conversation Record  
 Attachment 3 - ASME III Article NC-6000

- Attachment 4 - EBASCO Procedure ASP-IV-63
- Attachment 5 - Mercury QCP - MCP-2170
- Attachment 6 - Field Change Request #FCR-1CP-19, Rev. 2
- Attachment 7 - Test Instructions Sheet
- Attachment 8 - LP&L Maintenance Procedure MI-4-315
- Attachment 9 - Nonconformance Report Samples
- Attachment 10 - EBASCO Letter LW3-1191-82
- Attachment 11 - Interoffice Correspondence ES-6369-82

Prepared By:

\_\_\_\_\_  
Dan Ford

\_\_\_\_\_  
Date

\_\_\_\_\_  
Dale Thatcher

\_\_\_\_\_  
Date

Reviewed By:

\_\_\_\_\_  
Team Leader

\_\_\_\_\_  
Date

Reviewed By:

\_\_\_\_\_  
Site Team Leader(s)

\_\_\_\_\_  
Date

Approved By:

\_\_\_\_\_  
Task Management

\_\_\_\_\_  
Date

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Requestor's ID:  
JOHNNIE

Author's Name:

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