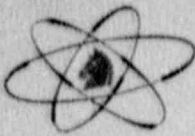


FGE



Portland General Electric Company
Trojan Nuclear Plant
71760 Columbia River Hwy
Rainier, Oregon 97048
(503) 556-3713

October 23, 1989
CPY-269-89

US Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Gentlemen:

Licensee Event Report No. 89-23, is attached. This reports an event in which Containment integrity was violated during local leak rate tests.

Sincerely,

C. E. Yundt
General Manager
Trojan Nuclear Plant

c: Mr. John B. Martin
Regional Administrator
US Nuclear Regulatory Commission

Mr. David Stewart-Smith
State of Oregon
Department of Energy

Mr. R. C. Barr
USNRC Resident Inspector
Trojan Nuclear Plant

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1): **Trojan Nuclear Plant** DOCKET NUMBER (2): **0 5 0 0 0 3 4 4 1 OF 0 7**

TITLE (4): **Containment integrity violated during local leak rate testing.**

| EVENT DATE (5) | | | LER NUMBER (6) | | | REPORT DATE (7) | | | OTHER FACILITIES INVOLVED (8) | | |
|----------------|-----|------|----------------|-------------------|-----------------|-----------------|-----|------|----------------------------------|--|--|
| MONTH | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | MONTH | DAY | YEAR | FACILITY NAME/ DOCKET NUMBER (3) | | |
| 0 9 | 1 8 | 8 9 | 8 9 | 0 2 3 | 0 0 | 1 0 | 2 3 | 8 9 | N/A 0 5 0 0 0 0 | | |
| 0 5 0 0 0 0 | | | | | | | | | | | |

OPERATING MODE (10): **5** THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)

| | | | |
|-------------------|--------------------|---------------------|--|
| 20.602(b) | 20.608(a) | 60.736(a)(1)(iv) | 73.71(b) |
| 20.608(a)(1)(ii) | 60.736(a)(1) | 60.736(a)(2)(iv) | 73.71(c) |
| 20.608(a)(1)(iii) | 60.736(a)(2) | 60.736(a)(2)(iv) | OTHER (Specify in Abstract below and in Text, NRC Form 305A) |
| 20.608(a)(1)(iv) | 60.736(a)(2)(i) | 60.736(a)(2)(iv)(A) | |
| 20.608(a)(1)(v) | X 60.736(a)(2)(ii) | 60.736(a)(2)(iv)(B) | |
| 20.608(a)(1)(vi) | 60.736(a)(2)(iii) | 60.736(a)(2)(iv)(C) | |

LICENSEE CONTACT FOR THIS LER (12): **Tyrone R. Blackburn, PRB Engineer** TELEPHONE NUMBER: **51 0 3 5 1 5 1 6 1 - 1 3 1 7 1 1 3**

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NRC | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NRC |
|-------|--------|-----------|--------------|-------------------|-------|--------|-----------|--------------|-------------------|
| N/A | | | | | | | | | |

SUPPLEMENTAL REPORT EXPECTED (14): YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15): **1 2 2 8 9**

ABSTRACT (Limit to 1400 words, i.e., approximately fifteen single-space typewritten lines) (16)

During an event evaluation it was determined that during the performance of Periodic Engineering Test (PET) 5-2 "Containment Local Leak Rate Testing (LLRT)" on the Electrical Penetration Assemblies (EPA), Trojan Technical Specification (TTS) 3.6.1.1 "Containment Integrity" was violated when in Modes 1-4. Each EPA has two self energized seals. The inboard seal provides a seal for leak testing purposes, but is not considered a Containment pressure boundary seal. The outboard seal performs the Containment pressure boundary function. With the test cart hooked up to the penetration a flow path exists from Containment past the inboard seal to the outside atmosphere.

The root cause of this event has not been firmly established, and an evaluation continues. It appears to be a combination of procedural inadequacies in PET 5-2, a lack of understanding of electrical penetration design, and several missed opportunities to identify the problem. The immediate corrective action was to stop LLRTs of EPAs during Modes 1-4. The permanent corrective actions will include revising PET 5-2, evaluating alternate testing methods. Additional details and corrective actions will follow within the next 60 days as a revision to this Licensee Event Report.

This event had no effect on the health and safety of the public.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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| | | | | | 023 | 01002 |

TEXT IF more space is required, use additional NRC Form 200A (11/77)

DESCRIPTION OF OCCURRENCE

On September 21, 1989, the plant was in Mode 5 (cold shutdown) with the Reactor Coolant System temperature at 125 degrees F and the pressurizer solid. During performance of an event evaluation it was determined, that at times during the performance of Periodic Engineering Test (PET) 5-2 "Containment Local Leak Rate Testing (LLRT)" on the Electrical Penetration Assemblies (EPA), Trojan Technical Specification (TTS) 3.6.1.1 "Containment Integrity" was violated. This testing was conducted in various Modes including Modes 1-4 when Containment integrity is required.

Local Leak Rate Testing (LLRT) per PET 5-2 of EPAs is normally conducted during Modes 5 and 6. Recently the seals on the feedthrough modules for the penetrations have experienced a tendency to develop leaks (degradation of the seal is suspected to be age and low outdoor ambient temperature related). In response to the degradation, portable detectors are used to first determine if leakage is occurring past the outboard seal on any individual module. (Note: each module has two self energized seals. The inboard seal provides a seal for leak testing purposes, but is not a Containment pressure boundary seal. The outboard seal performs the Containment pressure boundary function. See Figure 1 attached.) If outboard leakage is detected, a LLRT is conducted to quantify the leak rate. This test has been conducted regardless of operational Mode.

The first step in doing a LLRT on an EPA is to purge the penetration by removing the purge plug (see Figures 1 and 2 attached). This step was added on May 15, 1987, in response to INPO Nuclear Network Operating Plant Report EO 1910 "Electrical Penetrations Assemblies" of December 12, 1986. Nitrogen is purged through the port to verify the flow path is not obstructed from the check valve (see figure 2 attached) to the purge port. This ensures all the modules and the check valve will be pressurized during the test. The LLRT test cart is then connected to the purge port and the LLRT is conducted.

TTS 3.6.1.1. addresses the Limiting Condition for Operation pertaining to Containment integrity. The Action Statement for this TTS is one hour. TTS 1.8 "Definitions" specifies if the leakrate stipulated in TTS 3.6.1.2.b is exceeded or if penetrations required to be closed during accident conditions are not isolated by manual valves then Containment integrity does not exist.

When a LLRT is conducted on an EPA in accordance with PET 5-2, in Modes 1-4, the Action Statement of TTS 3.6.1.1 is entered because:

1. The removal of the purge plug for purging provides a direct path from inside Containment to the atmosphere, because the inboard seal of an EPA does not provide a Containment pressure boundary seal. Therefore when in Modes 1-4 with the purge port plug removed, Containment integrity is no maintained and the Action Statement of TTS 3.6.1.1 is entered.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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- The test cart is attached to the purge port after purging. The test cart is not seismically qualified and cannot be considered an extension of the boundary during the test.

In addition, calculations indicate leakage out the removed plug hole could cause total leakage to exceed the total allowable containment leakage per the TTS by a factor of five. This condition could prevent the fulfillment of the Containment's function to mitigate the consequences of an accident. An Emergency Notification System (ENS) red phone call was made September 21, 1989, reflecting this condition.

PET 5-2 does not identify these concerns nor restrict LLRTs on EPAs to Modes 5-6 where the above TTSS are not applicable.

The testing usually takes 20 to 30 minutes, but no controls were in place to prevent the equipment from being connected for greater than one hour. Review of the PET 5-2 data sheets did not indicate any circumstances when the one hour Action Statement time limit was exceeded, however; the stabilization time for monitoring one penetration on February 3, 1989 probably did exceed one hour. Additionally, on this same day, the test cart was left hooked up to the penetration, with the local nitrogen supply isolation valve shut, while the tent surrounding the test cart was heated (to meet criteria on flow measuring devices). The plant was in this state for approximately three to four hours.

One previous instance of related failures to maintain Containment integrity due to EPA problems was reported in:

- Licensee Event Report (LER) 87-11, May 12, 1987. Electrical Penetration leaked excessively due to degraded seals.

The corrective actions from this LER required that leak rates through degraded seals be quantified using PET 5-2.

CAUSE OF OCCURRENCE

The root cause of this event is still under investigation, but appears to be a combination of three factors:

- Procedural error in PET 5-2 that allowed performance of this test in Modes 1-4 without annotating the entrance into the TTS action statements. The test was written primarily for performance during Modes 5 and 6, and did not discuss performance in other operational Modes.
- Lack of information on the design basis for the Amphenol EPAs. The design information problem was identified in early 1988 during evaluation of seal degradation concerns. Resolution of the problem was complicated because the Original Equipment Manufacture is no longer in business (since 1984). Additionally, information was available from the

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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TEXT IF more space is required, use additional NRC Form 200A (1/77)

architect engineer and other industry sources stating the inboard seal was a Containment pressure boundary. PGE contracted with the custodian of the Amphenol files and received information in late 1988 that has been interpreted to indicate the inboard seal does not meet all pressure requirements during accident conditions and can not be depended on as a Containment pressure boundary. The inboard seal is adequate at low pressures.

3. Missed opportunities to find the above errors and correct them. Specifically:
 - a. When the evaluation for the degraded seals cast doubts concerning the status of the inboard seals it was recommended that PET 5-2 be performed in Mode 1. A thorough review of this recommendation prior to implementation could have identified the potential for problems with Containment integrity.
 - b. In late 1988 information was disseminated outside of engineering that the inboard seal could not be considered a pressure boundary. PET 5-2 was reviewed with this information in mind, and the check valve in the nitrogen feed system was included in the boundary for PET 5-2. It is believed the entrance into TTS action statements was missed because the procedure does not address the possibility that testing might occur during Modes 1-4 (see cause 1). The procedure infers the test will be done in Mode 5 or 6, but does not disallow Modes 1-4. Personnel failed to realize the additional concerns with using PET 5-2 to quantify leakrates in Modes 1-4.

CORRECTIVE ACTIONS

The immediate corrective action was to stop LLRTs of EPAs during Modes 1-4.

The permanent corrective actions will be:

1. PET 5-2 will be revised by November 17, 1989, to specify how to test in Modes 1-4. (CTL # 31222)
2. Other methods of quantifying the leakrates will be evaluate by February 28, 1990. (CTL # 31223)
3. A revision will be submitted for this LER by December 22, 1989, to report the full findings of the evaluation as well as any additional corrective actions. (CTL # 31224)

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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TEXT (If more space is required, use additional NRC Form 288A's) (17)

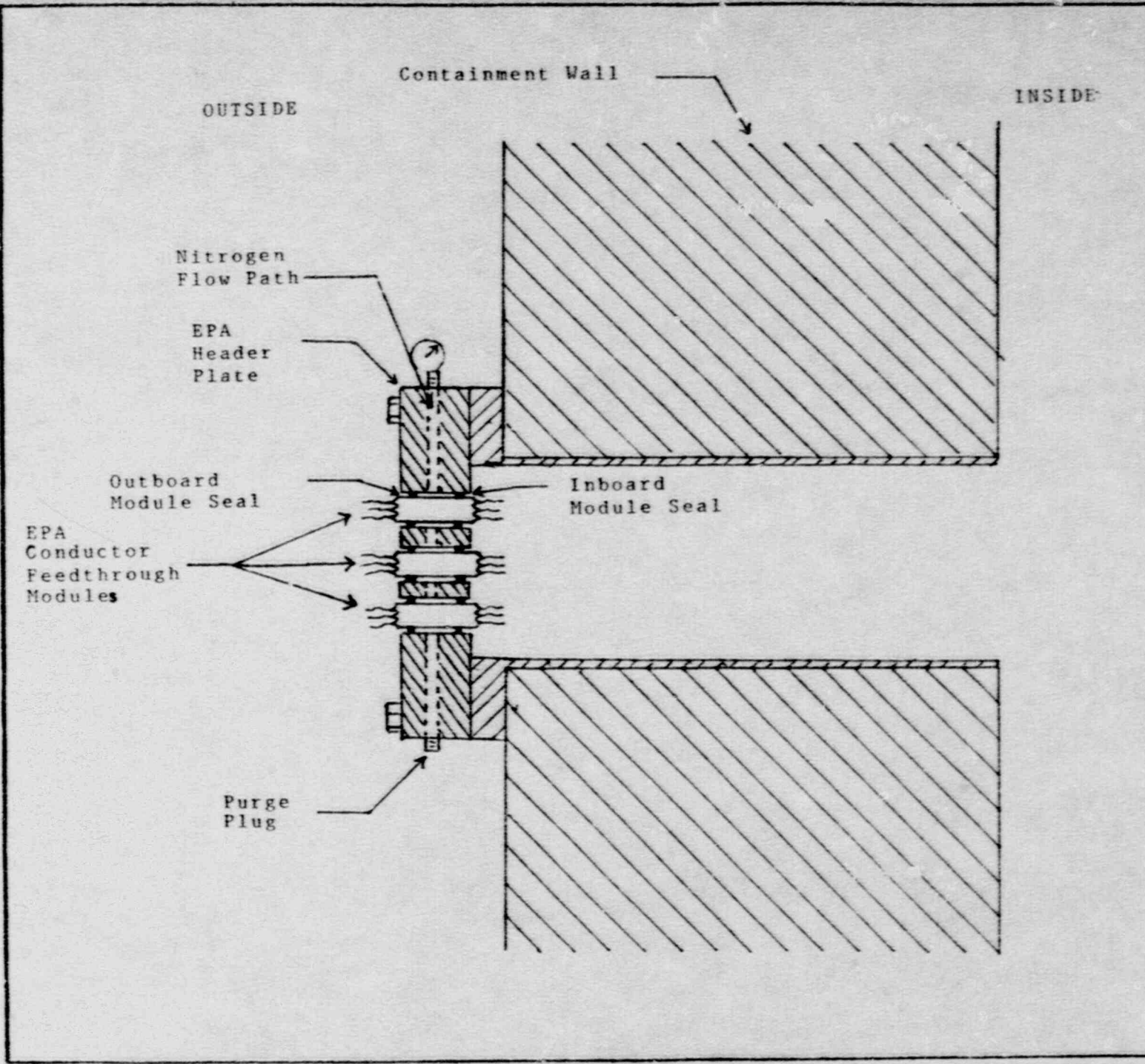
SIGNIFICANCE OF OCCURRENCE

This event had no effect on the health and safety of the public. No over pressure transients have occurred in Containment which would have challenged the integrity of the inboard seal. The inboard seal is adequate as a boundary at low pressures.

PLANT NAME (1) Trojan Nuclear Plant
 UNIT (If more than one unit, use appropriate NRC Area 2004.21(1))
 DOCKET NUMBER (2) 0500003448
 JER NUMBER (3) 023
 PAGE (4) 17

| YEAR | MONTH | DAY | HR | MIN | SEC |
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Figure 1 - Amphenol SAMS Electrical Penetration Assembly (EPA)



NRC FORM 2004 (8/83)

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Figure 2 - Nitrogen System Interface

