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Public Service Electric and Gas Company P.O. Box E Hancocks Bridge, New Jersey 08038

Salem Generating Station

May 9, 1983

Mr. J. Allan
Acting Regional Administrator
USNRC
Region 1
631 Park Avenue
King of Prussia, Pennsylvania 19406

Dear Mr. Allan

LICENSE NO. DPR-70
DOCKET NO. 50-272
REPORTABLE OCCURRENCE 82-078/01X-1
SUPPLEMENTAL REPORT

Pursuant to the requirements of Salem Generating Station
Unit No. 1 Technical Specifications, Section 6.9.1.9.b,
we are submitting supplemental Licensee Event Report for
Reportable Occurrence 82-078/01X-1.

Sincerely yours,

J. M. Zupko, Jr.
General Manager -
Salem Operations

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CC: Distribution

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The Energy People

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Report Number: 82-078/01X-1
Report Date: 05-04-83
Occurrence Date: 10-17-82
Facility: Salem Generating Station Unit 1
Public Service Electric & Gas Company
Hancock's Bridge, New Jersey 08038

IDENTIFICATION OF OCCURRENCE:

Radiation Monitoring Instrumentation - Containment-Plant Vent
Radioactivity Monitor - Inoperable.

This report was initiated by Incident Report 82-366.

CONDITIONS PRIOR TO OCCURRENCE:

Mode 5 - Rx Power 0 % - Unit Load 0 MWe.

DESCRIPTION OF OCCURRENCE:

At 1348 hours, October 17, 1982, during routine shutdown operation, a containment purge was initiated. At 1414 hours, the Control Room Operator noticed that the Containment-Plant Vent Radioactivity Monitor (Channels 1R11/1R12), which was aligned to the plant vent for the purge, indicated a decrease in radiation levels (drop in monitor count rate). Since no reason for the decrease was apparent, the purge was terminated, and the valve line-up of the monitor sampling system was checked. No abnormalities in the line-up were discovered, however, and at 1529 hours, the containment purge was reinitiated. A similar decrease in count rate was observed, and the purge was terminated for a second time.

At the previous request of the Chemistry Department, a series of special calibrations of Radiation Monitoring System (RMS) effluent channels had been ordered. The tests utilized radioactive gases available during the depressurization of the Reactor Coolant System (RCS) at shutdown. Testing results indicated that the Channel 1R12A Noble Gas Monitor was not functioning properly when aligned to the plant vent, and that the Channel 1R41C Plant Vent Noble Gas Monitor sensitivity was reduced.

Further investigation into the problem revealed that the Containment-Plant Vent air particulate detector (APD) sample line to the plant vent had been erroneously left capped during the implementation of Design Change Request (DCR) ED-0014. This DCR had been partially completed prior to the unit startup on April 5, 1982. Related to the problem, an open-ended line had been connected to the suction line of Plant Vent Monitor 1R41, resulting in the dilution of sample flow and decreased sensitivity of that device. The capped line rendered inoperable the containment purge and pressure relief isolation function associated with the Containment-Plant Vent Monitor.

DESCRIPTION OF OCCURRENCE: (cont'd)

It was later discovered that the vacuum relief device on the suction of the Containment-Plant Vent APD sample pump was lifting at normal operating pressures in the sample line. Lifting of the device caused dilution of sample flow by air from the North Mechanical Penetration Area, when the monitor was aligned in the "containment" sampling mode. Although the capability of the APD was reduced by the dilution, the monitor would be able to detect RCS leakage at somewhat higher levels. The reduced effectiveness, however, requires that the device be considered inoperable.

APPARENT CAUSE OF OCCURRENCE:

The immediate cause of the occurrence was the failure to remove the cap from the APD suction line in March 1982. The intent of DCR ED-0014 was to ultimately segregate the "containment" and "plant vent" modes of sampling into two distinct systems. While the Containment-Plant Vent APD was originally designed to sample in both modes, the DCR eliminated the plant vent sampling function; the Channel 1R41 APD was in turn connected to sample the plant vent. This modification reused portions of tubing previously utilized by the Containment-Plant Vent APD for suction and return flow to the plant vent.

The DCR could not be completed prior to plant start-up, however, and it was decided to return the Containment-Plant Vent APD to its prior status. In order to return both monitors to an operable configuration, the original APD suction line was to be reconnected to the new Channel 1R41 sample pump suction line. During the process, however, the original suction line was left capped, and a parallel, open-ended, spare line (the former return line) was reconnected to the combined monitor suction. A visual check of the line continuity and a quality verification were performed. However, in both instances, an obscure crossing of the similar lines prevented immediate detection of the error.

The test requirements of the partial DCR did not specify a pressure-type continuity test. Final testing as requested was of an operational nature utilizing existing procedures and failed to detect the capped suction line.

The vacuum relief device was apparently damaged soon after the unit was returned to power operation (April 5, 1982). It is believed that this damage resulted from attempting to draw a sample through the capped suction line in the "plant vent" sampling mode. Since the vacuum relief device was in the open position when the APD was aligned to the plant vent, a Low Flow alarm would not be received.

ANALYSIS OF OCCURRENCE:

The Containment-Plant Vent Radioactivity Monitoring System provides indication of the concentration of radioactive gas and particulate in containment for the purpose of detecting RCS leakage. Operability of the system along with the Containment Sump Monitoring System and the Containment Fan Cooler Flow Rate indication insure timely detection of RCS Pressure Boundary leakage.

ANALYSIS OF OCCURRENCE: (cont'd)

The Containment-Plant Vent Monitor is also used to ensure that the release rate during purging, pressure relief and gaseous releases is maintained below limits specified by the Environmental Technical Specifications (ETS). A high radioactivity level initiates automatic closure of the containment purge duct and pressure relief isolation valves.

Technical Specification Limiting Condition for Operation 3.3.3.1b Action 20 requires:

With only two of the RCS leakage detection systems operable, operation may continue for up to 30 days provided grab samples of the containment atmosphere are obtained and analyzed at least once per 24 hours when the required gaseous and/or particulate monitoring is inoperable; otherwise be in at least hot standby within the next 6 hours and in cold shutdown within the following 30 hours.

Action 22 requires:

With the containment purge and pressure-vacuum relief isolation system inoperable, close each of the purge and pressure relief penetration providing direct access from the containment to the outside atmosphere.

As noted, the plant was operated at power with the containment-plant vent monitor inoperable for the bulk of the period from April 5 through October 16, 1982. The pressure relief valves were opened to relieve containment pressure on 368 occasions, with an aggregate "open" time of 711 hours. The event therefore constituted operation less conservative than the least conservative aspect of a limiting condition for operation, and is reportable in accordance with Technical Specification 6.9.1.8.b.

Although the effectiveness of Monitors 1R11/12 and 1R41 was reduced during the period, Plant Vent Gross Activity Monitor 1R16 was operable. Additionally, the iodine and particulate collection devices were also functional. Finally, the Channel 1R14 Waste Gas Effluent Monitor, which automatically initiates closure of the Waste Gas System discharge in the event of high radiation levels, was operable throughout the occurrence. Operability of this equipment met the monitoring requirements of the ETS.

With the exception of the purge-pressure relief containment isolation feature, the integrity of the fuel cladding, reactor coolant pressure boundary and containment were maintained throughout the occurrence. Operability of the Channel 1R16 monitor combined with Control Room Operator action would have reasonably resulted in isolation of any purge or pressure relief in the event of a significant release of radioactivity to the containment atmosphere. As noted, in the "containment" sampling mode, the dilution of sample flow would have reduced the effectiveness but not totally disabled Monitors 1R11/12. Parallel indicators of RCS pressure boundary leakage were also available (RCS Coolant Inventory results, periodic grab samples,

Containment Area Monitor, Containment Sump Level indication/alarm).

Sufficient data exists to verify that ETS instantaneous release rate limits were not exceeded during the period involved. The highest observed instantaneous rates were less than 0.5% of the specification limits. Average release rate limits were also met, and the event therefore involved no adverse impact on the environment.

CORRECTIVE ACTION:

The sample lines were reconnected properly, and the failed vacuum relief device was repaired. The vacuum device was relocated downstream of the Low Flow alarm sensor, to insure an alarm will be received if the device fails or opens. The Containment-Plant Vent Monitor was satisfactorily tested, including a pressure-continuity test, and was returned to an operable status on October 23, 1982. With the monitor operable, compliance with Limiting Condition for Operation 3.3.3.1b was regained.

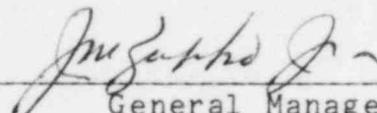
Prior to discovery of the incident, an Operational Test Group had been formed to review each design change package to determine testing requirements, generate a change test package, direct operational tests required, and review the results of such testing. The group is presently testing all non-station packages, and is expected to be fully functional by the next refueling outage. Implementation of this group should prevent recurrence of this type of incident.

Finally, the contractor who performed the work involved has agreed to add instructions and Quality Control inspection points to controlled work packages for the installation of instrument tubing; included will be requirements for an air flow test for tubing continuity.

FAILURE DATA:

Not Applicable

Prepared By R. Frahm



General Manager -
Salem Operations

SORC Meeting No. 83-060