REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8505060316 DOC.DATE: 85/05/01 NOTARIZED: NO DOCKET #
FACIL:50-387 Susquehanna Steam Electric Station, Unit 1, Pennsylva 05000387
50-388 Susquehanna Steam Electric Station, Unit 2, Pennsylva 05000388
AUTH.NAME AUTHOR AFFILIATION
CURTIS,N.W. Pennsylvania Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
SCHWENCER,A. Licensing Branch 2

SUBJECT: Forwards response to GE significant Info Ltr 402, "Wetwell/ Drywell Inerting," superseding 840925 response. Visual insp of Unit 1 drywell penetrations & surrounding equipment performed. No evidence of cracking found.

DISTRIBUTION CODE: A001D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 7
TITLE: OR Submittal: General Distribution

NOTES:1cy NMSS/FCAF/PM. LPDR 2cys Transcripts. 05000387
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PP&L Pennsylvania Power & Light Company
Two North Ninth Street • Allentown, PA 18101 • 215 / 770-5151

Norman W. Curtis
Vice President-Engineering & Construction-Nuclear
215/770-7501

MAY 1 1985

Director of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION
COMPLIANCE WITH GE SIL 402
ER 100450 FILE 841-4 Docket Nos. 50-387
PLA-2454 and 50-388

Dear Mr. Schwencer:

Attached is PP&L's response to GE SIL 402, "Wetwell/Drywell Inerting". This response supersedes our earlier response provided as PLA-2313 dated September 25, 1984.

Very truly yours,

N. W. Curtis
Vice President-Engineering & Construction-Nuclear

Attachment

cc: M. J. Campagnone - NRC
R. H. Jacobs - NRC

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Attachment to PLA-2454

RESPONSE TO GE SIL 402

1. Evaluate Inerting System Design

Evaluate the design of the nitrogen inerting system. Investigate the potential for introducing cold (less than 40°F) nitrogen and the orientation of the nitrogen port relative to the vent header, downcomers, or other equipment in the wetwell and drywell which may be in the path of the injected nitrogen. Assure that the temperature monitoring devices, the low temperature shutoff valve, and overall system design are adequate to prevent the injection of cold nitrogen into the containment.

Response:

At Susquehanna SES, nitrogen can be introduced into the containment through either of two physically separate systems - the nitrogen makeup system or the nitrogen inerting system. These systems are not safety related, but they do contain sufficient safety grade components to ensure containment isolation.

A. Design and Operation

1. Nitrogen Inerting

The nitrogen inerting system is used during plant startup to purge the primary containment of air with pure nitrogen until the containment atmosphere contains less than 4% oxygen. This system receives its supply of gaseous nitrogen from a vendor supplied nitrogen tank truck and vaporizer which are connected to the system via a spoolpiece. Typical tank trucks which service SSES utilize either a direct fire vaporizer or an ethylene glycol vaporizer. The direct fire vaporizer burns diesel fuel to provide heat to vaporize the nitrogen. The ethylene glycol vaporizer burns diesel fuel to heat the ethylene glycol which then provides heat to vaporize the nitrogen. In the event that the burner should fail, the ethylene glycol type vaporizer still provides enough heat to vaporize the nitrogen until the nitrogen flow is stopped. For this reason, the most commonly supplied tank truck is equipped with an ethylene glycol vaporizer. PP&L directs the nitrogen flow rate to be provided by the truck operator and PP&L locally monitors the nitrogen pressure. The main control room has nitrogen flow indication through flow element FE-05719, but not pressure or temperature indication. The nitrogen enters the containment through a 24 inch drywell and 18 inch wetwell penetration. There is no distribution pipe network inside containment.

2. Nitrogen Makeup

The nitrogen makeup system stores and supplies nitrogen for containment atmosphere makeup during normal plant operation. Liquid nitrogen is stored in a 1500 gallon tank, and vaporized to nitrogen gas by an ambient vaporizer, which is designed to deliver 9000 SCFH. A tank mounted low temperature shutoff valve (TCV-05701) is provided to shut off the flow of nitrogen if the temperature of the gas falls below -20°F. Nitrogen volumetric flow is measured by flow element FE-15716 which provides indication in the main control room. Flow is also initiated and terminated from the main control room. There is no pressure or temperature indication currently provided for the nitrogen makeup system. The nitrogen enters the containment through a one-inch penetration in both the drywell and the wetwell. There is no distribution pipe network inside containment.

B. Orientation

1. Unit 1

An inspection was conducted of the Unit 1 drywell to determine the orientation of the nitrogen injection ports relative to equipment located inside the containment in the direct path of the injected nitrogen. No safety related equipment was found to be directly impinged in the drywell. The drywell makeup penetration, X-80C, located at elevation 727', azimuth 154°, will impinge on a personnel stairway located a distance of 8 feet away. The drywell inerting penetration, X-25, located at elevation 710', azimuth 236°, will impinge on the left rear support for the drywell unit cooler 1V415A located approximately 2 feet away. Wetwell drawings were also reviewed. Nitrogen makeup is injected into the wetwell through penetration X-238B located at elevation 674', azimuth 52°; where it impinges on a downcomer located approximately 1 foot away at azimuth 53°. Nitrogen inerting is injected into the wetwell through penetration X-201A located at elevation 687', azimuth 221°, where it injects between two downcomers located approximately 1 foot away at azimuth 217° and 5 feet away at azimuth 225°. No impingement was apparent. A modification is planned for Unit 1 which will reroute the makeup lines through drywell penetration X-88A and wetwell penetration X-220B.

2. Unit 2

For Unit 2, the nitrogen inerting system is the same as Unit 1. The same penetrations are used with the same elevations and same orientation to equipment inside containment. However, the nitrogen makeup system was modified on Unit 2 to reroute the system through drywell penetration X-88A at elevation 722', azimuth 115°, where the nitrogen will impinge on a vertical drop of 5-inch insulated chilled water pipe located 2 feet away. This chilled water pipe serves the drywell unit coolers and is

non-safety related. Similarly, the wetwell makeup line was rerouted through penetration X-220B at elevation 675', azimuth 44°, where the nitrogen impinges on a downcomer at azimuth 45° located 1 foot away.

C. Potential for Introducing "Cold" Nitrogen

1. Nitrogen Inerting

If the nitrogen inerting system is operated properly, there is reasonable assurance that the nitrogen entering containment will be above 40°F.

2. Nitrogen Makeup

The temperature of the nitrogen injected into containment through the makeup system is chiefly dependent on the performance of the ambient vaporizer. The nitrogen leaving the vaporizer will be at some temperature less than the ambient temperature which is weather dependent. During the winter, nitrogen could exit the vaporizer at temperatures below zero but above -20°F where the low temperature shutoff valve would actuate. From there it would pass through a pressure reducer and several hundred feet of warmer piping inside the turbine and reactor buildings. Nevertheless, normal operation of the system as designed does not appear to preclude injection of nitrogen into containment at temperatures less than 40°F.

2. Evaluate Inerting System Operation

Review the operating experience of the inerting system to assure that the vaporizer, the low temperature shutoff valve and the temperature indicators have functioned properly. Evaluate the plant calibration, maintenance and operating procedures for the inerting system. Assure that cold nitrogen injection would be detected and prevented.

Response:

A) Nitrogen Inerting System - There are no specific maintenance or calibration procedures for the inerting system. In review of our operating experience, the only problem encountered was a system overpressurization which was reported in Unit 1 LER 84-048. The plant operating procedures for inerting have been changed to prevent future overpressurizations.

B) Nitrogen Makeup System - The makeup system contains non-Q components such as a bulk liquid nitrogen tank, an atmospheric vaporizer, a low temperature shut off valve and a pressure reducer. While there are no maintenance or calibration procedures specifically for the makeup system, these components are maintained and calibrated using general plant procedures. Operating procedures for the makeup system have been reviewed and found to be satisfactory for the system as currently designed.

To assure that cold nitrogen injection would be detected and prevented, PP&L plans to take the following actions.

1) Nitrogen Inerting

Temperature indication will be provided for the PP&L operator who currently monitors nitrogen pressure during inerting. Procedures will be developed to provide assurance that injection of cold nitrogen would be promptly detected and terminated. This will be in place prior to inerting following the current Unit 1 refueling outage.

2) Nitrogen Makeup

Temperature indication will be installed. Procedures will be developed to monitor temperature during makeup to ensure that injection of cold nitrogen would be promptly detected and terminated. This will be in place prior to October 1, 1985.

3. Test for Drywell/Wetwell Bypass Leakage

Perform a bypass leakage test as soon as convenient to confirm the integrity of the vent system. This test should be conducted during plant operation following normal plant procedures. If no procedures exist, the following is a general guide for preparing your procedure: pressurize the drywell to approximately 0.75 psi above the wetwell pressure, maintain this drywell pressure and measure the pressure buildup in the wetwell. Any bypass leak area can then be calculated (and is limited by Technical Specifications on many plants) from the wetwell pressure and the drywell-wetwell pressure difference. This will provide an indication that the vent system integrity is intact and that no gross failure exists.

Response:

Bypass leakage tests at Susquehanna SES are performed for both units pursuant to Tech Specs Surveillance 4.6.2.1.d. The tests were last performed for Unit 1 in May, 1983, and for Unit 2 in December, 1984. The test will be performed again for Unit 1 prior to startup following the current refueling outage.

4. Inspect Nitrogen Injection Line

Conduct an ultrasonic test (UT) as soon as convenient of all accessible welds in the nitrogen injection line from the last isolation valve to the wetwell and drywell penetrations. Also UT the containment penetrations and the containment shell within 6 inches of the penetration. UT is recommended because cracks would be most likely to initiate on the inside of the pipe or on the side of the metal in contact with cold nitrogen.

Response:

1. Unit 1

The Unit 1 nitrogen inerting and make-up lines between the containment isolation valves were hydro-tested in February, 1984. In December, 1984 the Unit 1 inerting line was overpressurized as described in LER 84-048. Following this event, it was discovered that some of the isolation valves had excessive leakage. After repairs, satisfactory local leak rate tests were performed. In addition, an analysis was performed on the inerting line (HBB-118) to identify the areas with highest stress. Based on this analysis, nineteen welds were inspected by UT. All welds inspected were found to be free of indications. Since these were the welds subject to the highest stresses, additional UT of the inerting system was considered unnecessary. Visual inspections of the Unit 1 inerting piping, valves, and penetrations specified will be performed prior to startup following the current refueling outage. Inspections of the makeup system are not necessary since the components of interest are series 300 stainless steel which is not affected by cold nitrogen.

2. Unit 2

Susquehanna Unit 2 was inerted for the first time in January, 1985, as part of the startup test program (ST 37.2). Based on the length of time Unit 1 systems have been in service, it is reasonable to expect that problems would have developed in the Unit 1 piping first. However, even after the unrelated overpressurization event in December, 1984, UT of selected welds in the Unit 1 inerting system uncovered no problems. Therefore, PP&L does not believe that UT of the Unit 2 inerting system is warranted. In lieu of UT, visual inspections of the Unit 2 inerting piping, valves and penetrations specified will be performed prior to startup following the Unit 2 first refueling outage. Again, inspections of the makeup system are not necessary since the components of interest are series 300 stainless steel which is not affected by cold nitrogen.

5. Inspect Containment

During the next planned outage, perform a visual inspection of the vent header, downcomers and other equipment in the containment which might be expected to be affected by the injection of cold nitrogen. The vent header should be inspected on the outside and the inside. Also inspect the containment shell or steel liner for at least 6 inches around the nitrogen penetration.

Response:

On March 15, 1984, in response to GE SIL 402, a visual inspection was performed of the nitrogen inerting and make-up piping/penetrations within the Unit 1 drywell including the containment liner plate for approximately two feet around the penetrations (the Mark II containment design has no

vent header). Surrounding equipment was also inspected. No signs of cracking were evident. Another inspection of the Unit 1 drywell penetrations and surrounding equipment was performed on April 18, 1985. Again, there was no evidence of cracking. The Unit 1 wetwell will be inspected as specified prior to startup following the current Unit 1 refueling outage. The Unit 2 wetwell and drywell will be inspected as specified during the Unit 2 first refueling outage.