

REGULATORY DOCKET FILE COPY

OCT 12 1979

Docket No. 50-311

Mr. R. L. Mittl, General Manager
Licensing and Environment
Engineering and Construction Department
Public Service Electric and Gas Company
801 Park Place
Newark, New Jersey 07101

Dear Mr. Mittl:

SUBJECT: AN ASSESSMENT OF THE SALEM, UNIT 2, CONTAINMENT SUMP

We have previously made a determination that in the case of duplicate or replicate plants, only the first of a series need be tested to demonstrate adequate performance of the containment sump in the post-LOCA recirculation mode. As Salem, Unit 1, had performed a test, it has been presumed that Salem, Unit 2, would not have to perform one. However, during a recent review of all containment sump tests, it was found that the Salem, Unit 1, test had been accepted as an appropriate demonstration of sump adequacy, primarily on the basis that the test crew had seen no vortex formation. A review of the test plan and data sheets indicated that only a 30 second test had been performed on each pump with the pumps throttled to 50 percent of design flow. Deficiencies in pump NPSH were indicated when the loss data were projected to the design and runout flow. In summary, neither vortex control nor adequate NPSH had actually been demonstrated by the Salem, Unit 1, tests.

In light of the above, we have re-reviewed the Salem, Unit 2, containment sump design. Our review was based on the information in the FSAR, a set of drawings of the containment sump provided by you on August 20, 1979, and our experience in following the testing and development of a variety of containment sump designs. The containment sump screen in the current Salem, Unit 2, design consists of an inverted metal box or cage located over the sump pit. The sides are perforated with 3/8" holes located on 1 1/2" centers. Conservative analysis by the NRC staff indicates a 5.5 ft. head loss through these holes at runout flow (4500 gpm per pump) with 50 percent blockage. Available NPSH would be less than required for the pumps under this condition.

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Experience indicates that air and debris entraining vortices would form from the water surface to the holes in the present design. Debris could cause progressive blockage of the holes. Entrained air would be expected to be drawn into the safety system by either of two mechanisms: (1) the high downward velocities in the cage and sump pit would overcome the potential for bouyant separation, and (2) selective blockage of the cage would force a rotational pattern inside resulting in an air entraining vortex penetrating to the outlet pipes. Both mechanisms have been observed during other sump tests involving designs with similar or more conservative design parameters. In order to remove these apparent potential problems, we require that the Salem, Unit 2, containment sump design be re-evaluated and modified as necessary. The objective is to decrease velocities to an acceptable level and to insert vortex suppression devices to keep rotational patterns from forming.

As you know, the NRC and the nuclear industry have been evaluating this matter over the past several years. Although continuing, this effort has resulted in evaluated and tested containment sump designs that appear to minimize the potential for the problems indicated above. Several such sump designs have been reviewed and approved by the NRC staff on recent operating applications. We recommend that you review the work performed by the NRC and the nuclear industry related to this matter, discuss it with us as may be necessary to reach full understanding, and submit information to substantiate your design or propose a modification to the Salem, Unit 2, sump design which will provide assurance that the sump will perform its intended function. We require that any proposed modifications be implemented prior to a decision concerning the issuance of an operating license. In addition, we require that you perform a model test of the final containment sump configuration, which will provide assurance that there is a very limited likelihood of adverse performance. The model testing program shall be subject to our approval, and scheduled for completion prior to the first scheduled refueling. Should the model test indicate requirements for further modifications, they must be made prior to start-up after the first refueling.

Accordingly, we request that you amend your FSAR to clearly state your intent regarding conformance with our position as stated above.

Please inform us after receipt of this letter, of your schedule for providing the information described above.

Sincerely,

Original Signed by
 Olan Parr
 Olan D. Parr, Chief
 Light Water Reactors, Branch No. 3
 Division of Project Management

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