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October 27, 1980

Mr. B. J. Youngblood, Chief
Licensing Branch No. 1
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: LaSalle County Station Unit 1 and 2
Response to INFORMAL NRC Questions
Concerning In-Plant S/RV Test Plan
NRC Docket Nos. 50-373/374

Dear Mr. Youngblood:

The attached materials respond to an NRC request for additional information regarding the LSCS-1 in-plant S/RV test. This informal inquiry was made by your staff (Mr. A. Bournia) on October 2, 1980.

In the event you have any further questions in this regard, please direct them to this office.

Very truly yours,

L. O. DelGeorge
Nuclear Licensing Administrator

Attachment

cc: RIII Resident Inspector - LSCS

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1. NRC Question

The stated objectives do not indicate any intent to qualify the plant pool temperature monitoring system during this test program. If the intent is to do it, it should be so stated (and the location of the permanent plant temperature sensors described). If not, you are required to justify this omission.

Response

The "qualification" of the plant temperature monitoring system is not an objective of the LaSalle in-plant SRV test. However, one of the objectives of the LaSalle in-plant SRV test is the determination of the extent of thermal mixing in the suppression pool during an extended blowdown test condition. As required in NUREG-0487 (Appendix D), the LaSalle in-plant SRV test has been instrumented with an extensive matrix of temperature sensors to produce a data base for establishing the difference between local and bulk pool temperatures. The definition of local temperature is in conformance with the NUREG-0487 definition, namely, that temperature which is measured on the containment wall in the sector containing the T-quencher, and at the same elevation as the T-quencher. Using the measured pool temperatures, which include the local temperature measurements according to the preceding definition, and subsequent lumped parameter analysis of the pool to determine the bulk pool temperature, a LaSalle unique bulk-to-local pool temperature differential will be established.

The permanent pool temperature monitoring system described in Chapter 6 of the LaSalle Design Assessment Report will be activated during the in-plant SRV test to measure the pool water temperatures during all extended blowdown tests. This measurement will then be used in conjunction with the bulk-to-local pool temperature differential to confirm the adequacy of the temperature monitoring system.

2. NRC Question

The omission of water level probe instrumentations is unacceptable unless it can be demonstrated that LaSalle's vacuum breaker capacity is equal to or greater than Susquehanna plant. We require the installation of water level probes in the largest discharge line if this is not the case.

Response

Based on information from the Susquehanna plant, it has been determined that the vacuum breaker capacity of the SRV discharge line in the LaSalle plant is equal to that in Susquehanna plant. Data documenting this information will be furnished to the NRC.

3. NRC Question

Strain gage instrumentation should be installed on the quencher associated with the smallest discharge line to be tested. If valve M is not the smallest, we require you to relocate this instrumentation as indicated.

Response

The acceptability of the stresses in the quencher resulting from SRV discharge was demonstrated by the test results available from the Karlstein Test Group. Verifying the quencher stresses is not a stated objective of the test and the strain gauges were specified for the quencher to obtain supplemental information only. Therefore, the location of this instrumentation is not essential to the outcome of the test.

4. NRC Question

Clarify the response to First Round Question 3 so that the correspondence between line volumes and quencher locations is unambiguous.

Response

The five T-quenchers and their corresponding SRV discharge lines, which are part of the LaSalle in-plant SRV test, have the following volumes.

T-quencher Number	T-quencher Azimuth (Degrees)	Line Air Volume (ft^3)
1B21-D359R	264°	91.22
1B21-D359H	252°	103.53
1B21-D359C	230°	107.01
1B21-D359G	210°	114.51
1B21-D359M	170°	122.20

Among all SRV discharge lines in the LaSalle plant, the largest line air volume is 122.20 ft^3 and the smallest line air volume is 80.05 ft^3. The arithmetic average of all line air volumes is 100.20 ft^3.

5. NRC Question

The test plan should provide detailed specifications for all instrumentation similar to that provided for accelerometers in Appendix B. As it stands now the operating range of the pressure transducers cannot be ascertained.

Response

The additional information requested via this question is being incorporated into the revised Test Plan document. A copy of the revised Test Plan document will be provided to the NRC as soon as it is completed.

6. NRC Question:

Describe the orientation of the quenchers with respect to the direction in which steam exits from the end cap perforations. Also indicate the direction of pool swirl with the RHR in operation. The acceptability of the temperature sensor array described in the test plan depends on this information. For example if the swirl is counterclockwise (as viewed in Figure 14 of the test plan) the array is acceptable, otherwise it is not.

Response

The T-quenchers in the LaSalle plant are located at two radii as shown in Figure 16 of the Test Plan document (Revision 3). The longitudinal axis of all T-quencher arms are oriented in a circumferential direction such that the end cap holes allow flows to exit in the clockwise direction when viewed from top.

During the in-plant SRV test, two sets of extended blowdown tests will be performed. One test will be performed without any RHR system in operation, while another test will be performed with RHR Loop A in operation. The swirl in the pool due to the operation of RHR Loop A will be caused by the pump suction, which is located at azimuth of 32°, and the return line, which is located at azimuth of 163°. With this orientation, the RHR suction of Loop A will draw pool water from both sides as shown by arrows in Figure 6.1. Therefore, in the test zone, which is located between azimuths 180° and 270°, the swirl in the suppression pool due to RHR Loop A will be clockwise, whereas the flow in the sector between azimuths 0° and 180° will be counterclockwise.

Notwithstanding the clockwise direction of the T-quencher end cap flows, the RHR Loop A would have a significant influence in determining the swirl pattern in the suppression pool as well as the columns which act as baffles causing directional changes in the flow. Furthermore, the mass flow rates exiting through the holes on the T-quencher arm which will be in a radial direction, unlike the circumferential direction of the end cap holes, are

6. Response (Cont'd)

much larger and will cause turbulent mixing of pool water in the vicinity of the T-quencher. Therefore, the suppression pool water is unlikely to experience a "clean swirl" in any given direction; rather the flow pattern will be turbulently mixed in the vicinity of the T-quencher with the general flow pattern moving toward the RHR Loop A suction line due to the operation of that system. The extensive network of temperature sensors installed on the pedestal wall, containment wall, basemat, and columns are adequately distributed to measure the pool temperature distribution resulting from this flow pattern.

Based on the foregoing discussion, it is our opinion that the current temperature sensor locations are adequate for determining the effects on thermal mixing during an extended blowdown test. We appreciate the concern raised by this question; however, we feel that a "clean" unidirectional swirl is not likely to occur and hence any relocation of sensors is unwarranted.

6. Response (Cont'd)

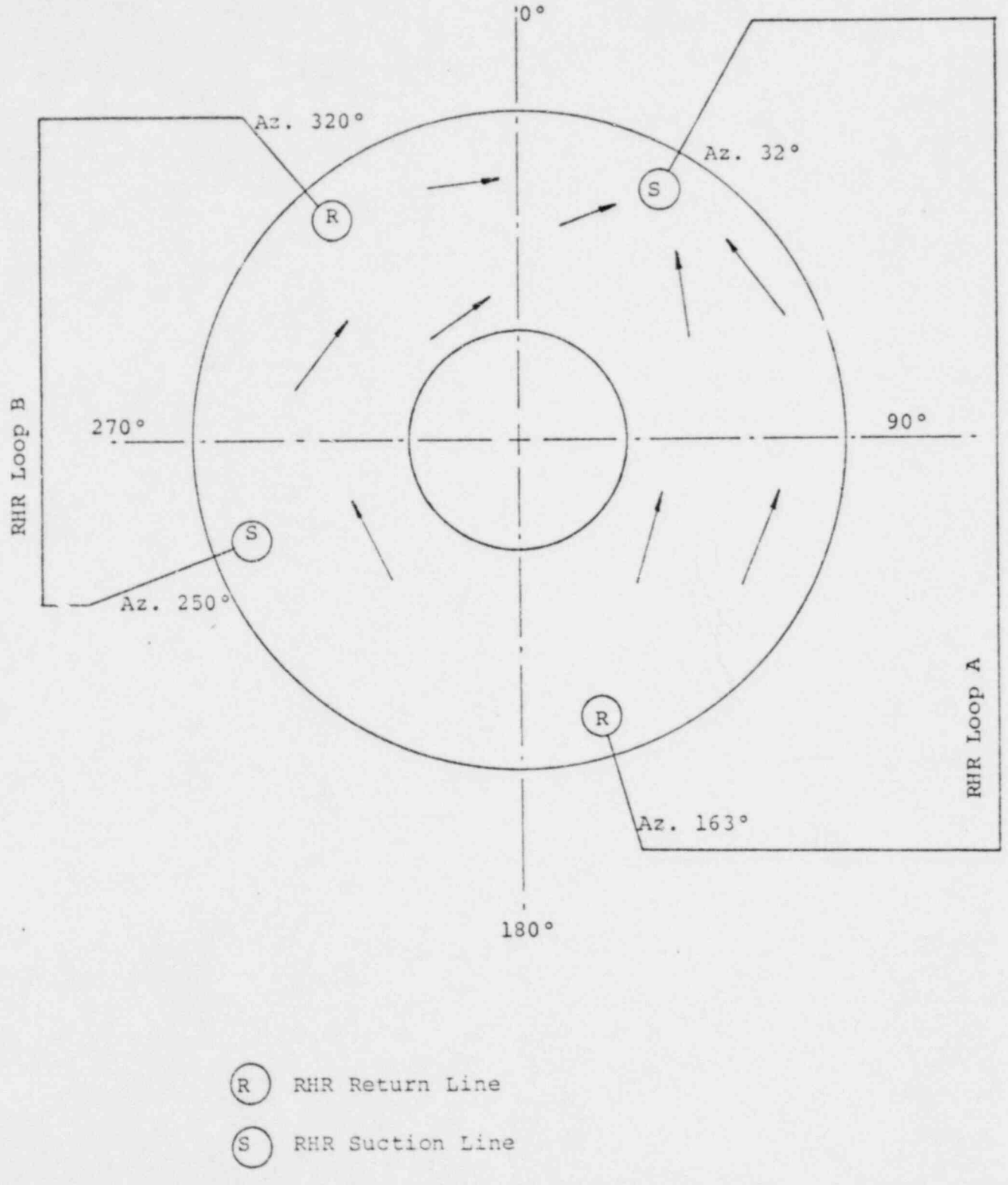

Figure 6.1 LaSalle Suppression Pool Showing RHR Loop A in Operation

7. NRC Question

Clarify why the expected response of sensors P37 through P40 (downcomer-Table 2) differs from that for sensors P1 through P30 (pool boundary, column).

Response

The expected response of pressure sensors P37 through P44, which are installed on the downcomer, are the same as those for the boundary and column sensors; namely, 3 to 46 psia.

9. NRC Question

Notwithstanding the general acceptability of the temperature sensor array (as discussed in Question 6 above), we recommended additional temperatures sensors be installed on the pedestal between sensors T10 and T26. This will provide some redundancy in the region where we expect the highest "local" pool temperature to occur. We also recommend that sensors T17, T19 and T20 be relocated in elevations to about 600 foot and that sensors T19 and T20 be also located to the opposite side of the columns from that shown. Note: some of these changes are contingent on which way the pool swirls (again see Question 6 above).

Response

The redundancy and the reliability of operation of the sensors were among the prime considerations in the specification of the in-plant SRV test instrumentation. For example, the temperature sensors have been subjected to qualification test to the appropriate environmental conditions, the cables have integral metal sheath, and they are supported with protecting brackets. Also, there is always a nearby sensor which acts as a redundant sensor, e.g., sensor T11, which is 10 feet away from T10, will act as a redundant sensor for T10. Finally, since sensors have been installed, the available penetrations through the wetwell boundary imposes a practical limit on the number of additional data channels that can be accommodated. Currently, we have used up all available penetrations dedicated to the LaSalle in-plant SRV test. We therefore believe that the need for additional temperature sensor, for redundancy's sake, is unwarranted.

The need for relocation of some of the temperature sensors as stated in the second half of this question is also unwarranted in light of our response to Question 6.

8. NRC Question

We recommend that the duration of the extended blowdowns be specified in more general terms: For example, "SRV discharge will continue until the pool temperature approaches the limit as defined in the Technical Specifications".

Response

The duration of the extended blowdown test will be determined by the LaSalle Technical Specification limits of the following parameters.

Suppression pool water temperature
Suppression pool high water level
Containment air pressure

The extended blowdown discharge test will continue until the Technical Specification limit of any of the aforementioned parameters are reached.

9. NRC Question

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The need for relocation of some of the temperature sensors as stated in the second half of this question is also unwarranted in light of our response to Question 6.

10. NRC Question

You should provide a more detailed description of where temperature sensors T32 and T33 are located. For sure, T33 cannot be located anywhere near a radius of 20 feet as indicated in Table 3.

Response

The additional information and clarification requested via this question is being incorporated into the revised Test Plan document. A copy of the revised Test Plan document will be provided to the NRC as soon as it is completed.

11. NRC Question

Do temperature sensors T34 through T41 measure wall temperature or fluid temperatures?

Response

The temperature sensors T34 through T41 in the LaSalle in-plant SRV test have been installed to measure the fluid temperature inside the SRV discharge line and T-quencher.

12. NRC Question

We note that the Zimmer test plan called for enclosing all underwater connectors and cabling in steel sheath or tubing to reduce instrumentation failure together with a qualification testing program to confirm the adequacy of the procedure. Do you intend to pursue the same approach? If so, it should be stated. If not, we do require it.

Response

The underwater connectors and cables used in the LaSalle in-plant SRV test will be encased in stainless steel sheath to reduce instrumentation failure. Furthermore, the sensors and cables have also been qualified for adequacy of operation by the vendors.

The revised Test Plan document will incorporate this additional information and clarification.

13. NRC Question

We note that the Zimmer test plan indicates that the structrual response portion of the test (i.e., acceleration measurement) is carried out in response to the SQRT request for in-situ testing. Is this also the case here? If it is, it should be so stated. If it is not, why not?

Response

The Commonwealth Edison SQRT program does include provisions for addressing structural response. This SQRT program was reviewed with Mr. A. Bournia and C. Hoffmeyer of the NRC Staff at the meeting of October 2, 1980 and a summary report of that discussion and previous responses on this subject was transmited in the L. O. DelGeorge letter to A. Bournia dated October 8, 1980.