

October 3, 1977

Docket Nos. 50-327
50-328
50-390
50-391

Tennessee Valley Authority
ATTN: Mr. Godwin Williams, Jr.
Manager of Power
830 Power Building
Chattanooga, Tennessee 37401

Gentlemen:

SUBJECT: CONTAINMENT SUMP MODEL TEST

We have received your letter of August 22, 1977, transmitting Report No. 72-27, Model Study for Sequoyah and Watts Bar Nuclear Plant Containment Sump Performance, and have reviewed that report. On September 14, 1977, we discussed some of our comments and concerns with your representatives.

The enclosure documents our comments of continuing concern. In order to facilitate acceptance of the test results, we recommend that you incorporate the changes and additions covered by these comments in your test program, and document them appropriately in the test plan and test report.

As discussed, we would like to witness a range of tests or demonstrations on a mutually agreeable date.

Sincerely,

Steven A. Varga, Chief
Light Water Reactors Branch 4
Division of Project Management

Enclosure:
As stated

MA-4
6D

OFFICE >	LWR-4	LWR-4	LWR-4			
SURNAME >	H Silverman	J Stahle	S A Varga			
DATE >	9/30/77	9/30/77	9/30/77			

REQUEST FOR ADDITIONAL INFORMATION - Sequoyah & Watts Bar

DISTRIBUTION:

NRC PDR
Local PDR
Docket file
LWR-4 Reading
RSBoyd
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FJWilliams
SAVarga
Project Manager : H. Silver, C. Stahle
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DRoss
JKnight
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MLErnst
WPGammill
WMcDonald, MIPC
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Tennessee Valley Authority

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COMMENTS ON MODEL STUDY FOR SEQUOYAH AND WATTS BAR
NUCLEAR PLANT CONTAINMENT SUMP PERFORMANCE

1. Provide a discussion of the preliminary tests you will perform which will verify that flow obstructions outside the model limits have a negligible effect on flow patterns in the sump.
2. In previous discussions the staff indicated that it believes a 1:1 or 1:2 scale would be more representative than the 1:4 scale which you intend to use. Due to your choice of a small model scale, the staff will require that the following two velocity scaling practices be followed in order to justify extrapolation of model results to the prototype.
 - 1) While Froude scaling is acceptable for the initiation of your tests, a number of test runs should be made where the model suction inlet velocity is equal to the prototype's expected runout velocity. This should take into account maximum possible runout flows resulting from a single failure.
 - 2) Additionally the test program should include a series of runs where the Reynolds number is equivalent to the prototype's Reynolds number under design flow conditions. These runs should be made with the model sump in exactly the configuration to be used in the plant.
3. Care should be used in the scaling of sump screens. A discussion should be included in your test report justifying that it accurately models the prototype screens.
4. The possibility of air entrainment should be considered in your scale tests. This should include tests to simulate air entrainment to the sump area due to falling water or, if appropriate, nearby steam jets from broken piping.
5. Your test report should discuss and describe the methods for creating turbulence, which you refer to on page 4 of the test proposal.

6. If significant pressure oscillation are observed during the tests, it may be an indication of coupling between your fluid system and the air trap. If this phenomenon does occur, additional tests with the air trap system removed may be required.
7. In the acceptance criteria portion of your test proposal it is stated that some rotational tendencies may be acceptable in the model. Due to the small 1:4 scale less intense and transient circulation may not be sufficient proof of satisfactory prototype performance.
8. You have not described screen and trash rack blockage tests. Up to 50% screen blockage will be required in your tests. These should include various alternate blockage locations, so that combinations causing circular flows are investigated.
9. Vortex tests should be conducted in a range of water temperatures, up to and including the temperatures expected at time of switch-over to recirculation following a LOCA. Hot water test runs should be included in the series of experiments conducted to meet the position of RSB-V-2.