

YANKEE ATOMIC ELECTRIC COMPANY



1671 Worcester Road, Framingham, Massachusetts 01701

OG-140
WOG-SGTR-84-024

December 20, 1984

Mr. D. G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Phillips Bldg., 7920 Norfolk Avenue
Bethesda, MD 20014

Westinghouse Owners Group
Resolution of SGTR Licensing Issues

Dear Mr. Eisenhut:

A subgroup was formed within the Westinghouse Owners Group (WOG) to address the licensing issues associated with a steam generator tube rupture (SGTR) event on a generic basis. The utilities which have participated in the SGTR Subgroup program are listed below, along with the respective plants.

<u>Utility</u>	<u>Plants</u>
Carolina Power & Light Co.	Shearon Harris ✓
Commonwealth Edison Co.	Byron/Braidwood
Duke Power Company	Catawba
Duquesne Light Co.	Beaver Valley 2 ✓
Houston Lighting & Power	South Texas
Northeast Utilities	Millstone 3 ✓
Rochester Gas & Electric	Ginna
Southern Co. Services for Georgia Power Company	Vogtle ✓
Tennessee Valley Authority	Watts Bar ✓
Texas Utilities Generating Co.	Commanche Peak ✓
Yankee Atomic Electric for Public Service Co. of N.H.	Seabrook ✓

The purpose of this letter is to transmit the initial results of this program, WCAP-10698, "SGTR Analysis Methodology to Determine the Margin to Steam Generator Overfill". WCAP-10698 is designated as a Westinghouse Proprietary Class 2 report. The non-proprietary version of the report is also transmitted as WCAP-10750.

8501180363 841220
PDR ADDCK 05000244
P PDR

*See Attached
Distribution*

2222

*1/20 Prop-WCAP-10698
10 Non Prop-WCAP-10750*

The major concern for an SGTR is related to the possibility of overfilling the ruptured steam generator and the potential effects of overfill on the secondary side integrity and radioactivity releases to the atmosphere. The concern over the potential for overfill has resulted in the following three issues regarding the FSAR analysis for an SGTR: (1) the operator action time required to terminate the primary to secondary leakage following a design basis SGTR, (2) the qualification of the equipment which is assumed to be used in the SGTR recovery, and (3) the evaluation of the worst case single failure for the SGTR analysis.

The results of the initial portion of the program to resolve the SGTR licensing issues are presented in WCAP-10698 (proprietary) and WCAP-10750 (non-proprietary). The program involved the development of a design basis analysis methodology and model to determine the margin to overfill for a design basis SGTR. The margin to steam generator overfill is defined as the steam space volume remaining below the steam generator outlet nozzle when the primary to secondary leakage is terminated. The analysis methodology includes the simulation of the operator actions for SGTR recovery based on Revision 1 of the WOG Emergency Response Guidelines (ERGs). An evaluation was performed to establish the operator action times to be used as a licensing basis for the SGTR analysis. The LOFTRAN program which is used for SGTR analysis was also modified to provide a more realistic prediction of the plant response during an SGTR and to improve the capability to simulate operator actions.

For the development of the analysis methodology, a preliminary analysis was performed to determine a reference plant to be used as the basis for the generic analysis. Sensitivity studies were performed for the reference plant to identify conservative assumptions and initial conditions with respect to the margin to overfill. A list of the equipment which is used for SGTR recovery was also developed based on Revision 1 of the ERGs. An evaluation of potential equipment failures was performed to identify the essential equipment and potential single failures. An analysis was performed for the design basis SGTR for the reference plant using the improved model, operator action times, conservative assumptions, and assuming the worst case single failure. The results of this analysis demonstrate that the operator can perform the required SGTR recovery actions to terminate primary to secondary leakage prior to steam generator overfill for the reference plant.

The SGTR analysis methodology which has been developed is designed to produce conservative results with respect to the margin to steam generator overfill. However, it is also necessary to provide a methodology to conservatively calculate the offsite radiation doses even if steam generator overfill does not occur. This effort will require an evaluation of the single failure assumptions for a SGTR to determine the worst single failure with respect to the offsite radiation doses. In order to demonstrate that the results are less than the limits in the Standard Review Plan, the offsite radiation doses will be calculated for the reference plant with the worst single failure. The results of the evaluation of the offsite radiation doses for a SGTR will be included in a supplement to this report, which is scheduled for submittal by March 1, 1985.

Mr. D. G. Eisenhut

- 3 -

OG-140
WOG-SGTR-84-024
December 20, 1984

The information presented in WCAP-10698 (proprietary) and WCAP-10750 (non-proprietary) indicates that the operators can respond to a design basis SGTR and perform the required recovery actions to terminate the primary to secondary leakage before steam generator overfill occurs. However, a contingency evaluation will also be performed to determine the effects of steam generator overfill resulting from an SGTR to demonstrate that the consequences are acceptable. An analysis will be performed to determine the thermal and hydraulic transient for a SGTR assuming extended operator action times which result in overfill. This transient will be used as the basis for calculation of the radiation exposure from the event and for evaluation of the waterhammer potential. The results of this evaluation will be submitted as a supplement to this report. This supplement is scheduled for submittal by July 1, 1985. An evaluation of the structural loading of the main steam lines and associated supports under water-filled conditions will be evaluated on a plant specific basis and will be submitted separately for each plant.

In summary, the WCAP-10698 (proprietary) and WCAP-10750 (non-proprietary) reports are submitted for your review to support the resolution of the SGTR Licensing issues for the plants in the WOG Subgroup. As noted above, these reports will be supplemented by an evaluation of the radiation dose for a SGTR and an evaluation of the consequences of steam generator overfill. If you have any questions regarding the attached reports or the future effort, the WOG SGTR Subgroup is available to answer them.

This submittal contains proprietary information of Westinghouse Electric Corporation. In conformance with the requirements of 10CFR2.790, as amended, of the Commission's regulations, we are enclosing with this submittal, an application for withholding from public disclosure and an affidavit. The affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission.

Correspondence with respect to the affidavit or application for withholding should reference CAW-84-113 and should be addressed to R. A. Hiesemann, Manager of Regulatory and Legislative Affairs, Westinghouse Electric Corporation, P. O. Box 355, Pittsburgh, Pennsylvania 15230.

Sincerely yours,

Alan E. Ladieu

Alan Ladieu, Chairman
SGTR Subgroup
Westinghouse Owners Group

Enclosures: WCAP-10698 - 22 Copies
WCAP-10750 - 12 Copies

cc: V. Nerses
N. Lewis
WOG SGTR Subgroup Members
4591g:12

PROPRIETARY INFORMATION NOTICE

TRANSMITTED HERewith ARE PROPRIETARY AND/OR NON-PROPRIETARY VERSIONS OF DOCUMENTS FURNISHED TO THE NRC IN CONNECTION WITH REQUESTS FOR GENERIC AND/OR PLANT SPECIFIC REVIEW AND APPROVAL.

IN ORDER TO CONFORM TO THE REQUIREMENTS OF 10CFR2.790 OF THE COMMISSION'S REGULATIONS CONCERNING THE PROTECTION OF PROPRIETARY INFORMATION SO SUBMITTED TO THE NRC, THE INFORMATION WHICH IS PROPRIETARY IN THE PROPRIETARY VERSIONS IS CONTAINED WITHIN BRACKETS AND WHERE THE PROPRIETARY INFORMATION HAS BEEN DELETED IN THE NON-PROPRIETARY VERSIONS ONLY THE BRACKETS REMAIN, THE INFORMATION THAT WAS CONTAINED WITHIN THE BRACKETS IN THE PROPRIETARY VERSIONS HAVING BEEN DELETED. THE JUSTIFICATION FOR CLAIMING THE INFORMATION SO DESIGNATED AS PROPRIETARY IS INDICATED IN BOTH VERSIONS BY MEANS OF LOWER CASE LETTERS (a) THROUGH (g) CONTAINED WITHIN PARENTHESES LOCATED AS A SUPERScript IMMEDIATELY FOLLOWING THE BRACKETS ENCLOSING EACH ITEM OF INFORMATION BEING IDENTIFIED AS PROPRIETARY OR IN THE MARGIN OPPOSITE SUCH INFORMATION. THESE LOWER CASE LETTERS REFER TO THE TYPES OF INFORMATION WESTINGHOUSE CUSTOMARILY HOLDS IN CONFIDENCE IDENTIFIED IN SECTIONS (4)(11)(a) through (4)(11)(g) OF THE AFFIDAVIT ACCOMPANYING THIS TRANSMITTAL PURSUANT TO 10CFR2.790(b)(1).