



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

June 3, 1997

Mr. Nicholas J. Liparulo, Manager
Nuclear Safety and Regulatory Analysis
Nuclear and Advanced Technology Division
Westinghouse Electric Corporation
P.O. Box 355
Pittsburgh, PA 15230

SUBJECT: AP600 TURBINE OVERSPEED TRIP

Dear Mr. Liparulo:

In a letter dated December 6, 1996, the Nuclear Regulatory Commission (NRC) sent Westinghouse a list of potential critical path issues for the design certification review for the AP600. One of the issues, Key Issue #14, involves the acceptability of the Westinghouse approach to the AP600 turbine overspeed trip. In a letter dated April 25, 1997, and supplemented by a diagram on May 9, 1997, Westinghouse provided additional information on the turbine overspeed trip for the AP600 to resolve the issue. The staff has reviewed the information and finds that it is unacceptable for justifying Westinghouse's position. The following is the staff's evaluation of the information.

The AP600 turbine overspeed trip design does not have a mechanical trip; the staff identified this issue in the draft safety evaluation report (DSER) issued in November 1994 (DSER Open Item 10.2.4-1, OITS Item No. 358) in November 1994 and as Key Issue #14 as a deviation from Paragraph III.2.c of Standard Review Plan (SRP) Section 10.2. In the AP600 Standard Safety Analysis Report (SSAR), Westinghouse states that the AP600 turbine overspeed trip design is as reliable as the design recommended in the SRP. However, Westinghouse has not provided sufficient information for the staff to review and confirm this statement. In a telephone conference on April 11, 1996, and subsequent letters of November 13, 1996, and April 11, 1997, the staff requested Westinghouse to provide a quantitative engineering analysis or operating data to support its position.

In its letter of April 25, 1997, Westinghouse states that the AP600 design is in conformance with SRP Section 10.2. However, the staff concludes that this is contrary to the staff's finding because Paragraph III.2.c of SRP Section 10.2 states that a mechanical overspeed trip device should be provided, and the AP600 turbine overspeed trip design does not have one. Therefore, it deviates from Paragraph III.2.c of SRP Section 10.2.

In the April 25th letter, Westinghouse presented the results of a probabilistic risk assessment (PRA) analysis. Westinghouse defines the issue by stating that the AP600 design utilizes an electronic overspeed trip system in lieu of the mechanical overspeed trip device, and its PRA results show that the conditional probability of destructive overspeed is unchanged by replacing the mechanical trip device with an AP600 electronic overspeed trip system. Although the staff does not have Westinghouse's PRA analysis, it believes that Westinghouse has oversimplified this issue. Paragraph III.2.b of SRP Section 10.2 states that an

NRC FILE CENTER COPY

9706060384 970603
PDR ADOCK 05200003
A PDR

electro-hydraulic control system that is able to fully cut off steam should be provided. Paragraph III.2.c states that a mechanical overspeed trip device should be provided. Paragraph III.2.d states that an independent and redundant electrical overspeed trip should also be included in the design. The AP600 design has an electro-hydraulic control system and an electronic trip system, but does not have a mechanical trip. Therefore, the staff believes that this reduction in the number of turbine trip mechanisms decreases trip diversity in the AP600 design. The staff does not believe that this reduction and decrease were considered in Westinghouse's PRA analysis because of its definition of the issue. Therefore, the staff finds that Westinghouse's PRA results are not acceptable for justifying this position. Furthermore, Westinghouse did not address the staff's concern for the potential for common-mode failures that may be associated with electronic trips, solenoid valves, oil systems, power sources, computer chips, and speed sensors.

In summary, the staff does not believe that the information in Westinghouse's letter and SSAR is sufficient enough to justify its position regarding the AP600 turbine trip design, and that it deviates from Paragraph III.2.c of SRP Section 10.2. Westinghouse should either provide a justifiable analysis or operating data to support its position, or withdraw its proposal and comply with the guidance in SRP Section 10.2. In order for the staff to reschedule its review of this issue and assess the impact on other review areas, if any, we request that Westinghouse provide a date for submittal of this information. If you have any questions concerning this matter, you can call Thomas Kenyon at (301) 415-1120.

Sincerely,

original signed by:

Marylee M. Slosson, Acting Director
 Division of Reactor Program Management
 Office of Nuclear Reactor Regulation

Docket No. 52-003

cc: See next page

DISTRIBUTION:

Docket File	PDST R/F	MSlosson
PUBLIC	SWeiss	TQuay
TQuay	TKenyon	BHuffman
JSebrosky	DJackson	GHolahan, 0-8 E2
ACRS (11)	JMoore, 0-15 B18	WDean, 0-5 E23
CLi, 0-8 D1	HWalker, 0-8 D1	LMarsh, 0-8 D1

DOCUMENT NAME: A:TURBINE.TRP

To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy

OFFICE	PM:PDST:DRPM	D:PDST:DRPM	D:DSSA	(A)D:DRPM
NAME	TJKenyon:sg	TQuay	GHolahan	MMSlosson
DATE	05/22/97	05/22/97	05/30/97	05/2/97

OFFICIAL RECORD COPY

Mr. Nicholas J. Liparulo
Westinghouse Electric Corporation

Docket No. 52-003
AP600

cc: Mr. B. A. McIntyre
Advanced Plant Safety & Licensing
Westinghouse Electric Corporation
Energy Systems Business Unit
P.O. Box 355
Pittsburgh, PA 15230

Mr. Ronald Simard, Director
Advanced Reactor Programs
Nuclear Energy Institute
1776 Eye Street, N.W.
Suite 300
Washington, DC 20006-3706

Mr. Cindy L. Haag
Advanced Plant Safety & Licensing
Westinghouse Electric Corporation
Energy Systems Business Unit
Box 355
Pittsburgh, PA 15230

Ms. Lynn Connor
Doc-Search Associates
Post Office Box 34
Cabin John, MD 20818

Mr. S. M. Modro
Nuclear Systems Analysis Technologies
Lockheed Idaho Technologies Company
Post Office Box 1625
Idaho Falls, ID 83415

Mr. James E. Quinn, Projects Manager
LMR and SBWR Programs
GE Nuclear Energy
175 Curtner Avenue, M/C 165
San Jose, CA 95125

Mr. Sterling Franks
U.S. Department of Energy
NE-50
19901 Germantown Road
Germantown, MD 20874

Mr. Robert H. Buchholz
GE Nuclear Energy
175 Curtner Avenue, MC-781
San Jose, CA 95125

Mr. Frank A. Ross
U.S. Department of Energy, NE-42
Office of LWR Safety and Technology
19901 Germantown Road
Germantown, MD 20874

Barton Z. Cowan, Esq.
Eckert Seamans Cherin & Mellott
600 Grant Street 42nd Floor
Pittsburgh, PA 15219

Mr. Charles Thompson, Nuclear Engineer
AP600 Certification
NE-50
19901 Germantown Road
Germantown, MD 20874

Mr. Ed Rodwell, Manager
PWR Design Certification
Electric Power Research Institute
3412 Hillview Avenue
Palo Alto, CA 94303