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DCP/NRC1118  
NSD-NRC-97-5414  
Docket No.: 52-003

November 4, 1997

Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

ATTENTION: T. R. QUAY

SUBJECT: RESPONSES TO FOLLOWON QUESTIONS REGARDING THE AP600  
INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA (ITAAC)

Dear Mr. Quay:

Enclosed are three copies of the Westinghouse responses to RAIs 640.126 through 640.135 related to comments on the AP600 Normal Residual Heat Removal System from the Reactor Systems Branch regarding Revision 3 of the AP600 Certified Design Material including the ITAAC as requested in a letter from the staff dated September 16, 1997.

This submittal closes, from Westinghouse' perspective, open items 5880 through 5889. As a result, the Westinghouse status column will be changed to "Closed" in the Open Item Tracking System (OITS). The NRC should review these responses and inform Westinghouse of the status of these open items to be designated in the "NRC Status" column of the OITS.

Please contact Mr. Eugene J. Piplica at (412) 374-5310 if you have any questions concerning this transmittal.

Brian A. McIntyre, Manager  
Advanced Plant Safety and Licensing

Enclosure

cc: J. M. Sebrosky, NRC  
J. N. Wilson, NRC  
A. E. Levin, NRC  
N. J. Liparulo, Westinghouse (w/o enclosures)

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## RESPONSES TO NRC REQUEST FOR ADDITIONAL INFORMATION



Question 640.126

Re: Section 3.3.7 - Normal Residual Heat Removal System

Add the following nonsafety-related functions to item #9: Provide cooling for the in-containment refueling water storage tank, provide reactor coolant system and refueling cavity purification flow to the chemical and volume control system during refueling operations, and provide backup for cooling the spent fuel pool.

Response:

ITAAC 2.3.6 item 9 has been revised to include the nonsafety-related function of providing cooling for the in-containment refueling water storage tank. The other nonsafety-related functions do not fall under the defense in depth or RTNSS categories and do not meet the criteria for inclusion in the ITAAC which are provided in SSAR Section 14.3.

SSAR Revision:

None

ITAAC Revision:

### Design Description 2.3.6.9d

d) The RNS provides heat removed from the incontainment refueling water storage tank.

Table 2.3.6-4

Design Commitment	Inspection, Tests, Analysis	Acceptance Criteria
9.d) The RNS provides heat removal from the in-containment refueling water storage tank (IRWST).	Testing will be performed to confirm that the RNS can provide flow through the RNS heat exchangers when the pump suction is aligned to the IRWST and the discharge is aligned to the IRWST.	Each RNS pump provides at least 925 gpm to the IRWST.

## RESPONSES TO NRC REQUEST FOR ADDITIONAL INFORMATION



Question 640.127

Re: Section 3.3.7 - Normal Residual Heat Removal System

The following design features addressing mid-loop operation should be verified in the ITAAC:

- (a) Loop piping effect, reactor coolant system hot legs and cold legs are vertically offset.
- (b) Step-nozzle connection, system employs a step-nozzle connection to the reactor coolant system hot leg.
- (c) Self-venting suction line, pump suction line is sloped continuously upward from the pump to the reactor coolant system hot leg with no local high points.

Response:

ITAAC 2.3.6 has not been revised to include inspection for these specific design features. RNS pumps perform no safety-related function except as a primary coolant pressure boundary. The specific piping design features identified as a), b) and c) above have been included to address problems with NPSH which have occurred at operating plants. The availability of sufficient NPSH will be confirmed by the testing identified in Table 2.3.6-4, items 9.b) and 9.c). The specific piping design features identified as a), b) and c) above do not meet the criteria for inclusion in the ITAAC which are provided in SSAR Section 14.3.

SSAR Revision:

None

ITAAC Revision:

None



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640.127-1



## RESPONSES TO NRC REQUEST FOR ADDITIONAL INFORMATION



Question 640.128

Re: Section 3.3.7 - Normal Residual Heat Removal System

The following design features addressing intersystem LOCA should be in ITAAC:

- (a) The design pressure of the system is 900 psig.
- (b) The reactor coolant system isolation valves are interlocked to prevent their opening at reactor coolant system pressures above 450 psig.

Response:

ITAAC 2.3.6 has been revised to include item a) but not item b) as discussed below:

- a) Table 2.3.6-4, items 4.a) and 4.b) have been revised to include the hydrostatic and design pressures.
- b) The reactor coolant system isolation valves (RNS-PL-V001A, -V001B, -V002A and -V002B) are interlocked to prevent their opening at reactor coolant system pressures above 450 psig. The testing of this function is included with ITAAC 2.5.2, "Protection and Safety Monitoring System," Table 2.5.2-7.

SSAR Revision:

None



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640.128-1

# RESPONSES TO NRC REQUEST FOR ADDITIONAL INFORMATION



ITAAC Revision:

Table 2.3.6-4

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
4.a) The components identified in Table 2.3.6-1 as ASME Code Section III retain their pressure boundary integrity at their design pressure.	A hydrostatic test $\geq 1125$ <del>psia</del> <i>psi design pressure</i> will be performed on the <del>900</del> <i>psi design pressure</i> components required by the ASME Code Section III to be hydrostatically tested.	A report exists and concludes that the results of the hydrostatic test of the components identified in Table 2.3.6-1 as ASME Code Section III conform with the requirements of the ASME Code Section III.
4.b) The piping identified in Table 2.3.6-2 as ASME Code Section III retains its pressure boundary integrity at its design pressure.	A hydrostatic test $\geq 1125$ <i>psi</i> will be performed on the <del>900</del> <i>psi design pressure</i> piping required by the ASME Code Section III to be hydrostatically tested.	A report exists and concludes that the results of the hydrostatic test of the piping identified in Table 2.3.6-2 as ASME Code Section III conform with the requirements of the ASME Code Section III.



## RESPONSES TO NRC REQUEST FOR ADDITIONAL INFORMATION



Question 640.129

Re: Section 3.3.6 - Normal Residual Heat Removal System

Since the Normal RHR system is a RTNSS system, the following should be added to ITAAC:

- (a) RNS pumps can be tested at design flow during normal operation.
- (b) RNS pump minimum flow lines should be shown in the figure.
- (c) RNS pumps' NPSH requirements should be specified to state that the available NPSH is greater than required NPSH. Actual NPSH values need not be specified, since they depend upon the pump type which will be specified in the future.

Response:

ITAAC 2.3.6 has not been revised to include the listed items as discussed below:

- a) The ITAAC purpose is to define the inspections, tests, analysis and acceptance criteria for the RNS prior to the first plant startup and attainment of normal operation. ITAAC has no function once normal operation has been achieved. It is inappropriate to identify normal operation testing features in the ITAAC.
- b) RNS pump minimum flow lines are not shown in ITAAC Figure 2.3.6-1. These portions of the RNS do not meet the criteria for inclusion in the ITAAC which are provided in SSAR Section 14.3.
- c) RNS pumps perform no safety-related function except as a primary coolant pressure boundary. NPSH requirements do not meet the criteria for inclusion in the ITAAC which are provided in SSAR Section 14.3.

SSAR Revision:

None

ITAAC Revision:

None



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640.129-1



## RESPONSES TO NRC REQUEST FOR ADDITIONAL INFORMATION



Question 640.130

Re: Section 3.3.7 - Normal Residual Heat Removal System

RNS heat exchanger B channel head drain valve RNS-PL-VO48 and RNS-PL-VO29 connecting valve to CVS letdown HX [Table 2.3.6-1, Page 2.3.6-5] should be added to the table.

Response:

Table 2.3.6-1 has not been revised to include RNS heat exchanger B channel head drain valve RNS-PL-VO48 and RNS-PL-VO29 connecting valve to CVS letdown HX. These portions of the RNS do not meet the criteria for inclusion in the ITAAC which are provided in SSAR Section 14.3. RNS heat exchanger B channel head drain valve RNS-PL-VO48 was not selected as the valve to be used for long term makeup to the RCS. RNS heat exchanger A channel head drain valve RNS-PL-VO46 was selected as the valve to be used for long term makeup to the RCS and is included in the appropriate ITAAC tables.

SSAR Revision:

None

ITAAC Revision:

None

RESPONSES TO NRC REQUEST FOR ADDITIONAL INFORMATION



Question 640.131

Re: Section 3.3.7 - Normal Residual Heat Removal System

Line numbers LOO3A,B, LOG8A,B and LO21 [Table 2.3.6-2, Page 2.3.6-6] should be added to the table.

Response:

Table 2.3.6-3 has not been revised to include line numbers LOO3A,B, LOO8A,B and LO21. These portions of the RNS do not meet the criteria for inclusion in the ITAAC which are provided in SSAR Section 14.3.

SSAR Revision:

None

ITAAC Revision:

None



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640.131-1



## RESPONSES TO NRC REQUEST FOR ADDITIONAL INFORMATION



Question 640.132

Re: Section 3.3.7 - Normal Residual Heat Removal System

Table 2.3.6-3, Page 2.3.6-8 is incomplete. Add the following: RNS-TE013A and B, TE014A and B, and PT012A and B.

Response:

Table 2.3.6-3 has not been revised to include RNS-TE013A and B, TE014A and B, and PT012A and B. These portions of the RNS do not meet the criteria for inclusion in the ITAAC which are provided in SSAR Section 14.3.

SSAR Revision:

None

ITAAC Revision:

None



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640.132-1

## RESPONSES TO NRC REQUEST FOR ADDITIONAL INFORMATION



Question 640.133

Re: Section 3.3.7 - Normal Residual Heat Removal System

It is not clear how item #1 of Table 2.3.6-4, Page 2.3.6-11, satisfies the acceptance criteria for item #8(b), flow path for long term, post-accident makeup to the RCS.

Response:

Item 1 refers to the ITAAC Figure 2.3.6-1 to show the functional arrangement of the RNS. This figure shows a make up connection to RNS heat exchanger A which includes valve RNS-PL-V046. When the RNS is constructed to include a make up connection to RNS heat exchanger A which includes valve RNS-PL-V046, the capability exists to provide long term, post-accident makeup to the RCS.

SSAR Revision:

None

ITAAC Revision:

None



# RESPONSES TO NRC REQUEST FOR ADDITIONAL INFORMATION



Question 640.134

Re: Section 3.3.7 - Normal Residual Heat Removal System

The LTOP relief valve capacity and opening pressure [Table 2.3.6-4, Page 2.3.6-12, item # 9 (a)] is already finalized and given in the SSAR. Therefore, these values should be given in the acceptance criteria.

Response:

Item 9(a) of the ITAAC has been revised to include the LTOP relief valve capacity and opening pressure.

SSAR Revision:

None

ITAC Revision:

Table 2.3.6-4

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
9.a) The RNS provides LTOP for the RCS during shutdown operations.	i) Inspections will be conducted on the low temperature overpressure protection relief valve to confirm that the capacity of the vendor code plate rating is greater than or equal to system relief requirements.	i) The rated capacity recorded on the valve vendor code plate equals or exceeds the <i>555 gpm</i> capacity assumed in the low temperature overpressure protection analysis.
	ii) A test will be performed to demonstrate that the relief valve opens at the set pressure.	ii) The relief valve opens at a pressure less than or equal to the value assumed in the low temperature overpressure protection analysis, <i>621 psi</i> .



RESPONSES TO NRC REQUEST FOR ADDITIONAL INFORMATION



Question 640.135

Re: Section 3.3.7 - Normal Residual Heat Removal System

The cross connections to spent fuel pool system and CVS letdown HX with valve V029 should be shown in Figure 2.3.6-1, Page 2.3.6-14.

Response:

Figure 2.3.6-1 has not been revised to show the cross connections to spent fuel pool system or the line to the CVS letdown HX with valve V029. These portions of the RNS do not meet the criteria for inclusion in the ITAAC which are provided in SSAR Section 14.3.

SSAR Revision:

None

ITAAC Revision:

None



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640.135-1