Westinghouse Electric Corporation Energy Systems

Box 355
Pittsburgh Pennsylvania 15230-0355

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Docket No.: 52-003

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

ATTENTION: T. R. QUAY

SUBJECT: RESPONSES TO STAFF REQUESTS REGARDING THE AP600 INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA (ITAAC) - RCS & PXS

Dear Mr. Quay:

Enclosed are three copies of Westinghouse's responses to RAIs 640.69 and 640.164 related to comments received from the staff on Revision 3 of the AP600 Certified Design Material including the ITAAC as requested in letters from the staff dated August 22, 1997 and November 6, 1997, respectively.

This submittal closes, from Westinghouse's perspective, open items 5728 and 6192. 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 the open items to be designated in the "NRC Status" column of the OITS.

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

Eugene J. Pipiica for

Brian A. McIntyre, Manager
Advanced Plant Safety and Licensing

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jml

Enclosure

cc: J. M. Sebrosky, NRC (w/Enclosure)
J. N. Wilson, NRC (w/Enclosure)
N. J. Liparulo, Westinghouse (w/o Enclosure)

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RAI 640.69 (OITS #5728)

2.1.2 Reactor Coolant System

In Table 2.1.2-4, Item 12.a provides ITAAC for MOV testing. Paragraph ii) in the "Inspections, Tests, and Analyses" column should be re-written to state, "Tests will be performed of the as-installed motor-operated valves under preoperational differential pressure, fluid flow, and temperature conditions."

Paragraph i) in the "Acceptance Criteria" column should be re-written to state, "A test report exists and concludes that each motor-operated valve is qualified to perform its safety function as indicated in Table 2.1.2-1 under design conditions."

Paragraph ii) in the "Acceptance Criteria" column should be re-written to state, "The as-installed motor-operated valves changes position as indicated in Table 2.1.2-1."

The above comment in 640.69 are generic comments that applies to the same ITAAC in other systems as well.

Response

The AP600 ITAAC's provide verification that active MOV's will be able to perform their safety-related functions to transfer open and / or close.

The AP600 ITAAC's require type tests which demonstrate that active MOV's can perform their safety-related active function under design basis conditions. In many cases, the flow and DP conditions that can be tested during in-plant tests will be less severe than the design conditions used in the type tests.

The COL applicant is required to develop a Inservice Test Program consistant with the AP600 SSAR section 3.9.6 (COL item 3.9.8.4). A part of this development is to evaluate which active valves are subject to flow / DP operability inservice testing. The AP600 SSAR (section 14) requires that these IST's be baselined during pre-operational testing. Both the IST plan and the pre-operational test plans are submitted to the NRC for their review.

The AP600 ITAAC's verify that active MOV's are qualified to operate under design basis conditions. The AP600 pre-operational testing verify that active MOV's are operable consistent with the IST plan. As a result, an additional ITAAC is not required.

SSAR Revision None

ITAAC Revision None

RAI 640.164 (OITS #6192)

AP600 is a passive plant and natural circulation is a key feature of the plant. The piping lay-out of the passive systems is critical to the proper operation of the passive system. We understand the detailed piping lay-out of several systems are already finalized including the pipe stress analysis. Confirm that piping slope and elevation are specified in the ITAAC to verify that the passive systems will function as designed. Systems flow resistance and nozzle elevations given in the ITAAC are not sufficient to verify the system function.

Response:

The PXS ITAAC's (Table 2.2.3-4) cover important characteristics of the PXS performance including the arrangement of the lines (Item i), the elevations of the injection tanks vs the RCS (Item 8.c.iii), and the lines resistances (item 8.c.i). It is not necessary or practical to ITAAC specific detailed pipe routings, such as the number / radius of elbows or specific slopes. Although the routing of these lines and their stress analysis have been completed, it is possible that the as built configuration is different than the current configuration. Such changes, if they occur, are not expected to be major; however they need to be allowed by the ITAAC's. The following additional pipe routing ITAAC's are provided to verify that the function of the PXS system is not affected by minor routing changes:

1. Slope the line from HL up to PRHR HX inlet line high point.
2. Slope the lines from CL up to CMT inlet line high point.
3. The maximum elevation of the IRWST injection and containment recirculation lines must be less than the bottom of the IRWST.

The line slope requirements support maintaining the water in these lines hot during plant operation which provides timely initiation of natural circulation flow in these lines when the isolation valves are opened. The maximum elevation of the IRWST injection and containment recirculation lines prevents possible voiding of the water in the lines during long term recirculation operation.

SSAR Changes: PXS P&ID (figures 6.3-1 and -2) are revised to indicate these routing requirements. These requirements are contained in note 16 on sheet 1 and on notes 3 and 30 on sheet 2.

ITAAC Changes: Add pipe routing ITA and AC in PXS ITAAC, Table 2.3-4, Item 8.c).

PXS SSAR P&ID

Sheet 1, Note 16

Current - Slope line continuously upward from the cold leg connection to high point at CMT inlet.

Revised - Route line from cold leg connection to high point without downward sloping sections.

Sheet 2, Note 3

Current - [note is blanked out in SSAR]

Revised - Route line from hot leg connection to high point without downward sloping sections.

Sheet 2, Note 30

New - Locate IRWST injection lines (from IRWST to RV) and containment recirculation lines (from containment to IRWST injection lines) at an elevation below the bottom of IRWST.

Table 2.2.3-4 (Cont.)
Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
8.c) The PXS provides RCS makeup, boration, and safety injection during design basis events.	ii) A low-pressure test and analysis will be conducted for each CMT to determine piping flow resistance from the cold leg to the CMT. The test will be performed by filling the CMT via the cold leg balance line by operating the normal residual heat removal pumps.	ii) The flow resistance from the cold leg to the CMT is $\leq 7.69 \times 10^{-6}$ ft/gpm^2.
	iii) Inspections of the routing of the following pipe lines will be conducted: *– CMT inlet line, cold leg to high point* *– PRHR HX inlet line, hot leg to high point*	*iii) These lines have no downward sloping sections between the connection to the RCS and the high point of the line.*
	iv) Inspections of the elevation of the following pipe lines will be conducted: *– IRWST injection lines; IRWST connection to DVI nozzles* *– Containment recirculation lines; containment to IRWST lines*	*iv) The maximum elevation of the top inside surface of these lines is less than the elevation of the bottom inside surface of the IRWST.*
	v) Inspections of the elevation of the following tanks will be conducted: – CMTs – IRWST	v) The elevation of the bottom inside tank surface is higher than the direct vessel injection nozzle centerline by the following: – CMTs ≥ 7.5 ft – IRWST ≥ 3.4 ft