



Westinghouse

# FAX COVER SHEET

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COMMENTS:
Tom: Here are some more sheets of backup. I know they may be too late
to be reviewed before the phone call.
- Response to DSEI OI 10.4.9-2 (OI 1164)
- Response to RAI 410.293 (OI 3102)
- Response to RAI 410.294 (OI 3103)

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PRELIMINARY

Question: DSER-OI 10.4.9-2

STARTUP FEEDWATER SYSTEM, FWS, WATER HAMMER) Westinghouse should address the issue of plant damage due to water hammer during startup.

Response: DSER-OI 10.4.9-2

In addition to information contained in SSAR, section 10.4, Revision 6, Appendix 3B, Revision 7, addresses the potential for water hammer in feedwater lines. The "Main Feedwater Line" portion of SSAR subsection 3B.2.3 addresses a number of design features included in the main and startup feedwater system, piping, components and control that minimize the potential for water hammer. The potential for water hammer during startup is minimized by having a startup feedwater system separate from the main feedwater system. This startup system can not add cold water to the hot main feedwater system, is sized appropriately for startup, has control valves and other features designed for startup service, is routed to minimize geometric sources of water hammer, and feeds a steam generator nozzle and feed spray system separate from the main feed ring. This item is closed.

PRELIMINARY

NRC REQUEST FOR ADDITIONAL INFORMATION

PRELIMINARY



Question 410.293

Section 10.4.9.1.1 of the SSAR (Revision 4) states, in part, that the startup feedwater control valves (SFCVs) and startup feedwater isolation valves (SFIVs) are designed to close on an appropriate engineered safety signal (startup feedwater isolation signal) and the SFIV also serves as a containment isolation valve. Before the design change, Section 10.4.7.1.1 of the SSAR stated that the SFIV serves as a containment isolation valve and closes on a containment isolation signal. Explain why the SFIV should not close on a containment isolation signal. Containment isolation provisions require auxiliary feedwater isolation valves to have remote manually close feature whenever containment isolation is required.

Response:

SSAR subsections 10.4.7.1.1 and 10.4.9.1.1, Revision 7, include a more consistent description of safety related functions of the main and startup feedwater control and isolation valves. Subsection 10.4.7.1.1 discusses only main feedwater system functions and components. Subsection 10.4.9.1.1 discusses only startup feedwater functions and components. Bullet sections of subsection 10.4.9.1.1 are intended to reinforce the first paragraph of the subsection. Startup feedwater isolation valves close on any of containment isolation, steam generator isolation or feedwater isolation signals. They can also be closed by a remote manual signal.

SSAR Revision: NONE

PRELIMINARY



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410.293-1

NRC REQUEST FOR ADDITIONAL INFORMATION

PRELIMINARY



Question 410.294

Section 10.4.9 of the SSAR (Revision 4) does not address water hammer problem in the startup feedwater system. Westinghouse added a paragraph in Section 5.4.2.2 of the SSAR (Revision 4) to address the design change by using a separate startup feedwater delivery system connected to the steam generator. However, the information provided in the section regarding water hammer occurrence in the startup feedwater piping is not adequate. Section 5.4.2.2 states, in part, that prevention and mitigation of feedline-related water hammer has been accomplished through an improved design and the layout of the startup feedwater piping includes the same features as the main feedwater line to minimize the potential for water hammer. Provide information on the improved design and design features for water hammer prevention for the startup feedwater system.

Response:

The Main Feedwater Line portion of SSAR Appendix 3B, subsection 3B.2.3, Revision 7, provides a more detailed discussion of the AP600 design features for minimizing water hammer, including piping layout features. As indicated in SSAR subsection 5.4.2.2, the startup feedwater piping layout includes the same features as the main feedwater piping layout. As indicated throughout SSAR subsection 10.4.9, the startup feedwater system is sized, operated and has water sources consistent with minimizing the potential for water hammer.

SSAR Revision: NONE

PRELIMINARY



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410.294-1