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Docket No.: STN-52-003

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

ATTENTION: T. R. QUAY

SUBJECT: RESPONSE TO NRC LETTER REGARDING AP600 TECHNICAL SPECIFICATION COMPLETION TIMES AND SURVEILLANCE FREQUENCIES.

References:

1. Letter from NRC to Westinghouse (Samuel Collins to Howard Bruschi), "Optimized Completion Times and Surveillance Frequencies - AP600 Technical Specifications", dated 3/27/97.

2. Letter from NRC to Westinghouse (Thomas Martin to Nicholas Liparulo), "List of Key Licensing Issues on the AP600 Design", dated 12/6/96.

3. DCP/NRC0616, "Closing the Last DSER Open Item for AP600 SSAR Section 16.1, Technical Specifications (TS)", dated 10/11/96.

This letter is sent in response to Reference 1 and as partial completion of the Westinghouse action for Key Licensing Issue #26, Technical Specifications review (see Reference 2). The NRC concluded in Reference 1 that the completion times and surveillance frequencies (CTs/SFs) for the AP600 Technical Specifications (TS) should be based on the Standardized Technical Specifications (STS) values.

As presented in Reference 3, the AP600 CTs/SFs are based on the STS values in that, Westinghouse developed a logic for selecting CTs/SFs based on the STS values. The goal of creating this selection logic was to present more consistent CTs/SFs throughout the AP600 TS as well as to provide a logic upon which to base selection of CTs/SFs for unique features of the AP600 which do not compare to STS LCO actions or surveillance requirements.

Due to the NRC time constraints faced in completing its review of the AP600 CTs/SFs consistent with the SECY-97-051 schedule, Westinghouse will not pursue its efforts to apply standardized selection criteria to the AP600 CTs/SFs. Therefore, enclosed is a markup of the AP600 TS CTs/SFs which is more consistent with STS values (see Enclosure 1).

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For those cases where the STS has no system comparable to the AP600, Westinghouse has applied the CTs/SFs from STS for comparable safety functions. The comparable STS is noted in the margin of the attached markup.

Table 1 (Attachment 1 to this letter) presents those seven TS for which Westinghouse requests the NRC consider the AP600-specific design features and differences from the STS plant designs. For many cases, Westinghouse was able to derive a CT/SF from an STS for a feature performing a similar safety function. In some cases however, no comparable STS could be identified. Table 1 provides the AP600 LCO number, the comparable STS LCO number (if any), and either an explanation of why the AP600 time is different than the STS time or justifications for AP600 times which have no comparable STS.

This submittal provides Westinghouse resolution of the issue identified in Reference 1. The NRC is requested to review this submittal and provide feedback to Westinghouse regarding the resolution status of this issue. The attached markup will be incorporated into the formal TS submittal to support NRC completion of the AP600 Design Certification safety evaluation. That submittal will also reflect resolution of the NRC concern related to TS which apply in mode 4 yet end in mode 4.

Upon receipt and review of this submittal, the NRC is requested to contact Robin K. Nydes at 412-374-4125 to arrange a CT/SF issue resolution/closure meeting.

Susan V Fanto for

Brian A. McIntyre, Manager
Advanced Plant Safety and Licensing

jml

cc: Angela Chu, NRC (1L, 1A, 1E)
Bill Huffman, NRC (1L, 1A, 1E)
Nicholas J. Liparulo, Westinghouse (w/o Attachment/Enclosure)

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Attachment 1

Table 1

Explanation for AP600 Technical Specification
Completion Times and Surveillance Frequencies
Which are not Identical to
Standardized Technical Specification
Completion Times and Surveillance Frequencies

Table 1
Explanation of AP600 non-STS Completion Times/Surveillance Frequencies

AP600 LCO	STS LCO	Explanation of CT/SF Value (See Note 1 for acronym definitions)
Instrumentation - 3.3		
General	General	The STS plant designs have two breakers in series such that, upon failure of one, the single failure criterion cannot be maintained. The AP600 has eight breakers assigned to four divisions such that failure of one division (one or two breakers) does not prevent the AP600 from meeting the single failure criterion. The AP600 configuration has improved breaker availability since the AP600 can withstand a failure of two divisions (up to four breakers) and still meet the single failure criterion.
Automatic Depressurization System - 3.4.12, 3.4.13, 3.4.14		
SR 3.4.12.2 IST	n/a (IST)	While the STS include the component testing frequency in each SR, AP600 component testing references the IST program for frequency. AP600 SSAR section 3.9.6 defines the IST inputs that the COL applicant will use to create the IST program. For AP600 and the STS, the frequency is based on ASME code requirements.
SR 3.4.12.3 IST	n/a (IST)	A separate SR has been added to the AP600 for squib valve IST while the STS do not address squib valve IST. The SR references the IST for the tests to be performed and their frequency. AP600 component testing references the IST program for frequency. AP600 SSAR section 3.9.6 defines the IST inputs that the COL applicant will use to create the IST program.
Accumulators - 3.5.1		
Action B 8 hours	3.5.1 Action B 1 hour	8 hours for restoration of an accumulator, for reasons other than boron concentration not within limits, is based on AP600 design differences which provide significant additional margin in large LOCA performance: - Because the AP600 accumulators are connected to the RCS through the DVI lines, a large LOCA does not cause one accumulator to spill such that both can inject. In current 2 loop plants, the accumulators are connected to the cold legs and a large LOCA can result in one accumulator spilling such that only one accumulator can inject. - A large break LOCA has been analyzed to support the AP600 PRA by demonstrating that one accumulator and one CMT provide adequate core cooling. This analysis uses the same computer code (WCOBRA-TRAC) and the same inputs as the SSAR LOCA analysis (except for conservative PRA assumptions of one CMT and no PRHR heat exchanger). The resulting peak clad temperature is below 2000°F which is well below the safety limit of 2200°F. Note that failures of one CMT and the PRHR heat exchanger need not be assumed in order to support the LCO, but these assumptions provide additional margin. - Small break LOCAs, including DVI line breaks, have been analyzed for the AP600 to demonstrate for the PRA that one CMT (without any accumulators) provides adequate core cooling. These analyses use the same computer code (NOTRUMP) and the same inputs as the SSAR LOCA analysis (except for conservative PRA assumptions of one CMT, no accumulator, no PRHR heat exchanger, and multiple ADS valve failures). This analysis shows that the peak clad temperature remains below the limit of 2200°F such that the core is adequately cooled. Note that failures of one CMT, the PRHR heat exchanger, and several ADS valves need not be assumed in order to support the LCO, but these assumptions provide additional margin.
SR 3.5.1.6 System Level IST	n/a (SL IST)	AP600 system testing is included in SSAR Section 3.9.6, Table 3.9-17. The AP600 Tech Spec references this SSAR information for the testing performed and its frequency. The STS do not include accumulator system-level IST.

AP600 LCO	STS LCO	Explanation of CT/SF Value (See Note 1 for acronym definitions)
Core Makeup Tanks - 3.5.2, 3.5.3		
SR 3.5.2.6 IST	n/a (IST)	While the STS include the component testing frequency in each SR, AP600 component testing references the IST program for frequency. AP600 SSAR section 3.9.6 defines the IST inputs that the COL applicant will use to create the IST program. For AP600 and the STS, the frequency is based on ASME code requirements.
SR 3.5.2.7 System Level IST	n/a (SL IST)	AP600 system testing is included in SSAR Section 3.9.6, Table 3.9-17. The AP600 Tech Spec references this SSAR information for the testing performed and its frequency. The STS do not include any HHSI system-level IST.
3.5.2 Action E and 3.5.3 Action C	n/a	The STS do not have a system that compares closely to the CMT although the CMTs provide a high pressure RCS injection function which is somewhat similar to current plant HHSI pumps. However, HHSI pumps take suction from one RWST and each HHSI pump injects into two or more locations in the RCS such that one pump can fail and the other can inject even if one of its RCS connecting lines is the LOCA. For the AP600, each CMT will inject even with a single failure; each CMT has redundant air-operated valves which initiate operation. However each CMT is connected to one RCS location such that a LOCA of a DVI line causes one CMT to spill. Aside from a DVI LOCA, one CMT can provide adequate core cooling with design basis analysis codes and assumptions. The following provides justification for selection of 8 hours: - Small break LOCA analysis has been performed for the AP600 PRA to demonstrate that no CMTs and one accumulator provide adequate core cooling. This analysis uses the same computer code (NOTRUMP) and the same inputs as the SSAR LOCA analysis (except for conservative PRA assumption of no CMTs, one accumulator and no PRHR heat exchanger). - The CMT inlet is connected to the RCS cold leg through an open line. As a result, any leakage from the CMT or connected piping will draw reactor coolant into the CMT through the open CMT line to the cold leg. The only way that the CMT level can drop below full is to have the inlet motor-operated valve closed or to have an accumulation of non-condensable gases, both of which are covered by Tech Spec conditions.
Passive Residual Heat Removal Heat Exchanger - 3.5.4, 3.5.5		
SR 3.5.4.4 IST	n/a (IST)	While the STS include the component testing frequency in each SR, AP600 component testing references the IST program for frequency. AP600 SSAR section 3.9.6 defines the IST inputs that the COL applicant will use to create the IST program. For AP600 and the STS, the frequency is based on ASME code requirements.
SR 3.5.4.5 System Level IST	n/a (SL IST)	AP600 system testing is included in SSAR Section 3.9.6, Table 3.9-17. The AP600 Tech Spec references this SSAR information for the testing performed and its frequency. The STS do not include any AFWS system-level IST.
3.5.4 Action F	3.7.5 Action D	This action requires the operator to verify that both startup feedwater pumps are available before initiating action to change MODEs. The availability of both RNS pumps, both component cooling water pumps, and both service water pumps and fans need also be verified prior to isolating the startup feedwater pumps in MODE 3. If these nonsafety-related components are not available, the plant should remain in its current MODE and initiate efforts to recover these components. The basis for this requirement is that the PRHR heat exchanger is the primary safety-related means for removing AP600 decay heat in MODES 1, 2, 3, and 4. With the PRHR heat exchanger and these nonsafety-related components unavailable, the plant should not initiate actions to change MODEs unless there are appropriate means for providing decay heat removal. This approach is similar to STS LCO 3.7.5 Action D, which suspends LCO 3.0.3 if the auxiliary feedwater system is inoperable.

AP600 LCO	STS LCO	Explanation of CT/SF Value (See Note 1 for acronym definitions)
3.5.4 Action E	n/a	The PRHR heat exchanger is a unique feature of the AP600. As such, there are no safety-related systems in current plants that are similar with respect to the PRHR heat exchanger design, equipment used, and function. The closest system in current plants in terms of safety function is the AFWS. However, there are major differences in the design of these systems. Some of those differences include: - The AFWS connects to the SGs and as a result it is degraded by some of the accidents it is designed to mitigate. For example, a break in a feedwater line tends to disable one of the three AFWS pumps normally provided and to degrade another pump. The PRHR heat exchanger is connected to the RCS and is not degraded by such accidents. - The STS AFWS uses AC power for 2 pumps and SG steam for another pump. These pumps have to be actuated by the protection system. The AP600 PRHR heat exchanger uses no pumps; it requires only one of two fail-open valves to open to initiate its operation. Normally these valves will be opened as a result of protection system actuation. They will also open on loss of power to the air control solenoid valves or on loss of instrument air. - The STS AFWS only provides heat removal through the SG in MODES 4 and above. The AP600 PRHR heat exchanger provides heat removal through MODE 5 with the RCS intact. - An analysis has been performed which demonstrates that, if the PRHR heat exchanger fails to function during a transient or SGTR, the core can be adequately cooled using passive feed and bleed. This analysis was performed to justify PRA success criteria using the same computer code (NOTRUMP) as used for the SSAR LOCA analyses but with more conservative assumptions (no CMTs, one accumulator, no PRHR heat exchanger, and multiple ADS valve failures). These assumptions need not be made in support of the LCO, but they do provide additional margin.
In-containment Refueling Water Storage Tank - 3.5.6, 3.5.7, 3.5.8		
3.5.6 Action C and 3.5.7 Action C and 3.5.8 Action C	3.5.4 Action A	LCO 3.5.6 Condition C includes water volume, temperature and boron concentration deviations. STS LCO 3.5.4 includes water temperature and boron concentration deviations. The justification for including water volume is as follows: - As discussed in the BASES, for minor deviations in volume, the IRWST is fully capable of providing IRWST injection and containment recirculation following any design basis LOCA. The ability of the AP600 to provide IRWST injection and containment recirculation with this amount of water is shown in T&H analysis performed to support PRA success criteria. This analysis has been performed using the design basis analysis computer code (WCOBRA TRAC) with SSAR analysis assumptions (except for only one accumulator and no CMTs). The loss of two CMTs and one accumulator reduces the water added to the containment to support containment recirculation by a greater amount than the minor deviation allowed by the Tech Specs. - The STS allowable completion time of 8 hours is retained for the volume adjustment. This short time limits the exposure time for these conditions. - SR 3.5.6.3 requires verification that the IRWST boron concentration is within limits when ever the IRWST water volume increases by more than 3%. This ensures that the boron concentration will remain within the Tech Spec Limits.
SR 3.5.6.3 31 day	SR 3.5.4.3 7 days	STS SR 3.5.4.3 for the RWST requires a frequency of 7 days while STS SR 3.5.1.4 for the accumulator requires a frequency of 31 days. AP600 SR 3.5.6.3 requires verification of the IRWST boron concentration every 31 days based on the following: - The IRWST is located inside containment and is less likely to have water added to it. - The IRWST is much larger than the RWSTs for current plants; This larger size makes it more difficult to inadvertently change boron concentration (in order to change its boron concentration, more water would have to be added).

AP600 LCO	STS LCO	Explanation of CT/SF Value (See Note 1 for acronym definitions)
SR 3.5.6.7 IST	n/a (IST)	While the STS include the component testing frequency in each SR, AP600 component testing references the IST program for frequency. AP600 SSAR section 3.9.6 defines the IST inputs that the COL applicant wil. use to create the IST program. For AP600 and the STS, the frequency is based on ASME code requirements.
SR 3.5.6.8	n/a	A separate SR has been added to the AP600 for squib valve IST. The SR references the IST for the tests and the frequency. STS do not address squib valve IST.
SR 3.5.6.9 System Level IST	n/a (SL IST)	AP600 system testing is included in SSAR Section 3.9.6, Table 3.9-17. The AP600 Tech Spec references this SSAR information for the testing performed and its frequency. The STS include some system performance testing. The STS do not include any low-head safety injection system system-level IST.
Electrical Power Systems - 3.8		
3.8.1 Action A and 3.8.1 Action B	3.8.4 Action A	STS plants have only two divisions of Class 1E DC power subsystems while the AP600 has four. For this reason, the AP600 Tech Specs contain two actions, one for one DC electrical subsystem inoperable and one for two DC electrical subsystems inoperable. AP600 3.8.1 Action B is assigned the two hour completion time based on its close comparison with the safety function and time for STS 3.8.4 Action A. Although STS plants are not comparable to AP600's Action A for 3.8.1, a time of 12 hours was chosen based on the precedent set by STS 3.8.1 Action D and Regulatory Guide 1.93.
3.8.5 Actions A and B and 3.8.5 Actions C and D	3.8.9 Actions B and C	STS plants have only two divisions of AC and DC instrument and control bus electrical power distribution subsystems while the AP600 has four. For this reason, the AP600 Tech Specs contain actions for either one or two divisions of AC or DC electrical power distribution subsystems inoperable. AP600 3.8.5 Actions C and D (for two divisions inoperable) are assigned the two hour completion time based on close comparison with the safety function and time for STS 3.8.9 actions B and D. Although STS plants are not comparable to AP600's Actions A and B for 3.8.5, a time of 12 hours was chosen based on the precedent set by STS 3.8.1 Action D and Regulatory Guide 1.93 (See AP600 3.8.1 above.)

Note 1:

ADS	automatic depressurization system
AFWS	auxiliary feedwater system
CMT	core makeup tank
DVI	direct vessel injection
HHSI	high head safety injection
IRWST	in-containment refueling water storage tank
IST	in-service testing
LOCA	loss of coolant accident
PRA	probability risk assessment
PRHR	passive residual heat removal
RCS	reactor coolant system
RNS	normal residual heat removal system
RWST	refueling water storage tank
SG	steam generator
SGTR	steam generator tube rupture
SSAR	Standard Safety Analysis Report
STS	Standardized Technical Specifications (NUREG-1431)

Enclosure 1

Markup of AP600 Technical Specifications
to Reflect Standardized Technical Specification
Completion Times and Surveillance Frequencies