September 30, 2002

Mr. Michael M. Corletti
Passive Plant Projects & Development
AP600 & AP1000 Projects
Westinghouse Electric Company
Post Office Box 355
Pittsburgh, Pennsylvania 15230-0355

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 13 - AP1000 DESIGN CERTIFICATION REVIEW (TAC NO. MB4683)

Dear Mr. Corletti:

By letter dated March 28, 2002, Westinghouse Electric Company (Westinghouse) submitted its application for final design approval and standard design certification for the AP1000.

The Nuclear Regulatory Commission (NRC) staff is performing a detailed review of your design certification application to ensure that the information is sufficiently complete to enable the NRC staff to reach a final conclusion on all safety questions associated with the design before the certification is granted.

The NRC staff has determined that additional information is necessary to continue the review. The requests for additional information (RAIs) are included as Enclosure 1. The topics covered in these RAIs include the areas of general information and technical specifications. These RAIs were sent to you via electronic mail on September 25 and 27, 2002. You agreed that Westinghouse would submit a response to these RAIs by December 2, 2002. Receipt of the information by December 2, 2002, will support the schedule documented in our letter dated July 12, 2002.

Enclosure 2 contains a list of AP1000 RAI correspondence.

If you have any questions or comments concerning this matter, you may contact me at (301) 415-3053 or ljb@nrc.gov.

Sincerely,

/RA/

Lawrence J. Burkhart, AP1000 Project Manager
New Reactor Licensing Project Office
Office of Nuclear Reactor Regulation

Docket No. 52-006

Enclosure: As stated

cc: See next page

If you have any questions or comments concerning this matter, you may contact me at (301) 415-3053 or ljb@nrc.gov.

Sincerely,

/RA/

Lawrence J. Burkhart, AP1000 Project Manager
New Reactor Licensing Project Office
Office of Nuclear Reactor Regulation

Docket No. 52-006

Enclosure: As stated

cc: See next page

Distribution:
Hard Copy
PUBLIC
NRLPO R/F
LBurkhart
JLyons
MGamberoni
JSebrosky

E-Mail

SCollins/JJohnson	SWeerakkody
RBorchardt	ADrozd
ACRS	JRaval
OGC	HWalker
YHsii	WJensen
HLi	RPalla
NSaltos	CHarbuck
SSheng	WBeckner
EThrom	RDennig

DOCUMENT NAME: C:\ORPCheckout\FileNET\ML022700053.wpd
ACCESSION NO. ML022700053 *See previous concurrence

OFFICE	NRLPO/PM	RORP/TSS/SC*	NRLPO/DD
NAME	LBurkhart:cn	RDennig	MGamberoni-JLyons for:
DATE	9/27/02	9/27/02	9/30/02

OFFICIAL RECORD COPY

Requests for Additional Information (RAIs)
AP1000 Standard Design Certification
Series 100 - General
Series 630 - Technical Specifications and Reliability Assurance Program

Series 100 - General

100.001

Westinghouse has not yet requested any exemptions from regulations for the AP1000 design. If exemptions from the regulations are desired to support the design certification, please provide a request and basis for each exemption in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.12.

100.002

10 CFR 52.47(a)(iv) requires proposed resolutions of certain safety issues which are identified in "the version of NUREG-0933 current on the date six months prior to application..." Please state the version of NUREG-0933 you are referencing for the AP1000 design certification application.

100.003

With respect to the regulatory treatment of non-safety systems (RTNSS), is the process you utilized to determine which AP1000 systems are designated as RTNSS systems (and subsequently covered by your investment protection short-term availability controls stated in Section 16.3 of the DCD) consistent with that utilized for the AP600 and the process discussed in NUREG-1512, "Final Safety Evaluation Report Related to Certification of the AP600 Standard Design," Chapter 22? If any differences exist, please describe. Has an AP1000-specific review (based on the AP1000 design and probabilistic risk assessment (PRA)) of which systems should have regulatory treatment been performed? If not, please justify.

Series 630 - Technical Specifications (TSs)

Reference: AP1000 Design Control Document (DCD) Tier 2, Section 16.1, "Technical Specifications."

630.001

A. (Section 16.1) The AP600 TSs were modeled after Revision 1 to NUREG-1431, "Standard Technical Specifications [STS] Westinghouse Plants," and the AP1000 TSs closely resemble the AP600 TSs. Many improvements (referred to as TS Task Force improvements or TSTFs) to NUREG-1431 have been made since Revision 1 was issued in 1995. These improvements have been incorporated into Revision 2 of NUREG-1431 which was issued in June 2001. (In addition, more TSTFs have been approved since the issuance of Revision 2.) Have you considered referencing Revision 2 of the STS for the AP1000 or incorporating each TSTF that was approved since the issuance of Revision 1? Please provide an explanation for the disposition of each TSTF, whether incorporated or not, noting the reason for any differences from Revision 2, as currently updated with approved TSTFs.

B. (Section 16.1) Are there any AP1000 systems not covered by TSs that meet the criteria of 10 CFR 50.36(c)(2)(ii), i.e., have you performed an AP1000-specific review of systems that should be covered by TSs? Identify all non-TS systems that contribute to risk reduction (as determined by the PRA) and state why these systems do not satisfy 10 CFR 50.36(c)(2)(ii)(A), (B), (C), and (D). For any non-TS system that is found to meet any of the four criteria, propose an associated TS LCO or justify not including the system in TSs.

630.002

(Section 16.1) Several mostly global editorial enhancements and corrections have been incorporated into Revision 2 of the STS and should be adopted in the AP1000 TSs. See STS Revision 2 for additional details. For instance:

A. Page numbering in the TSs and the Bases was changed to a specification basis, rather than a section basis,

B. References to the Nuclear Regulatory Commission (NRC) Policy Statement criteria in the TS Bases Applicable Safety Analyses discussions should be replaced by references to 10 CFR 50.36(c)(2)(ii) criteria. Also, the Bases of every limiting condition of operation (LCO) in Sections 3.1 through 3.9 must state which of the 4 criteria apply to the LCO; if none, then include an explanation why the LCO is otherwise specified,

C. The Bases Control Program in TS Section 5.0 should be revised to reflect the revised 10 CFR 50.59, which no longer uses the term ‘unreviewed safety question.’

D. The convention for noting continuation of a subsection to the next page and from the previous page, both in the TSs and the Bases, was simplified and made easier to follow,

E. Format for Notes in the TSs was changed to stand out better and be more consistent.

F. Example 1.3-3 illustrates the use of an LCO restoration overall Completion Time for Action tables that otherwise could logically be entered and never exited. This type of Completion Time is not implemented in all cases (in TS Sections 3.1 - 3.9) where it should be (for example, TS 3.7.10). Identify those LCOs for which this restriction could be applied and modify them accordingly. In each such case explain why this limitation is not adopted.

630.003

(Section 16.1, TS Section 1.1) The AP1000 definition of Dose Equivalent I-131 differs from that of the STSs and the AP600 TSs; and the definition of Dose Equivalent Xe-133 differs from that of the AP600 TSs (this definition is not contained in the STSs). Please explain the differences and why they are acceptable.

630.004

(Section 16.1, TS Sections 1.2, 1.3, and 1.4) The last paragraph of Example 1.3-6 of the AP1000 TS Section 1.3 and in Section 16.1, page 1.3-11, is incorrectly placed after the title for Example 1.3-7. Also, each example in Sections 1.2, 1.3, and 1.4 should start on a new page, consistent with the STS format. Please revise the DCD accordingly.

630.005

(Section 16.1, TS Section 2.1 Bases) The safety limits discussion in the Bases for the reactor coolant system (RCS) Pressure Safety Limit in the AP600 and the STS Revision 2 Bases, includes bracketed information regarding the pressure allowances for the RCS piping, as well as the pressure vessel allowances of the American Society of Mechanical Engineers (ASME) Code, Section III. However, the AP1000 discussion only refers to the RCS pressure "boundary" pressure limit without separately addressing the vessel and the piping pressure limits, and omits the bracketed information. Provide the rationale for this difference or restore the omitted information consistent with the AP1000 design.

630.006

(Section 16.1, TS LCO 3.0.8) LCO 3.0.8 and supporting Bases refer to the Safety System Shutdown Monitoring Tree parameters. The Bases also refer to the Shutdown Emergency Response Guidelines. Where are these found? Also, provide a specific example that demonstrates how LCO 3.0.8 works. Consider adding such an example to TS Section 1.3, or explain it in the Bases.

630.007

(Section 16.1, TS Section 3.0) The Passive System Shutdown MODE Matrix lacks the designation of "Table B 3.0-1." Please revise the DCD accordingly.

630.008

(Section 16.1, TS Section 3.1) Acceptance of TS Section 3.1 requires resolution of the AP1000 RAIs 440.100 and 440.101. Please resolve these issues and revise the DCD/TSs accordingly.

NOTE: AP1000 RAIs 440.100 and 440.101 were issued on September 18, 2002 (ADAMS Accession No. ML022610042).

630.009

(Section 16.1, TS 3.1.1 Bases) The Bases for STS TS 3.1.1 Actions ends with the following paragraph:

"In determining the boration flow rate, the time in core life must be considered. For instance, the most difficult time in core life to increase the RCS boron concentration is at the beginning of [the] cycle, when the boron concentration may approach or exceed 2000 ppm. Assuming that a value of [1]% $\Delta k/k$ must be recovered and a boration flow rate is [ ] gpm, it is possible to increase the boron concentration of the RCS by 100 ppm in approximately 35 minutes. If a

boron worth of 10 pcm/ppm is assumed, this combination of parameters will increase the SDM [shutdown margin] by [1]% Δk/k. These boration parameters of [ ] gpm and [ ] ppm represent typical values and are provided for the purpose of offering a specific example."

The corresponding AP1000 Bases omits everything after the second sentence, which is modified by replacing "may exceed 2000 ppm" by "is highest." Please provide the rationale for these differences or adopt the STS discussion.

630.010

(Section 16.1, TS Surveillance Requirement (SR) 3.1.2.1 Bases) The Bases for AP1000 SR 3.1.2.1 does not discuss the additional requirement given in the second sentence of the Note to this SR. The corresponding STS SR 3.1.2.1 Note does not contain this sentence. Please revise the Bases to explain the reason for and acceptability of this additional requirement.

630.011

(Section 16.1, TS 3.1.3)

A. Please correct the following errors in the AP1000 TS 3.1.3 SRs:

- AP1000 SR 3.1.3.3 Notes should be revised to match the format of STS SR 3.1.3.2; the Note in the Frequency column should be put in the Surveillance column as Note 1, and the other two notes should be renumbered as Notes 2 and 3.

- AP1000 SR 3.1.3.2 should be considered for deletion because STS 3.1.3 no longer includes this SR; with this deletion, SR 3.1.3.3 should be renumbered as SR 3.1.3.2. Make appropriate Bases changes.

- The Notes to be renumbered as Notes 2 and 3 in renumbered SR 3.1.3.2 should refer to SR 3.1.3.2, not SR 3.1.4.3.

B. AP1000 RAI 440.015B addresses the affect of a positive moderator temperature coefficient (MTC) on TS 3.1.3 and asked: "If indeed the MTC is positive, how will it impact the TechnicalSpecification (TS) associated with the MTC?" Does a limit on unfavorable exposure time (UET) need to be included in TSs? The first sentence of the third paragraph of the AP1000 TS 3.1.3 Bases discussion of the Applicable Safety Analyses should be changed from "least negative" to "positive" similar to the STS. Also, are any related changes needed to AP1000 TS 5.6.5.b to describe the reference document containing the approved method of controlling UET? (See discussion on similar issue in Exelon Generating Company, LLC, letter to NRC, dated March 19, 2002, requesting license amendments to modify the method of controlling UET for Byron and Braidwood Stations, ADAMS Accession No. ML020910469.) Also note that DCD paragraph 1.2.1.2.1 page 1.2-6, third bullet, states that the AP1000 "core is designed with a moderator temperature coefficient that is non-positive . . . " Reconcile this statement with the potential for positive MTC addressed in RAI 440.015B.

NOTE: AP1000 RAI 440.015B was issued on September 18, 2002 (ADAMS Accession No. ML022610042).

630.012

(Section 16.1, TSs 3.1.4, 3.1.5, 3.1.6 and 3.1.8) Consider revising action requirements of TSs 3.1.4, 3.1.5, 3.1.6 and 3.1.8 to refer to the shutdown margin (SDM) limit specified in the core operating limits report (COLR), instead of a specific value (this would be consistent with the STS which assume the COLR exists).

630.013

(Section 16.1, TS Section 3.2) Acceptance of TS Section 3.2 requires resolution of RAI 440.102. Please resolve this issue and revise the DCD/TSs accordingly.

NOTE: AP1000 RAI 440.102 was issued on September 18, 2002 (ADAMS Accession No. ML022610042).

630.014

(Section 16.1, TS Section 3.3) Acceptance of TS Section 3.3 requires resolution of RAIs 420.034, 420.041, 420.042, 440.103, 440.111, 440.117, and 440.120. Please resolve these issues and revise the DCD/TSs accordingly.

NOTE: AP1000 RAIs 420.034, 420.041, and 420.042 were issued on August 27, 2002 (ADAMS Accession No. ML022390103). AP1000 RAIs 4401.103, 440.111, 440.117, and 440.120 were issued on September 18, 2002 (ADAMS Accession No. ML022610042).

630.015

(Section 16.1, TS 3.3.1) The word “inoperable” is unnecessary in TS 3.3.1 Actions Note and should be removed. Please revise the DCD accordingly.

630.016

(Section 16.1, TSs 3.3.1 and 3.3.2) Similar to RAIs 420.041 and 420.042 (quoted below), explain why TS 3.3.1 Required Actions D.1.2, D.1.3, E.1.2, F.1.2, K.1.2, and L.1.2, as proposed, were not needed for the AP600 reactor protection system (RPS), but are needed for the AP1000 RPS design? Also explain the same for TS 3.3.2 Required Actions B.1, B.2, I.1, I.2, J.2.1, and J.2.2.

A. 420.041 (DCD 16.1, TS LCO 3.3.1) TS LCO 3.3.1 Conditions N and O has added new Required Actions, N.2.2 and O.2.2, respectively, which states that “With two interlock channels inoperable, place the Functions associated with one inoperable interlock channel in bypass and with one inoperable interlock channel in trip.” Explain why this Action is required for the AP1000 design, but was not required for the AP600 design. Are all the interlock logics using 2-out-of-4 coincident logic? Why is the wording in Required Actions N.2.1 and O.2.1 different?

B. 420.042 (DCD 16.1, TS LCO 3.3.2) TS LCO 3.3.2 Condition J has added a new Required Action J.2.2 which states that "With two interlock channels inoperable, place the Functions associated with one inoperable interlock channel in bypass and with one inoperable interlock channel in trip." Explain why this Action is required for the AP1000 design and was not required for the AP600 design. Are all the interlock logics using 2-out-of-4 coincident logic?

Please resolve these issues and revise the DCD/TSs accordingly.

NOTE: AP1000 RAIs 420.041 and 420.042 were issued on August 27, 2002 (ADAMS Accession No. ML022390103).

630.017

(Section 16.1, TS 3.3.2) TS 3.3.2 Required Action B.2 should address two inoperable divisions as well as two inoperable channels because Condition B applies to engineered safety feature actuation system (ESFAS) Functions 15.c and 20.b. Please revise the DCD accordingly.

630.018

(Section 16.1, TSs 3.3.1 and 3.4.1) STS Table 3.3.1-1, Notes 1 and 2, refer to the COLR for the values of constants used in the equations for Overtemperature ΔT and Overpower ΔT nominal trip setpoints. Consider doing the same for the AP1000 TSs provided the bracketed values are included elsewhere in the DCD Tier 2 information.

630.019

(Section 16.1, TS 3.3.3) The STS Table 3.3.3-1 and the AP600 TS Table 3.3.3-1 include the Power Range and Source Range Neutron Flux post-accident monitoring (PAM) functions; the AP600 also includes the Intermediate Range Neutron Flux PAM function. Why does the proposed AP1000 TS Table 3.3.3-1 Function 1 only include the Intermediate Range Neutron Flux PAM function? (Note that the markup of the AP600 TS Bases for PAM Function 1 seems to indicate that the AP600 TSs only required the Intermediate Range Neutron Flux.) Does the AP1000 intermediate range instrument cover both the source and power range? The STS Bases gives adequate neutron flux coverage as a basis for its requirement. Why is such a basis missing from the AP600 and the AP1000 Bases?

630.020

(Section 16.1, TS 3.3.4 Required Action B.2) The Applicability of the remote shutdown workstation (RSW) differs from that of STS 3.3.4 and AP600 TS 3.3.4, which are the same except for the time to get to 350°F by Required Action B.2. Why is the AP1000 TS 3.3.4 Applicability changed to exclude Mode 4, i.e., shutdown with RCS temperature below 420°F? In addition, why are 13 hours permitted to place the plant below this temperature? Most other similar AP1000 TS Required Actions regarding placing the plant in Mode 4 allow only 12 hours (this is less restrictive than the STS, which requires reaching an even lower RCS temperature). Please explain.

630.021

(Section 16.1, Bases References for TSs 3.3.1 and 3.3.2) Reference 7 for TS 3.3.1 and Reference 6 for TS 3.3.2 seem to cite the same document, WCAP-10271-P-A, "Evaluation of Surveillance Frequencies and Out of Service Times for the Reactor Protection Instrumentation System," Supplement 2, Revision 1. However the document dates cited in TS 3.3.1 and TS 3.3.2 are not the same (June 1996 and June 1990, respectively). Please correct this discrepancy. The reactor trip system (RTS) and ESFAS instrumentation designs for the AP1000 are different from those addressed in the STS and the AP600. Explain how WCAP-10271-P-A applies to the AP1000 instrumentation test intervals and allowed outage times.

630.022

(Section 16.1, TS Section 3.4) Acceptance of TS Section 3.4 requires resolution of RAIs 410.006, 440.036, 440.104, 440.105, 440.106, 440.140, and 471.001. Please resolve these issues and revise the DCD/TSs accordingly.

NOTE: AP1000 RAIs 410.006, 440.036, 440.104, 440.105, 440.106, 440.140, and 471.001 were issued on September 30, 2002 (ADAMS Accession No. ML022680338).

630.023

A. (Section 16.1, TS 3.4.15) AP1000 RAI 440.036 refers to TS 3.4.3 and TS 3.4.15 and requested a derivation of the proposed low-pressure over-pressure protection (LTOP) arming temperature (275°F), which will also be specified in the pressure-temperature limits report (PTLR). This RAI is for tracking any changes to TS 3.4.15 that may result from the resolution of RAI 440.036. Please resolve this issue and revise the DCD/TSs accordingly.

NOTE: AP1000 RAI 440.036 was issued on September 30, 2002 (ADAMS Accession No. ML022680338).

B. The Applicability of STS 3.4.12 states the LTOP system is required in "Mode 4 when *any* RCS cold leg temperature is $\leq$ [275°F]." Please explain why the AP1000 TS 3.4.15 Applicability states "Mode 4 when *all* RCS cold leg temperatures are $\leq$ 275°F."

C. Why is the RCS vent area of 5.4 square inches a bracketed value?

630.024

(Section 15.4.4; Section 16.1, TS LCO 3.4.4 Note 1 & Bases) The accident analysis for startup of an inactive reactor coolant pump (RCP) at an incorrect temperature relies on Note 1 of TS 3.4.4 (no starting of a RCP with the reactor trip breakers [RTBs] closed) to ensure that initial core power is approximately zero megawatts (thermal) [MWt] and that no increase in core power will occur. However, the Bases for this note states that "[t]his requirement prevents circulation of cold and/or unborated water from an inactive loop into the core, which could cause a reactivity excursion." According to the Bases for Required Actions A.1 and B.2, starting an RCP with the reactor subcritical, with the RTBs closed, and possibly one or more withdrawn control rods, or critical below P-10, has not been analyzed, and is apparently deemed not

credible because of TS LCO 3.4.4 Note 1. Please consider revising the Bases discussion of Note 1 to be more consistent with the Chapter 15 discussion. In addition:

A. Why was this restriction not explicitly included in the AP1000 TSs 3.4.4 and 3.4.5? The AP1000 TSs contain the restriction of Note 1, but only for entry into Mode 2 from Mode 3, by virtue of LCO 3.0.4 and SR 3.0.4 in combination with LCO 3.4.4.

B. The Notes in Conditions A and B of the AP1000 TS 3.4.4 accomplish the same preventive action as Note 1. That is, they do not allow exiting the Condition by restarting a RCP with the RTBs still closed. Consider whether Note 1 is needed.

C. Why is there no interlock that prevents starting an RCP with the RTBs closed?

D. Why is Note 1 a sufficient restriction to ensure this event could never happen?

E. When is it necessary to close the RTBs and withdraw a control rod in Modes 4 and 5?

630.025

(Section 16.1, Bases for TS 3.4.17 Required Action C.2) The Completion Time of Required Action C.2 seems to allow for cooling down to the temperature (assumed to be 275°F) at which the residual heat removal system (RNS) may be placed in operation after entering Mode 4. The Bases should explain this more explicitly because the usual time to reach Mode 4 (420°F) on a shutdown action is 12 hours.

630.026

(Sections 15.5.1 and 15.5.2) The analyses of incidents [or transients] that increase reactor coolant inventory, based on the descriptions provided, assume pressurizer spray operation and automatic rod control. If these incidents present “a challenge to the integrity of a fission product barrier,” and the spray and rod control are part of the “primary success path” which functions to mitigate such design-basis transients, then it seems these two functions satisfy 10 CFR 50.36(c)(2)(ii)(C) Criterion 3. Please explain the rationale for not explicitly addressing the spray and rod control in a TS LCO.

630.027

(Section 16.1, Bases for TS 3.4.12)

A. The Bases Background discussion does not state the size of the Stage 4 automatic depressurization system (ADS) flow path squib and motor operated valves. The staff suggests including this information for completeness.

B. The last sentence of the Bases Background discussion states “The [probabilistic risk assessment] PRA (Ref. 3) shows that adequate core cooling can be provided with the failure of two (or more) flow paths.” Is this referring only to the ADS Stage 4 flow paths? What does the “(or more)” mean - that all ADS flow paths can be inoperable without compromising core cooling? Please clarify.

630.028

(Section 16.1, TS 3.4.12 Action A and TS 3.4.13 Action A) Condition A lists three possible conditions. Does each condition get a separate Completion Time? How does this action requirement work? None of the examples in Section 1.3 address this format. Please describe a specific example for each Specification. There may be a clearer way to render these action statement conditions.

630.029

(Section 16.1, Bases for TSs 3.4.12, 3.4.13, and 3.4.14) The Bases for each Specification should state which 10 CFR Section 50.36 criterion is satisfied by the ADS system. It also should more clearly state the accidents or transients requiring ADS actuation and the appropriate references.

630.030

(Section 16.1, TS 1.1 definition of LEAKAGE; and TSs 3.4.16 and 3.4.8; Sections 5.2.5 and 5.2.5.2; and Bases for TS 3.4.11)

A. LCO 3.4.16 and Action A use the term leakage while SR 3.4.16.1 uses the term LEAKAGE. Despite the opening statement of the TS 3.4.16 Bases LCO discussion that RCS pressure isolation valve (PIV) leakage is "identified LEAKAGE," the proposed TS definition of LEAKAGE does not appear to account for RCS PIV leakage (and it is not considered part of "Unidentified LEAKAGE"). Note that DCD Section 5.2.5, second bullet of the last paragraph, states that intersystem leakage is not identified leakage, and refers to TS 3.4.8 Bases. Clarify what is meant by leakage in TS 3.4.16, clearing up inconsistencies among the DCDs, TSs, and Bases. In addition, the Bases for TS 3.4.11 uses LEAKAGE in reference to primary and secondary leak rate; it appears that lower case is appropriate, i.e., leakage.

B. AP1000 SR 3.4.8.1 should be revised to state, "Verify RCS Operational leakage is within limits by performance of RCS water inventory balance." Please revise the DCD accordingly.

630.031

(Section 16.1, TS 3.4.8, and Section 5.2.5.3.3)

A. Explain why the primary to secondary LEAKAGE limits in proposed LCO 3.4.8.d and LCO 3.4.8.e have been reduced from the values in the AP600. That is, why were the accident analysis leakage assumptions reduced (see associated Bases discussion),

B. The Frequency Note of SR 3.4.8.1 is redundant and may be deleted,

C. The last sentence of the first paragraph of DCD Section 5.2.5.3.3 contains an extraneous 'and' after the word gaseous.

630.032

(Section 16.1, TS 3.4.10)

A. Why does Required Action A.1 not contain a Note that says “LCO 3.0.4 is not applicable.”? If it should contain this note, then, consistent with STS 3.4.15, this note should be placed over the Actions table, and removed from the individual Conditions A and B.

B. Why does TS 3.4.10 not adopt STS 3.4.15, Action F, to enter LCO 3.0.3 immediately if all required monitors are inoperable? This action should be included.

C. STS 3.4.15 Required Actions A.1 and B.1.2 to perform RCS water inventory balance (SR 3.4.13.1) contain a note that says “Not required until 12 hours after establishment of steady state operation.” If this note applies to the AP1000, it should be adopted in the AP1000 TS 3.4.10 Required Actions A.1 and B.1.2.

630.033

(Section 16.1, TS 3.4.11 Bases; TS 3.7.4 Bases; Section 15.6.3.3.1, last paragraph)

The Bases (Applicable Safety Analysis) for STS 3.4.16, “RCS Specific Activity,” states that the steam generator tube rupture (SGTR) analysis assumes the secondary coolant DOSE EQUIVALENT I-131 limit of 0.1 µCi/gm (micro-Curies-per-gram). The corresponding discussion in the Bases for the AP1000 TS 3.4.11 does not address assumptions about the secondary coolant activity; however, the last paragraph of DCD 15.6.3.3.1 indicates that SGTR source term assumes 10 percent of the maximum RCS coolant equilibrium activity of iodine and alkali metal activity. Further, the Bases for the AP1000 TS 3.4.11 only mentions the main steam line break, not the SGTR event. Revise the Bases to be more consistent with the STS Bases and the DCD.

630.034

(Sections 16.1, TS 3.4.17 Bases) The Bases for the reactor vessel head vent system (RVHV) specification does not state which 10 CFR 50.36 criterion applies, and thus, why it is included in the AP1000 TSs. Please revise the Bases to state why this system is in TSs.

630.035

(Section 16.1, TS 3.5.1) The Bases Background discussion for the AP1000 TS 3.5.1 states that both accumulators are needed in the event of a large break loss-of-coolant accident (LOCA) caused by a break of a cold leg pipe. Although this is a low probability event, the 8-hour Completion Time for the Condition of one inoperable accumulator does not appear to be justified.

The STS Bases for STS LCO 3.5.1 states that:

“Four accumulators are required to ensure that 100% of the contents of three of the accumulators will reach the core during a LOCA. This is consistent with the assumption that the contents of one accumulator spill through the break. If less than three accumulators are

injected during the blowdown phase of a LOCA, the ECCS acceptance criteria of 10 CFR 50.46 could be violated."

Accordingly, the STS allows just one hour to restore the accumulator to operable status in the event one accumulator is inoperable for reasons other than boron concentration not within limits. In the AP1000 design, the accumulators connect directly to the reactor vessel, which reduces the likelihood that the contents of one accumulator will not flow into the core. A similar arrangement exists in the AP600 design. However, only one accumulator's contents are needed in the AP600. Thus, the 8-hour accumulator restoration Completion Time of the AP600 TS 3.5.1 appears to be justified. It does not appear to be justified for the AP1000, however. Either provide additional justification for the 8-hour Completion Time for the AP1000 design, including additonal Bases discussion, or adopt a 1-hour time, consistent with the STS.

630.036

(Section 16.1, TS SR 3.5.1.4) Explain why the AP600 accumulator specified boron concentration range applies to the AP1000, given there is no change in the accumulator specified volume range (SR 3.5.1.3), when there is an increase in reactor pressure vessel (RPV) volume, pressurizer water volume, and steam generator (SG) primary side volume (DCD Sections 5.1 - 5.4) over the AP600 design. Note that the boron concentration remains unchanged for the core makeup tanks (CMTs) while the volume increases by 25 percent (SR 3.5.2.2).

630.037

(Section 16.1, TS 3.5.2 and 3.5.3 Actions)

A. Explain how Action B would apply if Condition B is entered on one CMT on boron concentration and subsequently on the same CMT on temperature, with boron concentration recovery before temperature recovery?

B. Why are there no Conditions addressing Condition A and B together on the same CMT or different CMTs? Also, Condition E should say "One CMT inoperable . . ."

C. The second condition in Action F tries to cover situations not explicitly covered by Actions A through E; however, Section 1.3 allows being in two or more conditions simultaneously as long as the specified conditions together encompass the actual plant condition for the system covered by the LCO. Explain when Action F would apply with multiple other conditions entered simultaneously. Consider revising the Actions to resolve this conflict.

D. Condition A should be revised for clarity as follows: "One CMT inoperable due to one CMT outlet isolation valve inoperable." This also applies to TS 3.5.3 Condition A.

630.038

(Section 16.1, TS 3.5.4 Action B Bases) The Bases should provide more information regarding the importance and function of the IRWST gutter isolation valves. Please revise the DCD accordingly.

630.039

(Section 16.1, TS 3.5.6 Action B and SRs, TSs 3.5.7 and 3.5.8)

A. In Action B, the first condition statement actually contains two separate conditions; hence Condition B is actually three separate Conditions that would each have its own 8-hour Completion Time to return the affected parameter to within limits, and contributing to the return of the IRWST to Operable status. Is this the intent? Suggest all Condition statements like this (where one or more parameters related to component operability are not within limits) be stated similarly to the following:

"IRWST inoperable due to one or more parameters (volume, temperature, and boron concentration) not within limits."

The rules of TS Section 1.3 are clear regarding how to apply this kind of condition statement.

B. If a 3 percent range of values for volume is acceptable, as indicated in the Bases for Required Action B.1, why not specify this range in SR 3.5.6.2? Also, the condition statement "IRWST water volume <100% and >97% of limit" implies that a volume below 100 percent but greater than 97 percent makes the IRWST inoperable. Please clarify.

C. Explain what is meant by the 3 percent given in the second Frequency of SR 3.5.6.3; modify the Frequency statement and the Bases as appropriate to clarify the meaning.

Note, the same or similar three comments apply to TSs 3.5.7 and 3.5.8.

630.040

(Section 16.1, SR 3.6.1.1 Note) Regarding the Note in the Frequency column, the Bases do not explain the reason for not allowing the 25 percent Frequency extension of SR 3.0.2. Corresponding STS SR 3.6.1.1 does not contain the note. Revise the Bases to state the reason for the note, if it is even necessary.

630.041

(Section 16.1, TS 3.6.3 Actions C and D, and SR 3.6.3.5)

A. Nuclear Energy Institute (NEI)/NRC guidance for STS formatting and style dictate that Condition C not be split between pages as proposed.

B. Delete the unnecessary phrase "in MODES 1, 2, 3, and 4" from Condition D.

C. The surveillance interval for testing automatic CIV actuation on a simulated or actual signal is not necessarily an inservice test. Specify a [18]-month frequency for SR 3.6.3.5 consistent with corresponding STS SR 3.6.3.8. (Choose an interval equal to the cycle duration.)

630.042

(Section 16.1, TSs 3.6.4, 3.6.5, and 3.6.6 Bases)

In reviewing the AP1000 TS Bases discussions of the Applicable Safety Analyses for TSs 3.6.4, "Containment Pressure," 3.6.5, "Containment Air Temperature," and 3.6.6, "PCS [Passive Containment Cooling System] - Operating," the staff noted that the content of the AP1000 discussion was changed from the content of the corresponding AP600 discussion, which is consistent with STS Revision 2. In Revision 0 to the AP1000 DCD, you removed the safety analysis calculated values but maintained the description and identity of the limiting design-basis accident (DBA), either the LOCA or the steam line break (SLB), as appropriate. In DCD Revision 1, you also removed the description and identity of the limiting event. As a result, the noted TS Bases discussions only indicate that DBAs have been analyzed (in DCD Section 6.2) and that these analyses show the containment design values are not exceeded. Please provide your rationale for these Bases changes or restore the omitted information, consistent with the applicable AP1000 DBA safety analyses.

630.043

(Section 16.1, TS LCO 3.6.4) The bracket around "$\geq$ -0.2 psig and" should only include "-0.2"; i.e., [-0.2]. Please revise the DCD accordingly.

630.044

(Section 16.1, TS 3.6.6 and 3.6.7, LCOs, Actions C and D, and SR 3.6.6.1)

A. Both LCOs 3.6.6 and 3.6.7 should explicitly require three PCS flow paths because the Actions are structured as if there are three operable flow paths. Also, please revise the Bases to make this clear.

B. Condition C should be stated "Water storage tank inoperable due to one or more parameters (volume and temperature) not within limits." This will make the second Condition of Action C less ambiguous. (See AP1000 RAI 630.039.)

C. The note in the Frequency column of SR 3.6.6.1 should be moved to the Surveillance column, and revised to say "Only required to be performed when the ambient temperature is $\leq$ 32°F or $\geq$ 100°F."

D. Revise the second paragraph of the Bases for SR 3.6.6.1 to make it clear that the temperature region of 32°F to 100°F is within the **ambient** operating temperature limits of the PCS water storage tank, which ensures the water temperature will remain within the band of 40°F to 120°F, the SR acceptance criteria.

630.045

(Section 16.1, TS 3.6.8 Bases) The Bases for TS 3.6.8 reference the PRA descriptions in DCD Chapter 19 and the AP1000 PRA, but do not explicitly state the specific bounding postulated shutdown event(s). The Background discussion, fifth paragraph, indicates that

events leading to loss of RNS cooling is the main concern. To minimize loss of cooling water inventory for such events, containment penetrations allowed by the LCO to be open should be closed before steaming occurs, within a time frame consistent with Figure B 3.6.8-1. However, for clarity and completeness, please: (a) Revise the Bases to explicitly state what the postulated events are, (b) clarify what is meant by "such events" (according to the last sentence of the fifth paragraph, the hot leg level instrument function to automatically isolate letdown on hot leg low level precludes loss of RNS cooling for "such events"), and (c) state which of the Criteria of 10 CFR 50.36 apply to this LCO.

630.046

(Section 16.1, omitted TS 3.6.10) Please explain why TSs for the hydrogen recombiners are not included.

630.047

(Section 16.1, TS Section 3.7) Acceptance of TS Section 3.7 requires resolution of RAIs 410.008, 410.009, and 410.013. Please address these issues and revise the DCD/TSs accordingly.

NOTE: AP1000 RAIs 410.008, 410.009, and 410.013 were issued on September 30, 2002 (ADAMS Accession No. ML022680338).

630.048

(Section 16.1, TS 3.7.5) Please change the Applicability of TS 3.7.5 to be consistent with corresponding STS 3.7.15.

630.049

(Section 16.1, TS 3.7.6) It is recommended that you adopt TSTF 287, Revision 5 for TS 3.7.6, consistent with STS TS 3.7.10. Although the AP600 has a 24-hour allowed outage time (AOT) (Action C) for an inoperable control room boundary, the handling of this provision, including Notes and Bases discussions related to intentionally making the boundary inoperable, was incomplete, and should be improved in the AP1000 TSs (consistent with TSTF 287 and Revision 2 to the STS).

630.050

(Section 16.1, TS 3.7.10) Modify the Bases of TS 3.7.10 with additional justification for the 8-hour Completion time for the loss of SG isolation function conditions of Actions C and D. What, if any risk insights does the AP1000 PRA provide to support this Completion Time?

630.051

(Section 16.1, TS Section 3.9) Acceptance of TS Section 3.9 requires resolution of RAI 410.009. Please address this issue and revise the DCD/TSs accordingly.

NOTE: AP1000 RAI 410.009 was issued on September 30, 2002 (ADAMS Accession No. ML022680338).

630.052

(Section 16.1, TS Section 3.9) STS Section 3.9 does not contain specifications for a decay time limit and a spent fuel pool fuel handling crane load limit. Nevertheless, such specifications must be included in the AP1000 TSs unless a suitable justification is provided, because these "operating restrictions" are directly related to assumptions of the design-basis fuel handling accident in the spent fuel storage pool, and satisfy Criterion 2 of 10 CFR 50.36(c)(2)(ii). Provide design-specific justifications for omitting these LCOs from the AP1000 TSs.

630.053

(Section 16.1, TS Section 5.5) Explain the basis for not adopting STS 5.5.3, Post Accident Sampling.

HISTORY OF AP1000
REQUESTS FOR ADDITIONAL INFORMATION (RAIs)

Letter No.	Date issued	ADAMS Accession No.	RAI Nos.	Date of response	ADAMS Accession No.
1	6/26/2002	ML021780568	440.001 - 440.008	7/24/2002	ML022110430
2	8/16/2002	ML022280379	720.001	9/10/2002	ML022560265
3	8/27/2002	ML022390103	420.001 - 420.046, 435.001 - 435.015		
4	9/3/2002	ML022460356	620.001 - 620.043		
5	9/4/2002	ML022470255	210.001 - 210.057		
6	9/5/2002 Reissued 9/18/2002	ML022480440, Reissued RAI ML022610042	440.009 - 440.148, 720.002 - 720.026	9/12/2002 (440.009)	ML022600097
7	9/19/2002	ML022620026	260.001 - 260.003, 261.001 - 261.010, 471.001, 471.010, 472.001, 472.003		
8	9/19/2002	ML022620319	220.001 - 220.019, 230.001 - 230.019, 240.001 - 240.004, 241.001 - 241.003		

HISTORY OF AP1000
REQUESTS FOR ADDITIONAL INFORMATION (RAIs)

9	9/24/2002	ML022620079	250.001 - 250.003, 251.001 - 251.029, 252.001 - 252.009, 281.001- 281.003		
10	9/25/2002	ML022620614	210.058 - 210.070, 261.011 - 261.013, 720.027 - 720.040		
11	9/27/2002	ML022670315	440.149 - 440.182, 451.001 - 451.007, 470.001 - 470.013, 720.041 - 720.097		
12	9/30/2002	ML022680338	280.001- 280.011, 410.001- 410.020, 460.001- 460.010, 480.001- 480.009, 640.001		
13	9/30/2002	ML022700053	100.001- 100.003, 630.001- 630.053		

AP 1000

cc:

Mr. W. Edward Cummins
Advanced Plant Safety & Licensing
Westinghouse Electric Company
P.O. Box 355
Pittsburgh, PA 15230-0355

Mr. Michael Corletti
Advanced Plant Safety & Licensing
Westinghouse Electric Company
P.O. Box 355
Pittsburgh, PA 15230-0355

Mr. H. A. Sepp
Westinghouse Electric Company
P.O. Box 355
Pittsburgh, PA 15230

Lynn Connor
Doc-Search Associates
2211 sw 1ST Ave - #1502
Portland, OR 97201

Barton Z. Cowan, Esq.
Eckert Seamans Cherin & Mellott, LLC
600 Grant Street 44th Floor
Pittsburgh, PA 15219

Mr. Ed Rodwell, Manager
Advanced Nuclear Plants' Systems
Electric Power Research Institute
3412 Hillview Avenue
Palo Alto, CA 94304-1395

Charles Brinkman, Director
Washington Operations
Westinghouse Electric Company
12300 Twinbrook Parkway, Suite 330
Rockville, MD 20852

Mr. R. Simard
Nuclear Energy Institute
1776 I Street NW
Suite 400
Washington, DC 20006

Mr. Thomas P. Miller
U.S. Department of Energy
Headquarters - Germantown
19901 Germantown Road
Germantown, MD 20874-1290

Mr. David Lochbaum
Nuclear Safety Engineer
Union of Concerned Scientists
1707 H Street NW, Suite 600
Washington, DC 20006-3919

Mr. Paul Gunter
Nuclear Information & Resource Service
1424 16th Street, NW., Suite 404
Washington, DC 20036

Ms. Wenonah Hauter
Public Citizen's Critical Mass Energy
Project
215 Pennsylvania Avenue, SE
Washington, DC 20003

Mr. Tom Clements
6703 Guide Avenue
Takoma Park, MD 20912

Mr. James Riccio
Greenpeace
702 H Street, NW, Suite 300
Washington, DC 20001

Hugh Jackson, Policy Analyst
Public Citizen's Critical Mass Energy
and Environment Program
1724 Duarte Drive
Henderson, NV 89014

Mr. James F. Mallay, Director
Regulatory Affairs
FRAMATOME, ANP
3315 Old Forest Road
Lynchburg, VA 24501

Mr. Ed Wallace, General Manager
Project Management
Lake Buena Vista Bldg., 3rd Floor
1267 Gordon Hood Avenue
Centurion 0046
Republic of South Africa
PO Box 9396 Centurion 0046

Mr. Vince Langman
Licensing Manager
AECL Technologies, Inc.
901 15th Street, NW., Suite 440
Washington, DC 20005-2301

Mr. Glenn R. George
PA Consulting Group
Chrysler Building, 34th Floor
405 Lexington Avenue
New York, NY 10174

Mr. Gary Wright, Manager
Office of Nuclear Facility Safety
Illinois Department of Nuclear Safety
1035 Outer Park Drive
Springfield, IL 62704