Docket File

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 15, 1997

Mr. Nicholas J. Liparulo, Manager
Nuclear Safety and Regulatory Analysis
Nuclear and Advanced Technology Division
Westinghouse Electric Corporation
P.O. Box 355
Pittsburgh, PA 15230

SUBJECT: COMMENTS ON THE AP600 TECHNICAL SPECIFICATIONS (TS) RELATED TO CONTAINMENT SYSTEMS

Dear Mr. Liparulo:

The U.S. Nuclear Regulatory Commission (NRC) is reviewing the AP600 TSs (08/96-Amendment 0) which were included with Revision 9 to the AP600 standard safety analysis report. In letters to Westinghouse dated December 24, 1996, and January 29, 1997, the staff provided initial comments on the AP600 TS. Numerous followup telecons have taken place between Westinghouse and NRC reviewers to resolve many issues. During this time the Containment Systems and Severe Accident Branch has completed its review of the AP600 TS. Their comments are enclosed with this letter.

The staff has noted in its previous comments to Westinghouse as well as those enclosed with this letter that there appears to be a generic misapplication of the use of Mode 4 as a Limiting Condition for Operation (LCO) required action end state. In addition, there are a number of references to the Inservice Testing Program (IST) for certain surveillance frequencies where the testing is not covered under the IST program.

Regarding the required action end states, a technical specification cannot end in the Mode in which the LCO is still applicable. The staff supports the use of Mode 4 as an end state to the extent that it can be justified by the AP600 design on a case-by-case basis. If applicability of a given LCO is needed for Mode 4, then the required action end state must be Mode 5. Concerning the use of IST, the reference to certain surveillance testing frequencies as "In accordance with the Inservice Testing Program" is only appropriate for those items that are directly covered by the testing frequencies of ASME Section XI of the Boiler and Pressure Vessel Code and applicable addenda as addressed in 10 CFR 50.55(a). Any surveillance testing not directly covered by this program should have the surveillance frequency specified in the TS along with a more detailed description of the functions to be tested.

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If you have any questions regarding this matter, you may contact me at (301) 415-1141.

Sincerely,

original signed by:

William C. Huffman, Project Manager
Standardization Project Directorate
Division of Reactor Program Management
Office of Nuclear Reactor Regulation

Docket No. 52-003

Enclosure: As stated

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William C. Huffman, Project Manager
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See next page

Mr. Nicholas J. Liparulo
Westinghouse Electric Corporation

Docket No. 52-003
AP600

cc: Mr. B. A. McIntyre
Advanced Plant Safety & Licensing
Westinghouse Electric Corporation
Energy Systems Business Unit
P.O. Box 355
Pittsburgh, PA 15230

Ms. Cindy L. Haag
Advanced Plant Safety & Licensing
Westinghouse Electric Corporation
Energy Systems Business Unit
Box 355
Pittsburgh, PA 15230

Mr. M. D. Beaumont
Nuclear and Advanced Technology Division
Westinghouse Electric Corporation
One Montrose Metro
11921 Rockville Pike
Suite 350
Rockville, MD 20852

Mr. Sterling Franks
U.S. Department of Energy
NE-50
19901 Germantown Road
Germantown, MD 20874

Mr. S. M. Modro
Nuclear Systems Analysis Technologies
Lockheed Idaho Technologies Company
Post Office Box 1625
Idaho Falls, ID 83415

Mr. Frank A. Ross
U.S. Department of Energy, NE-42
Office of LWR Safety and Technology
19901 Germantown Road
Germantown, MD 20874

Mr. Ronald Simard, Director
Advanced Reactor Programs
Nuclear Energy Institute
1776 Eye Street, N.W.
Suite 300
Washington, DC 20006-3706

Ms. Lynn Connor
Doc-Search Associates
Post Office Box 34
Cabin John, MD 20818

Mr. James E. Quinn, Projects Manager
LMR and SBWR Programs
GE Nuclear Energy
175 Curtner Avenue, M/C 165
San Jose, CA 95125

Mr. Robert H. Buchholz
GE Nuclear Energy
175 Curtner Avenue, MC-781
San Jose, CA 95125

Barton Z. Cowan, Esq.
Eckert Seamans Cherin & Mellott
600 Grant Street 42nd Floor
Pittsburgh, PA 15219

Mr. Ed Rodwell, Manager
PWR Design Certification
Electric Power Research Institute
3412 Hillview Avenue
Palo Alto, CA 94303

Mr. Charles Thompson, Nuclear Engineer
AP600 Certification
NE-50
19901 Germantown Road
Germantown, MD 20874

CONTAINMENT AND SEVERE ACCIDENT BRANCH
COMMENTS CONCERNING
WESTINGHOUSE AP600 TECHNICAL SPECIFICATIONS

(1) 3.3.2 ESFAS Instrumentation

NUREG-1431 contains an LCO 3.3.6, "Containment Purge and Exhaust Isolation Instrumentation," which has been moved to LCO 3.3.2, "ESFAS Instrumentation," in the AP600 TSs. The TS was moved because the instrumentation is not separate from ESFAS as in operating Westinghouse plants. LCO 3.3.6 of NUREG-1431 is applicable during Modes 1,2,3, and 4, during core alterations, and during movement of irradiated fuel assemblies within containment. The BASES for LCO 3.3.6 state that the containment purge and exhaust isolation radiation monitors act as backup to the SI signal to ensure closure of the purge and exhaust valves. The radiation monitors are also the primary means for automatically isolating containment in the event of a fuel handling accident during shutdown.

Function 19, "Containment Air Filtration System Isolation," of Table 3.3.2-1, of the AP600 TS addresses isolation of the Containment Air filtration System upon receipt of a high containment radioactivity signal. This isolation capability is covered by LCO 3.3.6 in NUREG-1431. Function 19 is only applicable in Modes 1,2,3 as opposed to Modes 1 through 4 and during fuel movement in LCO 3.3.6. Function 19 requires 3 out of 4 channels operable and, with one required channel inoperable, returning an inoperable channel to operable in 168 hours. LCO 3.3.6 requires a gaseous, a particulate, an iodine and an area containment radiation monitor to be operable and, with one of the four channels inoperable, returning an inoperable channel to operable within four hours. The Nominal Trip Setpoints and Completion Times, between the two LCOs, are also different. LCO 3.3.6 is twice background while Table 3.3.2-1 is less than or equal to 2 R/hr. SCSB does not believe that LCO 3.3.6 of NUREG-1431 has been adequately reflected in the AP600 TSs. The differences identified above need to be justified.

3.6.1 Containment

(2) Westinghouse has renamed "HOT STANDBY" as "SAFE SHUTDOWN" and changed the temperature range from 200-350 °F to 200-420 °F. The proposed TS 3.6.1 is confusing. It requires that the containment be operable in Mode 4, but if it isn't, the required ACTION is to go to Mode 4. This makes no sense! The applicability of this TS in Mode 4 needs to be clarified. If it is not applicable in Mode 4, it needs to be analytically justified.

(3) BASES 3.6.1, LCO, first paragraph: The text "leakage testing" was not incorporated as detailed in accordance with the Appendix J, Option B Model STS.

Enclosure

(4) According to the P&ID (SSAR Fig 9.4.7-1, Note 11) for the Containment Air Filtration System the purge valves are metal-seated. Thus there is no need to refer to resilient-seated purge valves in BASES SR 3.6.1.1. Westinghouse should explain the reason for the reference to resilient seat valves in the 3.6.1 LCO BASIS.

(5) SSAR 6.2.5.1, Design Basis (for Containment Leak Rate Test System), states "The system design accommodates the test methods and frequencies consistent with requirements of 10 CFR Part 50 Appendix J, Option A or B". The NUREG-1431 is developed based upon Option A only. There is a Model STS for converting only to the Option B method. There are no STS models for accommodating Option A and B, concurrently. Most recent licensee technical specification amendments are proposing to convert to the Option B. The AP600 STS should also be developed accordingly. Westinghouse has been asked to reconsider the Exemptions List of Table 6.2.5-1. It is the NRC position that Appendix J Exemptions will have to be specifically requested by COL applicants - they should not be written into the Design Certification Rule.

(6) The BASES text indicates a 4.5 foot annulus space. There is a baffle in the annulus that creates the air flow path (~3 ft between shield building and baffle, the downcomer, and ~1-½ ft between baffle and containment vertical shell, the riser). The baffle is sectional and removable for inspection of the steel shell and dome. Based on the description provided, it could appear that the baffle is a flow obstruction.

3.6.2 Air Locks

(7) LCO Actions Note #1: This word change from "on" to "of" does not appear to clarify the intent of the Action Note. Westinghouse has not justified this change. For the sake of consistency, please retain the wording preference of NUREG-1431.

(8) Required Action A.1 and A.2: This appears to be a typo. The Logical Connector <u>AND</u> is missing between Required Action A.1 and A.2.

(9) Condition B: There are four proposed changes in wording which do not appear to clarify the intent of this Condition. Westinghouse has not justified any of these changes. For the sake of consistency, please retain the wording preference of NUREG-1431.

(10) Consistent with comment (2) above, the General Design Criteria (GDC), and the containment safety function, containment integrity should be required for all plant conditions for which a LOCA is postulated. Westinghouse will either need to change the required action end state for this LCO to Mode 5 or justify why it is not applicable in Mode 4.

(11) SR 3.6.2.1: This Frequency Note stating "3.0.2 is not applicable" is a legitimate requirement. In accordance with the Appendix J, Option B Model STS, this note has been relocated to Section 5.0 as a part of the

description of the Containment Leakage Rate Testing Program. See Section 5.5.9. Also, in Note #2, in accordance with the Option B Model STS, "of" must be replaced with "applicable to".

(12) SR 3.6.2.1, Note #1: A new word "associated" has been inserted to describe the overall air lock leakage test. The addition of "associated" does not improve the wording of this note. The BASES do not explain this change. This change has not been justified by Westinghouse. There appears no reason to change the current NUREG-1431 text.

(13) SR 3.6.2.2, Note: This appears to be a typo. "Air lock" is two words.

(14) BASES SR 3.6.2.1, first paragraph: In the second sentence, the word "rate" has been deleted and "regard" has been substituted for "respect". Also, the third sentence has been deleted. For the sake of consistency with the NUREG-1431 and the Appendix J, Option B, Model STS, please retain the STS text.

BASES SR 3.6.2.1, first paragraph: In the third sentence, the text deletions and additions have changed the meaning so that it implies the airlock has a higher allowed leakage rate than the STS allows. This is not acceptable. Please retain the requirement as is written in NUREG-1431.

BASES SR 3.6.2.1, first paragraph: In accordance with the Appendix J, Option B Model STS, in the fourth sentence, the words "Appendix J" and "as specified in" should be removed. Also, the fifth sentence should be removed to be in accordance with the Appendix J, Option B Model STS.

(15) BASES SR 3.6.2.1, second paragraph: The SR 3.6.2.1 refers to "the" and not to "an" overall air lock test. There is no justification for this change. Please retain the text as intended by the NUREG-1431.

BASES SR 3.6.2.1, second paragraph: The changes required to Note #2 were not incorporated as required to be in accordance with the Appendix J, Option B Model STS. Please change this text.

(16) BASES, References: In accordance with the Appendix J, Option B Model STS, the "Option B" is identified with Appendix J.

3.6.3 Containment Isolation Valves

(17) LCO Actions Note #3: The addition of the word "supported" appears to limit the number of systems which have to be declared inoperable. This is not discussed in the BASES. This is not justified by Westinghouse. There appears to be no basis for this change. Please retain the text as written in NUREG-1431.

(18) Note 4, The words "acceptance criteria" should be added to the end of this Note for consistency with NUREG-1431 and terminology used in the Containment Leakage Rate Testing Program and applicable SRs. Also, the Note #3 of LCO 3.6.2 should be made equally consistent.

(19) Condition A, Note: The word "those" has been added but there is no Westinghouse justification for this change. Please leave text as is written in NUREG-1431.

(20) Required Action A.2: The word "each" is proposed to be substituted for "the". This change is redundant and unnecessary because Actions Note #2 explicitly states this action is for each affected flow path. There is no Westinghouse technical basis provided for this change. Therefore, please leave text as is written in NUREG-1431.

(21) Required Action C.1: It is assumed this is a typo because most other locations this word is hyphenated which is the preference of the NRC STS Style Guide.

(22) For Condition D of this LCO, Westinghouse must either go to Mode 5 or justify why the LCO is not applicable in Mode 4 similar to comment (2) above.

(23) SR 3.6.3.1: This SR has been edited in a way which changes the meaning and is different from the BASES. After "ALARA", the "or" was deleted and a "comma" was inserted. It was intended that ALARA was to be joined to the "considerations for personnel entry" and not separated, as is created by this change. Please retain the wording of the NUREG-1431.

SR 3.6.3.1: NUREG-1431 SR 3.6.3.1 was deleted without Westinghouse justification. The AP600 standard design contains provisions for these large purge and supply valves. The AP600 purge valves are metal-seated with special sealing and testing provisions built into them. The NUREG-1431 surveillance requirement SR 3.6.3.1 should be retained so as to require a periodic verification that the valves are leaktight.

(24) NUREG-1431 SR 3.6.3.6 and SR 3.6.3.9: The STS contains two surveillance requirements, SRs 3.6.3.6 and 3.6.3.9, for the weight or spring loaded check valves tested during operation and then at refueling. Westinghouse has not provided justifications to explain these deletions. Please explain this deletion?

(25) NUREG-1431 SR 3.6.3.7: This STS surveillance requirement has been deleted from the AP600 TS. If the COL applicant selects purge valves designs or any other containment isolation valves which have resilient seals, then this SR 3.6.3.7 will apply. Westinghouse has not provided justifications to explain these deletions. Westinghouse should explain the NUREG-1431 deletion. Metal-seated valves that rely on inflatable seals for leaktightness should be included in TSs similarly to resiliently seated.

(26) BASES, References: In accordance with the Appendix J, Option B Model STS, a reference is to be added so "Option B" is identified with "10 CFR Part 50, Appendix J, Option B."

3.6.4 Containment Pressure

(27) LCO Statement: The containment pressures are not bracketed.

(28) For Condition B of this LCO, Westinghouse must either go to Mode 5 or justify why the LCO is not applicable in Mode 4 similar to comment (2) above.

(29) BASES, Applicable Safety Analyses: The results of the safety analyses are not included in the BASES. It only states that results are within the design capability. Please provide reference values as are in NUREG-1431.

3.6.5 Containment Air Temperature

(30) LCO Statement: The containment temperature is not bracketed.

(31) For Condition B of this LCO, Westinghouse must either go to Mode 5 or justify why the LCO is not applicable in Mode 4 similar to comment (2) above.

(32) BASES, Applicable Safety Analyses: The results of the safety analyses are not included in the BASES. It only states that results are within the design capability or are acceptable. Please provide reference values as are in NUREG-1431.

3.6.6 Passive Containment Cooling System (PCS) - Operating

(33) Condition A: The BASES description of what constitutes an operable flow path requires more explanation. In the LCO description, a degraded system configuration is presented as an operable flow path. The air-operated valve is "administratively" held open while the motor-operated valve is relied upon to automatically release PCS water. This is an inoperable flow path and Condition A should be entered.

(34) Since the PCS system has no specific counterpart in standard technical specifications, Westinghouse will need to provide detailed justification for the completion times and surveillance frequencies chosen.

(35) A new "Condition C" should be considered which states "PCS is inoperable for reasons other than Conditions A or B". This Condition means PCS water is capable of flowing; however, the PCS support systems may not be able to maintain the water within the conditions needed to achieve the desired flow limits. Such as, a condition when the PCS storage tank is inoperable due the inoperability of the recirculation pump, the heaters or the chemical addition tank. SSAR 6.2.2.2.3, third paragraph, states PCS operability is dependent upon the recirculation loop. Also, there is no mention in the BASES of the recirculation loop.

This new Condition "C" would also replace the Condition D <u>OR</u> statement of "LCO not met for reasons other than A, B, or C." which is really another basis for entry into LCO 3.0.3. This <u>OR</u> statement should be

deleted because it is redundant to LCO 3.0.3. There is no specific justification for this OR statement addition in the Westinghouse justification document or in the BASES.

(36) In addition to the PCS description shortfall noted in comment (35) (recirculation loop and pumps, chemical control, and heaters), the PCS has additional features which need to be considered both for operability and for surveillance requirements:

(a) Bucket: there is a bucket suspended from the shield building just above the containment dome apex. The bucket is used to assure uniform distribution of the PCS water. The delivery pipes are located somewhere below the operating water level of the bucket (SSAR 6.2.2.2.3). The bucket must be operable (in place). If the bucket can fill with rain water, or condensation, and subsequently freeze, the PCS water flow path will be closed.

(b) Weirs: there are two sets of weirs on the containment dome. The weirs are used to assure uniform distribution of the PCS water. The weirs must be operable (in place).

(c) The PCS will not perform its design function if there is a degradation of the inorganic zinc paint on either the exterior or the interior of the containment shell and dome region. The effects of environmental pollutants needs to be addressed (for example, soot from a fire or organic residues from industrial works), at least for surveillance. As a first-of-a-kind (FOAK), there may be the need for an applicant to commit to perform inspections on the surface wetability during the first few refueling outages before any extended surveillance period can be considered or justified. The surveillance interval needs to be reconsidered.

(d) The passive containment cooling water storage tank (PCCWST) is also used for makeup to the spent fuel pool. Since this could occur during reactor operations, an LCO needs to be developed.

(e) The post 72 hour designs changes need to be considered. The increased PCCWST volume and the on-grade auxiliary storage tank need to be considered. The auxiliary tank level (volume), temperature, and chemical control need to be considered (operability and surveillance). The recirculation pumps, which provided post 72 hour makeup to the PCCWST (for up to 7 days) need to be considered (operability and surveillance).

(f) The PCS air flow path is not described in sufficient detail to determine surveillance requirements and or possible failure modes: the air inlets with their (heated) screens, the baffle which creates the downcomer and riser sections, the flow turning (curved) vanes, and the chimney with its screens (heated).

(g) The drains in the upper annulus region need to be clear from obstructions to maintain the air flow path. In Section 40 of the

probabilistic risk assessment (PRA) (Revision 8, September 30, 1996), it is stated that weekly surveillance of the drains is performed to preclude blockage of the air path as a failure mode.

(h) From the SSAR description it is not clear if part of the PCCWST discharge piping (to the bucket) will be outside the heated valve room. Loss of heating may result in freezing of the line. There is no LCO or surveillance on the valve room or piping temperatures or heater availability.

(37) Current Condition C: When two PCS flow paths are inoperable, then LCO 3.0.3 should be entered immediately. This is a loss of function. The proposed 8 hour is inconsistent the STS practice for loss of both trains of an engineered safety feature. There should be no additional time needed to evaluate this condition and the completion time should be immediate entry to LCO 3.0.3.

(38) For Condition D of this LCO, Westinghouse must either go to Mode 5 or justify why the LCO is not applicable in Mode 4 similar to comment (2) above.

(39) SR 3.6.6.1: Upper and lower external temperature limits have been added to the performance of this SR. Please explain the appropriateness of these temperatures to the analysis initial condition limits specified in SSAR Table 6.2.1.1-3. Where is the air temperature measured? Analytically, this would be the temperature of the air as it enters the shield building. It could be from -40 °F to 115 °F. Since the air temperature is one of the variables that impacts the pressure calculation, why is there no LCO on its value?

(40) SR 3.6.6.3: The performance of this SR is questioned because the BASES imply it is dependent upon the availability of a control room indication. If the indication is not available, what is done? Also, what if the indication becomes inoperable? The NUREG-1431 requires direct inspection every 31 days. Has this been deleted? If so, explain why?

(41) SR 3.6.6.4: Verification of that valves are not locked, sealed or secured and will correctly position on an automatic signal are not part of the ASME Section XI Inservice Testing Program. Westinghouse should specify a specific frequency for this surveillance as currently done in NUREG-1431. This comment is also applicable to SR 3.6.3.5 for containment isolation valves.

(42) SR 3.6.6.5: SSAR 6.2.2.2.4, fifth paragraph, implies that the air baffle in the shield building annulus is removable. Are the removable sections the inspection ports? It would seem appropriate that inspection that all potentially removable baffle sections should also be added to the SR to verify that they are in place, prior to startup.

(43) Bases, Background, fifth paragraph & Applicable Safety Analyses, third paragraph: This states that PCS is automatically actuated by a Containment High-1 pressure signal. SSAR 6.2.2.1, Table 6.22-3 and Figure 7.2-1 all indicate it should be a Containment High-2 pressure signal. Also, the dual separate switches of Figure 7.2-1 for manual initiation are not adequately discussed. The SSAR 6.2.2.1 states that PCS cooling water is designed to flow for at least three days. Please add this specific requirement rather than just "until tank is empty".

(44) BASES, Applicable Safety Analyses second paragraph: The results of this analyses all report that they meet design limits without stating what the specific results are. Please add bracketed representative values.

(45) BASES, Applicable Safety Analyses, second and third paragraph: The last sentence of the second paragraph and the third paragraph appears to be the same subject for the assumed response time delay. Please clarify.

(46) BASES, Action B.1: The last part of this paragraph is not developed enough to provide adequate justification for the 24 hour completion time. Credit cannot be given to water sources which are not subject to TS control.

(47) SR 3.6.6.6: The proposed inservice testing program (ITP) is not in accordance with ASME Section XI. It is the staff's understanding that this refers to AP600 SSAR Table 3.9-17, "PCS." This is unacceptable. The test and frequency should be placed in the TSs. In addition, the following questions related to the test described in SSAR Table 3.9-17.

(a) What are the PCCWST drain lines? Are these the discharge lines discussed in the technical specifications? Are they the delivery lines discussed in the SSAR (6.2.2.2.3)? Or are these the upper annulus drains?

(b) The test does not address the three flow stages (each line has its own flow orifice and measuring device - not a single flow as indicated in Note 2 of Table 3.9-17), the uniformity of the flow around the vessel circumference or the water area coverage fraction for each flow phase. Measurements of all three is necessary to assess degradation of the exterior surface.

(c) There is no justification for the 10 year surveillance period. As a FOAK, there may be the need for an applicant to commit to perform inspections on the surface wetability during the first few refueling outages before any extended surveillance period can be considered or justified. The surveillance interval needs to be reconsidered.

3.6.7 Passive Containment Cooling System (PCS) - Shutdown

(48) Most of the comment for LCO 3.6.6 above are valid for this LCO as well.

(49) BASES, Applicability: Why does the maintenance of the storage tank and water delivery system have to do with the Applicability? Why permit any maintenance before the end of the Applicability of this LCO for the PCS? There is more discussion of what happens after the 100 hours rather than justification for why the 100 hour limit is appropriate for the Applicability as proposed. For example, the bases appears to imply that limited work on the air baffles could begin before the 100 hour time limit. However, if maintenance of the air flow path or baffle begins prior to the end of the Applicability of this PCS, then SR 3.6.6.5 can not be met.

(50) BASES, Background and Applicable Safety Analyses: Please expand these sections for Shutdown. Please identify what accidents are affected by the loss of containment decay heat removal. Where are and what are the results of these analyses discussed in the SSAR? Also, discuss the reasons for the 100 hours limit. An analysis to support the air cooling only capability of the PCS during shutdown needs to be performed and documented as part of the bases.

(51) Where are the analyses which support the required actions for Condition D?

(52) Why are there no references in the bases?

3.6.8 Containment Penetrations

(53) LCO 3.6.8: The Westinghouse justification document does not provide any reasons for this LCO. This is a new LCO which is similar to NUREG-1431 LCO 3.9.4 (to which it is compared) but the reasons for including this LCO are different. Westinghouse should clarify in the BASES why this LCO is now applicable in Modes 5 and 6 rather than simply refueling operations as in NUREG-1431.

(54) "Closure capability" can be directly reasoned for containment penetrations such as the purge system flow paths provided the automatic valve is not blocked open. This "closure capability" definition assumes each penetration flow path has a removable blockage that must somehow get removed before the flow path can be isolated. Containment "closure capability" is also defined as dependent upon an unknown number of penetrations which will have to be closed prior to "steaming into containment". As defined, it appears this capability can not be specifically established to determined whether or not it is within the limiting bounds of the proposed BASES Figure 3.6.8-1. Can closure capability ever be numerically established and controlled to provide a reasonable margin prior to steaming into containment?

(55) Bases, Applicable Safety Analyses: Please identify what are the safety analyses performed that have which assumptions or initial conditions that are used as the basis for this LCO. Please identify what are the shutdown events associated with this LCO. Where are the analyses? The References in the BASES refer to "FSAR 15.4.5" but in SSAR 15.4.5 it states this is not applicable for the AP600 design because it is for

BWR's. The reference to the Standard Review Plan section 15.7.4 seems inappropriate. In addition, "...Interim..." should be deleted to be consistent with the other Bases sections of TS.

(56) The BASES LCO state this is to limit the loss of cooling water inventory. The Background states some water can be lost. Is it an assumption of the safety analyses that some water will be lost until containment closure is achieved. How is this assumption verified? What if too much water escapes?

(57) This LCO appears to facilitate an accelerated or shorten refueling operations period by permitting the rapid entry into containment with an accompanying loss of containment isolation. Is this correct or please explain? Also, explain the meaning of "Time After Shutdown" as used in the Background and in the BASES Figure 3.6.8-1. When exactly is time equal to zero for "Time After Shutdown"?

(58) What is intended for the status of Containment OPERABILITY during the movement of irradiated fuel assemblies in containment and for CORE ALTERATIONS? How does a fuel handling accident in containment affect containment OPERABILITY? Was the analyses of SSAR 15.7.4 performed assuming all potential open penetrations in the containment per this LCO or was release assumed only through certain penetrations?

(59) LCO Statement b: There appears to no need to delete the requirement that one door in each air lock be closed as in NUREG-1431 LCO 3.9.4. It is suggested that the NUREG-1431 LCO 3.9.4 text be kept and include the additionally proposed clause by changing "and" to "or" . This is same as LCO Statement "a" where "or" is used when a penetration has to be open.

(60) LCO Statement d.2: There does not appear to be a "Containment Isolation" signal required to be Operable for this condition. What signal is this LCO referring to? Some clarification is needed for the technical specification on this matter.

(61) Condition B: Would the required actions of Condition B be needed if the Applicability is changed to not permit any containment penetration to be open during these conditions with short times to "steaming the containment"?

(62) SR 3.6.8.3: How is this covered by the ASME Section XI IST program? The staff believes that this should be defined with its own specific frequency unrelated to IST.

(63) Why are there no SRs similar to proposed SR 3.6.8.2 for the air locks or for the spare containment penetrations which opened under this LCO? Air locks and spare penetrations must be capable of being restored prior to steaming. An appropriate SR is to require periodic verification that necessary equipment is properly staged.

(64) Bases, Background: There appears to be a typo where "isolable" is met.

3.6.9 pH Adjustment

(65) SR 3.6.9.1 requires only a lower limit; whereas, the BASES state that the volume of trisodium phosphate (TSP) is to create a containment sump water solution with a pH between 7.0 and 9.5. It is SCSB's understanding that the LOCA radiological consequences analysis takes credit for iodine retention in the sump solution based on the water pH being greater than or equal to 7.0. The radionuclide releases from the containment atmosphere and the consequences of a LOCA would be increased if the pH of the sump water were not adjusted to 7.0 or above. Therefore, the volume of TSP is only to maintain the pH greater than or equal to 7.0 and there is no requirement to keep it less than 9.5. Condition A, SR 3.6.9.1 and the applicable BASES should be made consistent with the assumptions in the AP600 SSAR

(66) Condition B: Delete the Condition B OR statement of "LCO not met for reasons other than A." which is really another basis for entry into LCO 3.0.3. This OR statement is redundant to LCO 3.0.3. There is no specific justification for this OR statement addition in the Westinghouse justification document or in the BASES.

(67) For Condition B of this LCO, Westinghouse must either go to Mode 5 or justify why the LCO is not applicable in Mode 4 similar to comment (2) above.

(68) SCSB believes that long term verification of the chemical quality of the TSP needs to be included in the surveillance requirements by the TSs. An example of an acceptable surveillance would be to take a representative sample of the TSP after exposure to the containment environment and submerge it in a specified amount of water. The water would have a specific concentration of boron and the water temperature would be controlled. Without agitation, the solution pH should be raised to greater than or equal to 7.0 within a set amount of time. The BASES should provide a description and location of the TSP baskets.

(69) References for the LCO on pH adjustment are needed. At a minimum, the assumptions involving the pH adjustment system in Chapter 15 of the AP600 SSAR should be included in the reference section.

(70) The BASES should call out the dodecahydrate form of TSP because it is hydrated and is less likely to absorb large amounts of water from the humid atmosphere and will undergo less physical and chemical change than the anhydrous form of TSP.

(71) The allowed completion times are not conservative when compared to those approved for pH control systems in evolutionary designs.

Hydrogen Recombiners (New LCO 3.6.10): Proposed in Westinghouse Letter dated March 12, 1997.

72) The BACKGROUND and REFERENCES sections to B 3.6.10 fails to reference the regulatory requirements for the PARs such as 10 CFR 50.44 and GDC 41.

73) In the APPLICABLE SAFETY ANALYSES, what are the conservative assumptions used to maximize the amount of hydrogen calculated? Is Westinghouse using assumptions other than those recommended in RG 1.7? If so, they should be given or referenced, or RG 1.7 should be mentioned? This is needed to consistent with the STS.

74) Why has all mention of steam line breaks in the Standard Technical Specifications (STSs) been eliminated from the AP600 TSs?

75) Either the SSAR needs to be revised to support determination of the air temperature increase to be measured in SR 3.6.10.2 or a COL action item to require development of a bench test to be incorporated into SR 3.6.10.2. To be consistent with the STSs, SR 3.6.10.2 should include the air temperature increase, the composition of the test mixture, and the allowable time to reach the prescribed temperature. This information is needed because during a test the temperature within a plate will be below and above the specified acceptance temperature depending on the location of the thermocouple. Temperatures within the PAR cartridge can vary greatly and are dependant on a number of factors such as location and mounting of the thermocouple, and the proximity of the thermocouple to the hydrogen source.

76) A specific surveillance frequency, such as [24] months, should be given for SR 3.6.10.1 and 2. It is inconsistent with the STSs to reference the Inservice Testing Program for the surveillance frequency.

Missing NUREG-1431 LCOs

(77) Hydrogen Ignition System (STS LCO 3.6.10): The AP600 TSs do not include the Hydrogen Ignition Subsystem (HIS). Operating experience, specifically the accident at Three Mile Island, has shown that a system for hydrogen control is important to public health and safety as promulgated by 10 CFR 50.34(f), "Additional TMI-Related Requirements." The Commission stated, in its statement of considerations for 10 CFR 50.34(f), that the requirements in the new rule are necessary for protection of the public and that their costs are not exorbitant. Westinghouse has used the criteria in the NRC Policy Statement on TS Improvement to identify the systems to be included in the AP600 TSs. Criterion 4 of the policy statement calls out structures, systems and components which operating experience or probabilistic safety assessment has shown to be important to public safety. Based on Criterion 4, the staff has concluded that systems provided to meet the requirements of 10 CFR

50.34(f)(2)(ix) should be included in the AP600's TSs. The precedent for this decision was made during the evolutionary design certification for the System 80+.

(78) Vacuum Relief System (STS LCO 3.6.12): There is no justification for the deletion of this LCO other than a statement that it does not apply. The BASES of LCO 3.6.4 is the only location which implies that the worst negative pressure event for containment is a loss of AC power coupled with an extremely cold outside temperature. This is the only credible event identified which could cause sufficient negative pressure inside containment to challenge the steel containment shell. There are no analyses results report in the BASES or the SSAR to confirm the severity of this event. Westinghouse should provide this information and include it in the BASES of LCO 3.6.4 and confirm if this is the only event.

(79) Shield Building (STS LCO 3.6.19): The deletion of this LCO requires discussion regarding how the structural integrity, functional spaces and surfaces of the shield building will be inspected. How is NUREG-1431 SR 3.6.19.3 incorporated into LCO 3.6.1 or LCO 3.6.6 as a part of structural integrity inspections of the Containment Leak Rate Test Program.

(80) **5.5 Programs and Manuals**

A PCS surveillance program should be established. The design basis is predicated on the expected performance of the water distribution system (PCCWST, flow lines, orifices, distribution bucket, and weirs) and the surface conditions on the exterior containment dome and vertical shell (wetability, uniformity and area coverage). The annulus air flow path (air inlets in the shield building, downcomer section, baffle and turning vanes, riser section, chimney and exhaust) and the upper annulus drains are also key components of the PCS. Unanticipated failure modes and degradation need to be considered in this program. For example:

(a) Monitoring should include the baffle plates and connectors for possible thermal or vibration induced problems.

(b) The alignment of the distribution bucket and the weirs needs to be verified periodically for possible problems resulting from long term settling of the structures.

(c) The wetability, including uniformity and area coverage, of the exterior surface needs to be monitored periodically and on a case-by-case basis following unexpected events such as fires or chemical accidents.

(d) Blockage of the PCS air inlets, exhaust or the upper annulus drains, although not expected, from environmentally induced factors such as ice or wind blown debris, or from biological induced factors such as bird or animal nests, needs to be trackable and, if possible, corrective actions taken and documented.