To: Diane Jackson, NRC

Subject: Draft SSAR changes to support the senior management meeting

February 27, 1997

Attached are draft SSAR changes to provide a site interface on soil variability. These requirements are to be added to subsection 2.5.4.5.2 as a COL requirement. Also provided is a new subsection 3.8.5.4.3 to be added provide limits on construction sequence.

This information is provided in support of the March 3, 1997 senior management meeting.

Don Lindgren

2.5.4.5 Combined License Information

Combined License applicants referencing the AP600 design will address the following site specific information related to the geotechnical engineering aspects of the site. No further action is required for sites within the bounds of the site interface criteria.

2.5.4.5.1 Site and Structures - Site-specific information regarding the underlying site conditions and geologic features will be addressed. This information will include site topographical features, as well as the locations of seismic Category I structures.

2.5.4.5.2 Properties of Underlying Materials - A determination of the static and dynamic engineering properties of foundation soils and rocks in the site area will be addressed. This information will include a discussion of the type, quantity, extent, and purpose of field explorations, as well as logs of borings and test pits. Results of field plate load tests, field permeability tests, and other special field tests (e.g., bore-hole extensometer or pressuremeter tests) will also be provided. Results of geophysical surveys will be presented in tables and profiles. Data will be provided pertaining to site-specific soil layers (including their thicknesses, densities, moduli, and Poisson's ratios) between the basemat and the underlying rock stratum. Plot plans and profiles of site explorations will be provided.

Laboratory Investigations of Underlying Materials - Information about the number and type of laboratory tests and the location of samples used to investigate underlying materials will be provided. Discussion of the results of laboratory tests on disturbed and undisturbed soil and rock samples obtained from field investigations will be provided.

Key considerations with respect to the materials underlying the nuclear island are to define the type of site, such as rock or soil, and to determine whether the site can be considered uniform; or, if the site is nonuniform, to define the nonuniform soil characteristics such as the location and profiles of soft and hard spots. These key considerations can be assessed with the information developed in response to Regulatory Guides 1.132 and 1.138. The geological investigations of subsection 2.5.1 and 2.5.4.5.1 provide information on the potential for the site to be non-uniform, whether it may be geologically impacted, and whether the bedrock may be sloping or undulatory. This information should be considered in planning the geotechnical investigations.

2.5.4.5.2.1 Site Evaluation for Uniform Sites

Appendix C to Regulatory Guide 1.132 provides guidance on the spacing and depth of borings for safety-related structures. Specific language in the Regulatory Guide suggests a spacing of 100 feet supplemented with borings on the periphery and at the corners for favorable, uniform geologic conditions.

For foundation engineering purposes, a series of borings should be drilled on a grid pattern that encompasses the nuclear island footprint and 40 feet beyond the boundaries of the footprint. The grid need not be of equal spacing in the two orthogonal directions, but it should be oriented in accordance with the true dip and strike of the rock in the immediate area

of the nuclear island footprint. If geologic conditions are such that true dip and strike are not obvious, or if the dip is practically flat, then the orientation of the grid can be consistent with the major orthogonal lines of the nuclear island. The spacing of the borings on the grid should be on the order of 50 to 60 feet. For example, an acceptable grid could have 5 borings in the short direction and 7 borings in the long direction, resulting in 35 borings to cover the footprint and 40 feet beyond. The depth of borings should be determined on the basis of the geologic conditions. Borings should be extended to a depth sufficient to define the site geology and to sample materials that may swell during excavation, may consolidate subsequent to construction, may be unstable under earthquake loading, or whose physical properties would affect foundation behavior or stability. At least one-fourth of the primary borings should penetrate sound rock or, for a deep soil site, to a maximum depth, d_{max}, taken as the depth at which the change in the vertical stress during or after construction for the combined foundation loading is less than 10 percent of the in situ effective overburden stress. Other borings may terminate at a depth of 160 feet below the foundation (equal to the width of the structure).

The subsurface may consist of layers and these layers may dip with respect to the horizontal. The physical properties of the foundation medium may or may not vary systematically across a horizontal plane. If the dip is less than 20 degrees, the generic analysis using horizontal layers is applicable as described in NUREG CR-0693 (Reference 28).

The recommended methodology for checking uniformity is to calculate from the boring logs a series of "best estimate" planes beneath the AP600 footprint that define the top (and bottom) of each layer. The planes could represent stratigraphic boundaries, lithologic changes, unconformities, but most important, they should represent boundaries between layers having different shear wave velocities. Shear wave velocity is the primary property used for defining uniformity of a site.

The depth to a given layer indicated on each boring log will not fall precisely on the postulated plane. There will be some deviation between the elevations indicated on the boring logs for the top of a layer and that suggested by a "best estimate" plane. A deviation of 5 percent of the depth from the ground surface to the plane is considered acceptable. If the deviation is greater than 5 percent, additional planes may be appropriate or additional borings may be required, thereby diminishing the spacing. After the calculated planes are established, the uniformity and dip of the layers are compared against the site interface criteria defined below.

The AP600 is designed for application at a site where the foundation conditions do not have extreme variation within the footprint of the nuclear island. The Combined License applicant shall demonstrate that the foundation subgrade modulus is within the range considered for design of the nuclear island basemat or a site specific analysis shall be performed. The subgrade modulus is a function of the soil layers below the footprint. The variation of shear wave velocity in the material below the foundation to a depth of 80 feet below the basemat within the footprint of the plant shall meet the following criteria for the site to be considered acceptable as a uniform site:

- For a rock site having consolidated natural material with an average zero strain shear wave velocity greater than or equal to 2500 feet per second at the ground surface, the layers should be approximately equal thickness, should have a dip no greater than 20 degrees, and the shear wave velocity at any location within any layer should not vary from the average velocity within the layer by more than 20 percent.

- For a soil site having consolidated natural material with an average zero strain shear wave velocity less than 2500 feet per second at the ground surface, the layers should be approximately equal thickness, should have a dip no greater than 20 degrees and the shear wave velocity at any location within any layer should not vary from the average velocity within the layer by more than 10 percent.

- For a site consisting of soil layers on top of rock, the rock and soil layers should meet the interface criteria for rock and soil sites respectively as decribed above.

2.5.4.5.2.2 Site Evaluation for Non-Uniform Sites

If it is determined during the course of the geological investigations that there is a possibility that the site is non-uniform or the borings associated with an investigation for a uniform site indicate that the site is actually non-uniform, the investigation effort should be extended in such a way that the site may be demonstrated to be acceptable for an AP600. As the AP600 foundation/structural system design is robust, the probability of being able to show compliance for all but the worst of sites is high, unless liquefaction or faulting is prevalent on the site. As stated in Regulatory Guide 1.132, where variable conditions are found, spacing of boreholes should be smaller, as needed, to obtain a clear picture of soil or rock properties and their variability. Where cavities or other discontinuities of engineering significance may occur, the normal exploratory work should be supplemented by borings or soundings at a spacing small enough to detect such features.

Appendix 2A presents a survey of 22 commercial nuclear power plant sites in the United States. This survey focused on site parameters that affect the seismic response such as the depth to bedrock, type and characteristic of the soil layers, including the variation of shear wave velocities, the depth to the ground water level, and the embedment depth of the plant structures. Of the 22 sites, 11 are rock sites where competent rock exists at relatively shallow depths. At the other sites, the depth to bedrock varies from about 50 feet (Callaway) to well in excess of 4,000 feet (South Texas). A review of these 11 soil sites, all of which are marine, deltaic, or lacustrine deposits, did not reveal any significant variation of soil characteristics below the footprint of the plant. There was one possible nonuniform site, Monticello, which is underlain by glacial deposits; the geologic description is such that there might be lateral variability in the foundation parameters within the plan dimension of the plant. The review of the 22 commercial nuclear power plant sites in the United States suggests that the majority of AP600 sites exhibit "uniform" soil properties within the plant footprint. These "uniform" sites would be evaluated as described in subsection 2.5.4.5.2.1.

To provide guidance for the site investigation of non-uniform sites, three non-uniform cases are described that might occur for nuclear plants. For each of these cases, the type of site investigation is described.

Sloping Bedrock Site

The sloping bedrock site as shown on Figure 2.5-2 is typical for a river front site where in the geologic past the bedrock has been eroded to a valley slope and then the valley was subsequently filled with alluvium. The bedding in the rock is nearly horizontal, but the surface of the rock is sloping on a strike parallel to the direction of the river. The shear wave velocity of the uniform soil layer overlying rock may vary between 1,000 and 2,500 feet per second. The shear wave velocity of 3,500 feet per second for the bedrock is representative of sites with a sloping rock surface. Sites where the bedrock has much higher shear wave velocities are not likely to exhibit such conditions.

Investigations for a site with a sloping bedrock surface must define the depth to bedrock as a function of plan location and the shear wave velocity of the overlying soil and bedrock. The bedrock profile can be identified in the same manner as described in subsection 2.5.4.5.2.1 for the various layers for a uniform site. The same criterion, i.e, deviations up to 5 percent of the depth are acceptable. More borings may be necessary than required for a uniform site in order to establish the variation in depth to bedrock within the nuclear island footprint.

Undulatory Bedrock Site

An undulatory bedrock site as shown in Figure 2.5-3 is one where the bedding planes in the bedrock are (or nearly) horizontal but the surface is undulatory. Such a situation may occur if the bedrock surface is an erosion surface in a marine or lake environment. Another example might be a limestone site overlain by saprolite as in the southeast United States. The undulations could be the result of differential weathering or by soft zones associated with solution activity in the limestone.

Investigations for a site with an undulatory bedrock surface associated with weathering or karst condition must define the depth to bedrock as a function of plan location and the shear wave velocity of the overlying soil and bedrock. For cases with the overlying soil layer between the foundation level and the bedrock less than 40 feet, the pattern dimensions of the undulations must be defined with borings, specifically the width and depth of the undulations. Boring spacings on the order of 10 feet may be required for undulations having dimensions on the order of 20 feet in order to establish the variation in depth to bedrock within the nuclear island footprint.

Geologically Impacted Site

A geologically impacted site as shown on Figure 2.5-4 is one where the bedrock has abrupt facies change or has been interrupted either by a fault (shear zone) or by an intrusive such as a dike. This leads to the possibility of lateral variation in the bedrock properties affecting soil structure interaction and bearing pressure. Three subcases are identified. The first type

includes an abrupt facies change. The second type has a shear zone of varying width and position. The third case is an intrusive dike of very competent rock compared to the surrounding rock.

Investigations for a geologically impacted site must define the width of the zone of the higher (or lower) shear wave velocity. The location of the zone of higher (or lower) shear wave velocity must be determined in relation to the center of containment. The azimuths of the bounding postulated vertical planes of the higher (or lower) shear wave velocity must be determined.

The zone of the higher (or lower) shear wave velocity has been shown in Figure 2.5-4 bounded by non-curvilinear vertical parallel planes. It is recognized that such a situation is highly unlikely in nature. A procedure similar to that described in subsection 2.5.4.5.2.1 for identifying the horizontal layers of uniform sites can be used to define the nearly vertical planes of a geologically impacted site. Deviations between the site condition and the idealized postulated situations on the order 5 percent are considered acceptable.

In order to define the width and location of the zone of higher (or lower) shear wave velocity, the spacing of the borings will have to be on the order of 10 feet for a zone with a width of 20 feet. It may be more practical to trench the site to locate and define the dimensions and locations of the intrusive or shear zone, thus eliminating many of the borings that would otherwise be required.

Acceptance criteria for non-uniform sites

The key attribute for acceptability of the site for an AP600 is the bearing pressure on the underside of the basemat. This is a function of the subgrade modulus at the elevation of the foundation. The lateral variability of this subgrade modulus is acceptable if the layers satisfy the criteria for uniform soils given in subsection 2.5.4.5.2.1. A site having local soft or hard spots within a layer or layers does not meet the criteria for a uniform site. The subgrade modulus is a function of the properties of the layers below the foundation and failure of one layer to meet the uniform criterion may not make the overall foundation unacceptable. An alternative evaluation criterion is therefore defined to evaluate sites that do not satisfy the requirement for all layers to be uniform.

A site with nonuniform soil properties may be demonstrated to be acceptable by site-specific analyses of the bearing pressures on the underside of a rigid rectangular basemat equivalent to the nuclear island. Bearing pressures are calculated for dead and safe shutdown earthquake loads. The safe shutdown earthquake loads are those from the AP600 design soil case representative of the site-specific soil. Alternatively, the safe shutdown earthquake loads may be determined from a site-specific seismic analysis of the nuclear island. For the site to be acceptable, the bearing pressures from the site-specific analyses need to be less than or equal to 120 percent of the bearing pressures calculated in similar analyses for a site having uniform soil properties. This evaluation method is expected to demonstrate that sloping and undulating bedrock sites are acceptable when the soil layer over the bedrock is sufficient. It will also

show acceptability for geologically impacted sites where there is a soil layer between the foundation level and the abrupt stiffness change of the bedrock.

For sites having bedrock close to the foundation level the assumption of a rigid basemat may be overly conservative because local deformation of the basemat will reduce the effect of local soil variability. For such sites, a site-specific analysis may be performed using the AP600 basemat model and methodology described in subsection 3.8.5. The safe shutdown earthquake loads are those from the AP600 design soil case representative of the site-specific soil. Alternatively, bearing pressures may be determined from a site-specific soil structure interaction analysis. For the site to be acceptable the bearing pressures from the site-specific analyses need to be demonstrated to be less than the capacity of each portion of the basemat.

2.5.4.5.3 Excavation and Backfill - Information concerning the extent (horizontal and vertical) of seismic Category I excavations, fills, and slopes, if any will be addressed. The sources, quantities, and static and dynamic engineering properties of borrow materials will be described in the site-specific application. The compaction requirements, results of field compaction tests, and fill material properties (such as moisture content, density, permeability, compressibility, and gradation) will also be provided. Information will be provided concerning the specific soil retention system, for example, the soil nailing system, including the length and size of the soil nails, which is based on actual soil conditions and applied construction surcharge loads.

2.5.4.5.4 Ground Water Conditions - Groundwater conditions will be described relative to the foundation stability of the safety-related structures at the site. The soil properties of the various layers under possible groundwater conditions during the life of the plant will be compared to the range of values assumed in the standard design in Table 2-1.

2.5.4.5.5 Response of Soil and Rock to Dynamic Loading - The dynamic characteristics of the soil and rock will be compared to the assumptions made in the standard design regarding the variation of shear wave velocity and material damping. The parametric analyses described in Appendices 2A and 2B cover a broad range of dynamic characteristics appropriate for most soil types (sand, silts, clays, gravels, and various combinations). The shear wave velocity (based on low strain best estimate soil properties) must be greater than or equal to 1000 feet per second.

For sites where the soil characteristics are outside the range considered in Appendix 2A.2 and Appendix 2B.2, site-specific soil structure interaction analyses may be performed by the Combined License applicant to demonstrate acceptability by comparison of floor response spectra at the following locations. These analyses would use the site specific soil conditions and site specific safe shutdown earthquake. The three components of the site specific ground motion time history must satisfy the enveloping criteria of Standard Review Plan 3.7.1 for the response spectrum for damping values of 2, 3, 4, 5 and 7 percent and the enveloping criterion for power spectral density function. Comparison of the floor response spectra at these locations is sufficient demonstration that the site seismic conditions are within the AP600 design basis.

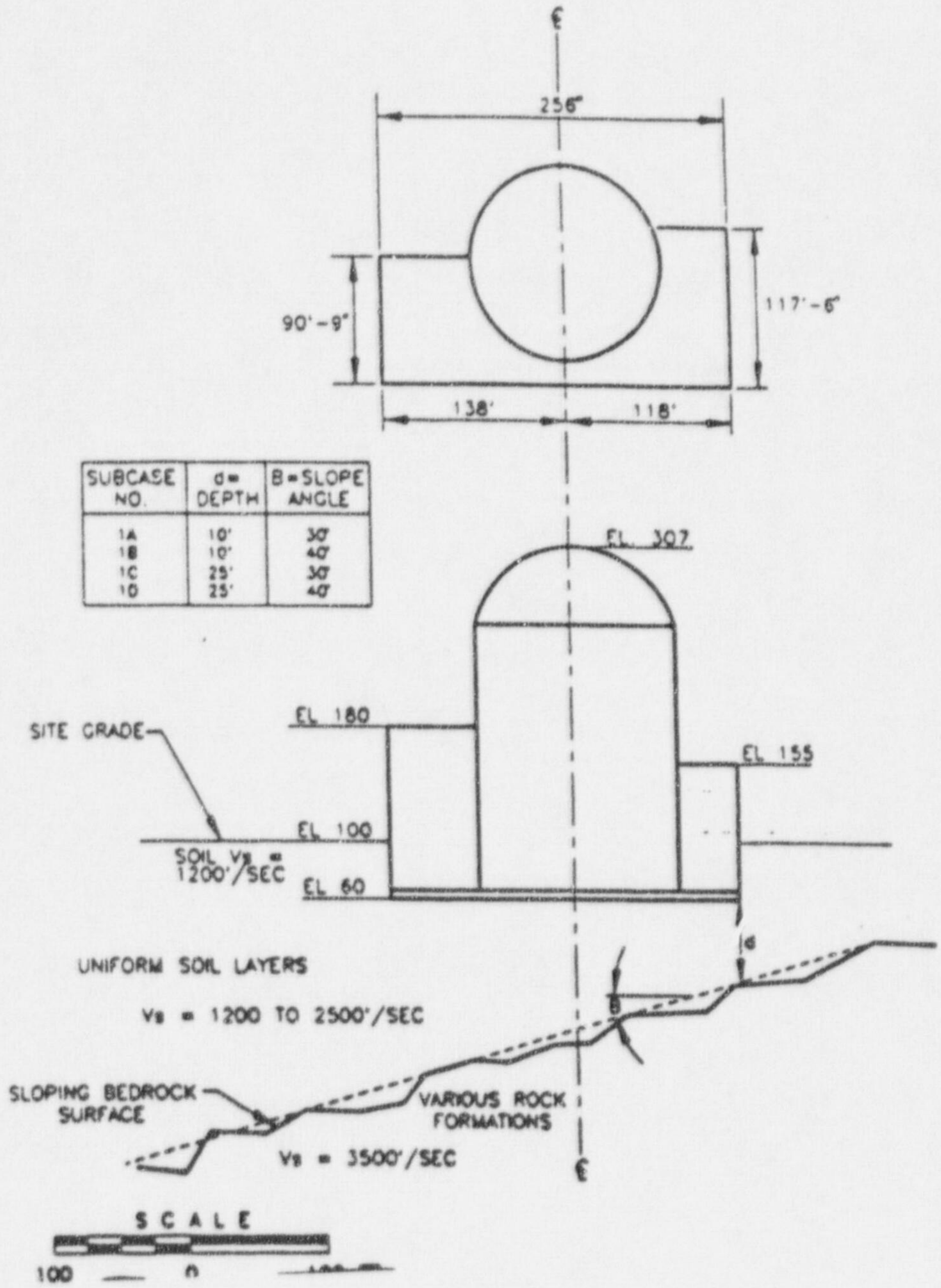


Figure 2.5-2

Sloping Bedrock Site

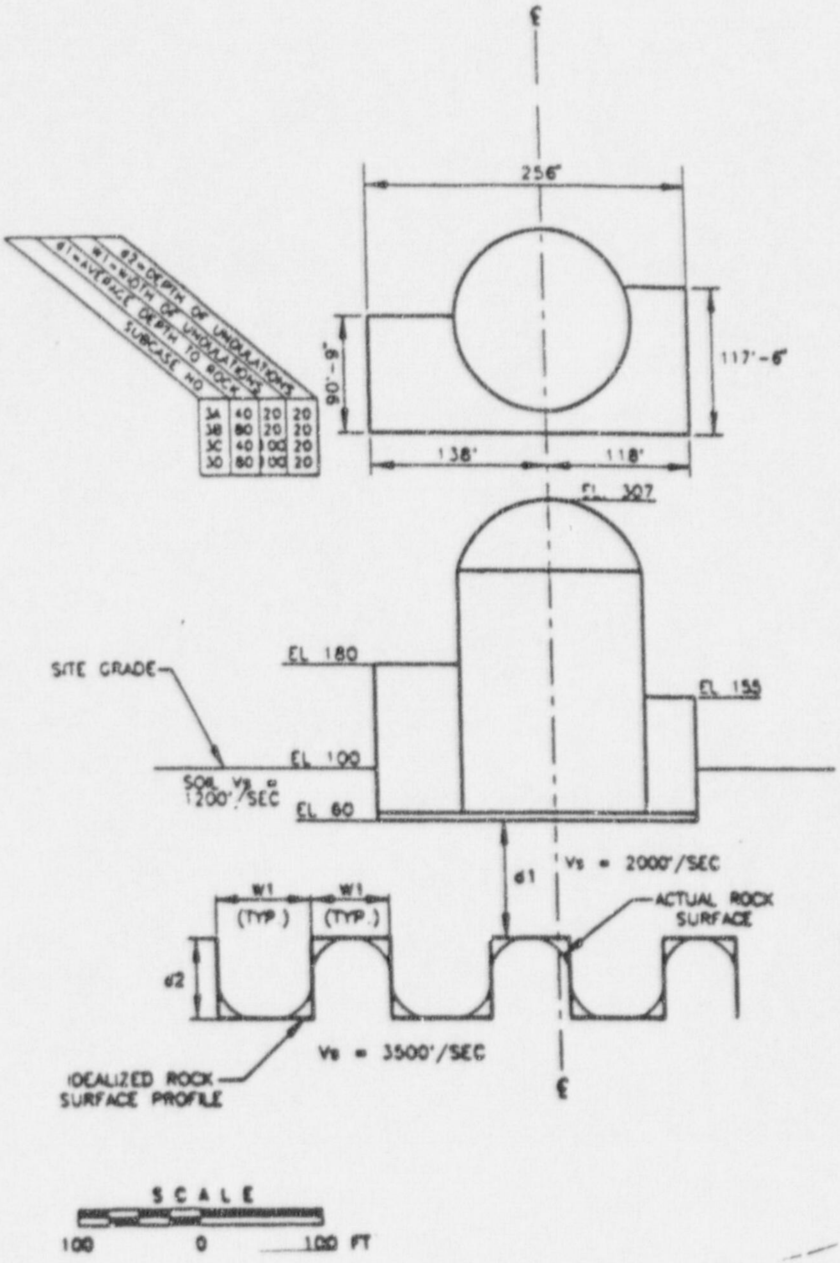
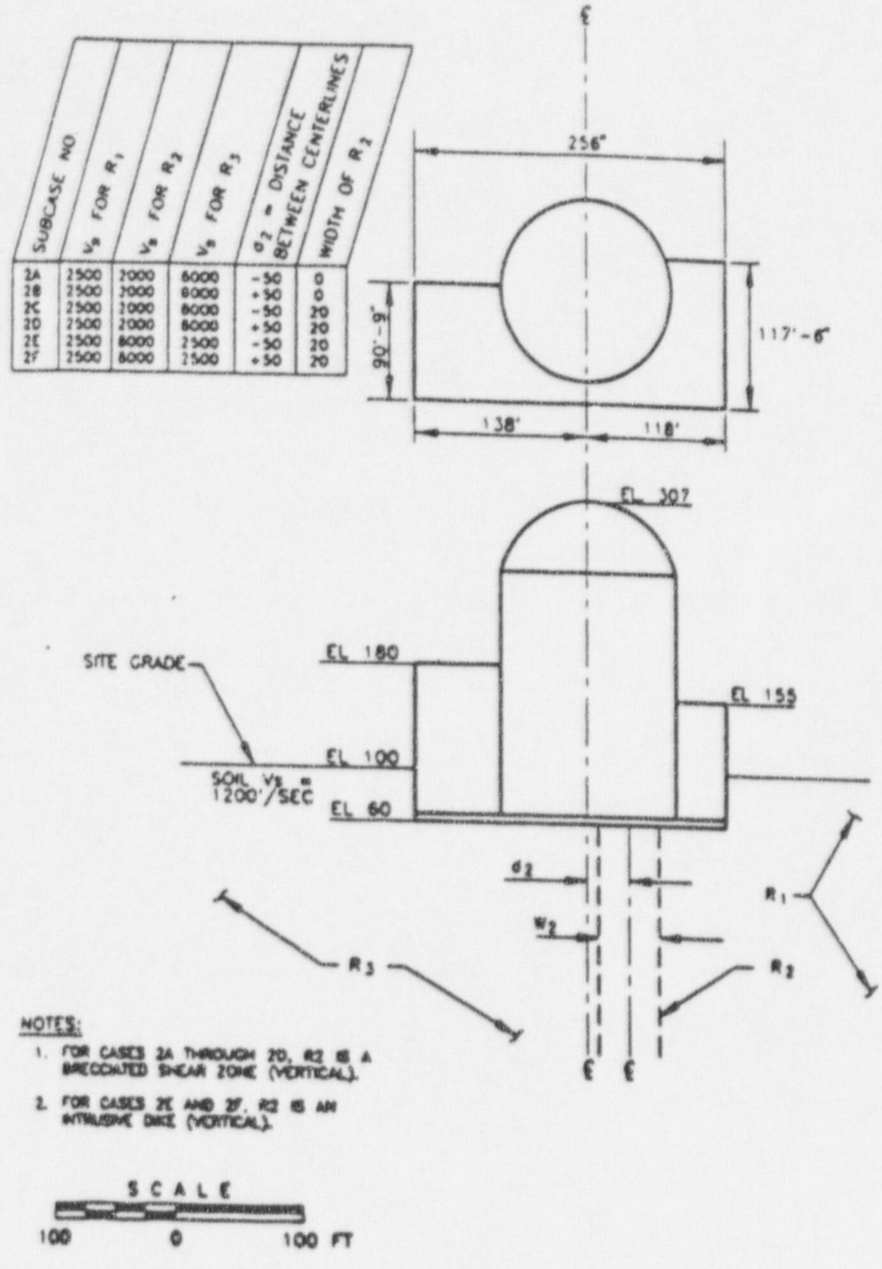


Figure 2.5-3

Undulating Bedrock Site



SUBCASE NO	Vs FOR R1	Vs FOR R2	Vs FOR R3	d2 = DISTANCE BETWEEN CENTERLINES	WIDTH OF R2
2A	2500	2000	6000	-50	0
2B	2500	2000	8000	+50	0
2C	2500	2000	8000	-50	20
2D	2500	2000	8000	+50	20
2E	2500	8000	2500	-50	20
2F	2500	8000	2500	+50	20

NOTES:

1. FOR CASES 2A THROUGH 2D, R2 IS A BRECCIATED SHEAR ZONE (VERTICAL).
2. FOR CASES 2E AND 2F, R2 IS AN INTRUSIVE DIKE (VERTICAL).

Figure 2.5-4

Geologically Impacted Site

3.8.5.4.3 Analysis for Loads during Construction

Construction loads are evaluated in the design of the nuclear island basemat. This evaluation is performed for soil sites meeting the site interface requirements of subsection 2.5.4 at which settlement is predicted to be maximum. In the expected basemat construction sequence, concrete for the mat is placed in a single placement. Construction continues with a portion of the shield building foundation and containment interior structure and the walls of the auxiliary building. The critical location for shear and moment in the basemat is around the perimeter of the shield building. Once the shield building and auxiliary building walls are completed to elevation 82′ 6″, the load path changes and loads are resisted by the basemat stiffened by the shear walls. Locked-in stresses during construction become secondary after completion of the auxiliary building walls. They do not reduce the strength of the section and are not included in the design load combinations for the completed structure.

Alternate construction scenarios and schedules are analyzed to confirm the adequacy of the basemat for unexpected changes in the construction plan. These analyses of alternate construction scenarios show that member forces in the basemat are acceptable. For soft soil sites, the auxiliary building must be completed to elevation 82′ 6″ prior to placement of concrete in the shield building above elevation 82′ 6″ or in the containment internal structures above elevation 83′ 0″. For construction sequences in which the auxiliary building progresses ahead of the shield building, concrete should not be placed in the auxiliary building above elevation 117′ 6″ before the shield building is completed to elevation 82′ 6″.

Westinghouse FAX COVER SHEET

RECIPIENT INFORMATION		SENDER INFORMATION	
DATE:	MARCH 3 1997	NAME:	JIM WINTERS
TO:	Tom Kenyon	LOCATION:	ENERGY CENTER - EAST
PHONE:	FACSIMILE:	PHONE:	Office: 412-374-5290
COMPANY:	USNRC	Facsimile:	win: 284-4887 outside: (412)374-4887
LOCATION:			

Cover + Pages 1 + 0

The following pages are being sent from the Westinghouse Energy Center, East Tower, Monroeville, PA. If any problems occur during this transmission, please call:

WIN: 284-5125 (Janice) or Outside: (412)374-5125.

COMMENTS:

Tom

IN RESPONSE TO YOUR E-MAIL QUESTION ON Q471.26, THE "POST ACCIDENT SAMPLE ROOM MONITOR" ADDRESSED IN 1994 IS THE SAME MONITOR AS THE "PRIMARY SAMPLING ROOM AREA MONITOR" ADDRESSED IN 1996. NOTE THAT THE INSTRUMENT NUMBERS AND DESCRIPTIONS ARE THE SAME. THE ROOM NAME CHANGED FOR BUILDING LAYOUT REASONS, BUT THE MONITOR AND ITS FUNCTION DID NOT.

Jim Winters

cc: LINDGREN
ISRAELSON
~~WILLS~~ MARK WILLS
CUMMINS
MCENTYRE
WINTERS.

FAX to DINO SCALETTI

February 25, 1997

CC: Sharon or Dino, please make copies for: Diane Jackson
Ted Quay

Don Lindgren
Dan McDermott
Don Hutchings
Gene Piplica
Brian McIntyre
Ed Cummins
Bob Vijuk

OPEN ITEM #5 (RAI 410.263)

In my quest to make sure we have provided NRC with everything you need to prepare an FSER, I am researching open items from the smallest number on. Attached are copies of some of the relevant documentation related to Open Item #5 (RAI 410.263). We provided a revision to the SSAR on August 9, 1996 which we considered to be adequate. After discussion with NRC and receipt of an additional request, we provided a revised a revised response to RAI 410.263 on February 7, 1997. This response included additional SSAR revisions which should be incorporated into Revision 11, to be issued February 28, 1997. We recognize that NRC review and confirmation of incorporation into the SSAR is not complete. However, Westinghouse knows of no further action required for this item and it seems a reasonable request that NRC acknowledge receipt of the revision of the response for RAI 410.263 and its SSAR change promise. We request that NRC provide a definitive action for Westinghouse or provide direction to change the status of this item. We recommend "Action N" or "Confirm N". Thank you.

Jim

Jim Winters
412-374-5290

AP600 Open Item Tracking System Database: Executive Summary

Date: 2/25/97

Selection: [item no] between 5 And 5 Sorted by Item #

Item No.	Branch	DSER Section/ Question	Type	Title/Description Detail Status	Resp Engineer	(W) Status	NRC Status	Letter No. /	Date
5	NRR/SPLB	10.4.7	RAI-OI		Winters, J.	Closed	Action W	NSD-NRC-97-4977	

Question 410.263 (FEEDWATER SYSTEM, FWS, WATER HAMMER)
Branch Technical Position ASB 10-2 provides design guidance to meet GDC 4 on dynamic effects associated with possible water hammers in the feedwater piping. Specifically, the feedwater system should be designed to (a) prevent or delay water draining from the feedring following a drop in steam generator water level, (b) minimize the volume of feedwater piping external to the steam generator which could pocket steam using the shortest horizontal run (less than 7 feet), (c) perform tests acceptable to NRC to verify that unacceptable feedwater hammer will not occur and provide the procedures for these tests for approval, and (d) implement pipe refill flow limits where practical. Address the AP600 feedwater system design against these guidelines.

Closed - Response provided by letter NSD-NRC-96-4806 dated September 5, 1996.

NRC Status Update provided in September 5, 1996 letter:
In a letter dated May 13, 1996, Westinghouse repsonsed to RAI# 410.263. The staff reviewed this response and found it was unacceptable. In a telephone conference on August 16, 1996, Westinghouse stated that the requirement for tests to verify that unacceptabie feedwater hammer will not occur is incorporated in SSAR Chapter 14, Revision 9. The staff reviewed SSAR 14.2.9.1.7 and others and found it did not address water hammer tests. Action Westinghouse
Closed & Action N - Response provided by NSD-NRC-97-4977 of 2/7/97.

Westinghouse
Electric Corporation

Energy Systems

Box 355
Pittsburgh Pennsylvania 15230-0355

NSD-NRC-97-4977
DCP/NRC0734
Docket No.: STN-52-003

February 7, 1997

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

ATTENTION: T. R. QUAY

SUBJECT: WESTINGHOUSE RESPONSES TO NRC REQUESTS FOR ADDITIONAL INFORMATION ON THE AP600

Dear Mr. Quay:

Enclosed are three copies of the Westinghouse responses to NRC requests for additional information on several AP600 Design Certification topics. RAIs addressing the SSAR include 280.10, Rev. 1, 410.244 and 410.263. RAI 440.197 addresses plant transient performance. Responses to RAIs 440.395, 570, 571, 572, 573, 574, 575, 576, 577, 580, 581, and 582 provide additional information on the test program.

These responses are also provided as electronic files in WordPerfect 5.1 format with Mr. Kenyon's copy. The Westinghouse Electric Corporation copyright notice, proprietary information notice, application for withholding and affidavit are also attached.

This submittal contains Westinghouse proprietary information consisting of trade secrets, commercial information or financial information which we consider privileged or confidential pursuant to 10CFR2.790. Therefore, it is requested that the Westinghouse proprietary information attached hereto be handled on a confidential basis and be withheld from public disclosures. The non-proprietary copy of Enclosure 1 is provided as Enclosure 2.

This material is for your internal use only and may be used for the purpose for which it is submitted. It should not be otherwise used, disclosed, duplicated, or disseminated, in whole or in part, to any other person or organization outside the Commission, the Office of Nuclear Reactor Regulation, the Office of Nuclear Regulatory Research and the necessary subcontractors that have signed a proprietary non-disclosure agreement with Westinghouse without the express written approval of Westinghouse.

3 of 6

Correspondence with respect to the application for withholding should reference AW-97-1076, and should be addressed to Brian A. McIntyre, Manager of Advanced Plant Safety and Licensing, Westinghouse Electric Corporation, P.O. Box 355, Pittsburgh, Pennsylvania, 15230-0355.

Brian A. McIntyre, Manager
Advanced Plant Safety and Licensing

/jml

Enclosures
Attachment

cc: T. Kenyon, NRC (w/o Enclosures/Attachments)
W. Huffman, NRC (1E1, 1E2)
R. C. Jones, NRC (w/o Enclosures/Attachments)
G. D. McPherson, NRC (w/o Enclosures/Attachments)
F. Eltawila, NRC (w/o Enclosures/Attachments)
R. Landry, NRC (1E1)
L. Lois, NRC (1E1)
A. Levin, NRC (1E1)
P. Boehnert, ACRS (4E1)
N. J. Liparulo, Westinghouse (w/o Enclosures/Attachments)

4 of 6

Question 410.263

Branch Technical Position ASB 10-2 provides design guidance to meet GDC 4 on dynamic effects associated with possible water hammers in the feedwater piping. Specifically, the feedwater system should be designed to (a) prevent or delay water draining from the feedring following a drop in steam generator water level, (b) minimize the volume of feedwater piping external to the steam generator which could pocket steam using the shortest horizontal run (less than 7 feet), (c) perform tests acceptable to NRC to verify that unacceptable feedwater hammer will not occur and provide the procedures for these tests for approval, and (d) implement pipe refill flow limits where practical. Address the AP600 feedwater system design against these guidelines.

Response:

As indicated in SSAR Section 10.4, the Startup Feedwater system and the condensate and feedwater systems include many features to minimize the potential for unacceptable water hammers in the feedwater piping. These features are further delineated in SSAR subsection 3B.2.3. These features include:

(a) The design of the feedwater system includes a number of features specifically intended to minimize water hammers. For example, the startup feedwater system is entirely separate from the main feedwater system, including its entry point into the steam generators. This allows the system flowrates and pipe sizes to be more consistent with their intended function than if startup feed flows were directed through main feed headers and feedrings. In addition, the main feedring itself is designed to minimize the potential for water hammer. The spray tubes are located on the top of the feedring so that the feedring does not drain when steam generator levels drop below the feedring level. The thermal sleeve is welded which also prevents drainage when steam generator levels fall.

(b) The main feedwater line is continuously sloped upward to the steam generator nozzle. The horizontal run from the steam generator to the feedwater elbow is minimized.

(c) Tests have been performed on many Westinghouse feedring type steam generators in the United States. These tests verify the effectiveness of Westinghouse feedring designs like that described above for AP600 in preventing water hammer. Westinghouse does not consider that further design testing is required.

(d) Pipe flow limits, especially on startup feed, are not required for AP600 because the startup feed path is separate from the main feed path, including its entry into the steam generator. In addition, unlike other PWRs, AP600 has no auxiliary feedwater system and associated lines and operations.

In addition, Chapter 14 of the SSAR includes a preoperational test (subsection 14.2.9.1.7) to verify unacceptable dynamic effects do not occur for expected startup and restart conditions. The changes below explicitly reinforce that plant dynamic effects testing includes feedwater related tests.

SSAR Revision:

Section 3.9.2.1, second paragraph, second sentence:

The pre-operational testing programs are outlined in subsection 14.2.8.9.

Section 14.2.9.1.7, subsection "Purpose":

The purpose of the expansion, vibration and dynamic effects testing is to verify that the safety-related, high energy piping and components are properly installed and supported such that expected movement due to thermal expansion during normal heatup and cooldown, and as a result of transients; thermal stratification and thermal cycling; as well as vibrations caused by steady-state or dynamic effects ~~during steady state and transients~~ do not result in excessive stress or fatigue to safety-related plant systems and equipment, as described in Section 3.9.

Section 14.2.9.1.7, subsection "General Test Method and Acceptance Criteria", subparagraphs b) and c):

b) Vibration testing is performed on safety-related and high-energy system piping and components during both cold and hot conditions to demonstrate that steady-state vibrations are within acceptable limits. See Subsection 3.9.2.1.1 for the acceptable standard for alternating stress intensity due to steady-state vibration. This testing includes visual observation and local and remote monitoring in critical steady-state operating modes. Results are acceptable when visual observations show no signs of excessive vibration and when measured vibration amplitudes are within acceptable levels.

c) Testing for significant vibrations caused by dynamic ~~events~~ effects is conducted during hot functional testing and may be performed as part of other specified preoperational tests. This testing is conducted to verify that stress analyses of safety-related and high-energy system piping under transient conditions are acceptable. See Subsection 3.9.2.1.1 for the acceptable standard for alternating stress intensity due to dynamic effects vibration. These tests are performed to verify that the dynamic effects ~~are within expected values~~ caused by ~~during~~ transients such as pump starts and stops, valve stroking, and significant process flow changes are within expected values. These tests include anticipated normal operating evolutions with system differential temperatures, such as, startup, which could induce dynamic effects.

FAX to ~~DINO SCALETTI~~

February 25, 1997

CC: Sharon or Dino, please make copies for: Diane Jackson
~~Ted Quay~~

Don Lindgren
Dan McDermott
Don Hutchings
Gene Piplica
Brian McIntyre
Ed Cummins
Bob Vijuk

OPEN ITEM #5 (RAI 410.263)

In my quest to make sure we have provided NRC with everything you need to prepare an FSER, I am researching open items from the smallest number on. Attached are copies of some of the relevant documentation related to Open Item #5 (RAI 410.263). We provided a revision to the SSAR on August 9, 1996 which we considered to be adequate. After discussion with NRC and receipt of an additional request, we provided a revised a revised response to RAI 410.263 on February 7, 1997. This response included additional SSAR revisions which should be incorporated into Revision 11, to be issued February 28, 1997. We recognize that NRC review and confirmation of incorporation into the SSAR is not complete. However, Westinghouse knows of no further action required for this item and it seems a reasonable request that NRC acknowledge receipt of the revision of the response for RAI 410.263 and its SSAR change promise. We request that NRC provide a definitive action for Westinghouse or provide direction to change the status of this item. We recommend "Action N" or "Confirm N". Thank you.

Jim

Jim Winters
412-374-5290

AP600 Open Item Tracking System Database: Executive Summary

Date: 2/25/97

Selection: [item no] between 5 And 5 Sorted by Item #

Item No.	Branch	DSER Section/ Question	Type	Title/Description Detail Status	Resp Engineer	(W) Status	NRC Status	Letter No. /	Date
5	NRR/SPLB	10.4.7	RAI-OI		Winters, J.	Closed	Action W	NSD-NRC-97-4977	

Question 410.263 (FEEDWATER SYSTEM, FWS, WATER HAMMER)
Branch Technical Position ASB 10-2 provides design guidance to meet GDC 4 on dynamic effects associated with possible water hammers in the feedwater piping. Specifically, the feedwater system should be designed to (a) prevent or delay water draining from the feedring following a drop in steam generator water level, (b) minimize the volume of feedwater piping external to the steam generator which could pocket steam using the shortest horizontal run (less than 7 feet), (c) perform tests acceptable to NRC to verify that unacceptable feedwater hammer will not occur and provide the procedures for these tests for approval, and (d) implement pipe refill flow limits where practical. Address the AP600 feedwater system design against these guidelines

Closed - Response provided by letter NSD-NRC-96-4806 dated September 5, 1996.

NRC Status Update provided in September 5, 1996 letter:
In a letter dated May 13, 1996, Westinghouse repsonsed to RAI# 410.263. The staff reviewed this response and found it was unacceptable. In a telephone conference on August 16, 1996, Westinghouse stated that the requirement for tests to verify that unacceptable feedwater hammer will not occur is incorporated in SSAR Chapter 14, Revision 9. The staff reviewed SSAR 14.2.9.1.7 and others and found it did not address water hammer tests. Action Westinghouse
Closed & Action N - Response provided by NSD-NRC-97-4977 of 2/7/97

2 of 6

Westinghouse Electric Corporation **Energy Systems**

Box 355
Pittsburgh Pennsylvania 15230-0355

NSD-NRC-97-4977
DCP/NRC0734
Docket No.: STN-52-003

February 7, 1997

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

ATTENTION: T. R. QUAY

SUBJECT: WESTINGHOUSE RESPONSES TO NRC REQUESTS FOR ADDITIONAL INFORMATION ON THE AP600

Dear Mr. Quay:

Enclosed are three copies of the Westinghouse responses to NRC requests for additional information on several AP600 Design Certification topics. RAIs addressing the SSAR include 280.10, Rev. 1, 410.244 and 410.263. RAI 440.197 addresses plant transient performance. Responses to RAIs 440.395, 570, 571, 572, 573, 574, 575, 576, 577, 580, 581, and 582 provide additional information on the test program.

These responses are also provided as electronic files in WordPerfect 5.1 format with Mr. Kenyon's copy. The Westinghouse Electric Corporation copyright notice, proprietary information notice, application for withholding and affidavit are also attached.

This submittal contains Westinghouse proprietary information consisting of trade secrets, commercial information or financial information which we consider privileged or confidential pursuant to 10CFR2.790. Therefore, it is requested that the Westinghouse proprietary information attached hereto be handled on a confidential basis and be withheld from public disclosures. The non-proprietary copy of Enclosure 1 is provided as Enclosure 2.

This material is for your internal use only and may be used for the purpose for which it is submitted. It should not be otherwise used, disclosed, duplicated, or disseminated, in whole or in part, to any other person or organization outside the Commission, the Office of Nuclear Reactor Regulation, the Office of Nuclear Regulatory Research and the necessary subcontractors that have signed a proprietary non-disclosure agreement with Westinghouse without the express written approval of Westinghouse.

3 of 6

Correspondence with respect to the application for withholding should reference AW-97-1076, and should be addressed to Brian A. McIntyre, Manager of Advanced Plant Safety and Licensing, Westinghouse Electric Corporation, P.O. Box 355, Pittsburgh, Pennsylvania, 15230-0355.

Brian A. McIntyre, Manager
Advanced Plant Safety and Licensing

/jml

Enclosures
Attachment

cc: T. Kenyon, NRC (w/o Enclosures/Attachments)
W. Huffman, NRC (1E1, 1E2)
R. C. Jones, NRC (w/o Enclosures/Attachments)
G. D. McPherson, NRC (w/o Enclosures/Attachments)
F. Eltawila, NRC (w/o Enclosures/Attachments)
R. Landry, NRC (1E1)
L. Lois, NRC (1E1)
A. Levin, NRC (1E1)
P. Boehnert, ACRS (4E1)
N. J. Liparulo, Westinghouse (w/o Enclosures/Attachments)

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Question 410.263

Branch Technical Position ASB 10-2 provides design guidance to meet GDC 4 on dynamic effects associated with possible water hammers in the feedwater piping. Specifically, the feedwater system should be designed to (a) prevent or delay water draining from the feedring following a drop in steam generator water level, (b) minimize the volume of feedwater piping external to the steam generator which could pocket steam using the shortest horizontal run (less than 7 feet), (c) perform tests acceptable to NRC to verify that unacceptable feedwater hammer will not occur and provide the procedures for these tests for approval, and (d) implement pipe refill flow limits where practical. Address the AP600 feedwater system design against these guidelines.

Response:

As indicated in SSAR Section 10.4, the Startup Feedwater system and the condensate and feedwater systems include many features to minimize the potential for unacceptable water hammers in the feedwater piping.
These features are further delineated in SSAR subsection 3B.2.3. These features include:

(a) The design of the feedwater system includes a number of features specifically intended to minimize water hammers. For example, the startup feedwater system is entirely separate from the main feedwater system, including its entry point into the steam generators. This allows the system flowrates and pipe sizes to be more consistent with their intended function than if startup feed flows were directed through main feed headers and feedrings. In addition, the main feedring itself is designed to minimize the potential for water hammer. The spray tubes are located on the top of the feedring so that the feedring does not drain when steam generator levels drop below the feedring level. The thermal sleeve is welded which also prevents drainage when steam generator levels fall.

(b) The main feedwater line is continuously sloped upward to the steam generator nozzle. The horizontal run from the steam generator to the feedwater elbow is minimized.

(c) Tests have been performed on many Westinghouse feedring type steam generators in the United States. These tests verify the effectiveness of Westinghouse feedring designs like that described above for AP600 in preventing water hammer. Westinghouse does not consider that further design testing is required.

(d) Pipe flow limits, especially on startup feed, are not required for AP600 because the startup feed path is separate from the main feed path, including its entry into the steam generator. In addition, unlike other PWRs, AP600 has no auxiliary feedwater system and associated lines and operations.

In addition, Chapter 14 of the SSAR includes a preoperational test (subsection 14.2.9.1.7) to verify unacceptable dynamic effects do not occur for expected startup and restart conditions. The changes below explicitly reinforce that plant dynamic effects testing includes feedwater related tests.

SSAR Revision:

Section 3.9.2.1, second paragraph, second sentence:

The pre-operational testing programs are outlined in subsection 14.2.8.9.

Section 14.2.9.1.7, subsection "Purpose":

The purpose of the expansion, vibration and dynamic effects testing is to verify that the safety-related, high energy piping and components are properly installed and supported such that expected movement due to thermal expansion during normal heatup and cooldown, and as a result of transients; thermal stratification and thermal cycling; as well as vibrations caused by steady-state or dynamic effects ~~during steady state and transients~~ do not result in excessive stress or fatigue to safety-related plant systems and equipment, as described in Section 3.9.

Section 14.2.9.1.7, subsection "General Test Method and Acceptance Criteria", subparagraphs b) and c):

b) Vibration testing is performed on safety-related and high-energy system piping and components during both cold and hot conditions to demonstrate that steady-state vibrations are within acceptable limits. See Subsection 3.9.2.1.1 for the acceptable standard for alternating stress intensity due to steady-state vibration. This testing includes visual observation and local and remote monitoring in critical steady-state operating modes. Results are acceptable when visual observations show no signs of excessive vibration and when measured vibration amplitudes are within acceptable levels.

c) Testing for significant vibrations caused by dynamic ~~events~~ effects is conducted during hot functional testing and may be performed as part of other specified preoperational tests. This testing is conducted to verify that stress analyses of safety-related and high-energy system piping under transient conditions are acceptable. See Subsection 3.9.2.1.1 for the acceptable standard for alternating stress intensity due to dynamic effects vibration. These tests are performed to verify that the dynamic effects ~~are within expected values~~ caused by ~~during~~ transients such as pump starts and stops, valve stroking, and significant process flow changes are within expected values. These tests include anticipated normal operating evolutions with system differential temperatures, such as, startup, which could induce dynamic effects.

FAX to DINO SCALETTI

March 4, 1997

CC: Sharon or Dino, please make copies for: Diane Jackson
Ted Quay

Don Lindgren
Robin Nydes
Dick Miller
Brian McIntyre
Ed Cummins
Bob Vijuk

OPEN ITEM #142 (M3.11-9)

In my quest to make sure we have provided NRC with everything you need to prepare an FSER, I am researching open items from the oldest on. Attached are copies of some of the relevant documentation related to Open Item #142 (M3.11-9). We provided a revision to SSAR subsection 3D.4.10.2 prior to February 29, 1996 (over 1 year ago) and then modified SSAR subsection 3D.6.2.1 for clarification in the February 29, 1996 revision. It seems a reasonable request that NRC acknowledge receipt of the change. Note that in the Open Item the staff has not requested explicit changes, they simply pointed out a potential future concern for Combined License applicants. Although we have other open items on environmental qualification, our records show no outstanding Westinghouse action on this item (#142) and we request that NRC provide a definitive action for Westinghouse or provide direction to change the status of this item. This is the second request to NRC for a status change. The first was on February 3, 1997 (over a month ago). We recognize that NRC review of the adequacy of our SSAR changes for Open Item #142 may not be complete. However, the act of determining the NRC position on this item makes its status "Action N". Thank you.

Jim

Jim Winters
412-374-5290

AP600 Open Item Tracking System Database: Executive Summary

Date: 3/4/97

Selection: [item no] between 142 And 142 Sorted by Item #

Item No.	Branch	DSER Section/ Question	Type	Title/Description Detail Status	Resp Engineer	(W) Status	NRC Status	Letter No. /	Date
142	NRR/SPLB	3.11	MTG-OI	M3.11-9 (EQUIPMENT QUALIFICATION) There is no evidence anywhere in Industry or in NRC acceptance practice to support the position stated in the SSAR or in the response to the Q270.10 in regards to similarity between equipment from different manufacturers. Similarity between manufacturers is not arbitrarily excluded, however, the staff is simply pointing out that it has not been satisfactorily demonstrated previously in order to prevent the raising of false hopes and unnecessary expense for potential COL Applicants. Closed - Revised SSAR 3.D.4.10.2 to clarify.	Miller	Closed	Action W		

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 Total Records: 1

3D.4.10.1.3 Material Link

This documentation certifies that the materials used in the equipment are represented in a materials aging analysis, such as that described in Attachment B, (Subprogram B). This link applies only to equipment whose equipment qualification data package references the materials aging analysis and reflects a comparison of the as-built drawings, baseline design document, or other documentation of the plant specific equipment to the materials aging analysis listing.

3D.4.10.2 Similarity

Where differences exist between items of equipment, analysis may be employed to demonstrate that the test results obtained for one piece of equipment are applicable to a similar piece of equipment. Documentation of this analysis conforms with guidelines in IEEE 323 and 627, and Subsection 3D.6.2.1 and Section 3D.7 of this appendix.

3D.5 Design Specifications

The conditions and parameters considered in the environmental and seismic qualification of AP600 safety-related equipment are separated into three categories: normal, abnormal, and design basis event. Normal conditions are those sets and ranges of plant conditions that are expected to occur regularly and for which plant equipment is expected to perform its safety-related function, as required, on a continuous, steady-state basis. Abnormal conditions refer to the extreme ranges of normal plant conditions for which the equipment is designed to operate for a period of time without any special calibration or maintenance effort. Design basis event conditions refers to environmental parameters to which the equipment may be subjected without impairment of its defined operating characteristics for those conditions. Equipment required to operate while subjected to the design basis event and its extreme conditions and if not replaced, may require that tests, inspections, and maintenance be performed on the equipment, before returning to normal operating conditions.

The following subsections define the basis for the normal, abnormal, design basis event, and post-design basis event environmental conditions specified for the qualification of safety-related equipment in the AP600 equipment qualification program. (these are cited in Section 1.7 of each equipment qualification data package; See Attachment A.)

The service conditions simulated by the test plan are identified in equipment qualification data package Section 3.7. (See Subsection 3D.7.4.6 and Attachment A.) In general, the parameters employed are selected to be equal to (normal and abnormal) or have margin (design basis event and post-design basis event) with respect to the specified service conditions of equipment qualification data package, Section 1.7, as recommended by IEEE 323. These conditions are conservatively derived to allow for possible alternative locations of equipment within the plant.

FAX to DINO SCALETTI

March 4, 1997

CC: Sharon or Dino, please make copies for: Diane Jackson
Ted Quay

Don Lindgren
Gordon Israelson
Jim Grover
Ed Cummins
Bob Vijuk
Brian McIntyre

OPEN ITEMS FOR SSAR Chapter 11

This is a background package for the remaining open items for SSAR Chapter 11 for your information. SSAR Chapter 11 is of interest because by our joint NRC/W schedule, the FSER for this section should be turned into Projects by the end of March. There are 5 Open Items with NRC Status of Action W. Of these, 4 items still require some Westinghouse action. A SSAR markup for the fifth (1172) was provided on February 21 and should be made final in Revision 11. This item (1172) should have its status changed to "Action N". Thank you.

Jim

Jim Winters
412-374-5290

AP600 Open Item Tracking System Database: Executive Summary

Date: 3/4/97

Selection: [nrc st code]='Action W' And [DSER Section] like '11*' Sorted by Item #

Item No.	Branch	DSER Section/ Question	Type	Title/Description Detail Status	Resp Engineer	(W) Status	NRC Status	Letter No. /	Date
1171	NRR/SPLB	11.2-5	DSER-OI		Israelson / Grover	Action W	Action W		
				Westinghouse has not responded to Q460.21, which deals with AP600 LWMS compliance with 10 CFR 20.1302.					
				Action W: Discussion is needed with staff to resolve the question regarding what to use for design basis fuel defect level. When this is determined and when the revised GALE code analysis is completed, the corrected report of effluent concentrations (and comparison with 10 CFR 20 limits) will be plced in the SSAR. OI - Action W - revise table 11.2-8 - see detail. Closed - SSAR table 11.2-8, Revision 8, includes appropriate data and footnotes. Resolved - Based on 11/21/96 meeting and acceptable response in 10/17/96 letter. See NRC letter of 12/9/96. Action W - See NRC letter date 1/30/97. Action W - W needs to fix Section 11.1, Table 11.1-2 and TechSpec bases 3.4.11 to correctly refect our agreement on using 1% failed fuel as our basis except where there is a techspec limit on iodine and noble gases. Action W - Westinghouse will clarify the SSAR Section 11.1; Table 11.1-2 and Technical Specification (TS) basis for 3.4.11 to reflect the 1 percent fuel failure assumption (except for TS limits on iodine and noble gases). (See NRC letter date 2/21/97.)					
1172	NRR/SPLB	11.2-6	DSER-OI		Israelson, G.	Closed	Action W		
				Westinghouse has not yet clarified whether indoor LWMS tanks will have curbs or thresholds with floor drains routed to the LWMS.					
				Closed - SSAR table 11.2-3 describes features to contain inventory of ruptured tanks. The desired information is also included in the response to RAI 460.6R1. OI - Action W - update and include RAI 460.20 response onto SSAR; justify why no local alarm system for liquid radwaste; clarify where monitor tanks are located; CST is in the yard and requires a dike, justify if not; provide COL action to provide QA program. Closed - SSAR Revision 8, includes instrumentation, QA and other details required for this item. No other items have been identified by NRC. Action W - W needs to fix 11.5.6.4 and appendix 1A to be like the other Quality Assurance promises in Chapter 11. Closed - Markup sections faxed on 2/21/97.					
3424	NRR/SPLB	11.1-2	RAI-OI		Winters	Action W	Action W		
				(Received in July 24, 1996 NRC letter) This is a new open item arising from review of Revision 6 to SSAR Chapter 11. P&IDs for LWMS, GWMS and SWMS resulting from Revision 6 are yet to be provided.					
				Closed/Action N - Westinghouse provided seven simplified P&IDs in Revision 8 of the SSAR Section 11.2 and 11.3. The staff is reviewing them. Action W - See NRC letter dated 1/30/97. Action W - i)W needs to satisfy RegGuide 1.70 by including all information specified for system information. The current simplified P&IDs don't do it. NRC will address all simplified P&IDs in a generic letter addressign this key issue. ii) Figure 11.2-1 is so simple it doesn't show all of the features discussed in the systems description part of the SSAR section. We need to include recycle line to waste holdup tanks from mobile equipment. Action W - (1) Westinghouse will revise SSAR Figure 11.2-1 to include the piping from the mobile equipment to the waste holdup tanks. (2) Westinghouse needs to address the staff concern of sufficient information and legibility of the piping and instrumentation drawings and system figures.					

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AP600 Open Item Tracking System Database: Executive Summary

Date: 3/4/97

Selection: [nrc st code]='Action W' And [DSER Section] like '11*' Sorted by Item #

Item No.	Branch	DSER Section/ Question	Type	Title/Description Detail Status	Resp Engineer	(W) Status	NRC Status	Letter No. /	Date
5004	NRR/SPLB	11.2-8	DSER-OI		Israelson, G.	Action W	Action W		

DSER OI 11.2-8

Issue - This open item was raised from the staff's review of Revision 6 of SSAR. The following concerns were identified:

1. An earlier SSAR Section 11.2.2.1.2 assigned two names to two subsystems, namely, effluent waste subsystem and general waste subsystem. There is no justification for deleting the identification of these subsystems.

2. There is no justification for deleting 1 monitor tank from a total of 4 monitor tanks, 2 each for each of the above 2 systems (The 4 tanks are listed in the earlier SSAR version).

3. SSAR Section 11.2.2.5.4 states the following: "when combined with detergent wastes, they may be suitable for processing and discharge." The subject section also states the following: "when not suitable for processing, they can be treated by use of mobile equipment or by shipment offsite."

The SSAR Section deals with chemical wastes. It is not clear what the above statements mean.

4. After detergent waste is processed, how is it disposed of?

5. Will chemical wastes ever be routed to general waste subsystem (this question arises since in the earlier proposed design, this was an option)?

6. SSAR Section 9.29 states that secondary coolant system sampling drain wastes will be routed to the plant's waste water system. the plant's waste water, in turn, if detected to be radioactive, when sampled, will be diverted to the liquid readioactive waste system for processing. SSAR Section 9.2-9, and schematic 11.2-1 do not provide information on the specific subsystem to which the radioactive stream will be routed for processing.

Action W - See NRC letter dated 1/30/97. Note items 1 through 5 inclusive, are actually have the "Resolved" status. Item 6 has the "Action W" status. W needs to resolve generic issues on P&ID legibility and completeness.

Item No.	Branch	DSER Section/ Question	Type	Title/Description Detail Status	Resp Engineer	(W) Status	NRC Status	Letter No. /	Date
5008	NRR/SPLB	11.1-6	DSER-OI		Israelson, G.	Action W	Action W		

DSER OI 11.1-6

Issue - This is a new item beyond Reference 1 relating SSAR Table 3.2-3 to radioactive waste systems.

Reference 1: NRC letter, "Open Items Status Regarding Several Plant Systems Branch Review Areas for the AP600 Advanced Reactor Design, "dated July 24, 1996

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SSAR Table 3.2-3 does not identify which components of the radioactive waste systems are housed in the seismically qualified auxiliary building, and which components are housed in the non-seismic radioactive waste building. As a result, the staff identifies the following specific problems.

1. SSAR Appendix 1A, RG 1.143 Item C.1.1.3 indicates that tanks in the liquid radioactive waste system are supposed to be in the Seismic Category I auxiliary building. In Table 3.2-3, p. 49 of 51, tanks are listed ans "NS," and it does not indicate whether those tanks are located in the auxiliary building or in the radioactive waste building.

2. SSAR Appendix 1A, RG 1.143, Item C.2.1.3 indicates that the guard bed and the delay beds in the gaseous radioactive waste system are supposed to be in the Seismic Category I auxiliary building. In Table 3.2-3, p. 49 of 51, they are listed ans "NS," and it does not indicate whether those beds are located in the auxiliary building or in the radioactive waste building.

3. SSAR Appendix 1A, RG 1.143 Item C.1.1.3 indicates that spent resin tanks in th solid radioactive waste system are supposed to be in the auxiliary building. Table 3.2-3 lists them as "NS."

4. SSAR Appendix 1A, RG 1.143, Item C.5.2: Westinghouse states that "those portions" of the radioactive waste systems that require seismic design by RG 1.143 are housed in the auxiliary building that is Seismic Category I. "those portions" are not defined. List "those portions" in Table 3.2-3.

Explain why those components that need to be in the seismically qualified auxiliary building per RG 1.143 are listed as "NS" (non-seismic) in Table 3.2-3. Revise the Table 3.2-3 information in radioactive waste systems to be consistent with RG 1.143 and to include the related location information.

Action W - See NRC letter dated 1/30/97.

Action W - Westinghouse believes that the interested information already exists in the SSAR. Westinghouse will provide the staff references. Additionally, Westinghouse will provide via facsimile a copy of refised Table 3.2-3 for the radioactive waste systems. This SSAR revision is scheduled to be submitted on February 28, 1997. (See NRC letter dated 2/21/97.)

FAX to DINO SCALETTI

March 4, 1997

CC: Sharon or Dino, please make copies for: Bill Huffman
Ted Quay

Don Lindgren
Moshe Mahlab
Ed Cummins
Bob Vijuk
Brian McIntyre

OPEN ITEMS FOR SSAR Chapter 4

This is a background package for the remaining open item for SSAR Chapter 4 for your action. SSAR Chapter 4 is of interest because by our joint NRC/W schedule, the FSER for this section should be turned into Projects by the end of March. There is 1 Open Item (854) with NRC Status of Action W. This item (attached) has been discussed repeatedly with NRC and the technical description is included in the item's "Status Detail." We believe that no further Westinghouse action is required. We believe that this information resolves the concerns of item #854. It seems a reasonable request that NRC acknowledge receipt of this information. We request that NRC provide a definitive action for Westinghouse or provide direction to change the status of this item. We recommend "Action N" or "Closed". Thank you.

Jim

Jim Winters
412-374-5290

1 of 2

AP600 Open Item Tracking System Database: Executive Summary

Date: 3/4/97

Selection: [nrc st code]='Action W' And [DSER Section] like '4*' Sorted by Item #

Item No.	Branch	DSER Section/ Question	Type	Title/Description Detail Status	Resp Engineer	(W) Status	NRC Status	Letter No. /	Date
854	NRR/SRXB	4.2.8-1	DSER-OI	The staff and Westinghouse should resolve the VANTAGE-5H flow- induced vibration problem, without an imposed thermal margin penalty. Closed - The grid to be used in the AP600 core has been redesigned. Figure 4.2-5 in Section 4.2 of the SSAR has been revised to reflect the design change. The grid design will preclude any flow induced vibration problems. The pressure drop accross the grid is not adversely affected. The thermal-hydraulic design basis for the AP600 core outlined in SSAR Section 4.4 is consistent with the use of this grid. There is not a thermal margin penalty associated with the use of this grid design. The grid design is the same as that which will be used in Vantage 5H+ fuel in operating plants.	More.D.G	Closed	Action W		

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