January 30, 2003

APPLICANT: Westinghouse Electric Company

PROJECT: AP1000 Standard Plant Design

SUBJECT: SUMMARY OF MEETING HELD FROM NOVEMBER 12 THROUGH NOVEMBER 15, 2002, REGARDING WESTINGHOUSE ELECTRIC COMPANY'S AP1000 DESIGN CERTIFICATION APPLICATION

Westinghouse Electric Company (Westinghouse) hosted meetings November 12 through November 15, 2002, at the Westinghouse Energy Center in Monroeville, Pennsylvania. The primary purpose of the meeting was to discuss the NRC staff's requests for additional information (RAIs) in the AP1000 structural design area. These RAIs were issued to Westinghouse via letter dated September 19, 2002 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML022620319). The November 12, 2002, portion of the meeting was open to the public (see meeting notice dated October 31, 2002 [ADAMS Accession No. ML023030012]). The meetings held from November 13 through November 15, 2002, were not open to the public because the primary purpose of these meetings was for the NRC staff to review and audit supporting design documents that are not available for public disclosure. Enclosure 1 is a list of the meeting attendees. Enclosure 2 is a handout provided by the NRC staff documenting the status of the staff's review of Westinghouse's RAI responses. Enclosure 3 is a list of minor clarifications requested by the NRC staff for consideration by Westinghouse for inclusion in the next design control document revision (the issues identified are assessed to be minor clarifications that do not rise to the level of an RAI). Enclosure 4 is a detailed summary of the discussions of the RAI responses including the NRC staff's understanding of additional information that would be provided by Westinghouse (Enclosure 4 was sent to Mr. Michael M. Corletti of Westinghouse via electronic mail on January 9, 2003 and may be found under the meeting summary Accession No. ML030150541). Enclosure 5 is a copy of the handouts that were provided by Westinghouse at these meetings. Enclosures 6 and 7 are draft responses to RAIs that were provided by Westinghouse at the meeting to facilitate discussion of Westinghouse's position regarding its revised response to RAIs 220.006 and its intended initial response to RAI 220.007.

Enclosures 2, 3, and 5 through 7 may be accessed through ADAMS. This system provides text and image files of NRC's public documents. The agenda and handouts mentioned above may be accessed through the ADAMS system under Accession Nos. ML030170005 (Enclosure 2), ML030170006 (Enclosure 3), ML030170017 (Enclosure 5), ML030170007 (Enclosure 6), and ML030170009 (Enclosure 7). If you do not have access to ADAMS or if there are problems in accessing the handouts located in ADAMS, contact the NRC Public Document Room (PDR) reference staff at 1-800-397-4209, 301-415-4737 or by e-mail to pdr@nrc.gov.

/RA/

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

Docket No. 52-006

Enclosures: As stated

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/RA/

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cc w/encls: See next page

ACCESSION #ML030150537-Pkg.
ACCESSION #ML030150541 -Meeting Summary
ACCESSION #ML030170020-Pkg. -Enclosures 2,3,5,6,7

OFFICE	PM:NRLPO	SC:EMEB	DD:NRLPO
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ATTENDEES OF THE NOVEMBER 12 THROUGH NOVEMBER 15, 2002, MEETINGS
TO DISCUSS REQUESTS FOR ADDITIONAL INFORMATION
REGARDING THE AP1000 STRUCTURAL DESIGN INFORMATION

Attendee	Organization
Lawrence Burkhart	NRC
Goutam Bagchi	NRC
Thomas Cheng	NRC
Tom Tsai	Constantino Associates
Carl Constantino	Constantino Associates
Richard Morante	Brookhaven National Laboratory
Ed Cummins	Westinghouse
Mike Corletti	Westinghouse
William LaPay	Westinghouse
Narendra Prasad	Westinghouse
Richard Orr	Westinghouse
Leonardo Tunan-Sanjur	Westinghouse
Rick Wright	Westinghouse
F. T. Johnson	Westinghouse
Yoshi Takeuchi	Obayashi
Takahiro Imamura	MHI
Nobuyoshi Iniki	MHI

Summary of 11/12-11/13 Meeting Discussion
AP1000 DCD Sections 2.5, 3.7 and 3.8

RAI 220.001

Part A Westinghouse agreed to provide additional quantitative information comparing the wetted/dry strip widths and maximum temperature change ΔT between the strips for both the AP1000 and AP600, and the technical basis for concluding that the AP600 tests and analyses demonstrate the structural adequacy of AP1000 containment vessel for this loading.

Part B Westinghouse agreed to provide additional information to (1) address the effect of increased energy input to the AP1000 in-structure refueling water storage tank (IRWST); (2) more completely describe automatic depressurization system $(ADS)_1$ and ADS_2 transients, identifying the actual pressure and temperature loads associated with each transient; (3) define the pressure and temperature conditions used in the design, and demonstrate that they envelop the actual ADS_1 and ADS_2 transients; and (4) clarify the phrase "occur at the beginning of the transient."

Part C Westinghouse agreed to provide the following additional information to address this RAI: (1) the controlling external wind velocities and calculated dynamic pressures used in the air baffle structural design for both the AP1000 and the AP600; (2) the pressure coefficient vertical profiles on both sides of the air baffle for both the AP1000 and the AP600; and (3) the technical basis for extrapolation of the AP600 wind tunnel test data to the development of the AP1000 pressure coefficient profile, considering the 25-feet increase in containment height from the AP600 to the AP1000.

RAI 220.002

Part A Westinghouse agreed to provide the following additional information in support of its basis for referencing the 2002 addenda to the American Society of Mechanical Engineers (ASME) code for the AP1000 containment shell design: (1) technical data in Westinghouse's possession that support the code revision documented in the 2002 addenda, with respect to the acceptability of SA738, Grade B as a containment vessel material; (2) technical data in Westinghouse's possession (or references to such data) that form the basis for code revisions from the 1992 edition through the 2002 addenda, with respect to the code-allowable stress intensity values applicable to containment vessel design.

Also, in order to quantify the de-facto corrosion allowance in the embedded transition region of the containment vessel, Westinghouse needs to complete a quantitative assessment of the effect of corrosion in the embedment transition region, considering all applicable load combinations and the associated applicable code stress intensity limits. Local shell bending stress will maximize at the embedment location and will increase as a function of $(t_{design}/t_{corroded})^2$.

Part B Westinghouse agreed to provide the following additional information in support of its basis for relying solely on the containment coatings to prevent general corrosion of the containment vessel: (1) identify that corrosion prevention is a safety-related function of the coatings on the internal and external surfaces of the containment vessel; and (2) define the responsibilities of the Combined License (COL) applicant for inspection and maintenance of these coatings, in order to preserve the corrosion prevention function of the coatings throughout the unit operating life.

RAI 220.003

Westinghouse agreed to provide additional information related to the technical basis for the 2002 addenda to the ASME Code, as identified under RAI 220.002, Part A.

RAI 220.004

No additional information is needed.

RAI 220.005

Westinghouse agreed to provide the heat transfer analyses conducted to demonstrate that -15^{o} F is a bounding minimum containment vessel temperature. The analyses will address (1) overall heat transfer across the containment vessel wall for 50^{o} F internal temperature and -40^{o} F external temperature; and (2) the local containment vessel external surface temperature at baffle attachment locations, considering the “fin” effect of the baffles, for the same internal and external temperature conditions.

RAI 220.006

The draft of the revised response to this RAI was provided at the meeting on November 13, 2002 (see Enclosure 7). The final revised response will be formally submitted when it becomes available. No additional information is needed.

RAI 220.007

Westinghouse provided an advance copy of its RAI response at the meeting (see Enclosure 6). (This RAI response was formally submitted on November 15, 2002.)

Based on the meeting discussion of its response, Westinghouse agreed to provide additional information describing how both (1) the rate of temperature increase and (2) the maximum temperature attained are utilized in the structural analysis/design of the module walls, including identification of the locations where each of these thermal conditions controls the design. In addition, Westinghouse agreed to provide a definition for the term “CMT” and explain its significance.

RAI 220.008

Westinghouse agreed to submit a clarification to its initial RAI response, explaining that the phrase "... partly due to changing the boundary conditions in the seismic analysis and removing the lateral support below grade for the hard rock site" was intended to indicate that the change in boundary conditions is the removal of the lateral support below grade. The upcoming staff audit of the detailed analysis/design method and the final design calculations will reassess the validity of the monolithic assumption in calculating the structural response of the structural modules.

RAI 220.009

As a result of meeting discussions and the conference call between NRC, Brookhaven National Laboratory (BNL), and Westinghouse conducted in Westinghouse's office on November 15, 2002, Westinghouse agreed to provide additional information to (1) address the effect of increased energy input to the AP1000 IRWST; (2) more completely describe ADS_1 and ADS_2, identifying the actual pressure and temperature loads associated with each transient; and (3) define the pressure and temperature conditions used in the AP1000 design, and demonstrate that they envelop the actual ADS_1 and ADS_2 transients. See also RAI 220.001, Part B.

Westinghouse also agreed to provide additional information that (1) compares the AP1000 and the AP600 natural frequencies for the module walls; (2) quantifies the effect of small changes in natural frequency of the AP1000 module walls on the transient response of the module walls due to ADS_1 (both loading spectra); (3) demonstrates that a uniform 5 psi pressure design loading is conservative for the AP1000; and (4) quantitatively compares the AP1000 and AP600 margins.

RAI 220.010

Westinghouse agreed to provide a revision to AP1000 DCD Table 3.8.3-2, which clarifies the specific analysis models and methods used for the seismic analysis of the AP1000 containment internal structures (CIS). Westinghouse indicated that frequencies and equivalent static accelerations for out-of-plane seismic analysis of the module walls and slabs are not available at this time. Westinghouse is expected to include this information in the final design calculations for the AP1000 module walls and slabs, which will be available for the staff audit when completed. The staff will make the determination of structural design adequacy of the AP1000 modules after a review and evaluation of all pertinent DCD information, RAI responses, design summary report, and detailed design calculations.

RAI 220.011

The draft of the revised response to this RAI was provided at the meeting (November 13, 2002). The final revised response will be formally submitted when it becomes available. No additional information is needed.

RAI 220.012

The staff reviewed Westinghouse's response to this RAI provided at the meeting and found that the information is not complete enough to address the staff's concern. As a result of discussions at the meeting, Westinghouse agreed to provide additional information about the anchorage of steam generator supports to module walls and also to provide larger, more easily readable copies of Figures 3.8.3-4 and 3.8.3-5 (Sheets 1 and 2).

RAI 220.013

No additional information is needed. Staff needs to resolve discrepancy between Regulatory Guide (RG) 1.142 and DG-1099 concerning load factor exceptions.

RAI 220.014

No additional information is needed.

RAI 220.015

The NRC staff did not review this RAI response because it was not available at the time of the meeting.

RAI 220.016

Part A The staff raised a concern regarding the assumed friction angle used in the passive pressure calculation (35 degrees) which is considered to be a conservative value for estimating passive pressure, provided that limitations are placed on soil types to be used for backfill adjacent to the nuclear island (NI) exterior walls. Westinghouse agreed to incorporate descriptions of acceptance fill soils in the civil/structural design criteria. No additional information is needed.

Part B No additional information is needed.

Part C In response to this concern, Westinghouse indicated that the value of unit weight was determined by subtracting the unit weight of water (62.4 pcf) from a saturated weight of soil of 150 pcf to obtain the value of dry unit weight of 87.6 pcf. The analysis of the wall then includes an additional water pressure load to obtain the total lateral load on the wall. In addition, the same unit weight is used for both the passive as well as the active pressure condition. No additional information is needed.

RAI 220.017

No additional information required.

RAI 220.018

In its response, Westinghouse provided the listings of total mass, foundation/wall soil design loads, location of mass centers of gravity (cg's) and the calculated safety factors. However, the following issues need to be addressed.

(A) The effects of potential lift-off of the basemat on building response and floor response spectra have not been considered in the evaluation. Westinghouse agreed to consider such potential lift-off effects and perform nonlinear time history evaluations using simplified structural models of the basemat, hard rock springs and structural stick models of the NI.

(B) When the modal time history analyses, using two components of the ground motion time history (H_1 and H_2 motions) as input, were performed for the NI, the building responses (member forces and floor response spectra) were calculated by an algebraical combination technique at each time step. Since the relation of positive directions of the ground motions to the NI is not defined, this procedure does not necessarily result in the maximum responses. Westinghouse agreed to consider this effect by changing the sign of one of the two ground motion components and perform seismic analyses using the same structural models to determine the final responses.

Westinghouse also committed that the results of these analyses will be available for review during the next design calculation audit.

RAI 220.019

No additional information is needed. As for the application of ACI 349 Code, the staff agreed to evaluate and decide whether Section 11.5.5.1 of ACI 349-01 should be referenced in DCD 3.8.5.5.

RAI 230.001

No additional information is needed.

RAI 230.002

Part A No additional information is needed.

Part B No additional information is needed.

Part C In its response, Westinghouse stated that the walls are designed to provide capacity to support full lateral passive pressures from side soil. The staff's concern is that although this approach leads to larger pressures at depth as compared to other load cases, it is uncertain whether this approach will lead to a conservative design if estimated seismic pressures reach their peak near the top of the walls. Westinghouse agreed to provide additional calculations of total lateral pressures for the various load cases to ensure that the load case leading to the maximum wall moments and shears are to be used in the design. The new calculations will be reviewed by the staff during the forthcoming design audit.

RAI 230.003

Part A In its response, Westinghouse stated that Equation 17.7-1 of the ANSYS Theory Manual computes the composite modal damping in proportion to the strain energy in the mode and is consistent with the method described in AP1000 DCD Section 3.7.1.3. As a result of a meeting discussion, Westinghouse agreed to confirm that, when using the ANSYS code to compute the composite modal damping, a zero value is input for the three parameters, β, ξ_c and ξ_i, in Equation 17.7-1 that are irrelevant to the modal damping calculation in question.

Part B No additional information is needed.

RAI 230.004

In its response, Westinghouse stated that all of the damping values specified in Table 3.7.1-1 are the same as those listed in AP600 DCD Table 3.7.1-1, which were accepted previously by the staff for the AP600 design certification. Also, Westinghouse provided the following specific bases/source references for specific damping values: Regulatory Guide (RG) 1.61 for the welded and bolted steel structures and equipment; ASCE 4-98 and Reference 19 of DCD Section 3.7 for the cable trays and conduits; recognized industrial practice for the control rod drive mechanisms, cabinets and panels for electrical equipment, and equipment such as welded instrument racks and tanks; and Reference 22 of DCD Section 3.7 for the primary coolant loop. In addition, Westinghouse agreed to delete those damping values, such as welded aluminum structures, from Table 3.7.1-2, because they are not actually used in the AP1000 design. The staff found the Westinghouse response sufficient and no additional information is needed.

RAI 230.005

The staff requested clarification on the adequacy of the design ground motion response spectrum, in light of new information developed on the frequency content of ground motions expected for sites in the Central Eastern United States (CEUS). The recommended response spectrum shapes considered appropriate for the CEUS sites are richer in spectral content at high frequencies above 10 Hz than those incorporated into the AP1000 design spectrum. In its response, Westinghouse indicated that the additional high frequency energy content is not expected to be damaging to the structures and equipment used in the nuclear power plants. Westinghouse also stated that this issue can be left to the COL applicant to determine if the site-specific ground response spectrum at the exceeded frequency of 10-4 per year lies below the current design ground response spectrum. No additional information is needed.

RAI 230.006

In its response, Westinghouse stated that the response spectrum analysis method will not be used for the global analysis of the stick model or finite element model of the NI structures, but it has not been eliminated as an acceptable method for the analysis and design of a particular structure, substructures or equipment. For purposes of clarification, Westinghouse proposed the following revisions to the AP1000 DCD:

- Add a new Subsection 3.7.2.1.3, Response Spectrum Analysis.
- Revise the fifth paragraph of Subsection 3.7.2.6 by deleting the description of the combination of responses due to the three earthquake components for the response spectrum analysis.
- Delete Subsection 3.7.2.12, "Comparison of Responses," and Tables 3.7.2-17 to 3.7.2-19.
- Revise Table 3.7.2-16 by deleting the use of response spectrum analysis for the 3D lumped mass stick model.

The staff raised a concern that since the response spectrum analysis method is retained as an optional dynamic analysis method, it should be included in both Tables 3.7.2-14 and 3.7.2-16. In addition, Table 3.7.2-14 should identify what particular structures, substructures or equipment will be analyzed with the response spectrum analysis method. Westinghouse agreed to address the staff's concern and provide the revised DCD sections and tables for review.

RAI 230.007

No additional information is needed.

RAI 230.008

No additional information is needed.

RAI 230.009

Part A In its response, Westinghouse stated that the location of the fixed base has been revised to the bottom of the foundation mat, i.e., Elevation 60'-6". However, the last paragraph of the revised Subsection 3.7.2.1.2 stated that the base of the finite element model is fixed at the middle of the basemat at Elevation 63'-6". It contradicts not only Westinghouse's response to the RAI but also the revised Subsection 3.7.2.3.1 which states that each of the finite element models starts at the underside of the basemat at Elev. 60'-6". As a result of a meeting discussion, Westinghouse agreed to clarify the inconsistency in the DCD and provide the basis of fixing the base at Elevation 63'-6" for the finite element model.

Part B In its response, Westinghouse stated that the ANSYS computer code is used to determine the dead weight and center of gravity of the nuclear island (NI). From the time history analysis of the nuclear island lumped mass stick model using the ANSYS code, the seismic reactions at the fixed base (Elevation 60'-6") are determined. A post processor was then used to combine the applicable loads to obtain the seismic overturning moments along column lines 1, 11 and the west side of the shield building. The seismic overturning moments were then adjusted for seismic missing mass effects for modes having frequencies over 88.466 Hz. Hand calculations were made to determine the factor of safety against overturning following the method specified in Subsection 3.8.5.5. This response sufficiently provided the requested information for the calculation of seismic overturning moments. However, Westinghouse did not provide sufficient information for the description of the procedure for the calculation of the seismic sliding force. As a result of a meeting discussion, Westinghouse agreed to provide a description of procedure for calculating the seismic sliding forces in the DCD.

RAI 230.010

No additional information is needed.

RAI 230.011

No additional information is needed.

RAI 230.012

No additional information is needed.

RAI 230.013

Subsection 3.7.2.1 and Table 3.7.2-14 specify only two methods for the seismic analyses of the nuclear island structures: the time history and equivalent static analysis methods. It contradicts Table 3.7.2-16 in which both the time history and response spectrum analysis methods are used in the seismic analysis of the 3D stick model. The staff requested Westinghouse to (a) reconcile the contradiction in question, (b) clarify the purpose of applying both the time history and response spectrum analysis methods to the seismic analysis of the 3D stick model, and (c) clarify the purpose of Subsection 3.7.2.12 and Tables 3.7.2-17 to 3.7.2-19 which compare the responses between the time history and response spectrum analysis methods. Westinghouse proposed the following revisions to the AP1000 DCD:

– Delete Subsection 3.7.2.12 and the reference to the response spectrum analysis method from Table 3.7.2-16;

– Delete Tables 3.7.2-17 to 3.7.2-19.

– Deleting Tables 3.7.2-17 to 3.7.2-19 provided the information requested in Item (c), but deleting Subsection 3.7.2.12 and the reference to the response spectrum analysis method from Table 3.7.216 is not sufficient to provide the information requested in Items (a) and (b). See the staff’s concern regarding Westinghouse’s response to RAI 230.006.

This RAI remains unresolved as far as Items (a) and (b) are concerned, pending Westinghouse’s revised response to RAI 230.006.

RAI 230.014

No additional information is needed.

RAI 230.015

In its response, Westinghouse stated that the orientation of the polar crane in the parked condition is a part of the plant design and is under configuration control. It establishes the location of the access platforms and ladders to the polar crane on the plant general arrangement, and is also specified in the Containment Vessel Design Specification. As such, Westinghouse maintained that it is not necessary to specify the polar crane orientation in the parked condition as an interface item for the COL applicant. Since the configuration control is not applicable to the AP1000, the Westinghouse response did not sufficiently provide the requested information. This RAI remains unresolved pending Westinghouse's revised response.

RAI 230.016

In its response, Westinghouse explained that enveloping is not applicable because there is only one analysis on the hard rock site. Accordingly, Westinghouse revised the third and fourth paragraphs in Subsection 3.7.2.5 by deleting the reference to spectral enveloping. Westinghouse also added a new paragraph to Subsection 3.7.2.1.2 in the draft of DCD Section 3.7.2, Revision 3 and stated that the three-dimensional finite element model of the auxiliary and shield building, or a portion thereof, developed as described in Subsection 3.7.2.3.1 is used to obtain the in-structure vertical response spectra of the auxiliary building including flexible floors. For the horizontal floor response spectra, the staff considers that Westinghouse's response is sufficient, because it meets the Standard Review Plan (SRP) Section 3.7.2 guidelines. However, for the vertical floor response spectra, the staff's concern is that since the vertical floor response spectra generated from the finite element model of the auxiliary building vary from location to location at a given elevation, Westinghouse should revise its response to discuss how the various vertical response spectra at different locations of a given elevation in the auxiliary building are to be enveloped for application to the seismic design of subsystems and equipment. Westinghouse agreed to revise its responses to address the staff's concern.

RAI 230.017

Responses provided by Westinghouse satisfied the staff's concern and no additional information is needed.

RAI 230.018

For vertical analysis of the coupled shield and auxiliary building, the staff requested an explanation for (a) why the AP600 uses a more detailed model than the AP1000 does for the shield building roof and (b) why the AP600, with a higher dominating vertical frequency (6.77 Hz) than the AP1000 (6.065 Hz), has a higher vertical acceleration response while the staff expects the opposite based on the vertical design spectra show in Figure 3.7.1-2. For Item (a), Westinghouse, in its response, indicated that the AP600 and the AP1000 models for the shield building roof are essentially the same with the exception that the AP600 model has an additional lumped mass at the mid-height of the primary coolant system (PCS) tank. However, the vertical response is primarily influenced by the conical roof and the additional mass at mid-height of the tank is redundant. Thus, the AP1000 model, though without the additional mass at mid-height of the tank, is equally sufficient as far as vertical vibration is concerned. For Item (b), Westinghouse stated that the maximum vertical acceleration response of the roof is 0.90g for the AP600 and 0.89g for the AP1000. Since the response spectrum of the vertical time history as shown in Figure 3.7.1-8 is not a smooth one like the design spectrum, the slightly lower vertical frequency in the case of the AP1000 need not always result in a higher response as expected based on the smooth design spectrum. The Westinghouse's response is sufficient in providing the requested information for Items (a) and (b).

The staff also requested a similar clarification for the vertical dynamic amplification for the steel containment vessel. In its response, Westinghouse indicated that the vertical acceleration response of the steel containment vessel, 1.49g for AP600 and 1.40g for the AP1000 and the comparison is similar to that for the vertical response of the shield building roof. However, in the most recent AP1000 analyses in the proposed revision to DCD Section 3.7, the maximum vertical acceleration response is significantly reduced to 1.13g. Westinghouse attributed such reduction in the vertical response to the use of a multi-mass model for the polar crane instead of the single-mass model used in both the AP600 and the initial AP1000 analyses. To incorporate the change from the single-mass to multi-mass model of the polar crane, Westinghouse proposed the following revisions to the AP1000 DCD:

- Revise the fourth paragraph in Subsection 3.7.2.3.2 to describe the multi-mass polar crane model;
- Add new Figure 3.7.2-8 to show the polar crane model;
- Revise Figure 3.7.2-5 to reference Figure 3.7.2-8 for the polar crane model.

The proposed DCD revisions sufficiently described the multi-mass polar crane model, but did not provide a sufficient basis for the significantly reduced vertical acceleration of 1.13g for the steel containment vessel. Westinghouse agreed to provide additional justification regarding the reduction of the vertical acceleration by using the new polar crane model.

RAI 230.019

No additional information is needed.

RAI 240.001

No additional information is needed.

RAI 240.002

The staff requested clarification of the definition of rock for which the fixed base analysis is considered appropriate. In sections of the DCD, Westinghouse indicated that the analysis was considered appropriate for a rock shear wave velocity of 3,500 fps. During the review and analyses performed for the AP600 application, it was noted that the effects of SSI were considered negligible only for the case of hard rock with shear wave velocities exceeding 8,000 fps. In its response, Westinghouse revised the DCD and indicated that the analyses being conducted are appropriate for the case of hard rock with shear wave velocities equal or exceeding 8,000 fps. Responses provided by Westinghouse satisfied the staff's concern and no additional information is needed.

RAI 240.003

The staff requested clarification on the potential impact of settlement on the design as indicated in DCD Subsection 2.5.4.3. In its response, Westinghouse stated that settlement effects for the hard rock design condition are negligible and any references to settlement will be removed from the DCD. This response is considered sufficient and no additional information is needed.

RAI 241.001*

Part A The response provided by Westinghouse satisfied the staff's concern and no information is needed.

Part B In its response, Westinghouse indicated that the design will be acceptable for hard rock having an allowable bearing capacity of 450 ksf. The staff raised a concern that this is considered an extremely high value of "allow bearing capacity," even for hard rocks, and will be difficult for the COL applicant to substantiate. The staff also identified that the response also does not indicate whether this definition refers to strength or displacement considerations. In addition, the review of the Civil/Structural Criteria document indicated that hard crystalline bedrock is to have an allowable bearing capacity of 4 ksf. Westinghouse agreed to clarify these discrepancies.

RAI 241.002

No additional information is needed.

RAI 241.003

No additional information is needed.

cc:

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