Progress Energy

Serial: NPD-NRC-2008-051 10CFR52.79
November 24, 2008

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

SHEARON HARRIS NUCLEAR POWER PLANT, UNITS 2 AND 3
DOCKET NOS. 52-022 AND 52-023
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 020 RELATED TO STABILITY OF SUBSURFACE MATERIALS AND FOUNDATIONS

Reference: Letter from Manny Comar (NRC) to James Scarola (PEC), dated September 26, 2008, "Request for Additional Information Letter No. 020 Related to SRP Section 02.05.04 for the Harris Units 2 and 3 Combined License Application"

Ladies and Gentlemen:

Progress Energy Carolinas, Inc. (PEC) hereby submits our response to the Nuclear Regulatory Commission's (NRC) request for additional information provided in the referenced letter. A partial response to the NRC request is provided in the enclosure. Page 1 of the enclosure includes the schedule for response to the remaining questions.

If you have any further questions, or need additional information, please contact Bob Kitchen at (919) 546-6992, or me at (919) 546-6107.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on November 24, 2008.

Sincerely,

Garry D. Miller
General Manager
Nuclear Plant Development

Enclosure/Attachments

cc : U.S. NRC Director, Office of New Reactors/NRLPO
U.S. NRC Office of Nuclear Reactor Regulation/NRLPO
U.S. NRC Region II, Regional Administrator
U.S. NRC Resident Inspector, SHNPP Unit 1
Mr. Manny Comar, U.S. NRC Project Manager

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**Shearon Harris Nuclear Power Plant Units 2 and 3
Response to NRC Request for Additional Information Letter No. 020 Related to
SRP Section 02.05.04 for the Combined License Application, dated September 26, 2008**

NRC RAI #	Progress Energy RAI #	Progress Energy Response
02.05.04-3	H-0117	Future submittal – expected by 12/5/08 with supplemental submittal expected by 1/15/09
02.05.04-4	H-0118	Response enclosed – see following pages
02.05.04-5	H-0119	Response enclosed – see following pages
02.05.04-6	H-0120	Future submittal – expected by 12/5/08
02.05.04-7	H-0121	Response enclosed – see following pages
02.05.04-8	H-0122	Future submittal – expected by 12/5/08 with supplemental submittal expected by 1/15/09
02.05.04-9	H-0123	Response enclosed – see following pages
02.05.04-10	H-0124	Response enclosed – see following pages
02.05.04-11	H-0125	Response enclosed – see following pages
02.05.04-12	H-0126	Response enclosed – see following pages
02.05.04-13	H-0127	Future submittal – expected by 12/5/08 with supplemental submittal expected by 1/15/09
02.05.04-14	H-0128	Future submittal – expected by 12/5/08 with supplemental submittal expected by 1/15/09

NCR Letter No.: HAR-NRC-LTR-020

NRC Letter Date: September 26, 2008

NRC Review of Final Safety Analysis Report

NRC RAI #: 02.05.04-4

Text of NRC RAI:

The AP1000 DCD Tier 1 (Table 5.0-1, Site Parameters) states "For a layer with a low strain shear wave velocity greater than or equal to 2500 feet per second, the layer should have approximately uniform thickness, should have a dip no greater than 20 degrees..."

The AP1000 DCD Tier 1 requirement for uniform sites requires a dip not greater than 20 degrees. The dip of strata identified under HAR 3 using the marker bed approach is nominally greater than 20 degrees. Please provide the basis for your conclusion that the Tier 1 requirement was met.

PGN RAI ID #: H-0118

PGN Response to NRC RAI:

Multiple approaches were employed to evaluate the dip of rock strata at the HAR sites, as summarized in the FSAR. For the two marker beds used to calculate the dip angle between boreholes, the calculated dip angles were 21 and 19.5 degrees. Comparison by best-fit visual matching of borehole shear-wave velocity profiles defined a dip angle marginally less than 20 degrees (19.9 degrees), whereas the acoustic televiewer bedding features had an average dip angle of 23.2 degrees. As stated in FSAR Table 2.0-201, since some of the HAR 3 dip angle data exceed 20 degrees, the DCD site parameter for dip angle is not clearly bounded but not considered significant for reasons provided.

Westinghouse Electric Company (WEC) was advised of this condition during preparation of the FSAR. WEC has confirmed that the design basis site conditions are satisfied if the dip angles along the nuclear island orthogonal axes ("Plant North" and "Plant East") are each less than 20 degrees, even if the true dip (not aligned with the plant axes) exceeds 20 degrees.

This condition is satisfied at the HAR site. The steepest dip angle at HAR 3, presented in FSAR Table 2.5.4-202 corresponding to the acoustic televiewer bedding features, is 23.2 degrees from horizontal directed 113.6 degrees from state plane north. The associated apparent dip oriented along the nuclear island orthogonal axes–"Plant North" at 65 degrees clockwise from state plane north and "Plant East" at 155 degrees clockwise from state plane north–are as follows:

<u>Apparent dip oriented Plant North (β_{NS}):</u>

a) $$\beta_{NS} = Tan^{-1}\left[\tan(23.2^o)\cos(113.6^o - 65^o)\right] = 15.8^o$$

<u>Apparent dip oriented Plant East (β_{EW}):</u>

b) $$\beta_{EW} = Tan^{-1}\left[\tan(23.2^o)\cos(155^o - 113.6^o)\right] = 17.8^o$$

The apparent dips calculated from the other methods (marker bed evaluation and V_s profile matching) are shallower than these values.

WEC concurs that since the dip angles along orthogonal axes of the nuclear island are less than 20 degrees, the dip angles are acceptable, and has advised that there is no need for further site investigations at the HAR sites.

Associated HAR COL Application Revisions:

No COLA revisions have been identified associated with this response.

Attachments/Enclosures:

None.

NCR Letter No.: HAR-NRC-LTR-020

NRC Letter Date: September 26, 2008

NRC Review of Final Safety Analysis Report

NRC RAI #: 02.05.04-5

Text of NRC RAI:

AP1000 DCD Tier 2 (Section 2.5.4.5.3.1, Site-Specific Subsurface Uniformity Design Basis) establishes that sites having local soft or hard spots within a layer or layers cannot be considered as uniform.

FSAR Section 2.5.4.4.2.1.1, "HAR 2" states "For dip-correlated strata below the nuclear island subgrade elevation of 67.1m (220 ft) amsl, Vs measured in the boreholes fall within 20 percent of the average among the three holes, except at a few isolated intervals (Figure 2.5.4-214B). The exceptions typically span only one or two suspension logging data points, representing up to approximately 1 m (3ft.) in thickness." This appears to be true except for immediately under the HAR 3 basemat. Referencing the HAR 3 shear wave velocity profiles, it is observed that the measured shear wave velocities between El. 210 and El. 220 vary from approximately 3500 fps in BPA-49 to 5100 fps in BPA-50. While the average of the 3 shear wave velocities in the subject depth interval within or in close proximity to the NI footprint would approximately be within the plus or minus 20% criteria, the data also seem to indicate a softening of the rock on the Northeast side of the HAR 3. The lower average value of 3500 fps observed in Boring BPA-49 is 30% lower than the average value of 5100 fps observed for the same depth interval at boring BPA-50.

Please clarify how it was determined that the variation observed at HAR 3 between El. 210 and El. 220 is within the criteria for a uniform site, and does not require additional site investigations on closer spacing.

PGN RAI ID #: H-0119

PGN Response to NRC RAI

The shear-wave velocities (V_s) of the various rock layers are closely associated between boreholes, as described in FSAR Subsection 2.5.4.4.2.1.1. However, due to the dip of these rock layers, V_s does not directly correlate at equal elevations between boreholes.

The specific elevation interval in question (elevation 210 to 220 feet at borehole BPA-49) represents rock layers that dip down to the east-southeast at approximately 20 degrees. Based on an average dip angle of 19.9 degrees calculated by visually matching the V_s profiles at HAR 3, rock layers encountered at BPA-49 are expected to be encountered at approximately 45 feet lower elevation at BPA-50 and 14 feet higher elevation at BPA-25 (per the note on FSAR Figure 2.5.4-215B). Small local variations in layer thickness or dip angle are such that the rock layers are encountered within a few feet of these expected differences at BPA-25 and BPA-50 relative to BPA-49.

The site uniformity criteria presented in the AP1000 DCD are based on comparisons of V_s data within layers and allow for modest dip under the NI. Following are more detailed comparisons of the interval in question at BPA-49 with the data oriented along-dip in boreholes BPA-25 and BPA-50, which show good correlation between V_s values within the layer. Additional comparisons between the boreholes at equal-elevation ranges are also presented, which show that V_s results are fairly consistent at equal elevation ranges at HAR 3.

A. Comparison of V_s at El. 210 to 220 ft at BPA-49 with Other Boreholes – Dip-Related Strata

As indicated on the borehole logs (FSAR Appendix 2BB), a clay seam was encountered in borehole BPA-49 at elevation 211.7 to 212.5 feet (49.4 to 50.2 ft bgs). This is aligned along dip with the clay seam encountered at elevation 224.2 to 224.6 feet (41.8 to 42.2 ft bgs) in BPA-25 and at elevation 164.1 to 165.0 feet (108.0 to 108.9 ft bgs) in BPA-50. The V_s profiles at BPA-25, BPA-49 and BPA-50 each show individual suspension logging V_s measurements lower than 4000 fps coincident with these clay seams.

The individual suspension logging V_s measurements taken in the 10-foot interval above and including this clay seam at BPA-25, BPA-49, and BPA-50 are as follows:

- **BPA-25:** 3850, 2710, 2710, 3740, 4370, 4520, and 4060 fps (at 42.7, 41.0, 39.4, 37.7, 36.1, 34.5, and 32.8 ft bgs respectively – data points between elevation 223.7 to 233.6 feet). Average V_s of these results: 3708 fps.
- **BPA-49:** 3400, 3700, 4690, 3810, 3270, 3880, 4690 fps (at 50.9, 49.2, 47.6, 45.9, 44.3, 42.7, and 41.0 ft bgs, respectively –data points between elevation 211 and 220.8 feet). Average V_s of these results: 3920 fps.
- **BPA-50:** 3400, 3330, 5600, 5700, 6410, 5800, 4420 fps (at 108.5, 106.9, 105.2, 103.6, 101.9, 100.3, and 98.7 ft bgs, respectively – data points between elevation 164.5 and 174.3 feet). Average V_s of these results: 4951 fps.

The overall average V_s for each of these datapoints is 4193 fps. Each of the three borehole average V_s calculated for this dip-related 10-foot layer, as listed above, fall within 20 percent above or below this overall average value (i.e., within 3355 and 5032 fps). Therefore, the DCD uniformity criterion for V_s variation is satisfied for this layer.

B. Comparison of V_s in Equal 10-ft Elevation Ranges – Without Consideration of Dip

In addition to the consistency of dip-related rock layers within the HAR 3 footprint, there is also general consistency of V_s between boreholes at equal-elevation ranges, without adjustment for dip. To demonstrate this, the average of suspension logging V_s measurements in the each of the three HAR 3 boreholes were calculated for each 10-foot elevation interval between elevation 220 and 100 feet. The overall average V_s value for all values in the three boreholes was also calculated for each elevation range. Figure A-1 (see page 7) shows the overall interval average V_s, the individual borehole average V_s, the V_s values that bracket 20 percent above and below the overall average, and the individual V_s data points.

As shown on Figure A-1, the 10-foot elevation interval averages in each borehole are bound within 20 percent of the overall average for the interval in nearly every case, including elevation 210 to 220 feet. The only exception is at elevation 160 to 170 feet, where the BPA-50 borehole average is 20.2 percent below the mean. This exception is driven by the presence of the clay seam discussed in section A above. Presence of such thin low-V_s intervals was considered in the site response analyses presented in FSAR 2.5.2. Therefore, the AP1000 DCD site uniformity criteria for V_s variation are effectively satisfied even without consideration of bedding dip.

C. Other Considerations

Care should be taken when considering the V_s data from other methods (SASW, downhole, and "smoothed" suspension logging profile) presented on FSAR Figure 2.5.4-209A through 209G, especially at shallow depths. For example, consider these data near subgrade elevation 220 ft. as plotted on FSAR Figure 2.5.4-209F for BPA-49. The plots for each of these three additional methods represent averaged V_s data over an elevation interval that includes material significantly above the subgrade elevation. The "Suspension Log – Smoothed" V_s data profile includes data from approximate elevation 212 to 232 feet within the calculation for one layer. The resulting "Suspension Log – Smoothed" V_s profile shown for this interval is therefore influenced by the lower V_s rock present above the subgrade elevation (above elevation 220 feet), which will be removed during construction. The average V_s calculated using individual suspension logging V_s results between elevation 210 and 220 feet (shown in Figure A-1) is therefore considered more representative of the rock immediately below subgrade elevation.

As a final point, subgrade improvement measures described in FSAR Subsection 2.5.4.5.2, including removal of excessively fractured or weathered rock and soil infilling and replacement with dental concrete, will increase the average V_s of rock from elevation 210 to 220 feet at borehole BPA-49 and at other locations at the HAR 3 subgrade. This will further reduce the V_s variability across the basemat subgrade. Commitments have been made to perform detailed excavation mapping and to implement a subgrade improvement program prior to construction.

For the reasons stated above, the variations between El. 210 and 220 ft. at HAR 3 are within the V_s variation criteria for a uniform site. WEC concurs that additional site investigations on closer spacing are not required.

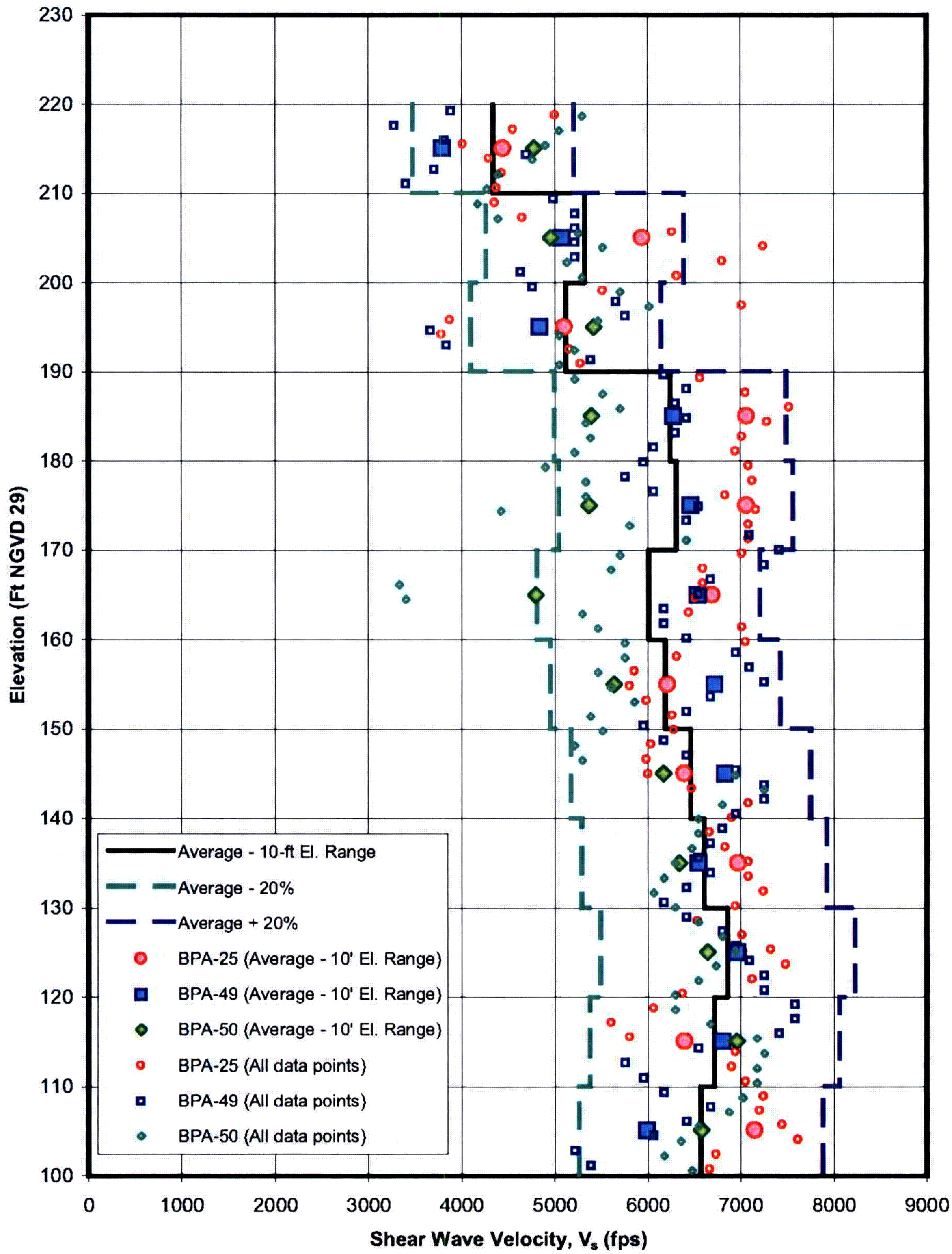
Associated HAR COL Application Revisions:

No COLA revisions have been identified associated with this response.

Attachments/Enclosures:

None.

Figure A-1
Comparison of Suspension Logging V_s Data Results in 10-Ft Elevation Ranges
Below El. 220 Ft - HAR 3



NCR Letter No.: HAR-NRC-LTR-020

NRC Letter Date: September 26, 2008

NRC Review of Final Safety Analysis Report

NRC RAI #: 02.05.04-7

Text of NRC RAI:

FSAR 2.5.4.2.4.3, "Elastic Modulus" states "If a lower reduction factor than 0.5 were used, the depth-weighted Young's modulus values would be correspondingly higher."

Please clarify this statement with a more detailed discussion.

PGN RAI ID #: H-0121

PGN Response to NRC RAI

The statement in question refers to the relationship between the "low-strain" and "large-strain" Young's (elastic) modulus derived from the suspension logging survey results and the corresponding "reduction factor" used to convert between these values.

"Low-strain" elastic modulus values (E) were calculated for each suspension logging data point below the nuclear island subgrade elevation. These values were calculated using the following relationship (Goodman, 1989):

a) $$E = \frac{(1-2\upsilon)(1+\upsilon)}{(1-\upsilon)}\rho V_p^2$$

Where υ is Poisson's ratio, ρ is the rock density, and V_p is the compressional wave velocity. V_p relates to the shear wave velocity (V_s) by the following equation (Goodman, 1989):

b) $$\upsilon = \frac{\left(V_p^2 / V_s^2\right) - 2}{2\left[\left(V_p^2 / V_s^2\right) - 1\right]}$$

Or, rewritten in terms of V_p:

c) $$V_p = V_S\left[\frac{(2-2\upsilon)}{(1-2\upsilon)}\right]^{0.5}$$

The V_p value calculated by this equation is the small-strain velocity consistent with the level that occurs during geophysical testing. In order to account for higher levels of strain, the "large-strain" elastic modulus values (E') were then calculated for each data point by adjusting E by a reduction factor (RF) of 0.5, as follows:

d) $$E' = (1-RF)E$$

The factor (1-RF) is equivalent to the G/G_{max} ratio at expected strain levels, as discussed in the response to NRC RAI # 02.05.04-9. For a G/G_{max} ratio of 0.5, the corresponding shear strain would be approximately 0.02 percent. This level of strain is an order of magnitude higher than is expected in the soft rock. Based on equation d) above, if a lower RF were used (i.e., a higher G/G_{max} ratio), the resulting depth-weighted average value of E' would be correspondingly higher.

The depth-weighted average value of E' below elevation 220 feet at each HAR site was calculated from individual suspension logging results in the applicable boreholes (BPA-5, BPA-47, and BPA-48 at HAR 2, and BPA-25, BPA-49, and BPA-50 at HAR 3). For this calculation, each data point was weighted proportional to the thickness of the rock depth interval represented by the datapoint; for equally spaced data points, the weights were the same. The actual depths or elevations of the data points were not considered. The average E' values were then calculated from the individual measurements and reported in the first paragraph of FSAR Subsection 2.5.4.2.4.3.

Reference:

Goodman, R.E. (1989). "Introduction to Rock Mechanics, Second Edition," John Wiley & Sons.

Associated HAR COL Application Revisions:

No COLA revisions have been identified associated with this response.

Attachments/Enclosures:

None.

NCR Letter No.: HAR-NRC-LTR-020

NRC Letter Date: September 26, 2008

NRC Review of Final Safety Analysis Report

NRC RAI #: 02.05.04-9

Text of NRC RAI:

FSAR 2.5.4.10.3.1, Elastic Settlement under Foundation Loads, states "The small-strain constrained modulus was conservatively degraded by 50 percent to model larger strain effects."

Please indicate the basis for choosing 50%.

PGN RAI ID #: H-0123

PGN Response to NRC RAI

FSAR Figure 2.5.2-263 shows the modulus degradation relationship (G/G_{max}) with strain level for soft rock, as considered in the site response analysis of FSAR Section 2.5.2. As shown on that figure, a G/G_{max} ratio of 0.5 corresponds to a strain level of approximately 0.02 percent.

The estimated strain level associated with nuclear island settlement is likely to be less than 0.02 percent. For example, for elastic settlement of 0.04 inch (as calculated using seismic survey data and reported in FSAR Table 2.5.4-215) over a depth of influence of 160 feet, the average strain level is 0.04/12/160 = 0.002 percent. The estimated G/G_{max} ratio for rock below the nuclear island subgrades at an average strain of 0.002 percent ranges is greater than 0.9 and therefore is significantly higher than 0.5. For a G/G_{max} of 0.9, the corresponding reduction factor (RF) would be 0.1.

Shear modulus (G) and elastic modulus (E) are linearly related. Use of the G/G_{max} ratio of 0.5 to adjust the small-strain modulus values for expected elastic strain effects is considered appropriate and results in conservative settlement estimates.

The RF discussed in the response to NRC RAI # 02.05.04-7 is calculated based on this G/G_{max} *ratio*, as follows:

a) $RF = 1 - (G/G_{max}) = 0.5$

Associated HAR COL Application Revisions:

No COLA revisions have been identified associated with this response.

Attachments/Enclosures:

None.

NCR Letter No.: HAR-NRC-LTR-020

NRC Letter Date: September 26, 2008

NRC Review of Final Safety Analysis Report

NRC RAI #: 02.05.04-10

Text of NRC RAI:

FSAR 2.5.4.10.3.3, "Total Settlement" states that the HNP settlements were within tolerable limits.

What are the magnitudes of total and differential settlements that have been measured at HNP? Compare the stratigraphy between the HNP site and HAR 2 and HAR 3.

PGN RAI ID #: H-0124

PGN Response to NRC RAI

Shearon Harris Nuclear Power Plant Unit 1 (HNP) FSAR Table 2.5.4-9 presented the average calculated building settlements for the HNP facilities. As listed in that table, the calculated HNP building settlements ranged from 0.001 to 0.025 foot. The HNP SER, Subsection 2.5.4.7 states,

> *"Because the plant structures are founded on sound rock and the predicted (and actual) settlements are less than 0.5 inch, the applicant plans to discontinue monitoring vertical movements of the structures at the start of plant operations.*

The geologic conditions at the HNP site are summarized in HNP FSAR Subsection 2.5.4.1. As stated therein,

> *"The plant is founded on well-consolidated Triassic sandstone, siltstone, shale, and claystone. The individual beds are generally lenticular; hence, rock types change abruptly horizontally and vertically."*

Borehole logs at the HNP are presented in HNP FSAR Appendix 2.5A. Two deep boreholes were advanced to over 200 ft bgs at the HNP containment structure (boreholes BP-74 and BP-76). Rock descriptions on those logs are similar to those at the HAR sites, as follows:

- Average RQD of rock below elevation 235 feet (approximately 40 feet below pre-construction grade) at boreholes BP-74 and BP-76 are 94.4 and 91.6, respectively, as presented in HNP FSAR Table 2.5.4-2. These results are similar to those encountered below elevation 220 feet in the deep boreholes at HAR 2 and HAR 3 (average borehole RQD ranged from 92 to 97 at boreholes BPA-5, 25, 47, 48, 49, and 50 as presented in HAR FSAR Table 2.5.4-203).
- Logs for boreholes BP-74 and BP-76 describe the rock as consisting predominantly of red to purple siltstone, shaley siltstone and sandstone, with lesser intervals of shale, similar to rock at the HAR sites. These descriptions are consistent with the rock types revealed during explorations at HAR 2 and HAR 3, as shown in Figures 2.5.4-204A and B and Figures 2.5.4-205A and B.
- Clay seams below sound rock are not noted on the cited HNP borehole logs. However, multiple indications of "soft shale seams" one or more inches thick are noted, as are

slickensided strata. It is possible that some of the soft shale seams described on the HNP borehole logs are similar to the clay seams described on the HAR borehole logs.

- Shear wave velocity of rock based on seismic refraction surveys was reported in Table 2.5.2-3 of the HNP FSAR. The typical V_s of sound rock was reported as 5600 fps, which is consistent with the V_s values recorded during geophysical measurements at HAR 2.

Rock core samples from HNP are no longer available for visual comparison with the HAR rock cores. However, comparison of the rock core descriptions between the HNP site and the HAR sites indicates that conditions are similar.

Associated HAR COL Application Revisions:

No COLA revisions have been identified associated with this response.

Attachments/Enclosures:

None.

NCR Letter No.: HAR-NRC-LTR-020

NRC Letter Date: September 26, 2008

NRC Review of Final Safety Analysis Report

NRC RAI #: 02.05.04-11

Text of NRC RAI:

FSAR 2.5.4.10.4 Lateral Earth Pressures states "Surface surcharge from structures adjacent to the nuclear islands could potentially increase the lateral earth pressures that develop against the nuclear island sidewalls. However, these adjacent structures will likely be founded on sound rock, which is stiffer than the soil backfill adjacent to nuclear islands. Due to this difference in rock and backfill stiffness, it is anticipated that these adjacent structure foundation loads will not be transferred to the soil backfill. Therefore, loads from structures adjacent to nuclear islands (Ps) were considered insignificant in calculation of the at-rest pressure distributions."

Please clarify what structures this paragraph refers to since it appears that the radwaste building and turbine building appear to be founded on engineered backfill. Only the Annex building is founded on concrete on rock.

PGN RAI ID #: H-0125

PGN Response to NRC RAI

As noted in the RAI, the HAR 2 and HAR 3 Annex Buildings will be founded on rock or concrete fill over rock. The other structures adjacent to the nuclear islands (Radwaste and Turbine buildings) may be founded on a few to tens of feet of compacted granular fill over rock, although the option to use concrete fill under some of these structures may still be considered prior to construction.

Compacted granular fill under structures adjacent to the nuclear islands will result in additional lateral pressures on the subgrade nuclear island walls. These additional lateral pressures will be considered in the response to NRC RAI # 02.05.04-8.

Associated HAR COL Application Revisions:

No COLA revisions have been identified associated with this response.

Attachments/Enclosures:

None.

NCR Letter No.: HAR-NRC-LTR-020

NRC Letter Date: September 26, 2008

NRC Review of Final Safety Analysis Report

NRC RAI #: 02.05.04-12

Text of NRC RAI:

FSAR 2.5.4.10.2, "Resistance to Sliding" states "The nuclear island has been designed such that passive resistance from this backfill is not necessary to prevent sliding." This statement is not in agreement with criteria for sliding presented in AP1000 DCD, Tier 2, Section 2.5.4.6.2 "Properties of Materials Adjacent to Nuclear Island Exterior Walls" where it states "A determination of the static and dynamic engineering properties of the surrounding soil will be made to demonstrate they are competent and provide passive earth pressures greater than or equal to those used in the seismic stability evaluation for sliding of the nuclear island."

Please clarify the statement that backfill is not required for sliding stability of the nuclear island.

PGN RAI ID #: H-0126

PGN Response to NRC RAI

The basis for the statement in question is in the second paragraph of Section 8.4, "Backfill Requirements," in Report No. APP-1000-X1-001, "Foundation Interface Conditions," Revision 1 (Paul C. Rizzo Associates, Inc., August 13, 2007), which states:

> This backfill material, for which no credit for lateral support is taken in the Nuclear Island design and analysis, is regarded by Westinghouse/RIZZO as a Non-Safety Class structure.

Since publication of the August 2007 report, additional clarification on backfill passive resistance required to resist sliding has been documented. The WEC response to RAI-TR85-SEB1-35 clarifies the lateral passive forces that were considered in the WEC nuclear island sliding resistance analyses.

Additional documentation is required to show that HAR sidewall soil, rock, and backfill will provide satisfactory passive resistance to prevent sliding. At HAR, the embedment depth into sound rock will contribute to the passive resistance. The response to NRC RAI # 02.05.04-8 will include a comparison of the calculated site-specific lateral dynamic passive forces with those required for sliding stability.

Associated HAR COL Application Revisions:

No COLA revisions have been identified associated with this response.

Attachments/Enclosures:

None.