PMHarrisCOL PEmails

From: Manny Comar
Sent: Friday, September 26, 2008 9:15 AM
To: robert.kitchen@pgnmail.com; david.waters@pgnmail.com; Wilkins, Tillie
Cc: Manny Comar; HarrisCOL Resource
Subject: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 020 RELATED TO SRP SECTION 02.05.04 FOR THE HARRIS UNITS 2 AND 3 COMBINED LICENSE APPLICATION
Attachments: Harris-RAI-LTR-20.pdf

All:

Attached is the RAI letter No.20 related to SRP Section: 02.05.04 - Stability of subsurface Materials and Foundations

The Accession number is ML082700060.

If you have any further questions, please feel free to contact me. Thanks

Manny Comar
Senior Project Manager
NRO/DNRL/NWE1
Nuclear Regulatory Commission
301-415-3863
mailto:manny.comar@nrc.gov

Hearing Identifier: ShearonHarris_COL_Public
Email Number: 97

Mail Envelope Properties (3AF7DEF82ADA8944AD8247B7ED7FD6517BF8FE7758)

Subject: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 020 RELATED TO SRP SECTION 02.05.04 FOR THE HARRIS UNITS 2 AND 3 COMBINED LICENSE APPLICATION
Sent Date: 9/26/2008 9:15:00 AM
Received Date: 9/26/2008 9:15:02 AM
From: Manny Comar

Created By: Manny.Comar@nrc.gov

Recipients:
"Manny Comar" <Manny.Comar@nrc.gov>
Tracking Status: None
"HarrisCOL Resource" <HarrisCOL.Resource@nrc.gov>
Tracking Status: None
"robert.kitchen@pgnmail.com" <robert.kitchen@pgnmail.com>
Tracking Status: None
"david.waters@pgnmail.com" <david.waters@pgnmail.com>
Tracking Status: None
"Wilkins, Tillie" <tillie.wilkins@pgnmail.com>
Tracking Status: None

Post Office: HQCLSTR01.nrc.gov

Files	**Size**	**Date & Time**
MESSAGE	450	9/26/2008 9:15:02 AM
Harris-RAI-LTR-20.pdf	147209	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

HarrisRAIsPEm Resource

From: Manny Comar
Sent: Friday, September 26, 2008 8:23 AM
To: HarrisRAIsPEm Resource
Subject: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 020 RELATED TO SRP SECTION 02.05.04 FOR THE HARRIS UNITS 2 AND 3 COMBINED LICENSE APPLICATION
Attachments: HAR-RAI-LTR-020.doc

Hearing Identifier: HarrisCOL_eRAIs
Email Number: 21

Mail Envelope Properties (3AF7DEF82ADA8944AD8247B7ED7FD6517BF8FE767E)

Subject: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 020 RELATED TO SRP SECTION 02.05.04 FOR THE HARRIS UNITS 2 AND 3 COMBINED LICENSE APPLICATION
Sent Date: 9/26/2008 8:22:49 AM
Received Date: 9/26/2008 8:22:51 AM
From: Manny Comar

Created By: Manny.Comar@nrc.gov

Recipients:
"HarrisRAIsPEm Resource" <HarrisRAIsPEm.Resource@nrc.gov>
Tracking Status: None

Post Office: HQCLSTR01.nrc.gov

Files	**Size**	**Date & Time**
MESSAGE	23	9/26/2008 8:22:51 AM
HAR-RAI-LTR-020.doc	64506	

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Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

September 26, 2008

James Scarola
Senior Vice President and
Chief Nuclear Officer
PO Box 1551
411 Fayetteville Street Mall
Raleigh NC 27602

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 020 RELATED TO SRP SECTION 02.05.04 FOR THE HARRIS UNITS 2 AND 3 COMBINED LICENSE APPLICATION

Dear Mr. Scarola:

By letter dated February 18, 2008, Progress Energy submitted its application to the U. S. Nuclear Regulatory Commission (NRC) for a combined license (COL) for two AP1000 advance passive pressurized water reactors pursuant to 10 CFR Part 52. The NRC staff is performing a detailed review of this application to enable the staff to reach a conclusion on the safety of the proposed application.

The NRC staff has identified that additional information is needed to continue portions of the review. The staff's request for additional information (RAI) is contained in the enclosure to this letter.

To support the review schedule, you are requested to respond within 30 days of the date of this letter. If changes are needed to the final safety analysis report, the staff requests that the RAI response include the proposed wording changes.

If you have any questions or comments concerning this matter, you may contact me at 301-415-3863.

Sincerely,

/**RA**/

Manny Comar, Lead Project Manager
AP1000 Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

Docket Nos. 52-022
52-023
ERAI Tracking No.1226

Enclosure:
Request for Additional Information

CC: see next page

If you have any questions or comments concerning this matter, you may contact me at 301-415-3863.

Sincerely,

/**RA**/

Manny Comar, Lead Project Manager
AP1000 Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

Docket Nos. 52-022
52-023
ERAI Tracking No. 1226

Enclosure:
Request for Additional Information

Distribution:

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NRO-002

OFFICE	RHEB/BC	NWE1/PM	OGC	NWE1/L-PM
NAME	RKaras*	MComar*	SBrock*	MComar*
DATE	9/17/08	9/17/08	9/19/08	9/25/08

*Approval captured electronically in the electronic RAI system.

OFFICIAL RECORD COPY

Request for Additional Information No. 1226

9/26/2008
Shearon Harris
Progress Energy
Docket No. 52-022 and 52-023
SRP Section: 02.05.04 - Stability of Subsurface Materials and Foundations
Application Section: 2.5.4

QUESTIONS for Geosciences and Geotechnical Engineering Branch 1 (RGS1)

02.05.04-3
Technical Memorandum (NPD-NRC-2008-014), "Supplemental Liquefaction Evaluation – HAR Site Backfill and Native Soil"; Section 1.0 "Site Specific Ground Motion Parameters, CSR, and FS Criteria", states that a site factor of 1.2 was assigned to "convert the PGA at top of sound rock to a ground surface motion" based on IBC 2006.

Please clarify whether IBC 2006 or a site-specific response was used for the liquefaction analysis. The report indicates a factor of 1.2 was applied, however, the plant grade peak ground acceleration could not be found in the report. Please provide the value of the peak ground acceleration at the surface, a sample liquefaction calculation using SPT N-values, and document how you determined N equals 30 for the sand backfill.

02.05.04-4
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.

02.05.04-5
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.

02.05.04-6
The AP1000 DCD, Tier 2, Section 2.5.4.5.3, “Site Foundation Material Evaluation Criteria” states, “The distribution of bearing reactions under the basemat is a function of the subgrade modulus, which in turn is a function of the shear wave velocity. The Combined License applicant shall demonstrate that the variation of subgrade modulus or shear wave velocity across the footprint is within the range considered for design of the nuclear island basemat.”

Considering the variation in shear wave velocity profiles at HAR 3, there appears to be softer conditions on the northwest side of the NI. The lower average shear wave velocity (3500 fps) observed in Boring BPA-49 is 30% lower than the 5100 fps observed for the same depth interval at boring BPA-50.

Please demonstrate that the variation of shear wave velocity (and therefore subgrade modulus) across the HAR 3 footprint is within the range considered for design of the nuclear island basemat.

02.05.04-7
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.

02.05.04-8
FSAR 2.5.4.10.4, “Lateral Earth Pressures”, states “The resulting at-rest lateral earth pressure profiles for the two soil backfill types are presented for representative sidewall elevations in Table 2.5.4-217.”

Please provide all the lateral earth pressures required by AP1000 DCD, Tier 2, and Section 2.5.4.6.7. Provide sample calculations showing the assumptions and methods used in the calculation of the dynamic active and passive lateral earth pressures.

02.05.04-9
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%.

02.05.04-10
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.

02.05.04-11

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.

02.05.04-12
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.

02.05.04-13
FSAR Section 2.5.4.10.1.2, “Rock Mass Strength Parameters for Bearing Capacity Analyses” provides the rationale and general procedures used to obtain Mohr–Coulomb strength parameters using the Hoek-Brown criteria for use in determining bearing capacity. However, the rock strength tables do not provide all the Hoek-Brown classification data needed as input to confirm the Mohr-Coulomb strength parameters presented for the various cases analyzed.

Please provide all the assumptions, input data, and a sample calculation showing how those input parameters were derived for the lower bound bearing capacity determination at HAR 3.

02.05.04-14
AP1000 DCD, Tier 2, (Section 2.5.4.6.2 “Properties of Materials Adjacent to Nuclear Island Exterior Walls”) states that “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.”

FSAR Section 2.5.4.5.3, “Properties of Backfill Adjacent to Nuclear Islands" states “Backfill materials will be placed adjacent to the sidewalls of the nuclear islands. The backfill material adjacent to the nuclear island sidewalls is nonsafety-related; the nuclear islands are designed for safe performance independent of the sidewall backfill type." Compare this statement to that found 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.” The DCD goes on to state: “If the soil below and adjacent to the exterior walls is made up of clay, sand and clay, or other types of soil

other than those classified above as competent, then the Combined License applicant will evaluate the seismic stability against sliding as described in subsection 3.8.5.5.3 using the site-specific soil properties."

Please include engineering data on all the backfill (concrete, cohesionless backfill and cohesive soil backfill) that will be used adjacent to nuclear islands. Also, please supply the borrow area exploration program data, field results on full scale test fills for each type material planned as backfill, including shear wave velocities measured in the test fills, and static and dynamic laboratory test results (including resonant column/torsional shear) for all backfill types intended for use adjacent to the sidewalls of the nuclear island.