Southern Nuclear
Operating Company, Inc.
42 Inverness Center Parkway
Birmingham, AL 35242

SOUTHERN COMPANY

JUL 20 2012

Docket Nos.: 52-025
52-026

ND-12-1503
10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Southern Nuclear Operating Company
Vogtle Electric Generating Plant Units 3 and 4
Response to Request for Additional Information Letter No. 02
Related to License Amendment Request (LAR) 12-003

Ladies and Gentlemen:

In accordance with the provisions of 10 CFR 50.90, by letter dated April 6, 2012 and revised by letters dated April 12, 2012, and May 7, 2012, Southern Nuclear Operating Company (SNC) submitted license amendment request (LAR) 12-003 to amend the Vogtle Electric Generating Plant (VEGP) Units 3 and 4 combined licenses (COLs) (License Nos. NPF-91 and NPF-92, respectively). During the course of the review of this LAR, the NRC staff identified the need for additional information to continue portions of the review. The NRC's request for additional information (RAI) was provided to SNC in RAI Letter No. 02 related to LAR-12-003, dated June 20, 2012. The enclosure to this letter provides the requested response to the subject RAI, which is also referred to as electronic RAIs (eRAIs) 6550 and 6561.

This letter contains no regulatory commitments.

Should you have any questions, please contact Mr. Wesley A. Sparkman at (205) 992-5061.

D092
NRO

Ms. Amy G. Aughtman states that she is a Licensing Manager of Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and to the best of her knowledge and belief, the facts set forth in this letter are true.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY

Amy G. Aughtman

A. G. Aughtman

AGA/ERG/kms

Sworn to and subscribed before me this 20 *day of* July *, 2012*

Notary Public: Mary J. Shurbut

My commission expires: 12/1/2012

NOTARY PUBLIC STATE OF ALABAMA AT LARGE
MY COMMISSION EXPIRES: Dec 1, 2012
BONDED THRU NOTARY PUBLIC UNDERWRITERS

Enclosure: Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Response to Request for Additional Information Letter No. 02 Related to License Amendment Request (LAR) 12-003

cc: Southern Nuclear Operating Company
Mr. S. E. Kuczynski, Chairman, President & CEO (w/o enclosure)
Mr. J. A. Miller, Executive VP, Nuclear Development
Mr. D. A. Bost, Chief Nuclear Officer (w/o enclosure)
Mr. B. L. Ivey, VP, Regulatory Affairs
Mr. M. D. Rauckhorst, VP, Vogtle 3 & 4 Construction (w/o enclosure)
Mr. D. H. Jones, VP, Regulatory Affairs, Vogtle 3 & 4
Mr. J. R. Johnson, VP, Operational Readiness, Vogtle 3 & 4 (w/o enclosure)
Mr. T. E. Tynan, Site VP, Vogtle 1 & 2
Mr. D. M. Lloyd, Project Support Director, Vogtle 3 & 4 (w/o enclosure)
Mr. C. R. Pierce, Regulatory Affairs Director
Mr. M. J. Ajluni, Nuclear Licensing Director
Mr. D. L. Fulton, Environmental Manager
Mr. J. D. Williams, Site Support Manager, Vogtle 3 & 4 (w/o enclosure)
Mr. C. H. Mahan, Site Licensing Manager, Vogtle 3 & 4
Ms. A. G. Aughtman, Corporate Licensing Manager, Vogtle 3 & 4
Mr. M. C. Medlock, ITAAC Project Manager, Vogtle 3 & 4
Mr. W. A. Sparkman, Licensing Supervisor
Mr. D. W. Midlik, Licensing Supervisor
Document Services RTYPE: GOV0208
File AR.01.02.06

Nuclear Regulatory Commission
Mr. V. M. McCree, Region II Administrator (w/o enclosure)
Mr. F. M. Akstulewicz, Deputy Director Div. of New Reactor Licensing (w/o enclosure)
Mr. M. E. Tonacci, AP1000 Licensing Branch Chief (w/o enclosure)
Mr. R. G. Joshi, Lead Project Manager of New Reactors
Ms. D. L. McGovern, Project Manager of New Reactors
Mr. B. M. Bavol, Project Manager of New Reactors
Ms. M. A. Sutton, Environmental Project Manager
Mr. L. M. Cain, Senior Resident Inspector of VEGP 1 & 2
Mr. J. D. Fuller, Senior Resident Inspector of VEGP 3 & 4
Mr. G. Khouri, Senior Project Engineer VEGP 3 & 4
Mr. C. Abbott, Resident Inspector of VEGP 3 & 4
Mr. C. Huffman, Resident Inspector of VEGP 3 & 4

Georgia Power Company
Mr. B.H. Whitley, Nuclear Development Director

State of Georgia
Mr. J. H. Turner, Environmental Protection Division Director

Oglethorpe Power Corporation
Mr. M. W. Price, Executive VP and Chief Operating Officer
Mr. K. T. Haynes, Director of Contracts and Regulatory Oversight

Municipal Electric Authority of Georgia
Mr. J. E. Fuller, Senior VP, Chief Financial Officer
Mr. S. M. Jackson, VP, Power Supply

Dalton Utilities
Mr. D. Cope, President and Chief Executive Officer

Bechtel Power Corporation
Mr. J. S. Prebula, Project Engineer (w/o enclosure)
Mr. R. W. Prunty, Licensing Engineer

Tetra Tech NUS, Inc.
Ms. K. K. Patterson, Project Manager

Shaw Stone & Webster, Inc.
Mr. G. Grant, VP, Licensing & Regulatory Affairs (w/o enclosure)
Ms. K. Stoner, Vogtle Project Manager (w/o enclosure)
Mr. C. A. Castell, Licensing Engineer
Mr. E. C. Wenzinger, Licensing Engineer, Vogtle Units 3 & 4

Westinghouse Electric Company, LLC
Ms. J. Falascino, VP, Project Delivery (w/o enclosure)
Mr. T. H. Dent, VP, Consortium Project Director Vogtle Units 3 & 4 (w/o enclosure)
Mr. R. F. Ziesing, Director, Vogtle AP1000 Operations and Consortium Licensing (w/o encl.)
Mr. P. A. Russ, Director, AP1000 Global Licensing
Mr. R. A. DeLong, Director of U.S. & International Licensing (acting)
Mr. S. A. Bradley, Vogtle Project Licensing Manager
Mr. T. J. Ray, Manager, AP1000 COL Licensing Support

Southern Nuclear Operating Company

ND-12-1503

Enclosure

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Response to Request for Additional Information Letter No. 02
Related to
License Amendment Request (LAR) 12-003

eRAI Tracking No. 6550

NRC RAI No. 03.08.05-1

The May 7, 2012, LAR (revised from April 12, 2012 submittal) states a proposed change to the upper tolerance on the Nuclear Island (NI) critical sections basemat thickness as identified in the VEGP Unit 3 and 4 Final Safety Analysis (FSAR). The thickness tolerance value is listed in the plant specific Design Control Document (DCD) and associated Table 3.8.5-3, Note 2 (Tier 2*) and the critical section where the tolerance identifies as +1inch. The proposed change is to increase this upper tolerance to +4 inches.

The staff performed a review of the LAR, Section 3 (Technical Evaluation) and finds that the justification for the basemat thickness change lacks substantive quantification and requires additional information. For example, Page 5 of the LAR states that a small change is mass (~0.6%) of the NI would have negligible impact on the dynamic analysis, but does not differentiate the effects of the mass/stiffness change on global response (i.e., sliding and overturning) and local response as defined by in-structure response spectra (ISRS).

Staff notes that FSAR Appendix 3GG summarizes ISRS demands (upper bound, best-estimate, and lower bound) for key nuclear island locations (Figures 12 through 29). While these comparisons indicate margin to the CSDRS broadened envelope for frequencies greater than 1 Hz, it is not clear to the extent this margin is affected by the increase in thickness of the basemat. To address this concern, staff requests the applicant to assess and quantify the impact of the basemat thickness change on FSAR Figures 12 through 29.

<u>**SNC Responses:**</u>

Quantitative Assessment of Variation

The proposed tolerance increase would allow up to a four and three-quarters inch variation in thickness in local regions of the basemat. The increase in possible variation affects both mass and stiffness. Changes in mass or stiffness affect the natural frequencies of the nuclear island buildings. Changes in natural frequencies in turn affect the building response as calculated in the building floor response spectra. A quantitative assessment is made below that shows that the increase in possible variation has a negligible effect in the global and local response of the nuclear island building.

<u>Change in Weight</u>

To estimate the change in weight, it is conservatively assumed that the 4 inch upper tolerance is utilized globally across the dimensions of the nuclear island and not localized.

Weight of the nuclear island ~ 286,400 kips
Weight of 4" tolerance variation ~ 1,500 kips
Percent increase in weight ~ 0.5%

Change in Stiffness

Figures 1 and 2 are used to estimate the change in stiffness.

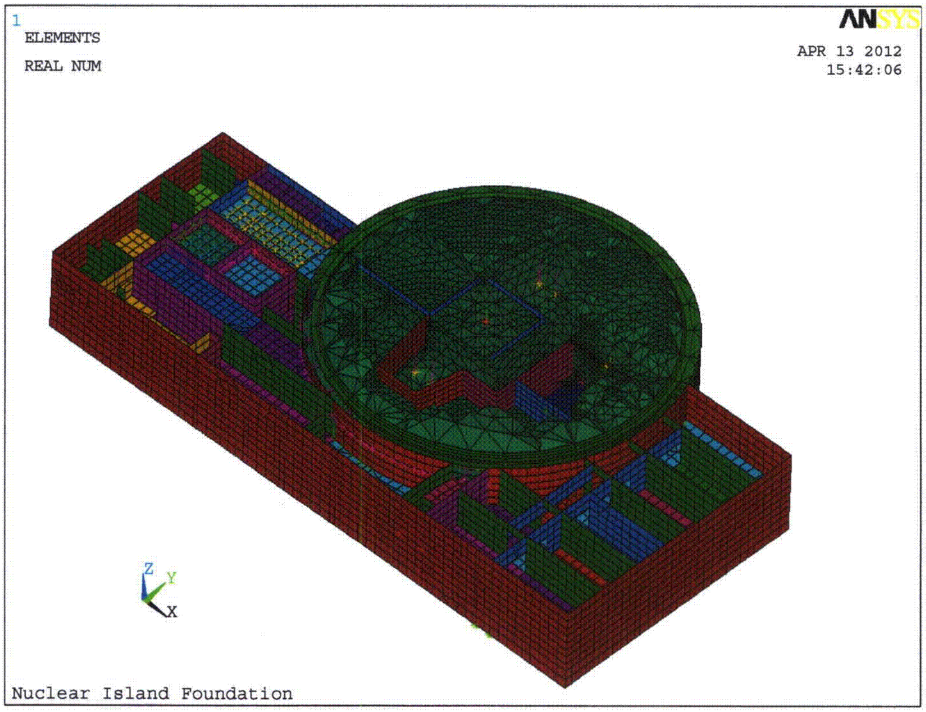

Figure 1: Integrated walls and slab basemat

Figure 1 (similar to UFSAR Figure 3.8.5-2) shows how the basemat was designed to be an integral part of a wall and foundation mat system which functions essentially as an egg crate that acts much stiffer than a 6 foot slab alone. Note that at the core of the basemat system, underneath the shield building, the thickness of the basemat is an additional 34 feet from the top of the 6 foot slab. The walls of the basemat system also rise 34 feet from the top of the 6 foot slab. The proposed allowable variation will have a small effect on the stiffness of the basemat system, and can be conservatively estimated based on the moment of inertia of the basemat.

Nominal basemat = 480 inches
Basemat with variation = 484 inches
Change in moment of inertia is $(484/480)^3 = 1.025$

In addition, Figure 2 (similar to UFSAR Figure 3G.2-11) illustrates that the nuclear island is embedded into the surrounding soil. The depth of this embedment is approximately 40 feet. Thus, the stiffness of the nuclear island building at the lower elevations is dependent not only on the basemat system stiffness but also on the stiffness of the adjacent soil. This coupling of basemat and soil tends to minimize the effect that the proposed allowable variation on a four

foot slab would have. Further, the proposed allowable variation is in the stiffer region of the nuclear island away from the building structures that are more flexible and are dominant contributors to the amplification of the in-structure seismic response spectra.

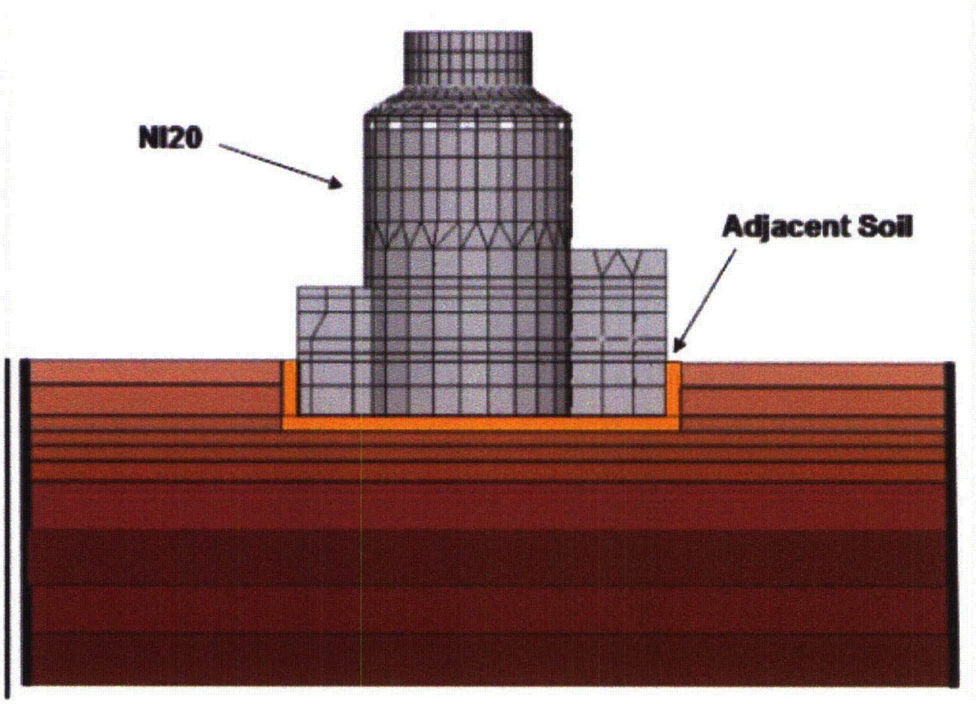

Figure 2: AP1000 is embedded

<u>Global Response</u>

The increased possible variation has a negligible effect on overturning. The mass increase occurs in the lowest region where the building lateral accelerations are small, thus no significant increase in the lateral force would occur. The increase in basemat thickness would help lower the center of gravity thus slightly reducing overturning.

The increased possible variation has a negligible effect on sliding. The mass increase occurs in the lowest region where the building lateral accelerations are small, thus no significant increase in the lateral force would occur. The increase in the system weight would increase the resisting friction force.

Local Response

The local response as defined by the in-structure response spectra (ISRS) is dependent on mass and stiffness changes. As conservatively calculated above,

Percent increase in weight ~ 0.5%
Percent increase in stiffness ~ 2.5%

To assess the effect of these mass and stiffness changes, a single degree of freedom system can be used. The change in frequency on such a system would be very small (conservatively, the increase in frequency is ~1% [= sqrt (1.025/1.005)]).

In reality the effect would be even smaller. The small increase in weight occurs in the region where the displacements are low compared to the upper elevations. Regions of small displacement tend to have a small effect on the building local response. The small increase in stiffness is occurring in the stiffest portion of the nuclear island building system. This small frequency shift will have negligible effect on the building response.

Therefore, it can be concluded that:

- Figures 12 through 29 in UFSAR Appendix 3GG will not change
- There will be no change in seismic bearing pressures or seismic stability values
- This variation in height is not significant to the AP1000 nuclear island design

In addition, the Vogtle site specific spectra is well below the AP1000 generic spectra. Most peaks of the Vogtle site specific spectra are approximately half of the generic design spectra. The Vogtle spectra are closest to the generic spectra at below 1 Hz. These peaks are controlled by the soil column conditions and not by basemat thickness. Thus, the conclusion that there are significant design margins for the Vogtle basemat remains valid.

The basemat variation in design will have negligible effect on the design parameters (e.g., seismic response spectra). Therefore, at this time in the construction process reasonable technically-informed judgments can be made without detailed analyses. Since these effects are deemed to be negligible, and since the as-built thickness of the basemat is not known at this time, the substantial reanalysis necessary to document that the change in the design seismic response spectra is insignificant is not warranted. It is recognized that there is potential for other changes during the construction of the plant that may result in the need for as-built reconciliation. UFSAR Subsection 3.7.5.4, "Reconciliation of Seismic Analyses of Nuclear Island Structures," discusses a process to address the effect of any such design changes. At that time these detailed design changes will be included with any other as-built details as required by License Condition 2.D(12)(g) item 2.

eRAI Tracking No. 6561

NRC RAI No. 02.05.04-1

In your License Amendment Request (LAR-12-003R, ML12130A468) you state (Page 4 of 9) that during recent surveying of the mudmat, it was determined that the upper surface of the mudmat is not as level as would be desired for placing a near-constant thickness basemat. You also state that "It is expected that the upper tolerance will need to exceed the current allowable upper tolerance in order to provide a level top surface of the Unit 3 basemat upon which the remaining nuclear structures would then be built." Since there is a specific settlement requirement in the AP1000 DCD, and a mudmat thickness specification in the Vogtle COL FSAR 2.5.4.1.3, in order for the staff to conduct a safety evaluation of this license amendment request, and in accordance with 10 CFR 100.23, please:

1. Clarify whether the uneven level of the upper surface of the mudmat was caused by uneven placement of the mudmat, or by additional backfill settlement. Please provide detailed data (e.g. settlement monitoring data, actual mudmat thickness data) with this clarification.
2. Explain in detail whether additional settlement, both total and differential settlement, will occur upon placement of the basemat. Provide a detailed projection of the expected settlement to justify the need for a 4 inch upper tolerance.

SNC Responses:

Response to NRC RAI 02.05.04-1 Question 1

The uneven level of the upper surface of the mudmat is primarily a result of the tolerance flatness requirements of the mudmat at the time of placement (i.e., plus or minus ¾ inch range specified). Settlement after backfilling placement activities in the Nuclear Island area and in the Turbine Building area up to the present construction activities contributed a small but measurable amount to the overall mudmat surface variations.

First, the mudmat construction details include a plus or minus ¾ of an inch tolerance during concrete placement activities that allows for an uneven surface (consistent with best management practices). Secondly, the additional compaction and backfill settlement of soil materials adjacent to the work area behind the mechanically-stabilized earth wall influenced the surroundings.

As shown on Table 1 (attached), the survey data for the Top of Subgrade, and Top of Layers 1 and 2 of the mudmat have been provided. This survey data shows the minimum thickness is 11.5 inches and maximum thickness is 12.7 inches, which is within the specified tolerance of plus or minus ¾ inch as expected for the 12 inch thick mudmat. Table 1 shows that after placement of the upper mudmat, the upper surface elevation variability was (~1.2") in July of 2011. Between July 2011 and July 2012, the average settlement of the mud mat, as shown in Table 1, was 1.5 inches. This settlement was such that the variation in elevation across the mudmat in July 2012 was also ~1.2". Thus, almost all of the variability in elevation across the mudmat is due to construction.

The impact of settlement on the levelness of the upper surface of the mudmat is discussed in more detail in the response to Question 2 below.

Response to NRC RAI 02.05.04-1 Question 2

Both total and differential settlement is expected to occur upon placement of the basemat. The Nuclear Island basemat mass is currently projected to settle 0.4 inches due to concrete basemat placement. This settlement is projected to be nearly uniform across the basemat. However, since the basemat concrete will be placed to markers anchored to the mudmat, this settlement will not result in an increased basemat thickness.

The request for a 3 inch upper tolerance limit increase from +1 to +4 inches is judged to be a reasonable upper bound for the combination of construction tolerances plus any differential settlement across the NI foundation prior to placement of concrete. While the predicted best estimate settlement is fairly uniform, there is uncertainty in any settlement calculation. The broadened tolerances will accommodate these uncertainties. The attached Table 2, "Settlement Marker Data," summarizes key survey data from July 2011 to July 2012 (a twelve month period).

The survey data from Table 2 supports the following information for Unit 3:

- The "Top of Mudmat" unevenness at the time of placement (July 2011) was calculated to be ~1.2 inches by subtracting the highest and lowest points on the surface (Settlement Marker ID.# 3NI-4 minus 3NI-3 or values 60.590 ft - 60.490 ft).
- The current measured differential settlement over the last twelve months was estimated to be ~0.3 inches by subtracting the July 2012 data from the July 2011 survey data for the respective settlement markers or values 60.510 ft - 60.385 ft = ~1.5 inches minus 1.2 inches (due to the mudmat surface unevenness contribution).

Since the mudmat surface concrete unevenness began as ~1.2 inches and is still ~1.2 inches, the settlement is not the predominant cause of the need for an increase in the basemat upper tolerance limit but it is a contributor. In order to pour a level top surface for the basemat within the existing 1¾ inch tolerance (with ~1.2 inches of the tolerance already subsumed by the uneven top surface of the mudmat, the constructor would have to pour the concrete for the basemat within the remaining 0.55 inches of the existing tolerance. If the basemat concrete flatness yields results similar to that of the existing mudmat flatness (i.e., ~1.2 inches), the existing upper limit (+1 inch) would not be met.

Summarizing the various construction tolerances of the mudmat unevenness (~1.2 inches), settlement to date (~0.3 inches), and a projected basemat unevenness similar to the mudmat (~1.2 inches) would yield results of approximately 2.7 inches in total variation to support the requested upper tolerance increase of +3 inches (from +1 to +4 inches).

Also, it should be noted at this time, the mudmat construction at Unit 4 is still in progress and no survey information has been provided to date. However, since the backfill operations are completed around Units 3 & 4, less impact is expected to occur in Unit 4.

Table 1 – Survey Mudmat Information

Unit 3 – Nuclear Island (Mudmat)

SUBGRADE - GROUND SHOTS				TOP of FIRST CONCRETE (LAYER 1)				Layer 1 - Subgrade Δ (inches)	TOP of SECOND CONCRETE (LAYER 2)				Layer 2 - Layer 1 Δ (inches)	TOTAL THICKNESS Layers 1 & 2 (inches)
PT. No.	NORTHING	EASTING	ELEVATION	PT.No.	NORTHING	EASTING	ELEVATION		PT.No.	NORTHING	EASTING	ELEVATION		
1003	7710.67	7786.35	179.53	2001	7710.65	7786.39	180.02	5.8	5001	7707.36	7786.38	180.55	6.4	12.2
1004	7710.21	7831.11	179.53	2002	7710.15	7830.90	180.01	5.8	5002	7710.10	7830.89	180.53	6.3	12.1
1005	7710.89	7873.43	179.53	2003	7710.86	7873.46	180.01	5.7	5003	7710.89	7869.06	180.53	6.3	12.0
1006	7681.54	7873.38	179.49	2004	7681.64	7873.42	179.99	6.1	5004	7681.55	7873.47	180.52	6.3	12.4
1007	7682.35	7832.42	179.53	2005	7682.35	7832.55	180.00	5.7	5005	7682.24	7832.61	180.54	6.5	12.2
1008	7682.06	7793.51	179.54	2006	7682.00	7793.56	180.02	5.8	5006	7681.93	7793.58	180.55	6.4	12.2
1009	7652.63	7778.71	179.53	2007	7652.75	7778.76	180.00	5.7	5007	7652.63	7778.80	180.54	6.4	12.1
1010	7652.76	7820.74	179.52	2008	7652.72	7820.79	179.99	5.7	5008	7652.64	7820.82	180.52	6.3	12.0
1011	7651.37	7858.73	179.54	2009	7651.43	7858.66	179.98	5.2	5009	7651.33	7858.70	180.50	6.2	**11.5**
1012	7621.62	7866.48	179.53	2010	7621.68	7866.52	180.00	5.6	5010	7621.63	7866.54	180.50	6.0	11.6
1013	7622.78	7836.91	179.53	2011	7622.77	7836.89	180.00	5.6	5011	7622.72	7836.91	180.50	6.0	11.6
1014	7623.22	7801.07	179.51	2012	7623.17	7801.10	180.02	6.1	5012	7623.14	7801.12	180.50	5.8	11.9
1015	7622.86	7763.40	179.52	2013	7622.87	7763.46	180.01	5.8	5013	7622.85	7763.47	180.50	5.9	11.7
1016	7592.19	7761.33	179.51	2014	7592.17	7761.23	180.01	6.0	5014	7592.15	7761.23	180.50	5.9	11.9
1017	7591.76	7788.81	179.53	2015	7591.76	7788.71	180.02	5.8	5015	7591.69	7788.73	180.51	5.9	11.7
1018	7592.40	7828.88	179.53	2016	7592.45	7828.88	180.01	5.8	5016	7592.43	7828.88	180.52	6.2	11.9
1019	7592.37	7867.90	179.53	2017	7592.36	7867.55	180.02	5.8	5017	7592.35	7867.55	180.49	5.7	11.5
1020	7561.27	7863.86	179.52	2018	7561.18	7863.79	179.98	5.6	5018	7561.16	7863.79	180.49	6.1	11.7
1021	7561.83	7835.34	179.52	2019	7561.87	7835.37	180.00	5.8	5019	7561.86	7835.37	180.52	6.2	12.0
1022	7561.87	7800.02	179.51	2020	7561.61	7800.40	180.02	6.2	5020	7561.60	7800.40	180.51	5.9	12.0
1023	7561.18	7758.86	179.53	2021	7561.16	7758.83	180.02	5.9	5021	7561.16	7758.84	180.50	5.8	11.7
1024	7531.77	7792.42	179.56	2022	7531.79	7792.29	180.00	5.3	5022	7535.97	7793.97	180.55	6.6	11.9
1025	7530.62	7827.16	179.54	2023	7530.59	7827.18	180.01	5.7	5023	7530.58	7827.18	180.52	6.1	11.8
1026	7530.11	7862.29	179.52	2024	7530.03	7862.23	179.99	5.6	5024	7530.02	7862.22	180.51	6.2	11.8
1027	7500.27	7868.67	179.52	2025	7500.31	7868.63	179.99	5.6	5025	7500.32	7868.61	180.50	6.2	11.7
1028	7500.52	7839.96	179.51	2026	7500.63	7839.92	180.01	5.9	5026	7500.64	7839.92	180.52	6.1	12.1
1029	7500.19	7810.74	179.52	2027	7500.16	7810.73	180.01	5.8	5027	7500.16	7810.73	180.53	6.3	12.1
1030	7468.97	7809.62	179.52	2028	7468.94	7809.62	180.01	5.9	5028	7471.84	7809.62	180.51	6.0	11.9
1031	7469.29	7842.07	179.50	2029	7469.32	7842.02	180.00	6.0	5029	7471.92	7842.02	180.50	6.0	12.0
1032	7469.45	7874.51	179.52	2030	7469.56	7874.45	180.01	5.9	5030	7471.51	7874.46	180.49	5.8	11.7

SUBGRADE - GROUND SHOTS				TOP OF FIRST CONCRETE (LAYER 1)				Layer 1 - Subgrade Δ (inches)	TOP of SECOND CONCRETE (LAYER 2)				Layer 2 - Layer 1 Δ (inches)	TOTAL THICKNESS Layers 1 & 2 (inches)
PT. No.	NORTHING	EASTING	ELEVATION	PT.No.	NORTHING	EASTING	ELEVATION		PT.No.	NORTHING	EASTING	ELEVATION		
3001	7485.54	7871.28	179.50	4001	7485.49	7871.30	180.00	6.0	6001	7485.50	7871.30	180.50	6.0	11.9
3002	7485.42	7840.60	179.51	4002	7485.41	7840.58	180.00	6.0	6002	7485.41	7840.57	180.51	6.1	12.0
3003	7484.99	7811.59	179.51	4003	7484.98	7811.60	180.01	6.1	6003	7484.99	7811.59	180.52	6.1	12.1
3004	7515.79	7813.03	179.49	4004	7515.81	7813.06	180.00	6.1	6004	7515.81	7813.06	180.55	6.5	**12.7**
3005	7515.32	7842.62	179.50	4005	7515.31	7842.65	180.01	6.1	6005	7515.32	7842.65	180.52	6.1	12.2
3006	7515.90	7871.56	179.51	4006	7515.84	7871.59	180.00	5.9	6006	7515.85	7871.60	180.50	6.0	11.9
3007	7546.86	7875.97	179.52	4007	7546.91	7875.90	180.00	5.8	6007	7546.94	7875.91	180.50	6.0	11.8
3008	7547.24	7849.30	179.49	4008	7547.29	7849.32	180.01	6.3	6008	7547.29	7849.33	180.53	6.2	12.5
3009	7547.28	7810.91	179.52	4009	7547.25	7811.01	180.03	6.1	6009	7547.25	7811.01	180.49	5.6	11.7
3010	7546.90	7772.53	179.52	4010	7546.85	7772.58	180.01	6.0	6010	7546.85	7772.58	180.50	5.8	11.8
3011	7576.94	7745.80	179.51	4011	7576.92	7745.82	180.03	6.3	6011	7576.92	7746.42	180.50	5.6	11.9
3012	7576.83	7772.71	179.53	4012	7576.83	7772.77	180.04	6.1	6012	7576.84	7772.77	180.50	5.5	11.6
3013	7576.15	7807.71	179.50	4013	7576.23	7807.74	180.02	6.2	6013	7576.23	7807.74	180.52	6.1	12.2
3014	7577.06	7837.29	179.51	4014	7577.12	7837.31	180.00	5.9	6014	7577.12	7837.31	180.51	6.1	12.0
3015	7576.61	7870.84	179.50	4015	7576.65	7870.81	180.02	6.1	6015	7576.65	7870.81	180.48	5.6	11.7
3016	7607.40	7875.52	179.51	4016	7607.40	7875.54	180.01	6.1	6016	7607.41	7875.54	180.52	6.1	12.2
3017	7608.06	7847.82	179.52	4017	7608.03	7847.77	180.01	5.8	6017	7608.04	7847.77	180.49	5.8	11.6
3018	7608.31	7817.52	179.54	4018	7608.28	7817.58	180.00	5.6	6018	7608.28	7817.58	180.51	6.1	11.6
3019	7607.51	7782.56	179.50	4019	7607.49	7782.59	180.01	6.2	6019	7607.50	7782.60	180.55	6.4	12.6
3020	7606.76	7746.60	179.52	4020	7606.77	7746.58	180.01	5.9	6020	7606.77	7746.58	180.53	6.2	12.1
3021	7636.38	7766.36	179.52	4021	7636.36	7766.37	180.00	5.8	6021	7636.36	7766.38	180.55	6.6	12.4
3022	7636.71	7798.61	179.52	4022	7636.75	7798.64	180.01	5.9	6022	7636.76	7798.65	180.52	6.1	12.0
3023	7636.76	7830.37	179.51	4023	7636.79	7830.48	180.02	6.1	6023	7636.80	7830.48	180.51	5.9	12.0
3024	7636.98	7869.13	179.52	4024	7636.93	7869.07	179.99	5.6	6024	7636.94	7869.07	180.52	6.4	12.0
3025	7666.32	7868.22	179.51	4025	7666.29	7868.18	180.01	6.0	6025	7666.29	7868.18	180.52	6.1	12.1
3026	7666.37	7828.18	179.52	4026	7666.36	7828.17	180.00	5.8	6026	7666.36	7828.17	180.53	6.3	12.1
3027	7666.69	7790.47	179.52	4027	7666.71	7790.47	180.01	5.9	6027	7666.71	7790.47	180.52	6.1	12.0
3028	7695.80	7788.94	179.53	4028	7695.80	7788.94	180.00	5.6	6028	7695.79	7788.95	180.55	6.6	12.3
3029	7695.96	7827.50	179.51	4029	7695.96	7827.50	180.02	6.1	6029	7695.96	7827.51	180.55	6.4	12.5
3030	7695.71	7869.15	179.49	4030	7695.68	7869.09	180.00	6.0	6030	7695.68	7869.10	180.52	6.3	12.3

Minimum total thickness = 11.5 inches **Maximum total thickness = 12.7 inches**

Table 2 – Settlement Marker Data
Unit 3 – Nuclear Island (Top of Mudmat)

SETTL. MARKER ID	PROPOSED LOCATION			ELEVATION JULY-21-2011 (Modeled Surface Elevation)	"AS BUILT" LOCATION MAR-07-2012			JUN-26-2012		Δ ELEV. SINCE MAR07 2012	JUL-02-2012		Δ ELEV. SINCE MAR07 2012	Δ JULY 2012 (SURVEYED) - JULY 2011 (MODELED)	
	NORTH	EAST	ELEVATION		NORTH	EAST	ELEVATION	SETTL. MARKER ID	ELEVATION		SETTL. MARKER ID	ELEVATION		(FEET)	(INCHES)
3NI-1	866.500	-998.000	60.50 (60'-6")	60.510	866.749	-997.648	60.390	3NI-1	COVERED		3NI-1	60.392	0.002	-0.12	1.42
3NI-2	866.500	-957.500	60.50 (60'-6")	60.495	866.800	-957.733	60.404	3NI-2	60.405	0.001	3NI-2	60.407	0.003	-0.09	1.06
3NI-3	866.500	-916.000	60.50 (60'-6")	60.490	866.863	-916.649	60.390	3NI-3	60.390	0.000	3NI-3	60.391	0.001	-0.10	1.19
3NI-4	926.500	-995.500	60.50 (60'-6")	60.590	925.025	-993.972	60.480	3NI-4	60.480	0.000	3NI-4	60.481	0.001	-0.11	1.31
3NI-5	945.000	-945.500	60.50 (60'-6")	60.520	945.214	-945.353	60.402	3NI-5	60.405	0.003	3NI-5	COVERED		-0.12	1.38
3NI-6	1000.000	-1069.500	60.50 (60'-6")	60.510	1000.152	-1066.790	60.386	3NI-6	60.384	-0.002	3NI-6	60.385	-0.001	-0.13	1.50
3NI-7	1008.500	-1000.000	60.50 (60'-6")	60.510	1008.432	-1000.147	60.423	3NI-7	60.424	0.001	3NI-7	60.425	0.002	-0.09	1.02
3NI-8	1000.000	-926.000	60.50 (60'-6")	60.510	1000.259	-924.505	60.434	3NI-8	60.436	0.002	3NI-8	60.435	0.001	-0.07	0.90
3NI-9	1069.750	-1024.500	60.50 (60'-6")	60.530	1069.771	-1024.481	60.451	3NI-9	60.451	0.000	3NI-9	60.459	0.008	-0.07	0.85
3NI-10	1073.750	-1000.000	60.50 (60'-6")	60.545	1074.313	-998.661	60.483	3NI-10	60.484	0.001	3NI-10	60.483	0.000	-0.06	0.74
3NI-11	1070.750	-974.000	60.50 (60'-6")	60.530	1071.037	-974.746	60.455	3NI-11	60.458	0.003	3NI-11	60.456	0.001	-0.07	0.89
3NI-12	1113.500	-1024.500	60.50 (60'-6")	60.550	1113.516	-1024.502	60.468	3NI-12	60.468	0.000	3NI-12	60.467	-0.001	-0.08	1.00
3NI-13	1113.500	-1000.000	60.50 (60'-6")	60.550	1113.335	-1000.166	60.462	3NI-13	60.462	0.000	3NI-13	60.461	-0.001	-0.09	1.07
3NI-14	1113.500	-960.000	60.50 (60'-6")	60.530	1113.246	-960.187	60.471	3NI-14	60.472	0.001	3NI-14	60.471	0.000	-0.06	0.71
3NI-15	1113.500	-921.500	60.50 (60'-6")	60.530	1113.365	-921.693	60.457	3NI-15	60.457	0.000	3NI-15	60.455	-0.002	-0.08	0.90

July 2011 Mudmat unevenness = ~1.2 inches (no settlement)
July 2012 Mudmat unevenness = ~1.2 inches (with settlement)