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November 22, 2011

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

Subject: Duke Energy Carolinas, LLC
William States Lee III Nuclear Station – Docket Nos. 52-018 and 52-019
AP1000 Combined License Application for the
William States Lee III Nuclear Station Units 1 and 2
Supplemental Response to RAI No. 5507
Ltr# WLG2011.11-05

Reference: Letter from Ronald A. Jones (Duke Energy) to Document Control Desk (NRC), *Request for Additional Information Letter No. 096 Related to SRP Section 02.04.12 (eRAI 5507) for the William States Lee III Units 1 and 2 Combined License Application*, dated May 18, 2011 (ML11139A408)

This letter provides supplemental information to the Duke Energy response to the Nuclear Regulatory Commission's request for additional information (RAI 02.04.12-020) included in the reference document.

Supplemental information for the response is addressed in the attached enclosures. Enclosure 1 identifies associated changes, when appropriate, that will be made in a future revision of the Final Safety Analysis Report for the Lee Nuclear Station. Enclosure 2 contains Input-Output Files for MODFLOW models.

If you have any questions or need any additional information, please contact James R. Thornton, Nuclear Plant Development Licensing Manager (Acting), at (704) 382-2612.

Sincerely,

Ronald A. Jones
Senior Vice President
Nuclear Development

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NRO

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Enclosures:

1. Lee Nuclear Station Supplemental Response to Request for Additional Information (RAI), RAI Letter No. 096, RAI 02.04.12-020

2. MODFLOW Input-Output Files for the Representative Case

AFFIDAVIT OF RONALD A. JONES

Ronald A. Jones, being duly sworn, states that he is Senior Vice President, Nuclear Development, Duke Energy Carolinas, LLC, that he is authorized on the part of said Company to sign and file with the U. S. Nuclear Regulatory Commission this combined license application for the William States Lee III Nuclear Station, and that all the matter and facts set forth herein are true and correct to the best of his knowledge.

Ronald A. Jones, Senior Vice President
Nuclear Development

Subscribed and sworn to me on November 22, 2011

Teresa D. Neely
Notary Public

My commission expires: 9/2/2015

SEAL

TERESA D. NEELY
NOTARY PUBLIC
GASTON COUNTY, NC
MY COMMISSION EXPIRES 09/02/2015

xc (w/o enclosures):

Charles Casto, Deputy Regional Administrator, Region II

xc (w/enclosures):

Brian Hughes, Senior Project Manager, DNRL

Lee Nuclear Station Supplemental Response to Request for Additional Information (RAI)

RAI Letter No. 096

NRC Technical Review Branch: **Hydrologic Engineering Branch (RHEB)**

Reference NRC RAI Number(s): **02.04.12-020**

NRC Request for Additional Information:

Additional information regarding maximum post-construction groundwater elevations at the Lee Nuclear Site is required to meet the requirements of 10 CFR 52.79(a)(l)(iii), 10 CFR 1 00.20(c), 10 CFR 100.2l(d), and GDC 2. The applicant's past estimates based on observed water levels in the Cherokee excavation and generalizations based on LeGrand (2004) are insufficient, since they do not sufficiently take into account the actual conditions that are anticipated to exist after construction. Staff needs an estimate of the maximum post-construction groundwater level that is based on anticipated post-construction surface conditions, and also on a plausible conceptual model of the post-construction subsurface conditions. The estimate must be based on recharge rates associated with each of the main surface features, including semi-impervious surfaces, grass-covered surfaces, drainage ditches, and the cooling tower mounds. The estimate must address groundwater response to the maximum plausible recharge rates and to potential groundwater mounds that might form, e.g., beneath the cooling towers and drainage ditches. The groundwater response must account for the post-construction subsurface conditions, including engineered fill and backfill. The area of interest is bounded approximately by the 588-ft contour just north and south of Units 1 and 2, as shown in COLA Rev. 2, FSAR Fig. 2.4.2 202, and bounded east and west by the cooling towers.

Duke Energy Supplemental Response:

Duke Energy provided a response to the subject RAI in Reference 1. This supplement to that response provides updated information to address remaining NRC questions on the assessment of post-construction maximum groundwater.

The overall objective of the updated groundwater analysis information is to demonstrate compliance with AP1000 DCD criteria for groundwater level. This updated information is presented in FSAR Table 2.0-201 and indicates that the estimated maximum post-construction groundwater level is less than the WLS site elevation of 588 ft. msl (2 ft. below plant elevation). This analysis assumes a severe precipitation event that is considered conservative and in compliance with 10 CFR 50, General Design Criteria (GDC) 2.

The supplemental information provided in this response addresses the following subjects:

1. Post-Construction Site Conditions
2. Groundwater Numerical Analysis
3. Summary of Results and Conclusions
4. Input and Output File Information

1. Post-Construction Site Conditions

1.1 Revisions to Site Grading and Drainage Plan and to Projected Post-Construction Groundwater Surface

A broad range of enhancements are planned for the WLS site grading and drainage plan. The site contours and grading were revised to improve overall site drainage away from the power block area. Site grading changes also improve the site's ability to respond to the severe precipitation event used in the numerical analysis of post-construction maximum groundwater level. A description of the enhancements to the site grading and drainage plan, along with a revised FSAR Figure 2.4.2-202, is presented in Reference 2.

Under natural conditions, the water table elevation within the Piedmont aquifers generally mimics the land surface topography, although the water table has less relief (FSAR Subsection 2.4.12.2.3). An updated projection of the post-construction potentiometric surface map was developed and is presented in the associated revision to FSAR Figure 2.4.12-204, Sheet 8 (Attachment 2). This figure is based on site investigation data (in particular for wells generally outside of the influence of site dewatering activities) and the revised post-construction plant topographic contours illustrated in revised FSAR Figure 2.4.2-202. This surface water mapping also considers, and is consistent with, expected impacts of important surface grading improvements, such as removal of cooling tower berms and sloping topography away from the power block area. The post-construction surface treatment plan with placement of impervious and pervious surfaces is also considered. This map represents expected groundwater conditions after all dewatering and construction activities have ceased and after groundwater conditions have stabilized and equilibrated. Considering the placement of the Units 1 and 2 power blocks on the site in relation to revised FSAR Figure 2.4.12-204, Sheet 8, the highest normal post-construction groundwater levels are expected at the southern end of the power block areas and lowest near the northeast corner of Unit 2.

FSAR Figure 2.4.12-208 illustrates groundwater transport pathways. Because FSAR Figure 2.4.12-208 uses the revised FSAR Figure 2.4.12-204, Sheet 8 as a basis, a revision to Figure 2.4.12-208 is also required. No changes were made to the pathways themselves.

The projection of post-construction groundwater conditions (revised FSAR Figure 2.4.12-204, Sheet 8) is considered an appropriate site-specific input representing initial water levels for the numerical analysis of the maximum post-construction groundwater elevation.

FSAR Subsection 2.4.12.2.3 is revised to simplify and clarify several topics related to the revised site grading and drainage plan (revised FSAR Figure 2.4.2-202). The revision to this subsection will also provide a summary of the numerical analysis of maximum post-construction groundwater, discussed in this response. Principal changes to FSAR Subsection 2.4.12.2.3 include:

- Clarification of the use of Cherokee excavation pit staining observations and applicability to expected fluctuations of groundwater in areas of Unit 1 and Unit 2;
- Deletion of discussion of post-construction groundwater estimates previously

based, in part, on excavation pit staining (no longer applicable considering the numerical analysis);

- Deletion of information on groundwater divides due to changes in the site grading and drainage plan; and

- Addition of a summary of the numerical analysis of maximum post-construction groundwater level (new FSAR Subsection 2.4.12.2.3.1).

FSAR Figure 2.4.12-205 (Sheets 1 through 4) is revised to reflect the following primary changes:

- Sheet 1 is revised to show two cooling towers per unit (versus three);

- Sheets 2, 3, and 4 are revised to delete the "maximum projected static water level." This information is considered unnecessary and creates confusion with the projected post-construction potentiometric surface map, presented in the revision to FSAR Figure 2.4.12-204 Sheet 8; and

- Sheets 2, 3, and 4 are revised to clarify the dating of ground surface and groundwater curves (changing "current" or "present" to "2006").

Revisions to FSAR Subsection 2.4.12.2.3 are provided in Attachment 1, and revisions to Figures 2.4.12-204, Sheet 8; 2.4.12-205, Sheets 1 through 4; and 2.4.12-208 are provided in Attachment 2 to this response.

1.2 Post-Construction Surface Treatment

Post-construction site surface treatments are discussed in Duke Energy's response to RAI 02.04.12-019, RAI Letter No. 91 (RAI No. 4870) (Reference 3). An updated surface treatment plan is presented in new FSAR Figure 2.4.12-209 (Attachment 2). This figure illustrates the expected surface cover materials for the area in and around the Unit 1 and 2 power blocks and extends generally to the vehicle barrier system (VBS)[1]. The numerical model considered three basic surface types:

- Impervious surfaces: primarily buildings, roads, and parking lots;

- Pervious surface: hardscape; and

- Pervious surfaces: grass (good condition) and brush (dirt).

Hardscape is expected to be a well-graded, compacted roadbed type of material. The modeling in the groundwater numerical analysis utilizes runoff coefficients for each surface cover type based on material properties, appropriate for underlying soil types.

[1] The VBS is primarily a plant security feature. See Section 1.3 regarding treatment of the VBS in the groundwater numerical analysis.

The area modeled in the groundwater numerical analysis is a portion of the area illustrated on new FSAR Figure 2.4.12-209. The model domain is discussed in Section 2.2 of this response.

1.3 Post-Construction Drainage Features

Stormwater controls for the site involve a combination of surface grading, the stormwater drainage system, and a roof drain and collection system as described in FSAR Subsection 2.4.12.2.3. In addition, the VBS is expected to accept runoff and drainage water from the power block area. However, the VBS is not expected to accommodate a severe precipitation event. The numerical analysis of maximum post-construction groundwater level assumes no credit for the stormwater drainage system, the roof drain and collection system, or the VBS as drainage features. This assumption provides a conservative approach since these drainage features are likely to decrease surface infiltration and groundwater recharge.

1.4 Use of Granular Backfill and General Soil Backfill in Plant Construction

As discussed in FSAR Subsection 2.5.4.5.3.5, a granular backfill will be placed outside the below-grade walls of the nuclear island structures and beneath the adjacent power block buildings. Outside the limits of granular backfill placement, a soil backfill (or general fill) will be used. Additional discussion of granular backfill and soil backfill is provided in this FSAR Subsection. The revised FSAR Figure 2.4.12-204, Sheet 8 (post-construction potentiometric surface map) illustrates the general placement locations of granular fill around the Units 1 and 2 nuclear islands and beneath adjacent buildings and general (soil) fill.

2. Groundwater Numerical Analysis

2.1 Analysis Objective

An analysis using a numerical model estimates the maximum post-construction groundwater level based on site-specific properties during a severe precipitation event (i.e., a storm in compliance with the requirements of GDC-2). The objective of the analysis is to provide a conservative estimate for maximum post-construction groundwater level to demonstrate compliance with the DCD site parameter criteria for groundwater level listed in FSAR Table 2.0-201.

2.2 Analytical Tools and Model Domain

The modeling software in this analysis is MODFLOW 2000, Version 1.19.01 (03/25/2010), developed by the USGS (Reference 4). MODFLOW modeling software is used to solve the three-dimensional, finite-difference groundwater flow equation in a transient mode. In addition, "Groundwater Vistas," Version 6 (Reference 5), is the pre- and post-processing software for MODFLOW and is used to construct the MODFLOW model, provide a user interface to facilitate the creation of input files, run MODFLOW, and process the MODFLOW output files.

The MODFLOW model covers a site area of 3,000 ft. by 3,000 ft. with the model domain centered on the Unit 1 and Unit 2 power block areas, as generally illustrated in new FSAR Figure 2.4.12-210 in Attachment 2. This domain, therefore, includes the majority of the area inscribed by the VBS and extends slightly beyond the VBS in the west, south, and east directions.

Grid cells range in size from 50 ft. by 50 ft. around the perimeter of the model domain, to 12.5 ft. by 12.5 ft. in the power block area. The finer grid mesh in the power block area provides improved representation of surface treatments and lateral resolution of the groundwater surface level. Vertical layers are used to generally represent key site stratigraphic units, subsurface fill placement, and subsurface structure features.

As discussed in Section 1.1, the revised FSAR Figure 2.4.12-204, Sheet 8 represents a projection of the expected post-construction potentiometric surface after all dewatering and construction activities have ceased and groundwater conditions have stabilized and equilibrated. This figure establishes the initial groundwater levels for the numerical model.

Model "observation points" provide water level response over the duration of the simulation. Three points are defined for each unit and located to demonstrate compliance with the DCD site parameter for maximum groundwater level (FSAR Table 2.0-201). Observation point locations are shown in new FSAR Figure 2.4.12-210. Unit 1 observation points are labeled U1-1 through U1-3. Similarly, Unit 2 observation points are U2-1 through U2-3. Given higher normal groundwater levels in the southern end of the plant area (as discussed in Section 1.1), observation points U1-3 and U2-3 are generally expected to see the maximum groundwater levels during a severe precipitation event.

2.3 Severe Precipitation Event Definition

Research supporting this analysis identified the August 1995 Tropical Storm Jerry (FSAR Table 2.3-256), as the most severe precipitation event recorded for the site and surrounding area. Gage data from the Greenville/Spartanburg station near Greer, South Carolina was used for this intense, 47-hr event. The hourly precipitation input data to the groundwater numerical analysis is provided in new FSAR Table 2.4.12-205 in Attachment 1.

The associated 24-hr precipitation for this storm recorded at the Greer station was 12.32 inches. By comparison, the South Carolina State Climatology Office (SCSCO) provides data from its station at Gaffney, SC (the station nearest the WLS site). This station recorded the Tropical Storm Jerry total precipitation as 6.78 inches.

In addition SCSCO's calculated estimate of the 100-year storm precipitation for Cherokee County is approximately 7.2 inches. The use of Tropical Storm Jerry data from the Greer Station represents the most severe precipitation event and has sufficient margin included, meeting the requirements of GDC-2 for the purposes of the groundwater numerical analysis.

2.4 Material Properties and Run-off Coefficients

Hydraulic Conductivity and Specific Yield

The model reflects the basic stratigraphy of the WLS site consisting of partially weathered rock (PWR), soil/saprolite, and fill (FSAR Subsection 2.4.12.1.2). The use of granular fill and general soil backfill during construction of Lee Nuclear Station is discussed in Section 1.4.

Properties for the three model layers are based on site specific investigations, spanning the Cherokee era work and the Lee Site investigations of 2006-2007. Granular fill properties have been developed for engineered fill that will be used during plant construction.

Run-off Coefficients

The modeling of post-construction groundwater utilizes runoff coefficients for each surface cover type, based on material properties and underlying hydrologic soil types. Type A soils typically have low runoff potential and high infiltration rates when thoroughly wetted, while Type B soils have moderate infiltration when thoroughly wetted (Reference 6).

2.5 Modeling Approach Summary

Key aspects of the numerical modeling approach and assumptions for this analysis:

(1) The model domain is limited, focused on Units 1 and 2 power blocks and surrounding areas. Model observation points are positioned such that groundwater level variance over the duration of the simulation could be used to demonstrate compliance with the DCD site parameter for maximum groundwater level.

(2) The model reflects a variety of post-construction surface treatments and placement of subsurface general fill and engineered granular backfill. The model is constructed of three layers of aquifer media identified at this site (fill, soil/saprolite, and partially weathered rock [PWR]). Site specific properties are used for hydraulic conductivity and specific yield of soil/saprolite, PWR, and general fill. Granular fill properties have been determined based on the grain size distribution of fill materials that will potentially be used on site.

(3) Initial groundwater levels are based on the projected post-construction groundwater surface map (revised FSAR Figure 2.4.12-204, Sheet 8).

(4) Groundwater recharge is calculated as the precipitation rate minus run-off (specific to each cover type). Run-off from impervious and hardscape areas is applied as additional input onto surrounding grass covered areas.

(5) Hourly precipitation rates are based on a 47-hr antecedent storm (40% of Tropical Storm Jerry's precipitation rate), a 72-hr "dry-off" period, and a 47-hr event (100% of Tropical Storm Jerry's precipitation rate).

(6) Infiltration is assumed to occur instantaneously (with no time lag as water travels through the vadose zone). Infiltration also occurs at a constant rate determined by the run-off coefficient of the surface material and does not consider a decrease in actual soil absorption capacity during the precipitation event.

(7) Modeled surface run-off from impervious surfaces is considered as additional water directed onto grass covered areas. This additional water is added to precipitation that falls directly on the down-slope grass surface.

(8) MODFLOW is used as an analytical tool to simulate anticipated post-construction conditions. Site characteristics are applied to enhance groundwater mounding in the vicinity of the Units 1 and 2 nuclear islands in a limited scope, pre-construction flow model. The limited scope flow model is not calibrated.

2.6 Representative Case Simulation Run and Sensitivity Analyses

The Representative Case analysis provides a model simulation run using input assumptions and values considered appropriate and representative of post-construction site conditions. The representative case analysis includes the following key inputs:

(1) The starting groundwater level is set to values associated with the projected post-construction groundwater surface map provided in revised FSAR Figure 2.4.12-204, Sheet 8.

(2) Hydraulic conductivity and specific yield values are set to median values. Median hydraulic conductivity values are selected because they are lower than average values; therefore, more conducive to groundwater mounding.

(3) Precipitation infiltration, which determines groundwater recharge, is set by run-off coefficients associated with Type B underlying soils (Reference 6).

A variety of sensitivity analyses are performed to assess results associated with variability of inputs. Inputs varied in these analyses included:

(1) Uniformly increased starting groundwater level across the potentiometric surface of revised FSAR Figure 2.4.12-204, Sheet 8;

(2) Varying the hydraulic conductivity values;

(3) Varying the specific yield values; and

(4) Using various run-off coefficients associated with Type A underlying soils (Reference 6).

3. Summary of Results and Conclusions

3.1 Representative Case Simulation Run and Sensitivity Analyses

The maximum post-construction groundwater level, from the Representative Case simulation run, results in a maximum groundwater level of 582.2 ft. msl at the southwest observation point, Point U1-3, SW corner of Unit 1 (see new FSAR Figure 2.4.12-210). The results for all observation points are illustrated in new FSAR Figure 2.4.12-211 in Attachment 2. This rigorous analysis using a MODFLOW numerical model, under the conditions of the most severe historically recorded precipitation event with an additional antecedent storm, using input values representative of the post-construction site demonstrates compliance with the DCD site parameter criteria for maximum groundwater level of 588 ft. msl (FSAR Table 2.0-201).

Sensitivity analyses similarly show that the estimated maximum post-construction groundwater level remains in compliance with the DCD criteria even with variations in key parameter values that would tend to promote groundwater mounding.

The Representative Case analysis result is considered appropriate and representative of the post-construction site. A summary of the groundwater numerical analysis and results is provided in new FSAR Subsection 2.4.12.2.3.1 (Attachment 1). The maximum post-construction groundwater level result of 582.2 ft. msl, using more rigorous techniques, falls within the previous estimate range of possible groundwater fluctuations at the site (i.e., 574 ft. msl to 584 ft. msl), maintaining the estimated maximum groundwater level of 584 ft. msl.

FSAR Table 2.0-201 and FSAR Subsection 2.4.12.5 is revised to refer to new FSAR Subsection 2.4.12.2.3.1 (Attachment 1). FSAR Subsection 2.4.16 is revised to include new references used in support of the groundwater numerical analysis, as noted in new FSAR Subsection 2.4.12.2.3.1 (Attachment 1).

FSAR Subsection 2.5.4.1.3 is revised to clarify a reference made to FSAR Table 2.0-201 in that subsection (Attachment 1).

4. Input and Output File Information

To support NRC review, MODFLOW input and output files for the Representative Case, which were constructed using Groundwater Vistas (.gwv files), are provided in Enclosure 2 CD ROM. The MODFLOW input files may also be independently executed using the MODFLOW executable file (mf2k1_19_01.exe) available from the USGS MODFLOW 2000 website (http://water.usgs.gov/nrp/gwsoftware/modflow2000/modflow2000.html). A listing of files on the CD is also included in Enclosure 2.

References:

1. Duke Energy Letter, dated May 18, 2011, from Ronald A. Jones to Document Control Desk, U.S. Nuclear Regulatory Commission, Lee Nuclear Station, Supplemental Response to Request for Additional Information, RAI Letter No. 096, NRC RAI No. 02.04.12-20, WLG2011.05-02, (ML11139A408).
2. Duke Energy Letter, dated November 22, 2011, from Ronald A. Jones to Document Control Desk, U.S. Nuclear Regulatory Commission, Lee Nuclear Station, Supplemental Response to Request for Information, RAI Letter No. 003, NRC RAI No. 10.04.05-2, WLG2011.11-03.
3. Duke Energy Letter, dated September 30, 2010, from B. J. Dolan to Document Control Desk, U.S. Nuclear Regulatory Commission, Lee Nuclear Station, Response to Request for Information, RAI letter No. 091, NRC RAI No. 02.04.12-019, WLG2010.09-09, (ML102770372).
4. Harbaugh, et. al., 2000. MODFLOW-2000, The U.S. Geological Survey Modular Ground-Water Model – User Guide to Modularization concepts and the Ground-Water Flow Process. U.S. Geological Survey. Reston, Virginia.
5. Groundwater Vistas, developed by Environmental Simulations, Inc, Version 6, 2011.
6. Natural Resources Conservation Service, Technical Release 55, Urban Hydrology for Small Watersheds, 210-VI-TR-55, Second Edition, June 1986.

Associated Revisions to the Lee Nuclear Station Final Safety Analysis Report:

1. FSAR Table 2.0-201
2. FSAR Subsection 2.4.12.2.3
3. New FSAR Subsection 2.4.12.2.3.1
4. New FSAR Table 2.4.12-205
5. FSAR Figure 2.4.12-204, Sheet 8
6. FSAR Figure 2.4.12-205, Sheets 1 through 4
7. FSAR Figure 2.4.12-208
8. New FSAR Figures 2.4.12-209, 2.4.12-210, 2.4.12-211
9. FSAR Subsection 2.4.12.5
10. FSAR Subsection 2.4.16
11. FSAR Subsection 2.5.4.1.3

Attachments:

1. Attachment 1 to Supplemental Response to RAI 02.04.12-020, Revision to FSAR Chapter 2 Text and Tables
2. Attachment 2 to Supplemental Response to RAI 02.04.12-020, Revision to FSAR Chapter 2 Figures

Lee Nuclear Station

Attachment 1 to Supplemental Response to

Request for Additional Information

RAI 02.04.12-020

FSAR Chapter 2 Text and Table Revisions:

FSAR Table 2.0-201, Sheet 6 of 8
FSAR Subsection 2.4.12.2.3
New FSAR Subsection 2.4.12.2.3.1
New FSAR Table 2.4.12-205
FSAR Subsection 2.4.12.5
FSAR Subsection 2.4.16
FSAR Subsection 2.5.4.1.3

COLA Part 2, FSAR Chapter 2, Table 2.0-201 is revised as follows:

WLS SUP 2.0-1

TABLE 2.0-201 (Sheet 6 of 8)
COMPARISON OF AP1000 DCD SITE PARAMETERS AND LEE NUCLEAR STATION UNITS 1 & 2 SITE CHARACTERISTICS

	AP 1000 DCD Site Parameters	WLS Site Characteristic	WLS FSAR Reference	WLS Within Site Parameter
Flood Level	Less than plant elevation 100' (WLS Elevation 590' msl)	584.8' msl	Subsection 2.4.3.6	Yes
Groundwater Level	Less than plant elevation 98' (WLS Elevation 588' msl)	Maximum ~~and average groundwater elevation is projected to be around 584 and 579.4~~groundwater elevation considering the most severe historically recorded natural phenomena has been estimated to be approximately 584 ft. msl, ~~respectively~~ with AP1000 elevation 100 ft at 590 ft. msl. This allows for approximately ~~5 to 10~~6 ft. of unsaturated interval below the plant grade elevation 100 ft.	Subsection ~~2.5.4.1.3~~ 2.4.12.2.3.1	Yes
Plant Grade Elevation	Less than plant elevation 100' (WLS elevation 590' msl) except for portion at a higher elevation adjacent to the annex building	589.5 ft. msl	Subsection 2.4.1.1.3	Yes
Precipitation				
Rain	20.7 in./hr [1-hr 1-mi^2 PMP]	18.9 in./hr. [1-hr 1-mi^2 PMP]	Table 2.4.2-203	Yes
Snow / Ice	75 pounds per square foot on ground with exposure factor of 1.0 and importance factors of 1.2 (safety) and 1.0 (non-safety)	17.7 pounds per square foot	Subsection 2.3.1.2.7.3	Yes
Atmospheric Dispersion Values $\chi/Q^{(g)}$				
Site Boundary (0-2 hr)	$\leq 5.1 \times 10^{-4}$ sec/m^3	3.46×10^{-4} sec/m^3	Table 2.3-283 Subsection 2.3.4.2	Yes
Site Boundary (Annual Average)	$\leq 2.0 \times 10^{-5}$ sec/m^3	5.8×10^{-6} sec/m^3	Table 2.3-289 (Sheet 1 of 4)	Yes

COLA Part 2, FSAR Chapter 2, Subsection 2.4.12.2.3 is revised as follows:

2.4.12.2.3 On-Site Conditions In 2006 To 2007 And Projected Post-Construction On-Site ~~Current On-Site Conditions~~~~Lee Water Table~~ Conditions

In March 2006, a~~the~~ ~~current~~ groundwater investigation was initiated as part of the subsurface study to evaluate hydrogeologic conditions for the Lee Nuclear Site. The dewatering of the existing excavation preceded the subsurface investigation, thus returning the site to hydrogeologic conditions similar to those of the previous construction phase. Approximately 740 million gal. of water were removed from the excavation from December 19, 2005, through September 7, 2006. Following the initial dewatering, an apparent 5-foot thick interval of staining was observed on the existing Cherokee concrete structures, the top of which was surveyed at an elevation of 578.72 ft. msl. ~~Given the range of apparent water table fluctuations as indicated by the concrete staining (574 – 579 ft. msl), the hydrostatic equilibrium elevation for the excavation area was estimated to be the midpoint of the range (576.5 ft. msl).~~ The staining observed between elevations 574 and 579 ft. msl is indicative of the range that water level fluctuated in the open excavation since termination of Cherokee era construction activities. A comparison of the apparent water levels in this impoundment, as shown on the February 1994 and February 2005 aerial photographs, with the topographic survey conducted in 2006 indicated a similar range of water levels in the excavation area (574 ft. msl in 1994 to 579 ft. msl in 2005). Precipitation data for the period preceding these observations indicated near normal conditions, confirming the aerial images captured typical impoundment water levels. Ongoing maintenance dewatering activities are expected to end following construction activities.

As part of the 2006-2007 groundwater investigation, fifteen borings were drilled into the crystalline bedrock, and monitoring wells were installed in partially weathered rock intervals. In July 2006, nine additional monitoring wells were installed to evaluate shallow groundwater conditions across the site. Details regarding well construction are presented in Table 2.4.12-201.

WLS COL 2.4-5 Following well development, water levels were measured monthly from April 2006 to April 2007 (Table 2.4.12-202) to characterize seasonal trends in groundwater levels and to identify flow pathways surrounding the Lee Nuclear Site. The hydrograph for this groundwater data is presented on Figure 2.4.12-203. Surface waters at four locations were also gauged as part of the monitoring program. These locations included Make-Up Pond B, a water retention impoundment below Make-Up Pond B, Make-Up Pond A, and Hold-Up Pond A. Based on this year of study, groundwater levels were observed to fluctuate, with the highest groundwater elevations observed between January and April 2007 and the lowest groundwater elevations between September and November 2006. This trend correlates with both the river flow and rainfall patterns and confirms that both groundwater levels and river flow are governed by local precipitation (Section 2.3).

Potentiometric surface maps developed from water level data showed that during the ~~recent~~ 2006 construction dewatering and site investigation, groundwater ~~surrounding the excavation~~ ~~is~~was drawn toward the excavation (Figure 2.4.12-204, Sheets 1 - 7). During the dewatering activities, continuous decline of water levels in areas downgradient of the excavation was observed, as recharge entering the power block area from the south was intercepted by the excavation, pumped and discharged to Make-Up Pond B. Following the completion of construction dewatering, the potentiometric surface beneath the reactor buildings is expected to rebound to equilibrium conditions.

Under natural conditions the topography of the water table within the Piedmont mimics the topography of the land surface, but has less relief. Cross-sections of the Lee Nuclear Site are presented in Figure 2.4.12-205, Sheets 1 - 4. These figures depict the relationship between groundwater beneath the site and the surface water bodies surrounding the site. Groundwater flow in the Piedmont province is typically restricted to the topographic area underlying the slope that extends from a divide to an adjacent stream.

Both regionally and locally, surface topography plays a dominant role in groundwater occurrence. Post-Cherokee plant construction topography was observed to affect groundwater conditions such that cuts in topography induce a lowered water table and fill induces a raised water table. Field evidence for this is based on comparison between the Cherokee water table map (Figure 2.4.12-201) and the maps developed from the Lee Nuclear Site investigation (Figure 2.4.12-204, Sheets 1-7). For example, MW-1204, located on the Unit 2 Cooling Tower Pad, is where construction fill was placed during Cherokee construction, resulting in a significantly higher land surface elevation (approximately 610 ft. msl compared to its pre-grading elevation of around 560 ft. msl). Consequently, the water table elevation is higher in MW-1204: groundwater elevation of approximately 570 ft. msl compared with the former groundwater elevation of less than 550 ft. msl. Another example includes MW-1200, located west-northwest of Unit 1, where construction cuts resulted in a significantly lower land surface elevation (approximately 590 ft. msl compared to its pre-grading elevation of approximately 670 ft. msl). Consequently, the water table elevation has lowered (groundwater elevation of 565 ft. msl compared with the former groundwater elevation of more than 585 ft. msl).

~~Upon~~ Following construction of the Lee Nuclear Station and returning~~ing~~ to ~~post-dewatering~~equilibrium conditions, the ~~post-construction~~ water table is expected to mimic land surface elevation contours, consistent with slope-aquifer conditions of the Piedmont physiographic province. ~~The potentiometric surface beneath Lee Units 1 and 2 is expected to rebound to an elevation near the apparent hydrostatic equilibrium (576.5 ft. msl).~~ The potentiometric surface elevation near Lee Units 1 and 2 is expected to rebound between 574 and 579 ft. msl, consistent with concrete stain observations discussed previously. Allowing for moderate frequency short-term fluctuations in water table level above this range that may not be evident in concrete stain observations, groundwater level near Lee Units 1 and 2 may occur between 574 ft. and 584 ft. msl.~~This apparent hydrostatic equilibrium is considered conservative since it represents the directly exposed water table in the post-Cherokee open excavation, allowing for recharge of all local precipitation less evaporation. In contrast, post-construction groundwater recharge would be significantly reduced due to impervious and semi-impervious areas (buildings, pavement, compacted road base material, and hardscape), site grading to effect drainage away from the nuclear islands, and installation of stormwater controls and roof drainage systems to further limit infiltration near Lee Units 1 and 2. Placement of impervious/semi-impervious surfaces is also expected to overlie the granular fill surrounding Units 1 and 2 such that infiltration in this area will be limited. Granular fill placement and characteristics are described in .~~

~~Seasonal water table fluctuations, as observed at the site, do not exceed 5 to 10 ft. Review of regional groundwater levels indicates that groundwater levels at Lee Nuclear Site are unlikely to~~

~~fluctuate more than 15 ft. total. Using the more conservative regional seasonal water level fluctuation (±7.5 ft.) as a bounding condition to fluctuate around the apparent hydrostatic equilibrium (576.5 ft. msl), a conservative estimate of the post-construction maximum groundwater elevation in the area of the excavation was established at 584 ft. msl.~~

The projected post-dewatering water table conditions following the construction of the Lee Nuclear Station are illustrated in Figure 2.4.12-204, Sheet 8. The potentiometric conditions shown in Figure 2.4.12-204, Sheet 8 affect the directions of groundwater flow surrounding the Lee Nuclear Station. Each of the ponds serves as a constant head flow boundary. ~~The crests of the water table indicate groundwater divides within the slope-aquifer system. These features indicate distinct compartments of groundwater flow at the site, with the nuclear site area flowing to the north toward the Broad River, the area west of the north divide flowing toward Make-Up Pond B, and the area east of the south divide flowing toward Make-Up Pond A. Surface water bodies located within the same hydrologic compartment as the Lee Nuclear Station are topographically downgradient such that surface runoff will drain away from the power block area and any interaction between groundwater and surface water would be well below the Lee Nuclear Station plant grade elevation.~~ Ultimately, ~~all~~ groundwater flow discharges to the Broad River, which is the groundwater sink for the site and the surrounding area.

Based on site observations, a network of storm drains and buried piping was partially installed during the Cherokee project to manage surface water runoff. While no as-built drawings for the existing storm drain system for the former Cherokee Nuclear Station exist, a review of stormwater plans was conducted to assess the drain system's potential effect on groundwater movement. Storm drains located more than 500 ft. upgradient (south) of the power block could potentially intercept the water table and allow shallow groundwater movement towards Make-Up Pond A; these drains do not affect groundwater movement in the power block area. Other storm drains appear to be above the water table and would not affect the movement of groundwater. One exception is a storm drain originally designed to transfer stormwater from the Cherokee power block area to Hold-Up Pond A. The depth of this storm drain pipe appears to be below the projected water table. Therefore, if left in place, this conduit could potentially cause a preferential groundwater pathway from the power block area downgradient to Hold-Up Pond A once groundwater recovers from the construction dewatering activities. The existing storm drain and bedding materials will be removed by overexcavation. The remaining void will then be plugged with low-permeability backfill material, and compacted to density sufficient to assure no short-circuiting can occur.

Stormwater controls at the Lee Nuclear Station include a combination of surface grading to facilitate surface water flow, construction of a stormwater drainage system (DRS), and construction of a roof drain and collection system. The Lee Nuclear Station DRS is designed to facilitate and control the runoff of precipitation along surface water flow paths, diverting surface runoff away from the power block area and reducing the potential for flooding. The site grading and drainage plan is shown in Figure 2.4.2-202. As discussed in Subsection 2.4.2.3, portions of the site are ~~The site is~~ relatively flat; however, the site is graded such that overall runoff will drain away from safety-related structures to Make-Up Pond B, Make-Up Pond A, or directly to the Broad River. Precipitation falling on buildings is captured by a roof drain and collection system, channeled through drainage downspouts, and directed to the DRS. The DRS is not expected to directly affect groundwater flow system of the limiting groundwater flow pathway.

COLA Part 2, FSAR Chapter 2, Subsection 2.4.12.2.3.1 is added as follows:

2.4.12.2.3.1 Maximum Post-Construction Groundwater Analysis

An analysis of maximum post-construction groundwater elevation in the area of the Units 1 and 2 power block areas was performed. The analysis utilized MODFLOW numerical method model (Reference 306). The following summarizes the analysis approach.

- The analysis considered planned post-construction surface cover treatment, as illustrated in Figure 2.4.12-209.
- The model domain covered a 3,000 ft. by 3,000 ft. area that includes both Unit 1 and Unit 2 power block areas and extends to include much of the area encompassed by the vehicle barrier system (VBS). However, no credit was taken in this analysis for VBS drainage capacity. MODFLOW observation points were defined and located to provide estimated groundwater elevations over the duration of the simulation run. The model domain and location of observation points, relative to the power block areas, are shown in Figure 2.4.12-210.
- The model reflects the fill, soil/saprolite, and PWR uppermost aquifer unit of the Lee site. Placement of granular fill and general fill was also included in the model construction. Hydraulic conductivity and specific yield values were derived from site investigations and expected properties of granular fill materials to be used during plant construction.
- Starting groundwater elevations for the analysis were based on hydraulic heads from the projected potentiometric surface map in Figure 2.4.12-204, Sheet 8.
- Precipitation input was developed from the 1995 Tropical Storm Jerry which exhibited the maximum monthly precipitation and maximum 24-hr precipitation at the regional Greenville/Spartanburg station near Greer, South Carolina. This storm is considered the most severe historically recorded precipitation event for the site and surrounding area. The storm duration, based on gage data from the Greer station is presented in Table 2.4.12-205. To maximize saturation of soils and associated groundwater mounding, the storm event definition included an antecedent storm (40% of the Table 2.4.12-205 distribution values), a 72-hr dry-out period, and followed by the full 100% precipitation, using the Table 2.4.12-205 distribution.
- Infiltration is assumed to occur instantaneously (with no time lag as water travels through the vadose zone). Infiltration occurs at a constant rate determined by the runoff coefficient of the surface material and does not consider a decrease in actual soil absorption capacity during the precipitation event.
- Modeled surface runoff from impervious surfaces is considered as additional water directed onto grass covered areas. This additional water is added to precipitation that falls directly on the down-slope grass surface.

The analysis concluded that the maximum post-construction groundwater elevation remained below 584 ft. msl; therefore, satisfying the DCD site parameter for maximum groundwater elevation of less than 588 ft. msl (Table 2.0-201).

COLA Part 2, FSAR Chapter 2, Table 2.4.12-205 is added as follows:

TABLE 2.4.12-205 (Sheet 1 of 3)
MAXIMUM HISTORICALLY-RECORDED RAINFALL DISTRIBUTION
(TROPICAL STORM JERRY)

Date	Time of Day (hr. : min.)	Rainfall (in.)	Cumulative Rainfall Duration (hr.)
25-Aug-95	1:00	0.00	
	2:00	0.00	
	3:00	0.00	
	4:00	0.00	
	5:00	0.00	
	6:00	0.00	
	7:00	0.00	
	8:00	0.00	
	9:00	0.00	
	10:00	0.00	
	11:00	0.00	
	12:00	0.00	
	13:00	0.00	
	14:00	0.00	
	15:00	0.00	
	16:00	0.00	
	17:00	0.30	1
	18:00	0.10	2
	19:00	0.00	3
	20:00	0.00	4
	21:00	0.00	5
	22:00	0.00	6
	23:00	0.00	7
	0:00	0.00	8

TABLE 2.4.12-205 (Sheet 2 of 3)
MAXIMUM HISTORICALLY-RECORDED RAINFALL DISTRIBUTION
(TROPICAL STORM JERRY)

Date	Time of Day (hr. : min.)	Rainfall (in.)	Cumulative Rainfall Duration (hr.)
26-Aug-95	1:00	0.00	9
	2:00	0.01	10
	3:00	0.32	11
	4:00	0.10	12
	5:00	0.11	13
	6:00	0.10	14
	7:00	0.14	15
	8:00	0.14	16
	9:00	0.11	17
	10:00	0.11	18
	11:00	0.14	19
	12:00	0.11	20
	13:00	0.26	21
	14:00	0.10[a]	22
	15:00	0.30[a]	23
	16:00	0.11[a]	24
	17:00	0.33[a]	25
	18:00	0.23[a]	26
	19:00	0.70[a]	27
	20:00	0.81[a]	28
	21:00	0.54[a]	29
	22:00	0.42[a]	30
	23:00	1.51[a]	31
	0:00	2.62[a]	32

TABLE 2.4.12-205 (Sheet 3 of 3)
MAXIMUM HISTORICALLY-RECORDED RAINFALL DISTRIBUTION
(TROPICAL STORM JERRY)

Date	Time of Day (hr. : min.)	Rainfall (in.)	Cumulative Rainfall Duration (hr.)
27-Aug-95	1:00	1.74[a]	33
	2:00	1.20[a]	34
	3:00	0.17[a]	35
	4:00	0.04[a]	36
	5:00	0.06[a]	37
	6:00	0.06[a]	38
	7:00	0.03[a]	39
	8:00	0.02[a]	40
	9:00	0.01[a]	41
	10:00	0.10[a]	42
	11:00	0.18[a]	43
	12:00	0.57[a]	44
	13:00	0.47[a]	45
	14:00	0.07	46
	15:00	0.03	47
	16:00	0.00	
	17:00	0.00	
	18:00	0.00	
	19:00	0.00	
	20:00	0.00	
	21:00	0.00	
	22:00	0.00	
	23:00	0.00	
	0:00	0.00	

Maximum 24-hr Rainfall (in.)	12.32
Total 47-hr Storm Rainfall (in.)	14.47

Note:
Data collected at Greenville-Spartanburg Airport, Greer, South Carolina
GSP Station, Gage ID No. 383747 (Reference 305)

(a) Rainfall measurements during the 24-hour maximum period.

COLA Part 2, FSAR Chapter 2, Subsection 2.4.12.5 is revised as follows:

2.4.12.5 Site Characteristics for Subsurface Hydrostatic Loading

WLS COL 2.4-4 According to the AP1000 Design Control Document (DCD), the design maximum groundwater elevation is 2 ft. below plant elevation. The Lee Nuclear Station plant elevation is 590.0 ft. above msl and the yard grade is 589.5 ft. above msl; therefore, the design maximum groundwater elevation for the Lee Site is 588.0 ft. above msl. ~~The maximum static groundwater level anticipated in the vicinity of Units 1 and 2 power blocks during operations is expected to be a maximum of 584 ft. msl (Figure 2.4.12-204, Sheet 8).~~ A maximum groundwater elevation, considering the most severe historically recorded natural phenomena for the Lee site is estimated to be approximately 584 ft. msl, as discussed in Subsection 2.4.12.2.3.1. The hydrostatic loading is not expected to exceed design criteria. An unsaturated zone of at least ~~5~~ ~~4~~ 6 ft. below plant grade elevation~~level~~ will be maintained during operations. The installation and operation of a permanent dewatering system is not a facility design requirement.

COLA Part 2, FSAR Chapter 2, Subsection 2.4.16, References is revised to add the following new references:

2.4.16 REFERENCES

305. National Oceanic & Atmospheric Administration Website, National Climatic Data Center, Local Climatic Data, Greenville-Spartanburg Station (Greer, SC), Station ID, GSP, Accessed at http://www7.ncdc.noaa.gov/CDO/dataproduct on October 4, 2011.

306. Harbaugh et. al., 2000. MODFLOW-2000, The U.S. Geological Survey Modular Ground-Water Model – User Guide to Modularization Concepts and the Ground-Water Flow Process. U.S. Geological Survey. Reston, Virginia.

COLA Part 2, FSAR Chapter 2, Subsection 2.5.4.1.3 is revised as follows:

2.5.4.1.3 Groundwater

The primary drainage in the site area is the Broad River and associated tributary drainages. Typical of most first order Piedmont streams, the Broad River flows southeast directly across the regional trend of most geologic contacts and structure. The streambed is at about 500 ft msl and has incised into the Piedmont surface about 200 ft below the drainage divides. The Broad River lacks a well-developed flood plain in the Lee Nuclear Station Site area.

The high historic groundwater level in the plant area is at Elevation 579 ~~feet mean sea level (~~ft. msl~~)~~. This elevation value is based on the existing well delineated high water mark along the exterior of the Cherokee Nuclear Station (CNS) Unit 1 reactor building. The existing excavations flooded naturally after cessation of dewatering operations when the plant construction was halted in the early 1980's. The water level in the excavations rose to, or near, the typical (static) groundwater table and remained in this state for over 20 years prior to dewatering for the Lee Nuclear Station project. Long-term standing water in the vacated CNS excavation left a high water mark on the partially constructed CNS Unit 1 reactor building structure that was surveyed at an elevation of 579 ~~feet~~ ft. msl. The design groundwater level for Lee Nuclear Station is Elevation 579±5 ~~feet~~ ft. msl, allowing for a 5-foot seasonal variation over the high water mark level ~~(see Table 2.0-201)~~. Numerical analysis confirmed that the maximum post-construction groundwater level anticipated at Lee Nuclear Station is bounded by elevation 584 ft. msl (see Subsection 2.4.12.2.3.1 and Table 2.0-201).

Lee Nuclear Station

Attachment 2 to Supplemental Response to

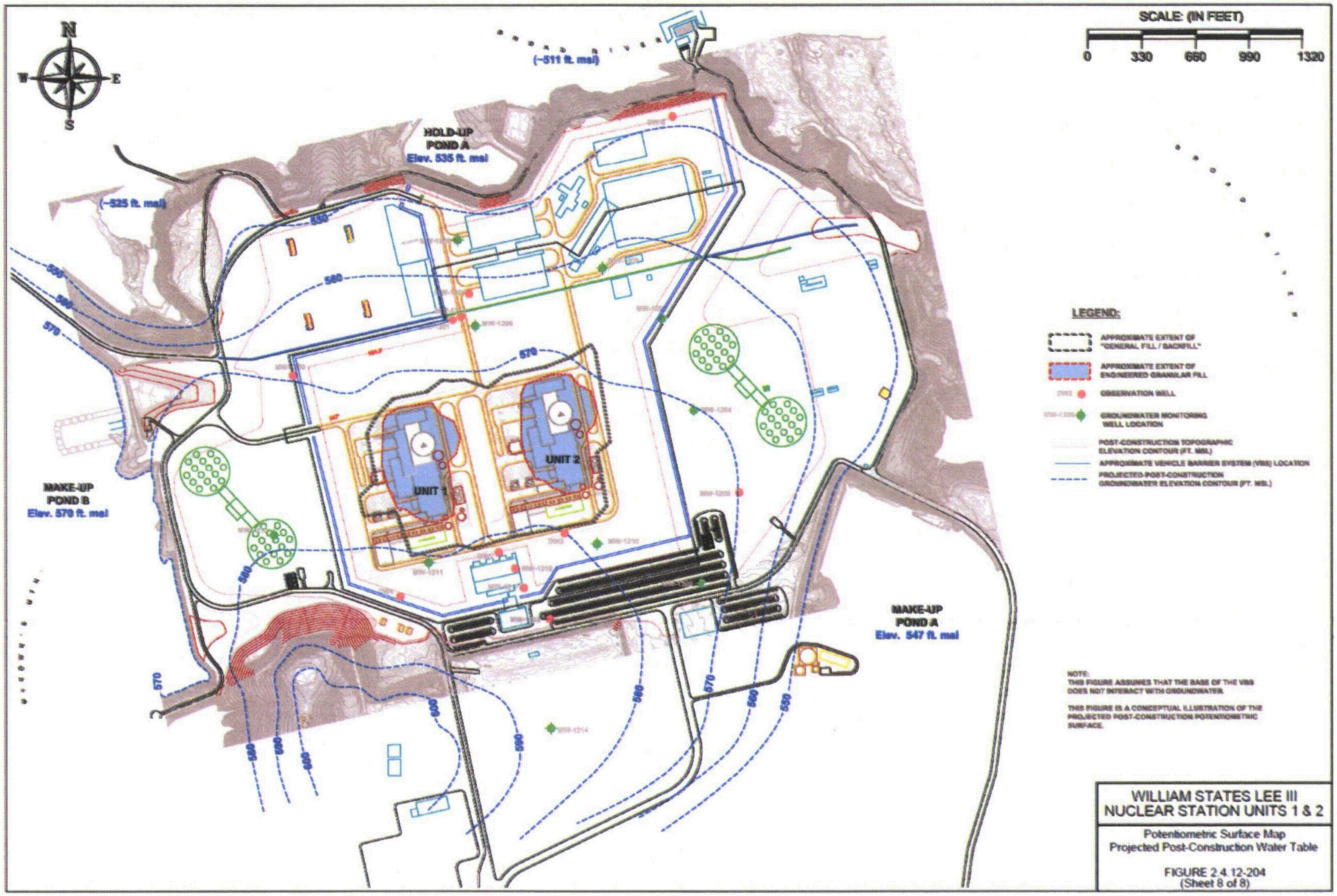
Request for Additional Information

RAI 02.04.12-020

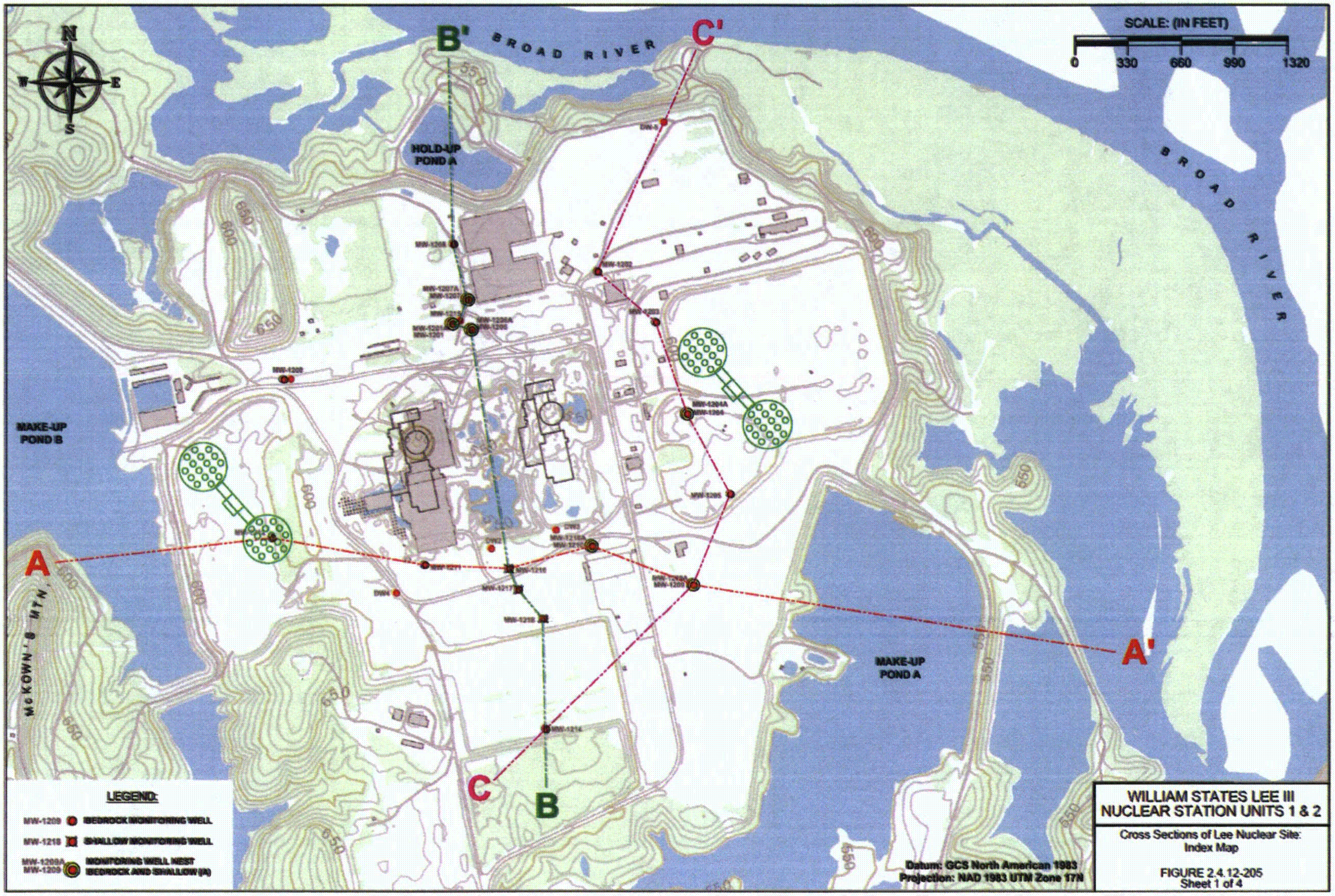
FSAR Chapter 2 Figure Revisions:

FSAR Figure 2.4.12-204, Sheet 8
FSAR Figure 2.4.12-205, Sheets 1 through 4
FSAR Figure 2.4.12-208
New FSAR Figure 2.4.12-209
New FSAR Figure 2.4.12-210
New FSAR Figure 2.4.12-211

COLA Part 2, FSAR Figure 2.4.12-204 Sheet 8 is revised as follows:



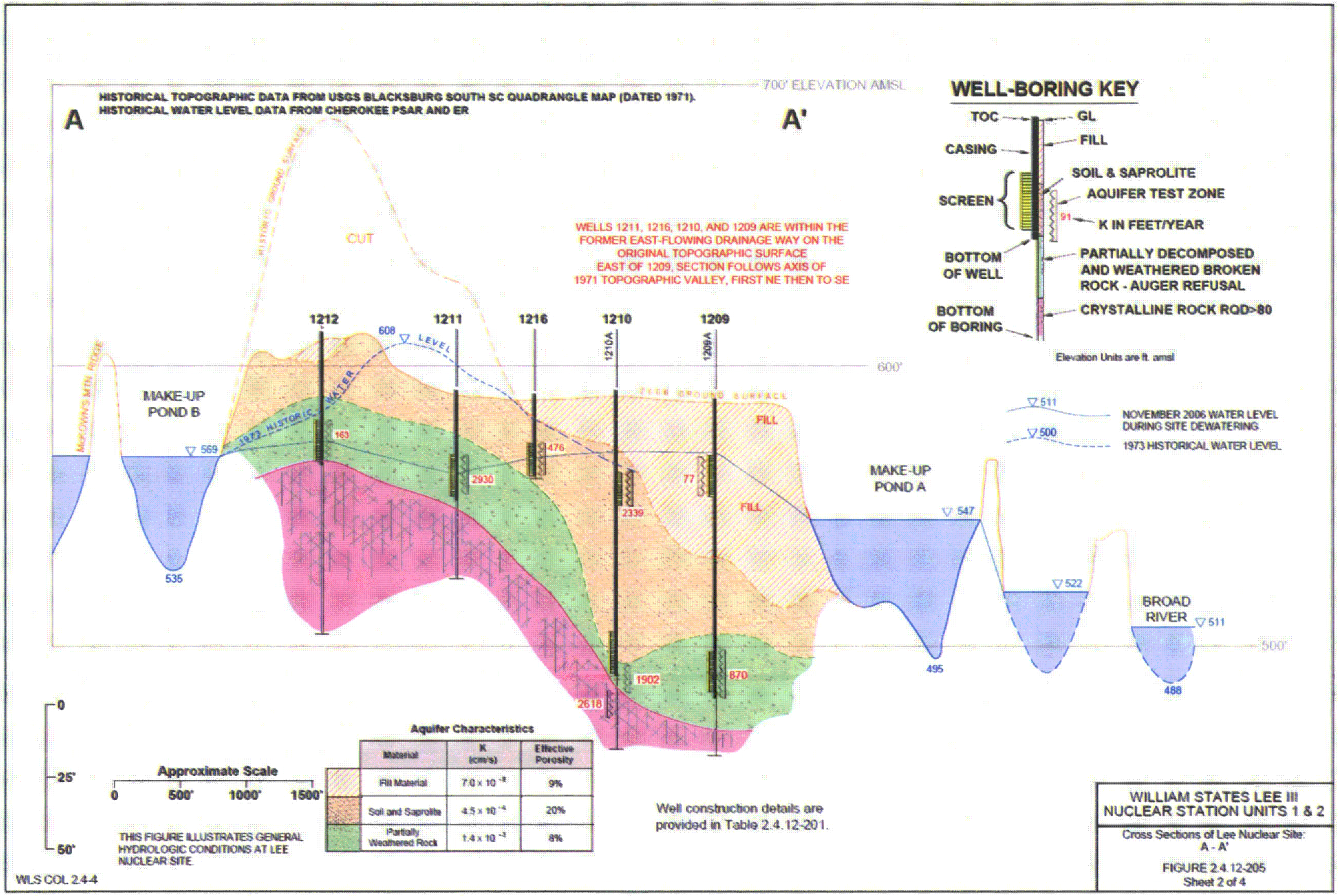
COLA Part 2, FSAR Figure 2.4.12-205 Sheets 1 through 4 are revised as follows:



WILLIAM STATES LEE III
NUCLEAR STATION UNITS 1 & 2

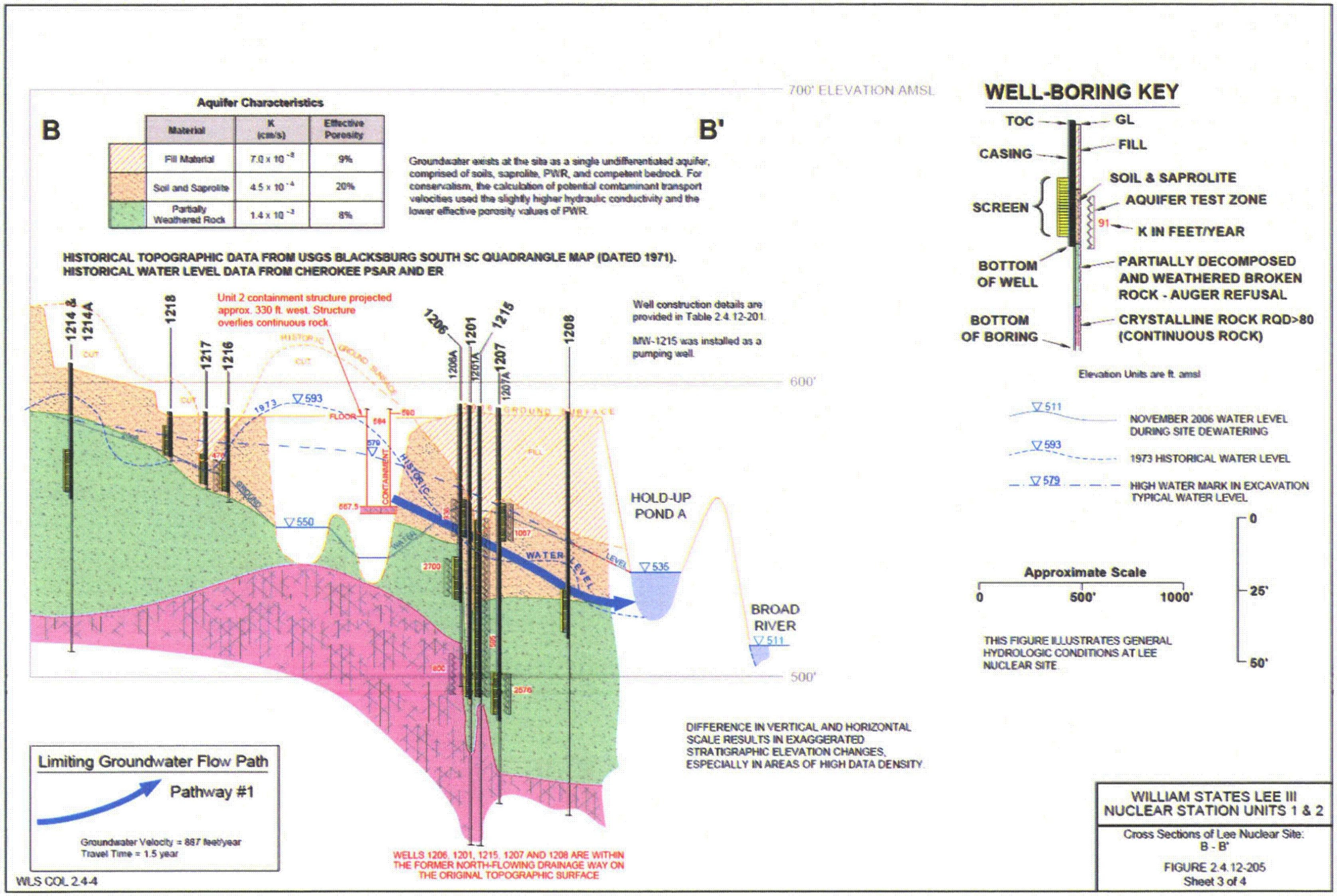
Cross Sections of Lee Nuclear Site:
Index Map

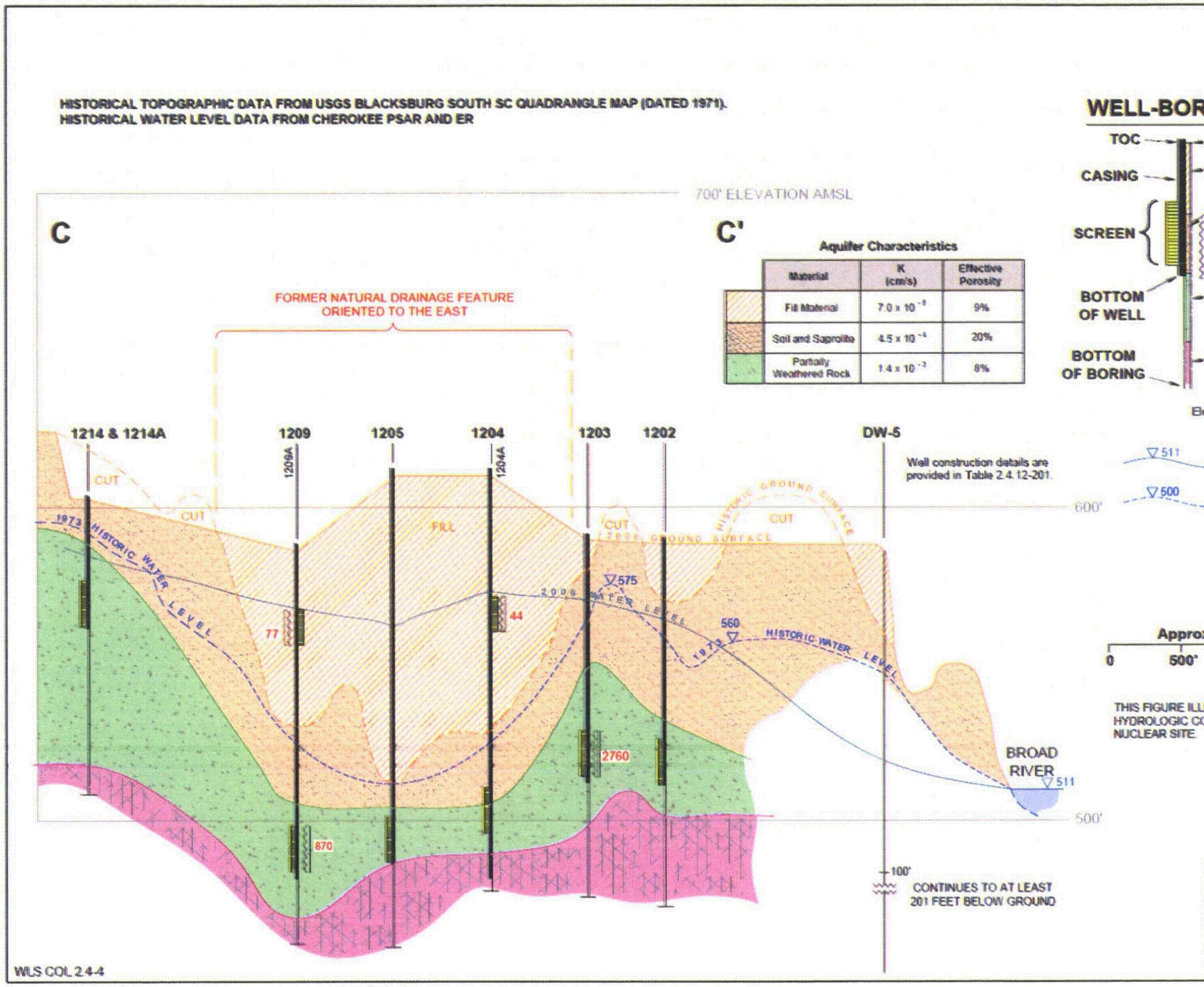
FIGURE 2.4.12-205
Sheet 1 of 4



Aquifer Characteristics

Material	K (cm/s)	Effective Porosity
Fill Material	7.0×10^{-5}	9%
Soil and Saprolite	4.5×10^{-4}	20%
Partially Weathered Rock	1.4×10^{-3}	8%


Aquifer Characteristics
B
B'
Material | K (cm/s) | Effective Porosity
Fill Material | 7.0×10^{-8} | 9%
Soil and Saprolite | 4.5×10^{-4} | 20%
Partially Weathered Rock | 1.4×10^{-3} | 8%
Groundwater exists at the site as a single undifferentiated aquifer, comprised of soils, saprolite, PWR, and competent bedrock. For conservatism, the calculation of potential contaminant transport velocities used the slightly higher hydraulic conductivity and the lower effective porosity values of PWR.
HISTORICAL TOPOGRAPHIC DATA FROM USGS BLACKSBURG SOUTH SC QUADRANGLE MAP (DATED 1971).
HISTORICAL WATER LEVEL DATA FROM CHEROKEE PSAR AND ER
Unit 2 containment structure projected approx. 330 ft. west. Structure overlies continuous rock.
Well construction details are provided in Table 2.4.12-201.
MW-1215 was installed as a pumping well.
700' ELEVATION AMSL
600'
500'
1214 & 1214A
1218
1217
1216
1206
1206A
1201
1201A
1215
1207
1207A
1208
HOLD-UP POND A
BROAD RIVER
WATER LEVEL
CONTAINMENT
DIFFERENCE IN VERTICAL AND HORIZONTAL SCALE RESULTS IN EXAGGERATED STRATIGRAPHIC ELEVATION CHANGES, ESPECIALLY IN AREAS OF HIGH DATA DENSITY.
Limiting Groundwater Flow Path
Pathway #1
Groundwater Velocity = 887 feet/year
Travel Time = 1.5 year
WELLS 1206, 1201, 1215, 1207 AND 1208 ARE WITHIN THE FORMER NORTH-FLOWING DRAINAGE WAY ON THE ORIGINAL TOPOGRAPHIC SURFACE
WLS COL 2.4-4
WELL-BORING KEY
TOC
GL
FILL
CASING
SOIL & SAPROLITE
SCREEN
AQUIFER TEST ZONE
K IN FEET/YEAR
BOTTOM OF WELL
PARTIALLY DECOMPOSED AND WEATHERED BROKEN ROCK - AUGER REFUSAL
BOTTOM OF BORING
CRYSTALLINE ROCK RQD>80 (CONTINUOUS ROCK)
Elevation Units are ft. amsl
NOVEMBER 2006 WATER LEVEL DURING SITE DEWATERING
1973 HISTORICAL WATER LEVEL
HIGH WATER MARK IN EXCAVATION TYPICAL WATER LEVEL
Approximate Scale
0
500'
1000'
25'
50'
THIS FIGURE ILLUSTRATES GENERAL HYDROLOGIC CONDITIONS AT LEE NUCLEAR SITE
WILLIAM STATES LEE III NUCLEAR STATION UNITS 1 & 2
Cross Sections of Lee Nuclear Site: B - B'
FIGURE 2.4.12-205
Sheet 3 of 4

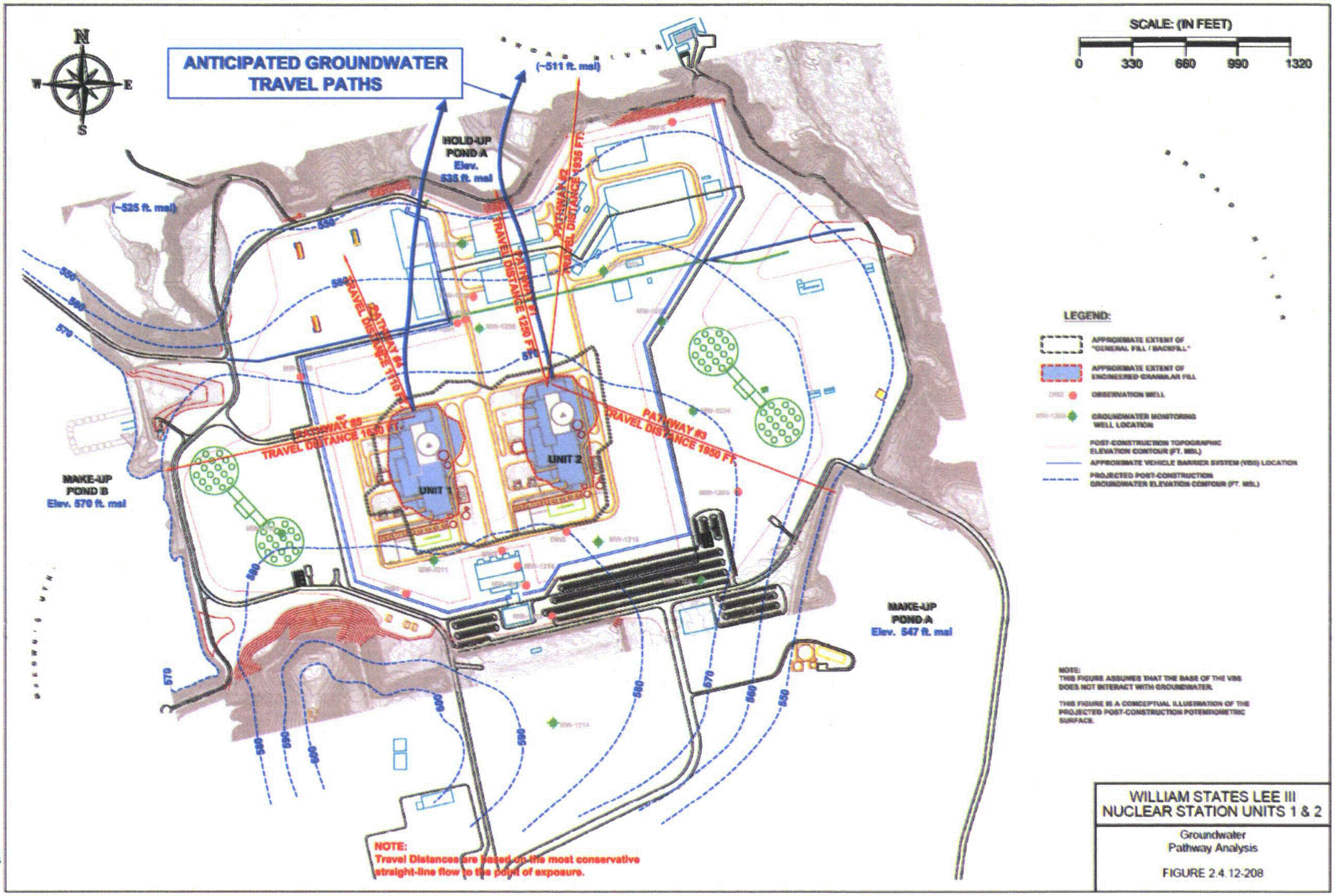


WILLIAM STATES LEE III
NUCLEAR STATION UNITS 1 & 2

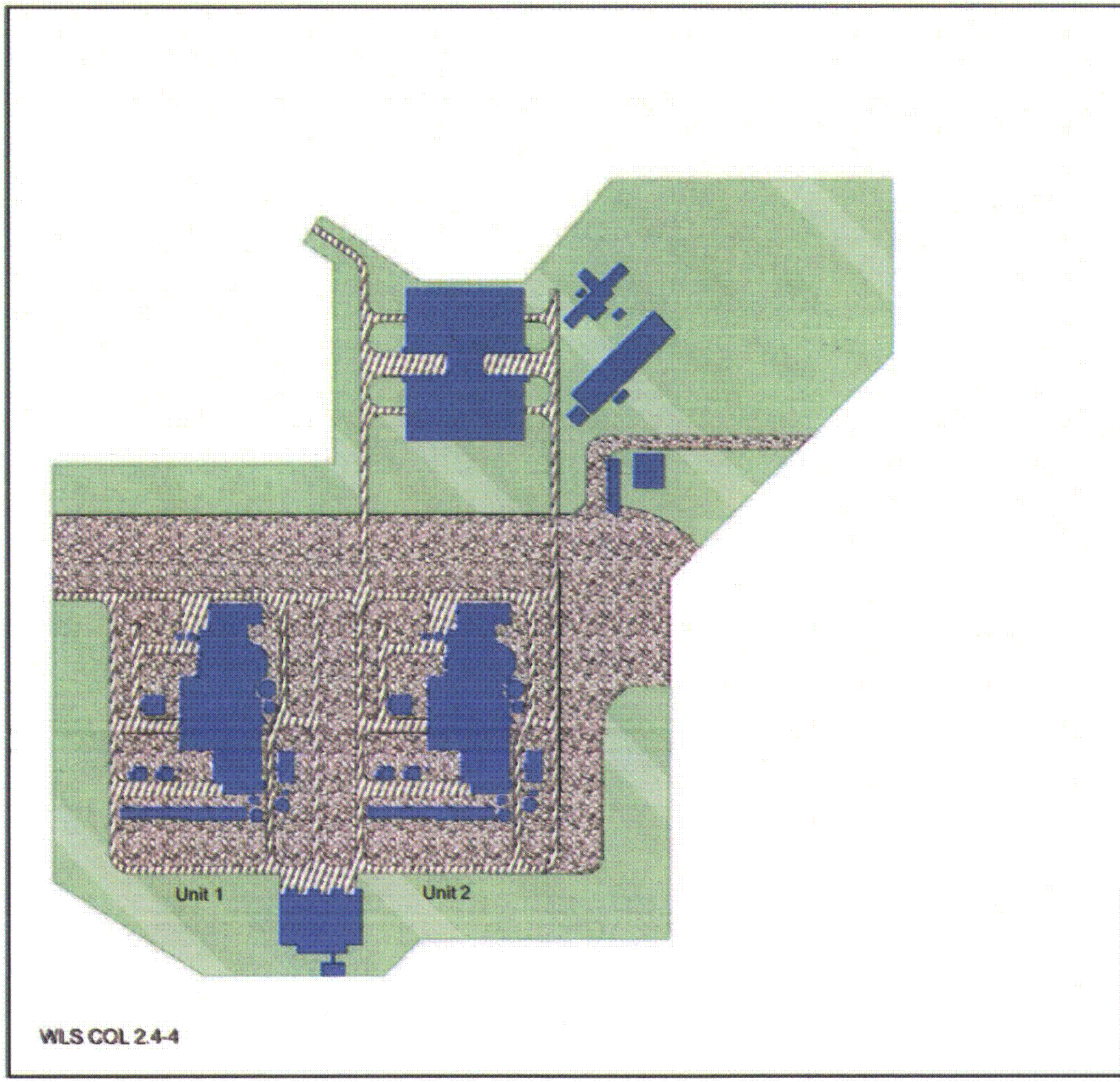
Cross Sections of Lee Nuclear Site: C - C'

FIGURE 2.4.12-205
Sheet 4 of 4

Enclosure 1
Duke Letter Dated: November 22, 2011
COLA Part 2, FSAR Figure 2.4.12-208 is revised as follows:



COLA Part 2, FSAR Figure 2.4.12-209 is added as follows:

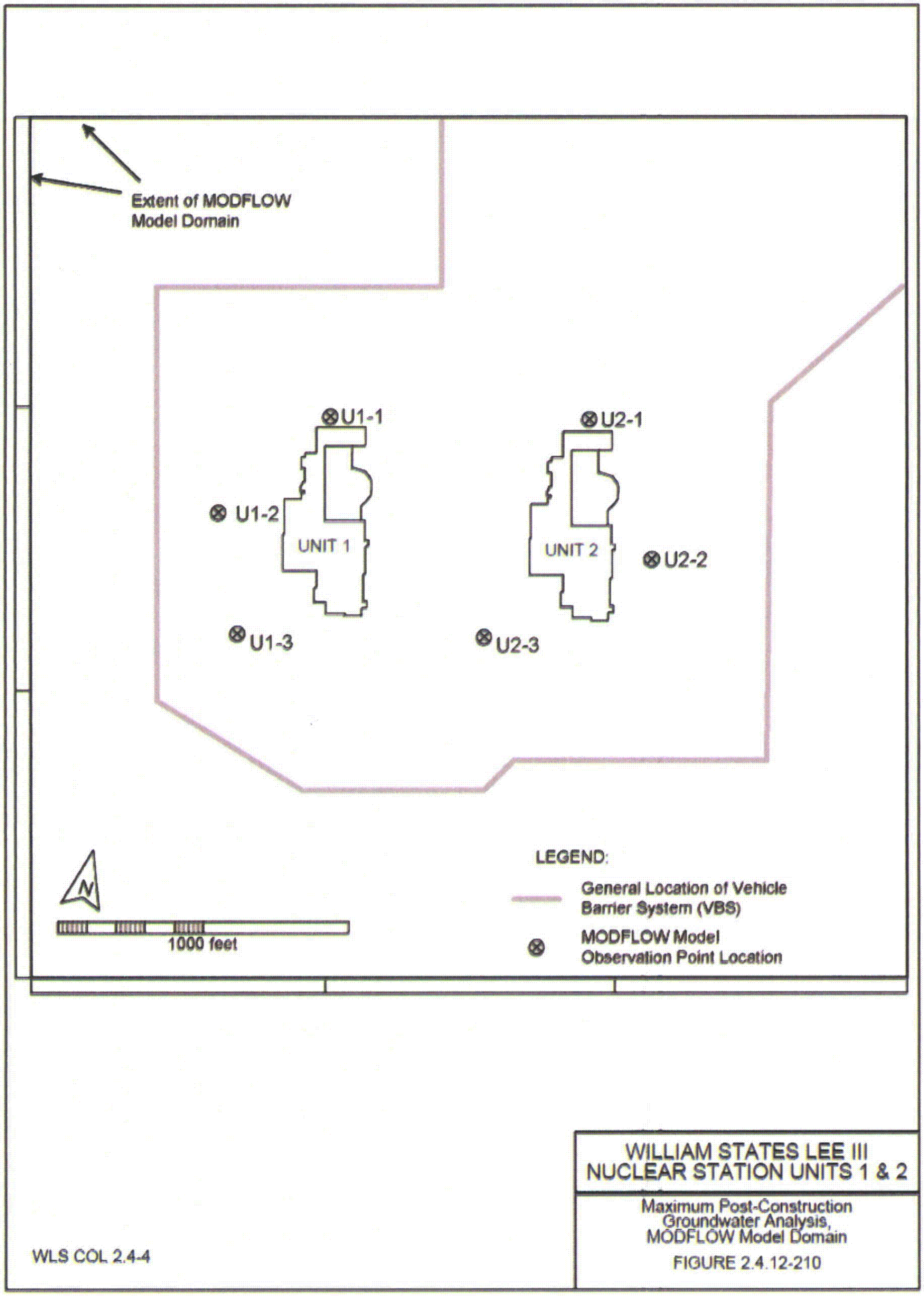


WILLIAM STATES LEE III
NUCLEAR STATION UNITS 1 & 2

Post-Construction Surface Cover Treatment in Power Block and Immediate Surrounding Area

FIGURE 2.4.12-209

COLA Part 2, FSAR Figure 2.4.12-210 is added as follows:

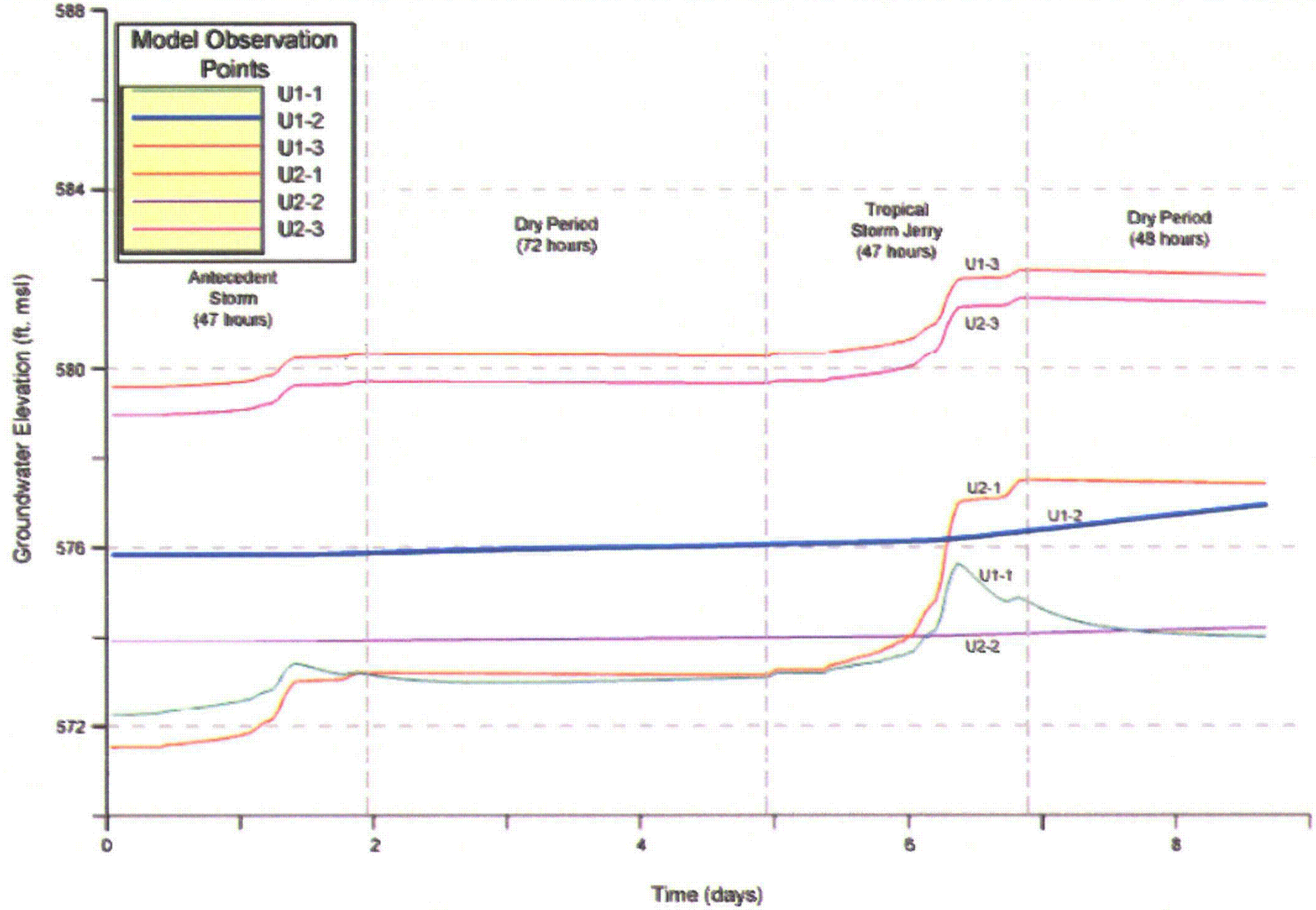


WILLIAM STATES LEE III NUCLEAR STATION UNITS 1 & 2

Maximum Post-Construction Groundwater Analysis, MODFLOW Model Domain

FIGURE 2.4.12-210

COLA Part 2, FSAR Figure 2.4.12-211 is revised as follows:



WILLIAM STATES LEE III
NUCLEAR STATION UNITS 1 & 2

Maximum Post-Construction Groundwater Analysis, Results Hydrograph

FIGURE 2.4.12-211

WLS COL 2.4-4

MODFLOW Input/Output Files for the Representative Case

Listing of files provided on CD ROM (Attachment 1):

Table A
List of Files
MODFLOW Input-Output for the Representative Case

Filename	File Type
GWV_Max-GW6-t4.bas	BAS File
GWV_Max-GW6-t4.cbb	CBB File
GWV_Max-GW6-t4.cbg	CBG File
GWV_Max-GW6-t4.ddn	DDN File
GWV_Max-GW6-t4.dis	DIS File
GWV_Max-GW6-t4.ghb	GHB File
GWV_Max-GW6-t4.glo	GLO File
GWV_Max-GW6-t4.hds	HDS File
GWV_Max-GW6-t4.lpf	LPF File
GWV_Max-GW6-t4.lst	LST File
GWV_Max-GW6-t4.mf2	MF2Kwin32 File
GWV_Max-GW6-t4.nam	NAM File
GWV_Max-GW6-t4.oc	OC File
GWV_Max-GW6-t4.pcg	PCG File
GWV_Max-GW6-t4.rch	RCH File
GWV_Max-GW6-t4.zone	ZONE File
GWV_Max-GW9f6-t4.gwv	Groundwater Vistas File
BldgOutlin_ROADS purged.map	MAP File
DTW 05-1993 AL SMALL.map	MAP File
FD-Fill_outlines.map	MAP File
Power-Block_area_CGS.map	MAP File

References

None

Associated Revision to the Lee Nuclear Station Combined License Application

None

Attachment

Attachment 1: CD Containing MODFLOW Input / Output for the Representative Case