Duke Energy

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April 30, 2012

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 Request for Additional Information
Ltr# WLG2012.04-05

References: Letter from J.M. Muir (NRC) to B.J. Dolan (Duke Energy), *Request for Additional Information Regarding the Environmental Review of the Combined License Application for William States Lee III Nuclear Station, Units 1 and 2*, dated August 21, 2008 (ML082200509)

Letter from Christopher M. Fallon to Chief, Rulemaking and Directives Branch, Comments on Draft Environmental Impact Statement for Combined Licenses (COLs) for William States Lee III Nuclear Station Units 1 and 2
Ltr# WLG2012.03-01, dated March 1, 2012 (ML12067A037)

This letter provides supplemental information to the Duke Energy response to the Nuclear Regulatory Commission's (NRC) request for additional information (RAI) included in the referenced letter:

RAI 8 Hydrology and Alternative Plant Systems

The supplemental response to this NRC request is addressed in the enclosure, which also identifies any associated changes to the Combined Application for the Lee Nuclear Station, when appropriate.

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,

Christopher M. Fallon

Christopher M. Fallon
Vice President
Nuclear Development (Acting)

D093
NRO

Enclosure:

1) Supplemental Response to ER RAI 8, Hydrology and Alternative Plant Systems

xc (w/out enclosure):

Charles Casto, Deputy Regional Administrator, Region II

xc (w/ enclosure):

Sarah Lopas, Project Manager, DSER
Brian Hughes, Senior Project Manager, DNRL
Terri Miley, PNNL

AFFIDAVIT OF CHRISTOPHER M. FALLON

Christopher M. Fallon, being duly sworn, states that he is Vice President, Nuclear Development (Acting), 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.

Christopher M. Fallon

Christopher M. Fallon, Vice President
Nuclear Development (Acting)

Subscribed and sworn to me on April 30, 2012

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

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

RAI Letter Dated: August 21, 2008

Reference NRC RAI Number: ER RAI-8 Hydrology and Alternative Plant Systems

NRC Request for Additional Information:

Submit the calculation package for groundwater movement. Identify in Tables 2.3-4 and 2.3-6 which parameters were measured and which were estimated. Note, where possible, the corroboration of values determined for the Lee Nuclear Station with published values used to represent similar settings elsewhere in the Piedmont region.

Duke Energy Supplemental Response:

Duke Energy has previously provided a response to the subject RAI in Reference 1. This supplemental response provides updated information to clarify the characterization of groundwater movement and conditions during plant operation. ER text and figures are being revised to reflect conforming changes to revisions submitted to the Lee Nuclear Station FSAR in November 2011. Updates to the discussion of groundwater conditions generally pertain to the results of the analysis of expected post-construction groundwater conditions.

Additional ER Chapter 2 text changes describe the planned changes to site grading and flow of stormwater runoff. Some administrative changes were previously identified as containing SUNSI information and were withheld from public disclosure. These changes will be submitted under a separate cover.

Reference:

1. Letter from Bryan J. Dolan to NRC Document Control Desk, Response to Request for Additional Information (RAI 8), Ltr# WLG2008.10-07, dated October 17, 2008 (ML083050603).

Associated Revisions to the Lee Nuclear Station Combined License Application:

1. ER Subsection 2.3.1.5.7.1
2. ER Subsection 2.3.1.5.9
3. ER Figure 2.3-5
4. ER Figure 2.3-16, Sheets 1 through 4
5. ER Figure 2.3-17
6. ER Figure 2.3-20
7. ER Figure 2.3-40

Attachments:

1. Attachment 1 to Supplemental Response to ER RAI-8, Revision to ER Chapter 2 Text
2. Attachment 2 to Supplemental Response to ER RAI-8, Revision to ER Chapter 2 Figures

Lee Nuclear Station

Attachment 1 to Supplemental Response to

Request for Additional Information

ER RAI-8

ER Chapter 2 Text Revisions:

ER Subsection 2.3.1.5.7.1
ER Subsection 2.3.1.5.9

COLA Part 3, ER Chapter 2 is revised as follows:

1) Subsection 2.3.1.5.7.1, fifth paragraph is revised to read:

In March 2006, a groundwater investigation was initiated as part of the subsurface study to evaluate hydrogeologic conditions for the Lee Nuclear Site. The main 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 five-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 to 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.

2) Subsection 2.3.1.5.7.1, eighth through the tenth paragraphs are revised to read:

The maximum observed seasonal water-level fluctuation was 9 ft. at monitoring well MW-1212, located near the apparent groundwater divide west of the nuclear island. ~~Water~~During the 2006 site investigation and construction dewatering, groundwater levels showed continuous decline in areas downgradient of the excavation, as recharge entering the power block area from the south was continuously intercepted by the excavation, pumped and discharged to the Make-Up Pond B during the dewatering activities. Potentiometric surface maps were developed and are presented as Figure 2.3-15, Sheets 1 to 7.

Following the completion of construction dewatering and the return of groundwater to equilibrium conditions, 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). Seasonal water table fluctuations, as observed at the site, do not exceed 5 to 10 ft. A conservative estimate of the post-construction maximum high groundwater elevation in the area of the excavation was established at 584 ft. msl.~~ mimic land surface elevation contours, consistent with slope-aquifer conditions of the Piedmont physiographic province. The potentiometric surface elevation in this area 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 above this range that may not be evident in concrete stain observations, the groundwater level near Lee Units 1 and 2 may occur between 574 ft. and 584 ft. msl.

The projected post-dewatering water table conditions following the construction of the Lee Nuclear Station are illustrated in Figure 2.3-15, Sheet 8. The potentiometric conditions shown in Figure 2.3-15, 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. Ultimately, all groundwater flow discharges to the Broad River, the groundwater sink for the site and the surrounding area.~~

3) Subsection 2.3.1.5.7.1, last paragraph is revised to read:

Stormwater management plans for the Lee Nuclear Station direct surface water runoff ~~to Make-Up Ponds A and B.~~ away from the power block area and towards Make-Up Pond A, Make-Up Pond B, or the Broad River. The projected impact of the planned stormwater system is to reduce the flow of water into the power block area.

4) Subsection 2.3.1.5.9, first paragraph is revised to read:

~~Within the preferential flow pathway that extends northward from the reactor buildings toward the Hold-Up Pond A and the Broad River (Figure 2.3-16, Sheet 3), groundwater appears to flow through each of the aquifer materials referenced above. The nature and depth of groundwater circulation in the Piedmont area is difficult to define and may be erratic, dependent upon the presence of interconnected rock fractures and gradient. However, based on analysis of groundwater levels at the cluster well locations, vertical gradients are generally in the downward direction, consistent with the predictably variable. This variability is a function of the singular aquifer system being comprised of weathered saprolite, PWR, and fractured bedrock, and the degree of interconnection of pores and fractures between these materials. Typical of the Piedmont, groundwater flow is from high topographic slope to the Broad River, indicating that groundwater positions (recharge areas) to the is occurring and groundwater movement generally parallels topography. Groundwater in storage moves from areas of recharge (impoundments, ridges, mounds, and cooling tower pads) to areas of regional drainage features (discharge areas). Groundwater flow at this site likewise generally mirrors the surface topography, with strong gradients and flow paths from the power block area, northward to (impoundments, creeks, and, ultimately, the Broad River).~~ The nature and depth of groundwater circulation in the Piedmont is predictably variable. This variability is a function of the singular aquifer system being comprised of weathered saprolite, PWR, and fractured bedrock, and the degree of interconnection of pores and fractures between these materials. Typical of the Piedmont, groundwater flow is from high topographic positions (recharge areas) to the regional drainage features (discharge areas). Groundwater flow at this site likewise generally mirrors the surface topography, with strong gradients and flow paths from the power block area, northward to the Broad River.

5) Subsection 2.3.1.5.9, fifth paragraph is revised as follows:

After construction dewatering and the return to static conditions, the potentiometric surface in the area of the reactor buildings is expected to rebound ~~to a maximum elevation of approximately 584 ft. msl.~~ between 574 and 579 ft. msl, consistent with concrete stain observations within the pre-construction excavation area. As discussed in FSAR Subsection 2.4.12.2.3.1, the maximum groundwater elevation for the Lee Nuclear Station site is estimated to be approximately 584 ft. msl, considering the most severe historically recorded natural phenomena for the site. These conditions reflect the maximum anticipated groundwater level during operations. A summary of aquifer parameters used in the analysis of the five flow paths is shown in Table 2.3-6.

Lee Nuclear Station

Attachment 2 to Supplemental Response to

Request for Additional Information

ER RAI-8

ER Chapter 2 Figure Revisions:

Figure 2.3-5

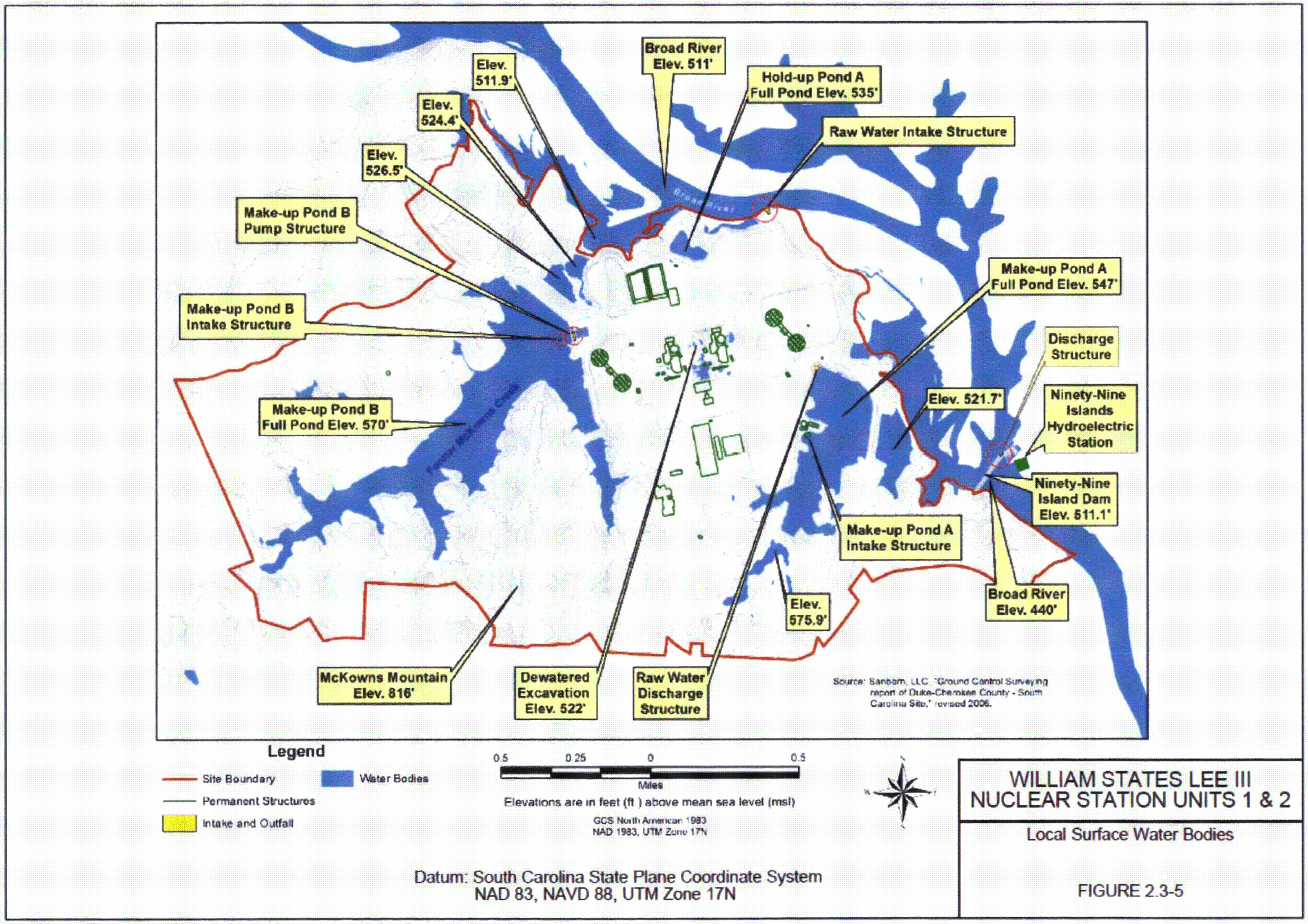
Figure 2.3-16, Sheets 1 through 4

Figure 2.3-17

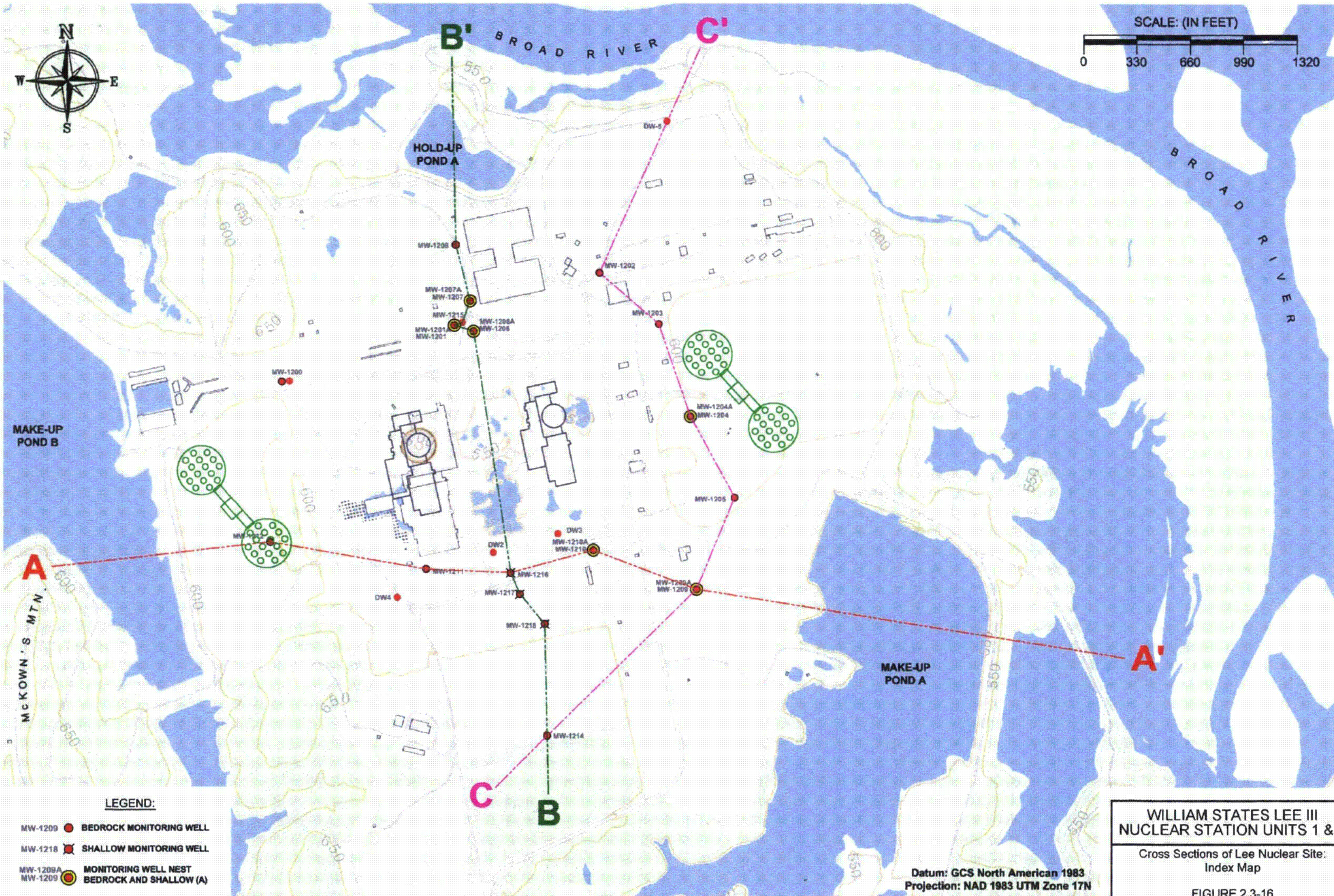
Figure 2.3-20

Figure 2.3-40

COLA Part 3, ER Chapter 2, Figure 2.3-5 is revised as shown:



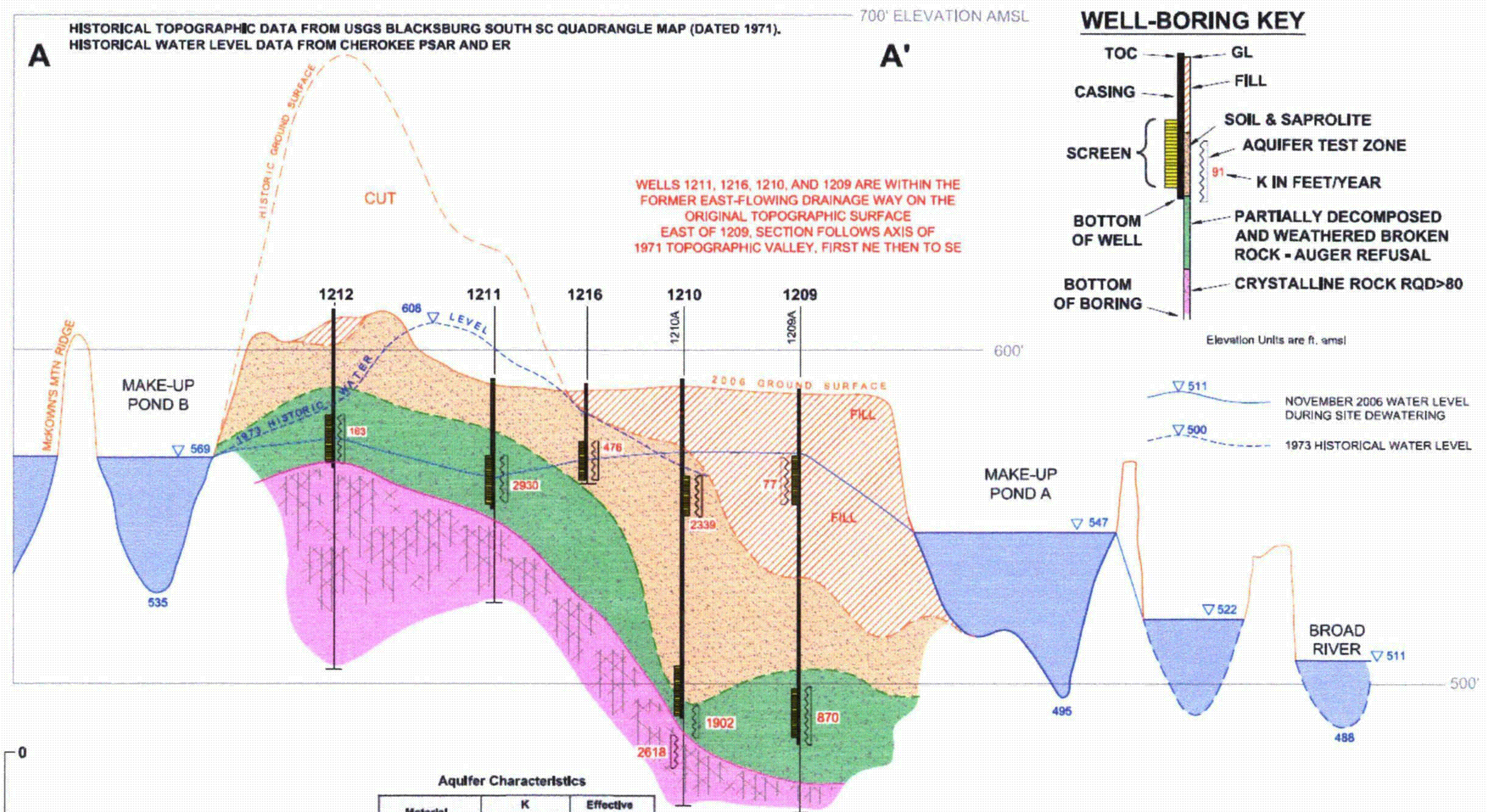
COLA Part 3, ER Figure 2.3-16 Sheets 1 through 4 are revised as follows:



WILLIAM STATES LEE III
NUCLEAR STATION UNITS 1 & 2

Cross Sections of Lee Nuclear Site:
Index Map

FIGURE 2.3-16
Sheet 1 of 4



0

25'

50'

Approximate Scale

0 500' 1000' 1500'

THIS FIGURE ILLUSTRATES GENERAL HYDROLOGIC CONDITIONS AT LEE NUCLEAR SITE.

Aquifer Characteristics

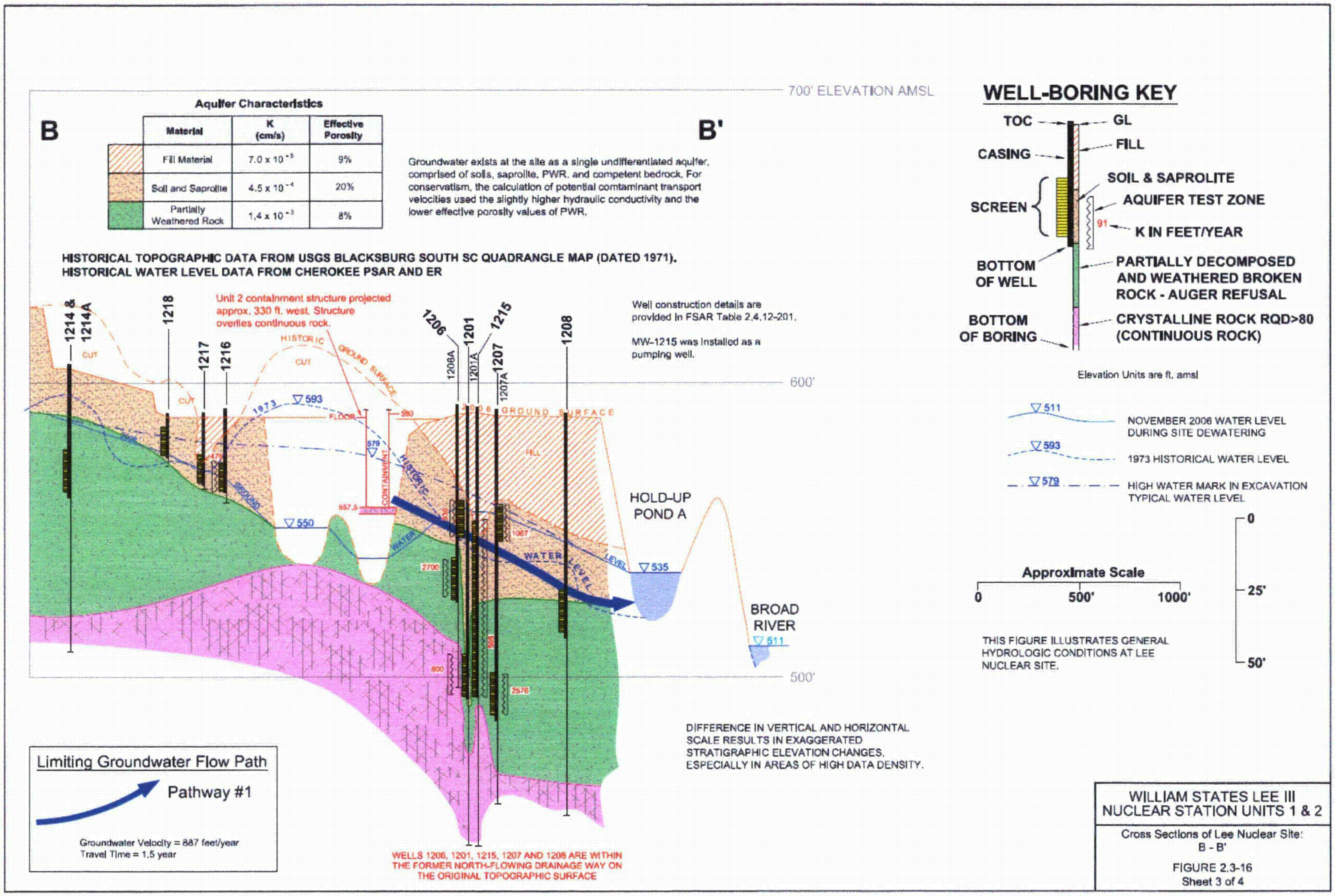
Material	K (cm/s)	Effective Porosity
Fill Material	7.0×10^{-5}	9%
Soil and Saprolite	4.5×10^{-4}	20%
Partially Weathered Rock	1.4×10^{-3}	8%

Well construction details are provided in FSAR Table 2.4.12-201.

WILLIAM STATES LEE III
NUCLEAR STATION UNITS 1 & 2

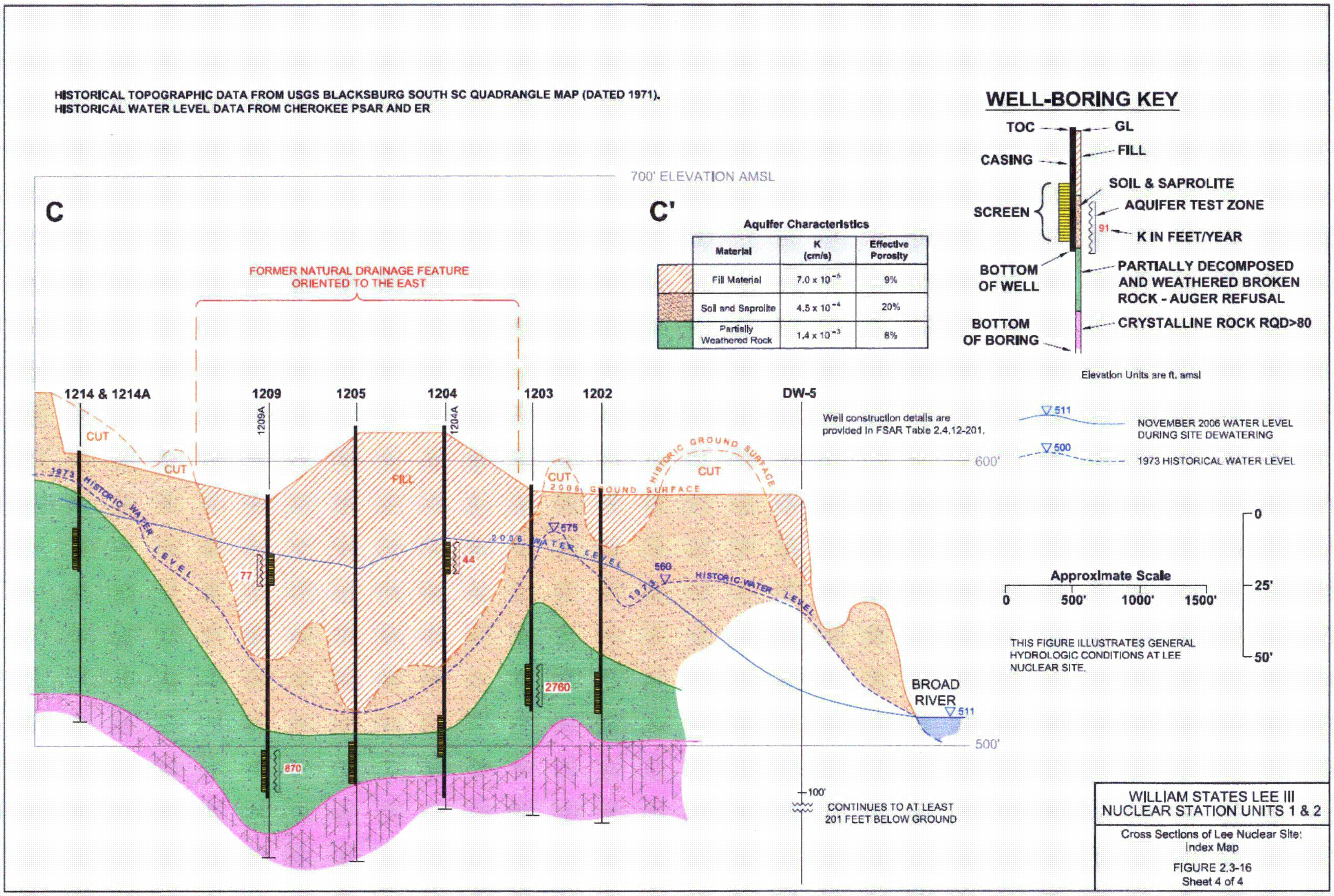
Cross Sections of Lee Nuclear Site:
A - A'

FIGURE 2.3-16
Sheet 2 of 4



Aquifer Characteristics

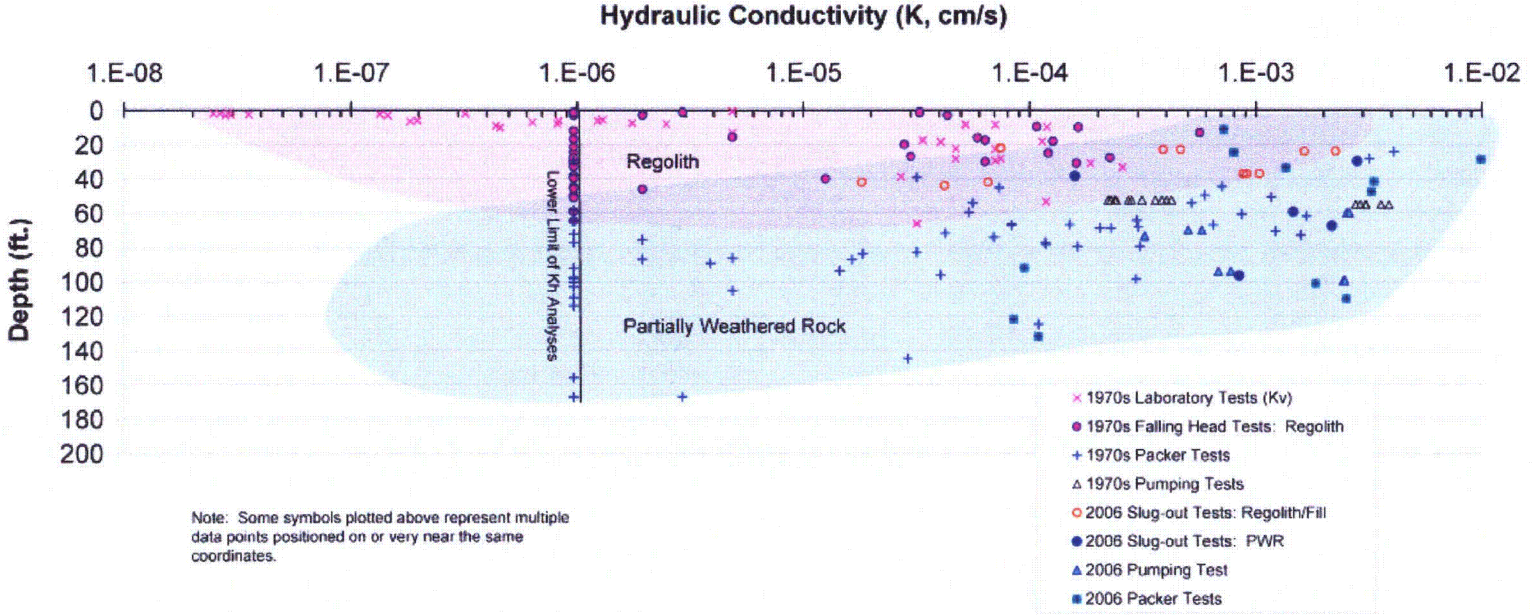
Material	K (cm/s)	Effective Porosity
Fill Material	7.0×10^{-5}	9%
Soil and Saprolite	4.5×10^{-4}	20%
Partially Weathered Rock	1.4×10^{-3}	8%



Aquifer Characteristics

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%

COLA Part 3, ER Figure 2.3-17 is revised as follows:



WILLIAM STATES LEE III
NUCLEAR STATION UNITS 1 & 2

Hydraulic Conductivities
of Subsurface Materials

FIGURE 2.3-17

COLA PART 3, ER Chapter 2, Figure 2.3-20 is revised as shown:

Withheld From Public Disclosure Under 10 CFR 2.390(a)(9)

WILLIAM STATES LEE III
NUCLEAR STATION UNITS 1 & 2

Groundwater Supply Wells
Surrounding the Lee Nuclear Site

FIGURE 2.3-20

COLA PART 3, ER Chapter 2, Figure 2.3-40 is revised as shown:

[Withheld from Public Disclosure Under 10 CFR 2.390(a)(9)]

WILLIAM STATES LEE III NUCLEAR STATION UNITS 1 & 2
Make-Up Pond C Private Potable Water Wells FIGURE 2.3-40