Ronald B. Clary
General Manager
New Nuclear Deployment

SCE&G®
A SCANA COMPANY

May 1, 2009
NND-09-0109

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

ATTN: Document Control Desk

Subject: Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3 Combined License Application (COLA) - Docket Numbers 52-027 and 52-028 Response to NRC Request for Additional Information (RAI) Letter No. 041

Reference: Letter from Manny Comar (NRC) to Alfred M. Paglia (SCE&G), Request for Additional Information Letter No. 041 Related to SRP Section 2.4.12 for the Virgil C. Summer Nuclear Station Units 2 and 3 Combined License Application, dated March 1, 2009.

The enclosure to this letter provides the South Carolina Electric & Gas Company (SCE&G) response to the RAI items included in the above referenced letter. The enclosure also identifies any associated changes that will be incorporated in a future revision of the VCSNS Units 2 and 3 COLA.

Should you have any questions, please contact Mr. Al Paglia by telephone at (803) 345-4191, or by email at apaglia@scana.com.

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

Executed on this 1st day of May, 2009.

Sincerely,

Ronald B Clary

Ronald B. Clary
General Manager
New Nuclear Deployment

AMM/RBC/am

Enclosure

D083
NRO

c (w/o attachment):
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NRC RAI Letter No. 041 Dated March 1, 2009

SRP Section: 2.4.12 – Groundwater

Questions from Hydrologic Engineering Branch (RHEB)

NRC RAI Number: 02.04.12-1

In order to show compliance with 10 CFR 100.20(c) which requires consideration of the physical characteristics of the site, the staff request that the applicant resolve the apparent discrepancies between the EPA SDWIS database provided in section 2.4.12 of the FSAR and the South Carolina State database concerning the local public water supply wells (Table 2.4-215) around the VC Summer plant.

VCSNS RESPONSE:

All the information provided in FSAR Table 2.4-215, with the exception of the population served data, was obtained from the South Carolina Department of Health and Environmental Control (SCDHEC) database. The population served data were obtained from the EPA Safe Drinking Water Information System (SDWIS) database. The SCDHEC database does not contain population served data. The apparent discrepancies between the information presented in FSAR Table 2.4-215 and the information contained in the EPA SDWIS database http://www.epa.gov/enviro/html/sdwis/sdwis_query.html as accessed on 4-3-09 are presented in the table below:

Water System Name	Apparent Discrepancy
Jenkinsville	SDWIS population served value is 2217. FSAR Table 2.4-215 population served value is 1969.
SCE&G PARR STEAM PLANT	SDWIS lists the status of this system as closed with a population served value of 10 and located in Pickens County. FSAR Table 2.4-215 lists the status of this system as active and located in Fairfield County with an unknown population served.
EDCON WAREHOUSE	This system could not be located in the SDWIS system.
GATEWAY MHP	SDWIS population served value is 11. FSAR Table 2.4-215 population served value is 25.
H.J. SMITH PROPERTIES	SDWIS population served value is 26. FSAR Table 2.4-215 population served value is 25.
SHEALY MHP	SDWIS population served value is 0. FSAR Table 2.4-215 population served value is 25. Both SDWIS and FSAR Table 2.4-215 list the system as closed or inactive.
WEBER MHP	SDWIS lists the status of this system as closed with a population served value of 22. FSAR Table 2.4-215 lists the status of this system as active with a population served value of 26.

The source of the apparent differences between the EPA SDWIS database and the information presented in FSAR Table 2.4-215 is unclear. The SCE&G Parr Steam Plant water system is incorrectly listed in the EPA database as located within Pickens County. With the exception of the population served values, all data in Table 2.4-215 were obtained from the SCDHEC database. Given Revision 0 of the FSAR was issued in 2007; some of the information in Table 2.4-215 may have changed over time. The SDWIS website indicates (as accessed on 4-3-09) its database was updated January 29, 2009 and therefore may contain updated information.

The significance of the apparent discrepancies presented in the above table is viewed to be relatively minor. Given the small population (less than 30) that most of the water systems presented in the table support, the groundwater withdrawals from these wells are small and therefore the impact to the overall groundwater flow system is minimal.

References for the Response:

U.S. Environmental Protection Agency, *Safe Drinking Water Information System (SDWIS)*. Available at http://www.epa.gov/enviro/html/sdwis/sdwis_query.html Accessed 4-3-09.

This response is PLANT SPECIFIC.

ASSOCIATED VCSNS COLA REVISIONS:

No COLA changes have been identified as a result of this response.

ASSOCIATED ATTACHMENTS:

None

NRC RAI Letter No. 041 Dated March 1, 2009

SRP Section: 2.4.12 – Groundwater

Questions from Hydrologic Engineering Branch (RHEB)

NRC RAI Number: 02.04.12-2

Reg. Guide 1.206 section 1.2.4.12.2 states that the applicant should tabulate existing water users (amounts, water levels, and elevation, location, and drawdown). FSAR Table 2.4-215 lists public ground supply within 6 miles of Units 2 and 3 but there is no information on the private supply wells near the VCSNS site. Please provide the locations and pumping rates of private water supply wells near the VCSNS site.

VCSNS RESPONSE:

Private well data from the South Carolina towns of Jenkinsville, Peak, Monticello, and Pomaria have been collected. (See Note 1 below.) These are the towns that are located nearest to the VCSNS site. The databases provide some location information about private wells; however, the databases do not specify pumping rates or other information that could be used to determine the quantity of water extracted by each well. Private wells that may have been developed without permits are not listed.

Note 1: The private well data was obtained from the South Carolina Department of Health and Environmental Control. Because some of the data contains information that could be considered personal to the owners of the wells, this supporting data is being maintained within SCE&G control and may be reviewed on a "need to know" basis.

This response is PLANT SPECIFIC.

ASSOCIATED VCSNS COLA REVISIONS:

No COLA changes have been identified as a result of this response.

ASSOCIATED ATTACHMENTS:

None

NRC RAI Letter No. 041 Dated March 1, 2009

SRP Section: 2.4.12 – Groundwater

Questions from Hydrologic Engineering Branch (RHEB)

NRC RAI Number: 02.04.12-3

FSAR section 2.4.12.2.2 does not provide a description of the of the potential of the ground water use in the area surrounding the VCSNS site. Reg. guide 1.206, C.I.2.4.12.2, states that the applicant should describe the present and projected future regional water use. Therefore, the staff requests the applicant provide a description of the potential future groundwater use in the area surrounding the VCSNS site and any potential impacts on and from the construction and operation of Units 2 and 3.

VCSNS RESPONSE:

Future regional groundwater use in the area surrounding the VCSNS site is expected to be relatively stable corresponding with the stable population predictions for Fairfield County. The Fairfield County population is predicted to rise to 27,280 by 2025, an approximate 12% increase over 2005 levels (New FSAR Reference 253). This modest increase in population suggests only a modest increase in water demand over this period. FSAR Table 2.4-213 reports the 2005 groundwater use for Fairfield County as approximately 68 million gallons.

There are no plans to use local groundwater for construction or operation of VCSNS Units 2 and 3. Construction of Units 2 and 3 power blocks requires temporary dewatering of the power block area. The low hydraulic conductivity of the local formations and limited spatial extent of the power block suggests the amount of groundwater derived from construction dewatering will be small. The small scale and temporary nature of the construction dewatering activities indicate a minimal impact to the groundwater flow system.

Water for construction purposes will be obtained from the Monticello Reservoir and the Jenkinsville Water Company. The Jenkinsville Water Company can meet the projected VCSNS water demand via purchase agreements with other water companies which have significant excess capacity. SCE&G plans to construct a water treatment facility, which draws from the Monticello Reservoir, to provide the plant with potable water in the future.

The closest a water supply well could be located to the proposed facility is approximately 0.75 miles to the southeast. This relatively long distance, coupled with the low well yields typical of the area (less than 30 gallons per minute [FSAR Subsection 2.4.12.1.1.2]), suggests any impacts to the groundwater flow system would be negligible. FSAR Subsection 2.4.12.1.1.2 will be revised to provide clarification on potential ground water use.

This response is PLANT SPECIFIC.

ASSOCIATED VCSNS COLA REVISIONS:

The following FSAR changes will be included in a future revision of the COLA:

The text below will be added to the end of FSAR Subsection 2.4.12.2.2:

Future regional groundwater use in the area surrounding the VCSNS site is expected to increase moderately, corresponding with the population predictions for Fairfield County. The Fairfield County population is predicted to rise to 27,280 by 2025, an approximate 12% increase over 2005 levels (Reference 253). This modest increase in population suggests only a modest increase in water demand over this period. Table 2.4-213 reports the 2005 groundwater use for Fairfield County as approximately 68 million gallons.

There are no plans to use local groundwater for construction or operation of VCSNS Units 2 and 3. Construction of Units 2 and 3 power blocks requires temporary dewatering of the power block area. The low hydraulic conductivity of the local formations and limited spatial extent of the power block suggests the amount of groundwater derived from construction dewatering will be small. The small scale and temporary nature of the construction dewatering activities indicate a minimal impact to the groundwater flow system.

Water for construction purposes will be obtained from the Monticello Reservoir and the Jenkinsville Water Company. The Jenkinsville Water Company can meet the projected VCSNS water demand via purchase agreements with other water companies which have significant excess capacity. SCE&G plans to construct a water treatment facility, which draws from the Monticello Reservoir, to provide the plant with potable water in the future.

The closest a water supply well could be located to the proposed facility is approximately 0.75 miles to the southeast. This relatively long distance, coupled with the low well yields typical of the area (less than 30 gallons per minute [see FSAR Subsection 2.4.12.1.1.2]), suggests any impacts to the groundwater flow system would be negligible.

The following reference will be added to FSAR Section 2.4:

253. Butler, A., *South Carolina Water Use Report 2006 Summary*, South Carolina, Department of Environmental Control, Bureau of Water, July 2007.

ASSOCIATED ATTACHMENTS:

None

NRC RAI Letter No. 041 Dated March 1, 2009

SRP Section: 2.4.12 – Groundwater

Questions from Hydrologic Engineering Branch (RHEB)

NRC RAI Number: 02.04.12-4

Staff requests that the applicant provide (in electronic format) the AQTESOLVE input files that were used in the slug test analysis for determining hydraulic conductivity.

VCSNS RESPONSE:

The thirty-four (34) AQTESOLV input/output files for the slug test results presented in FSAR Table 2.4-218 have been made available to the NRC (Letter from Ronald B. Clary to the Document Control Desk, NND-09-0104, dated April 29, 2009). Please note that one output value from AQTESOLV (for observation well OW-623) was incorrectly transcribed into Revision 0 of FSAR Table 2.4-218. The value is shown as 1.8E-5 cm/s where it should have been shown as 1.8E-4 cm/s for the falling head test. This transcription error impacts the summary statistics only slightly and does not impact the radionuclide transport calculation in FSAR Subsection 2.4.13 (which used the 75th percentile value of hydraulic conductivity). FSAR Table 2.4-218 will be corrected in the next revision of the FSAR.

FSAR Table 2.4-218 and any corresponding text in FSAR Subsection 2.4.12 for the hydraulic conductivity value listed for observation well OW-623 will be revised in the next revision of the FSAR.

This response is PLANT SPECIFIC.

ASSOCIATED VCSNS COLA REVISIONS:

The following FSAR changes will be included in a future revision of the COLA:

The third, fourth and fifth paragraphs of FSAR Subsection 2.4.12.3.3 will be revised as follows:

> The remaining 21 slug test results were analyzed and low, high, and geometric mean values were calculated for each of the hydrostratigraphic zones. The saprolite/shallow bedrock hydrostratigraphic zone tests were completed in saprolite, partially weathered rock, or a combination of both. Based on 16 slug tests, hydraulic conductivity values for this zone vary from 0.0017 feet/day to 18 feet/day with a geometric mean for this zone of ~~0.60~~0.62 feet/day. The deep bedrock hydrostratigraphic zone tests were completed in sound rock. Based on five slug tests, the hydraulic conductivity values for the deep bedrock zone vary from 0.0088

feet/day to 0.38 feet/day with a geometric mean for this zone of 0.07 feet/day. Figure 2.4-246 is a graph of hydraulic conductivity versus depth and hydrostratigraphic zone. This plot indicates that within the saprolite/shallow bedrock zone the hydraulic conductivities do not vary much with depth; however, in the deep bedrock zone, hydraulic conductivities decrease with depth.

Table 2.4-219 gives the results of packer tests conducted in selected geotechnical borings. These tests were conducted in the deep bedrock hydrostratigraphic zone. The hydraulic conductivity values for the deep bedrock zone from the packer tests vary from 0 to 1.14 feet/day with a geometric mean value of ~~for this zone is 0.166~~ 0.17 ~~feet/year~~ feet/day. Some hydraulic conductivity values are listed as zero. This is a result of a test conducted in a zone that did not take any water. This geometric mean hydraulic conductivity value of the packer tests is higher than the 0.07 ~~feet/year~~feet/day geometric mean hydraulic conductivity value indicated by the slug test results for the deep bedrock zone. The differences in values measured by the two tests are interpreted as a result of the depths at which the tests were conducted. The packer tests were generally conducted at shallower depths than the slug tests. The hydraulic conductivity values of the deep bedrock zone increase at shallower depths. When compared with just the shallow slug test results, the packer test values and the slug test values are in much closer agreement (Figure 2.4-246).

FSAR Table 2.4-218 and Table 2.4-219 will be revised as shown in the attached tables.

FSAR Figure 2.4-246 will be revised as shown in the attached figure.

ASSOCIATED ATTACHMENTS:

FSAR Table 2.4-218
FSAR Table 2.4-219
FSAR Figure 2.4-246

Table 2.4-218
Slug Test Results

	Test Interval			Hydraulic Conductivity		
Well Number	Screened Interval (feet bgs)	Hydrostratigraphic Zone	Submerged Screen	Falling Head Test (cm/s)	Rising Head Test (cm/s)	Maximum Test Result (feet/day)
OW-205A	98.5–108.5	Deep bedrock	Fully submerged screen	3.1E-6	Discard	0.0088
OW-212	56–66	Saprolite/Shallow bedrock	Fully submerged screen	8.7E-4	3.6E-4	2.5
OW-213	44.75–54.75	Saprolite/Shallow bedrock	Fully submerged screen	No test	5.9E-4	1.7
OW-227	71.25–81.25	Deep bedrock	Fully submerged screen	4.5E-5	4.4E-5	0.13
OW-305A	119.5–139.5	Deep bedrock	Fully-submerged screen	7.3E-6	6.2E-6	0.021
OW-313	48–58	Saprolite/Shallow bedrock	Partially submerged screen	No test	3.4E-3	9.6
OW-327	55–65	Saprolite/Shallow bedrock	Fully submerged screen	No test	7.1E-5	0.20
OW-333	60–70	Deep bedrock	Partially submerged screen	No test	1.3E-4	0.38
OW-401A	80–90	Deep bedrock	Fully submerged screen	8.2E-5	6.9E-5	0.23
OW-401B	60–65	Saprolite/Shallow bedrock	Fully submerged screen	1.7E-5	1.5E-5	0.047
OW-405	44–54	Saprolite/Shallow bedrock	Fully submerged screen	6.4E-3	4.9E-3	18
OW-612	47.5–57.5	Saprolite/Shallow bedrock	Partially submerged screen	No test	5.0E-4	1.4
OW-617	98–108	Saprolite/Shallow bedrock	Fully submerged screen	No test	5.9E-7	0.0017
OW-618	18.5–28.5	Saprolite/Shallow bedrock	Fully submerged screen	2.2E-4	4.3E-4	1.2
OW-620	76.6–86.5	Saprolite/Shallow bedrock	Fully submerged screen	1.1E-3	1.3E-3	3.6
OW-621B	60–70	Saprolite/Shallow bedrock	Fully submerged screen	2.2E-4	2.2E-4	0.61
OW-622	48.5–58.5	Saprolite/Shallow bedrock	Fully submerged screen	4.8E-4	4.8E-4	1.4
OW-623	76.5–86.5	Saprolite/Shallow bedrock	Fully submerged screen	~~1.8E-5~~ 1.8E-4	1.1E-4	~~0.32~~ 0.52
OW-625	84.5–104.5	Saprolite/Shallow bedrock	Partially submerged screen	No test	4.2E-4	1.2
OW-626	71–81	Saprolite/Shallow bedrock	Fully submerged screen	3.1E-5	1.3E-5	0.087
OW-627B	43–53	Saprolite/Shallow bedrock	Fully submerged screen	5.6E-5	1.6E-5	0.16

	Maximum Test Result Range		
Hydrostratigraphic Zone	Low (feet/day)	High (feet/day)	Geometric Mean (feet/day)
Saprolite/Shallow Bedrock Zone	0.0017	18	~~0.60~~ 0.62
Deep Bedrock Zone	0.0088	0.38	0.07
All	0.0017	18	~~0.36~~ 0.37

Slug test results for eight wells are not included because of invalid test conditions or questionable data.
Statistics are calculated using maximum result from either falling head test or rising head test (if both performed).

Table 2.4-219
Packer Test Results

	Test Interval		Hydraulic Conductivity	
Boring Number	Test Section Depth (feet bgs)	Material	Feet/Year	Feet/Day
B-201	65–75	Sound Rock	0	0.00
	86–96	Sound Rock	49	0.13
B-205	59–69	Rock/Sound Rock	417	1.14
	96 ~~93~~–106	Sound Rock	0	0.00
B-305	62–72	Sound Rock	86	0.24
	72–82	Sound Rock	0	0.00
B-330	57–67	Sound Rock	5	0.014
	67–77	Sound Rock	92	0.25

Hydraulic Conductivity (feet/day)		
Minimum	Maximum	Geometric Mean
0	1.14	~~0.166~~ 0.17

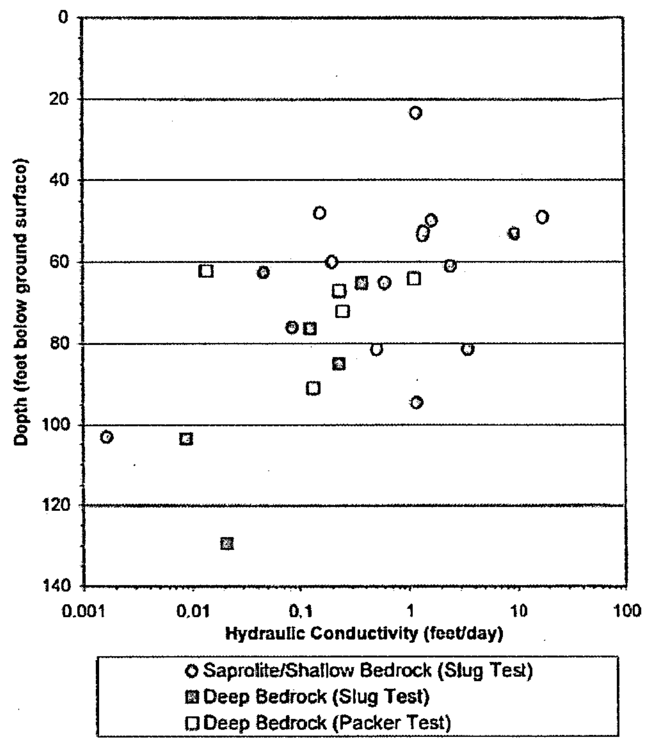

Figure 2.4-246 Hydraulic Conductivity vs. Depth and Hydrostratigraphic Zone

NRC RAI Letter No. 041 Dated March 1, 2009

SRP Section: 2.4.12 – Groundwater

Questions from Hydrologic Engineering Branch (RHEB)

NRC RAI Number: 02.04.12-5

10 CFR 52.79(d)(2) requires that the FSAR demonstrate that the interface requirements established under 10 CFR 52.47 (site parameters) have been met. The staff requests that the applicant provide additional data to expand the precipitation and long term water level trends presented in the FSAR to include the time period of the Units 2 and 3 water level monitoring period (i.e. June 2006 to June 2007).

VCSNS RESPONSE:

FSAR Table 2.4-223 contains monthly rainfall data from the Parr Climate Station through September 2006. Monthly precipitation data from the Parr Climate Station for October 2006 – December 2007 are presented below. Precipitation data for the Parr Climate Station were obtained from the Southeast Regional Climate Center website (http://www.sercc.com/climateinfo/historical/historical_sc.html). Precipitation data from the Parr Climate Station are missing for a significant number of days in 2008 and therefore are not presented.

Parr Climate Station Precipitation Data

Month/ Year	Precipitation Amount (inches)
October 2006	3.07
November 2006	6.21
December 2006	3.93
January 2007	3.98
February 2007	2.28
March 2007	2.98
April 2007	1.75
May 2007	0.49
June 2007	7.66
July 2007	0.90
August 2007	1.01
September 2007	0.12
October 2007	1.49
November 2007	1.30
December 2007	5.56

FSAR Table 2.4-217 contains monthly groundwater elevation data for June 2006 – June 2007. Additional groundwater elevation data collected after June 2007 are presented below.

Groundwater Elevation Data

Well ID	7/9/07	9/20/07	12/18/07	3/17/08	7/17/08	9/24/08	11/24/08
OW-205A	358.90	N/A	N/A	N/A	N/A	N/A	N/A
OW-205B	N/A	366.48	365.48	364.43	N/A	N/A	N/A
OW-305A	369.30	N/A	N/A	N/A	N/A	367.00	N/A
OW-305B	N/A	368.50	368.06	367.48	367.02	366.84	366.72
OW-618	303.30	N/A	N/A	N/A	N/A	N/A	N/A
OW-619	320.60	N/A	N/A	N/A	N/A	N/A	N/A
OW-624	320.38	312.30	309.30	316.35	317.88	N/A	N/A
OW-627B	N/A	315.70	315.55	317.89	315.68	N/A	N/A

References for the Response:

The Southeast Regional Climate Center, *Historical Climate Summaries for South Carolina database*. Available at http://www.sercc.com/climateinfo/historical/historical_sc.html, accessed 4-5-2009.

This response is PLANT SPECIFIC.

ASSOCIATED VCSNS COLA REVISIONS:

No COLA changes have been identified as a result of this response.

ASSOCIATED ATTACHMENTS:

None

NRC RAI Letter No. 041 Dated March 1, 2009

SRP Section: 2.4.12 – Groundwater

Questions from Hydrologic Engineering Branch (RHEB)

NRC RAI Number: 02.04.12-6

10 CFR52.79(d)(2) requires that the FSAR demonstrate that the interface requirements established under 10CFR52.47 (site parameters) have been met and to show compliance with 10CFR 100.20(c), which requires consideration of the physical characteristics of the site. The staff requests that the applicant describe the impact of the post-construction / operational setting on water table elevations (site grading including infilling on east below cooling towers, removal of saprolite/shallow bedrock zone, hydraulic properties and use of common fill and structural fill, changes in surface recharge) and subsurface pathways. This would include descriptions of changes in site grading, land cover, recharge rates, and fill material properties.

VCSNS RESPONSE:

The site is graded to obtain a plant grade of about El. 400 feet by excavating up to 28 feet of residuum and saprolite. Compared with the pre-construction topography (FSAR Figure 2.5.1-222), the final site grade is relatively flat as shown in FSAR Figure 2.5.4-245. Fill is placed east of the power block area to construct the cooling towers. The site will be graded to direct storm water runoff to three basins as shown in FSAR Figure 2.5.4-245.

Both common and structural fill are used for construction of VCSNS Units 2 and 3. (Note: The base of each nuclear island is founded on rock with leveling concrete applied as needed.) Structural fill is either concrete or well-graded granular material. The anticipated extent of the concrete and granular fill is shown on the foundation cross sections in FSAR Figures 2.5.4-220 through 2.5.4-223. The concrete fill is used mainly to replace any partially or moderately weathered rock exposed at the bottom of the excavations for the seismic Category I nuclear island foundation mat. The granular structural fill material is classified as SW (well graded sand) or SW-SM (well graded sand with silt) under the Unified Soil Classification System. Particle size distribution curves from samples of the structural fill taken from the fill source quarry are shown in FSAR Figure 2.5.4-234. Modified Proctor compaction test (ASTM D 1557-02) results (FSAR Figure 2.5.4-235) for the structural fill indicate a maximum dry density in the 123 to 125 pounds per cubic foot (pcf) range. This structural fill is placed in thin lifts and compacted to at least 95% of the maximum dry density.

The residual and saprolitic soils excavated from the site are used for common fill in areas where structural fill is not required (FSAR Figures 2.5.4-220 through 2.5.4-223). Common fill is placed east of the power block in the area of the cooling towers. The residual and saprolitic soils are classified mostly as silty sands. Modified Proctor compaction tests results (MACTEC, 2007) indicate a maximum dry density in the 106 to 109 pcf range. This common fill is placed in thin lifts and compacted to at least 90% of the maximum dry density.

Given the dry unit weight (γ_d) of the fill, the unit weight of water (γ_w = 62.4 pcf) and the specific gravity of the soil solids (G_s), the porosity of the fill materials can be calculated using the below equations (Das, 2002). Approximate fill material properties are shown below.

$$e = \frac{G_s \gamma_w}{\gamma_d} - 1$$

where e is the void ratio

$$n = \frac{e}{1+e}$$

where n is soil porosity

Approximate Properties of Fill

Material	Max γ_d [a] (pcf)	Compaction [a] density (%)	γ_d [b] (pcf)	γ_w [c] (pcf)	G_s	e[f]	n[f]
Structural fill	125	95	118.8	62.4	2.65[d]	0.39	0.28
Common fill	109	90	98.1	62.4	2.79[e]	0.77	0.44

[a] From FSAR subsection 2.5.4.5.3
[b] (maximum soil density) x (compaction density [decimal])
[c] From Das, 2002
[d] From FSAR Figure 2.5.4-235.
[e] Average of values presented in FSAR Table 2.5.4-207
[f] calculated from previously presented equations

The hydraulic conductivity of the structural and common fills has not been tested. The structural fill is estimated to have the hydraulic conductivity of clean sand (hydraulic conductivity ≈ 1 x 10^{-3} cm/s). The common fill is reworked saprolite. Due to the in-place compaction of the fill, the hydraulic conductivity of the common fill is assumed to be reduced compared to that of the native in-situ saprolite properties. The compacted saprolite is assumed to have an approximate hydraulic conductivity of 5 x 10^{-5} cm/s. This value corresponds approximately to the 25th percentile of the slug test measurements for the saprolite/shallow bedrock aquifer as shown in FSAR Table 2.4-218.

The grading of the site and construction of Units 2 and 3 will replace the existing forest cover with buildings, parking lots, grass, gravel, etc. Overall, the post-construction land surface is less pervious and could generally result in more storm water runoff and less recharge to the aquifer. This reduced recharge could result in lower groundwater hydraulic gradients, but routing storm water runoff to the three storm water basins constructed as shown in FSAR Figure 2.5.4-245 may increase recharge locally.

VCSNS Units 2 and 3 are located on a groundwater high, with groundwater flowing radially away from the facility. Due to the small spatial extent and symmetric nature of fill placement around the power block area, the fill is not expected to significantly impact the existing groundwater pathways. A pile foundation design with common fill is used to construct the cooling towers. A drain system is installed in the existing channel adjacent to the cooling towers that is backfilled. The impact to existing groundwater flow paths from the cooling towers foundation is not precisely defined, but its small size relative to the flow system suggests any impacts would be localized.

To demonstrate the final impact of constructing and operating VCSNS Units 2 and 3 on the existing groundwater flow paths, alternate groundwater flow paths are being evaluated and presented in the responses to RAIs 02.04.13-4 and 02.04.13-5. The evaluations will include a possible eastern pathway toward Mayo Creek in both the saprolite/shallow bedrock zone and the deep bedrock zone.

<u>References for the Response</u>:

1. ASTM D 1557-02, ASTM International, *Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3))*, West Conshohocken, Pennsylvania, 2003.

2. MACTEC, *SCE&G COL Geotechnical Data Report, Results of Geotechnical Exploration and Testing,* Rev. 2, V.C. Summer Nuclear Plant, for Bechtel, February 2007.

3. Das, B., Principles of Geotechnical Engineering Fifth Edition. Brooks/Cole 2002.

This response is PLANT SPECIFIC.

ASSOCIATED VCSNS COLA REVISIONS:

No COLA changes have been identified as a result of this response.

ASSOCIATED ATTACHMENTS:

None