SNC 2005 - Calc Package

V-600

Well Discharge (gal/min)	Step Duration (min)	Total Drawdown (ft)	Specific Capacity (gal/min/ft)
1150	720	32.7	35.2
2232	720	72.3	30.0
3334	2880	123.9	26.9

The transmissivity (T) of the aquifer was determined from the measurements of drawdown taken during the initial step-discharge test and from the measurements of recovery following the test.

The drawdown data were analyzed using the Jacob method (modified Theis nonequillibrium equation), and the recovery data were analyzed by the Theis recovery formula. The analyses show that the transmissivity is in the range of 110,400 to 116,600 gal/d/ft.

The pumping test for MU-2 began on December 15, 1977, and concluded 72 h later. Recovery level readings began immediately following pump shutdown and continued for 24 h. The pump intake was placed at 231 ft below top of 16-in diameter casing at approximate el -16 ft msl. Depth to water in the well before pump startup was 42.1 ft (from top of casing). The step discharge test is summarized below:

Well Discharge (gal/min)	Step Duration (min)	Total Drawdown (ft)	Specific Capacity (gal/min/ft)
1200	720	22.0	54.5
2175	720	47.5	45.8
3316	2880	81.3	40.8

The transmissivity of the aquifer was determined from the measurements of drawdown taken during the initial step- discharge test and from the measurements of recovery following the test. The drawdown data were analyzed using the Jacob method (modified Theis nonequilibrium equation), and the recovery data were analyzed by the Theis recovery formula. The analyses show that the transmissivity is in the range of 128,700 to 130,900 gal/d/ft.

Table 2.4.12-8 summarizes aquifer characteristics of the Cretaceous aquifer determined with test well TW-1 and with the makeup water wells. The moderately wide range of transmissivities and storage coefficients shown on the table suggests that the aquifer is not uniform in character and that permeability varies from place to place. No particular significance is attached to this condition because (1) the range of differences is not especially large and (2) the lowest of the values (110,400 gal/d/ft) is still indicative of a highly productive aquifer. It is noteworthy that the 158,000-gal/d/ft

value, determined from a distance-drawdown analysis and considered more indicative of the average, falls very close to the median value between the highest and lowest transmissivities obtained. This implies that the value of 150,000 gal/d/ft is a realistic and conservative value to be used in evaluating the capability of the aquifer in this area to yield water to wells. The values of storage coefficient determined from the pumping tests indicate the aquifer is effectively confined.

2.4.12.2.4.2 Blue Bluff Marl. The Blue Bluff marl is approximately 70 ft thick. It extends over an area well beyond the limits of the plant site and the interfluvial ridge on which the plant site is located. The comprehensive exploration and testing that has been conducted demonstrates that the marl is an extensive and persistent unit. In particular, the marl's integrity as a barrier to ground-water movement has been demonstrated by (1) field permeability testing, (2) visual inspecton of cored samples, the marl surface exposed during site excavation, and marl outcrops along the Savannah River, and (3) comparison of water levels in observation wells open to the water table aquifer with those observed in wells open to the confined aquifer immediately below the marl.

The continuity of this nearly impermeable material (i.e., the lack of voids, open joints or fractures) has also been demonstrated. Since 1971, there have been over 10,000 ft of marl penetrated at VEGP by drilling, coring, Standard Penetration Testing, and undisturbed sampling. When coring, the most revealing evidence for the occurrence of voids or permeable fractures is a loss of all or part of the drilling fluid and/or a sudden or rapid advance of the core barrel. At no time throughout this extensive testing was there any unaccountable fluid loss or abnormal tool advance in the marl. None of the borings encountered significantly fractured zones, nor was there evidence of leaching (removal of calcareous material by solution activity) of the marl.

Visual inspections and detailed logging of the many extracted samples of marl have likewise produced no indications of voids or extensive fracture zones. Over 1000 ft of the marl penetrated in drill holes have been either cored or sampled, and have been closely inspected and described. Very few joints or fractures were observed and those identified were consistently found to be tight, and without void space. More than 940,000 ft^2 of marl beneath the plant site was exposed during the excavation for the foundation and was directly examined and carefully logged. The results are discussed in detail in subsection 2.5.1.2.2.2.1.1. Additionally, marl outcroups along the Savannah River in the vicinity of VEGP have also been examined and mapped. These extensive and detailed mapping investigations of the marl

TABLE 2.4.12-8

SUMMARY OF AQUIFER CHARACTERISTICS CALCULATIONS

Method of Analysis	Observation Point (s)	Calculated Transmissivity (gal/d/ft)	Storage Coefficient
Test Well Data (TW-1)			
Straight-line, distance drawdown	Pumping well observation points	158,000	(a)
Type-curve, time-drawdown	1	196,000	6.6×10^{-4}
Type-curve, time-drawdown	2	160,000	3.3×10^{-4}
Type-curve, time-drawdown	3	163,700	3.5×10^{-4}
Type-curve, time-drawdown	4	153,000	2.1×10^{-5}
Type-curve, time-drawdown	5	229,200	3.9×10^{-4}
Makeup Well Data MU-1 and MU-2)			
Type-curve, time-drawdown, MU-1	None	110,400	(a)
Type-curve, time recovery, MU-1	None	116,600	(a)
Type-curve, time drawdown, MU-2	MU-1	130,900	1.07×10^{-4}
Type-curve, time recovery, MU-2	MU-2	128,700	(a)

a. Storage coefficient calculated only from observation well data.