TABLE 2.4-1

SUMMARY OF MAXIMUM STILLWATER ELEVATION DETERMINATIONS

| Fetch Number | Maximum Wind Speed at Fetch Center) (mph) | Angle of Wind to Bay Axis (degrees) | Crosswind Component (mph) | Average Fetch Depth dt (ft) | Crosswind Setup (ft) | Surge Elevation at the Site (ft) | Maximum Stillwater Elevation at the Site (ft) |
|---|---|---|---|---|---|---|---|
| 1 | 108.6 | -13.0 | 24.4 | 39.3 | 0.00 | 109.2 | 109.2 |
| 2 | 113.3 | 2.0 | 4.0 | 39.3 | 0.00 | 110.9 | 110.9 |
| 3 | 112.2 | 17.0 | 32.8 | 38.0 | 0.00 | 109.2 | 109.2 |
| 4 | 108.6 | 32.0 | 57.5 | 37.9 | 0.08 | 106.5 | 106.6 |
| 5 | 106.6 | 47.0 | 78.0 | 35.6 | 0.25 | 104.3 | 104.6 |
| 6 | 106.0 | 62.0 | 93.5 | 37.4 | 0.34 | 101.8 | 102.1 |

TABLE 2.4-2

AGENCIES AND INDIVIDUALS CONTACTED

| Agency | Location | Individual |
|---|---|---|
| U.S. Geological Survey<br>Water Resources Division | Trenton, New Jersey | Mr. H. Gill<br>Mr. H. Meisler |
| New Jersey Division of<br>Water Policy and Supply | Trenton, New Jersey | Mr. J. C. Mearill |
| Coleman Well Drilling Co. | Hancocks Bridge,<br>New Jersey | Mr. P. Coleman |
| | Vicinity of site | Numerous local<br>residents |

TABLE 2.4-3

HYDROLOGIC CHARACTERISTICS OF GEOLOGIC FORMATIONS
(Youngest to Oldest Formations)

Pleistocene Series: Pleistocene deposits occur in this region as thin discontinuous formations and are not a major source of water. Large capacity wells from these deposits are not feasible; however, infiltration galleries have been used in this formation where hydraulically connected to the Delaware River. Shallow wells draw water from these aquifers for domestic suppliers in some area.

Cohansey Sand: The Cohansey Sand outcrops along a line trending northeast-southwest, about 6 miles east of the site. The formation dips to the southeast and therefore is not present at the site. It is composed predominantly of well-sorted sand and gravel, and is potentially the most productive aquifer in the Coastal Plain area.

Groundwater in the Cohansey Sand is largely unconfined. There is no significant regional pattern of water movement in the formation. The flow pattern is governed largely by local topography.

Kirkwood Formation: The Kirkwood Formation immediately underlies the Pleistocene Soils at the site and dips to the southeast. It is composed of light gray clay with interbedded layers of sand. Domestic and farm water supplies are obtained from wells in the Kirkwood Formation. Yields on the order of 5 to 100 gallons per minute are obtained in the Kirkwood.

A few pumping tests have been made in aquifers within the Kirkwood Formation, although none have been documented in the vicinity of the site. The nearest test on record (about 15

miles to the northeast) indicates a field coefficient of permeability of about 200 gallons per day per square foot.

More often than not, the direction of the hydraulic movement in the Kirkwood Formation does not conform with the direction of dip. The major areas of discharge are probably in the permeable parts of the outcrop area where stream channels, swamps, and marshes provide relatively low-elevation discharge areas. A potentially large natural discharge area occurs where the Kirkwood Formation crops out in the Delaware River. This occurs at the site.

Vincetown Formation: This formation is a minor but relatively important source of water in New Jersey. It crops out in the vicinity of the site and is composed of a semi-consolidated sand.

In the vicinity of Salem, New Jersey, about 8 miles northeast of the site, wells in the Vincetown Formation have been reported to yield as much as 300 gallons per minute. This is in an area where the granular portion of the aquifer is thicker than normal. At the site the Vincetown Formation contains saline water.

Navesink Formation: The Navesink Formation is composed of fine to medium-grained sand with some clay. It is not widely used as a source of water supply in the region.

Hornerstown Sand: This formation is composed of sand and clay. It is not used as a source of water supply due to its impermeable nature. However, it is not a tight aquiclude and some vertical leakage may occur into or out of the underlying aquifer, depending upon the hydraulic gradient. Production wells tested at the site in 1970 confirmed that vertical

leakage occurs in some areas due to changes in hydraulic gradient.

Wenonah - Mt. Laurel Sands: These formations function hydrological as a single unit; the Wenonah sand is composed mainly of fine to coarse-grained sand and is overlain by the Mt. Laurel sand which is characteristically a medium to coarse-grained sand.

This unit is well utilized aquifer, used predominantly for domestic purposes. The aquifer recharges from precipitation and discharges predominantly in low outcrop areas. The aquifer outcrops beneath the Delaware River, a probable discharge area. Since the aquifer is confined and withdrawal volumes are small, it is probably that very little water movement occurs. Operation of onsite production wells in the Mount Laurel-Wenonah Formation will induce groundwater flow towards the wells.

Marshalltown Formation: The Marshalltown Formation is composed of clay, is impermeable, and considered to be an aquiclude.

Englishtown Formation: This sand formation is not utilized as a source of water in the vicinity of the site due to a large amount of clay and silt in the formation. Its permeability increases to the north and east, where it is tapped by wells having yields up to 200 gallons per minute.

Merchantville Clay: This formation is characteristically a clay or sandy clay overlain in many areas by the Woodbury clay, of similar characteristics. In combination with the Woodbury clay, it forms an effective aquiclude.

Magothy Formation: This formation consists of sand with thin beds of silt and organic matter. It is a major aquifer in much of the area, although it is generally not utilized south and east of the site due to the high chloride content of its water.

Aquifer coefficients, based on pump test data, indicate that the Magothy has a permeability value of about 400 gallons per day per square foot. Its porosity is about 45 percent and the specific yield is about 40 percent.

Potomac Group: The Potomac Group consists of an upper aquifer (Raritan Formation) and a lower aquifer (Patuxent Formation) separated by clay with sand lenses. The movement of groundwater through this formation is generally downdip, or southeast. This aquifer is not used in the vicinity of the site due to its depth and proximity to the salt water-fresh water interface believed to occur about 5000 feet east of the site.

Source: Dames and Moore, 1970.

TABLE 2.4-4

PUBLIC WATER SUPPLIES

| Town | Population Served | Average Output (mgd)* | Source of Water |
|---|---|---|---|
| Salem, New Jersey | 9,000 | 1.7 | About 2/3 of water consumed is surface water, pumped from the Quinton pumping station about 3 miles east of town and 9 miles northeast of the site. Remainder is obtained from four wells, ranging in depth from 80 to 168 feet, located east of Salem. |
| Pennsville, New Jersey | 10,500 | | Four wells ranging in depth from 105 to 240 feet. The wells are probably completed in the Magothy Formation. |
| PennsGrove, New Jersey | 8,000 | | Two wells, 292 and 360 feet deep. The water probably comes from the Potomac Group. |
| Woodstown, New Jersey | 3,000 | | Eight wells; six are about 100 feet deep and the others are about 300 and 350 feet deep. |
| Elmer, New Jersey | | 2,500 | Three wells; two are 80 feet deep and the third is 500 feet deep. The shallow wells probably tap the Mount Laurel-Wenonah Formation. |

TABLE 2.4-4 (Cont)

| Town | Population Served | Average Output (mgd)* | Source of Water |
|---|---|---|---|
| Bridgeton, New Jersey | 22,000 | | A total of 12 wells, some of which are no longer in use, range in depth from 75 feet to 129 feet. They are completed in the Cohansey Sand. |
| Smyrna, Delaware | | 0.27 | Two wells, 20 feet and 95 feet deep supply the town. The shallower well is used for standby purposes. |
| Clayton, Delaware | 825 | 1.2 | One well, 272 feet deep, is the source of water supply. |
| Middletown, Delaware | 2,000 | 0.2 | Three wells, having depths of 100 feet, 200 feet and 500 feet, supply the town. |
| Delaware City, Delaware | 1,500 | 0.2 | Two wells, one 26 feet deep in the Wenonah Formation and the other in the Magothy Formation, supply the town. |
| New Castle, Delaware | | | The town obtains water from a shallow infiltration gallery system located in Pleistocene deposits. |

* mgd = millions of gallons per day

TABLE 2.4-5

PRIVATE WATER WELLS IN VICINITY OF THE SITE

| Well No. | Owner's Name | Total Depth (ft) | Diameter (in.) | Casing Length (ft) | Static Water Level (ft) | Yield | Remarks |
|---|---|---|---|---|---|---|---|
| 1 | Aloes Marina | 252 | 2 | 220 | 3½ | | |
| 2 | Dr. Devlin | 252 | 2 | 210 | 5 | | |
| 3 | Dr. Devlin | 252 | 2 | 230 | 2½ | | |
| 4 | Dr. Devlin | 252 | 2 | 212 | 4 | | |
| 5 | Mr. Henchman | 252 | 2 | 218 | 6 | | |
| 6 | G. Harbeson | 15 | 42 | | | | Dug well |
| 7 | G. Harbeson | 15 | 42 | | | | Dug well |
| 8 | F. Harris | 12 | 36 | | 8+ | | Four wells, Deepest is 32 feet. |
| 9 | F. Shimp | 90 | | 60± | 12-13 | | |
| 10 | T. Hilliard | 90 | 6 | 60± | 12-13 | | |
| 11 | Mr. Snideker | 10 | 36 | | 7-8 | | |
| 12 | Mr. Snideker | 90 | 4 | | | | |
| 13 | W. Ashlock | 252 | 2 | 231 | 8 | | |
| 14 | F. Schrier | 90 | 4 | 60 | 12-13 | | |
| 15 | B. Hendman | 89 | 2 | 84 | 15 | | |
| 16. | B. Hendman | | | | | | Well filled in. |
| 17 | State of N.J. | 89 | 2 | 84 | 12 | | |
| 18 | | | 2 | | | | |
| 19 | T. Dixon | 156 | 2 | 147 | 3 | | |
| 20 | | | | | | | Well abandoned. |
| 21 | T. Dixon | 90 | 2 | | 12 | | Well abandoned. |

TABLE 2.4-5 (Cont)

| Well No. | Owner's Name | Total Depth (ft) | Diameter (in.) | Casing Length (ft) | Static Water Level (ft) | Yield | Remarks |
|---|---|---|---|---|---|---|---|
| 22 | D. Harris | 32 | 2 | 32 | | Flowing | Well abandoned. |
| 23 | Mr. McCray | 17 | 2 | 17 | | Flowing | Water is salty. |
| 24 | Mr. McCray | 165 | 2 | 147 | 5 | | |
| 25 | J. Pancast | 115 | 2 | | 5-6 | | |
| 26 | J. Pancast | 89 | 2 | 82 | 4 | | |
| 27 | R. Davis | 14 | 36 | | 6 | | Dug well. |
| 28 | W. Hancock | 90 | 4 | 50 | 10-12 | | Iron, bad water. |
| 29 | Mr. Ingersol | 90 | 4 | 50 | 10-12 | | |
| 30 | L. Fonderbank | 100 | 2 | 86 | 3 | | |
| 31 | O. Ayrs | 199 | 2 | 189 | 7 | | |
| 32 | Stony Point | 315± | | | | | Well abandoned. |
| 33 | | 400± | | | | | |
| 34 | | 900± | | | | | |
| 35 | | | | | | | |
| 36 | | 165 | 2 | 90 | | | |
| 37 | Eagle Island Gun Club | 110 | 2 | 103 | 6 | | |
| 38 | J. Dilkes | | 2 | 131 | 8 | | |
| 39 | Public Service (Production Well 3) | 298 | 16 | 243 | 20 | 200 | Not in use |
| 40 | Public Service (Production Well 4) | 284 | 16 | 210 | | 200 | Not in use |

TABLE 2.4-5 (Cont)

| Well No. | Owner's Name | Total Depth (ft) | Diameter (in.) | Casing Length (ft) | Static Water Level (ft) | Yield | Remarks |
|---|---|---|---|---|---|---|---|
| 41 | Public Service (Production Well 1) | 300 | 10 | 250 | | 200 | Intermit Use for Construction |
| 42 | Public Service (Production Well 2) | 286 | 16 | 220 | 18½ | 200 | Not in use |