

Box # 1

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PHASE I FINAL PROGRESS REPORT  
SITE ASSESSMENT INVESTIGATION  
CHEVRON-GULF REFINERY  
PHILADELPHIA, PENNSYLVANIA  
MAY 23, 1986

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**Dames & Moore**



# Dames & Moore



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May 23, 1986

J. H. Williams  
Chevron Gulf Refinery  
30th & Penrose St.  
Philadelphia, PA 19101

Re: Phase I Final Progress Report  
Week Ending May 23, 1986  
Site Assessment Investigation  
Chevron-Gulf Refinery  
Philadelphia, Pennsylvania

Dear Mr. Williams:

This report presents the remaining Phase I data not previously transmitted in Phase I Technical Progress Reports #1 through #3. The data presented in this report includes that obtained from the second round of the water level and product thickness measurements, the tidal study, the slug tests and the search for existing deep wells in the site vicinity. Also, survey elevations on Tables 1 and 2 have been corrected to National Geodetic Vertical Datum (NGVD). All Phase I work was complete as of the week ending May 23, 1986.

The recommended Phase II scope of work and cost estimate for the Chevron-Gulf Refinery including the associated facilities, was presented with our Phase I Progress Report #3, dated April 16, 1986. The additional data collected since Phase I Progress Report #3 does not change those Phase II recommendations.

### Water Level and Product Thickness Measurements

The water level and product thickness data obtained from the first round performed from February 13 to 19, 1986 and second round performed on May 1, 1986 are provided on Tables 1 and 2, respectively. A comparison of product thickness measurements indicates an overall increase in product thickness. Significant increases occurred in monitoring wells A22 (0.01 to 1.84 feet), A20 (0.05 to 0.38 feet), A24 (1.26 to 3.22 feet), B39 (1.11 to 2.46 feet), D71 (0.01 to 0.45 feet) and C63 (0.00 to 0.21 feet).

Also, a product thickness of 1.39 feet was measured in H91 (culvert at Hog Island). Several of the wells for which a sheen (0.01 feet) was reported during the first round had no measureable product during the second round. This includes the three wells at Hog Island, and two of the three wells at Darby Creek.

Figures 1 through 4 present the May 1, 1986 ground water elevation contours for the Main Plant, Ballfields, Schuylkill River Tank Farm, and Darby Creek Tank Farm, respectively. Figures 5 and 6 present May 1, 1986 product thickness contours for the Main Plant and Darby Creek Tank Farm. Free product was not detected at either the Ballfields or Schuylkill River Tank Farm and at Hog Island free product was only detected in the culvert (H91).

#### Slug Tests

To evaluate the permeability characteristics of the shallow water table aquifer a total of nine slug tests were performed between March 27 and April 1, 1986 at the following monitoring wells: Main Plant - A14, A24, B39, B48, and C54; Darby Creek Tank Farm - D68 and D70; and Schuylkill River Tank Farm- S75 and S82. The wells tested were selected in areas of known free product accumulations and to provide a range of permeabilities based on approximate recharge rates noted during previously performed well development. Each slug test consisted of the following procedures:

- o Measure the static water level in the well; record on the Slug-Test Data Form.
- o Wash the steel cylindrical slug with alcohol, steam clean and rinse liberally with distilled water.
- o Lower the slug rapidly but smoothly into the water column of the well and note the time of slug introduction.
- o Measure and record the decline of the water level at frequent intervals as it returns to the static level; record on the Slug-Test Data Form the water levels in feet to the nearest 0.01 foot and the time in seconds since the introduction of the slug.
- o Continue taking readings for at least one hour; terminate readings after that as soon as the water level has recovered at least 90 percent.
- o Remove the slug rapidly from the water and the well; note the time.

- o Measure and record the rise of the water level at frequent intervals as it returns to the static level; record on the Slug-Test Data Form the water levels in feet to the nearest 0.01 foot and the time in seconds since the removal of the slug.
- o Continue taking readings for at least one hour; terminate readings after that as soon as the water level has recovered at least 90 percent.
- o Complete the information on the Slug-Test Data Forms, including calculation of drawdowns.

The data obtained from the slug tests were analyzed to obtain estimates of aquifer hydraulic conductivity and are presented in Appendix A. Dames & Moore's computer program SLUGT was utilized to perform the analysis. The SLUGT program computes hydraulic conductivity and transmissivity by two methods; the method of Cooper, Bredehoeft and Papadopoulos (1967) which applies to confined conditions, and the method of Bouwer and Rice (1976) which applies to water-table conditions. The results of this analysis for the method of Bouwer and Rice are summarized in Table 3, which provides the estimated values for transmissivity ( $T$ ) and horizontal hydraulic conductivity ( $K_h$ ), for both the falling-head and the rising-head cases.

Table 3 shows that in most cases the rising-head part of the test resulted in a slightly higher value for  $T$  and  $K_h$  than did the falling-head portion, with the exception of well S82 where the falling-head part of the test was slightly greater than the rising-head part and well D70 where the falling-head part of the test yielded an anomalously low value which differed from the rising-head part.

With the exception of the results from the rising head portion of the test performed on well D70, which indicated a permeability of  $9.23 \times 10^{-11}$  ft/sec, the values obtained from the slug test data are reasonable for the subsurface materials intersected by the well screen. Based on the five tests performed at the Main Plant, the falling head test indicated an average permeability of  $1.53 \times 10^{-5}$  ft/sec. At the Darby Creek and Schuylkill River Tank Farms the falling-head portion of the test yielded average permeabilities of  $1.94 \times 10^{-6}$  ft/sec and  $4.9 \times 10^{-5}$  ft/sec, respectively.

#### Tidal Study

Continuous water level meters were in operation during the period April 7, 1986 to May 9, 1986 at well A9 in the Main Plant, and at wells S74 and S76 in the Schuylkill River Tank Farm. Well A9 is located approximately 150 feet east of the river. Wells S74 and S76 are located approximately 600 feet and

1000 feet west of the river, respectively. In addition to Well A9 at the Main Plant, a continuous water level meter was set up at Well A8, located approximately 75 feet east of the river, however this meter operated for only one week (March 16 to March 24, 1986) before a mechanical failure occurred. A tidal staff/stilling well also was set up in the Schuylkill River near the end of 4th street in order to measure tidal variations of the Schuylkill River.

Each meter was periodically visited to insure its proper operation and to take measurements of the water levels inside the associated well. Water level readings were also taken at the stilling well on the Schuylkill River every half hour for a total of twelve hours, on April 17, 1986 to evaluate the magnitude of tidal fluctuations in the river.

A tidal fluctuation of approximately 4.5 feet was measured at the stilling well in the river. However, no daily or systematic fluctuations were noted in the wells monitored as a result of this tidal fluctuation. The only noticeable elevation change of the water table was observed in well number S76 as a sharp increase which occurred during a period of heavy rain from April 16, 1986 thru April 18, 1986. Other slight fluctuations in the water table were recorded at all three wells, but do not appear to be related to tidal fluctuations. It is possible that the sheet pile wall which is present along the Schuylkill River at the Main Plant may have effected the response of the water table to tidal fluctuations. Although the wells at the Schuylkill River Tank Farm were chosen because they are the closest at the site to the river, it is probable that these wells are located too far from the river to respond to tidal fluctuations.

#### Deep Well Survey - Site Vicinity

The following two documents were reviewed as a part of our well survey and contain the information provided below:

- o Hydrologic Data For Aquifers In Philadelphia, Pennsylvania; USGS Open-File Report 83-149; Prepared in cooperation with the City of Philadelphia Water Department, 1984.
- o Ground-Water Resources of the Coastal Plain Area of Southeastern Pennsylvania; Pennsylvania Geological Survey Bulletin W13, 1961.

Seven (7) wells, completed in the lower and middle sand units of the Cretaceous Raritan-Magothy Formation, exist within a 1.5-mile radius from the Chevron-Gulf Refinery. Four of the seven are unused; two are located on the Main Plant of the

Chevron-Gulf Refinery and two are located approximately 1.5-miles southeast of the Main Plant at the U.S. Naval Shipyard. The remaining three (3) wells are located about 1-mile southwest of the Main Plant by the sewage treatment plant. These wells are owned by the city of Philadelphia and are listed as observation wells.

Table 4 presents the well owner, date of installation, well type, well usage, surface elevation, and static water level for each of the seven wells. Well locations are shown on Figure 7, Site Vicinity Map.

Should you have any questions regarding the data obtained during our Phase I investigation or the Phase II Recommendations previously submitted, please do not hesitate to call.

Very truly yours,

DAMES & MOORE

*Frank J. Vernese*  
Frank J. Vernese  
Partner

*Ralph T. Golia*  
Ralph T. Golia  
Project Hydrogeologist

cc: Dorothy Keech  
Irv Whittemore  
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TABLE 1

MONITORING WELL SPECIFICATION  
 GROUND WATER TABLE  
 ELEVATIONS AND PRODUCT  
 THICKNESS  
 CHEVRON - GULF REFINERY  
 PHILADELPHIA PENNSYLVANIA

Monitoring Well	Depth of Boring (ft)	Depth of Well (ft)	Depth of Screened Interval (ft)	Top of Well Casing Elevation (NGVD)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Water Table Elevation (NGVD)	Round 1 3/13/86 to 3/19/86	
A1	15	15	5-15	8.63	--	6.59	--	2.04		--
A2	13	13	3-13	7.84	--	2.35	--	5.49		--
A3	15	15	3-13	9.37	4.79	4.80	0.01	4.57		--
A4	15	15	5-15	7.06	5.80	5.81	0.01	1.25		--
A5	18	17	4-17	6.93	4.73	--	*	2.20		--
A6	15	15	3-15	7.96	10.64	10.65	0.01	2.69		--
A7	15	15	3-13	8.02	3.15	3.93	0.78	4.09	4.79	
A8	15	15	5-15	6.29	--	5.29	--	1.00		--
A9	15	15	3-13	7.17	--	4.47	--	2.70		--
A10	15	15	5-15	9.48	--	3.39	--	6.09		--
A11	14	13.6	3.6-13.6	5.89	--	2.25	--	3.64		--
A12	13	13	3-13	6.14	--	2.29	--	3.85		--
A13	13	13	3-13	7.91	--	3.67	--	4.24		--
A14	13	13	3-13	8.55	4.36	4.37	0.01	4.18		--
A15	15	15	5-15	6.90	--	1.84	--	5.06		--
A16	15	14	1.6-11.6	8.47	2.63	2.64	0.01	5.83		--
A17	15	14	2-12	9.42	--	4.02	--	5.40		--
A18	12	12	2-12	9.52	--	2.91	--	6.61		--
A19	12	11.6	1.6-11.6	9.52	--	4.47	--	5.05		--
A20	14	14	4-14	8.81	6.61	6.66	0.05	2.15		--
A21	13	13	3-13	9.34	2.58	2.59	0.01	6.75		--
A22	15	15	5-15	9.02	6.61	6.62	0.01	2.40		--
A23	13	13	3-13	4.71	--	0.54	--	4.17		--
A24	14.6	14.6	2-12	6.54	2.93	4.19	1.26	2.35	3.48	
A25	13	13	3-13	10.46	--	6.37	--	4.09		--
A26	15	15	3.6-13.6	11.38	--	7.28	--	4.10		--
A27	15	15	5-15	12.08	8.44	8.45	0.01	3.63		--
B39	15	15	3-15	8.73	2.68	3.79	1.11	4.94	5.94	
B40	15	13	3-13	7.17	--	1.56	--	5.61		--
B41	15	12	2-12	8.85	--	3.07	--	5.78		--
B42	17	15	2.5-15	8.04	--	2.13	--	5.89		--
B43	15	14.5	3-14.5	9.36	5.19	5.20	0.01	4.16		--
B44	15	15	3-13	8.21	2.91	2.91	0.01	5.30		--
B45	15	15	3-15	7.30	--	2.04	--	5.26		--
B46	15	15	2-12	10.55	--	2.03	--	8.52		--
B47	15	15	3-13	10.56	3.18	3.19	0.01	7.37		--
B48	16	14	4-14	8.90	--	0.97	--	7.93		--
BF88	14.6	14.6	4.6-14.6	12.93	--	11.10	--	1.83		--
BF89	13.5	13.5	3.5-13.5	11.81	--	10.56	--	1.25		--

TABLE 1 (con't)

Round 1 3/13/86 to 3/19/86

Monitoring Well	Depth of Boring (ft)	Depth of Well (ft)	Depth of Screened Interval (ft)	Top of Casing Elevation (NGVD)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Water Table Elevation (NGVD)	Corrected Water Table Elevation** (NGVD)
BB90	15	13	3-13	9.68	--	1.29	--	8.39	--
C49	20	18	8-18	12.16	--	6.43	--	5.73	--
C50	20	15.6	5.6-15.6	15.35	--	10.23	--	5.12	--
C51	14	13	3-13	10.71	--	3.24	--	7.47	--
C52	14	13	3-13	10.14	--	7.41	--	2.73	--
C53	16	15	5-15	11.93	--	6.19	--	5.74	--
C54	16	14	4-14	9.58	--	1.07	--	8.51	--
C55	15	14.6	5-15	12.21	--	5.73	--	6.48	--
C56	14	13	3-13	11.77	--	2.23	--	9.14	--
C57	15.6	14.6	4.6-14.6	10.77	--	3.07	--	7.70	--
C58	14.6	13	3-13	9.75	--	1.02	--	8.73	--
C59	15	14	4-14	9.75	--	0.98	--	8.77	--
C60	14	13	3-13	9.85	--	3.63	--	6.22	--
C61	14	13	3-13	11.27	--	3.76	--	7.51	--
C62	14	13	3-13	13.90	--	4.83	--	9.07	--
C63	14.6	13	3-13	9.22	--	5.06	--	4.16	--
C64	14.6	13	3-13	10.21	--	6.66	--	3.55	--
C65	14	13	3-13	13.33	--	7.84	--	5.49	--
D66***	15.5	12.5	2.5-12.5	35.23	--	6.10	--	29.13	--
D67	15.6	12.6	2.6-12.6	16.12	--	13.38	--	2.74	--
D68	15.5	13.5	2.5-12.5	13.28	--	4.24	--	9.04	--
D69	25	24	14-24	14.97	4.35	4.36	0.01	10.61	--
D70	15	15	5-15	12.54	--	4.42	--	8.12	--
D71	25	20	5.20	13.22	9.15	9.16	0.01	4.06	--
D72	15.6	14	4-14	15.58	--	9.89	--	5.69	--
D73	20	20	10-20	27.02	12.18	12.19	0.01	14.83	--
S74***	15.6	14	4-14	14.54	--	8.58	--	5.96	--
S75	15.6	15.6	5.6-15.6	13.19	--	7.80	--	5.39	--
S76	15	14	4-14	9.56	--	11.62	--	-3.06	--
S77	16	15	5-15	6.20	--	8.91	--	-2.71	--
S78	15	14	4-14	2.77	--	6.01	--	-3.24	--
S79	15	14.6	4.6-14.6	3.88	--	6.64	--	-2.76	--
S80	20	15	4.8-14.8	3.20	--	6.78	--	-3.58	--
S81	15	13.3	3.3-13.3	3.57	--	6.75	--	-3.18	--
S82	14	13	3-13	3.00	--	1.29	--	1.71	--
S83	15.6	13	3-13	4.35	--	4.30	--	0.05	--
H85	16	13	3-13	12.23	8.00	8.01	0.01	3.92	--
H86	14.6	13	3-13	13.20	8.11	8.12	0.01	4.78	--
H87	14.6	13	3-13	12.15	6.82	6.83	0.01	5.02	--
A28	Culvert			8.58	5.32	5.35	0.03	3.23	--
A29	Culvert			7.91	5.78	5.79	0.01	2.12	--
A30	Culvert			8.63	4.65	4.66	0.01	3.97	--
A31	Culvert			7.30	7.00	7.17	0.17	0.13	0.28
A32	Culvert			7.73	5.95	5.97	0.02	2.23	--

TABLE 1 (con't)

Round 1 3/13/86 to 3/19/86

Monitoring Well	Depth of Boring (ft)	Depth of Well Screened Interval (ft)	Depth of Casing Elevation (NGVD)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Water Table Elevation (NGVD)	Corrected Water Table Elevation** (NGVD)
A33	Culvert		7.44	5.55	5.64	0.09	1.8	--
A34	Culvert		6.71	5.12	5.16	0.04	1.55	--
A35	Culvert		11.68	10.52	10.64	0.12	1.04	1.14
A36	Culvert		12.99	6.28	6.32	0.04	6.67	--
A37	Culvert		12.38	7.49	--	*	--	--
A38	Culvert		13.68	8.44	8.65	0.21	5.03	5.22

## Notes:

1. All elevations based on the National Geodetic Vertical Datum (NGVD).

\* Product coated probe. Depth to water not available.

\*\* Corrected water table elevation based on an assumed product density of 0.9.

TABLE 2

MONITORING WELL SPECIFICATION  
 GROUND WATER TABLE  
 ELEVATIONS AND PRODUCT  
 THICKNESS  
 CHEVRON - GULF REFINERY  
 PHILADELPHIA PENNSYLVANIA

Round 2 5/18/86

Monitoring Well	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Water Table Elevation (NGVD)	Corrected Water Table Elevation**
A1	--	5.94	--	2.69	--
A2	--	2.27	--	5.55	--
A3	--	4.70	--	4.67	--
A4	5.01	5.10	0.0	1.96	2.04
A5	--	--	--	--	--
A6	--	4.20	--	3.76	--
A7	3.09	4.27	1.18	3.75	4.80
A8	--	5.16	--	1.13	--
A9	--	4.12	--	3.05	--
A10	--	3.52	--	5.96	--
A11	--	1.90	--	3.99	--
A12	--	2.54	--	3.60	--
A13	3.31	3.40	0.09	4.51	4.59
A14	3.8	3.93	0.13	4.62	4.73
A15	--	1.47	--	5.43	--
A16	--	2.46	--	6.01	--
A17	--	3.91	--	5.51	--
A18	--	2.98	--	6.54	--
A19	--	4.22	--	5.30	--
A20	6.47	6.85	0.38	1.96	2.3
A21	2.21	2.34	0.13	7.00	7.11
A22	10.36	12.20	1.84	-3.18	-1.52
A23	--	0.65	--	4.06	--
A24	1.87	5.09	3.22	1.45	4.35
A25	--	4.98	--	5.48	--
A26	--	6.56	--	4.82	--
A27	--	7.69	--	4.39	--
B39	2.24	4.70	2.46	4.03	6.24
B40	--	1.30	--	5.87	--
B41	--	2.87	--	5.98	--
B42	--	1.46	--	6.58	--
B43	5.04	5.07	.03	4.29	4.32
B44	--	2.55	--	5.66	--
B45	--	1.76	--	5.54	--
B46	--	1.77	--	8.78	--
B47	--	3.37	--	7.19	--
B48	--	0.87	--	8.03	--
BF88	--	10.78	--	2.15	--
BF89	--	9.77	--	2.04	--

Table 2 (con't)

Round 2 5/18/86

Monitoring Well (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Water Table Elevation (NGVD)	Corrected Water Table Elevation**
BF90	--	1.60	--	8.08	--
C49	--	5.23	--	7.73	--
C50	--	11.07	--	4.28	--
C51	--	3.47	--	7.27	--
C52	--	6.48	--	3.66	--
C53	--	5.87	--	6.06	--
C54	--	1.23	--	8.35	--
C55	--	5.54	--	6.67	--
C56	--	2.36	--	9.41	--
C57	--	2.91	--	7.86	--
C58	--	1.15	--	8.6	--
C59	--	0.88	--	8.87	--
C60	--	3.71	--	6.14	--
C61	--	4.30	--	6.97	--
C62	--	5.16	--	8.74	--
C63	--	6.19	--	3.03	--
C64	--	7.54	--	2.67	--
C65	7.33	7.54	0.21	5.79	5.98
D66	--	6.24	--	28.99	--
D67	--	13.04	--	3.08	--
D68	--	4.21	--	9.07	--
D69	--	4.37	--	10.6	--
D70	--	3.20	--	9.34	--
D71	7.08	7.53	0.45	5.69	6.10
D72	--	9.10	--	6.80	--
D73	--	12.26	--	14.76	--
S74	--	8.70	--	5.84	--
S75	--	8.93	--	4.26	--
S76	--	10.57	--	-1.01	--
S77	--	8.09	--	-1.89	--
S78	--	5.13	--	-2.36	--
S79	--	5.77	--	-1.89	--
S80	--	5.80	--	-2.60	--
S81	--	5.89	--	-2.32	--
S82	--	1.36	--	1.64	--
S83	--	3.98	--	0.37	--
H85	--	7.95	--	4.28	--
H86	--	8.03	--	5.17	--
H87	--	6.90	--	5.25	--
A28	6.15	6.17	0.02	2.21	2.23
A29	--	5.90	--	2.01	--
A30	--	6.01	--	2.62	--
A31	7.18	7.38	0.02	-0.08	--
A32	--	5.57	--	2.16	--

Table 2 (con't)

Round 2 5/18/86

Monitoring Well (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Water Table Elevation (NGVD)	Corrected Water Table Elevation**
A33	4.92	5.04	0.12	2.40	2.51
A34	4.94	5.02	0.08	1.69	1.76
A35	9.93	10.30	0.37	1.38	1.71
A36	*	--	--	--	--
A37	7.15	7.25	0.10	5.13	5.22
A38	7.82	8.10	0.28	5.58	5.83

## Notes:

1. All elevations based on the National Geodetic Vertical Datum (NGVD).

\* Product coated probe. Depth to water not available.

\*\* Corrected water table elevation based on an assumed product density of 0.9.

Table 3

Summary of Permeability and Transmissivity Values from Slug Tests  
Monitoring Wells

Main Plant					
	A14	A24	B39	B48	C54
Transmissivity ft/sec	6.33X10 <sup>-5</sup>	1.97X10 <sup>-4</sup>	1.06X10 <sup>-4</sup>	3.36X10 <sup>-5</sup>	1.59X10 <sup>-4</sup>
					Falling Head
Permeability ft/sec	1.04X10 <sup>-4</sup>	1.92X10 <sup>-4</sup>	1.93X10 <sup>-4</sup>	7.49X10 <sup>-5</sup>	6.76X10 <sup>-4</sup>
					Rising Head
	7.81X10 <sup>-6</sup>	3.39X10 <sup>-5</sup>	1.99X10 <sup>-5</sup>	2.95X10 <sup>-6</sup>	1.19X10 <sup>-5</sup>
					Falling Head
	1.29X10 <sup>-5</sup>	3.31X10 <sup>-5</sup>	3.64X10 <sup>-5</sup>	6.57X10 <sup>-6</sup>	5.04X10 <sup>-5</sup>
					Rising Head

Monitoring Wells

	D68	D70	S75	S82	
Transmissivity ft/sec	2.64X10 <sup>-5</sup>	3.37X10 <sup>-6</sup>	1.63X10 <sup>-6</sup>	1.09X10 <sup>-3</sup>	Falling Head
					Rising
Permeability ft/sec	2.78X10 <sup>-5</sup>	9.23X10 <sup>-11</sup>	1.50X10 <sup>-5</sup>	8.8X10 <sup>-4</sup>	Head
					Falling
	3.34X10 <sup>-6</sup>	5.44X10 <sup>-7</sup>	3.08X10 <sup>-7</sup>	9.77X10 <sup>-5</sup>	Head
					Rising
	5.52X10 <sup>-6</sup>	1.49X10 <sup>-11</sup>	2.84X10 <sup>-6</sup>	7.92X10 <sup>-5</sup>	Head

Notes:

1. Permeability: Defined as the capacity of a porous medium for transmitting water.
2. Transmissivity: Defined as the rate at which water is transmitted through a unit width of aquifer under a unit hydraulic gradient.
3. T= Kb T= Transmissivity, K= Hydraulic conductivity, and b= saturated thickness of the aquifer.

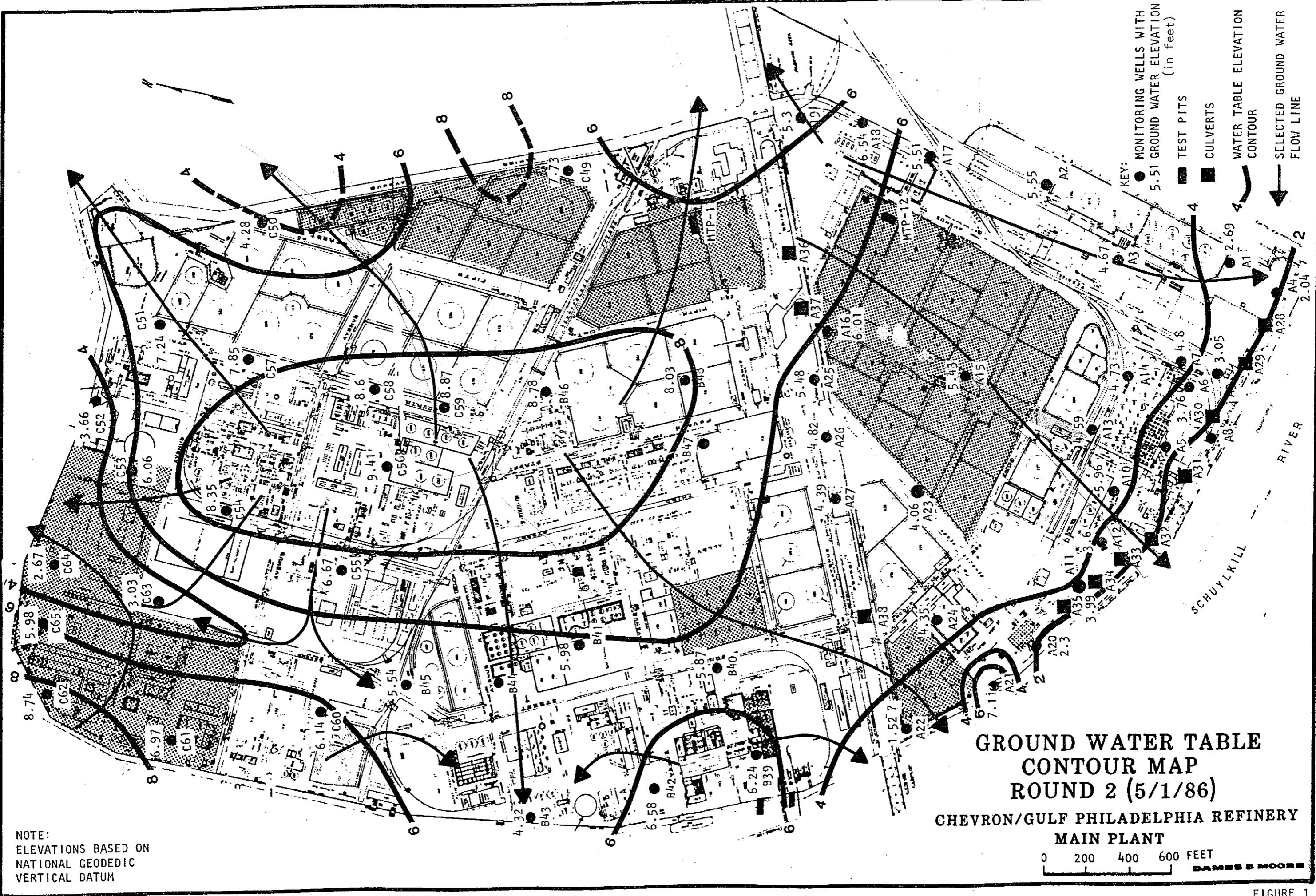
TABLE 4

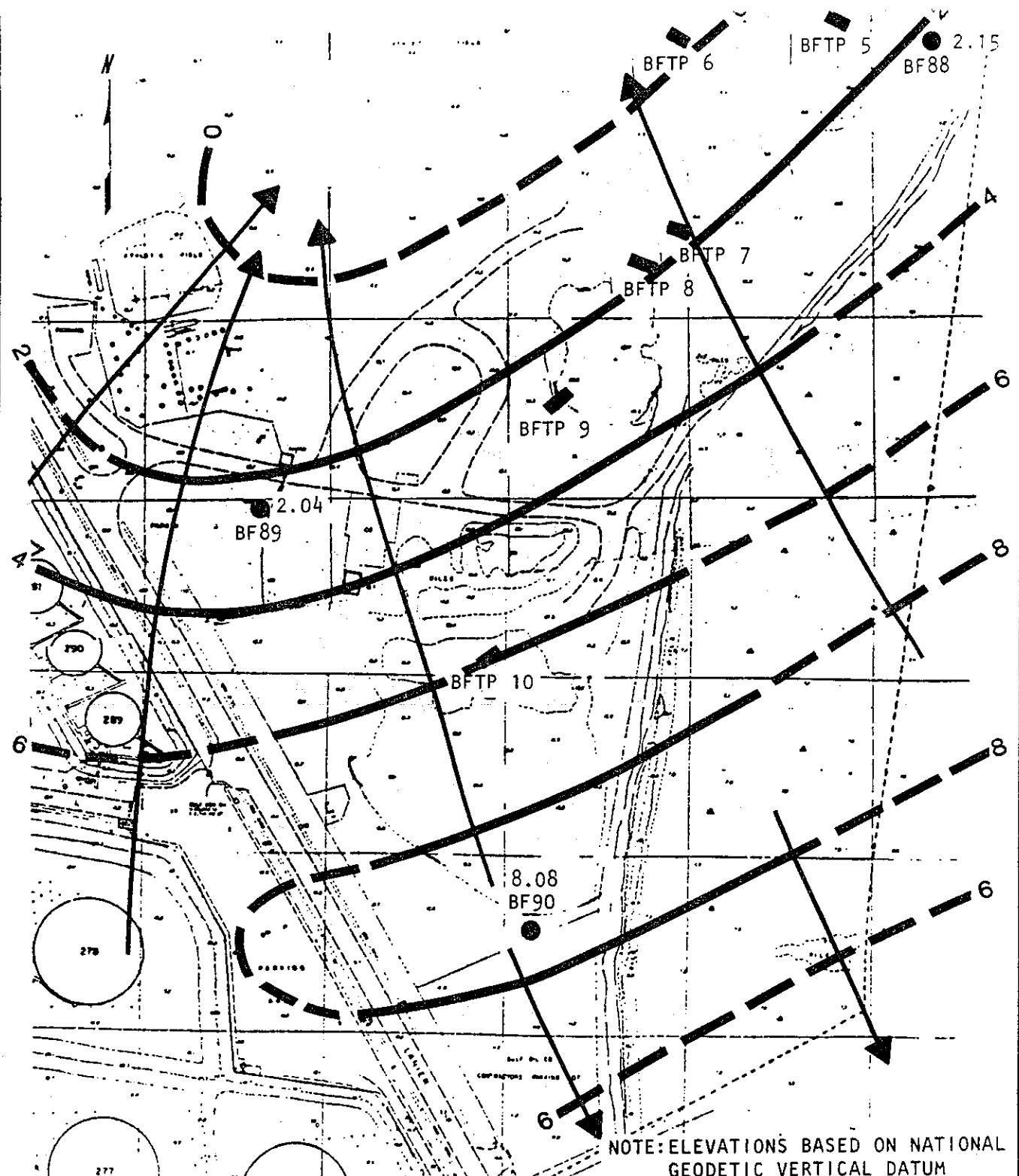
Well Screened In The Raritan-Magothy Formation  
Within A 1.5-Mile Radius From The Chevron-Gulf Refinery

Well No	Owner	Installation Date	Well Usage	Surface Elevation (in feet above MSL)	Depth to Static Water Level (in feet)	Geologic Unit
1	U.S. Navy	May, 1940	Unused	14.76	28.41 11/1/78	Lower sand unit Raritan-Magothy Fm.
2	U.S. Navy	June 20, 1942	Unused	10.19	19.22 10/31/78	Lower sand unit Raritan-Magothy Fm.
3.	Chevron	January, 1946	Unused	10.40	11.88 11/8/78	Lower sand unit Raritan-Magothy Fm.
4.	Chevron	March, 1946	Unused	10.50	11.60 11/8/78	Lower sand unit Raritan-Magothy Fm.
5.	City of Philadelphia	January, 1981	Observation	4.60	9.38 2/4/81	Middle sand unit Raritan-Magothy Fm.
6.	City of Philadelphia	January, 1981	Observation	10.70	8.76 2/4/81	Middle sand unit Raritan-Magothy Fm.
7.	City of Philadelphia	January, 1981	Observation	7.50	8.17 2/4/81	Middle sand unit Raritan-Magothy Fm.

DEPTHS BELOW MSL

- Notes: 1) For well locations see Figure 7.  
 2) Data obtained from; Hydrologic Data For Aquifers In Philadelphia, Pennsylvania; U.S. Geological Survey Open-File Report 83-149, 1984.





KEY:

8.08 ● MONITORING WELLS WITH GROUND WATER TABLE ELEVATION

■ TEST PITS

6 — GROUND WATER TABLE ELEVATION CONTOUR (CONTOUR INTERVAL = 2 FOOT)

← SELECTED GROUND WATER FLOW LINE

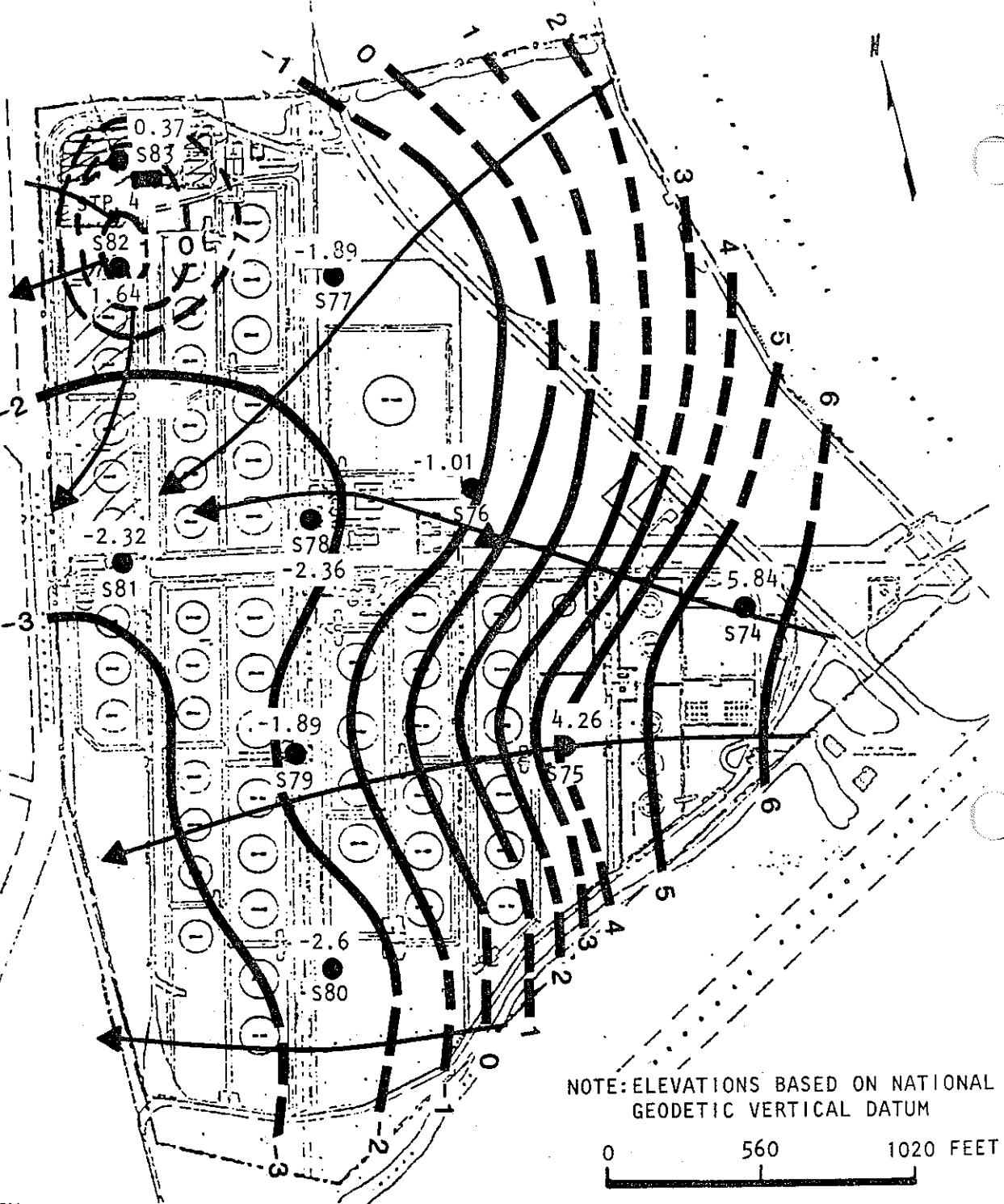
## GROUND WATER TABLE CONTOUR MAP

ROUND 2 (5/1/86)

CHEVRON/GULF PHILADELPHIA REFINERY

BALLFIELDS

DAMES & MOORE



- KEY:
- 1.89 ● MONITORING WELLS WITH GROUND WATER TABLE ELEVATION
  - TEST PITS
  - 6 — GROUND WATER TABLE ELEVATION CONTOUR (CONTOUR INTERVAL = 1 FOOT)
  - ← SELECTED GROUND WATER FLOW LINE

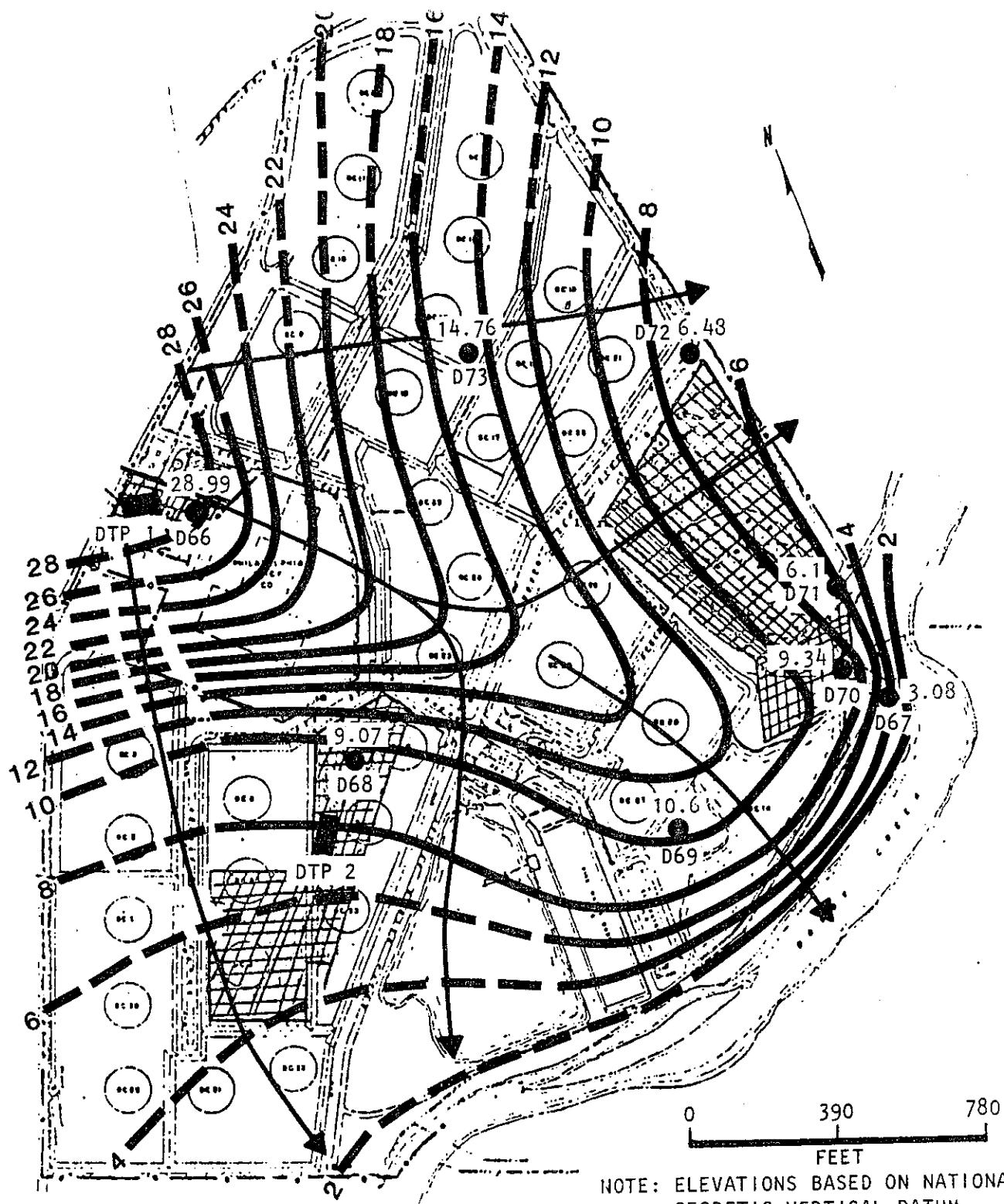
## GROUND WATER TABLE CONTOUR MAP

ROUND 2 (5/1/86)

CHEVRON/GULF PHILADELPHIA REFINERY

SCHUYLKILL RIVER TANK FARM

DAMES & MOORE

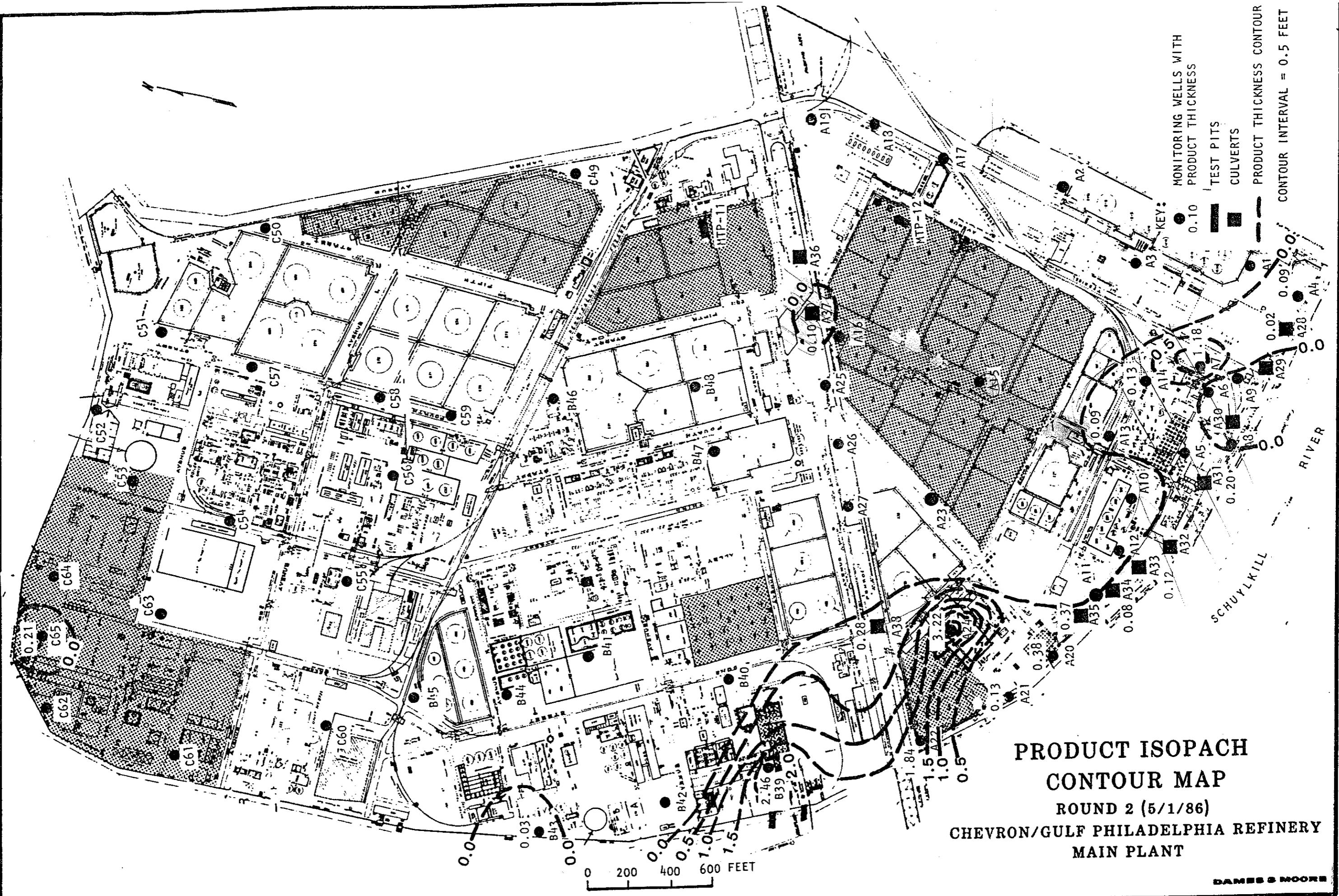


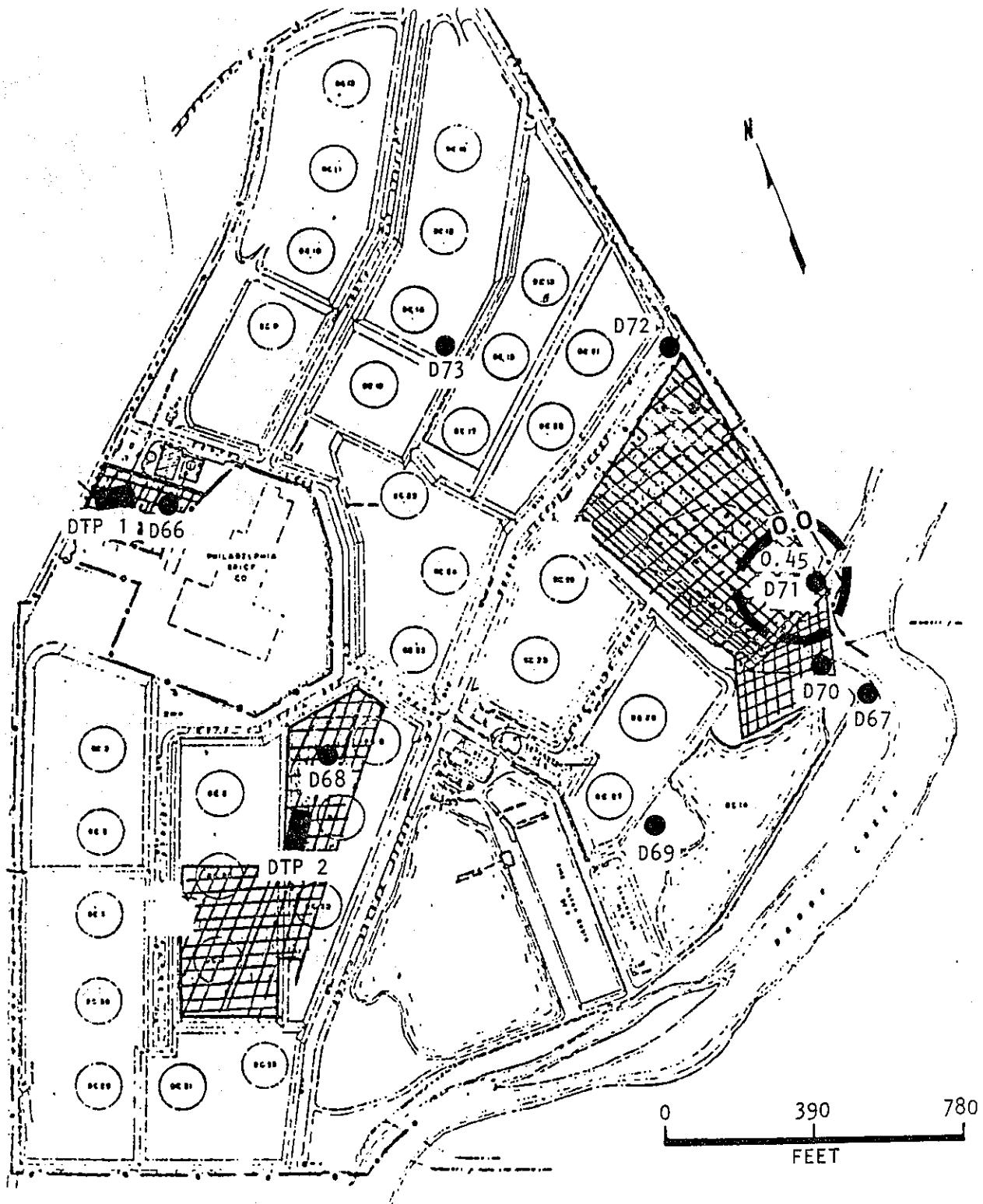
- KEY:
- MONITORING WELLS WITH GROUND WATER TABLE ELEVATION
  - TEST PITS
  - GROUND WATER TABLE ELEVATION CONTOUR (CONTOUR INTERVAL = 2 FEET)
  - ← SELECTED GROUND WATER FLOW LINE

## GROUND WATER TABLE CONTOUR MAP ROUND 2 (5/1/86)

CHEVRON/GULF PHILADELPHIA REFINERY  
DARBY CREEK TANK FARM

JAMES B. MOORE





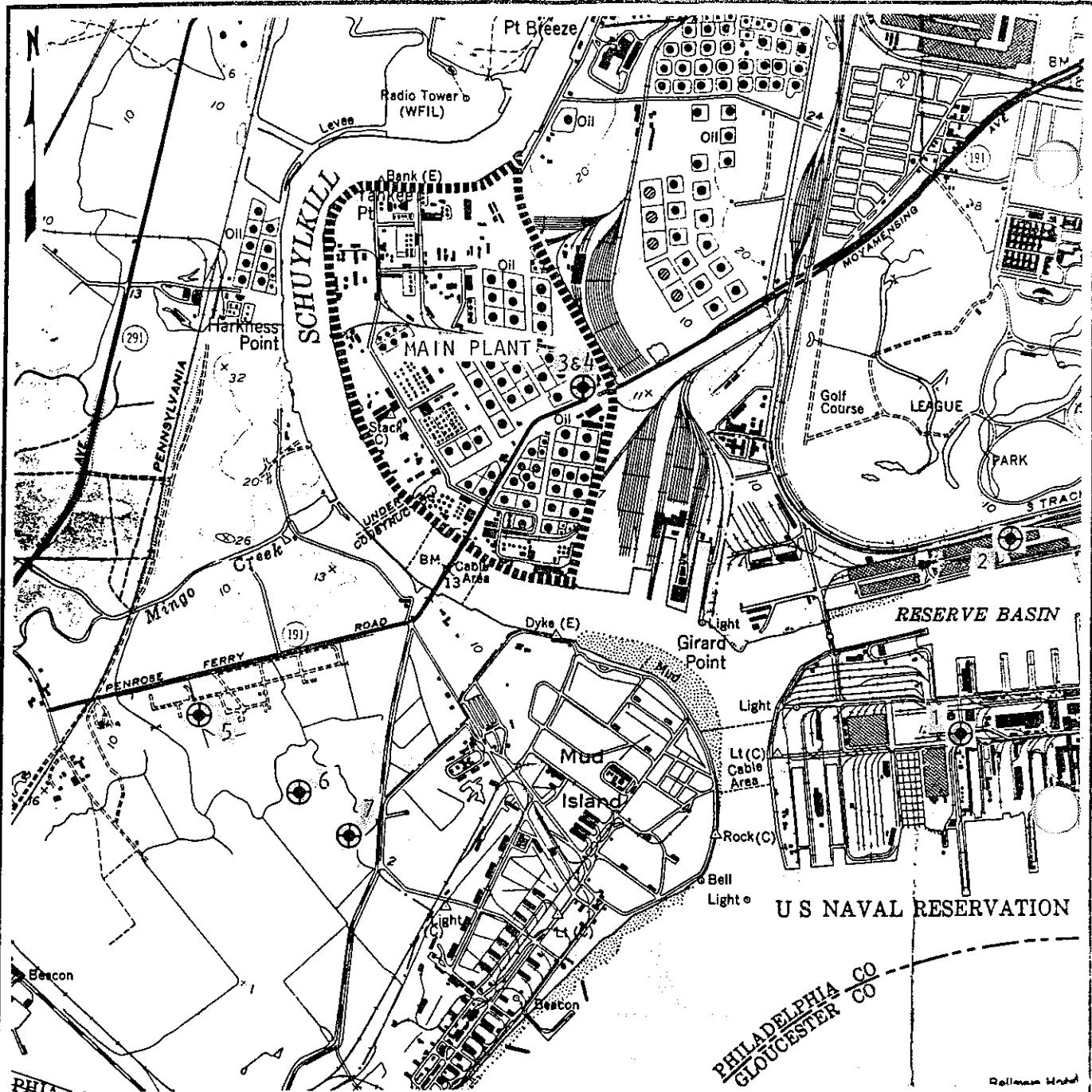
KEY:

- MONITORING WELLS WITH PRODUCT THICKNESS (IN FEET)
- TEST PITS
- PRODUCT THICKNESS CONTOUR

## PRODUCT ISOPACH CONTOUR MAP

ROUND 2 (5/1/86)  
**CHEVRON/GULF PHILADELPHIA REFINERY**  
 DARBY CREEK TANK FARM

DAMES & MOORE



## SITE VICINITY MAP

SHOWING LOCATIONS OF WELLS SCREENED IN THE  
RARITAN-MAGOTHONY FORMATION WITHIN A 1.5-MILE RADIUS FROM  
THE CHEVRON-GULF REFINERY  
PHILADELPHIA, PENNSYLVANIA

0 2000 4000 FEET  
SCALE

KEY

7 WELL SCREENED IN RARITAN-  
MAGOTHONY FORMATION (see  
Table 4 for well details)

### REFERENCE

BASE WAS PREPARED FROM A PORTION  
OF USGS 7.5 MINUTE PHILADELPHIA  
TOPOGRAPHIC QUADRANGLE, 1954.

DAMES & MOORE

**APPENDIX A**

**SLUG TEST DATA**

**SLUG TEST DATA FORM**

Observation/Monitoring Well No. 5-12

Job No. 6012-509

Client Cognos

Site S.R.T.E.

D&M Investigators D. Wagner /

E. G. Miller

Date 4/1/86

Time

Inner Diameter in inches of portion of well (screen or casing) in which water-level recovery occurred

5 - 2

Inner Diameter in inches of the screen or open portion of the hole

4

Diameter of drilled hole in  
inches

— 1 —

Slug used — diameter (in.)

*[Redacted]*

Whether test is falling head  
(slug entering water column)  
or rising head (slug being  
pulled out of well)

SLUG TEST DATA FORM

Observation/Monitoring Well No.

A-14

Job No. 201-2-909

Inner Diameter in inches of portion of well (screen or casing) in which water-level recovery occurred

4"

Client Chemical

Inner Diameter in inches of the screen or open portion of the hole

4"

Site Plant

Diameter of drilled hole in inches

10"

D&M Investigators D. Whipple /

F. J. Fillo

Date 3/27/86

Time 10:30 AM

Slug used → diameter (in.)

— length (in.)

Small

Whether test is falling head (slug entering water column) or rising head (slug being pulled out of well)

Both

From Top  
of Brass

Top of  
product =  
3.92'

Bottom of  
product =  
3.93'

(Introduce  
Slug)



100

150

180

210

240

300

360

420

540

660

780

900

1080

1260

1440

1740

2040

2340

2740

3040

3440

3740

4140

4540

Time After Introduction (Removal) of Slug	Mark Held or Nearest Foot Mark (ft)	Subtract or Add (ft)	Add or Subtract Correction Factor (ft)	Depth to Water, Below Top of Casing (ft)	Difference Between SWL and Depth to Water at t > 0 (ft)	Comments
0				3.92'		Static Water Level (SWL)
20"				3.64'	0.28	0.0' product PRESENT
30"				3.65'	0.27	
40"				3.66'	0.26	
50"				3.665'	0.255	
60"				3.67'	0.25	
70"				3.68'	0.24	
80"				3.685'	0.235	
90"				3.69'	0.23	
100'				3.71'	0.21	
150	2.5'			3.72'	0.20	
180	3.0'			3.73'	0.19	
210	3.5'			3.745'	0.175	
240	4.0'			3.76'	0.16	
300	5.0'			3.77'	0.15	
360	6.0'			3.79'	0.14	
420	7.0'			3.81'	0.12	
540	9.0'			3.83'	0.10	
660	11.0'			3.85'	0.08	
780	13.0'			3.86'	0.07	
900	15.0'			3.88'	0.05	
1080	18.0'			3.90'	0.04	
1260	21.0'			3.90'	0.04	
1440	24.0'			3.905'	0.015	
1740	29.0'			3.915'	0.005	
2040	34.0'			3.92'	0.00	
2340	37.0'			4.29'	0.37	
2740	41.0'			4.28'	0.36	
3040	45.0'			4.26'	0.34	

Leave Slug



**SLUG TEST DATA FORM**

**Observation/Monitoring Well No.**

Inner Diameter in inches of portion of well (screen or casing) in which water-level recovery occurred

Inner Diameter in Inches of the screen or open portion of the hole

Diameter of drilled hole in  
inches

Slug used — diameter (in.)

Job No. 113-404

**Client** *Office*

Site Main Plant

D&M Investigators D. Wagner  
E.J. Fillo

Date 3/27/86

Timo

Whether test is falling head  
(slug entering water column)  
or rising head (slug being  
pulled out of well)

SLUG TEST DATA FORM

Observation/Monitoring Well No. A-71

Inner Diameter in inches of portion of well (screen or casing) in which water-level recovery occurred

4"

Inner Diameter in inches of the screen or open portion of the hole

4"

Diameter of drilled hole in inches

10"

Slug used -- diameter (in.)

-- length (in.)

Small

Job No. 1-2-3-4

Client Citation

Site 100 ft from +

D&M Investigators D. Wagner /

E.J. F.H.O.

Date 3/27/86

Time 9:40 AM

Whether test is falling head (slug entering water column) or rising head (slug being pulled out of well) Both

*Top of Casing*

*Top of Perforations  
266'*

*Bottom of  
Perforations  
3.63'*

Time After Introduction (Removal) of Slug	Mark Held or Nearest Foot Mark (ft)	Subtract or Add (ft)	Add or Subtract Correction Factor (ft)	Depth to Water, Below Top of Casing (ft)	Difference Between SWL and Depth to Water at t > 0 (ft)	Comments
0				2.66'	0.00	Static Water Level (SWL)
10"				2.3	0.36	
20"				2.44'	0.22	
30"				2.45'	0.21	
40"				2.48'	0.18	
50"				2.50'	0.16	
60"				2.52'	0.14	
70"				2.54"	0.12	
80"				2.55"	0.11	
90"				2.56'	0.10	
120"	2.0'			2.59'	0.07	
150"	2.5'			2.60'	0.06	
180"	3.0'			2.61'	0.05	
210"	3.5'			2.62'	0.04	
240"	4.0'			2.63'	0.03	
270"	4.5'			2.635'	0.025	
300"	5.0'			2.64'	0.02	
360"	6.0'			2.645'	0.015	
420"	7.0'			2.65'	0.01	
480"	8.0'			2.655'	0.005	
540"	9.0'			2.655'	0.005	
600"	10.0'			2.655'	0.005	
660"	11.0'			2.66'	0.00	
0"				2.66'	0.00	
30"				2.85'	0.19	
40"				2.83'	0.17	
50"				2.82'	0.16	
60"				2.791	0.13	
70"				2.78"	0.12	
80"				2.77"	0.11	

(Introduce Slug)



(Remove Slug)



**SLUG TEST DATA FORM**

Observation/Monitoring Well No. A-24

Job No.

**Client** John Doe

**Site** \_\_\_\_\_

D&M Investigators \_\_\_\_\_

Date 3/27/36

Time

Whether test is falling head :

**Outer Diameter in inches of the screen or open portion of the hole**

Diameter of drilled hole in  
inches \_\_\_\_\_

Diameter of drilled hole in  
inches

Diameter of drilled hole in  
inches \_\_\_\_\_

Slug used — diameter (in.) \_\_\_\_\_  
— length (in.) \_\_\_\_\_

*2007-03-12 14:47*

---

Whether test is falling head  
(slug entering water column)  
or rising head (slug being  
pulled out of well) \_\_\_\_\_

SLUG TEST DATA FORM

Observation/Monitoring Well No. F-29

Inner Diameter in inches of portion of well (screen or casing) in which water-level recovery occurred

4"

Inner Diameter in inches of the screen or open portion of the hole

1 1/2"

Diameter of drilled hole in inches

10"

Slug used - diameter (in.)

- length (in.)

Small

Job No. 001-2-210

Client Chesapeake

Site Mg 210-1

D&M Investigators D. Whaley /

E.J. Filho

Date 3/26/86

Time 8:00 AM

Whether test is falling head (slug entering water column) or rising head (slug being pulled out of well)

Both

Static H<sub>2</sub>O level = 2.68'

2.68' Top of ERG.  
Casing?  
13.58'

**SLUG NOT FULLY SUBMERGED**

(introduction  
depth)

Time After Introduction (Removal) of Slug	Mark Held or Nearest Foot Mark (ft)	Subtract or Add (ft)	Add or Subtract Correction Factor (ft)	Depth to Water, Below Top of Casing (ft)	Difference Between SWL and Depth to Water at t > 0 (ft)	Comments
0				2.68'		Static Water Level (SWL)
-10"				2.57'	0.11	
-20"				2.58'	0.10	
-30"				2.59'	0.09	
-40"				2.61'	0.07	
-50"				2.62'	0.06	
-60"				2.63'	0.05	
-90"	1.5'			2.64'	0.04	
-120"	2.0'			2.65'	0.03	
-150"	2.5'			2.66'	0.02	
-180"	3.0'			2.665'	0.015	
-210"	3.5'			2.67'	0.01	
-240"	4.0'			2.67'	0.01	
-300"	5.0'			2.67'	0.01	
-360"	6.0'			2.67'	0.01	
-420"	7.0'			2.675'	0.005	
-480"	8.0'			2.675'	0.005	
-540"	9.0'			2.675'	0.005	
-600"	10.0'			2.675'	0.005	
-660"	11.0'			2.675'	0.005	
-720"	12.0'			2.68'	0.00	
-780"	13.0'			2.68'	0.00	
-840"	14.0'			2.68'	0.00	
-900"	15.0'			2.68'	0.00	
-960"	16.0'			2.68'	0.00	
-1020"	17.0'			2.68'	0.00	
0"				2.68'	0.00	
10"				2.79'	0.11	
20"				2.78'	0.10	
30"				2.77'	0.09	

**SLUG TEST DATA FORM**

Observation/Monitoring Well No. E - 79

Inner Diameter in inches of portion of well (screen or casing) in which water-level recovery occurred

Inner Diameter in inches of the screen or open portion of the hole

Diameter of drilled hole in  
Inches

Slugs used --- diameter (in.) \_\_\_\_\_  
--- length (in.) Small

Job No.

Client : Chevron

Sites  $\langle \langle a_{ij} - v_i \rangle \rangle_{j \neq i}$

D&M Investigations D. W. 11-21-13 /

五、四

Date \_\_\_\_\_

Time \_\_\_\_\_

Whether test is falling head  
(slug entering water column)  
or rising head (slug being  
pulled out of well) \_\_\_\_\_

## SLUG TEST DATA FORM

Observation/Monitoring Well No. P-45

Inner Diameter in inches of portion of well (screen or casing) in which water-level recovery occurred

41"Job No. 1-1-2-959Client Cougar

1/20/86

Site Montgomery

Ga. Reg.

D&M Investigators D. WagnerL. J. L. I.Date 3/27/86Time 1:00 PM

Inner Diameter in inches of the screen or open portion of the hole

4"

Diameter of drilled hole in inches

10"

Slug used -- diameter (in.)

5 in.

-- length (in.)

Whether test is falling head (slug entering water column) or rising head (slug being pulled out of well)

BothTop of work  
(from top of access)

1.06'

Upgoing  
(slug) →

120"

150"

180"

&gt;10

240"

270"

&gt;20"

360"

420"

540"

660"

&gt;80

900"

1080"

1260"

1440"

1620"

1760"

Time After Introduction (Removal) of Slug	Mark Held or Nearest Foot Mark (ft)	Subtract or Add (ft)	Add or Subtract Correction Factor (ft)	Depth to Water, Below Top of Casing (ft)	Difference Between SWL and Depth to Water at t > 0 (ft)	Comments
0"				1.06'		Static Water Level (SWL)
10"				0.73'	0.33	
20"				0.75'	0.31	
30"				0.76'	0.30	
40"				0.77"	0.29	
50"				0.775'	0.285	
60"				0.78'	0.28	
70"				0.79'	0.27	
80"				0.80'	0.26	
90"				0.80'	0.26	
120"	20'			0.81'	0.25	
150"	25'			0.83'	0.23	
180"	3.0'			0.835'	0.225	
>10	3.5'			0.85'	0.21	
240"	4.0'			0.86'	0.20	
270"	4.5'			0.86'	0.19	
>20"	5.0'			0.87'	0.18	
360"	6.0'			0.88'	0.17	
420"	7.0'			0.895'	0.165	
540"	8.0'					
660"	9.0'			0.91'	0.15	
>80	11.0'			0.925'	0.145	
900"	13.0'			0.935'	0.135	
1080"	15.0'			0.95'	0.11	
1260"	18.0'			0.955'	0.105	
1440"	21.0'			0.96'	0.10	
1620"	24.0'			0.97'	0.09	
1760"	27.0'			0.975'	0.085	
	32.0'			0.98'	0.08	

**SLUG TEST DATA FORM**

Observation/Monitoring Well No. 13-1-1

Job No. 12-17

**Client**

Site # 11121-4

R&M Investigators D. 4/16/66

E. J. Tilla

Date 3/22/86

Name

Inner Diameter in inches of portion of well (screen or casing) in which water-level recovery occurred

Inner Diameter in inches of the  
screen or open portion of the  
hole : 4 "

Diameter of drilled hole in  
inches 10

Slug used -- diameter (in.)

100-46 (111)

Whether test is falling head (slug entering water column) or rising head (slug being pulled out of well)

## SLUG TEST DATA FORM

Observation/Monitoring Well No.

C-54Job No. 00113-901

Inner Diameter in inches of portion of well (screen or casing) in which water-level recovery occurred

7"Client Cheswick

Inner Diameter in inches of the screen or open portion of the hole

4"Site Mtn. Sh., I

Diameter of drilled hole in inches

7"D&M Investigators D. Wagner /E. J. ElmoDate 3/27/86Time 2:30 PM

Slug used - diameter (in.)

- length (in.)

SmallWhether test is falling head (slug entering water column) or rising head (slug being pulled out of well) Both

Top of SWL

Top of Water  
1.71'(Introduction →  
Slug)

Time After Introduction (Removal) of Slug	Mark Held or Nearest Foot Mark (ft)	Subtract or Add (ft)	Add or Subtract Correction Factor (ft)	Depth to Water, Below Top of Casing (ft)	Difference Between SWL and Depth to Water at t > 0 (ft)	Comments
0				1.71'		Static Water Level (SWL)
10"				1.35'	0.36	
20"				1.39'	0.32	
30"				1.42'	0.29	
40"				1.44'	0.27	
50"				1.46'	0.25	
60"				1.48'	0.23	
70"				1.49'	0.22	
80"				1.51'	0.20	
90"				1.52'	0.19	
120"	2.0'			1.56'	0.15	
150"	2.5'			1.58'	0.13	
180"	3.0'			1.60'	0.11	
210"	3.5'			1.61'	0.10	
240"	4.0'			1.62'	0.09	
270"	4.5'			1.63'	0.08	
300"	5.0'			1.635'	0.075	
360"	6.0'			1.645'	0.065	
420"	7.0'			1.65'	0.06	
480"	8.0'			1.655'	0.055	
540"	9.0'			1.655'	0.055	
660"	11.0'			1.66'	0.05	
780"	13.0'			1.68'	0.03	
900"	15.0'			1.69'	0.02	
1080"	18.0'			1.70'	0.01	
1260"	21.0'			1.70'	0.01	
1440"	24.0'			1.70'	0.01	
0"				1.70'	0.01	
10"				2.01'	0.31	
20"				1.93'	0.28	

(more slug) →

**SLUG TEST DATA FORM**

Observation/Monitoring Well No. 1-171

Job No. 100-2-231

Client John Doe

Site \_\_\_\_\_

D&M Investigators

Date 3/27/36

### Time

~~Whether test is falling head~~

slug entering water column  
or rising head (slug being  
pulled out of well) \_\_\_\_\_

## SLUG TEST DATA FORM

Observation/Monitoring Well No. D-62

Inner Diameter in inches of portion of well (screen or casing) in which water-level recovery occurred

4"

Inner Diameter in inches of the screen or open portion of the hole

4"

Diameter of drilled hole in inches

7"

Slug used - diameter (in.)

→ length (in.)

SmallJob No. OC113-9-9-1-2Client ChesapeakeSite De Bus ParkD&M Investigators D. Wagner /E. J. FilloDate 4/1/86Time 9:00 AMWhether test is falling head (slug entering water column) or rising head (slug being pulled out of well) BothProcedure →  
slug)

Time After Introduction (Removal) of Slug	Mark Held or Nearest Foot Mark (ft)	Subtract or Add (ft)	Add or Subtract Correction Factor (ft)	Depth to Water, Below Top of Casing (ft)	Difference Between SWL and Depth to Water at t > 0 (ft)	Comments
0				4.72'		Static Water Level (SWL)
20"				4.34'	0.38	
30"				4.34'	0.38	
40"				4.35'	0.37	
50"				4.35'	0.37	
60"				4.36'	0.36	
70"				4.36'	0.36	
80"				4.365'	0.355	
90"				4.37'	0.35	
120"	2.00'			4.38'	0.34	
150"	2.50'			4.39'	0.33	
180"	3.00'			4.395'	0.325	
210"	3.50'			4.405'	0.315	
240"	4.00'			4.415'	0.305	
300"	5.00'			4.430'	0.29	
360"	6.00'			4.445'	0.275	
420"	7.00'			4.46'	0.26	
540"	9.00'			4.48'	0.24	
660"	11.00'			4.50'	0.22	
780"	13.00'			4.52'	0.20	
900"	15.00'			4.54'	0.18	
1080"	18.00'			4.56'	0.16	
1260"	21.00'			4.58'	0.14	
1420"	24.00'			4.60'	0.12	
1600"	27.00'			4.61'	0.11	
1780"	30.00'			4.62'	0.10	
1940"	33.00'			4.63'	0.09	
2340"	39.00'			4.64'	0.08	
2700"	45.00'			4.65'	0.07	
3000"	51.00'			4.66'	0.06	
3420"	57.00'			4.67'	0.05	

from top  
of PVC =  
4.72 - P<sub>swl</sub>4.73 - H<sub>o</sub>30 pts.  
falling N<sub>swl</sub>product =  
0.01

**SLUG TEST DATA FORM**

Observation/Monitoring Well No. 12-65

Inner Diameter in inches of portion of well (screen or casing) in which water-level recovery occurred

inner Diameter in Inches of the  
screen or open portion of the  
hole

Diameter of drilled hole in  
inches

Slug used — diameter (in.)

— length (in.) 5m > 11

Job No. 40013-101-032

**Client** John Doe

Site 11-21-2 Jepk

D&M Investigators

E. J. Voss

Date 4/1/86

### Time

Whether test is falling head :

Whether test is falling head  
(slug entering water column)  
or rising head (slug being  
pulled out of well)

SLUG TEST DATA FORM

Observation/Monitoring Well No. D-70  
 Inner Diameter in inches of portion of well (screen or casing) in which water-level recovery occurred 4"  
 Inner Diameter in inches of the screen or open portion of the hole 4"  
 Diameter of drilled hole in inches 7"  
 Slug used → diameter (in.)  
 → length (in.) 5.0 ft

Job No. 17113 929 - 032  
 Client Chase  
 Site Dr. in Creek  
 D&M Investigators D. White / E.J. Fillo  
 Date 4/1/86  
 Time 8:40 AM

Whether test is falling head (slug entering water column) or rising head (slug being pulled out of well) Both

Static H<sub>2</sub>O  
From top of  
PVC casing  
3.59'

(Sec)	Time After Introduction (Removal) of Slug	Mark Held or Nearest Foot Mark (ft)	Subtract or Add (ft)	Add or Subtract Correction Factor (ft)	Depth to Water, Below Top of Casing (ft)	Difference Between SWL and Depth to Water at t > 0 (ft)	Comments
	0				3.59'		Static Water Level (SWL)
	20"				3.20'	0.39	
	30"				3.20'	0.39	
	40"				3.20'	0.39	
	50"				3.20'	0.39	
	60"				3.20'	0.39	
	70"				3.20'	0.39	
	80"				3.20'	0.39	
	90"				3.20'	0.39	
120	2.00'				3.20'	0.39	
150	2.50'				3.20'	0.39	
210	3.50'				3.21'	0.38	
240	4.00'				3.21'	0.38	
300	5.00'				3.21'	0.38	
Remove Slug) →							
	0"				3.21'	0.38	
	20"				3.61'	0.40	
	30"				3.61'	0.40	
	40"				3.61'	0.40	
	50"				3.61'	0.40	
	60"				3.61'	0.40	
	70"				3.61'	0.40	
	80"				3.61'	0.40	
	90"				3.61'	0.40	
120	2.00'				3.61'	0.40	
150	2.50'				3.61'	0.40	
180	3.00'				3.61'	0.40	
240	4.00'				3.61'	0.40	
300	5.00'				3.61'	0.40	

## SLUG TEST DATA FORM

Observation/Monitoring Well No.

S-75

Job No. 0VH15-907-032

Inner Diameter in inches of portion of well (screen or casing) in which water-level recovery occurred

Client D.M.I.

Inner Diameter in inches of the screen or open portion of the hole

Site C. P.

Diameter of drilled hole in inches

D&amp;M Investigators D. H. ...

Slug used — diameter (in.)

1 1/2"

— length (in.)

4 1/8"

L...ge

Date 4/11/86

Time 12:50 PM

Whether test is falling head (slug entering water column)

or rising head (slug being pulled out of well)

Rising Head

Time After Introduction (Removal) of Slug	Mark Held or Nearest Foot Mark (ft)	Subtract or Add (ft)	Add or Subtract Correction Factor (ft)	Top of Steep Depth to Water, Below Top of Casing (ft)	Difference Between SWL and Depth to Water at t > 0 (ft)	Comments
0				10.31'		Static Water Level (SWL)
20"				8.44'	1.87	
30"				8.45'	1.86	
40"				8.46'	1.85	
50"				8.465'	1.845	
60"				8.47'	1.84	
70"				8.48'	1.83	
80"				8.485'	1.825	
90"				8.49'	1.82	
120	2.00'			8.505'	1.805	
150	2.50'			8.515'	1.795	
180	3.00'			8.525'	1.785	
210	3.50'			8.535'	1.775	
240	4.00'			8.545'	1.765	
270	4.50'			8.550'	1.76	
300	5.00'			8.560'	1.75	
360	6.00'			8.570'	1.74	
420	7.00'			8.580'	1.73	
480	8.00'			8.590'	1.72	
540	9.00'			8.600'	1.71	
660	11.00'			8.615'	1.695	
780	13.00'			8.63'	1.68	
1080	18.00'			8.655'	1.655	
1800	30.00'			8.710'	1.6	
3300	55.00'			8.820'	1.49	
6400	115.00'			9.02'	1.29	
7500	125.00'			9.06'	1.25	
<i>(Remove Slug) →</i>						
0"				9.06'	1.25	
35"				9.93'	1.87	

**SLUG TEST DATA FORM**

Observation/Monitoring Well No. 9-75

Job No. 00113-909-032

Client John Doe

Site S.R.T.F.

D&M Investigators D. V./2014

4. T. E. Hill

Date 4/11/86

Time \_\_\_\_\_

### Whether test is falling head

• WHAT a  
Day.

Inner Diameter in inches of  
section of well (approx.)

Inner Diameter in inches of portion of well (screen or casing) in which water-level recovery occurred

Inner Diameter in Inches of the screen or open portion of the hole

Diameter of drilled hole in  
inches

Slug used — diameter (in.)

— length (in.)

(Large)

Whether test is falling head (slug entering water column) or rising head (slug being pulled out of well)

pulled out of wall) Both

## SLUG TEST DATA FORM

Observation/Monitoring Well No. 5-72

Inner Diameter in inches of portion of well (screen or casing) in which water-level recovery occurred 4"

Inner Diameter in inches of the screen or open portion of the hole 4"

Diameter of drilled hole in inches 7"

Slug used -- diameter (in.)

-- length (in.) Small

Job No. 100-117-2

Client D. L. Brown

Site C. T. F.

D&amp;M Investigators D. L. Brown

A. J. L.

Date 4/11/86

Time

Whether test is falling head (slug entering water column) or rising head (slug being pulled out of well) Both

(Introduce →  
slug)

120

150

180

210

240

270

300

330

420

540

1260

Time After  
Introduction  
(Removal)  
of SlugMark Held  
or Nearest  
Foot Mark  
(ft)Subtract  
or  
Add  
(ft)Add or  
Subtract  
Correction  
Factor (ft)Depth to Water,  
Below Top of  
Casing  
(ft)Difference  
Between SWL  
and Depth to  
Water at  
t > 0 (ft)

Comments

0"

10"

20"

30"

40"

50"

60"

70"

80"

90"

1200'

1500'

1800'

2100'

2400'

2700'

3000'

3300'

4200'

5400'

21.00'

0"

15"

20"

30"

40"

50"

60"

70"

80"

90"

→ 1.54°

→ 1.66°

1.57°

1.57°

1.60°

1.62°

1.62°

1.625°

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