915072

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

PHASE II INVESTIGATION

Tifft Farm
Site No. 915072
City of Buffalo, Erie County

Final – April 1988

Prepared for:

New York State
Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233

Thomas C. Jorling, Commissioner
Division of Hazardous Waste Remediation
Michael J. O'Toole, Jr., P.E., Acting Director

Prepared by:

EA SCIENCE AND TECHNOLOGY
A Division of EA Engineering, Science, and Technology, Inc.

EA Report DEC52I

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES IN THE STATE OF NEW YORK

PHASE II INVESTIGATIONS
TIFFT FARM SITE
CITY OF BUFFALO, ERIE COUNTY
NEW YORK ID NO. 915072

Prepared for

Division of Hazardous Waste Remediation
New York State Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233-0001

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A Division of EA Engineering, Science, and Technology, Inc.

April 1988

CONTENTS

1. EXECUTIVE SUMMARY

The Tifft Farm site (New York I.D. No. 915072 and EPA I.D. No. NYP000776799) is an inactive dump located at the intersection of Tifft Street and Fuhrmann Blvd in the City of Buffalo, Erie County, New York. The site, 264 acres in size, is currently owned by the City of Buffalo and has been operated by the Buffalo Museum of Science as a nature preserve since 1976. The eastern boundary of the site is a natural freshwater wetlands, the last remaining remnant of what was once a great wetlands area along the eastern shoreline of Lake Erie. Until the early 1940s, the site was used for shipping and had three canals. Dumping on the site and into the canals (which are now the lakes and ponds of the nature preserve) began sometime between 1942 and 1951.

Republic Steel purchased the site in 1955 and used it for slag dumping. The City of Buffalo also used the site. The amount of waste dumped is unknown. Materials disposed of include slag, sludge, foundry sand, flyash, and other garbage. The City of Buffalo bought the site in 1972 to transfer debris from Squaw Island. Waste materials from the City have been formed into natural-looking mounds, covered with topsoil, and planted. In 1974, Tifft Farm received a grant from New York State to develop the site into a wildlife preserve and nature sanctuary.

In 1975, acid sludge possibly from the Chevrolet plant was reportedly being dumped at Tifft Farm. New York State Department of Environmental Conservation (NYSDEC) responded to the report and ceased all disposal.

In 1982, drums were discovered on the south shore of Lake Kirsty. Samples indicated the drum contents were contaminated with heavy metals, PAH, and phenolic compounds. As a result, the Tifft Farm Nature Preserve was closed for approximately 6 months in 1983. During this time, over 100 drums were removed from the site, primarily from Lake Kirsty.

From 1977 until 1983, extensive sampling took place at Tifft Farms. The tissue of fish from onsite surface water bodies was found to contain PCB, oil, pesticides, heavy metal, and THO. Surficial soil samples collected from many areas on the site contained high levels of metals and PAH. PCB was also detected.

During the Phase II investigation, 7 ground-water samples, 4 surface water samples, 4 sediment samples, 1 drum sample, and 1 leachate sample were collected and analyzed for the inorganic parameters and organic compounds of the Hazardous Substance List. Elevated levels of metals and, in some cases, volatiles and semi-volatiles were detected in most of the samples. However, the concentrations were not significantly greater than upgradient conditions. Based on the previous soil sampling results, an observed release to surface water was indicated because the contaminated sediment could be reentrained in the surface water bodies onsite.

The final HRS scores for the site are as follows: Migration Score (S_M)= 9.98 [Ground-Water Route (S_{GW}) = 4.08, Surface Water Route (S_{SW}) = 16.78, Air Route (S_A) = 0]; Direct Contact Score (S_{DC}) = 25; and Fire and Explosion (S_{FE}) = N/A.

The lower S_M is due to ground water and surface water not being used in a 3-mi radius of the site as a drinking water suppply.

Site Coordinates:

Latitude: 42° 50' 54"
Longitude: 78° 51' 31"

TIFFT FARM

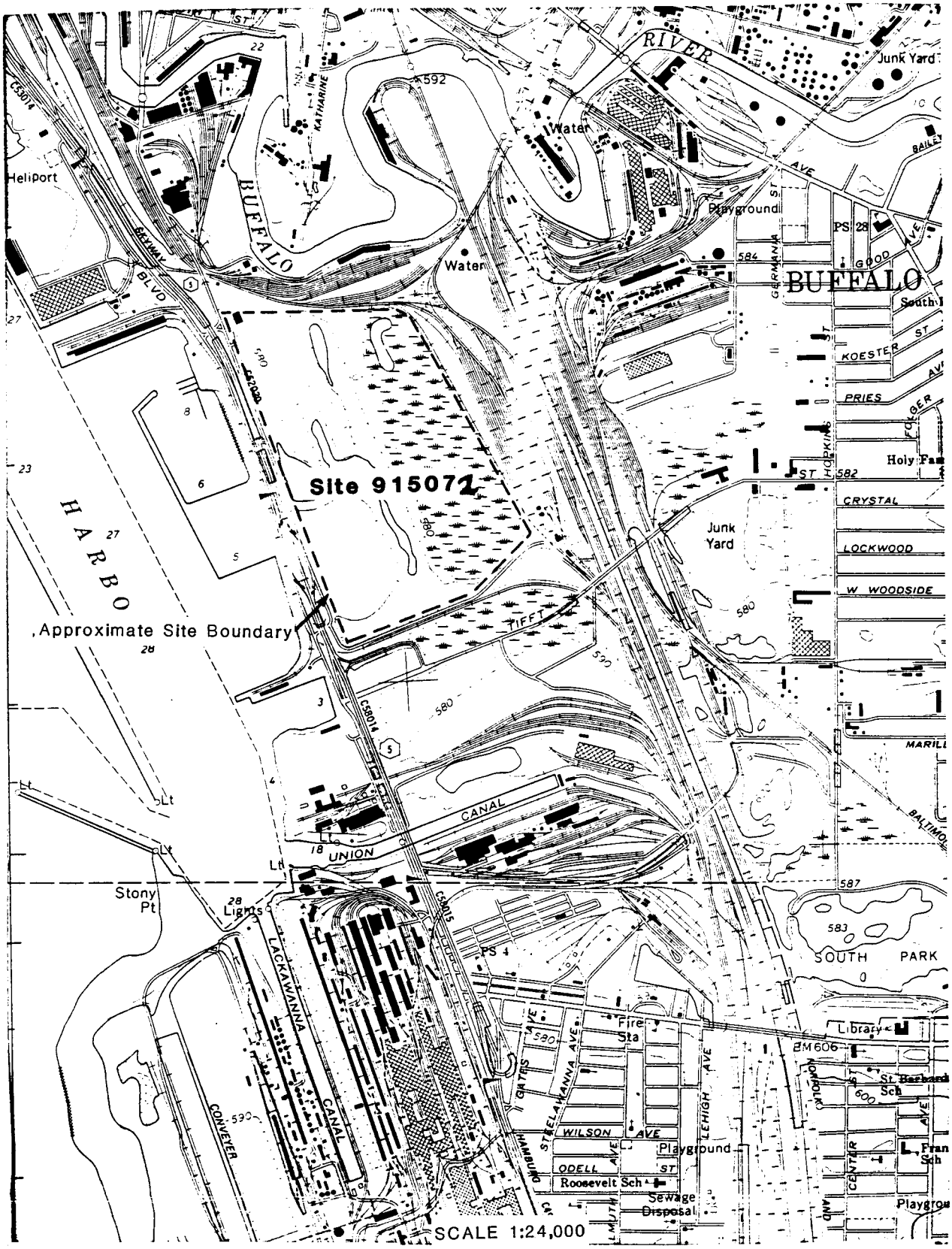
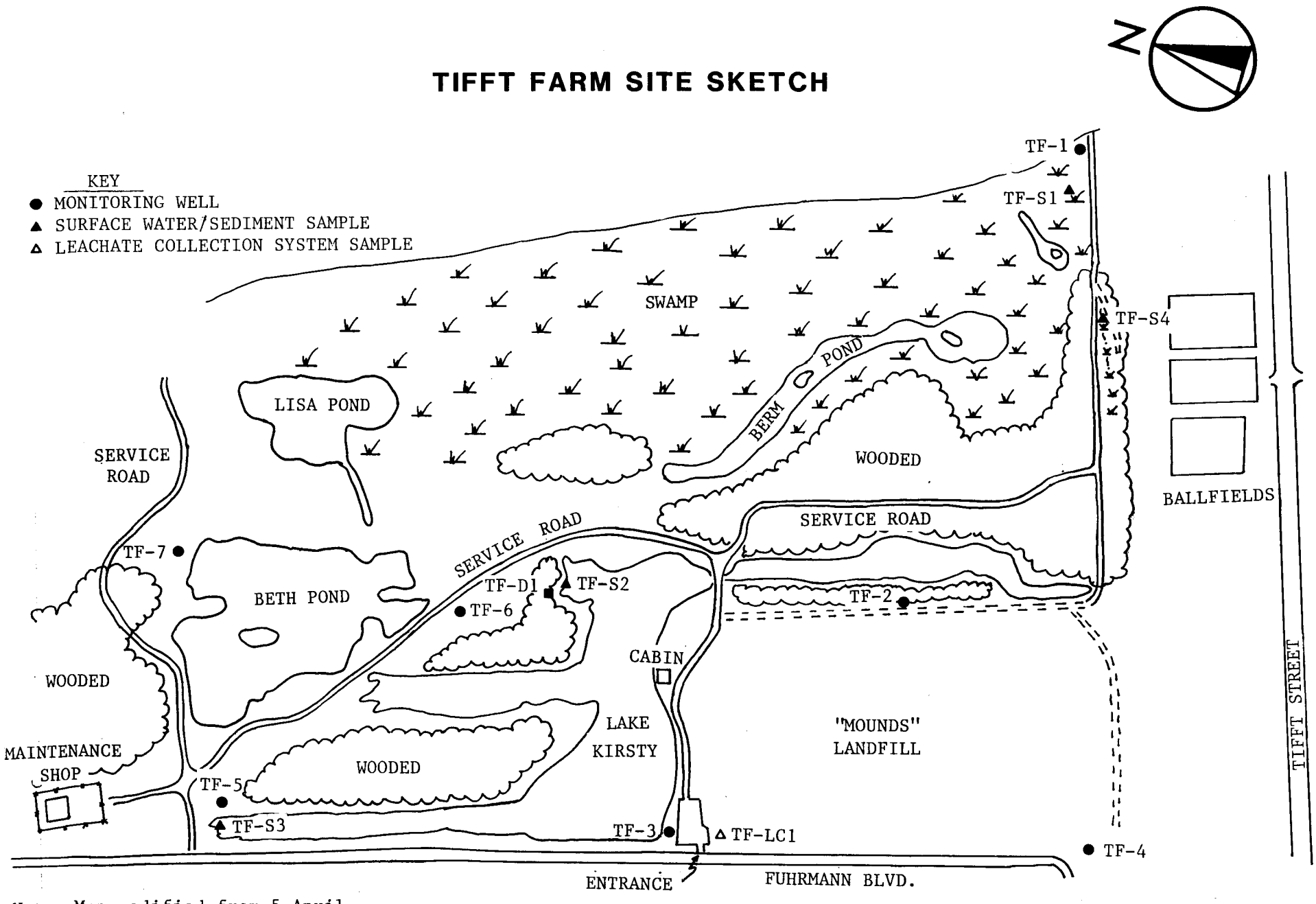


Figure 1-1. Site locator map.

BUFFALO SE QUAD
7.5 MINUTE SERIES
NYSDOT
1975 EDITION

TIFFT FARM SITE SKETCH



Note: Map modified from 5 April 1982 aerial photograph (reduced).

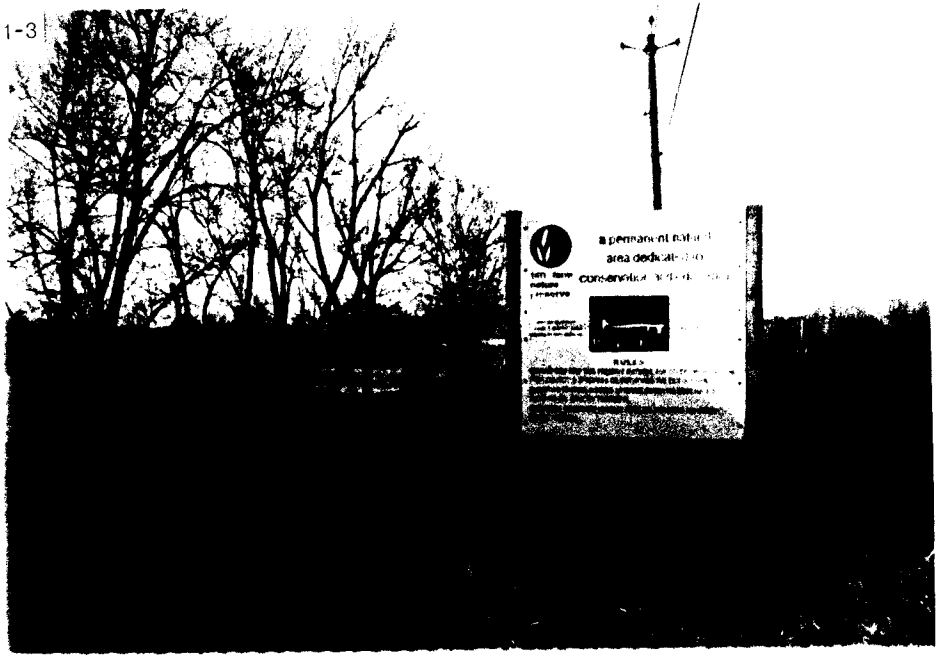
(Not drawn to scale)

FIGURE 1-2

1-1

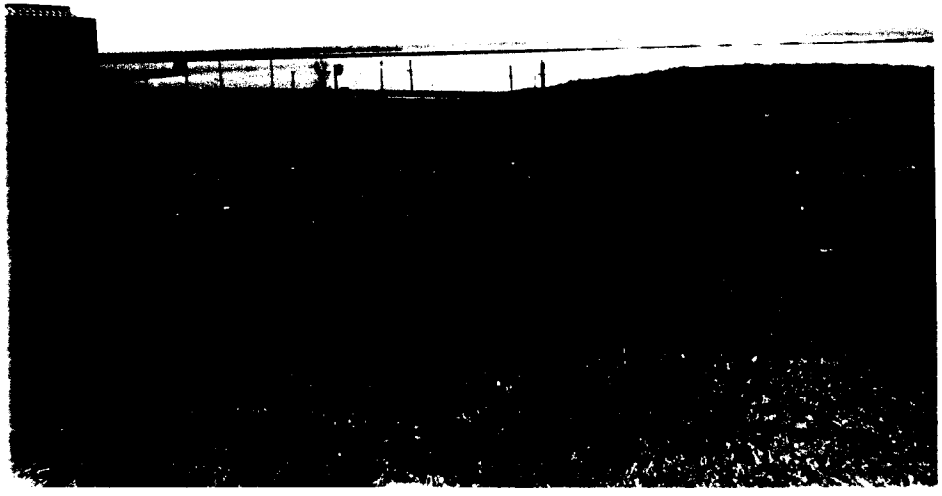
1-2

1-3



1-4

-5



1-6

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1-14


-15


1-16

PHOTO LOG - TIFFT FARMS

Photo	Description
1-1, 1-2	View of the main entrance gate to Tifft Farms Nature Preserve off Fuhrmann Blvd. Concrete structure in center of Photo 1-1 is the pumping station for the leachate collection station. A leachate collection station manhole is located near the white pine on the slope of the "mounds" in the southwest portion of the site (right center of Photo 1-2).
1-3	Entrance road to Tifft Farms Nature Preserve, Lake Kirsty is located on left side of photo.
1-4	Nature Preserve cabin on Lake Kirsty.
1-5, 1-6	Panoramic view west from top of mounds in southwest portion of site. Lake Erie is in the background.
1-7, 1-8	Panoramic view north from top of mounds. Downtown City of Buffalo visible in background of Photo 1-7.
1-9	View south along eastern edge of mounds in southwest portion of site. EA personnel in approximate location of monitoring Well TF-2.
1-10	View of southeast corner of mounds. Surface water in left portion of photo is the southern-most extent of Lake Kirsty.
1-11	View north of monitoring Well TF-6, Beth Pond visible in background.
1-12	View north of monitoring Well TF-5 located in northwest portion of site. Surface water is northern-most portion of Lake Kirsty. Sample TF-S3 collected on other side of the guard rail. North access road to site off Fuhrmann Blvd visible in upper right corner of the photo.
1-13	Two drums located just off northeast corner of Lake Kirsty from which sample TF-D1 was collected.
1-14	View of swamp off south dirt road in southeast portion of site where sample TF-S4 was collected.
1-15	Closeup of sample location TF-S4. Surface water has sheen on surface and orange precipated at the bottom.
1-16	Leachate collection system manhole near the site's main entrance (Photo 1-2) from which sample TF-LC1 was collected.

2. PURPOSE

The goal of the Phase II investigation of this site was to: (1) obtain available records on the site history from state, federal, county, and local agencies; (2) obtain information on site topography, geology, local surface and ground-water use, contamination assessments, and local demographics; (3) interview site owners, operators, and other groups or individuals knowledgeable of site operations; (4) conduct a site inspection to observe current conditions; (5) perform geophysical surveys at and around the site to evaluate the potential presence of ground-water contaminant plumes, and stratigraphic information; (6) install test borings/monitoring wells and perform environmental sampling; and (7) prepare a Phase II report. The Phase II report includes a final Hazard Ranking Score (HRS), an assessment of the available information, and a recommendation for remedial work, if warranted.

3. SCOPE OF WORK

3.1 RECORD SEARCH/DATA COMPILATION

A record search/data compilation and interviews were conducted as part of the Phase II investigation of the Tifft Farm site. Appendix 1.3.1-1 contains a list of agencies and individuals contacted.

3.2 FIELD ACTIVITIES

3.2.1 Site Reconnaissance

EA Science and Technology conducted a site reconnaissance on 16 April 1985 to familiarize key project personnel with the site. During the site reconnaissance, visible waste and/or filled areas were located, tentative locations for test borings/observation wells and sampling were selected, accessibility was evaluated, and HNU measurements (upgradient and site-wide) were obtained to help the Safety Officer develop specific health and safety requirements for the field activities. No organic vapors were detected above background by the HNU at the site during the site reconnaissance. Photographs of the site were taken and significant features were noted on an aerial photograph (Scale: 1 in. = 250 ft; dated 4 May 1982) of the site.

3.2.2 Geophysical Surveying

Geophysical surveys of the site were conducted by EA Science and Technology on 2-4 June 1985.

The purpose of the geophysical investigation was to non-destructively, accurately, and cost effectively evaluate possible subsurface contaminant plumes. The geophysical information (anomalous zones) were then used to aid in final selection of the locations for monitoring wells.

The existing site data (geology, area size, hydrogeology, etc.) were reviewed. Upon completion of the geophysical survey of the site, interpretation of the geophysical data was made prior to leaving the site. Monitoring wells were then located in accordance with anomalous zones and general hydrogeologic information.

The geophysical technique used first at the site was a perimeter terrain conductivity (electromagnetic or EM) survey, using an EM-34 with 20-meter cable and effective depth of penetration of 45 and 90 ft below grade. The data gathered from this type of survey indicated zones of anomalous conductivity, potential subsurface contamination (plumes). The second technique used was resistivity. This method measures vertical changes in subsurface resistivity, providing for evaluation of depth to ground water, depth to rock, and general stratigraphy (refer to Appendix 1.3.2-1 for details, e.g., specific geophysical survey locations and resultant interpreted anomalous zones).

3.2.3 Observation Well Installation

Based upon the available information, seven test borings/monitoring wells were installed at the site (Figure 3-1). The drilling was performed under the fulltime supervision of an EA geologist.

Seven shallow monitoring wells (TF-1 through TF-7) were installed and screened in the unconsolidated sediment. This work required four days of drilling between 14-15 and 19-20 August 1985. Well TF-1 (the upgradient well) was installed in the southeast corner of the site. Two wells, TF-2 and TF-4, were installed in anomalous zones identified by the geophysical surveys. Wells TF-3 and TF-5 were located on the downgradient side of the site along Fuhrmann Blvd. The remaining two wells, TF-6 and TF-7, were installed in filled portions of the middle canal which was once part of Lehigh Valley's canal system (Appendix 1.4.1-2). Well TF-2 was installed adjacent to the east side of the "mounds" area. Wells TF-3 and TF-4 were installed on the west side of the mounds in the north corner and the south corner, respectively. Well TF-5 was installed off the northwest corner of Lake Kirsty. Well TF-6 was located between Lake Kirsty and Beth Pond, just off the service road. Well TF-7 was installed near the northwest corner of Beth Pond.

All test borings/monitoring wells were installed with a hollow-stem auger using a CME-75 truck-mounted drill rig. The boring logs and well schematics are provided as Figures 3-2 to 3-8. Grain size analyses were performed on selected

representative samples collected during drilling of Wells TF-1 through TF-4. The resultant data curves are provided in Figures 3-9 through 3-20. Appendix 1.3.2-2 provides details of drilling and well installation procedures.

Development of all wells was accomplished on 29 and 30 July 1985 by using a centrifugal pump. Clean 3/4-in. polyethylene hose was attached to the pump at the surface and lowered to the bottom of the well. Water was pumped until clear. Water in Wells TF-3, TF-5, and TF-7 was grayish-brown before clearing, but exhibited no odor.

Upon completion of the monitoring wells, vertical elevation of the upper rim of each well casing was surveyed to aid in evaluation of the ground-water flow direction. A Kern-Swiss Automatic Construction Level GKO-A was used to perform the surveying. Elevations were determined in ft above/below an assumed datum of 100 ft, established on the upper rim of the TF-1 well casing. Surveying was performed on 8-10 October 1985.

A short-term, low yield pumping test was performed in each monitoring well installed during the Phase II study. A centrifugal pump was used and the water was discharged to the ground surface in the immediate area of the activity. Figures 3-21 to 3-34 show the pumping test data curves. The pumping tests were performed on 16-18 October 1985. Table 3-1 provides a summary of well data for the site. Well development and pumping test field methods are provided in Appendix 1.3.2-2.

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3.2.4 Sampling

Sampling of the Tifft Farm site was initially completed in one day, 10 November 1985 by EA personnel. Due to missed holding times, the site was resampled on 11 March 1987 for pesticide and PCB analysis. Because new information indicated that the original sampling location for the leachate collection system may have been incorrect, it was resampled on 11 March 1987 and analyzed for the full suite of HSL parameters.

The sampling program included seven ground-water samples (one from each Phase II monitoring well), four surface water samples, four sediment samples (collected at the same locations as the surface water samples), 1 drum sample, and 1 "mounds" leachate collection system sample (Figure 3-1).

All the monitoring wells were purged using a centrifugal pump. The sampling procedures are detailed in Appendix 1.3.2-3. EA's Field Data Sheets for purging and sampling are provided in Figures 3-35 to 3-48.

The analytical program for the water, sediment, drum, and leachate collection system samples include the inorganic parameters and the organic compounds of the Hazardous Substance List. The full Contract Laboratory Program (CLP) package of analytical results for the original sampling (November 1985) was sent to NYSDEC previously. The CLP package for the resampling analysis is included as Appendix 3 (bound and submitted separately) of this report.

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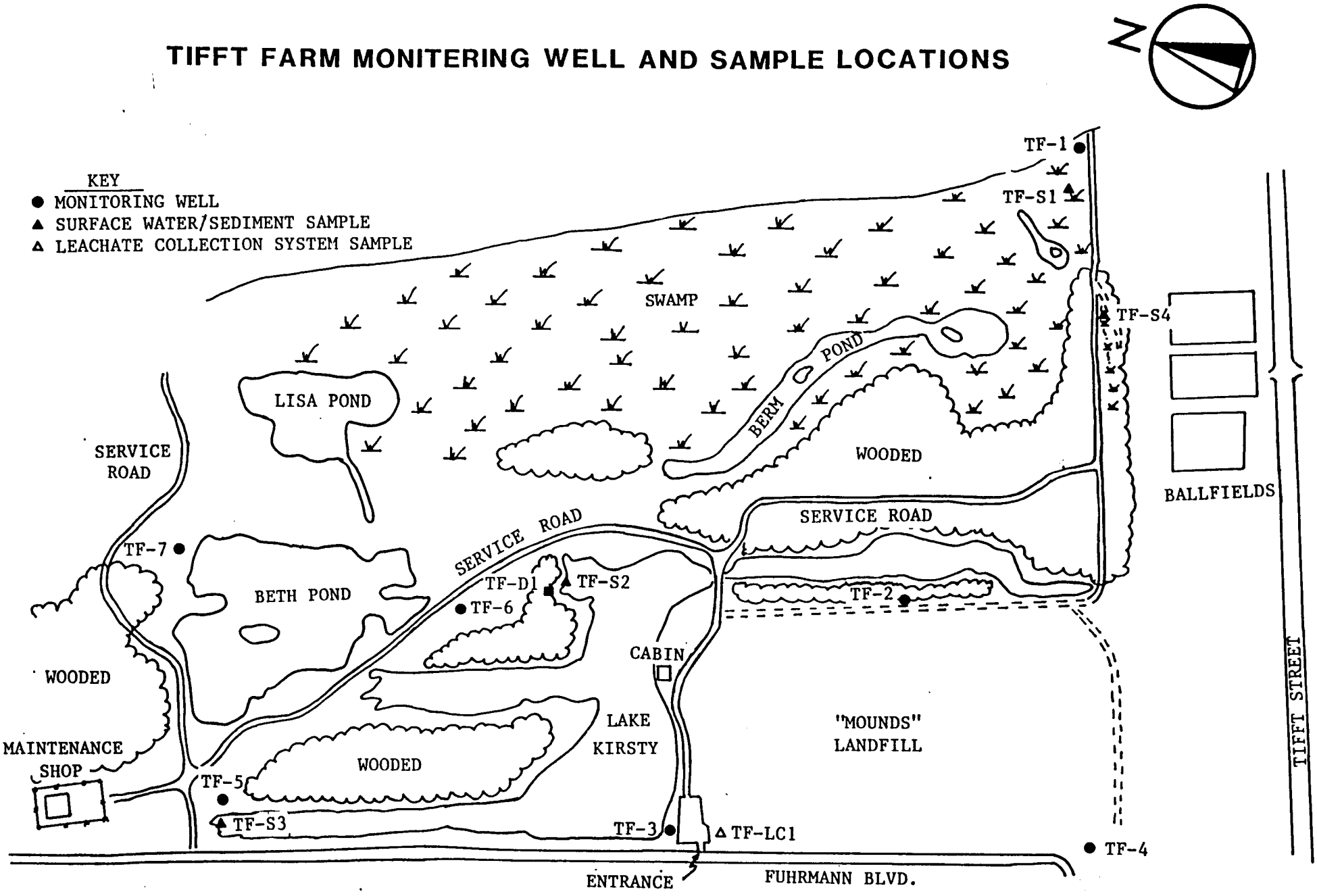
TABLE 3-1 TIFFT FARM: SUMMARY OF MONITORING WELL DATA

Well No.	Observation Well			Ground Water		
	Stickup (Ft Above Ground Surface)	Total Depth (Ft Below Ground Surface)	Elevation of MP*	Date	Depth (ft below MP)	Elevation**
TF-1	1.42	12.98	99.82	09 NOV 85	3.01	96.81
TF-2	1.52	14.00	98.83	09 NOV 85	6.03	92.80
TF-3	2.00	14.00	100.33	09 NOV 85	7.10	93.23
TF-4	2.48	12.00	98.24	09 NOV 85	3.61	94.63
TF-5	1.77	16.00	99.55	09 NOV 85	5.29	94.29
TF-6	1.78	12.00	97.84	09 NOV 85	4.21	93.63
TF-7	1.31	16.00	99.54	09 NOV 85	5.97	93.57
TF-1	1.42	12.98	99.82	10 MAR 87	1.97	97.85
TF-2	1.52	14.00	98.83	11 MAR 87	6.13	92.70
TF-3	2.00	14.00	100.33	11 MAR 87	7.84	92.49
TF-4	2.48	12.00	98.24	11 MAR 87	3.65	94.59
TF-5	1.77	16.00	99.55	11 MAR 87	3.56	95.99
TF-6	1.78	12.00	97.84	11 MAR 87	4.72	93.12
TF-7	1.31	16.00	99.54	11 MAR 87	3.15	96.39

* MP = Measuring Point (top of PVC).
** Ft above or below an assumed datum of 100 ft, established at TF-1 (top of steel).

TIFFT FARM MONITERING WELL AND SAMPLE LOCATIONS



Note: Map modified from 5 April 1982 aerial photograph (reduced).

(Not drawn to scale)

FIGURE 3-1

Well TF-1

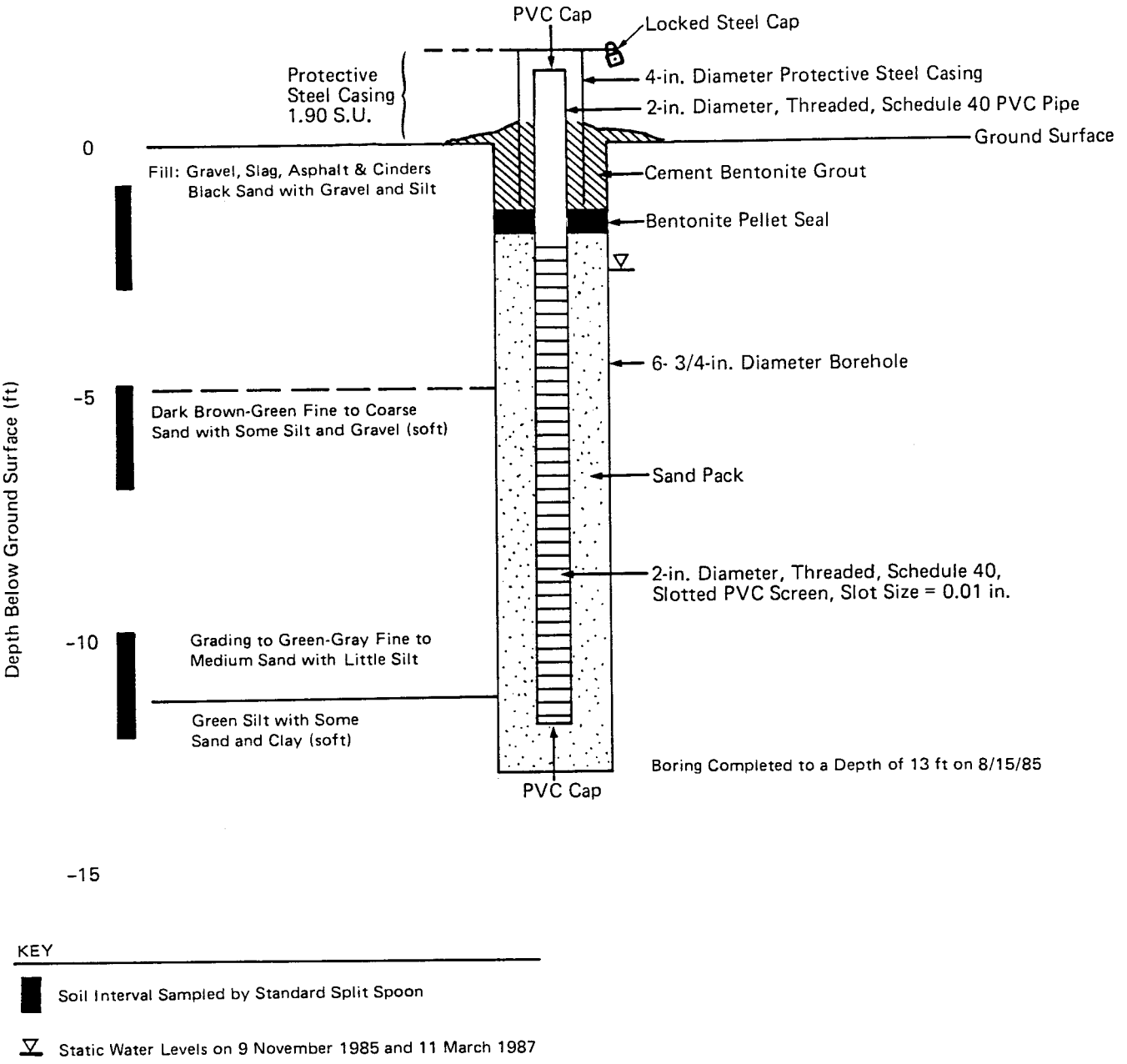
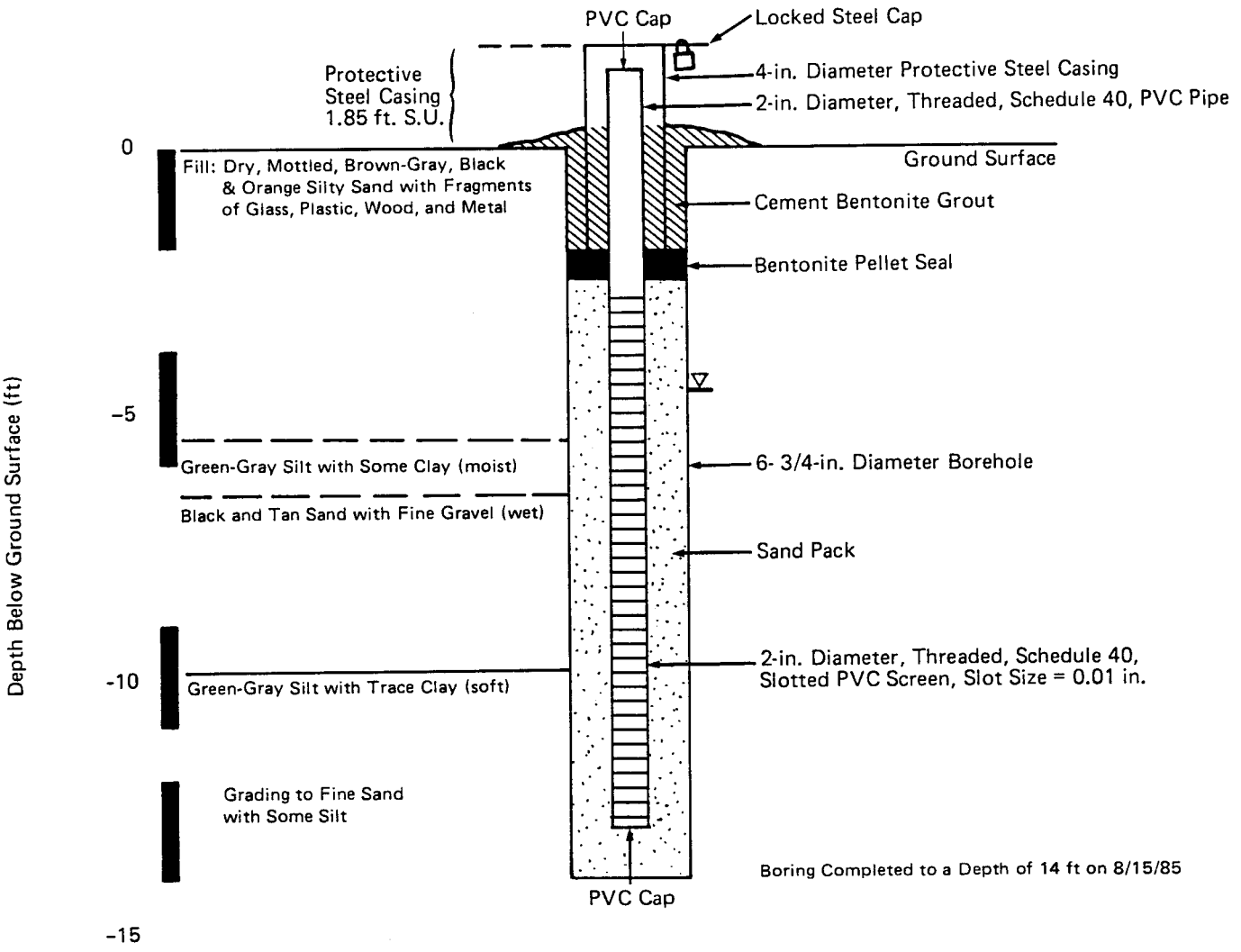


Figure 3-2.

Well TF-2



KEY

Soil Interval Sampled by Standard Split Spoon

Static Water Levels on 9 November 1985 and 11 March 1987

Figure 3-3.

Well TF-3

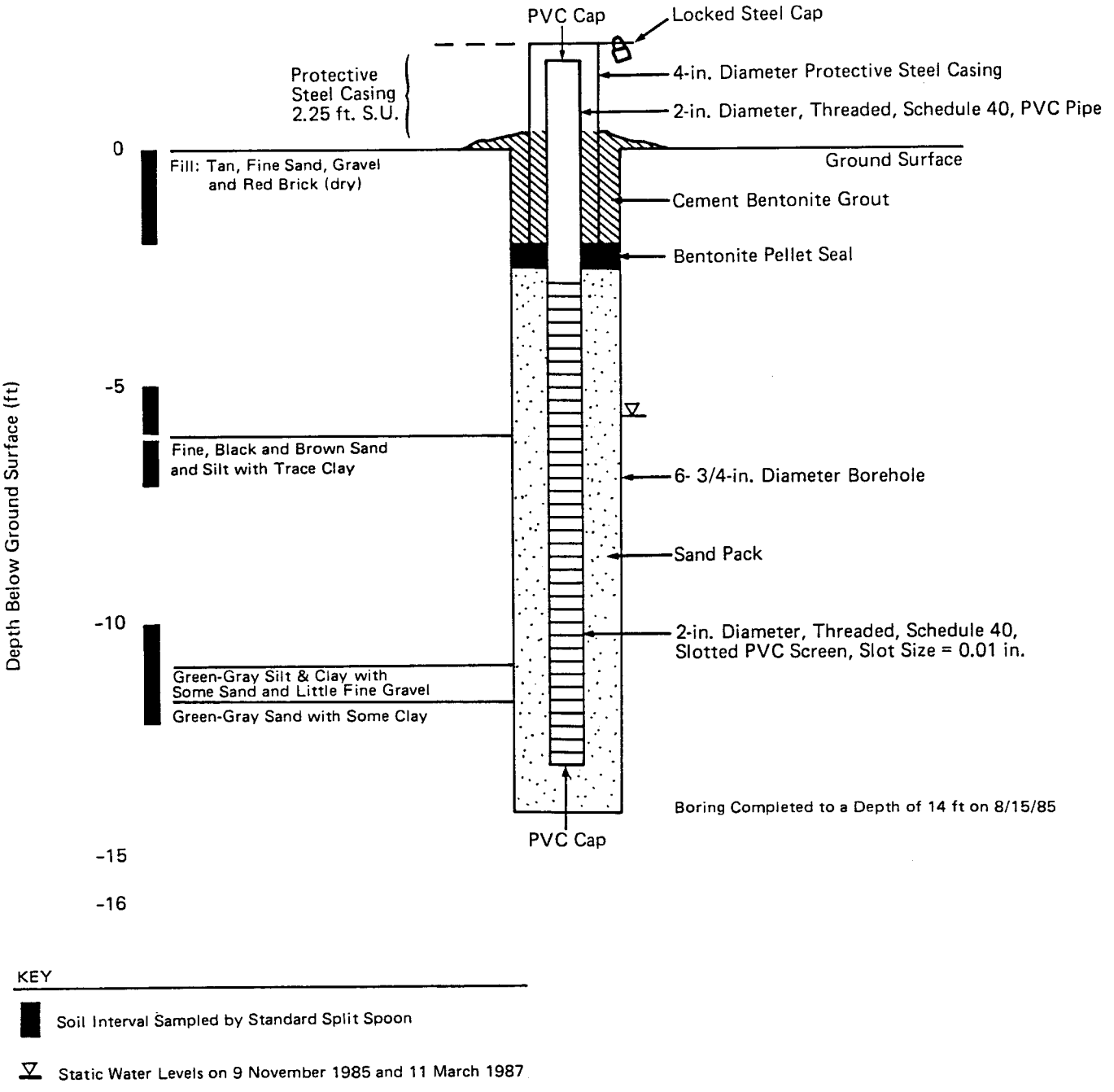


Figure 3-4.

Well TF-4

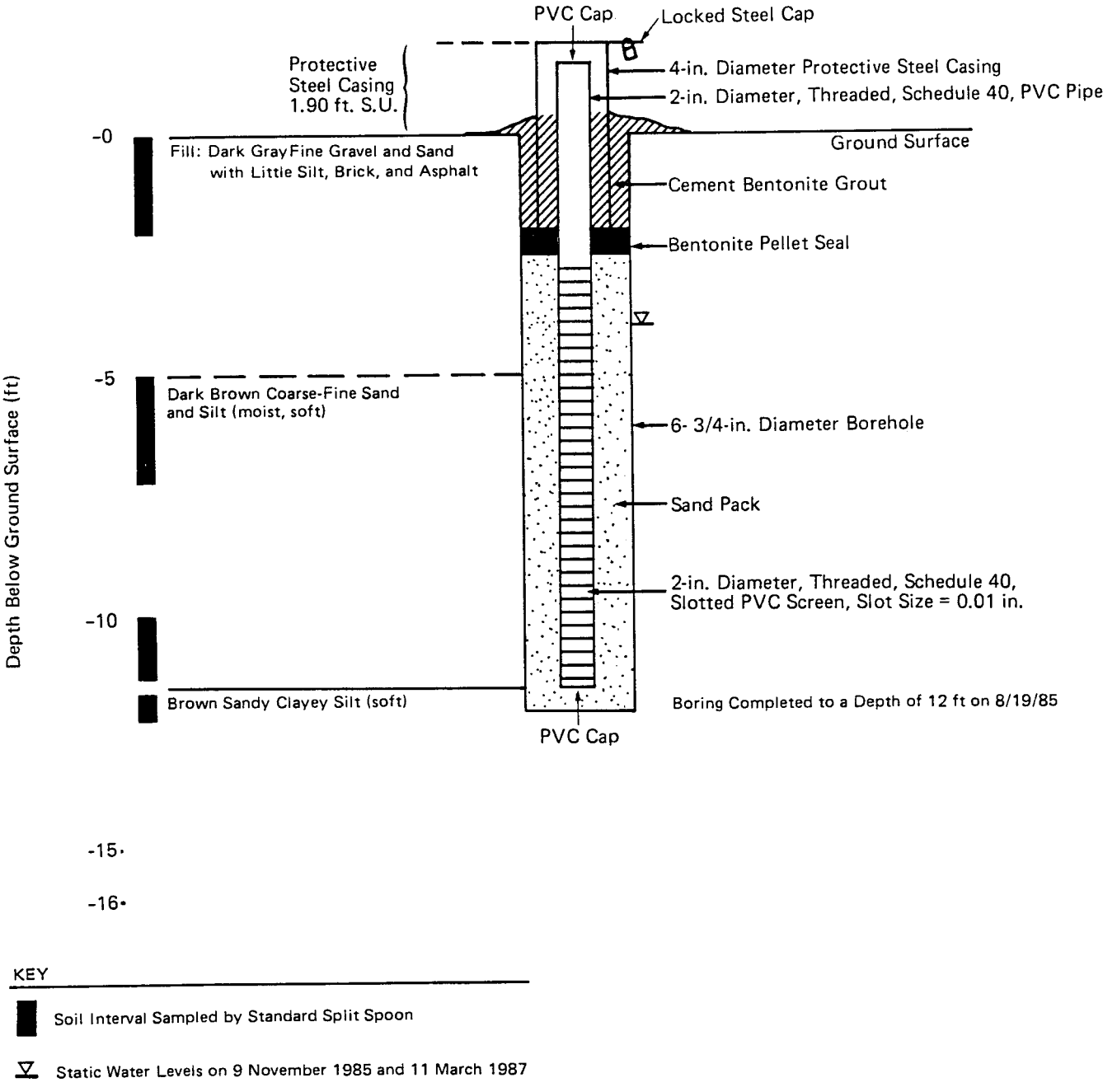
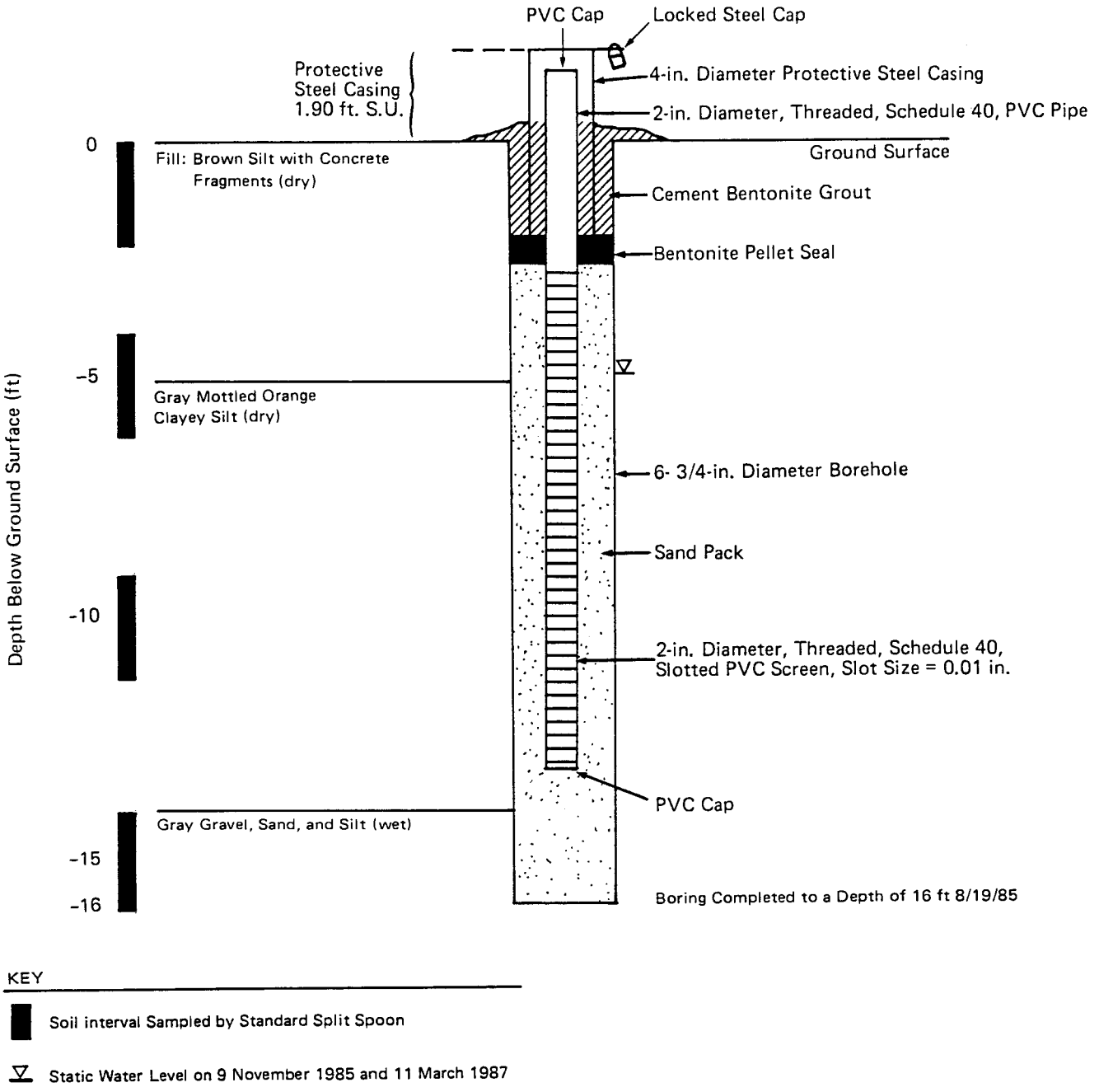


Figure 3-5.

Well TF-5



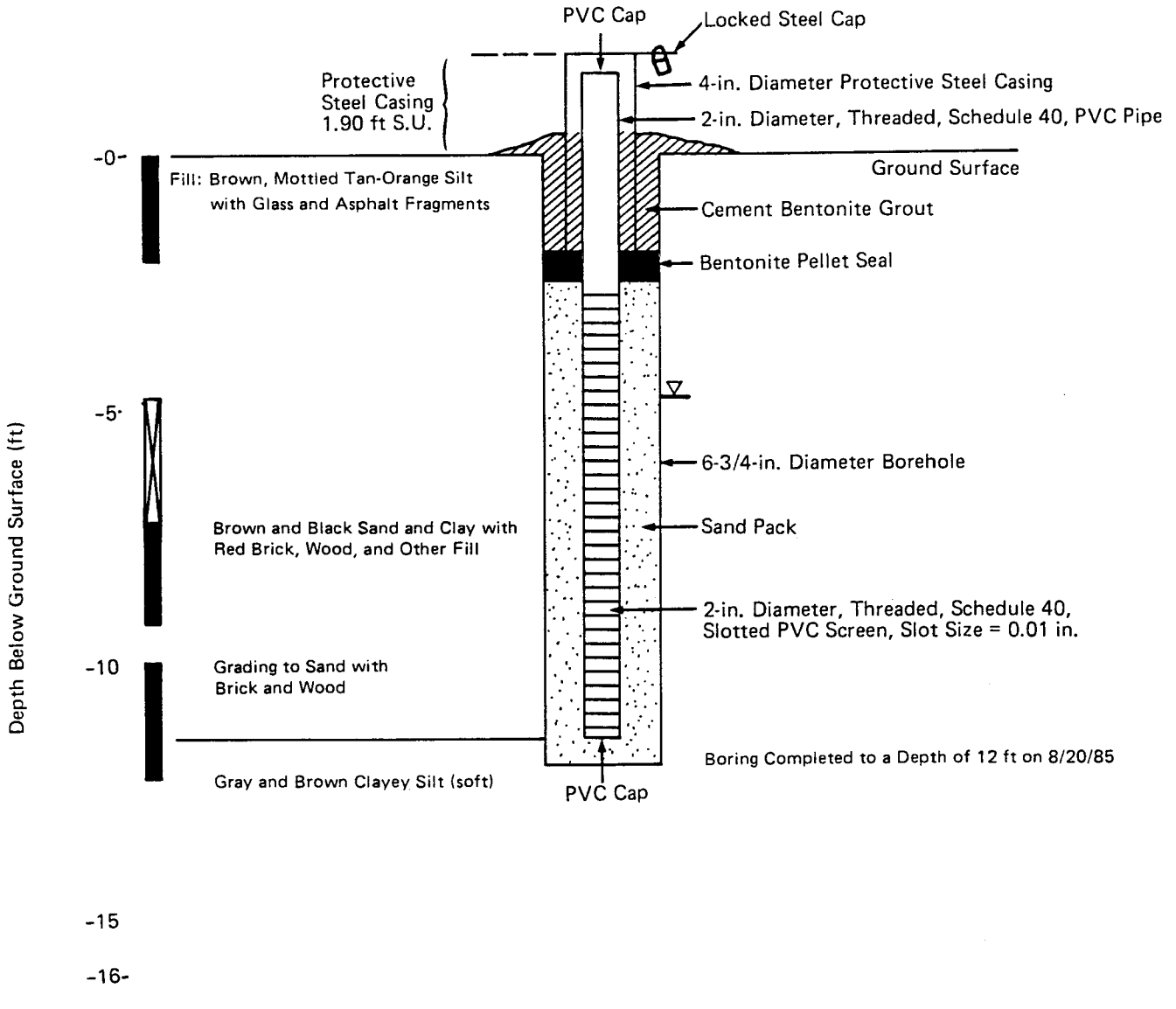
KEY

Soil interval Sampled by Standard Split Spoon

Static Water Level on 9 November 1985 and 11 March 1987

Figure 3-6.

Well TF-6



KEY

Soil Interval Sampled by Standard Split Spoon, "X" Indicates No Sample Recovered

Static Water Levels on 9 November 1985 and 11 March 1987

Figure 3-7.

Well TF-7

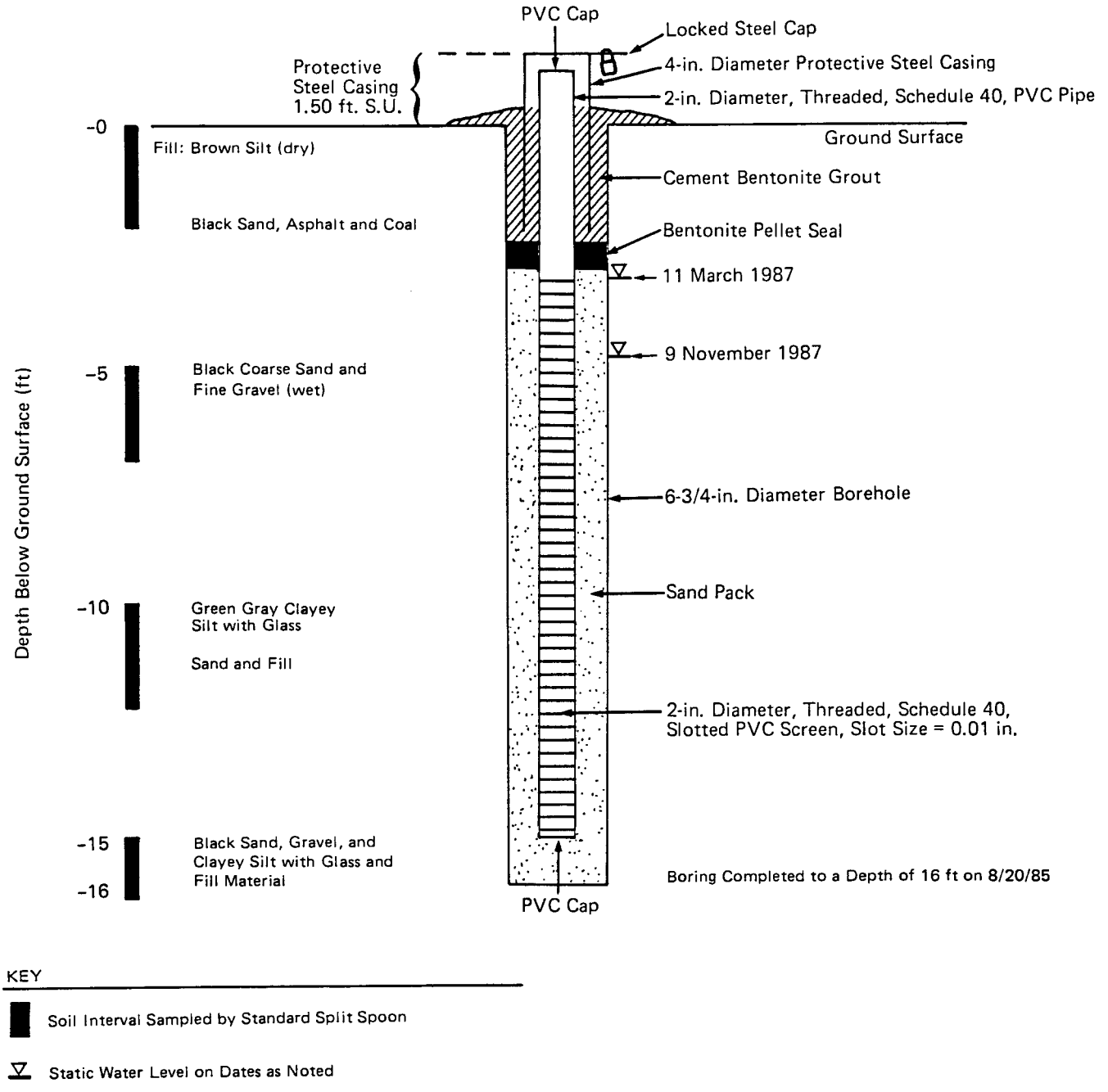


Figure 3-8.

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

GRAIN SIZE DISTRIBUTION CURVE

Project TIFFT FARM

Boring No. TF-1 Sample No. 1

Depth _____ Elevation _____

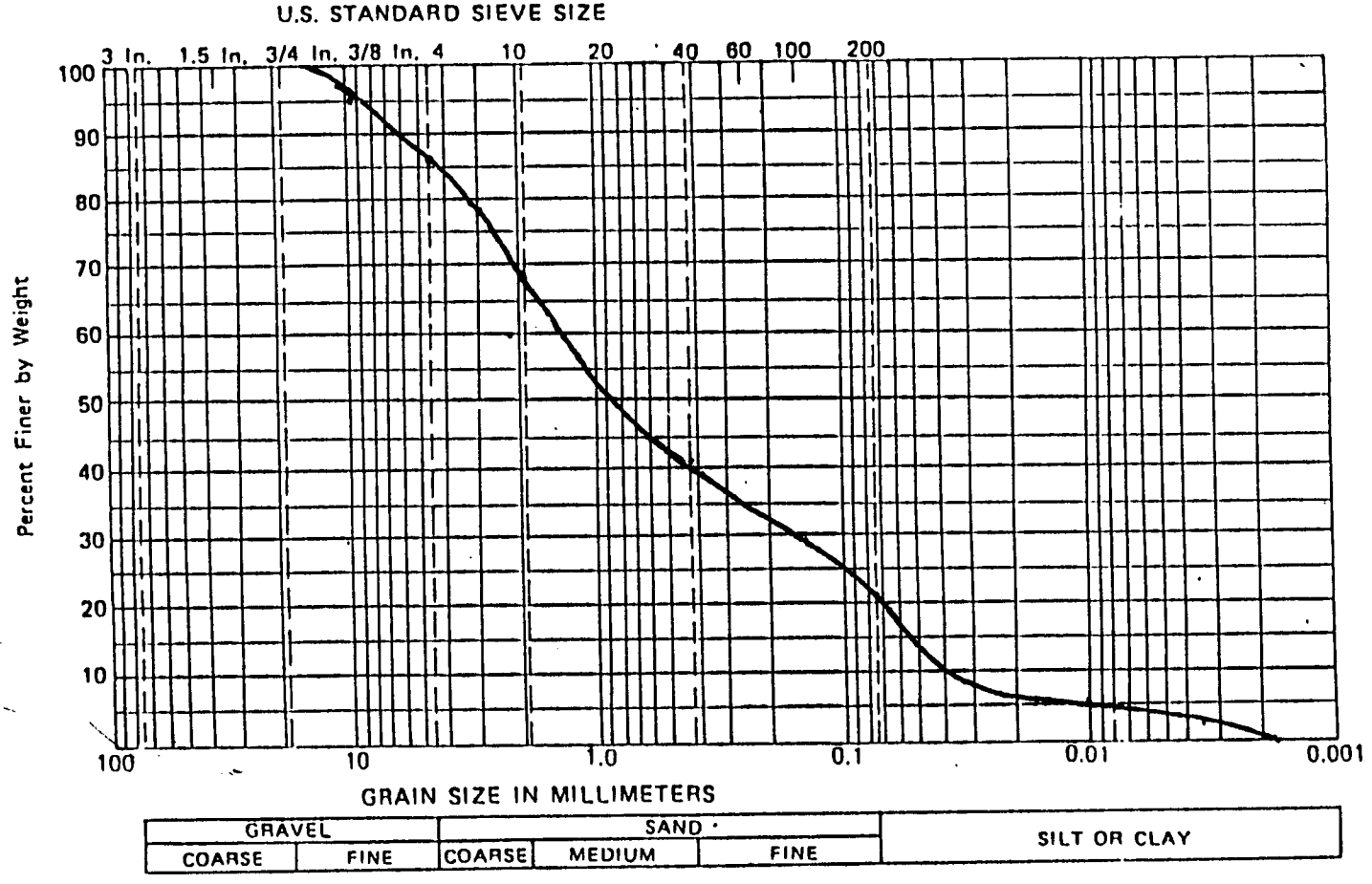


Figure 3-9

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

GRAIN SIZE DISTRIBUTION CURVE

Project TIFFT FARM

Boring No. TF-1 Sample No. 2

Depth _____ Elevation _____

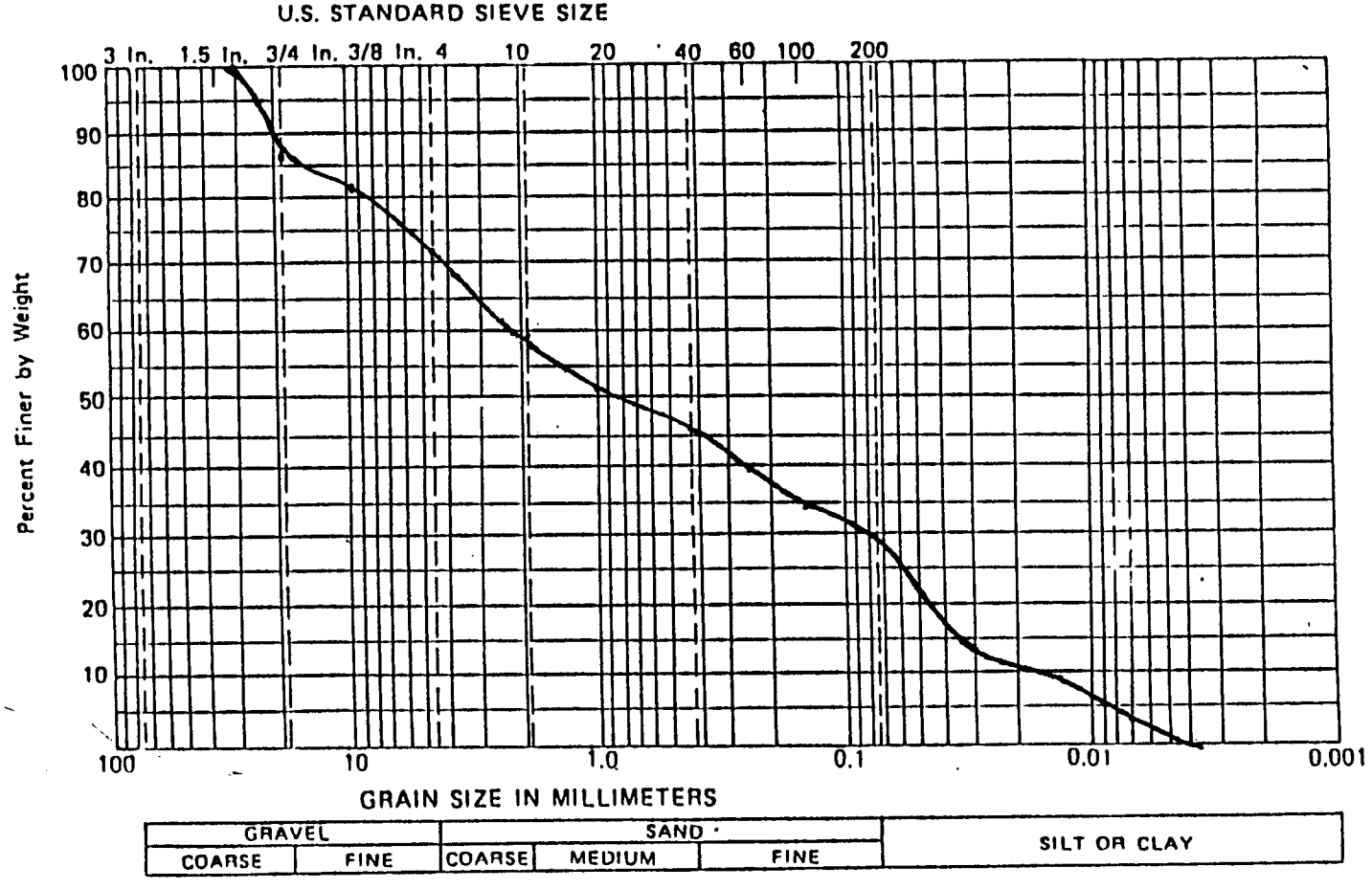


Figure 3-10

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

GRAIN SIZE DISTRIBUTION CURVE

Project TIFFT FARM

Boring No. TF-1 Sample No. 3

Depth _____ Elevation _____

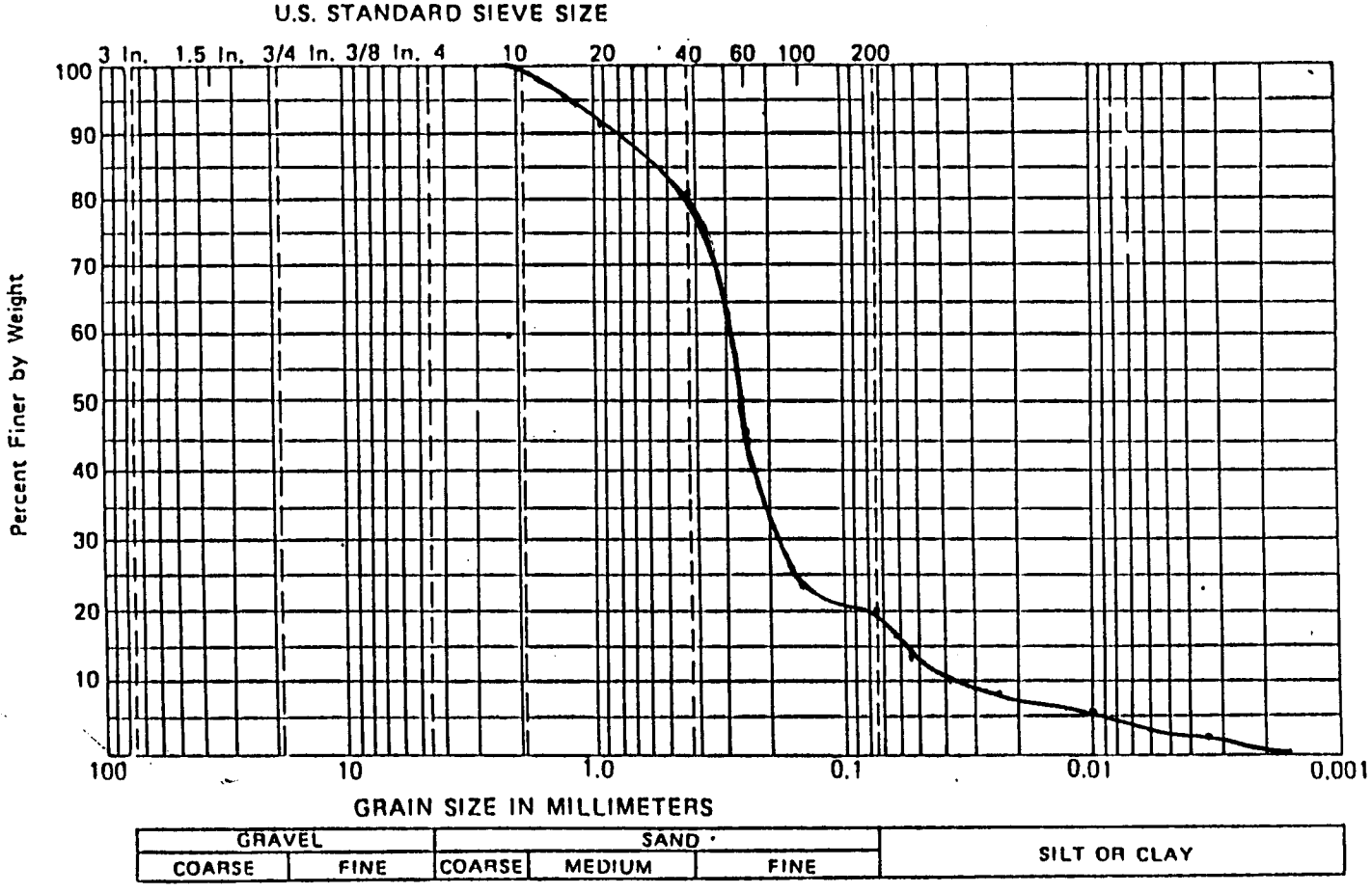


Figure 3-11

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

GRAIN SIZE DISTRIBUTION CURVE

Project TIFFT FARM

Boring No. TF-1 Sample No. 4

Depth _____ Elevation _____

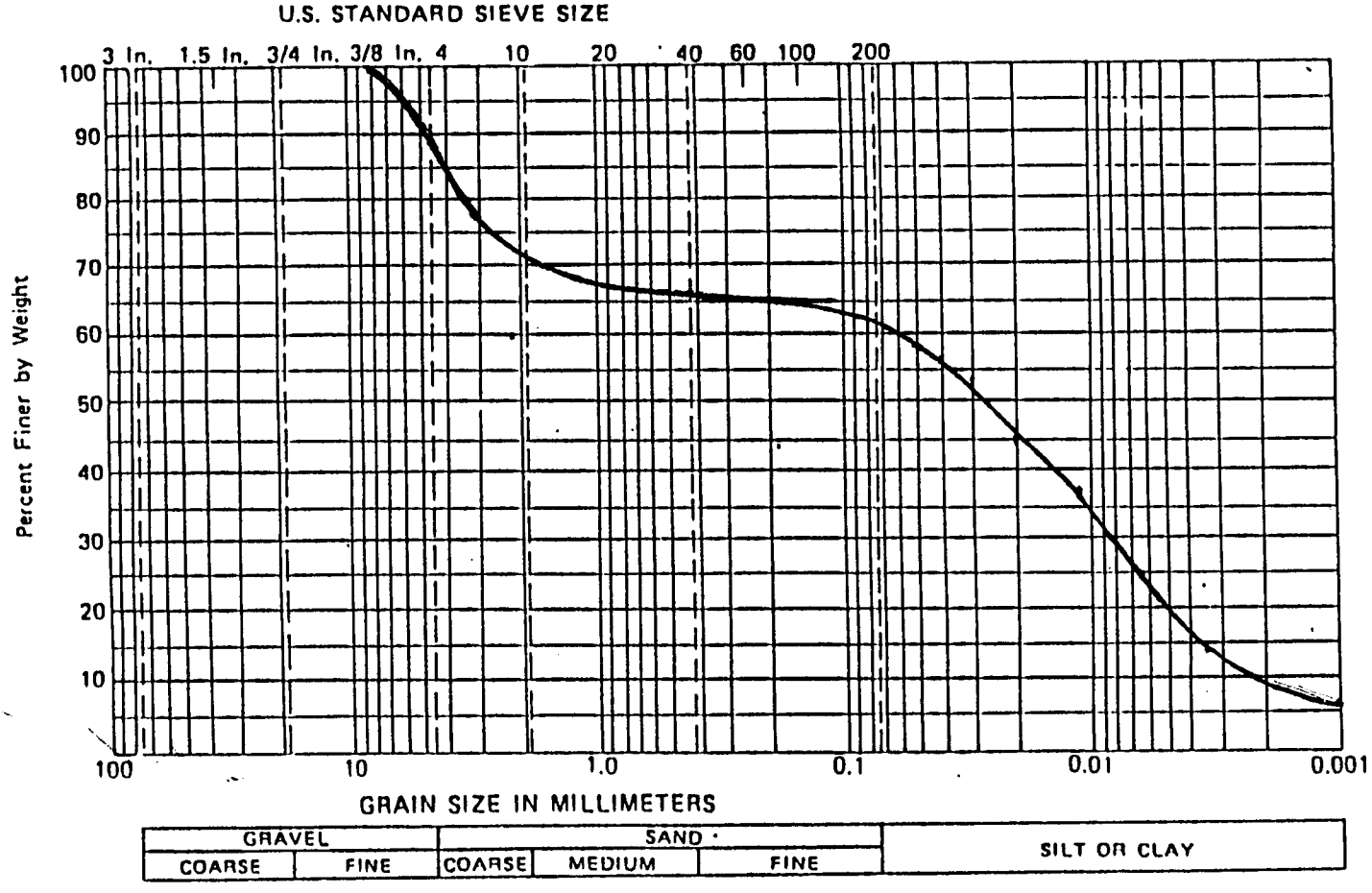


Figure 3-12

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

GRAIN SIZE DISTRIBUTION CURVE

Project TIFFT FARM

Boring No. TF-2 Sample No. 3

Depth _____ Elevation _____

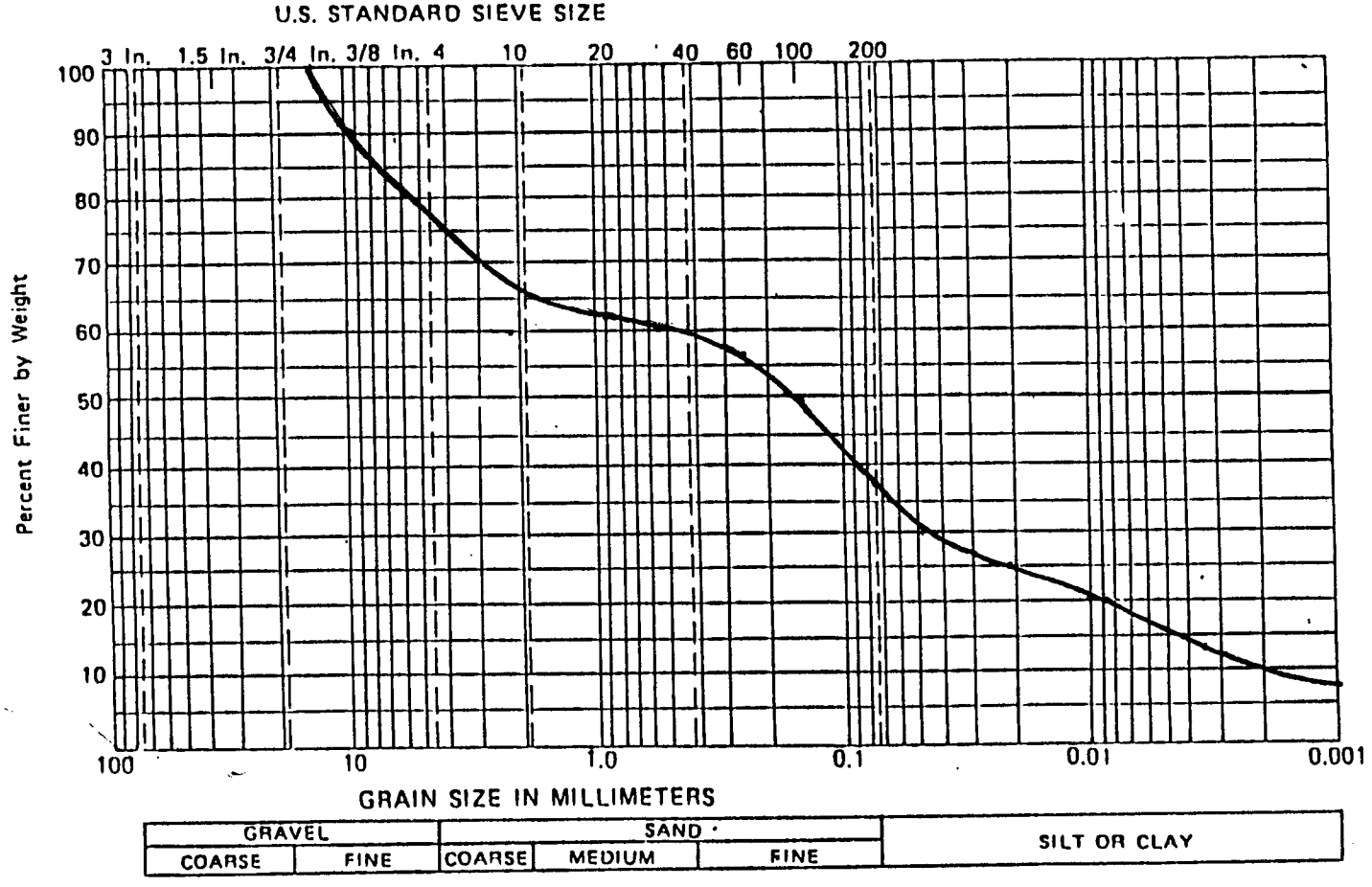


Figure 3-13

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

GRAIN SIZE DISTRIBUTION CURVE

Project TIFFT FARM

Boring No. TF-2 Sample No. 4

Depth _____ Elevation _____

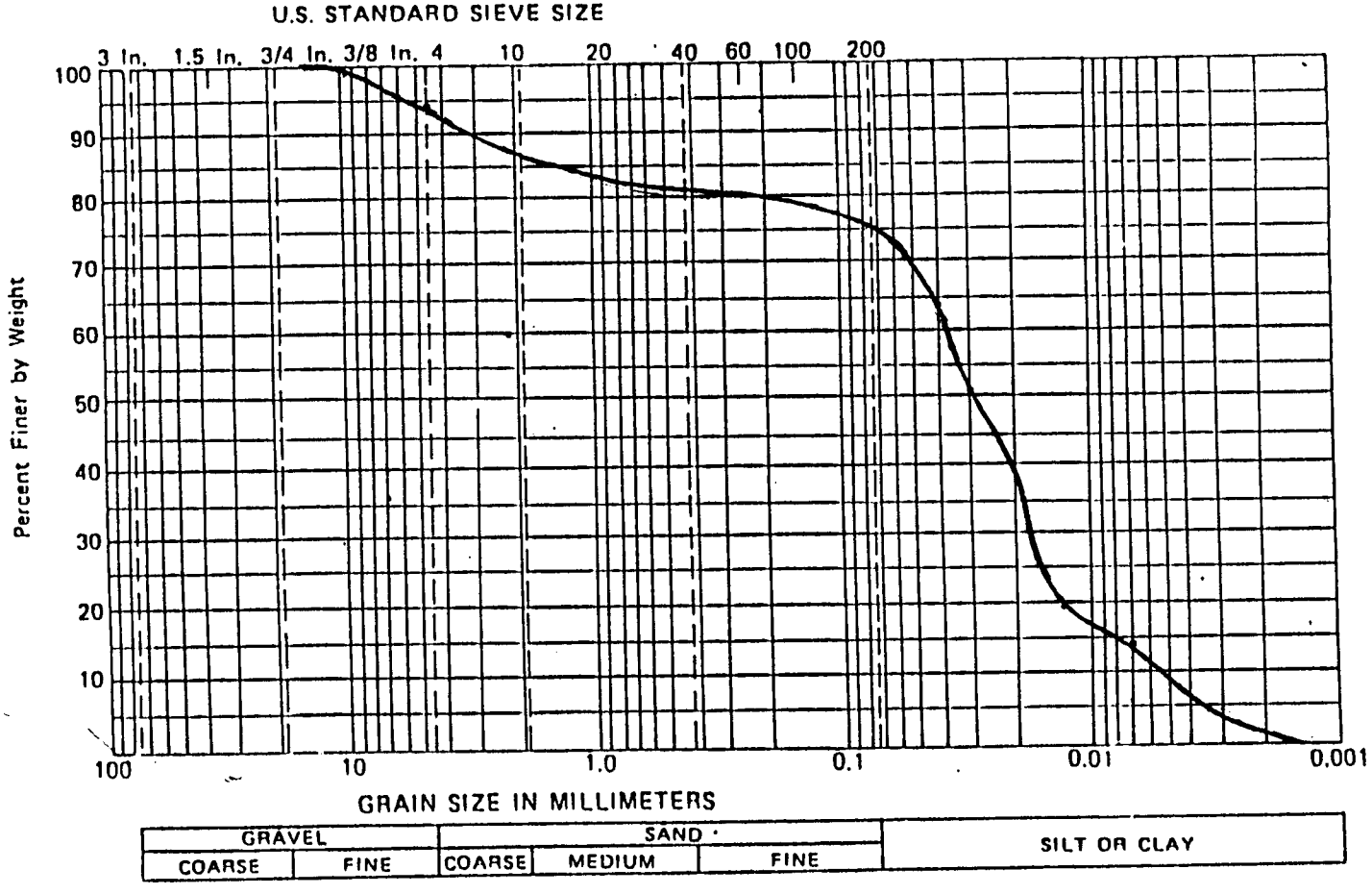


Figure 3-14

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

GRAIN SIZE DISTRIBUTION CURVE

Project TIFFT FARM

Boring No. TF-3 Sample No. 2

Depth _____ Elevation _____

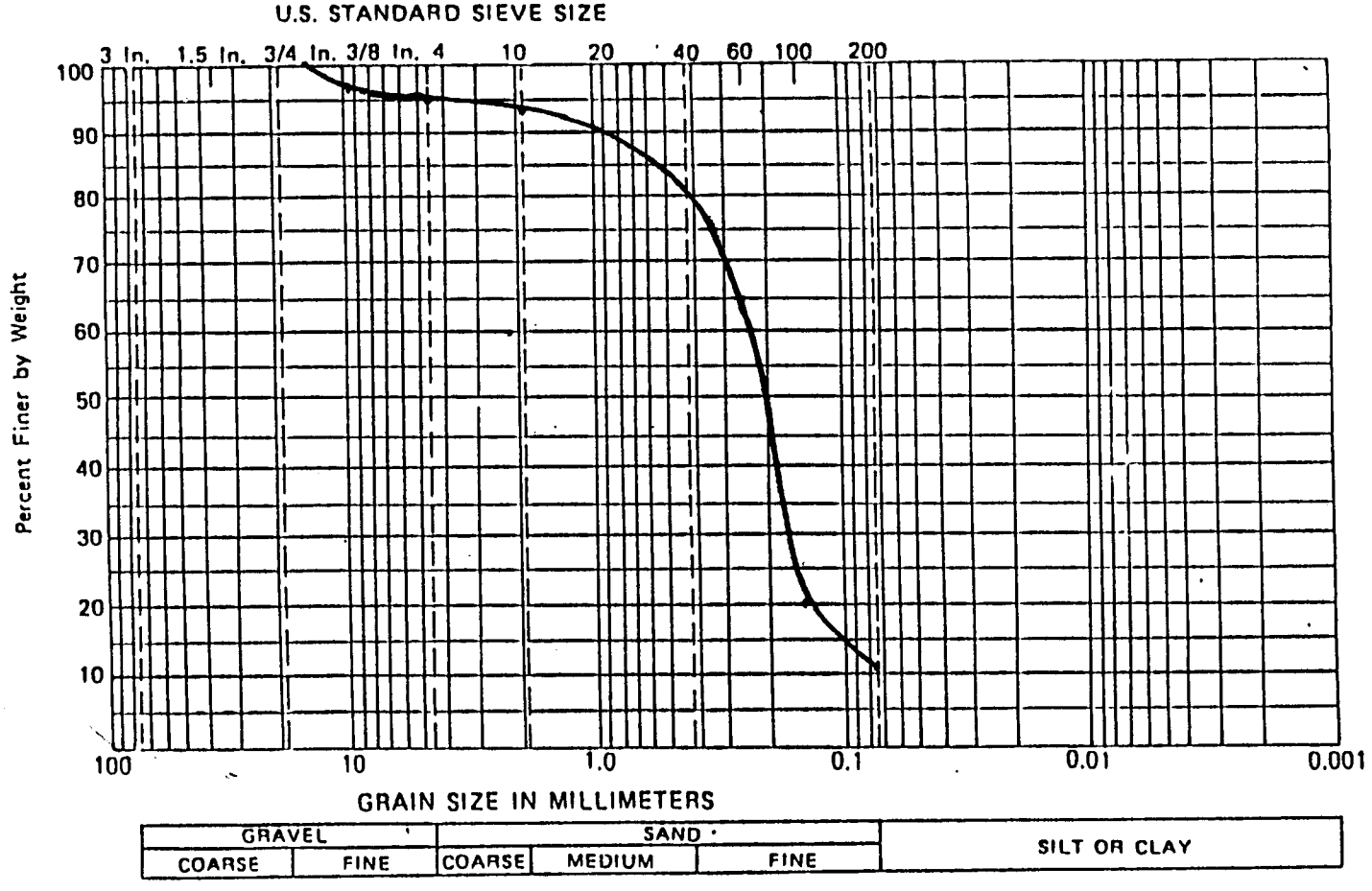


Figure 3-15

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

GRAIN SIZE DISTRIBUTION CURVE

Project TIFFT FARM

Boring No. TF-3 Sample No. 3

Depth _____ Elevation _____

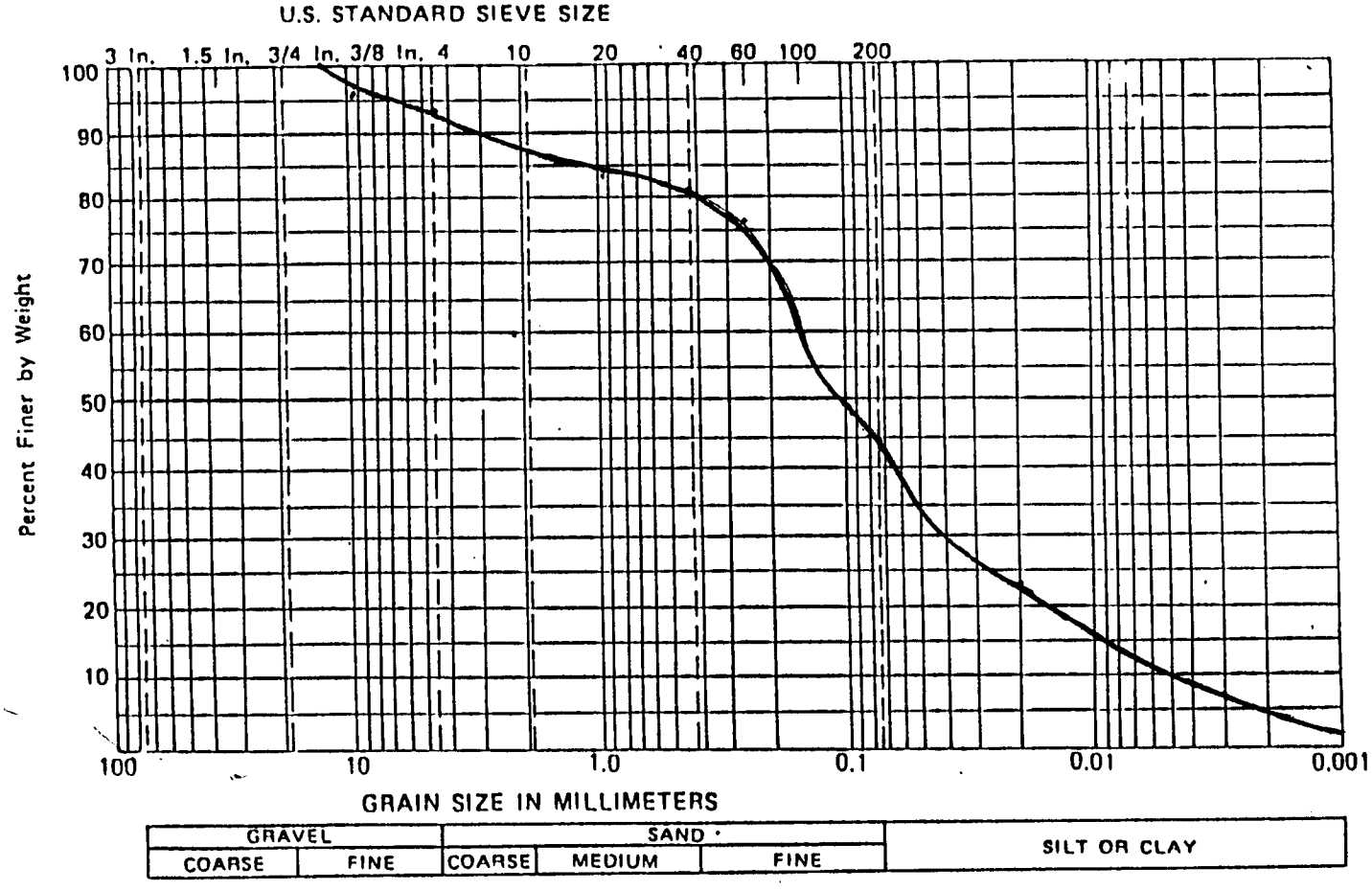


Figure 3-16

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

GRAIN SIZE DISTRIBUTION CURVE

Project TIFFT FARM

Boring No. TF-3 Sample No. 4

Depth _____ Elevation _____

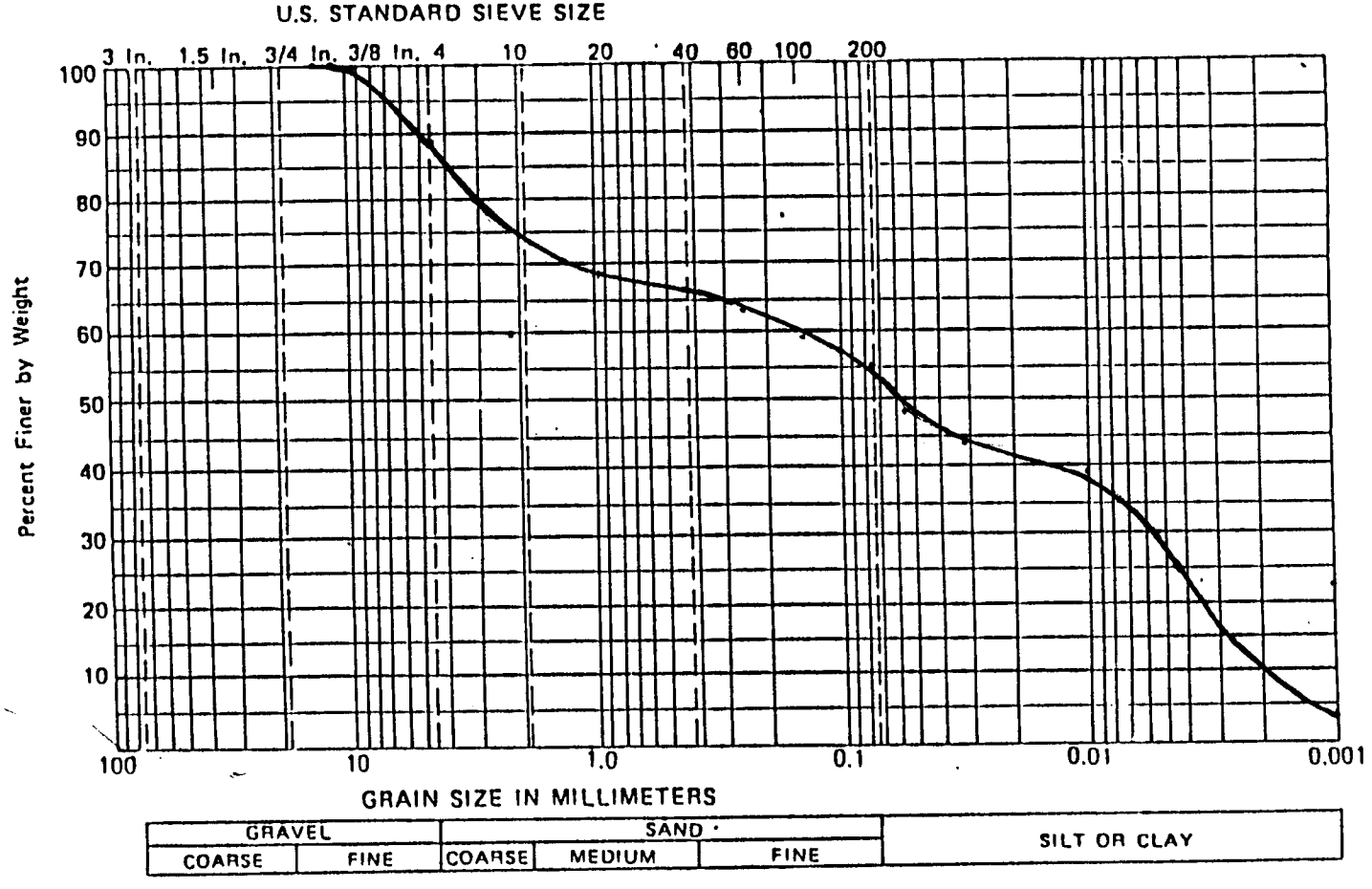


Figure 3-17

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

GRAIN SIZE DISTRIBUTION CURVE

Project TIFFT FARM

Boring No. TF-4 Sample No. 1

Depth _____ Elevation _____

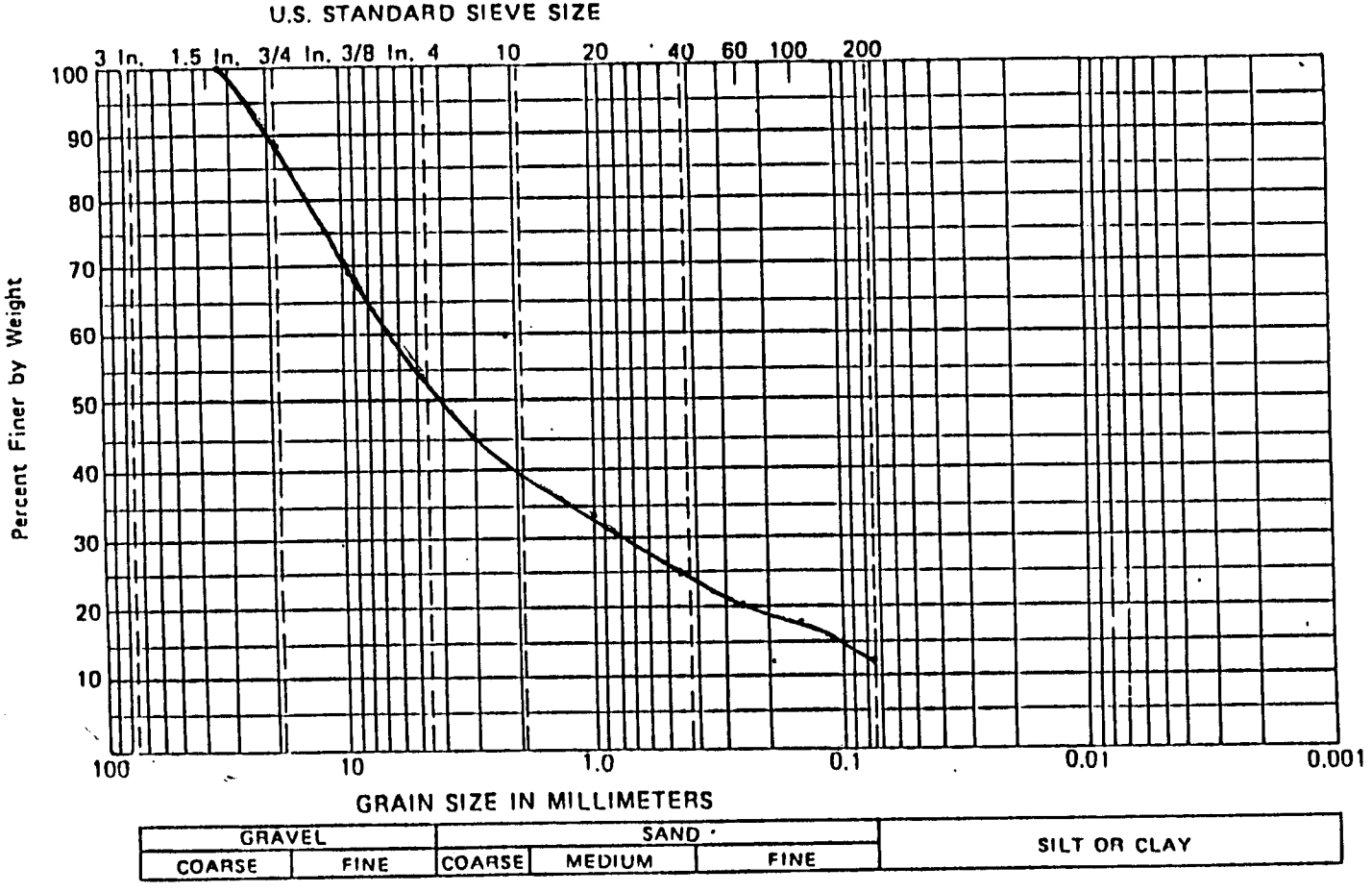


Figure 3-18

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

GRAIN SIZE DISTRIBUTION CURVE

Project TIFFT FARM

Boring No. TF-4 Sample No. S-2

Depth _____ Elevation _____

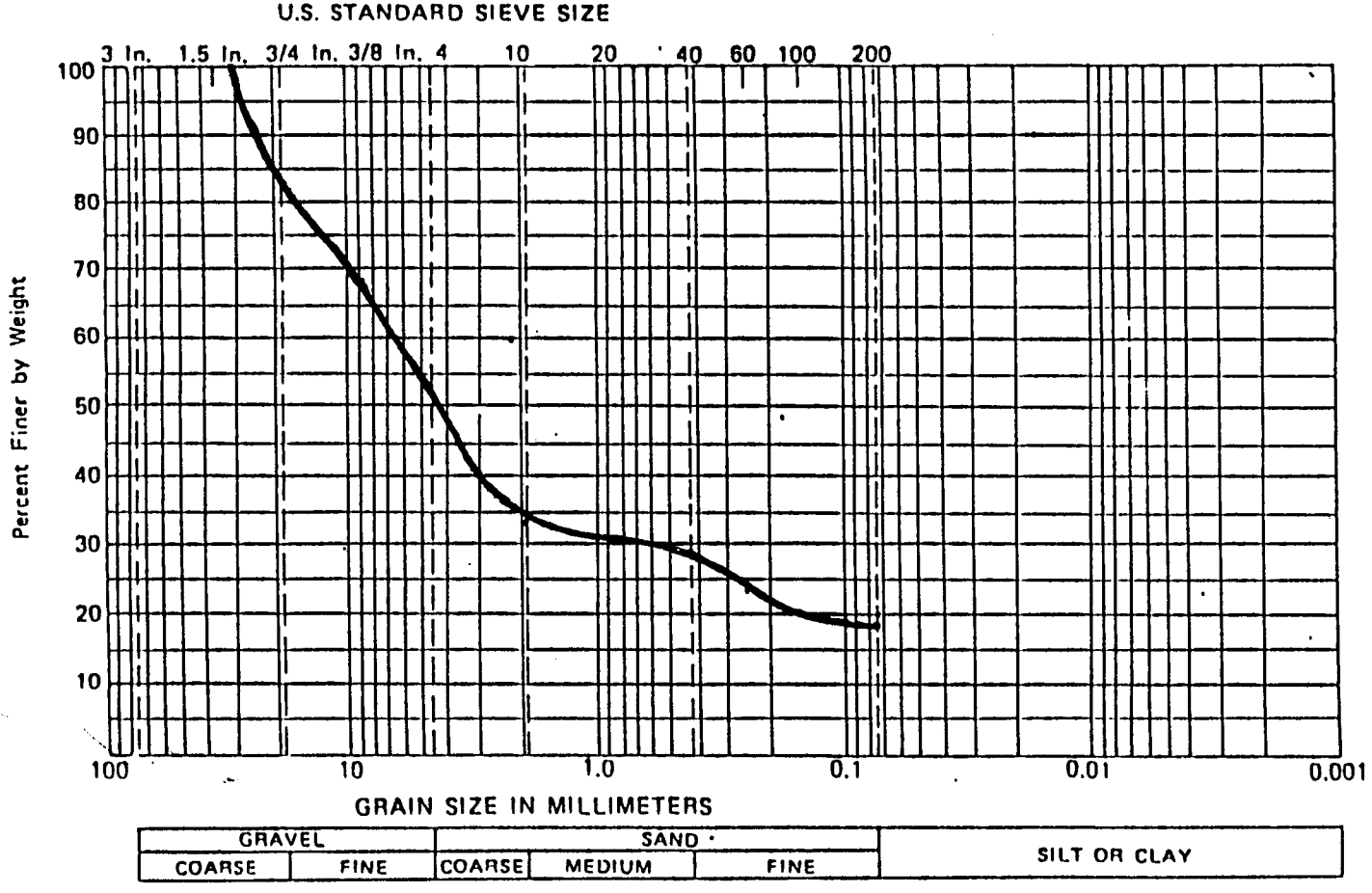


Figure 3-19

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

GRAIN SIZE DISTRIBUTION CURVE

Project TIFFT FARM

Boring No. TF-4 Sample No. 3

Depth _____ Elevation _____

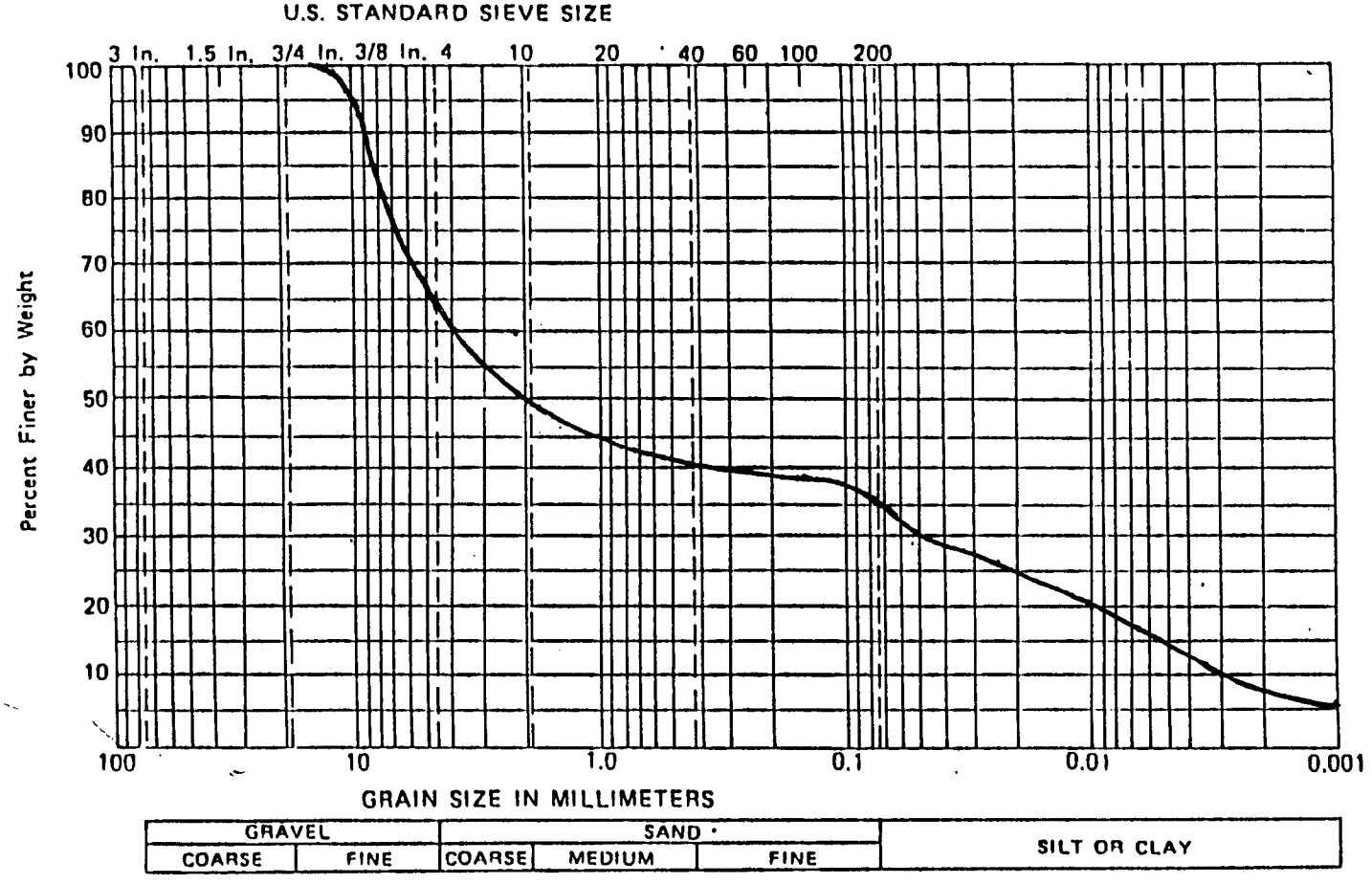


Figure 3-20

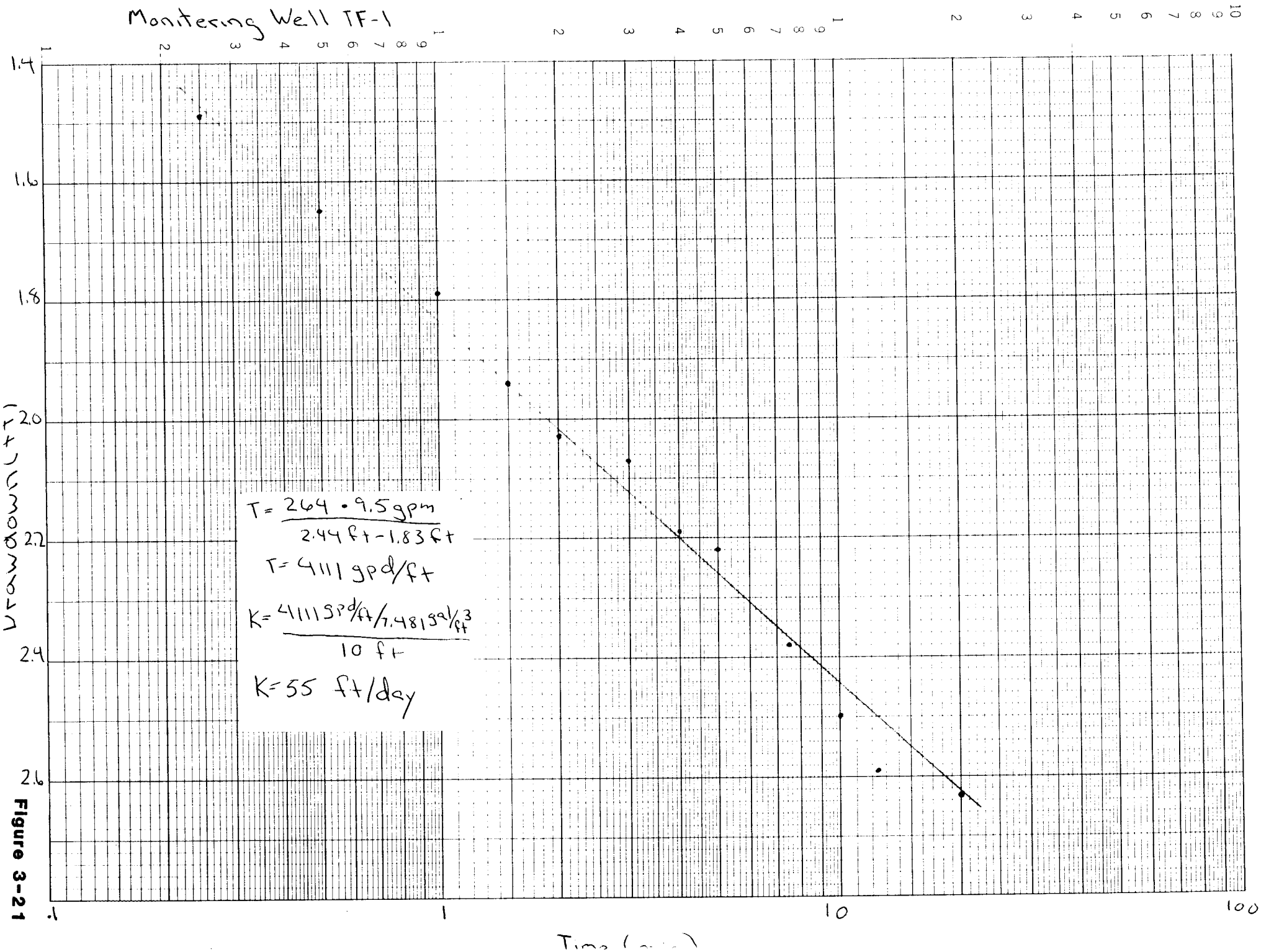


Figure 3-21

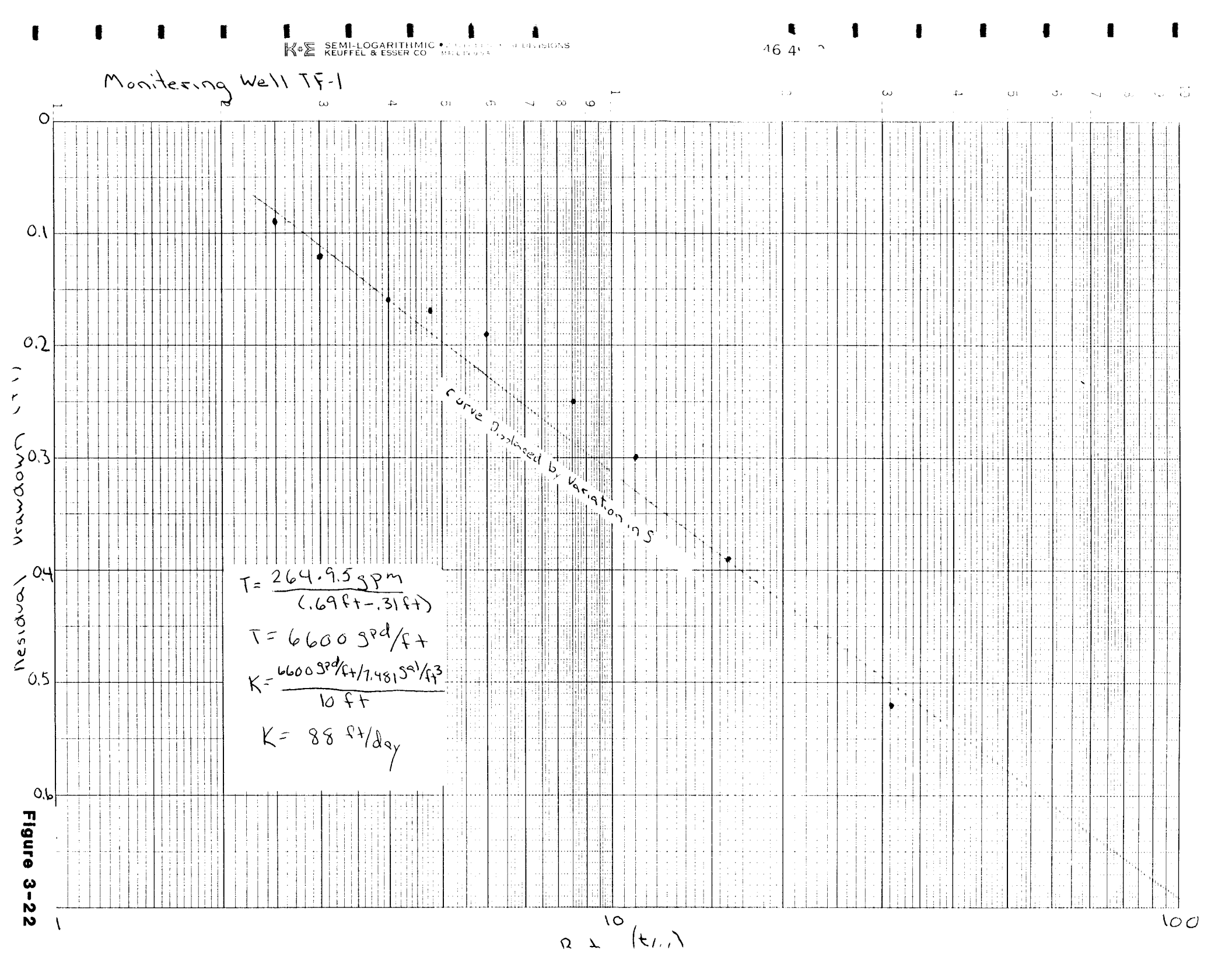

SEMI-LOGARITHMIC
KEUFFEL & ESSER CO
Monitoring Well TF-1
Residual Drawdown (ft)
0
0.1
0.2
0.3
0.4
0.5
0.6
1
10
100
Curve Displaced by Variation in S
T = 264.9.5 gpm / (.69 ft - .31 ft)
T = 6600 gpd/ft
K = 6600 gpd/ft / 7.481 gal/ft³ / 10 ft
K = 88 ft/day

Figure 3-22

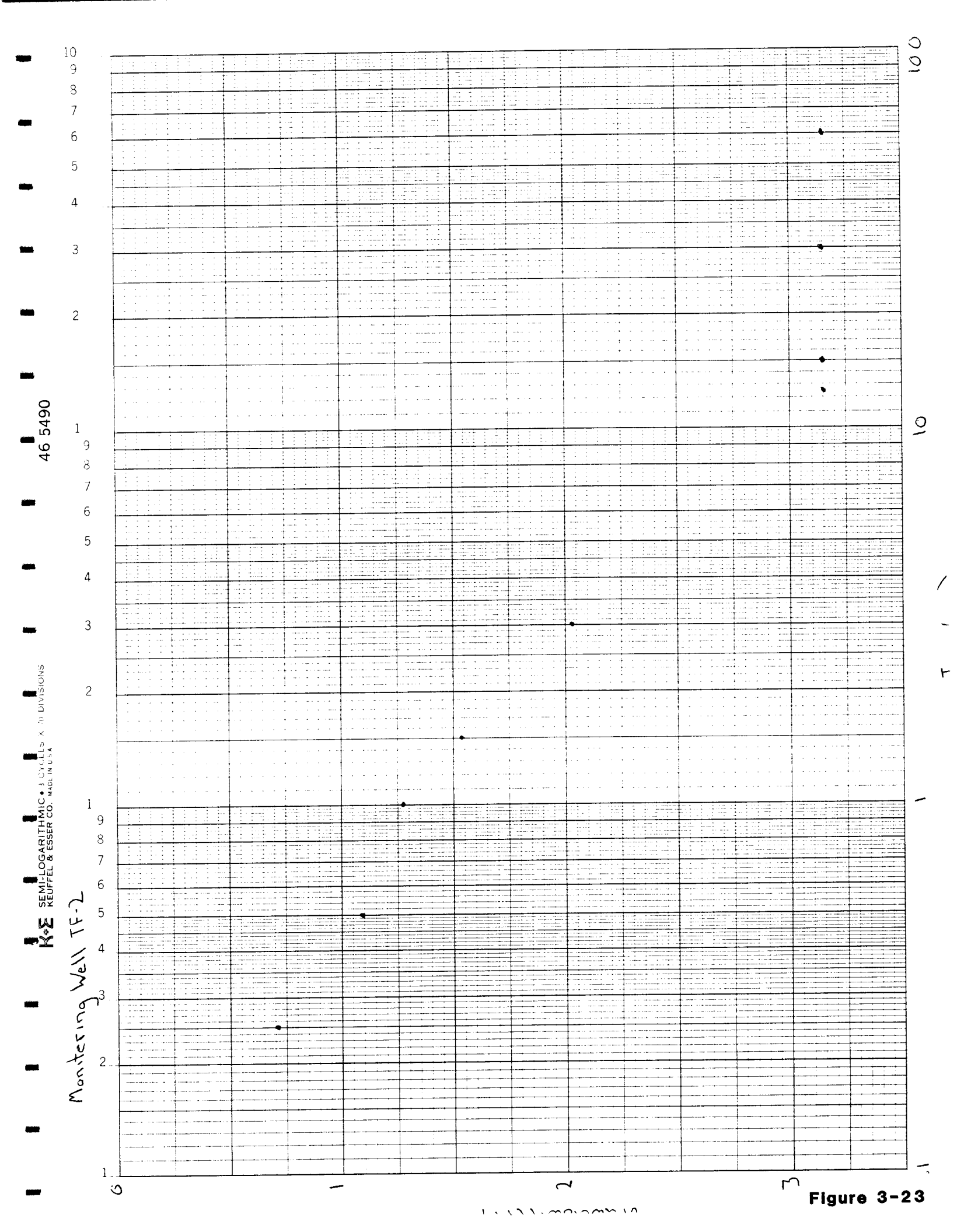

Monitoring Well TF-2
SEMI-LOGARITHMIC • 3 CYCLES X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.
46 5490

Figure 3-23

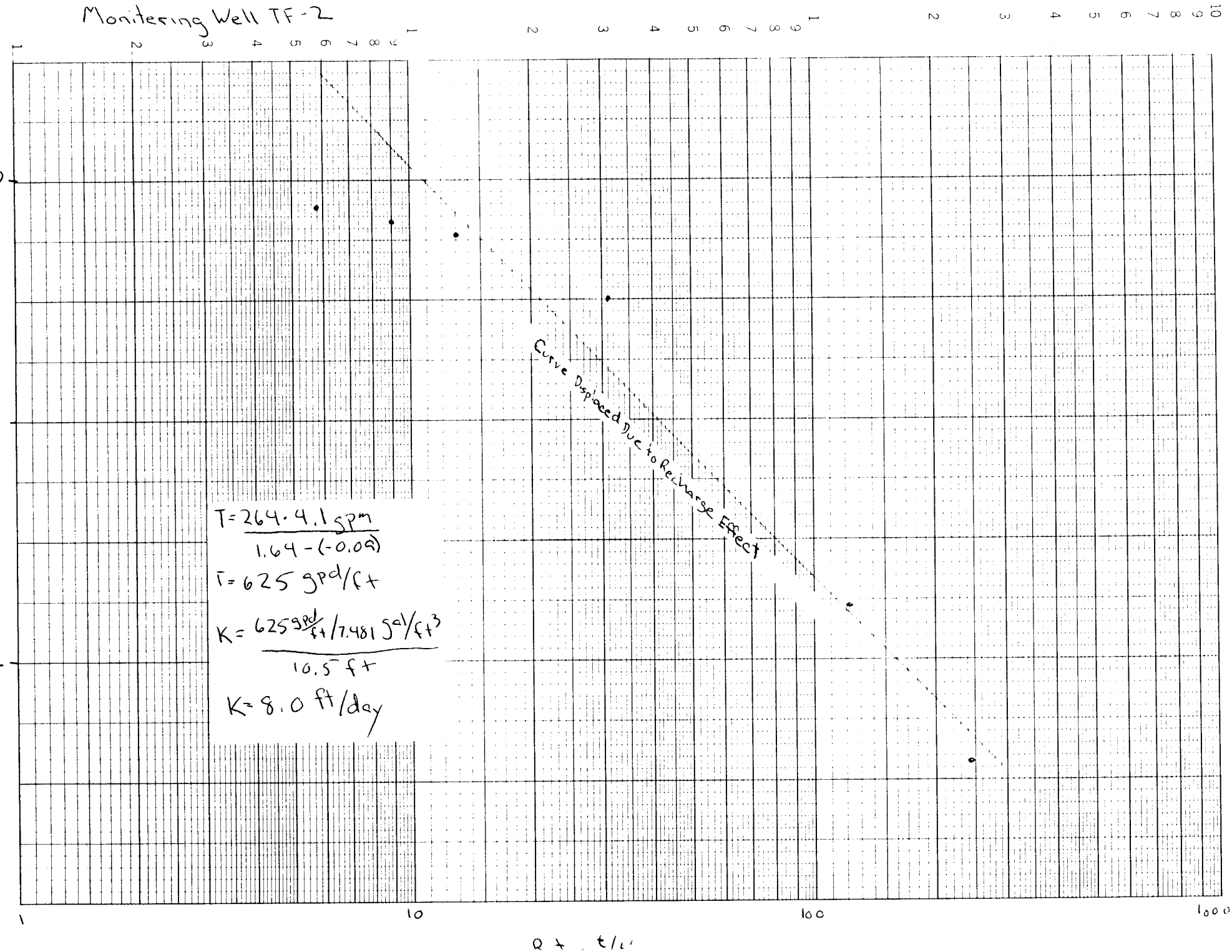

Monitering Well TF-2
Curve Displaced Due to Recharge Effect
T = 264 · 4.1 gpm / (1.64 − (−0.09))
T = 625 gpd/ft
K = 625 gpd/ft / 7.481 gal/ft³ / 10.5 ft
K = 8.0 ft/day
0
1
2
1
10
100
1000

Figure 3-24

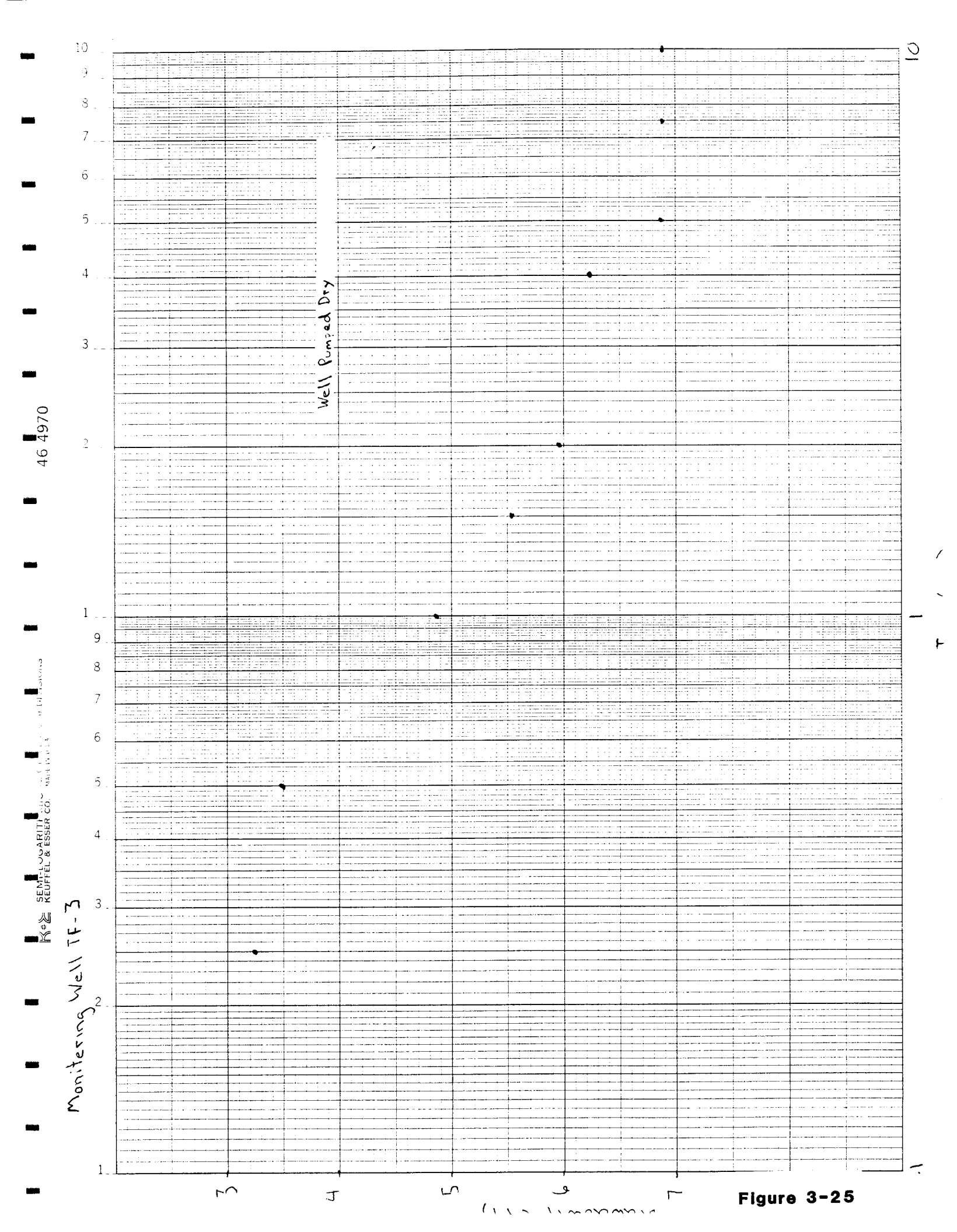

Well Pumped Dry
Monitoring Well TF-3
46 4970
KEUFFEL & ESSER CO.

Figure 3-25

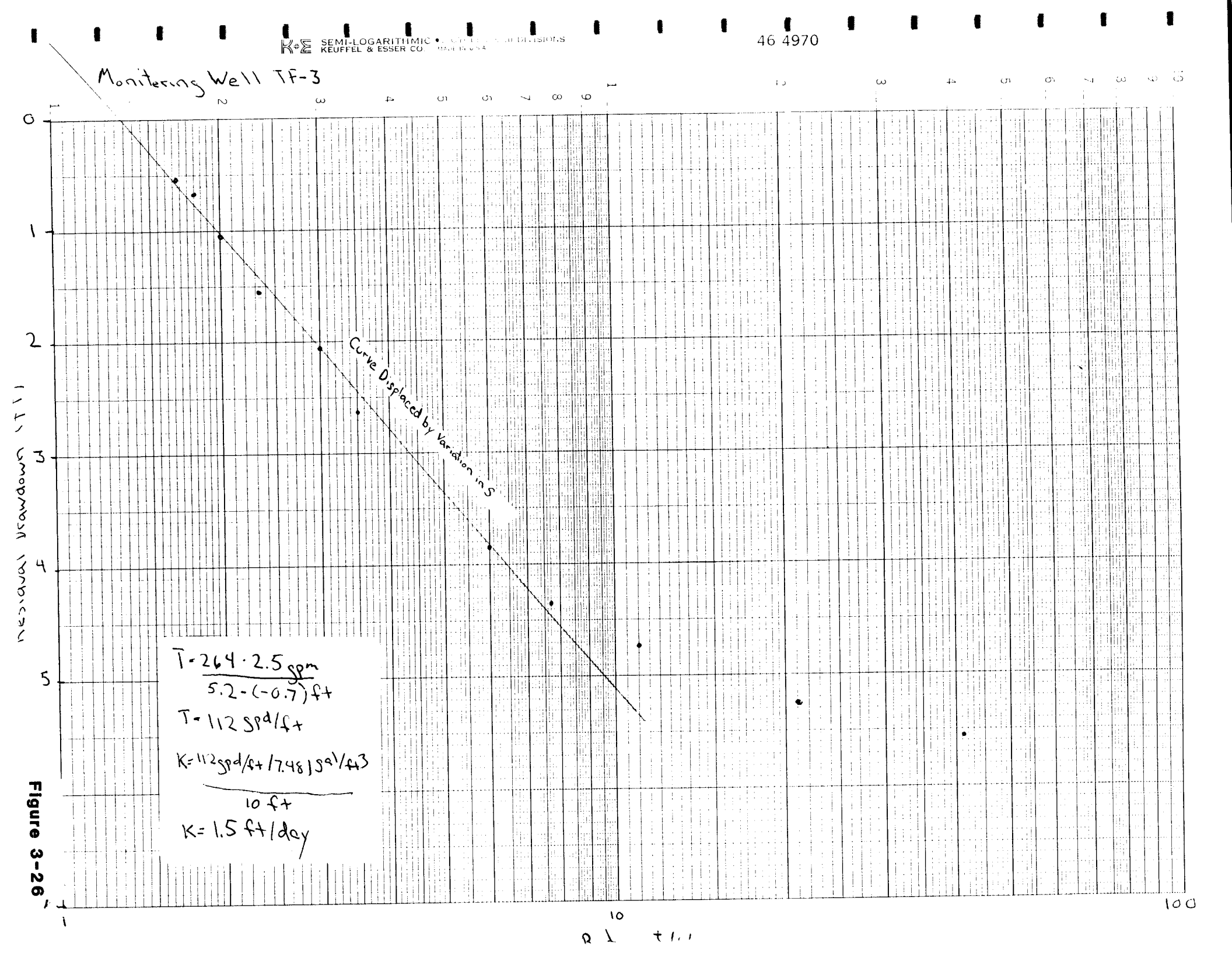

K&E SEMI-LOGARITHMIC
KEUFFEL & ESSER CO.
46 4970
Monitering Well TF-3
Curve Displaced by Variation in S
T = 264 · 2.5 gpm / 5.2 - (-0.7) ft
T = 112 gpd/ft
K = 112 gpd/ft / 7.48 gal/ft3 / 10 ft
K = 1.5 ft/day

Figure 3-26

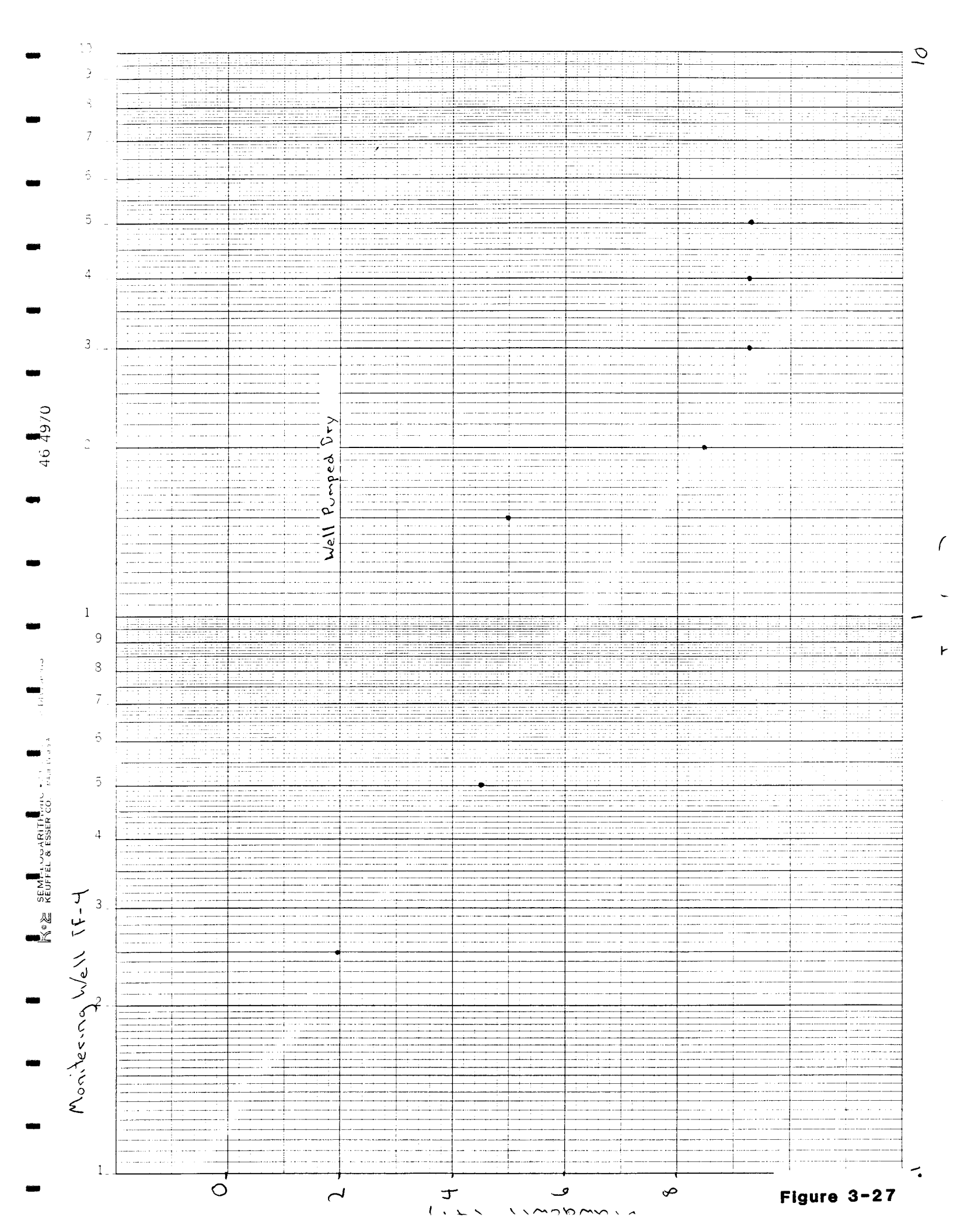


Figure 3-27

Monitering Well TF-4

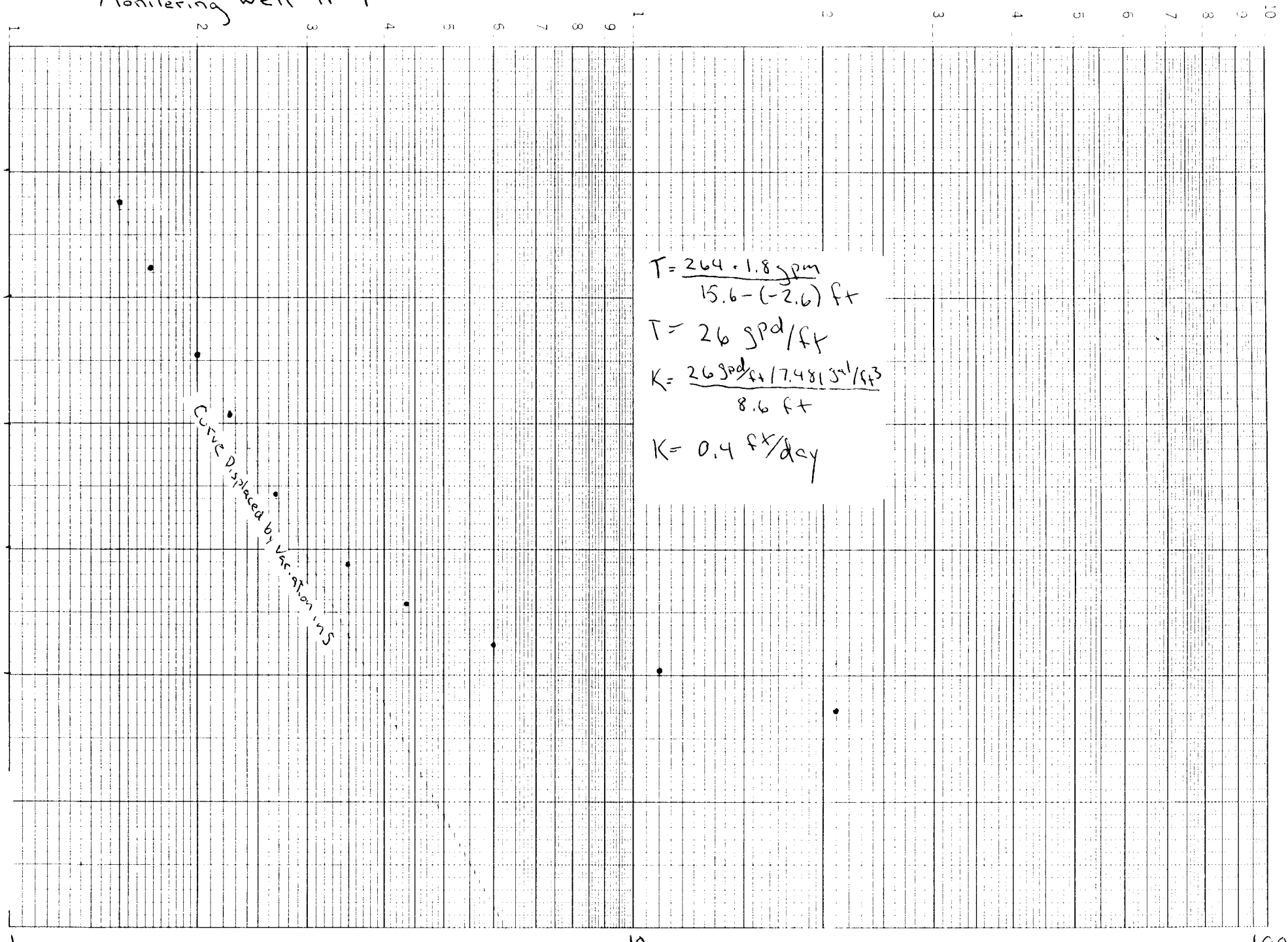


Figure 3-28

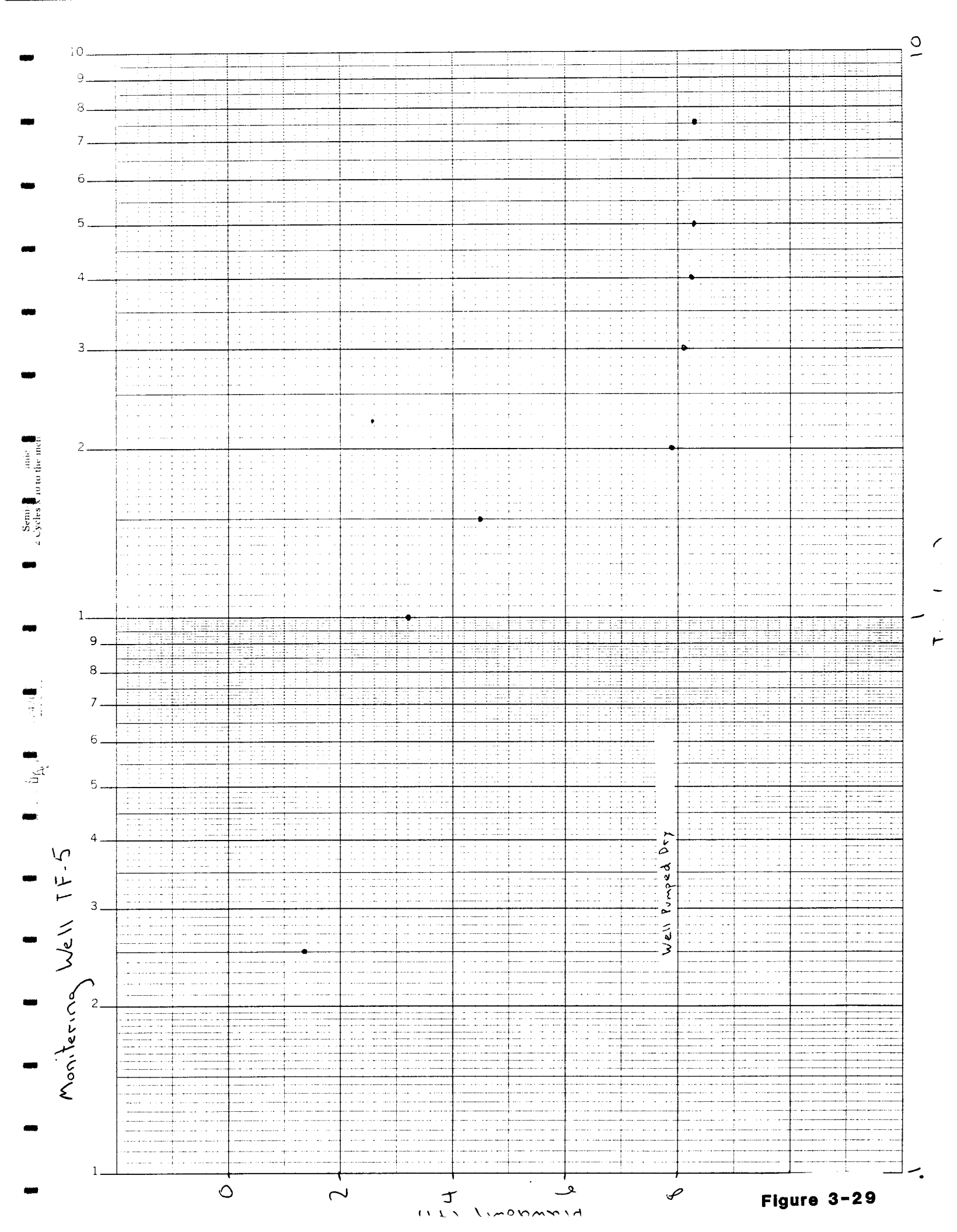


Figure 3-29

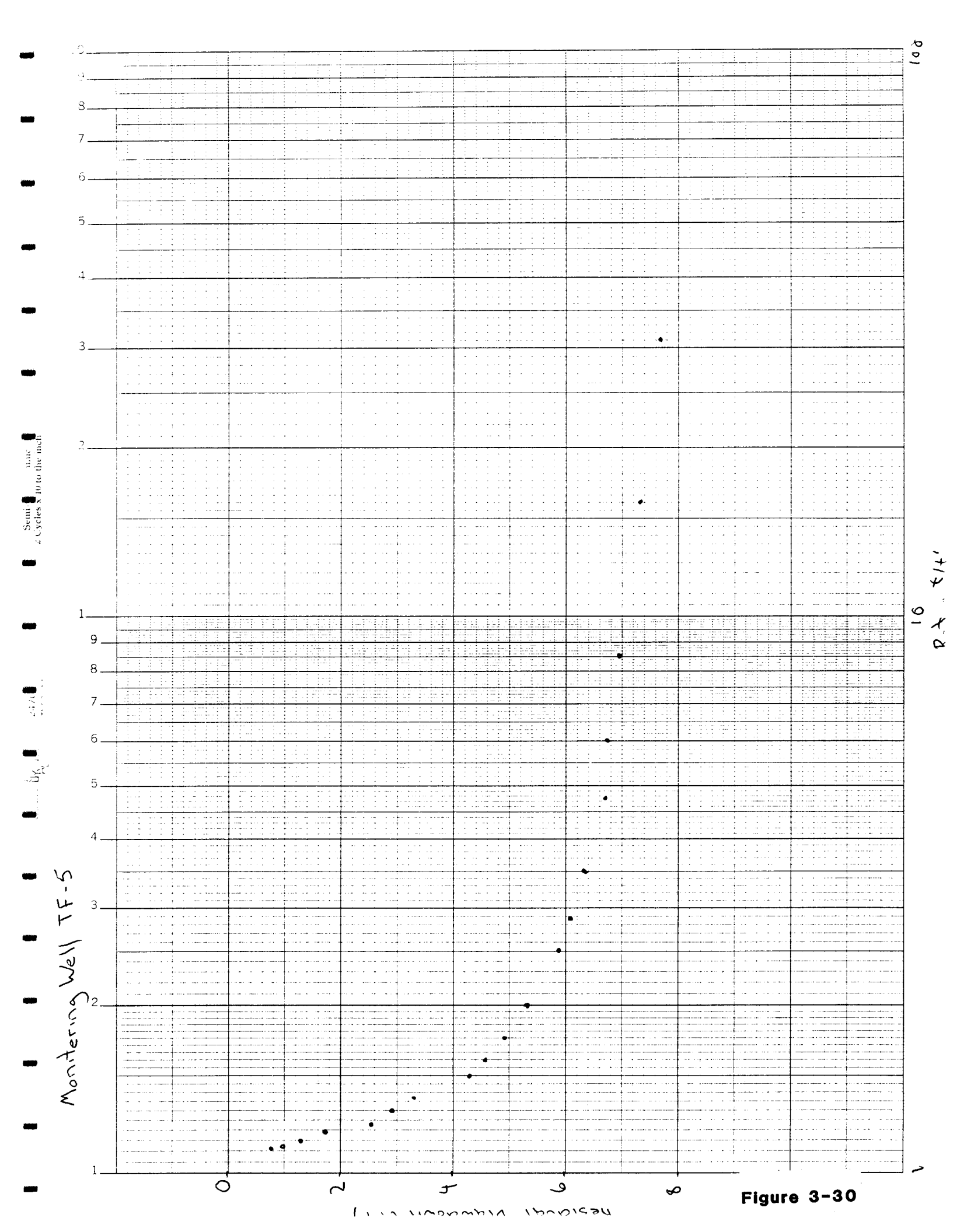
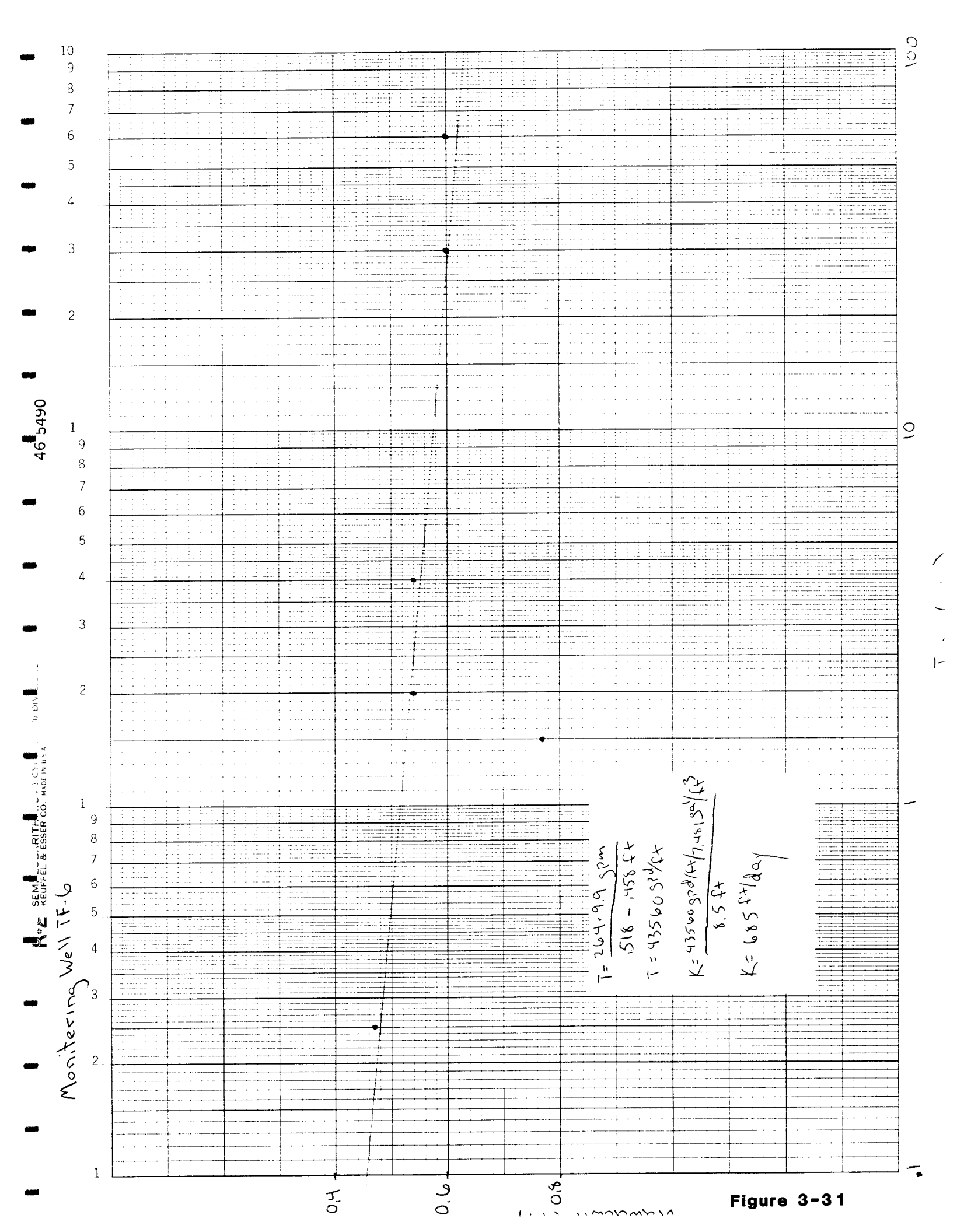


Figure 3-30


Monitoring Well TF-6
$T = \frac{264.9.9\ gpm}{.518 - .456\ ft}$
$T = 43560\ gpd/ft$
$K = \frac{43560\ gpd/ft / 7.481\ gal/ft^3}{8.5\ ft}$
$K = 685\ ft/day$
Figure 3-31

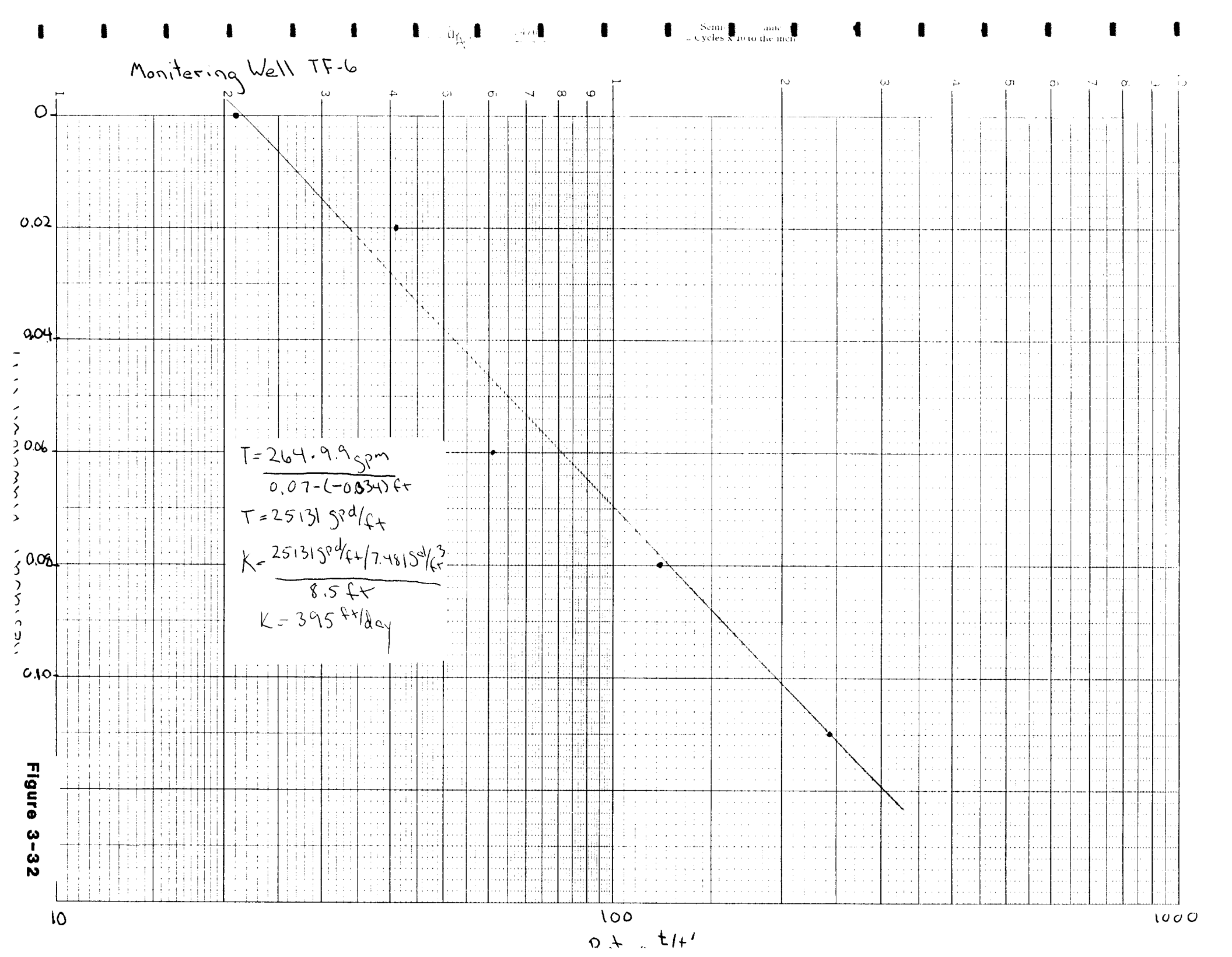

Monitering Well TF-6
T = 264.9 gpm / 0.07 - (-0.034) ft
T = 25131 gpd/ft
K = 25131 gpd/ft / 7.48 gpd/ft³ / 8.5 ft
K = 395 ft/day
0
0.02
0.04
0.06
0.08
0.10
10
100
1000

Figure 3-32

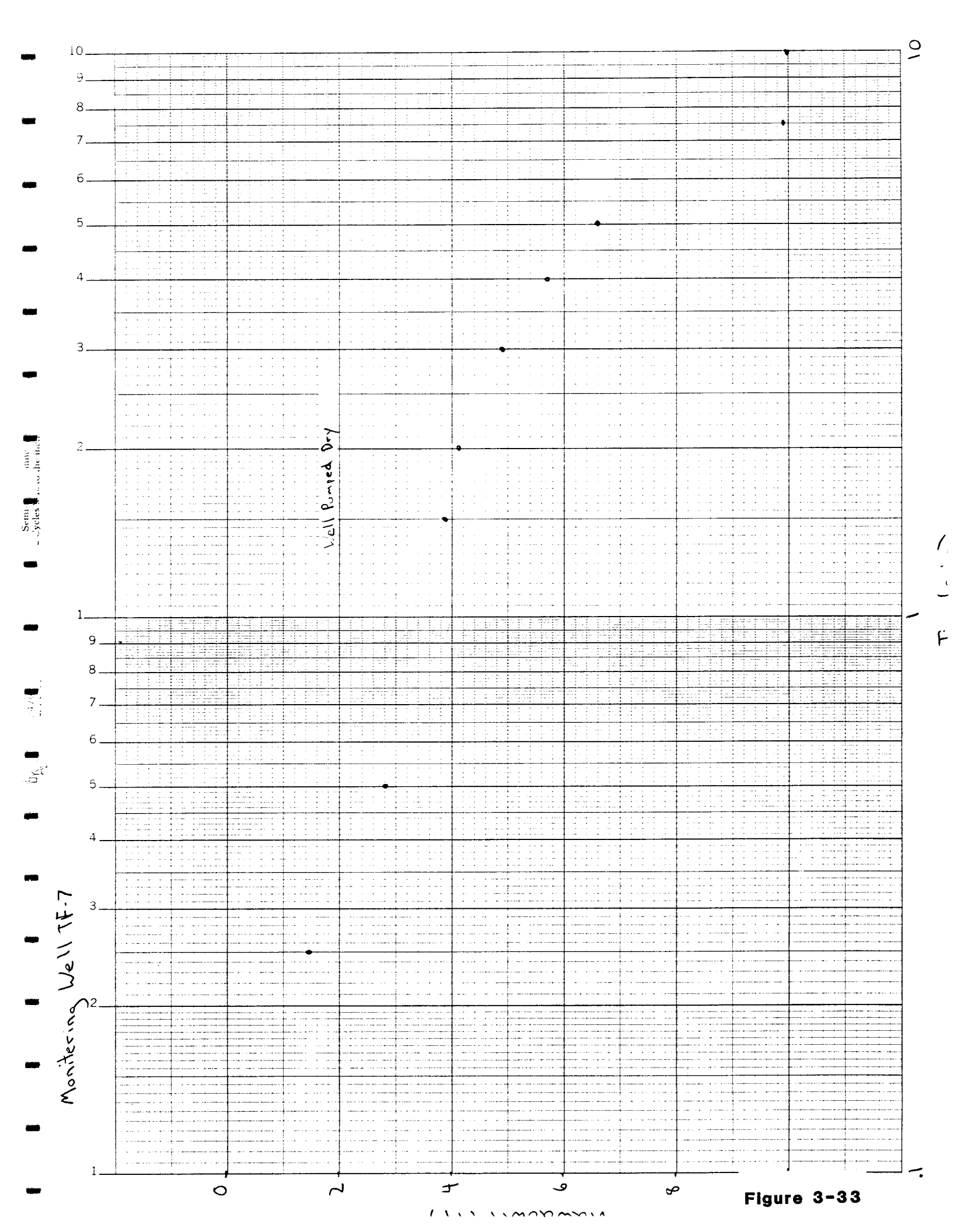


Figure 3-33

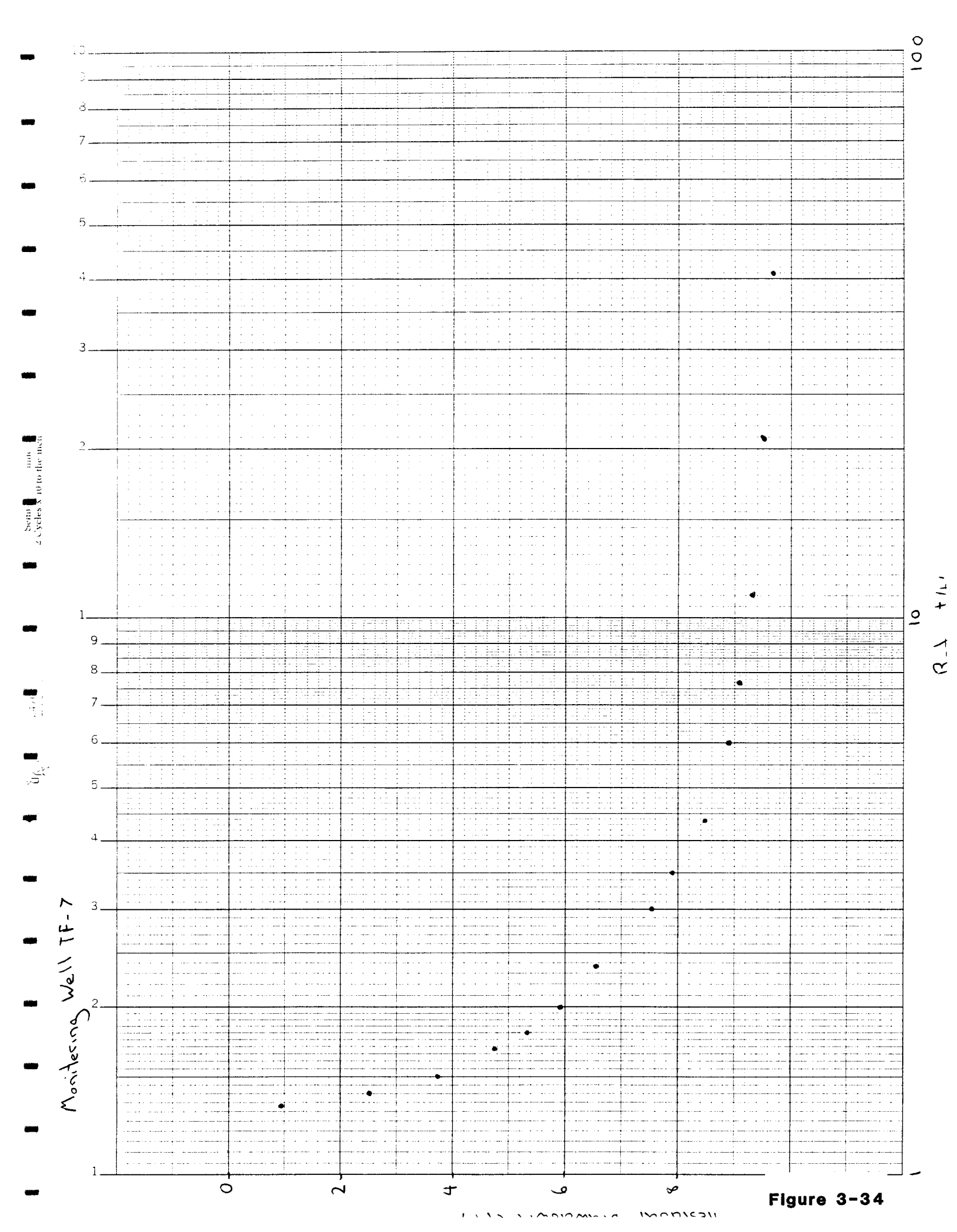


Figure 3-34

FIELD RECORD OF WELL GAUGING, PURGING AND SAMPLING

Site: Tifft Farm

Well No: TF-1 Gauge Date: — Time: —

Weather: Intermittent Rain; 40's

Well Condition: Lock intact; good condition

Well Diameter (inches): 2" well in 6 3/4" borehole

Odor (describe): —None

Sounding Method: Water Level Indicator Measurement Reference: Top of PVC

Stick up/down (ft): 1.42' above ground surface

(1) Well Depth (ft): 14.4' Purge Date: 11/9/85 Time: 0915

(2) Depth to Liquid (ft): — Purge Method: Centrifugal Pump

(3) Depth to Water (ft): 3.01' Purge Rate (gpm): _____

(4) Liquid Depth [(1)-(2)]: 11.39 Purge Time (min): _____

(5) Liquid Volume [(4)xF] (gal): 6.8 Purge Volume (gal): 40

6.8 x 4 = 27.2

Did Well Pump Dry? No Describe: _____

Samplers: JWK, CRG

Sampling Date: 11/10/85 Time: 1030

Sample Type: _____ Split? _____ With Whom: _____

Comments and Observations: _____

Figure 3-35

FIELD RECORD OF WELL GAUGING, PURGING AND SAMPLING

Site: Tifft Farm

Well No: TF-2 Gauge Date: _____ Time: _____

Weather: Intermittent rain; 40's

Well Condition: Lock intact

Well Diameter (inches): 2" well in 6 3/4" borehole

Odor (describe): None

QED water

Sounding Method: level indicator Measurement Reference: Top of PVC

Stick up/down (ft): 1.52' above ground surface

(1) Well Depth (ft): 15.52' Purge Date: 11/9/85 Time: 0900

(2) Depth to Liquid (ft): — Purge Method: Centrifugal Pump

(3) Depth to Water (ft): 6.03' Purge Rate (gpm): _____

(4) Liquid Depth [(1)-(2)]: 9.49 Purge Time (min): _____

(5) Liquid Volume [(4)xF] (gal): 5.7 Purge Volume (gal): 30

5.7 X 4 = 22.8

Did Well Pump Dry? No Describe: _____

Samplers: JWK, CRG

Sampling Date: 11/10/85 Time: 1250

Sample Type: _____ Split? _____ With Whom: _____

Comments and Observations: _____

Figure 3-36

FIELD RECORD OF WELL GAUGING, PURGING AND SAMPLING

Site: Tifft Farm

Well No: TF-3 Gauge Date: _____ Time: _____

Weather: Intermittent Rain; 40's

Well Condition: Locked, sound

Well Diameter (inches): 2" well in 6 3/4" borehole

Odor (describe): None

Sounding Method: QED water level indicator Measurement Reference: Top of PVC

Stick up/down (ft): 2.0' above ground surface

(1) Well Depth (ft): 16.0' Purge Date: 11/9/85 Time: 0950

(2) Depth to Liquid (ft): — Purge Method: Centrifugal Pump

(3) Depth to Water (ft): 7.10' Purge Rate (gpm): _____

(4) Liquid Depth [(1)-(2)]: 8.9' Purge Time (min): _____

(5) Liquid Volume [(4)xF] (gal): 5.34 Purge Volume (gal): 22

5.34 X 4 = 21.36

Did Well Pump Dry? No Describe: _____

Samplers: JWK, CRG

Sampling Date: 11/10/85 Time: 0915

Sample Type: _____ Split? _____ With Whom: _____

Comments and Observations: _____

Figure 3-37

FIELD RECORD OF WELL GAUGING, PURGING AND SAMPLING

Site: Tifft Farm

Well No: TF-4 Gauge Date: _____ Time: _____

Weather: Intermittent Rain

Well Condition: Locked, sound

Well Diameter (inches): 2" well in 6 3/4" borehole

Odor (describe): None
QED water

Sounding Method: level indicator Measurement Reference: Top of PVC

Stick up/down (ft): 2.48' above ground surface

(1) Well Depth (ft): 14.48 Purge Date: 11/9/85 Time: 1050

(2) Depth to Liquid (ft): — Purge Method: Centrifugal Pump

(3) Depth to Water (ft): 3.61 Purge Rate (gpm): _____

(4) Liquid Depth [(1)-(2)]: 10.87 Purge Time (min): _____

(5) Liquid Volume [(4)xF] (gal): 6.5 Purge Volume (gal): 25
6.5 x 4 = 26

Did Well Pump Dry? Describe: No

Samplers: JNK, CRG

Sampling Date: 11/10/85 Time: 0830

Sample Type: _____ Split? _____ With Whom: _____

Comments and Observations: _____

Figure 3-38

FIELD RECORD OF WELL GAUGING, PURGING AND SAMPLING

Site: Tifft Farm

Well No: TF-5 Gauge Date: _____ Time: _____

Weather: Intermittent Rain, 40's

Well Condition: Locked, secure

Well Diameter (inches): 2" well in 6 3/4" borehole

Odor (describe): None
QED water

Sounding Method: Level Indicator Measurement Reference: _____

Stick up/down (ft): 1.77 above ground surface

(1) Well Depth (ft): 17.77 Purge Date: 11/9/85 Time: 1330

(2) Depth to Liquid (ft): — Purge Method: Centrifugal Pump

(3) Depth to Water (ft): 5.29' Purge Rate (gpm): _____

(4) Liquid Depth [(1)-(2)]: 12.48 Purge Time (min): _____

(5) Liquid Volume [(4)xF] (gal): 7.5 Purge Volume (gal): 20
7.5 x 4 = 30

Did Well Pump Dry? Describe: Yes, purged dry twice

Samplers: JWK, CRG

Sampling Date: 11/10/85 Time: 1000

Sample Type: _____ Split? _____ With Whom: _____

Comments and Observations: _____

Figure 3-39

FIELD RECORD OF WELL GAUGING, PURGING AND SAMPLING

Site: Tifft Farm

Well No: TF-6 Gauge Date: _____ Time: _____

Weather: Intermittent Rain, 40's

Well Condition: Locked, secure

Well Diameter (inches): 2" well in 6 3/4" borehole

Odor (describe): None
QED Water

Sounding Method: Level Indicator Measurement Reference: Top of PVC

Stick up/down (ft): 1.78' above ground surface

(1) Well Depth (ft): 13.78 Purge Date: 11/9/85 Time: 1245

(2) Depth to Liquid (ft): — Purge Method: Centrifugal Pump

(3) Depth to Water (ft): 4.21 Purge Rate (gpm): _____

(4) Liquid Depth [(1)-(2)]: 9.57 Purge Time (min): _____

(5) Liquid Volume [(4)xF] (gal): 5.74 Purge Volume (gal): 35
5.74 x 4 = 22.96

Did Well Pump Dry? Describe: No

Samplers: JWK, CRG

Sampling Date: 11/10/85 Time: 1145

Sample Type: _____ Split? _____ With Whom: _____

Comments and Observations: _____

Figure 3-40

FIELD RECORD OF WELL GAUGING, PURGING AND SAMPLING

Site: Tifft Farm

Well No: TF-7 Gauge Date: _____ Time: _____

Weather: Intermittent Rain, 40's

Well Condition: Locked, secure

Well Diameter (inches): 2" well in 6 3/4" borehole

Odor (describe): None

Sounding Method: QED Water Level Indicator Measurement Reference: Top of PVC

Stick up/down (ft): 1.31 above ground surface

(1) Well Depth (ft): 17.3 Purge Date: 11/9/85 Time: 1510

(2) Depth to Liquid (ft): — Purge Method: Centrifugal Pump

(3) Depth to Water (ft): 5.97 Purge Rate (gpm): _____

(4) Liquid Depth [(1)-(2)]: 11.33 Purge Time (min): _____

(5) Liquid Volume [(4)xF] (gal): 6.8 Purge Volume (gal): 25

6.8 x 4 = 27.2

Did Well Pump Dry? Describe: No

Samplers: JWS, CRG

Sampling Date: 11/10/85 Time: 1045

Sample Type: _____ Split? — With Whom: —

Comments and Observations: _____

Figure 3-41

FIELD RECORD OF WELL GAUGING, PURGING AND SAMPLING

Site: Tifft Farm

Well No: TF-1 Gauge Date: 3-10-87 Time: 1620 hrs.

Weather: Cold, 28°F Sunny

Well Condition: Locked, secure

Well Diameter (inches): 2" well in 6¾" borehole

Odor (describe): None.

Sounding Method: OED water level indicator Measurement Reference: Top of PVC

Stick up/down (ft): 1.42' above ground surface

(1) Well Depth (ft): 14.4' Purge Date: 3-10-87 Time: 1634

(2) Depth to Liquid (ft): — Purge Method: centrifugal pump

(3) Depth to Water (ft): 1.97' Purge Rate (gpm): 3.5

(4) Liquid Depth [(1)-(2)]: 12.43 Purge Time (min): 11 min.

(5) Liquid Volume [(4)xF] (gal): 7.4 Purge Volume (gal): 38.5

7.4 x 4 = 29.6

Did Well Pump Dry? Describe: No. Initial discharge black after 3 gal. clear.

Samplers: LR, TP

Sampling Date: 3/11/87 Time: 1315

Sample Type: _____ Split? _____ With Whom: _____

Comments and Observations: _____

Figure 3-42

FIELD RECORD OF WELL GAUGING, PURGING AND SAMPLING

Site: Tifft Farm

Well No: TF-2 Gauge Date: 3/11/87 Time: 1050

Weather: Sunny, cold ~20°F, windy

Well Condition: Locked, sound

Well Diameter (inches): 2" well in 6 3/4" borehole

Odor (describe): None

Sounding Method: level indicator (QED water) Measurement Reference: Top of PVC

Stick up/down (ft): 1.52' above ground surface

(1) Well Depth (ft): 15.52' Purge Date: 3/11/87 Time: 1050

(2) Depth to Liquid (ft): — Purge Method: Centrifugal pump

(3) Depth to Water (ft): 6.13' Purge Rate (gpm): 2.5

(4) Liquid Depth [(1)-(2)]: 9.37 Purge Time (min): 9

(5) Liquid Volume [(4)xF] (gal): 5.65 Purge Volume (gal): 22.5

5.65 X 4 = 22.6

Did Well Pump Dry? Describe: Yes, initial discharge was orange. After 2 gal, silty black (w/black silt). Waited 10 min. pumped well dry again (water clear

Samplers: TP, CR

Sampling Date: 3/11/87 Time: 1115

Sample Type: _____ Split? _____ With Whom: _____

Comments and Observations: _____

Figure 3-43

FIELD RECORD OF WELL GAUGING, PURGING AND SAMPLING

Site: Tifft Farm

Well No: TF-3 Gauge Date: 3/11/87 Time: 1440

Weather: Sunny, cold ~20° F, windy

Well Condition: Locked, sound

Well Diameter (inches): 2" well in 6 3/4" borehole

Odor (describe): None

Sounding Method: QED water level indicator Measurement Reference: Top of PVC

Stick up/down (ft): 2.0' above ground level

(1) Well Depth (ft): 16.0' Purge Date: 3/11/87 Time: 1440

(2) Depth to Liquid (ft): — Purge Method: Centrifugal Pump

(3) Depth to Water (ft): 7.84 Purge Rate (gpm): 2.0

(4) Liquid Depth [(1)-(2)]: 8.16 Purge Time (min): 4

(5) Liquid Volume [(4)xF] (gal): 4.9 Purge Volume (gal): 8

4.9 x 4 = 19.6

Did Well Pump Dry? Describe: Yes, initial discharge rust-colored orange, after 4 gal cloudy brn/gray, Waited 10 min then pumped well dry again (water remained cloudy)

Samplers: TP, LR

Sampling Date: 3/11/87 Time: 1455

Sample Type: _____ Split? _____ With Whom: _____

Comments and Observations: _____

Figure 3-44

FIELD RECORD OF WELL GAUGING, PURGING AND SAMPLING

Site: Tiff Farm

Well No: TF-4 Gauge Date: 3/11/87 Time: 1640

Weather: Cold, windy ~15°F

Well Condition: Locked, secure

Well Diameter (inches): 2" well in 6 3/4" borehole

Odor (describe): none

Sounding Method: level indicator (QED water) Measurement Reference: Top of PVC

Stick up/down (ft): 2.48 above ground level

(1) Well Depth (ft): 14.48 Purge Date: 3/11/87 Time: 1640

(2) Depth to Liquid (ft): — Purge Method: Centrifugal Pump

(3) Depth to Water (ft): 3.65 Purge Rate (gpm): 1.75

(4) Liquid Depth [(1)-(2)]: 10.83 Purge Time (min): 3

(5) Liquid Volume [(4)xF] (gal): 6.5 Purge Volume (gal): 5

6.5 x 4 = 26

Did Well Pump Dry? Describe: Yes, initial discharge orange. After 2 gal, water turned cloudy gray/brn

Samplers: LR, JP

Sampling Date: 3/11/87 Time: 1710

Sample Type: _____ Split? _____ With Whom: _____

Comments and Observations: _____

Figure 3-45

FIELD RECORD OF WELL GAUGING, PURGING AND SAMPLING

Site: Tifft Farm

Well No: TF-5 Gauge Date: 3/11/87 Time: 1520

Weather: Cold ~15°F

Well Condition: Locked, secure

Well Diameter (inches): 2" well in 6 3/4" borehole

Odor (describe): none

Sounding Method: QED water level indicator Measurement Reference: Top of PVC

Stick up/down (ft): 1.77 above ground level

(1) Well Depth (ft): 17.77 Purge Date: 3/11/87 Time: 1520

(2) Depth to Liquid (ft): - Purge Method: Centrifugal Pump

(3) Depth to Water (ft): 3.56 Purge Rate (gpm): 2

(4) Liquid Depth [(1)-(2)]: 14.21 Purge Time (min): 3.75

(5) Liquid Volume [(4)xF] (gal): 8.5 Purge Volume (gal): 7.5

Did Well Pump Dry? 4 X 8.5 = 34 Describe: Yes, ~~no~~ 1st two gallons orange, then turned gray, very sandy and silty

Samplers: TP, CR

Sampling Date: 3/11/87 Time: 1540

Sample Type: _____ Split? _____ With Whom: _____

Comments and Observations: _____

Figure 3-46

FIELD RECORD OF WELL GAUGING, PURGING AND SAMPLING

Site: Tifft FARM

Well No: TF-6 Gauge Date: 3-10-87 Time: 1515 hrs.

Weather: Cold, 20°F Sunny

Well Condition: Locked

Well Diameter (inches): 2" well in 6 3/4" bore hole

Odor (describe):

Sounding Method: QED water Level indicator Measurement Reference: Top of PVC

Stick up/down (ft): 1.78 above ground surface

(1) Well Depth (ft): 13.78 Purge Date: 3-10-87 Time: 1523 hrs.

(2) Depth to Liquid (ft): — Purge Method: Centrifugal pump

(3) Depth to Water (ft): 4.72 Purge Rate (gpm): 2 gpm

(4) Liquid Depth [(1)-(2)]: 9.06 Purge Time (min): 14 min.

(5) Liquid Volume [(4)xF] (gal): 5.42 Purge Volume (gal): 28 gal
5.42 x 4 = 21.67

Did Well Pump Dry? Describe: No, intial discharge very silty black, cleared after 1st 2 gal.

Samplers: LR, TP

Sampling Date: 3/11/87 Time: 1220

Sample Type: _____ Split? _____ With Whom: _____

Comments and Observations:

Figure 3-47

FIELD RECORD OF WELL GAUGING, PURGING AND SAMPLING

Site: Tifft Farm

Well No: TF-7 Gauge Date: 3-10-87 Time: 1545 hrs.

Weather: Cold ~20°F, Sunny

Well Condition: Lock, secure

Well Diameter (inches): 2" well in 6¾" borehole

Odor (describe): None

Sounding Method: OEA water level indicator Measurement Reference: Top of PVC

Stick up/down (ft): 1.31 above top of ground surface

(1) Well Depth (ft): 17.3 Purge Date: 3/10/87 Time: 1557

(2) Depth to Liquid (ft): — Purge Method: centrifugal pump

(3) Depth to Water (ft): 3.15 Purge Rate (gpm): 2 gpm

(4) Liquid Depth [(1)-(2)]: 14.15 Purge Time (min): _____

(5) Liquid Volume [(4)xF] (gal): 8.4 Purge Volume (gal): 13 gals.

Did Well Pump Dry? Describe: Yes, initial discharge was orange turned translucent w/ black silt. Waited 10 min. pumped well dry again.

Samplers: TP, LR

Sampling Date: 3/11/87 Time: 1210

Sample Type: _____ Split? _____ With Whom: _____

Comments and Observations: _____

Figure 3-48

4. SITE ASSESSMENT

4.1 SITE HISTORY

The Tifft Farm site, approximately 264 acres in size, is an inactive dump located at the intersection of Tifft Street and Fuhrmann Blvd in the City of Buffalo, Erie County, New York (Appendixes 1.4.1-1 and 1.4.1-2). Purchased by the City of Buffalo from Republic Steel on 12 December 1972, the site, the last remaining remnant of what was once a great wetlands area, has been used as a nature preserve since 1976 (Appendix 1.4.1-1). For approximately 30 years prior to the opening of the Tifft Farm Nature Preserve, the site was used as a dump by both the City of Buffalo and the Republic Steel Corporation (Appendixes 1.4.1-2 and 1.4.1-3).

The history of Tifft Farm dates back to 1847 when George Washington Tifft purchased the property for farming purposes. Because the site is adjacent to Lake Erie, grain and livestock could be easily loaded into boats and transported. In the early 1880s, the Lehigh Valley Railroad purchased the property. Over the course of the next several years, channels were constructed to provide extensive shipping facilities for the railroad (Appendix 1.4.1-2). Further development of the property was planned. However, after much of the property was destroyed in a fire in 1934, business at the site began to decline; the channels were no longer maintained and began to fill in (Appendix 1.4.1-2).

By 1938, ships were no longer able to enter the canal system. As business continued to fail the Lehigh Valley Railroad decided to abandon its plans to develop the property. Some time in the years following the 1946 decision, the property was sold to the City of Buffalo. Aerial photographs taken in 1951 indicate that landfilling had already started in the southern portion of the site near the intersection of Tifft Street and Fuhrmann Blvd (Appendixes 1.4.1-2 and 1.4.1-4).

In December 1955, the Republic Steel Corporation purchased the property to use as a dumping grounds primarily for melt shop slag. According to J.M. Potwora, a Republic Steel representative, the City of Buffalo continued to dump refuse at the site until 1959. During this time period, Mr. Potwora indicated that the City was dumping approximately 6,000 loads of garbage a month at Tifft Farm (Appendix 1.4.1-3). Aerial photographs taken in 1958, 1959, 1960, and 1972, indicate that extensive landfilling occurred at the site. Progressing northward from the area noted in the 1951 photograph, wetlands and canals were being filled in with the disposed material. Most of the landfilling had stopped by 1972. By this time, however, the western canal, the northern portion of the middle canal, and upgradient water bodies had been filled (Appendix 1.4.1-4).

In the early 1970s, the Buffalo Sewer Authority received funding from the Federal Pure Waters Program in order to build a new sewage treatment facility on Squaw Island, which is located in the Niagara River. In order to construct the plant, approximately 1.6 million yds^3 of debris and sanitary sludge needed to be removed from the Island. As a result, the City of Buffalo re-acquired

the Tifft Farm property on 12 December 1972 in order to landfill the wastes from Squaw Island. From 1973 to 1975, the wastes were transferred and dumped in the southern portion of the site at the intersection of Fuhrmann Blvd and Tifft Street (Appendixes 1.4.1-2 and 1.4.1-3). Four mounds were created. A 22-ft deep clay wall was placed around the mounds. Drainage pipes were installed at the base of the clay to collect leachate and transport it into the municipal sewerage system. Two ft of soil, excavated from the north end of the Tifft Farm property, was used to cover the mounds (Appendix 1.4.1-2).

In 1975, spent acid possibly from the Chevrolet plant was reportedly being dumped at the site. The New York State Department of Environmental Conservation (NYSDEC) responded to the report and ceased all disposal (Appendix 1.4.1-5).

By 1976, plans to utilize the inactive dump as a nature preserve was completed; Tifft Farm Nature Preserve was opened to the public. Under an agreement signed in 1977, the City of Buffalo maintained ownership of the property. The Buffalo Museum of Science was chosen to manage the preserve (Appendix 1.4.1-2).

On 9 September 1982, two 55-gal drums were discovered on the south shore of Lake Kirsty. Samples were collected by NYSDEC and analyzed by RECRA Environmental Laboratories for organic compounds. Analyses indicated elevated concentrations of phenolic compounds in one sample and polynuclear aromatic hydrocarbons (PAHs) in the second sample (Appendix 1.4.1-6). Upon further

investigation by the Tifft Farm staff, additional drums were discovered in Lake Kirsty (Appendix 1.4.1-6). As a result, the nature preserve was closed to the public from April to October 1983 (Appendix 1.4.1-2). During this time, 112 drums were removed from Lake Kirsty, Lisa Pond, and the east side of the mounds area. Samples were collected from the drums and divided into eight composite samples (Appendixes 1.4.1-7 through 1.4.1-9). Analyzed by the NYSDEC, the samples contained total halogenated organics (THO), arsenic, chromium, lead, mercury, and napthalene (Appendix 1.4.1-8, 1.4.1-10).

In addition to the drum sampling, investigations were conducted on fish tissue, surface water, and sediment by several agencies beginning in 1977. Fish were collected from Lake Kirsty by the NYSDEC in 1977-1978, 1982, and 1983. In 1982, fish were also collected in Beth Pond. Analyses of fish tissue indicated oil, PCB, DDT, HCB, mercury, dacthal, THO, chromium, and arsenic (Appendixes 1.4.1-10 through 1.4.1-12). On 28 January 1982, the NYSDEC collected water samples from Lisa Pond, Beth Pond, Berm Pond, and Lake Kirsty. The samples were analyzed for halogenated organics, mercury, cadmium, lead, and iron. The results indicated low levels of iron (Appendix 1.4.1-11). Sediment samples were taken from the bottoms of Lake Kirsty, Beth Pond, the marsh, and the southernmost extension of Lake Kirsty by the Tifft Farm staff on 14 September 1982 (Appendix 1.4.1-13). Analyzed for PAH, all four composite samples contained PAH with levels ranging from 0.095 to 5.630 ppm. Extensive surficial soil investigations were undertaken by the NYSDEC, USGS, and the Erie County Department of Environment and Planning in 1982 and 1983 (Appendixes 1.4.1-14 through 1.4.1-19). High concentrations of chromium, copper, iron, lead, zinc,

arsenic, cadmium, nickel, mercury, selenium, and thallium were detected when compared to naturally occuring metals in U.S. soils (Appendix 1.4.1-20). In addition, PAH levels ranging from not detected (ND) to 6.82 ppm, were noted in all but the USGS sampling program in which PAH was not a parameter (Appendixes 1.4.1-13, 1.4.1-15, 1.4.1-18, and 1.4.1-19). Results of the NYSDEC 1983 sampling program also indicated levels of PCB, primarily in the south central portion of the site, east of Lake Kirsty (Appendix 1.4.1-18).

4.2 SITE TOPOGRAPHY

The Tifft Farm site is located along Buffalo Outer Harbor on the eastern shore of Lake Erie at an elevation of approximately 580 ft above mean sea level (Figure 1-1). The regional slope of terrain is to the west-southwest. The site itself is relatively flat with the exception of the "mounds" area which slopes radially outward with a range of 15-30 percent (EA Site Inspection, Appendix 1.4.2-1).

There are three surface water bodies situated on the property, remnants of canals which have been filled in with debris (Figure 1-2). Lisa Pond and Beth Pond are located in the north portion of the property; Lake Kirsty is located in the western-middle portion of the property. Wetlands cover almost half of the site, the eastern portion, and also border Tifft Street in the southern portion of the site. The "mounds" area is situated in the southwest corner of the property, covering approximately one quarter of the site. The leachate collection station, the location where leachate is collected and

transferred to the Buffalo Municipal sewerage system, is located in the northwest corner of the mounds area. A log cabin used as an education center is situated between Lake Kirsty and the mounds area (EA Site Inspection, Appendix 1.4.2-1).

The Tifft Farm site is surrounded by Tifft Street on the south, Fuhrmann Blvd on the west, and railroad tracks on the north and east. The nearest commercial establishment is located approximately 900 ft northwest of the site. The nearest residence is located approximately 800 ft north-northwest of the property. Drinking water for the area surrounding the site is served by community water systems supplied by Lake Erie; there are no ground-water wells within a 3-mi radius (Appendixes 1.4.2-2 and 1.4.2-3). As previously mentioned, there are three surface water bodies located on the Tifft Farm site. In addition, Lake Erie is situated approximately 400 ft west of the site (EA Site Inspection, Appendix 1.4.2-1).

4.3 SITE HYDROGEOLOGY

The Tifft Farm site is located adjacent to Lake Erie within the Erie-Niagara Basin of the Erie-Ontario Lowlands Physiographic Province, an area of low relief. The site area is characterized by unconsolidated lake deposits consisting of interbedded clay, silt, and fine sand deposited in glacial lakes (Appendix 1.4.3-1). The glacial lake deposits are in turn underlain by Devonian Age shale of the Marcellus Formation (Appendix 1.4.3-2).

The unconsolidated lake deposits may yield small supplies of water from sandy parts of the deposits, but otherwise the unit is not water yielding. The Marcellus shale generally yields only small supplies of water to wells, but could be used for domestic supplies (Appendix 1.4.3-1).

Based on the seven Phase II borings/monitorings wells installed in the upper 10-16 ft of overburden, the site consists of a layer of fill material underlain by beds of sand, silt, and clay. Borings TF-1 through TF-5 each encountered approximately 5 ft of fill material, while TF-6 and TF-7 encountered approximately 11 ft and at least 16 ft, respectively. Borings TF-6 and TF-7 are located in areas where filling of the old canals took place, while the other borings were located near the edge of the site (Figure ~~3-1~~ 4-1).

The fill consists of a mixture of wastes (iron slag, rubble, glass, plastic, brick), gravel, sand, and silt. The fill at borings TF-1 through TF-4 is directly underlain by silty sand beds 3-6 ft thick which in turn is underlain by sandy silt deposits. Boring TF-3 was completed in clayey sand. Borings TF-5 and TF-6 encountered clayey silt directly beneath the fill. Boring TF-7 encountered fill material to it's completed depth of 16 ft. (Borings logs/well schematics are provided in Figures 3-2 to 3-8).

Depth to bedrock is estimated to be 50 ft below ground surface, based on a resistivity sounding performed in the south central portion of the site during the geophysical survey (Appendix 1.3.2-1).

Depth to water ranges from about 1 to 6 ft below ground surface across the site. Because the material the Tifft Farm wells were screened in varied considerably across the site from clay and silt to sand and fill, a ground-water flow direction could not be established for the site as a whole. However, in general, it appears that the flow is trending towards the west (Figure 4-1).

A short-term, low-yield pumping test was performed in each Phase II test boring/monitoring well. Calculations of transmissivity (T) and permeability (K) are based on Jacobs modification of the Theis equation (Appendix 1.4.3-4). Table 4-1 provides a summary of the resultant estimated aquifer characteristics. Four of the wells (TF-3, TF-4, TF-5, and TF-7) pumped dry during the drawdown phase of the pumping test at low pumping rates, thereby exhibiting low transmissivity and effective permeability. Residual drawdown phase calculations of T and K for Wells TF-3 and TF-4 are also very low. In addition, Well TF-2 has a low transmissivity and permeability. The upgradient well (TF-1), screened in silty sand, has a higher transmissivity (4,058-6,481 gpd/ft) and effective permeability (55-88 ft/day). Well TF-6, screened in fill, has a high transmissivity and effective permeability (Figures 3-21 to 3-34).

Based upon the available information, the aquifer of concern is considered to be the unconsolidated deposits and the underlying shale bedrock. A hydraulic connection between the overburden and bedrock is possible through sandy sediment facies which were encountered by the borings at the site.

The unconsolidated lake deposits can yield small supplies of water from sandy portions/facies of the deposits as indicated locally by the Phase II monitoring wells during the pump tests. The shale bedrock also reportedly can yield small supplies of water to wells (Appendix 1.4.3-1).

Drinking water within the 3-mi radius of the site is served by the Erie County Water Authority which is supplied by surface water from Lake Erie. The intake for this supply is located outside the 3-mi radius of the site (Appendix 1.4.2-2). There are no private wells within a 3-mi radius of the site (Appendix 1.4.2-3).

4.4 SITE CONTAMINATION

On 9 September 1982, two drums were discovered on the south shore of Lake Kirsty. Samples, collected by NYSDEC, were analyzed for organic compounds by RECRA Environmental Laboratories. The following compounds were detected: acenaphthylene (ND and 31 ppm), anthracene (ND and 0.26 ppm), benzo(a)anthracene (ND and 0.16 ppm), benzo(a)pyrene (ND and 1.3 ppm), benzo(b)fluoranthene (ND and 1.7 ppm), benzo(g,h,i)perylene (ND and 0.69 ppm) benzo(k)fluoranthene (ND and 1.6 ppm), chrysene (ND and 4.1 ppm), indeno (1,2,3-c,d)pyrene (ND and 21 ppm), napthalene (ND and 62 ppm), phenanthrene (ND and 0.81 ppm), pyrene (ND and 7.4 ppm), and total recoverable phenolics (13 and 1,600 ppm) (Appendix 1.4.1-6). Upon further investigation of the Tifft Farm Site, it was determined that there were more drums in Lake Kirsty. In addition, drums were discovered along the western edge of Lisa Pond and to the east of the mounds area. On

7-10 and 13 June 1983, a clean-up program was conducted. As a result, 112 drums were removed from the site (80+ from Lake Kirsty and the remainder from Lisa Pond and the east side of the mounds area). Samples were taken from each drum and composited in the field by the Erie County Department of Environment and Planning. Eight composite samples were collected. Composite samples 1-7 were taken from drums located on the south shore of Lake Kirsty (east of the visitor center). Composite sample 8 was taken from drums located on the south shore of Lake Kirsty (west of the visitor center), the east side of the mounds, and the west shore of Lisa Pond. The samples were analyzed by NYSDEC for PCBs, total halogenated organics (THO), polynuclear aromatic hydrocarbons, phenols, arsenic, cadmium, chromium, lead, and mercury. Samples 1-7 contained THO (ND and 200 ppm), arsenic (ND and 1,900 ppm), chromium (796-1,140 ppm), mercury (0.1-33 ppm), and napthalene (5,000-250,000 ppm). Sample 8 contained lead (38 ppm), mercury (0.1 ppm), and napthalene (2.5 ppm) (Appendixes 1.4.1-9 and 1.4.1-10).

On 11 March 1987, during the EA Phase II sampling program, a "mounds" landfill leachate collection system was sampled from a manhole ("holding tank") at the site. One semi-volatile organic (4-chloroanniline) and ten metals (aluminum, arsenic, barium, calcium, iron, magnesium, manganese, potassium, sodium, and zinc) were detected above the contract required detection limit (CRDL) (Table 4-2). Additionally, a drum sample was collected on 10 November 1985. Fifteen metals were detected above the CRDL. Total cyanide and total phenol were also detected in the drum sample (Table 4-3).

Ground-Water

No assessment of ground-water quality in the vicinity of Tifft Farms was conducted prior to the Phase II investigation. As part of the Phase II investigation, seven monitoring wells were installed at the site (one well, TF-1, is located on the upgradient side of the site) in the upper 12 to 16 ft of unconsolidated sediment and fill material. Ground-water samples were collected from each Phase II well on 10 November 1985 (Table 4-4). Due to missed holding times, the wells were resampled on 11 March 1987 for pesticides and PCB.

Table 4-4 is a summary of parameters detected during the Phase II investigation. No volatile organics were detected above CRDL. Methylene chloride, acetone, and 2-butanone were detected below CRDL but were also detected in the method blank.

Bis(2-ethylhexyl)phthalate (detected in TF-2 through and TF-5), and Di-N-Octylphthalate (detected in TF-2 and TF-5) were the only semi-volatile compounds detected in significant concentrations compared to the upgradient well. However, the laboratory has noted internal phthalate problems at the time the samples were run. Therefore, these detected contaminants may have resulted from laboratory contamination.

Twelve metals were detected above CRDL (aluminum, arsenic, barium, calcium, chromium, iron, lead, magnesium, manganese, sodium, total cyanide, and total phenol). However, the levels of these metals were not significantly greater than upgradient conditions on TF-1. No release from the site to the ground water can be confirmed by the Phase II analytical results.

Surface Water

Prior to EA's Phase II sampling program, the surface water bodies at Tifft were sampled only once. On 28 January 1982, the NYSDEC collected samples from Lisa Pond, Beth Pond, Berm Pond, and Lake Kirsty. The samples, which were analyzed for halogenated organics, mercury, cadmium, lead, and iron, were found to contain only iron (0.2-1.2 ppm) (Appendix 1.4.1-11). In addition, fish species have been collected on several occasions for chemical analysis. Because the surface water bodies at Tifft Farm are entirely surrounded by land, there is a strong possibility that chemical substances present in fish tissue are also present in the ponds. In 1977-1978, the NYSDEC collected carp (goldfish) from Lake Kirsty. Analysis of the tissue indicated concentrations of oil (5-8.3 percent), PCB (2.16-5.48 ppm)DDT (0.07-0.28 ppm), HCB (ND and 0.02 ppm), and mercury (0.2 ppm). In 1982, the NYSDEC collected fish (bluegill and black crappie) from Beth Pond. Tissue samples contained oil (1.5 percent) and PCB (<10 ppm) (Appendixes 1.4.1-11 and 1.4.1-12). The NYSDEC sampled fish from Tifft Farm a third time in August 1983, after 112 drums were removed from the site (Appendix 1.4.1-10). Several species of fish were collected from Lake Kirsty (mirror carp, goldfish, perch, bluegills, and pumpkinseed sunfish). The

tissue samples contained aroclor (0.01-3.3 ppm), dacthal (ND and 0.8 ppm), THO (0.1-5 ppm) chromium (0.7-1.3 ppm), and arsenic (0.2-1 ppm). One species of fish, bluegills, was collected from Beth Pond. Analysis of the tissue samples indicated arochlor (0.3 ppm) THO (0.5 ppm), chromium (0.7 ppm), and arsenic (0.4 ppm) (Appendix 1.4.1-10).

As part of the Phase II sampling program, four surface water samples were collected on 10 November 1985 (Table 4-5). Due to missed holding times, the locations were resampled for pesticide and PCB on 11 March 1987.

No volatiles were detected above CRDL. Methylene chloride, acetone, and 2-butanone were detected below CRDL, but were also detected in the method blank. Bis(2-ethylhexyl)phthalate and diethyl phthalate were the only semi-volatile compounds detected above CRDL. However, they were also detected in the upgradient sample, TF-S1. The laboratory has noted phthalate contamination problems at the time the samples were run.

The upgradient sample, TF-S1, contained Alpha BHC (0.08 ppb). No pesticides were detected downgradient. Nine metals were detected above CRDL (aluminum, calcium, iron, lead, magnesium, manganese, potassium, sodium, and zinc) in the surface water samples. However, these metals were not detected in significant concentrations above the upgradient sample.

Soil

On 14 September 1982, the Tifft Farm staff collected sediment samples from Lake Kirsty, Beth Pond, the marsh, and the southernmost extension of Lake Kirsty. The samples from each surface water body were composited and analyzed for polycylic aromatic hydrocarbons (PAH) by Dr. John Black, Roswell Park Memorial Institute. Results indicated the following detected concentrations of fluorene (0.095-0.662 ppm), Phenanthrene (0.868-4.860 ppm), anthracene (0.263-1.030 ppm), fluoranthene (2.110-11.158 ppm), meanthrene (0.2-0.468 ppm), benzo-fluorene (1.250-2.430 ppm), benzanthracene (1.100-2.530 ppm), chrysene (0.847-1.680 ppm), benzo(e)pyrene (1.500-5.630 ppm), perylene (3.100-5.360 ppm), benzo(b)fluoranthene (0.895-1.900 ppm), benzo(a)pyrene (1.326-3.315 ppm), dibenz(a,h)anthracene (0.200-0.523 ppm), benzo(g,h,i)perylene (0.761-2.610 ppm), and ideno(1,2,3-c.d)pyrene (0.658-4.370 ppm) (Appendixes 1.4.1-13 and 1.4.1-15).

On 15 March 1982, surficial soil samples were collected from five locations at Tifft Farm by NYSDEC (Appendix 1.4.1-14 and 1.4.1.15). The samples were located as follows:

Sample SE-S1: Northwest portion of site, along Fuhrmann Blvd

Sample SE-S2: Northwest portion of site

Samples SE-S3 and SE-S4: East of southernmost extension of Lake Kirsty

Sample SE-S5: Southeast of the site, along the southern edge of Tifft Street.

The samples were analyzed for certain metals, PCB, and total halogenated organics (THO). Samples SE-S1 and SE-S4 contained chromium (5-35 ppm), copper (50-170 ppm), iron (6,400-29,000 ppm), lead (60-110 ppm), and zinc (85-192 ppm). However, the background sample (Sample No. 5) contained higher concentrations of each metal with the exception of zinc (186 ppm). In addition, Samples SE-S4 and SE-S5 were analyzed for PCB, PAH, and thirteen heavy metals. With the exception of benzo(a)anthracene, benzo(k)fluuoranthene, and dibenzo(g,h)anthracene, Sample SE-S5 (background sample) contained higher levels of PAH. However, there were higher metals concentrations in SE-S4: total arsenic (43 ppm), total cadmium (8.9 ppm), total chromium (530 ppm), total copper (400 ppm), total lead (1,000 ppm), total mercury (0.34 ppm), total nickel (110 ppm), total selenium (6.2 ppm), and total zinc (1,600 ppm) (Appendixes 1.4.1-14 and 1.4.1-15).

In addition, surficial soil samples were collected by USGS, NYSDEC, and the Erie County Department of Environment and Planning in 1982 and 1983. The USGS sampled 20 locations at Tifft Farm on 19 July, 31 July, and 7 August 1982, at depths ranging from 2 to 17 ft. The samples, which were analyzed for metals, contained the following:

Sample	Cadmium	Chromium	Copper	Iron	Lead	Nickel
GS-S1 - GS-S2 (Wetlands, south central portion of property)	ND ppm	1-2 ppm	17-19 ppm	7,200-10,000 ppm	10 ppm	ND-10 ppm

GS-S3 - GS-S7 (Mounds area, along Fuhrmann Blvd)	ND-1 ppm	6-7 ppm	14-40 ppm	2,300-12,000 ppm	10-140	ND-10 ppm
GS-S8 (West of Lake Kirsty, along Fuhrmann Blvd)	5 ppm	170 ppm	44 ppm	20,000 ppm	35 ppm	20 ppm
GS-S9 - GS-S11 (north edge of mounds, across from visitor center)	1-14 ppm	7-20 ppm	19-2,100 ppm	7,000-16,000 ppm	10-1,600 ppm	20-30 ppm
GS-S12 - GS-S13 (North portion of site, west of Beth Pond)	ND	3-10 ppm	3-12 ppm	2,000-4,500 ppm	10 ppm	ND-10 ppm
GS-S14 - GS-S16 (Northwestern portion of site, along Fuhrmann Blvd)	ND-2 ppm	3-10 ppm	10-22 ppm	2,300-5,900 ppm	10-160 ppm	ND-10 ppm
Gs-S17 - GS-S18 (Northern-central portion of property)	ND	3-9 ppm	13-25 ppm	1,400-3,500 ppm	30 ppm	ND-20 ppm
GS-S19 - GS-S20 (East edge of site, south portion and north portion, respectively)	ND-1 ppm	4-8 ppm	13-79 ppm	3,700-12,000	10-20 ppm	ND-20 ppm

ND = Not detected
(Appendixes 1.4.1-15 and 1.4.1-16.)

On 20 October 1982, the NYSDEC collected eleven surfical soil samples (SE-S6 - SE-S16) along the northern border of Tifft Farm. Analysis was performed by RECRA Environmental Laboratories for metals, organics, and 11 priority pollutants. The resultant data indicated total chromium (13-24 ppm), total

cadmium (ND-0.59 ppm), total nickel (10-38 ppm), total lead (9.4-640 ppm), total arsenic (3.7-21 ppm), total mercury (ND-0.65 ppm), and total zinc (18-330 ppm). The highest concentrations of heavy metals appeared in SE-S6, located in the northwest corner of the site. In addition, the following PAHs were detected in SE-S11 and SE-S12 (located north of Beth Pond):

SE-11: Benzo(b)fluoranthene (1.2 ppm)

SE-12: Benzo(a)anthracene (1.6 ppm)
Benzo(a)pyrene (6.0 ppm)
Benzo(b)fluoranthene (7.8 ppm)
Benzo(g,h,i)perylene (5.8 ppm)
Chrysene (1.4 ppm)
Dibenzo(a,h)anthracene (7.1 ppm)
Indeno (1,2,3-cd)pyrene (6.6 ppm)
Pyrene (1.1 ppm)

(Appendixes 1.4.1-15 and 1.4.1-17.)

On 11 and 12 July 1983, thirty-six surficial soil samples were collected by the Erie County Department of Environment and Planning at Tifft Farm (Appendix 1.4.1-18). In additon, three control samples were taken from three nearby locations (Holy Cross Cemetary and the Botanical Gardens) which were considered to be representative of ambient conditions. The samples were analyzed for selected metals, pesticides, and PCB by the Erie County Public Health Laboratory. In addition, the samples were grouped into representative

locations and composited. The ten composite samples were analyzed for PAH by Dr. John Black, Roswell Park Memorial Institute. The metals results are as follows:

Sites 1-4	
West side, southern shore of Lake Kirsty	Arsenic 2-9 ppm
	Chromium 10-20.9 ppm
	Copper 12.1- 34.6 ppm
	Iron 12,360-79,170 ppm
	Lead 30.2-83.8 ppm
	Mercury ND-0.3 ppm
	Nickel ND-11.1 ppm
	Selenium ND-6 ppm
	Zinc 59.3-151 ppm
	Thallium ND-30.2 ppm
Sites 5-11	
Mounds Area	Arsenic 2.1-8.1 ppm
	Chromium 20.0-34.9 ppm
	Copper 20.8-43.2 ppm
	Iron 23,550-59,470 ppm
	Lead 34.9-60.3 ppm
	Mercury ND-0.36 ppm
	Nickel ND-23.3 ppm

	Selenium ND-5.0 ppm
	Zinc 98.9-428 ppm
	Thallium ND-20.1 ppm
Sites 12-23	
Central portion of site	Arsenic ND-34.7 ppm
from direct middle to	Chromium 43.5-254 ppm
southernmost dirt road	Copper 65.6-447 ppm
	Iron 8,610-112,890 ppm
	Lead 103-1,250 ppm
	Mercury ND-2.74 ppm
	Nickel ND-53.3 ppm
	Selenium ND-5.2 ppm
	Silver ND-16.0 ppm
	Zinc 229-1,130 ppm
	Thallium 20.8-26.7 ppm
Sites 24-26 and 32-33	
Northern central portion	Arsenic 3.2-22.2 ppm
from south edge of Lisa	Chromium 31.7-144 ppm
Pond down to middle of	Copper 29.0-200 ppm
site	Iron 21,230-190,500 ppm
	Lead 96.8-2,687 ppm
	Mercury 0.17-0.33 ppm
	Nickel 10.6-55.6 ppm

	Selenium ND-2.2 ppm
	Zinc 245-1,210 ppm
	Thallium ND-21.2 ppm
Sites 27-29	
Western and northwestern edge of Beth Pond	Arsenic 4.2-16.2 ppm
	Chromium 20.4-167 ppm
	Copper 23.5-586 ppm
	Iron 27,310-60,890 ppm
	Lead 40.8-761 ppm
	Mercury 0.04-0.26 ppm
	Nickel 10.2-50.8 ppm
	Zinc 78.1-927 ppm
Sites 30 and 31	
Northern edge of Beth Pond	Arsenic ND-7 ppm
	Chromium 10.9-30.2 ppm
	Copper 29.5-32.2 ppm
	Iron 8,390-29,270 ppm
	Lead 32.8-60.3 ppm
	Mercury ND-0.04 ppm
	Zinc 21.9-106 ppm

Site 34	
Northern edge-Middle	Arsenic 2.0 ppm
	Chromium 20.2 ppm
	Copper 17.2 ppm
	Iron 15,420 ppm
	Lead 50.5 ppm
	Mercury 0.04 ppm
	Zinc 43.4 ppm
Site 35	
Northwest shore	Arsenic 1.2 ppm
Lisa Pond	Chromium 35.9 ppm
	Copper 14,270 ppm
	Iron 17,590 ppm
	Lead 3,590 ppm
	Mercury 0.05 ppm
	Nickel 240 ppm
	Zinc 2,075 ppm
Site 36	
Fuhrmann Blvd, western	Arsenic 7.1 ppm
edge of Lake Kirsty	Chromium 20.3 ppm
	Copper 50.8 ppm
	Iron 28,230 ppm

Lead 1.2 ppm

Mercury 0.53 ppm

Zinc ppm

In addition, PCB was found in various samples with a range of ND-3.1 ppm. The highest concentration was found in the northwest corner of Beth Pond. However, the most frequent levels of PCB occurred in a cluster in the south central portion of Tifft Farm, just east of the southernmost extension of Lake Kirsty (Appendix 1.4.1-18). Results of the composite sampling indicate Benzanthracene (0.14-32.7 ppm), Benzo(b)fluoranethrene (0.10-68.2 ppm), Benzo(a)pyrene (0.01-1.05 ppm), and Dibenzo(a)anthracene (0.01-3.21 ppm). Noticeably higher concentrations were detected in Composites F, G, and H, which were collected in the central-eastern portion of the site, beginning on the easternmost edge of Lake Kirsty and continuing down to the southernmost edge (Appendix 1.4.1-19).

Four sediment samples (TF-S1, TF-S2, TF-S3, and TF-S4) were collected during the Phase II investigation at the same locations where the surface water samples were collected (Figure 3-1). Samples were analyzed for all HSL parameters. Table 4-4 is a summary of the HSL parameters which were detected in the sediment samples.

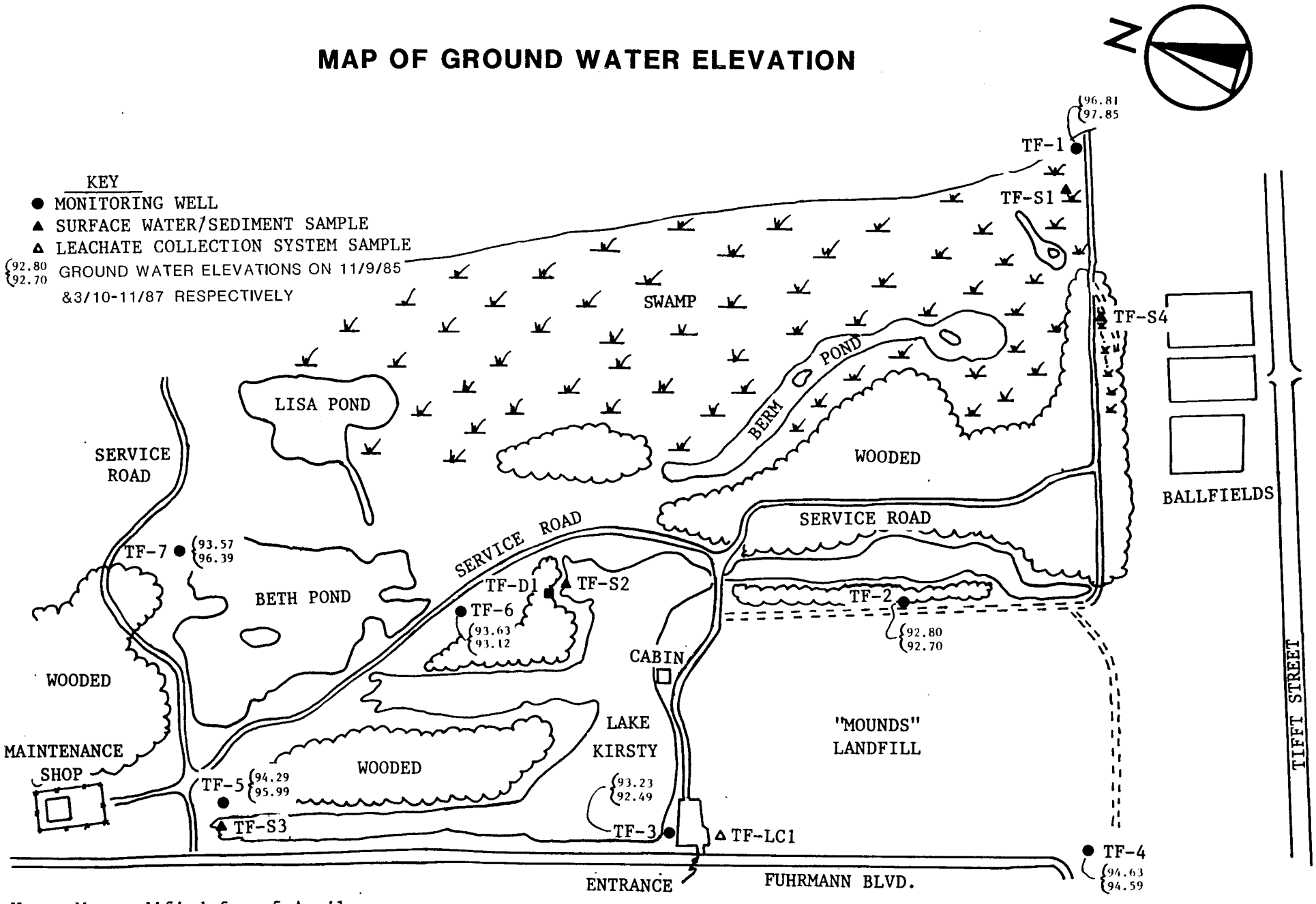
The organic compounds which were detected above the CRDL are methylene chloride and acetone. Acetone was used to clean sampling equipment between locations as required by NYSDEC. Methylene chloride is a possible laboratory contaminant.

Although several semi-volatile compounds were detected in the sediment samples, the concentrations were highest in upgradient TF-S1 with the exception of benzo(b+k)fluoranthene, benzo(g,h,i)perylene, and diethyl phthalate. However, the laboratory reported general phthalate contamination problems for the semi-volatile extractibles in soils.

With the exception of antimony and thallium, all HSL metals were detected in concentrations above CRDL. However, with regard for HRS, concentrations detected in the downgradient samples were not significantly higher than that detected in the upgradient sample.

The extensive soil sampling performed at the site in 1982 and 1983 contain results which are significantly higher than concentrations reported for naturally occurring metals in U.S. soils (Appendixes 1.4.1-13 through 1.4.1-20). In addition, results also indicated elevated levels of PAH and PCB. Because the contaminated sediment could be reentrained in the surface water bodies on site, the soil sampling results indicate an observed release to surface waters.

MAP OF GROUND WATER ELEVATION



Note: Map modified from 5 April 1982 aerial photograph (reduced).

(Not drawn to scale)

FIGURE 4-1

TABLE 4-1 SUMMARY OF PRELIMINARY AQUIFER CHARACTERISTICS BASED ON SHORT-TERM, LOW-YIELD PUMPING TESTS

	Pumping Tests				
		Drawdown Phase		Residual Drawdown Phase	
Well Number	Pump Rate gpm	Transmissibility (T) gpd/ft	Permeability(K) ft/day	Transmissibility (T) gpd/ft	Permeability(K) ft/day
TF-1	9.5	4,111	55	6,481	88
TF-2	4.1	(b)	(b)	625	8.0
TF-3	2.5	(a)	(a)	112	1.5
TF-4	1.8	(a)	(a)	26	0.4
TF-5	1.1	(a)	(a)	(c)	(c)
TF-6	9.9	43,560	685	25,131	395
TF-7	0.8	(a)	(a)	(c)	(c)

(a) Data obtained appears to be directly related to evacuation of the well casing.
(b) Mechanical problems, data not valid.
(c) Field data suggests potential delayed recharge to the well.

TABLE 4-2 SUMMARY OF RESULTS FOR ORGANIC AND INORGANIC DETERMINATIONS CONDUCTED ON A SAMPLE FROM THE LEACHATE COLLECTION SYSTEM AT THE TIFFT FARM SITE, BUFFALO NEW YORK, 11 MARCH 1987

Parameters	TF-L1	Field Blank	Method Blank
Volatiles (ppb)			
Methylene chloride	BCRDL[b]	BCRDL[b]	BCRDL
Acetone			BCRDL
Semi-Volatiles (ppb)			
4-chloroaniline	11		
N-nitrosodiphenylamine	BCRDL		
Bis(2-Ethylhexyl)phthalate		BCRDL	
Metals (ppm)			
Aluminum	0.3		
Arsenic	0.027		
Barium	0.383		
Calcium	195		
Iron	12	BCRDL	
Magnesium	58		
Manganese	0.920		
Potassium	51.2		
Sodium	241		
Thallium	BCRDL		
Vanadium		BCRDL	
Zinc	0.170		

NOTE: b = Parameter was detected in the method blank.
BCRDL = Detected below contract required detection limit.

TABLE 4-3 SUMMARY OF ANALYTICAL RESULTS FOR SEDIMENT AND DRUM SAMPLES COLLECTED ON 10 NOVEMBER 1985 AND 3 APRIL 1986

	10 November 1985							3 April 1986	
	Sediment								
	Upgradient	Downgradient			Drum		Method	Drum	
Parameters	TF-S1	TF-S2	TF-S3	TF-S4	TF-D1	TF-D1[a]	Blank	TF-D1	TF-D1[a]
Volatiles (ppb)									
Methylene chloride	56[b]	44[b]	17[b]	140[b]	39[b]	QNS	10		
Acetone	29[b]	62[b]	36[b]	47[b]	26[b]	QNS	12		
2-Butanone	BCRDL[b]	BCRDL[b]	BCRDL[b]		BCRDL[b]		BCRDL		
Semi-Volatiles (ppb)									
Napthalene	BCRDL					QNS			
2-Mehtylnapthalene	BCRDL					QNS			
Acenaphthene	BCRDL					QNS			
Fluorene	BCRDL					QNS			
Phenauthrene	790	BCRDL[b]		BCRDL[b]		QNS			
Di-n-butyl phthalate	1500[b]	BCRDL[b]	BCRDL[b]	BCRDL[b]	BCRDL[b]	QNS	550		
Fluoranthene	960	550		BCRDL	BCRDL	QNS			
Pyrene	990	490		BCRDL		QNS			
Benzo(a)authracene	600	BCRDL[b]		BCRDL[b]		QNS			
Bis(2-ethylhexyl)phthalate	BCRDL[b]	BCRDL[b]	BCRDL[b]	BCRDL[b]	BCRDL[b]	QNS	2400		
Chrysene	510	470		BCRDL		QNS			
Benzo(B+K)fluorauthene*	1000	1300		BCRDL		QNS			
Benzo(a)pyrene	470	BCRDL		BCRDL		QNS			
Indeno(1,2,3-CD)pyrene	BCRDL	BCRDL		BCRDL		QNS			
Dibenzo(a,h)authracene	BCRDL	BCRDL				QNS			
Benzo(GHI)perylene	BCRDL	610		BCRDL		QNS			
Diethyl phthalate		BCRDL	BCRDL	1300		QNS			
Anthracene		BCRDL				QNS			

* = Unable to separate isomers.

NOTE: a = determinations conducted on EP Toxicity extract.
b = Parameter detected in blank.
QNS = Quantity Not Sufficient.
BCRDL = detected below contract required detection limit.
Due to missed holding times locations were resampled on 11 March 1987 for pesticide and PCB. Nothing was detected.
Analytical parameters included the full Hazardous Substance List (HSL), however, this table is composed of only those parameters detected in at least one sample.

TABLE 4-3 (Cont.)

Parameters	TF-S1	TF-S2	TF-S3	TF-S4	TF-D1	TF-D1[a]	Method Blank	TF-D1	TF-D1[a]
Metals (ppm)									
Aluminum	11	6.1	2.7	7.5	QNS	0.8		0.93	
Antimony	BCRDL	BCRDL		BCRDL	QNS	BCRDL			
Arsenic	0.0069	0.0096	0.00024	0.012	QNS			0.00067	
Barium	0.12	0.2	0.0013	0.21	QNS	0.51		BCRDL	4.9
Beryllium	0.000614	0.000401	0.000124	0.000531	QNS				
Cadmium	0.0019	0.0022	BCRDL	0.0056	QNS			BCRDL	
Calcium	50	41	38	30	QNS	160		46.0	
Chromium	0.021	0.017	0.003	0.046	QNS	BCRDL		0.0288	0.02
Cobalt	0.0051	0.0043	0.0013	0.0065	QNS			0.00292	
Copper	0.03	0.017	0.006	0.25	QNS			0.002	
Iron	21	22	5.6	54	QNS	0.83		20.0	
Lead	0.25	0.59	0.0097	0.4	QNS			0.006	
Magnesium	12	13	16	5.2	QNS	8.0		32.8	
Manganese	12	13	16	5.2	QNS	8.0		0.1	
Mercury	0.00053	0.00098		0.0044	QNS				0.0002
Nickel	0.015	0.013	0.0037	0.021	QNS			0.058	
Potassium	1.5	0.73	0.44	0.46	QNS	BCRDL		0.23	
Selenium	0.00046	0.00026		0.00054	QNS	QNS			
Silver	0.00038	0.00074	BCRDL	0.0048	QNS				
Sodium	0.14	0.15	0.081	0.12	QNS			0.091	
Thallium	BCRDL	BCRDL	BCRDL	BCRDL	QNS				
Tin	0.0015	0.0022	BCRDL	0.0079	QNS	QNS			
Vanadium	0.016	0.012	0.047	0.025	QNS			0.0077	
Zinc	0.38	0.52	0.07	0.79	QNS	0.33		0.00905	
Total Cyanide	0.3				0.8				
Total Phenol					4				
EA No.	11224	11225	11226	11227	11236				

TABLE 4-4 SUMMARY OF RESULTS FOR ORGANIC AND INORGANIC DETERMINATIONS CONDUCTED ON SEVEN GROUND-WATER SAMPLES COLLECTED AT THE TIFFT FARM SITE BUFFALO, NEW YORK, 10 NOVEMBER 1985

Parameters	Upgradient	Downgradient						Field Blank	Method Blank
	TF-W1	TF-W2	TF-W3	TF-W4	TF-W5	TF-W6	TF-W7		
Volatiles (ppb)									
Methylene chloride	BCRDL[b]	BCRDL[b]		BCRDL[b]	BCRDL[b]	BCRDL[b]	BCRDL[b]	BCRDL[b]	BCRDL
Acetone	BCRDL[b]	BCRDL[b]	BCRDL[b]	BCRDL[b]	BCRDL[b]	BCRDL[b]	BCRDL[b]	22[b]	
2-Butanone	BCRDL[b]	BCRDL[b]	BCRDL[b]	BCRDL[b]	BCRDL[b]	BCRDL[b]	BCRDL[b]	BCRDL[b]	BCRDL
Semi-Volatiles (ppb)									
4-Chloroaniline									
Napthalene						BCRDL			
2-Mehtylnapthalene									
Acenaphthene									
Fluorene	BCRDL								
Phenauthrene		BCRDL				BCRDL			
Di-n-butyl phthalate				BCRDL					
Fluoranthene		BCRDL				BCRDL			
Pyrene		BCRDL				BCRDL			
Benzo(a)authracene						BCRDL			
Bis(2-ethylhexyl)phthalate	BCRDL	200	33	71	190	BCRDL	BCRDL		
Chrysene						BCRDL			
Benzo(B+K)fluoranthene*						BCRDL			
Benzo(a)pyrene						BCRDL			
Indeno(1,2,3-CD)pyrene						BCRDL			
Dibenzo(a,h)authracene									
Benzo(GHI)perylene									
Diethyl phthalate	18					BCRDL		18	
Anthracene									
N-Nitiosodiptenylamine	13								
Di-N-Octylphthalate		36		BCRDL	54				

* = Unable to separate isomers.

NOTE: b = Parameter detected in blank.
BCRDL = Detected below contract required detection limit.
Due to missed holding times, the wells were resampled on 11 March 1987 for pesticide and PCB.
Nothing was detected.
Analytical parameters included the full Hazardous Substance List (HSL), however, this table is composed of only those parameters detected in at least one sample.

TABLE 4-4 (Cont.)

Parameters	TF-W1	TF-W2	TF-W3	TF-W4	TF-W5	TF-W6	TF-W7	Field Blank	Method Blank
Metals (ppm)									
Aluminum	0.6	0.5			1.4	0.7	0.2		
Antimony									
Arsenic			BCRDL	BCRDL	0.020	BCRDL			
Barium	BCRDL	0.44	BCRDL	BCRDL	0.23	BCRDL	BCRDL		
Beryllium									
Cadmium	BCRDL				BCRDL	BCRDL	BCRDL	BCRDL	
Calcium	120	180	180	120	180	120	47		
Chromium	0.048	BCRDL	BCRDL	BCRDL	0.010	BCRDL	BCRDL	BCRDL	
Cobalt									
Copper	BCRDL				BCRDL	BCRDL			
Iron	11	13	4	0.88	40	6	0.6		
Lead	0.030	0.005		0.006	0.014	0.050			
Magnesium	14	48	5.2	46	69	4.7	27		
Manganese	0.76	0.61	0.78	0.95	2.25	0.29	0.20	0.05	
Mercury									
Nickel									
Potassium	12	13	12	14	BCRDL	10	21		
Selenium									
Silver									
Sodium	42	41	220	80	13	12	16		
Thallium									
Tin			BCRDL						
Vanadium									
Zinc	0.07		0.04		0.04	0.07			
Total Cyanide	0.02		0.01						
Total Phenol									
EA No.	11211	11212	11213	11214	11215	11216	11217		

TABLE 4-5 SUMMARY OF RESULTS FOR ORGANIC AND INORGANIC DETERMINATIONS CONDUCTED ON THE FOUR SURFACE WATER SAMPLES COLLECTED AT THE TIFFT FARM SITE, BUFFALO NEW YORK, 10 NOVEMBER 1985

Parameters	Upgradient TF-S1	Downgradient TF-S2	Downgradient TF-S3	Downgradient TF-S4	Field Blank	Method Blank
Volatiles (ppb)						
Methylene chloride	BCRDL[b]	BCDRL[b]	BCRDL[b]		BCRDL[b]	BCRDL
Acetone	BCRDL[b]	BCRDL	BCRDL	BCRDL[b]	22[b]	
2-Butanone	BCRDL[b]			BCRDL[b]	BCRDL[b]	BCRDL
Semi-Volatiles (ppb)						
4-Chloroaniline						
Napthalene						
2-Mehtylnapthalene						
Acenaphthene						
Fluorene						
Phenauthrene						
Di-n-butyl phthalate			BCRDL			
Fluoranthene						
Pyrene						
Benzo(a)authracene						
Bis(2-ethylhexyl) phthalate	BCRDL	BCRDL	14	32		
Chrysene						
Benzo(B+K)fluoranthene*						
Benzo(a)pyrene						
Indeno(1,2,3-CD)pyrene						
Dibenzo(a,h)authracene						
Benzo(GHI)perylene						
Diethyl phthalate	17	14		14	18	
Anthracene						
N-Nitiosodiptenylamine						
Di-N-Octylphthalate						
Pesticide (ppb)						
Alpha BHC	0.08					

NOTE: [b] = Parameter detected in blank.
BCRDL = Detected below contract required detection limit.
Due to missed holding times, the surface water locations were resampled for pesticude and PCB. Nothing was detected.
Analytical parameters included the full Hazardous Substance List (HSL), however, this table is composed of only those parameters detected in at least one sample.

TABLE 4-5 (Cont.)

Parameters	TF-S1	TF-S2	TF-S3	TF-S4	Field Blank	Method Blank
Metals (ppm)						
Aluminum	0.8	0.2		0.4		
Antimony						
Arsenic						
Barium	BCRDL	BCRDL	BCRDL	BCRDL		
Beryllium						
Volatiles						
Cadmium	BCRDL		BCRDL	BCRDL	BCRDL	
Calcium	56	71	99	130		
Chromium	BCRDL	BCRDL	BCRDL	BCRDL	BCRDL	
Cobalt						
Copper	BCRDL			BCRDL		
Iron	0.55	0.55	0.18	3.6		
Lead	0.005	0.009				
Magnesium	13	11	11	13		
Manganese	0.05	0.12	0.43	4.87	0.05	
Mercury						
Nickel						
Potassium	7	14	8	14		
Selenium						
Silver						
Sodium	11	42	32	20		
Thallium						
Tin						
Vanadium						
Zinc	0.03			0.11		
Total Cyanide						
Total Phenol						
EA No.	11218	11219	11220	11221	11223	

5. NARRATIVE SUMMARY

The Tifft Farm site (New York I.D. No. 915071 and EPA I.D. No. NYP000776799) is an inactive dump located at the intersection of Tifft Street and Fuhrmann Blvd in the City of Buffalo, Erie County, New York. The site, 264 acres in size, is currently owned by the City of Buffalo and has been operated by the Buffalo Museum of Science as a nature preserve since 1976. The eastern boundary of the site is a natural freshwater wetlands, the last remaining remnant of what was once a great wetlands area along the eastern shoreline of Lake Erie. Until the early 1940s, the site was used for shipping and had three canals. Dumping on the site and into the canals (which are now the lakes and ponds of the nature preserve) began sometime between 1942 and 1951.

Republic Steel purchased the site in 1955 and used it for slag dumping. The City of Buffalo also used the site. The amount of waste dumped is unknown. Materials disposed of include slag, sludge, foundry sand, flyash, and other garbage. The City of Buffalo bought the site in 1972 to transfer debris from Squaw Island. Waste materials from the City have been formed into natural-looking mounds, covered with topsoil, and planted. In 1974, Tifft Farm received a grant from New York State to develop the site into a wildlife preserve and nature sanctuary.

In 1975, acid sludge possibly from the Chevrolet plant was reportedly being dumped at Tifft Farm. New York State Department of Environmental Conservation (NYSDEC) responded to the report and ceased all disposal.

In 1982, drums were discovered on the south shore of Lake Kirsty. Samples indicated the drums were contaminated with heavy metals, PAH, and phenolic compounds. As a result, the Tifft Farm Nature Preserve was closed for approximately 6 months in 1983. During this time, over 100 drums were removed from the site, primarily from Lake Kirsty.

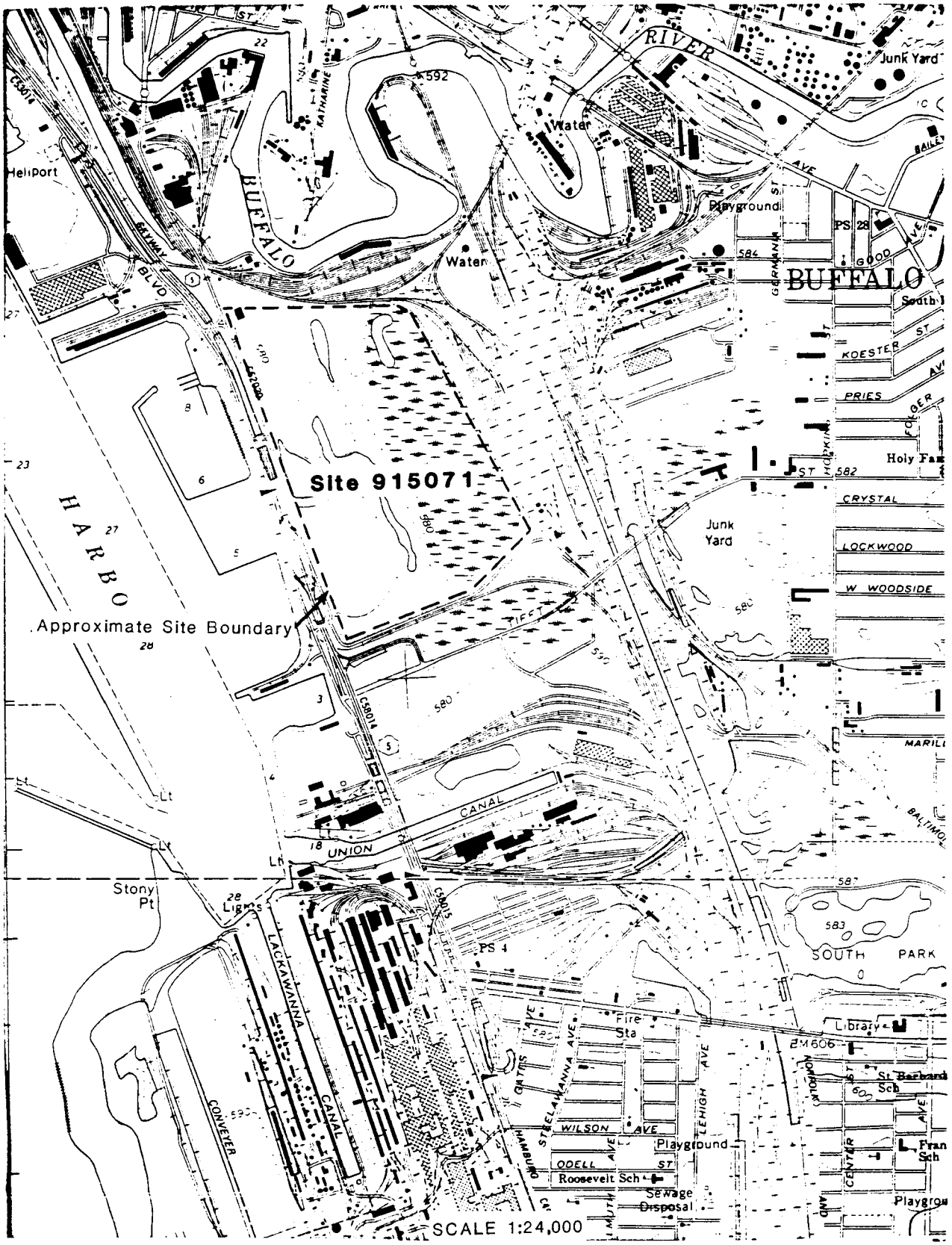
From 1977 until 1983, extensive sampling took place at Tifft Farms. Fish tissue from onsite surface water bodies was found to contain PCB, oil, pesticides, heavy metal, and THO. Surficial soil samples collected from many areas on the site contained high levels of metals and PAH. PCB was also detected.

According to tests conducted by EA, contaminants at the Tifft Farm site were not present in significant concentrations compared to ambient conditions to constitute an observed release. However, the past soil sampling results, discussed above, did indicate an observed release to surface water because the contaminated sediment could be reentrained in the surface water bodies onsite.

Site Coordinates:

Latitude: 42° 50' 54"
Longitude: 78° 51' 31"

TIFFT FARM



BUFFALO SE QUAD
7.5 MINUTE SERIES
NYSDOT
1975 EDITION

Facility name: Tifft Farm Nature Preserve

Location: 1200 Fuhrmann Boulevard, Buffalo, New York

EPA Region: II

Person(s) in charge of the facility: City of Buffalo (Buffalo Museum of Science)
Humboldt Parkway
Buffalo, New York 14211

Name of Reviewer: EA Science and Technology Date: 7 August 1985

General description of the facility:
(For example: landfill, surface impoundment, pile, container; types of hazardous substances; location of the facility; contamination route of major concern; types of information needed for rating; agency action, etc.)

The Tifft Farm site is a nature preserve in an urban setting. It was the site for uncontrolled dumping from the forties until 1975. In 1983, 112 barrels, some containing naphthalene, were found and removed from the site. PAH and phenolics have also reportedly been detected.

Scores: S_M = 9.98 (S_{gw} = 4.08 S_{sw} = 16.78 S_a = 0)

S_{FE} = N/A

S_{DC} = 25

FIGURE 1
HRS COVER SHEET

Ground Water Route Work Sheet							
Rating Factor	Assigned Value (Circle One)		Multi-plier	Score	Max. Score	Ref. (Section)	Maximum Possibl
1 Observed Release	0	45	1	0	45	3.1	45
If observed release is given a score of 45, proceed to line 4. If observed release is given a score of 0, proceed to line 2.							
2 Route Characteristics						3.2	
Depth to Aquifer of Concern	0 1 2 3		2	6	6		
Net Precipitation	0 1 2 3		1	2	3		
Permeability of the Unsaturated Zone	0 1 2 3		1	2	3		
Physical State	0 1 2 3		1	3	3		
Total Route Characteristics Score				13	15		
3 Containment	0 1 2 3		1	3	3	3.3	
4 Waste Characteristics						3.4	
Toxicity/Persistence	0 3 6 9 12 15 18		1	18	18		
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8		1	2	8		
Total Waste Characteristics Score				20	26		20
5 Targets						3.5	
Ground Water Use	0 1 2 3		3	3	9		
Distance to Nearest Well/Population Served	0 4 6 8 10 12 16 18 20 24 30 32 35 40		1	0	40		
Total Targets Score				3	49		3
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5				2,340	57,330		2,700
7 Divide line 6 by 57,330 and multiply by 100			S_{gw} = 4.08				4.71

FIGURE 2
GROUND WATER ROUTE WORK SHEET

Surface Water Route Work Sheet						
Rating Factor	Assigned Value (Circle One)		Multiplier	Score	Max Score	Ref. (Section)
1 Observed Release	0	45	1	45	45	4.1
If observed release is given a value of 45, proceed to line 4. If observed release is given a value of 0, proceed to line 2.						
2 Route Characteristics						4.2
Facility Slope and Intervening Terrain	0 1 2 3		1		3	
1-yr. 24-hr. Rainfall	0 1 2 3		1		3	
Distance to Nearest Surface Water	0 1 2 3		2		6	
Physical State	0 1 2 3		1		3	
Total Route Characteristics Score				N/A	15	
3 Containment	0 1 2 3		1	N/A	3	4.3
4 Waste Characteristics						4.4
Toxicity/Persistence	0 3 6 9 12 15 18		1	18	18	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8		1	2	8	
Total Waste Characteristics Score				20	26	
5 Targets						4.5
Surface Water Use	0 1 2 3		3	6	9	
Distance to a Sensitive Environment	0 1 2 3		2	6	6	
Population Served/Distance to Water Intake Downstream	0 4 6 8 10 12 16 18 20 24 30 32 35 40		1	0	40	
Total Targets Score				12	55	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5				10,800	64,350	
7 Divide line 6 by 64,350 and multiply by 100			S_{sw} = 16.78			

FIGURE 7
SURFACE WATER ROUTE WORK SHEET

Air Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max Score	Ref. Section
[1] Observed Release	0 45	1	0	45	5.1
Date and Location:					
Sampling Protocol:					
If line [1] is 0, the S_a = 0. Enter on line [5]. If line [1] is 45, then proceed to line [2].					
[2] Waste Characteristics					5.2
Reactivity and Incompatibility	0 1 2 3	1		3	
Toxicity	0 1 2 3	3		9	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
	Total Waste Characteristics Score			20	
[3] Targets					5.3
Population Within 4-Mile Radius	0 9 12 15 18 21 24 27 30	1		30	
Distance to Sensitive Environment	0 1 2 3	2		6	
Land Use	0 1 2 3	1		3	
	Total Targets Score			39	
[4] Multiply [1] x [2] x [3]				35,100	
[5] Divide line [4] by 35,100 and multiply by 100		S_a =	0		

FIGURE 9
AIR ROUTE WORK SHEET

	S	S^2
Groundwater Route Score (S_{gw})	4.08	16.65
Surface Water Route Score (S_{sw})	16.78	281.57
Air Route Score (S_a)	0	0
$S_{gw}^2 + S_{sw}^2 + S_a^2$		298.22
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		17.27
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} \,/\, 1.73 = S_M =$		9.98

FIGURE 10
WORKSHEET FOR COMPUTING S_M

Fire and Explosion Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max Score	Ref. (Section)
1 Containment	1 3	1		3	7.1
2 Waste Characteristics					7.2
Direct Evidence	0 3	1		3	
Ignitability	0 1 2 3	1		3	
Reactivity	0 1 2 3	1		3	
Incompatibility	0 1 2 3	1		3	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
Total Waste Characteristics Score				20	
3 Targets					7.3
Distance to Nearest Population	0 1 2 3 4 5	1		5	
Distance to Nearest Building	0 1 2 3	1		3	
Distance to Sensitive Environment	0 1 2 3	1		3	
Land Use	0 1 2 3	1		3	
Population Within 2-Mile Radius	0 1 2 3 4 5	1		5	
Buildings Within 2-Mile Radius	0 1 2 3 4 5	1		5	
Total Targets Score				24	
4 Multiply 1 x 2 x 3				1,440	
5 Divide line 4 by 1,440 and multiply by 100		S_{FE} = N/A			

FIGURE 11
FIRE AND EXPLOSION WORK SHEET

Direct Contact Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max Score	Ref. (Section)
1 Observed Incident	0 45	1	0	45	8.1
If line 1 is 45, proceed to line 4 If line 1 is 0, proceed to line 2					
2 Accessibility	0 1 2 3	1	3	3	8.2
3 Containment	0 15	1	15	15	8.3
4 Waste Characteristics Toxicity	0 1 2 3	5	15	15	8.4
5 Targets					8.5
Population Within a 1-Mile Radius	0 1 2 3 4 5	4	8	20	
Distance to a Critical Habitat	0 1 2 3	4	0	12	
Total Targets Score			8	32	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			5,400	21,600	
7 Divide line 6 by 21,600 and multiply by 100		S_{DC} =	25.00		

FIGURE 12
DIRECT CONTACT WORK SHEET

GROUND WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected (5 maximum):

No observed release. References: Table 4-5, Section 4.4-2.

Rationale for attributing the contaminants to the facility:

Assigned value = 0. Reference: 1.

***

2 ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Name/description of aquifer(s) of concern:

There are no ground-water wells within a 3-mi radius of the site. However, both the unconsolidated sediments and shale bedrock can yield small supplies of water to wells, therefore could be used as a domestic supply. Both are considered to be the aquifer of concern. References: 2, 3, and Section 4.3.

Depth(s) from the ground surface to the highest seasonal level of the saturated zone (water table[s]) of the aquifer of concern:

1/2 ft. Reference: Table 3-1, EA Phase II Sampling Program.

Depth from the ground surface to the lowest point of waste disposal/storage:

16 ft. Reference: 4. Depth to aquifer is 1/2 ft.
Assigned value = 3.
References: 1 and 4.

Net Precipitation

Mean annual or seasonal precipitation (list months for seasonal):

35 in. Reference: 5.

Mean annual lake or seasonal evaporation (list months for seasonal):

26 in. Reference: 1.

Net precipitation (subtract the above figures):

9 in. Assigned value = 2.
Reference: 1.

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

Silt, sand, fine gravel, and fill material. Reference: Section 4.3 and Figures 3-2 through 3-8.

Permeability associated with soil type:

10^{-3} to 10^{-5} cm/sec. Assigned value = 2.
Reference: 1.

Physical State

Physical state of substances at time of disposal (or at present time for generated gases):

Solids and sludge. References: 6 and 7.
Assigned value = 3.
Reference: 1.

***

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

The "mounds" landfill, which received waste from Squaw Island, has a clay liner and a leachate collection system. The remainder of the site has no containment. Drums in different stages of deterioration were discovered onsite.
References: 5 and 7.

Method with highest score:

No containment. Assigned value = 3. Reference: 1.

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

Acenaphthylene	chrysene	Total Halogenated Organics
benzo(a)pyrene	napthalene	arsenic
benzo(k&b)fluoranthene	pyrene	iron
chromium	lead	
copper		

References: 9, 10, 11, 12, 13, 14, 15, and 16.

Compound with highest score:

Arsenic. Assigned value = 18. Reference: 1.

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

112 drums. Reference: 17.

Basis of estimating and/or computing waste quantity:

Assigned value = 2. Reference: 1.

***

5 TARGETS

Ground Water Use

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:

Not currently used, but usable. Reference: 2.
Assigned value = 1.

Distance to Nearest Well

Location of nearest well drawing from aquifer of concern or occupied building not served by a public water supply:

None within a 3-mi radius. Reference: 2.

Distance to above well or building:

N/A. Assigned value = 0. Reference: 1.

Population Served by Ground Water Wells Within a 3-Mile Radius

Identified water-supply well(s) drawing from aquifer(s) of concern within a 3-mile radius and populations served by each:

Zero. Reference: 2.

Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

There is no irrigated land within a 3-mi radius of the site. Any such land would be served by public water supply, served by surface water from intakes outside a 3-mi radius.
Reference: 18.

Total population served by ground water within a 3-mile radius:

Zero. References: 2 and 18.
Assigned value = 0. Reference: 1.

SURFACE WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum):

Although no contaminants were detected in surface water sampling, concentrations of PAH, heavy metals, and PCB have been detected in sediment. Heavy metals include chromium, copper, iron, lead, zinc, arsenic, cadmium, nickel, mercury, selenium, and thallium. References: 11 through 16.

Rationale for attributing the contaminants to the facility:

Sediment could be reentrained, thereby contaminating surface water. Assigned value = 45. Reference: 1.

***

2 ROUTE CHARACTERISTICS

Not applicable/observed release

Facility Slope and Intervening Terrain

Average slope of facility in percent:

Name/description of nearest downslope surface water:

Average slope of terrain between facility and above-cited surface water body in percent:

Is the facility located either totally or partially in surface water?

Is the facility completely surrounded by areas of higher elevation?

1-Year, 24-Hour Rainfall in Inches

Distance to Nearest Downslope Surface Water

Physical State of Waste

***

3 CONTAINMENT

Not applicable/observed release

Containment

Method(s) of waste or leachate containment evaluated:

Method with highest score:

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated

PAHs, PCBs, and 11 metals, including chromium, copper, lead, arsenic, and mercury. References: 11 through 16.

Compound with highest score:

Arsenic, mercury, copper, and lead.
Assigned value = 18. Reference: 1.

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

112 drums. Reference: 17.

Basis of estimating and/or computing waste quantity:

Assigned value = 2. Reference: 1.

***

5 TARGETS

Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous substance:

Recreational. Reference: 2.
Assigned value = 2. Reference: 1.

Is there tidal influence?

No. Reference: 19.

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

N/A. Reference: 19.

Distance to 5-acre (minimum) freshwater wetland, if 1 mile or less:

Zero. References: 2, 8, 19, and 23. Assigned value = 3. Reference: 1.

Distance to critical habitat of an endangered species or national wildlife refuge, if 1 mile or less:

None. Reference: 20.

Population Served by Surface Water

Location(s) of water supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static waterbodies) downstream of the hazardous substance and population served by each intake:

The nearest surface water intake is located on Lake Erie, >1 mi from the the site. Reference: 21. Assigned value = 0. Reference: 1.

Computation of land area irrigated by above-cited intake(s) and conversion to population (1.5 people per acre).

There is no irrigated land within a 3-mi radius of the site. Reference: 18. Assigned value = 0. Reference: 1.

Total population served:

Zero. References: 8 and 21.

Name/description of nearest of above waterbodies:

Distance to above-cited intakes, measured in stream miles.

AIR ROUTE

Not applicable based on available information. There is no information or analytical data in the files received during the records search indicating a problem with air contamination. No readings above background were detected during the Phase II sampling program.

1 OBSERVED RELEASE

Contaminants detected:

Date and location of detection of contaminants

Methods used to detect the contaminants:

Rationale for attributing the contaminants to the site:

***

2 WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:

Most incompatible pair of compounds:

Toxicity

Most toxic compound:

Hazardous Waste Quantity

Total quantity of hazardous waste:

Basis of estimating and/or computing waste quantity:

***

3 TARGETS

Population Within 4-Mile Radius

Circle radius used, give population, and indicate how determined:

0 to 4 mi 0 to 1 mi 0 to 1/2 mi 0 to 1/4 mi

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

Distance to 5-acre (minimum) freshwater wetland, if 1 mile or less:

Distance to critical habitat of an endangered species, if 1 mile or less:

Land Use

Distance to commercial/industrial area, if 1 mile or less:

Distance to national or state park, forest, or wildlife reserve if 2 miles or less:

Distance to residential area, if 2 miles or less:

Distance to agricultural land in production within past 5 years, if 1 mile or less:

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within the view of the site?

FIRE AND EXPLOSION

Not applicable based on information provided. No state or local fire marshal has certified that the site presents a significant fire or explosion threat or whether a threat has been demonstrated based on field observations (e.g., combustable gas indicator readings are not available). Reference: 22.

1 CONTAINMENT

Hazardous substances present:

Type of containment, if applicable:

***

2 WASTE CHARACTERISTICS

Direct Evidence

Type of instrument and measurements:

Ignitability

Compound used:

Reactivity

Most reactive compound:

Incompatibility

Most incompatible pair of compounds:

***

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility:

Basis of estimating and/or computing waste quantity:

***

3 TARGETS

Distance to Nearest Population

Distance to Nearest Building

Distance to Sensitive Environment

Distance to wetlands:

Distance to critical habitat:

Land Use

Distance to commercial/industrial area, if 1 mile or less:

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

Distance to residential area, if 2 miles or less:

Distance to agricultural land in production within past 5 years, if 1 mile or less:

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within the view of the site?

Population Within 2-Mile Radius

Buildings Within 2-Mile Radius

DIRECT CONTACT

1 OBSERVED INCIDENT

Date, location, and pertinent details of incident:

None. References: 3 and 7.

***

2 ACCESSIBILITY

Describe type of barrier(s):

Parts of site are fenced. However, the site is a nature preserve and pedestrian access is unlimited.
Reference: 8. Assigned value = 3. Reference: 1.

***

3 CONTAINMENT

Type of containment, if applicable:

Evidence of surficial soils contamination has been found throughout much of the site. References: 10 through 16.
Assigned value = 15.
Reference: 1.

***

4 WASTE CHARACTERISTICS

Toxicity

Compounds evaluated:

PAH, PCBs, and 11 metals, including chromium, copper, lead, arsenic, and mercury. References: 9 through 16.

Compound with highest score:

Arsenic.
Assigned value = 3. Reference: 1.

***

5 TARGETS

Population Within 1-Mile Radius

43 homes x 3.8 = 163 people. Reference: 19.
Assigned value = 2. Reference: 1.

Distance to Critical Habitat (of Endangered Species)

>3 mi radius. Reference: 20.
Assigned value = 0. Reference: 1.

REFERENCES

1. U.S. Environmental Protection Agency (U.S. EPA). 1984. Uncontrolled Hazardous Waste Site Ranking System. A Users Manual.

2. Koczaja, R. 1987. Public Health Engineer, Erie County Department of Health. Personal Communication. 13 May. (Appendix 1.4.2-3.)

3. LaSala, A.M. Jr. 1960. Ground-Water Resources of the Erie-Niagara Basin, New York. (Appendix 1.4.3-1.)

4. EA Science and Technology (EA). 1987. Phase II Field Activities. (Section 3.3 of this report, boring logs.)

5. Dethier, B.E. 1966. Precipitation in New York State: Cornell Univ. Agr. Expt. Sta. Bulletin 1009. Ithaca, New York.

6. Wolfe, T. et al. Tifft Farm, A History of Man and Nature. (Appendix 1.4.1-2.)

7. West, W.L. 1981. U.S. EPA. Director of Environmental Control. Notification of Hazardous Waste Site. 8 June. (Appendix 1.4.1-3.)

8. EA. 1985. Site Inspection. 16 April.

9. RECRA Environmental Lab. 1982. Drum sample analytical results. 15 November. (Appendix 1.4.1-6.)

10. New York State Department of Environmental Conservation (NYSDEC). 1983. Final Report on the Analysis of Eight Composite Drum Samples and Fish Samples from Tifft Farm. 26 August. (Appendix 1.4.1-10.)

11. Tifft Farm Staff. 1982. Results of Analysis for Composite Sediment Samples. 14 September. (Appendix 1.4.1-13.)

12. NYSDEC. 1982. Results of Analysis of Five Sediment Samples. 15 March. (Appendix 1.4.1-14.)

13. USGS. 1982. Results of Analysis of Sediment Collected at Tifft Farm. (Appendix 1.4.1-16.)

14. NYSDEC. 1982. Results of Analysis of Soil. 20 October. (Appendix 1.4.1-17.)

15. Department of Environment and Planning Division of Environmental Control. 1983. (Tifft Farm Nature Preserve Sampling Program. July. (Appendix 1.4.1-18.)

16. Erie County Department of Environmental Protection. 1983. Polycyclic Aromatic Hydrocarbon Comparison Summary. Tifft Farm Surface Soil Composite Samples. (Appendix 1.4.1-19.)

17. County of Erie Department of Health. 1983. Letter regarding drum sampling observations and methods. (Appendix 1.4.1-8.)

18. Whitney, J. 1987. Soil Conservationist. U.S. Dept. of Agriculture Soil Conservation Service. Personal Communication. 26 May. (Appendix 1.5.1-1.)

19. USGS. 1965. 7.5 Minute, Topographic Series, Buffalo SE Quadrangle. (Appendix 1.4.2-1.)

20. Ozard, J. 1986. NYSDEC. Senior Wildlife Biologist. Personal Communication. 10 April. (Appendix 1.5.1-2.)

21. New York State Department of Health (NYSDOH). 1982. New York State Atlas of Community Water System Sources. (Appendix 1.4.2-2.)

22. DeYoung, E. 1987. Captain, Fire Prevention, City of Buffalo. Personal Communication. 26 May (Appendix 1.5.1-3.)

23. Dietz, J. 1988. Senior Environmental Analyst, NYSDEC. Personal Communication. 11 April. (Appendix 1.5.1-4.)

DOCUMENTATION RECORDS
FOR
HAZARD RANKING SYSTEM

INSTRUCTIONS: As briefly as possible, summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference. Include the location of the document.

FACILITY NAME: Tifft Farm

LOCATION: Buffalo, New York

DATE SCORED: 29 May 1987

PERSON SCORING: EA Science and Technology

PRIMARY SOURCES(S) OF INFORMATION (e.g., EPA region, state, FIT, etc.)

New York State Department of Environmental Conservation
Erie County Department of Environment and Planning
Mr. Wayne Gall, Director of Tifft Farm Nature Preserve
EA Site Inspection, EA Phase II Sampling Program

FACTORS NOT SCORED DUE TO INSUFFICIENT INFORMATION:

Air Route

COMMENTS OR QUALIFICATIONS:

United States
Environmental Protection
Agency

Office of Emergency and
Remedial Response
Washington, DC 20460

EPA Form 2070-13
July 1981

Tifft Farm

EPA

Potential Hazardous Waste Site

Site Inspection Report

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

EPA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	NYP000776799

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER				
Tifft Farm	1200 Fuhrmann Blvd				
03 CITY	**04 STATE**	**05 ZIP CODE**	**06 COUNTY**	**07 COUNTY CODE**	**08 CONG DIST**
Buffalo	NY	14203	Erie	29	

09 COORDINATES LATITUDE 42° 50' 54" | LONGITUDE 78° 51' 31"

10 TYPE OF OWNERSHIP (Check one)
☐ A. PRIVATE ☐ B. FEDERAL _____ ☐ C. STATE ☐ D. COUNTY ☒ E. MUNICIPAL
☐ F. OTHER _____ ☐ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION	02 SITE STATUS	03 YEARS OF OPERATION
4 / 16 / 85 (MONTH DAY YEAR)	☐ ACTIVE ☒ INACTIVE	1940s (BEGINNING YEAR) 1975 (ENDING YEAR) ___ UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply)
☐ A. EPA ☐ B. EPA CONTRACTOR _____ (Name of firm) ☐ C. MUNICIPAL ☐ D. MUNICIPAL CONTRACTOR _____ (Name of firm)
☐ E. STATE ☒ F. STATE CONTRACTOR EA Science & Tech. (Name of firm) ☐ G. OTHER _____ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO
Dr. Chuck Houlik	Senior Geologist	EA	(301) 771-4950
09 OTHER INSPECTORS	**10 TITLE**	**11 ORGANIZATION**	**12 TELEPHONE NO**
Linda Rubin	Corporate Health and Safety Officer	EA	(301) 771-4950
John Koslowski	Geologist	EA	(301) 771-4950
			( )
			( )
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO
Wayne Gall	Director of Preserve	1200 Fuhrmann Blvd Buffalo, NY 14203	(716) 896-5200
			( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
☒ PERMISSION ☐ WARRANT	13:30-19:30	Sunny 70 F

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO
James Shultz	EA Science and Technology	914) 692-6706

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
Lori Rogers		EA		5 / 29 / 87 (MONTH DAY YEAR)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	NYP000776799

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- [X] A. SOLID
- [X] B. POWDER, FINES
- [X] C. SLUDGE
- [ ] D. OTHER (Specify)
- [ ] E. SLURRY
- [ ] F. LIQUID
- [ ] G. GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS: unknown

CUBIC YARDS:

NO. OF DRUMS:

03 WASTE CHARACTERISTICS (Check all that apply)

- [X] A. TOXIC
- [ ] B. CORROSIVE
- [ ] C. RADIOACTIVE
- [X] D. PERSISTENT
- [ ] E. SOLUBLE
- [ ] F. INFECTIOUS
- [ ] G. FLAMMABLE
- [ ] H. IGNITABLE
- [ ] I. HIGHLY VOLATILE
- [ ] J. EXPLOSIVE
- [ ] K. REACTIVE
- [ ] L. INCOMPATIBLE
- [ ] M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE	unknown		
OLW	OILY WASTE			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS	unknown		

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
MES	Chromium	7440-47-3	OD	254	ppm
MES	Copper		OD	2,100	ppm
MES	Iron		OD	190,500	ppm
MES	Lead		OD	2,687	ppm
MES	Zinc		OD	1,210	ppm
MES	Arsenic	7440-38-2	OD	34.7	ppm
MES	Cadmium	7440-45-9	OD	14	ppm
MES	Nickel	7440-02-0	OD	240	ppm
MES	Mercury		OD	2.74	ppm
	PCB		OD	3.1	ppm
	Benzo(b)fluoranthracene			68.2	ppm
	Benzo(a)pyrene		OD	3.315	ppm
	Dibenz(a,h)anthracene		OD	3.21	ppm
	Indeno(1,2,3-c,d)pyrene		OD	4.37	ppm
	Total cyanide		OD		ppm
	Total phenol	108-98-2	OD		ppm

V. FEEDSTOCKS (See Appendix for CAS numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sampling reports)

EA Site Inspection, 16 April 1985.
Appendixes 1.4.1-2, 1.4.1-13 through 1.4.1-19.
Table 4-4.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION
01 STATE: NY | 02 SITE NUMBER: NYP000776799

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☐ A. GROUNDWATER CONTAMINATION
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION

None known; there are no ground water wells within a 3-mi radius of the site.

01 ☒ B. SURFACE WATER CONTAMINATION
02 ☒ OBSERVED (DATE: 1982-1983) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION

Surficial soils sampling indicated levels of PAH, heavy metals, and PCB in many areas of the site. However, there are no surface water intakes within a 3-mi. radius of the site.

01 ☐ C. CONTAMINATION OF AIR
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION

None known.

01 ☐ D. FIRE/EXPLOSIVE CONDITIONS
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION

None known.

01 ☒ E. DIRECT CONTACT
02 ☐ OBSERVED (DATE: _____) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 163
04 NARRATIVE DESCRIPTION

There are only 163 people living within a 1-mi radius of the site.

01 ☒ F. CONTAMINATION OF SOIL
02 ☒ OBSERVED (DATE: 1982-1983) ☐ POTENTIAL ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED: 264 (Acres)
04 NARRATIVE DESCRIPTION

Surficial soils sampling indicated levels of PAH, heavy metals, and PCB in many areas of the site.

01 ☐ G. DRINKING WATER CONTAMINATION
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION

No potential; there are no ground-water or surface water intakes within a 3-mi radius of the site.

01 ☐ H. WORKER EXPOSURE/INJURY
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 WORKERS POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION

None known.

01 ☐ I. POPULATION EXPOSURE/INJURY
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION

None known.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	NYP000776799

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☐ J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None known.

01 ☒ K. DAMAGE TO FAUNA — 02 ☒ OBSERVED (DATE: 1977-1983) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION (Include names of species)

01 ☒ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE: _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Several species of fish located in onsite surface water bodies were sampled. Analysis of fish tissue indicated pesticide, oil, PCB, and heavy metals.

01 ☒ M. UNSTABLE CONTAINMENT OF WASTES (Spills/Runoff/Standing liquids/Leaking drums) — 02 ☐ OBSERVED (DATE: 1982-1983) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Surficial soils are contaminated.

01 ☐ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None known.

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None known.

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

III. TOTAL POPULATION POTENTIALLY AFFECTED: 162

IV. COMMENTS

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Appendixes 1.4.1-2, 1.4.1-18 through 1.4.1-22.
Section 4.4
USGS. 1965. 7.5-Minute Topographic Series: Buffalo SE Quad.
EA Site Inspection.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION

01 STATE: NY | 02 SITE NUMBER: NYP000776799

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
☐ A. NPDES				
☐ B. UIC				
☐ C. AIR				
☐ D. RCRA				
☐ E. RCRA INTERIM STATUS				
☐ F. SPCC PLAN				
☐ G. STATE (Specify)				
☐ H. LOCAL (Specify)				
☐ I. OTHER (Specify)				
☐ J. NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
☐ A. SURFACE IMPOUNDMENT		
☐ B. PILES		
☐ C. DRUMS, ABOVE GROUND		
☐ D. TANK, ABOVE GROUND		
☐ E. TANK, BELOW GROUND		
☒ F. LANDFILL	unknown	
☐ G. LANDFARM		
☒ H. OPEN DUMP	unknown	(at least 112 drums)
☐ I. OTHER (Specify)		

04 TREATMENT (Check all that apply)
- ☐ A. INCENERATION
- ☐ B. UNDERGROUND INJECTION
- ☐ C. CHEMICAL/PHYSICAL
- ☐ D. BIOLOGICAL
- ☐ E. WASTE OIL PROCESSING
- ☐ F. SOLVENT RECOVERY
- ☐ G. OTHER RECYCLING/RECOVERY
- ☐ H. OTHER (Specify)

05 OTHER
- ☒ A. BUILDINGS ON SITE

06 AREA OF SITE: 264 (Acres)

07 COMMENTS

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)

☐ A. ADEQUATE, SECURE ☐ B. MODERATE ☐ C. INADEQUATE, POOR ☒ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC

There are no barriers or liner. Surficial soils may be reentrained by surface water. In addition, many of the drums found onsite were rusted and broken open.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE ☒ YES ☐ NO

02 COMMENTS

Site open to the public.

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

EA Site Ispection.
Appendixes 1.4.1-2, 1.4.1-10 through 1.4.1-19.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	NYP000776799

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as appropriate): None

	SURFACE	WELL
COMMUNITY	A. ☐	B. ☐
NON-COMMUNITY	C. ☐	D. ☐

02 STATUS

	ENDANGERED	AFFECTED	MONITORED
	A. ☐	B. ☐	C. ☐
	D. ☐	E. ☐	F. ☐

03 DISTANCE TO SITE
A. _____ (mi)
B. _____ (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (Check one)
☐ A. ONLY SOURCE FOR DRINKING ☐ B. DRINKING (Other sources available) COMMERCIAL, INDUSTRIAL, IRRIGATION (No other water sources available) ☐ C. COMMERCIAL, INDUSTRIAL, IRRIGATION (Limited other sources available) ☒ D. NOT USED, UNUSEABLE

02 POPULATION SERVED BY GROUND WATER: 0
03 DISTANCE TO NEAREST DRINKING WATER WELL: N/A (mi)

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
1/2 (ft)	WNW	2 (ft)	unknown (gpd)	☐ YES ☒ NO

09 DESCRIPTION OF WELLS (Including usage, depth, and location relative to population and buildings)

None known within a 3-mi radius.

10 RECHARGE AREA		11 DISCHARGE AREA	
☒ YES ☐ NO	COMMENTS	☒ YES ☐ NO	COMMENTS

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)
☒ A. RESERVOIR, RECREATION, DRINKING WATER SOURCE ☐ B. IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES ☐ C. COMMERCIAL, INDUSTRIAL ☐ D. NOT CURRENTLY USED

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME	AFFECTED	DISTANCE TO SITE
Lake Kirsty, Beth Pond, Lisa Pond	☐	onsite (mi)
	☐	(mi)
	☐	(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE
A. 163 NO. OF PERSONS	B. 22,519 NO. OF PERSONS	C. 84,468 NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION: 0.15 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE: _____

04 DISTANCE TO NEAREST OFF-SITE BUILDING: 0.15 (mi)

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site, e.g., rural village, densely populated urban area)

The area is surrounded by industrial facilities, many of which have been abandoned. Because of this, the site is isolated with the exception of a freeway bordering the western boundary. The population is sparse within 1-mi of the site. Beyond 1-mi you enter the City of Buffalo, which is heavily populated.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	NYP000776799

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

☐ A. $10^{-6} - 10^{-8}$ cm/sec ☐ B. $10^{-4} - 10^{-6}$ cm/sec ☐ C. $10^{-4} - 10^{-3}$ cm/sec ☒ D. GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one) unknown

☐ A. IMPERMEABLE (Less than 10^{-6} cm/sec) ☐ B. RELATIVELY IMPERMEABLE ($10^{-4} - 10^{-6}$ cm/sec) ☐ C. RELATIVELY PERMEABLE ($10^{-2} - 10^{-4}$ cm/sec) ☐ D. VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL pH
~ 50 (ft)	unknown (ft)	unknown

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE: SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
9 (in)	2 (in)	0-30 %	WSW	2 %

09 FLOOD POTENTIAL

SITE IS IN N/A YEAR FLOODPLAIN

10 ☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE: A. _____ (mi)

OTHER: B. onsite (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

>1 (mi)

ENDANGERED SPECIES: _____

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREAS; NATIONAL/STATE PARKS FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS: PRIME AG LAND	AG LAND
A. 0.17 (mi)	B. 0.15 (mi)	C. >3 (mi)	D. >3 (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

The lakes at the site are a series of abandoned, partially filled-in canals and marshland. Past landfilling practices have created a mound on the southwest portion of the site. The remainder of the site is relatively flat.

VII. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis reports.)

EA Site Inspection
U.S. Dept. of Commerce - Climatic Atlas of the United States
USGS. 1965. 7.5-Minute Quadrangle: Buffalo SE Quad.
Sections 4.2 and 4.3.
Appendixes 1.4.2-2 and 1.4.2-3.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION	
01 STATE: NY	02 SITE NUMBER: NYP000776799

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER	7	EA Science and Technology	
SURFACE WATER	4	EA Science and Technology	
WASTE	1	EA Science and Technology	
AIR			
RUNOFF			
SPILL			
SOIL	4	EA Science and Technology	
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS
Slope	Measured with Suunto Clinometer
Volatile organics	Measured with photoionization detector
Water levels/ relative elevation	Measured with electronic water level indicator. Phase II wells surveyed to an assumed datum of 100 ft established at Well TF-1 (top of PVC casing).

IV. PHOTOGRAPHS AND MAPS

01 TYPE X GROUND X AERIAL

02 IN CUSTODY OF EA Science and Technology (Name of organization or individual)

03 MAPS X YES ☐ NO

04 LOCATION OF MAPS EA Science and Technology

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

Short-term low-yield pump test performed on wells. Geophysical Data: conductivity and resistivity surveys were performed at the site.

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EA Site Inspection.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	NYP000776799

II. CURRENT OWNER(S) / **PARENT COMPANY** (if applicable)

01 NAME	02 D+B NUMBER	08 NAME	09 D+B NUMBER
City of Buffalo % Tifft Farm Nature Preserve			

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE
1200 Fuhrmann Blvd			

05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE
Buffalo	NY	14211			

01 NAME	02 D+B NUMBER	08 NAME	09 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE

01 NAME	02 D+B NUMBER	08 NAME	09 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE

01 NAME	02 D+B NUMBER	08 NAME	09 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE

III. PREVIOUS OWNER(S) (List most recent first) / **IV. REALTY OWNER(S)** (if applicable; list most recent first)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
Republic Steel			

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
P.O. Box 6			

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE
Buffalo	NY	14240			

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
Lehigh Valley RR			

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Appendixes 1.4.1-2 and 1.4.1-3.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	NYP000776799

II. CURRENT OPERATOR (Provide if different from owner)

01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER

OPERATOR'S PARENT COMPANY (If applicable)

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)

PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)

01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER
Republic Steel Corp.			

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE
P.O. Box 6			

05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
Buffalo	NY	14240			

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD
17	Republic Steel

01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER
Lehigh Valley RR			

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sampling events, reports)

Appendixes 1.4.1-2 and 1.4.1-3.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	NYP000776799

II. ON-SITE GENERATOR

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
Buffalo Sewer Authority			

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
City Hall			

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE
Buffalo	NY	14240			

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

IV. TRANSPORTER(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Appendixes 1.4.1-2 and 1.4.1-3.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	NYP000776799

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ D. SPILLED MATERIAL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ E. CONTAMINATED SOIL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ F. WASTE REPACKAGED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☒ G. WASTE DISPOSED ELSEWHERE — 02 DATE 1983 — 03 AGENCY _____
04 DESCRIPTION
112 drums were removed from the site.

01 ☐ H. ON SITE BURIAL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ I. IN SITU CHEMICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ J. IN SITU BIOLOGICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ K. IN SITU PHYSICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ L. ENCAPSULATION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ M. EMERGENCY WASTE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ N. CUTOFF WALLS — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ P. CUTOFF TRENCHES/SUMP — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ Q. SUBSURFACE CUTOFF WALL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	NYP000776799

II. PAST RESPONSE ACTIVITIES (Continued)

01 ☐ R. BARRIER WALLS CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ S. CAPPING/COVERING — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ T. BULK TANKAGE REPAIRED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ U. GROUT CURTAIN CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ V. BOTTOM SEALED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ W. GAS CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ X. FIRE CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ Y. LEACHATE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ Z. AREA EVACUATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ 1. ACCESS TO SITE RESTRICTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ 2. POPULATION RELOCATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ 3. OTHER REMEDIAL ACTIVITIES — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Appendixes 1.4.1-2, 1.4.1-9 and 1.4.1-10.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	NYP000776799

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION ☒ YES ☐ NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY/ENFORCEMENT ACTION

112 drums were removed from the site in 1983 under the direction of New York State Department of Environmental Conservation and Erie County Department of Environmental Protection.

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Appendixes 1.4.1-2, 1.4.1-9, and 1.4.1-10.

6. REMEDIAL COST ESTIMATE

6.1 SITE SUMMARY

Tifft Farm is an inactive dump approximately 264 acres in size located in the City of Buffalo, New York. The last known dumping at the site occurred in 1975.

In 1975, acid sludge, possibly from the Chevrolet plant, was reportedly being dumped at Tifft Farm. The New York State Department of Environmental Conservation (NYSDEC) responded to this report and terminated all disposal efforts. The site was converted to the Tifft Farm Nature Preserve in 1976 and was opened to the public.

On 9 September 1982, two 55-gal drums were discovered on the south shore of Lake Kirsty. Samples collected by NYSDEC and analyzed by RECRA Environmental Laboratories indicated elevated concentrations of phenolic compounds in one sample and polynuclear aromatic hydrocarbons (PAHs) in the second sample (Appendix 1.4.1-6). During this time period, 112 drums were removed from Lake Kirsty, Lisa Pond, and the east side of the mounds area. Samples collected from the drums and analyzed by the NYSDEC contained total halogenated organics (THO), arsenic, chromium, lead, mercury, and napthalene (Appendixes 14.1.1-8, 1.4.1-10).

6.2 ANALYTICAL RESULTS

Seven monitoring wells were installed at the site as part of the Phase II investigation, and ground-water samples were collected from each well. No Hazardous Substance List (HSL) volatile organics were detected above the contract required detection limits (CRDL). Two semi-volatile phthalates were detected, but the testing laboratory noted phthalate problems at the time the analysis was performed. Therefore, laboratory contamination is the suspected reason why the phthalates were detected. Twelve metals were detected above the CRDL, but at concentrations which were not significantly greater than upgradient conditions. No release from the site to the ground water can be confirmed by the Phase II analytical results.

Four surface water samples were collected during the Phase II investigation and analyzed for the HSL parameters. No volatiles were detected above CRDL. Phthalates were detected, but as with the ground-water samples, laboratory contamination is suspected. Nine metals were detected above CRDL, but none in significant concentrations above the upgradient sample.

Four sediment samples were taken during the Phase II investigation at the same locations where the surface water samples were collected (Figure 3-1). Samples were analyzed for all HSL parameters; results are summarized in Table 4-4. Acetone and methylene chloride were the only detected organic compounds which were above the CRDL. Acetone was used as a field sampling equipment cleansing agent as required by NYSDEC, and methylene chloride is a possible laboratory contaminant. The several semi-volatile compounds detected which had

concentrations higher than those found upgradient are suspected to be the result of laboratory contamination. No metals detected in the downgradient samples had significantly higher concentration than the upgradient sample.

Extensive soil sampling at the site in 1982 and 1983 by NYSDEC and Erie County yielded significantly higher metals concentrations than those occurring naturally in U.S. soils (Appendixes 1.4.1-13 through 1.4.1-20). These results also indicated PAH and PCB contamination. Because the contaminated sediment could be reentrained in the surface water bodies onsite, the soil sampling results indicate a release to surface waters is possible.

During the Phase II investigation, one sample was also collected from the "mounds" landfill leachate collection system. One semi-volatile organic and 10 metals were detected above the CRDL. A drum contents sample was also collected; 15 metals were detected above the CRDL, and total cyanide and total phenol were also detected.

6.3 RECOMMENDED REMEDIAL ACTIONS

Based on the results of the Phase II investigation and the extensive soil sampling done by NYSDEC and Erie County, a more detailed investigation of the Tifft Farm site is warranted. Until such a study is finalized, EA recommends that the following activities be conducted:

- Remove and dispose of all exposed waste drums and any associated contaminated soil. Based on 50 drums, removal and disposal costs are estimated to range from $30,000 to $45,000. Contaminated soil can be

disposed of at a cost of $80-$200 per ton; an assumed quantity of 4,000 cy yields an estimated soil removal cost range of $355,000-$844,000. These costs include backfill and compaction with offsite borrow.

- Installation of 4 additional monitoring wells on the eastern perimeter of the site. These wells are intended to better detect migrating contamination from potential offsite, upgradient sources. The cost of installation of the 4 monitoring wells is estimated to range from $4,000 to $10,000.

- Develop a ground-water monitoring program to include the 7 existing wells and the 4 proposed wells. At a minimum, the plan should include annual sampling for volatile organics, semi-volatile organics, and metals. The annual cost for ground-water monitoring from the 11 wells is in the range of $50,000-$60,000.

- Develop a surface water monitoring plan to include annual samples from Lake Kirsty, Lisa Pond, Beth Pond and Berm Pond. Samples should be collected and analyzed annually for same parameters as recommended for the ground-water analysis. The estimated annual cost is estimated to be $18,000-$22,000.

- Perform a geophysical survey of the area of Tifft Farm bounded by Fuhrmann Boulevard, the main entrance road, Lisa Pond, and the service road from Fuhrmann Boulevard to the maintenance shop (generally, the northwest corner of ths site). This survey should include both terrain

conductivity and magnetometer methods to identify subsurface masses of metal. The survey should also include Lake Kirsty, Lisa Pond, and Beth Pond. Estimated cost is $35,000-$40,000.

Total cost for these activities at the Tifft Farm site is estimated to be $492,000-$1,021,000, for the initial year and an estimated annual cost of $68,000-$82,000 thereafter. No treatment of the leachate from the "mounds" area is currently deemed necessary because there is already a leachate collection and treatment system in place. It should be noted that these recommendations are preliminary at best, and the costs presented above are rough estimates which are based upon the Phase II investigation information.

If significant ground-water, surface water, or soil contamination is detected by the monitoring program, substantial remediation measures not addressed herein may be necessary. Should the geophysical survey indicate suspected buried masses of metal, a removal effort may be an appropriate undertaking. Should the geophysical survey detect other anomalies, other remedial actions may also be required.

APPENDIX 1.3.1-1

The Phase II investigation of the Tifft Farm site involved a site inspection by EA, geophysical studies, boring and monitoring well placement, and installation and sampling (soil, surface water, and air) as well as record searches and interviews. The following agencies or individuals were contacted.

Contact	Information Received
Mr. Wayne Gall Administrator Tifft Farm Nature Preserve 1200 Fuhrmann Boulevard Buffalo, New York 14203 (716) 896-5200	Site history, file, and interview for site access
Mr. Ronald Koczaja Public Health Engineer Erie County Department of Health 95 Franklin Street Buffalo, New York 14202	Water Supply
Mr. Marsden Chen, P.E. New York State Department of Environmental Conservation Bureau of Site Control 50 Wolf Road Albany, New York 12233-0001 (518) 457-0639	No additional information on file
Mr. Kevin Walter. P.E. New York State Department of Environmental Conservation Division of Hazardous Waste Enforcement 50 Wolf Road Albany, New York 12233-0001 (518) 457-4346	No file
Mr. John Iannotti, P.E. New York State Department of Environmental Conservation Bureau of Remedial Action 50 Wolf Road Albany, New York 12233-0001 (518) 457-5637	No file

Contact	Information Received
Mr. Anthony T. Voell Deputy Commissioner Erie County Department of Environmental Planning 95 Franklin Street Buffalo, New York 14203 (716) 846-6370	Site file
Mr. Peter Skinner, P.E. New York State Attorney General's Office Room 221 Justice Building Albany, New York 12224 (518) 474-2432	No file
Ms. Diana Messina U.S. Department Protection Agency Region II Surveillance and Monitoring Branch Woodbridge Avenue Edison, New Jersey 08837 (201) 321-6776	File
Mr. Peter Buechi New York State Department of Environmental Conservation Region 9 Office 600 Delaware Avenue Buffalo, New York 14202	Site file
Mr. John Ozard Senior Wildlife Biologist New York State Department of Environmental Conservation Wildlife Resources Center Significant Habitat Unit Delmar, New York 12054 (518) 439-7486	Critical habitats of endangered species information
Mr. Jim Ressis Lockwood Support Service, Inc. (716) 342-5810	Aerial photographs
Mr. Frank Dimascio Buffalo Sewer Authority 1038 City Hall Buffalo, new York 14202 (716) 855-4664	Sewer Plans

Contact	Information Received
Dr. T.J. Tofflemire, P.E. Senior Sanitary Engineer New York State Department of Environmental Conservation 50 Wolf Road Albany, New York 12233-0001 (518) 457-0639	No file
Captain Ed DeYoung Bureau of Fire Prevention City of Buffalo Room 31, City Hall Buffalo, New York 14202	Information on fire and explosion threat
Mr. John Whitney Soil Conservationist USDA Soil Conservation Service 21 South Grove Street East Aurora, New York 14052	Information on agriculture land

APPENDIX 1.3.2-1

GEOPHYSICAL FIELD EQUIPMENT
AND GENERAL METHODOLOGY

Two geophysical instruments were used at the site to evaluate general subsurface conditions (geology, depth to ground water, and contamination). The following provides a description of the equipment used.

Field Equipment

Terrain Conductivity

EM-34

The Geonics, Ltd., EM-34 terrain conductivity meter is portable. The EM-34 has variable depth capability which allows the user to measure subsurface conductance at more than one depth. This is important when depth to rock or approximate depth of contamination plumes is required. The EM-34 has separate transmitter and receiver coils. The coils are connected by either a 10-, 20-, or 40-meter cable which determines the general depth range being investigated. In addition to being able to change cable lengths, the operator can change the receiver and transmitter orientations (horizontal and vertical dipole modes) to also vary the depth range being investigated.

The transmitter induces very small (primary field) currents into the earth from a magnetic dipole transmitter coil producing a weak secondary magnetic field. The equipment compares the weak secondary field with the primary field using advanced current techniques to produce direct terrain conductivity (mmhos/m) readings.

Resistivity

Resistivity soundings were made using a Bison 2350B earth resistivity meter. The 2350B earth resistivity meter measures the nature of subsurface materials in ohm-ft. This technique employs the use of four electrodes (two outer and two inner) oriented along a straight line (for the Wenner and Schlumberger arrays). The instrument produces a DC current into the ground between the two outer electrodes, and the potential difference is measured between the two inner electrodes. This potential difference may be affected by differences in geology, porosity, dissolved ions, soil moisture and/or water quality. As the electrode positions are moved, specific potential differences are recorded. For each potential difference, apparent resistivity can be calculated. When the apparent resistivity values are plotted, the nature of subsurface conditions (location of voids, sand and gravel, water quality, etc.) can be inferred.

Geophysical Surveys

Conductivity

Initially, an Electromagentic terrain conductivity survey (EM) was conducted with an EM-34 (20-meter cable) which allowed measurement of subsurface conductivity (mmhos/m) for two effective depths (45 and 90 ft). Conductivity data was collected at 30-ft intervals along each line. A proximal and distal line were surveyed along the west landfill boundary and along the north site boundary. A single proximal line was surveyed along the east and south landfill boundaries (Figure 1). The survey lines along the east, west, and south boundaries were established to assess the potential for contaminant movement away from the landfill as a result of radial flow to the surrounding marshes on the south and east, and west towards the highway. EM lines were surveyed along the north site boundary to delineate potential contaminant movement in a sub-regional downgradient direction from the site towards Lake Erie.

Cultural interferences such as power lines, buried steel pipes, and chain line fences were considerable, especially along the south and west boundaries of the fill.

Conductivity lines are shown in Figure 1 (effective depth: 45 ft) along with areas of cultural interferences and anomalous zones. Conductivity readings obtained at each station are listed in Table 1. Conductivity values obtained in the vertical dipole mode (effective depth: 90 ft) were too obscured by cultural interferences to be conclusive, subsequently, the horizontal dipole mode only was used in evaluation of the subsurface hydrogeology.

Resistivity

A vertical resistivity sounding was performed on the west side of the mounds located over the anomalous area in the east central portion of EM line 3 (Figures 1 and 2). The sounding was performed utilizing the Lee modification of the Wenner electrode configuration. Data obtained from the R-1 sounding location produced a three-layer model.

The upper layer 0-1.4 meters (0-4.62 ft) roughly correlates with the unsaturated overburden. The intermediate layer 1.4-15.4 meters (4.62 - 50.80 ft) correlates to the saturated overburden. Bedrock is interpreted to be at a depth on the order of 15.4 meters (50.80 ft).

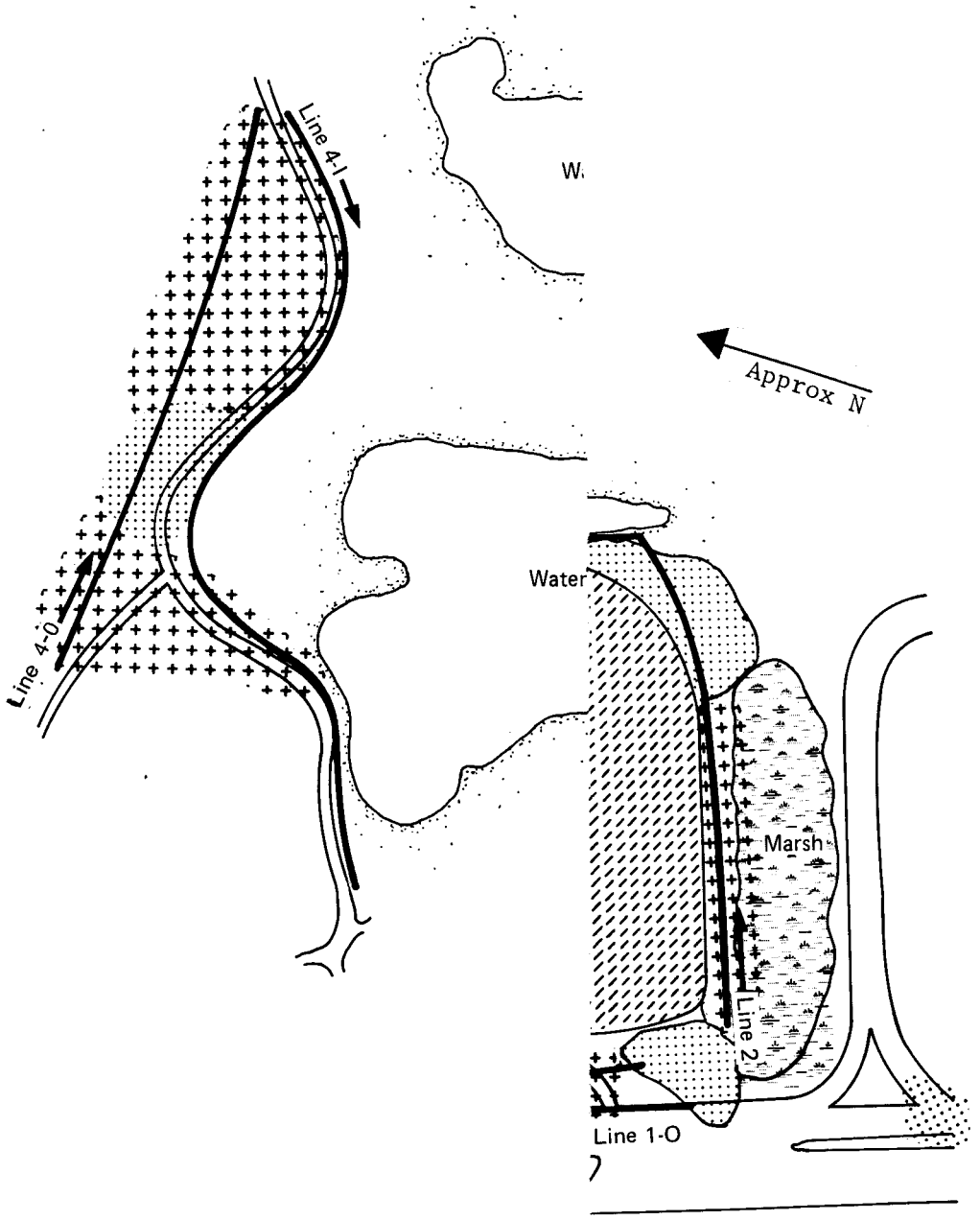


Figure 1 . Tifft Farm terrain conductivity perimeter survey, effective depth: 45 ft.

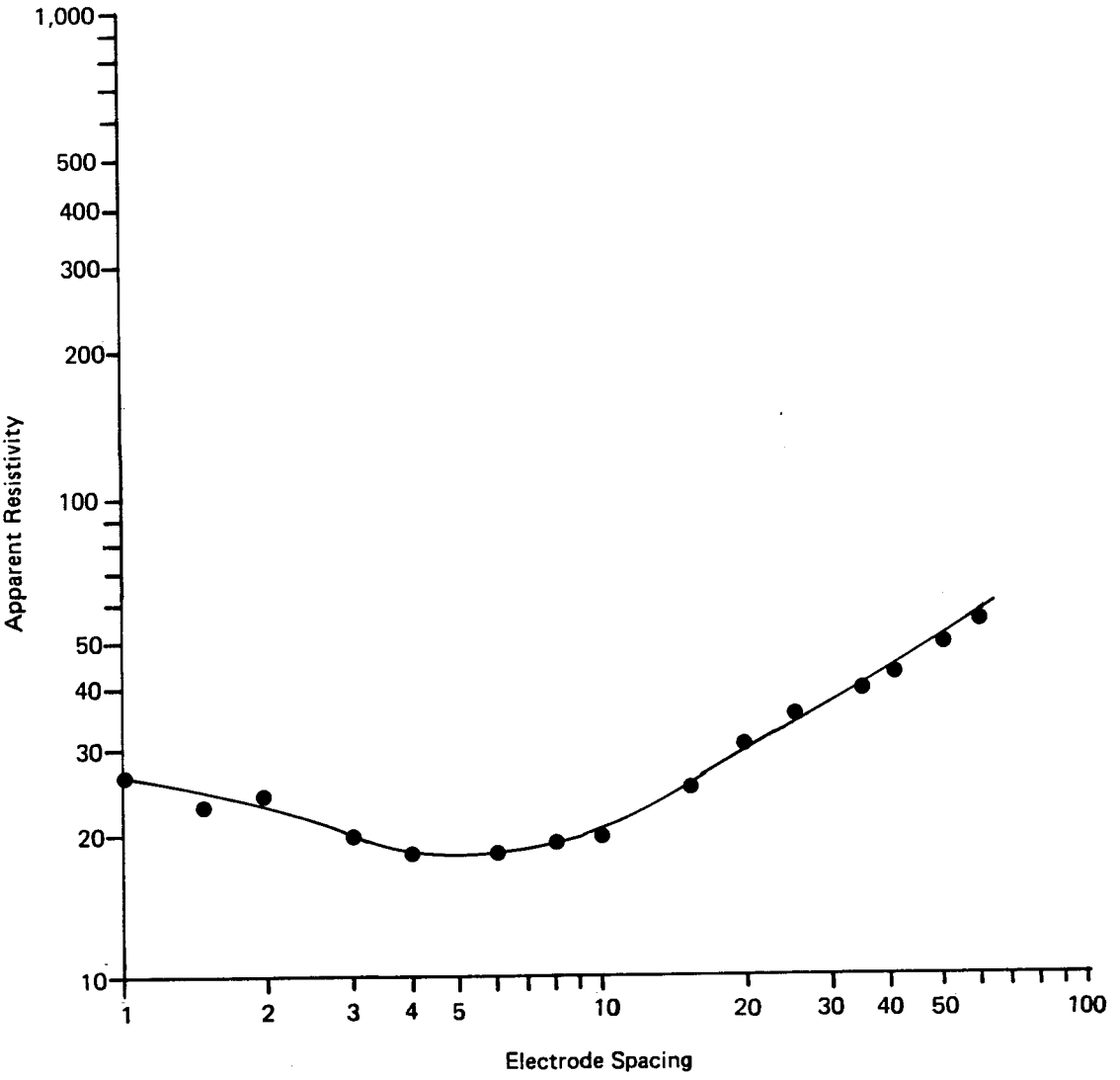


Figure 2 Tifft Farm resistivity sounding curve, R-1.

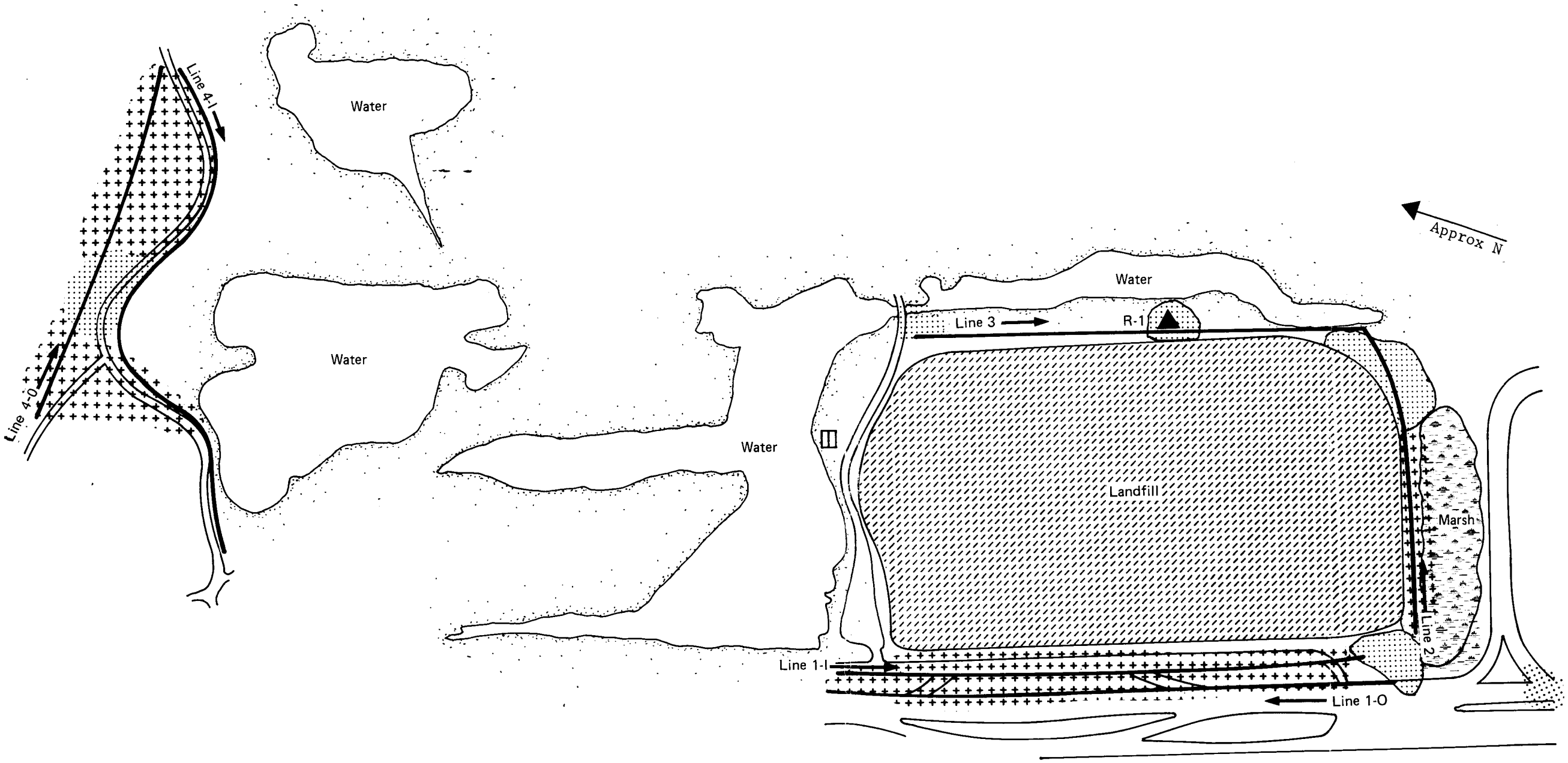


Figure 1 . Tifft Farm terrain conductivity perimeter survey, effective depth: 45 ft.

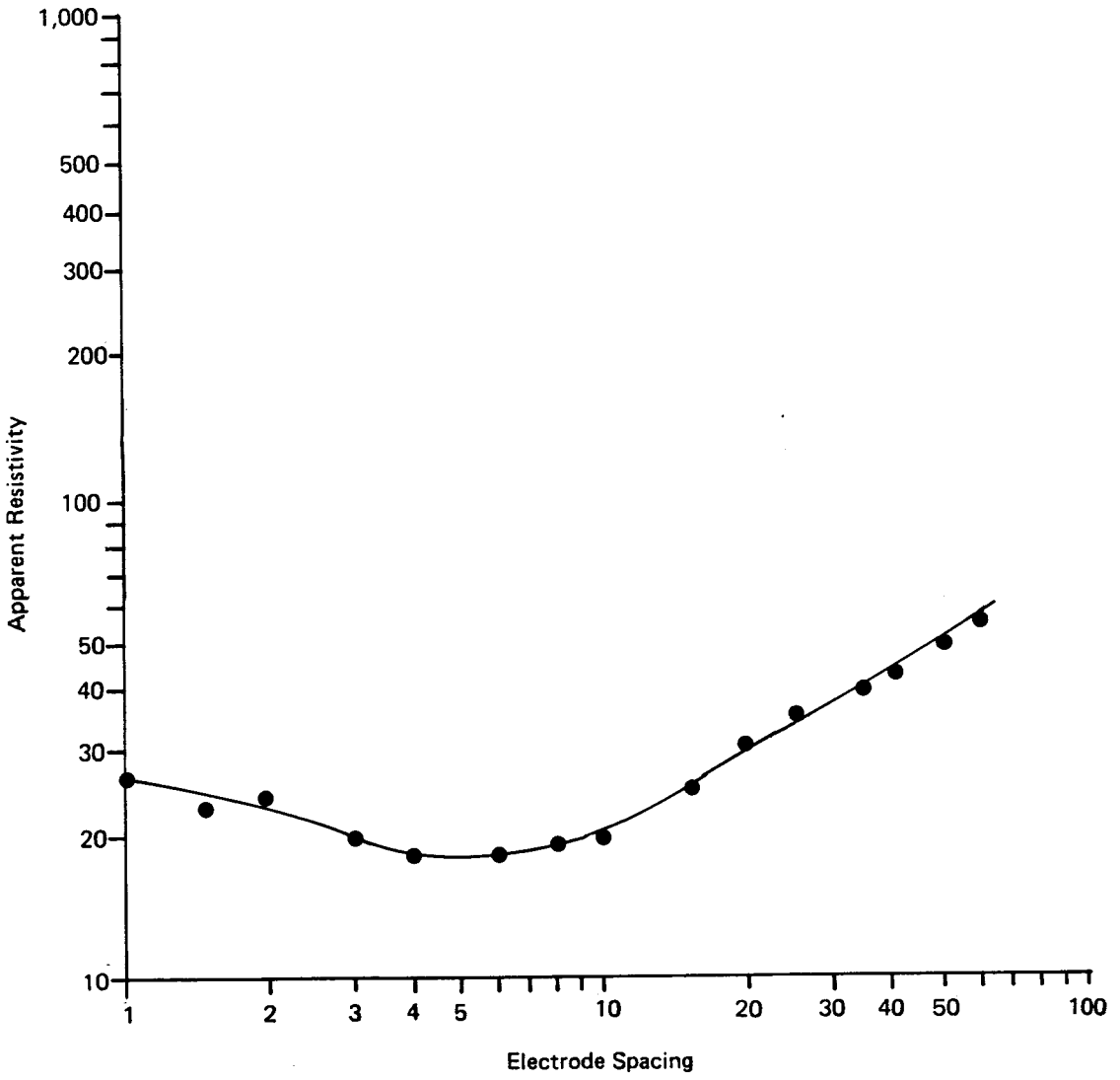


Figure 2 Tifft Farm resistivity sounding curve, R-1.

APPENDIX 1.3.2-2

MONITORING WELL INSTALLATION
AND TESTING PROCEDURES

Observation Well Drilling and Sediment Sampling

Well drilling was accomplished using a CME-75 truck-mounted drill rig. All wells at the site were installed in unconsolidated sediment using a 4-1/4-in. I.D. hollow-stem auger.

Prior to the drilling of each boring/well, and at the completion of the last boring/well, the drilling equipment which came in contact with subsurface materials was pressure-washed with hot potable water. Soil sampling of the unconsolidated sediment was performed using a split-spoon sampler at approximately 5 ft intervals and at detected major stratigraphic changes. The split-spoon sampler was pressure washed with hot potable water before and after each sample. An HNU was used to monitor the potential organic vapors emitted during drilling operations and from each soil sample. Unless otherwise instructed, all drill cuttings, fluids, and development/purging water were left on, or discharged to, the ground surface in the immediate area of the activity. An HNU reading of at least 5 ppm above ambient readings was established by NYSDEC as the criteria above which fluids and cuttings were to be collected and drummed for future appropriate disposal by NYSDEC. No such readings were encountered.

Well Construction

Immediately prior to installation, the well pipe and screen were cleaned with a hot potable water pressure washer.

During installation of the shallow wells, the auger was temporarily left in the overburden. Approximately one ft on No. 4 gravel pack was then placed into the borehole bottom and 2-in. diameter PVC screen and riser of appropriate length were lowered down inside the auger. No.4 gravel pack was then placed around the screen to about 1-2 ft above the top of the screen interval. The auger was withdrawn slowly during this process. Once the auger was withdrawn, a 0.5 to 1.0 ft bentonite pellet seal was placed above the top of sand followed by cement grout to the surface. A 5-ft length of protective steel casing with a locked cap was set into the grout around the PVC well pipe stickup.

Well Development

The development of the monitoring wells was performed by pumping as soon as practical after well installation. A centrifugal pump was used because the depth to water was less than 20 ft below ground surface.

For development using a centrifugal pump, a new, unused length of polyethylene flexible pipe was used in each well as a suction line. The well was pumped throughout the screen interval until the discharge water appeared to be clear.

Pump Tests of Monitoring Wells

A short-term, low-yield pumping test was performed in each well. Each test was comprised of: (1) a continuous discharge, pumped (drawdown) phase, and (2) a recovery phase. For such a test, pumping and water level measurement occurred in the same well. The short-term pumping tests were performed using a centrifugal pump. A new, unused length of polyethylene flexible pipe was used as the suction line in each well.

In performing the short-term pumping test, first the static water level was measured and recorded prior to setting the pump. The pump was then set and started at a discharged rate apparently compatible to the estimated amount of ground water yielded by the well; simultaneously, a stop-watch was started. Accurate depth to water measurements during the drawdown phase were obtained and recorded at regular intervals. The discharge rate was also messured (using a calibrated bucket and a stop watch) at different times dureing the pumping phase. When little or no further drawdown occurred, the pump was stopped. Time and water level measurements of the recovery phase instantly began. Accurate depth to water measurements were recorded at regualr intervls until 90 percent recovery to the static (pre-pumping) water level was achieved, if possible.

A Q.E.D. water level indicator was used to measure depth to water in the wells; this instrument has depth markers at 0.05-ft intervals. The Q.E.D. was decontaminated between wells by washing with Alkanox detergent, then rinsed with deionized water, acetone, and hexane.

APPENDIX 1.3.2-3

SAMPLING PROCEDURES

A variety of samples types were collected. These included ground water from monitoring wells, surface water, sediment, drum, and leachate collection system samples. All sampling was conducted by EA personnel under supervision of the project manager. All sampling was accomplished under a rigorous chain-of-custody protocol. All samples were placed in containers of appropriate composition containing appropriate preservatives as presented in Table 7-1 of the Work/QA Project Plan for the current Amendment to Perform Phase II Work dated 16 January 1985.

Monitoring Well Ground-Water Sampling

Purging and sample collection was performed at the Tifft Farm site initially on 9-10 November 1985, and again on 11 March 1987 because of missed holding times for pesticides and PCB.

Grab-type, ground-water samples were collected for chemical analysis from each of the monitoring wells installed for this project.

The purging and sampling of each well was performed at least one week after completion of well development. Each well was purged by a centrifugal pump to remove potentially stagnant water in the well, and allow for the recharge of the fresh ground water to the well for sampling. Each sampled well was purged to dryness, or up to approximately four times the volume of the water column in the borehole, depending upon the well yield. A new, clean length of polyethylene flexible pipe was used as the discharge line for each well.

To ensure that all stagnant water was purged from the well, the pump or suction line was lowered to the bottom of the well, at which time the pump was started. After the required volume of water had been nearly evacuated, the suction line was raised slowly to the water surface and allowed to pump for a short time. The volume of water to be purged was determined as follows. For the Phase II wells, the conversion factor is 0.5 gal/lin ft for PVC wells completed in unconsolidated sediment.

Upon completion of the purging operation at each well, a sample of the ground water was obtained by using individual bottom-fill Teflon bailers lowered into each well with new polypropylene rope, or similar, for each well. For each well sampled, the bailer was handled with a new pair of disposable plastic gloves. The bailer was lowered into each well slowly to minimize the potential for aeration of the water sample. Water samples were carefully transferred from the bailer to the sample containers to further minimize the potential for aeration of water samples, especially those for VOA. No "head space" was allowed in filled VOA water sample containers. Prior to the arrival at the site, individual bottom-fill Teflon bailers were prepared in the laboratory for each well to be sampled. The preparation procedures were comprised of washing with hot water and Alkanonx soap followed by a hot water rinse, acetone and hexane rinses, and air dried.

Sediment and Drum Sampling

The sediment samples and drum samples were collected using a new individual, disposable polyethylene scoop. Prior to mobilization in the field, the scoop was cleaned in the laboratory, in the same manner as the teflon bailers. Each sample was handled with a new pair of disposable plastic gloves and placed in appropriate containers (Section 7 of the Work/QA Project Plan).

Surface Water and Leachate Collection System

The grap-type surface water and leachate collection system samples were collected in containers of appropriate composition containing appropriate preservative for the parameters to be determined. Each sample was handled with a new pair of disposable plastic gloves and placed in appropriate containers (Section 7 of the Work/QA Project Plan).

cameron O'connor

Appendix 1.4.1-1
pg 1 of 3

tifft farm
nature
preserve

May 18, 1983

Mr. Keith D. Keller
NUS Corporation
Raritan Plaza III
Fieldcrest Avenue
Edison, New Jersey 08837

Dear Keith:

Enclosed are the documents which I promised to send you, when you performed a "Preliminary Assessment Site Inspection" at Tifft Farm Nature Preserve, on May 11, 1983.

All but the first document were provided by Cameron O'Connor, Environmental Quality Technician, for the Erie County Department of Environment and Planning. The documents are as follows:

1) Site Map - locates sampling points corresponding to the analytical data (12 pages) which I gave you May 11.

2) Letter from Republic Steel (August 14, 1981) with attached EPA Notification of Hazardous Waste Site form. Note, particularly, that Republic Steel owned the "Tifft Farm" property from 1955-1972.

3) Interpretation of aerial photographs with figures. Analysis of aerial photography, by Cameron O'Connor, typed from Cameron's handwritten work notes, accompanied by schematic figures.

Since our telephone conversation yesterday morning, I have checked into the question of threatened or endangered species at Tifft Farm. Osprey (irregular visitants at Tifft Farm)

PS 2 of 3

are listed as "threatened" on both the Federal and New York State (pursuant to NYS Environmental Conservation Law, Section 11-0535) lists. Red-shouldered Hawk (irregular visitant) and Common Tern (regular visitant) are listed as "threatened" on the NYS list only.

The NYS list also designates the following species as being of "Special Concern": Common Loon, Least Bittern (nests at Tifft Farm presently), Cooper's Hawk, Upland Sandpiper, Black Tern (nested at Tifft Farm in the recent past; may do so now), Common Barn-Owl, Short-eared Owl, Common Nighthawk, Eastern Bluebird, and Vesper Sparrow. All are irregular visitants at Tifft Farm except Least Bittern and Black Tern.

In terms of "critical habitat" at Tifft Farm, major portions of the 264-acre site are designated as "Protected Wetland," pursuant to NYS Environmental Conservation Law. As I mentioned to you, the 75-acre cattail marsh at Tifft Farm Nature Preserve is the only significant remnant of the great wetland which once covered the entire eastern shore of Lake Erie.

Tifft Farm Nature Preserve is also located along a major migratory path for birds skirting the east end of Lake Erie during Spring and Fall migrations. Over the years 221 species of birds have been sighted at Tifft Farm, a truly amazing fact when you consider its location is only three miles from the heart of downtown Buffalo. This list of birds sighted at the Preserve is also enclosed.

If you have any other questions, feel free to contact me at 716-896-5200, extension 250.

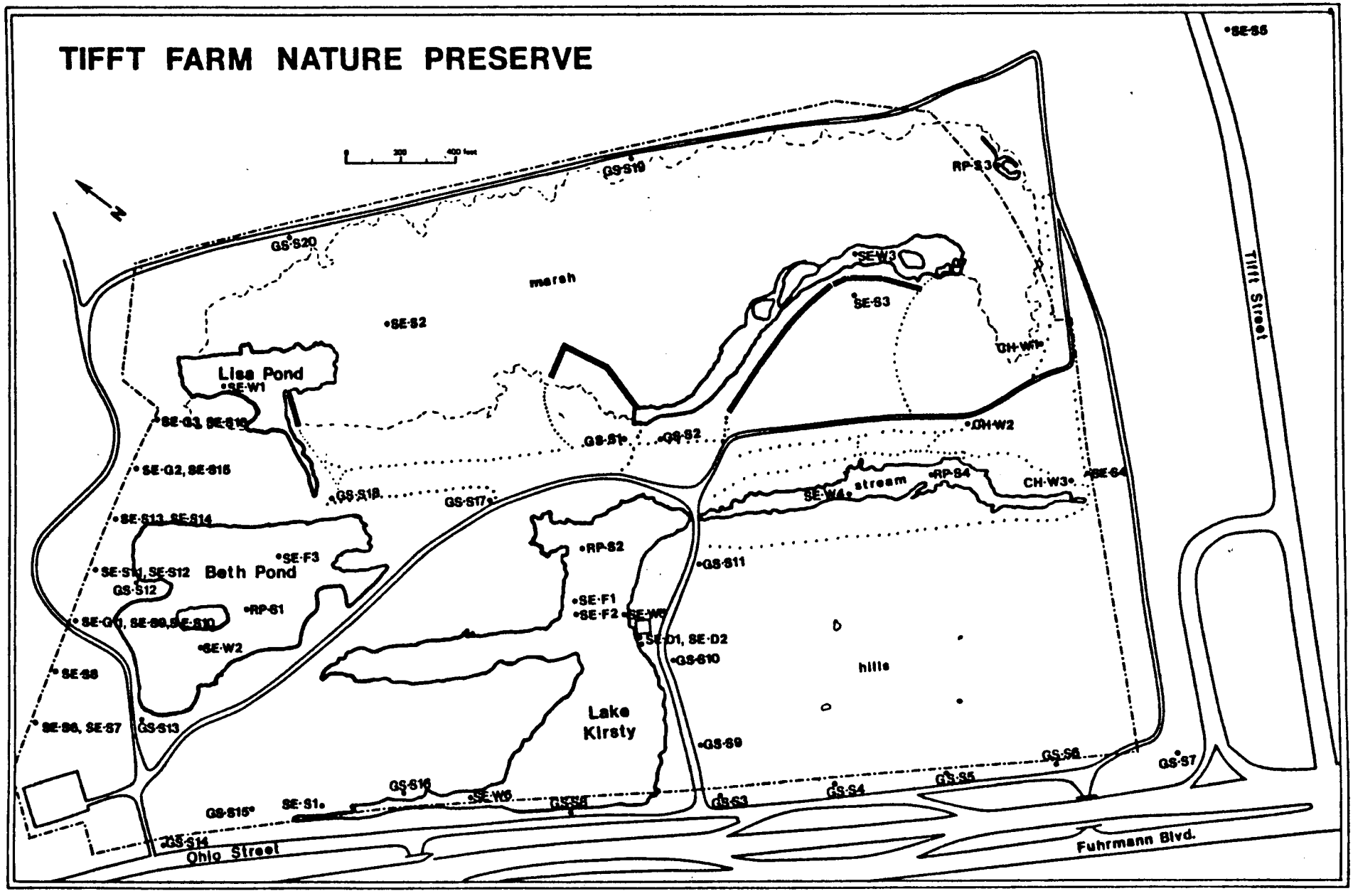
Very truly yours,

Wayne K. Gall

Wayne K. Gall
Administrator
Tifft Farm Nature Preserve
Buffalo Museum of Science

WKG:nfo
enclosures
cc: Morris Trichon, EPA, Hazardous Waste Site Branch, New York
Fred Rubel, EPA, Emergency Response Branch, Edison, NJ
D. Herold
H. Darling
R. Andrle

bcc: Dr. Richard Spear, EPA Surveillance and Monitoring Division, Edison, NJ
C. O'Connor, ECDEP


TIFFT FARM NATURE PRESERVE
N
GS-S19
RP-S3
GS-S20
marsh
SE-W3
SE-S3
SE-S2
CH-W1
Lisa Pond
SE-W1
SE-G3, SE-S9
GS-S1
GS-S2
CH-W2
SE-G2, SE-S15
GS-S18
GS-S17
SE-W4
stream
RP-S4
CH-W3
SE-S4
SE-S13, SE-S14
SE-F3
RP-S2
GS-S11
SE-S11, SE-S12
Beth Pond
GS-S12
SE-F1
SE-F2
SE-W5
RP-S1
SE-G1, SE-S8, SE-S10
SE-D1, SE-D2
SE-W2
GS-S10
hills
SE-S8
Lake
Kirsty
SE-S6, SE-S7
GS-S13
GS-S9
GS-S16
GS-S15
SE-S1
SE-W5
GS-S8
GS-S3
GS-S4
GS-S5
GS-S6
GS-S7
GS-S14
Ohio Street
Fuhrmann Blvd.
Tifft Street
SE-S5

PS 3 of 3

(47-15-11 (10/83)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DIVISION OF SOLID AND HAZARDOUS WASTE

INACTIVE HAZARDOUS WASTE DISPOSAL SITE REPORT

PRIORITY CODE: _____ SITE CODE: 915071

NAME OF SITE: Tifft Farm Nature Preserve REGION: 9

STREET ADDRESS: 1200 Fuhrmann Blvd

TOWN/CITY: Buffalo, New York 14203 COUNTY: Erie

NAME OF CURRENT OWNER OF SITE: City of Buffalo, c/o Buffalo Museum of Science

ADDRESS OF CURRENT OWNER OF SITE: Humboldt Pkwy, Buffalo, New York 14211

TYPE OF SITE: OPEN DUMP [x] STRUCTURE [ ] LAGOON [ ]

LANDFILL [x] TREATMENT POND [ ]

ESTIMATED SIZE: 264 ACRES

SITE DESCRIPTION:

The Tifft Farm site is a nature preserve in an urban setting. It contains many species of wildlife and is bordered by a natural fresh water wetland that is the last remaining remnant of the once great wetlands area along the eastern shoreline of Lake Erie. The site includes three bodies of water which were once canals. Uncontrolled dumping occurred at the site and into the canals from the 1940s until 1972. In 1972, the City of Buffalo transferred waste from Squaw Island to Tifft Farm. In 1974, Tifft Farm received a grant from New York State to develop the site into a wildlife preserve.

HAZARDOUS WASTE DISPOSED: CONFIRMED [ ] SUSPECTED [ ]

TYPE AND QUANTITY OF HAZARDOUS WASTES DISPOSED:

TYPE	QUANTITY (POUNDS, TONS, DRUMS, GALLONS)
Heavy metals, PAH, PCB	unknown

TIME PERIOD SITE WAS USED FOR HAZARDOUS WASTE DISPOSAL:

_____, 19 40s TO _____, 19 72

OWNER(S) DURING PERIOD OF USE: Republic Steel, City of Buffalo

SITE OPERATOR DURING PERIOD OF USE: _____

ADDRESS OF SITE OPERATOR: _____

ANALYTICAL DATA AVAILABLE: AIR ☐ SURFACE WATER ☒ GROUNDWATER ☒
SOIL ☒ SEDIMENT ☒ NONE ☐ Waste ☒

CONTRAVENTION OF STANDARDS: GROUNDWATER ☐ DRINKING WATER ☐
SURFACE WATER ☐ AIR ☐

SOIL TYPE: Silty sand to clayey silt

DEPTH TO GROUNDWATER TABLE: 3-10 ft

LEGAL ACTION: TYPE: _____ STATE ☐ FEDERAL ☐
STATUS: IN PROGRESS ☐ COMPLETED ☐
REMEDIAL ACTION: PROPOSED ☐ UNDER DESIGN ☐
IN PROGRESS ☐ COMPLETED ☒
NATURE OF ACTION: Drums removed from site

ASSESSMENT OF ENVIRONMENTAL PROBLEMS:

Potential ground-water and surface water contamination.

ASSESSMENT OF HEALTH PROBLEMS:

PERSON(S) COMPLETING THIS FORM:

FOR NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

NAME EA Science and Technology
TITLE _____
NAME _____
TITLE _____
DATE: _____

NEW YORK STATE DEPARTMENT OF HEALTH

NAME _____
TITLE _____
NAME _____
TITLE _____
DATE: _____