

STATUS REPORT

For

Sunoco Inc.
Belmont Terminal
2700 Passyunk Avenue
Philadelphia, Pennsylvania

Submitted To

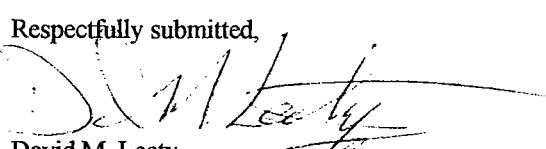
Mr. David Burke
Pennsylvania Department of Environmental Protection
Southeast Regional Office
Lee Park, Suite 6010
Conshohocken, Pennsylvania 19428

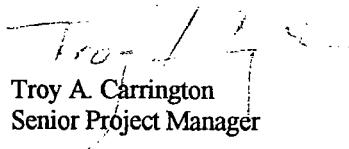
Prepared By

Handex of Maryland, Inc.
360 Morgan Road
Odenton, Maryland 21113

September 29, 2000

Respectfully submitted,


David M. Leety
Hydrogeologist


Troy A. Carrington
Senior Project Manager



September 29, 2000

Mr. David Burke
Pennsylvania Department of Environmental Protection
Southeast Regional Office
Lee Park, Suite 6010
Conshohocken, Pennsylvania 19428

RE: Status Report
Sunoco, Inc. Belmont Terminal
2700 Passyunk Avenue
Philadelphia, Pennsylvania

Dear Mr. Burke:

Attached please find a Site Status Report summarizing site environmental activities for January through September 2000. As requested during the August 31, 2000 meeting between Sunoco, the Pennsylvania Department of the Environment (PADEP), and the Philadelphia Water Department (PWD) the status report contains information pertaining to the ground water and non-aqueous phase liquid (NAPL) recovery systems; NAPL sampling results; the Shunk Street Vapor Abatement System; the Cone Penetrometer (CPT) Subsurface Investigation; and site gauging data.

If you have any questions regarding the data presented in the Status Report please feel free to contact either Handex or Sunoco.

Sincerely,

David M. Leety
Hydrogeologist

Troy A. Carrington
Senior Project Manager

Attachment

cc: Mr. Daniel Shine, Sunoco, Inc., Aston, Pennsylvania

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TABLE OF CONTENTS

	<u>Page #</u>
1.0 Introduction	1
2.0 Ground Water and NAPL Recovery System Data	1
3.0 Shunk Street Vapor Abatement System.....	2
4.0 NAPL Sampling Results.....	2
5.0 Cone Penetrometer Subsurface Investigation	2
6.0 Recovery Well Development.....	3
7.0 Temporary Monitoring Point Gauging Data.....	3
8.0 Site Gauging Data.....	4
9.0 Summary	5
10.0 Discussion	6

Figures

- | | |
|----------|--|
| Figure 1 | Site Map |
| Figure 2 | CPT Sounding Location Map |
| Figure 3 | Contoured Ground Water Elevation Map, September 11, 2000 |

Appendices

- | | |
|------------|--|
| Appendix A | Ground Water and NAPL Recovery System Data |
| Appendix B | Shunk Street Sewer Vapor Abatement System Data |
| Appendix C | Laboratory Analytical Report, NAPL Samples Collected May 9, 2000 |
| Appendix D | Cone Penetrometer Subsurface Investigation Report |
| Appendix E | Gauging Data: Temporary Monitoring Points and Site Monitoring and Recovery Wells |
| Appendix F | Belmont Terminal Cross Sections |

STATUS REPORT

**Sunoco, Inc.
Belmont Terminal
2700 Passyunk Avenue
Philadelphia, Pennsylvania**

1.0 Introduction

The purpose of this report is to summarize site activities that occurred from January 1 through September 26, 2000. Included within this report are summaries of the following data:

- Ground water and NAPL recovery system data for the year 2000.
- Shunk Street Sewer vapor abatement system data for July through September 2000.
- May 9, 2000 NAPL Sampling Results.
- The Cone Penetrometer (CPT) Delineation Program.
- Gauging data for the temporary well points installed in 8 of the CPT points for September 2000.
- Gauging data for all site wells for the year 2000.

2.0 Ground Water and NAPL Recovery System Data

The remediation system at the Belmont Terminal consists of both ground water and NAPL recovery pumps at RW-1, RW-4, RW-6, and RW-7. Well locations are shown on Figure 1. RW-15 was taken off-line in September 1998 due to continual operational problems related to equipment and piping. Recovered NAPL is pumped to an on-site 1,000 gallon holding tank that is periodically pumped out. Recovered ground water passes through an oil/water separator before being discharged to the City of Philadelphia sanitary sewer system.

With few exceptions the recovery system is monitored on a weekly basis. Operation and Maintenance (O&M) activities include evaluation of recovery pumps, system equipment and associated level switches, and collection of the appropriate system performance data. System operational data and maintenance data are attached in Appendix A. The ground water and NAPL recovery systems operated continuously during the year 2000. During August and September 2000 the NAPL recovery system was taken off line during weekends to prevent the entire system (both ground water and NAPL recovery systems) from shutting down due to a high NAPL alarm at the holding tank.

RW-1 was not operational from March 2000 through June 2000 due to damage caused by a steam line leak. The damage was repaired in June and the well was brought back on line. Based on flow meter readings, approximately 2,837 gallons of NAPL and 419,440 gallons of water have been recovered from RW-1 in 2000. RW-4 operated continuously with the exception of problems with the pump control probe assembly in March and April 2000. The NAPL flow meter was removed in March 2000 due to continual malfunctions. Maintenance was performed during the Second Quarter of 2000 and the RW-4 has remained operational. Based on flow meter readings, approximately 839.2 gallons of NAPL (through March 2000) and 11,150 gallons of water have been recovered from RW-4 in 2000. RW-6 has operated continuously during 2000. Based on flow meter readings, approximately 0.2 gallons of NAPL and 681,190 gallons of water have been recovered from RW-6. RW-7 has also operated continuously during 2000. Based on flow meter readings, approximately 453.9 gallons of LPH and 420,450 gallons of water have been recovered from RW-7. Recovery totals for both NAPL and water are approximate due to flow meter malfunctions resulting from NAPL reactions with the internal parts in the flow meters.

3.0 Shunk Street Vapor Abatement System

The Shunk Street Sewer Vapor Abatement System (VAS) involves the removal of vapors at the Belmont Terminal (Belmont Blower Manhole) via an above grade blower and the routing of these vapors to an existing Biofilter Treatment System (located approximately 0.5 miles south) via the 26th Street Sewer. During 2000 the VAS has operated continuously with the exception of minor periodic downtime for compressor maintenance; and from September 13 through 15 while the Philadelphia Water Department (PWD) performed work on the tide gate at the biofilter.

The VAS is monitored daily for flow rate, air temperature, percent oxygen (%O₂), percent lower explosive limit (%LEL), and volatile organic compounds (VOCs) utilizing a photoionization detector (PID). In addition, %O₂, %LEL, VOCs, and the flow direction (in to the sewer vs. out of the sewer) are monitored daily at the Maintenance Building Manhole, the Outfall Manhole, and the Jeffco Manhole. Monitoring data for the VAS for 2000 is attached as Appendix B. The average recorded values for each of the monitored parameters at the Belmont Blower Manhole (January through September 28) are listed below:

- Flow rate: 1,674 cubic feet per minute (cfm)
- Temperature: 73 degrees Fahrenheit (°F)
- %O₂: 21.0%
- %LEL: 5%
- VOC reading: 202 parts per million (ppm)

4.0 NAPL Sampling Results

On May 9, 2000 NAPL samples were collected from six wells (RW-1, RW-4, RW-7, RW-15, S-75, and S-76). Well locations are shown on Figure 1. In addition, virgin product samples were collected for 87 Octane and 94 Octane Gasoline, Jet Fuel, Low Sulfur Diesel Fuel, Home Heating Oil, and a Sunoco Gasoline Additive. The samples from RW-1, RW-15, S-75, and S-76 were collected directly from the well using a PVC bailer. The samples from RW-4 and RW-7 were collected from the NAPL recovery pump discharge hose. The virgin samples were collected by Sunoco and submitted to Handex with the exception of the Sunoco Gasoline Additive, which was collected from a valve at the additive AST. Based on field observations, the samples collected from RW-1, RW-4, RW-7, and RW-15 were golden in color, and the samples collected at S-75 and S-76 were dark reddish-brown in color.

All samples were submitted to Torkelson Geochemistry, Inc. of Tulsa, Oklahoma for Gas Chromatography analysis and analysis of Density and Lead. The report indicates that the NAPL in the four recovery wells (RW-1, RW-4, RW-7, and RW-15) is essentially identical and is from the same source. Based on the high methyl-tertiary-butyl-ether (MTBE) peaks, the source is a motor fuel and is in close proximity to the recovery wells. However, when the recovery well samples were compared to the virgin samples, a match could not be made. According to the laboratory report the samples from S-75 and S-76 both appeared to be composed of a mixture of gasoline and another hydrocarbon distillate. These samples also differ from each other in the amount of weathering of the product; S-75 is moderately to severely weathered and S-76 is unweathered to moderately weathered. A copy of the Laboratory Analytical Report is attached as Appendix C.

5.0 Cone Penetrometer Subsurface Investigation

On August 28 through August 30, 2000 a NAPL delineation program was conducted at the site. The program consisted of the installation of 22 Cone Penetrometer (CPT) soundings. CPT sounding locations are shown on Figure 2. The data collected during the delineation program is summarized in the Cone Penetrometer Subsurface Investigation Report attached as Appendix D. The investigation concluded:

- High Fuel Fluorescence Detector (FFD) responses were encountered in all CPT soundings except CPT-19, which met refusal at 20.61 feet below grade.

- Hydrocarbons were detected predominantly within two elevation intervals; the upper level between 10 and 30 feet in elevation (at grade to 20 feet below grade) and the lower level between 10 and -5 feet in elevation (20 to 35 feet below grade).
- The upper level hydrocarbons (between grade and 20 feet below grade) were detected primarily under the loading racks, between the loading racks and the main parking lot, and just south of the main entrance.
- The lower level hydrocarbons (between 20 and 35 feet below grade) were detected in three areas: just south of the loading racks, south of the main parking area in the area of CPT-6, and just south of the main entrance.

6.0 Recovery Well Development

In April 2000 the ground water and NAPL recovery pumps and probes were placed at deeper depths to increase the amount of drawdown and the amount of NAPL recovery from each well. During the deepening process it was discovered that RW-4 had filled with silt to a depth of approximately 35 feet below grade. On September 5, 2000 during regular system operation and maintenance (O&M) activities it was discovered that RW-7 had filled with silt to a depth of approximately 42 feet below grade. The completion depth of both of these wells was recorded at 50 feet below grade.

On September 26, 2000 attempts were made to remove the sediment out of RW-4 and RW-7 utilizing air-lifting and bailing. Approximately 15 feet of sediment was removed from RW-4. However, while cleaning RW-7 it became apparent that the gravel pack was filling the well. While attempting to remove the gravel from RW-7 additional gravel entered the well, filling it to 40 feet below grade (a 2-foot loss in depth).

7.0 Temporary Monitoring Point Gauging Data

As part of the delineation program temporary monitoring points were installed in 8 of the 22 CPT soundings. Only 8 temporary points could be installed as the remainder of the boreholes collapsed before the well casing could be installed. The temporary monitoring points are constructed of 1.5-inch diameter solid PVC and 1.5-inch diameter 0.020-inch slotted PVC well screen. Construction details for each temporary point are summarized in the Table below.

**Temporary Monitoring Point
Construction Details**

Temporary Point Number	Length of Solid Casing (feet)	Length of Well Screen (feet)	Total Depth (feet)
CPT-1	6.25	20.00	26.25
CPT-3	9.30	20.00	29.30
CPT-5	8.75	20.00	28.75
CPT-7	10.00	20.00	30.00
CPT-11	8.75	20.00	28.75
CPT-14	5.00	30.00	35.00
CPT-16	16.50	20.00	36.50
CPT-17	16.00	20.00	36.00

The temporary monitoring points were gauged weekly for depth to water and depth to NAPL. Gauging data indicates that NAPL is present in CPT-1, CPT-5, CPT-11, CPT-14, CPT-16, and CPT-17 at thicknesses ranging from a sheen (< 0.01 feet) in CPT-14 to 3.06 feet in CPT-1. Temporary monitoring point gauging data is attached in Appendix E. In addition, the NAPL in each temporary point was visually inspected for color. The NAPL colors observed in the temporary points are summarized in the Table below.

Temporary Monitoring Point

Product Color

August 26, 2000

Temporary Monitoring Point Number	Product Color
CPT-1	Black
CPT-3	---
CPT-5	Light Brown
CPT-7	---
CPT-11	Light Brown
CPT-14	Brown
CPT-16	Dark Brown
CPT-17	Dark Brown

--- No Product Measured in Monitoring Point.

8.0 Site Gauging Data

All site wells have been gauged regularly since they were installed in 1998. Gauging data for all site wells for the year 2000 is included in Appendix E. Gauging data from the wells and temporary monitoring points from September 11, 2000 was used to prepare a Contoured Ground Water Elevation Map (Figure 3). As shown by Figure 3, ground water at the site is relatively flat, with the highest elevation at 7.28 feet in CPT-3 and the lowest elevation at 1.75 feet in RW-7, which is a pumping well. The size of the cone of depression created by pumping RW-7 was estimated.

Cross sections showing the depth to NAPL and depth to water in the wells along the south side of the Shunk Street Sewer were constructed from the gauging data collected from select wells since February 21, 2000. The cross sections are attached in Appendix F. On the cross sections the recovery wells are represented by a vertical line and each well data point is labeled. As shown on the February 21, 2000 cross section the top of ground water and top of product, except for RW-4, intersect the Shunk Street Sewer.

In April 2000 the ground water recovery pumps and NAPL recovery pumps were lowered in order to increase the radius of influence of the cones of depression so that more NAPL could be recovered by the recovery system. Current ground water and NAPL pump intake depths are summarized in the Table below.

**Current Recovery Well
Pump Intake Depths**

Recovery Well	Well Depth (feet)	Ground Water Pump Intake Depth (feet)	NAPL Pump Intake Depth (feet)
RW-1	44.66	41.00	33.00
RW-4	49.50	32.83	30.08
RW-6	50.08	46.75	35.00
RW-7	44.50	43.83	33.00
RW-14	49.45	NA	NA

As shown on the May 15, 2000 through September 26, 2000 cross sections, ground water elevations in the recovery wells are slightly lower. In addition, NAPL elevations, except for RW-4, have also decreased slightly. Based on gauging data and the cross-sectional views, it does not appear that deepening the recovery pumps has increased the influence of the recovery wells.

9.0 Summary

Ground Water and NAPL Recovery System

- The ground water recovery system has operated continuously in 2000.
- The NAPL recovery system has operated continuously in 2000 except during weekends in August and September when the system was taken off-line to prevent the NAPL holding tank from filling.
- Based on holding tank vac-out data approximately 45,578 gallons of NAPL have been recovered in 2000.
- Based on flow meter readings approximately 1,340,990 gallons of water has been recovered in 2000. Please note that due to chemical reactions with the plastic parts in the flow meters the flow meters are often inoperable. Therefore the total flow has been under estimated.

Shunk Street Sewer Vapor Abatement System

- The Shunk Street Sewer Vapor Abatement System has operated continuously during 2000 except for September 13 through 15 when the system was taken off-line by the Philadelphia Water Department while they conducted maintenance on the tide gate at the biofilter.
- An average flow rate of 1,674 cfm was recorded during 2000.

NAPL Sampling Results

- Samples collected from RW-1, RW-4, RW-7, and RW-15 were nearly identical and consisted of an unweathered motor fuel.
- Samples collected from S-75 and S-76 were similar and consisted of a moderately to severely weathered mixture of gasoline and another hydrocarbon distillate.

Cone Penetrometer Subsurface Investigation

- High FFD responses were encountered in all CPT soundings.
- Hydrocarbons were detected within two elevation intervals.
- The NAPL was not fully delineated during the CPT Investigation

Recovery Well Development

- RW-4 was cleared of 15 feet of sediment bringing the total depth to 49.50 feet below grade.
- It appears that there is a break in the casing of RW-7 which is allowing the gravel pack to fall into the well. During the development of RW-7 an additional two feet of depth was lost. The total measured depth is now 40 feet below grade.

Temporary Monitoring Point Gauging Data

- Temporary monitoring points were installed in 8 of the 22 CPT soundings.
- Gauging data from the CPT points indicates that NAPL is present in all but 2 of the temporary monitoring points at thicknesses ranging from <0.01 feet to 3.06 feet.

Site Gauging Data

- Site gauging data indicates that ground water elevations have ranged from -16.01 feet (RW-6) to 17.99 (RW-4) during 2000.
- Gauging data collected on September 11, 2000 indicates that the ground water surface is fairly flat, with elevations ranging from 1.75 feet (RW-7) to 7.28 feet (CPT-3).
- Gauging data and cross-sectional views of the wells adjacent to the Shunk Street Sewer indicates that cone of depression created by ground water pumping from the recovery wells do not appear to influence other wells.

10.0 Discussion

Based on the data presented in this report it appears that the ground water and NAPL recovery systems are operating adequately. Several system modifications are scheduled for the next several months, including:

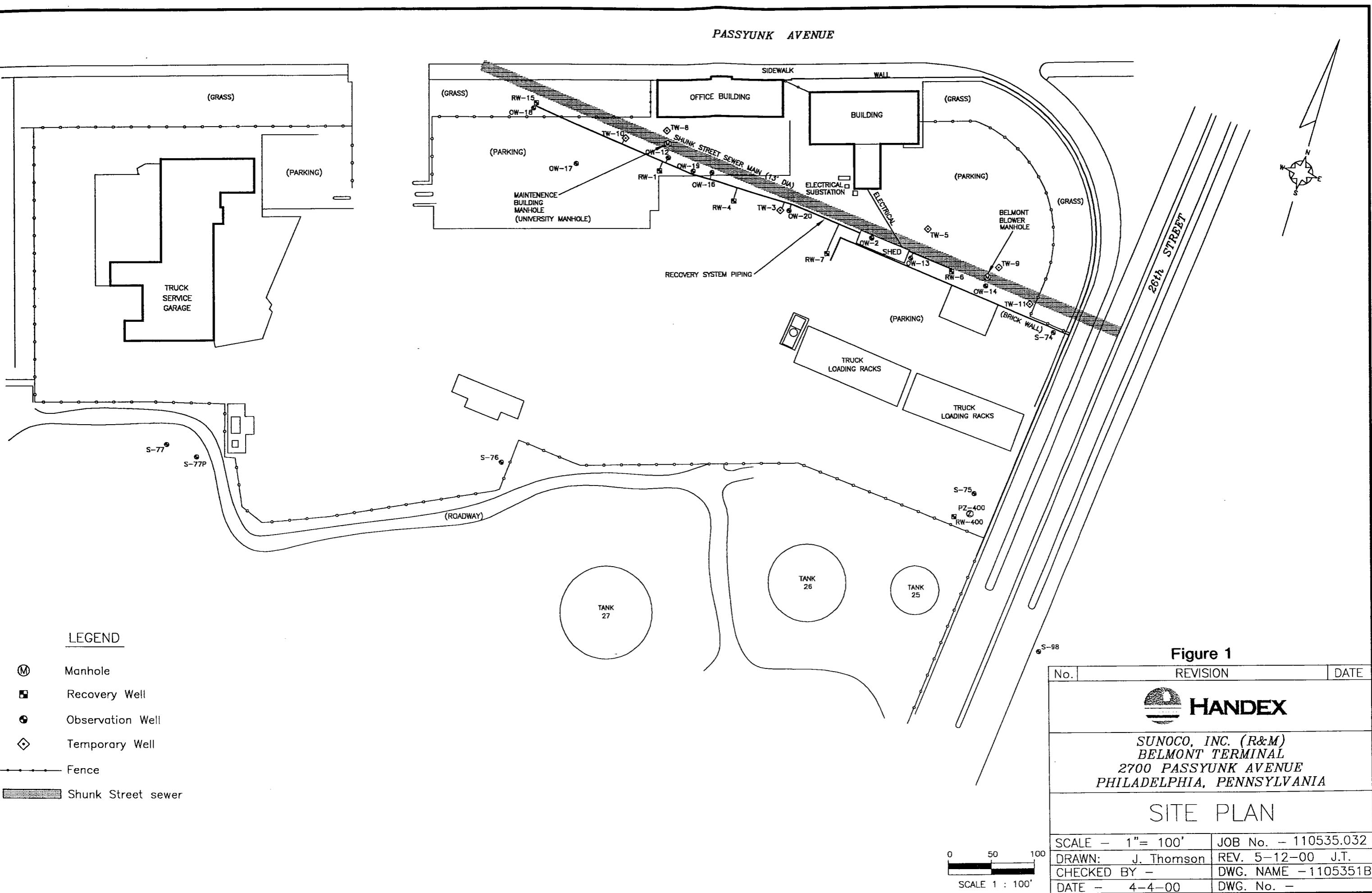
- Bringing RW-15 back on-line by installing new ground water and NAPL recovery pumps.
- Installing a larger NAPL holding tank so that NAPL recovery system run time can be increased.
- Replacing the existing flow meters with meters compatible with the NAPL so that accurate ground water and NAPL recovery totals can be obtained.

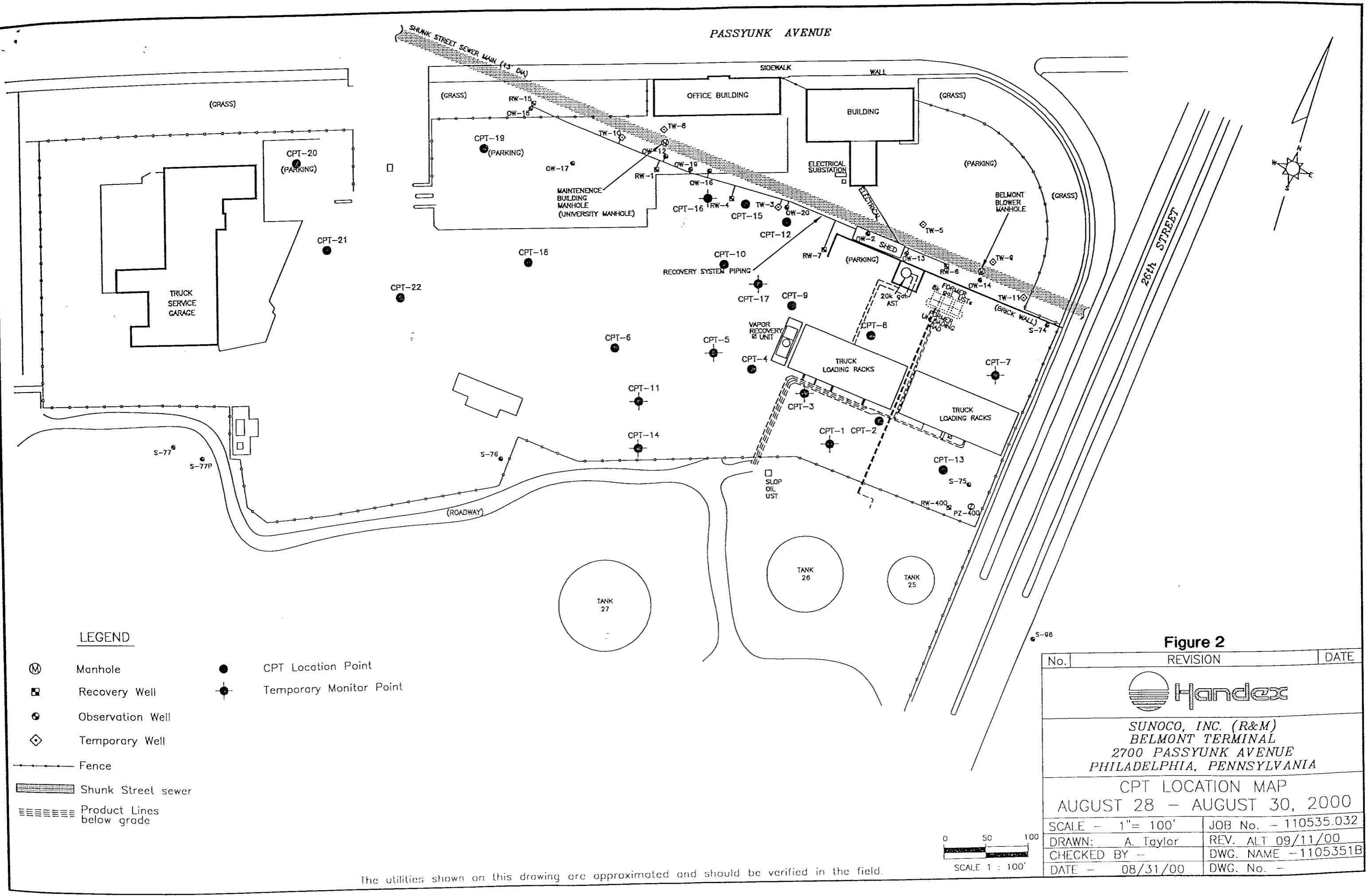
Based on flow measurements recorded at the Belmont Blower Manhole blower, it appears that the existing Shunk Street Sewer Vapor Abatement System is removing approximately 2,400,000 cubic feet of air from the Shunk Street Sewer daily. In order to increase the amount of air removed from the sewer, installation of an upgraded system vapor abatement system is tentatively scheduled for early 2001.

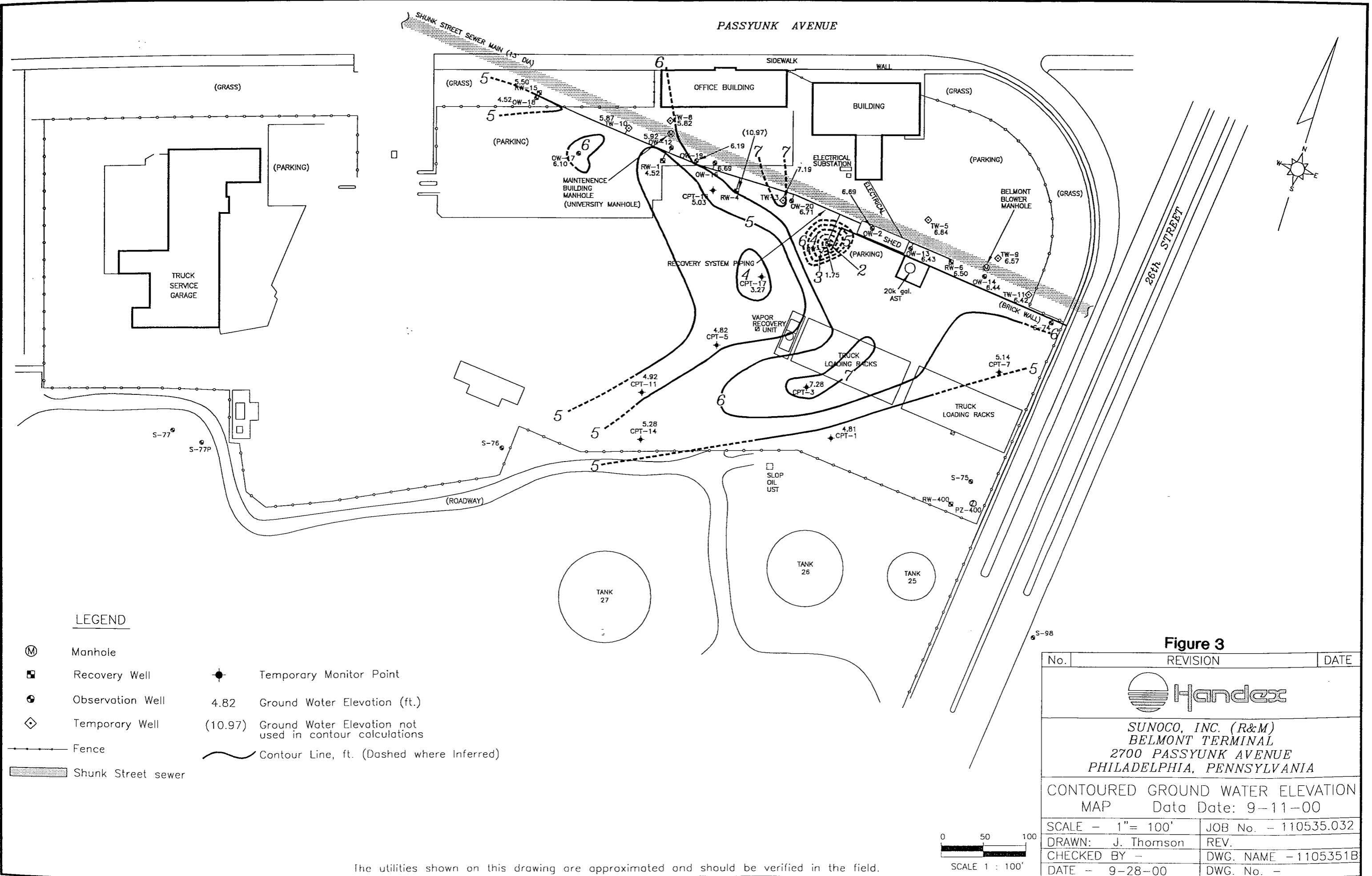
Due to an apparent break in the well casing in RW-7 the gravel pack is filling the well. Sunoco and Handex are currently evaluating options to salvage RW-7.

Based on the CPT Investigation, relatively high FFD responses were recorded in all CPT soundings indicating the apparent presence of NAPL. However, according to gauging data collected from the temporary monitoring points installed within the CPT soundings, NAPL is not present at all locations. Sunoco and Handex are currently evaluating the next phase of NAPL delineation. In addition, options to enhance the NAPL recovery system are also being evaluated.

FIGURES







APPENDIX A

**GROUND WATER & NAPL
RECOVERY SYSTEM DATA**

Sunoco, Inc. (R&M) - Philadelphia Refinery
Remediation System Operational Data
Belmont Terminal Fluid Recovery System - Recovery Well Data

Recovery Well #1

Date	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Depth to Water (feet)	Total Water Extracted (gal)	Average Water Flow Rate (gpm)	Total Product Recovered (gal)
03-Jan-00	25.21	25.96	0.75	25.41	483169	0.00	50481.8
11-Jan-00	25.33	26.38	1.05	25.61	483169	0.00	50518.3
17-Jan-00	25.40	26.00	0.60	25.56	483169	0.00	51262.3
26-Jan-00	25.26	26.02	0.76	25.47	483169	0.00	51996.8
31-Jan-00	25.82	26.40	0.58	25.98	483169	0.00	51997.8
07-Feb-00	25.41	26.31	0.90	25.65	483169	0.00	52000.1
14-Feb-00	25.79	26.49	0.70	25.98	483169	0.00	52560.7
21-Feb-00	25.41	26.18	0.77	25.62	483169	0.00	52560.7
28-Feb-00	25.21	26.74	1.53	25.62	483169	0.00	53030.0
06-Mar-00	25.24	27.71	2.47	25.91	492969	0.97	53030.0
13-Mar-00	25.37	27.92	2.55	26.06	500679	0.76	53030.0
20-Mar-00	25.11	28.16	3.05	25.93	510959	1.02	53030.0
27-Mar-00	24.76	27.75	2.99	25.57	522389	1.13	53030.0
03-Apr-00	25.35	28.23	2.88	26.13	533329	1.09	53030.0
10-Apr-00	25.20	28.03	2.83	25.96	543999	1.06	53030.0
17-Apr-00	24.95	27.78	2.83	25.71	554709	1.06	53030.0
24-Apr-00	25.04	27.96	2.92	25.83	566169	1.14	53030.0
01-May-00	25.36	27.75	2.39	26.01	577849	1.16	53030.0
09-May-00	24.87	26.66	1.79	25.35	581359	0.30	53030.0
15-May-00	24.96	26.65	1.69	25.42	581359	0.00	53030.0
22-May-00	24.89	26.58	1.69	25.35	581359	0.00	53030.0
30-May-00	24.99	26.63	1.64	25.43	581359	0.00	53030.0
05-Jun-00	24.94	26.65	1.71	25.40	581359	0.00	53030.0
12-Jun-00	25.29	37.10	11.81	28.48	586459	0.51	53030.0
19-Jun-00	25.80	32.25	6.45	27.54	592929	0.64	53030.0
26-Jun-00	24.85	31.31	6.46	26.59	615279	2.22	53030.0
05-Jul-00	25.18	31.41	6.23	26.86	635459	1.56	53030.0
11-Jul-00	24.88	31.19	6.31	26.58	654439	2.20	53030.0
18-Jul-00	24.96	30.11	5.15	26.35	675309	2.07	53030.0
24-Jul-00	25.04	30.20	5.16	26.43	696559	2.46	53030.0
31-Jul-00	25.04	27.06	2.02	25.59	720449	2.37	53030.0
07-Aug-00	25.05	29.26	4.21	26.19	737839	1.73	53030.0
15-Aug-00	24.95	27.11	2.16	25.53	760959	2.01	53030.0
21-Aug-00	25.09	28.70	3.61	26.06	776909	1.85	53030.0
28-Aug-00	25.04	30.05	5.01	26.39	802439	2.53	53030.0
05-Sep-00	25.32	30.80	5.48	26.80	829629	2.36	53030.0
11-Sep-00	25.35	27.99	2.64	26.06	850159	2.38	53030.0
18-Sep-00		No Access			873839	2.35	53030.0
26-Sep-00	25.11	30.39	5.28	26.54	902609	2.50	53030.0

NOTE

Recovery data is approximate due to problems with flow meter malfunction

Sunoco, Inc. (R&M) - Philadelphia Refinery
Remediation System Operational Data
Belmont Terminal Fluid Recovery System - Recovery Well Data

Recovery Well #4

Date	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Depth to Water (feet)	Total Water Extracted (gal)	Average Water Flow Rate (gpm)	Total Product Recovered (gal)
03-Jan-00	18.63	23.54	4.91	19.96	1770	0.00	2367.6
11-Jan-00	14.36	17.92	3.56	15.32	1770	0.00	2483.4
17-Jan-00	13.48	20.10	6.62	15.27	1770	0.00	2536.9
26-Jan-00	14.13	19.64	5.51	15.62	1770	0.00	2587.5
31-Jan-00	13.10	23.94	10.84	16.03	1770	0.00	2607.3
07-Feb-00	14.18	16.42	2.24	14.78	1770	0.00	2698.4
14-Feb-00	12.77	15.51	2.74	13.51	1770	0.00	2707.0
21-Feb-00	14.39	21.48	7.09	16.30	1770	0.00	2825.1
28-Feb-00	13.52	14.94	1.42	13.90	1770	0.00	2850.3
06-Mar-00	12.57	26.02	13.45	16.20	1780	0.00	2989.4
13-Mar-00	13.25	32.56	19.31	18.46	1780	0.00	3123.5
20-Mar-00	16.77	25.44	8.67	19.11	1780	0.00	3123.5
27-Mar-00	14.25	25.99	11.74	17.42	1780	0.00	3123.5
03-Apr-00	26.69	27.00	0.31	26.77	1780	0.00	3123.5
10-Apr-00	12.66	24.36	11.70	15.82	2400	0.06	3123.5
17-Apr-00	26.68	27.61	0.93	26.93	2450	0.00	3123.5
24-Apr-00	26.74	27.53	0.79	26.95	3350	0.09	3123.5
01-May-00	26.54	27.19	0.65	26.72	4280	0.09	3123.5
09-May-00	13.12	26.32	13.20	16.68	4380	0.01	3123.5
15-May-00	28.10	28.77	0.67	28.28	4380	0.00	3123.5
22-May-00	22.10	29.97	7.87	24.22	4630	0.02	3123.5
30-May-00	13.62	28.97	15.35	17.76	4720	0.01	3123.5
05-Jun-00	14.82	30.05	15.23	18.93	4770	0.01	3123.5
12-Jun-00	20.08	26.80	6.72	21.89	4770	0.00	3123.5
19-Jun-00	16.40	28.28	11.88	19.61	4770	0.00	3123.5
26-Jun-00	13.22	28.35	15.13	17.31	4770	0.00	3123.5
05-Jul-00	27.10	27.39	0.29	27.18	5490	0.06	3123.5
11-Jul-00	27.15	27.46	0.31	27.23	6040	0.06	3123.5
18-Jul-00	27.13	27.54	0.41	27.24	6450	0.04	3123.5
24-Jul-00	27.16	27.81	0.65	27.34	6990	0.06	3123.5
31-Jul-00	25.14	27.53	2.39	25.79	6990	0.00	3123.5
07-Aug-00	19.43	26.85	7.42	21.43	6990	0.00	3123.5
15-Aug-00	13.55	26.18	12.63	16.96	7600	0.05	3123.5
21-Aug-00	18.40	27.30	8.90	20.80	7880	0.03	3123.5
28-Aug-00	17.69	26.85	9.16	20.16	8220	0.03	3123.5
05-Sep-00	24.74	28.37	3.63	25.72	8730	0.04	3123.5
11-Sep-00	18.07	27.95	9.88	20.74	10100	0.16	3123.5
18-Sep-00	21.45	27.99	6.54	23.22	11950	0.18	3123.5
26-Sep-00	27.51	28.46	0.95	27.77	12920	0.08	3123.5

NOTE

Recovery data is approximate due to problems with flow meter malfunction



HANDEX

Sunoco, Inc. (R&M) - Philadelphia Refinery
Remediation System Operational Data
Belmont Terminal Fluid Recovery System - Recovery Well Data

Recovery Well #6

Date	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Depth to Water (feet)	Total Water Extracted (gal)	Average Water Flow Rate (gpm)	Total Product Recovered (gal)
03-Jan-00	30.25	30.71	0.46	30.37	1628290	1.34	2.6
11-Jan-00	30.27	31.01	0.74	30.47	1643340	1.31	2.6
17-Jan-00	30.42	30.80	0.38	30.52	1654490	1.29	2.6
26-Jan-00	29.81	30.39	0.58	29.97	1666080	0.89	2.6
31-Jan-00	30.26	30.91	0.65	30.44	1675150	1.26	2.6
07-Feb-00	31.11	31.66	0.55	31.26	1686960	1.17	2.6
14-Feb-00	30.99	31.07	0.08	31.01	1698370	1.13	2.6
21-Feb-00	30.02	30.46	0.44	30.14	1708930	1.05	2.6
28-Feb-00	26.81	27.85	1.04	27.09	1719760	1.07	2.8
06-Mar-00	30.90	31.18	0.28	30.98	1729360	0.95	2.8
13-Mar-00	31.59	32.65	1.06	31.88	1740030	1.06	2.8
20-Mar-00	30.70	31.84	1.14	31.01	1753450	1.33	2.8
27-Mar-00	30.63	31.92	1.29	30.98	1766430	1.29	2.8
03-Apr-00	31.36	32.55	1.19	31.68	1779130	1.26	2.8
10-Apr-00	30.26	31.45	1.19	30.58	1791260	1.20	2.8
17-Apr-00	29.38	30.43	1.05	29.66	1804090	1.27	2.8
24-Apr-00	29.03	30.12	1.09	29.32	1812570	0.84	2.8
01-May-00	29.43	30.38	0.95	29.69	1821000	0.84	2.8
09-May-00	34.91	34.91	0.00	34.91	1851060	2.61	2.8
15-May-00	46.39	46.39	0.00	46.39	1882380	3.63	2.8
22-May-00	39.39	39.39	0.00	39.39	1918470	3.58	2.8
30-May-00	39.80	39.80	0.00	39.80	1955740	3.24	2.8
05-Jun-00	42.42	42.42	0.00	42.42	1986720	3.59	2.8
12-Jun-00	49.10	49.10	0.00	49.10	2006540	1.97	2.8
19-Jun-00	47.60	47.60	0.00	47.60	2029760	2.30	2.8
26-Jun-00	35.06	35.17	0.11	35.09	2054870	2.49	2.8
05-Jul-00	34.04	34.36	0.32	34.13	2084560	2.29	2.8
11-Jul-00	34.77	35.93	1.16	35.08	2109270	2.86	2.8
18-Jul-00	31.51	33.70	2.19	32.10	2135530	2.61	2.8
24-Jul-00	34.55	35.80	1.25	34.89	2155710	2.34	2.8
31-Jul-00	32.91	34.01	1.10	33.21	2179390	2.35	2.8
07-Aug-00	31.79	35.18	3.39	32.71	2194740	1.52	2.8
15-Aug-00	25.94	29.94	4.00	27.02	2214950	1.75	2.8
21-Aug-00	31.58	34.92	3.34	32.48	2234800	2.30	2.8
28-Aug-00	33.41	37.06	3.65	34.40	2243470	0.86	2.8
05-Sep-00	33.40	36.81	3.41	34.32	2259410	1.38	2.8
11-Sep-00	26.06	28.60	2.54	26.75	2264400	0.58	2.8
18-Sep-00	34.20	34.31	0.11	34.23	2278340	1.38	2.8
26-Sep-00	34.87	34.93	0.06	34.89	2295980	1.53	2.8

NOTE

Recovery data is approximate due to problems with flow meter malfunction

Sunoco, Inc. (R&M) - Philadelphia Refinery
Remediation System Operational Data
Belmont Terminal Fluid Recovery System - Recovery Well Data

Recovery Well #7

Date	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Depth to Water (feet)	Total Water Extracted (gal)	Average Water Flow Rate (gpm)	Total Product Recovered (gal)
03-Jan-00	29.13	29.66	0.53	29.27	590700	1.61	15.3
11-Jan-00	28.93	29.37	0.44	29.05	610920	1.76	18.7
17-Jan-00	29.22	29.40	0.18	29.27	625260	1.66	19.5
26-Jan-00	28.91	29.17	0.26	28.98	650780	1.97	23.2
31-Jan-00	28.43	28.62	0.19	28.48	672040	2.95	25.4
07-Feb-00	29.14	29.53	0.39	29.25	693570	2.14	34.5
14-Feb-00	28.26	29.04	0.78	28.47	713540	1.98	40.6
21-Feb-00	28.99	29.20	0.21	29.05	733760	2.01	50.5
28-Feb-00	23.79	24.54	0.75	23.99	754840	2.09	59.4
06-Mar-00	27.48	28.09	0.61	27.64	778890	2.39	70.3
13-Mar-00	28.70	29.15	0.45	28.82	798190	1.91	83.6
20-Mar-00	27.43	27.75	0.32	27.52	824560	2.62	103.1
27-Mar-00	29.07	29.55	0.48	29.20	849210	2.45	114.5
03-Apr-00	27.11	27.42	0.31	27.19	866440	1.71	144.3
10-Apr-00	28.09	28.38	0.29	28.17	890340	2.37	226.5
17-Apr-00	29.35	30.02	0.67	29.53	914400	2.39	434.7
24-Apr-00	29.40	30.18	0.78	29.61	936760	2.22	452.0
01-May-00	27.72	28.61	0.89	27.96	957990	2.11	457.4
09-May-00	24.70	25.64	0.94	24.95	982690	2.14	465.9
15-May-00	33.18	33.18	0.00	33.18	991470	1.02	468.4
22-May-00	33.52	33.52	<0.01	33.52	991470	0.00	468.4
30-May-00	33.23	33.24	0.01	33.23	991470	0.00	468.4
05-Jun-00	32.61	32.84	0.23	32.67	991470	0.00	468.4
12-Jun-00	32.76	33.01	0.25	32.83	991470	0.00	468.4
19-Jun-00	33.22	33.48	0.26	33.29	994440	0.29	468.4
26-Jun-00	33.51	33.56	0.05	33.52	994440	0.00	468.4
05-Jul-00	33.02	33.35	0.33	33.11	994530	0.01	468.4
11-Jul-00	32.59	33.00	0.41	32.70	994530	0.00	468.5
18-Jul-00	32.40	33.28	0.88	32.64	994530	0.00	468.7
24-Jul-00	32.49	33.16	0.67	32.67	994550	0.00	469.2
31-Jul-00	23.60	24.09	0.49	23.73	994860	0.03	469.2
07-Aug-00	31.15	31.65	0.50	31.29	994860	0.00	469.2
15-Aug-00	23.53	24.92	1.39	23.91	994860	0.00	469.2
21-Aug-00	32.40	32.74	0.34	32.49	994860	0.00	469.2
28-Aug-00	32.95	33.71	0.76	33.16	994890	0.00	469.2
05-Sep-00	24.80	25.45	0.65	24.98	994890	0.00	469.2
11-Sep-00	27.02	28.74	1.72	27.48	994890	0.00	469.2
18-Sep-00	23.40	24.65	1.25	23.74	994890	0.00	469.2
26-Sep-00	23.86	25.15	1.29	24.21	994890	0.00	469.2

NOTE

Recovery data is approximate due to problems with flow meter malfunction



HANDEX

Sunoco, Inc. (R&M) - Philadelphia Refinery
Remediation System Operational Data
Belmont Terminal Fluid Recovery System - Recovery Well Data

Recovery Well #15

Date	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Corrected Depth to Water (feet)	Total Water Extracted (gal)	Average Water Flow Rate (gpm)	Total Product Recovered (gal)
03-Jan-00	26.71	28.42	1.71	27.17	4100	0.00	N/A
11-Jan-00	26.65	28.34	1.69	27.11	4100	0.00	N/A
17-Jan-00	26.74	28.43	1.69	27.20	4100	0.00	N/A
26-Jan-00	26.75	28.46	1.71	27.21	4100	0.00	N/A
31-Jan-00	26.73	28.39	1.66	27.18	4100	0.00	N/A
07-Feb-00	26.79	28.54	1.75	27.26	4100	0.00	N/A
14-Feb-00	26.79	28.37	1.58	27.22	4100	0.00	N/A
21-Feb-00	26.80	28.61	1.81	27.29	4100	0.00	N/A
28-Feb-00	26.78	28.44	1.66	27.23	4100	0.00	N/A
06-Mar-00	26.83	28.61	1.78	27.31	4100	0.00	N/A
13-Mar-00	26.81	28.45	1.64	27.25	4100	0.00	N/A
20-Mar-00	26.75	28.40	1.65	27.20	4100	0.00	N/A
27-Mar-00	26.61	28.25	1.64	27.05	4100	0.00	N/A
03-Apr-00	26.65	28.27	1.62	27.09	4100	0.00	N/A
10-Apr-00	26.69	28.40	1.71	27.15	4100	0.00	N/A
17-Apr-00	26.62	28.15	1.53	27.03	4100	0.00	N/A
24-Apr-00	26.59	28.20	1.61	27.02	4100	0.00	N/A
01-May-00	26.61	28.20	1.59	27.04	4100	0.00	N/A
09-May-00	26.56	28.05	1.49	26.96	4100	0.00	N/A
15-May-00	26.64	28.13	1.49	27.04	4100	0.00	N/A
22-May-00	26.59	28.01	1.42	26.97	4100	0.00	N/A
30-May-00	26.61	28.03	1.42	26.99	4100	0.00	N/A
05-Jun-00	26.60	28.03	1.43	26.99	4100	0.00	N/A
12-Jun-00	26.62	28.14	1.52	27.03	4100	0.00	N/A
19-Jun-00	26.58	28.00	1.42	26.96	4100	0.00	N/A
26-Jun-00	26.58	28.01	1.43	26.97	4100	0.00	N/A
05-Jul-00	26.60	28.27	1.67	27.05	4100	0.00	N/A
11-Jul-00	26.64	28.32	1.68	27.09	4100	0.00	N/A
18-Jul-00	26.65	28.34	1.69	27.11	4100	0.00	N/A
24-Jul-00	26.69	28.42	1.73	27.16	4100	0.00	N/A
31-Jul-00	26.53	28.40	1.87	27.03	4100	0.00	N/A
07-Aug-00	26.79	28.32	1.53	27.20	4100	0.00	N/A
15-Aug-00	26.52	28.28	1.76	27.00	4100	0.00	N/A
21-Aug-00	26.62	28.38	1.76	27.10	4100	0.00	N/A
28-Aug-00	26.60	28.38	1.78	27.08	4100	0.00	N/A
05-Sep-00	26.61	28.37	1.76	27.09	4100	0.00	N/A
11-Sep-00	26.53	28.30	1.77	27.01	4100	0.00	N/A
18-Sep-00	26.68	28.26	1.58	27.11	4100	0.00	N/A
26-Sep-00	26.49	28.19	1.70	26.95	4100	0.00	N/A



HANDEX

SUNOCO, INC. (R&M) BELMONT TERMINAL MAINTENANCE REPORTS		
RW-1	DATE	COMMENTS
02/21/00		Product pump "weaker" based on lower flow rate
02/28/00		Product pump may not be operating well based on NAPL thickness
03/03/00		Lowered GW Pump
03/03/00		PP turned off due to plumbing leak caused by leaking steam line
05/03/00		water pump power cord damaged; pump removed from well pending new power cord
05/31/00		Gw pump power cord replaced, Gw pump discharge hose replaced, & pump cable replaced
05/31/00		Gw pump installed with intake at 43 ft.; pump motor is not operational
06/05/00		Checked water pump to change motor and found that pump end is not operational; no action until receive pump end
06/09/00		Installed new water pump end (Grundfos 10E11) and water pump motor (3/4 hp, 230v, 1 ph, 2 wire); set water pump intake at 41 ft. and probe system at 39 ft.
06/12/00		prod pump to be installed on 6/13
06/19/00		Installed spare product pump - not operational pending plumbing repair
06/19/00		HT was pumped out in the am
07/18/00		plumbing repair of GW and Product pumps/reactivated
08/07/00		HT was vac'd out
09/05/00		prod line down
09/11/00		HT vac'd out by Allstate
09/18/00		Non-movable vehicle on well
RW-4	DATE	COMMENTS
01/07/00		manually pumped off product
01/11/00		installed new NES product pump probe
01/14/00		product pump probe stuck
01/17/00		product probe stuck
01/19/00		product probe stuck
01/20/00		product probe stuck
01/26/00		5' of product in well
02/21/00		Product pump "weaker" based on lower flow rate
03/03/00		water flow meter repaired
03/06/00		Product pump not operational-Removed product pump assembly from RW-6 and installed in RW-4
03/20/00		water flow meter operated for only 10 gallons due to swollen internals
03/23/00		Installed ORS floats on the NES probe stem; system operational
03/27/00		Removed product flow meter and installed straight pipe; flow meter was removed because it clogs which causes backpressure on the product pump
03/31/00		raised product pump to pump off product that accumulated in the well
04/03/00		ground water pump does not seem operational-possible due to conductivity probe; changed flow meter internal parts
04/10/00		ground water pump off upon arrival; restarted, however conductivity probes seem to be negatively impacting operation of the ground water pump

04/12/00	existing ORS floats that are installed on an NES probe stem are not operating properly because one of the floats is the wrong type. Replaced float with one from RW-108 - operational
04/17/00	replaced internal parts for water flow meter
05/03/00	water pump: lowered so intake is at 32'10"; installed new discharge hose
05/03/00	product pump: lowered so intake is at 30'1"
05/08/00	turned off water and product pumps for the water sampling event on May 9
06/05/00	product pump not operational; installed product pump from RW1; operational
06/19/00	product pump not operational; installed spare product pump; reading was 48/0
06/26/00	changed flow meter parts
09/11/00	Repaired leak at water pump cam lock
RW-6	
DATE	COMMENTS
05/03/00	water pump: lowered so intake is at 46'9"; installed new discharge hose
05/31/00	Repaired Gw pump XP plug; it was loose and a few screws were missing
06/21/00	raised probe assembly to 35 ft
09/11/00	Water pump is down due to fitting on pump end blew out.
RW-7	
DATE	COMMENTS
05/03/00	water pump: lowered so intake is at 43'0"; installed new discharge hose
05/12/00	lowered product pump to 33'; goal was 35' but probe wire was too short
06/21/00	Installed check valve on product pump
06/26/00	changed flow meter parts
07/24/00	changed flow meter parts
09/05/00	System down / water pump
09/11/00	Changed flow meter parts, meter worked for approx 15 seconds then stopped again, pulled and rechecked and restarted but still does not work.
RW-15	
DATE	COMMENTS
System inactive	
SYSTEM	
DATE	COMMENTS
01/17/00	IHT pumped out
04/10/00	IHT pumped out
07/05/00	IHT pumped out
07/11/00	IHT pumped out

APPENDIX B
SHUNK STREET VAPOR ABATEMENT SYSTEM DATA

TABLE 5
SHUNK STREET SEWER BLOWER & MANHOLE DATA
SUNOCO, INC. (R&M)
PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

			SCHUYLKILL RIVER		BELMONT BLOWER MANHOLE					MAINTENANCE BUILDING MANHOLE			OUTFALL MANHOLE			JEFCO MANHOLE			COMMENTS				
					SHUNK ST. SEWER					SHUNK ST. SEWER			PASSYUNK AVE. SEWER			SHUNK ST. SEWER							
DATE	TIME	WEATHER	RIVER3 STAGE (ft)	APPROX TIDAL STATUS	FLOW	FLOW RATE (cfm)	TEMP (F)	%O ₂	%LEL	P P M	FLOW	%O ₂	%LEL	P P M	FLOW	%O ₂	%LEL	P P M	FLOW	%O ₂	%LEL	P P M	
01/03/2000	8:45	cool/overcast	-1.54		OUT	1540	72.6	21.0	3	83.6	OUT	20.9	11	131.2	OUT	21.0	0	0	IN/OUT	20.9	0	0.0	
01/04/2000	9:00	cool/overcast	-1.44		OUT	1530	73.5	20.9	11	228.4	IN	20.8	0	0	OUT	21.0	0	0	IN	21.0	0	6.2	
01/05/2000	8:30	mostly sunny/40	-3.46		OUT	1420	66.9	21.0	2	130.5	IN/OUT	21.0	3	263	IN	21.0	0	0	OUT	21.0	0	2.5	Called Steve with readings
01/06/2000	8:00	sunny	-3.17		OUT	1350	65.7	21.0	0	24.6	OUT	20.9	4	264	IN	20.9	0	0	OUT	21.0	0	0.0	
01/07/2000	8:40	cold/clear	-5.54	LOW	OUT	1410	67.8	21.0	12	519	OUT	21.0	12	435	OUT	21.0	0	0	OUT	21.0	7	256.0	
01/11/2000	9:15	cold/clear	-3.89		OUT	1500	70.7	21.0	9	487	IN/OUT	21.0	0	138	OUT	21.0	0	0	OUT	20.9	2	194.7	
01/12/2000	8:50	cold/clear	-4.14	LOW	OUT	1560	66.8	21.0	9	287	OUT	21.0	11	476	OUT	21.0	0	0	IN	21.0	0	126.9	
01/13/2000	8:50	cold/overcast	-2.39		OUT	1690	68.1	21.0	0	42.2	OUT	20.9	6	239.6	OUT	20.9	2	67.1	IN	21.0	0	0.0	
01/14/2000	9:05	cold/clear	-3.64		OUT	1630	65.9	20.9	1	133.7	OUT	20.9	18	372	IN	21.0	0	0	OUT	21.0	1	18.3	
01/17/2000	8:15	cold/windy	-3.18		OUT	1590	64.4	21.0	2	138.2	OUT	21.0	10	283	IN/OUT	21.2	1	54.0	OUT	21.0	0	0.0	
01/18/2000	8:30	cold/clear	-0.84		OUT	1550	65.6	21.0	5	259	OUT	20.9	14	387	OUT	21.0	0	0	OUT	20.9	0	3.5	
01/19/2000	9:15	cold/clear	0.26		OUT	1500	67.3	21.0	4	152.2	OUT	20.9	16	425	IN	21.0	0	0	OUT	20.9	1	14.3	
01/20/2000	9:15	snowy/cold	-0.89		OUT	1510	67.5	21.0	0	14.9	OUT	21.0	7	216.7	OUT	21.0	3	55.3	OUT	21.0	0	0.0	
01/21/2000	9:15	cold/clear	-6.69	LOW	OUT	1250	64.1	20.9	10	361	OUT	21.0	14	393	OUT	21.0	0	0	OUT	20.9	3	123.9	
01/24/2000	8:15	cold/overcast	-3.90		OUT	1380	68.4	21.1	3	96.8	OUT	21.9	12	457	OUT	21.3	1	0	OUT	21.2	1	28.9	
01/26/2000	9:15	cold/clear	-2.84		OUT	1350	66.7	21.3	7	264	OUT	21.1	14	371	IN	21.2	0	0	IN	21.0	0	41.3	
01/27/2000	9:00	cold/clear	-5.44	LOW	OUT	1270	64.1	21.1	4	191.6	OUT	20.9	10	413	OUT	21.0	0	0	OUT	21.1	1	112.1	
01/28/2000	10:00	cold/clear	-4.04	LOW	OUT	1250	64.7	21.2	0	19.1	OUT	20.9	5	303	IN	21.2	0	0	OUT	20.9	0	0.0	
01/31/2000	9:30	cold/overcast	0.31		OUT	NA	NA	21.1	10	301	OUT	21.0	10	309	IN	21.3	0	0	OUT	21.1	6	185.9	Batteries on flow meter dead, will repair for 2/1
02/01/2000	9:00	cold/overcast	-1.20		OUT	1090	66.8	21.0	10	259	OUT	21.0	8	289	IN	21.2	0	0	OUT	21.0	10	231.4	
02/02/2000	10:00	cold/clear	-2.24		OUT	1450	62.2	21.0	4	180	OUT	21.0	11	359	IN	21.0	0	0	OUT	21.0	1	60.0	
02/03/2000	9:30	cold/overcast	-2.09		OUT	1460	63.7	21.0	8	227.7	OUT	20.9	19	331	OUT	21.0	0	0	OUT	21.0	0	2.2	Sun installed new fan b/c flow rate decreased; did not increase flow.
02/04/2000	9:15	cold/snowy	-2.14		OUT	1460	63.8	21.0	9	254.9	OUT	21.0	18	297	OUT	21.0	0	6	OUT	20.9	2	53.7	
02/07/2000	9:10	cold/clear	-6.54	LOW	OUT	1430	63.4	20.9	10	323	IN	21.0	6	171.2	OUT	21.0	0	0	OUT	20.9	2	60.7	
02/08/2000	9:00	cold/clear	-6.14	LOW	OUT	1410	62.7	20.9	6	211.5	OUT	20.9	12	493	OUT	21.3	0	0	OUT	21.0	0	1.4	
02/09/2000	9:35	warm/clear	-5.34	LOW	OUT	1460	62.3	20.9	3	90	OUT	20.9	11	306	OUT	21.0	0	0	OUT	21.0	0	3.2	
02/10/2000	9:00	warm/clear	-4.44	LOW	OUT	1410	65.2	20.9	15	493	OUT	20.9	15	434	IN	20.9	0	0	OUT	20.9	2	78.6	
02/11/2000	8:50	overcast/cold	-2.64		OUT	1420	63.9	20.9	4	163.2	OUT	20.9	12	373	OUT	20.9	2	46.1	OUT	21.0	1	0.0	
02/14/2000	11:45	warm/overcast	-1.74		OUT	1360	63.1	20.9	3	135.4	OUT	20.9	5	92.9	OUT	21.0	0	0	OUT	20.9	0	0.0	
02/15/2000	9:15	warm/clear	-0.54		OUT	1420	62.4	20.9	15	317	OUT	20.9	7	412	IN	21.0	0	0	IN	20.9	1	72.6	

TABLE 5
SHUNK STREET SEWER BLOWER & MANHOLE DATA
SUNOCO, INC. (R&M)
PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

DATE	TIME	WEATHER	RIVER3 STAGE (ft)	APPROX TIDAL STATUS	BELMONT BLOWER MANHOLE					MAINTENANCE BUILDING MANHOLE				OUTFALL MANHOLE				JEFCO MANHOLE													
					SCHUYLKILL RIVER				SHUNK ST. SEWER				SHUNK ST. SEWER				PASSYUNK AVE. SEWER				SHUNK ST. SEWER										
					FLOW	FLOW RATE (cfm)	TEMP (F)	% O ₂	% L E L	P P M	FLOW	FLOW RATE (cfm)	TEMP (F)	% O ₂	% L E L	P P M	FLOW	FLOW RATE (cfm)	TEMP (F)	% O ₂	% L E L	P P M	FLOW	FLOW RATE (cfm)	TEMP (F)	% O ₂	% L E L	P P M			
02/16/2000	8:30	cloudy/38	0.29		OUT	1380	63.8	20.9	2	124.5	IN	20.8	1	100.4	OUT	21.0	0	0	IN	20.9	0	8.0									
02/17/2000	8:00	sunny/cool	0.29		OUT	1370	60.2	21.0	1	107.4	OUT	21.0	6	236.4	IN	21.1	0	0	OUT	21.0	0	4.2									
02/18/2000	8:55	snowy/rainy/mid 30's	-2.29		OUT	1300	62.6	21.0	0	30	OUT	20.9	8	212.9	OUT	20.9	1	42.3	OUT	20.9	0	0.0									
02/21/2000	8:00	cool/clear	-4.80	LOW	OUT	1320	62.0	21.1	6	234.8	OUT	21.0	15	436	OUT	21.1	0	1.8	IN	21.0	0	2.6									
02/22/2000	9:25	warm/clear	-5.39	LOW	OUT	1410	63.5	20.9	3	70.9	OUT	20.9	12	306	OUT	20.9	0	3.8	OUT	20.9	0	0.0									
02/23/2000	9:00	warm/clear	-4.14	LOW	OUT	1300	63.9	20.9	2	64.4	OUT	20.9	12	274	IN/OUT	20.9	0	10.8	OUT	20.9	0	0.0									
02/24/2000	9:00	warm/clear	-3.74		OUT	1340	64.5	21.0	5	179	OUT	20.9	17	421	IN	20.9	0	1.8	OUT	21.0	2	0.0									
02/25/2000	9:00	warm/clear	-2.79		OUT	1690	65.9	20.9	6	92.2	OUT	20.9	15	104.1	IN	21.0	0	0	OUT	20.9	3	0.0									
02/28/2000	9:00	warm/clear	-0.64		OUT	1410	63.5	20.9	6	207.6	OUT	20.7	19	132.7	IN	21.0	0	0	OUT	20.9	2	82.3									
02/29/2000	8:30	warm/clear	-0.39		OUT	1600	61.6	21.0	8	275	OUT	20.9	14	309	IN	20.9	0	0	OUT	20.9	0	26.1									
03/01/2000	8:15	cloudy/48	0.37		OUT	1480	63.5	21.0	2	78.5	OUT	20.9	8	218	OUT	21.0	1	95.2	OUT	21.0	0	0.0									
03/02/2000	8:30	ptly sunny/45	0.54	HIGH	OUT	1440	61.0	21.0	8	225.5	OUT	21.0	10	334	IN	21.2	0	0	OUT	21.0	0	2.2									
03/03/2000	8:45	cool/clear	-2.84		OUT	1400	61.2	21.0	16	349	OUT	21.0	14	506	IN	21.3	0	0	IN/OUT	21.2	2	146.4									
03/06/2000	9:00	warm/clear	-5.02	LOW	OUT	1420	61.9	21.0	4	11.1	OUT	21.0	10	330	IN	21.1	0	0	OUT	21.1	0	0.0									
03/07/2000	9:15	warm/clear	-5.49	LOW	OUT	1400	63.8	21.0	6	220	OUT	20.9	13	348	OUT	21.0	0	0	IN	21.1	0	0.0									
03/08/2000	8:45	warm/clear	-4.99	LOW	OUT	1450	66.2	20.9	7	249.6	IN	20.9	7	185	IN	21.0	0	1.1	OUT	21.0	1	13.5									
03/09/2000	8:40	warm/clear	-3.94		OUT	1410	65.1	20.9	5	58.9	OUT	20.9	12	269	OUT	20.9	0	0	OUT	20.9	3	13.0									
03/10/2000	8:50	warm/clear	-3.39		OUT	1370	65.6	20.9	4	208.3	OUT	20.9	12	280	IN	21.1	0	0	OUT	21.0	1	16.7									
03/13/2000	8:00	cool/clear	-0.50		OUT	1550	62.2	21.0	7	55.2	OUT	21.0	7	7.1	IN	21.1	0	0	IN	20.9	4	37.8									
03/15/2000	8:30	ptly sunny/58	-0.06		OUT	1510	65.6	21.0	10	814	OUT	20.9	11	895	OUT	21.0	0	23	OUT	20.9	2	242.2									
03/16/2000	9:15	cloudy/60	0.74	HIGH	OUT	1530	66.2	21.0	9	819	OUT	20.9	8	565	OUT	20.9	0	21	OUT	20.9	7	430									
03/17/2000	9:15	cold/overcast	-0.39		OUT	1510	60.8	21.0	4	149.2	OUT	20.9	7	275	OUT	21.0	0	4.2	OUT	21.0	0	13.9									
03/20/2000	9:00	cool/overcast	-3.99		OUT	1440	62.2	21.1	2	89.6	OUT	20.9	6	137.8	OUT	21.1	1	12.7	OUT	21.0	0	1.5									
03/21/2000	9:10	drizzly/cool	-4.39	LOW	OUT	1410	60.9	21.0	0	9.2	OUT	20.9	2	67.1	OUT	20.9	6	240	OUT	20.9	0	1.3									
03/22/2000	9:15	overcast/cool	-2.84		OUT	1450	59.3	21.1	2	133.5	OUT	20.9	12	308	OUT	21.0	2	68.1	OUT	21.1	0	19.4									
03/24/2000	9:15	warm/clear	-3.64		OUT	1520	66.4	20.9	2	159.9	OUT	20.9	11	267	IN	21.1	0	0	OUT	20.9	3	171.3									
03/27/2000	9:00	warm/clear	-1.49		OUT	1730	67.0	20.9	0	8.9	OUT	20.9	3	48.9	OUT	21.0	5	147	OUT	20.9	0	2.9									
03/29/2000	8:45	sunny/52	0.68	HIGH	OUT	1730	65.2	20.9	12	296.5	OUT	20.9	11	272.5	OUT	21.0	0	8.5	OUT	21.0	3	198.6									
03/30/2000	8:30	sunny/50	0.55	HIGH	OUT	1680	66.5	20.9	14	276	OUT	20.8	15	260	IN/OUT	21.0	0	5.5	OUT	21.0	0	6.2									
03/31/2000	8:30	warm/clear	-0.18		OUT	1830	65.2	21.0	10	200.7	OUT	20.9	10	221.5	IN	21.1	0	3.6	OUT	21.1	3	90.1									
04/03/2000	9:05	vercast/humid mid 60	-4.84	LOW	OUT	1570	67.1	20.9	4	162.9	IN	20.9	4	66.7	OUT	21.0	0	3.1	OUT	21.0	0	0.0									
04/04/2000	9:00	rainy/humid mid 60's	-5.04	LOW	OUT	1930	63.4	20.9	11	275	IN	20.9	2	82.1	OUT	21.1	0	0	IN	20.9	0	0.0									
04/05/2000	1:30	cool/clear	-5.54	LOW	OUT	1810	63.9	20.9	8	383	OUT	20.9	11	344	OUT	20.9	0	0	OUT	21.0	0	283.0									
04/06/2000	8:15	warm/clear	-4.08	LOW	OUT	1860	67.5	20.9	6	112.1	IN	20.9	0	26.7	OUT	21.0	0	1.3	IN	21.0	0	2.8									

TABLE 5
SHUNK STREET SEWER BLOWER & MANHOLE DATA
SUNOCO, INC. (R&M)
PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

DATE	TIME	WEATHER	RIVER3 STAGE (ft)	APPROX TIDAL STATUS	BELMONT BLOWER MANHOLE					MAINTENANCE BUILDING MANHOLE					OUTFALL MANHOLE				JEFCO MANHOLE				
					SHUNK ST. SEWER					SHUNK ST. SEWER					PASSYUNK AVE. SEWER				SHUNK ST. SEWER				
					SCHUYLKILL RIVER		FLOW	FLOW RATE (cfm)	TEMP (F)	% O ₂	% L E L	P P M	FLOW	% O ₂	% L E L	P P M	FLOW	% O ₂	% L E L	P P M	FLOW	% O ₂	% L E L
04/07/2000	9:00	overcast/warm	-3.89		OUT	1860	68.6	20.9	11	359	OUT	20.9	18	348	IN	21.1	0	0	OUT	20.9	2	107.3	
04/10/2000	9:25	cool/clear	-2.44		OUT	2120	66.7	21.1	4	324	OUT	20.9	12	321	IN	21.0	0	0	OUT	20.9	8	127.2	
04/11/2000	8:45	cool/clear	-0.49		OUT	2090	66.2	21.0	0	75.6	OUT	20.9	4	223.9	OUT	21.0	2	124	OUT	21.1	1	1.7	
04/12/2000	8:30	cloudy/47	1.34	HIGH	OUT	2010	66.0	21.0	7	277	OUT	20.9	13	341	IN	21.0	0	0	OUT	20.9	1	111.5	
04/13/2000	8:45	sunny/49	0.89	HIGH	OUT	2170	65.1	20.9	3	137.5	OUT	21.0	9	295	IN/OUT	21.0	0	2.5	OUT	21.0	0	80.5	
04/14/2000	9:00	warm/clear	-0.24		OUT	2130	67.2	21.0	0	68.7	OUT	20.9	5	226.4	OUT	21.0	0	59.7	OUT	21.0	0	0.0	
04/17/2000	8:15	rainy/cool	-4.66	LOW	OUT	2040	61.1	21.1	1	4.5	OUT	20.9	6	247.5	OUT	21.1	0	10.6	OUT	21.0	0	6.7	
04/18/2000	9:00	rainy/cold	-4.24	LOW	OUT	1830	63.8	21.0	0	39.2	OUT	20.9	4	192.7	OUT	21.0	0	20.1	OUT	21.0	0	0.0	
04/19/2000	8:45	cool/overcast	-3.69		OUT	1860	65.4	21.0	7	236.9	OUT	20.9	12	310	OUT	21.1	1	86.1	OUT	21.1	1	101.8	
04/20/2000	9:00	warm/clear	-3.74		OUT	1850	70.0	20.9	11	389	OUT	20.9	17	407	IN	21.0	0	0	IN	21.0	0	22.9	
04/21/2000	8:35	rainy/warm	-1.74		OUT	1860	66.3	20.9	0	0	OUT	20.9	0	37.3	OUT	21.0	8	248	OUT	20.9	0	0.0	
04/24/2000	9:00	warm/clear	-1.74		OUT	1750	67.8	21.0	10	993	OUT	20.9	12	203	OUT	21.0	0	0	OUT	20.9	4	189.0	
04/25/2000	8:45	cool/overcast	-0.84		OUT	1710	63.9	21.0	0	63.9	OUT	20.9	1	161.8	OUT	21.1	3	222	OUT	21.0	0	0.0	
04/26/2000	8:15	ptly sunny/ 50	0.78	HIGH	OUT	1670	66.6	20.9	3	203.5	OUT	20.9	7	246	OUT	21.0	0	0	OUT	20.9	1	47.5	
04/27/2000	8:30	cloudy/50	0.69	HIGH	OUT	1620	66.4	20.9	1	69.5	OUT	21.0	2	85.5	OUT	21.0	0	0	OUT	21.0	0	7.0	
04/28/2000	7:30	overcast/warm	0.33		OUT	1740	66.5	21.0	3	68.3	OUT	21.0	12	105.8	OUT	21.1	0	0	OUT	21.0	0	12.8	
05/01/2000	8:50	warm/clear	-1.74		OUT	1570	69.0	20.9	11	358	IN	21.0	13	146.2	OUT	21.0	0	7.1	IN	20.9	0	21.9	
05/02/2000	9:00	warm/clear	-2.89		OUT	1500	69.1	20.9	5	271	OUT	20.7	17	106.8	IN	21.0	0	3	OUT	20.9	2	76.7	
05/03/2000	8:40	warm/clear	-5.84	LOW	OUT	1520	69.8	21.0	2	229.9	OUT	20.9	10	321	OUT	21.0	0	0	IN	21.0	1	151.7	
05/04/2000	9:15	warm/clear	-5.34	LOW	OUT	1500	70.8	20.9	0	54.8	OUT	20.9	4	95.2	OUT	20.9	0	0	OUT	20.9	0	0.0	
05/05/2000	8:45	hot/clear	-4.74	LOW	OUT	1270	71.9	20.9	9	447	OUT	20.9	0	1.8	OUT	20.9	0	1.6	OUT	20.9	6	195.7	
05/08/2000	8:30	sunny/warm	-1.80		OUT	1820	77.5	20.9	4	217.4	IN	20.7	1	0	IN/OUT	21.0	0	0	IN	20.9	0	0.0	
05/09/2000	9:00	hot/clear	-1.24		OUT	1940	76.4	20.9	8	431	OUT	20.7	8	187.9	OUT	21.0	0	0	OUT	20.9	13	396.0	
05/10/2000	8:45	sunny/85	-0.26		OUT	2080	75.4	20.9	2	68.2	IN	20.8	1	41.5	OUT	20.9	0	0	IN	20.8	0	0.0	
05/11/2000	8:15	mostly sunny/70	1.05	HIGH	OUT	2010	71.8	20.9	6	343	OUT	20.9	3	138	IN	21.0	0	0	OUT	20.9	0	31.5	
05/12/2000	8:45	hot/clear	1.21	HIGH	OUT	1980	73.7	20.8	0	85.9	OUT	20.9	1	95.8	OUT	20.8	6	268	OUT	20.9	0	0.0	
05/15/2000	9:15	warm/clear	-2.14		OUT	2020	73.3	20.8	10	593	OUT	20.9	10	161.7	IN	21.0	0	0	OUT	20.7	3	149.8	
05/16/2000	9:15	warm/clear	-3.34		OUT	1940	73.6	20.9	8	250	OUT	20.9	9	169	OUT	21.1	0	7.6	OUT	20.9	1	83.3	
05/17/2000	9:15	warm/clear	-5.14	LOW	OUT	2060	72.4	20.9	0	51.1	OUT	20.9	1	48.7	OUT	20.9	9	349	OUT	20.9	0	0.0	
05/18/2000	7:30	warm/clear	-3.57		OUT	2000	74.4	20.8	5	111.5	OUT	20.7	5	64.1	OUT	21.1	0	0	OUT	20.9	0	0.0	
05/19/2000	10:45	rainy/cool	-4.69	LOW	OUT	1600	75.1	20.9	0	86.3	OUT	20.9	0	34.6	OUT	21.0	0	0	IN	21.0	0	0.0	
05/22/2000	8:00	rainy/cool	-1.58		OUT	1040	72.0	20.9	0	63.7	OUT	20.9	1	106.5	OUT	21.1	1	84.6	OUT	21.1	0	0.0	
05/23/2000	9:00	overcast/cool	-1.64		OUT	1980	73.5	20.8	6	77.9	OUT	20.8	6	89.8	OUT	20.9	0	1.2	OUT	20.7	1	0.0	

TABLE 5
SHUNK STREET SEWER BLOWER & MANHOLE DATA
SUNOCO, INC. (R&M)
PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

DATE	TIME	WEATHER	RIVER3 STAGE (ft)	APPROX TIDAL STATUS	BELMONT BLOWER MANHOLE					MAINTENANCE BUILDING MANHOLE				OUTFALL MANHOLE				JEFCO MANHOLE				COMMENTS	
					SCHUYLKILL RIVER					SHUNK ST. SEWER				SHUNK ST. SEWER				PASSYUNK AVE. SEWER					
					FLOW	FLOW RATE (cfm)	TEMP (F)	%O ₂	% L E L	P P M	FLOW	%O ₂	% L E L	P P M	FLOW	%O ₂	% L E L	P P M	FLOW	%O ₂	% L E L	P P M	
05/24/2000	9:00	sunny/75	-1.06		OUT	1860	75.9	20.9	15	298	OUT	20.8	13	95.5	OUT	20.9	0	0	IN/OUT	20.8	8	140.5	
05/25/2000	9:30	cloudy/75	-1.57		OUT	1780	76.0	20.9	7	261	OUT	20.9	5	167.5	IN	21.0	0	0	OUT	20.9	5	185.0	
05/26/2000	8:40	warm/clear	0.66	HIGH	OUT	1820	74.9	20.8	10	38	OUT	20.9	10	137	IN	21.0	0	0	OUT	20.8	3	104.2	
05/30/2000	9:05	warm/clear	-0.09		OUT	1800	71.3	21.1	1	70.4	OUT	20.9	4	109.9	OUT	21.0	2	74.4	OUT	21.0	0	0.0	
05/31/2000	9:30	warm/clear	-1.19		OUT	1920	72.7	20.9	5	170.5	OUT	20.8	8	184	IN	21.0	0	6.8	OUT	21.0	1	6.8	
06/01/2000	13:00	warm/clear	0.76	HIGH	OUT	1890	79.3	20.7	13	366	OUT	20.4	1	0	IN	20.9	0	0.7	OUT	20.9	1	4.9	
06/02/2000	9:00	hot/clear	-5.51	LOW	OUT	1840	78.3	20.7	13	296	IN	20.7	1	16.3	IN	20.9	0	0.8	IN	20.8	0	0.0	
06/05/2000	8:15	warm/clear	-4.43	LOW	OUT	1740	74.8	21.0	1	68.6	OUT	21.0	4	108.6	OUT	20.8	5	184	OUT	21.0	0	0.0	
06/06/2000	8:10	rainy/cool	-2.34		OUT	1820	70.5	20.8	15	390	OUT	20.9	15	210.6	OUT	21.1	0	0	OUT	20.9	2	8.7	
06/07/2000	8:20	warm/clear	-0.67		OUT	1660	73.2	21.1	11	417	OUT	21.0	10	55.5	IN	21.3	0	0	IN	21.0	0	47.3	
06/08/2000	7:50	hot/clear	0.52	HIGH	OUT	1540	75.8	21.0	6	270	OUT	21.0	5	35.2	IN	21.1	0	0	OUT	20.9	1	25.0	
06/09/2000	8:30	hot/clear	0.71	HIGH	OUT	1550	77.0	20.9	10	415	OUT	20.9	10	128.3	OUT	21.0	0	0	IN	21.0	4	108.6	
06/12/2000	8:15	hot/clear	-1.58		OUT	1630	78.6	20.9	6	212.2	IN	20.8	5	120.3	IN/OUT	21.0	0	0	OUT	21.0	0	0.0	
06/13/2000	8:15	cool/cloudy	-1.73		OUT	1620	73.4	21.0	0	45.9	OUT	21.1	0	67.4	OUT	21.1	1	114	OUT	21.1	0	0.0	
06/14/2000	8:00	cool/cloudy	-3.15		OUT	1620	73.2	21.0	0	26.5	IN/OUT	21.1	0	30.5	OUT	21.1	3	222	OUT	21.3	0	0.0	
06/15/2000	9:00	cloudy/warm	-4.28	LOW	OUT	1530	74.8	21.0	0	30.2	OUT	20.9	2	38.7	OUT	21.0	2	55.7	IN/OUT	20.9	0	0.0	
06/16/2000	7:45	hot/clear	-4.28	LOW	OUT	1570	77.0	21.1	1	146.4	IN/OUT	21.0	1	22	OUT	21.0	0	0	IN/OUT	21.0	2	87.3	
06/19/2000	8:30	overcast/cool	-3.06		OUT	1830	76.1	21.2	7	328	OUT	21.0	8	339	IN	21.1	0	0	OUT	21.1	7	266.0	
06/20/2000	9:15	hot/clear	-3.47		OUT	1740	78.9	21.1	5	257	OUT	21.0	3	50.9	OUT	21.0	0	6.8	OUT	21.0	7	153.8	
06/21/2000	8:45	hot/humid	-2.63		OUT	1780	78.9	21.0	5	271	OUT	20.8	0	0	OUT	21.1	0	0	IN/OUT	21.0	0	8.3	
06/22/2000	8:30	overcast/humid	-1.82		OUT	810	77.0	21.1	5	236.1	OUT	21.0	4	98.5	OUT	21.1	0	0	OUT	21.0	8	179.3	
06/23/2000	8:40	warm/clear	-1.25		OUT	1780	79.4	21.0	8	398	OUT	20.9	10	176.1	IN	21.0	0	0	IN	20.9	2	88.2	
06/26/2000	9:45	hot/clear	-0.85		OUT	1880	81.4	20.9	12	333	OUT	20.9	1	3.7	OUT	20.9	0	0	OUT	21.0	1	0.0	
06/27/2000	8:15	warm/clear	-0.16		OUT	1930	82.1	21.0	6	205.7	OUT	20.9	0	0	OUT	21.1	0	0	OUT	21.0	0	0.0	
06/28/2000	9:30	warm/cloudy	0.11		OUT	1880	82.1	20.9	0	30.9	OUT	20.8	2	24.8	OUT	21.0	4	77.3	OUT	20.9	0	0.0	
06/29/2000	9:00	warm/cloudy	-0.98		OUT	1940	72.6	20.8	9	197.8	OUT	20.8	6	53.9	OUT	21.1	0	0	IN	21.0	0	0.0	
06/30/2000	8:45	hot/clear	-5.05	LOW	OUT	1800	79.8	20.9	2	277	OUT	20.9	5	49.7	IN	21.1	0	0	OUT	20.9	0	0.0	
07/03/2000	7:45	hot/clear	-2.85		OUT	1740	80.3	20.9	4	271	OUT	20.8	4	87.2	OUT	21.0	0	0	OUT	20.9	0	0.0	
07/05/2000	8:00	hot/clear	-1.50		OUT	1760	80.6	20.9	5	444	OUT	20.8	10	152	IN	21.0	0	0	OUT	20.8	2	117.2	
07/06/2000	7:45	sunny/pleasant	-0.99		OUT	1840	79.2	21.0	10	308	OUT	21.0	7	46.5	OUT	21.1	0	0	OUT	21.0	1	23.6	
07/07/2000	8:00	hot/clear	0.35		OUT	1770	79.0	21.0	10	317	OUT	20.9	10	76.4	OUT	21.0	0	0	OUT	21.0	1	15.1	
07/10/2000	8:05	warm/humid	-0.29		OUT	1810	80.9	21.0	7	339	IN	20.8	1	9.3	OUT	21.1	0	0	OUT	20.8	5	55.3	
07/11/2000	8:00	overcast/warm	-1.28		OUT	1790	80.1	20.9	4	173.7	OUT	20.8	5	46.5	OUT	21.0	7	322	OUT	20.7	0	0.0	
07/12/2000	8:30	sunny/warm	-2.33		OUT	1870	80.6	21.0	6	258	IN/OUT	20.9	10	55	OUT	21.1	0	0	OUT	20.9	0	13.2	



TABLE 5
SHUNK STREET SEWER BLOWER & MANHOLE DATA
SUNOCO, INC. (R&M)
PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

			SCHUYLKILL RIVER		BELMONT BLOWER MANHOLE					MAINTENANCE BUILDING MANHOLE				OUTFALL MANHOLE				JEFCO MANHOLE				COMMENTS	
					SHUNK ST. SEWER				SHUNK ST. SEWER				PASSYUNK AVE. SEWER				SHUNK ST. SEWER						
DATE	TIME	WEATHER	RIVER3 STAGE (ft)	APPROX TIDAL STATUS	FLOW	FLOW RATE (cfm)	TEMP (F)	%O ₂	% L E L	P P M	FLOW	%O ₂	% L E L	P P M	FLOW	%O ₂	% L E L	P P M	FLOW	%O ₂	% L E L	P P M	
07/13/2000	8:00	sunny/humid	-4.33	LOW	OUT	1830	81.2	21.0	10	292	OUT	20.8	8	36.7	OUT	21.0	0	0	IN/OUT	20.8	5	21.2	
07/14/2000	9:00	rainy/humid	-2.59		OUT	1720	81.1	20.9	8	266	OUT	20.6	4	105	OUT	21.0	0	0	OUT	21.0	0	0.0	
07/17/2000	8:00	hot/overcast	-3.61		OUT	1920	81.5	20.7	11	131.4	OUT	20.7	6	45.7	OUT	21.0	0	0	OUT	20.8	0	1.1	
07/18/2000	7:50	hot/clear	-2.72		OUT	1910	82.3	21.0	9	329	OUT	20.9	9	31.3	OUT	21.0	0	0	IN	20.9	0	0.0	
07/19/2000	8:15	warm/rainy	-2.87		OUT	1890	80.5	20.9	5	171.1	OUT	20.9	6	61.4	OUT	21.0	1	52.2	OUT	20.9	0	0.0	
07/20/2000	8:00	overcast/warm	-1.98		OUT	1770	78.9	20.9	12	493	OUT	20.9	13	264	OUT	21.0	0	2	OUT	20.9	10	203.0	
07/21/2000	8:30	hot/clear	-1.69		OUT	1790	82.3	20.9	15	401	OUT	20.9	5	41.3	OUT	21.0	0	0	OUT	20.9	0	4.9	
07/24/2000	8:15	overcast/warm	0.50		OUT	1760	81.4	20.8	3	64.4	OUT	20.5	10	78.3	OUT	20.9	8	179	OUT	20.6	6	36.2	
07/25/2000	7:40	overcast/warm	0.52	HIGH	OUT	1750	80.4	20.8	8	139.3	OUT	20.7	9	67.1	OUT	21.0	0	0	OUT	20.6	7	42.1	
07/26/2000	8:00	rainy/cool	0.44		OUT	1420	78.1	20.9	0	7	OUT	20.8	1	16.2	OUT	20.7	10	472	OUT	20.8	0	0.0	
07/27/2000	8:50	overcast/humid	0.26		OUT	1680	79.3	20.9	9	208.6	OUT	20.9	7	124.1	IN	21.0	0	0	OUT	20.7	8	103.7	
07/28/2000	8:00	partly cloudy/warm	-1.90		OUT	1550	80.3	20.9	1	46.7	OUT	20.8	3	48.3	OUT	20.9	16	233	OUT	20.9	0	0.0	
07/31/2000	8:45	cloudy/humid	-4.42	LOW	OUT	1550	81.3	21.0	3	81.3	OUT	20.9	5	107.8	OUT	21.2	0	0	IN	21.0	1	3.1	
08/01/2000	8:00	cloudy/humid	-3.72		OUT	1540	81.7	21.0	1	2.3	OUT	20.9	3	32.3	OUT	21.0	10	27.3	OUT	20.9	1	0.0	
08/02/2000	8:20	ptly cloudy/humid	-2.65		OUT	1560	82.1	21.2	12	341	IN	21.1	0	0	OUT	21.3	0	0	OUT	21.2	0	0.0	
08/03/2000	8:00	overcast/humid	-1.56		OUT	1860	81.5	21.0	7	304	OUT	21.0	1	11.2	OUT	21.2	0	0	OUT	20.9	0	0.0	
08/04/2000	8:00	ptly cloudy/warm	-1.06		OUT	1850	81.7	21.0	10	214.1	OUT	20.9	9	62.3	OUT	21.1	0	0	OUT	20.8	3	25.3	
08/04/2000	11:30	ptly cloudy/warm	-1.06		OUT	1850	81.7	20.9	2	38.3	-	-	-	-	-	-	-	-	-	-	-	-	
08/07/2000	9:00	hot/humid	-0.17		OUT	1860	83.5	20.9	10	240.8	IN	20.8	8	65.3	OUT	21.0	0	0	IN	20.6	0	0.0	
08/08/2000	8:15	hot/humid	-0.05		OUT	1780	83.5	20.9	6	176.2	OUT	20.9	7	28.3	IN	20.8	0	0	OUT	20.8	3	18.0	
08/09/2000	7:50	hot/humid	-0.88		OUT	1840	83.1	20.8	7	166.3	IN	20.9	8	62.6	OUT	21.0	0	0	OUT	20.6	2	12.6	
08/10/2000	7:50	sunny/warm	-2.27		OUT	1770	83.1	20.9	4	95.8	OUT	20.8	10	41.3	IN	21.0	0	0	IN	20.8	1	5.4	
08/11/2000	8:00	sunny/warm	-3.13		OUT	1840	84.1	20.7	14	219.8	OUT	20.8	5	22.6	OUT	20.9	0	0	OUT	20.9	1	4.5	
08/14/2000	8:00	rainy/cool	-3.52		OUT	1770	80.2	21.0	4	123.6	OUT	20.9	5	91.5	OUT	20.9	0	0	IN	21.0	0	0.0	
08/15/2000	11:00	sunny/warm	-2.12		OUT	1820	83.5	20.9	14	235.7	OUT	20.8	10	114.2	IN	21.0	0	0	OUT	20.8	1	21.8	
08/16/2000	8:10	sunny/warm	-2.89		OUT	1810	80.7	20.8	5	131.2	OUT	20.9	3	15.9	OUT	20.9	0	0	OUT	20.5	1	5.1	
08/17/2000	8:30	warm/clear	-3.69		OUT	1960	84.4	20.9	7	290	OUT	20.9	10	293	OUT	21.0	0	0	OUT	20.9	0	18.1	
08/18/2000	8:30	drizzle/cool	-2.87		OUT	1950	84.2	20.9	4	142.8	OUT	20.8	8	172	OUT	21.0	0	0	OUT	21.0	1	5.2	
08/21/2000	8:00	warm/clear	-1.28		OUT	1940	85.2	21.1	10	472	OUT	20.9	3	81.8	OUT	21.1	0	0	OUT	21.0	0	0.0	
08/22/2000	8:00	warm/clear	-0.20		OUT	1940	83.9	21.2	6	158	OUT	21.1	6	72.4	OUT	21.2	0	0	OUT	21.0	3	37.2	
08/23/2000	8:15	warm/clear	0.19		OUT	1980	85.1	20.9	1	49.1	OUT	21.1	0	0	OUT	21.2	0	0	OUT	21.2	0	0.0	
08/24/2000	8:45	warm/clear	-0.09		OUT	2030	85.9	20.9	7	83.8	IN	20.9	9	51.9	OUT	21.1	1	0	IN/OUT	20.9	2	15.6	
08/25/2000	7:45	sunny/mild	-1.02		OUT	2190	82.2	21.1	10	447	OUT	21.1	4	67.9	OUT	21.2	0	0	OUT	21.1	0	0.0	
08/28/2000	7:55	overcast/humid	-5.32	LOW	OUT	1670	75.8	21.3	0	0	OUT	21.0	0	0	OUT	21.2	5	161	IN	21.4	0	0.0	

TABLE 5
SHUNK STREET SEWER BLOWER & MANHOLE DATA
SUNOCO, INC. (R&M)
PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

DATE	TIME	WEATHER	RIVER3 STAGE (ft)	APPROX TIDAL STATUS	BELMONT BLOWER MANHOLE					MAINTENANCE BUILDING MANHOLE					OUTFALL MANHOLE				JEFCO MANHOLE				COMMENTS			
					SCHUYLKILL RIVER				SHUNK ST. SEWER				SHUNK ST. SEWER				PASSYUNK AVE. SEWER				SHUNK ST. SEWER					
					FLOW	FLOW RATE (cfm)	TEMP (F)	%O ₂	% L E L	P P M	FLOW	%O ₂	% L E L	P P M	FLOW	%O ₂	% L E L	P P M	FLOW	%O ₂	% L E L	P P M				
08/29/2000	8:00	cloudy/warm	-4.76	LOW	OUT	2130	76.9	21.0	0	0	OUT	21.0	2	3.6	OUT	21.1	6	131	OUT	21.0	0	0.0				
08/30/2000	7:55	ptly sunny/warm	-3.61		OUT	2170	84.4	21.0	2	31.5	OUT	21.0	3	22.4	OUT	21.2	8	143	OUT	21.1	0	0.0				
08/31/2000	8:30	overcast/warm	-3.46		OUT	2120	84.5	20.9	1	36.4	IN	20.9	2	11.9	OUT	20.9	8	78.6	OUT	21.0	0	0.0				
09/01/2000	8:15	overcast/humid	-2.31		OUT	2130	86.9	20.8	1	6.7	OUT	20.6	1	4.8	OUT	20.7	7	128	OUT	20.9	0	0.0	Compressor needs to be changed out			
09/05/2000	8:10	cool/clear	-0.26		OUT	1770	77.1	21.0	7	445	OUT	21.0	3	129.4	OUT	21.2	1	54.6	OUT	21.0	0	4.8	Compressor hrs = 5668.3			
09/06/2000	8:45	warm/clear	0.45		OUT	1740	79.3	21.0	1	22.3	OUT	21.0	1	17.6	OUT	21.2	0	3.2	OUT	21.0	0	0.0				
09/07/2000	8:00	sunny/warm	-0.12		OUT	1650	80.1	21.0	4	83.6	OUT	20.9	4	57.9	OUT	21.0	0	0	OUT	20.9	3	44.3				
09/08/2000	8:20	warm/clear	-1.13		OUT	1870	81.1	21.0	0	74.1	OUT	21.0	1	30.1	OUT	21.0	0	0	OUT	20.9	7	70.8				
09/11/2000	8:15	warm/clear	-4.72	LOW	OUT	1940	84.4	20.9	2	117.5	OUT	21.0	5	65.1	OUT	21.1	0	0	OUT	20.9	2	28.1				
09/12/2000	8:30	warm/clear	-4.67	LOW	OUT	1920	82.9	21.0	2	79.1	OUT	21.0	0	2.2	OUT	21.0	0	0	IN	21.0	0	0.0				
09/13/2000	8:30	warm/clear	-5.03	LOW	OUT	1870	82.5	21.0	10	234	OUT	20.9	10	131.3	IN	21.1	0	0	OUT	20.9	1	20.1	Blower is off awaiting PWD to service tide gate at biofilter			
09/14/2000	8:40	warm/clear	-4.84	LOW	OUT	29.8	77.8	21.1	0	31.3	OUT	21.0	1	19.8	OUT	21.0	0	0.7	OUT	21.0	4	32.9	Blower is off awaiting PWD work at biofilter			
09/15/2000	8:40	warm/overcast	-2.89		OUT	70.5	71.4	21.0	0	78.8	OUT	21.1	0	75.6	OUT	21.2	0	1.7	OUT	21.1	4	161.5	Blower off in AM for PWD work but on in PM after completion			
09/18/2000	8:00	warm/clear	-2.49		OUT	1850	74.9	21.0	0	63.2	OUT	21.0	0	22.3	OUT	21.0	0	0	OUT	21.2	3	52.3				
09/19/2000	8:30	rainy/cool	-2.35		OUT	1870	79.5	21.0	0	0	OUT	20.9	0	2.2	OUT	21.1	2	61.3	OUT	21.0	0	0.0				
09/20/2000	8:00	warm/clear	-0.72		OUT	1850	79.8	20.9	4	94.7	OUT	21.0	4	29.4	OUT	20.9	1	2.3	OUT	21.0	2	29.3				
09/21/2000	8:45	warm/clear	-0.29		OUT	1880	81.3	21.0	5	283	IN	21.0	0	21.8	OUT	21.0	0	0	OUT	21.1	0	28.1				
09/22/2000	7:50	sunny/pleasant	-1.11		OUT	1910	79.4	21.1	3	110.7	OUT	21.0	0	56.7	OUT	21.1	0	0	OUT	21.1	1	59.1				

TABLE 5
SHUNK STREET SEWER BLOWER & MANHOLE DATA
SUNOCO, INC. (R&M)
PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

			SCHUYLKILL RIVER		BELMONT BLOWER MANHOLE					MAINTENANCE BUILDING MANHOLE					OUTFALL MANHOLE					JEFCO MANHOLE				
					SHUNK ST. SEWER					SHUNK ST. SEWER					PASSYUNK AVE. SEWER					SHUNK ST. SEWER				
DATE	T I M E	WEATHER	RIVER3 STAGE (ft)	APPROX TIDAL STATUS	FLOW	FLOW RATE (cfm)	TEMP (F)	%O ₂	% LEL	P P M	FLOW	%O ₂	% LEL	P P M	FLOW	%O ₂	% LEL	P P M	FLOW	%O ₂	% LEL	P P M	COMMENTS	
09/25/2000	8:15	rainy/cool	-4.13	LOW	OUT	1780	76.2	21.2	4	442	OUT	21.2	1	86.1	OUT	21.0	0	0	OUT	21.2	4	94.2		
09/26/2000	8:00	rainy/cool	-3.18		OUT	1670	72.3	21.1	2	157	OUT	21.0	6	135.7	OUT	21.1	0	0	OUT	21.2	0	5.9		

NOTES

RIVER3 STAGE (ft): Schuylkill River elevation in feet at River Gauge Point 3 which is located at the Short Pier (measured with an oil/water interface probe).

%LEL: Percentage of the lower explosive limit including methane (measured with a portable meter).

FLOW: Flow direction of air relative to sewer where IN = into sewer and OUT = out of sewer (measured with smoke test).

FLOW RATE (cfm): Air flow rate in cubic feet per minute (measured with a portable meter).

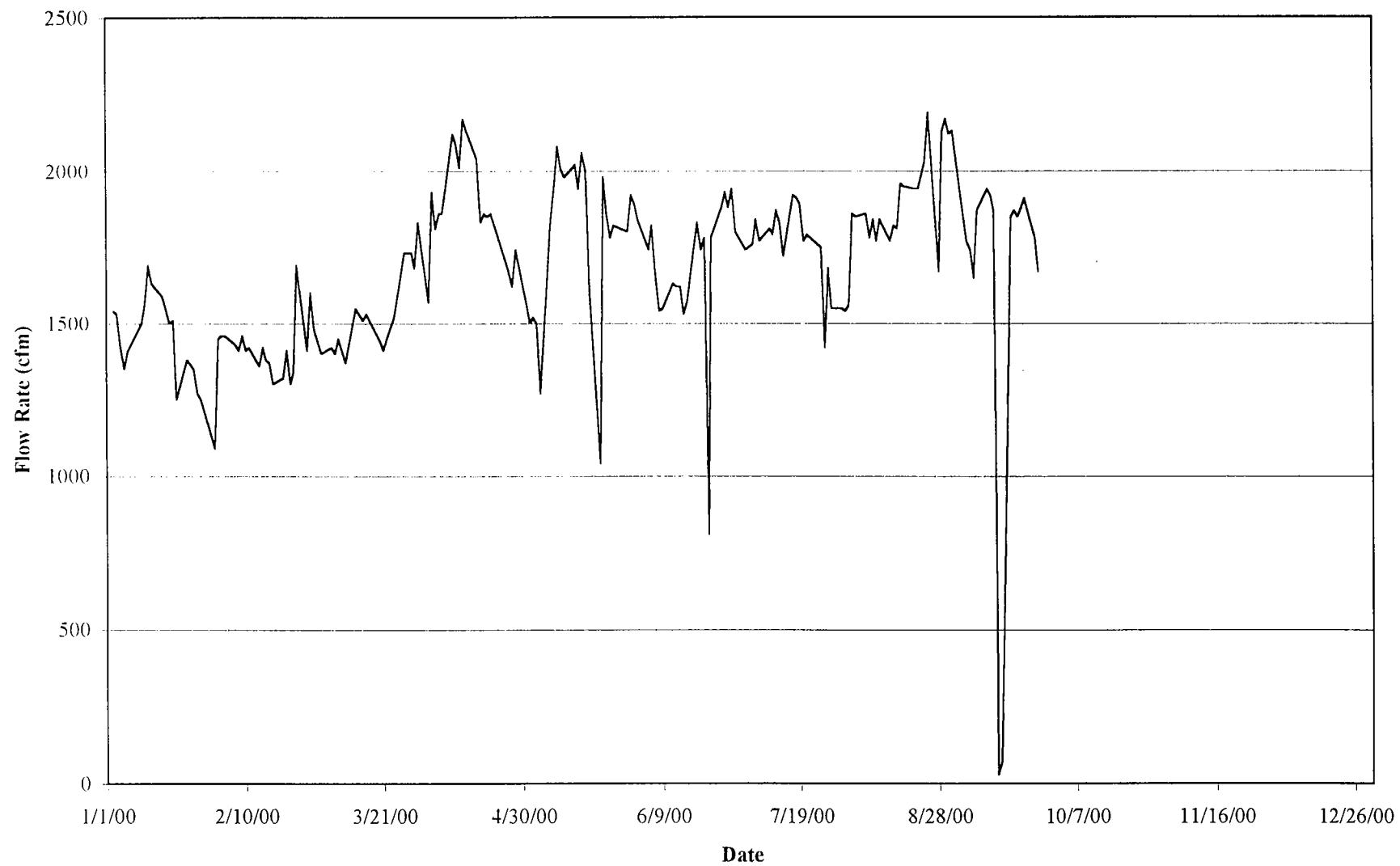
TEMP (F): Air temperature in Fahrenheit (measured with a portable meter).

%O₂: Percent oxygen (measured with a portable meter).

NA = Not accessible or not available.

PPM: Vapor concentration data in parts per million (recorded with a portable photoionization detector; readings not collected until July 6, 1998).

Shunk Street Sewer Blower Flow Rate vs. Time (Year 2000 Only)



APPENDIX C

**LABORATORY ANALYTICAL REPORT
NAPL SAMPLES COLLECTED MAY 9, 2000**



Torkelson Geochemistry, Inc.

2528 South Columbia Place, Tulsa, Oklahoma 74114-3233
Voice 918-749-8441, Fax 918-749-6005

May 26, 2000

Arsin Sahba
Handex of Maryland, Inc.
360 Morgan Road
Odenton, MD 21113

Subject: Gas Chromatography, Density, and Lead Analysis and evaluation of 12 product samples from the Belmont Terminal, Sunoco, Inc. (R&M), Philadelphia, PA.

Twelve product samples collected 5-9-2000 were submitted to Torkelson Geochemistry by Handex for hydrocarbon fingerprint (capillary gas chromatography), density, lead analysis, and interpretation. Six of the samples are virgin products and six are "unknowns" collected from wells. The purpose of this work is to determine the relationships between the unknown samples from the wells and the relationship of the unknown well samples to the virgin product samples. An additional purpose is to look for any components in the well samples that may be causing the unusual deterioration of the PVC plumbing at this site

The following are my interpretations of the data. Please keep in mind that these interpretations are made without any specific knowledge of the site, locations from which these samples came, or other analyses done on these samples.

RW-1 is a fairly fresh gasoline. This interpretation is based on the range, type and proportions of peaks on the gas chromatogram, Figure 1. The presence of a large MTBE peak suggests that this is a more modern gasoline and that it has not been effected much by water washing (dissolution). RW-1 is very similar to RW-4, RW-7, and RW-15. There are some differences in these four chromatograms that are probably due to slight differences in weathering. RW-1 is probably the least weathered of the four RW-# samples. RW-1 has significant differences when compared to the two virgin product gasolines included in this set of samples.

RW-4 is a fairly fresh gasoline. This interpretation is based on the range, type and proportions of peaks on the gas chromatogram, Figure 2. The presence of an MTBE peak suggests that this is a more modern gasoline and that it has not been effected very much by water washing (dissolution). RW-4 is very similar to RW-1, RW-7, and RW-15. There are some differences in these four chromatograms that are probably due to slight differences in weathering. RW-4 is probably a bit more water washed than the other four RW-# samples. RW-4 has significant differences when compared to the two virgin product gasolines included in this set of samples.

RW-7 is a fairly fresh gasoline. This interpretation is based on the range, type and proportions of peaks on the gas chromatogram, Figure 3. The presence of a large MTBE peak suggests that this is a more modern gasoline and that it has not been effected much by water washing (dissolution). RW-7 is very similar to RW-1, RW-4, and RW-15. There are some differences in these four chromatograms that are probably due to slight differences in weathering. RW-7 is almost as fresh as RW-1, showing a slightly greater loss of butane (nC4). RW-7 has significant differences when compared to the two virgin product gasolines included in this set of samples.

RW-15 is a fairly fresh gasoline. This interpretation is based on the range, type and proportions of peaks on the gas chromatogram, Figure 4. The presence of a fairly large MTBE peak suggests that this is a more modern gasoline and that it has not been effected much by water washing (dissolution). RW-15 is very similar to RW-1, RW-4, and RW-7. There are some differences in these four chromatograms that are probably due to slight differences in weathering. RW-15 is slightly more devolatilized than the other four RW-# samples and the MTBE is diminished compared to RW-1 and RW-7 but not as much as RW-4. RW-15 has significant differences when compared to the two virgin product gasolines included in this set of samples.

S-75 appears to be a mixture composed mostly of gasoline range material that is moderately to severely weathered and a smaller portion of heavily weathered distillate. This interpretation is based on the range, type and proportions of peaks on the gas chromatogram, Figure 5. The gasoline range portion of S-75 has most of the features of gasoline, but differs in having rather large normal paraffin peaks (nC7, nC8, nC9 and nC10) when compared to the virgin product gasolines (Figures 7 and 8). S-75 is somewhat similar to S-76 but is much more weathered than S-76. None of the other samples in this set are similar to S-75.

S-76 appears to be a mixture composed mostly of gasoline range material that is rather unweathered and a smaller portion of moderately weathered distillate. This interpretation is based on the range, type and proportions of peaks on the gas chromatogram, Figure 6. The gasoline range portion of S-75 has most of the features of gasoline, but differs in having rather large normal paraffin peaks (nC5, nC6, nC7, nC8, nC9 and nC10) when compared to the virgin product gasolines (Figures 7 and 8). S-76 is somewhat similar to S-75 but is much less weathered than S-75. None of the other samples in this set are similar to S-76.

87 Reg (Figure 7) is a virgin product, 87 Octane Gasoline.

94 Reg 26TK (Figure 8) is a virgin product, 94 Octane Gasoline.

Sun Ad (Figure 9) is a virgin product, Gasoline Additive.

Jet (Figure 10) is a virgin product, Jet Fuel.

LS Diesel 85TK (Figure 11) is a virgin product, Low Sulfur Diesel Fuel.

HHO 42TK (Figure 12) is a virgin product, Home Heating Oil.

It is difficult to say for sure, but the cause of the PVC deterioration may be MTBE. The only thing that is somewhat unusual about the well samples is the presence and in some cases rather large amount of MTBE in the four RW-# samples. It is quite rare, at least in my experience, to see this much MTBE in well samples. Even in situations where MTBE was expected to be present it is usually not seen in the NAPL samples, probably because of its rather strong solubility in water.

Please let me know if you have any questions regarding this preliminary interpretation.

Bruce Torkelson

Table 1, Density and Total Lead

Sample Number	Density gm/ml @ 60F	Total Lead (mg/kg)
RW-1	0.7616	3.92
RW-4	0.7593	4.50
RW-7	0.7600	7.20
RW-15	0.7747	9.20
S-75	0.8000	<3.00
S-76	0.7916	53.4
87 Reg	0.7467	3.70
94 Reg 26TK	0.7359	<3.00
Sun Ad	0.9015	4.50
Jet	0.8149	4.50
LS Diesel 85TK	0.8492	5.70
HHO 42TK	0.8473	3.90

Sunoco, Inc. (R&M), Belmont Terminal, Philadelphia, PA

Sample ID : RW-1

Acquired : May 15, 2000 13:23:11

c:\ezchrom\chrom\00075\rw-1 -- Channel A

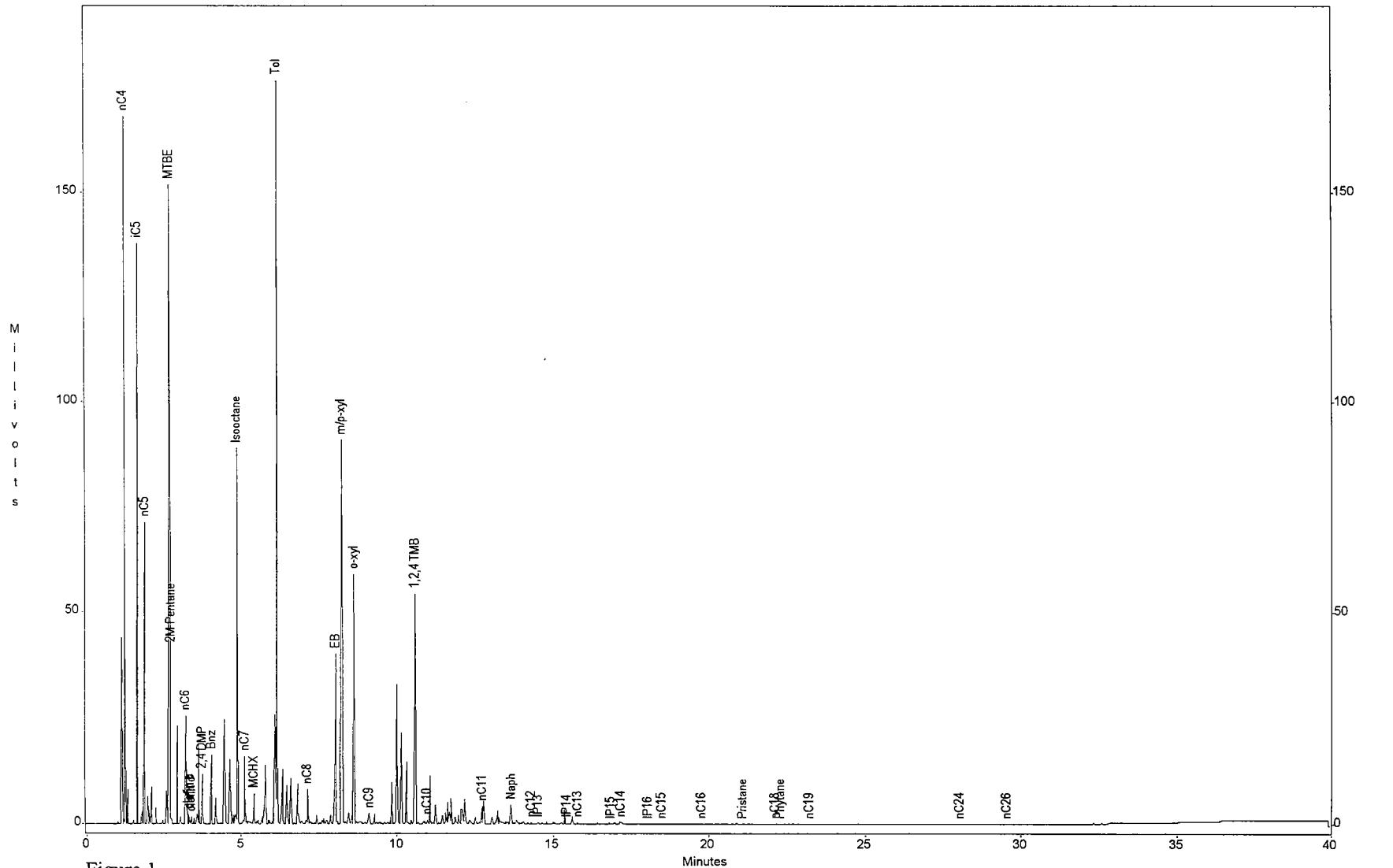


Figure 1

Sunoco, Inc. (R&M), Belmont Terminal, Philadelphia, PA

Sample ID : RW-4

Acquired : May 15, 2000 14:12:56

c:\ezchrom\chrom\00075\rw-4 -- Channel A

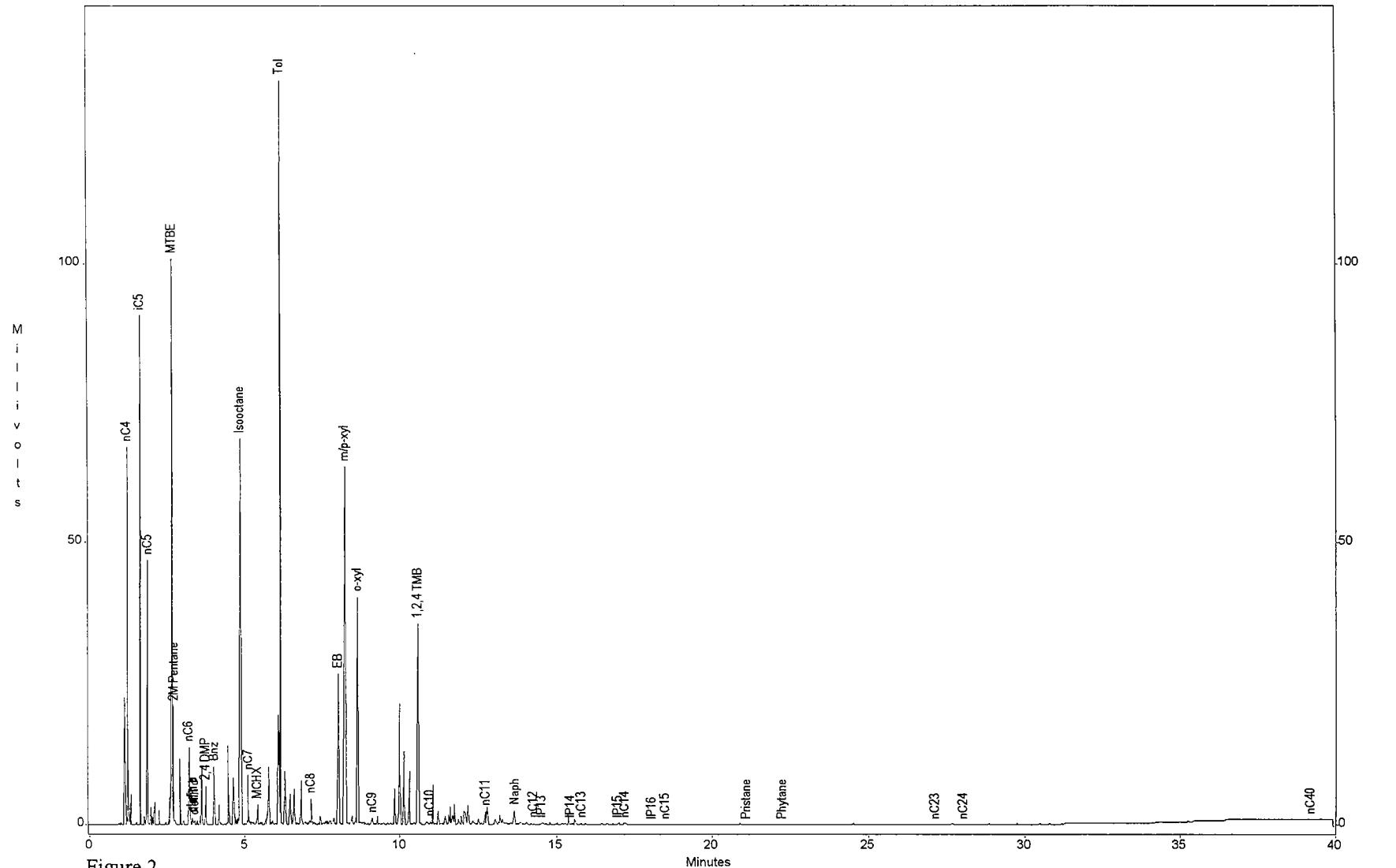


Figure 2

Sunoco, Inc. (R&M), Belmont Terminal, Philadelphia, PA

Sample ID : RW-7

Acquired : May 15, 2000 15:01:58

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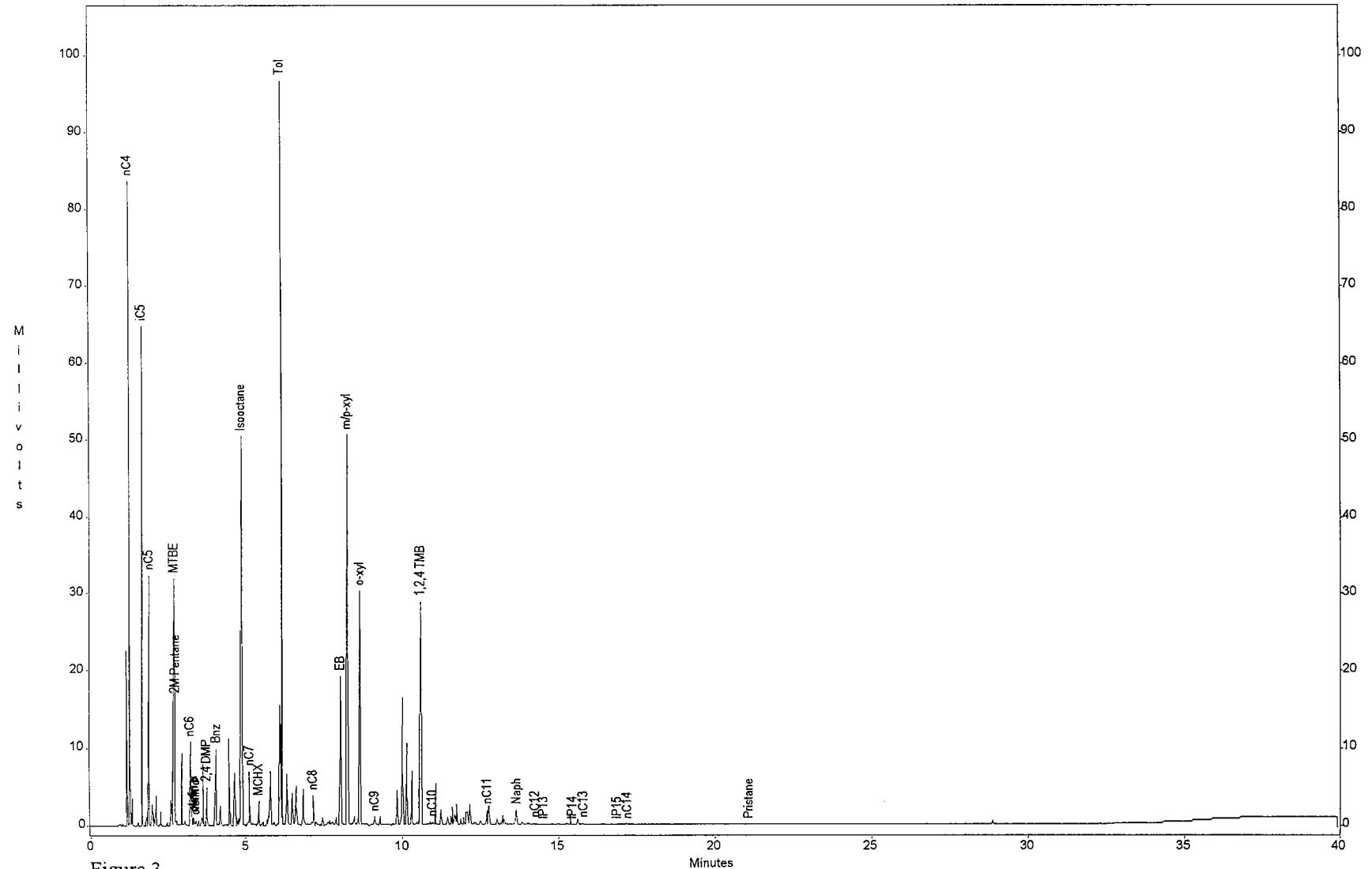


Figure 3.

Sunoco, Inc. (R&M), Belmont Terminal, Philadelphia, PA

Sample ID : RW-15

Acquired : May 15, 2000 15:51:02

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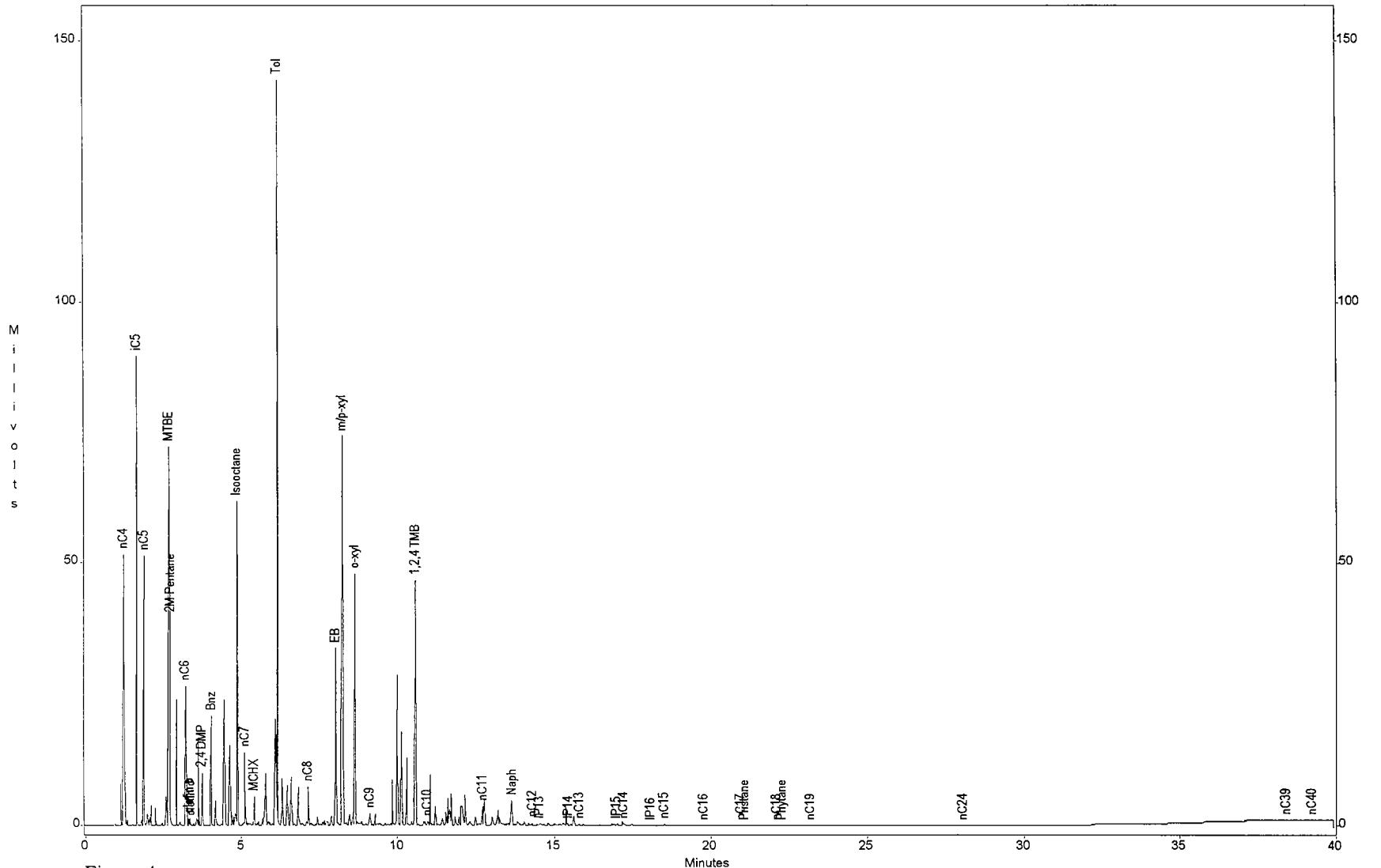


Figure 4.

Sunoco, Inc. (R&M), Belmont Terminal, Philadelphia, PA

Sample ID : S-75

Acquired : May 15, 2000 09:49:03

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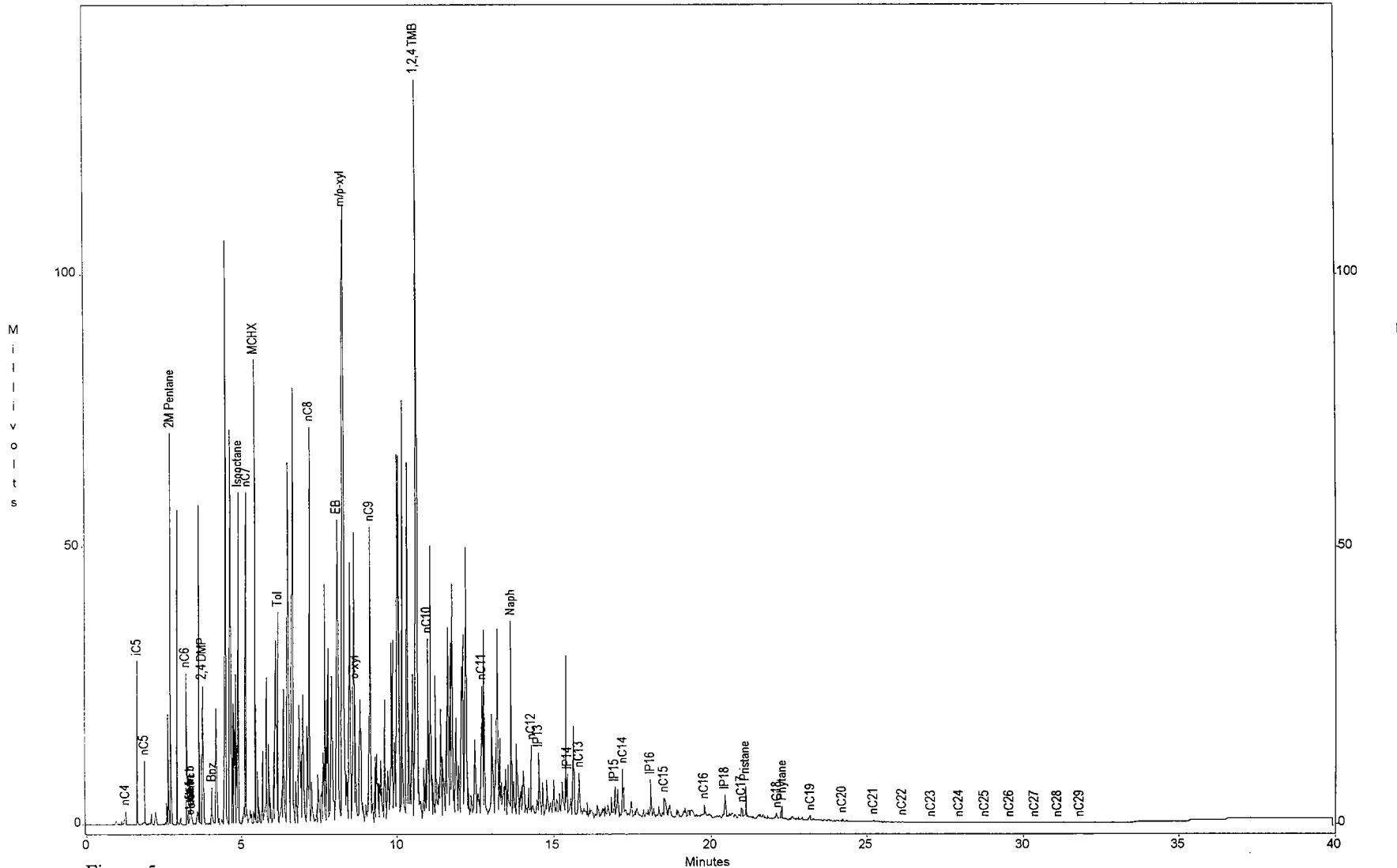


Figure 5.

Sunoco, Inc. (R&M), Belmont Terminal, Philadelphia, PA

Sample ID : S-76

Acquired : May 15, 2000 10:39:29

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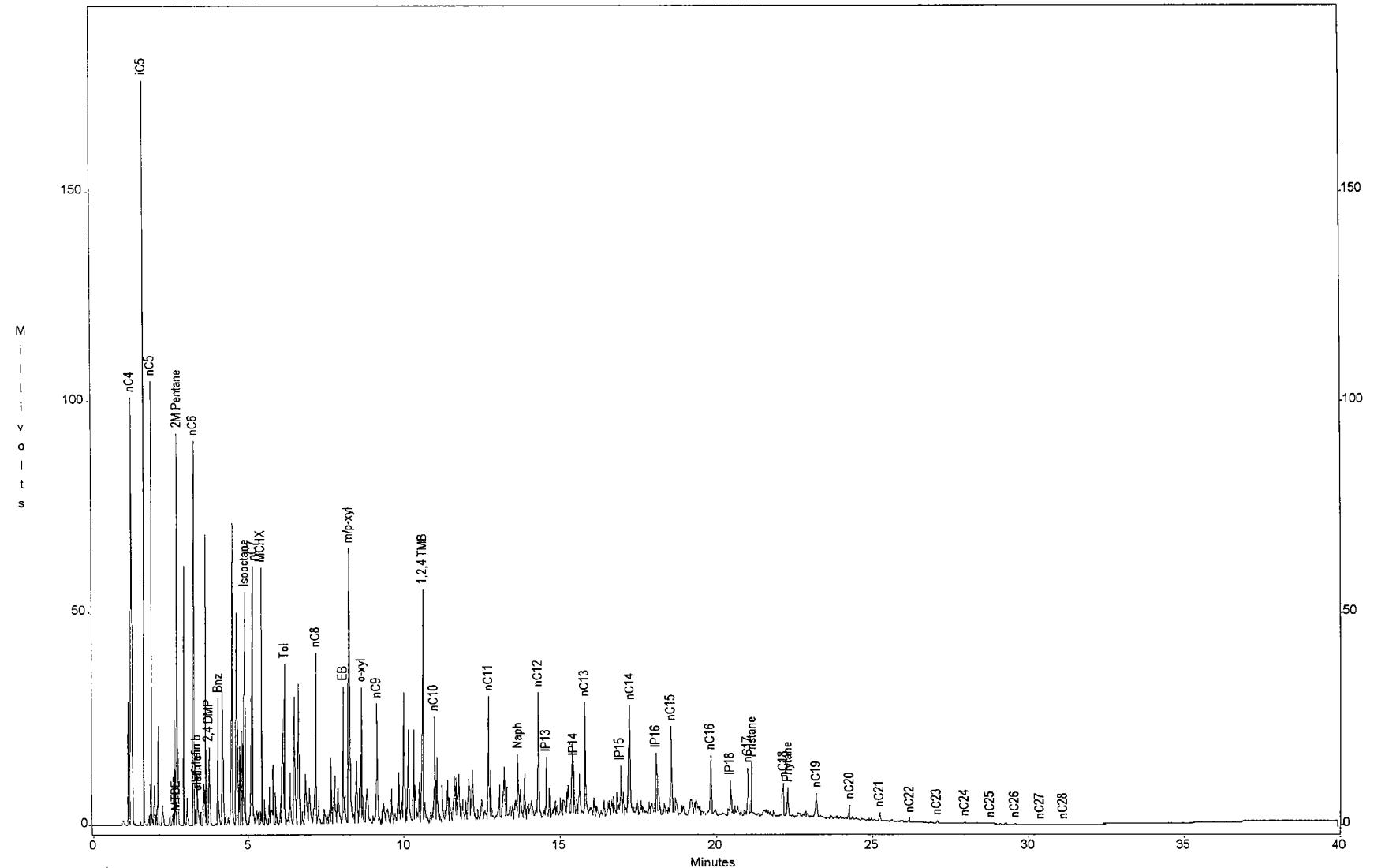


Figure 6.

Sunoco, Inc. (R&M), Belmont Terminal, Philadelphia, PA

Sample ID : 87 Reg

Acquired : May 15, 2000 20:00:43

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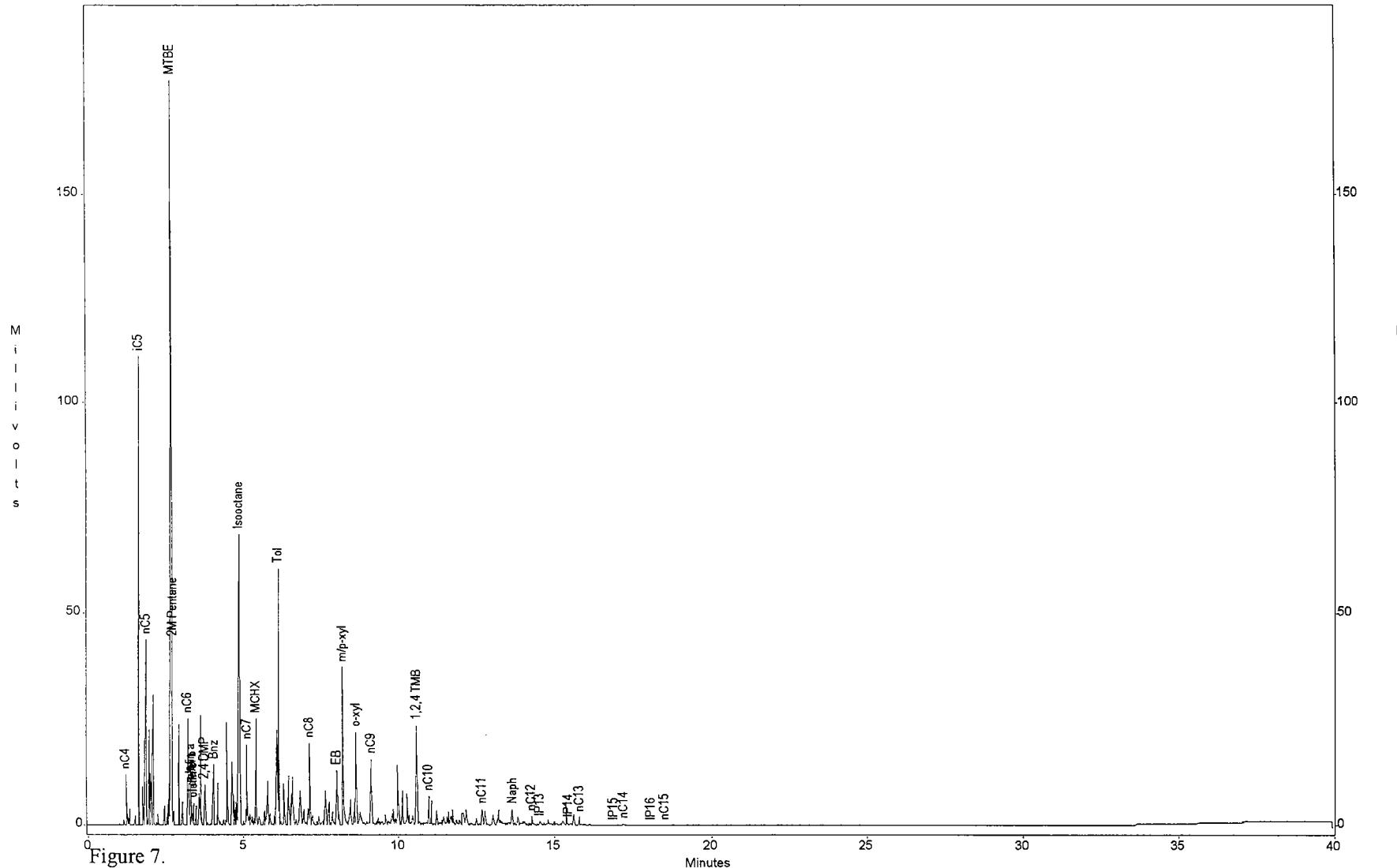


Figure 7.

Sunoco, Inc. (R&M), Belmont Terminal, Philadelphia, PA

Sample ID : 94 Reg 26TK

Acquired : May 15, 2000 18:23:41

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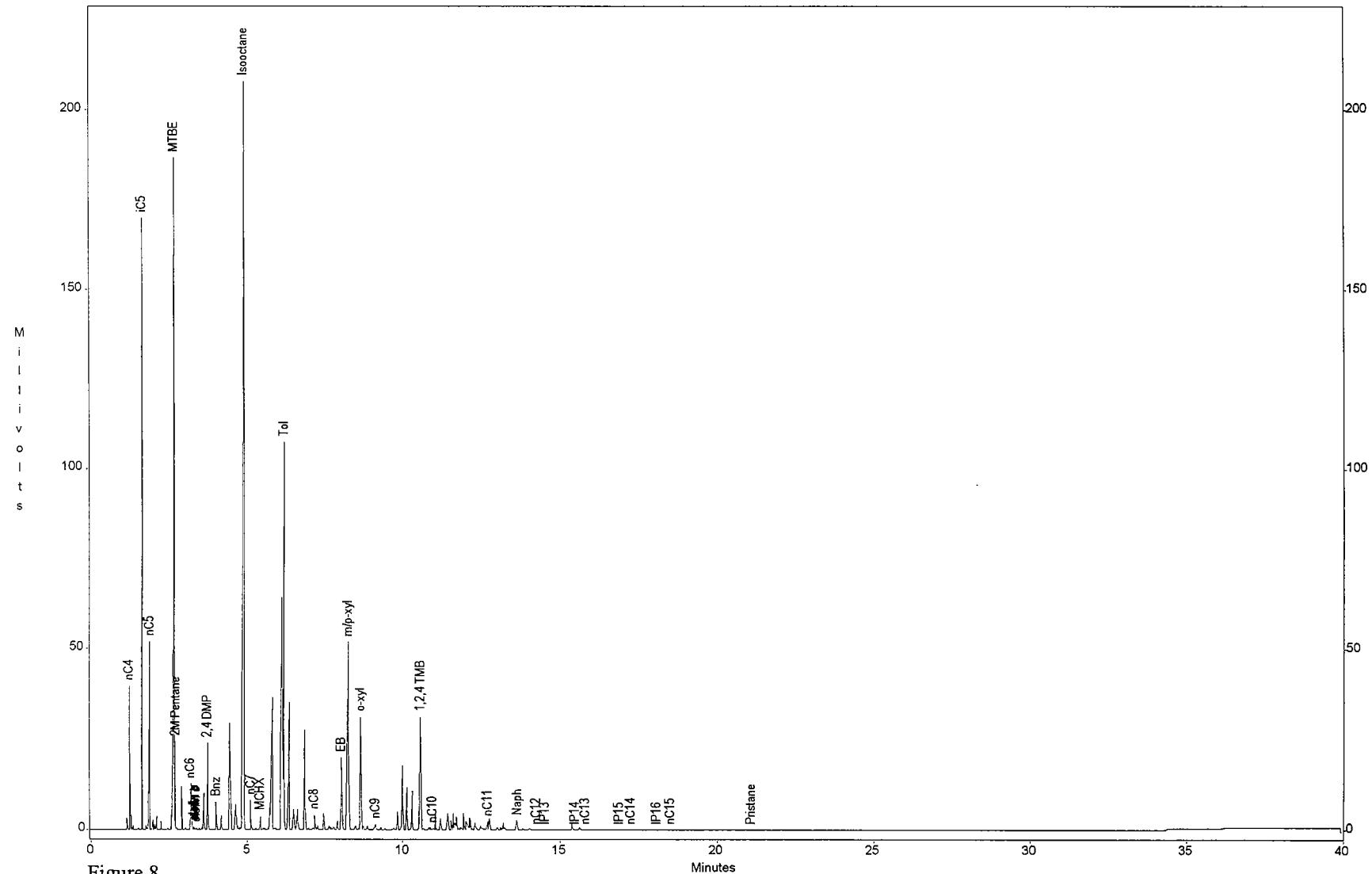


Figure 8.

Sunoco, Inc. (R&M), Belmont Terminal, Philadelphia, PA

Sample ID : Sun Ad

Acquired : May 15, 2000 21:37:10

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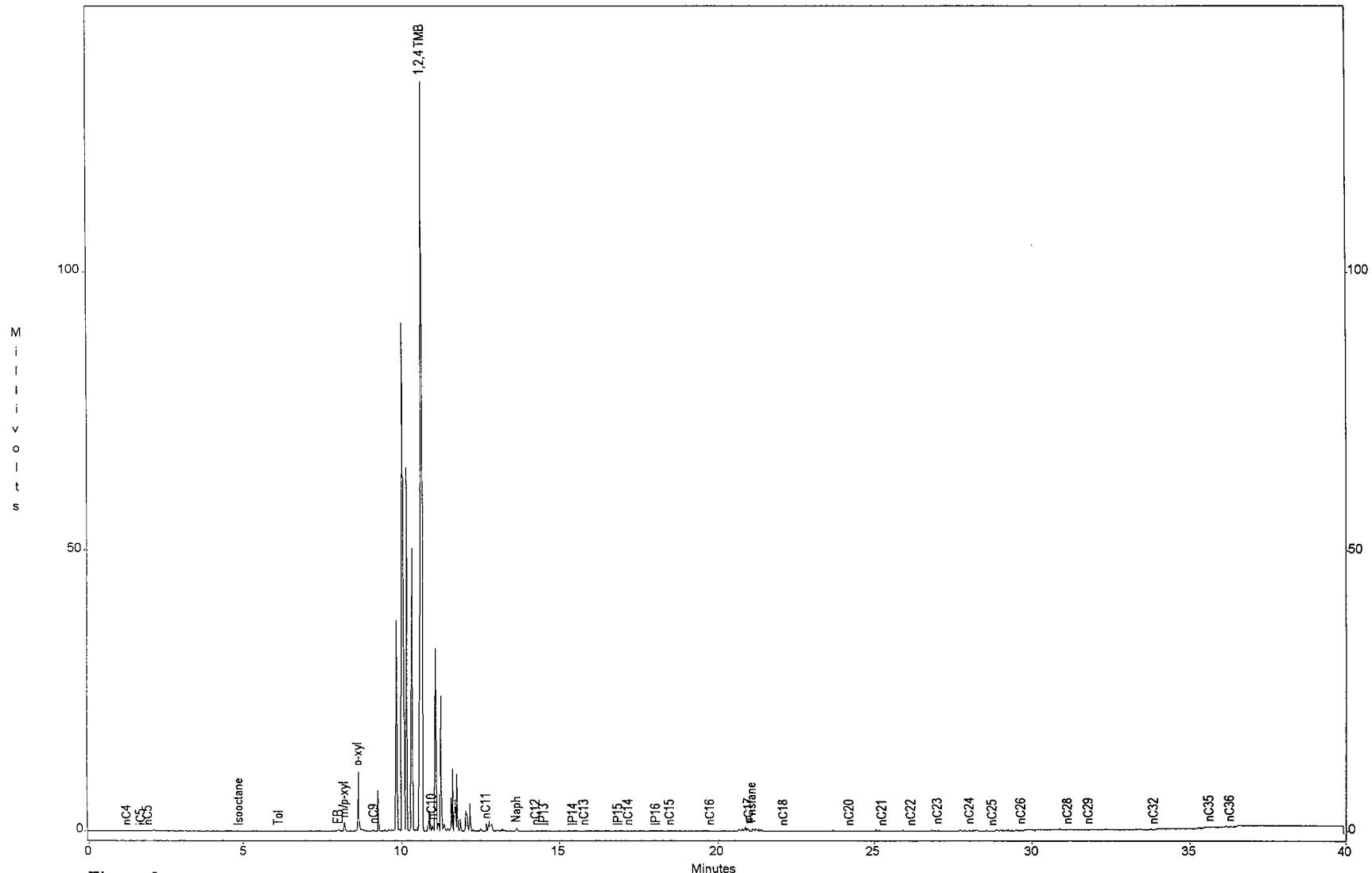


Figure 9.

Sunoco, Inc. (R&M), Belmont Terminal, Philadelphia, PA
Sample ID : Jet
Acquired : May 15, 2000 17:32:06

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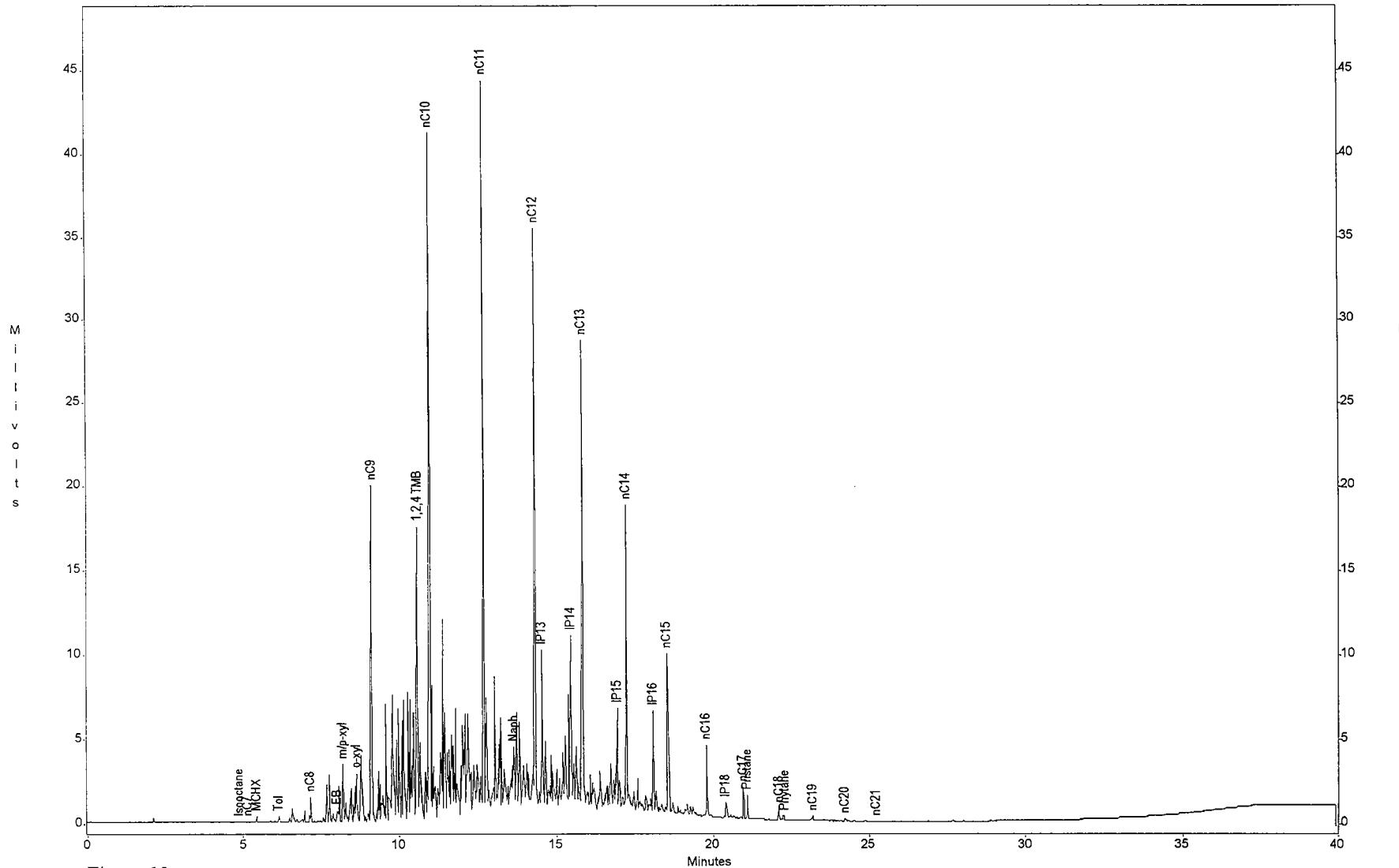


Figure 10

Sunoco, Inc. (R&M), Belmont Terminal, Philadelphia, PA
Sample ID : LS Diesel 85TK
Acquired : May 15, 2000 16:40:39

c:\ezchrom\chrom\00075\lsdies -- Channel A

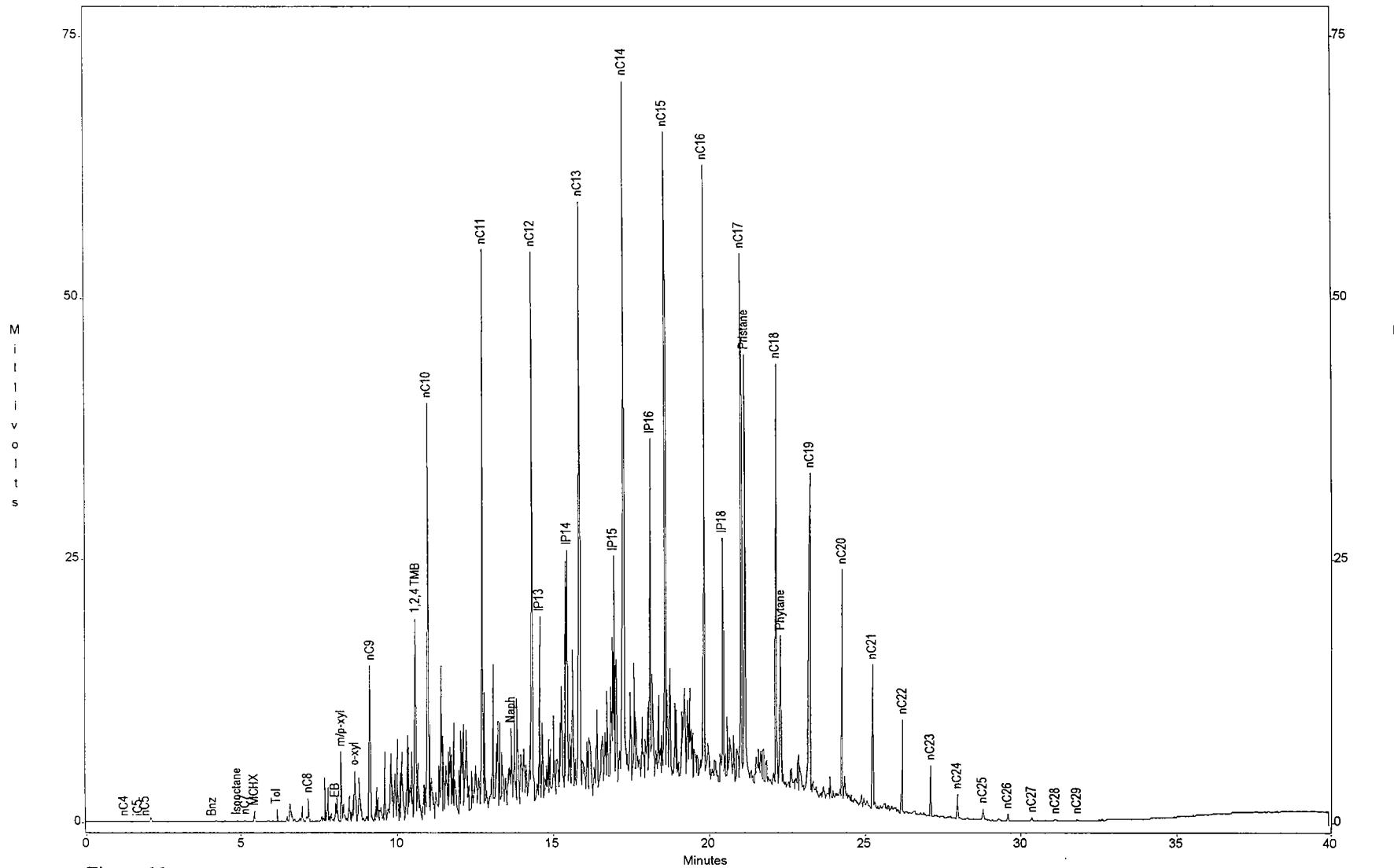


Figure 11

Sunoco, Inc. (R&M), Belmont Terminal, Philadelphia, PA
Sample ID : HHO 42TK
Acquired : May 15, 2000 20:49:13

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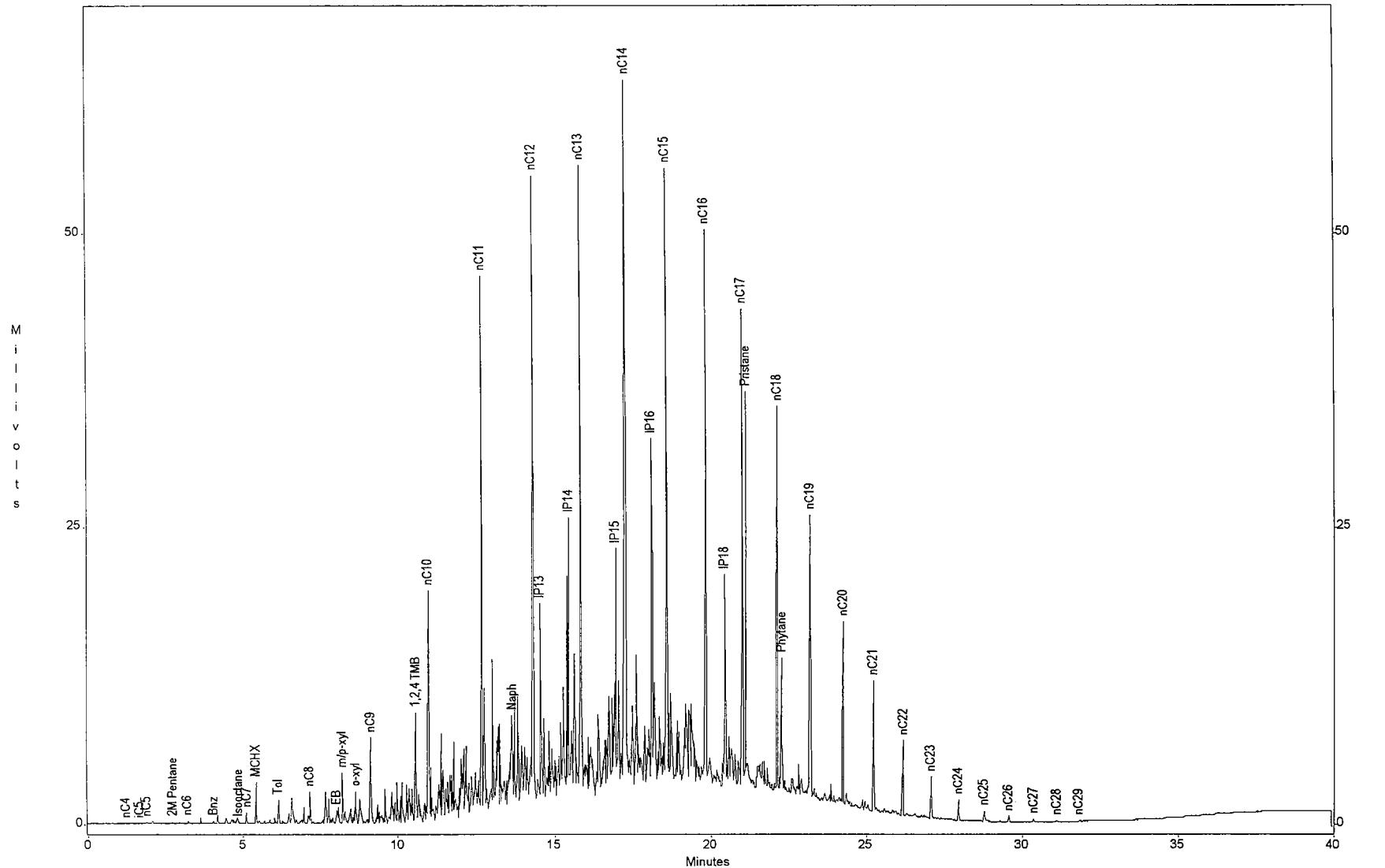


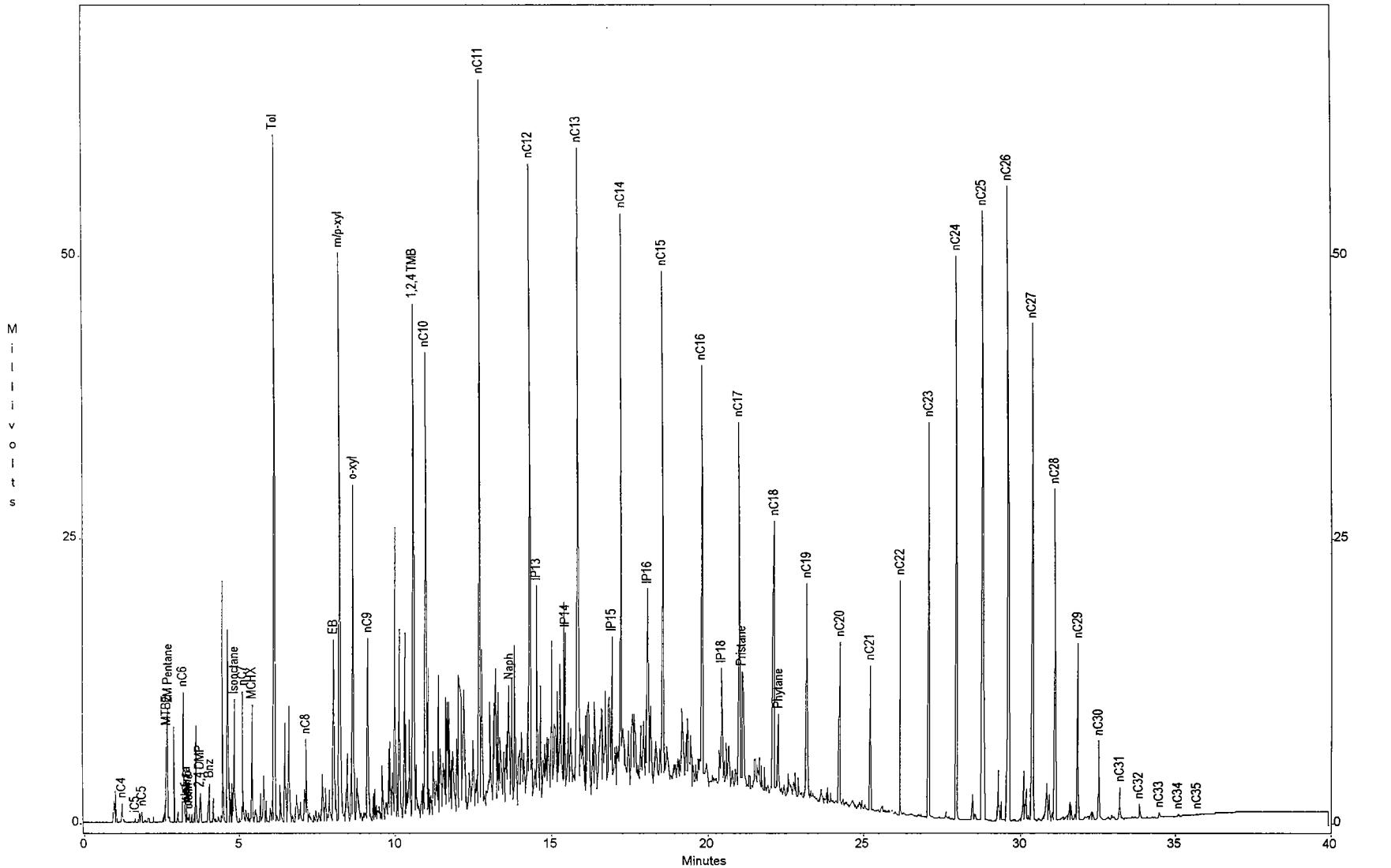
Figure 12

Sunoco, Inc. (R&M), Belmont Terminal, Philadelphia, PA

Sample ID : Gas/Dies/Wax std

Acquired : May 15, 2000 19:12:45

c:\ezchrom\chrom\00075\gadiwax -- Channel A



Torkelson Geochemistry

Sample Transmittal Form

* Representative Authorizing Work:

Steve (Chattanooga)

Person Who Contacted You

* Internal Billing Number

PRIN# / BASD#

* Facility/Service Station Information

Bellmont Terminal
Facility Name

Synco Inc (23m)
Service Station Number (if applicable)

2700 Passyunk Ave.
Street Address

Philadelphia, PA 19145
City, State, Zip

* Note: Laboratory Results will not be mailed out unless this section is completed.

Consultant Information:

Arsin Sahba (Ext. 234)

Name of Consulting Company Project Manager

410-674-3200

Telephone Number

410-674-3203

Fax Number

Handex of Maryland, Inc.

Name of Consulting Company

360 Morgan Road

Street Address

Suite #

Odenton

MD

21113

City

State

Zip Code

Turn Around Requested:

Normal

RUSH

(Please schedule RUSH requests with FCL Lab)

Send Results to:

My Representative

Other _____

Consultant

Send Samples To:

Torkelson Geochemistry

c/o Bruce Torkelson

2528 S. Columbia Place

Tulsa, Ok 74114-3233

Phone: (918) 749-8441

(Results will be faxed if the FAX number is provided.)

QUESTIONS ABOUT ANALYSES? PLEASE CALL 

Reason for Sampling or Additional Remarks: Samples collected from wells & refinery to characterize & fingerprint

Shipped by: Anne Heppner Date: 5/10/00

Please Attach Original "Chain of Custody" Form or Complete Form on Reverse Side.

PB# 101385

115535, 032

Torkelson Geochemistry

Page 1 of 1 Pages
CHAIN OF CUSTODY RECORD

Location Sampled: Sunoco Terminal Address: 2700 Belmont Passenger Avenue

SHADED AREA FOR ABUSE ONLY Service Station Number: _____ City, State: Philadelphia, PA

Sampler (Please Print)		Sampler Signature		Analyses Required (✓)				
Amy Heywood		Amy Heywood		TS O.E. DA YL				
Lab ID #:								
Lab Sample ID	Sample Identification	COLLECTION	MATRIX	Preservation Method (Freon, Ice Packs, None)	Sample Container Description	Number of Containers	OTHER SAMPLE RELATED REMARKS	
		Date Sampled	Time Sampled	W = Water S = Soil P = Product				
	RW-1	5/9/00	-	P	NONE	20ml glass	2	X X X
	RW-4		-	P	none	20ml glass	2	X X X
	RW-7		-	P	none	20ml glass	2	X X X
	RW-15	5/9/00	-	P	none	20ml glass	2	X X X
Comments: With chromatogram plots attached & comparison								
RBC/CIPT TEMPERATURE								
1. Relinquished By:	Date: 5/11/01	1. Received By:	Date: 5/11/01	3. Relinquished By:	Date:	3. Received By:	Date:	
(initials)	Time: 0955	(initials)	Time: 0955	(initials)	Time:	(initials)	Time:	
2. Relinquished By:	Date:	4. Relinquished By:	Date:	4. Received By:	Date:			
(initials)	Time:	(initials)	Time:	(initials)	Time:			

110535,032

Torkelson Geochemistry

Page 1 of 1 Pages
CHAIN OF CUSTODY RECORD

Bo#101385

Location Sampled

Facility Name: Belmont Terminal Address: 2700 Passyunk Avenue
Street Address

SHADED AREA FOR ABUSE ONLY Service Station Number: _____ City, State: Philadelphia, PA

Comments: 14th Chromatogram Please
Microfotograph & Comments

RECEIPT TEMPERATURE: °C

1. Relinquished By:	Date: <u>7-10-08</u>	1. Received By:	Date: <u>7-11-08</u>	2. Relinquished By:	Date: _____	3. Received By:	Date: _____
<i>Frank Tabular</i>	Time: <u>0955</u>				Time: _____		Time: _____

APPENDIX D
CONE PENETROMETER
SUBSURFACE INVESTIGATION REPORT





CONE PENETROMETER SUBSURFACE INVESTIGATION REPORT

*SUNNOCO, INC.
BELMONT TERMINAL
2700 PASSYUNK AVE.
PHILADELPHIA, PA*

Jack Mannix
Senior Hydrogeologist

HANDEX CONE PENETROMETER DIVISION
61-C Carolyn Boulevard Farmingdale, New York 11735

TABLE OF CONTENTS

INTRODUCTION

FIELD INVESTIGATION

Site Background

CPT Sounding Program

Site Geology and CPT Soil Classification

FFD Results

SUMMARY AND RECOMMENDATIONS

FIGURES

1. Site Plan
2. Site Plan With Upper Level Hydrocarbon Distribution
3. Site Plan With Lower Level Hydrocarbon Distribution
4. 3D Hydrocarbon Distribution Model

REFERENCES

APPENDICES

A - CPT Sounding Profiles

B - Site Calibration Data (CPT/FFD Module)

INTRODUCTION

Handex was retained by Sunoco Inc. to conduct a Cone Penetrometer Technology (CPT), characterization at 2700 Passyunk Ave., Philadelphia, PA. The CPT is used to assess and partially delineate the subsurface petroleum impacted areas of concern using electronic sensors and a Fuel Fluorescence Detector (FFD). The investigation was completed in September of 2000 and utilized the Handex CPT which is equipped with a Fuel Fluorescence Detector (FFD) to identify and delineate the presence of subsurface hydrocarbons. The following report, geologic logs and model output summarizes the results of the CPT / FFD soil investigation.

The Handex CPT is equipped with a fuel fluorescence detector that projects ultraviolet light through a sapphire window onto the soil as the tool is being advanced into the ground. If hydrocarbons are present they absorb the ultraviolet (UV) light and emit energy in the form of fluorescent light. This light passes back through the sapphire window and is collected by a fiber optic cable and transmitted to two photo-multipliers in the FFD probe. Here the optical signal is converted to two electric signals and transmitted through a cable into the truck, where the signals are amplified and logged by the on-board data acquisition system. The resulting output is two continuous FFD profiles displaying fluorescence intensity versus depth below the land surface.

The wavelength of the excitation light source located in the FFD module is 254 nanometers (nm) (Bratton and Shinn). If hydrocarbons are impacted by the excitation light source, they will fluoresce. The fluorescent response signal is split and then filtered at each photo-multiplier. One half of the signal is filtered to remove wavelengths below 280 nm and above 450 nm while the other half is filtered to remove wavelengths below 450 nm and

above 575 nm. The fluorescence response signal for gasoline and fuel oil (diesel) range hydrocarbons is observed in the 280 to 400 nm wavelength range. The fluorescence response from heavier compounds such as creosote and coal tar residuals are observed at longer wavelengths, primarily impacting the photo-multiplier equipped with the long pass filter (only allowing 450nm to 575nm wavelength range of light to pass). Since all of the hydrocarbons encountered at this site had a more significant response from the higher wavelength FFD (HFFD) and are best represented by this signature, only the HFFD was used to generate the hydrocarbon distribution model shown in the Figures section of this report. The intensity of the FFD signals are expressed in volts and in previous applications have been found to be proportional to the amount of hydrocarbon present in the pore space in the sediments along with air and groundwater.

FIELD INVESTIGATION

CPT/FFD Sounding Program

A total of 22 CPT/FFD soundings were completed at the site to depths ranging from approximately 21 to 53 feet Below Land Surface (BLS). All locations were cleared to 5 feet with an air knife prior to the CPT/FFD sounding to insure that subsurface utilities were cleared before the work began. The locations of the CPT soundings are shown on the site plan (Figure 1).

Site Geology and CPT Soil Classification

The CPT data was collected in accordance with ASTM D 3441-1986 and was used to determine the subsurface stratigraphy. The CPT sounding profiles generated from the data are included as Appendix A.

The site is primarily underlain by sand and gravelly sand to a depth of about 30 feet BLS. Most of the soundings displayed 1 to 4 foot thick layer of sand mix or clayey silt between 20 and 30 feet BLS, which is within the primary sand layer. A fine grained sand mix, clayey silt and clay was detected under the primary sand layer in most soundings, starting between 31 and 41 feet BLS and extending to the bottom of the soundings.

Fuel Fluorescence Detector Results

The FFD tool was calibrated with a card that has a black area and a white area designed to give a known difference in FFD output from each of the colors, on each of the FFD detectors. The voltage output was in the same range as previous outputs for the same calibration card. The results of the FFD calibration are provided in Appendix B. In Appendix A, the columns labeled "LFFD" and "HFFD" represent the fluorescent light response, which

is located 2.37 feet above the cone tip. This is the reason the FFD profiles are shorter than the terminal depth of the push.

High FFD responses were encountered in all soundings except CPT-19 which met refusal at 20.61 feet BLS, above the expected hydrocarbon level and CPT-20 which was the farthest point from the loading rack. Since the locations were cleared to 5 feet BLS prior to performing the soundings, most of the data above 5 feet BLS was lost. High FFD readings were observed at various depths from 5 feet BLS to approximately 38 feet BLS. The responses were not detected at uniform depths in all soundings, but the following trends in the data should be noted.

As shown on Figure 4 (3D Hydrocarbon Distribution Model), the Hydrocarbons were detected predominantly within two elevation intervals. The upper interval is between 10 and 30 feet in elevation (at grade to 20 feet below grade) and the lower interval is between negative 10 and -5 feet in elevation (20 to 35 feet below grade). Figure 4 also shows a connection between the two levels near the western-most loading rack. The hydrocarbon connection can be observed in this area where elevated FFD readings exist between the two levels. Three good example soundings where hydrocarbons were detected between these two elevations are CPT-3, CPT-8, and CPT-12. The lower level FFD readings generally occur within the primary sand layer and below the 1 to 4 foot thick sand mix or clayey silt layer. Two different hydrocarbons were detected in the lower level that are distinguished primarily by their fluorescent properties. The LFFD readings are higher near the top of the hydrocarbon impacted zone while the HFFD readings are higher near the bottom of the zone. These two lower level hydrocarbon saturated zones are separate in some soundings and they run together in others.

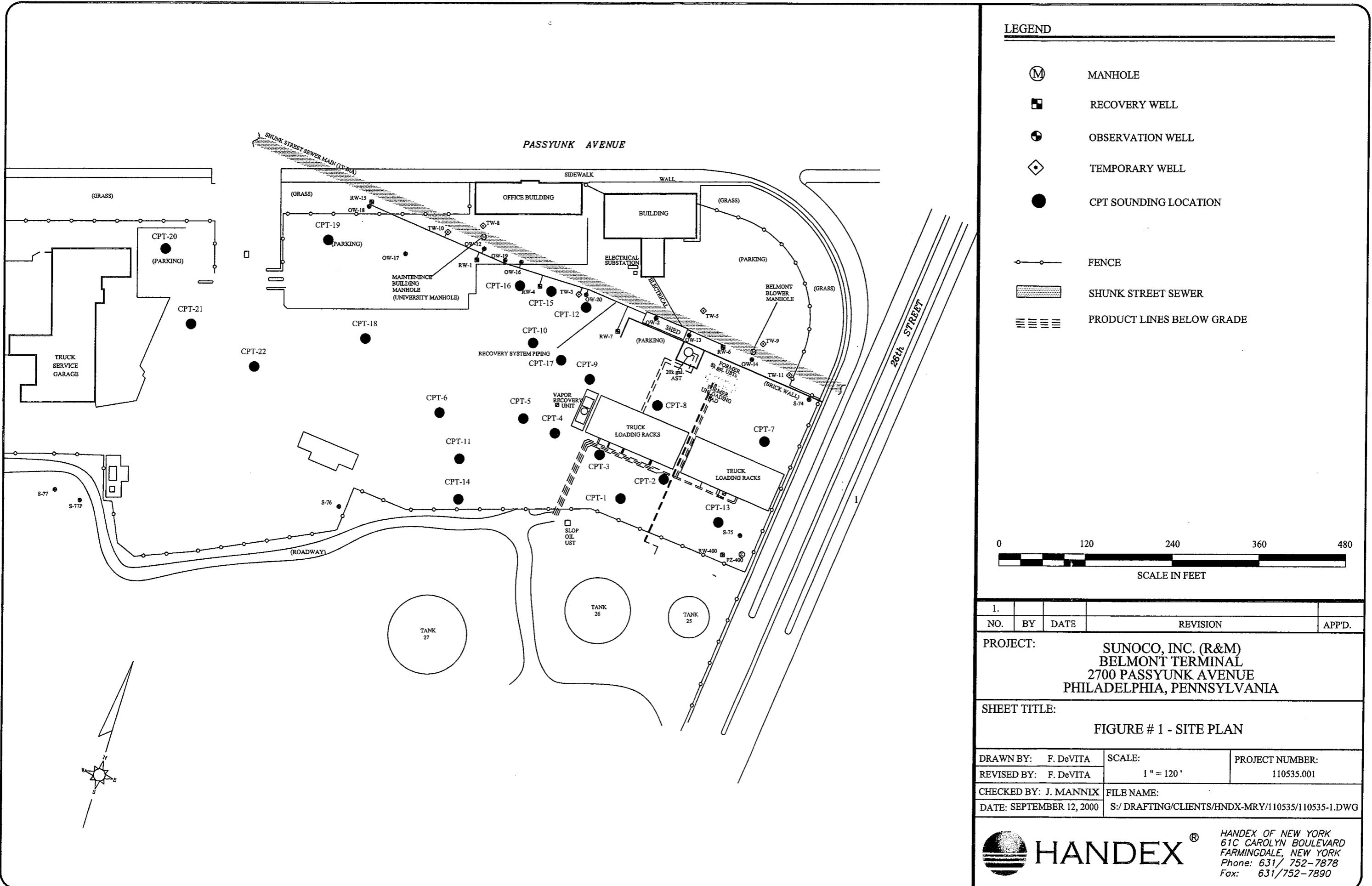
The upper level hydrocarbons (between 10 and 30 feet in elevation) were detected primarily under the loading racks, under the paved area between the loading racks and the main parking lot and just to the south of the main entrance. The lower level hydrocarbons produced the highest FFD readings in three areas. The first was just to the south of the loading racks, the second was approximately 140 feet south of the main parking lot in sounding CPT-6 and the third was just south of the main entrance in CPT-22. Please note that the two eastern-most areas of lower level hydrocarbons may be connected as the sounding separating the two areas (CPT-4) did not go deep enough to detect the lower level hydrocarbons.

Conclusions / Recommendations

Based on the interpolated fuel fluorescence intensity maps shown on Figure 2 and Figure 3, the upper level hydrocarbons and the lower level hydrocarbons are centered along two different lines. Figure 2 shows the upper level hydrocarbons' intensity at it's highest on a line from CPT-7 to CPT-16. Figure 3 shows the lower level hydrocarbons' intensity at it's highest farther to the south-west, on a line from CPT-13 to CPT-22.

In order to fully delineate the extent of hydrocarbons on this site, additional delineation should be performed on the western portion of the site.

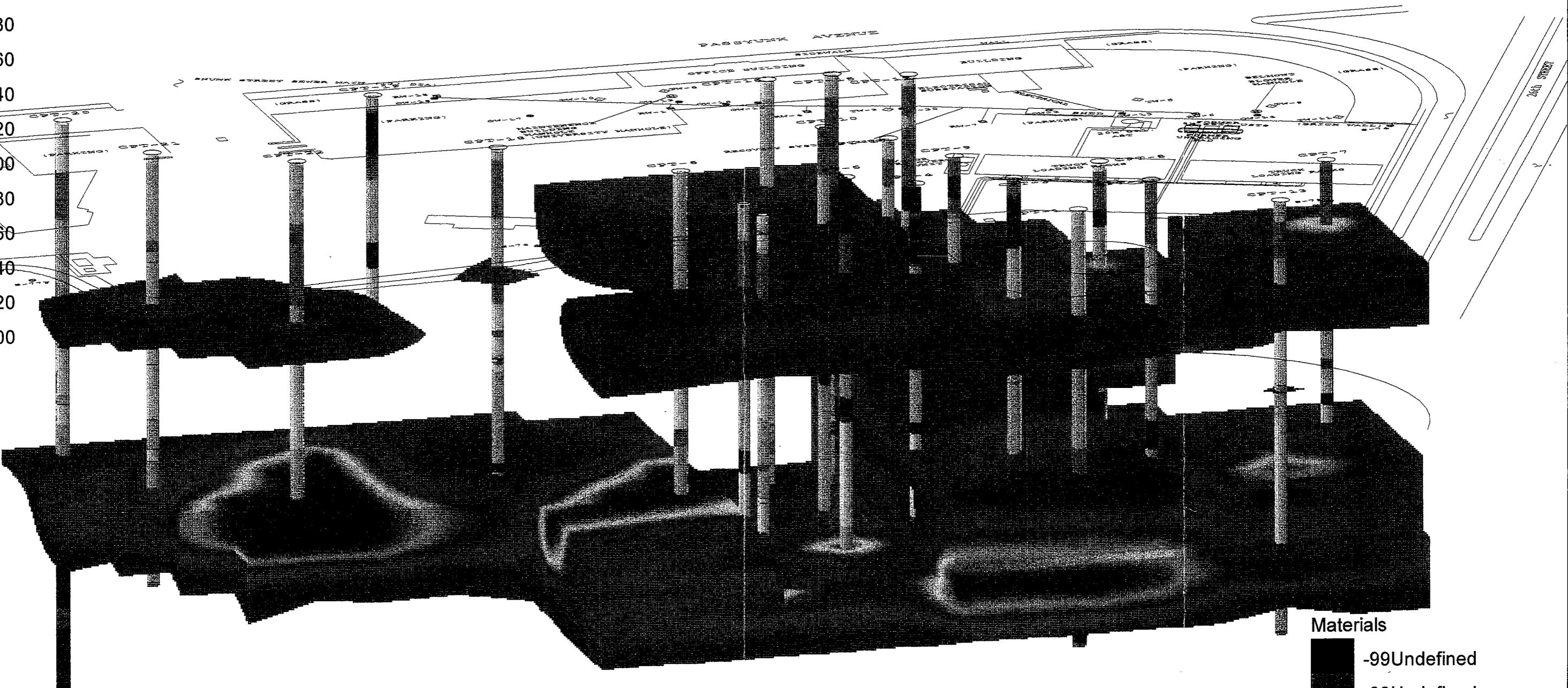
FIGURES



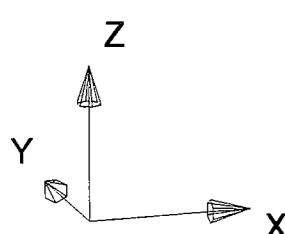
3D Hydrocarbon Distribution Model

Sunoco Belmont HFFD / Volts

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1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00

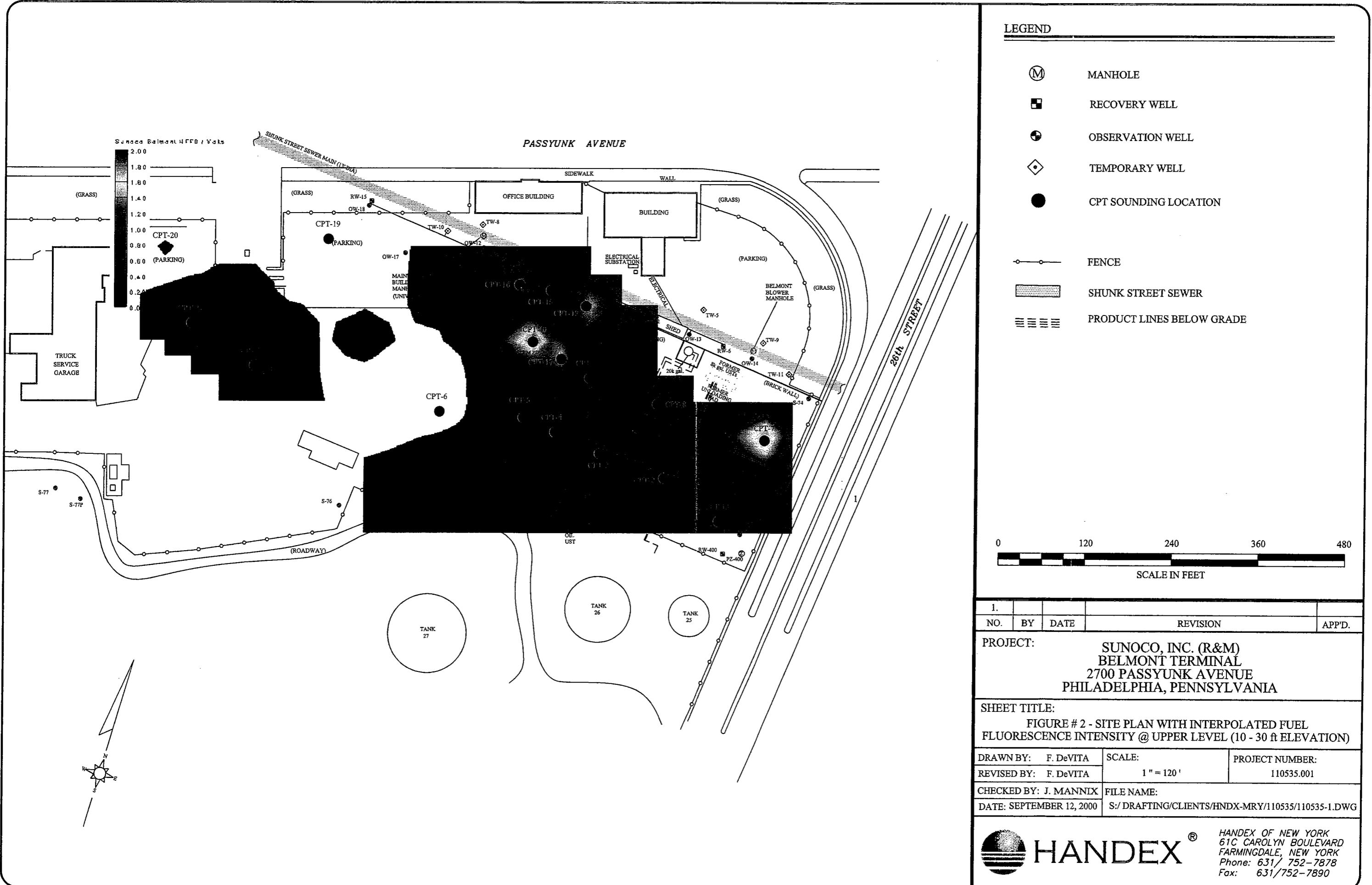


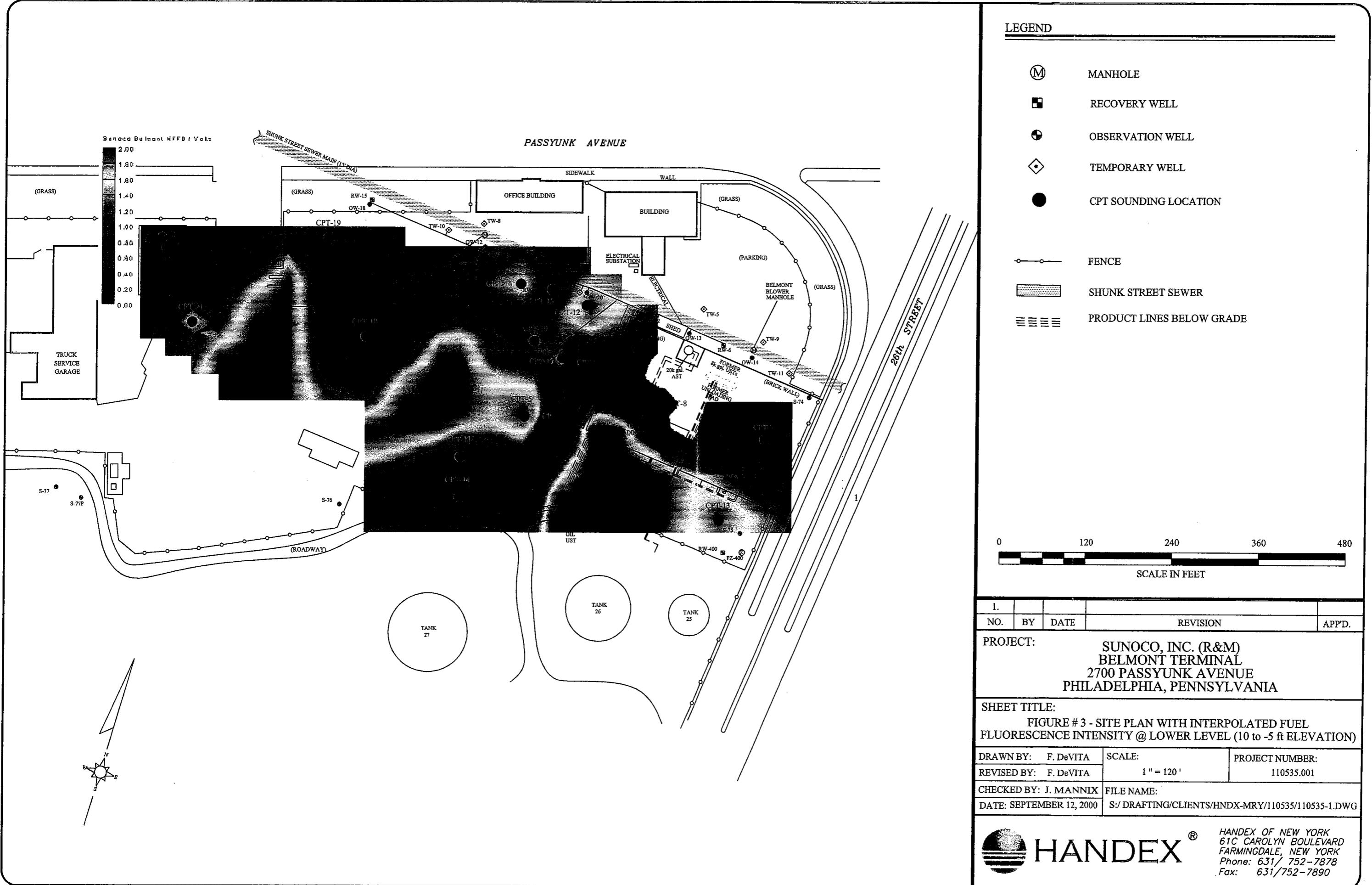
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-99Undefined
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2Organic_Soil-Peats
3Clays
4Silt_Mixtures
5Sand_Mixtures
6Sands
7Gravelly_Sands
9OC



8X Vertical Exaggeration

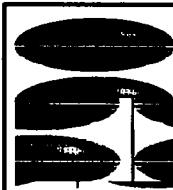
Figure 4





APPENDIX A

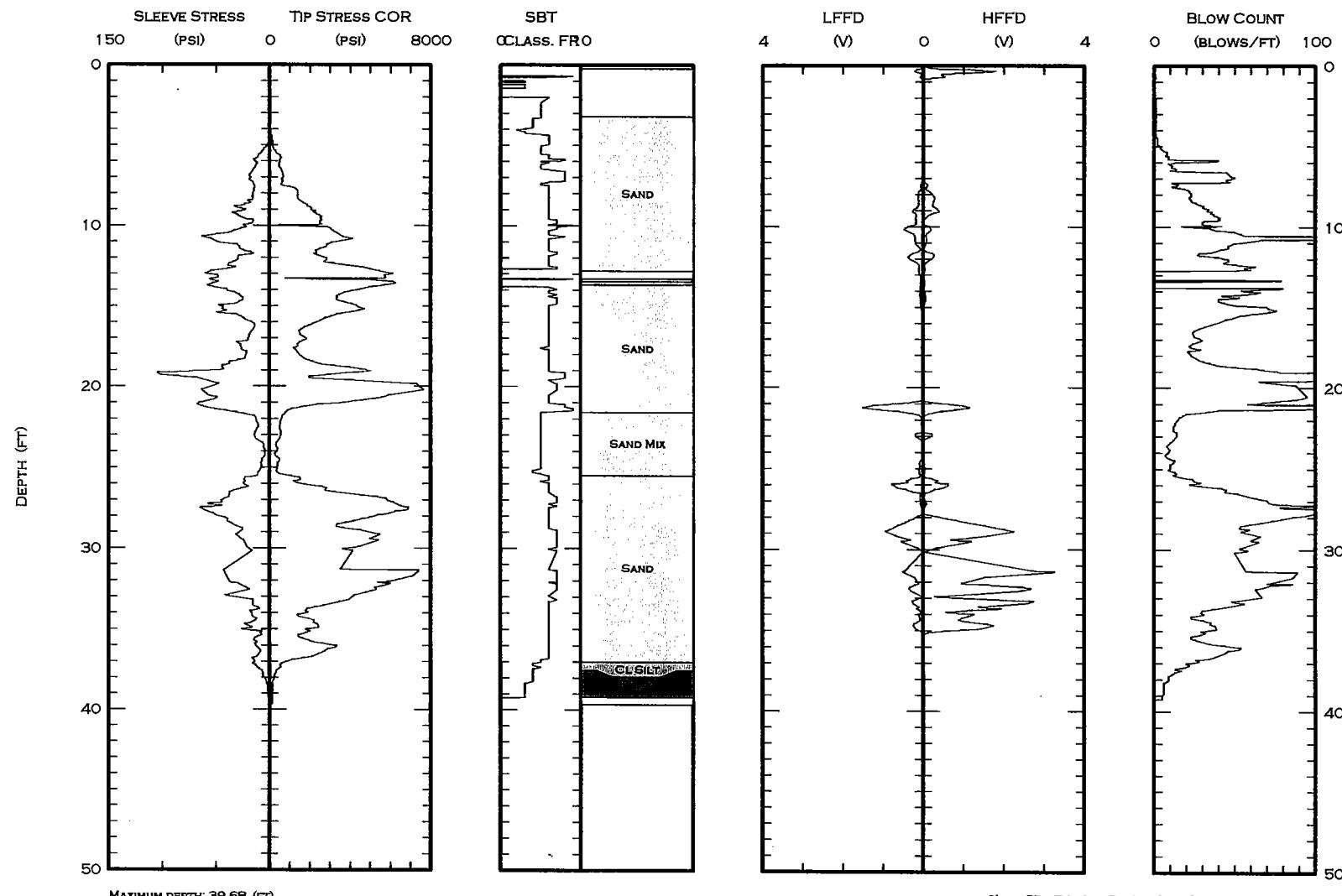
CPT SOUNDING PROFILES



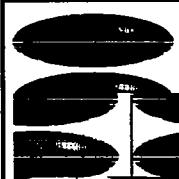
Handex
Farmingdale, NY 11735
(631)-752-7878
Email: JMannix@Handexmail.com
<http://www.Handex.com>

Northing:
Easting:
Elevation:
Client: Sun
Site: Sunoco Belmont Refinery

Date: 28/Aug/2000
Test ID: CPT-1
Project: PhilSun



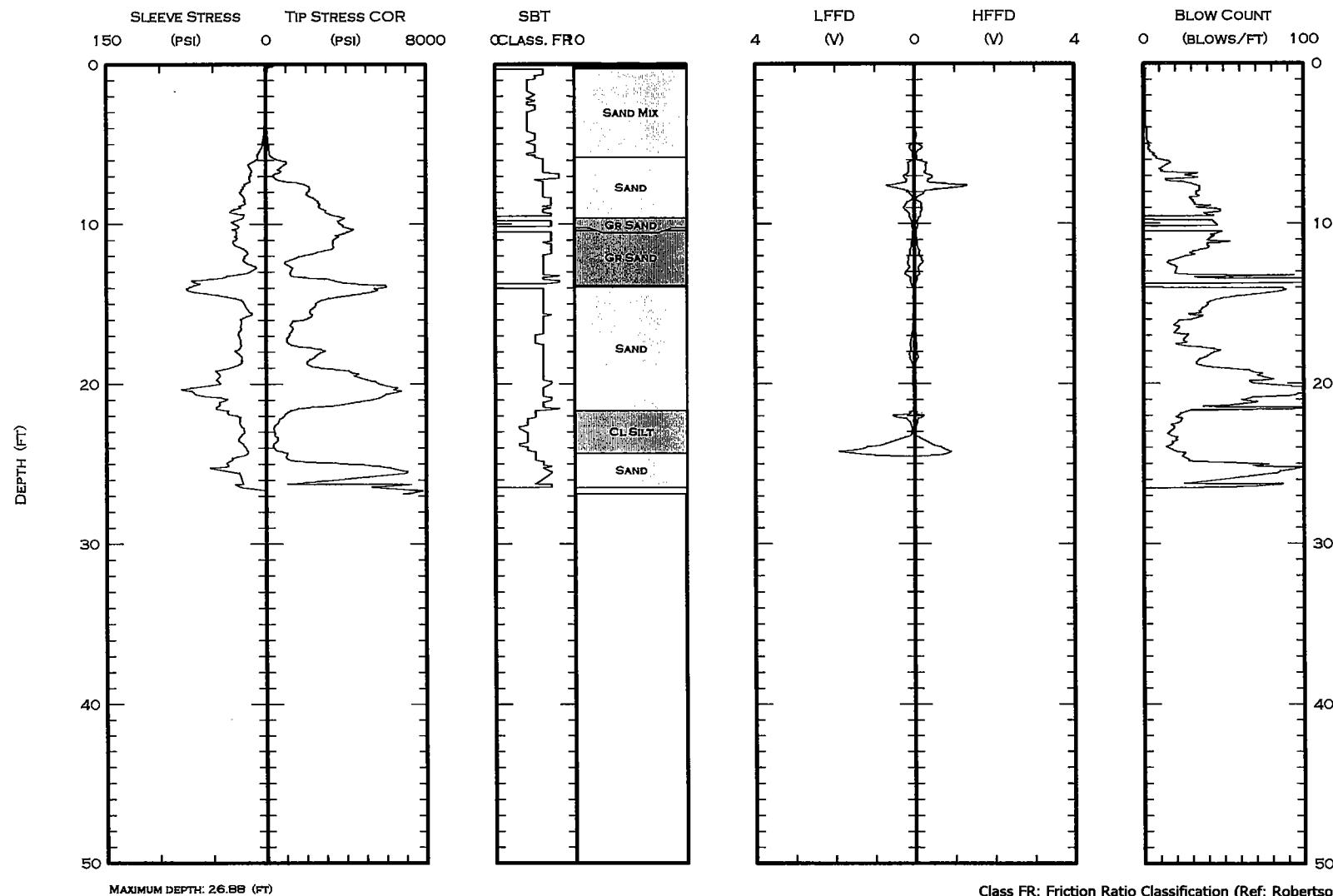
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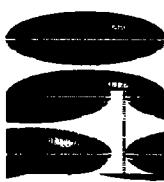


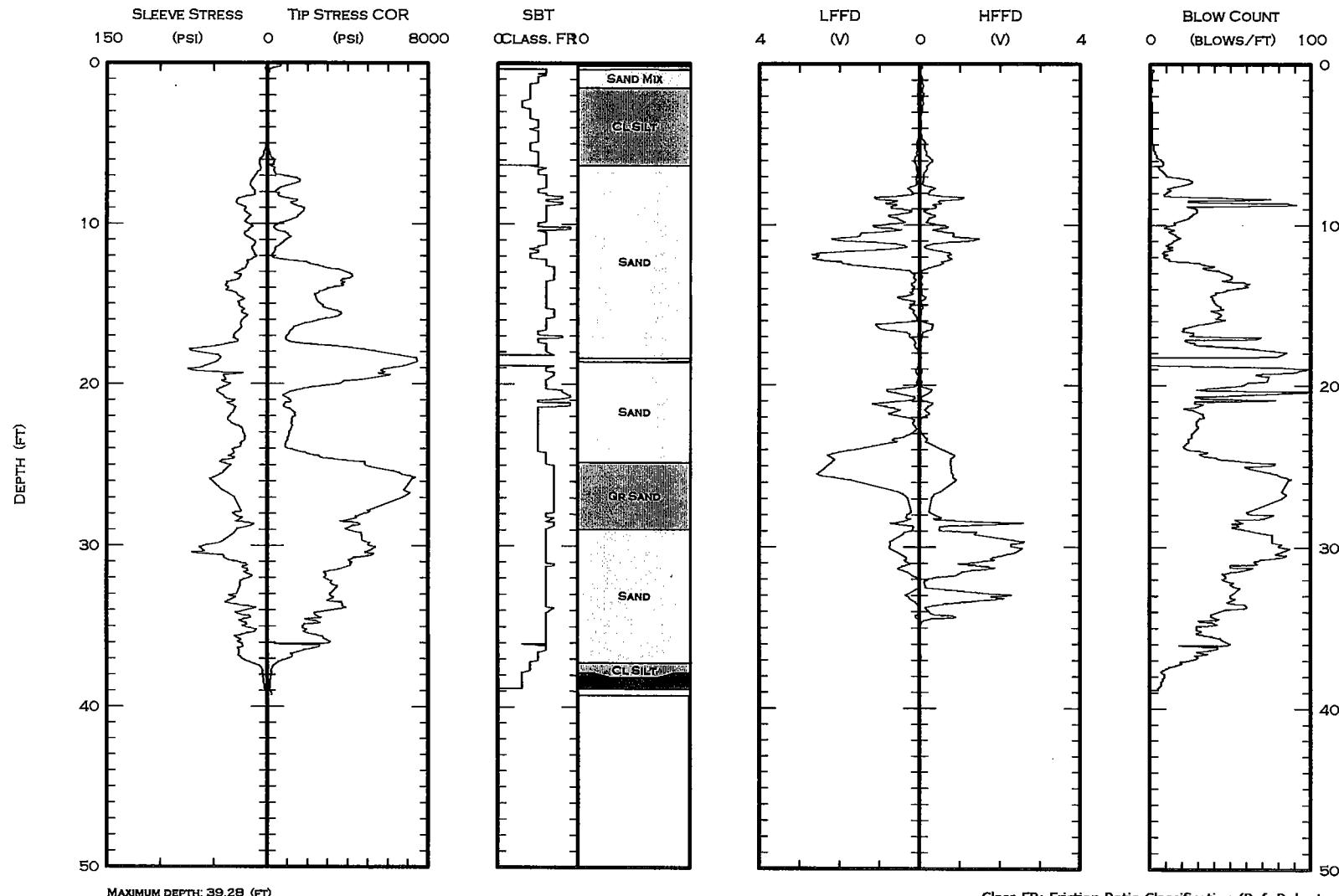
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Email: JMannix@Handexmail.com
<http://www.Handex.com>

Northing:
Easting:
Elevation:
Date: 28/Aug/2000
Test ID: CPT-2
Project: PhilSun

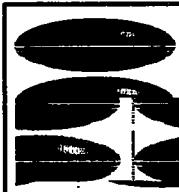
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Site: Sunoco Belmont Refinery



	Handex Farmingdale, NY 11735 (631)-752-7878 Email: JMannix@Handexmail.com http://www.Handex.com	Northing: Easting: Elevation: Client: Sun Site: Sunnoco Belmont Refinery	Date: 28/Aug/2000 Test ID: CPT-3 Project: PhilSun
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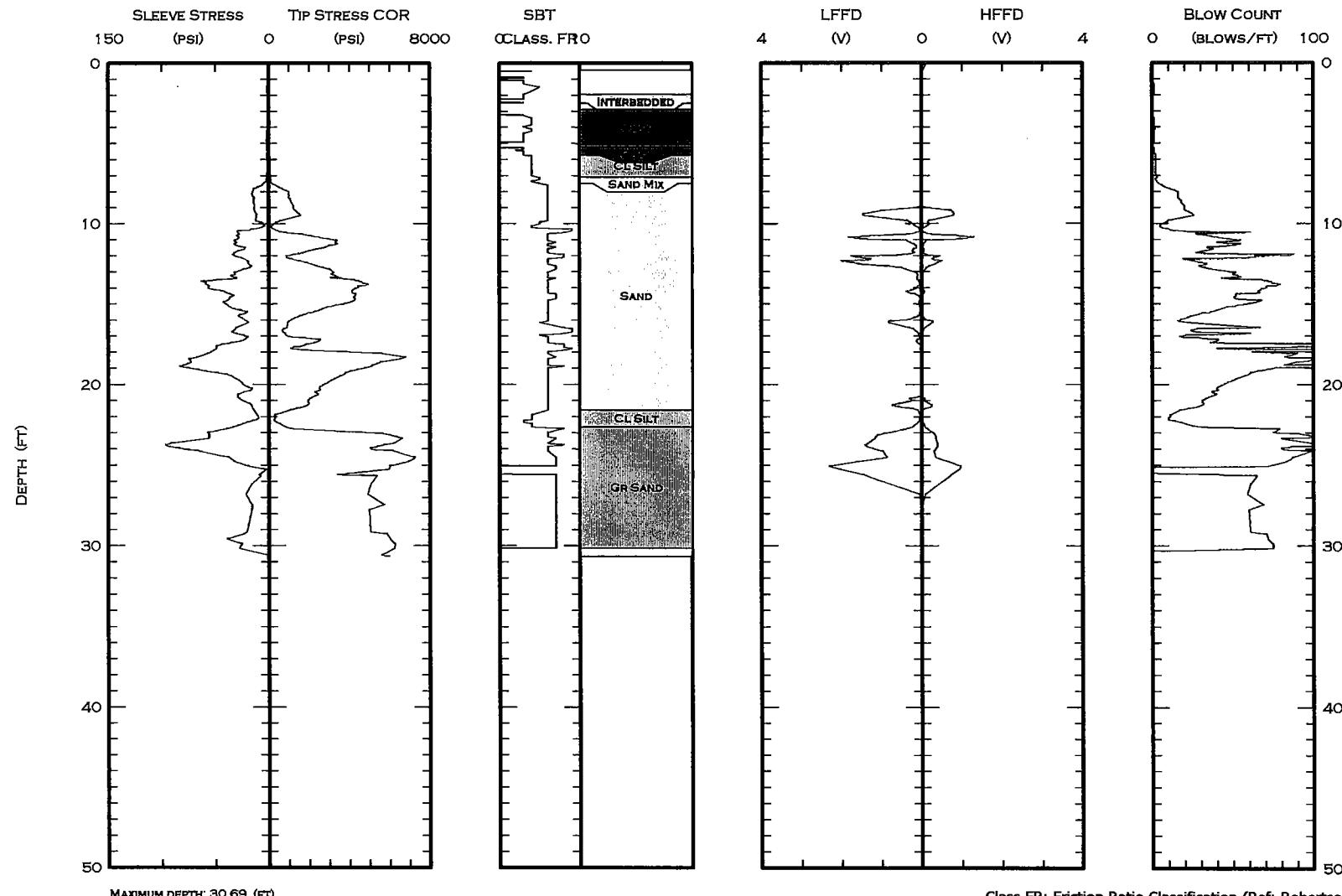
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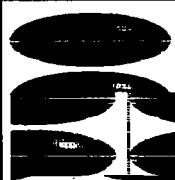


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<http://www.Handex.com>

Northing:
Easting:
Elevation:
Client: Sun
Site: Sunnoco Belmont Refinery

Date: 28/Aug/2000
Test ID: CPT-4
Project: PhilSun

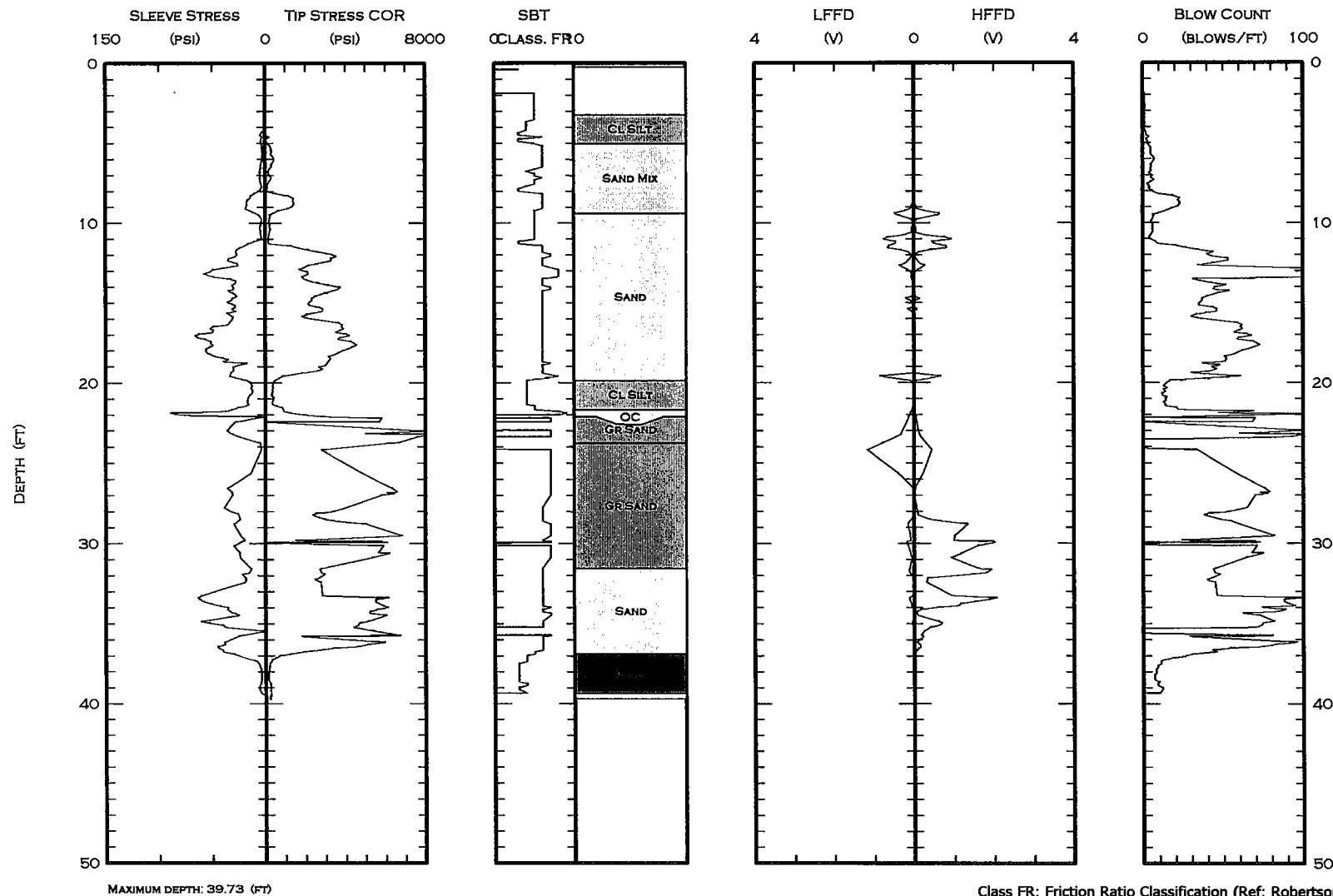


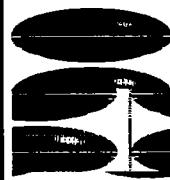


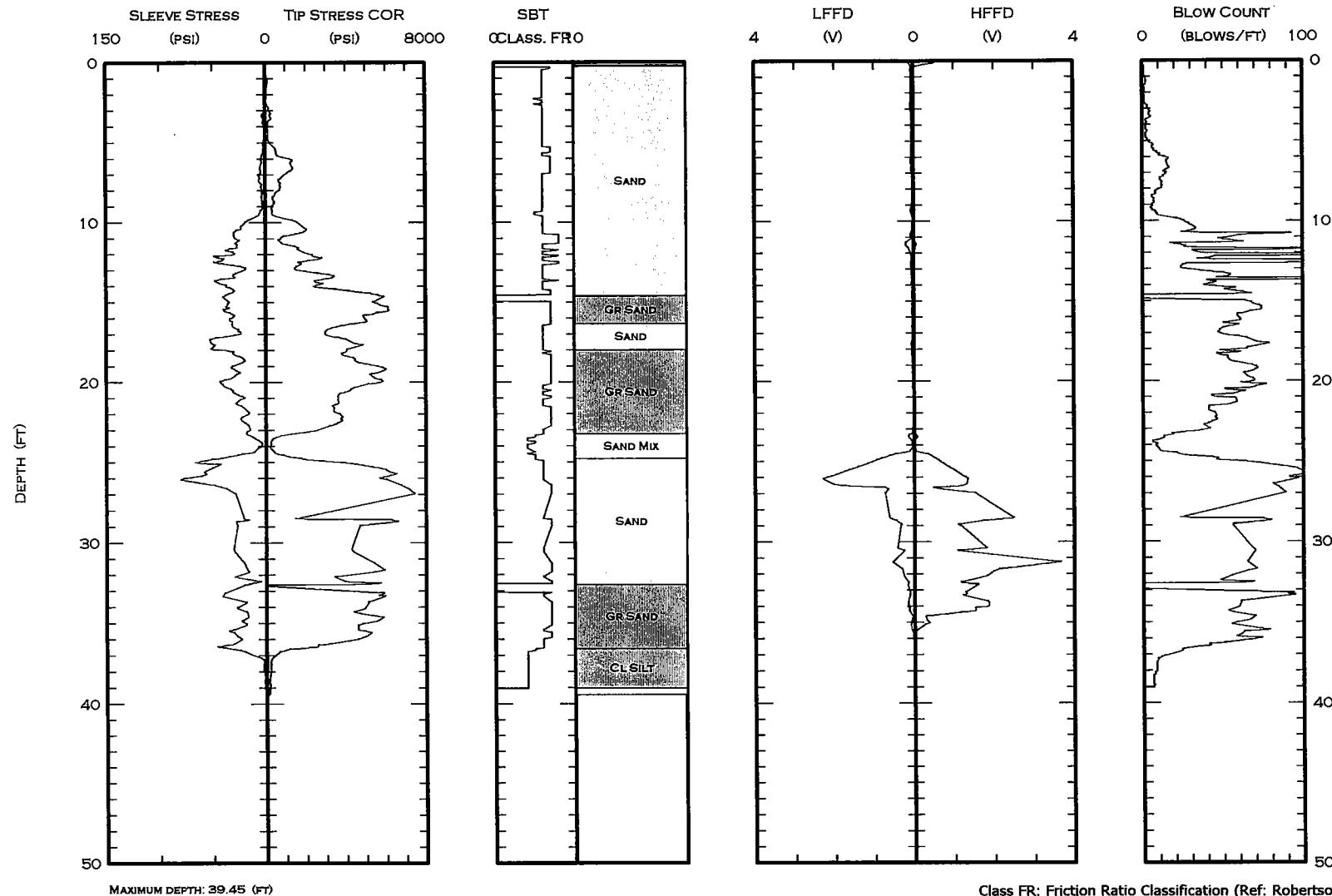
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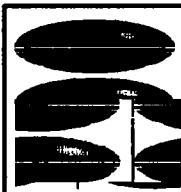
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Elevation:
Client: Sun
Site: Sunoco Belmont Refinery

Date: 28/Aug/2000
Test ID: CPT-5
Project: PhilSun



 <p>Handex Farmingdale, NY 11735 (631)-752-7878 Email: JManix@Handexmail.com http://www.Handex.com</p>	<p>Northing: Easting: Elevation: Client: Sun Site: Sunnoco Belmont Refinery</p>	<p>Date: 28/Aug/2000 Test ID: CPT-6 Project: PhilSun</p>
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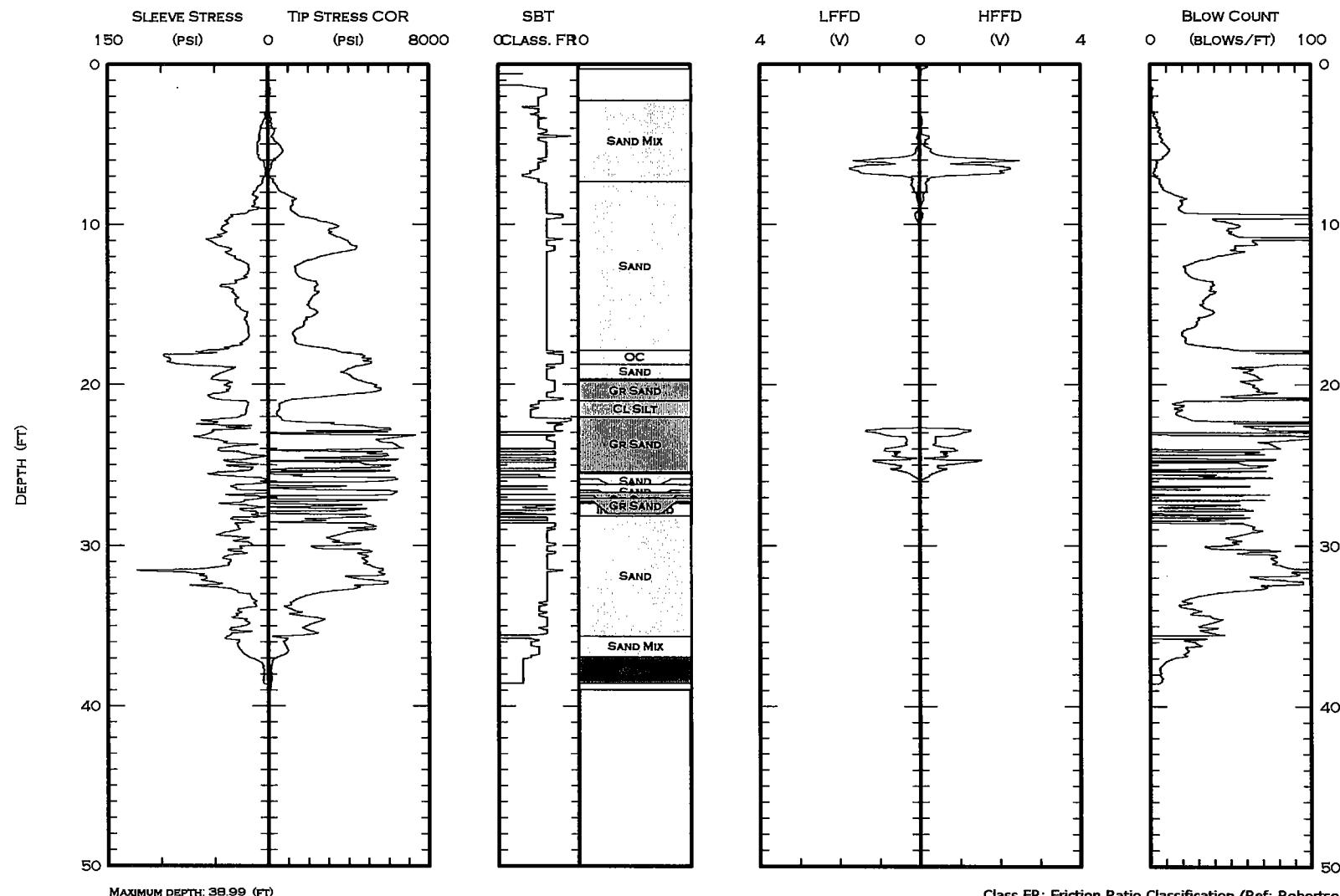


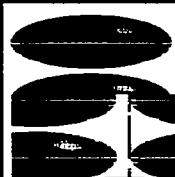


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<http://www.Handex.com>

Northing:
Easting:
Elevation:
Client: Sun
Site: Sunnoco Belmont Refinery

Date: 29/Aug/2000
Test ID: CPT-7
Project: PhilSun



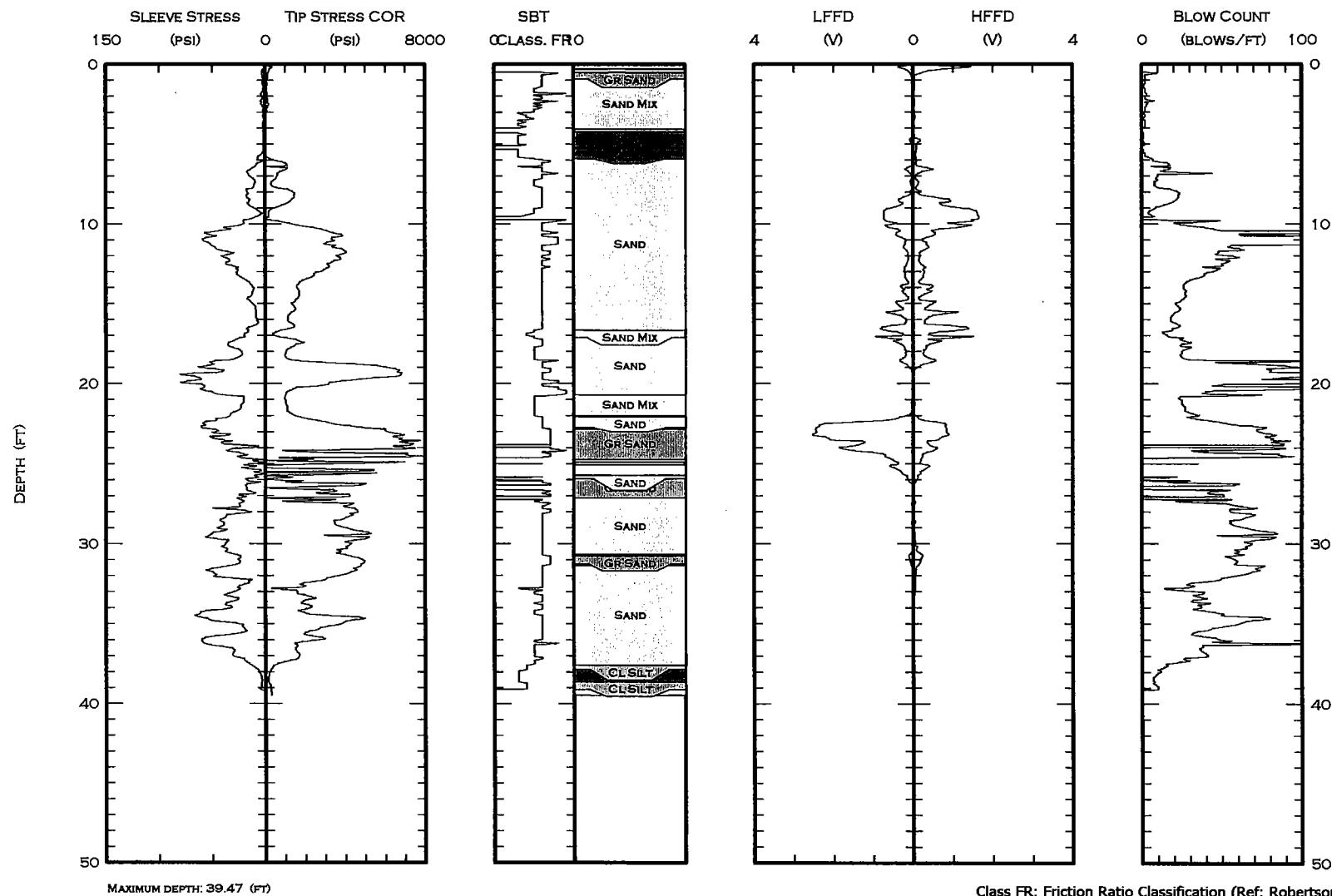


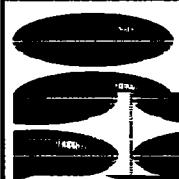
Handex
Farmingdale, NY 11735
(631)-752-7878
Email: JMannix@Handexmail.com
<http://www.Handex.com>

Northing:
Easting:
Elevation:

Date: 29/Aug/2000
Test ID: CPT-8
Project: PhilSun

Client: Sun
Site: Sunoco Belmont Refinery

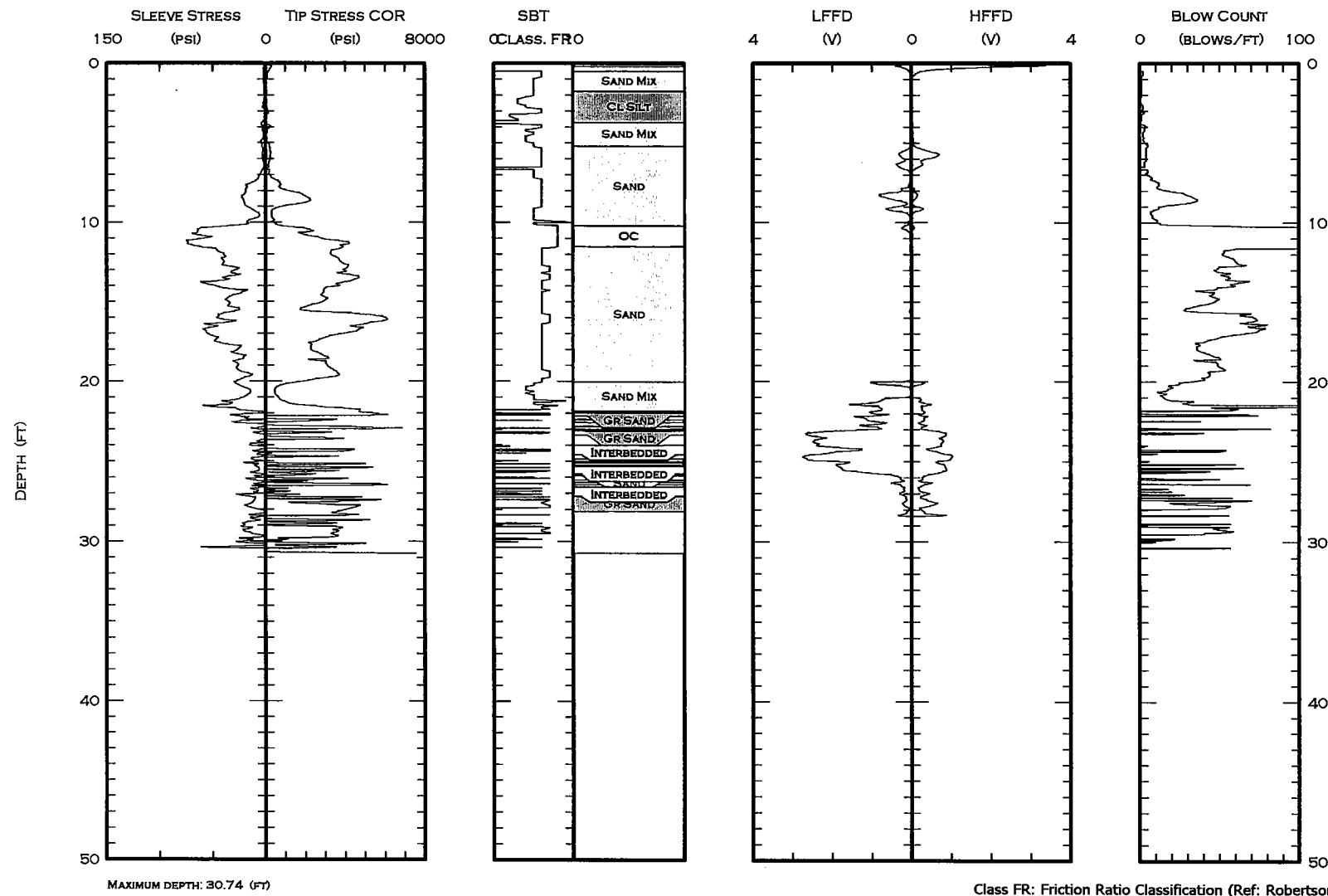


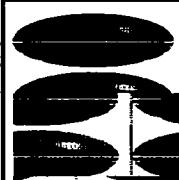


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Farmingdale, NY 11735
(631)-752-7878
Email: JMannix@Handexmail.com
<http://www.Handex.com>

Northing:
Easting:
Elevation:
Client: Sun
Site: Sunoco Belmont Refinery

Date: 29/Aug/2000
Test ID: CPT-9
Project: PhilSun

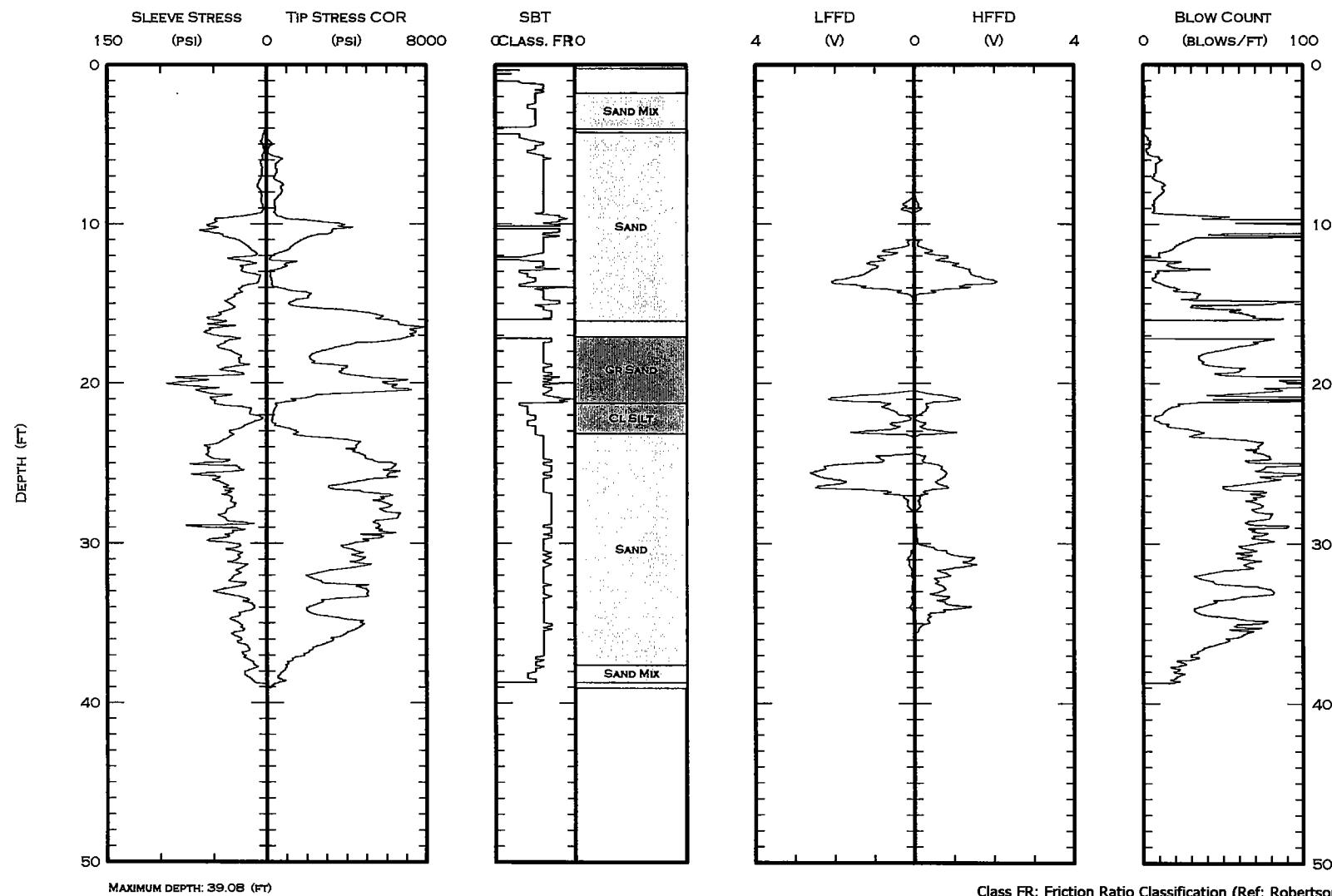


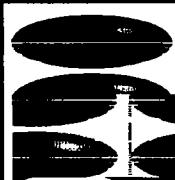


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Farmingdale, NY 11735
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Email: JManix@Handexmail.com
<http://www.Handex.com>

Northing:
Easting:
Elevation:
Client: Sun
Site: Sunnoco Belmont Refinery

Date: 28/Aug/2000
Test ID: CPT-10
Project: PhilSun

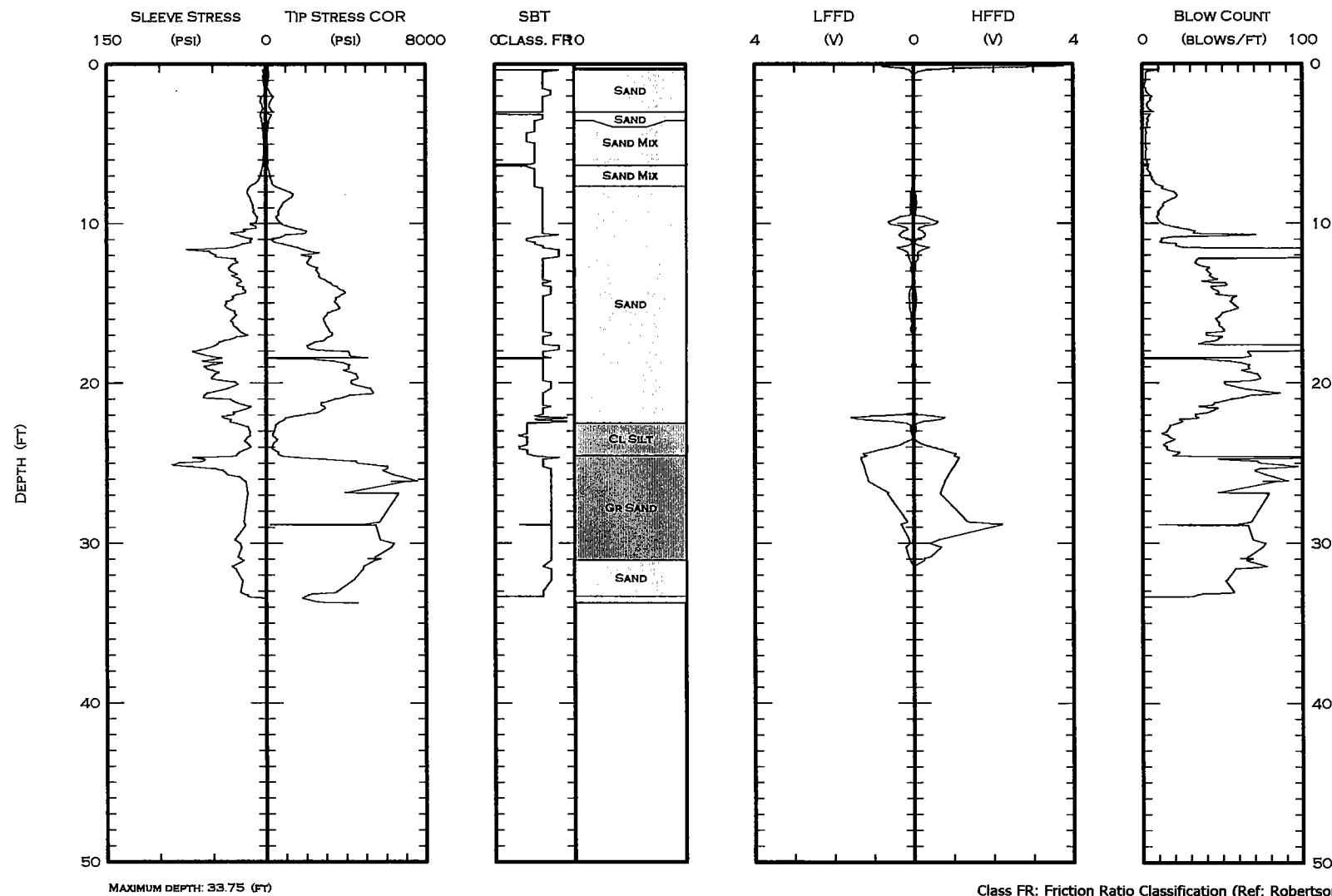


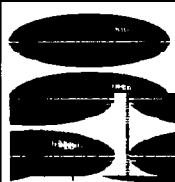


Handex
Farmingdale, NY 11735
(631)-752-7878
Email: JMannix@Handexmail.com
<http://www.Handex.com>

Northing:
Easting:
Elevation:
Client: Sun
Site: Sunnoco Belmont Refinery

Date: 28/Aug/2000
Test ID: CPT-11
Project: PhilSun

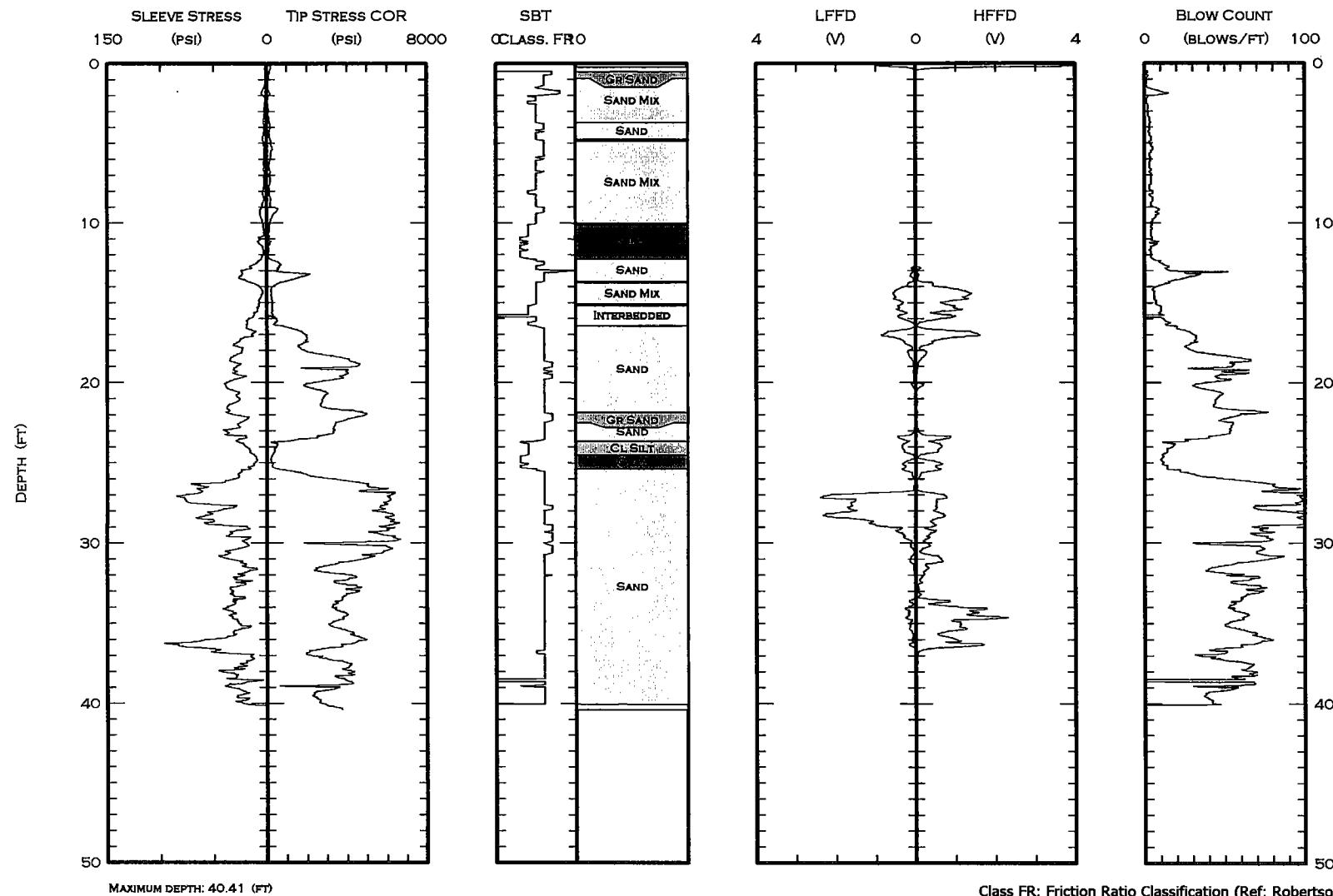


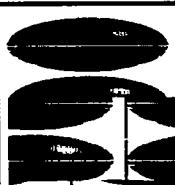


Handex
Farmingdale, NY 11735
(631)-752-7878
Email: JMannix@Handexmail.com
<http://www.Handex.com>

Northing:
Easting:
Elevation:
Client: Sun
Site: Sunoco Belmont Refinery

Date: 29/Aug/2000
Test ID: CPT-12
Project: PhilSun

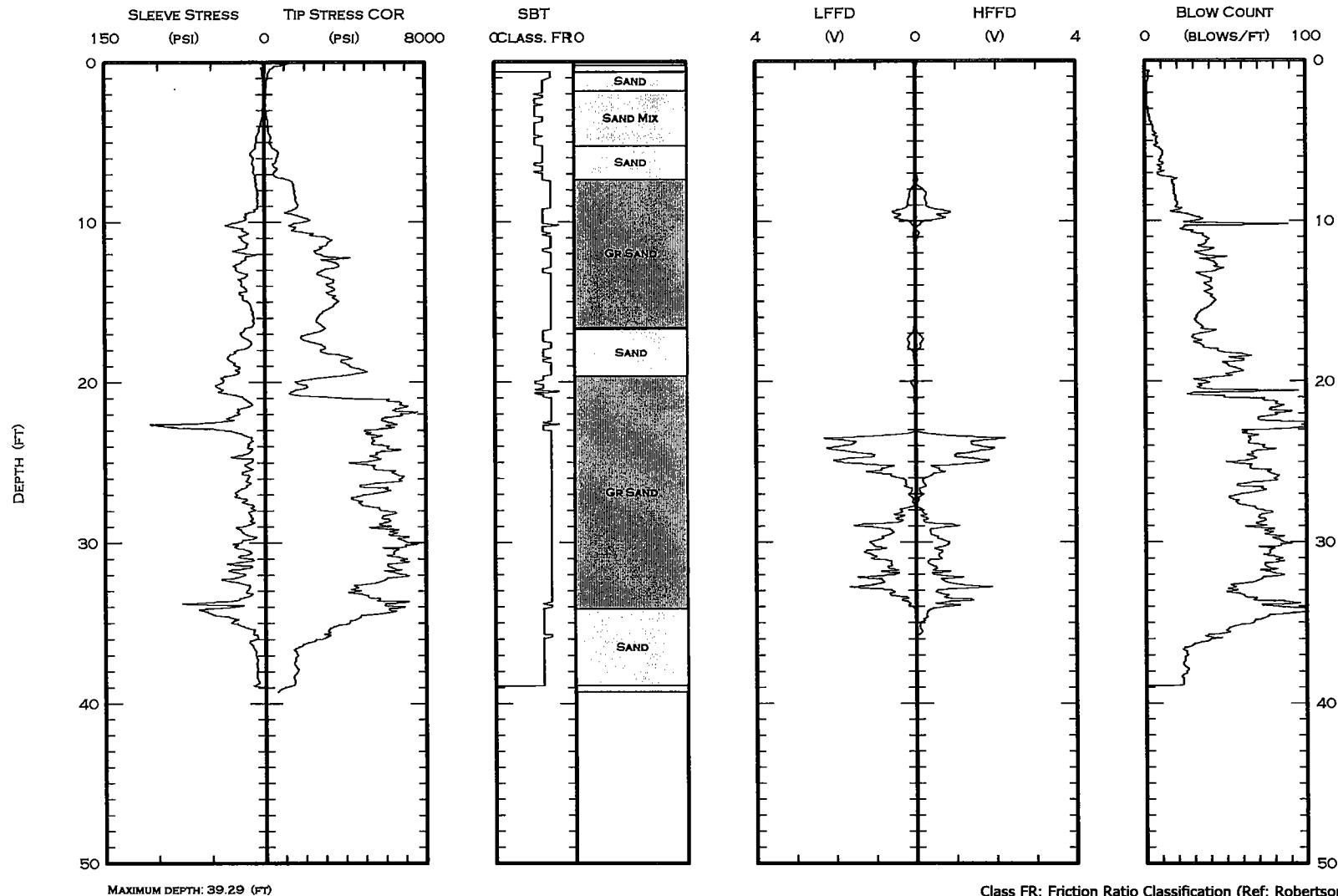


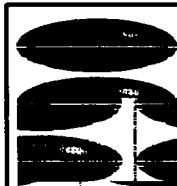


Handex
Farmingdale, NY 11735
(631)-752-7878
Email: JMannix@Handexmail.com
<http://www.Handex.com>

Northing:
Easting:
Elevation:
Client: Sun
Site: Sunoco Belmont Refinery

Date: 30/Aug/2000
Test ID: CPT-13
Project: PhilSun





Handex
Farmingdale, NY 11735
(631)-752-7878
Email: JMannix@Handexmail.com
<http://www.Handex.com>

Northing:

Easting:

Elevation:

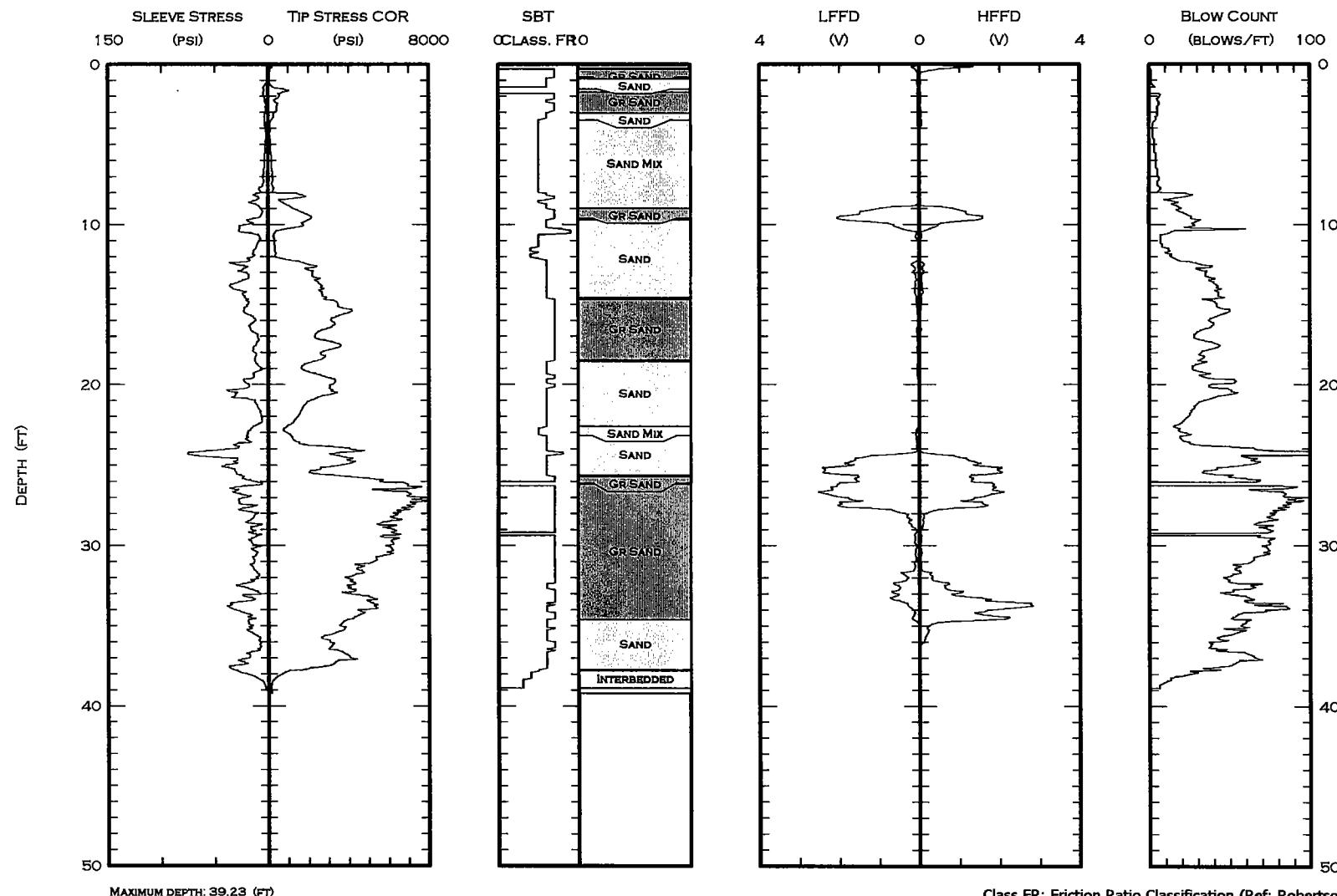
Date: 30/Aug/2000

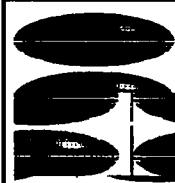
Test ID: CPT-14

Project: PhilSun

Client: Sun

Site: Sunoco Belmont Refinery

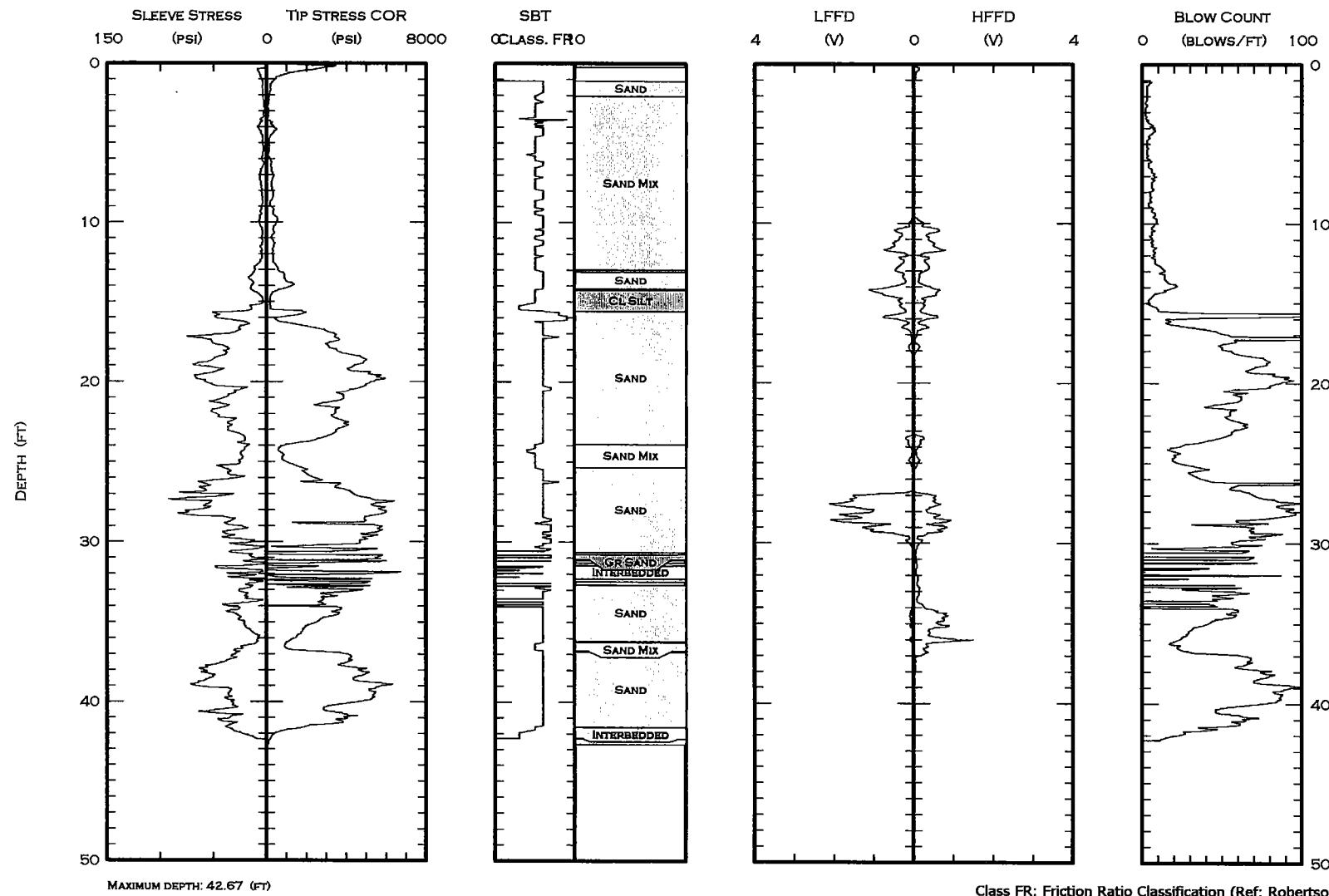


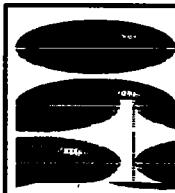


Handex
Farmingdale, NY 11735
(631)-752-7878
Email: JMannix@Handexmail.com
<http://www.Handex.com>

Northing:
Easting:
Elevation:
Client: Sun
Site: Sunnoco Belmont Refinery

Date: 29/Aug/2000
Test ID: CPT-15
Project: PhilSun

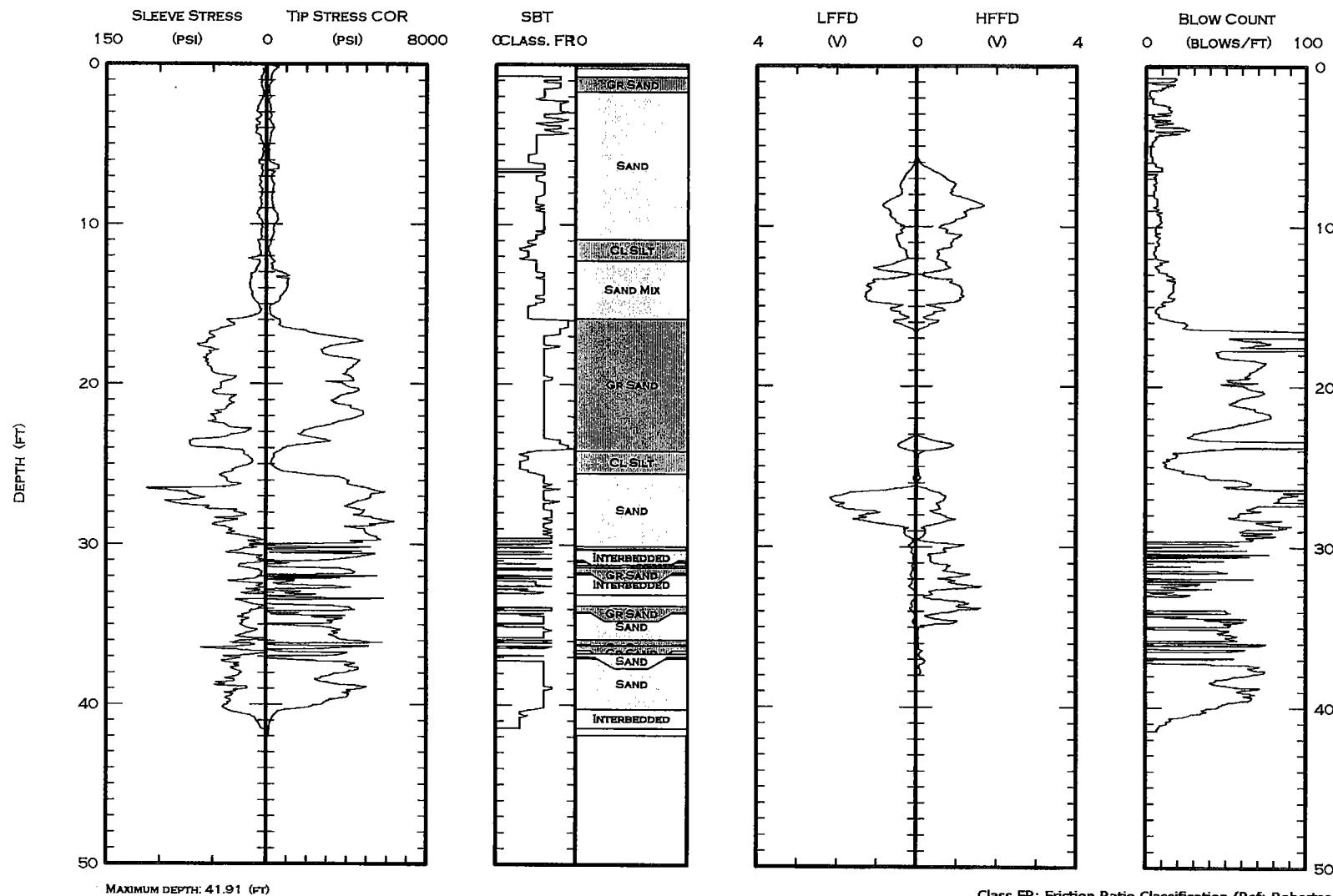


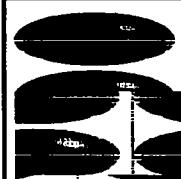


Handex
Farmingdale, NY 11735
(631)-752-7878
Email: JMannix@Handexmail.com
<http://www.Handex.com>

Northing:
Easting:
Elevation:
Client: Sun
Site: Sunnoco Belmont Refinery

Date: 29/Aug/2000
Test ID: CPT-16
Project: PhilSun

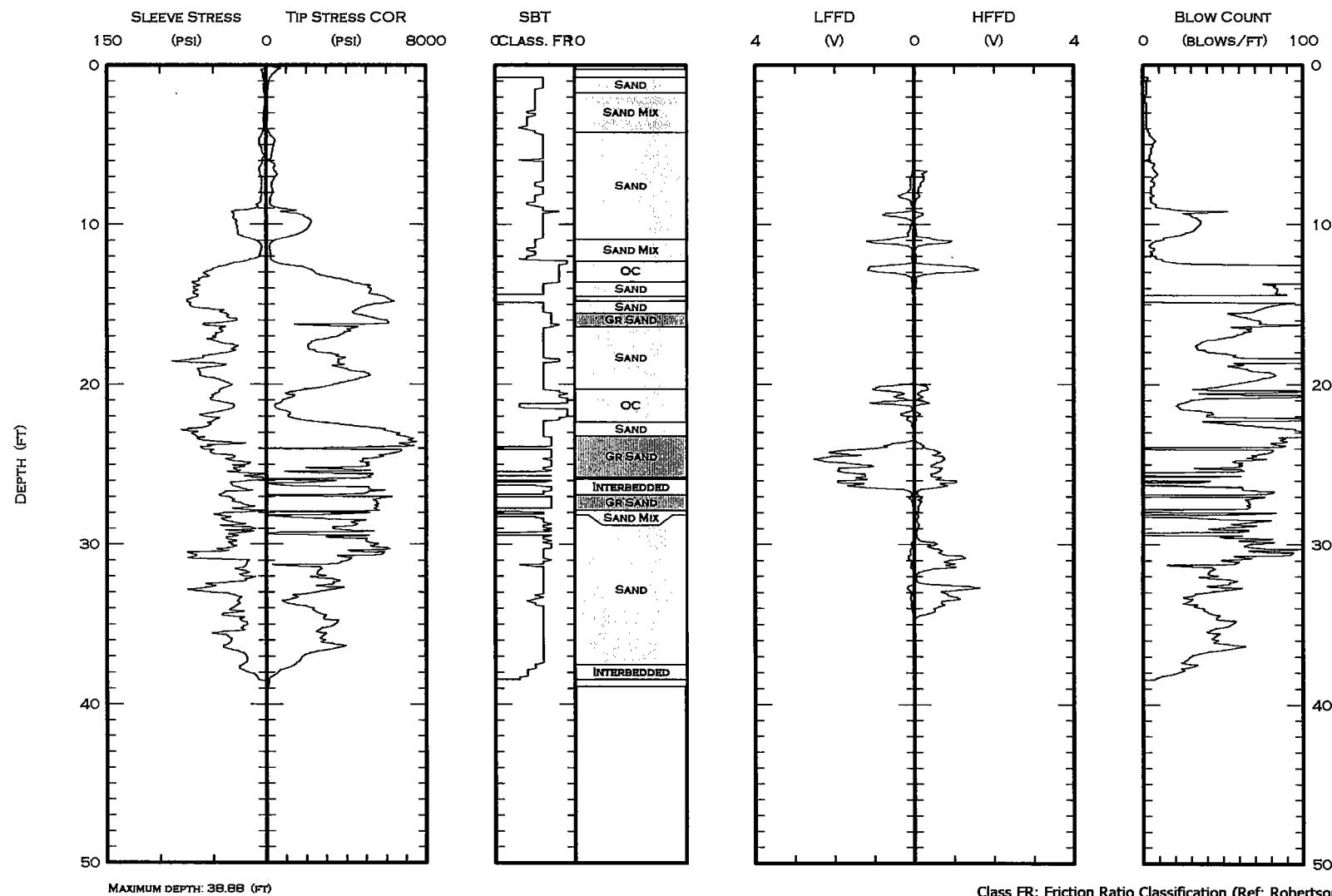


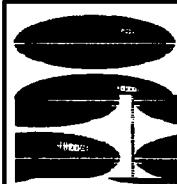


Handex
Farmingdale, NY 11735
(631)-752-7878
Email: JMannix@Handexmail.com
<http://www.Handex.com>

Northing:
Easting:
Elevation:
Client: Sun
Site: Sunnoco Belmont Refinery

Date: 29/Aug/2000
Test ID: CPT-17
Project: PhilSun

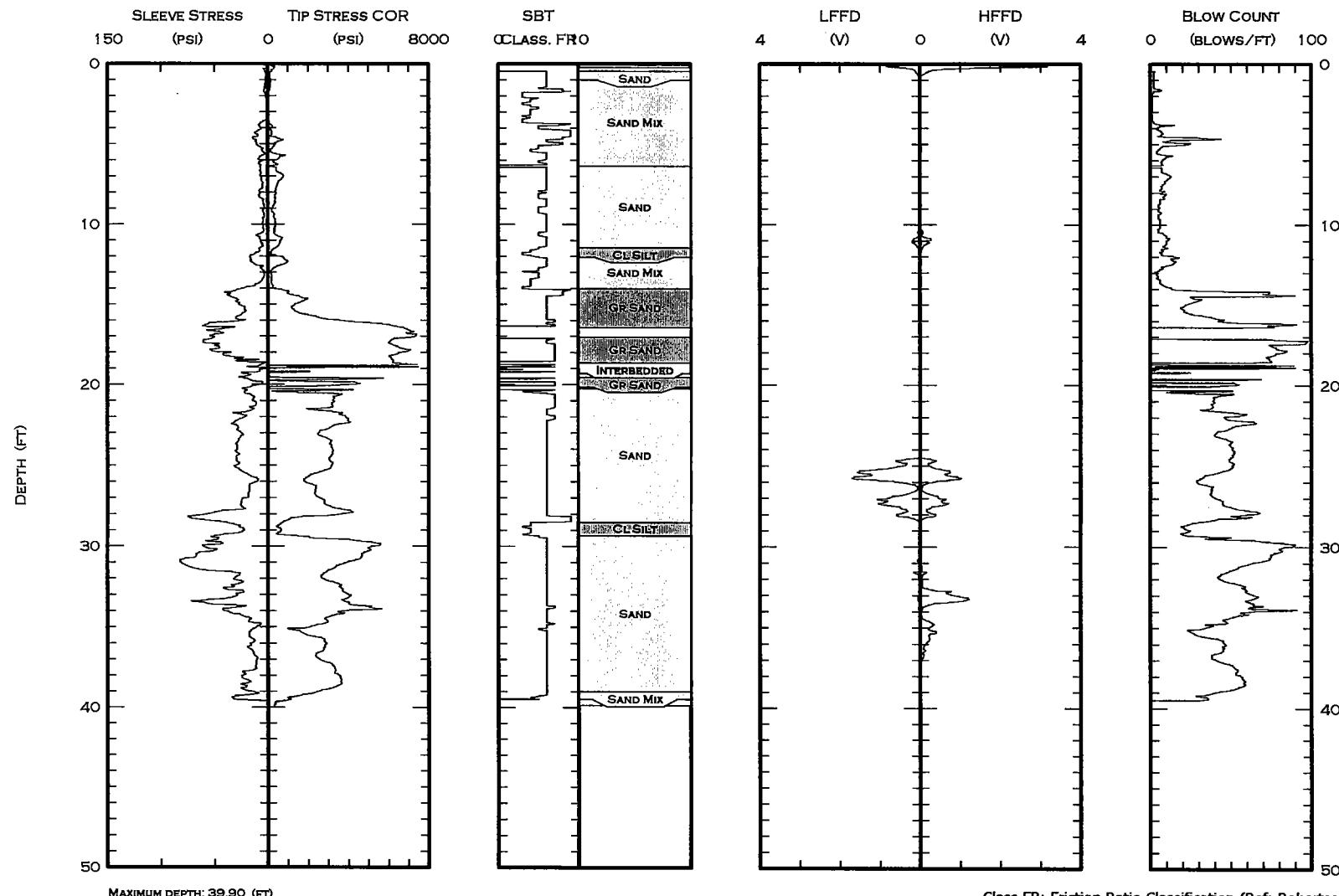


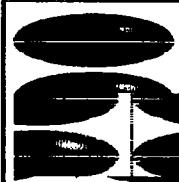


Handex
Farmingdale, NY 11735
(631)-752-7878
Email: JMannix@Handexmail.com
<http://www.Handex.com>

Northing:
Easting:
Elevation:
Client: Sun
Site: Sunnoco Belmont Refinery

Date: 29/Aug/2000
Test ID: CPT-18
Project: PhilSun

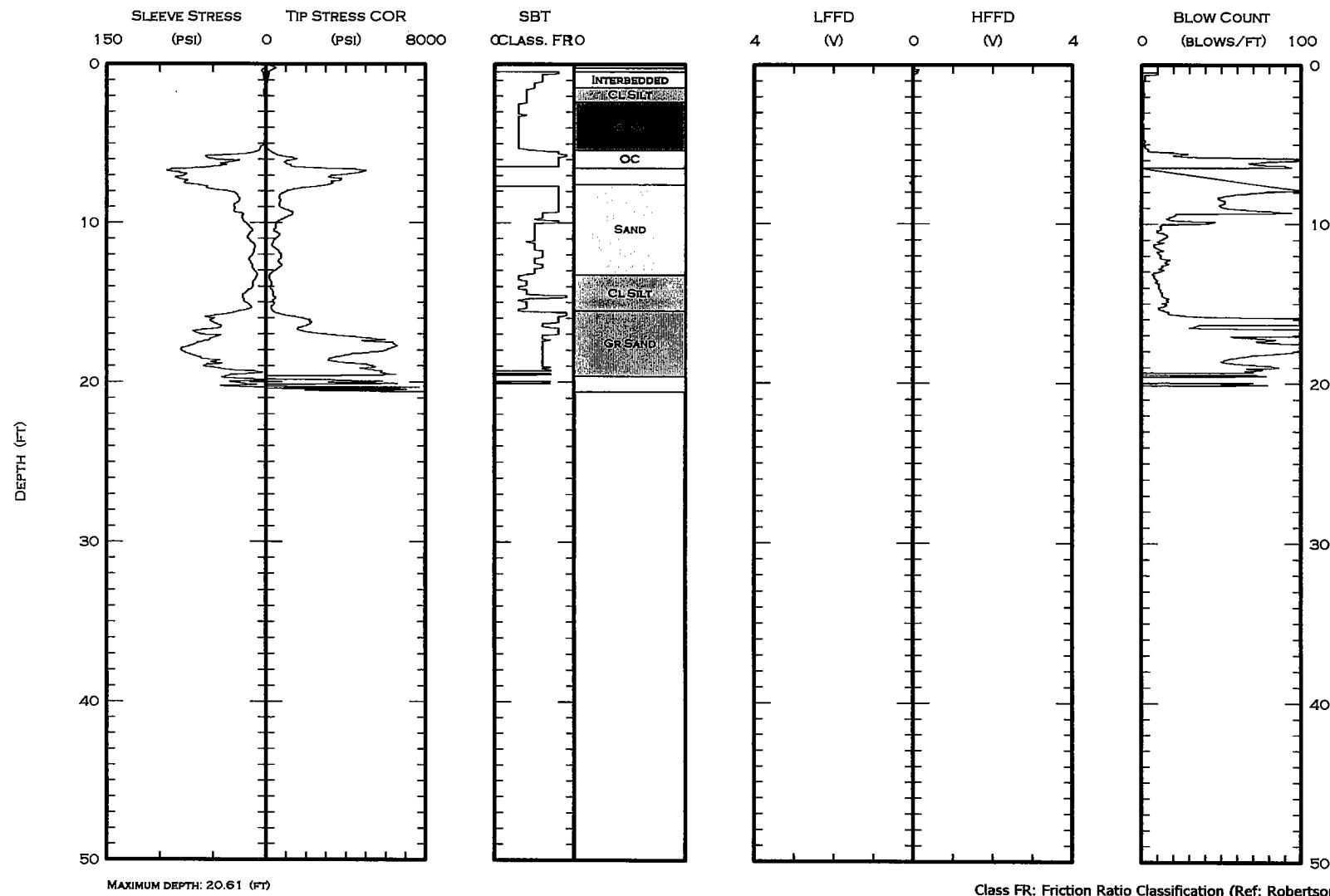


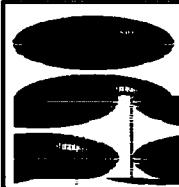


Handex
Farmingdale, NY 11735
(631)-752-7878
Email: JMannix@Handexmail.com
<http://www.Handex.com>

Northing:
Easting:
Elevation:
Client: Sun
Site: Sunoco Belmont Refinery

Date: 29/Aug/2000
Test ID: CPT-19
Project: PhilSun

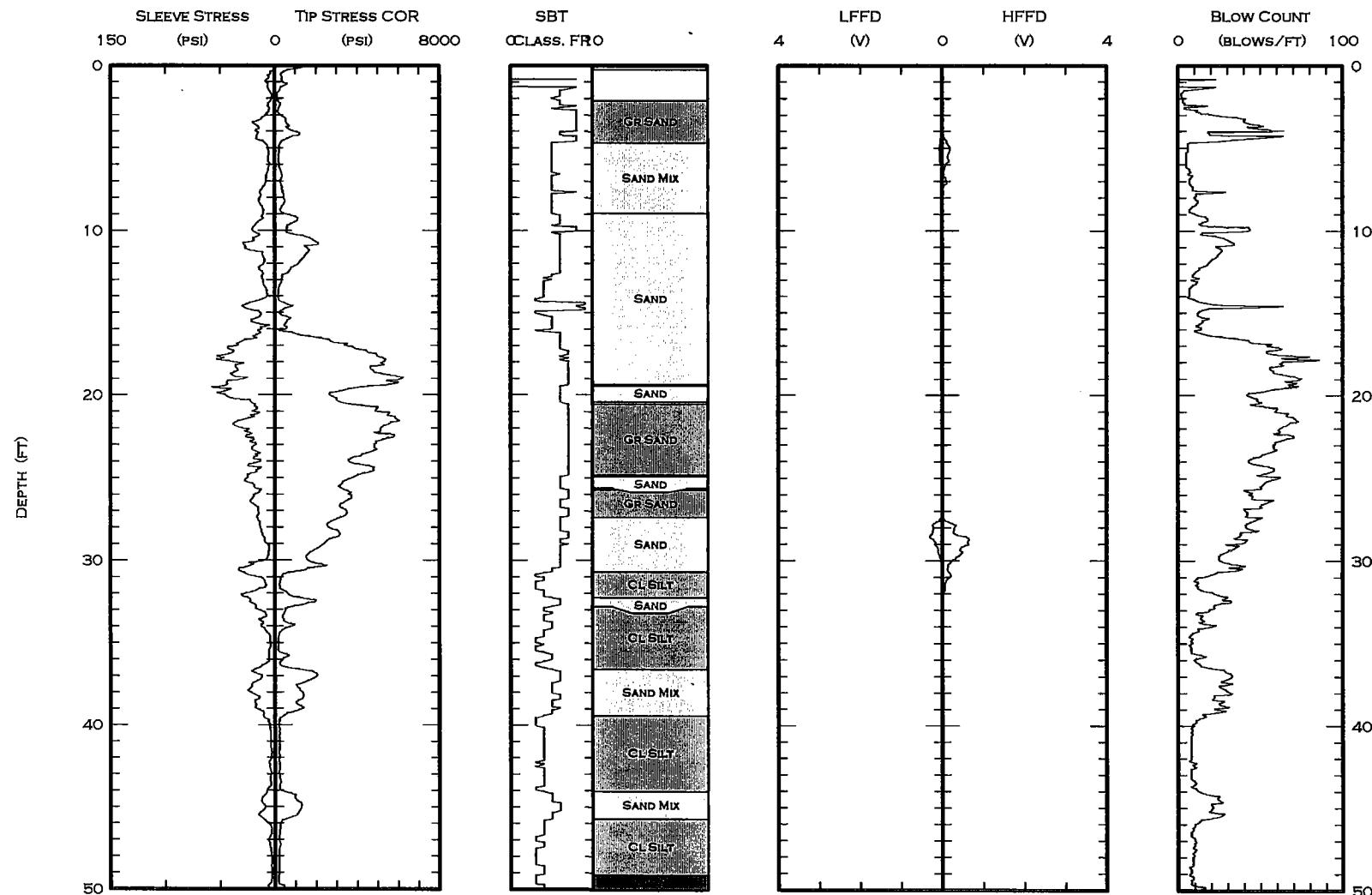




Handex
Farmingdale, NY 11735
(631)-752-7878
Email: JMannix@Handexmail.com
<http://www.Handex.com>

Northing:
Easting:
Elevation:
Client: Sun
Site: Sunnoco Belmont Refinery

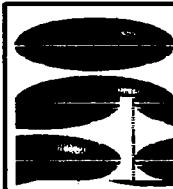
Date: 30/Aug/2000
Test ID: CPT-20
Project: PhilSun



MAXIMUM DEPTH: 52.45 (FT)

PAGE 1 OF 2

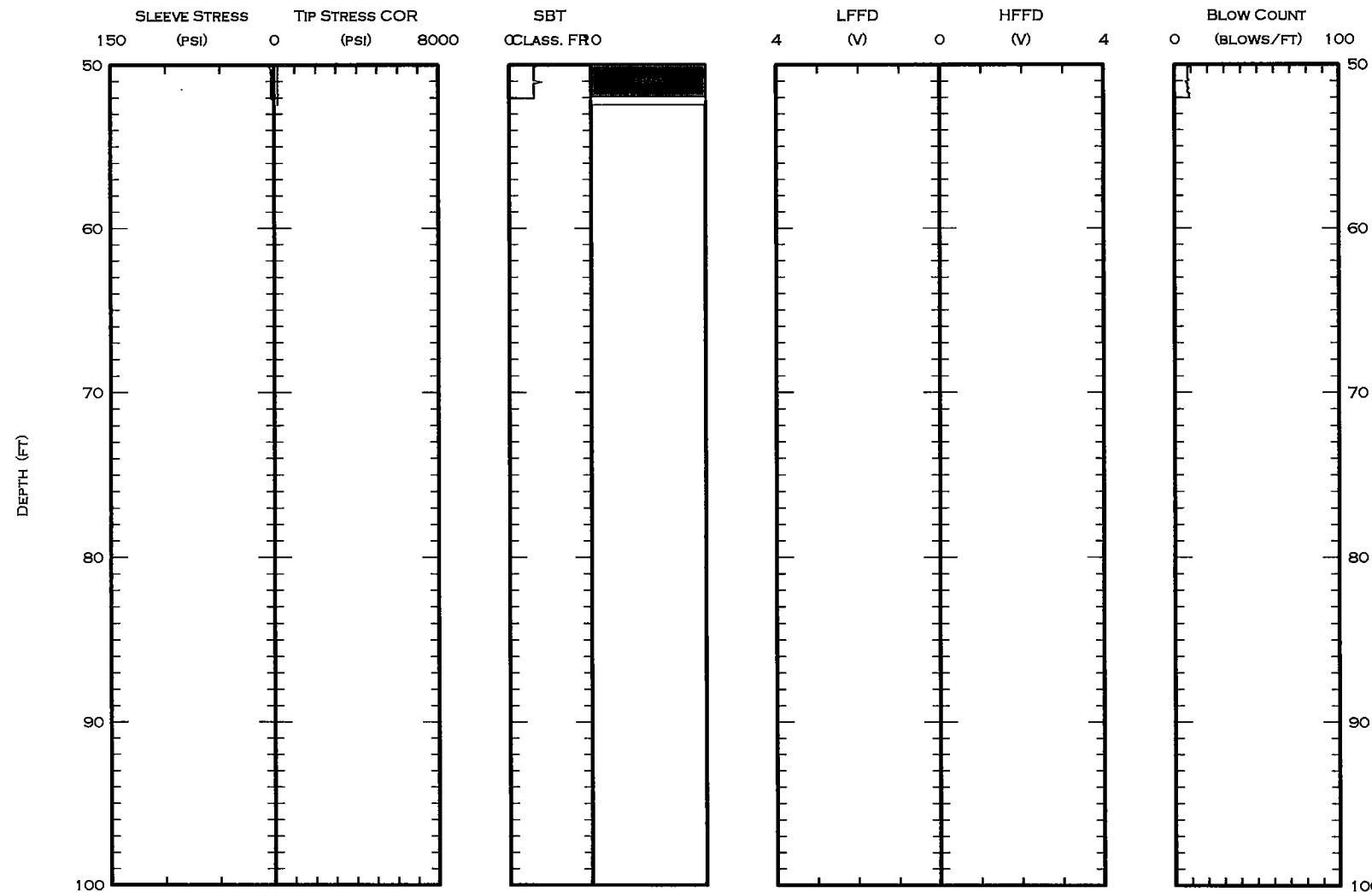
Class FR: Friction Ratio Classification (Ref: Robertson 1990)



Handex
Farmingdale, NY 11735
(631)-752-7878
Email: JManix@Handexmail.com
<http://www.Handex.com>

Northing:
Easting:
Elevation:
Date: 30/Aug/2000
Test ID: CPT-20
Project: PhilSun

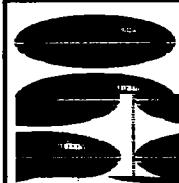
Client: Sun
Site: Sunoco Belmont Refinery



MAXIMUM DEPTH: 52.45 (FT)

PAGE 2 OF 2

Class FR: Friction Ratio Classification (Ref: Robertson 1990)



Handex
Farmingdale, NY 11735
(631)-752-7878
Email: JMannix@Handexmail.com
<http://www.Handex.com>

Northing:

Easting:

Elevation:

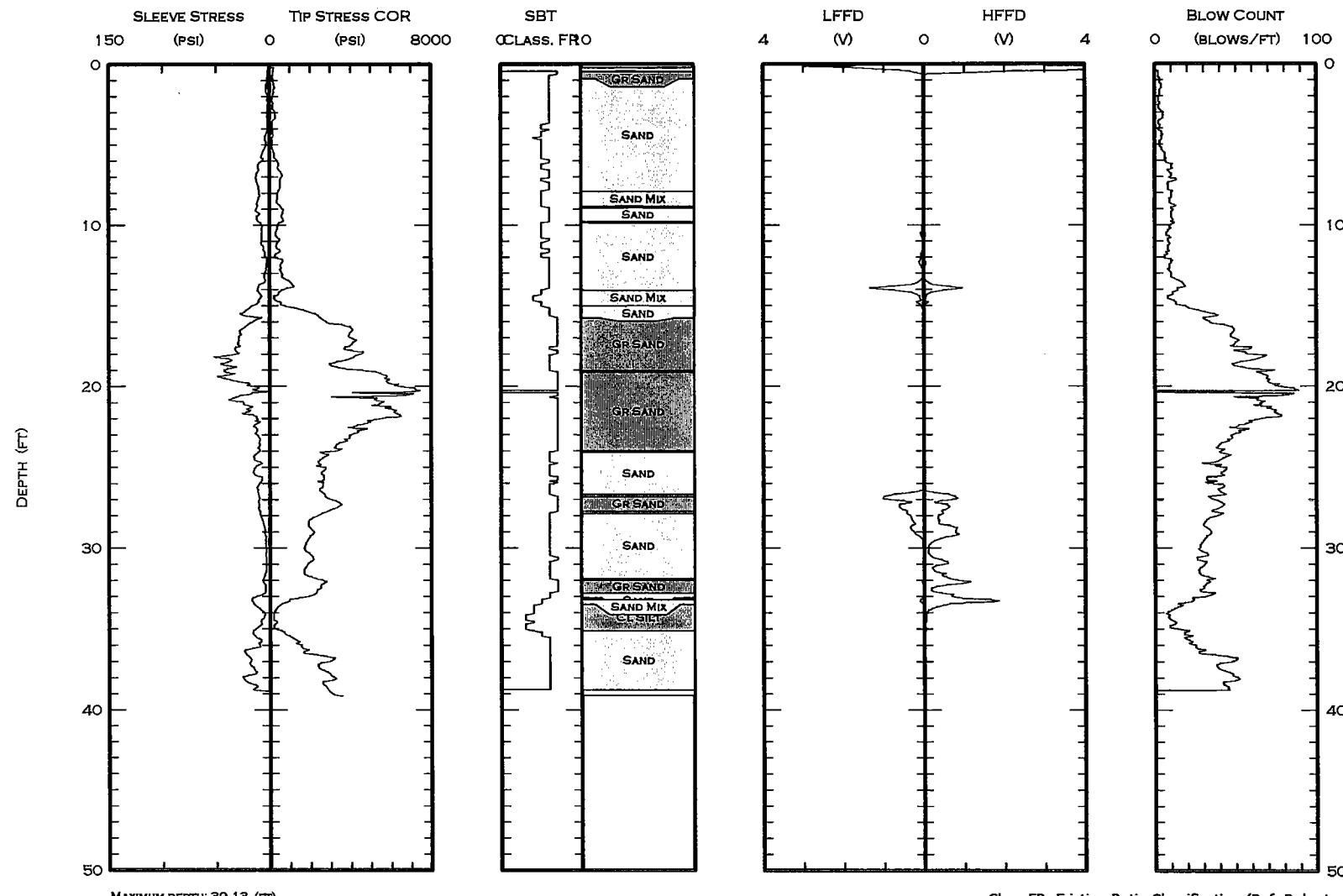
Date: 30/Aug/2000

Test ID: CPT-21

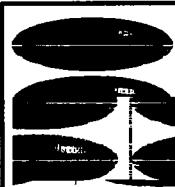
Project: PhilSun

Client: Sun

Site: Sunnoco Belmont Refinery



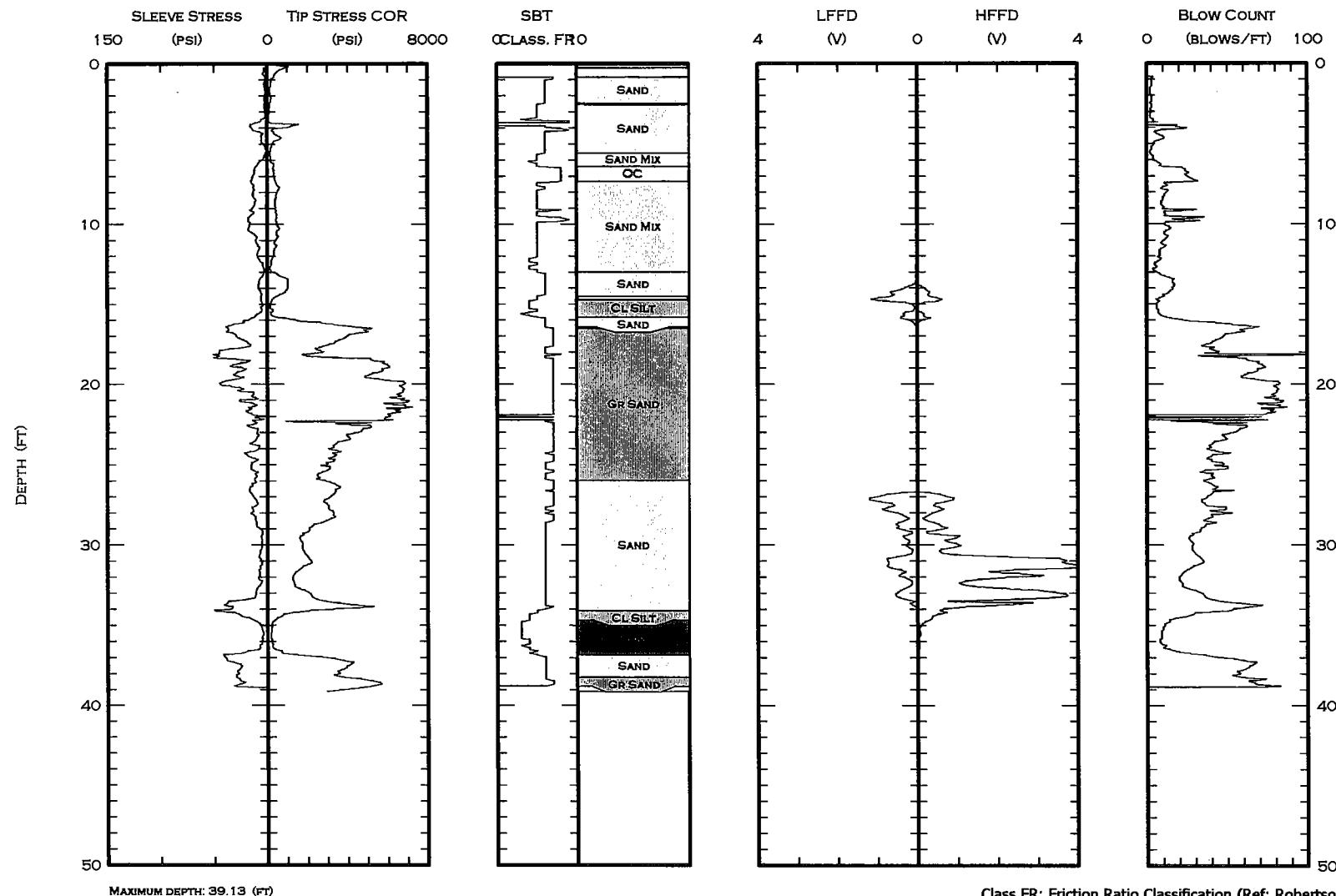
Class FR: Friction Ratio Classification (Ref: Robertson 1990)



Handex
Farmingdale, NY 11735
(631)-752-7878
Email: JManix@Handexmail.com
<http://www.Handex.com>

Northing:
Easting:
Elevation:
Client: Sun
Site: Sunoco Belmont Refinery

Date: 30/Aug/2000
Test ID: CPT-22
Project: PhilSun

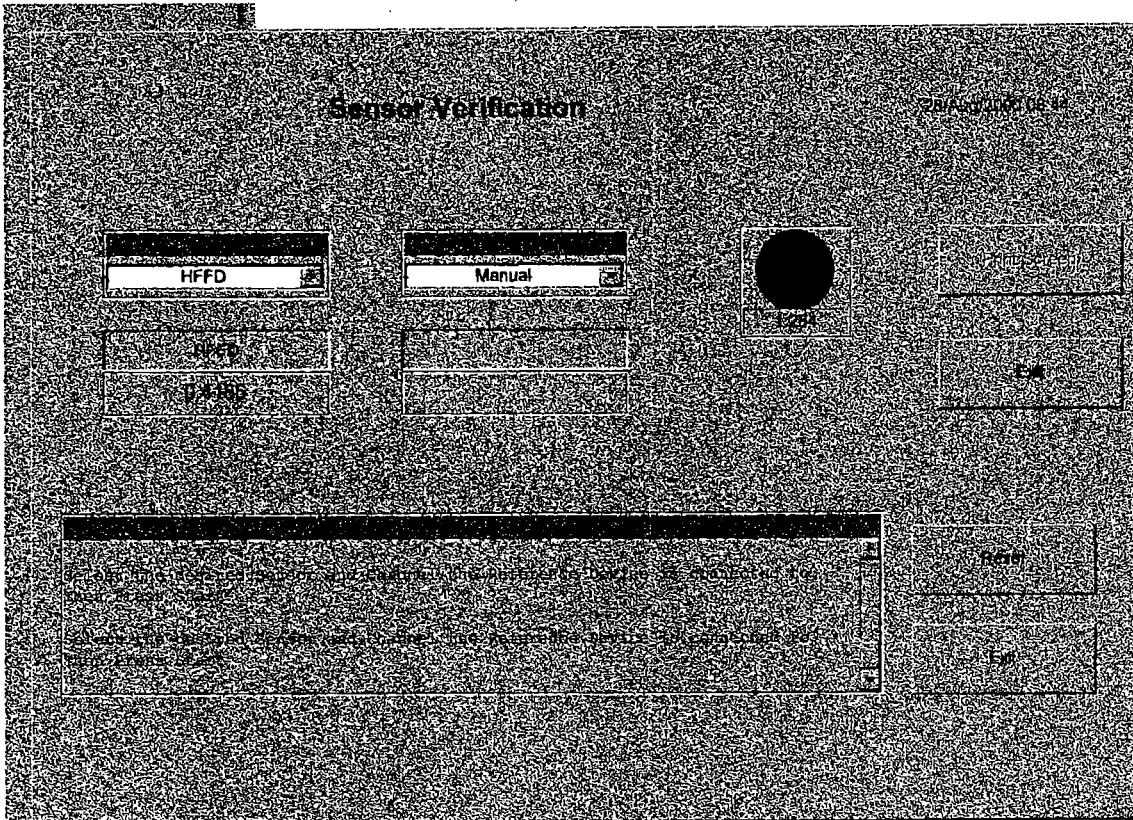


APPENDIX B

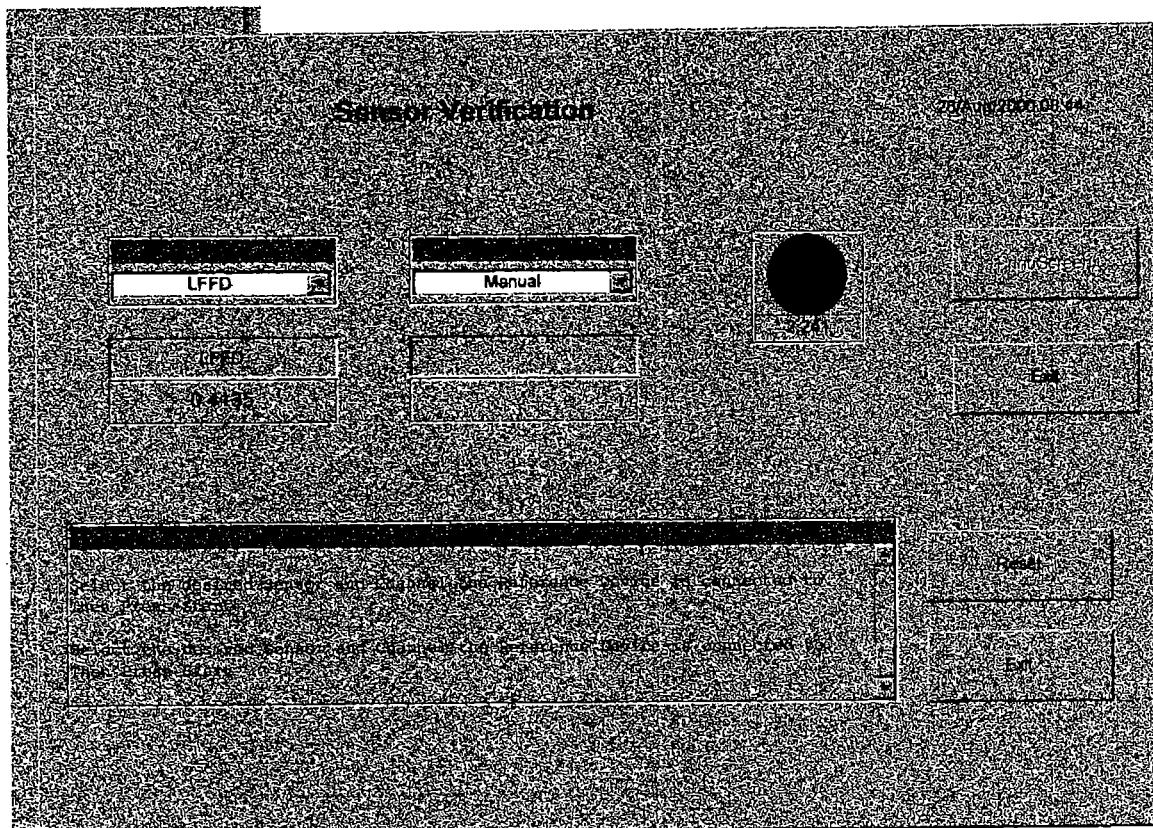
**SITE CALIBRATION DATA
(CPT/FFD MODULE)**

Mon 28/Aug/2000 09:05:42

1



Vertek Card #2



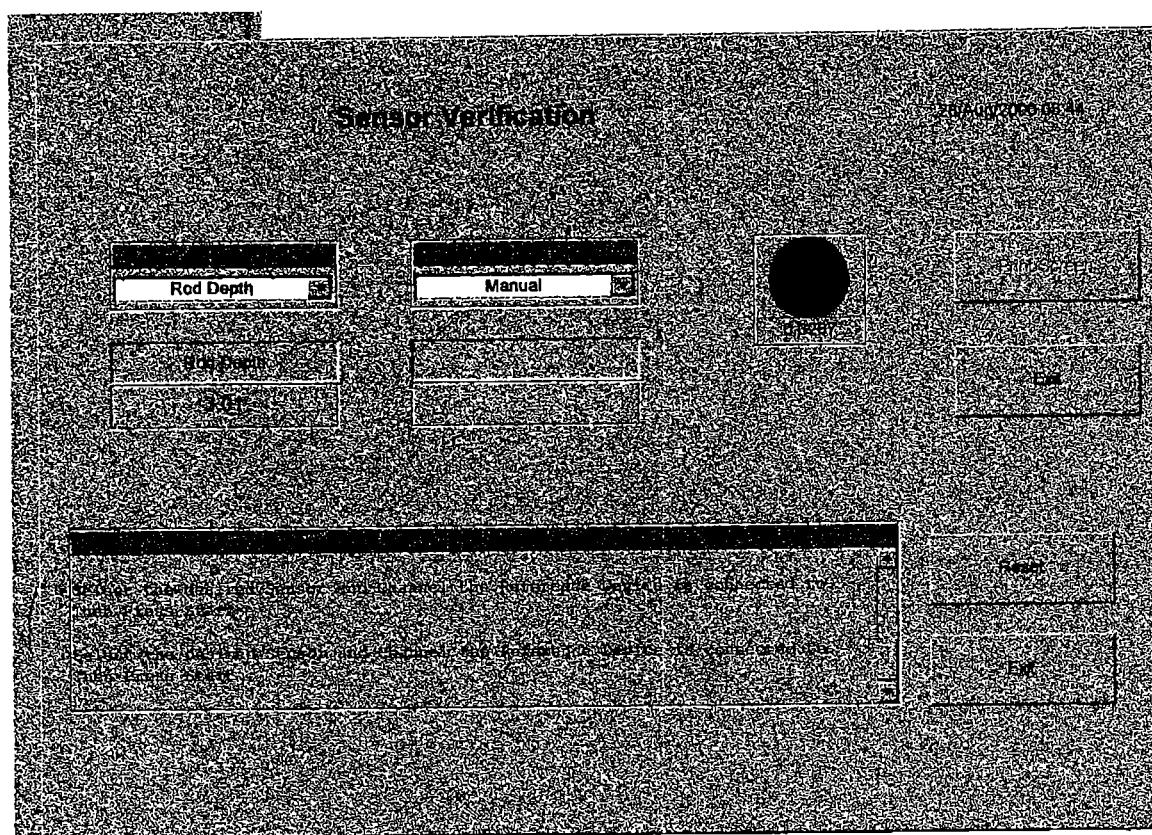
Vertek Card #2

09/28/2000 16:22 FAX 7045982248

Mon 28/Aug/2000 09:02:11

handex carolinas

003



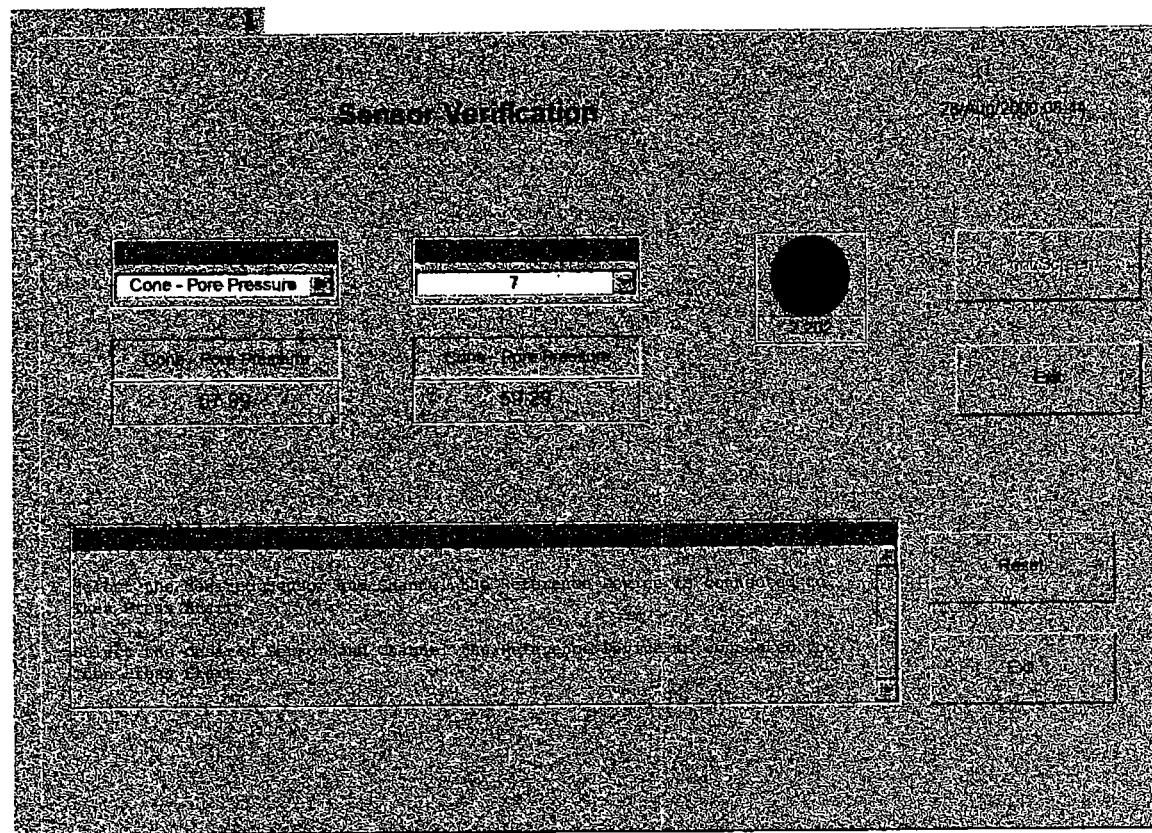
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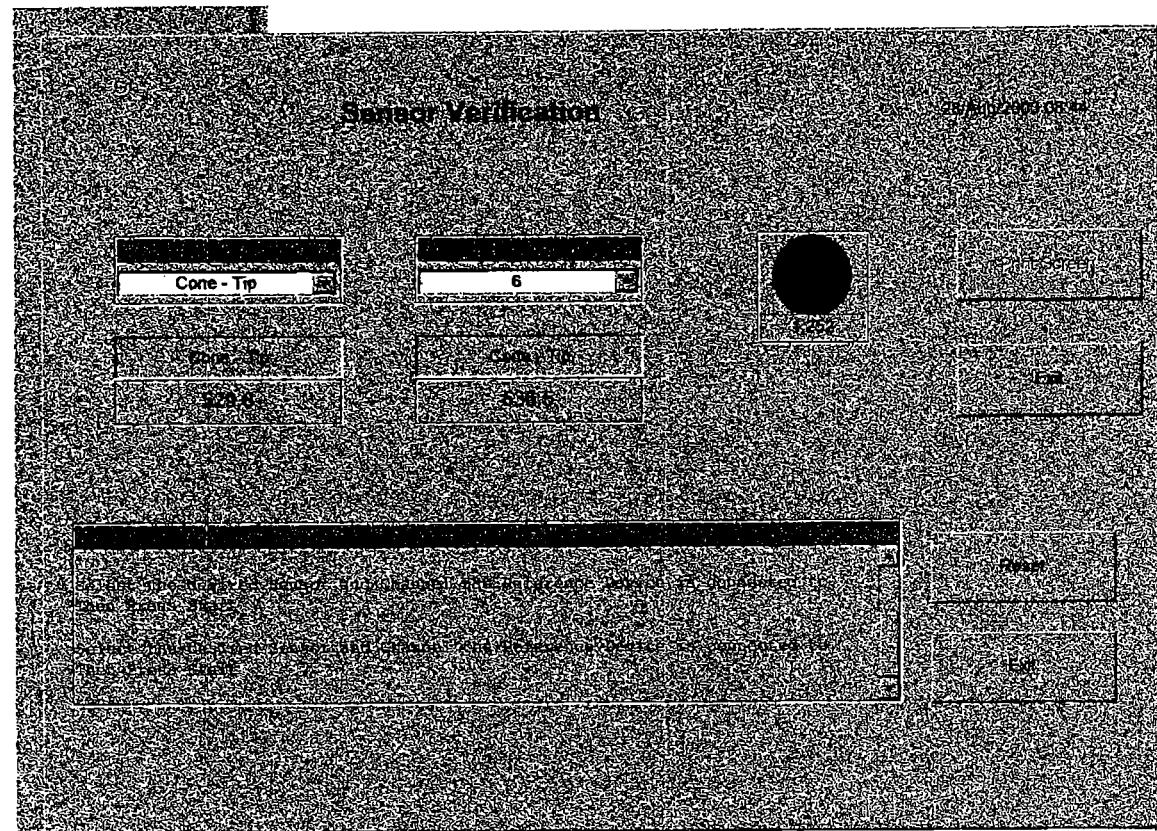
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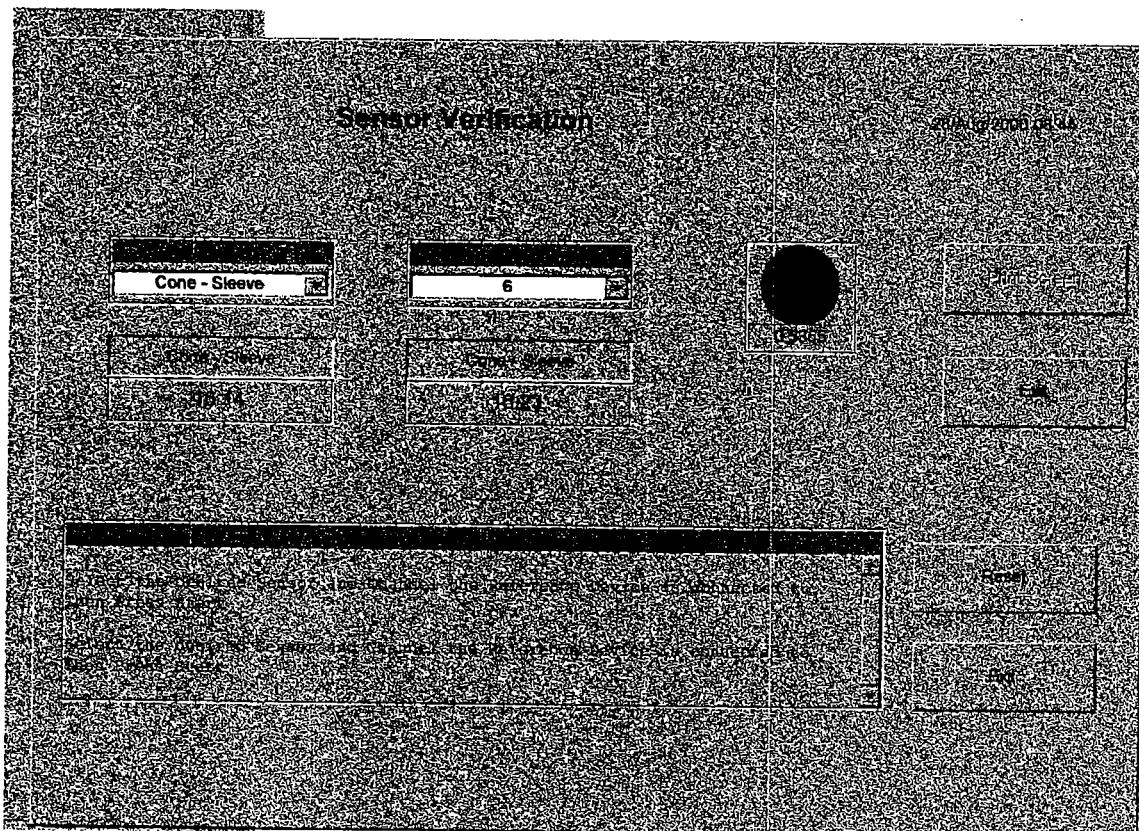
handex carolinas

004

1







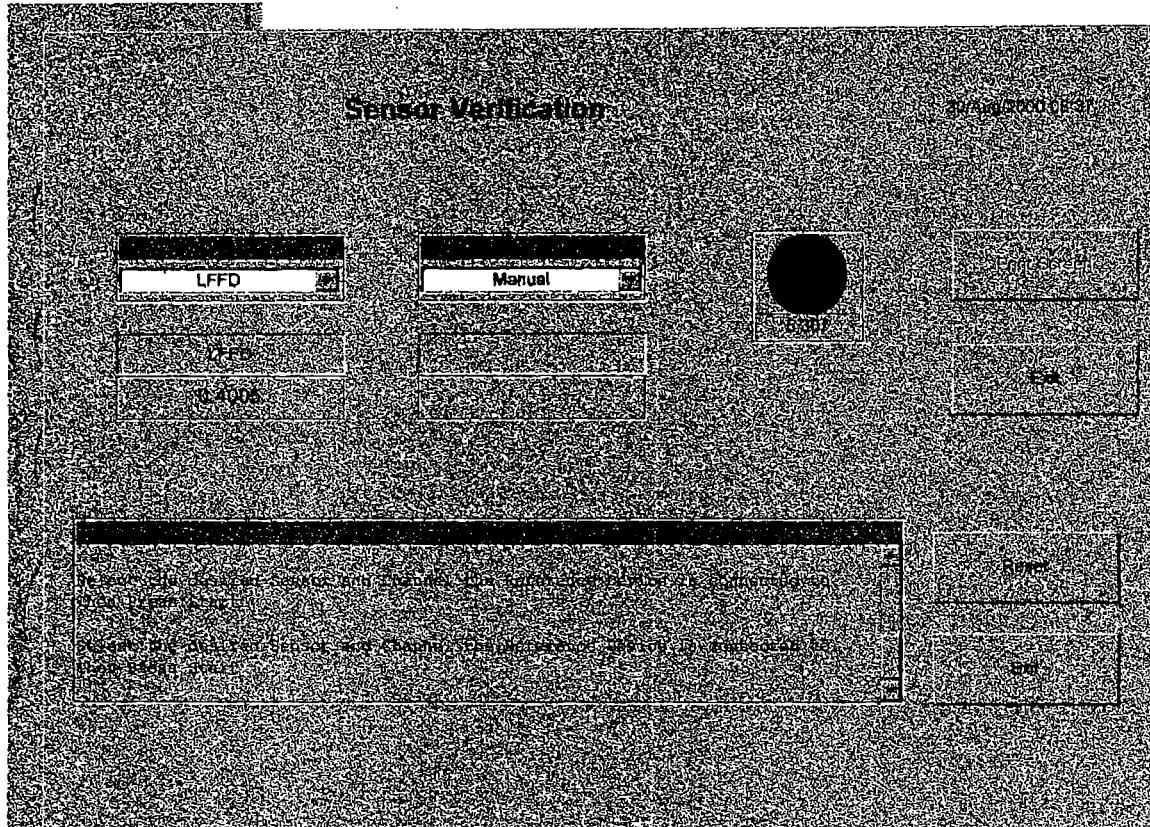
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handex carolinas

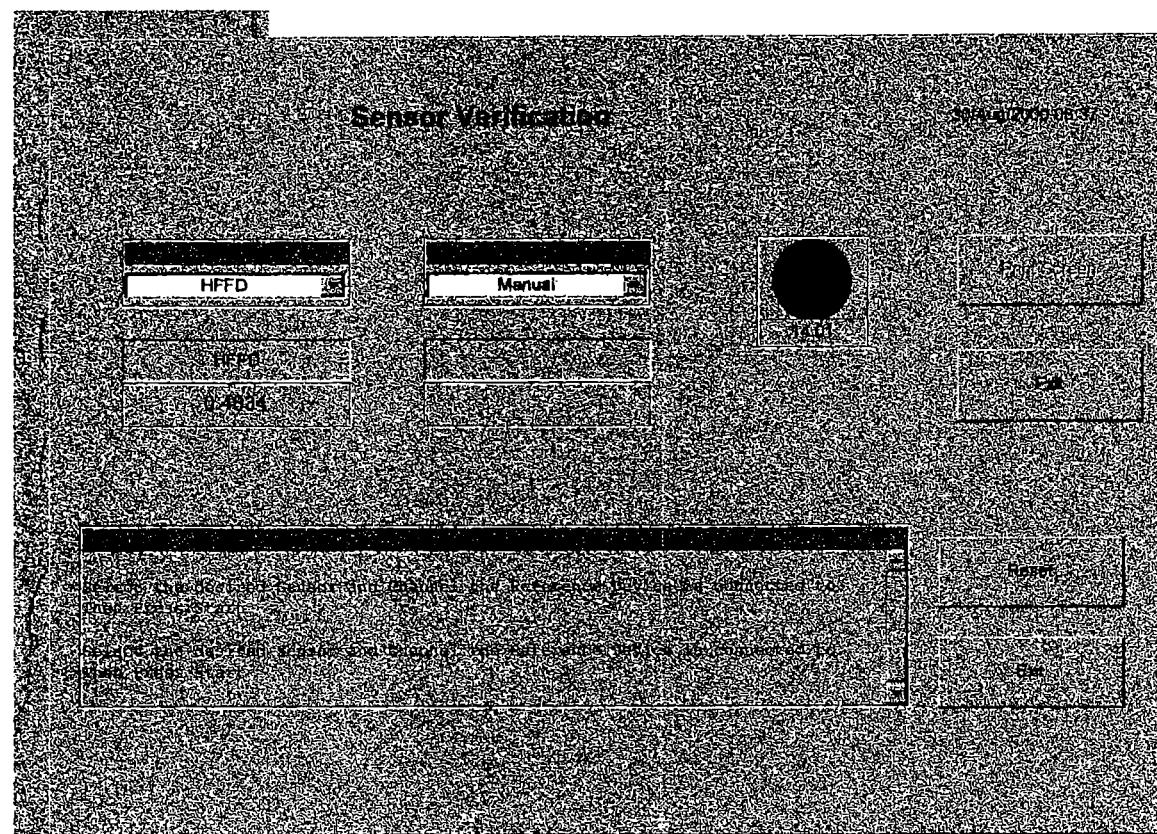
→ Odenton MD

001

Wed 30/Aug/2000 08:48:07



Vertek Calibration Card
2



09/28/2000 16:51 FAX 7045982248

handex carolinas

→ Odenton MD

003

Wed 30/Aug/2000 08:46:19

1

Serial Verification

Cone - Tip

6

100%

100%

100%

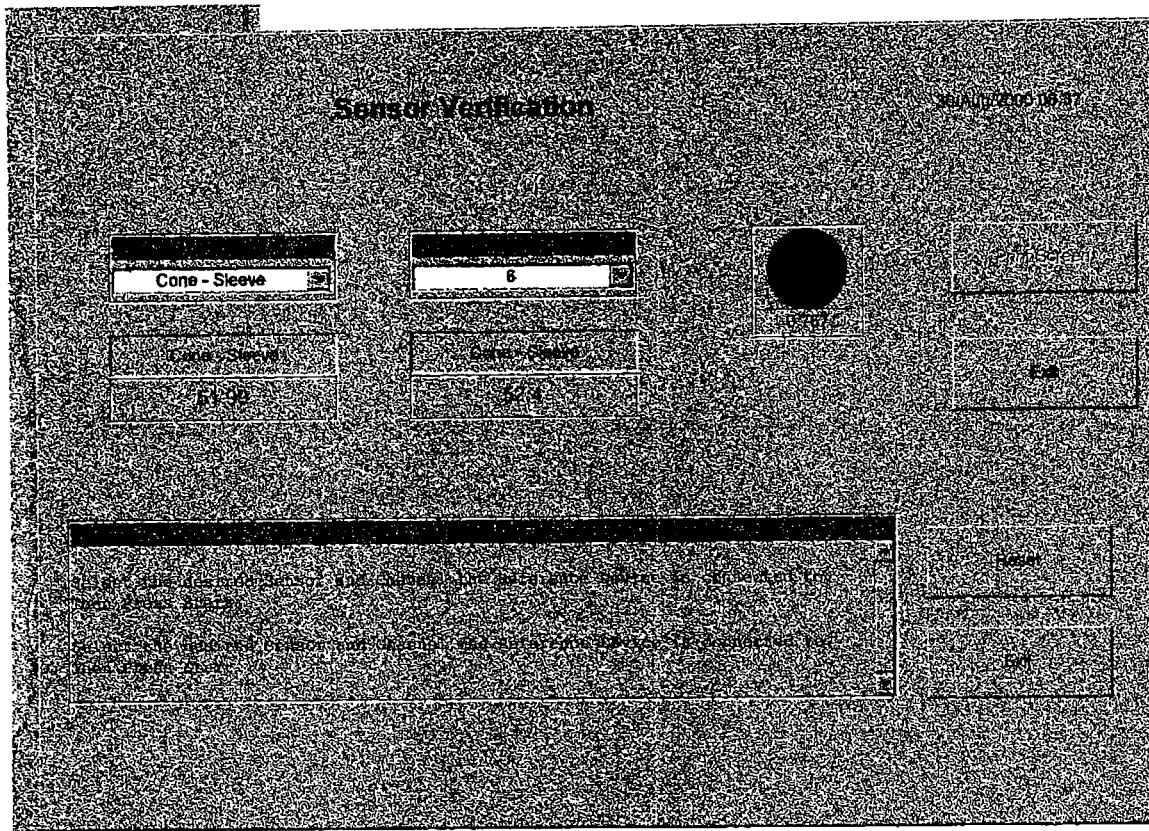
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handex carolinas

→ Odenton MD

4004

Wed 30/Aug/2000 08:38:16



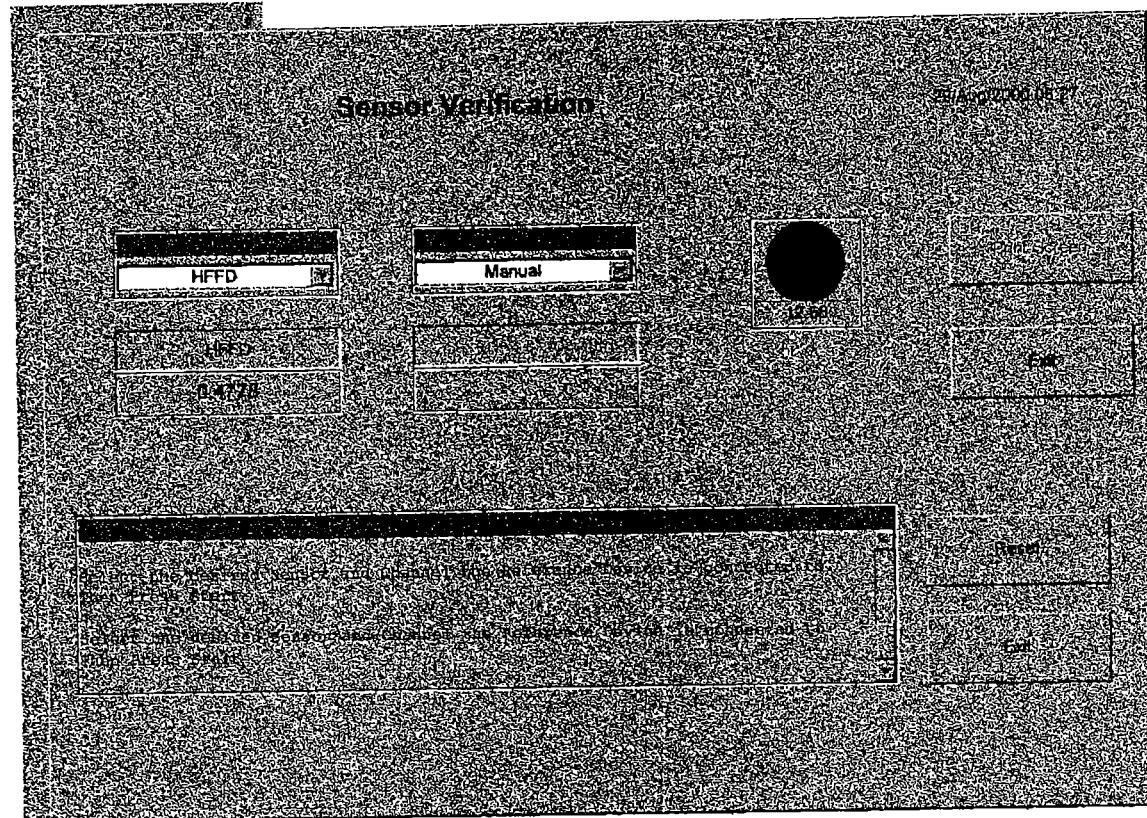
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handex carolinas

→ Odenton MD

011

Tue 28/Aug/2000 08:52:03



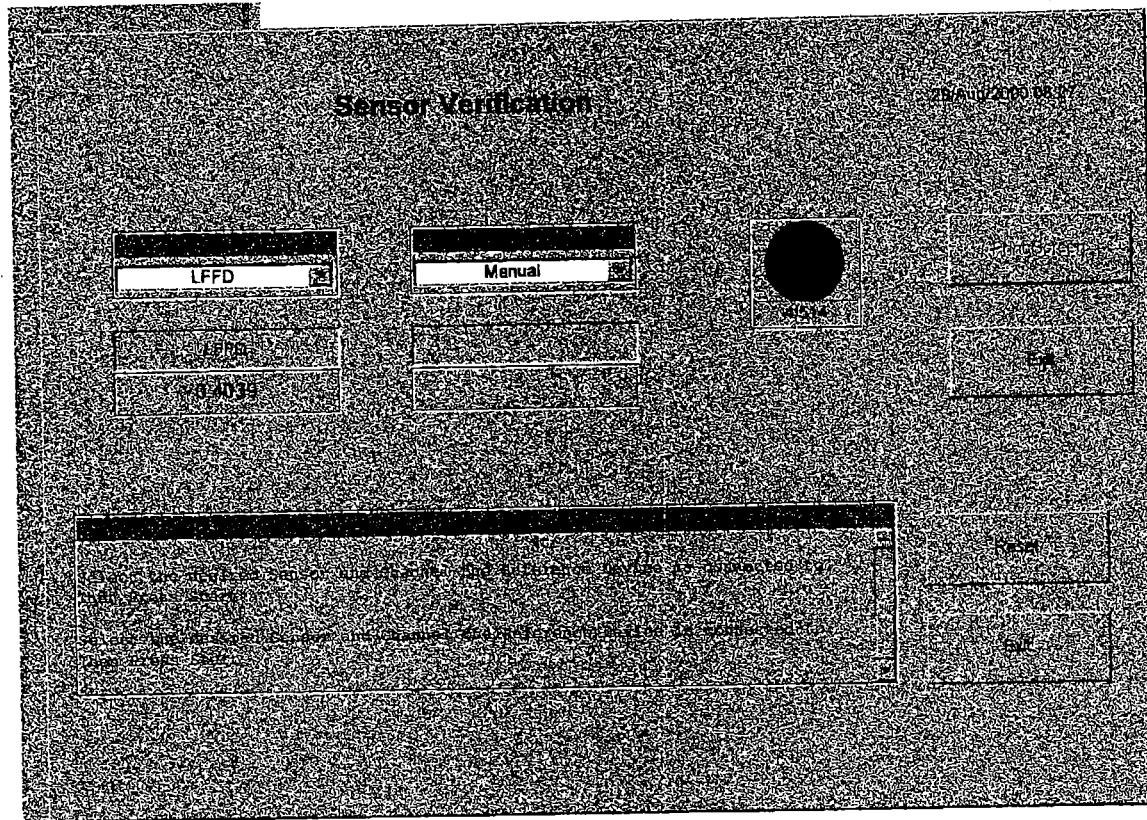
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handex carolinas

→ Odenton MD

012

Tue 28/Aug/2000 08:51:01



09/28/2000 17:26 FAX 7045982248

handex carolinas

→ Odenton MD

013

Tue 29/Aug/2000 08:47:31

Sensor Verification

Rod Depth

Manual

1000m

14.000

14.000

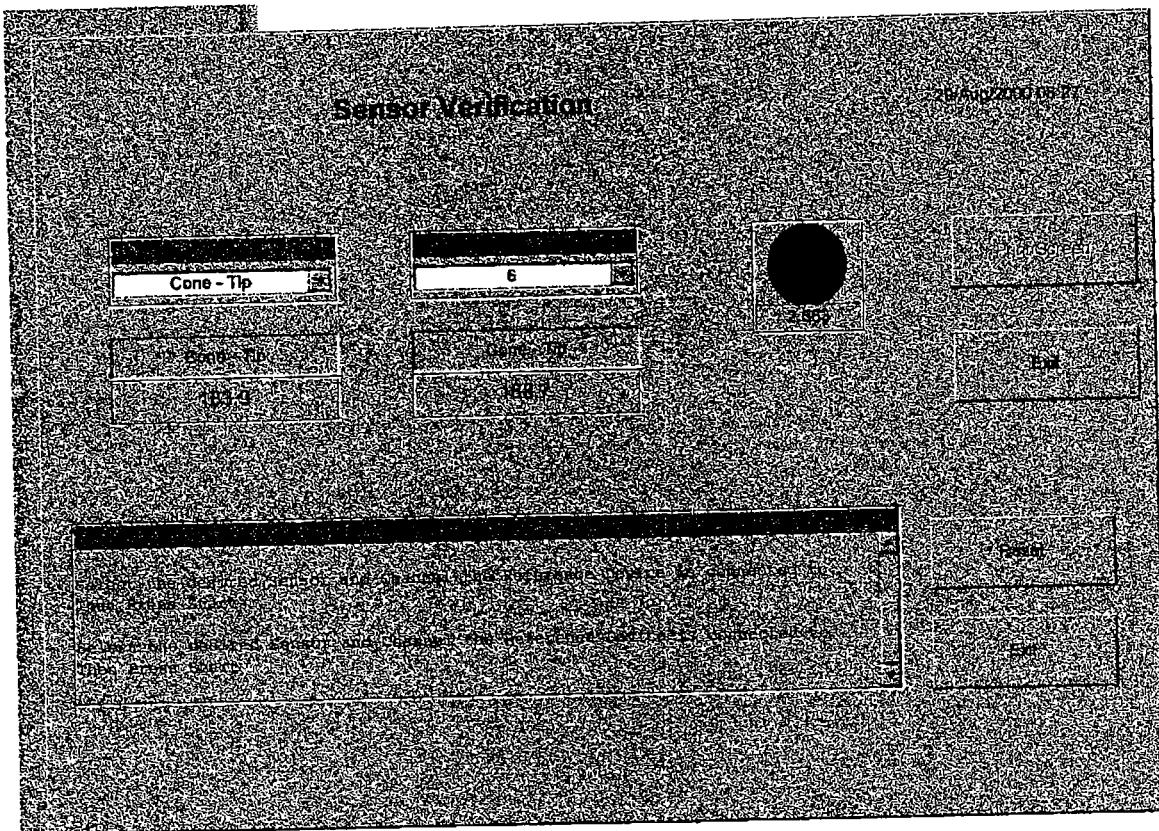
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handex carolinas

→ Odenton MD

014

Tue 29/Aug/2000 08:41:29



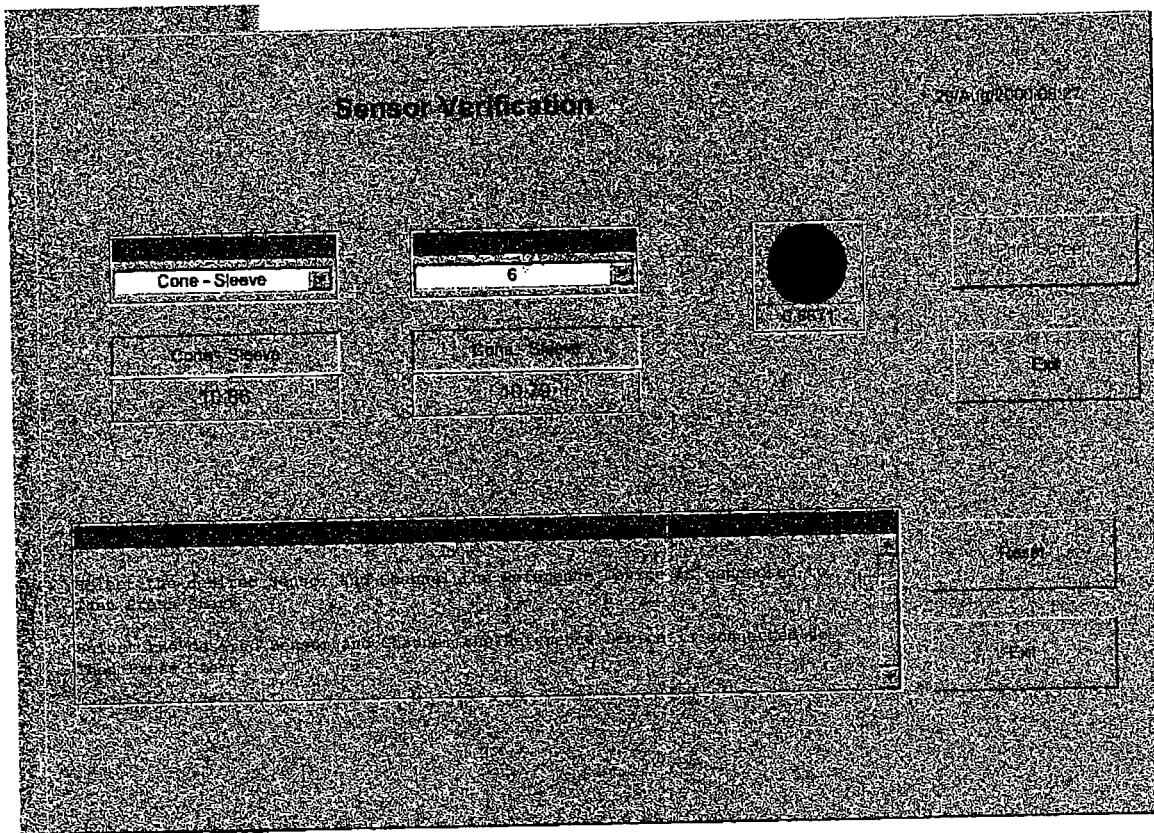
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handex carolinas

→ Odenton MD

015

Tue 28/Aug/2000 08:30:52



APPENDIX E

**GAUGING DATA: TEMPORARY MONITORING POINTS
&
SITE MONITORING AND RECOVERY WELLS**

Sun Oil Company
 Belmont Terminal
 2700 Passyunk Avenue
 Philadelphia, Pennsylvania

Temporary Monitoring Point Gauging Data

Temporary Monitoring Point Number	Date	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Product Elevation (feet)	Water Elevation (feet)	Corrected Water Elevation (feet)
CPT-1	09/05/2000	22.49	25.23	2.74	5.28	2.54	4.62
	09/11/2000	22.26	25.18	2.92	5.51	2.59	4.81
	09/18/2000	22.32	25.38	3.06	5.45	2.39	4.72
	09/26/2000	22.11	25.08	2.97	5.66	2.69	4.95
CPT-3	09/05/2000	21.53	19.46	0.76	7.46	9.53	9.53
	09/11/2000		22.29			6.70	7.28
	09/18/2000		19.57			9.42	9.42
	09/26/2000		19.15			9.84	9.84
CPT-5	09/05/2000	23.19	25.20	2.01	5.32	3.31	4.84
	09/11/2000	23.25	25.10	1.85	5.26	3.41	4.82
	09/18/2000	23.15	25.06	1.91	5.36	3.45	4.90
	09/26/2000	23.01	24.90	1.89	5.50	3.61	5.05
CPT-7	09/11/2000		22.71			5.14	5.14
	09/18/2000		22.71			5.14	5.14
	09/26/2000		22.57			5.28	5.28
CPT-11	09/05/2000	23.65	25.72	2.07	5.24	3.17	4.74
	09/11/2000	23.46	25.57	2.11	5.43	3.32	4.92
	09/18/2000	23.50	25.43	1.93	5.39	3.46	4.93
	09/26/2000	23.59	24.54	0.95	5.30	4.35	5.07
CPT-14	09/05/2000	24.34	26.75	2.41	5.18	2.77	4.60
	09/11/2000	24.24	24.26	0.02	5.28	5.26	5.28
	09/18/2000	24.91	24.91	< 0.01	4.61	4.61	4.61
	09/26/2000	25.21	25.21	< 0.01	4.31	4.31	4.61
CPT-16	09/11/2000	26.30	27.61	1.31	5.34	4.03	5.03
	09/18/2000	26.24	27.48	1.24	5.40	4.16	5.10
	09/26/2000	26.24	27.35	1.11	5.40	4.29	5.13
CPT-17	09/05/2000	22.95	26.39	3.44	4.04	0.60	3.21
	09/11/2000	23.22	25.29	2.07	3.77	1.70	3.27
	09/18/2000	23.30	25.05	1.75	3.69	1.94	3.27
	09/26/2000	23.33	24.68	1.35	3.66	2.31	3.34

WELL GAUGE REPORT

CLIENT: SUNOCO INC.
 LOCATION: PHILADELPHIA, 3144 PASSYUNK AVENUE
 STATE: PA

CLIENT CODE: SUNOCO INC.
 HANDEX CODE: 110535

MONITORING DATE	WELL TYPE - #	C	PRODUCT DEPTH (feet)	WATER DEPTH (feet)	PRODUCT THICK. (feet)	PRODUCT ELEV. (feet)	GW ELEV. (feet)	CORR GW ELEV. (feet)
21-Feb-2000	S - 74			26.06			6.05	6.05
29-Mar-2000	S - 74			25.82			6.29	6.29
15-May-2000	S - 74			25.82			6.29	6.29
18-Jul-2000	S - 74			25.82			6.29	6.29
21-Aug-2000	S - 74			25.83			6.28	6.28
05-Sep-2000	S - 74			25.69			6.42	6.42
11-Sep-2000	S - 74			25.70			6.41	6.41
18-Sep-2000	S - 74			25.71			6.40	6.40
26-Sep-2000	S - 74			25.47			6.64	6.64
21-Feb-2000	S - 75		27.20	27.65	0.45	6.04	5.59	5.93
29-Mar-2000	S - 75		26.94	27.01	0.07	6.30	6.23	6.28
09-May-2000	S - 75		26.80	26.98	0.18	6.44	6.26	6.40
15-May-2000	S - 75		26.90	27.01	0.11	6.34	6.23	6.31
14-Aug-2000	S - 75		23.74	24.26	0.52	9.50	8.98	9.37
21-Aug-2000	S - 75		26.90	27.13	0.23	6.34	6.11	6.28
27-Jan-2000	S - 76	I						
21-Feb-2000	S - 76		26.77	28.78	2.01	6.28	4.27	5.78
24-Feb-2000	S - 76		26.63	28.50	1.87	6.42	4.55	5.95
25-Feb-2000	S - 76		26.99	28.37	1.38	6.06	4.68	5.72
29-Mar-2000	S - 76		26.47	28.80	2.33	6.58	4.25	6.00
30-Mar-2000	S - 76		26.58	28.35	1.77	6.47	4.70	6.03
18-Apr-2000	S - 76		26.35	28.40	2.05	6.70	4.65	6.19
19-Apr-2000	S - 76		26.46	28.40	1.94	6.59	4.65	6.11
09-May-2000	S - 76		26.22	28.42	2.20	6.83	4.63	6.28
15-May-2000	S - 76		26.40	28.54	2.14	6.65	4.51	6.12
16-May-2000	S - 76		26.44	28.65	2.21	6.61	4.40	6.06
27-Jun-2000	S - 76		26.25	28.61	2.36	6.80	4.44	6.21
28-Jun-2000	S - 76		26.29	28.47	2.18	6.76	4.58	6.22
18-Jul-2000	S - 76		26.41	28.63	2.22	6.64	4.42	6.09
19-Jul-2000	S - 76		26.50	28.43	1.93	6.55	4.62	6.07
14-Aug-2000	S - 76		26.33	28.75	2.42	6.72	4.30	6.12
21-Aug-2000	S - 76		26.43	28.76	2.33	6.62	4.29	6.04
22-Aug-2000	S - 76		26.39	28.72	2.33	6.66	4.33	6.08
23-Aug-2000	S - 76		26.34	28.32	1.98	6.71	4.73	6.22
25-Sep-2000	S - 76		26.25	28.77	2.52	6.80	4.28	6.17
26-Sep-2000	S - 76		26.16	28.46	2.30	6.89	4.59	6.32
21-Feb-2000	OW - 2		27.29	27.97	0.68	6.39	5.71	6.22
15-May-2000	OW - 2		27.08	27.65	0.57	6.60	6.03	6.46
18-Jul-2000	OW - 2		27.01	27.89	0.88	6.67	5.79	6.45

WELL GAUGE REPORT

CLIENT: SUNOCO INC.
 LOCATION: PHILADELPHIA, 3144 PASSYUNK AVENUE
 STATE: PA

CLIENT CODE: SUNOCO INC.
 HANDEX CODE: 110535

MONITORING DATE	WELL TYPE - #	C	PRODUCT DEPTH (feet)	WATER DEPTH (feet)	PRODUCT THICK. (feet)	PRODUCT ELEV. (feet)	GW ELEV. (feet)	CORR GW ELEV. (feet)
21-Aug-2000	OW - 2		27.01	27.85	0.84	6.67	5.83	6.46
05-Sep-2000	OW - 2		26.50	28.15	1.65	7.18	5.53	6.77
11-Sep-2000	OW - 2		26.76	27.70	0.94	6.92	5.98	6.69
18-Sep-2000	OW - 2		26.95	27.47	0.52	6.73	6.21	6.60
26-Sep-2000	OW - 2		26.88	27.19	0.31	6.80	6.49	6.72
21-Feb-2000	OW - 12		25.96	26.71	0.75	5.99	5.24	5.80
15-May-2000	OW - 12		25.65	26.38	0.73	6.30	5.57	6.12
18-Jul-2000	OW - 12		25.71	27.50	1.79	6.24	4.45	5.79
21-Aug-2000	OW - 12		25.77	27.26	1.49	6.18	4.69	5.81
05-Sep-2000	OW - 12		25.73	27.34	1.61	6.22	4.61	5.82
11-Sep-2000	OW - 12		25.61	27.30	1.69	6.34	4.65	5.92
18-Sep-2000	OW - 12		25.65	27.19	1.54	6.30	4.76	5.92
26-Sep-2000	OW - 12		25.68	26.99	1.31	6.27	4.96	5.94
21-Feb-2000	OW - 13		27.81	28.74	0.93	6.18	5.25	5.95
15-May-2000	OW - 13		27.54	28.61	1.07	6.45	5.38	6.18
18-Jul-2000	OW - 13		27.50	28.77	1.27	6.49	5.22	6.17
21-Aug-2000	OW - 13		27.43	28.82	1.39	6.56	5.17	6.21
05-Sep-2000	OW - 13		27.34	28.58	1.24	6.65	5.41	6.34
11-Sep-2000	OW - 13		27.14	28.81	1.67	6.85	5.18	6.43
18-Sep-2000	OW - 13		27.40	28.39	0.99	6.59	5.60	6.34
26-Sep-2000	OW - 13		27.41	27.79	0.38	6.58	6.20	6.49
21-Feb-2000	OW - 14			28.43			5.83	5.83
15-May-2000	OW - 14			28.12			6.14	6.14
18-Jul-2000	OW - 14			28.09			6.17	6.17
21-Aug-2000	OW - 14			27.97			6.29	6.29
05-Sep-2000	OW - 14			27.86			6.40	6.40
11-Sep-2000	OW - 14			27.82			6.44	6.44
18-Sep-2000	OW - 14			27.88			6.38	6.38
26-Sep-2000	OW - 14			27.71			6.55	6.55
21-Feb-2000	OW - 16		26.97	28.13	1.16	6.44	5.28	6.15
15-May-2000	OW - 16		26.62	27.20	0.58	6.79	6.21	6.65
18-Jul-2000	OW - 16		26.65	27.53	0.88	6.76	5.88	6.54
21-Aug-2000	OW - 16		26.64	27.45	0.81	6.77	5.96	6.57
05-Sep-2000	OW - 16		26.63	27.37	0.74	6.78	6.04	6.60
11-Sep-2000	OW - 16		26.52	27.33	0.81	6.89	6.08	6.69
18-Sep-2000	OW - 16		26.60	27.26	0.66	6.81	6.15	6.65
26-Sep-2000	OW - 16		26.57	27.16	0.59	6.84	6.25	6.69

WELL GAUGE REPORT

CLIENT: SUNOCO INC.
 LOCATION: PHILADELPHIA, 3144 PASSYUNK AVENUE
 STATE: PA

CLIENT CODE: SUNOCO INC.
 HANDEX CODE: 110535

MONITORING DATE	WELL TYPE - #	C	PRODUCT DEPTH (feet)	WATER DEPTH (feet)	PRODUCT THICK. (feet)	PRODUCT ELEV. (feet)	GW ELEV. (feet)	CORR GW ELEV. (feet)
21-Feb-2000	OW - 17			26.34			5.72	5.72
15-May-2000	OW - 17		25.94	25.95	0.01	6.12	6.11	6.12
18-Jul-2000	OW - 17		26.04	26.04 F		6.02	6.02	6.02
21-Aug-2000	OW - 17		26.04	26.04 F		6.02	6.02	6.02
05-Sep-2000	OW - 17		26.05	26.06	0.01	6.01	6.00	6.01
11-Sep-2000	OW - 17		25.96	25.96 F		6.10	6.10	6.10
18-Sep-2000	OW - 17		26.03	26.03 F		6.03	6.03	6.03
26-Sep-2000	OW - 17		25.95	25.95 F		6.11	6.11	6.11
21-Feb-2000	OW - 18		27.17	28.39	1.22	4.62	3.40	4.32
15-May-2000	OW - 18		27.00	29.11	2.11	4.79	2.68	4.26
18-Jul-2000	OW - 18		27.02	28.33	1.31	4.77	3.46	4.44
21-Aug-2000	OW - 18		26.99	28.40	1.41	4.80	3.39	4.45
05-Sep-2000	OW - 18		26.96	28.34	1.38	4.83	3.45	4.49
11-Sep-2000	OW - 18		26.92	28.31	1.39	4.87	3.48	4.52
18-Sep-2000	OW - 18		26.96	28.30	1.34	4.83	3.49	4.50
26-Sep-2000	OW - 18		26.88	28.21	1.33	4.91	3.58	4.58
21-Feb-2000	OW - 19		25.72	25.73	0.01	6.23	6.22	6.23
15-May-2000	OW - 19		25.53	25.60	0.07	6.42	6.35	6.40
18-Jul-2000	OW - 19		25.88	26.05	0.17	6.07	5.90	6.03
21-Aug-2000	OW - 19		25.89	26.05	0.16	6.06	5.90	6.02
05-Sep-2000	OW - 19		25.96	26.08	0.12	5.99	5.87	5.96
11-Sep-2000	OW - 19		25.75	25.78	0.03	6.20	6.17	6.19
18-Sep-2000	OW - 19	I						
26-Sep-2000	OW - 19		25.49	25.56	0.07	6.46	6.39	6.44
21-Feb-2000	OW - 20		26.14	26.14 F		6.72	6.72	6.72
15-May-2000	OW - 20		26.20	26.20 F		6.66	6.66	6.66
18-Jul-2000	OW - 20		26.42	26.42 F		6.44	6.44	6.44
21-Aug-2000	OW - 20		26.39	26.40	0.01	6.47	6.46	6.47
05-Sep-2000	OW - 20		25.62	25.62 F		7.24	7.24	7.24
11-Sep-2000	OW - 20			26.15			6.71	6.71
18-Sep-2000	OW - 20			26.35			6.51	6.51
26-Sep-2000	OW - 20		26.37	26.37 F		6.49	6.49	6.49
03-Jan-2000	RW - 4		18.63	23.54	4.91	12.79	7.88	11.61
11-Jan-2000	RW - 4		14.36	17.92	3.56	17.06	13.50	16.21
17-Jan-2000	RW - 4		13.48	20.10	6.62	17.94	11.32	16.35
26-Jan-2000	RW - 4		14.13	19.64	5.51	17.29	11.78	15.97
31-Jan-2000	RW - 4		13.10	23.94	10.84	18.32	7.48	15.72
07-Feb-2000	RW - 4		14.18	16.42	2.24	17.24	15.00	16.70

WELL GAUGE REPORT

CLIENT: SUNOCO INC.
 LOCATION: PHILADELPHIA, 3144 PASSYUNK AVENUE
 STATE: PA

CLIENT CODE: SUNOCO INC.
 HANDEX CODE: 110535

MONITORING DATE	WELL TYPE - #	C	PRODUCT DEPTH (feet)	WATER DEPTH (feet)	PRODUCT THICK. (feet)	PRODUCT ELEV. (feet)	GW ELEV. (feet)	CORR GW ELEV. (feet)
14-Feb-2000	RW - 4		12.77	15.51	2.74	18.65	15.91	17.99
21-Feb-2000	RW - 4		14.39	21.48	7.09	17.03	9.94	15.33
28-Feb-2000	RW - 4		13.52	14.91	1.39	17.90	16.51	17.57
06-Mar-2000	RW - 4		12.57	26.02	13.45	18.85	5.40	15.62
13-Mar-2000	RW - 4		13.25	32.56	19.31	18.17	-1.14	13.54
20-Mar-2000	RW - 4		16.77	25.44	8.67	14.65	5.98	12.57
27-Mar-2000	RW - 4		14.25	25.99	11.74	17.17	5.43	14.35
03-Apr-2000	RW - 4		26.69	27.00	0.31	4.73	4.42	4.66
10-Apr-2000	RW - 4		12.66	24.36	11.70	18.76	7.06	15.95
17-Apr-2000	RW - 4		26.68	27.61	0.93	4.74	3.81	4.52
24-Apr-2000	RW - 4		26.74	27.53	0.79	4.68	3.89	4.49
01-May-2000	RW - 4		26.54	27.19	0.65	4.88	4.23	4.72
09-May-2000	RW - 4		13.12	26.32	13.20	18.30	5.10	5.10
15-May-2000	RW - 4		28.10	28.77	0.67	3.32	2.65	2.65
22-May-2000	RW - 4		22.10	29.97	7.87	9.32	1.45	1.45
30-May-2000	RW - 4		13.62	28.97	15.35	17.80	2.45	2.45
05-Jun-2000	RW - 4		14.82	30.05	15.23	16.60	1.37	1.37
12-Jun-2000	RW - 4		20.08	26.80	6.72	11.34	4.62	9.72
19-Jun-2000	RW - 4		16.40	28.28	11.88	15.02	3.14	12.16
26-Jun-2000	RW - 4		13.22	28.35	15.13	18.20	3.07	14.56
05-Jul-2000	RW - 4		27.10	27.39	0.29	4.32	4.03	4.25
11-Jul-2000	RW - 4		27.15	27.46	0.31	4.27	3.96	4.20
18-Jul-2000	RW - 4		27.13	27.54	0.41	4.29	3.88	4.19
24-Jul-2000	RW - 4		27.16	27.81	0.65	4.26	3.61	4.10
31-Jul-2000	RW - 4		25.14	27.53	2.39	6.28	3.89	5.70
07-Aug-2000	RW - 4		19.43	26.85	7.42	11.99	4.57	10.20
15-Aug-2000	RW - 4		13.55	26.18	12.63	17.87	5.24	14.83
21-Aug-2000	RW - 4		18.40	27.30	8.90	13.02	4.12	10.88
28-Aug-2000	RW - 4		17.69	26.85	9.16	13.73	4.57	11.53
05-Sep-2000	RW - 4		24.74	28.37	3.63	6.68	3.05	5.81
11-Sep-2000	RW - 4		18.07	27.95	9.88	13.35	3.47	10.97
18-Sep-2000	RW - 4		21.45	27.99	6.54	9.97	3.43	8.40
26-Sep-2000	RW - 4		27.51	28.46	0.95	3.91	2.96	3.68
03-Jan-2000	RW - 6		30.25	30.71	0.46	2.84	2.38	2.74
11-Jan-2000	RW - 6		30.27	31.01	0.74	2.82	2.08	2.66
17-Jan-2000	RW - 6		30.42	30.80	0.38	2.67	2.29	2.59
26-Jan-2000	RW - 6		29.81	30.39	0.58	3.28	2.70	3.16
31-Jan-2000	RW - 6		30.26	30.91	0.65	2.83	2.18	2.69
07-Feb-2000	RW - 6		31.11	31.66	0.55	1.98	1.43	1.86
14-Feb-2000	RW - 6		30.99	31.07	0.08	2.10	2.02	2.08
21-Feb-2000	RW - 6		30.02	30.46	0.44	3.07	2.63	2.98

WELL GAUGE REPORT

CLIENT: SUNOCO INC.
 LOCATION: PHILADELPHIA, 3144 PASSYUNK AVENUE
 STATE: PA

CLIENT CODE: SUNOCO INC.
 HANDEX CODE: 110535

MONITORING DATE	WELL TYPE - #	C	PRODUCT DEPTH (feet)	WATER DEPTH (feet)	PRODUCT THICK. (feet)	PRODUCT ELEV. (feet)	GW ELEV. (feet)	CORR GW ELEV. (feet)
28-Feb-2000	RW - 6		26.81	27.85	1.04	6.28	5.24	6.06
06-Mar-2000	RW - 6		30.90	31.18	0.28	2.19	1.91	2.13
13-Mar-2000	RW - 6		31.59	32.65	1.06	1.50	0.44	1.28
20-Mar-2000	RW - 6		30.70	31.84	1.14	2.39	1.25	2.15
27-Mar-2000	RW - 6		30.63	31.92	1.29	2.46	1.17	2.19
03-Apr-2000	RW - 6		31.36	32.55	1.19	1.73	0.54	1.48
10-Apr-2000	RW - 6		30.26	31.45	1.19	2.83	1.64	2.58
17-Apr-2000	RW - 6		29.38	30.43	1.05	3.71	2.66	3.49
24-Apr-2000	RW - 6		29.03	30.12	1.09	4.06	2.97	3.83
01-May-2000	RW - 6		29.43	30.38	0.95	3.66	2.71	3.46
09-May-2000	RW - 6			34.91			-1.82	-1.82
15-May-2000	RW - 6			46.39			-13.30	-13.30
22-May-2000	RW - 6			39.39			-6.30	-6.30
30-May-2000	RW - 6			39.80			-6.71	-6.71
05-Jun-2000	RW - 6			42.42			-9.33	-9.33
12-Jun-2000	RW - 6			49.10			-16.01	-16.01
19-Jun-2000	RW - 6			47.60			-14.51	-14.51
26-Jun-2000	RW - 6		35.06	35.17	0.11	-1.97	-2.08	-1.99
05-Jul-2000	RW - 6		34.04	34.36	0.32	-0.95	-1.27	-1.02
11-Jul-2000	RW - 6		34.77	35.93	1.16	-1.68	-2.84	-1.92
18-Jul-2000	RW - 6		31.51	33.70	2.19	1.58	-0.61	1.12
24-Jul-2000	RW - 6		34.55	35.80	1.25	-1.46	-2.71	-1.72
31-Jul-2000	RW - 6		32.91	34.01	1.10	0.18	-0.92	-0.05
07-Aug-2000	RW - 6		31.79	35.18	3.39	1.30	-2.09	0.59
15-Aug-2000	RW - 6		25.94	29.94	4.00	7.15	3.15	6.31
21-Aug-2000	RW - 6		31.58	34.92	3.34	1.51	-1.83	0.81
28-Aug-2000	RW - 6		33.41	37.06	3.65	-0.32	-3.97	-1.09
05-Sep-2000	RW - 6		33.40	36.81	3.41	-0.31	-3.72	-1.03
11-Sep-2000	RW - 6		26.06	28.60	2.54	7.03	4.49	6.50
18-Sep-2000	RW - 6		34.20	34.31	0.11	-1.11	-1.22	-1.13
26-Sep-2000	RW - 6		34.87	34.93	0.06	-1.78	-1.84	-1.79
03-Jan-2000	RW - 7		29.13	29.66	0.53	0.05	-0.48	-0.07
11-Jan-2000	RW - 7		28.93	29.37	0.44	0.25	-0.19	0.15
17-Jan-2000	RW - 7		29.22	29.40	0.18	-0.04	-0.22	-0.08
26-Jan-2000	RW - 7		28.91	29.17	0.26	0.27	0.01	0.21
31-Jan-2000	RW - 7		28.43	28.62	0.19	0.75	0.56	0.71
07-Feb-2000	RW - 7		29.14	29.53	0.39	0.04	-0.35	-0.05
14-Feb-2000	RW - 7		28.26	29.04	0.78	0.92	0.14	0.75
21-Feb-2000	RW - 7		28.99	29.20	0.21	0.19	-0.02	0.14
28-Feb-2000	RW - 7		23.79	24.54	0.75	5.39	4.64	5.23
06-Mar-2000	RW - 7		27.48	28.09	0.61	1.70	1.09	1.57

WELL GAUGE REPORT

CLIENT: SUNOCO INC.
 LOCATION: PHILADELPHIA, 3144 PASSYUNK AVENUE
 STATE: PA

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MONITORING DATE	WELL TYPE - #	C	PRODUCT DEPTH (feet)	WATER DEPTH (feet)	PRODUCT THICK. (feet)	PRODUCT ELEV. (feet)	GW ELEV. (feet)	CORR GW ELEV. (feet)
13-Mar-2000	RW - 7		28.70	29.15	0.45	0.48	0.03	0.38
20-Mar-2000	RW - 7		27.43	27.75	0.32	1.75	1.43	1.68
27-Mar-2000	RW - 7		29.07	29.55	0.48	0.11	-0.37	
03-Apr-2000	RW - 7		27.11	27.42	0.31	2.07	1.76	2.00
10-Apr-2000	RW - 7		28.09	28.38	0.29	1.09	0.80	1.03
17-Apr-2000	RW - 7		29.35	30.02	0.67	-0.17	-0.84	-0.32
24-Apr-2000	RW - 7		29.40	30.18	0.78	-0.22	-1.00	-0.39
01-May-2000	RW - 7		27.72	28.61	0.89	1.46	0.57	1.26
09-May-2000	RW - 7		24.70	25.64	0.94	4.48	3.54	3.54
15-May-2000	RW - 7			33.18			-4.00	-4.00
22-May-2000	RW - 7		33.52	33.52 F		-4.34	-4.34	-4.34
30-May-2000	RW - 7		33.23	33.24	0.01	-4.05	-4.06	-4.06
05-Jun-2000	RW - 7		32.61	32.84	0.23	-3.43	-3.66	-3.66
12-Jun-2000	RW - 7		32.76	33.01	0.25	-3.58	-3.83	-3.64
19-Jun-2000	RW - 7		33.22	33.48	0.26	-4.04	-4.30	-4.10
26-Jun-2000	RW - 7		33.51	33.56	0.05	-4.33	-4.38	-4.34
05-Jul-2000	RW - 7		33.02	33.35	0.33	-3.84	-4.17	-3.92
11-Jul-2000	RW - 7		32.59	33.00	0.41	-3.41	-3.82	-3.51
18-Jul-2000	RW - 7		32.40	33.28	0.88	-3.22	-4.10	-3.43
24-Jul-2000	RW - 7		32.49	33.16	0.67	-3.31	-3.98	-3.47
31-Jul-2000	RW - 7		23.60	24.09	0.49	5.58	5.09	5.46
07-Aug-2000	RW - 7		31.15	31.65	0.50	-1.97	-2.47	-2.09
15-Aug-2000	RW - 7		23.53	24.92	1.39	5.65	4.26	5.32
21-Aug-2000	RW - 7		32.40	32.74	0.34	-3.22	-3.56	-3.30
28-Aug-2000	RW - 7		32.95	33.71	0.76	-3.77	-4.53	-3.95
05-Sep-2000	RW - 7		24.80	25.45	0.65	4.38	3.73	4.22
11-Sep-2000	RW - 7		27.02	28.74	1.72	2.16	0.44	1.75
18-Sep-2000	RW - 7		23.40	24.65	1.25	5.78	4.53	5.48
26-Sep-2000	RW - 7		23.86	25.15	1.29	5.32	4.03	5.01
03-Jan-2000	RW - 15		26.71	28.42	1.71	5.72	4.01	5.29
11-Jan-2000	RW - 15		26.65	28.34	1.69	5.78	4.09	5.36
17-Jan-2000	RW - 15		26.74	28.43	1.69	5.69	4.00	5.27
26-Jan-2000	RW - 15		26.75	28.46	1.71	5.68	3.97	5.25
31-Jan-2000	RW - 15		26.73	28.39	1.66	5.70	4.04	5.29
07-Feb-2000	RW - 15		26.79	28.54	1.75	5.64	3.89	5.20
14-Feb-2000	RW - 15		26.79	28.37	1.58	5.64	4.06	5.25
21-Feb-2000	RW - 15		26.80	28.61	1.81	5.63	3.82	5.18
28-Feb-2000	RW - 15		26.78	28.44	1.66	5.65	3.99	5.24
06-Mar-2000	RW - 15		26.83	28.61	1.78	5.60	3.82	5.16
13-Mar-2000	RW - 15		26.81	28.45	1.64	5.62	3.98	5.21
20-Mar-2000	RW - 15		26.75	28.40	1.65	5.68	4.03	5.27

WELL GAUGE REPORT

CLIENT: SUNOCO INC.
 LOCATION: PHILADELPHIA, 3144 PASSYUNK AVENUE
 STATE: PA

CLIENT CODE: SUNOCO INC.
 HANDEX CODE: 110535

MONITORING DATE	WELL TYPE - #	C	PRODUCT DEPTH (feet)	WATER DEPTH (feet)	PRODUCT THICK. (feet)	PRODUCT ELEV. (feet)	GW ELEV. (feet)	CORR GW ELEV. (feet)
27-Mar-2000	RW - 15		26.61	28.25	1.64	5.82	4.18	5.41
03-Apr-2000	RW - 15		26.65	28.27	1.62	5.78	4.16	5.38
10-Apr-2000	RW - 15		26.69	28.40	1.71	5.74	4.03	5.31
17-Apr-2000	RW - 15		26.62	28.15	1.53	5.81	4.28	5.43
24-Apr-2000	RW - 15		26.59	28.20	1.61	5.84	4.23	5.44
01-May-2000	RW - 15		26.61	28.20	1.59	5.82	4.23	5.42
09-May-2000	RW - 15		26.56	28.05	1.49	5.87	4.38	4.38
15-May-2000	RW - 15		26.64	28.13	1.49	5.79	4.30	4.30
22-May-2000	RW - 15		26.59	28.01	1.42	5.84	4.42	4.42
30-May-2000	RW - 15		26.61	28.03	1.42	5.82	4.40	4.40
05-Jun-2000	RW - 15		26.60	28.03	1.43	5.83	4.40	4.40
12-Jun-2000	RW - 15		26.62	28.14	1.52	5.81	4.29	5.47
19-Jun-2000	RW - 15		26.58	28.00	1.42	5.85	4.43	5.53
26-Jun-2000	RW - 15		26.58	28.01	1.43	5.85	4.42	5.53
05-Jul-2000	RW - 15		26.60	28.27	1.67	5.83	4.16	5.45
11-Jul-2000	RW - 15		26.64	28.32	1.68	5.79	4.11	5.41
18-Jul-2000	RW - 15		26.65	28.34	1.69	5.78	4.09	5.40
24-Jul-2000	RW - 15		26.69	28.42	1.73	5.74	4.01	5.35
31-Jul-2000	RW - 15		26.53	28.40	1.87	5.90	4.03	5.48
07-Aug-2000	RW - 15		26.79	28.32	1.53	5.64	4.11	5.30
15-Aug-2000	RW - 15		26.52	28.28	1.76	5.91	4.15	5.51
21-Aug-2000	RW - 15		26.62	28.38	1.76	5.81	4.05	5.41
28-Aug-2000	RW - 15		26.60	28.38	1.78	5.83	4.05	5.43
05-Sep-2000	RW - 15		26.61	28.37	1.76	5.82	4.06	5.42
11-Sep-2000	RW - 15		26.53	28.30	1.77	5.90	4.13	5.50
18-Sep-2000	RW - 15		26.68	28.26	1.58	5.75	4.17	5.39
26-Sep-2000	RW - 15		26.49	28.19	1.70	5.94	4.24	5.56
03-Jan-2000	RW - 400		32.58	32.69	0.11	-2.39	-2.50	-2.42
11-Jan-2000	RW - 400		31.95	32.56	0.61	-1.76	-2.37	-1.91
17-Jan-2000	RW - 400		24.14	24.32	0.18	6.05	5.87	6.01
24-Jan-2000	RW - 400		24.24	24.93	0.69	5.95	5.26	5.78
31-Jan-2000	RW - 400		24.31	24.93	0.62	5.88	5.26	5.73
08-Feb-2000	RW - 400		23.99	24.62	0.63	6.20	5.57	6.04
14-Feb-2000	RW - 400		28.38	29.00	0.62	1.81	1.19	1.66
21-Feb-2000	RW - 400		32.50	32.91	0.41	-2.31	-2.72	-2.41
28-Feb-2000	RW - 400		32.20	32.64	0.44	-2.01	-2.45	-2.12
06-Mar-2000	RW - 400		32.41	32.77	0.36	-2.22	-2.58	-2.31
13-Mar-2000	RW - 400		32.50	32.88	0.38	-2.31	-2.69	-2.41
20-Mar-2000	RW - 400		32.49	32.89	0.40	-2.30	-2.70	-2.40
27-Mar-2000	RW - 400		33.66	33.85	0.19	-3.47	-3.66	-3.52
29-Mar-2000	RW - 400		33.62	33.78	0.16	-3.43	-3.59	-3.47

WELL GAUGE REPORT

CLIENT: SUNOCO INC.
 LOCATION: PHILADELPHIA, 3144 PASSYUNK AVENUE
 STATE: PA

CLIENT CODE: SUNOCO INC.
 HANDEX CODE: 110535

MONITORING DATE	WELL TYPE - #	C	PRODUCT DEPTH (feet)	WATER DEPTH (feet)	PRODUCT THICK. (feet)	PRODUCT ELEV. (feet)	GW ELEV. (feet)	CORR GW ELEV. (feet)
03-Apr-2000	RW - 400		33.59	33.81	0.22	-3.40	-3.62	-3.46
10-Apr-2000	RW - 400		33.35	33.51	0.16	-3.16	-3.32	-3.20
17-Apr-2000	RW - 400		32.82	33.35	0.53	-2.63	-3.16	-2.76
24-Apr-2000	RW - 400		32.56	32.86	0.30	-2.37	-2.67	-2.45
01-May-2000	RW - 400		32.84	33.51	0.67	-2.65	-3.32	-2.82
09-May-2000	RW - 400		32.85	33.39	0.54	-2.66	-3.20	-2.80
15-May-2000	RW - 400		33.61	33.75	0.14	-3.42	-3.56	-3.46
22-May-2000	RW - 400		32.96	33.18	0.22	-2.77	-2.99	-2.83
30-May-2000	RW - 400		33.01	33.72	0.71	-2.82	-3.53	-3.00
05-Jun-2000	RW - 400		33.54	33.77	0.23	-3.35	-3.58	-3.41
13-Jun-2000	RW - 400		33.37	33.52	0.15	-3.18	-3.33	-3.22
19-Jun-2000	RW - 400		33.26	33.76	0.50	-3.07	-3.57	-3.20
26-Jun-2000	RW - 400		33.61	33.76	0.15	-3.42	-3.57	-3.46
03-Jul-2000	RW - 400		33.52	33.66	0.14	-3.33	-3.47	-3.37
10-Jul-2000	RW - 400		32.42	33.49	1.07	-2.23	-3.30	-2.50
17-Jul-2000	RW - 400		33.44	33.69	0.25	-3.25	-3.50	-3.31
24-Jul-2000	RW - 400		33.28	33.51	0.23	-3.09	-3.32	-3.15
31-Jul-2000	RW - 400		33.33	33.71	0.38	-3.14	-3.52	-3.24
07-Aug-2000	RW - 400		32.98	33.31	0.33	-2.79	-3.12	-2.87
14-Aug-2000	RW - 400		33.55	33.75	0.20	-3.36	-3.56	-3.41
21-Aug-2000	RW - 400		33.49	33.66	0.17	-3.30	-3.47	-3.34
28-Aug-2000	RW - 400		33.54	33.68	0.14	-3.35	-3.49	-3.39
06-Sep-2000	RW - 400		33.56	33.62	0.06	-3.37	-3.43	-3.39
11-Sep-2000	RW - 400		32.98	33.20	0.22	-2.79	-3.01	-2.85
18-Sep-2000	RW - 400		33.62	33.71	0.09	-3.43	-3.52	-3.45
25-Sep-2000	RW - 400		33.48	33.62	0.14	-3.29	-3.43	-3.33
21-Feb-2000	TW - 3		27.66	28.73	1.07	6.07	5.00	5.80
15-May-2000	TW - 3		27.39	28.53	1.14	6.34	5.20	6.06
18-Jul-2000	TW - 3		27.39	28.73	1.34	6.34	5.00	6.01
21-Aug-2000	TW - 3		27.42	28.53	1.11	6.31	5.20	6.03
05-Sep-2000	TW - 3		23.56	25.21	1.65	10.17	8.52	9.76
11-Sep-2000	TW - 3		26.63	26.58				
18-Sep-2000	TW - 3		27.41	27.47	0.06	6.32	6.26	6.31
26-Sep-2000	TW - 3		27.42	27.50	0.08	6.31	6.23	6.29
21-Feb-2000	TW - 5			27.75			6.34	6.34
15-May-2000	TW - 5			27.41			6.68	6.68
18-Jul-2000	TW - 5			27.48			6.61	6.61
21-Aug-2000	TW - 5			27.51			6.58	6.58
05-Sep-2000	TW - 5			27.44			6.65	6.65
11-Sep-2000	TW - 5			27.25			6.84	6.84

WELL GAUGE REPORT

CLIENT: SUNOCO INC.
 LOCATION: PHILADELPHIA, 3144 PASSYUNK AVENUE
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MONITORING DATE	WELL TYPE - #	C	PRODUCT DEPTH (feet)	WATER DEPTH (feet)	PRODUCT THICK. (feet)	PRODUCT ELEV. (feet)	GW ELEV. (feet)	CORR GW ELEV. (feet)
18-Sep-2000	TW - 5			27.37			6.72	6.72
26-Sep-2000	TW - 5			27.75			6.34	6.34
21-Feb-2000	TW - 8			26.32			5.51	5.51
15-May-2000	TW - 8			26.01			5.82	5.82
18-Jul-2000	TW - 8			26.18			5.65	5.65
21-Aug-2000	TW - 8			26.16			5.67	5.67
05-Sep-2000	TW - 8			26.15			5.68	5.68
11-Sep-2000	TW - 8			26.01			5.82	5.82
18-Sep-2000	TW - 8			26.06			5.77	5.77
26-Sep-2000	TW - 8			26.01			5.82	5.82
21-Feb-2000	TW - 9			28.02			5.97	5.97
15-May-2000	TW - 9			27.73			6.26	6.26
18-Jul-2000	TW - 9			28.66			5.33	5.33
21-Aug-2000	TW - 9			27.64			6.35	6.35
05-Sep-2000	TW - 9			27.51			6.48	6.48
11-Sep-2000	TW - 9			27.42			6.57	6.57
18-Sep-2000	TW - 9			27.57			6.42	6.42
26-Sep-2000	TW - 9			10.26			23.73	23.73
21-Feb-2000	TW - 10		26.05	28.10	2.05	5.95	3.90	5.44
15-May-2000	TW - 10		25.85	27.99	2.14	6.15	4.01	5.62
18-Jul-2000	TW - 10		25.83	28.45	2.62	6.17	3.55	5.52
21-Aug-2000	TW - 10		25.86	28.23	2.37	6.14	3.77	5.55
05-Sep-2000	TW - 10		25.79	28.34	2.55	6.21	3.66	5.57
11-Sep-2000	TW - 10		25.39	28.35	2.96	6.61	3.65	5.87
18-Sep-2000	TW - 10		25.73	27.42	1.69	6.27	4.58	5.85
26-Sep-2000	TW - 10		25.75	27.90	2.15	6.25	4.10	5.71

WELL GAUGE REPORT

CLIENT: SUNOCO INC.
 LOCATION: PHILADELPHIA, 3144 PASSYUNK AVENUE
 STATE: PA

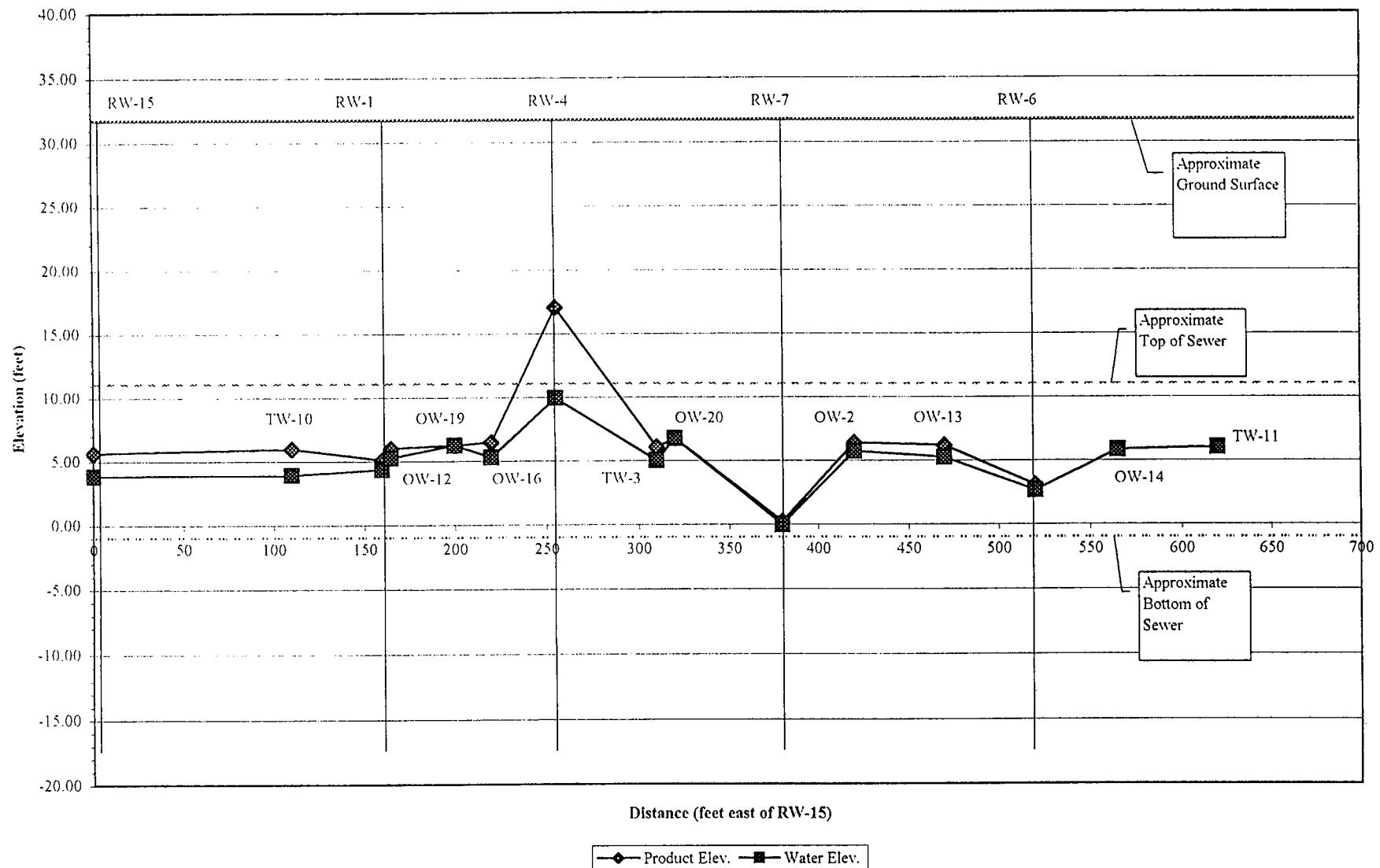
CLIENT CODE: SUNOCO INC.
 HANDEX CODE: 110535

MONITORING DATE	WELL TYPE - #	C	PRODUCT DEPTH (feet)	WATER DEPTH (feet)	PRODUCT THICK. (feet)	PRODUCT ELEV. (feet)	GW ELEV. (feet)	CORR GW ELEV. (feet)
21-Feb-2000	TW - 11			28.43			6.03	6.03
15-May-2000	TW - 11			28.05			6.41	6.41
18-Jul-2000	TW - 11			28.16			6.30	6.30
21-Aug-2000	TW - 11			28.15			6.31	6.31
05-Sep-2000	TW - 11			28.08			6.38	6.38
11-Sep-2000	TW - 11			28.04			6.42	6.42
18-Sep-2000	TW - 11			28.09			6.37	6.37
26-Sep-2000	TW - 11			27.92			6.54	6.54

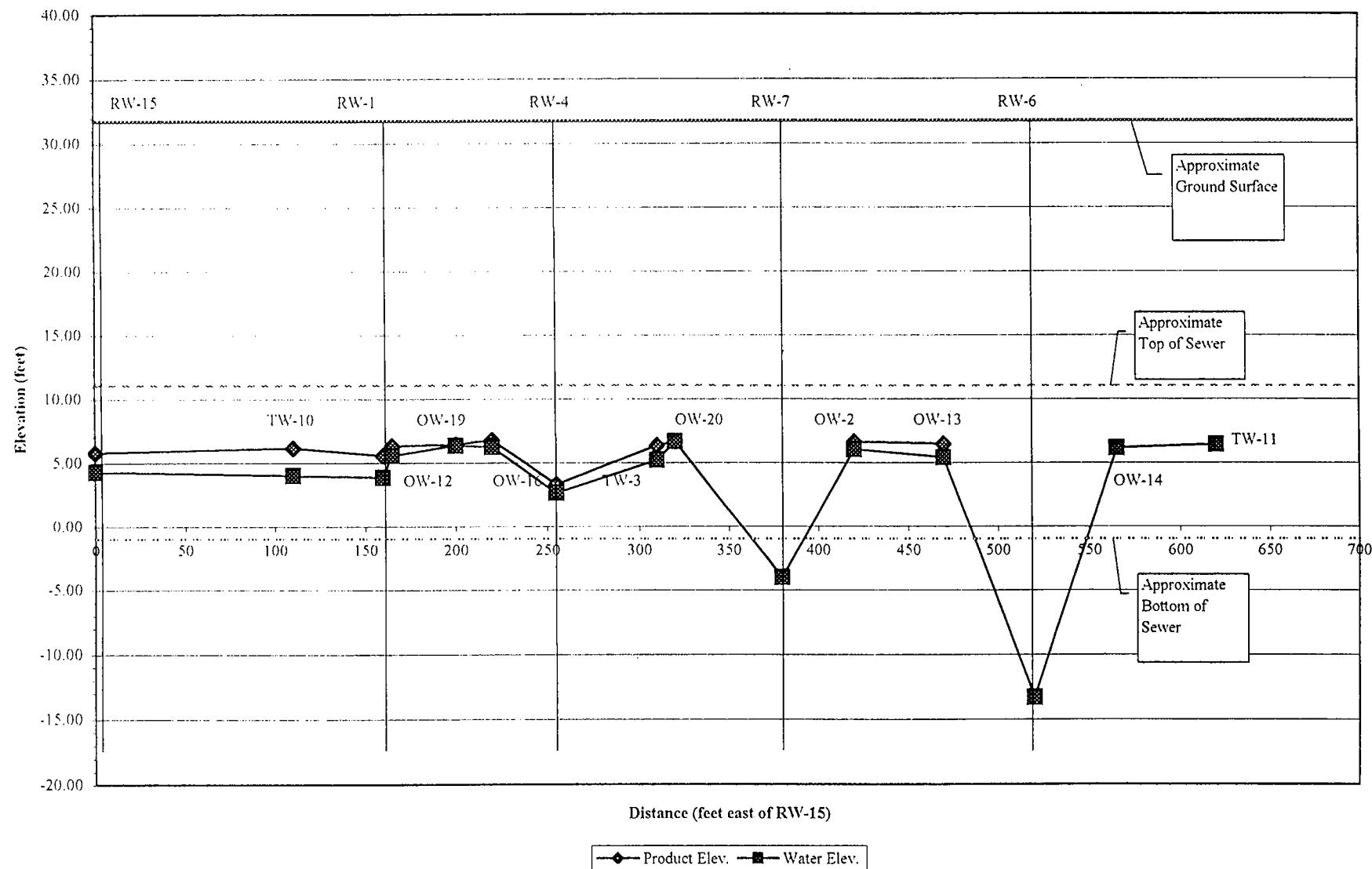
"C"omments: [P = Pumping; N = Non-Pumping; B/C = Before/After Adjustment]
 [I = Well Inaccessible; D = Dry Well; * = Not Gauged; L = Flooded; O = Obstruction]
 [A = Abandoned; F/T = Film or Trace of Product; X = Approximate; S = Sampled]

APPENDIX F
BELMONT TERMINAL CROSS SECTIONS

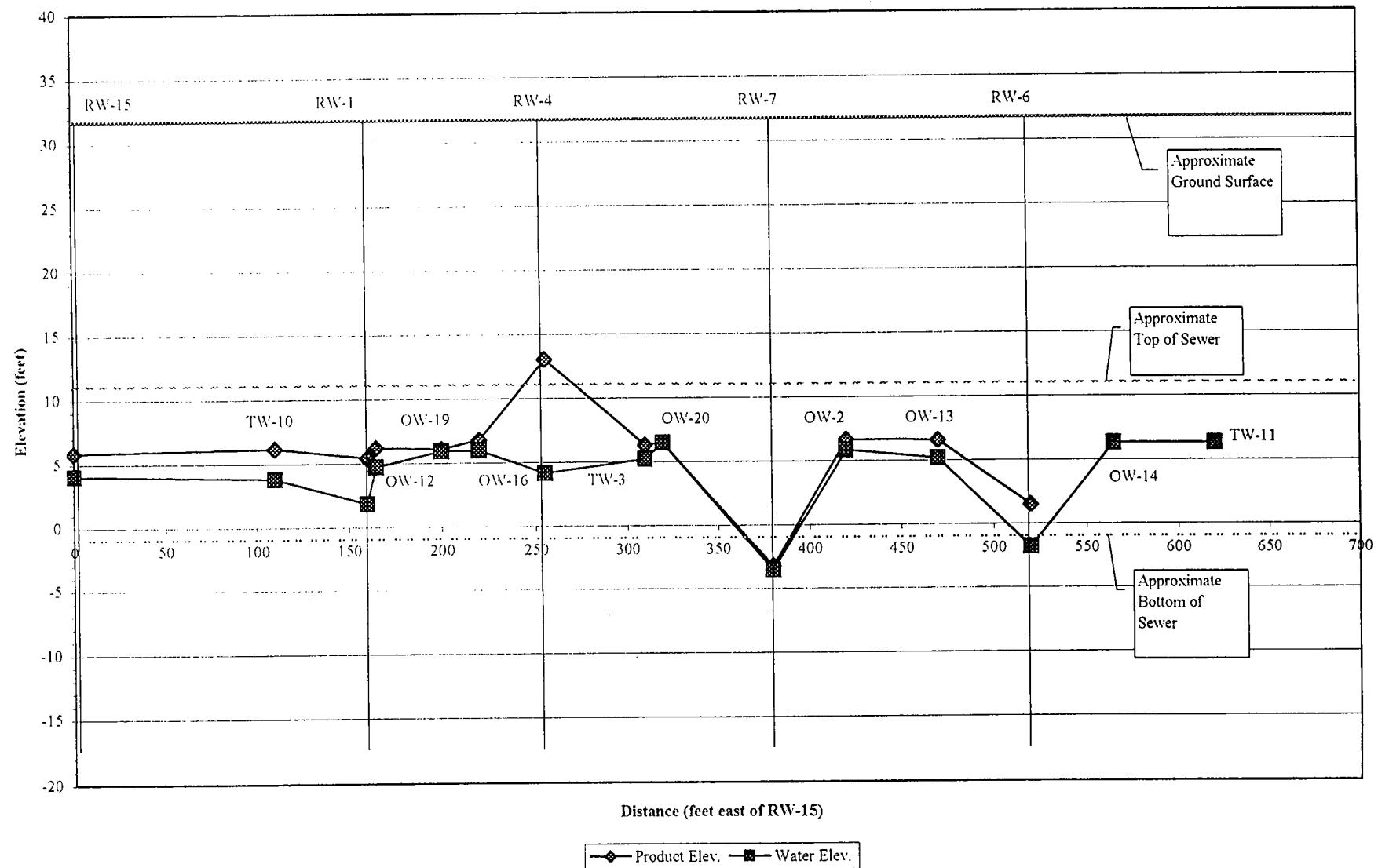
February 21, 2000 Product and Water Elevations



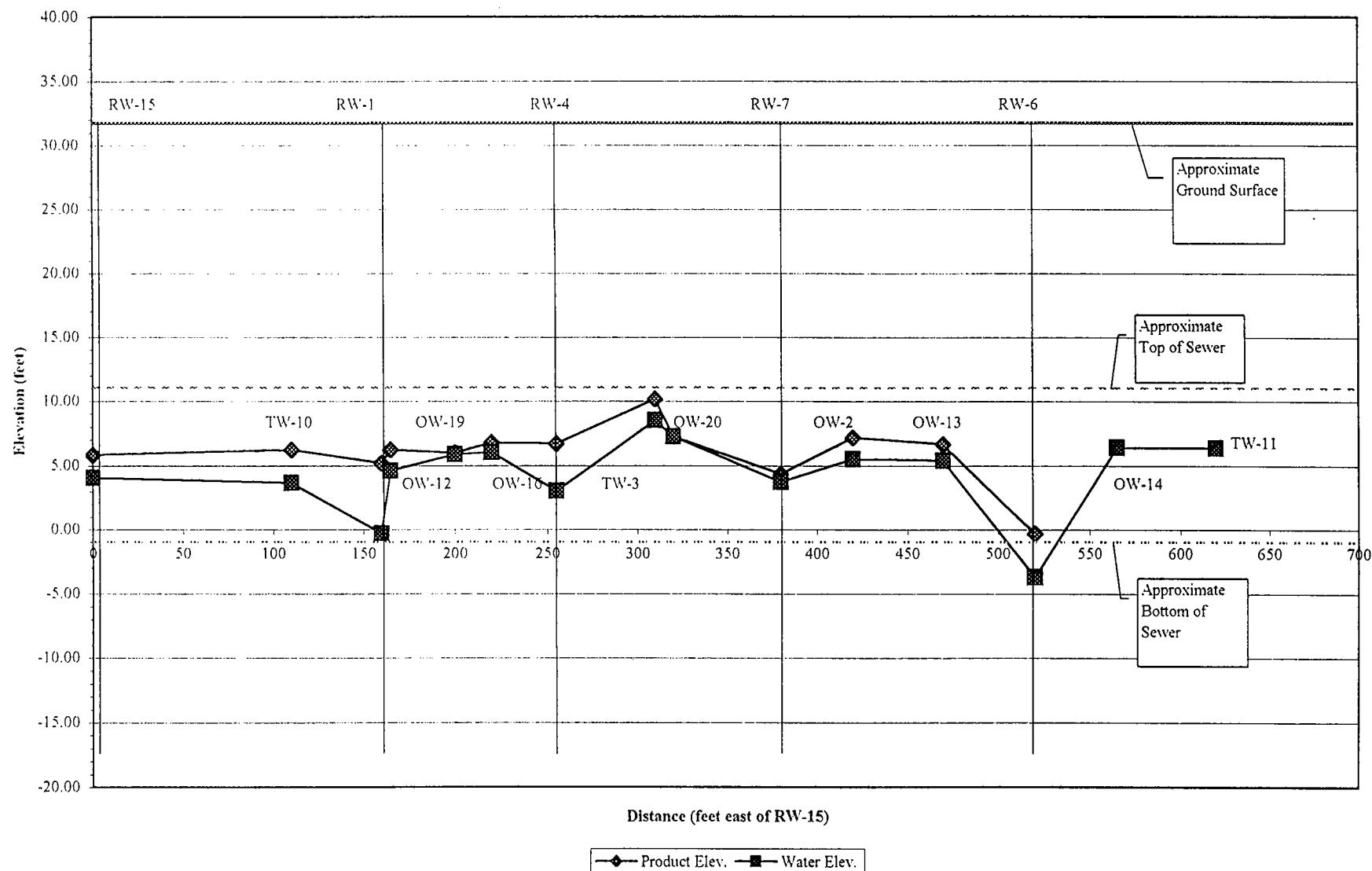
May 15, 2000 Product and Water Elevations



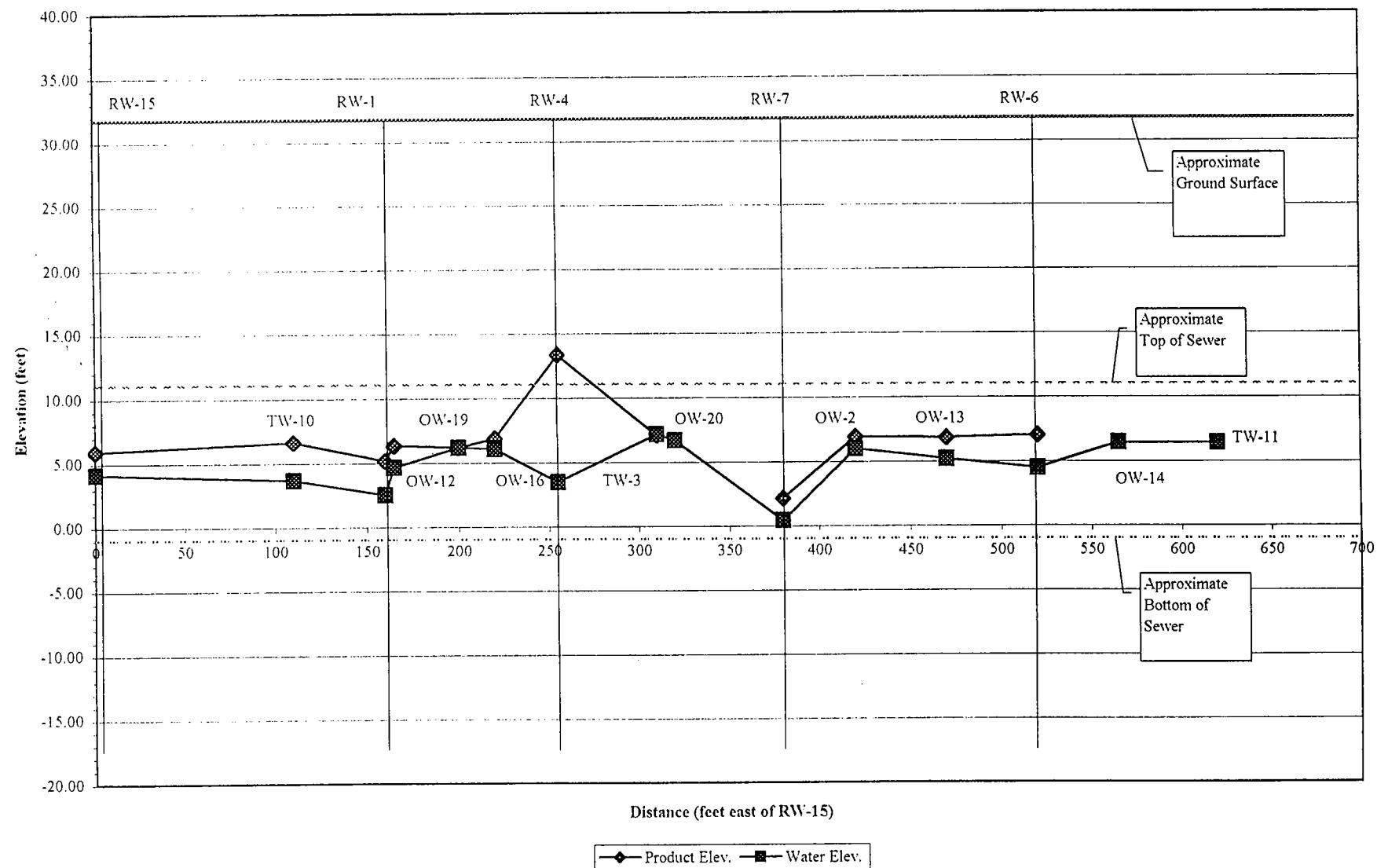
August 21, 2000 Product and Water Elevations



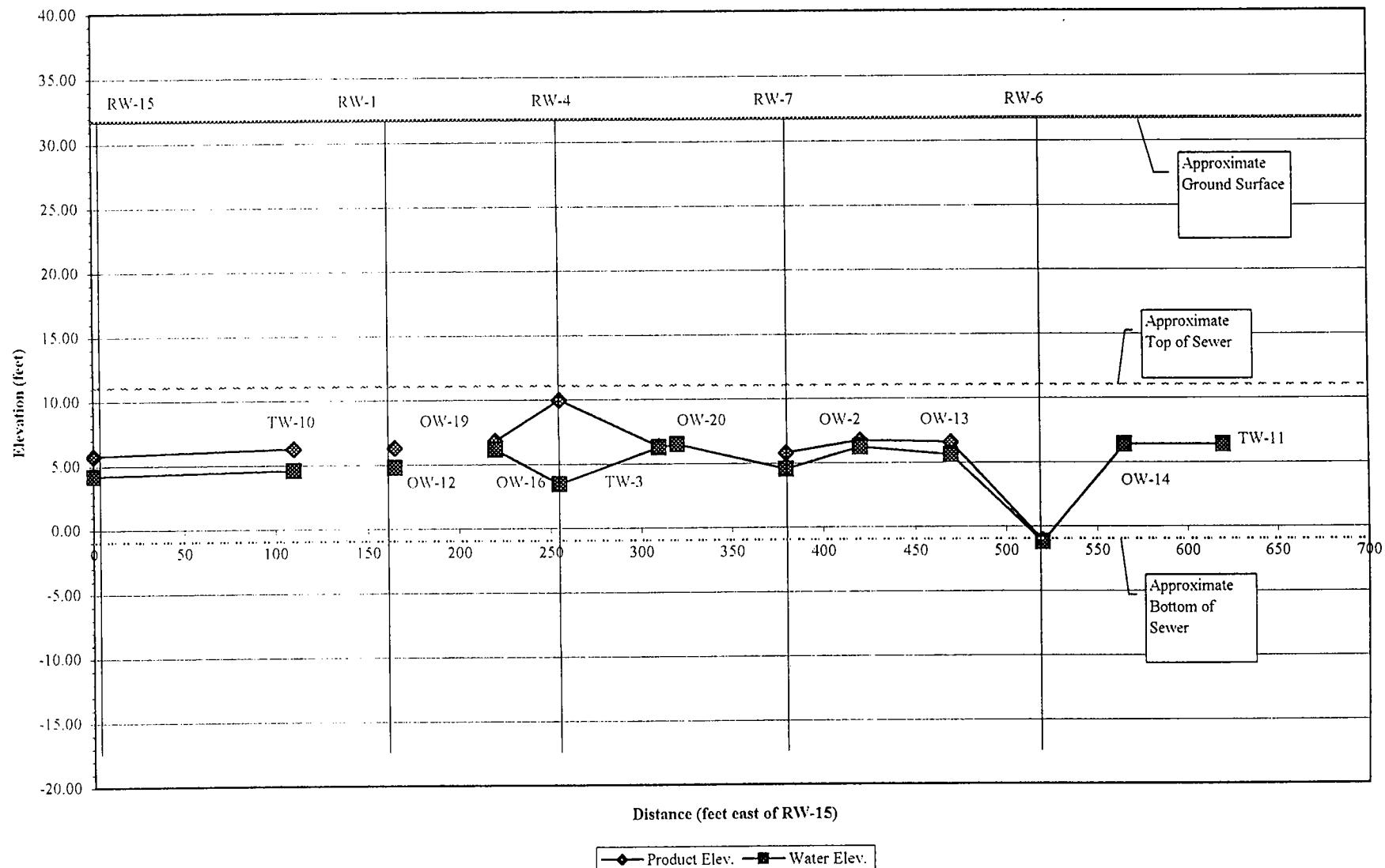
September 5, 2000 Product and Water Elevations



September 11, 2000 Product and Water Elevations



September 18, 2000 Product and Water Elevations



September 26, 2000 Product and Water Elevations

