

May 2, 2001

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

RE: 14 Service Building/Pollock Street Sewer Naphtha Investigation

Sunoco Philadelphia Refinery, Point Breeze Processing Area

3144 Passyunk Avenue, Philadelphia, Pennsylvania

Dear Mr. Burke:

This letter report has been prepared to summarize the investigation related to the subsurface release of naphtha in the area of the 14 Service Building located within the Sunoco Philadelphia Refinery, Point Breeze Processing Area. Included are summaries of release mitigation activities and soil boring installation activities.

Background

On December 13, 2000, during a regular sewer outfall inspection, non-aqueous phase liquid (NAPL) was observed seeping from the Pollock Street sewer outfall into the Pollock Street Coffer Dam, located in the Schuylkill River. Sunoco, Inc. (R&M) (Sunoco) maintains sorbant booms around the sewer outfall and coffer dam, which consequently contained the NAPL and prevented impact to the Schuylkill River. Sunoco utilized a vac-truck to remove the NAPL contained in the coffer dam and behind the sorbant booms in the river. NAPL was not observed during subsequent outfall and coffer dam inspections.

NAPL was again observed seeping into the Pollock Street Coffer Dam from the Pollock Street sewer on December 26, 2000. Sunoco again utilized a vac-truck to remove the NAPL from the coffer dam. NAPL continued to be observed in the coffer dam through January 29, 2001, and had been observed on several occasions through April 6, 2001. Throughout this time, Sunoco continued to remove the NAPL utilizing a vac-truck and a dedicated skimmer-pump. A sample of the NAPL was collected and identified by the Sunoco Laboratory as naphtha.

Release Identification and Abatement Measures

Sunoco identified an out-of-service underground pipeline located approximately 60 feet south of 14 Service Building as the probable source of the naphtha release. The pipeline location is shown on the attached Figure. The pipeline is buried at a depth of approximately 16 feet below grade, and runs from a series of transfer pumps located south of 14 Service Building, under the road approximately 100 feet to the east where it resurfaces.

On January 25, 2001 Sunoco attempted to excavate and inspect a portion of the underground pipeline near the transfer pumps. However, ground water was encountered at approximately 6 feet below grade, and could not be removed from the excavation at a rate faster than infiltration. Sunoco then pressure tightness tested the pipeline to determine its integrity. The pipeline failed the tightness test and Sunoco abandoned the underground section by filling it with concrete and blanking the flange at both ends.

Mr. David Burke May 2, 2001 Page 2 of 3

It is believed that the naphtha migrated from the now abandoned underground pipeline through the backfill of sewer laterals north to the Pollock Street sewer where it crosses the Philadelphia Refinery approximately 60 feet north of 14 Service Building. Because the Pollock Street sewer is constructed of brick, an infiltration pathway for naphtha into the sewer was most likely readily available.

Soil Boring Investigation

To determine if there was naphtha remaining in the subsurface and to determine its pathway from the release point to the Pollock Street sewer, on March 12 through 16, 2001, twenty-three (23) soil borings were installed in the area of 14 Service Building. A temporary well point was installed in each soil boring so that naphtha accumulation could be gauged. The soil boring locations are shown on the attached Figure.

The soil borings were installed utilizing a Geoprobe to a depth of 20 feet below grade. Only soil boring SB-17 met refusal at a depth less than 20 feet below grade. Boring logs and temporary well construction diagrams are also attached. As shown on the boring logs, soils in the area of 14 Service Building consist primarily of dry to slightly moist fine sand and silt to a depth of approximately 15 to 20 feet below grade. At approximately 15 to 20 feet below grade a wet coarse sand and fine gravel was encountered in many of the soil borings.

NAPL stained soils were observed in approximately half of the soil borings (SB-1, SB-4, SB-6, SB-9, SB-10, SB-11, SB-12, SB-14, SB-19, SB-21, SB-22, and SB-23) at depths ranging from approximately 5 to 19 feet below grade. Liquid NAPL was encountered only in SB-23 at a depth of approximately 15 to 17 feet below grade. There is not an identifiable pattern to the distribution of soils containing NAPL staining. In addition, an adequate volume of NAPL could not be secured to determine if the NAPL observed was naphtha.

The temporary well points have been gauged 4 times for depth to NAPL and/or depth to water since their installation. A table summarizing the gauging data collected to date is attached. NAPL has been detected in SB-1, SB-6, SB-7, SB-12, SB-15, SB-16, SB-18, SB-19, SB-20, and SB-23 at a thickness of 0.01 feet or greater. The maximum NAPL thickness measured to date was 0.11 feet in SB-7 and SB-19, both on April 29, 2001. With the exception of SB-6, SB-7, and SB-12, temporary well points containing NAPL are located to the west and northwest of the release point.

Based on gauging data collected on March 19, 2001, a vac-truck was utilized on March 29, 2001 to develop select well points (SB-1, SB-15, SB-16, SB-17, SB-18, SB-19, SB-20, and SB-23). The well points were developed in an attempt to increase the NAPL thickness in those wells so that a NAPL sample could be collected for identification. Based on gauging data collected since the select wells were developed, it appears that developing the wells has removed any NAPL that was present prior to development. In all cases, the NAPL thickness did not recover to the pre-development thickness. The maximum NAPL thickness detected since well development was 0.03 feet in SB-6, a non-developed well point.

Conclusions

In summary, the following data has been collected to date:

- Naphtha was observed in the Pollock Street Coffer dam December 26, 2000 through January 29, 2001, and had been observed on several occasions through April 6, 2001.
- The underground pipeline where the release originated was abandoned in place in late January 2001.
- Once the underground pipeline where the release originated was abandoned, the flow of naphtha
 from the Pollock Street sewer into the Pollock Street Coffer Dam subsided. NAPL has not been
 observed in the coffer dam since April 6, 2001. Therefore, it appears that the source has been
 removed.



- Twenty-three (23) soil borings/temporary well points were installed in the area of the release on March 12 through 16, 2001. Minimal NAPL was observed only in approximately 12 borings. Minimal NAPL was encountered during the installation of the 23 soil borings and temporary well points and during subsequent well point gauging. This suggests that the naphtha released did not significantly impact the area proximal to the release.
- The temporary well points were gauged for depth to NAPL and depth to water four (4) times. Trace to approximately 0.10 feet of NAPL was detected in eleven (11) of the temporary points. Well points in which NAPL was detected are located predominantly to the west and northwest of the release point. On March 29, 2001, the temporary wells that had exhibited NAPL were developed utilizing a vac-truck. Since development, the original NAPL thickness has not returned to the developed wells.
- Because it does not appear that the area proximal to the release point was significantly impacted by the naphtha release, it is likely that there was a preferential flow pathway from the release point to the Pollock Street sewer. Because the majority of the well points in which NAPL was detected are to the west and northwest of the release point the preferential flow was most likely in that direction. The most likely preferential flow path has been identified as the backfill around the underground sewer pipelines that run along the west side of the release area and 14 service building, and intersect with the Pollock Street sewer.

Based on the data collected to date, it appears that the source of the naphtha release has been removed and that impact to the area immediately adjacent to the release point was minimal. In addition, the backfill around the underground sewer lines that run along the west side of the release area has been identified as the most likely pathway of naphtha from the release point to the Pollock Street sewer. As such, Handex feels that no further investigation is warranted with regard to this issue.

If you have any questions regarding the information contained in this letter please feel free to contact either Mr. James Oppenheim of Sunoco at (215) 339-2436 or either of the undersigned at (410) 674-3200.

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David M. Leety

Sincerely

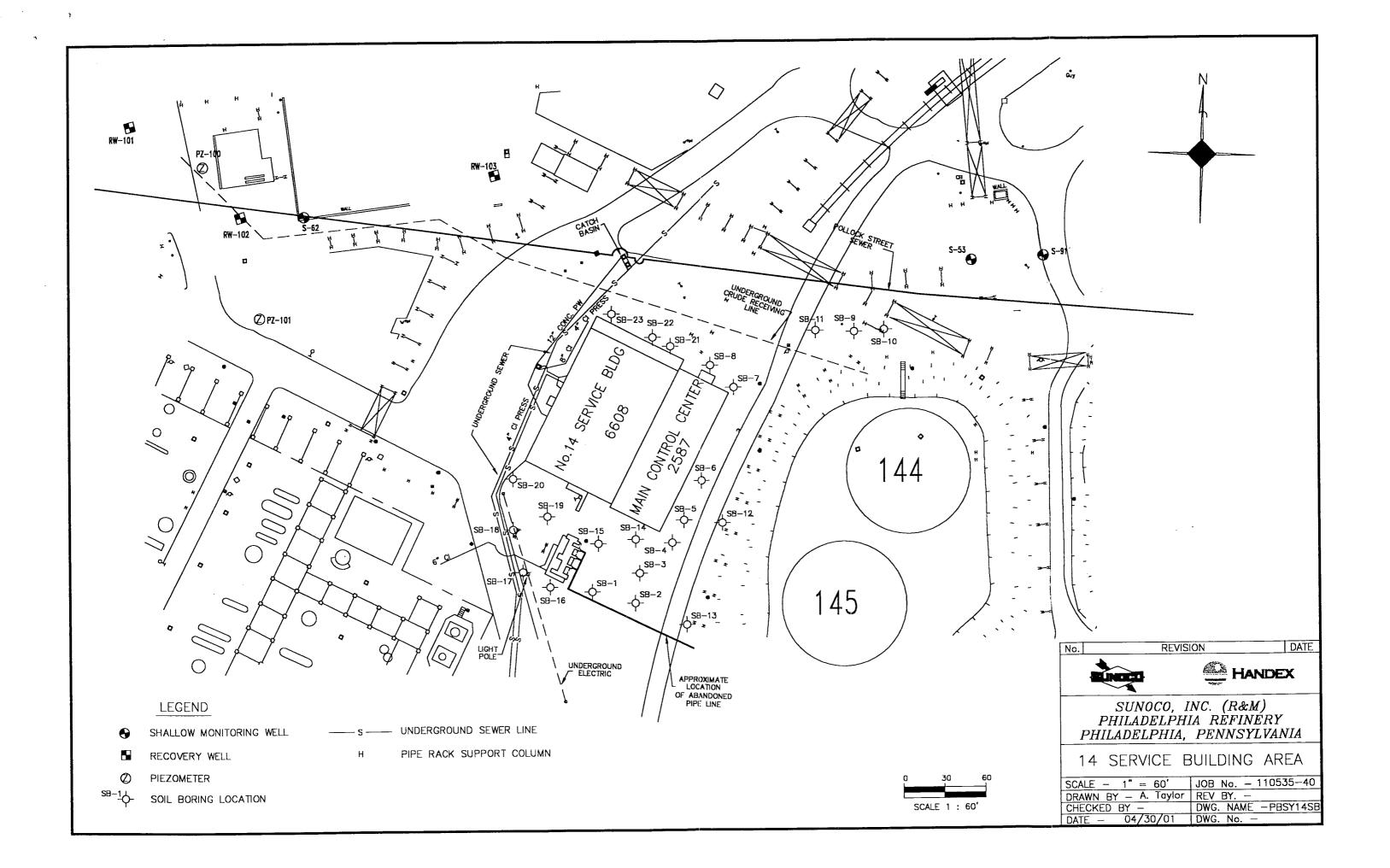
Senior Geologic Scientist

Troy A. Carrington Senior Project Manager

Attachments

cc: Mr. James Oppenheim, Sunoco, Inc. (R&M), Philadelphia, Pennsylvania

HANDEX®





WELL LOG: SB-1

Handex Of Maryland Use: Temporary Point Permit #: N/A Drill Date: *March 15, 2001* Owner Loc #: 14 Service Building Location: Point Breeze, Philadelphia Refinery Handex Loc #: 110535.040.T3075.900 Owner: Sunoco Owner Address: 3144 Passyunk Avenue, Philadelphia, RA BORING - Depth: 20 ft. Diameter: 2 in. Drilling Method: Geoprobe CASING - Length: 5 ft. Diameter: 1.25 in. SCREEN - Length: 15 ft. Diameter: 1.25 in. Sampling Method: Direct-Push (Geoprobe) WELL - Depth: 19.08 ft. Static Water Level: Depth **Graphic** Log Blows/6 in. (mdd) Depth (ft.) Well Diagram Sample 1 Sample Geologic Description PIO 92' PVC Stick-Up Brown SILT, slightly moist 40 PVC Riser 5-Brown SILT, NAPL staining 25" Scheduled Brown SILT, slightly moist 8 Continuous 24 10-Continuous 33 12 Grey and Buff SILT -15 15-Continuous 9 18 Brown fine SAND with fine Gravel, slightly moist 20 Continuous 13 Grey and Buff medium to coarse SAND, wet 20-25-Driller: B.L. Myers Brothers



WELL LOG: SB-2

Driller: B.L. Myers Brothers

Handex Of Maryland Use: Temporary Point Drill Date: *March 13, 2001* Permit #: N/A Owner Loc #: 14 Service Building Location: Point Breeze, Philadelphia Refinery Handex Loc #: 110535.040.T3075.900 Owner: Sunoco Owner Address: 3144 Passyunk Avenue, Philadelphia, PA BORING - Depth: 20 ft. Diameter: 2 in. CASING - Length: 5 ft. Diameter: 1.25 in. Drilling Method: Geoprobe Sampling Method: Direct-Push (Geoprobe) Diameter: 1.25 in. SCREEN - Length: 15 ft. WELL - Depth: 18.58 ft. Static Water Level: Depth Graphic Log (£;) Ė (mdd) Well Diagram Sample Blows/6 Depth (Sample (Geologic Description PID 142' PVC Stick-Up Large to medium GRAVEL, moist Brown fine Sandy SILT, slightly moist .25" Scheduled 40 PVC Riser 5-Continuous 90 8 .25" Scheduled 40 PVC (0.020 slat) Brown SILT, moist 10-Continuous 21 12 Brown SAND, wet 15-Continuous 16 11 Brown SILT, very slightly maist Brown SAND, wet 20-25-



WELL LOG: SB-3

Handex Of Maryland Permit #: N/A Drill Date: March 13, 2001 Use: Temporary Point Owner Loc #: 14 Service Building Location: Point Breeze, Philadelphia Refinery Handex Loc #: 110535.040.T3075.900 Owner: Sunoco Owner Address: 3144 Passyunk Avenue, Philadelphia, A BORING - Depth: 20 ft. Diameter: 2 in. Drilling Method: Geoprobe CASING - Length: 5 ft. Diameter: 1.25 in. SCREEN - Length: 15 ft. Diameter: 1.25 in. Sampling Method: Direct-Push (Geoprobe) WELL - Depth: 19.08 ft. Static Water Level: Depth Graphic Log (mdd) Depth (ft.) Well Diagram Sample] Blows/6 Sample Geologic Description PIO 92 PVC Stick-Up Large to medium GRAVEL, moist Brown fine Sandy SILT, slightly moist .25" Scheduled 40 PVC Riser 5-Continuous 294 8 Brown SILT, moist 10-Continuous 42 12 Brown SAND, wet 15-18 Continuous 8.7 Brown SILT, very slightly moist Brown SAND, wet 20-25-Driller: B.L. Myers Brothers Geologist: David Leety



WELL LOG: SB-4

Handex Of Maryland Drill Date: March 13, 2001 Use: Temporary Point Permit #: N/A Location: Point Breeze, Philadelphia Refinery Owner Loc #: 14 Service Building Handex Loc #: 110535.040.T3075.900 Owner: Sunoco Owner Address: 3144 Passyunk Avenue, Philadelphia, PA BORING - Depth: 20 ft. Diameter: 2 in. CASING - Length: 5 ft. Diameter: 1.25 in. Drilling Method: Geoprobe SCREEN - Length: 15 ft. Sampling Method: Direct-Push (Geoprobe) Diameter: 1.25 in. Static Water Level: WELL - Depth: 19.67 ft. Depth Graphic Log (mdd) (ft.) Blows/6 in. Well Diagram Sample . Depth Geologic Description <u>w</u> PID Sampl .33' PVC Stick-Up **ASPHALT** Brown SAND, moist Scheduled 40 PVC Riser 5-Brown SILT with trace Clay, slightly moist 1" Scheduled 40 (0.020 slat 40 10-12 Continuous 312 Black stained SILT with trace Clay, slightly 13 Continuous 53 Brown SILT with trace Clay, slightly moist Black SAND, moist Brown grading to Grey SILT, slightly moist 15 Grey to Buff SILT, dry Black SAND, wet 57 20 Continuous -20 20 25-Driller: B.L. Myers Brothers Geologist: David Leety



WELL LOG: SB-5

Driller: B.L. Myers Brothers

Handex Of Maryland Permit #: N/A Drill Date: March 13, 2001 Use: Temporary Point Location: Point Breeze, Philadelphia Refinery Owner Loc #: 14 Service Building Handex Loc #: 110535.040.T3075.900 Owner: Sunoco Owner Address: 3144 Passyunk Avenue, Philadelphia, RA BORING - Depth: 19 ft. Diameter: 2 in. CASING - Length: 5 ft. Diameter: 1.25 in. Drilling Method: Geoprobe SCREEN - Length: 15 ft. Diameter: 1.25 in. Sampling Method: Direct-Push (Geoprobe) WELL - Depth: 18.46 ft. Static Water Level: Depth Graphic Log (mdd) Depth (ft.) Well Diagram Sample Blows/6 Geologic Description Sampli PIO .54' PVC Stick-Up **ASPHALT** Gravel and sand sub base Brown moist SAND and SILT, with fine gravel, .25" Scheduled 40 PVC Riser 5-Brown SILT and SAND, moist 8 Continuous 15.5 .25" Scheduled 40 (0.020 slot) Brown SILT, slightly moist 10-Continuous 6.5 12 -15 15-19 Continuous 4.3 -20 20 -25 25



WELL LOG: SB-6

Driller: B.L. Myers Brothers

Handex Of Maryland Drill Date: March 13, 2001 Use: Temporary Point Permit #: N/A Owner Loc #: 14 Service Building Location: Point Breeze, Philadelphia Refinery Handex Loc #: 110535.040.T3075.900 Owner: Sunoco Owner Address: 3144 Passyunk Avenue, Philadelphia, PA BORING - Depth: 20 ft. Diameter: 2 in. CASING - Length: 5 ft. Diameter: 1.25 in. Drilling Method: Geoprobe Diameter: 1.25 in. SCREEN - Length: 15 ft. Sampling Method: Direct-Push (Geoprobe) WELL - Depth: 17.92 ft. Static Water Level: Depth Graphic Log (mdd) (££.) <u>:</u> Well Diagram 3lows/8 Sample Depth Sample 1 Geologic Description PID 2.08 PVC Stick-Up **ASPHALT** Gravel and sand sub base Brown and Grey SILT and SAND, with fine 1.25" Scheduled 40 PVC Riser 5-Scheduled 40 (0.020 slot) Brown and Grey SILT, slightly moist 40 10-Continuous 28 12 Brown SILT, slight NAPL staining at 14 feet 14.5 Continuous 29 **-1**5 15-Grey SILT, moist 19 Continuous 81 Brown coarse SAND, with fine Gravel -20 20 -25 25-



WELL LOG: SB-7

Driller: B.L. Myers Brothers

Handex Of Maryland Use: Temporary Point Drill Date: March 13, 2001 Permit #: N/A Owner Loc #: 14 Service Building Location: Point Breeze, Philadelphia Refinery Handex Loc #: 110535.040.T3075.900 Owner: Sunoco Owner Address: 3144 Passyunk Avenue, Philadelphia, PA BORING - Depth: 20 ft. Diameter: 2 in. CASING - Length: 5 ft. Diameter: 1.25 in. Drilling Method: Geoprobe SCREEN - Length: 15 ft. Diameter: 1.25 in. Sampling Method: Direct-Push (Geoprobe) WELL - Depth: 17.75 ft. Static Water Level: Depth Graphic Log (mdd) Depth (ft.) Well Diagram Blows/6 Sample Sample Geologic Description PIO 225 PVC Stick-Up **ASPHALT** Gravel and sand sub base Brown and Grey SILT, with some Sand and fine .25" Scheduled 40 PVC Riser 5 Brown fine SAND and SILT, NAPL stains throughout 10-Continuous 12 8.7 Brown SILT Grey and White mottled SILT 15 Continuous 2.1 15 Grey and Brown SAND, with fine Gravel and Cobbles, wet 20 Continuous 4.3 20--25 25-



WELL LOG: SB-8

Driller: B.L. Myers Brothers

Handex Of Maryland Use: Temporary Point Drill Date: March 15, 2001 Permit #: N/A Owner Loc #: 14 Service Building Location: Point Breeze, Philadelphia Refinery Handex Loc #: 110535.040.T3075.900 Owner: Sunoco Owner Address: 3144 Passyunk Avenue, Philadelphia, PA BORING - Depth: 20 ft. Diameter: 2 in. CASING - Length: 5 ft. Diameter: 1.25 in. Drilling Method: Geoprobe SCREEN - Length: 15 ft. Diameter: 1.25 in. Sampling Method: Direct-Push (Geoprobe) WELL - Depth: 18.08 ft. Static Water Level: Depth Graphic Log Depth (ft.) (mdd) Well Diagram Blows/6 Sample Sample Geologic Description PIG 192' PVC Stick-Up Brown SILT and SAND, with medium Gravel RIser. 1.25" Scheduled 40 PVC Brown Sandy SILT, wet Continuous 2 8 Scheduled 40 (0.020 slot) Brown Sandy SILT, mottled and moist -10 10-12 Continuous 15 Brown medium SAND, wet to moist -15 15-18 Continuous 28 Brown and Grey SILT, mottled Brown SILT, wet 20 Continuous 33 Grey medium SAND and GRAVEL, wet -20 20--25 25-



WELL LOG: SB-9

Driller: B.L. Myers Brothers

Handex Of Maryland Drill Date: March 15, 2001 Use: Temporary Point Permit #: N/A Owner Loc #: 14 Service Building Location: Point Breeze, Philadelphia Refinery Handex Loc #: 110535.040.T3075.900 Owner: Sunoco Owner Address: 3144 Passyunk Avenue, Philadelphia, PA BORING - Depth: 20 ft. Diameter: 2 in. CASING - Length: 5 ft. Diameter: 1.25 in. Drilling Method: Geoprobe SCREEN - Length: 15 ft. Diameter: 1.25 in. Sampling Method: Direct-Push (Geoprobe) WELL - Depth: 19.42 ft. Static Water Level: Depth Graphic Log (ft.) Ė (mdd) Well Diagram Sample Blows/6 Depth (Geologic Description യ Sample PIO 58' PVC Stick-Up Brown SILT and SAND, with some Gravel, slightly maist Scheduled 40 PVC Riser 5-Brown SILT, mottled, maist 1.25" .25" Scheduled 40 (0.020 slot) 10-Continuous 224 12 Brown medium SAND, moist Brown SILT, slight NAPL stain at 14.5' 15-16 Continuous 318 Brown fine SAND Grey fine Sandy SILT, with some fine gravel, slightly moist Continuous 105 20 Brown medium SAND with medium Gravel, wet -20 20-25



WELL LOG: SB-10

Driller: B.L. Myers Brothers

Handex Of Maryland Use: Temporary Point Drill Date: *March 15, 2001* Permit #: N/A Owner Loc #: 14 Service Building Location: Point Breeze, Philadelphia Refinery Handex Loc #: 110535.040.T3075.900 Owner: Sunoco Owner Address: 3144 Passyunk Avenue, Philadelphia, PA BORING - Depth: 20 ft. Diameter: 2 in. CASING - Length: 5 ft. Diameter: 1.25 in. Drilling Method: Geoprobe SCREEN - Length: 15 ft. Diameter: 1.25 in. Sampling Method: Direct-Push (Geoprobe) WELL - Depth: 19.67 ft. Static Water Level: Depth Graphic Log ≟ (mdd) Depth (ft.) Well Diagram Blows/6 Sample Geologic Description Sample 밉 33' PVC Stick-Up Brown SILT and SAND, with some Gravel, slightly maist .25" Scheduled 40 PVC Riser 5-Brown and black fine SAND and SILT, slight NAPL staining 8 Continuous 103 Brown SILT, slight NAPL staining .25" Scheduled 40 PVC (0.020 slot) 10-Continuous 143 12 15-18 Continuous 125 Brown fine SAND and SILT with some fine to medium Gravel, NAPL stains Brown medium SAND and SILT, with fine to medium Gravel 255 Continuous 20 Brown coarse SAND with fine Gravel, wet 20 -25 25



WELL LOG: SB-11

Driller: B.L. Myers Brothers

Handex Of Maryland Drill Date: March 15, 2001 Use: Temporary Point Permit #: N/A Owner Loc #: 14 Service Building Location: Point Breeze, Philadelphia Refinery Handex Loc #: 110535.040.T3075.900 Owner: Sunoco Owner Address: 3144 Passyunk Avenue, Philadelphia, PA BORING - Depth: 20 ft. Diameter: 2 in. CASING - Length: 5 ft. Diameter: 1.25 in. Drilling Method: Geoprobe Diameter: 1.25 in. SCREEN - Length: 15 ft. Sampling Method: Direct-Push (Geoprobe) WELL - Depth: 15.46 ft. Static Water Level: Depth Graphic Log (££.) ⋵ (mdd) Well Diagram Sample 3lows/8 Depth (Geologic Description Sample PID 4.54' PVC Stick-Up Brown SILT and SAND, with some Gravel, slightly moist .25" Scheduled 40 PVC Riser .25" Scheduled 40 PVC (0.020 slot) 5-Brown SILT, maist 8 Continuous 143 Brown and black fine SAND and SILT, little NAPL staining Brown SILT, little NAPL staining 40 10-12 Continuous 115 Brown SILT and fine SAND, with fine Gravel, **⊣**5 15slightly moist Continuous 75 16 Brown medium to coarse SAND, with fine Gravel, moist to wet Continuous 178 20 -20 20--25

Handex*
Handex Of Maryland

WELL LOG: SB-12

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Permit #: N/A				Drill Date: March 15, 2001				Use: Temporary Point				
Location: Point Breeze, Philadelphia Refinery Owner Loc							#: 1	4 Service	Building			
Owne	r: <i>Sund</i>	oco						Handex Lo	DC #:	110535.0	40.T3075.90	0
Owne	r Addre	ess:	3144 Passy	unk A	venue,	Philadelphia, P	A BORING - Depth	: <i>20 ft</i> .		Diamete	: 2 in.	
Drillin	g Meth	od: i	Geoprobe				CASING - Length	n: <i>5 ft</i> .		Diamete	: 1.25 in.	
Sampling Method: Direct—Push (Geoprobe) SCR						SCREEN - Length	n: <i>15 ft</i> .		Diamete	: 1.25 in.		
Stati	c Water	Lev	el:				WELL - Depti	n: <i>19.04 ft.</i>	,			
Depth (ft.)	Sample ID								.98' PVC Stick-Up		iagram •	
10-	8 12 18		Continuous	13 48		Grey SILT an Grey medium S wet	minor NAPL staining d fine SAND, with fine G SAND and fine to mediu	m Gravel,	Scheduled 40 PVC Riser			
25-					<u></u>				-25	<u>-</u>		
							Drillor: D.L. No.	ore Brother		<u> </u>		_
i Geold	ogist: 🛭	Javid	Leety				Driller: B.L. My	ers promer	5			



WELL LOG: SB-13

Driller: B.L. Myers Brothers

Handex Of Maryland Drill Date: March 15, 2001 Use: Temporary Point Permit #: N/A Owner Loc #: 14 Service Building Location: Point Breeze, Philadelphia Refinery Handex Loc #: 110535.040.T3075.900 Owner: Sunoco Owner Address: 3144 Passyunk Avenue, Philadelphia, PA BORING - Depth: 20 ft. Diameter: 2 in. CASING - Length: 5 ft. Diameter: 1.25 in. Drilling Method: Geoprobe Sampling Method: Direct-Push (Geoprobe) SCREEN - Length: 15 ft. Diameter: 1.25 in. WELL - Depth: 18.42 ft. Static Water Level: Depth Graphic Log (mdd) Depth (ft.) Well Diagram 3lows/6 Sample Sample 1 Geologic Description PIO 158' PVC Stick-Up Light Brown SILT, slightly moist 1.25" Scheduled 40 PVC Riser 5-7 8 Continuous .25" Scheduled 40 PVC (0.020 slot) Black and brown SILT 10-Brown SILT 12 Continuous 28 Brown medium to coarse SAND, wet Grey and Buff mottled SILT, slightly moist **-15** 15-16 Continuous Brown coarse SAND, wet 20 Continuous Dark Brown fine to medium SAND, with fine -20 20--25 25



WELL LOG: SB-14

Driller: B.L. Myers Brothers

Handex Of Maryland Permit #: N/A Drill Date: March 15, 2001 Use: Temporary Point Owner Loc #: 14 Service Building Location: Point Breeze, Philadelphia Refinery Handex Loc #: 110535.040.T3075.900 Owner: Sunoco Owner Address: 3144 Passyunk Avenue, Philadelphia, PA BORING - Depth: 20 ft. Diameter: 2 in. CASING - Length: 5 ft. Diameter: 1.25 in. Drilling Method: Geoprobe SCREEN - Length: 15 ft. Diameter: 1.25 in. Sampling Method: Direct-Push (Geoprobe) WELL - Depth: 18.42 ft. Static Water Level: Depth Graphic Log (mdd) (££.) Ŀ Well Diagram Sample 1 3lows/8 Depth (Sample Geologic Description \Box 158' PVC Stick-Up Brown SILT, slightly moist 1" Scheduled 40 PVC Riser 5-8 Continuous 24 40 10-Brown SILT, slight NAPL staining 12 Continuous 24 **-1**5 15-18 Continuous Grey and Brown mottled SILT Grey SILT, with little fine gravel 20 Continuous Grey SILT, with coarse Sand and Gravel -20 20 -25 25



WELL LOG: SB-15

Driller: B.L. Myers Brothers

Handex Of Maryland Use: Temporary Point Drill Date: March 15, 2001 Permit #: N/A Owner Loc #: 14 Service Building Location: Point Breeze, Philadelphia Refinery Handex Loc #: 110535.040.T3075.900 Owner: Sunoco Owner Address: 3144 Passyunk Avenue, Philadelphia, PA BORING - Depth: 20 ft. Diameter: 2 in. CASING - Length: 5 ft. Diameter: 1.25 in. Drilling Method: Geoprobe SCREEN - Length: 15 ft. Diameter: 1.25 in. Sampling Method: Direct-Push (Geoprobe) WELL - Depth: 18.29 ft. Static Water Level: Depth Graphic Log (ft.) .⊆ (mdd) Well Diagram Blows/6 Sample Depth (Sample Geologic Description PIO 17f PVC · Stick-Up Brown SILT, slightly moist 1.25" Scheduled 40 PVC Riser 5-8 Continuous 24 Scheduled 40 PVC (0.020 slot) 10-Brown fine SAND and SILT Continuous 12 Grey and Brown mottled SILT -15 15-10 Continuous 2 Brown coarse SAND with fine to mdium Gravel, 20 Continuous 2 Grey SILT, with coarse Sand and Gravel -20 20-25-



WELL LOG: SB-16

Driller: B.L. Myers Brothers

Handex Of Maryland Drill Date: March 16, 2001 Use: Temporary Point Permit #: N/A Owner Loc #: 14 Service Building Location: Point Breeze, Philadelphia Refinery Handex Loc #: 110535.040.T3075.900 Owner: Sunoco Owner Address: 3144 Passyunk Avenue, Philadelphia, PA BORING - Depth: 20 ft. Diameter: 2 in. CASING - Length: 5 ft. Diameter: 1.25 in. Drilling Method: Geoprobe SCREEN - Length: 15 ft. Diameter: 1.25 in. Sampling Method: Direct-Push (Geoprobe) WELL - Depth: 18.83 ft. Static Water Level: Depth Graphic Log (mdd) Depth (ft.) Well Diagram Blows/6 Sample Sample Geologic Description PID 117" PVC Brown SILT .25" Scheduled 40 PVC Riser 5-8 Continuous 13 Black fine SAND and SILT, with medium Gravel .25" Scheduled 40 PVC (0.020 slat) Dark grey to black SILT, slightly moist Grey SILT 10-Brown and grey mottled SILT 12 Continuous 0 **⊣**5 15-16 Continuous 0 Grey SILT No recovery 20--25 25



WELL LOG: SB-17

Driller: B.L. Myers Brothers

Handex Of Maryland Use: Temporary Point Drill Date: March 16, 2001 Permit #: N/A Owner Loc #: 14 Service Building Location: Point Breeze, Philadelphia Refinery Handex Loc #: 110535.040.T3075.900 Owner: Sunoco Owner Address: 3144 Passyunk Avenue, Philadelphia, PA BORING - Depth: 15 ft. Diameter: 2 in. CASING - Length: 5 ft. Diameter: 1.25 in. Drilling Method: Geoprobe Diameter: 1.25 in. SCREEN - Length: 10 ft. Sampling Method: Direct-Push (Geoprobe) WELL - Depth: 14.42 ft. Static Water Level: Depth **Graphic Log** (£.) (mdd) Well Diagram Blows/6 Sample Depth Geologic Description Ø Sample PID 58' PVC Stick-Up Brown SILT 1.25" Scheduled 40 PVC Riser 5-Grey SILT, slightly moist 1.25" Scheduled 40 PVC (0.020 slot) Continuous 95 Grey and light brown mottled SILT 10-Continuous 9 12 Light brown SILT 15 Continuous 29 Grey fine SAND with medium rounded Cobbles 15--20 20-25



WELL LOG: SB-18

Handex Of Maryland Permit #: N/A Drill Date: *March 16, 2001* Use: Temporary Point Owner Loc #: 14 Service Building Location: Point Breeze, Philadelphia Refinery Handex Loc #: 110535.040.T3075.900 Owner: Sunoco Owner Address: 3144 Passyunk Avenue, Philadelphia, PA BORING - Depth: 20 ft. Diameter: 2 in. Drilling Method: Geoprobe CASING - Length: 5 ft. Diameter: 1.25 in. Sampling Method: Direct-Push (Geoprobe) SCREEN - Length: 15 ft. Diameter: 1.25 in.

Stati	c Wate	r Lev	el:				WELL – Depth: <i>16</i> .	83 ft.
Depth (ft.)	Sample ID	Sample Depth	Blows/6 in.	PID (ppm)	Graphic Log	Ge	eologic Description	Well Diagram 3.17' PVC Stick-Up
	5		Continuous	190		Dark brown a	nd black SILT, moist	4 40 PVC Riser
5	8		Continuous	87		Brown SILT, s	slightly moist ey mottled SILT	1.25" Scheduled 40 PVC Riser (0.020 slot)
10-	12		Continuous	41		Brown SILT		- 1.25" Scheduled 4
15-	16		Continuous	103		Brown medium rounded Grav	SAND, with fine to medium	—————————————————————————————————————
20-	20		Continuous	201				20
25-								-25

Geologist: David Leety

Driller: B.L. Myers Brothers



WELL LOG: SB-19

Handex Of Maryland Use: Temporary Point Permit #: N/A Drill Date: March 16, 2001 Owner Loc #: 14 Service Building Location: Point Breeze, Philadelphia Refinery Handex Loc #: 110535.040.T3075.900 Owner: Sunoco Owner Address: 3144 Passyunk Avenue, Philadelphia, PA BORING - Depth: 20 ft. Diameter: 2 in. CASING - Length: 5 ft. Diameter: 1.25 in. Drilling Method: Geoprobe SCREEN - Length: 15 ft. Diameter: 1.25 in. Sampling Method: Direct-Push (Geoprobe) WELL - Depth: 17.42 ft. Static Water Level: Depth Graphic Log ڃَ (mdd) Depth (ft.) Well Diagram Sample Blows/6 Geologic Description Sample PIO 258' PVC Stick-Up Brown SILT, little fine Gravel, moist 1.25" Scheduled 40 PVC Riser 5 .25' Scheduled 40 PVC (0.020 slat) 8 Continuous 17 Brown SILT, slightly moist 10-Continuous 7 12 Brown SILT -15 15 Continuous в 18 Brown SILT, NAPL staining, wet Continuous 95 19 215 Continuous 20 Brown coarse SAND, with medium Gravel 20--25 25 Driller: B.L. Myers Brothers



WELL LOG: SB-20

Handex Of Maryland Drill Date: *March 16, 2001* Use: Temporary Point Permit #: N/A Owner Loc #: 14 Service Building Location: Point Breeze, Philadelphia Refinery Handex Loc #: 110535.040.T3075.900 Owner: Sunoco Owner Address: 3144 Passyunk Avenue, Philadelphia, PA BORING - Depth: 20 ft. Diameter: 2 in. CASING - Length: 5 ft. Diameter: 1.25 in. Drilling Method: Geoprobe SCREEN - Length: 15 ft. Diameter: 1.25 in. Sampling Method: Direct-Push (Geoprobe) WELL - Depth: 16.25 ft. Static Water Level: Depth Graphic Log Blows/6 in. Depth (ft.) (mdd) Well Diagram Sample Sample [Geologic Description 딥 3.75' PVC Stick-Up Dark grey and black SILT, moist .25" Scheduled 40 PVC Riser 5. .25" Scheduled 40 PVC (0.020 slot) Continuous 8 Brown and grey mottled SILT, slightly moist 10-15 12 Continuous 45 15-18 Continuous Grey SILT, slightly moist Brown medium SAND, with fine to medium Gravel, wet Continuous 359 20 -20 20-25 Driller: B.L. Myers Brothers Geologist: David Leety



WELL LOG: SB-21

Driller: B.L. Myers Brothers

Handex Of Maryland Drill Date: March 16, 2001 Use: Temporary Point Permit #: N/A Owner Loc #: 14 Service Building Location: Point Breeze, Philadelphia Refinery Handex Loc #: 110535.040.T3075.900 Owner: Sunoco Owner Address: 3144 Passyunk Avenue, Philadelphia, PA BORING - Depth: 20 ft. Diameter: 2 in. Diameter: 1.25 in. CASING - Length: 5 ft. Drilling Method: Geoprobe SCREEN - Length: 15 ft. Diameter: 1.25 in. Sampling Method: Direct-Push (Geoprobe) Static Water Level: WELL - Depth: 18.04 ft. Depth **Graphic** Log (mdd) Depth (ft.) Well Diagram Sample 1 Blows/6 Sample Geologic Description PIO 196' PVC Gray SILT, slightly moist .25" Scheduled 40 PVC Riser .25" Scheduled 40 PVC (0.020 slat) 10-Grey and brown mottled SILT, slightly moist, NAPL staining 12 Continuous 39 Grey and brown mottled SILT, slightly moist 14 Continuous 62 Grey and brown mottled SILT, moist, NAPL staining Grey and brown mottled SILT **H**5 15-Continuous 48 16 Grey and brown mottled SILT, NAPL staining Continuous 13 20 Brown fine SAND, slightly moist -20 20--25 25.



WELL LOG: SB-22

Driller: B.L. Myers Brothers

Handex Of Maryland Drill Date: March 16, 2001 Use: Temporary Point Permit #: N/A Owner Loc #: 14 Service Building Location: Point Breeze, Philadelphia Refinery Handex Loc #: 110535.040.T3075.900 Owner: Sunoco Owner Address: 3144 Passyunk Avenue, Philadelphia, AA BORING - Depth: 20 ft. Diameter: 2 in. CASING - Length: 5 ft. Diameter: 1.25 in. Drilling Method: Geoprobe Diameter: 1.25 in. SCREEN - Length: 15 ft. Sampling Method: Direct-Push (Geoprobe) WELL - Depth: 18.83 ft. Static Water Level: Depth Graphic Log Sample ID .⊆ (mdd) Depth (ft.) Well Diagram Blows/6 Geologic Description Sample PID LIT' PVC Grey SILT, moist, NAPL staining at 9'-10' .25" Scheduled 40 PVC Riser .25" Scheduled 40 PVC (0.020 slat) 10-Continuous 75 12 Grey medium SAND, wet Grey SILT 15-16 Continuous 44 Brown and grey mottled SILT, moist, NAPL staining Brown and grey mottled SILT, moist Brown medium SAND, wet 50 20 Continuous -20 20 Brown fine SAND 25



WELL LOG: SB-23

Handex Of Maryland Drill Date: March 16, 2001 Use: Temporary Point Permit #: N/A Owner Loc #: 14 Service Building Location: Point Breeze, Philadelphia Refinery Handex Loc #: 110535.040.T3075.900 Owner: Sunoco Owner Address: 3144 Passyunk Avenue, Philadelphia, PA BORING - Depth: 20 ft. Diameter: 2 in. CASING - Length: 5 ft. Diameter: 1.25 in. Drilling Method: Geoprobe Sampling Method: Direct-Push (Geoprobe) SCREEN - Length: 15 ft. Diameter: 1.25 in. WELL - Depth: 18 ft. Static Water Level: Depth Log (mdd) Depth (ft.) Well Diagram Blows/6 Sample Graphic Sample Geologic Description PIO 2 PVC Stick-Up Grey SILT, wet, NAPL staining at 9'-10' .25"Scheduled 40 PVC Riser 5-.25" Scheduled 40 PVC (0.020 slot) 10-Dark grey and black SILT, NAPL staining 12 Continuous 10 Brown and grey mottled SILT, slightly moist, with NAPL liquid Brown and grey mottled SILT, moist, NAPL staining and liquid **⊣**5 15-18 Continuous 48 18 Continuous 125 Grey SAND, wet, with NAPL liquid Brown fine SAND, with fine gravel -20 20 -25 25

Driller: B.L. Myers

Sunoco Philadelphia Refinery Point Breeze Processing Area 14 Service Building Area

Soil Boring Temporary Well Point Gauging Data

		Depth to	Depth to	NAPL	
Well Point	Date	NAPL	Water	Thickness	Comments
Location		(feet)	(feet)	(feet)	
SB-1	03/19/2001	2.80	2.85	0.05	
1	03/29/2001	2.80	2.85	0.05	Well developed.
	04/05/2001	2.19	2.19	Trace	
	04/17/2001	2.18	2.18	Trace	
SB-2	03/19/2001		8.99		
ĺ	03/29/2001		8.80		
	04/05/2001		8.48		
	04/17/2001		8.20		
SB-3	03/19/2001		7.17		
	03/29/2001		7.29		
	04/05/2001		6.88		
	04/17/2001		6.91		
SB-4	03/19/2001		7.41		
	03/29/2001		7.55		
j	04/05/2001		6.97		
	04/17/2001		7.34		
SB-5	03/19/2001		7.75		
	03/29/2001		7.79		
1	04/05/2001		7.40		
1	04/17/2001		7.66		
SB-6	03/19/2001		7.92		
İ	03/29/2001		9.00		
	04/05/2001	8.45	8.45	Trace	
	04/17/2001	8.86	8.89	0.03	
SB-7	03/19/2001		8.85		
	03/29/2001	6.89	7.00	0.11	
	04/05/2001	6.74	6.74	Trace	
	04/17/2001		6.85		
SB-8	03/19/2001		5.73		
	03/29/2001		8.00		
	04/05/2001		5.81		
1	04/17/2001		5.73		
SB-9	03/19/2001		7.94		
	03/29/2001		8.14		
	04/05/2001		7.72		
	04/17/2001		7.84		
SB-10	03/19/2001		19.62		
1	03/29/2001		19.61		
	04/05/2001		19.54		
	04/17/2001		19.12		



Sunoco Philadelphia Refinery Point Breeze Processing Area 14 Service Building Area

Soil Boring Temporary Well Point Gauging Data

		Depth to	Depth to Depth to NAPL		7	
Well Point	Date	NAPL	Water	Thickness	Comments	
Location		(feet)	(feet)	(feet)		
SB-11	03/19/2001		9.39			
	03/29/2001		9.55			
	04/05/2001		9.40			
	04/17/2001		9.41			
SB-12	03/19/2001	17.62	17.72	0.10		
	03/29/2001	17.57	17.57	Trace		
	04/05/2001	16.38	16.38	Trace		
ļ	04/17/2001	NA	NA	NA	Well damaged at grade	
SB-13	03/19/2001		8.43			
	03/29/2001		8.66			
	04/05/2001		8.15			
	04/17/2001		8.57			
SB-14	03/19/2001		7.64		•	
l	03/29/2001		7.77			
ĺ	04/05/2001		7.49			
	04/17/2001		7.47			
SB-15	03/19/2001	3.96	3.96	Trace		
	03/29/2001	4.10	4.11	0.01	Well developed.	
	03/29/2001		4.37		0.13 feet cut from TOC.	
	04/05/2001		4.11			
	04/17/2001		4.13			
SB-16	03/19/2001	2.80	2.82	0.02		
	03/29/2001	2.92	2.93	0.01	Well developed.	
	03/29/2001	3.94	3.94	Trace	0.13 feet cut from TOC	
	04/05/2001		2.79			
	04/17/2001		2.89			
SB-17	03/19/2001		7.32			
	03/29/2001		7.99		Well developed.	
•	04/05/2001		14.22			
	04/17/2001		13.25			
SB-18	03/19/2001	5.06	5.09	0.03		
	03/29/2001	5.25	5.31	0,06	Well developed.	
	03/29/2001		3,40		1.67 feet cut from TOC	
	04/05/2001		3.25			
	04/17/2001	3.46	3.46	Trace		
SB-19	03/19/2001	4.58	4.62	0.04		
	03/29/2001	4.69	4.80	0.11	Well developed.	
	03/29/2001	14.83	14.84	0.01	1.0 feet cut from TOC	
	04/05/2001		12.75			
	04/17/2001		14.10			

Sunoco Philadelphia Refinery Point Breeze Processing Area 14 Service Building Area

Soil Boring Temporary Well Point Gauging Data

Well Point Location	Date	Depth to NAPL (feet)	Depth to Water (feet)	NAPL Thickness (feet)	Comments
SB-20	03/19/2001	6.44	6.44	Trace	
	03/29/2001	6,55	6.56	0.01	Well developed.
•	03/29/2001	4.02	4.02	Trace	2.0 feet cut from TOC
	04/05/2001		3.93		
	04/17/2001		4.05		
SB-21	03/19/2001				obstruction at 4.84
	03/29/2001				obstruction at 4.84
	04/05/2001				obstruction at 4.84
	04/17/2001				obstruction at 4.84
SB-22	03/19/2001	4.92	4.92	Trace	
	03/29/2001		8.10		
	04/05/2001		4.96		
	04/17/2001		5.08		
SB-23	03/19/2001	5.53	5.55	0.02	
	03/29/2001		5.66		Well developed.
	03/29/2001		5.01		
	04/05/2001		4.87		
	04/17/2001		4.98		