WORK PLAN FOR SITE WIDE APPROACH UNDER THE ONE CLEANUP PROGRAM

SUNOCO PHILADELPHIA REFINERY
PHILADELPHIA, PENNSYLVANIA

Sunoco, Inc. (R&M)
3144 Passyunk Avenue
Philadelphia, Pennsylvania

September 16, 2011
2574601

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1.0 INTRODUCTION AND BACKGROUND

This Work Plan for Site Wide Approach under the One Cleanup Program (Work Plan) has been prepared by Sunoco, Inc. (R&M) (Sunoco) in support of the ongoing site wide remedial program at Sunoco's Philadelphia Refinery (facility). The facility is shown in Figure 1 of this Work Plan.

Sunoco and the Pennsylvania Department of Environmental Protection (PADEP) entered into a Consent Order & Agreement (CO&A) in December 2003 with respect to remedial activities at the facility. Sunoco's Phase I Remedial Plan (Phase I Plan), dated November 2003, was included as an attachment to the CO&A. A copy of the CO&A and Phase I Plan are included as Appendix A of this Work Plan. In accordance with the CO&A and Phase I Plan, a Current Conditions Report and Comprehensive Remedial Plan (CCR) was prepared by Sunoco in June 2004. The Phase I Plan and the CCR divided the facility into 11 Areas of Interest (AOIs), and presented a prioritization of the AOIs based on specific risk factors. The AOIs are shown in Figure 2 of this Work Plan. The CCR also presented the Phase II remedial approach and schedule to characterize each of the 11 AOIs, and to conduct Phase I and II corrective action activities in accordance with the 2003 CO&A and the Phase I Plan. Since 2003, Sunoco has completed site characterization activities for all 11 AOIs. For each AOI that has been characterized, Sunoco has prepared and submitted a corresponding Site Characterization Report in accordance with the Revised Phase II Corrective Action Activities schedule that was included in the CCR. A copy of this schedule is included in this Work Plan as Appendix B.

In April 2004, the PADEP and the United States Environmental Protection Agency (EPA) signed an agreement entitled "One Cleanup Program Memorandum of Agreement (PA One Cleanup Program)," which provides a process for sites remediated under Pennsylvania's Land Recycling and Environmental Remediation Standards Act (Act 2) program to satisfy EPA's Resource, Conservation and Recovery Act (RCRA) corrective action requirements through characterization and attainment of Act 2 remediation standards. Since November 2005, Sunoco and its representatives have met with officials of the PADEP and EPA on several occasions to discuss the applicability of PA One Cleanup Program to the ongoing remedial program for the facility. Sunoco, PADEP and EPA agree that the ongoing remedial program can be addressed under the PA One Cleanup Program. Sunoco submitted a Notice of Intent to Remediate (NIR) on October 12, 2006 to formally enter the facility into the PA Act 2 Program. The portion of the facility known as the Belmont Terminal is not subject to RCRA corrective action requirements and was not included in the NIR. A NIR may be submitted in the future for the Belmont

Terminal. A copy of the NIR and associated public and municipal notices are provided in Appendix C of this Work Plan. The cover letter included with the NIR expressed Sunoco's intent to enter the facility into the PA One Cleanup Program. DEP and EPA have agreed that the facility is in the PA One Cleanup Program and it is listed on EPA's online PA One Cleanup Program list. The facility's participation in the PA One Cleanup Program will be included in the RCRA Corrective Action Module of its RCRA Part B Permit.

1.1 Site Description and Site History

The current Site was historically operated as two separate facilities. Point Breeze was formerly owned by Atlantic Richfield Company (ARCO) and Girard Point was formerly owned by Chevron. Point Breeze has been operating under a Consent Order and Agreement since 1993. The 2003 CO&A replaced the 1993 CO&A and includes Girard Point the West Yard, and the Schuylkill River Tank Farm.

AOIs were defined in the Phase I Plan and the CCR based on risk-based factors, including product types, potential exposure pathways, receptors, known light non-aqueous phase liquid (LNAPL) quantities, and historical information. The AOIs are shown on Figure 2 and include:

- AOI 1 - Belmont Terminal, #1 Tank Farm, and #2 Tank Farm Point Breeze
- AOI 2 - Point Breeze Processing Area
- AOI 3 - Impoundment Area Point Breeze
- AOI 4 - #4 Tank Farm Area Point Breeze
- AOI 5 - Girard Point South Tank Field Area
- AOI 6 - Girard Point Chemicals Processing Area
- AOI 7 - Girard Point Fuels Processing Area
- AOI 8 - Point Breeze Process Area North Yard
- AOI 9 - Schuylkill River Tank Farm
- AOI 10 - West Yard
- AOI 11 - Deep Aquifer, Farrington Sand Beneath Facility

Since 2003, Sunoco has completed site characterization activities for all 11 AOIs. The Deep Aquifer (AOI 11) has been included within the scope of each individual AOI investigation, but the reporting for AOI 11 was the last report submitted in accordance with the Phase II Corrective Action Schedule.

2.0 OBJECTIVE

The technical approach outlined in the CO&A embodies the following goals:

- Attainment of an Act 2 standard at the boundaries of the Philadelphia Refinery and Belmont Terminal;
- Protection of human health within the boundaries of the Philadelphia Refinery and Belmont Terminal; and
- Assess potential for chemical degradation of groundwater under the Facility from past or present operations caused by geochemical processes that originate with the presence of petroleum chemicals in the soil and groundwater.

Sunoco has been pursuing these goals by evaluating a number of boundary and internal issues that are also set forth in the CO&A. These are:

- Offsite light non-aqueous phase liquid (LNAPL) on groundwater from past or current operations;
- Offsite dissolved-phase groundwater contamination from past or current operations;
- Current and future releases of contaminants into surface waters and the City of Philadelphia combined sewer system;
- Soil contamination at levels which may result in future boundary issues due to surface runoff, migration of LNAPL, or the leaching of chemicals from contaminated soil into groundwater;
- Soil contamination which poses an unreasonable threat to human health;
- LNAPL on groundwater where LNAPL recovery is practicable or where LNAPL recovery or containment is necessary to prevent offsite contamination; and
- Groundwater contamination or subsurface LNAPL which poses an unreasonable threat to human health.

This Work Plan expands the technical approach outlined in the CO&A based on the Site entering into the PA One Cleanup Program. This expanded technical approached is termed "Site Wide Approach" as it expands the approach established in Phases I and II of the existing remedial plan. This Site Wide Approach work plan provides a technical and administrative approach to utilize Act 2 and PA One Cleanup Program to obtain: 1) releases of liability under Act 2 from the PADEP, and 2) comfort letters and a Final Agency Determination from EPA for

all RCRA Corrective Action issues. The details governing implementation of the Site Wide Approach are described throughout the remainder of this Work Plan.

3.0 FRAMEWORK OF SITE WIDE APPROACH

The following summarizes the key elements of the Site Wide Approach for the facility:

Site Use

All investigation and remedial activities of facility internal areas will be completed under a non-residential land use scenario. Investigation and remediation of off-site areas will be completed under either a residential or non-residential land use scenario, as appropriate, given the surrounding land use.

Compounds of Concern

The compounds of concern (COCs) for the ongoing and proposed investigation activities include all current constituents from the Pennsylvania Corrective Action Process (CAP) Regulation Amendments effective December 1, 2001; provided in Chapter VI, Section E of PADEP's Closure Requirements for Underground Storage Tank Systems, with the exception of the waste oil parameters since waste oil is stored in small tanks within the facility maintenance garages. The COCs are listed in Table 2 of this Work Plan. These COCs are the same as those listed in the CCR with the exception of two additional compounds: 1,2,4-trimethylbenze and 1,3,5-trimethylbenzene. These two compounds were added to the list of COCs by Sunoco in May 2009 based on the PADEP's revisions to the petroleum short list of compounds and at the request of the PADEP.

Media of Concern

The media of concern for the site include groundwater and soils. Indoor air quality and off-site vapor migration will be evaluated as receptors from site soils and/or groundwater through the use of PADEP's vapor intrusion guidance or by direct sampling. Surface water will be evaluated as a receptor in relation to facility activities.

Act 2 Remediation Standards

The approach for attaining Act 2 remediation standards for the media of concern is described below by media. This approach also applies to media within the Solid Waste Management Units (SWMUs) within the facility.

Groundwater

Attainment of one or more of the Act 2 remediation standards (statewide, site-specific or background) will be demonstrated for groundwater at the downgradient facility boundary. Site-specific remediation standards may be achieved using a pathway elimination demonstration or calculated risk-based standards.

Soil – 0 to 2 Feet Interval

Attainment of one or more of the Act 2 direct contact remediation standards (statewide, site-specific or background standard) will be demonstrated for shallow soil within the boundaries of the facility in accordance with the direct contact pathway provisions of Act 2. Site-specific remediation standards may be achieved using a pathway elimination demonstration or calculated risk-based standards.

Soil – 2 to 15 Feet Interval

Attainment of the site-specific remediation standard using the pathway elimination option will be achieved for soil between 2 and 15 feet beneath the ground surface within the boundaries of the facility by evaluating the groundwater pathway.

Vapor Intrusion Into Indoor Air

On-site groundwater and soil conditions will be evaluated for the vapor intrusion pathway in accordance with the current Act 2 Vapor Intrusion Guidance. The facility is regulated under the Occupational Safety and Health Administration (OSHA); therefore, the appropriate OSHA standard will be applied when evaluating the potential indoor air pathway for the facility. Potential offsite areas will be evaluated as appropriate (residential or non-residential) based on site use. Potential off-site impacts associated with possible vapor transport through preferential pathways (e.g., sewer system) may also be evaluated separately

<u>Definition of Site for Act 2 Purposes</u>

For the purposes of requesting relief from liability under PA Act 2, Sunoco may define a "Site" to include multiple AOIs, a single AOI, or a portion of an AOI. Appropriate Act 2 Reports will be prepared for each "site" as discussed later in this Work Plan.

4.0 PROCEDURAL STEPS

The following sections describe procedural steps that will be followed to implement the Site Wide Approach for the facility.

4.1 Reporting

In accordance with the CCR, Sunoco has historically prepared and submitted Site Characterization Reports (SCRs) summarizing the results of the individual AOI site characterizations since the CO&A was executed in 2003. The expanded Site Wide Approach incorporates the formal administrative and procedural requirements of Act 2. As such, all future reports will be titled as follows:

- Work Plans for Site Characterization;
- Site Characterization Reports/Remedial Investigation Reports (SCR/RIR);
- Cleanup Plans; and
- Final Reports.

In accordance with Act 2, reports may be combined (e.g., Cleanup Plan/Final Report). A schedule indicating the proposed report submittal dates is included as Appendix D.

The individual reports are described in further detail in the following sections.

4.1.1 Work Plans for Site Characterization

Although not required by the 2003 CO&A, since submittal of the CCR in 2004, Work Plans for Site Characterization have been prepared by Sunoco and submitted to PADEP and EPA for each AOI ahead of performing site characterization activities. In some cases, a single Work Plan for Site Characterization was prepared for multiple AOIs (e.g., AOIs 1 and 4 Work Plan). These Work Plans for Site Characterization present the historic research completed for each AOI and the proposed plan to characterize the AOI in accordance with the CO&A and the CCR.

Sunoco intends to continue preparing and submitting Work Plans for Site Characterization to document future AOI characterization efforts. PADEP or EPA may respond to Sunoco with comments to a Work Plan for Site Characterization,

however, there are no regulatory review times associated with these Work Plans.

4.1.2 Site Characterization Reports/Remedial Investigation Reports

Site Characterization Reports (SCRs) and SCR/Remedial Investigation Reports (SCR/RIR) that have been submitted prior to April 2011 will be repackaged as SCR/RIRs and re-submitted to allow for the reports submitted earlier in the CO&A process to be updated with current Act 2 standards and to allow for the appropriate public and municipal notice provisions of Act 2 to be satisfied for each repackaged SCR/RIR. Once the repackaged SCR/RIRs have been submitted to the PADEP they are to be considered equivalent to RIRs. The SCR/RIRs will be accepted by PADEP as having satisfied the terms and conditions of the CO&A.

4.1.3 Remedial Action Plans/Cleanup Plans

Where remedial actions are required based on the results of the site characterization activities completed under this program, Sunoco will prepare Cleanup Plans in accordance with PA Act 2. Public and municipal notice provisions of Act 2 will also be satisfied for each Cleanup Plan, where appropriate.

4.1.4 Final Reports

When the SCR/RIR and Cleanup Plan are approved by the PADEP and the remedial activities are implemented, Sunoco will prepare and submit Final Reports in accordance with PA Act 2. Public and municipal notice provisions of Act 2 will also be satisfied for each Final Report submittal, where appropriate.

4.1.5 Post Remediation Care

The facility currently operates a number of interim remedial systems whose ongoing operations serve as engineering controls. Sunoco routinely performs operation and maintenance (O&M) and performance monitoring activities for these systems. The O&M and performance monitoring data for these systems is documented in Quarterly Status Reports that are submitted to PADEP and EPA.

The Post Remedial Care Plans will document the engineering and administrative controls consistent with the Final Reports for each Site. The Post Remedial Care Plans will also include those actions necessary to monitor the implementation of these controls. The implementation of the Post Remedial Care Plans will be documented in the Quarterly Status Reports.

4.2 Environmental Covenant

Sunoco will prepare an environmental covenant in accordance with PA Act 68, the Uniform Environmental Covenant Act (UECA), to ensure that any required Post Remedial Care Plan will continue to be implemented after approval of any Final Reports. The draft covenant would be prepared ahead of submitting any Act 2 Final Reports.

4.3 EPA Procedures

4.3.1 Environmental Indicators

Currently, Sunoco Girard Point (AOI 5, 6 and 7) has achieved a "Yes" determination for both the Human Health (HH) and Groundwater (GW) Environmental Indicators (EI)s. The Schuylkill River Tank Farm (AOI 9) has also achieved a "Yes" determination for the HH and GW EIs. Sunoco Point Breeze has achieved a "Yes" determination for HH and more information is needed (IN) for GW. This Workplan presents an approach and schedule to ensure a "Yes" determination for EIs at every AOI at the Site.

4.3.2 SWMU/CAMU Summary

The SWMUs/CAMUs at the facility are summarized on the following table:

Table 1. SWMU/CAMU Summary

SWMU ID	SWMU Name	AOI
Girard Point		
SWMU 87	Buried Lead Sludge Area No.1	AOI 7
SWMU 88	Buried Lead Sludge Area No.2	AOI 7
SWMU 89	Buried Lead Sludge Area No.3	AOI 7
SWMU 90	Buried Lead Sludge Area No.4	AOI 7
SWMU 91	Buried Lead Sludge Area No.5	AOI 7
SWMU 92	Buried Lead Sludge Area No.6	AOI 6
SWMU 93	Buried Lead Sludge Area No.7	AOI 5
SWMU 94	Buried Lead Sludge Area No.8	AOI 5
SWMU 95	Buried Lead Sludge Area No.9	AOI 6
SWMU 101	Bulkhead Area	AOI 5
Point Breeze		
SWMU 1 (CAMU)	4 Past Disposal Areas	AOI 10
SWMU 2	Leaded Sludge Weathering Pad	AOI 8
SWMU 3	Guard Basin	AOI 3

For those RCRA-regulated SWMUs that Sunoco has completed characterization, and no further remediation is required, Sunoco will seek a "comfort letter" from EPA expressing EPA's agreement that characterization is complete and no further remediation is required under the RCRA Corrective Action Program.

4.3.3 Statement of Basis

Once Act 2 releases of liability for all sites have been granted by the PADEP, EPA will prepare a Statement of Basis for the facility. The Statement of Basis will likely include the following information:

- A description of the selected remedial measures for containing or cleaning up the waste management units at the facility;
- A description of the regulatory reports that were prepared to document the site characterization and cleanup of the waste management units at the facility;
- A description and environmental setting of the facility;
- Names and concentrations of contaminants detected at the facility and associated exposure pathways, and,
- Public involvement requirements under the corrective action program.

4.3.4 EPA Final Determination

Following completion of the public notice provisions, EPA will issue a Final Agency Determination documenting that all RCRA Corrective Action obligations have been addressed at the facility.

4.4 Public Involvement

The Public Involvement Plan is provided in Appendix E. This plan incorporates aspects of public involvement under both PADEP's Act 2 program and EPA's RCRA Corrective Action program. The Act 2 report submittals will include the appropriate municipal and public notice requirements in accordance with the provisions of Act 2. Notices will be published in the Pennsylvania Bulletin and a summary of the notice will appear in four local newspapers, including the Philadelphia Daily News, South Philly Review, Philadelphia Inquirer and, Philadelphia Globe Times. As part of the public involvement plan, Sunoco intends to hold an initial public meeting in the city of Philadelphia to present the strategy and give status updates of the project at the CAP meeting on an annual basis.

EPA will complete its own public involvement through notices under the Corrective Action Program and by updating its online Fact Sheet for the refinery.

TABLES

Table 1
SWMU/CAMU Summary
Sunoco Philadelphia Refinery
Philadelphia, PA

SWMU ID	SWMU Name	AOI
Girard Point		
SWMU 87	Buried Lead Sludge Area No.1	AOI 7
SWMU 88	Buried Lead Sludge Area No.2	AOI 7
SWMU 89	Buried Lead Sludge Area No.3	AOI 7
SWMU 90	Buried Lead Sludge Area No.4	AOI 7
SWMU 91	Buried Lead Sludge Area No.5	AOI 7
SWMU 92	Buried Lead Sludge Area No.6	AOI 6
SWMU 93	Buried Lead Sludge Area No.7	AOI 5
SWMU 94	Buried Lead Sludge Area No.8	AOI 5
SWMU 95	Buried Lead Sludge Area No.9	AOI 6
SWMU 101	Bulkhead Area	AOI 5
Point Breeze		
SWMU 1 (CAMU)	4 Past Disposal Areas	AOI 10
SWMU 2	Leaded Sludge Weathering Pad	AOI 8
SWMU 3	Guard Basin	AOI 3

Table 2
Constituents of Concern for Groundwater
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

METALS	CAS No.
Lead (dissolved)	7439-92-1

VOLATILE ORGANIC COMPOUNDS	CAS No.
1,2-Dichloroethane	107-06-2
1,2,4-Trimethylbenzene	95-63-6
1,3,5-Trimethylbenzene	108-67-8
Benzene	71-43-2
Cumene	98-82-8
Ethylbenzene	100-41-4
Ethylene dibromide	106-93-4
Methyl tertiary butyl ether	1634-04-4
Toluene	108-88-3
Xylenes (total)	1330-20-7

SEMI-VOLATILE ORGANIC COMPOUNDS	CAS No.
Chrysene	218-01-9
Fluorene	86-73-7
Naphthalene	91-20-3
Phenanthrene	85-01-8
Pyrene	129-00-0

Notes:

1. Constituents are from Pennsylvania Corrective Action Process (CAP) Regulation Amendments effective December 1, 2001; provided in Chapter VI, Section E (pgs. 29-30) of PADEP Document, *Closure Requirements for Underground Storage Tank Systems*, effective April 1, 1998 and the March 18, 2008 revised PADEP Petroleum Short List.

Table 2 (continued)
Constituents of Concern for Soil
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

METALS	CAS No.
Lead (total)	7439-92-1

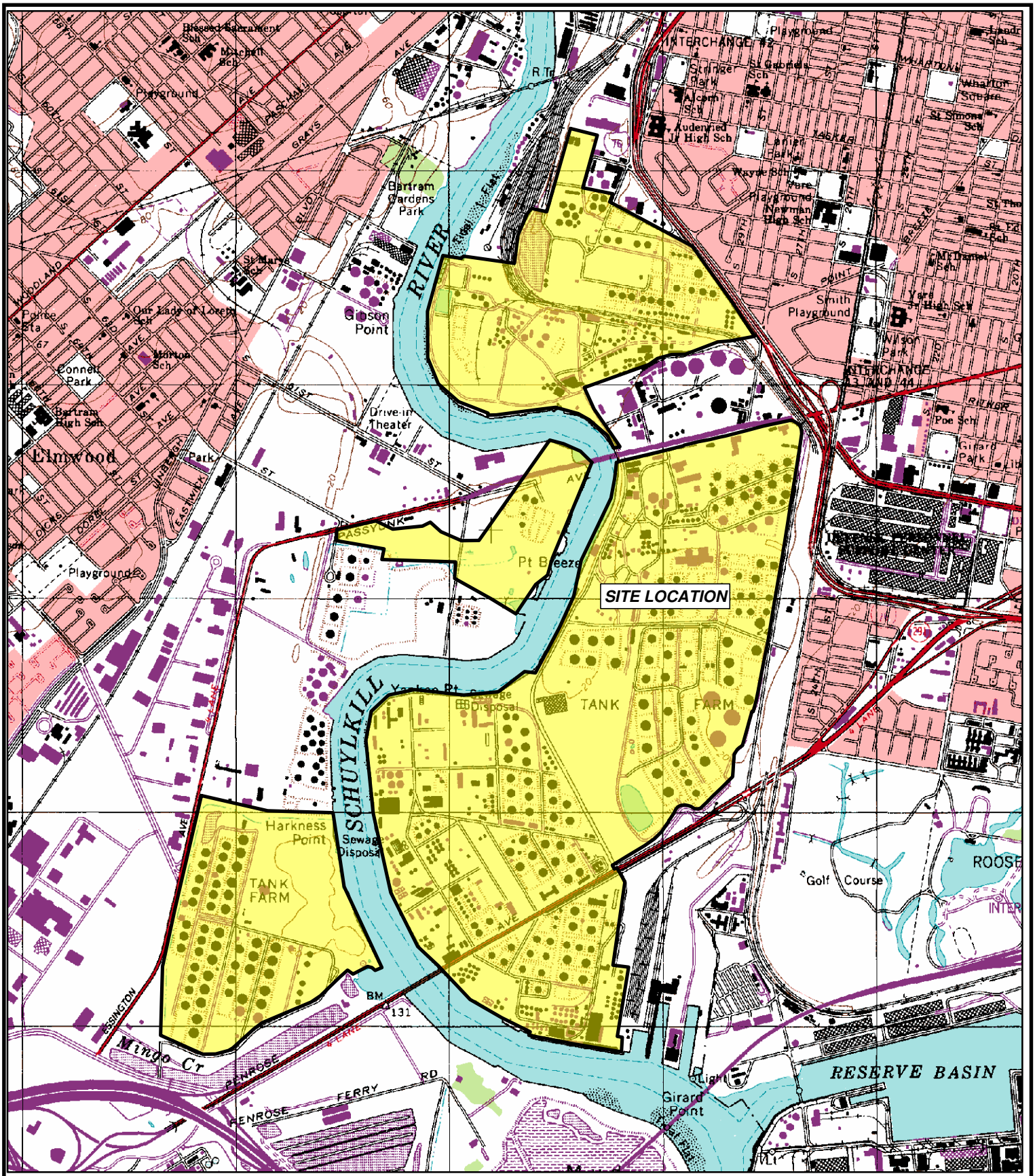
VOLATILE ORGANIC COMPOUNDS	CAS No.
1,2-Dichloroethane	107-06-2
1,2,4-Trimethylbenzene	95-63-6
1,3,5-Trimethylbenzene	108-67-8
Benzene	71-43-2
Cumene	98-82-8
Ethylbenzene	100-41-4
Ethylene dibromide	106-93-4
Methyl tertiary butyl ether	1634-04-4
Toluene	108-88-3
Xylenes (total)	1330-20-7

SEMI-VOLATILE ORGANIC COMPOUNDS	CAS No.
Anthracene	120-12-7
Benzo(a)anthracene	56-55-3
Benzo (g,h,i) perylene	191-24-2
Benzo(a)pyrene	50-32-8
Benzo(b)fluoranthene	205-99-2
Chrysene	218-01-9
Fluorene	86-73-7
Naphthalene	91-20-3
Phenanthrene	85-01-8
Pyrene	129-00-0

Notes:

1. Constituents are from Pennsylvania Corrective Action Process (CAP) Regulation Amendments effective December 1, 2001; provided in Chapter VI, Section E (pgs. 29-30) of PADEP Document, *Closure Requirements for Underground Storage Tank Systems*, effective April 1, 1998 and the March 18, 2008 revised PADEP Petroleum Short List.

FIGURES



USGS Topographic Map, Philadelphia, PA. Quadrangle, USGS 1995

Sunoco, Inc. (R&M)

Philadelphia Refinery

3144 Passyunk Avenue
Philadelphia, PA. 19145

Figure 1: Site Location Map
Sunoco Philadelphia Refinery

Philadelphia Pennsylvania

Job Number	Scale: 1" = 800'	Date
2574601	0 1,000 2,000 Feet	January 20, 2011

Q:\data6\2574601\ArcGIS\MapDocuments\AOI 11\Figure 1- Site Location Map.mxd

Notes:
1. 2005 aerial photography provided by the Delaware Valley Regional Planning Commission (DVRPC).

Legend

- AOI-1: Belmont Terminal/No.1 Tank Farm/No.2 Tank Farm
- AOI-2: Point Breeze Processing Area
- AOI-3: Impoundment Area
- AOI-4: No. 4 Tank Farm Area
- AOI-5: Girard Point South Tank Field Area
- AOI-6: Girard Point Chemical Processing Area
- AOI-7: Girard Point Fuels Processing Area
- AOI-8: Point Breeze Process Area North Yard
- AOI-9: Schuylkill River Tank Farm
- AOI -10: Point Breeze Processing Area West Yard

AOI-11 Deep Aquifer, Not Shown.

N W E S

Figure 2: Areas of Interest
Sunoco Philadelphia Refinery
Philadelphia, Pennsylvania

Sunoco, Inc. (R&M)
Philadelphia Refinery
3144 Passyunk Avenue
Philadelphia, PA.
19145

0 250 500 1,000 Feet

SCALE: 1" = 500'
DATE: November 23, 2010
DRN. BY: MH
CKD. BY: DW
JOB#: 2574601

Q:\data6\2574601\ArcGIS\MapDocuments\AOIs\Figure 2 - Areas of Interest_rev11-23-10.mxd

APPENDIX A

2003 CONSENT ORDER AND AGREEMENT AND PHASE I REMEDIAL PLAN

2003 CONSENT ORDER AND AGREEMENT

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

In the Matter of:

Sunoco, Inc. (R&M)	:	Clean Streams Law
Philadelphia Refinery and Belmont Terminal	:	Land Recycling Act

CONSENT ORDER AND AGREEMENT

This Consent Order and Agreement ("CO&A") is entered into this 17th day of December 2003, by and between the Commonwealth of Pennsylvania, Department of Environmental Protection (hereinafter "Department"), and Sunoco, Inc. (R&M) (hereinafter "Sunoco").

Findings

The Department has found and determined the following:

A. The Department is the agency with the duty and authority to administer and enforce The Clean Streams Law, Act of June 22, 1937, P.L. 1987, as amended, 35 P.S. §§ 691.1 et seq. ("Clean Streams Law"); The Land Recycling and Environmental Remediation Standards Act, 35 P.S. §§ 6026.101 et seq. ("Land Recycling Act"); Section 1917-A of the Administrative Code of 1929, Act of April 9, 1929, P.L. 177, as amended, 71 P.S. §§ 510-17 ("Administrative Code"); The Pennsylvania Storage and Spill Prevention Act ("Pennsylvania Tank Act") 35 P.S. § 6021 et seq**.,** and the rules and regulations promulgated thereunder**.**

B. Sunoco is a Pennsylvania corporation with its principal office at Ten Penn Center, 1801 Market Street, Philadelphia, PA. Sunoco operates a refinery in Philadelphia located principally along the Schuylkill River in Philadelphia, Pennsylvania with a mailing address of 3144 Passyunk Ave., Philadelphia, Pa., 19145-5299 ("Refinery").

C. The Refinery is adjacent to and in portions of the floodplain of the Schuylkill River. The Refinery is currently divided into two "processing areas", designations which reflect that the Refinery consists of two formerly separate refineries.

D. The Girard Point Processing Area consists of the former Chevron Refinery, including the "Ballfields Area", and is located generally between Yankee Point and Girard Point, near the mouth of the Schuylkill River. Sunoco owns the Girard Point Processing Area. It is included in this CO&A.

E. The Point Breeze Processing Area consists of the former Atlantic Refinery, and is located to the north of the Girard Point Processing Area. The Point Breeze Processing Area's North and South Yards are separated by a facility owned by Philadelphia Gas Works, located along the north side of

Passyunk Avenue. The Point Breeze Processing Area is operated by Sunoco and owned by Atlantic Refining & Marketing Corp. ("Atlantic R&M"), an affiliated entity. It is included in this CO&A.

F. Belmont Terminal is owned and operated by Sunoco Partners Marketing & Terminals LP, a Texas limited partnership ("Sunoco Partners"). Belmont Terminal handles petroleum products refined at the Philadelphia Refinery and is located north of the northeast corner of the South Yard of the Point Breeze Processing Area, on the south side of Passyunk Avenue. Sunoco, as the prior owner, is responsible contractually for remediation of contamination at Belmont Terminal that existed as of February 7, 2002. It is included in this CO&A only with respect to contamination that existed as of February 7, 2002. Sunoco Partners and/or other corporations or limited partnerships affiliated with Sunoco Partners own and operate some pipelines located within the boundary of the Refinery or other facilities that are included in the CO&A. Releases from those lines or facilities that occurred prior to February 7, 2002 are included in this CO&A, but those that occur on or after that date are not included in this CO&A.

G. The Schuylkill River Tank Farm ("SRTF") located on the west side of the Schuylkill River handles finished and unfinished petroleum products processed at the Philadelphia Refinery. It is included in this CO&A.

H. The West Yard of the Point Breeze Processing Facility ("West Yard") is no longer active but contains waste materials generated at the Point Breeze Processing Area. It is included in this CO&A. (For purposes of the CO&A, the Refinery, West Yard and SRTF are referred to collectively as the "Philadelphia Refinery." At times, the Philadelphia Refinery and Belmont Terminal are referred to collectively as the " Facility.")

I. The Darby Creek Tank Farm (the "Tank Farm") located in Delaware County, the Hog Island Marine Terminal adjacent to the Philadelphia International Airport and the Fort Mifflin Marine Terminals also adjacent to the Philadelphia International Airport handle raw materials and/or petroleum products processed at the Philadelphia Refinery, and are all owned by Sunoco Partners. These facilities are not included in this CO&A.

J. Various pipelines outside the boundary of the Philadelphia Refinery and Belmont Terminal, including lines under the Schuykill River, transport materials to and from the Philadelphia Refinery and/ or the Belmont Terminal or the Tank Farm or other terminal facilities described herein. These pipelines are owned and operated by various pipeline companies or by Sunoco. These pipelines are not included in this CO&A.

K. Atlantic R&M acquired the Point Breeze Processing Area and Belmont Terminal in 1988 and Sunoco began operating those facilities after the acquisition. Sunoco acquired the Girard Point Processing Area and the Schuylkill River Tank Farm in 1994. These areas had been active petroleum refining, processing and/or handling facilities for many decades before such acquisitions. The history of petroleum refining and handling at Point Breeze dates back as far as 1866. Except as otherwise noted, the Philadelphia Refinery and Belmont Terminal continue to be active petroleum refining and petroleum terminaling facilities respectively.

L. Over the years of operation, petroleum in various forms has been released into the environment at the Philadelphia Refinery and Belmont terminal, and has caused contamination of soils and groundwater. Some petroleum contamination appears to have migrated beyond the boundaries of the Philadelphia Refinery. Petroleum from these releases has also entered the Philadelphia sewer system and has caused oil sheens on the Schuylkill River. Significant quantities of petroleum remain in the subsurface environment, including non-aqueous phase liquid (NAPL or free product), dissolved phase

petroleum in the groundwater and petroleum adsorbed to soils. Fluctuations of the water table have smeared petroleum contamination across soils both above and below the current water table elevation.

M. On December 17, 1993, Sunoco, then called Sun Company, Inc. (R&M) entered into a Consent Order and Agreement (1993 CO&A) with the Pennsylvania Department of Environmental Resources, the predecessor to the Department. The 1993 CO&A covered the Point Breeze Processing Area, except for the West Yard.

N. Sunoco and its predecessors have, over the years, undertaken various efforts to remove NAPL from the subsurface. In addition, Sunoco has withdrawn and treated contaminated groundwater and has undertaken various measures to address petroleum releases to the Schuylkill River and to the Philadelphia sewer system. Some of this work was undertaken pursuant to the 1993 CO&A, particularly the work performed on and in the vicinity of the Point Breeze Processing Area. Other work was performed under less formal Department oversight.

O. Sunoco has constructed and operated collection and treatment systems designed to abate petroleum vapors which have entered the City of Philadelphia combined sewer system and caused odors beyond the refinery boundaries. At present, pursuant to a Department order issued December 17, 1999, the Defense Logistics Agency is partially funding the operation of this system since it also treats vapors entering the Packer Avenue sewer from a NAPL petroleum plume centered on the southern portion of the former Defense Supply Center, Philadelphia, located to the east of the refinery boundaries.

P. Remediation of the West Yard has been performed under EPA oversight.

Q. Although Sunoco has accomplished much to date, considerable additional work remains to be done to address petroleum contamination at the Philadelphia Refinery and Belmont Terminal.

R. The 1993 CO&A will expire under its own terms on December 17, 2003, and the parties seek a new agreement to replace and supplement the terms of the 1993 CO&A.

S. Since the execution of the 1993 CO&A, Pennsylvania has enacted the Land Recycling Act (sometimes referred to as "Act 2") and promulgated implementing regulations. The Land Recycling Act and underlying regulations establish procedures and establish cleanup standards for the remediation of contaminated sites.

T. The petroleum contamination at the Philadelphia Refinery and Belmont Terminal constitutes a statutory nuisance under Section 401 of the Clean Streams Law, 35 P.S. § 691.401, and the Department may require Sunoco, as landowner of the Philadelphia Refinery and Sunoco Partners as land owner of Belmont Terminal, to remediate this contamination under Section 316 of the Clean Streams Law, 35 P.S. § 691.316.

After full and complete negotiation of all matters set forth in this CO&A and upon mutual exchange of covenants contained herein, the parties desiring to avoid litigation and intending to be legally bound, it is hereby **ORDERED** by the Department and **AGREED** to by Sunoco as follows:

1. **Authority.** This CO&A is an Order of the Department authorized and issued pursuant to Sections 5 and 316 of the Clean Streams Law, 35 P.S. §§ 691.5, 691.316; and Section 1917-A of the Administrative Code, supra.

2. **Findings.**

(a) Sunoco agrees that the findings in Paragraphs A through S are true and correct and, in any matter or proceeding involving Sunoco and the Department, Sunoco shall not challenge the accuracy or validity of these findings.

(b) The parties do not authorize any other persons to use the findings in this CO&A in any matter or proceeding.

3. **Corrective Action.**

(a) The goals of corrective action to be undertaken by Sunoco are:
- (i) Attainment of an Act 2 standard at the boundaries of the Philadelphia Refinery and Belmont Terminal ("boundary issues").
- (ii) Protection of human health within the boundaries of the Philadelphia Refinery and Belmont Terminal ("internal issues").
- (iii) Assessment of potential for chemical degradation of groundwater under the Facility from past or present operations caused by geochemical processes that originate with the presence of petroleum chemicals in the soil and groundwater.

(b) The following are agreed to be "boundary issues":
- (i) Offsite NAPL on groundwater from past or current operations.
- (ii) Offsite dissolved-phase groundwater contamination from past or current operations.
- (iii) Current and future releases or seeps of contaminants into surface waters and the City of Philadelphia combined sewer system.
- (iv) Soil contamination at levels which may result in future boundary issues due to surface runoff, migration of NAPL, or the leaching of chemicals from contaminated soil into groundwater.

(c) The following are agreed to be "internal issues":
- (i) Soil contamination which poses an unreasonable threat to human health.
- (ii) NAPL on groundwater where NAPL recovery is practicable or where NAPL recovery or containment is necessary to prevent offsite contamination.
- (iii) Groundwater contamination or subsurface NAPL which poses an unreasonable threat to human health.

(d) Work to be undertaken under this CO&A will, to the maximum extent possible, meet the following objectives:

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- (i) Achieve steady progress in meeting the corrective action goals of this CO&A.
- (ii) Maximize efficiencies, including phasing work based on logical progressions.
- (iii) Encourage innovative, environmentally beneficial solutions by promoting beneficial reuse of contaminated materials and testing of new technologies on pilot scale projects.
- (iv) Support short and longer-term budget planning by providing for even and predictable expenditures from year to year.

4. **Phase One**.

(a) Characterization. Attachment A to this CO&A contains the Phase One Remedial Plan ("RP") for the Philadelphia Refinery and Belmont Terminal. This plan describes the current status of remedial programs at the refinery and terminal, divides the refinery and terminal into eleven Areas of Interest ("AOI"). Ten of the AOI's address distinct geographic areas with respect to soils and surficial aquifer. The eleventh AOI addresses the deep aquifer beneath the Facility. The RP provides the framework for the process that Sunoco will undertake for further investigation and evaluation of remediation options for the AOI's. In addition to describing the specific remediation activities addressed in 4(c) below, the RP forms the basis for the Current Conditions Report and Comprehensive Remedial Plan addressed in Paragraph 4(b).

(b) By June 30, 2004 Sunoco will prepare and submit to the Department a Current Conditions Report and Comprehensive Remedial Plan ("CCR") which will present a detailed Site Conceptual Model based on the information in the RP. The Site Conceptual Model will rely on the use of graphic information and data management systems to provide the current understanding of subsurface conditions and the fate and transport of separate phase and dissolved phase contaminants in the subsurface. The CCR will prioritize the eleven AOI's identified in the RP and outline recommendations for further characterization and/or remediation efforts described in Paragraph 4(c) by area. Within this report, Sunoco will propose to the Department a program and schedule to complete the characterization of each of the AOIs in a prioritized, stepwise manner. Sunoco shall base its characterization priorities upon risk-based factors, including product types, potential exposure pathways, known NAPL quantities and historical information, including the results of previous characterization work. This characterization work shall include investigations of soil, groundwater and NAPL contamination as necessary, and shall also include chemical analysis of the contamination for the applicable compounds set forth in the Land Recycling Act regulations and guidance manual. For AOI 11 pertaining to the deep aquifer, the characterization work will include investigation of inorganic species in the deep aquifer under the Facility as related to surficial hydrocarbon contamination. Following Department approval of this program, Sunoco will perform the tasks set forth in this characterization program.

(c) Remediation Projects. Sunoco shall continue operating existing systems until the Department approves modifications. On a schedule set forth in the RP, Sunoco shall perform additional remediation described in the RP covering the following areas: Pollock Street Sewer, Jackson Street Sewer, 26th Street Area, Short Pier, Number 4 Tank Farm (S-30/RW-1 area), and 797 Benzene Tank Area.

5. **Phase Two.**

(a) Within 90 days after completing each AOI characterization, pursuant to Paragraph 4(a), Sunoco shall issue a report to the Department that proposes: i) no further action, ii) further characterization and assessment, or iii) other remediation projects that may include enhancements to existing recovery systems based on the results of the site characterization work described in Paragraph 4(a) and consistent with the overall goals of this CO&A. For any AOI, where additional work is proposed, a schedule will be provided for conducting these activities.

(b) This Report shall include, if applicable, a proposal by Sunoco for a process and schedule under which Sunoco will meet a remedial standard under the Land Recycling Act. Sunoco may take into account whether the goals of this Agreement may be more efficiently served by combining AOIs for purposes of remediation and may propose such consolidation in this Report.

6. **Sunoco Submissions and Department Review and Approval.**

(a) Sunoco Submissions

(i) Sunoco submissions under this CO&A, including without limitation the CCR, proposals by Sunoco for additional work in Phase One or Phase Two and proposals for modifications pursuant to Paragraph 7 shall be in written form, unless agreed otherwise.

(b) Department Responses

(i) Within ninety (90) calendar days after receipt, the Department shall review and provide Sunoco with written comments, if any, on the CCR or any proposal by Sunoco for additional or modified work.

(ii) Within thirty (30) calendar days after receiving comments from the Department, Sunoco shall either incorporate or otherwise address those comments or initiate Dispute Resolution pursuant to Paragraph 14 of this CO&A. If the comments furnished by the Department require a change to any such submission in any substantive manner, Sunoco shall provide the Department with a revised submission for review within the 30-day time period; provided, however, that if Sunoco needs to collect additional data in order to address the Department's comments, Sunoco shall have one hundred eighty (180) calendar days, or such other time as the parties agree, to submit the revised submission.

(iii) The cycle of review and revision (and the associated timeframes) described above shall continue until the Department approves the submission or until either party invokes Dispute Resolution pursuant to Paragraph 14 of this CO&A. The Department's approval of any submission shall be in the form of a written or verbal response indicating the Department's agreement.

7. **Quarterly Reports and Annual Review.** Sunoco shall, on or before April 30, July 31, October 31 and January 31, report on the work accomplished during the previous calendar quarter. In addition, by February 15 of each year, Sunoco shall review the work performed in the prior calendar year and shall propose modifications of ongoing work or additional work to increase the effectiveness of its remedial program.

8. **Pennsylvania Tank Act.** For each aboveground storage tank ("AST") regulated under the Pennsylvania Tank Act that is taken out of service or undergoes a change in service, Sunoco will undertake an assessment in accordance with the Department's Aboveground Storage Tank Closure Guidance issued October 12, 2002. In the event that such assessment confirms that there

has been a release from the AST, Sunoco will perform the measures required by 25 Pa. Code Sections 245.304, 245.305, 245.306 and 245.307 of the Corrective Action Process regulations. After performing these tasks, Sunoco will conduct an additional investigation consistent with this CO&A process. This additional investigation shall consider available information including subsurface conditions, risk, history, etc. and shall assess whether the release from the AST requires additional characterization, remediation, or other work beyond that which is already being performed under this CO&A. Thereafter, Sunoco will report the results of its investigation to the Department and include a proposal for no further action, additional characterization, and/or proposals for remedial action, including a schedule for conducting any proposed remediation, consistent with the prioritized approach under this CO&A. The Department's response is subject to Paragraph 6 of this CO&A.

9. **Reservation of Rights.** The Department reserves the right to require additional measures to achieve compliance with applicable law. Sunoco reserves the right to challenge any action which the Department may take to require those measures.

10. **Liability of Sunoco.** Sunoco shall be liable for any violations of the CO&A, including those caused by, contributed to, or allowed by its officers, agents, employees, or contractors. Sunoco also shall be liable for any violation of this CO&A caused by, contributed to, or allowed by its successors and assigns.

11. **Transfer of Site**.

    (a) The duties and obligations under this CO&A shall not be modified, diminished, terminated or otherwise altered by the transfer of any legal or equitable interest in the Philadelphia Refinery or Belmont Terminal or any part thereof.

    (b) If Sunoco intends to transfer any legal or equitable interest in the Philadelphia Refinery which is affected by this CO&A, Sunoco shall serve a copy of this CO&A upon the prospective transferee of the legal and equitable interest at least thirty (30) days prior to the contemplated transfer and shall simultaneously inform the Southeast Regional Office of the Department of such intent.

12. **Civil Penalties**. The Department recognizes that Sunoco began operations at a portion of the Philadelphia Refinery and Belmont Terminal in 1988, and began operations at another portion in 1994, and that Sunoco has undertaken considerable work to address contamination at these facilities, and that contamination waspresent at the facilities for decades prior to Sunoco's operations. Accordingly, no Civil Penalties are assessed to Sunoco except as provided in Paragraph 13 (Stipulated Penalties).

13. **Stipulated Penalties.** Sunoco shall pay a stipulated penalty for the following violations of this CO&A:

    (a) For failure to timely submit the CCR as required by Paragraph 4(b), $300 per day;

    (b) For failure to timely submit quarterly or annual review reports as required by Paragraph 7, $100 per day.

    (c) Stipulated penalties that accrue under this CO&A shall be paid to the Department as follows: If Sunoco does not dispute the Department's entitlement to stipulated penalties

demanded by the Department, such stipulated penalties shall be paid to the Department by check made out to the Department of Environmental Protection and delivered to the Southeast Regional Office of the Department within thirty (30) calendar days of written demand for payment. If Sunoco does dispute entitlement to any stipulated penalties demanded by the Department, Sunoco shall pay the disputed stipulated penalties into an interest-bearing escrow account established by Sunoco with thirty (30) calendar days of the Department's written demand for payment. The parties shall attempt to resolve the dispute and, if they are unable to do so within sixty (60) days of the Department's written demand for payment, then Sunoco must either pay the penalties demanded by the Department (with accrued interest), or submit the dispute for resolution pursuant to Paragraph 14. If it is determined that the Department is entitled to the demanded stipulated penalties, in whole or in part, the Department shall also be entitled to the portion of the accrued interest in the escrow account allocable to the demanded stipulated penalties that the Department is entitled to, and Sunoco shall pay such stipulated penalties and accrued interest within seven (7) calendar days of the determination. If Sunoco fails to timely pay, either to the Department or into an interest-bearing escrow account, any stipulated penalties demanded by the Department under this CO&A, Sunoco shall be liable for, and shall pay, along with the demanded stipulated penalties to which the Department is entitled, interest on any such demanded and unpaid stipulated penalties in the amount of 6 percent per annum. Such interest shall be calculated from the stipulated penalties payment deadline in this Paragraph 13(c) of this CO&A.

(d) It is understood by the parties hereto that payment of any money hereunder shall neither constitute a waiver of Sunoco's duty to meet its obligations under this CO&A nor preclude the Department from commencing an action to compel Sunoco's compliance with the terms and conditions of this CO&A, or any applicable statute, rule, regulation, permit, or order of the Department.

14. **Dispute Resolution**

All disputes arising out of the implementation of this CO&A shall be resolved in accordance with the applicable provisions of this Paragraph 14(a), using a sequential system of dispute avoidance and resolution that encourages the parties to resolve issues at the most appropriate level. Through the use of good communication, information sharing, and the development of effective and efficient methods of addressing emerging concerns, the dispute resolution process will enhance the implementation of this CO&A.

(a) Initial Level
Sunoco and Department personnel responsible for day-to-day operations under this CO&A, shall attempt in good faith to resolve any disputes through negotiation. If these individuals are unable to resolve the dispute within thirty (30) business days, either party may refer the dispute, in writing, to the Dispute Resolution Panel.

(b) Dispute Resolution Panel
The Department shall designate one individual and Sunoco shall designate one individual to serve on a Dispute Resolution Panel (the “Dispute Resolution Panel”). Each individual should either be vested with management-level decision-making authority or shall have ready and immediate access to persons within their respective organizations with such authority. Panel members may be appointed or changed by their respective organizations without limitation, upon

written notice to both parties. The Dispute Resolution Panel shall meet at a mutually agreeable time and place within thirty (30) business days in order to exchange relevant information and perspectives and to attempt in good faith to resolve the dispute. The Dispute Resolution Panel members shall be free to accept all reports, oral briefings, or any other form of information without regard to the rules of evidence and without restrictions on ex parte communications. All decisions of the Dispute Resolution Panel must be unanimous, and shall either be made in writing or memorialized in minutes of Dispute Resolution Panel meeting.

(c) Neutral Technical Expert

The Dispute Resolution Panel may hire a neutral technical expert to assist in resolving any disputes of a technical nature. The costs of any such neutral technical expert shall be borne equally by the parties, unless there is an advance agreement for some other arrangement

(d) Mediation and Facilitation

The Dispute Resolution Panel may seek the assistance of a neutral mediator or neutral facilitator to assist the parties towards resolving any dispute. Costs of any such neutral mediator or facilitator shall be borne equally by the parties, unless there is an advance agreement for some other arrangement.

(e) Failure to Resolve Dispute

(i) At any time after it has received an issue for resolution, the Dispute Resolution Panel, or any of its members, may declare that an apparent deadlock exists. Following the declaration of an apparent deadlock, the Parties will have fourteen (14) calendar days to resolve the dispute.

(ii) If the dispute is not resolved in that fourteen (14) calendar day period, then the Department may take whatever action it feels to be appropriate under the circumstances, and Sunoco may respond to such action by pursuing all rights it has under Pennsylvania Law to challenge the Department's decision, without regard to the dispute resolution provisions of this CO&A.

(f) Effect of Dispute Resolution

During the time that any dispute is subject to the dispute resolution process, Sunoco will not be obligated to perform any of the actions in dispute or any actions reasonably related to or affected by the dispute.

(g) Extension of Time Frames

The parties may, by mutual written agreement, extend any of the time frames contained in this dispute resolution process.

(h) Criteria for Decisions

In resolving disputes that arise under this CO&A, the parties shall take into consideration the applicable laws and regulations, the dictates of sound science, reasonableness and other principles contained in this CO&A.

15. **Termination**

(a) Sunoco's obligations under this CO&A shall continue until the activities enumerated herein are completed, as determined under the process set forth in Paragraph 15(b), or the expiration of ten (10) years from the date hereof whichever occurs sooner.

(b) When Sunoco finds that it has completed all of the tasks set forth herein, Sunoco shall submit a written termination request to the Department setting forth the basis for its finding. The Department will review all available information and respond to Sunoco's request in writing. If the Department determines that Sunoco has met the conditions set forth in this Paragraph, Sunoco shall be relieved of its obligations under this CO&A. Any disputes regarding termination shall be resolved pursuant to Paragraph 14. However, nothing shall preclude the parties from amending this CO&A to provide for additional remedial work.

16. **Correspondence with Department.** All correspondence with the Department concerning this CO&A shall be addressed to:

Steve O'Neil
Pennsylvania DEP
2 East Main Street
Norristown PA (19401)

17. **Correspondence with Sunoco.** All correspondence with Sunoco concerning this CO&A shall be addressed to:

Terry Soule
Manager Environmental Northeast Refining Complex
10th & Green St.
Marcus Hook PA
(610)-859-1695 (phone)
610-859-1006 (fax)

with a copy to:
Edward J Ciechon, Esq.
1801 Market Street
Philadelphia PA 19103
215-977-6139 (phone)
215-977-6878 (fax)

Sunoco shall notify the Department whenever there is a change in the contact person's name, title, or address. Service of any notice or any legal process for any purpose under this CO&A, including its enforcement, may be made by mailing a copy by first class mail to the above address.

18. **Severability.** The Paragraphs of this CO&A shall be severable and should any part hereof be declared invalid or unenforceable, the remainder shall continue in full force and effect between the parties.

19. **Entire Agreement.** This CO&A shall constitute the entire integrated agreement of the parties. No prior or contemporaneous communications or prior drafts shall be relevant or admissible for purposes of determining the meaning or extent of any provisions herein in any litigation or any other proceeding.

20. **Attorney Fees.** The parties shall bear their respective attorney fees, expenses and other costs in the prosecution or defense of this matter or any related matters, arising prior to execution of this CO&A.

21. **Modifications.** No changes, additions, modifications, or amendments of this CO&A shall be effective unless they are set out in writing and signed by the parties hereto.

22. **Titles.** A title used at the beginning of any Paragraph of this CO&A may be used to aid in the construction of that Paragraph, but shall not be treated as controlling.

23. **Hazardous Sites Cleanup Act.** Sunoco agrees that failure to comply with the provisions of Paragraphs 4 and 5 of this CO&A constitutes a failure to comply with an "enforcement action" as provided in Paragraph 1301 of the Hazardous Sites Cleanup Act, the Act of October 18, 1988, P.L. § 756, No. 1988-108, 35 P.S. §§ 6020.1301.

24. **Force Majeure**

(a) If Sunoco is prevented from complying in a timely manner with any time limit or other requirement contained in this CO&A because of a strike, fire, flood, act of God, or other circumstances beyond Sunoco's reasonable control, including but not limited to DEP's inability to meet its commitments as required in this CO&A, the Sunoco may request an extension of time.

(b) Sunoco will be entitled to the benefits of this Paragraph 24 if it notifies the Department within fifteen (15) business days by telephone and within thirty (30) business days in writing of the date it becomes aware or reasonably should have become aware of the event or circumstance impending performance. The written submission shall include related documentation, as well as a letter specifying the reasons for the delay, the expected duration of the delay, and the efforts which Sunoco has made and will make to minimize the length of the delay. Sunoco's failure to comply with the requirements of this Paragraph 24(b) in a timely fashion shall render it null and of no effect as to the particular incident or circumstance involved.

(c) Within fifteen (15) business days after Sunoco submits a written notification under Paragraph 24(b), the Department will decide, in writing, whether to grant or deny all or part of the extension requested on the basis of all documentation submitted by Sunoco and other information available to the Department. The Department's decision may be submitted to dispute resolution under Paragraph 14.

(d) Sunoco shall have the burden of proof as to the justification for an extension of time and the length of such extension of time under this Paragraph 24, both to the Department and in the event that compliance with the terms and conditions of this CO&A becomes an issue in any subsequent action. Such burden of proof shall be by preponderance of the evidence.

IN WITNESS WHEREOF, the parties hereto have caused this Consent Order and Agreement to be executed by their duly authorized representatives. The undersigned representatives of Sunoco certify under penalty of law, as provided by 18 Pa.C.S. §§ 4904, that they are authorized to execute this Consent Order and Agreement on behalf of Sunoco, that Sunoco consents to the entry of this Consent Order and Agreement as a final **ORDER** of the Department; and that Sunoco hereby knowingly waives its rights to appeal this Consent Order and Agreement and to challenge its content or validity, which rights may be available under Paragraph 4 of the Environmental Hearing Board Act, the Act of July 13, 1988, P.L. 530, No. 1988-94, 35 P.S. § 7514; the Administrative Agency Law, 2 Pa.C.S. §§ 103(a) and Chapters 5A and 7A; or any other provision of law. Signature by Sunoco's attorney certifies only that the agreement has been signed after consulting with counsel.

FOR SUNOCO:

James A. Keeler
Facility Manager

Edward J. Ciechon
Attorney for Sunoco

FOR THE COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Name
Title

Wm. Stanley Sneath
Assistant Counsel

Re 30 (WP)

2003 PHASE I REMEDIAL PLAN

SUNOCO, INC (R&M)
PHILADELPHIA FACILITY
PHASE ONE REMEDIAL PLAN

NOVEMBER 2003

SUNOCO, INC (R&M)
PHILADELPHIA FACILITY
PHASE ONE REMEDIAL PLAN

December 22, 2003

Submitted to:

Pennsylvania Department of Environmental Protection
Southeast Regional Office
Lee Park, Suite 6010
555 North Lane
Conshohocken, PA 19428

Prepared by:

Sunoco Inc.
1801 Market Street
Ten Penn Center
Philadelphia, PA 19103-1699

Table of Contents

1.0 Introduction

This Remedial Plan is submitted as an attachment to the Consent Order & Agreement between Sunoco Inc (R&M) ("Sunoco") and Pennsylvania Department of Environmental Protection ("Department"), dated December 17, 2003 (CO&A). This Phase One Remedial Plan (Plan) applies to Sunoco's Philadelphia Refinery (for historic and current releases) and the Belmont Terminal, currently owned and operated by Sunoco Partners Marketing & Terminal LP, a Texas limited partnership, for releases occurring prior to February 7, 2002. (For convenience both facilities will be referred to as "Facility" even though each facility is currently owned and operated by distinct legal entities.) This Plan presents a framework for further investigation and evaluation of remediation options for the Facility as well as summarizes ongoing remedial programs. The Facility is divided into six distinct geographical areas; the Point Breeze North Yard, the Point Breeze South Yard, the Girard Point Process Area, the West Yard, the Schuylkill River Tank Farm, and Belmont Terminal. These areas are shown in Figure 1. This Plan describes how these areas will be further subdivided into Areas of Interest (AOI's) and addressed as discrete units through the planned site activities. All work outlined within this Plan will be completed in accordance with the 2003 Consent Order and Agreement (CO&A) between the Department and Sunoco consistent with the Pennsylvania Clean Streams Law, the Pennsylvania Land Recycling and Environmental Remediation Standards Act (Act 2) and Chapter 245, Subchapter D, of the Pennsylvania Tank Law. This Plan will form the basis for a Current Conditions Report and Comprehensive Plan which will detail investigation processes consistent with the framework presented herein.

1.1 Goals and Objectives

The goals and objectives set forth in the CO&A apply to this Plan. These are:

- Attainment of an Act 2 standard at the boundaries of the Philadelphia Refinery and Belmont Terminal.
- Protection of human health within the boundaries of the Philadelphia Refinery and Belmont Terminal.
- Assess potential for chemical degradation of groundwater under the Facility from past or present operations caused by geochemical processes that originate with the presence of petroleum chemicals in the soil and groundwater.
- Address potential migration of on-site and off-site subsurface vapors in accordance with the Act 2 Vapor Intrusion Guidance.

These goals will be pursued by evaluating a number of boundary and internal issues that are also set forth in the CO&A. These are:

- Offsite NAPL on groundwater from past or current operations.
- Offsite dissolved-phase groundwater contamination from past or current operations.
- Current and future releases of contaminants into surface waters and the City of Philadelphia combined sewer system.
- Soil contamination at levels which may result in future boundary issues due to surface runoff, migration of NAPL, or the leaching of chemicals from contaminated soil into groundwater.
- Soil contamination which poses an unreasonable threat to human health.
- NAPL on groundwater where NAPL recovery is practicable or where NAPL recovery or containment is necessary to prevent offsite contamination.

- Groundwater contamination or subsurface NAPL which poses an unreasonable threat to human health.

Corrective action activities proposed as part of this Plan, including work plans, investigations, remedial alternative evaluations, remedial actions and risk assessments, will be directed towards addressing these issues while achieving the following objectives:

- Achieve steady progress in meeting the goals of this CO&A.
- Maximize efficiencies, including phasing work based on logical progressions.
- Encourage innovative, environmentally beneficial solutions by promoting beneficial reuse of contaminated materials and testing of new technologies on pilot scale projects.
- Support short and longer term budget planning by providing for even and predictable expenditures from year to year.

1.2 Overview of Investigative Framework and Remedial Approach

Sunoco's investigation and remediation activities for the Philadelphia Facility will be implemented pursuant to the CO&A to achieve the Goals and Objectives referenced in Section 1. The framework for these activities is to divide the Facility into related Areas of Interest or AOIs based on consideration of risk factors. A Geographic Information System (GIS) will be utilized to support the implementation of this remedial approach.

The following summarizes the key elements of this approach:

Risk Based Standards - Act 2 risk based standards will be utilized at the Facility in accordance with the 2003 CO&A. Compliance with the appropriate Act 2 groundwater standards (statewide, site-specific or background) will be achieved at the downgradient Facility boundary as well as any impacted areas off-site. Back-calculated risk based site-specific groundwater standards or pathway elimination may be utilized interior to the Facility to address the soil to groundwater pathway for on-site soils and streamline site characterization activities. The direct contact statewide, site-specific or background standard will be applied to site soils in accordance with the direct contact pathway provisions in Act 2. On-site groundwater and soils will be evaluated for the vapor pathway in accordance with Act 2 Vapor Guidance. Off-site impacts associated with vapor transport through the sewer system (a potential preferential pathway) may also need to be evaluated, in accordance with the Act 2 Vapor Intrusion Guidance. The direct contact and/or vapor pathway from Facility soils may be eliminated using the pathway elimination under the site-specific standard. For purposes of evaluating groundwater impacts, soil analyses may not be necessary in instances where LNAPL is the predominant contaminant source in soil and groundwater. In some cases soil sampling will be necessary to evaluate the soil to groundwater pathway. These situations will be addressed on a site specific basis. The identification of the appropriate standards for each AOI will be presented to the Department once the site characterization activities are completed for the specific AOI.

Selection of the Areas of Interest - AOIs were defined based on risk based factors including product types, potential exposure pathways, receptors, known LNAPL quantities, and historical information. These AOIs are shown on Figure 2 and include:

- AOI 1 – Belmont Terminal, #1 Tank Farm, and #2 Tank Farm
- AOI 2 - Point Breeze Processing Area
- AOI 3 – Impoundment Area

- AOI 4 - #4 Tank Farm Area
- AOI 5 - Girard Point South Tank Field Area
- AOI 6 – Girard Point Chemicals Processing Area
- AOI 7 – Girard Point Fuels Processing Area
- AOI 8 – Point Breeze Process Area North Yard
- AOI 9 – Schuylkill River Tank Farm
- AOI 10 – West Yard
- AOI 11 – Deep Aquifer Beneath Facility

Dependent upon the results of the investigation activities, these AOIs may be further refined to focus on a potential exposure pathway or specific remedial activities.

Compounds of Concern (COCs) - The COCs for the proposed investigation activities will include a Modified Skinner List as an initial screening step. Based on the results of the initial screening process and the relevant product types within an AOI, a focused list of COCs will be carried forward for further investigation and/or remedial activities.

Media of Concern - The media of concern for the site include groundwater and soils. Indoor and outdoor air will be evaluated as a receptor from site soils and/or groundwater through the use of the Vapor Intrusion Guidance or by direct sampling. Surface water will be evaluated as a receptor in relation to Facility activities.

Site Use - All investigation and remedial activities of facility internal areas will be completed under a non-residential land use scenario. Investigation and remediation of off-site areas will be completed under either a residential or non-residential land use scenario as appropriate, given the surrounding land use. The site is regulated under the Occupational Safety and Health Administration (OSHA); therefore, OSHA Permissible Exposure Limits (PELs) will be applied when evaluating the potential indoor air pathway in the Facility.

Prioritization of Characterization and Remediation Activities - The implementation of the investigation and remedial activities will be based on potential impacts to receptors and known environmental conditions. The sequence of activities outlined in this Plan may be altered dependent upon the conditions observed during implementation of this Plan.

2.0 General Facility Description

The Facility is located on approximately 672 acres in southwest Philadelphia. The Facility has a long history of petroleum transportation, storage, and processing. The oldest portion of the Facility started petroleum related activities in the 1860's, when Atlantic Refining Company established an oil distribution center. In the 1900's, crude oil processing began and full-scale gasoline production was initiated during World War II. In addition to refining crude oil, various chemicals, such as acids and ammonia, were also produced at the site for a time. Current operations at the facility are limited to the production of fuels and basic petrochemicals for the chemical industry. The Point Breeze Processing Area portion of the Facility has been operating under a Consent Order and Agreement since 1993. The 2003 CO&A replaces the 1993 CO&A.

2.1 Site Physiography and Topography

The Facility falls within the Atlantic Coastal Plain Physiographic Province which is generally low-lying and relatively flat. Northwest of the Facility, bedrock outcrops along

the Fall Line (the line between the area where bedrock outcrops to the west and the Coastal Plain sediments to the west); near the site, bedrock is overlain with thick, unconsolidated deposits of layered sand and gravel, silts, and clays. These deposits are somewhat thin along the western portion of the Coastal Plain where bedrock is at shallower depths, and gradually thicken in a southeast direction to the coast, where these deposits are several thousand feet thick. Within the Facility, at the northwestern end of the Coastal Plain, existing boring information indicates the unconsolidated deposits to be generally less than 100 feet in thickness. Land surface topography at the Facility is relatively flat, with the land surface elevation being generally less than 30 feet above mean sea level. The flatness of the topography is representative of the Coastal Plain where alluvial sediments have been deposited by meandering streams and rivers with deposition ultimately controlled by the proximity to sea level. There are no significant areas of topographic relief within the Facility.

2.2 Surface Water Hydrology

The Delaware River, which discharges into the Delaware Bay and the Atlantic Ocean, is the major surface water body within the vicinity of the Facility. A tributary of the Delaware River, the Schuylkill River, is present within the Facility, and bisects the site in a generally north to south direction. Both rivers are tidally-influenced with several feet of tidal variation observed in the Schuylkill River. Lands Creek, a small perennial stream, is also located adjacent to the West Yard.

2.3 Geology and Hydrogeology

The geology of the Facility is composed of several different units, which can be generally characterized as: filled land in many portions of the site; unconsolidated sand, gravel, silt, and clay, which occur as layered and differentiated units, and bedrock. The following summary discussions present a description of each of the geologic units at the site in terms of geologic history, lithology, and regional hydrogeology. Site specific hydrogeologic information is also present in relation to the most shallow geologic unit at the facility, the recent alluvium.

Wissahickon Formation - According to the American Institute of Professional Geologists mapping (Bennison, 1976), the oldest geologic unit underlying the site is the Wissahickon Formation of lower Cambrian age (540-570 million years). This formation is a metamorphosed micaceous schist and quartzite into which igneous bodies have intruded (Greenman, et a., 1961). The surface of the Wissahickon Formation was eroded by the paleo-Schuylkill River, which formed four channels which fed the paleo-Delaware River.

The Wissahickon Formation is overlain by an extensive confining unit derived from the weathering of the bedrock. Near its top, the confining unit is predominately a micaceous, soft clay which grades downward, becoming increasingly sandy as the degree of weathering of the crystalline formation lessens and competent bedrock is reached. The clay layer acts as a confining layer to the water-bearing fractures of the Wissahickon Formation. Where the clay layer is present, the Wissahickon Formation behaves as an artesian aquifer, with flow generally to the southeast away from the Fall Line at a steep gradient. In its outcrop area to the northwest of the study area, the Wissahickon Formation is a water table aquifer.

Farrington Sand - At the Facility, the Wissahickon Formation is overlain by the Farrington Sand, which is the lowest member of the Raritan Formation, the only member

of the Potomac-Raritan Magothy Formation present at the Facility (upper Cretaceous age; 65 to 98 million years). The Farrington Sand is a coarse sand and fine gravel, yellowish gray to yellowish brown in color, that is generally overlain by the Lower and Middle Clay members of the Raritan Formation.

The Farrington Sand is generally separated hydraulically from surface waters (i.e., Delaware River and Schuylkill River) and the surficial unconfined aquifer by superjacent, confining clays of the Raritan Formation. Where these confining clay layers are absent, the Farrington Sand is hydraulically connected to the overlying, unconfined aquifer and/ or surface waters so that both units behave as one hydrologic and geochemical unit.

Middle Clay - The Middle Clay member of the Raritan Formation is the most extensive clay layer in the Philadelphia area. The Middle Clay is fairly uniform, being less variable in lithology than the other clay members of the Raritan Formation, and is a tough, red and white massive clay with a characteristic basal layer of lignite. The Middle Clay has been eroded away in parts of the Facility, particularly under the West Yard. Regionally, the thickness of the Middle Clay ranges from 0 to 60 feet, with thicknesses commonly greater than 20 feet. The Middle Clay is characterized by a very low permeability and forms an effective barrier to groundwater flow.

Cape May Formation - The Cape May Formation overlies the Middle Clay and Farrington Sand with thicknesses up to 80 feet and a typical thickness of 40 feet. The Cape May Formation is of Pleistocene Age (Ice Age; less than 2 million years) and is a very heterogeneous unit comprised of a predominant brown to gray sand and gravel. Along the Schuylkill River, most of the Pleistocene formations have been eroded away; although it is present over the entire Facility area. The thickest portion of the Cape May Formation underlies the present day Schuylkill River, forming a north-south deposit along the axis of the bedrock channel.

Recent Alluvium - Overlying the Cape May Formation is recent alluvium with depths up to 78 feet of these deposits generally consisting of dark gray organic clayey mud or silt and fine sand. The recent alluvium is unimportant as a water source because it is much less permeable that the subjacent aquifers. The alluvium acts, however, as a leaky confining bed, impeding flow of groundwater to the lower aquifers. Where it overlies the Cape May Formation, the recent alluvium may cause the Cape May Formation to respond as an artesian aquifer. The primary hydrologic features in the vicinity of the site include the Schuylkill and Delaware Rivers. Contoured ground water maps of the site show that shallow ground water flow is generally toward the south-southwest toward the Schuylkill River, however, there is south-southeast component of flow toward the confluence of the Delaware and Schuylkill Rivers.

2.4 Potential Receptors

The potential surface water receptors for the site include the Delaware River and the Schuylkill River, and Lands Creek that runs parallel to the West Yard. There are no groundwater receptors within the site boundaries and therefore highest beneficial use of groundwater is as a recharge to surface water. Potential human health receptors for the Facility include direct contact with site soils, and potential indoor air vapor inhalation. Potential off-site human health receptor considerations include off-site migration of vapors, dissolved phase COCs or LNAPL.

3.0 Site Conceptual Model (SCM)

A preliminary Site Conceptual Model was developed based on site history, previous environmental investigations, current site use, potential receptors and future site use. Application of this preliminary SCM has allowed for the identification of eleven Areas of Interest at the Facility. As data is collected, the SCM will be refined and utilized to assist in fate and transport analysis and exposure pathway evaluation for the individual areas of interest, as well as for the Facility in aggregate. The SCM will include geology, hydrogeology, COCs, potential receptors and site use. The SCM will be displayed through GIS coverages and other relevant figures and tables. The SCM will rely on the use of the GIS to portray the current understanding of subsurface conditions as well as, the fate and transport of LNAPL and dissolved phase constituents.

4.0 Overview of Current Facility Remediation and Monitoring and Summary of Previous Work

The following sections present the current conditions and a summary of completed work at the Facility since the 1993 CO&A. Since this work was completed before the development of the AOIs, this section is presented both in relation to the process areas as well as the AOIs.

4.1 Point Breeze Process Area

The Point Breeze Processing Area North Yard (AOI 8) and South Yards (AOI 1 through AOI 4) are separated by a facility owned by Philadelphia Gas Works, located along the north side of Passyunk Avenue (Figures 1 and 2). For purpose of this Plan the Point Breeze Processing Area includes the Belmont Terminal (AOI 1). The Belmont Terminal is located adjacent to the northeast corner of the south yard of the Point Breeze Processing Area and on the south side of Passyunk Avenue. The Point Breeze Processing Area also includes an ancillary facility located on the west side of the Schuylkill River, referred to as the West Yard (AOI 10).

Results of a RCRA Facility Investigation (RFI) for the Point Breeze Process Area are summarized in a report by ENSR Consulting and Engineering (ENSR) dated September 1992. The primary purpose of the RFI was to examine potential contaminant releases to surrounding soils/sediments, surface water, and groundwater within three areas of the Point Breeze Processing Area. The investigation included the completion of soil borings and monitoring wells; sampling of groundwater and surface water sediments; sampling of waste materials, sampling of subsurface soils; geophysical surveys; bathymetric surveys, tidal surveys, and monthly water level monitoring. Pertinent data and observations obtained during ENSR's 1992 investigation are summarized within individual AOI discussions presented in Section 5.0.

Supplemental investigations have been performed at isolated impacted areas within Point Breeze. Areas targeted for additional investigation were those that posed the highest potential for off-site migration and discharge to sensitive receptors. These areas include the Pollock Street Sewer (AOI 2), Short Pier (AOI 2), and Jackson Street Sewer (AOI 8) and the Bulkhead in the North Yard (AOI 8). Results of these investigations have been summarized in several reports by Aquaterra Technologies, Inc. (Aquaterra) and include: *Pollock Street Sewer Investigation* dated October 18, 2002, *Site Characterization and Remedial Feasibility testing report at the Short Pier* dated January 30, 2003, and by Handex *Subsurface Evaluation Update: Jackson Street Sewer-North Yard dated July 30, 2002, Supplemental Subsurface Evaluation: Jackson*

St. Sewer dated October 18, 2002 and Short Pier Area Recovery Well Installation and Feasibility Test Report (October 16, 1997). Pertinent data and observations obtained during these investigations are summarized within the appropriate AOI discussions presented in Section 5.0.

Based upon investigation results, active remediation consists of dissolved hydrocarbon, LNAPL and hydrocarbon vapor recovery within the Point Breeze Process Areas. LNAPL recovery is conducted at eight recovery system areas that incorporate thirty-two active recovery wells for ground water and LNAPL extraction and one LNAPL only skimming device. In addition, non-system LNAPL recovery is currently conducted at three areas via a gauge and bail program. The LNAPL recovery systems were undertaken pursuant to the Consent Order and Agreement between Sunoco and the Department dated December 17, 1993. Hydrocarbon vapor removal is performed at the Packer Avenue and 26th Street sewers. Recovered vapors are treated using a biofilter.

The monitoring program consists of semi-annual ground water gauging and annual ground water sampling and analysis. In addition, three sewer outfalls (Pollock St. Jackson St and Passyunk Ave) are routinely inspected for evidence of LNAPL in the discharge. Semi-annual gauging of all wells and annual ground water sampling of twenty perimeter monitoring wells was requested by the Department in a correspondence to Sunoco dated March 29, 1993. The purpose of the well gauging is to identify the presence of LNAPL, determine ground water flow patterns, and identify wells for the monthly gauge and bail program. The purpose of the annual ground water sampling event is to evaluate concentration trends at the perimeter of the facility and compare the results with historical ground water sampling events. Semi-annual gauging occurs during the 2nd and 4th Quarters and the annual ground water sampling occurs during the 4th Quarter of every year.

4.2 Girard Point Process Area

Prior to August 1994, the area currently known as Girard Point was owned by Chevron USA, Inc (Chevron). In 1993, a Remedial Action Plan (RAP) was implemented in response to the September 4, 1992 and January 19, 1993 letters forwarded to Chevron from the Pennsylvania Department of Environmental Resources (PADER) requesting that Chevron address the removal of free-phase hydrocarbon from the water table in “affected areas” of the Facility. The results of this investigation/remedial measures evaluation are presented in Remedial *Action Plan Implementation*, dated September 30, 1993, prepared by Chevron’s consultant, Dames & Moore. In addition, Chevron also conducted Remedial Investigation work as part of EPA’s corrective action program. Dames & Moore performed an RFI and results of the investigation are presented in a report titled *RCRA Facility Investigation* dated November 23, 1993. The purpose of the RFI was to assess the degree and extent of hazardous waste constituents present and to evaluate whether further investigation was warranted at 10 identified Solid Waste Management Units (SWMUs). The investigation included soil gas sampling and analysis, subsurface soil sample collection and analysis, and groundwater sampling and analysis. Pertinent data and observations obtained during these investigations are summarized within individual AOIs (AOI 5 through AOI 7) discussions presented in Section 5.0.

The current remediation program in the Girard Point Process Areas consists of LNAPL recovery from six recovery areas that incorporate sixteen recovery wells for automated ground water and LNAPL recovery. In addition, non-system LNAPL recovery (absorbent wicks, passive bailers, and manual bailing) is conducted at thirteen wells via a gauge and bail program.

The monitoring program consists of annual ground water gauging of all Girard Point Processing Area wells and annual ground water sampling and analysis of six perimeter monitoring wells. The purpose of the well gauging is to identify the presence of LNAPL, determine ground water flow patterns, and identify wells for the monthly gauge and bail program. The purpose of the annual ground water sampling event is to evaluate concentration trends at the perimeter of the Facility and compare the results with historical ground water sampling events.

5.0 Areas of Interest

The following section presents a general description of each AOI, identifies potential exposure pathways, potential receptors, summarizes existing environmental conditions, ongoing remedial activities, and identifies additional remedial work to be undertaken as part of Phase One of the CO&A.

5.1 AOI 1 – Belmont Terminal/ #1 Tank Farm/ #2 Tank Farm

5.1.1 General Description

AOI 1 is bordered by Passyunk Avenue to the North, 26th Street to the East, Hartranft Street to the South, and Process area 869/employee parking area to the West (Figure 2) and encompasses approximately 100 acres. Historic usage will be investigated through available historical information and local knowledge. Currently, AOI 1 is comprised of primarily light-end hydrocarbon Above Ground Tankage (No. 1 and 2 Tank Farms) and loading racks (the Belmont Terminal) to the Northeast of the No. 1 Tank Farm. There are numerous underground process lines in AOI 1.

5.1.2 Potential Exposure Pathways, Receptors

Potential migration pathways include a number of sewers including the 26th Street Sewer, the Packer Avenue Sewer, the Pollock Street Sewer, the Shunk Street Sewer and the Passyunk Avenue Sewer. Additionally, groundwater has the potential to migrate off-site to the east-southeast. Potential receptors include properties immediately east of 26th Street and the Schuylkill River.

5.1.3 Existing Environmental Conditions

The monitoring network in AOI 1 includes a total of 65 monitoring wells and five piezometers. All wells are included within the monitoring program developed under the 1993 CO&A. The monitoring program consists of semi-annual ground water gauging of all South Yard wells and annual ground water sampling and analysis of select perimeter monitoring wells.

Currently, the presence of LNAPL is detected in wells in the northeastern portion of the site, proximal to the Belmont Terminal loading rack area and Tanks 26 and 85. Shallow groundwater generally flows toward the south-southeast; however, an isolated groundwater depression occurs proximal to monitoring well, S-127, and an isolated groundwater mound occurs proximal to monitoring well, S-84. Off-site areas located east of the Facility and contiguous to this AOI, appear to have LNAPL impacts which appear to be continuous with LNAPL plumes at the Facility.

Potential sources for the observed LNAPL include the loading rack and underground pipelines. Petroleum products distributed from aboveground storage tanks in AOI 1 to the loading rack include: light-end gasoline products, MTBE, reformate, alkylate and naphthalene.

5.1.4 Active Remediation

A total of 15 recovery wells are located throughout AOI 1. The current remediation program consists of 15 recovery wells for automated ground water and LNAPL recovery. In addition, non-system LNAPL recovery (manual bailing) is currently conducted via a monthly gauge and bail program.

Vapors from the Packer Avenue Sewer, 26th Street Sewer, and Shunk Street Sewer are currently treated by two Sewer Odor Control Systems (Packer Avenue Sewer, 26th Street System and the Shunk Street System).

5.1.5 Additional Remediation

A recovery system consisting of between three to five recovery wells will be designed, installed, and activated across 26th Street (off-site) from AOI 1 in mid 2004. An expanded recovery system will be designed, installed, and activated on the 26th Street border adjacent to Tanks 26 and 85 in mid 2004.

5.2 AOI 2 – Point Breeze Processing Area

5.2.1 General Description

AOI 2 is bordered by Passyunk Avenue to the North, AOI 1 to the East, Hartranft Street to the South, and the Schuylkill River to the West (Figure 2). Historic usage will be investigated through available historical information and local knowledge. Currently, AOI 2 has the only active dock (Short Pier) for loading/ offloading refined products in the Point Breeze Facility. AOI 2 is primarily comprised of crude units, hydrodesulfurization units, cracking and alkylation units, sulfur recovery, maintenance facilities, wastewater treatment plant, parking areas, office buildings, and the laboratory. AOI 2 encompasses approximately 120 acres. AOI 2 is almost entirely paved except for directly on the Short Pier and at the eastern edge adjacent to the tank farms.

5.2.2 Potential Exposure Pathways and Receptors

Pollock Street Sewer is a potential migration pathway of LNAPL and vapor to the Schuylkill River. The Schuylkill River is a potential receptor of dissolved hydrocarbons or LNAPL impact in the area of the Short Pier/Casement Wharf. Several office buildings and control rooms are present within AOI 2 and may

provide potential receptors for indoor vapor intrusion.

5.2.3 Existing Environmental Conditions

The monitoring well network in AOI 2 includes a total of 53 monitoring wells and two piezometers. All wells are included in the monitoring program developed under the 1993 CO&A. The monitoring program consists of semi-annual ground water gauging of all South Yard wells and annual ground water sampling and analysis of select perimeter monitoring wells.

Currently the presence of LNAPL is observed in three areas: the Short Pier, the 869 Process Area, and proximal to the Pollock Street Sewer. Potential sources within the 869 Process Area include underground pipelines, and former tanks and process units. Areas currently under investigation in AOI 2 include the Pollock Street sewer and the Short Pier Area.

5.2.4 Active Remediation

The monitoring well network in AOI 2 includes a total of 13 recovery wells. The remediation program consists of operation of 13 recovery wells for automated ground water and LNAPL recovery. In addition, non-system LNAPL recovery (manual bailing) is conducted via a monthly gauge and bail program.

5.2.5 Additional Remediation

A horizontal recovery well / total fluids extraction system will be installed proximal to the Pollock Street Sewer in AOI 2 in November 2003. Based on the performance and monitoring results of the Pollock Street Sewer Remediation System, an expanded horizontal well/total fluids extraction system is scheduled for the remaining impacted stretches of the Pollock Street Sewer in late 2004. A total phase recovery system is planned for installation at the Short Pier subsequent to the completion of the Case Wharf stabilization project.

5.3 AOI 3 - Impoundment Area

5.3.1 General Description

AOI 3 is bordered by Hartranft Street to the North, AOI 4 to the East, Penrose Avenue to the South, Girard Point Processing Area Facility to the Southwest, and the Schuylkill River to the Northwest (Figure 2). Historic usage will be investigated through available historical information and local knowledge. Currently, AOI 3 is comprised of the Guard Basin, the Four (4) Pond, the former “Chevron Ballfields”, the Contractor Parking Lot, and the Central Warehouse.

5.3.2 Potential Exposure Pathways and Receptors

Potential receptors from LNAPL in AOI 3 include the Schuylkill River, the Girard Point Processing Area, the Guard Basin and the 4 Pond. The Central Warehouse and office buildings are present in AOI 3 and may provide potential receptors for indoor vapor intrusion.

5.3.3 Existing Environmental Conditions

The monitoring well network in AOI 3 includes a total of 30 monitoring wells located throughout AOI 3. All wells are included in the monitoring program developed under the 1993 CO&A. The monitoring program consists of semi-annual ground water gauging of all South Yard wells and annual ground water sampling of perimeter monitoring wells.

Currently, the presence of LNAPL is observed in two areas of AOI 3. An extensive area is observed along the western edge of AOI 3 proximal to a storage area, and an isolated area is observed proximal to monitoring wells, S-18 and S-21. Potential sources of LNAPL include petroleum distribution lines, tankage, and distribution lines within AOI 4.

The Guard Basin is listed as a SWMU under EPA corrective action program and has been studied as part of an RFI, completed by ENSR in 1992. This unlined basin has been in operation since the late 1950's as a stormwater retention basin. During the RFI, one chemical of potential concern, lead, in subsurface soil and sediment was identified.

5.3.4 Active Remediation

One recovery well (RW 2) is located in AOI 3. The remediation program consists of operation of the recovery well for automated ground water and LNAPL recovery. In addition, non-system LNAPL recovery (manual bailing) is currently conducted via a monthly gauge and bail program.

5.3.5 Additional Remediation

No additional remediation is currently planned for AOI 3. A CMS work plan was proposed to the EPA in 1999.

5.4 AOI 4 - #4 Tank Farm Area

5.4.1 General Description

AOI 4 is bordered by Hartranft Street to the North, 26th Street to the East, Penrose Avenue to the South, and AOI 3 to the West (Figure 2) and encompasses approximately 90 acres. Historic usage will be investigated through available historical information and local knowledge. Currently, AOI 4 is comprised of primarily Crude Oil and Gas Oil Above Ground Tankage. Numerous below ground pipelines are active within AOI 4.

5.4.2 Potential Exposure Pathways and Receptors

Currently identified potential receptors for LNAPL in AOI 4 include 26th Street, and Penrose Avenue and adjacent off-site industrial properties. In addition, groundwater may flow towards AOI 3. The 15 Pump House building is considered a potential receptor for indoor vapor intrusion.

5.4.3 Existing Environmental Conditions

A total of 33 monitoring wells are located throughout AOI 4. All wells are included in the monitoring program developed under the 1993 CO&A. The monitoring program consists of semi-annual ground water gauging of all South Yard wells and annual ground water sampling and analysis of perimeter monitoring wells.

The presence of LNAPL is observed in three areas of AOI 4; an extensive area within the northwestern portion of the tank field, an isolated area proximal to monitoring well, S-97, and an isolated area proximal to monitoring well, S-124. Potential sources of LNAPL impact within AOI 4 include petroleum distribution lines, crude oil and gas oil AST's.

5.4.4 Active Remediation

One recovery well, S-30, is located in AOI 4. The remediation program consists of LNAPL recovery only from this well. In addition, non-system LNAPL recovery (manual bailing) is currently conducted via a monthly gauge and bail program.

5.4.5 Additional Remediation

An expanded LNAPL only recovery system is planned for additional recovery wells and monitoring wells in the vicinity of S-30. Installation of this system is planned for early to mid 2004.

5.5 AOI 5 – Girard Point South Tank Field Area

5.5.1 General Description

AOI 5 is the tank field area directly south of the Penrose Avenue Bridge (Figure 2) and encompasses approximately 100 acres. Historic usage will be investigated through available historical information and local knowledge. Currently, AOI 5 consists primarily of intermediate product tankage, old warehouses, and the docks which consist of three barge loading areas. Much of the area is unoccupied with a large number of tanks that have been removed and demolished.

5.5.2 Potential Exposure Pathways and Receptors

The Schuylkill River has been identified as a potential receptor for LNAPL in AOI 5. The control houses in AOI 5 are considered a potential receptor for the vapor intrusion pathway.

5.5.3 Existing Environmental Conditions

The monitoring network in AOI 5 includes a total of 74 monitoring wells and two recovery wells. The monitoring program consists of annual ground water gauging of all wells and annual ground water sampling and analysis of two perimeter monitoring wells. Gauging of selected wells in these areas typically occurs twice a month. More comprehensive gauging is conducted quarterly.

The presence of LNAPL is observed in wells located along the southwest bulkhead bordering the Schuylkill River in AOI 5. Lesser LNAPL thicknesses are also observed in wells further west, in the vicinity of recovery wells RWBH-1 and RWBH-2 and in the vicinity of Pump House 1.

Ground water flow in the western portion of the AOI 5 is generally to the south toward the Schuylkill River. Ground water flow in the west-central portion of the AOI splits along an east-west divide with the majority of ground water ultimately flowing toward the Schuylkill River with a lesser portion flowing towards the northwest.

5.5.4 Active Remediation

Active remediation is currently underway and consists of total fluids (ground water and LNAPL) recovery from two recovery wells (RW-BH1 and RW-BH2) using electric, submersible pumps. O&M activities occur every other week and include evaluation of the recovery pumps, system equipment and associated level switches, and collection of the appropriate system performance data

5.5.5 Additional Remediation

No additional remediation is planned for AOI 5 at this time.

5.6 AOI 6 – Girard Point Chemicals Processing Area

5.6.1 General Description

AOI 6 is located north of the Penrose Avenue Bridge and south of Pennypacker Avenue in a wedge shaped section extending from Lanier Avenue to the Schuylkill River (Figure 2) and encompasses approximately 100 acres. Historic usage will be investigated through available historical information and local knowledge. Existing usage within AOI 6 consists of benzene and cumene units, reformers, tankage, boilerhouses, maintenance buildings, and office buildings.

5.6.2 Potential Exposure Pathways and Receptors

Currently identified potential receptors for LNAPL in AOI 6 include the Schuylkill River. The control houses in AOI 6 are considered a potential receptor for the indoor vapor intrusion. Limited areas have benzene soil concentrations in excess of the direct contact and the soil to groundwater Statewide Health Standards. These areas will be evaluated in relation to potential worker exposure under an industrial exposure scenario and with respect to the potential soil to groundwater migration pathway.

5.6.3 Existing Environmental Conditions

The monitoring network in AOI 6 includes a total of 62 monitoring wells. The monitoring program consists of annual ground water gauging of all wells and annual ground water sampling and analysis of one perimeter monitoring well. AOI 6 is further divided into three zones referred to as 27 Pump House, Area 9 and Main Office Building. Gauging of selected wells in these areas typically occurs on a twice monthly basis complemented by a more comprehensive gauging event that is conducted quarterly. Based on the gauging data, LNAPL is generally present in

wells located in a localized area to the south and east of the former 27 Pump House and in two wells located further south in Area 9.

Ground water flow in the western portion of AOI 6 under non-pumping conditions is generally southwest toward the Schuylkill River. Under pumping conditions localized flow is reversed so that a radial depression is formed in the area of known LNAPL impact around the 27 pump house area.

5.6.4 Active Remediation

Active remediation in AOI 6 is currently underway at the former 27 Pump House Area and Area 9. LNAPL accumulations in the 27 Pump House Area are being addressed via total fluids recovery from 11 recovery wells distributed to the south and east of the Former 27 Pump House, in the area of known LNAPL impact. LNAPL recovery in Area 9 is achieved via a single LNAPL-only recovery pump to address apparent LNAPL accumulations up to two feet thick in two of the wells.

5.6.5 Additional Remediation

The current Area 9 recovery system will be converted from LNAPL only to a total fluids recovery system by tying it in with the 27 pump house system. This is scheduled to be completed by December 2003.

5.7 AOI 7 – Girard Point Fuels Processing Area

5.7.1 General Description

AOI 7 is located north of Pennypacker Avenue, east of Lanier Avenue, and south and west of the Schuylkill River (Figure 2). Historic usage will be investigated through available historical information and local knowledge. Currently, the area encompasses approximately 140 acres and consists of crude units, cracking and alkylation units, hydrodesulfurization units, flares, and tankage.

5.7.2 Potential Exposure Pathways and Receptors

Currently, the Schuylkill River is identified as a potential receptor for LNAPL in AOI 7. The control houses in AOI 7 are considered a potential receptor for the vapor intrusion pathway.

5.7.3 Existing Environmental

The monitoring network in AOI 7 includes a total of 33 monitoring wells. The monitoring program consists of annual ground water gauging of all wells and annual ground water sampling of two perimeter monitoring wells. LNAPL was detected in four wells, each of which borders the Schuylkill River.

5.7.4 Active Remediation

No active remediation systems are currently operating in AOI 7.

5.7.5 Additional Remediation

No remediation is currently planned for AOI 7.

5.8 AOI 8 - Pt. Breeze Process Area North Yard

5.8.1 General Description

AOI 8 is bound by PGW to the south, the Schuylkill River to the west, industrial properties to the north and urban streets to the east (Figure 2) and approximately 250 acres. The North Yard was an active refinery process area from approximately the 1920s until the 1970s when a general restructuring of the entire facility was completed. From the late 1950's to the mid-1970's an area in the North Yard Asphalt Plant area was used to weather leaded gasoline tank bottoms. This pad was identified as a SWMU as part of EPA's corrective action process, and was investigated as part of an RFI, conducted by ENSR in 1992 During the RFI, chemicals of potential concern, including lead, arsenic, vanadium, benzo(a)pyrene, dibenz(a,h)anthracene, benzo(a)anthracene, benzo(b)fluroanthene, were identified in subsurface soils. Currently, the only remaining active facilities in the North Yard are the Asphalt Dock, the Boiler house, and the butane and propane storage and loading/unloading facilities. Much of the North Yard is unoccupied.

5.8.2 Potential Exposure Pathways and Receptors

The Jackson Street sewer can be a potential LNAPL and subsurface vapor migration pathway. The potential receptors in the North Yard are the Schuylkill River, the PGW property and the Jackson Street sewer for potential odor intrusion.

5.8.3 Existing Environmental Conditions

Measurable LNAPL has been detected in 23 of the North Yard monitoring wells with apparent thicknesses ranging from approximately 0.01 to 3.61 feet. Significant accumulations were noted in wells located south of the rail lines near the southern end of the Land Treatment Unit, north of the rail lines adjacent to the Jackson Street sewer and adjacent to the northern PGW facility border (both on and off-site.) Several monitoring wells located near the Schuylkill River also contained LNAPL.

The monitoring network in AOI 8 includes a total of 91 monitoring wells, 13 piezometers and 18 active recovery wells. All wells are included in the monitoring program developed under the 1993 CO&A. The monitoring program consists of semi-annual ground water gauging of all North Yard wells and annual ground water sampling of select perimeter monitoring wells.

Areas currently being investigated in the North Yard include the length of the Jackson Street sewer from the Schuylkill Expressway on the East to the outfall into the Schuylkill River on the West.

5.8.4 Active Remediation

Areas under active remediation in the North Yard Include the Jackson Street Sewer, The PGW Border and the North Yard Bulkhead / #3 tank farm separator.

There are a number of barrier systems installed, including a barrier wall along the north yard bulkhead and a cap on the #3 tank farm separator. These barrier and remediation systems were installed as part of the 1993 CO&A and are still in place and active as containment structures. The ongoing remediation program consists of non-aqueous phase liquid (LNAPL) recovery from eighteen recovery wells through total fluids extraction. In addition, non-system LNAPL recovery (manual bailing) is conducted via a monthly gauge and bail program. LNAPL discharges to the Jackson Street sewer outfall are controlled using river boom, an underflow weir and an automated product skimming pump. The cap on the #3 tank farm separator is maintained to prevent erosion or waste exposure.

5.8.5 Additional Remediation

An investigation into possible expansion of the recovery system along the Jackson Street sewer will be conducted in mid -2004. A CMS Work Plan for the leaded tank bottom treatment area was proposed to the EPA in 1999.

5.9 AOI 9 – Schuylkill River Tank Farm

5.9.1 General Description

AOI 9 is comprised of approximately 80 acres and is located southwest and across the Schuylkill River from the Girard Point facility (Figure 2). Historic usage will be investigated through available historical information and local knowledge. Currently, activities at the Schuylkill River Tank Farm include storage and blending of refined petroleum products.

5.9.2 Potential Exposure Pathways and Receptors

The Schuylkill River is identified as a potential receptors for LNAPL in AOI 9. The control houses in AOI 9 are considered a potential receptor for the vapor intrusion pathway.

5.9.3 Existing Environmental Conditions

The monitoring network in AOI 9 includes a total of nine monitoring wells located in the southern portion of the facility. The monitoring program consists of annual ground water gauging of all wells. Gauging of selected wells in this area occurs on a twice monthly basis. A comprehensive gauging event is conducted quarterly. Based on the gauging data LNAPL is generally present in both of the recovery wells and one of the monitoring wells. LNAPL thicknesses in the wells typically measure less than 0.10 feet with recent data indicating only a film (<0.01 feet).

Ground water flow under non-pumping conditions is generally east, toward the Schuylkill River. Under pumping conditions, a radial depression is formed in the area of known LNAPL impact.

5.9.4 Active Remediation

Active remediation in AOI 9 is currently underway and consists of two total fluids (ground water and LNAPL) pumps and associated treatment equipment located in the southern portion of AOI 9.

5.9.5 Additional Remediation

No additional remediation is currently planned for AOI 9.

5.10 AOI 10- Point Breeze Processing Area - West Yard

5.10.1 General Description

The West Yard is comprised of approximately 22 acres and is located west of the Schuylkill River and south of Passyunk Avenue (Figure 2). A portion of the west yard (approximately 21 acres) received waste from the refinery from the 1950's and 1960's. The waste is covered in four past disposal areas (PDAs). Currently, remaining activities in the West Yard include semi-annual gauging of all 27 area monitoring wells.

5.10.2 Potential Exposure Pathways and Receptors

The potential receptors in AOI 10 include Lands Creek and the Schuylkill River.

5.10.3 Existing Environmental Conditions

An investigation of the PDAs was conducted by ENSR in 1992 as part of an RFI. PDAs 3 and 4 received primarily trash construction rubble, tank bottom and separator sludges and spent catalyst during the 1950s. PDAs 1 and 2 received acid wastes, caustic waste, asphalt, coal slag, paraffin, bender catalyst and leaded sludge in the 1950s and 1960s. During the RFI, 17 soil samples, 12 waste samples, 3 sediment samples and 3 surface water samples were collected. Chemicals of Potential Concern identified by the RFI included Benzo(a)Pyrene and Dibenz(a,h) anthracene in waste, lead in surface soil, and lead, benzo(a)pyrene,7,12-dimethylbenz(a)anthracene, dibenz(a,h)anthracene and vanadium in subsurface soil.

A total of 27 wells are located within the West Yard, four are classified as deep wells with the remaining classified as shallow wells. Recent gauging data indicates shallow ground water flows toward the west and east at hydraulic gradients of 0.01ft/ft and 0.004ft/ft, respectively. The deep wells exhibit a southwesterly flow at a hydraulic gradient of approximately 0.002 ft/ft. Of 20 wells gauged, LNAPL was detected at only one well, W-1, at thickness of 0.28 feet.

5.10.4 Active Remediation

No active remediation systems are currently operating in AOI 10.

5.10.5 Additional Remediation

No remediation is currently planned for AOI 10. A Corrective Measures Study Work Plan was prepared in April 1999 and submitted to EPA. As part of this study, additional soil and waste samples were proposed. The study will be focused on collecting data to determine the aerial extent of any capping or hot spot removal necessary to protect human exposure to waste and impacted soils.

5.11 AOI 11- Deep Aquifer beneath Facility

5.11.1 General Description

As described in Section 2.0, a water table aquifer exists throughout the facility within recent alluvium deposits and the Cape May Formation. In some areas of the facility, there exists beneath this surficial aquifer two stratigraphic units, the Middle Clay, and the Farrington Sand that are members of the Raritan formation which is in turn a formation within the Potomac-Raritan-Magothy (PRM) aquifer system. The PRM is used as a source of drinking water in southern and coastal New Jersey. The deep aquifer as used herein refers to the Middle Clay and Farrington Sand units of the Raritan Formation.

5.11.2 Potential Exposure Pathways and Receptors

The potential receptors in AOI 11 are the Delaware River and Schuylkill River from groundwater discharge and the PRM aquifer through groundwater recharge.

5.11.3 Existing Environmental Conditions

The evolution of groundwater quality and quantity in the Philadelphia and South Jersey area has been documented in detail in a number of USGS reports. As indicated in these reports, urbanization has had an effect on both groundwater quality and flow direction. Early pumping in southeast Pennsylvania by the refinery, Navy Yard, and other industries along the Delaware River may have altered groundwater gradients away from discharge to the Delaware River and other surface water bodies. More recent pumping in New Jersey may have similar effects. In addition, releases of contaminants from industrial brines, sewage, and inorganic and organic wastes from industrial and residential sources have led to regional degraded groundwater conditions. Organic contaminants can contribute to increases in inorganic species in groundwater through microbial reactions that deplete oxygen and provide reducing conditions that promote the dissolution of naturally occurring iron and manganese minerals in the aquifer.

Previous studies of the deeper aquifer at the facility have been conducted by ENSR (*Investigation of Shallow and Deep Groundwater Quality, Philadelphia Refinery, Philadelphia, PA, May 1994.*) This study indicates that groundwater, both surficial and deeper, is in a reduced state and has inorganic compounds at concentrations consistent with a low oxygen, high electron potential (high eH) environment. However, the concentrations of these compounds are generally consistent with regional groundwater quality data collected by the USGS. (Paulachok, 1991). The ENSR report did find high ammonia concentrations in upgradient areas suggesting off-site sources not related to refinery operations, and did not observe a spatial trend of increasing concentrations with downgradient locations. ENSR also reported that organic petroleum compounds (BTEX) were observed in two deep wells in the South Yard although they questioned whether the sampled intervals were actually above the deep aquifer.

Because the deep aquifer beneath the Facility is potentially related to a large regional issue and because the occurrence and orientation of the Middle Clay and Farrington Sand that drive the potential for inorganic contamination is unrelated to specific AOI's, the deep aquifer beneath the Facility will be

evaluated as a separate AOI.

5.11.4 Active Remediation

No active remediation systems are currently operating in AOI 11.

5.11.5 Additional Remediation

No remediation is currently planned for AOI 11.

6.0 Sequence of Activities

6.1 Site Characterization

Sunoco will provide a Current Conditions Report and Comprehensive Remedial Plan (CCR) by June 30, 2004 which will present a detailed Site Conceptual Model of the Facility. The Site Conceptual Model will rely on the use of graphic information and data management systems to provide the current understanding of subsurface conditions and the fate and transport of separate phase and dissolved phase contaminants in the subsurface. The CCR will prioritize the eleven AOI's presented in this plan and provide recommendations for further characterization and/or remediation by AOI in a prioritized, stepwise manner. The prioritization and recommendations will be based upon risk-based factors, including product types, potential exposure pathways, known NAPL quantities and historical information, including the results of previous characterization work. A detailed schedule will be presented with the Current Conditions Report.

6.2 Remediation

Section 5.0 summarizes the additional remediation activities for the AOIs in Phase One. Generally, the additional remediation activities will start in November 2003 and continue throughout 2004.

Other additional remediation activities may be identified through the Site Characterization Process described in 6.1 above. These activities will be incorporated into the overall project with a proposed schedule for implementation as laid out in the CO&A.

6.3 Monitoring

Sunoco will conduct twice yearly reviews of all monitoring wells for groundwater level and apparent LNAPL thickness. The frequency of this check may change as needed to determine the effectiveness of future LNAPL recovery programs. The existing annual sampling and analysis of dissolved constituents in perimeter monitoring wells will also continue although it may also be modified in the future based on the CCR and future characterization activities.

6.4 Reporting

To advise the Department of progress of the various projects, Sunoco will provide quarterly progress reports. The results of all monitoring will be included in these reports. The first of these reports will be sent to the Department in April 2004.

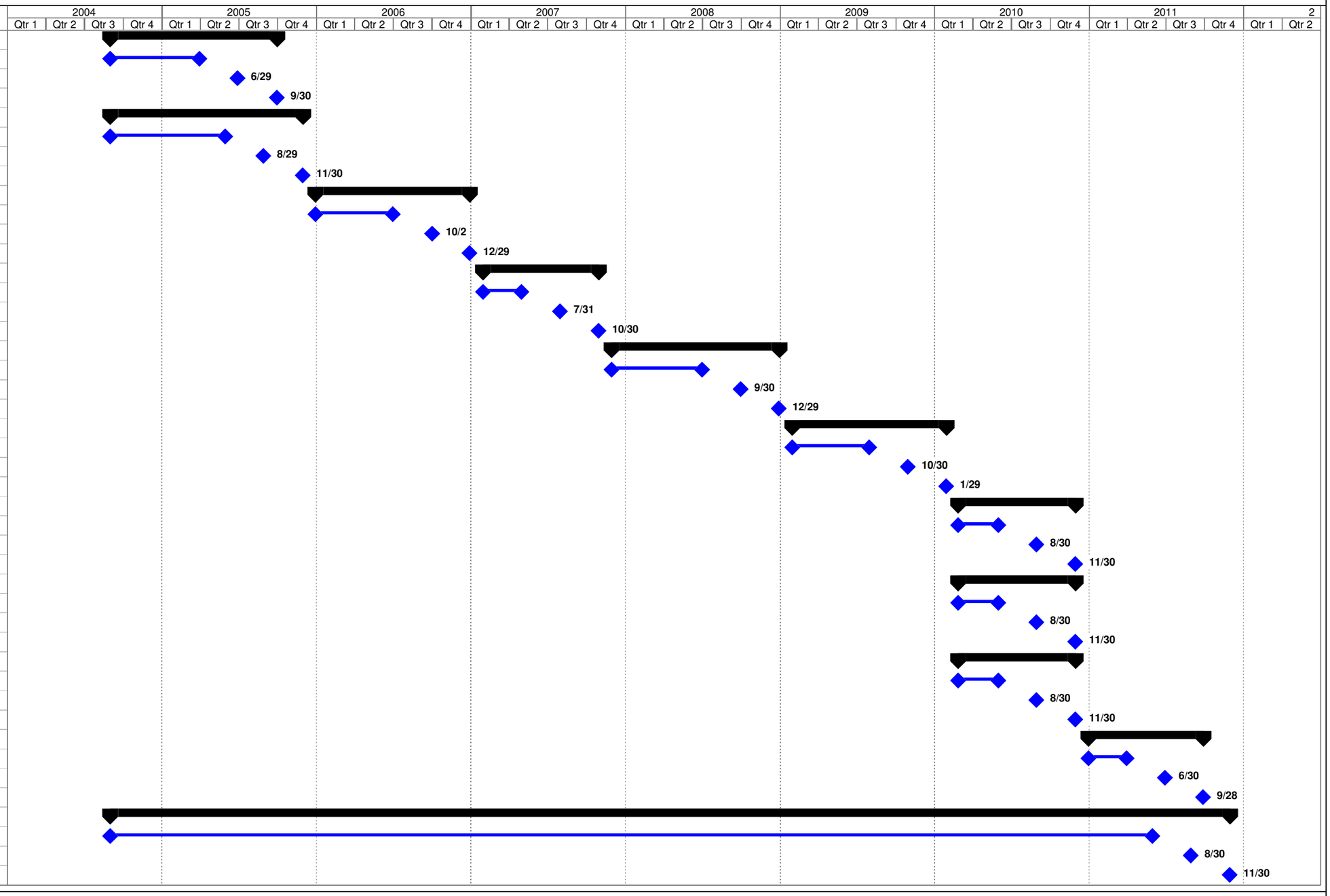
APPENDIX B

REVISED PHASE II CORRECTIVE ACTION ACTIVITIES SCHEDULE

Appendix B

Revised Phase II Corrective Action Activities

ID	Task Name
1	**AOI 1**
2	Characterization
3	Submittal of Site Characterization Report
4	PADEP Comments
5	**AOI 4**
6	Characterization
7	Submittal of Site Characterization Report
8	PADEP Comments
9	**AOI 6**
10	Characterization
11	Submittal of Site Characterization Report
12	PADEP Comments
13	**AOI 5**
14	Characterization
15	Submittal of Site Characterization Report
16	PADEP Comments
17	**AOI 8**
18	Characterization
19	Submittal of Site Characterization Report
20	PADEP Comments
21	**AOI 9**
22	Characterization
23	Submittal of Site Characterization Report
24	PADEP Comments
25	**AOI 3**
26	Characterization
27	Submittal of Site Characterization Report
28	PADEP Comments
29	**AOI 2**
30	Characterization
31	Submittal of Site Characterization Report
32	PADEP Comments
33	**AOI 7**
34	Characterization
35	Submittal of Site Characterization Report
36	PADEP Comments
37	**AOI 10**
38	Characterization
39	Submittal of Site Characterization Report
40	PADEP Comments
41	**AOI 11**
42	Characterization
43	Submittal of Site Characterization Report
44	PADEP Comments



Project: Figure 19 Phase 2 Corrective
Date: Tue 4/14/09

Task Progress Summary External Tasks Deadline
Split Milestone Project Summary External Milestone

APPENDIX C

NIR AND ASSOCIATED NOTICES

Sunoco Inc.
3144 Passyunk Avenue
Philadelphia PA 19145-5299
215 339 2000

October 12, 2006

Mr. Robert Day-Lewis
Pennsylvania DEP
2 East Main Street
Norristown, PA 19401

Mr. Steve O'Neil
Pennsylvania DEP
2 East Main Street
Norristown, PA 19401

Re: Sunoco Inc. (R&M) Philadelphia Refinery
Philadelphia, Philadelphia County

Dear Mr. Day-Lewis and Mr. O'Neil:

In accordance with the Land Recycling and Environmental Remediation Standards Act (Act 2), enclosed are two copies of a Notice of Intent to Remediate (NIR) for the Sunoco Inc. (R&M) Philadelphia Refinery. This NIR covers remediation being done as part of the 2003 Consent Order and Agreement (CO&A) at Point Breeze, Girard Point and Schuylkill River Tank Farm. Remediation at Belmont Terminal, which is part of the CO&A, is not part of this NIR since this site is not subject to RCRA Corrective Action. Sunoco is considering submitting a separate NIR for this area under the Act 2 program only.

This NIR is being submitted with the intent to enter the Sunoco Philadelphia Refinery into the One Cleanup Program with PaDEP and the USEPA. All remediation work at the Philadelphia refinery will be completed under the 2003 Consent Order & Agreement (CO&A), however, RCRA Corrective Action measures will be addressed concurrently with work performed under the CO&A and within the Act 2 program.

Please call me at 610-859-1881 or email me at jroppenheim@sunocoinc.com with any questions or comments.

Best Regards,

James Oppenheim, PE
Sr. Environmental Consultant

Cc: Sunoco Legal Dept.
Philadelphia Refinery Environmental Central File
David Burke, PADEP
Walter Payne, PADEP
Hon Lee, USEPA Region III
Colleen Costello, Langan

Will remediation be to a site-specific standard ☒ or as a special industrial area ☐? If so, the municipality or municipalities must be provided 30-day comment period.
Remediator/Property Owner/Consultant. For each of these recipients of the approval of the final report, complete form below.

Remediator
Contact Person: James R. Oppenheim
Relationship to site (e.g. owner, remediator, participating in cleanup, consultant): Remediation Project Manager
Phone Number: (610) 859-1881
Company Name: Sunoco, Inc. (R&M)
Address (street, city, state, zip): 100 Green St., Marcus Hook, PA 19061
Email Address: jroppenheim@sunocoinc.com
Property Owner
Contact Person: Scott Baker
Relationship to site (e.g. owner, remediator, participating in cleanup, consultant): Environmental Manager
Phone Number: (215) 339-2074
Company Name: Sunoco, Inc. (R&M)
Address (street, city, state, zip): 3144 Passyunk Ave. Philadelphia, PA 19145
Email Address: sabaker@sunocoinc.com
Consultant
Contact Person: Colleen Costello
Relationship to site (e.g. owner, remediator, participating in cleanup, consultant): Consultant
Phone Number: (215) 864-0640
Company Name: Langan Engineering and Environmental Services
Address (street, city, state, zip): 30 South 17th St., Suite 1500, Philadelphia, PA 19103
Email Address: ccostello@langan.com

Preparer of Notice of Intent to Remediate:

Name: James Oppenheim

Title: Project Manager

Address: 100 Green Street
Marcus Hook, PA 19061

Telephone: (610) 859-1881

Email Address: jroppenheim@sunocoinc.com

Email Image File of Site Map showing property lines and general area of site(s) to be remediated to: (landrecycling@state.pa.us)

Sunoco Inc.
3144 Passyunk Avenue
Philadelphia PA 19145-5299
215 339 2000

October 12, 2006

Manager
Philadelphia Department of Public Health
Environmental Health Services
321 University Avenue
Philadelphia, PA 19104

Re: Sunoco, Inc. (R&M) Philadelphia Refinery
Philadelphia, Philadelphia County

Dear Sir/Madam:

The Land Recycling and Environmental Remediation Standards Act (Act 2) requires that a Notice of Intent to Remediate (NIR) be provided to the municipality in which the site is located when a site is being remediated to a site-specific Standard. The municipality is afforded a 30-day comment period. In accordance with this provision of the Act, Sunoco, Inc. (R&M) is formally notifying you of its intent to remediate the subject site under Act 2. A copy of the NIR, which will be sent to the Pennsylvania Department of Environmental Protection (PaDEP), is enclosed. This notice will also be published in the Pennsylvania Bulletin, and a summary of the notice appeared in the Philadelphia Daily News on October 16, 2006.

Publication of this notice in the Philadelphia Daily News initiates the 30-day public and municipal comment period. During the next thirty days, your municipality may request to become involved in the development of the remediation plans for the site. If the municipality wishes to become involved in this project, please send your comments to Sunoco to my attention.

Please call me at (610) 859-1881 if you have any questions concerning the proposed remediation.

Best Regards,

James R. Oppenheim, P.E.
Senior Environmental Consultant

Cc: Sunoco Legal Dept.
Philadelphia Refinery Environmental Central File
Steve O'Neil, PaDEP
Colleen Costello, Langan

Will remediation be to a site-specific standard ☒ or as a special industrial area ☐? If so, the municipality or municipalities must be provided 30-day comment period.
Remediator/Property Owner/Consultant. For each of these recipients of the approval of the final report, complete form below.

Remediator
Contact Person: James R. Oppenheim
Relationship to site (e.g. owner, remediator, participating in cleanup, consultant): Remediation Project Manager
Phone Number: (610) 859-1881
Company Name: Sunoco, Inc. (R&M)
Address (street, city, state, zip): 100 Green St., Marcus Hook, PA 19061
Email Address: jroppenheim@sunocoinc.com
Property Owner
Contact Person: Scott Baker
Relationship to site (e.g. owner, remediator, participating in cleanup, consultant): Environmental Manager
Phone Number: (215) 339-2074
Company Name: Sunoco, Inc. (R&M)
Address (street, city, state, zip): 3144 Passyunk Ave. Philadelphia, PA 19145
Email Address: sabaker@sunocoinc.com
Consultant
Contact Person: Colleen Costello
Relationship to site (e.g. owner, remediator, participating in cleanup, consultant): Consultant
Phone Number: (215) 864-0640
Company Name: Langan Engineering and Environmental Services
Address (street, city, state, zip): 30 South 17th St., Suite 1500, Philadelphia, PA 19103
Email Address: ccostello@langan.com

Preparer of Notice of Intent to Remediate:

Name: James Oppenheim
Title: Project Manager
Address: 100 Green Street
Marcus Hook, PA 19061
Telephone: (610) 859-1881
Email Address: jroppenheim@sunocoinc.com

Email Image File of Site Map showing property lines and general area of site(s) to be remediated to: (landrecycling@state.pa.us)

Proof of Publication in The Philadelphia Daily News
Under Act. No 587, Approved May 16, 1929

STATE OF PENNSYLVANIA
COUNTY OF PHILADELPHIA

Anna Dickerson being duly sworn, deposes and says that **The Philadelphia Daily News** is a newspaper published daily, except Sunday, at Philadelphia, Pennsylvania, and was established in said city in 1925, since which date said newspaper has been regularly issued in said County, and that a copy of the printed notice of publication is attached hereto exactly as the same was printed and published in the regular editions and issues of the said newspaper on the following dates:

October 16, 2006

Affiant further deposes and says that he is an employee of the publisher of said newspaper and has been authorized to verify the foregoing statement and that he is not interested in the subject matter of the aforesaid notice of publication, and that all allegations in the foregoing statement as to time, place and character of publication are true.

Anna Dickerson

Sworn to and subscribed before me this 16th day of October, 2006

Mary Anne Logan
Notary Public

My Commission Expires:

NOTARIAL SEAL
Mary Anne Logan, Notary Public
City of Philadelphia, Phila. County
My Commission Expires March 30, 2009

Copy of Notice of Publication

Newspaper Notice of Intent to Remediate to an Environmental Standard. (Sections 302(e)(1)(ii), 303(h)(1)(ii), 304(n)(1)(i), and 305(c)(1))

Pursuant to the Land Recycling and Environmental Remediation Standards Act (Act), the act of May 19, 1995, P.L. 4, No. 1995-2, notice is hereby given that Sunoco Inc.(R&M) has submitted to the Pennsylvania Department of Environmental Protection a Notice of Intent to Remediate a site located at 3144 Passyunk Ave., Philadelphia, Philadelphia County, Pennsylvania. This Notice of Intent to Remediate states that the site is a petroleum refinery. It has been determined that petroleum compounds have impacted soil and groundwater at the site. Sunoco, Inc. (R&M) has indicated that proposed remediation measures will include source reduction and engineered boundary controls. The proposed future use of the property is industrial for continued operation as a petroleum refinery.

Sunoco Inc. (R&M) plans to use the site-specific remediation standard at the site. The Act provides for a 30-day public comment period for site-specific standard remediation. The 30-day comment period is initiated with the publication of this notice. Until November 16, 2006, the City of Philadelphia may submit a request to Sunoco Inc. (R&M) to be involved in the development of the remediation and reuse plans for the site. The City of Philadelphia may also submit a request to Sunoco Inc. (R&M) during this 30-day comment period to develop and implement a public involvement plan. Copies of these requests and of any comments should also be submitted to the Department of Environmental Protection at 2 East Main Street, Norristown, PA 19401 to the attention of Mr. Walter Payne. All correspondence with Sunoco Inc. (R&M) should be addressed to the Public Relations Dept., Sunoco Inc. (R&M) at 3144 Passyunk Ave, Philadelphia, PA, 19145.

LEGAL NOTICES

Newspaper Notice of Intent to Remediate
to an Environmental Standard.
(Sections 302(e)(1)(ii), 303(h)(1)(ii),
304(n)(1)(i), and 305(c)(1))

Pursuant to the Land Recycling and Environmental Remediation Standards Act (Act), the act of May 19, 1995, P.L. 4, No. 1995-2., notice is hereby given that Sunoco Inc.(R&M) has submitted to the Pennsylvania Department of Environmental Protection a Notice of Intent to Remediate a site located at 3144 Passyunk Ave., Philadelphia, Philadelphia County, Pennsylvania. This Notice of Intent to Remediate states that the site is a petroleum refinery. It has been determined that petroleum compounds have impacted soil and groundwater at the site. Sunoco Inc. (R&M) has indicated that proposed remediation measures will include source reduction and engineered boundary controls. The proposed future use of the property is industrial for continued operation as a petroleum refinery.

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Appeared in: ***Philadelphia Inquirer & Philadelphia Daily News*** on Monday, 10/16/2006

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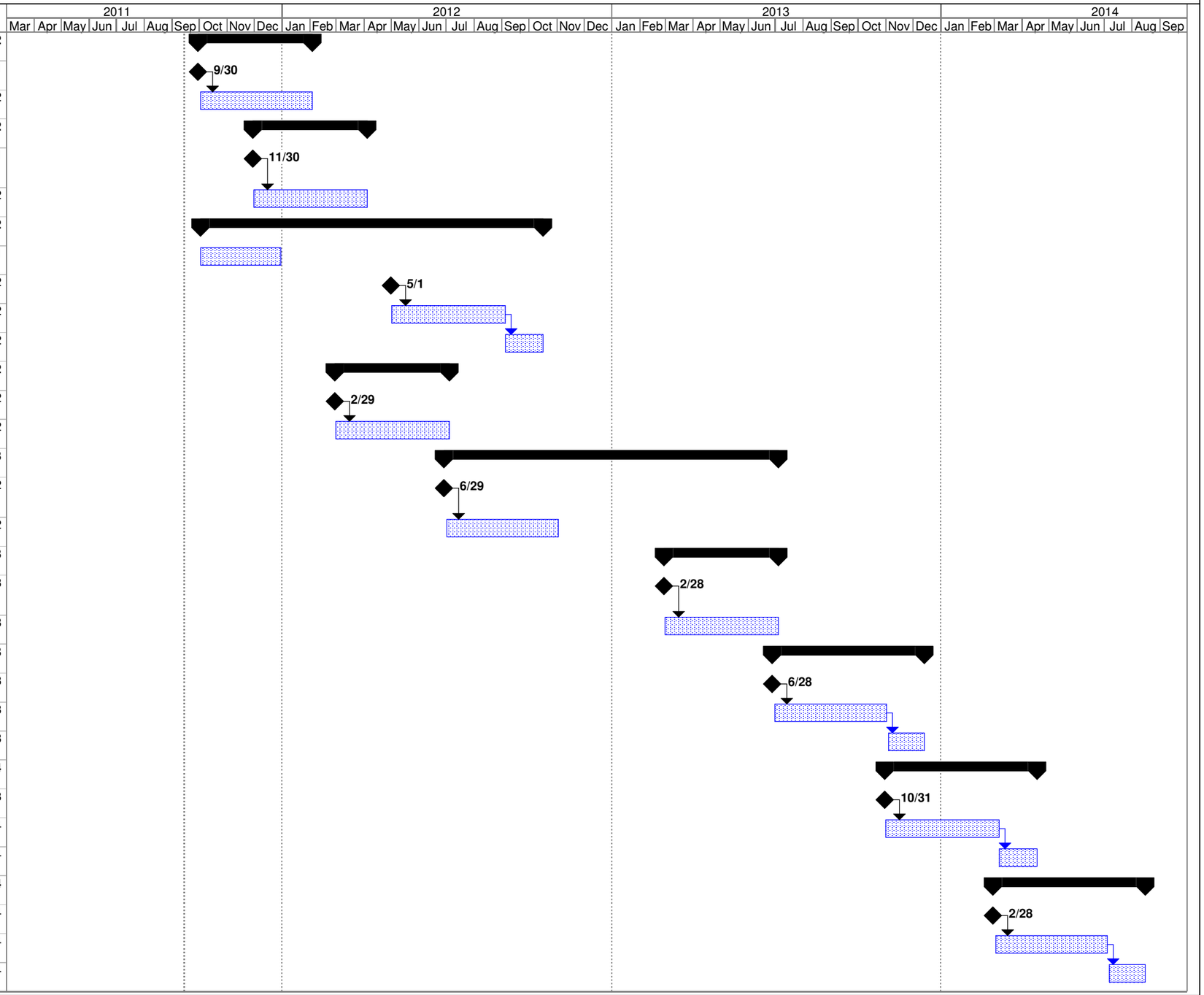
APPENDIX D

SCHEDULE FOR SUBMITTAL OF SCR/RIR/CLEANUP PLANS

APPENDIX D
Schedule for Submittal of SCR/RIR/Cleanup Plans

ID	Task Name	Duration	Start	Finish
1	**AOI 8**	**91 days**	**Fri 9/30/11**	**Fri 2/3/12**
2	Submit Repackaged SCR/RIR to Agencies	1 day	Fri 9/30/11	Fri 9/30/11
3	PADEP 90 Day Review Period	90 days	Mon 10/3/11	Fri 2/3/12
4	**AOI 5**	**91 days**	**Wed 11/30/11**	**Wed 4/4/12**
5	Submit repackaged SCR/RIR and Cleanup Plan to Agencies	1 day	Wed 11/30/11	Wed 11/30/11
6	PADEP 90 Day Review Period	90 days	Thu 12/1/11	Wed 4/4/12
7	**AOI 1**	**272 days**	**Mon 10/3/11**	**Tue 10/16/12**
8	AOI 1 South data evaluation	65 days	Mon 10/3/11	Fri 12/30/11
9	Submit repackaged SCR/RIR to Agencies	1 day	Tue 5/1/12	Tue 5/1/12
10	PADEP 90 Day Review Period	90 days	Wed 5/2/12	Tue 9/4/12
11	Cleanup Plan	30 days	Wed 9/5/12	Tue 10/16/12
12	**AOI 7**	**91 days**	**Wed 2/29/12**	**Wed 7/4/12**
13	Submit repackaged SCR/RIR and Cleanup Plan	1 day	Wed 2/29/12	Wed 2/29/12
14	PADEP 90 Day Review Period	90 days	Thu 3/1/12	Wed 7/4/12
15	**AOI 4**	**265 days**	**Fri 6/29/12**	**Thu 7/4/13**
16	Submit repackaged SCR/RIR and Cleanup Plan to Agencies	1 day	Fri 6/29/12	Fri 6/29/12
17	PADEP 90 Day Review Period	90 days	Mon 7/2/12	Fri 11/2/12
18	**AOI 6**	**91 days**	**Thu 2/28/13**	**Thu 7/4/13**
19	Submit repackaged SCR/RIR and Cleanup Plan to Agencies	1 day	Thu 2/28/13	Thu 2/28/13
20	PADEP 90 Day Review Period	90 days	Fri 3/1/13	Thu 7/4/13
21	**AOI 2**	**121 days**	**Fri 6/28/13**	**Fri 12/13/13**
22	Submit repackaged SCR/RIR to Agencies	1 day	Fri 6/28/13	Fri 6/28/13
23	PADEP 90 Day Review Period	90 days	Mon 7/1/13	Fri 11/1/13
24	Cleanup Plan	30 days	Mon 11/4/13	Fri 12/13/13
25	**AOI 3**	**121 days**	**Thu 10/31/13**	**Thu 4/17/14**
26	Submit repackaged SCR/RIR to Agencies	1 day	Thu 10/31/13	Thu 10/31/13
27	PADEP 90 Day Review Period	90 days	Fri 11/1/13	Thu 3/6/14
28	Cleanup Plan	30 days	Fri 3/7/14	Thu 4/17/14
29	**AOI 9**	**121 days**	**Fri 2/28/14**	**Fri 8/15/14**
30	Submit repackaged SCR/RIR	1 day	Fri 2/28/14	Fri 2/28/14
31	PADEP 90 Day Review Period	90 days	Mon 3/3/14	Fri 7/4/14
32	Cleanup Plan	30 days	Mon 7/7/14	Fri 8/15/14



Project: Sunoco Philadelphia Refinery
Date: Wed 9/14/11

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

APPENDIX E

PUBLIC PARTICIPATION PLAN

Appendix E

Public Participation Plan
Sunoco Philadelphia Refinery

Introduction

This public participation plan is intended to address public notification for work done under Pennsylvania's Land Recycling and Environmental Remediation Standards Act (Act 2) and the United States Environmental Protection Agency's (EPA) Resource Conservation Recovery (RCRA) Corrective Action Program.

Background

Sunoco entered into a Consent Order and Agreement (CO&A) with PADEP in 2003 to conduct necessary investigations and remediation of the land and groundwater. One of the goals of corrective action is protecting human health and the environment, consistent with the requirements of PADEP's regulations on remediation (PA Act 2). The COA required Sunoco to prioritize remedial investigation activities across 11 Areas of Interest (AOIs) that make up the entire facility and to conduct remediation based on the results of the investigation work. In accordance with the CO&A and Phase I Remedial Plan, a Current Conditions Report and Comprehensive Remedial Plan (CCR) was prepared by Sunoco in June 2004. The Phase I Plan and the CCR carried forward the COA concept by dividing the facility into 11 AOIs, and presented a prioritization of the AOIs. All work activities have been and will be reported to PADEP/EPA through Work Plans and Site Characterization/Remedial Investigation Reports.

In April 2004, PADEP and EPA's Region 3 signed a Memorandum of Agreement (MOA) for the One Cleanup Program. The One Cleanup Plan recognizes the benefit of avoiding duplicative work activities to satisfy similar requirements between the state and federal remediation programs. Region 3 reviewed and evaluated Pennsylvania's Voluntary Cleanup Plan (VCP) and determined that the VCP included each of the elements of a state response program listed in CERCLA Section 128(a)(2) but EPA retained all authority in the Commonwealth for RCRA Corrective Action. As a result of these discussions, Sunoco petitioned to enter the Philadelphia Refinery into the "One Cleanup Program" with the intent that the work conducted under the CO&A and Act 2 would satisfy both EPA and Pennsylvania remediation requirements. DEP and EPA have agreed that the facility is in the PA One Cleanup Program and the facility is listed on EPA's online PA One Cleanup Program list.

Sunoco submitted a Notice of Intent to Remediate (NIR) on October 12, 2006 to formally enter the facility into the PA Act 2 Program and the NIR was published and subject to public participation soon thereafter. A parcel adjacent to the facility known as the Belmont Terminal is not subject to RCRA corrective action requirements and was not included in the NIR but is covered under the CO&A. The facility's participation in the PA One Cleanup Program will be included in the RCRA Corrective Action Module of its RCRA Part B Permit.

The Act 2 Report submittals will include the appropriate municipal and public notice requirements in accordance with the provisions of Act 2. Notices will be published in the Pennsylvania Bulletin and a summary of the notice will appear in at least one local newspaper. As part of the public involvement plan, Sunoco intends to hold an initial public meeting and subsequent meetings on an as-needed basis upon request of the City of Philadelphia to give status updates of the project. EPA will complete additional public involvement through activities, such as notices under the Corrective Action Program and by updating its online Fact Sheet for the refinery.

Availability of Public Documents

Per Land Recycling regulations 250.6c, reports detailing work conducted under the CO&A and Act 2 will be available for public review at the Library at 20th and Shunk Streets (the former Passyunk Branch) and the Eastwick Branch at Island Avenue and Lindbergh Boulevard. The contact person for any questions regarding any aspect of Sunoco's Philadelphia Refinery Remediation Program is Kevin Thompson, Public Relations Director for Sunoco. Kevin can be reached at (215) 977-6313

Public Information Session

The initial public meeting will be held in the City of Philadelphia to give an overview of the project. Per Land Recycling regulations 250.6c, Sunoco will advertise the notice for a public information session in the South Philly Review, the Inquirer, the Daily News and the Globe Times newspapers a minimum 30 days prior to the date of the meeting. Sunoco will notify the S/SW Philadelphia Community Advisory Panel members of the meeting and seek their attendance. Sunoco will provide the Lena Maloney CDC/Eastwick at the Meadows facility at 6630 Lindbergh Boulevard, Philadelphia, PA 19142 or an equivalent meeting space.

Sunoco will provide a facilitator for the meeting so that it can be conducted in an orderly manner and to ensure that affected organizations/individuals will have an opportunity to speak and be heard. A Sunoco representative will make a presentation to those gathered about the status of the project. The Sunoco representative will be supported

by other Sunoco employees, and third party experts, as Sunoco deems necessary to answer questions.

Proposed Initial Meeting Agenda

- Upon entering the facility, attendees will be asked to sign in.
- Those wishing to make formal statements will sign in separately and will be called to speak in the order of their arrival.
- Sunoco Public Affairs representative and a PADEP/EPA representative will welcome everyone to the gathering and introduce the panel from each of their organizations.
- The facilitator will introduce the format and advise all in attendance of the Ground Rules for the evening.
- Sunoco will make its Presentation.
- Statements/questions from the organizations gathered will be taken in order of their arrival.
- Questions from the general audience for the panel will be heard after the organizations.
- Adjournment.