



# ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-3397

JB PRITZKER, GOVERNOR

JAMES JENNINGS, ACTING DIRECTOR

217/524-3301

Certified Mail  
Return Receipt Requested

SEP 25 2024

9589 0710 5270 0389 7094 92

BP Products North America, Inc.  
Attention: Ms. Michelle Knapp  
Liability Manager  
301 Evans Avenue  
P.O. Box 167  
Wood River, Illinois 62095

Re: 1191150001 -- Madison County  
BP Products North American Inc./Main Plant  
ILD980700967  
Log No. B-147R2  
RCRA Administrative Record – 24D  
Permit Draft

Dear Ms. Knapp:

Attached is a draft renewed Resource Conservation and Recovery Act (RCRA) corrective action permit (draft renewed RCRA permit) and fact sheet for the above-referenced facility. The draft renewed RCRA permit is based on the administrative record contained in the Illinois EPA's files. The contents of the administrative record are described in Title 35 Illinois Administrative Code (IAC) Section 705.144.

Under the provisions of 35 IAC 705.141(d), the draft renewed RCRA permit and administrative record must be publicly noticed and made available for public review and comment. The Illinois EPA must also provide an opportunity for a public hearing. Copies of the draft renewed RCRA permit, fact sheet, and renewal application are available for review at the Wood River Public Library, 326 E. Ferguson Avenue, Wood River, Illinois and copies of the draft renewed RCRA permit and fact sheet are available on the Illinois EPA website. The Illinois EPA has not scheduled a public hearing at the current time. However, any interested party may request a public hearing. The public comment period will close on November 14, 2024.

During the comment period, the applicant or any interested party may submit comments to the Illinois EPA on the draft renewed RCRA permit. At the close of the comment period, the Illinois EPA will prepare a response to significant comments. The physical address of the Illinois EPA is scheduled to change in the coming months, but the Post Office Box will remain the same. Any comments on the draft renewed RCRA permit should include the Illinois EPA Post Office Box and may be submitted to:

2125 S. First Street, Champaign, IL 61820 (217) 278-5800  
115 S. LaSalle Street, Suite 2203, Chicago, IL 60603  
1101 Eastport Plaza Dr., Suite 100, Collinsville, IL 62234 (618) 346-5120  
9511 Harrison Street, Des Plaines, IL 60016 (847) 294-4000

595 S. State Street, Elgin, IL 60123 (847) 608-3131  
2309 W. Main Street, Suite 116, Marion, IL 62959 (618) 993-7200  
412 SW Washington Street, Suite D, Peoria, IL 61602 (309) 671-3022  
4302 N. Main Street, Rockford, IL 61103 (815) 987-7760



Sarah Brubaker, Public Involvement Coordinator (#5)  
Illinois Environmental Protection Agency  
1021 N. Grand Avenue East  
Post Office Box 19276  
Springfield, Illinois 62794-9276  
[Sarah.Brubaker@illinois.gov](mailto:Sarah.Brubaker@illinois.gov)

The Illinois EPA will issue a final renewed RCRA permit after the close of the public comment period unless the Illinois EPA decides to reverse the tentative decision. The appeal process and limitations are addressed in 35 IAC 705.212.

If you have any questions regarding the groundwater monitoring aspects of this draft renewed RCRA permit, please contact Amy Butler, P.G. at 217/558-4716. If you have questions regarding the other aspects of this permit, please contact Omar Faruk at 217/557-9764.

Sincerely,



Joshua L. Rhoades, P.G.  
Permit Section Manager  
Bureau of Land

JLR:OF:1191150001-RCRA-B147R2-Draft.docx

*OF TNH AMB*

Attachment: Fact Sheet  
Draft Renewed RCRA Corrective Action Permit

cc: Norberto Gonzalez, U.S. EPA – Region V  
Michelle Knapp, BP Products North America, Inc  
Michael Hoffman, WSP USA Environment & Infrastructure, Inc  
Starlet S. Wright, Sovereign Consulting, Inc.



**FACT SHEET**  
**for**  
**DRAFT RENEWED RCRA CORRECTIVE ACTION PERMIT**  
**BP Products North American Inc./Main Plant**  
**Madison, Illinois**  
**STATE ID NO. 1191150001**  
**FEDERAL ID NO. ILD980700967**  
**RCRA CORRECTIVE ACTION PERMIT LOG NO. B-147R2**

This fact sheet has been prepared pursuant to the requirements of Title 35 Illinois Administrative Code (IAC) 705.143. The fact sheet is intended to be a brief summary of the principal facts and significant factual, legal, methodological, and policy questions considered in preparing a draft renewed Resource Conservation and Recovery Act (RCRA) corrective action permit (draft renewed RCRA permit). This draft renewed RCRA permit requires BP Main Plant (also referred to as the facility) to continue to provide corrective action for twenty-one (21) solid waste management units (SWMUs) and eight (8) Product Release Sites (PRSs) at this site. The draft renewed RCRA permit also redefines the permitted facility boundary subject to this RCRA permit. Pursuant to 35 IAC 705.143(a), this fact sheet is sent to the applicant and to any other person who requests it.

**I. INTRODUCTION**

The draft renewed RCRA permit for BP Main Plant contains all of the standard conditions required by 35 IAC Parts 702, 703 and 724; and the applicable conditions of 35 IAC 724.201 and Section 3004(u) of RCRA for the completion of corrective action activities at the subject facility.

The BP Main Plant is an existing facility that has been under a RCRA permit (Log No. B-147) since first issued on September 30, 1993. A renewed RCRA permit was issued on March 4, 2011 (Log No. B-147R) and most recently was modified on May 29, 2018 (B-147R-M-17 and M-18). The March 4, 2011 renewed RCRA permit approved closure by removal for the former regulated units (South Flare Pit and North Cell of Spray Pond 1); therefore, the renewed RCRA permit was issued as a corrective action permit and post-closure care was no longer required. Currently there are no hazardous waste management units being operated or under post-closure at this facility. This draft renewed RCRA permit (Log No. B-147R2) contains requirements similar to those set forth in the original permit and previous renewed permit, updated as appropriate to reflect the current status of the facility and the applicable regulations.

**II. DESCRIPTION OF FACILITY**

**I. General**

The BP Main Plant and Riverfront facilities were owned by Amoco Oil Company until the company merged with BP in 1999. Amoco operated an oil refinery at the Main Plant from 1908 to 1981 and Amoco Petroleum Additives Company operated in

a portion of the Main Plant from 1957 to 1996. BP operated a storage and distribution facility at the Main Plant Property for gasoline and petroleum distillates until 2016.

BP has completed the soil-portion of corrective action at two areas in the northeast corner of the site, and, with a concurrence from the Illinois EPA, donated the following two (2) parcels to the City of Wood River: (1) a 9.56-acre parcel, which extends from the ground surface to a horizontal plane approximately 23 feet below ground surface (ft-bgs) at elevation of 418 feet above mean sea level (ft above MSL); and (2) a 7.5-acre parcel, which extends from the ground surface to a horizontal plane approximately 15 ft-bgs at elevation of 428 ft above MSL. Both subsurface areas below 15 and 23 ft-bgs will remain under BP's ownership and are included within the permitted facility boundary.

In 2016, Kinder Morgan Phoenix Holdings, LLC (KMPH) purchased an approximate 118.25-acre three-dimensional parcel above elevation 408 ft above MSL of the BP Main Plant for the purpose of operating a storage and distribution facility for gasoline and petroleum distillates. This parcel of the BP Main Plant, now under the ownership of KMPH, has already been issued a separate RCRA Corrective Action permit (Log No. B-214 under the Illinois EPA site number: 1190505061)).

While both the BP Main Plant and Riverfront facilities are owned and operated by BP, each facility has been issued a separate RCRA Permit under a separate site identification number. The BP Main Plant is being remediated and redeveloped for industrial and commercial use. It has been divided into nineteen (19) Land Reuse Areas which will be investigated, remediated, reported on, and redeveloped on an Area-by-Area basis.

## 2. Site Description and Location

The BP Main Plant Property is located at Township 5 North, Range 9 West of the Third Principal Meridian, where it occupies all or parts of Sections 27, 28, 34, and the northeast corner of Section 33. The mailing address of the BP Main Plant Property is:

BP Products North America Inc./Main Plant  
301 Evans Avenue, Post Office Box 167  
Wood River, Illinois 62095

Most of the BP Main Plant Property (approximately the northern-most 80 percent) is in the City of Wood River. The remainder is located within the Village of Hartford. A site location map is provided as Attachment 1 to this fact sheet.

## III. HAZARDOUS WASTE MANAGEMENT ACTIVITIES

There are currently no hazardous waste management units (HWMUs) being operated or

under post-closure care at the BP Main Plant. Two HWMUs at the BP Main Plant, the North Cell of Spray Pond 1 (NC-SP1), a surface impoundment that received reactive sulfide material (U189); and the South Flare Pit (SFP), the location of a former underground storage tank that contained various non-hazardous wastes, as well as wastes bearing hazardous waste characteristics (D001, D002, D003, D008, U189, and U122) have been certified as closed by removal.

In the late 1990s, and 2000s, BP conducted further investigation and remediation of the NC-SP1 and SFP HWMUs. Closure by removal reports were submitted for NC-SP1 in November 2002, and for the SFP in April 2005. A letter from the Illinois EPA dated January 7, 2008 granted approval for closure by removal of the NC-SP1 pending a Class 3 permit modification request to formally remove the unit from the Part B post-closure permit. This letter also granted approval for the soil-portion of the closure by removal determination for the SFP and requested further work on the groundwater portion for this unit. Subsequently, BP conducted this additional work, and based upon the Illinois EPA's review of the results of this work, the SFP was approved for closure by removal, subject to certain conditions.

#### **IV. CORRECTIVE ACTION ACTIVITIES**

##### **A. Solid Waste Management Units (SWMUs)**

35 IAC 724.201 and the original and current RCRA permit for this facility requires corrective action, as necessary to protect human health and the environment from all releases of hazardous wastes or hazardous constituents from any SWMUs and areas of concern at this facility.

The Illinois EPA issued a RCRA permit (Log No. B-147) on September 30, 1993 to Amoco Oil Company (now BP Main Plant) in Wood River, Illinois, which included, among other things, requirements to conduct corrective action on twenty-one (21) SWMUs and nine (9) PRSs. On, June 21, 2002, the Illinois EPA approved a plan to expand the scope of the corrective action program to include all recognized environmental conditions (RECs) at the facility. To accomplish this, the facility was divided into nineteen (19) Land Reuse Areas so that corrective action, and potential redevelopment could be addressed on an Area-by-Area basis. As the approximate 118.25-acre KMPH parcel (at and above 408 ft above MSL), which contained one of the PRSs (PRS 7), was removed from the facility subject to this permit, the number of PRSs requiring corrective action under this permit is now eight (8), while groundwater throughout the original permitted boundaries of the facility is still subject to corrective action. The requirements to addresses corrective action at these areas are included in Section II of this draft renewed RCRA permit.

##### **B. Groundwater Corrective Action**

Section II of this draft renewed RCRA permit also identifies groundwater corrective action requirements that must be completed as outlined in Section III. Hazardous constituents associated with historical activities at BP Main Plant have been detected

in the groundwater across the site in exceedance of the groundwater quality standards established in 35 IAC Part 620. Therefore, a corrective action program for groundwater meeting the requirements of 35 IAC 724.201 must be implemented at the facility. In addition to the corrective action necessary to treat or remove hazardous constituents released to groundwater, this draft renewed RCRA permit also requires the Permittee to implement a corrective action program for the groundwater present in the uppermost aquifer beneath the facility, and off-site as necessary.

The major components of the Groundwater Corrective Action Program in Section III include: (1) a Groundwater Management Zone (GMZ); (2) semi-annual groundwater monitoring through a network of wells installed both on-site and off-site; (3) removal and treatment of contaminated groundwater through hydraulic recovery and bioremediation systems; (4) control of the contaminated groundwater within the uppermost aquifer through a network of pumping wells (Cone of Depression (COD) wells); and (5) treatment and reduction of free phase and residual light nonaqueous phase liquid (LNAPL) via the bioremediation treatment systems. Groundwater is routinely sampled semi-annually for refinery-related constituents based on historical activities at the site, and results are reported semi-annually.

There are shallow fine-grained materials overlying much of the uppermost aquifer at this facility. The uppermost aquifer is a sand and gravel aquifer located approximately 30 ft-bgs and extending to a depth of about 101 to 113 ft-bgs to the top of the bedrock surface. This aquifer is commonly referred to as the "American Bottoms." The groundwater of the uppermost aquifer is classified as a Class I groundwater.

a. Parameters

Parameters monitored at the site and the respective concentration limits to be met are listed below. The following hazardous constituents and their concentration limits comprise the groundwater protection standards:

<u>Hazardous Constituents</u>	<u>Storet No.</u>	<u>Concentration Limits (mg/L)</u>
<u>Metals</u>		
Antimony	01097	0.006
Arsenic	01002	0.010
Barium	01007	2.0
Beryllium	01012	0.004
Cadmium	01027	0.005
Chromium	01034	0.1
Cobalt	01037	1.0
Lead	01051	0.0075
Mercury	71900	0.002
Nickel	01067	0.1
Selenium	01147	0.05
Vanadium	01087	0.049



<u>Hazardous Constituents</u>	<u>Storet No.</u>	<u>Concentration Limits (mg/L)</u>
<u>VOCs</u>		
1,2-Dichloroethane	34531	0.005
1,3-Dichlorobenzene	34561	0.0002
1,4-Dichlorobenzene	34571	0.075
2-Butanone (MEK)	81595	4.2
Benzene	34030	0.005
Carbon Disulfide	77041	0.7
Chlorobenzene	34301	0.1
Chloroform	32106	0.0002
Ethylbenzene	78113	0.7
Toluene	34010	1.0
Total Xylenes	34020	10.0
Methyl Tertiary-Butyl Ether	46491	0.07
Styrene	77128	0.1
<u>SVOCs</u>		
2,4-Dimethylphenol	34606	0.14
2,4-Dinitrophenol	34616	0.014
2-Methylphenol (o-cresol)	77152	0.35
4-Methylphenol (p-cresol)	77146	0.035
4-Nitrophenol	34646	--
Anthracene	34220	2.1
Benzo(a)anthracene	34526	0.00013
Benzo(a)pyrene	34247	0.0002
Benzo(b)fluoranthene	34230	0.00018
Benzo(k)fluoranthene	34242	0.00017
Bis(2-ethylhexyl) phthalate	39100	0.006
Butyl benzyl phthalate	34292	1.4
Chrysene	34320	0.0015
Dibenzo(a,h)anthracene	34556	0.0003
Diethyl phthalate	34336	5.6
Dimethyl phthalate	34341	--
Di-n-butyl phthalate	39110	0.7
Di-n-octyl phthalate	34596	0.14
Fluoranthene	34376	0.28
Naphthalene	34696	0.14
Phenanthrene	34461	0.21
Phenol	34466	0.1
Pyrene	34469	0.21
Pyridine	77045	0.007
-- Not available		

C. Standard Permit Conditions

Section V of the draft renewed RCRA permit contains standard conditions that are regulatory requirements of 35 IAC Parts 702, 703 and 724. The standard conditions are of a general nature and are applicable to all hazardous waste management facilities regulated pursuant to an Illinois EPA RCRA permit. The standard conditions include the effectiveness of the permit, permit actions, permit severability, permit expiration, monitoring, retention of records, permit transfer, and compliance schedules.

V. CONSIDERED PERMIT ACTIONS OTHER THAN RCRA

A. Air

The air emissions from this site are regulated under RCRA, the Clean Air Act (CAA), the Illinois Environmental Protection Act (Act) and State regulations at Title 35: Environmental Protection, Subtitle B: Air Pollution. Under these regulations, it is required to obtain a permit to install or operate any process which is, or may be, a source of air pollutants. The only air emission source currently present at the facility is the groundwater remediation and treatment system. This system operates under a permit from Illinois EPA's Bureau of Air (Title V Air Permit No. 95060048).

B. Water

Discharge of any waste from a hazardous waste management facility into the waters of the State is required to have a National Pollutant Discharge Elimination System (NPDES) permit, issued by the Illinois EPA under Section 39(b) of the Act. The groundwater remediation and treatment system at the facility has a permit from Illinois EPA's Bureau of Water (Permit No. 2020-EP-64994).

VI. PROCEDURES FOR REACHING A FINAL DECISION

Pursuant to 35 IAC 705.162(a)(2), the public is given at least forty-five (45) days to review the renewal application and comment on the draft renewed RCRA permit conditions prior to Illinois EPA taking any final permitting action on the renewal application for this draft renewed RCRA permit. The comment period will begin on September 30, 2024, the date of publication of the public notice in a major local newspaper of general circulation. The comment period will end on November 14, 2024.

Copies of the draft renewed RCRA permit, fact sheet, and renewal application, are available for review at:

Wood River Public Library  
326 E. Ferguson Avenue  
Wood River, Illinois 62095

Copies of the draft renewed RCRA permit and fact sheet are available on the Illinois EPA website.

The administrative record contains the renewal application, draft renewed RCRA permit, fact sheet, and other supporting documents and correspondence submitted to the Illinois EPA. The administrative record can be made available for public inspection by appointment only at the Illinois EPA's Springfield headquarters from 9:00 a.m. to 5:00 p.m., Monday through Friday. Inspection of the administrative record must be scheduled in advance by contacting Sarah Brubaker, Illinois EPA Public Involvement Coordinator, at the address listed below. The physical address of Illinois EPA is scheduled to change in the coming months, but the Post Office Box will remain the same. Any comments on the draft renewed RCRA permit should include the Illinois EPA Post Office Box.

In response to requests received during the comment period or at the discretion of the Illinois EPA, a public hearing may be held to clarify one or more issues concerning the renewal application and draft renewed RCRA permit. A request for a public hearing must be submitted in writing and shall state the nature of the issues proposed to be raised at the hearing. Public notice of a public hearing will be issued at least forty-five (45) days before the hearing date.

For further information regarding the permit process, to submit written comments on the draft renewed RCRA permit, or to request a public hearing, please contact:

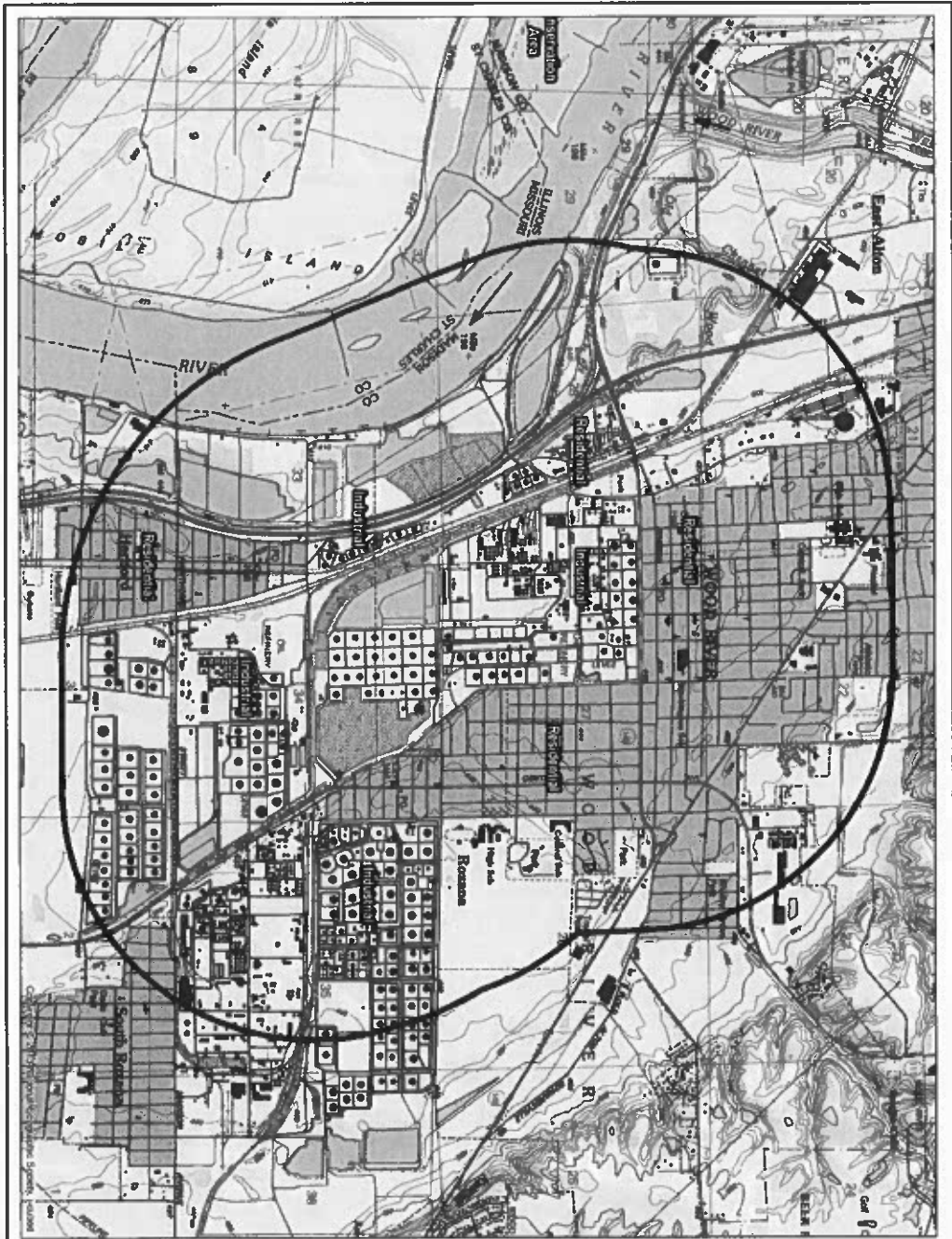
Sarah Brubaker, Public Involvement Coordinator (#5)  
Illinois Environmental Protection Agency  
1021 N. Grand Avenue East  
Post Office Box 19276  
Springfield, Illinois 62794-9276  
[Sarah.Brubaker@illinois.gov](mailto:Sarah.Brubaker@illinois.gov)

When the Illinois EPA makes its final permit decision, notice will be given to the applicant and each person who has submitted written comments or requested notice of the final permit decision. The permit will become effective thirty-five (35) days after service of notice of the decision or at a later date if stated in the permit unless the decision is appealed.

Attachment 1 - Site Location Map  
Attachment 2 - Site Layout Map



**Fact Sheet**  
**Draft Renewed RCRA Corrective Action Permit**  
**Log No. B-147R2**  
**ATTACHMENT 1**  
**Site Location Map**



- Legend**
- Facility Plus 1 Mile
  - Main Plant Property
  - Municipal Well
  - River Flow Direction

Source:  
 USGS 7.5 Minute Topographic Map  
 -Wood River, IL-MO, 2017  
 -Aran, IL, 2017  
 -Berthel, IL, 2017  
 -Columbia Bottoms, MO, 2017



Figures for Item 86, Map  
 Part A Permit Application  
 Topographic Map  
 1 Mile Facility Buffer  
 BP Main Plant Property  
 Wood River, Illinois

**wood**

WOOD COUNTY, ILLINOIS

PERMITTING DIVISION

1100 N. STATE ST., SUITE 1000  
 PEORIA, IL 61602

TEL: 309.671.1700  
 FAX: 309.671.1701

**bp**

AMERICAN PETROLEUM CORPORATION

1500 SHELDON DRIVE, SUITE 100  
 HOUSTON, TEXAS 77058

**Fact Sheet**

**Draft Renewed RCRA Corrective Action Permit**

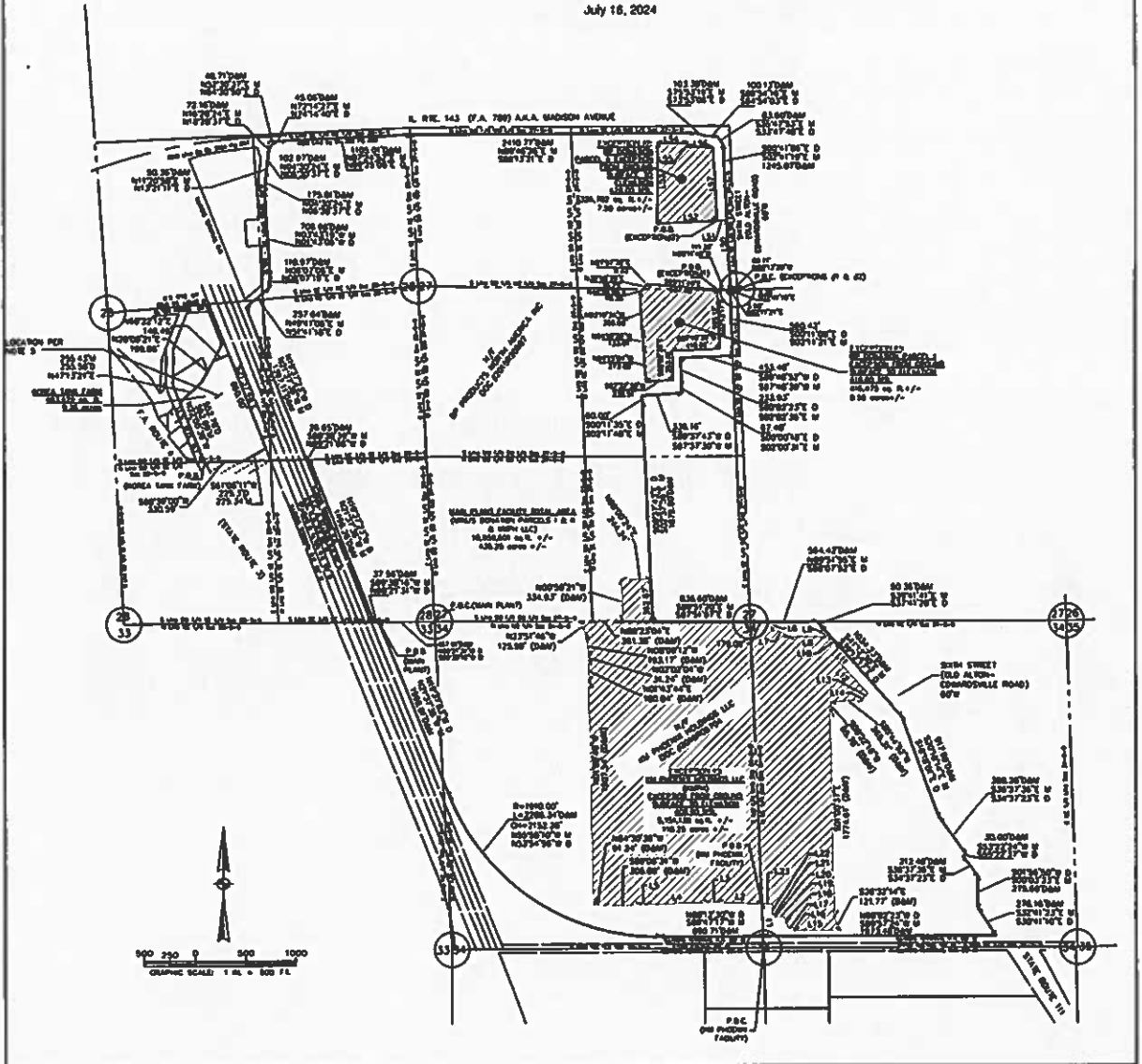
**Log No. B-147R2**

**ATTACHMENT 2**

**Site Layout Map**

**EXHIBIT: B.P. AMOCO MAIN PLANT AND AREA TANK FARM WITH  
 DONATION PARCEL EXCEPTIONS PARCEL I & PARCEL II AND KIMBERLY MORGAN PHOENIX HOLDINGS, LLC EXCEPTION  
 BEING PART OF SECTIONS 27, 28, 33 AND 34, ALL IN TOWNSHIP 5 NORTH, RANGE 9 WEST OF THE THIRD PRINCIPAL MERIDIAN  
 CITY OF WOOD RIVER, MADISON COUNTY, ILLINOIS**

July 16, 2024







# ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 · (217) 782-3397

JB PRITZKER, GOVERNOR

JAMES JENNINGS, ACTING DIRECTOR

## RCRA CORRECTIVE ACTION PERMIT

1191150001 -- Madison County  
BP Products North America, Inc./Main Plant  
ILD 980700967  
Log No. B-147R2  
RCRA Administrative Record

Issue Date: DRAFT  
Effective Date: DRAFT  
Expiration Date: DRAFT

### PERMITTEE

BP Products North America, Inc.  
Attention: Ms. Michelle Knapp  
301 Evans Avenue, P.O. Box 167  
Wood River, Illinois 62095

A Renewed Resource Conservation and Recovery Act (RCRA) permit for corrective action is hereby issued to BP Products North America Inc. (BP) as Owner and Operator and Permittee pursuant to Section 39(d) of the Illinois Environmental Protection Act and Title 35 Illinois Administrative Code Subtitle G (35 IAC).

### PERMITTED HAZARDOUS WASTE ACTIVITY

This permit requires BP to conduct the following hazardous waste activities in accordance with the approved permit application and the conditions in this permit:

**Corrective Action:** Twenty-one (21) Solid Waste Management Units (SWMUs) and eight (8) Product Release Sites (PRs) in nineteen (19) Land Reuse Areas.

**Groundwater Monitoring:** Corrective action for the SWMUs and PRs in Land Reuse Areas.

This RCRA permit consists of the conditions contained herein and those in Sections and Attachments in this permit. The Permittee must comply with all terms and conditions of this permit and the applicable regulations contained in 35 IAC Parts 702, 703, 705 and 720 through 729 in effect on the effective date of this RCRA permit.

This permit is issued based on the information submitted in the approved permit application identified in Attachment A of this permit, and any subsequent amendments. Any inaccuracies found in the information provided in the approved permit application may be grounds for the termination or modification of this permit (see 35 IAC 702.187 and 702.186) and potential enforcement action (415 ILCS 5/44(h)).

### DRAFT

Joshua L. Rhoades, P.G.  
Permit Section Manager  
Bureau of Land

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OF 7/14 AMB



**RCRA Corrective Action Permit**

**BP Products North America -- Main Plant Facility**

**Wood River, Illinois**

**Illinois EPA No. 1191150001**

**USEPA No: ILD980700967**



**RCRA Corrective Action Permit  
BP Products North America/Main Plant**

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## SECTION I: GENERAL FACILITY DESCRIPTION

### A. OWNER AND OPERATOR

The facility is owned and operated by BP Products, North America Inc., hereinafter referred to as the "Permittee" (35 IAC 702.121, 702.123 and 703.181).

BP Products North America, Inc.  
301 Evans Avenue  
Wood River, Illinois 62095

Facility Contact:

Michelle Knapp  
Liability Manager  
Remediation Management Services Company  
An Affiliate of BP Products North America Inc.  
847-346-7112  
[michelle.knapp@BP.com](mailto:michelle.knapp@BP.com)

### B. LOCATION

1. Location of the facility:

The BP Products North America, Inc. (formerly Amoco) Main Plant facility is located at 301 Evans Avenue, Wood River, Madison County, Illinois.

2. Definition of facility covered by this Permit:

a. The boundary of the facility subject to this permit has been modified to reflect the previous corrective action and permit decisions made under the previous permit (Log No. B-147R). The original permitted facility (approximately 570 acres) was previously parceled to remove three specific portions of land, by parceling horizontally and vertically, as described below:

- 1) A 9.56-acre donated parcel which extends from the ground surface vertically downward to a subsurface horizontal plane at an elevation of 418 feet above mean sea level (ft above MSL); this plane is located approximately 23 feet below ground surface (ft-bgs). The Property Index Number (PIN) for this parcel is 19-2-08-27-14-301-003. The PIN for the parcel directly beneath the 9.56-acre donated parcel is 19-2-08-27-301-004, which is still owned by the Permittee and included in the permitted facility boundary.
- 2) A 7.5-acre donated parcel which extends from the ground surface vertically downward to a subsurface horizontal plane at an elevation of 428 ft above MSL; this plane is located approximately 15 ft-bgs. The PIN for this parcel is 19-2-08-27-10-101-002. The PIN for the parcel directly beneath the

parcel is 19-2-08-27-10-101-003, which is still owned by the Permittee and included in the permitted facility boundary.

- 3) An approximate 118.25-acre parcel purchased by Kinder Morgan Phoenix Holdings LLC (KMPH) which only extends from ground surface vertically downward to a subsurface horizontal plane at an elevation of 408 ft above MSL, which is located approximately 25 ft-bgs. The Property Index Numbers (PINs) for the 118.25-acre KMPH parcel are:

19-1-08-27-18-301-001.001

19-1-08-34-00-000-001.004

19-1-08-34-00-000-001.005

19-1-08-34-00-000-001.006

19-1-08-34-00-000-001.007

Note that the parcel of land which lies directly beneath each of the KMPH parcels is owned by the Permittee and is a part of the permitted facility.

- b. The facility which is the subject of this permit, located between the ground surface and an elevation of 428 ft above MSL, is approximately 434.69 acres in size. This is a reduction of approximately 135.31 acres from the original BP Main Plant to remove the parcels described in Conditions I.B.2.a (1) through (3).
- c. The facility which is the subject of this permit, located between 418 ft above MSL and 428 ft above MSL, is approximately 442.19 acres in size. This is a reduction of approximately 7.5 acres from the original BP Main Plant to remove the parcels described in Conditions I.B.2.a (2).
- d. The facility which is the subject of this permit, located between 408 ft above MSL and 418 ft above MSL, is approximately 451.75 acres in size. This is a reduction of approximately 17.06 acres from the original BP Main Plant to remove the parcels described in Conditions I.B.2.a (1) and (2).
- e. The facility which is the subject of this permit, located between 408 ft above MSL and below, is approximately 570 acres in size. This is identical to the original BP Main Plant boundary.

### 3. Facility Maps:

The general location of the facility is shown on Figure B-1, Attachment B of this permit. The location of the solid waste management units (SWMUs), product release sites (PRSs) and Land Reuse Areas are shown on Figure B-2, Attachment B of this permit. The facility layout map is shown on Figure B-3, Attachment B of this permit.



**C. DESCRIPTION OF HAZARDOUS WASTE MANAGEMENT ACTIVITIES**

1. There are no regulated hazardous waste management units (HWMUs) operating or requiring closure/post-closure care under this permit at this facility. Because no HWMUs remain at the site, several portions of 35 IAC Part 724 are not applicable to this permit. This includes the requirements for personnel training (35 IAC 724, Subpart B), preparedness and prevention (35 IAC 724, Subpart C) and contingency plan and emergency procedures (35 IAC 724, Subpart D). However, please note that through the application of other laws, regulations, and permit conditions, some of the concepts covered by these regulations may still apply to corrective action activities conducted at the site.
2. The Permittee currently proposes no corrective action activities that would subject the facility to a RCRA Remedial Action Plan Permit (RAPP). If plans change in the future such that one or more corrective action activities would subject the facility to a RCRA RAPP, the Permittee must submit a modification request to incorporate requirements for a RAPP into this permit in addition to the plans submitted as a part of a normal corrective action document, as well as certification in accordance with Section 39(i) of the Illinois Environmental Protection Act.
3. Requirements for HWMUs: NC-SP1 and SFP
  - a. At the North Cell of Spray Pond 1 (NC-SP1) the closure-by-removal requirements of 35 IAC 703.159 have been met. This determination was made in the Illinois EPA's January 7, 2008 letter (Log No. B-147-CA-70) and was based upon the review of the October 17, 2007 "Supplemental Soil Investigation Report for the North Cell of Spray Pond 1" and the Illinois EPA's May 29, 2007 (Log No. B-147-M-7) letter to BP. This letter also required a Class 3 modification of the permit requesting that the NC-SP1 be removed as a regulated unit subject to the requirements of the permit. With the approval of this permit, this requirement has been considered to be met and accordingly, no further action is necessary for the NC-SP1.
  - b. At the South Flare Pit (SFP), Condition 2 of the Illinois EPA's January 7, 2008 letter (Log No. B-147-CA-70) stated that the review of soil data contained in the October 17, 2007 "Supplemental Soil Investigation Report" determined that the closure-by-removal demonstration had been met for soil and no further action was needed for soil:
    - (1) With the implementation of a Health and Safety Plan for Construction Workers in the area of the SFP shown within the hyphenated line by Attachment 1 of the January 7, 2008 letter;
    - (2) With the eventual implementation of an Environmental Land use Control (ELUC) as required by Attachment C of the Illinois EPA's May 29, 2007 letter and the conditions set forth in the January 7, 2008 letter;

- (3) Provided that groundwater issues for the SFP are addressed as outlined by Items 1 through 4 in Attachment C of the Illinois EPA's May 29, 2007 letter (Log No. B- 147-M-7 and B-147-M-1).

Condition II.F of this permit addresses the requirements of Conditions I.C.3.b (1) and (2) above, the remaining corrective action activities that need to be completed at the SFP. An ELUC must be established in accordance with the Conditions II.F of this permit renewal before a No Further Action (NFA) can be issued for the SFP. Condition II.C.5 below (Groundwater Requirements for the SFP) addresses the requirements associated with Item 3 above.

4. Groundwater Requirements for the SFP

- a. The Illinois EPA approved the March 18, 2010 submittal for the SFP demonstration to exclude the groundwater ingestion exposure route for perched groundwater (locally encountered groundwater in surficial fill and fine-grained native materials (Cahokia Clay facies) at the former SFP area.

- (1) As a result of the perched groundwater route being excluded, the Groundwater Detection Monitoring Program was removed with the issuance of the renewed RCRA Permit (Log No. B-147R).
- (2) The facility must satisfy the requirement of Condition II.F.2 of this permit.
- (3) The facility must continue to address groundwater of the uppermost aquifer in accordance with Section III of this permit.

## SECTION II: CORRECTIVE ACTION

### A. INTRODUCTION

1. In accordance with Section 3004(u) of RCRA and 35 IAC 724.201, the Permittee shall institute such corrective action as necessary to protect human health and the environment from all releases of hazardous wastes or hazardous waste constituents, listed in 35 IAC 721, Appendix H, from any Solid Waste Management Unit (SWMU) at the BP Main Plant in Wood River, Illinois. This section contains the conditions which must be followed to ensure these requirements are met.
2. The original permit issued by the Illinois EPA for this facility on September 30, 1993 required that the facility conduct corrective action at twenty-one (21) SWMUs and nine (9) product release sites (PRSs) (locations where product was known to have been released or where product could have potentially been released). On June 21, 2002, the Illinois EPA approved a plan to expand the scope of this corrective action program to include all recognized environmental conditions (RECs) at the facility. To accomplish this, the facility was broken up into nineteen (19) investigation areas (Land Reuse Areas) so that corrective action at the facility could be addressed on an Area-by-Area basis.
3. One of the Land Reuse Areas (Area 18) contains two units that were identified and regulated as hazardous waste management units (HWMUs) in the permit issued to this facility on September 30, 1993. The facility has since accomplished closure by removal for these two units (referred to as the North Cell Spray Pond 1 (NC-SP1) and the South Flare Pit (SFP)). This section summarizes the status of these units relative to RCRA closure, RCRA post-closure and RCRA corrective action (it must be noted that HWMUs are a subset of SWMUs).
4. The facility has completed a substantial amount of corrective action efforts to date at this facility. This permit summarizes these efforts and describes the corrective action efforts which must still be completed at this facility to ensure the requirements of Section 3004(u) and (v) of RCRA and 35 IAC 724.201 are met.
5. The Permittee must provide corrective action, as appropriate, for any future releases from SWMUs present at the facility or any SWMUs found during the course of facility operations in the future.
6. As 35 IAC Part 742 was amended to include indoor inhalation exposure route, all SWMUs which obtained no further action for corrective action as listed in Condition II.B.1 must be re-evaluated for the indoor inhalation pathway and meet all updated remediation standards to meet the requirements of 35 IAC Part 742.
7. The Permittee must develop and implement a Corrective Measures Program (CMP), as necessary, to protect human health and the environment from any SWMUs and Areas of Concern (AOCs) at the facility.

8. The Permittee must carry out interim measures in accordance with the terms, conditions, and requirements of this permit to address existing contamination at the facility until such time as a final corrective measure can be developed and implemented.
9. The Permittee must provide corrective action, as appropriate, for: (1) any newly discovered SWMUs and AOCs; and/or (2) future releases for existing SWMUs at the facility.
10. Investigation and remediation efforts carried out as part of the corrective action program implemented in accordance with this permit must meet the requirements of: (1) this permit, and the regulations cited herein; (2) the Illinois EPA and the USEPA guidance documents regarding such efforts; and (3) the Illinois EPA letters regarding such activities.
11. Unless there is a desire to modify specific requirements set forth in this Section, information submitted to Illinois EPA regarding the corrective action requirements set forth in this Section is not a request to modify this permit nor subject to the requirements of 35 IAC 703 Subpart G.
12. All Illinois EPA final decisions regarding RCRA corrective action at this facility are subject to the appeal provisions of Sections 39(a) and 40(a) of the Illinois Environmental Protection Act (Act).
13. All documents submitted to the Illinois EPA regarding corrective action efforts must be accompanied by a completed RCRA Corrective Action Certification Form (LPC 632). This form can be found on the Illinois EPA website.
14. The Illinois EPA may modify this Section when it determines good cause exists for modification of a compliance schedule, such as an act of nature, strike, flood or materials shortage or other Force Majeure or events over which the Permittee has no control and for which there is no reasonably available remedy.
15. Based on the results of the investigative efforts as required in corrective action, the Illinois EPA reserves the right to withdraw any "No Further Action" (NFA) determinations.
16. The Permittee shall incorporate, as necessary, climate change adaptation considerations into the corrective action required at this facility in accordance with the applicable USEPA guidance(s) regarding integrating climate change adaptation considerations into the RCRA corrective action process.

**B. CORRECTIVE ACTION REQUIREMENTS**

A plan to conduct a Phase I RCRA Facility Investigation (RFI) of the twenty-one (21) SWMUs and nine (9) product release sites (PRSs) of concern as identified in the 1993 permit and listed below was approved by Illinois EPA on September 7, 1994; a report documenting the results of this investigation was approved by Illinois EPA on June 5, 2001. In 2016, as the approximate 118.25-acre KMPH parcel at and above 408 feet above mean sea level (ft above MSL), which contained one of the PRSs (PRS 7), was removed from the facility subject to this permit, the number of PRSs requiring corrective action under this permit is now eight (8), while groundwater throughout the original permitted boundaries of the facility is still subject to corrective action. The requirements to address corrective action at these areas are included in Section II of this permit.

<u>SWMU #</u>	<u>SMMU Description</u>
8	Three Leaded Tank Bottom Disposal Area
9	Northeast Sand Pits
12	Southeast Disposal Area
13	API Separator Sludge Landform
14	North Cell/Spray Pond 1
15	Spray Ponds Other Than North Cell/Spray Pond 1
16	Old API Separator
17	Additive Waste Pit
18	DAP Spent Filter Cake Storage Area
21	Former APAC Waste Transfer Area
22	New APAC Waste Transfer Area
23	MAP Spent Filter Cake Storage Area
24	APAC Slop Oil Tank 70
25	APAC Slop Oil Tank 176
26	APAC Slop Oil Tanks 189, 190, 845, and 846
27	APAC Slop Oil Tank 277 Area
30	Korea Tank Form Disposal Area
31	Waste Phenol Accumulation Area
33	South Flare Pit
34	Amoco's Sewer System
36	Liquid Waste Collection Bin

<u>PRS #</u>	<u>PRS Description</u>
1	Former Tank 228 Dike Area
2	Former Tank 256 Dike Area
3	Waste Oil Leak Area
4	Hydrocarbons on Water Table
5	North Tank Farm
6	East Tank Farm
8	Korea Tank Farm
9	Gasoline Piping Manifold

1. A Phase II RFI workplan for the SWMUs and PRSs mentioned above was approved by Illinois EPA on February 5, 2002 that was subsequently modified on June 21, 2002. The February 5, 2002 approval letter expanded the scope of corrective action at this facility to all recognized environmental conditions (not just the SWMUs and PRSs identified in the original 1993 permit) and divided the facility into nineteen (19) Land Reuse Areas for remediation and potential redevelopment. A map of the BP Main Plant Land Reuse Areas is presented in Attachment A-1 to this section; these areas are also identified as follows:

<b><u>Land Reuse Area No.</u></b>	<b><u>Name</u></b>
Area 1	Northwest Corner
Area 2	Northeast Corner
Area 3	North Central Area
Area 4	Former Rail Yard
Area 5	South Central Area
Area 6	Former APAC Area
Area 7	Former Alkyl Plant
Area 8	North Tank Farm
Area 9	Korea Tank Farm
Area 10	East Tank Farm
Area 11	Spray Pond Area (Ponds 1 & 2 and Intake Channel Areas)
Area 12	South Tank Farm
Area 13	Wildlife Enhancement Area
Area 14	Southeast Corner
Area 15	Administration Building
Area 16	Marketing Operations Area
Area 17	Liquid Propane Gas (LPG) Caverns
Area 18	North Cell Spray Pond 1 and South Flare Pit
Area 19	Spray Pond 3

2. Condition II.C.1 below includes the facility's corrective action efforts that have been completed, updated to June 2024. Condition II.D below includes the required corrective action that still must be completed at the facility.
3. All investigation efforts conducted at each Land Reuse Area must be sufficient as to thoroughly characterize contamination associated with all the identified recognized environmental conditions present in the area. The Land Reuse Area investigations will focus on soil and perched groundwater.
4. Conduct additional investigation and remediation, as necessary, to address any on-site and/or off-site contamination, which has migrated beyond the property boundaries from the former operation of the facility.
5. All plans and reports associated with all aspects of corrective action at this facility should be submitted to the Illinois EPA for review and approval before implemented. A summary of the plans/reports submitted to date regarding corrective action at this facility, organized by the Illinois EPA log number (and thus the chronologic order in

which the plans/reports were submitted) is provided in Attachment C; this attachment also identifies the Illinois EPA's final action on each submittal.

6. The requirements of 35 IAC Parts 620 and 742 must be met, when applicable, in establishing remediation objectives for corrective action. In addition, all corrective action efforts must meet the requirements of 35 IAC 724.201.
7. Components of the corrective action program must include:
  - a. Continued groundwater monitoring and corrective action program in accordance with the conditions in Section III of this permit.
  - b. Continued operation of the bioremediation systems and remediation of hydrocarbon in accordance with Condition II.E and as approved in Illinois EPA letters.
  - c. Continued submittal of Corrective Action Progress Reports in accordance with Condition II.L.1 of this permit.
  - d. Continued implementation of ELUC – Condition II.C of this permit.
8. The Permittee plans to complete corrective action for the soil and perched groundwater at the facility through the land reuse investigation remediation process. The goal in following this process is to obtain a NFA determination for a given Land Reuse Area by addressing recognized environmental conditions in that area. If the Permittee determines that redevelopment is not likely to occur in a given area, the Permittee will follow the corrective action process only for the SWMUs and PRSs in that area. If the potential for redevelopment of the Land Reuse Area becomes viable in the future, the Permittee would pursue an NFA determination for the entire area (including RECs) at that time. The general process for investigation and remediation of each Land Reuse Area is as follows:
  - a. Current conditions will be established for the parcel/area.
  - b. An Investigation Workplan incorporating the current conditions will be developed and submitted to the Illinois EPA for review and approval to investigate data gaps required to properly characterize the area (this submittal is referred to as the Current Conditions Report/Investigation Workplan).
  - c. The investigation, focused on obtaining soil and any perched groundwater data, will be completed. It must be noted that the groundwater within the uppermost aquifer beneath the facility is being addressed by the requirements of Section III of this permit.
  - d. The results of the investigation will be analyzed; as well as all other data remediation objectives will be developed in accordance with 35 IAC Part 742; a comparison will be made between the data to the developed remediation

objectives; and a determination will be made regarding the need for any remedial activities (including the establishment of engineered barriers and institutional controls).

- e. A report documenting the results of the efforts described in Conditions II.B.9.c and d above will be submitted to the Illinois EPA for review and approval (this report is referred to as the Investigation Report). This report will also identify any required remedial activities (including establishment of any required engineered barriers and/or institutional controls) needed to achieve the proposed remediation objectives.
- f. Based upon review of the Investigation Report, the Illinois EPA will either:
  - (1) require that additional investigative efforts be conducted;
  - (2) issue a draft NFA letter for soil and perched groundwater (if applicable). This draft NFA will identify any required remedial activities (including establishment of an engineered barrier or institutional control) that must be completed before a final NFA letter can be issued. As necessary, the Permittee will conduct the required remedial activities and submit a report to the Illinois EPA for review and approval documenting the results of these activities. Additional work must be conducted by the Permittee as necessary in accordance with plans and reports approved by the Illinois EPA, until the Illinois EPA determines that a final NFA letter can be issued.
  - (3) issue a final NFA letter for soil and perched groundwater (if applicable); or
  - (4) require some combination of the above efforts.
- g. Any engineered barriers and/or institutional controls required in the development of remediation objectives must be established before a final NFA letter can be issued. Plans for establishing the required engineered barrier, if necessary, and associated institutional control(s) required must be submitted to the Illinois EPA for review and approval as well as reports documenting completion of these efforts. Any other proposed remedial efforts to achieve the established remediation objectives must also be completed before a final NFA letter can be issued.
- h. Development of the area may proceed so as long as such activities are conducted, meeting all the requirements and conditions of the NFA letter and any applicable conditions of this permit.



**C. SUMMARY OF CORRECTIVE ACTION EFFORTS COMPLETED**

1. The status of investigations and corrective action for each Land Reuse Area as of September 2024, is presented on the table below.

Notes: CCR/IW = Current Conditions Report/Investigation Work Plan

Inv Report = Investigation Report

ELUC = Environmental Land Use Control

APAC = Amoco Petroleum Additives Company

NFA = No further Action

IEPA = Illinois EPA

<b>Land Reuse Area</b>	<b>SWMUs/PRSs contained in Areas</b>	<b>Accomplishments as of Date</b>	<b>Current Status</b>
Area 1- Northwest Corner	PRS 5 – North Tank Farm	NFA for soils approved December 5, 2001. Recorded ELUC approved March 25, 2005.	Comply with conditions of NFA and ELUC.
Area 2- Northeast Corner	PRS 1 – Former Tank 228 Dike Area	NFA for soils approved August 13, 2002. Recorded ELUC approved March 29, 2005.	Comply with conditions of NFA and ELUC.  The Permittee retains ownership and responsibility for RCRA corrective action activities associated groundwater in the vicinity of two parcels removed from the facility as described in Conditions II.C.5 (a) and (b) below.
	PRS 5 – North Tank Farm	Revised recorded ELUC approved February 27, 2012. A revised recorded ELUC approved August 9, 2017.	
	PRS 6 – East Tank Farm		
	SWMU 9 – Northeast Sand Pit		
Area 3-North Central Area	SWMU 24 – APAC Slop Oil Tank 70	CCR/IW approved September 27, 2002. Inv. Report submitted December 22, 2006; revised Inv. Report submitted May 8, 2012. IEPA requested that the Permittee withdraw the 2012 Inv Report in a letter dated May 30, 2019. Additional environmental data collected in 2018 submitted March 8, 2024.	The Permittee to submit revised Inv. Report pending further discussion with IEPA.
	SWMU 26 – APAC Slop Oil Tanks 189, 190, 845, 846		

Land Reuse Area	SWMUs/PRSs contained in Areas	Accomplishments as of Date	Current Status
Area 4-Former Rail Yard	SWMU 13 – Separator Sludge Landfarm	NFA for soils approved August 22, 2003. Recorded ELUC approved September 29, 2005.	Comply with conditions of NFA and ELUC.  * See Notes below.
	SWMU 21 – Former APAC Waste Transfer Area		
Area 5-South Central Area	SWMU 27 – APAC Slop Oil Tank 177 Area	CCR/IW approved September 27, 2002. Inv. Report submitted December 22, 2006; revised report received by IEPA February 12, 2012. IEPA requested that the Permittee withdraw the 2011 Inv Report in a letter dated May 30, 2019. Additional environmental data collected in 2018-2019 submitted March 8, 2024.	The Permittee to submit revised Inv. Report pending further discussion with IEPA.  * See Notes below.
	PRS 3 – Waste Oil Leak Area		
Area 6-Former APAC Area	SWMU 17 - Additives Waste Pit	CCR/IW approved September 5, 2002. Inv. Report submitted December 22, 2006; revised report received by IEPA March 16, 2012. IEPA requested that the Permittee withdraw the 2011 Inv Report in a letter dated May 30, 2019. Additional environmental data collected in 2018-2019 submitted March 8, 2024.	The Permittee to submit revised Inv. Report pending further discussion with IEPA.
	SWMU 18 - Detergent Additives Plant (DAP) Spent Filter Cake Storage Area		
	SWMU 22 – New APAC Waste Transfer Area		
	SWMU 23 – Multipurpose Additives Plant (MAP) Spent Filter Cake Storage Area		
	SWMU 31 – Waste Phenol Accumulation Area		
	SWMU 36 – Liquid Waste Collection Bin		

Land Reuse Area	SWMUs/PRSs contained in Areas	Accomplishments as of Date	Current Status
Area 7-Former Alkyl Plant	PRS 5 – North Tank Farm	CCR/IW approved August 7, 2003. Inv. Report submitted June 2, 2008 to IEPA. IEPA requested that the Permittee withdraw the 2011 Inv Report in a letter dated May 30, 2019. Additional environmental data collected in 2018-2019 submitted March 8, 2024.	The Permittee to submit revised Inv. Report pending further discussion with IEPA.
Area 8-North Tank Farm	PRS 2 – Former Tank 246 Dike Area	CCR/IW approved August 7, 2003. Inv. Report submitted June 2, 2008. IEPA requested that the Permittee withdraw the 2011 Inv Report in a letter dated May 30, 2019. Additional environmental data collected in 2018-2019 submitted March 8, 2024.	The Permittee to submit revised Inv. Report pending further discussion with IEPA.
	PRS 5 – North Tank Farm		
	SWMU 8 – Bottom Disposal Areas		
	SWMU 25 – APAC Slop Oil Tank 189		
Area 9-Korea Tank Farm	SWMU 30 – Korea Tank Farm Disposal Area	CCR/IW approved September 9, 2002. Inv. Report submitted May 9, 2008; revised report received by IEPA on December 15, 2011. IEPA requested that the Permittee withdraw the 2011 Inv. Report in a letter dated May 30, 2019.	The Permittee to submit revised Inv. Report pending further discussion with IEPA.
	PRS 8 – Korea Tank Farm		
Area 10-East Tank Farm	PRS 6 – East Tank Farm	CCR approved June 4, 2003. Inv. Report submitted March 21, 2008; revised Inv. Report received by IEPA on May 5, 2011. IEPA requested that the Permittee withdraw the 2011 Inv. Report in a letter dated May 30, 2019. Revised Inv. Report submitted December 20, 2019, superseding 2011 Inv. Report.	Revised Inv. Report pending IEPA review. * See Notes below.
Area 11-Spray Pond Area (Ponds 1 and 2)	SWMU 15 – Spray Ponds Other than	RFI Phase I report for SWMUs in this area approved June 5, 2001.	The Permittee implementing approved CCR/IW.

Land Reuse Area	SWMUs/PRSs contained in Areas	Accomplishments as of Date	Current Status
and Intake Channel Areas)	NC-SP1 / Spray Pond 1	CCR/IW approved by IEPA January 24, 2012.	* See Notes below.
Area 12-South Tank Farm	PRS 7 – South Tank Farm SWMU 12 – Southeast Disposal Area	RFI Phase I report for SWMUs in this area approved June 5, 2001. IEPA notified of the Ownership Transfer of the Permittee to Kinder Morgan Phoenix Holdings LLC (KMPH) on November 2, 2015.	KMPH is responsible for RCRA corrective action activities at and above elevation 408 ft above MSL in Area 12. The Permittee retains ownership and responsibility for RCRA corrective action activities below elevation 408 ft above MSL.
Area 13-Wildlife Enhancement Area	SWMU 12 – Southeast Disposal Area	RFI Phase I report for SWMUs in area approved June 5, 2001. CCR/IW approved by IEPA on October 26, 2011. Further revised Investigation Report submitted March 12, 2024.	The Permittee to submit revised Inv. Report pending further discussion with IEPA. * See Notes below.
Area 14-Southeast Corner	None	RFI Phase I report for SWMUs in area approved June 5, 2001. CCR/IW approved July 12, 2012. Environmental data collected in 2017-2019 submitted March 8, 2024.	March 2024 submittal under IEPA review.
Area 15-Administration Building	None	NFA for soils approved November 19, 2003. Recorded ELUC approved September 29, 2005.	Comply with conditions of NFA and ELUC.
Area 16-Marketing Operations Area	SWMU 16 – Old American Petroleum Institute (API) Separator SWMU 34 – Amoco's Sewer System	CCR/IW approved May 5, 2009. Inv. Report submitted December 23, 2014 and received by IEPA on December 24, 2014. IEPA requested a revised Inv. Report in a letter dated June 14, 2016. Additional environmental data collected in 2018-2019 submitted March 8, 2024.	The Permittee to submit revised Inv. Report pending further discussion with IEPA.

Land Reuse Area	SWMUs/PRs contained in Areas	Accomplishments as of Date	Current Status
Area 17-LPG Caverns	None	CCR/IW approved May 5, 2009. Inv. Report submitted October 22, 2012. IEPA requested that the Permittee withdraw the 2012 Inv. Report in a letter dated May 30, 2019. Additional environmental data collected in 2019 submitted March 8, 2024.	The Permittee to submit revised Inv. Report pending further discussion with IEPA. * See Notes below.
Area 18-North Cell Spray Pond 1 (NC-SP1) and South Flare Pit (SFP)	SWMU 14 – NC-SP1 SWMU 33 – SFP	On January 7, 2008, Illinois EPA approved closure by removal demonstration for the NC-SP1. IEPA has determined that the facility has satisfied the groundwater requirements of IEPA's May 29, 2007 and September 9, 2008 letters. Based upon 35 IAC 742.925, the groundwater ingestion route for perched groundwater can be excluded at the SFP area. A closure by removal demonstration for the soils at the SFP was approved by IEPA on January 7, 2008 subject to the establishment of an ELUC meeting the requirements of 35 IAC Part 742 which places certain restriction on future activities at the unit. Recorded ELUC approved July 18, 2016.	NFA at NC-SP1. Regarding the SFP. The Permittee must continue to address groundwater of the uppermost aquifer in accordance with the RCRA Permit. The Permittee must also comply with conditions of the ELUC.
Area 19 Spray Pond 3	SWMU 15 – Spray Ponds Other than NC-SP1 / Spray Pond 1	IEPA approved Inv. Report on December 6, 2007; IEPA revised this letter on April 13, 2009. This letter determined that no further action required in area provided certain requirements are met and certain restrictions are placed on future activities in the area.	The Permittee must carry out requirements set forth in IEPA's April 13, 2009 letter. * See Notes below.

\*Notes: In accordance with the KMPH RCRA Permit issued March 4, 2024, small portions of the following Land Reuse Areas were included in the transfer of ownership to KMPH: 4, 5, 10, 11, 13, 17

and 19. The Permittee retains ownership and responsibility for RCRA corrective action activities at and below elevation 408 ft above MSL.

2. As provided by 35 IAC 742.1000(a), an institutional control satisfactory to the Illinois EPA must be established for property or media that have been remediated to any acceptable standard identified in 35 IAC Part 742 other than those for a residential use. As of September 2024, the Permittee has completed the required environmental investigation and remedial activities associated with the corrective action for soil and perched groundwater at Land Reuse Areas 1, 2, 4, and 15 identified in Condition II.C.3. As discussed in Condition II.C.3, No Further Action (NFA) determinations for soil and perched groundwater at Land Reuse Areas 1, 2, 4, and 15 have been made by Illinois EPA..
3. As of September 2024, the Permittee has obtained NFA for the specific media at the following parcels and SWMUs:

<b>Land Reuse Area/ SWMUs Present in Area</b>	<b>NFA and Media</b>
Area 1	NFA letter for soil and groundwater ingestion route for perched-groundwater only was issued on December 5, 2001 (Log No. B-147-CA-11). ELUC was established for Area 1 (see Conditions II.C.4 and 6 below).
Area 2	NFA letter for soil only was issued on August 13, 2002 (Log No. B-147-CA-14). ELUC was established for Area 2 (see Conditions II.C.4 and 6 below). No perched groundwater was encountered during the investigation.
Area 4	NFA letter for soil only was issued on August 22, 2003 (Log No. B-147-CA-30). Exclusion of groundwater ingestion exposure route for perched-groundwater in this parcel was approved on August 22, 2003 (B-147-CA-30). ELUC was established for Area 4 (Conditions II.C.4 and 6 below).
Area 15	NFA letter for soil only was issued on November 19, 2003 (Log No. B-147-CA-31,36 & 37). ELUC was established for Area 15 (see Conditions II.C.4 and 6 below).

4. As of September 2024, the following Environmental Land Use Control (ELUC) has been established following the NFA determinations by Illinois EPA and recorded with the Madison County Recorder's Office as shown in the table below.

ELUC Recorded as Part of RFI for BP Main Plant

<b>Area Name</b>	<b>Size (Acres)</b>	<b>Parcel ID for Site</b>	<b>Date of NFA Letter</b>	<b>County Recorder's No. /Date Recorded</b>	<b>PIN/TAX ID</b>
Area 1	6.3	Northwest Parcel	December 5, 2001	2003R05241/ January 23, 2003	19-1-08-28-12-201-001.001
Area 2	43	Police Station Donation Parcel & BP retained Parcel	August 13, 2002	2003R08605/ February 5, 2003	19-2-08-27-14-301-003; 19-2-08-27-301-004; 19-2-08-27-10-101-002; 19-2-08-27-10-101-003.
Area 4	29.44	Former Rail Yard	August 22, 2003	2005R38583/ July 13, 2005	19-1-08-28-00-000-010; 19-1-08-33-00-000-013; 19-1-08-34-00-000-001; 19-1-08-34-00-000-001.001
Area 15	11.73	Administration Building Parcel	November 19, 2003	2004R59615/ October 1, 2004	19-1-08-28-00-000-010.001

5. Three parcels have been removed from the original definition of the facility that are subject to corrective action under this permit as described below:
- a. BP donated a 9.56-acre parcel in Area 2 to the City of Wood River. This parcel received a NFA for soils only and extends from the ground surface to a horizontal plane approximately 23 ft-bgs at an elevation of 418 ft above MSL. The Parcel Index No. assigned to this parcel of land is 19-2-08-27-14-301-003. BP retained ownership of that portion of the 9.56- acre parcel which extends below a horizontal plane at an elevation of 418 ft above MSL. The Parcel Index No. assigned to this latter parcel of land is 19-2-08-27-301-004.
    - (1) As a result of this action, BP established two new ELUCs to supersede the one filed for Area 2 on February 5, 2003, one for the parcel being donated to the City of Wood River and one for that portion of Area 2 being retained by BP.
    - (2) The Illinois EPA approved a draft ELUC for the 9.56-acre donation parcel on November 3, 2011 (Log No. B-147R-CA-12) and this document was filed with the Madison County Recorder's office on December 7, 2011 as Document No. R2011R45888. This ELUC contained the same restrictions on this parcel as was in the original ELUC for Area 2 (Document No. 2003R0865 filed with the Madison County Recorder on February 5, 2003.
    - (3) The Illinois EPA approved a draft ELUC for the remainder of Area 2

being retained by BP on November 3, 2011 (Log No. B-147R-CA-12) and this document was filed with the Madison County Recorder's office on December 7, 2011 as Document No. 2011R45887. This ELUC contained the same restrictions on this parcel as was in the original ELUC for Area 2 (Document No. 2003R08605 filed with the Madison County Recorder on February 5, 2003) and superseded the original ELUC for Area 2.

- (4) The Illinois EPA issued a modified permit for this facility on December 21, 2012 which allowed the 9.56-acre donation parcel (Parcel Index No. 19-2-08-27-14-301-003) to be removed from the defined facility covered by this permit. The basis for this modification was that: (1) a NFA was issued for soils in Area 2 by Illinois EPA on August 3, 2002 (which would include the 9.56-acre donation parcel), subject to certain restrictions being in place on future activities in Area 2; and (2) an ELUC specific to this parcel was in place which restricted future activities in the donation parcel as required by the NFA Letter for Area 2.
- b. BP donated a 7.5-acre parcel within Area 2 to the City of Wood River for the construction of a new police station. This parcel received a NFA for soils only and extends from the ground surface to a horizontal plane approximately 15 ft-bgs at an elevation of 428 ft above MSL. The Parcel Index No. assigned to this parcel of land is 19-2-08-27-10-101-002. BP is retaining ownership of that portion of the 7.5-acre parcel which extends below a horizontal plane at an elevation of 428 ft above MSL. The Parcel Index No. assigned to this latter parcel of land is 19-2-08-27-10-101-003.
- (1) As a result of this action, BP established two new ELUCs to supersede the one filed for Area 2 on December 7, 2011, one for the parcel being donated to the City and one for that portion of Area 2 being retained by BP.
  - (2) Due to the amendments made in 35 IAC Part 742 associated with indoor air inhalation exposure route these requirements must be addressed. Thus, BP must conduct an investigation to demonstrate that the soils present in this second donation parcel met remediation objectives for the indoor air inhalation exposure route before it was removed from the defined facility covered by this RCRA permit in accordance with plans approved by Illinois EPA.
  - (3) The Illinois EPA issued a NFA letter on August 22, 2016 regarding the indoor air inhalation exposure route for the second donation parcel. This NFA determination was based in part on the establishment of an ELUC which would place certain restrictions on future activities within this parcel.



- (4) The Illinois approved a draft ELUC for the 7.5-acre donation parcel on May 4, 2017 (Log No. B-147R-CA-78) and this document was filed with the Madison County Recorder's office on June 5, 2017 as Document No. 201718528. This ELUC contained the same restrictions on this parcel as was in the revised ELUC for Area 2 as identified in Condition II.C.5.a (3) above in addition to restrictions required by Illinois EPA's August 22, 2016 letter discussed in Condition II.C.5.b (3) above.
  - (5) The Illinois EPA approved a draft ELUC for the remainder of Area 2 being retained by BP on May 4, 2017 (Log No. B-147R-CA-77) and this document was filed with the Madison County Recorder's office on June 5, 2017 as Document No. R201718529. This ELUC contained the same restrictions on this parcel as was in the revised ELUC for Area 2 as identified in Condition II.C.5.a (3) above and also superseded this latter ELUC.
  - (6) This modified permit (Log No. B-147R-M-16 and any future modifications) allows the subject 7.5-acre donation parcel (Parcel Index No. 19-2-08-27-104-101-002) to be removed from the defined facility covered by this RCRA permit. The basis for this modification is that: (1) NFA Letters were issued for soils in this parcel by Illinois EPA on August 13, 2002 and August 22, 2016, subject to certain restrictions being in place on future activities in the parcel; and (2) an ELUC specific to this parcel is in place which restricted future activities in the donation parcel as required by these NFA letters.
- c. An approximate 118.25-acre three-dimensional parcel at elevation of 408 ft above MSL is not part of the facility. This parcel has already been issued a RCRA Corrective Action Permit (Log No. B-214) to KM Phoenix Holdings LLC (KMPH). The area below elevation of 408 ft above MSL remains part of the facility and is subject to BP Main Plant's RCRA permit.
- (1) KMPH is responsible for RCRA Corrective action activities at and above elevation of 408 ft above MSL at the former BP Wood River Terminal (South Tank Farm), Land Reuse Area 12, and those portions of the following areas that were included in the purchase: 4, 5, 10, 11, 13, 17 and 19.
  - (2) The Permittee retains ownership and responsibility for RCRA Corrective Action activities below elevation of 408 ft-MSL.
  - (3) The Permittee and KMPH recognize that the post-closure conditions, operations or other activities at the property acquired by KMPH or its successor could impact property owned and/or operated by BP or its successors. The parties also acknowledge that post-closure conditions, operations, and activates at the property retained by the BP, or its

successors could impact property owned and/or operated by KMPH or its successors.

- (4) In the event that post-closure activities at the property acquired by KMPH impact (if determined to be the result of KMPH's activities) the underlying and/or adjacent property owned by the Permittee, KMPH will be responsible for the environmental impacts and corrective action activities that result.
  - (5) In the event that post-closure activities at the property retained by the Permittee impact the overlying and/or adjacent property owned by KMPH, the Permittee will be responsible (if determined to be the result of the Permittee's activities) for the environmental impacts and corrective action activities that result.
6. In general, the ELUCs identified place the following restriction on Land Reuse Areas 1, 2, 4 and 15:
- a. No groundwater beneath the areas, including perched groundwater, may be used as a potable supply of water.
  - b. Contaminated groundwater and/or soil that is removed, excavated, or disturbed from the areas must be handled in accordance with all applicable laws and regulations.
  - c. The areas may not be used for residential purposes and may only be used solely and exclusively as "industrial/commercial property" as that term is defined in 35 IAC Part 742.
  - d. Excavation and subsurface construction work in the Land Reuse Areas must be conducted in accordance with a site health and safety plan designed to restrict direct worker exposure to impacted soil and impacted perched groundwater in the area. All construction workers shall be equipped with appropriate personal protective equipment as required and specified in the site health and safety plan.
  - e. The soil within each area is to remain in place, except where necessary to remove it for construction purposes.
  - f. A detailed process must be followed in the management on any soil excavated during construction/demolition/excavation efforts in the areas. This process allows the excavated soil to be placed elsewhere at the BP facility provided certain requirements are met.
  - g. Requires maintenance of engineered barriers over certain portions of each area as follows:

<u>Land Reuse Areas</u>	<u>Number of Subareas Requiring an Engineered Barrier</u>
Area 1	2
Area 2	2
Area 4	3
Area 15	4

- h. Prior to commencement of any future excavation and/or construction in or near the sub-areas covered by an engineered barrier, a safety plan for that sub-area is required that is consistent with NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities; OSHA regulations, particularly in 29 CFR 1910 and 1926; state and local regulations, and other USEPA guidance as available. At a minimum, the plan should address possible worker exposure to contaminated soil which may be present in the sub-area. Any contaminated soil removed, or excavated from, or disturbed in the sub-areas where any engineered barrier is present must be handled in accordance with all applicable laws and regulations.
- i. Failure to comply with the limitations or requirements of an ELUC may result in avoidance of an Illinois EPA's NFA determination in accordance with the program under which the determination was made. The failure to comply with the limitations or requirements of an ELUC may also be grounds for an enforcement action pursuant to Title VIII of the Act.
- j. The limitations or requirements of an ELUC apply in perpetuity or until:
- (1) The Illinois EPA issues a new NFA determination approving modification or removal of the limitation/requirement; and
  - (2) A release or modification of the land use limitation is filed on the chain of title for the property that is the subject of the ELUC.
- k. At no time shall this site be used in a manner inconsistent with the land use limitations established in an approved ELUC, unless: (1) attainment of objectives appropriate for the new land use is achieved; and (2) a new NFA determination is obtained from Illinois EPA and subsequently recorded in accordance with 35 IAC Part 742.
- (1) Requests to release or modify an ELUC must be formally requested in writing from Illinois EPA as a: (1) request to amend the certification of closure; or (2) a permit modification request. Sufficient information must be provided in these requests to demonstrate that the requested change meets all the requirements of 35 IAC Part 742.
  - (2) Any final approval by Illinois EPA of a request to release or modify an ELUC must be filed with the chain of title for the subject facility.

**D. SUMMARY OF CORRECTIVE ACTION EFFORTS STILL TO BE COMPLETED**

1. The Permittee must meet the applicable indoor inhalation remediation objectives both on-site and the impacted off-site properties in accordance with 35 IAC Part 742.
  - a. The Permittee must continue to address the primary objectives set forth in these documents entitled, "Revised Indoor Inhalation Exposure Route Evaluation and Work Plan" dated August 28, 2019 (Log No. B-147R-CA-96) and received by Illinois EPA on August 29, 2019; "Action Plan For Potential Man-Made Pathway Evaluation" dated November 25, 2019 (Log No. B-147R-CA-98) and received by Illinois EPA on November 26, 2019; "Soil Gas Pathway Evaluation Report" dated June 7, 2021 (Log No. B-147R-CA-111) and received by Illinois EPA on June 8, 2021; "Additional Info to the Revised Indoor Inhalation Exposure Route Eval And Work Plan Dated August 29, 2019 To Provide An Update on Changed Site Conditions" dated April 12, 2024 (Log No. B-147R-CA-126) and received by Illinois EPA on April 16, 2024. Note, these documents are currently under review by the Illinois EPA.
  - b. Additional evaluation for the indoor inhalation exposure route requirements must be met for all SWMUs and PRSs listed in Condition IV.B.1.
2. The Permittee is required to continue addressing the key objectives in these documents entitled, "Main Plant Area 10 Comprehensive Land Reuse Investigation Report" dated December 20, 2019 (Log No. B-147R-CA-99) and received by Illinois EPA on December 30, 2019; "Main Plant Land Reuse Investigation Data Submittal of General Background, Sampling Methods, Analytical Procedures, and Analytical Results for Areas" dated March 8, 2024 (Log No. B-147R-CA-125) and received by March 12, 2024. Note, these documents are currently under review by the Illinois EPA.
3. Additional corrective action activities must be carried out and additional information must be submitted to Illinois EPA, as necessary, to ensure all SWMUs and PRSs are properly remediated.
4. The requirements in Condition II.E and Section III of this permit must be met to address remediation of groundwater and hydrocarbon and refinery products.

**E. REMEDIATION OF HYDROCARBON AND REFINERY PRODUCTS**

Implementation of the bioremediation systems for impacted groundwater, treatment and reduction of free phase and residual product, and interim removal actions for recoverable product must be completed as set forth in Condition II.E of the permit.

1. Prior to the issuance of the permit issued May 29, 2018 (Log No. B-147R-M-17 and M-18), the Permittee had operated a Hydrocarbon Recovery System (HRS) to remove refinery product from above the water table. The HRS at the Former Wood River Main Plant was commissioned as an interim remedial measure (IRM) in 1993 to hydraulically recover subsurface mobile light non-aqueous phase liquids (LNAPL) from above the

water table. The original system included twenty-one (21) HRS extraction wells. Following seventeen (17) years of operation, sixteen (16) HRS wells were deactivated in 2010 based on declining LNAPL recovery. After seven (7) additional years of operation, the remaining five (5) HRS extraction wells were deactivated in 2017 due to the system reaching its limit of performance effectiveness.

2. During 2016 and 2017, in an effort to provide an interim measure and to conduct an evaluation of bioremediation technologies, the Permittee proposed to replace the above-mentioned original HRS with alternative remedial system(s). The Permittee installed and started to operate the following three different hydrocarbon bioremediation systems in the northern and central part of the BP Main Plant on a pilot scale:
  - a. Biovent System (in the mid-section of Area 3); the Biovent System is designed to inject air into the vadose zone to provide oxygen and enhance in-situ aerobic bioremediation of hydrocarbons and refinery product at and above the water table as detailed in Attachment E;
  - b. Biosparge System (mainly in the eastern portion of Land Reuse Area 5 extending to portions of Land Reuse Areas 6 and 10); the Biosparge System is designed to inject air below the water table to provide oxygen for enhancing aerobic bioremediation of hydrocarbons and refinery product in groundwater and the smear zone, as well as allow for biodegradation of volatilized hydrocarbons and residual product as it contributes to dissolved phase impacts in the vadose zone as detailed in Attachment E;
  - c. Air Sparge/Soil Vapor Extraction (AS/SVE) (in the northeastern corner of Area 8); Air Sparging is designed to inject air below the water table to volatilize hydrocarbons from groundwater and the smear zone and provide oxygen for enhancing aerobic bioremediation of hydrocarbons and refinery product in the saturated zone. Soil Vapor Extraction is designed to recover volatilized hydrocarbons as necessary for ex-situ treatment, and to promote the flow of atmospheric air into the vadose zone to enhance aerobic bioremediation above the water table. This system is detailed in Attachment E;

The locations of the three pilot remediation systems within the facility are shown in Figure E-1 of Attachment E.

3. The facility shut down the above-mentioned HRS in Condition II.E.1 above under the Temporary Authorization issued by Illinois EPA (effective date of December 5, 2017) provided the facility collected data as required, and submitted: (1) a Pilot-Scale Bioremediation System Performance Report for the pilot-scale tests identified in Condition II.E.1 above; and (2) a workplan for developing a site-wide hydrocarbon recovery/remediation system to address the hydrocarbon contamination in the groundwater and the smear zone above the facility's remedial objectives as defined in the workplan and applicable regulations, as approved by Illinois EPA. The workplan was required to provide a conceptual plan to implement the hydrocarbon recovery/remediation systems for the entire facility in the groundwater and smear zone

as well as an outline of the next steps in full-scale implementation of the hydrocarbon remedial systems. A report entitled, "Remedial Action Selection Report and Main Plant Remedy Roadmap" was received January 31, 2022, to meet this requirement. The document is currently under review by the Illinois EPA.

4. The Permittee shall operate, expand and use the pilot-scale Bioremediation Systems and technologies in order to remediate hydrocarbons and refinery product from the smear zone and vadose zone as it contributes to dissolved phase impacts. The number and location of Bioremediation Systems and Bioremediation wells, as detailed in Attachment E, can be modified to maintain or enhance remediation of hydrocarbons and refinery product. As the Permittee has continued to successfully operate these systems, activities associated with these systems shall be summarized in the Corrective Action Progress Reports required by Condition II.L.1.
5. As an interim remedial measure to address recoverable refinery product prior to the implementation of the Main Plant Remediation Plan, the Permittee shall perform interim removal action(s);
  - a. Interim Removal Actions Shall occur when the 30-Day Average Mississippi River Stage as Calculated based on the Alton Dam Tailwater River stage is below 410 ft above MSL.
  - b. Recoverable refinery product requiring interim removal shall be considered the product from those wells where most recent recoverability testing results indicate a product transmissivity of 2.0 ft<sup>2</sup>/day or greater:
    - (1) The refinery product recoverability shall be determined through product baildown testing or product skimming testing in accordance with applicable ASTM standards, and the data utilized to calculate product transmissivity using the Bouwer and Rice method (ASTM E2856-13 or most current method);
    - (2) Re-evaluation of wells exhibiting most recent transmissivity testing results above 2.0 ft<sup>2</sup>/day and thicknesses equal to or greater than 0.5 feet will be conducted a minimum of once per year during seasonal low water table conditions;
    - (3) Refinery product exhibiting transmissivity values below 2.0 ft<sup>2</sup>/day will be addressed as part of the final remedy;
  - c. Interim removal actions must include one of the following (for wells above 2.0 ft<sup>2</sup>/day):
    - (1) Mobile LNAPL recovery system;

- (2) Manual bailing and pumping; or
  - (3) Expansion of a pilot-scale bioremediation technology (i.e., AS/SVE, bioventing, or biosparging) into the area.
- d. Interim remedial performance data will be used to re-evaluate LNAPL transmissivity over time.

**F. RCRA CLOSURE, RCRA POST-CLOSURE AND RCRA CORRECTIVE ACTION STATUS OF THE NORTH CELL SPRAY POND 1 AND THE SOUTH FLARE PIT**

1. The North Cell Spray Pond 1 (NC-SP1) and South Flare Pit (SFP) were regulated HWMUs in the permit issued to this facility on September 30, 1993. Since that time, BP has been providing post-closure care of these two HWMUs in accordance with the requirements of that permit. BP began pursuing a closure-by-removal demonstration for the NC-SP1 in 2002 and the SFP in 2005.
  - a. With regard to the NC-SP1, on January 7, 2008, Illinois EPA approved a closure-by-removal demonstration. Based upon this approval, no further action is necessary at NC-SP1 in regards to RCRA closure, RCRA post-closure or RCRA corrective action.
  - b. With regard to the SFP:
    - (1) The Illinois EPA has determined that the facility has satisfied the groundwater requirements of Illinois EPA's May 29, 2007 (Log Nos. B-147-M-7 and M-13) and September 9, 2008 (Log No. PS08-030) letters. Based upon 35 IAC 742.925, the groundwater ingestion route for perched groundwater can be excluded at the SFP area. The facility must continue to address groundwater of the uppermost aquifer in accordance with Section III of this permit.
    - (2) A closure-by-removal demonstration for the soils at the SFP, was approved by the Illinois EPA on January 7, 2008 subject to the establishment of an ELUC meeting the requirements of 35 IAC Part 742 which places certain restriction on future activities at the HWMU. The requirements regarding the restrictions that must be contained in the ELUC are set forth in Condition II.F.2.
2. The ELUC to be established for the SFP must place the following restrictions, at a minimum, on the future activities of the subject property:
  - a. All groundwater, including the perched groundwater, under the property shall not be used as a potable supply of water, and any contaminated groundwater and/or soil that is removed, excavated, or disturbed from the property shall be handled in accordance with all applicable laws and regulations;

- b. The property shall not be used for residential use. The property shall be used solely and exclusively for “industrial/commercial property” use as it is defined in 35 IAC Part 742;
- c. Any excavation and subsurface construction work on the property shall be conducted in accordance with a site health and safety plan designed to restrict direct worker exposure to impacted soils and impacted perched groundwater on the property, and all the construction workers shall be equipped with appropriate personal protective equipment as required and specified by the site health and safety plan;
- d. The soil within the property shall remain in place, except where necessary to remove it for construction activities;
- e. Soil excavated during construction/demolition/excavation activities within the Property shall be evaluated to determine if it is contaminated. This determination shall be made by a visual inspection and by subjecting the soils to field screening tests for volatile organic compounds (VOCs). The soil evaluation and management procedures shall be as follows:
  - (1) Field Screening. Soil shall be considered “potentially contaminated” if: (1) there is a visual discoloring of the soil indicative of hydrocarbon product; or (2) a field screening test for VOCs detects the presence (i.e., PID readings >100 units) of VOCs in soil;
  - (2) Laboratory Analysis. Soils exhibiting potential contamination based on visual discoloring or a field screening test for VOCs will must be sampled for benzene, toluene, ethylbenzene, and xylenes (BTEX) and polycyclic aromatic hydrocarbons (PAHs) laboratory analysis, or considered contaminated without analytical testing.
  - (3) Determination of Non-Contaminated Soils. Soils will be considered non-contaminated if: (1) laboratory analytical data indicates constituents in soil are less than the Illinois EPA approved site-specific industrial/commercial remediation objectives (ROs) developed for the Property; or (2) visual inspection or field screening indicates soils are below the threshold levels given in II.F.2.e.1 above.
  - (4) Management of Non-Contaminated Soils. Soils that are considered not contaminated, as determined by field screening or laboratory results, may be reused as clean fill in other areas of the former BP Main Plant Facility. Soils may be transported off-site as clean fill if laboratory data indicates constituents are less than TACO residential standards.
  - (5) Management of Contaminated Soils. If soils are found to be contaminated, they shall be sent off-site for disposal in accordance with 35 IAC Subtitle G: Waste Disposal.



- (6) Documentation. All of these activities must be documented in the facility's operating records.

**G. LAND REUSE PROCESS FOR AREAS 1 THROUGH 19**

The purpose of the Land Reuse process is to allow for a potential redevelopment for each Land Reuse Area when proposed by the Permittee and approved by the Illinois EPA at the facility.

1. A NFA determination may be made for a Land Reuse Area and approved by the Illinois EPA in order to remove the Land Reuse Area from the definition of the facility subject to this permit for redevelopment by following the process described below:
  - a. Assess and document the current conditions of the Land Reuse Area in the Current Conditions Report (CCR);
  - b. Develop a Land Reuse Work Plan to investigate and address any data gaps necessary for a proper characterization of the Land Reuse Area;
  - c. Conduct an investigation to collect soil and perched groundwater data for the Land Reuse Area;
  - d. Analyze the collected data and perform a comprehensive risk assessment, as necessary;
  - e. Identify the necessary remedial actions and institutional controls and incorporate them into the Land Reuse Investigation Report;
  - f. Obtain a conditional NFA determination from the Illinois EPA for soil, perched groundwater and groundwater upon the Illinois EPA review and approval of the Land Reuse Investigation Report;
  - g. Submit a draft ELUC for the Illinois EPA's review and approval;
  - h. Upon the Illinois EPA's approval of a draft ELUC, record the ELUC on the property deed for the Land Reuse Area and submit a certified copy of the recorded ELUC to the Illinois EPA's review and approval;
  - i. Upon the Illinois EPA's approval of a certified ELUC, proceed with the development of the Land Reuse Area, which fully complies with the conditions of the Illinois EPA's approval letters regarding such activities; and
  - j. As necessary and applicable, submit final reports and required documentation of construction and any other required information to the Illinois EPA that satisfies conditions of the Illinois EPA approval letters, which may include an addendum to the ELUC and/or NFA letter.

2. The eventual removal of a Land Reuse Area from the terms and conditions of the facility's permit (so that its ownership can be transferred to another entity) will require that:
  - a. The Permittee must eventually receive a NFA determination for all Land Reuse Areas from the Illinois EPA for the soils, groundwater, and, as appropriate, perched groundwater and/or surface water within the Area by following the Land Reuse process and at the completion of the corrective action process;
  - b. The Permittee either receives a NFA determination for the groundwater in the vicinity of the Land Reuse Area from the Illinois EPA or demonstrates through the Land Reuse process that the contamination remaining at the site will not pose threat to human health and the environment under the appropriate intended use for the area during the Land Reuse Process for the purpose of redevelopment as described in Condition II.G.1 above.
  - c. The boundaries of any parcels established in accordance with the process approved by this permit must be defined by a professional land surveyor licensed to practice in the State of Illinois and meet the requirements of all statutes and regulations applicable to such efforts. The boundaries of any new parcel must first be approved by the Illinois EPA before a new PIN is obtained for the parcel. It must be noted that Illinois EPA has already approved the boundaries of nineteen (19) horizontal parcels within the facility.
  - d. Each parcel established in accordance with the Land Reuse process approved by this permit must obtain an individual and unique Real Estate Tax Index/PIN from Madison County.
  - e. At a minimum, as part of obtaining a NFA determination, an ELUC must be established which allows full access of the property for the Permittee in the future for any refinery product and/or groundwater monitoring or remediation efforts to complete any remaining corrective actions required under this permit within the timeline approved by the Illinois EPA.
3. To modify the definition of the facility covered by the permit, the Permittee will be required to submit a request to modify the permit in accordance with 35 IAC 703, Subpart G. Such a request must be a Class 3 modification request, unless demonstrated otherwise, in accordance with the procedures set forth in 35 IAC 703.283.
4. The Illinois EPA must be able to enforce any efforts necessary to complete corrective action and achieve approved remediation objectives at the subject facility. This may be achieved through institutional controls, ordinances and the facility's permit.
5. As property (or parcels) with new PINs are established, it may be necessary to re-file ELUCs which have already been filed with the Madison County Recorder.

- a. This effort is necessary if the new parcel was created from a parcel for which an ELUC was already established.
- b. In addition to re-filing the required ELUC on the new parcel, it will be necessary to file documentation on the original parcel indicating that the original ELUC no longer applies to that parcel (it may also be necessary to file a revised ELUC on the original parcel) identifying any restrictions that still apply to that parcel of land.

## **H. CORRECTIVE MEASURES REQUIREMENTS**

1. If it is determined that corrective measures must be taken at a SWMU, then the Permittee must implement a Corrective Measures Program (CMP) for such SWMUs in general accordance with the procedures set forth in Attachment D. The corrective measures implemented by the Permittee must be sufficient to ensure the appropriate requirements of 35 IAC Parts 302, 620, 724, and 742 are met.
2. The types of corrective measures which may be implemented include, but are not limited to:
  - a. Removal of the contaminants or the contaminated media so that the remaining media meet remediation objectives developed in accordance with 35 IAC Part 742;
  - b. Closing the SWMU as a landfill by establishing a proper final cover over the SWMU and then providing proper long-term monitoring/maintenance/management of: (1) leachate; (2) subsurface gas; (3) final cover system; and (4) groundwater;
  - c. Establishing engineered barriers to restrict exposure to the contaminants remaining at the SWMU (necessary to certain remediation objectives developed in accordance with 35 IAC Part 742); and
  - d. Establishing institutional controls to restrict activities at the facility, as necessary, to support remediation objectives established in accordance with 35 IAC Part 742.
3. The CMP described in Attachment D consists of five (5) phases:
  - a. Phase I--conceptual design of the selected corrective measure.
  - b. Phase II--development of the final design plans for the corrective measure, including installation and operation/maintenance plans.
  - c. Phase III--actual construction/installation/implementation of the corrective measure.

- d. Phase IV--operation/maintenance/monitoring, as necessary, of the corrective measure to ensure it is being properly implemented and is properly protecting human health and the environment.
  - e. Phase V--demonstration/verification that the corrective measure has been completed and that the established remediation objectives have been achieved.
  - f. Phases may be combined or skipped, depending on the actual corrective measure selected. The overall CMP implemented at a given SWMU must: (1) be logical in nature; and (2) allow for the Illinois EPA oversight and approval throughout the entire process. As such, it will be necessary for the Permittee to submit workplans and reports regarding all aspects of corrective measures for the Illinois EPA review and approval prior to carrying out any corrective measure activity.
4. A Phase I CMP workplan, or its equivalent, must be submitted to the Illinois EPA within ninety (90) days of the date that the Illinois EPA notifies the Permittee of the need for a CMP.
  5. Subsequent CMP related workplans and reports must be submitted to the Illinois EPA for review and approval in accordance with a schedule approved by the Illinois EPA.
  6. Once all corrective measures have been completed, a report must be developed documenting all efforts and results associated with the completed measure, including, as appropriate, information demonstrating the approved remediation objectives for the project have been achieved.

**I. REQUIREMENTS FOR ADDRESSING NEWLY IDENTIFIED SWMU(s)**

1. The Permittee shall notify the Illinois EPA in writing of any newly identified SWMU and/or AOCs discovered during the course of groundwater monitoring, field investigations, environmental audits, or other means, no later than thirty (30) days after discovery. The notification shall provide the following information, as available:
  - a. The location of the newly identified SWMU and/or AOC in relation to other SWMUs on a scaled map or drawing;
  - b. The type and past and present function of the unit;
  - c. The general dimensions, capacities, and structural description of the unit (available drawings and specifications provided);
  - d. The period during which the unit was operated;
  - e. The specifics on all materials, including but not limited to, wastes and hazardous constituents, that have been or are being managed at the SWMU/AOC, to the extent available; and

- f. The results of any relevant available sampling and analysis which may aid in determining whether releases of hazardous wastes or hazardous constituents have occurred or are occurring from the unit.
2. If the submitted information demonstrates a potential for a release of hazardous waste or hazardous waste constituents from the newly identified SWMU/AOC, the Illinois EPA may request in writing, that the Permittee prepare a SWMU Assessment Plan and a proposed schedule of implementation and completion of the Plan for any additional SWMU(s) discovered subsequent to the issuance of this permit. This SWMU Assessment Plan must also propose investigations, including field investigations, if necessary, to determine the release potential to specific environmental media for the newly identified SWMU/AOC. The SWMU Assessment Plan must demonstrate that the sampling and analysis program, if applicable, is capable of yielding representative samples and must include parameters sufficient to identify migration of hazardous waste and hazardous constituents from the newly identified SWMU/AOC to the environment.
3. Within ninety (90) days after receipt of the Illinois EPA's request for a SWMU Assessment Plan, the Permittee shall submit a SWMU Assessment Plan to the Illinois EPA for review and approval.
4. After the Permittee submits the SWMU Assessment Plan, the Illinois EPA shall either approve, conditionally approve, or disapprove the Plan in writing. If the Plan is approved, the Permittee shall begin to implement the Plan within forty-five (45) days of receiving such written notification or according to the terms and schedule established within the Plan and any conditions placed on it. If the Plan is disapproved, the Illinois EPA shall notify the Permittee in writing of the Plan's deficiencies and specify a due date for submittal of a revised plan.
5. The Permittee shall submit a report documenting the results of the approved SWMU Assessment Plan to the Illinois EPA in accordance with the schedule in the approved SWMU Assessment Plan. The SWMU Assessment Report shall describe all results obtained from the implementation of the approved SWMU Assessment Plan.
6. Additional investigation plans and reports must be submitted to and approved by the Illinois EPA, as necessary, to ensure the nature and extent of contamination at the SWMU/AOC is adequately characterized. Once the contamination is characterized, the Permittee shall develop remedial objectives for the SMWU/AOC in accordance with 35 IAC Part 742; such objectives are subject to the Illinois EPA review and approval.
7. The Permittee must implement a CMP, as necessary, to properly address any contamination encountered during the assessment. Guidance regarding the implementation of this program will be provided at the time the Illinois EPA notifies the Permittee of the need for such a program.

8. All efforts carried out at newly identified SWMU/AOCs must meet the requirements of 35 IAC 724.201.

**J. FUTURE RELEASES FROM SWMUs**

There exists a potential that a release may occur in the future from SWMUs identified in the RCRA Facility Assessment (RFA) which did not require any corrective action at the time that the RFA or RFI was completed. If the Permittee discovers that a release has occurred from such a SWMU in the future, then the Illinois EPA must be notified of this release within thirty (30) days after its discovery following the procedures set forth in Condition II.I.1. Additional investigation and, as necessary, corrective measures efforts at this SWMU must be carried out in accordance with the procedure set forth in condition II.H. The results of all corrective action efforts required by this condition must meet the requirements of 35 IAC 724.201.

**K. INTERIM MEASURES/STABILIZATION**

The Permittee shall carry out interim measures/stabilization activities to prevent or mitigate the migration of a release of hazardous substances into the environment, and to provide adequate protection to human health and the environment.

1. At any time during the corrective action process, the Permittee may initiate interim measures for the purpose of preventing continuing releases and/or mitigating the results of releases and/or mitigating the migration of hazardous wastes or hazardous constituents. It shall not be necessary to conduct all phases of a RFI or a CMS prior to implementing an interim measure if the Illinois EPA and the Permittee agree that a problem can be corrected, or a release cleaned up, without additional study and/or without a formal CMS.
2. Prior to implementing any interim measures, the Permittee must submit detailed information regarding the proposed interim measure to the Illinois EPA for approval. This information shall include, at a minimum:
  - a. Objectives of the interim measures; how the measure is mitigating a potential threat to human health and the environment and/or is consistent with and integrated into any long-term solution at the facility;
  - b. Design, construction, and maintenance requirements;
  - c. Schedules for design and construction; and
  - d. Schedules for progress reports.
3. If the Illinois EPA determines that a release cannot be addressed without additional study and/or a formal CMS, then the Illinois EPA will notify the Permittee that these must be performed. Any proposal made under this provision or any other activity

resulting from such proposal, including the invocation of dispute resolution, shall not affect the schedule for implementation of the other corrective action efforts being carried out at the facility or of any other portion of the permit.

4. If the Illinois EPA determines that interim measures are necessary to protect human health or the environment, the Permittee will be notified by way of a permit modification.
5. Consistent with the annual reporting requirements of this permit, the Permittee shall submit a report assessing the effectiveness of any interim measures being carried out in accordance with this permit. Based on a review of this report, the Illinois EPA reserves the right to require additional interim measures be carried out if it is determined that the interim measure is unable to protect human health and the environment. This annual report should at a minimum contain the following information regarding each system which comprises the interim measure:
  - a. A discussion of each system's operation during the year. This discussion should address: (1) actual daily, weekly and monthly flow rates through each system; (2) any periods when the systems were not operating; and (3) deviations from the design operating procedures for the system (such as problems with drawing an adequate vacuum, downtime due to equipment failure, etc.);
  - b. Results of all monitoring efforts carried out during the year;
  - c. A discussion of the effectiveness of the system supported as appropriate with data and calculations; and
  - d. Recommended changes, if any, which should be made to the system to improve its effectiveness.
6. The Illinois EPA reserves the right to require the Permittee to remove or treat soil if the Illinois EPA determines that contaminants are present in the soils at levels such that the remediation system is unable to protect human health and the environment. Remediation objectives for corrective measures will be established by the Illinois EPA at a later date.
7. The interim measure approved for a SWMU may not be sufficient to meet the final requirements for corrective action for remediation for the unit. The adequacy of the interim measure will be addressed upon the Illinois EPA review and approval of the RFI reports and the CMP, as required by this permit. As such, the Permittee may be required to expand this interim measure as necessary to address existing or additional contamination detected through RFI investigations.
8. The Illinois EPA reserves the right to require revision and modification of the interim measures implemented by the facility should it be determined by the Illinois EPA through information obtained through facility monitoring that the interim measures

approved by this portion of the permit are ineffective in protecting human health and the environment.

**L. REPORTING REQUIREMENTS**

1. A Corrective Action Progress Report must be submitted summarizing the corrective action efforts completed during each quarter of the calendar year. This report must also contain a general description of the corrective action efforts to be completed during the next quarter of the calendar year.

- a. The reports should be submitted in accordance with the following schedule:

<b>Reporting Period</b>	<b>Report to be Submitted by the following</b>
January-March	May 1
April-June	August 1
July-September	November 1
October-December	March 1*

\*Included in Annual Report required in Condition II.L.2 below.

- b. Each Corrective Action Progress Report must contain:
  - (1) a summary of activities completed at each parcel during the quarter, including information regarding the amount of free product/groundwater/leachate removed on a weekly basis from various units during the quarter;
  - (2) a discussion of any problems encountered while conducting corrective action at each parcel during the quarter;
  - (3) A summary of the activities anticipated to be carried out during the next quarter.
2. A report must be submitted to Illinois EPA by March 1 of each year which summarizes corrective action program activities completed at the facility during the previous calendar year (i.e., the previous January 1 to December 31). This report must contain a compilation/summary of the information in the quarterly reports for the year, what was completed during the year, and what must still be done in the next year and in the following years.
3. Final reports must be submitted to Illinois EPA for review and approval when corrective action is complete for a given parcel. Such reports must be certified by an independent licensed professional engineer and a person of authority from the Permittee. This certification must meet the requirements of 35 IAC 702.126. These reports must contain be detailed in nature and contain sufficient information which (1)



describes in detail all investigation/remediation efforts carried out in the parcel; and (2) the efforts were carried out in accordance with the approved plan and this permit.

**M. COST ESTIMATES/FINANCIAL ASSURANCE FOR CORRECTIVE ACTION**

1. The current cost-estimate for completing corrective action and groundwater remediation at the BP Main Plant by the facility is \$87,922,423 in 2020 dollars. The Permittee shall prepare an updated cost estimate for the completion of any corrective action required under this permit in order to provide financial assurance for the approved amount of that cost estimate as required in Condition IV.C.2. The cost-estimate for completing corrective action required in this permit must include 10% contingency.
2. The Permittee shall prepare a cost estimate for the completion of any corrective action required under this permit, in order to provide financial assurance for completion of corrective action, in order to provide financial assurance for the approved amount of that cost estimate within ninety (90) days of the date of the effective date of this permit, as required under 35 IAC 724.201(b). Such a cost estimate must be based upon the cost of contamination investigations and assessments for the SWMU(s), and design, construction, operation, inspection, monitoring, and maintenance of the corrective measure(s) to meet the requirements of 35 IAC 724.201 and this permit. These estimates must be based upon third party costs. The revised cost estimate for corrective action must be submitted to the Illinois EPA annually by January 1.
3. The Permittee shall demonstrate continuous compliance with 35 IAC 724.201 by providing documentation of financial assurance using a mechanism specified in 35 IAC 724.243, in at least the amount of the cost estimate required under Condition II.M.1 the words "completion of corrective action" shall be substituted for "closure and/or post-closure", as appropriate in the financial instrument specified in 35 IAC 724.251. The documentation shall be submitted to the Illinois EPA within sixty (60) days after the submittal of the initial or revised cost estimates required under Condition II.M.1. The Illinois EPA may accept financial assurance for completion of corrective action in combination with another financial mechanism that is acceptable under 35 IAC 724.246 at its discretion.
4. It must be noted that cost estimates and financial assurance must be provided for the operation of the groundwater remediation system required by Section III of this permit as such a system is necessary to meet the requirements of 35 IAC 724.201.
5. All cost estimates prepared under the requirements of Conditions II.M.1 through II.M.4 must be submitted as a Class 1\* permit modification request in accordance with 35 IAC 703.281.
6. Financial assurance for corrective action must be updated, as necessary, to reflect the current status of the RCRA corrective action program at this facility. In addition, this financial assurance must be adjusted annually for inflation.

### **SECTION III: GROUNDWATER CORRECTIVE ACTION PROGRAM**

#### **A. SUMMARY**

Hazardous constituents associated with historical activities at the BP Main Plant have been detected in the groundwater across the site which exceed the groundwater quality standards established in 35 IAC Part 620. Therefore, a corrective action program for groundwater meeting the requirements of 35 IAC 724.201 must be implemented at the facility. In addition to the corrective action necessary to treat or remove hazardous constituents released to groundwater, this permit also requires the Permittee to implement a corrective action program for the groundwater present in the uppermost aquifer beneath the facility, and off-site as necessary.

The groundwater corrective action program required by this permit includes:

1. Control of the horizontal and vertical flow of the vertical column of groundwater in the uppermost aquifer such that groundwater flow is towards the interior of the BP Main Plant. This control of groundwater flow will be accomplished by withdrawing sufficient quantities of groundwater from the uppermost aquifer. Such flow control is necessary as a corrective measure to prevent further contaminant migration of on-site releases of product or waste, beyond the boundaries of the BP Main Plant and is the basis for the establishment of a Groundwater Management Zone (GMZ), except as provided in Condition III.A.5 below.
2. Verification that the flow of groundwater is adequately controlled as required by Condition III.A.1 above.
3. Monitoring the quality and movement of the groundwater in the uppermost aquifer beneath the BP Main Plant to determine the effectiveness of the groundwater corrective action program, as well as, verify compliance with the GMZ.
4. Remediating and/or removing refinery product from above the water table, and within the smear zone of the uppermost aquifer. The smear zone will be considered the minimum and maximum range of water table fluctuations observed at the BP Main Plant.
5. In the event that the Permittee is unable to demonstrate an inward gradient in the southeast corner of the facility, or in the vicinity of Land Reuse Area 9, compliance will be satisfied by demonstration that the groundwater quality at designated Sentry Observation Monitoring Wells in this portion of the facility meet applicable groundwater quality standards. The Permittee shall comply with the requirements of III.E.12 in the event that groundwater quality in this portion of the facility does not meet groundwater quality standards. Contingent actions could include increased monitoring to demonstrate that contaminants do not migrate beyond the GMZ boundary and/or sentry well installation and monitoring, increased groundwater extraction, or other alternate measures.

6. Implementation of the bioremediation systems for impacted groundwater, treatment and reduction of free phase and residual product, and interim removal actions for recoverable product must be completed as set forth in Condition II.E of the permit.

**B. IMPLEMENTATION**

1. The Permittee shall implement the Groundwater Corrective Action Program established in this permit upon the effective date of this permit. On that date, the corrective action and groundwater monitoring requirements set forth in this permit shall supersede those previously established.
2. The Permittee shall carry out the corrective actions specified in this permit on the groundwater beneath the BP Main Plant. The "uppermost aquifer" refers to the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically connected with this aquifer in the vicinity of the facility. The uppermost aquifer at this facility is a sand and gravel aquifer located approximately 30 feet below the ground surface (ft-bgs) and extending to a depth of about 101 to 113 ft-bgs to the top of the bedrock surface. This aquifer is commonly referred to as the "American Bottoms."
3. For the purposes of this permit and in accordance with 35 IAC Part 620 regulations, the sand and gravel aquifer has been designated Class I: Potable Resource Groundwater. The analytical results obtained from these groundwater monitoring wells shall be compared to the appropriate Class I concentration limits that comprise the groundwater protection standard found in Condition III.D.1 or to established background values or other applicable standards as appropriate.
4. The Permittee must continue corrective action measures to the extent necessary to ensure that the groundwater protection standard is not exceeded to meet the requirements of 35 IAC 724.201.

**C. WELL LOCATIONS AND CONSTRUCTION**

1. The Permittee shall maintain the groundwater monitoring wells identified in the table below to allow for the collection of groundwater samples from the uppermost aquifer. The location of these wells is specified in Figure C-2 of the approved permit application. Northing and Easting coordinates for wells are provided in Attachment F.

<u>IEPA Well No.</u>	<u>Facility Well No.</u>	<u>Well Depth (ft.)</u>	<u>Well Depth Elevation (ft. MSL)</u>	<u>Well Screen Interval (ft. MSL)</u>	<u>Well Designation<sup>1</sup></u>
<b><u>GMZ Boundary Wells</u></b>					
G005 <sup>(8)</sup>	B-5D	44.00	386.10	406.10-386.10	UMA H
G006	B-6	44.00	384.01	404.01-384.01	UMA H
G008*	B-8D	50.00	378.21	408.21-378.21	UMA H
G021	C-11	49.70	382.27	417.27-382.27	UMA C
G023	C-13	49.50	381.74	416.74-381.74	UMA C
G04R	B-4R	59.50	382.54	402.54-382.54	UMA H
G045	G-5	40.87	402.67	412.67-402.67	UMA H
G055	G-15	52.19	393.02	413.02-393.02	UMA H
G059	G-19	45.00	384.33	404.33-384.33	UMA C
G062	G-22	45.00	388.01	408.01-388.01	UMA H
R063	G-23R	46.24	385.58	405.82-385.82	UMA H
G067 <sup>#</sup>	G-27	49.00	386.28	406.280-386.28	UMA H
G068 <sup>@</sup>	G-28	50.00	392.24	414.24-392.24	UMA H
G073	G-33	44.00	387.15	407.15-387.15	UMA H
G079	G-39	40.00	383.12	404.12-384.12	UMA C
G084	G32R	45.00	389.13	409.13-389.33	UMA H
G085	G-26R	54.15	388.59	408.24-388.94	UMA H
G111	SWMU12-MW02	38.17	393.89	404.06-394.06	UMA H
G112	SWMU12-GH1	43.22	388.87	408.87-388.87	UMA C
G32R	H32R	44.50	384.64	405.34-385.34	UMA C
G35A	G35A	32.20	397.95	408.15-398.15	UMA H
G35B	G35B	40.20	390.26	400.46-390.46	UMA H
G37	H-37	46.00	386.47	401.47-386.47	UMA C
G5B	G-5B	75.85	367.73	377.73-367.73	UMA H
G500 <sup>(7)</sup>	G500	29.39	401.06	411.06-401.06	UMA C
G69R	G-29R	59.96	385.87	405.87-385.87	UMA H
G74L	G-34	60.00	386.69	406.69-386.69	UMA H
G75L	G-35	60.00	386.51	406.51-386.51	UMA H
G76L	G-36	60.00	385.81	405.81-385.81	UMA H
G91	M-1D	39.70	388.13	398.13-388.13	UMA H
G92	M-2D	40.40	386.08	401.08-386.08	UMA H
G93L	M-3D	40.80	386.18	401.18-386.18	UMA H
H31B	H-31B	75.02	357.32	367.32-357.32	UMA H
RG36	H36R	60.43	384.94	404.27-389.57	UMA H
R302 <sup>&amp;</sup>	R302	33.20	399.84	410.04-400.04	Cahokia Clay
G303	RP-3D	39.85	393.24	398.74-393.74	UMA C
G503 <sup>(8)</sup>	G08A	32.00	396.20	406.20-396.20	UMA H
G504 <sup>(8)</sup>	R067	32.12	404.38	409.68-404.68	UMA H
G505 <sup>(8)</sup>	R068	37.70	403.90	414.20-404.20	UMA H

<u>IEPA Well No.</u>	<u>Facility Well No.</u>	<u>Well Depth (ft.)</u>	<u>Well Depth Elevation (ft. MSL)</u>	<u>Well Screen Interval (ft. MSL)</u>	<u>Well Designation<sup>1</sup></u>
<b><u>Observation Monitoring Wells</u></b>					
G002	G-01R	37.32	391.34	411.16-391.56	UMA C
G009	B-9	49.00	382.66	407.66-382.66	UMA H
G020	C-10	49.50	382.50	417.50-382.50	UMA C
R042 <sup>(3A)</sup>	R042	37.20	393.48	403.48-394.02	UMA H
G048	G-8	48.00	381.68	401.68-381.68	UMA H
G057 <sup>(4)</sup>	G-17	35.02	391.90	411.90-391.90	UMA C
G058 <sup>(4)</sup>	G18	36.00	391.27	411.27-391.27	UMA C
R083 <sup>(3A)</sup>	R083	38.79	393.44	403.98-394.52	UMA H
G10L	H-20	58.43	371.82	396.82-376.82	UMA H
G14L	H-24	57.00	372.85	397.85-377.85	UMA H
G16L	H-26A	55.00	378.24	408.24-378.24	UMA H
G22R	C-12R	54.70	378.10	398.10-378.10	UMA C
G30R	H-30R	43.04	387.98	408.63-388.63	UMA H
G31D	C-21C	70.00	357.98	362.98-357.98	UMA H
G39*	H-39	42.10	385.74	400.74-385.74	UMA H
G84L	H-4	59.00	374.19	399.19-379.19	UMA H
G87L	H-7	51.50	376.68	402.68-382.68	UMA C
G92L	H-12	69.00	373.82	410.82-378.82	UMA H
G98L	H-18	52.50	378.22	403.22-383.22	UMA C
G301	RP-1	49.00	377.38	388.38-378.38	UMA H
G305	RP-5	49.00	381.06	391.06-381.06	UMA C
G307	RP-7D	49.00	383.13	393.13-383.13	UMA H
G501 <sup>(3A)</sup>	G501	40.89	392.55	403.09-393.63	UMA H
G502 <sup>(3A)(8)</sup>	G502	35.55	393.75	404.29-394.83	UMA H
<b><u>Sampling Only Network<sup>(5)</sup></u></b>					
G031	C-21A	35.00	393.18	403.18-393.18	Cahokia Clay
G065	G-25	55.00	389.58	409.58-389.58	UMA H
G082	G-42	40.00	388.81	409.81-388.81	UMA C
R11L	H-21R	57.47	371.85	391.85-371.85	UMA C
G19	H-29	47.24	386.42	401.42-386.42	UMA H
R31L <sup>(8)</sup>	R31L	55.00	373.10	378.10-373.10	UMA H
G33	H-33	44.00	387.37	407.37-387.37	UMA C
G71L	G-31	58.70	387.25	407.25-387.25	UMA H
G97L	H-17	58.00	377.09	402.09-382.09	UMA H
G306	RP-6	49.00	381.34	391.34-381.34	UMA H
<b><u>Gauging Only Network</u></b>					
G016	C-6	49.50	381.00	416.00-381.00	UMA C
G046	G-6	50.00	391.37	411.37-391.37	UMA H
G050	G-10	44.00	386.65	406.65-386.65	UMA C

<b>IEPA Well No.</b>	<b>Facility Well No.</b>	<b>Well Depth (ft.)</b>	<b>Well Depth Elevation (ft. MSL)</b>	<b>Well Screen Interval (ft. MSL)</b>	<b>Well Designation<sup>1</sup></b>
G31R <sup>(8)</sup>	H-31R	42.22	389.88	410.08-390.08	UMA H
G83L	H-3	52.50	375.09	400.09-380.09	UMA H
G86L	H-6	64.30	376.92	401.92-381.92	UMA H
G89L	H-9	53.50	375.96	400.96-380.96	UMA H
G99L <sup>(8)</sup>	H-19	53.50	376.60	402.10-382.10	UMA H
G128 <sup>(2)</sup>	G128	33.65	395.86	406.04-396.26	UMA H
G506	A8MW04	50.00	383.34	418.34-383.34	UMA H
G507	A8MW05	48.00	383.74	413.74-383.74	UMA H
G508	A8MW06	48.00	381.97	416.97-381.97	UMA H
<b><u>LNAPL Monitoring network</u></b> <sup>(6)</sup>					
G011	C-1	49.50	380.30	415.30-380.30	UMA C
G027	C-17	40.00	390.32	400.32-390.32	UMA C
G049	G-9	47.00	382.75	402.75-382.75	UMA H
G13L	H-23	51.50	380.14	408.64-388.64	UMA H
G34	H-34	38.47	393.11	403.11-393.11	UMA C
G96L	H-16	58.50	373.28	393.28-378.28	UMA H
G417	B-17	51.00	380.48	400.48-380.48	UMA H
G603	RC-3	54.00	377.3	397.30-377.30	UMA H
G604	RC-4	51.46	379.92	399.92-379.92	UMA H
G605	RC-5	51.19	378.91	398.91-378.91	UMA H
G613	RC-13	63.12	368.38	403.38-373.38	UMA H
G614	RC-14	61.81	369.99	404.99-374.99	UMA H
G615	RC-15	59.66	370.48	405.48-375.48	UMA H
G617	RC-17	58.00	370.91	403.91-386.91	UMA H
G618	RC-18	57.50	371.78	411.78-376.78	UMA H
G619	RC-19	58.00	369.3	407.30-372.30	UMA H
G620	RC-20	85.36	344.51	406.28-349.64	UMA H
G509 <sup>(9)</sup>	B-14	54.83	376.37	396.37-376.37	UMA H
G510 <sup>(8)</sup>	C-9	+	+	+	unknown
G511	G-11	43.08	388.38	408.21-388.21	UMA H
G512 <sup>(9)</sup>	G-12	45.37	386.12	406.25-386.25	UMA H
G513	G-40	40.00	388.26	409.26-389.26	UMA C
G514 <sup>(9)</sup>	G-47	38.67	389.33	407.66-389.66	UMA C
G515 <sup>(9)</sup>	G-14	+	+	+	unknown
G516	A3MW01	45.00	384.8	414.80-384.80	UMA H
G517	A3MW02	50.00	380.5	415.50-380.50	UMA H
G518	A6MW01	50.00	380.01	415.01-380.01	UMA H
G519	A6MW02	50.00	382.17	417.17-382.17	UMA C
G520	A6MW03	55.00	376.26	416.26-376.26	UMA H
G521	A8MW02	50.00	379.67	414.67-379.67	UMA H
G522	A9BH05	37.00	391.29	405.29-391.29	UMA C
G523	LS-1	33.87	394.71	414.71-394.71	UMA C

G524 <sup>(9)</sup>	SVE-2	36.62	395.97	416.50-396.50	UMA C
<b>Demonstration Wells</b>					
R032 <sup>(3B)</sup>	R032	39.27	388.99	399.47-389.71	UMA C
R034 <sup>(3B)</sup>	C-24R	35.24	393.64	403.88-386.34	UMA C
R035 <sup>(3B)</sup>	C-25AR	35.57	392.04	402.50-392.72	UMA C
G304 <sup>(3B)</sup>	RP-4D	45.75	385.51	396.34-386.34	UMA C

Notes: \* = Groundwater sampling only required at G008 when G503 is dry.

+ = Well construction information is incomplete.

# = Groundwater sampling only required at G067 when G504 is dry.

@ = Groundwater sampling only required at G068 when G505 is dry.

& = R302 was installed as a water table well and G302 was abandoned (G302 had screened interval 393.63-383.63). It appears a benzene pipeline release from the neighboring site (ID No. 1191150025) may be the source of contamination previously measured at G302. IEPA will require the neighboring site to delineate onto BP property. The contamination detected at the screened interval for former G302/RP-2D must continue to be monitored due to contaminant levels previously detected. As the Illinois EPA is working with Shell Oil Products US to delineate benzene contamination associated with a benzene pipeline release at BOL site ID No. 1191150025, BP will not be required to install a well at the screened interval of approximately 393.63-383.63 at this time.

1 = Top of casing and ground surface elevation measurements are from the 2020 Monitoring Well Survey unless otherwise noted.

2 = Groundwater gauging only at G128 due to known benzene release from Shell Oil pipeline in 1986 and the requirement for the permittee associated with site 1191150002 sampling G128.

3A = Sentry Well used to demonstrate contaminant control in the southeast portion of the GMZ.

3B = Sentry Well used to demonstrate contaminant control in the vicinity of Land Reuse Area 9.

4 = Also a designated Sentinel Well under the Riverfront RCRA Permit.

5 = Groundwater sampling only, well will still be gauged when sampled in accordance with Condition III.F.1; however, water level data will not be utilized for developing potentiometric surface maps or evaluation of hydraulic gradients as required under Condition III.E.6.

6 = LNAPL monitoring only, groundwater sampling not required (32 wells).

7 = G500 installed on November 20, 2017 as the well listed in the May 29, 2018 RCRA Permit as IEPA Well No. G113 "to be installed." The designation G500 was used because there is a different well designated as G113 under the Riverfront RCRA Permit.

8 = Top of casing and ground surface elevation measurements measured on the following dates: June 17, 2021 (G31R, GOSA, C-9); March 7, 2022 (G005, G99L, G502); and September 19, 2023 (R31L, R067, R068).

9 = Top of casing and ground surface elevation measurements are from 2015 Monitoring Well Survey.

10 = Well designations are identified based on zones within the uppermost aquifer being monitored: wells behaving as perched wells (Cahokia Perched); within the silty sandy layer of the Cahokia Sand facies (UMA C); within the coarse sand and gravel of the Henry formation (UMA H).

11 = Per Condition IV.C.1.a, G078, G030, G97L, and G87L require a new or replacement well or well pairs be installed within ninety (90) days to monitor the previously screened interval. Of those wells, only G078 no longer exists because the well was damaged.

Additional Notes:

“Ft-bgs” = refers to the number of feet below the ground surface.  
 “Ft-MSL” = refers to the number of feet referenced to mean sea level.  
 “Stick-up” = refers to the height of the reference survey datum. This point is determined with + 0.01 foot in relation to mean sea level, which in turn is established by reference to an established National Geodetic Vertical Datum.

- The Permittee shall maintain the Gradient Control Wells (Cone of Depression (COD) Wells) identified in the table below to allow for the withdrawal of contaminated groundwater, as well as, the measurement of water levels to verify the flow of groundwater is adequately controlled as required by Condition III.A.1 above.

<u>IEPA Well No.</u>	<u>Facility Well No.</u>	<u>Well Depth (ft.)</u>	<u>Well Screen Elevation (ft. MSL)</u>	<u>Well Screen Length (ft.)</u>
<u>Gradient Control Wells</u>				
HW1B	HW01-B	75.00	356.12	300
HW2A	HW02-A	75.00	355.71	300
HW2B	HW02-B	75.00	356.37	300

Note: The Gradient Control Wells are horizontal wells.

- Construction of each monitoring well/piezometer must be in accordance with the “Monitoring Well Diagram” and “Well Completion Report” forms located on the Illinois EPA website, unless otherwise approved in writing by the Illinois EPA. All new monitoring wells/piezometers to be installed must be continuously sampled and logged on Illinois EPA boring logs contained in the “Field Boring Log” form on the Illinois EPA website, unless otherwise approved by the Illinois EPA.
- The Permittee shall notify the Illinois EPA within thirty (30) days in writing if any of the wells identified in Condition III.C.1 and III.C.2 are damaged, or the structural integrity has been compromised causing the well not to serve its function or to act as a contaminant pathway. A proposal for the replacement of the subject well shall accompany the notification. The well shall not be plugged until the new well is on-line and monitoring data has been obtained and verified unless the well is extremely damaged or would create a potential route for groundwater contamination. Prior to replacing the subject well, the Permittee shall obtain written approval from the Illinois EPA regarding the proposed installation procedures and construction.
- Should any well become consistently dry or unserviceable, a replacement well shall be provided within ten (10) feet of the existing well. This well shall monitor the same zone as the existing well and be constructed in accordance with the current Illinois EPA groundwater monitoring well construction standards at the time that the well is replaced. A well which is more than ten (10) feet from the existing well or does not monitor the



same geologic zone must be approved by the Illinois EPA and designated as a new well.

6. The Permittee shall submit boring logs, construction diagrams and datasheets from installation and development of a new or replacement well to the Illinois EPA at the address below within thirty (30) days of the date that installation of the well is completed. In addition, the Permittee shall submit certification that plugging and abandonment of a well was carried out in accordance with the approved procedures to the Illinois EPA at the address below within thirty (30) days of the date that the well is plugged and abandoned. All pertinent information should be submitted to the appropriate State agencies.

Illinois Environmental Protection Agency  
Bureau of Land -- #33  
Permit Section  
1021 North Grand Avenue East  
Post Office Box 19276  
Springfield, Illinois 62794-9276

7. All wells/piezometers shall be clearly identified and shall be equipped with protective caps and locks. Monitoring wells or piezometers located in high traffic areas must be protected with bumper guards.
8. All groundwater monitoring wells and piezometers not utilized in the approved groundwater monitoring system, but retained by the facility, must be constructed, and maintained in accordance with 77 IAC Part 920 regulations. Monitoring wells and piezometers that are improperly constructed must be abandoned in accordance with Condition III.C.4.

#### **D. GROUNDWATER PROTECTION STANDARD**

1. The following hazardous constituents and their concentration limits comprise the groundwater protection standard for the groundwater monitoring wells found in Conditions III.C.1. Total (unfiltered) values will be used for the comparison with the 35 IAC Part 620, Class I, Groundwater Quality Standards. Dissolved values shall be used for statistical evaluations required in Condition III.H unless otherwise noted.

<u>Field Parameters</u>	<u>Storet</u>	<u>Units</u>
pH	00400	Standard Units
Specific Conductance	00094	micromhos/cm
Temperature of Water Sample	00011	(°F)
Turbidity	45626	Ntus
Depth to Water (below land surface)	72019	Feet
Depth to Water (below measuring point)	72109	Feet
Elevation of Groundwater Surface	71993	Ft MSL
Elevation of Bottom of Well #	72020	Ft MSL
Elevation of Measuring Point (Top of casing)##	72110	Ft MSL

# Shall be determined during the first semi-annual sampling event each year.  
 ## Shall be surveyed once every five (5) years, or at the request of the Illinois EPA, or whenever the elevation changes as required by Condition III.I.9.a.

<u>Hazardous Constituents</u>	<u>Storet No.</u>	<u>Concentration Limits (mg/L)</u>
<u>Metals</u>		
Antimony	01097	0.006
Arsenic	01002	0.010
Barium	01007	2.0
Beryllium	01012	0.004
Cadmium	01027	0.005
Chromium	01034	0.1
Cobalt	01037	1.0
Lead	01051	0.0075
Mercury	71900	0.002
Nickel	01067	0.1
Selenium	01147	0.05
Vanadium	01087	0.049
<u>VOCs</u>		
1,2-Dichloroethane	34531	0.005
1,3-Dichlorobenzene	34561	0.0002
1,4-Dichlorobenzene	34571	0.075
2-Butanone (MEK)	81595	4.2
Benzene	34030	0.005
Carbon Disulfide	77041	0.7
Chlorobenzene	34301	0.1
Chloroform	32106	0.0002
Ethylbenzene	78113	0.7
Toluene	34010	1.0
Total Xylenes	34020	10.0
Methyl Tertiary-Butyl Ether	46491	0.07
Styrene	77128	0.1
<u>SVOCs</u>		
2,4-Dimethylphenol	34606	0.14
2,4-Dinitrophenol	34616	0.014
2-Methylphenol (o-cresol)	77152	0.35
4-Methylphenol (p-cresol)	77146	0.035
4-Nitrophenol	34646	--
Anthracene	34220	2.1
Benzo(a)anthracene	34526	0.00013
Benzo(a)pyrene	34247	0.0002
Benzo(b)fluoranthene	34230	0.00018
Benzo(k)fluoranthene	34242	0.00017
Bis(2-ethylhexyl)phthalate	39100	0.006

<b><u>Hazardous Constituents</u></b>	<b><u>Storet No.</u></b>	<b><u>Concentration Limits (mg/L)</u></b>
Butyl benzyl phthalate	34292	1.4
Chrysene	34320	0.0015
Dibenzo(a,h)anthracene	34556	0.0003
Diethyl phthalate	34336	5.6
Dimethyl phthalate	34341	--
Di-n-butyl phthalate	39110	0.7
Di-n-octyl phthalate	34596	0.14
Fluoranthene	34376	0.28
Naphthalene	34696	0.14
Phenanthrene	34461	0.21
Phenol	34466	0.1
Pyrene	34469	0.21
Pyridine	77045	0.007

-- Not available

2. Alternate concentration limits may be established where the Permittee can determine a constituent will not pose a substantial hazard to human health or the environment.
  - a. Where a hazardous constituent has a standard in 35 IAC Part 620, the facility must apply for an adjusted standard as outlined in Section 28.1 of the Environmental Protection Act (Act) or reapply once corrective measures have been implemented pursuant to 35 IAC 620.450.
  - b. For those hazardous constituents without a 35 IAC 620 standard, the alternative concentration limits proposed by the facility must be approved by the Illinois EPA.

#### **E. GROUNDWATER CORRECTIVE ACTION PROGRAM**

The Permittee shall conduct the Groundwater Corrective Action Program and perform groundwater monitoring detailed in this section, in accordance with the following:

1. The Permittee shall determine the groundwater quality for the Observation wells and the GMZ Boundary Wells designated in Condition III.D.1 for the hazardous constituents listed in Condition III.E.1 above.
2. In accordance with 35 IAC 620.250, a GMZ is a three-dimensional region containing groundwater being managed to mitigate impairment caused by the release of contaminants from the facility. The GMZ must be monitored and maintained as follows:
  - a. The GMZ horizontal and vertical extent is monitored with program monitoring wells measuring concentrations of hazardous constituents in Condition III.D.1 in groundwater.

- i. The following groundwater monitoring wells shall define the outermost horizontal extent of the approved GMZ: G005, G006, G008, G021, G023, G04R, G045, G055, G059, G062, R063, G067, G068, G073, G079, G084, G111, G112, G32R, G37, G5B, G35A, G35B, G500, G69R, G74L, G75L, G76L, G91, G92, G93L, H31B, RG36, R302, G303, G503, G504, G505.
    - ii. The vertical boundaries of the GMZ shall range from the approximate top of the uppermost aquifer (30 feet bgs) to the top of the bedrock surface at the BP Main Plant facility. As required by Condition IV.C.1.b, wells must be proposed to better define the vertical extent.
  - b. The results of monitoring the GMZ shall be submitted to the Illinois EPA semi-annually in accordance with the schedule found in Condition III.I.2.
  - c. The GMZ expires when all groundwater monitoring wells within the GMZ have attained the appropriate Class I concentration limits that comprise the groundwater protection standard found in Condition III.D.1.
  - d. The appropriate Class I concentration limits shall be considered attained when groundwater monitoring results meet the appropriate concentration limit for two (2) consecutive years. A Mann-Kendall trend analysis based on eight (8) quarters of data shall be submitted for Illinois EPA review and approval unless otherwise approved.
  - e. An evaluation of the GMZ shall be submitted in a report for Illinois EPA review and approval, a minimum of every five (5) years, in accordance with the guidance document, "Re-evaluation of Groundwater Management Zones at RCRA Facilities" found at the Illinois EPA website. Statistical analysis required by III.H must also be included.
3. The Groundwater Corrective Action Program shall control the horizontal and vertical flow in the vertical column of water present in the uppermost aquifer beneath the facility and monitor the position and rate of migration of the hazardous constituents released to groundwater as follows:
  - a. The pumping from the Gradient Control Wells (also referred to as Cone of Depression (COD) wells) shall maintain the cone of depression to ensure groundwater flow is adequately controlled in the uppermost aquifer, except as provided in Condition III.A.
  - b. The pumping rate from each Gradient Control Well (COD well) shall be recorded each business day. This data shall be used to calculate the monthly average withdrawal rate for the Gradient Control System.

4. The Permittee shall monitor the groundwater horizontal and vertical gradients in the uppermost aquifer beneath the facility.
5. The Permittee shall record the following measurements and submit to the Illinois EPA semi-annually as required by Condition III.I.2.
  - a. A record of the amount of groundwater withdrawn each day by the Gradient Control Wells (COD wells).
  - b. Quarterly monitoring of the piezometric head at wells identified in Condition III.C.1 and III.C.2 above to demonstrate that groundwater flow is properly controlled throughout the contaminated area requiring corrective action.
  - c. The measured thickness of hydrocarbon product encountered at each well identified in Condition III.C.1 and III.C.2.
6. The Permittee shall determine the groundwater flow rate (i.e., seepage velocity in ft/day) and direction in the uppermost aquifer at least annually from the monitoring wells listed in Condition III.C.1.
7. The groundwater quality in the uppermost aquifer shall be monitored on a quarterly or semi-annual basis at each of the wells identified in Condition III.C.1, and submitted to the Illinois EPA semi-annually, as identified in Condition III.I.2.
8. If the groundwater gradient is not maintained, as required by Condition III.E.3, or contamination is migrating beyond the GMZ Boundary Wells, the Permittee shall submit an application for a permit modification, as required by Condition III.J.
9. Prior to making any changes on-site which might affect the overall program associated with controlling the groundwater flow as required by Condition III.E.3 of the permit (i.e., maintain and verify an inward gradient), the Permittee must obtain written permission from the Illinois EPA. Detailed information regarding the changes shall be submitted to the Illinois EPA at least 120 days prior to the date that the change is to be made. Disapproval or approval with modifications of any written requests for changes shall be subject to the appeal provisions of Section 40 of the Act.
10. The Permittee shall maintain all equipment associated with withdrawal and treatment of water withdrawn from the uppermost aquifer to adequately control groundwater flow. This includes maintenance of any pollution control equipment (i.e., air pollution and water pollution control equipment) necessary for these activities.
11. The Permittee must continue to pursue access to the off-site property where former wells G060 and G061 are located for the purposes of properly abandoning these wells. Once access to the property is obtained, the facility must submit certification that plugging and abandonment of the well(s) was carried out in accordance with the approved procedures to Illinois EPA and the appropriate State Agencies in accordance

with Condition III.C.6. Until the wells are abandoned, the status and details of any efforts must be reported in the reports required by Condition III.I.2.

12. In the event that the Permittee is unable to demonstrate an inward groundwater gradient based upon groundwater elevation data in the Southeast portion of the GMZ, and/or in the vicinity of Land Reuse Area 9 for the GMZ (western portion of the GMZ), during a monitoring event, the Permittee will take the following actions:
  - a. The Permittee will review the groundwater quality data for the most recent sampling event for the Sentry Observation Monitoring Wells (G042R, G083R, G501, and G502) for the southeast corner of the GMZ, and/or Demonstration Wells (R032, R034, R035, and G304) for the vicinity of Land Reuse Area 9.
  - b. If the groundwater quality data from the most recent sampling event for the Sentry Observation Monitoring Wells meets the permit-defined requirements for VOCs, the Permittee shall include a summary of the results in the semi-annual report required by Condition III.I.2.
  - c. If the groundwater quality data from the most recent sampling event for the Sentry Observation Monitoring Wells or Demonstration Wells, does not meet permit-defined requirements for VOCs, the Permittee shall:
    - i. Notify the Illinois EPA in writing within seven (7) days of the date the determination is made.
    - ii. Perform a "Resampling Event" for the Sentry Observation Monitoring Wells within thirty (30) days of the date the determination is made.
  - d. If the groundwater quality data from the Resampling Event for the Sentry Observation Monitoring Wells and/or Demonstration Wells required by Condition III.E.12.c meets permit-defined requirements for VOCs, the Permittee shall include a summary of the results in the semi-annual report required by Condition III.I.2.
  - e. If the groundwater quality data from the Resampling Event for the Sentry Observation Monitoring Wells and/or Demonstration Wells required by Condition III.E.12.c does not meet the permit-defined requirements for VOCs, the Permittee shall:
    - i. Notify the Illinois EPA in writing within seven (7) days of the date the determination is made.
    - ii. Initiate "Contingency Monitoring" consisting of monthly groundwater gauging and monitoring for a period of three (3) months for the Southeast portion of the GMZ, and/or in the vicinity of Land Reuse Area 9, as follows:

1. For the Southeast portion of the GMZ, the groundwater gauging performed for Contingency Monitoring shall use at a minimum the following nine (9) monitoring wells in order to develop a groundwater flow gradient. For the southeast portion of the GMZ: wells G301, G305, R042, R083, G501, G502, G005, G92, and G112. For the vicinity of Land Reuse Area 9: wells R032, R034, R035, and G304.
  2. For the vicinity of Land Reuse Area 9, the groundwater gauging and monitoring performed for Contingency Monitoring shall use at a minimum the following four (4) monitoring wells in order to develop a groundwater flow gradient for the vicinity of Land Reuse Area 9 of the GMZ: R032, R034, R035, and G304.
  3. The Contingency Monitoring shall include monthly groundwater sampling for a period of three (3) months for the Sentry Observation Monitoring Wells R042, R083, G501, and G502 for the southeast area, and/or the Demonstration Wells R032, R034, R035 and G304 for Land Reuse Area 9.
- f. If the three (3) monthly groundwater gauging potentiometric maps from Contingency Monitoring demonstrate an inward gradient, and the groundwater quality data from the three (3) monthly sampling events for the Sentry Observation Monitoring Wells and/or Demonstration Wells required by Condition III.E.12.e.ii meets the permit-defined requirements for VOCs, the Permittee shall include a summary of the results in the semi-annual report required by Condition III.I.2.
- g. If the monthly groundwater gauging potentiometric maps for Contingency Monitoring do not demonstrate an inward gradient, and the groundwater quality data from the sampling event for the Sentry Observation Monitoring Wells and/or Demonstration Wells required by Condition III.E.12.e.ii does not meet the permit-defined requirements for VOCs, the Permittee shall submit a written report to the Illinois EPA:
- i. Notify the Illinois EPA in writing within seven (7) days of the date the determination is made.
  - ii. Submit a written report to the Illinois EPA within thirty (30) days of the date the determination is made describing the actions to be taken.
  - iii. Install additional well(s) at locations approved by the Illinois EPA.
  - iv. Implement an Illinois EPA-approved groundwater monitoring program for the new wells on a monthly basis for three (3) months.

- v. Evaluate Contingent Corrective Measures to address the potential for off-site contaminant migration from the southeast corner, including but not limited to, modification of pumping rates at the Gradient Control Wells, rehabilitation of one or more Gradient Control Wells to address loss of hydraulic capacity, supplemental groundwater investigation, and/or in-situ technologies.
    - h. Design and implement Contingent Corrective Measures approved by the Illinois EPA.
- 13. The Permittee shall operate, expand and use the Bioremediation Systems and/or other technologies approved by the Illinois EPA in order to remediate hydrocarbons and refinery product in accordance with Condition II.D of the Corrective Action Section of the Permit and 35 IAC Parts 620, 724, and 742. Historical information related to the development of these remediation systems is summarized in Attachment E. Current information related to the remediation activities of hydrocarbons and refinery product must be submitted within reports required by Condition II.M.1. A discussion must also be provided in reports required by Condition III.I.6.
- 14. Semi-annual evaluations for the indoor inhalation exposure route must be provided for exceedances of 35 IAC Part 620 and screening levels identified in Table H of Appendix B in 35 IAC Part 742 at the groundwater monitoring wells located at the property boundary and at any off-site locations. Screening levels for the current type of property use shall be used.
  - a. Identify any homes or buildings potentially impacted by the exceedance and evaluate, in accordance with 35 IAC Part 742, if the indoor inhalation pathway is complete by conducting site-specific evaluations based on the most recent water level, building-specific construction information if known, known occupancy and any other site-specific factors, as appropriate and applicable, at each building.
  - b. If the evaluation demonstrates that the indoor inhalation pathway is incomplete, the Permittee shall include the demonstration in the semi-annual report required by Condition III.I.2.
  - c. If the evaluation demonstrates that the indoor inhalation pathway is complete, the Permittee must submit the evaluation and propose additional corrective action within thirty (30) days of the discovery of the exceedance for the Illinois EPA review and approval.
  - d. A new evaluation is required for each sampling to determine whether screening levels are exceeded.



**F. GROUNDWATER ELEVATIONS**

1. The Permittee shall determine the groundwater surface elevation referenced to mean sea level (MSL) at each well at least quarterly and each time groundwater is sampled in accordance with Condition III.I.3.
2. The Permittee shall report the surveyed elevation of stick-up and ground surface referenced to MSL once every five (5) years or at the request of the Illinois EPA, or whenever the elevation changes in accordance with Condition III.I.9.
3. Elevation, as referenced to MSL, of the bottom of each monitoring well (STORET 72020), is to be reported at least annually in accordance with Condition III.I.10. The mandatory measurement shall be taken during the second quarter sampling event each year.

**G. SAMPLING AND ANALYSIS PROCEDURES**

The Permittee shall follow the techniques and procedures described in Exhibit C-1 of the approved permit application, except as modified below, when obtaining and analyzing samples from the groundwater monitoring wells described in Condition III.C.1:

1. Samples shall be collected by the techniques described for low-flow sample collection in Section 2.2 of Exhibit C-1.
2. Samples shall be preserved, shipped and handled in accordance with the procedures specified in Section 2.2 of Exhibit C-1.
3. Samples shall be analyzed according to the procedures specified in Section 7 of Appendix B. Groundwater analysis must be in accordance with the most current version of the applicable methods found in USEPA's "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," Third Edition (SW-846) and finalized updates.
4. Samples shall be tracked and controlled using the chain-of-custody procedures specified in Section 2.2 of Exhibit C-1.

**H. STATISTICAL METHODS**

The Permittee shall evaluate the quality of groundwater samples collected during semi-annual sampling events identified in Condition III.E to determine trends and demonstrate effectiveness of corrective action as follows:

1. The GMZ Boundary Wells and Observation Monitoring Wells, as identified in Condition III.C.1, shall be used for statistical evaluations of groundwater quality data as follows:
  - a. The groundwater quality data shall be statistically evaluated annually for the constituents identified in Condition III.D.1, in accordance with Exhibit C-3 of the approved permit application.

- b. The results of the statistical evaluations shall be discussed and included within the required 5-year GMZ Evaluation reports required by Condition III.I.11.

**I. REPORTING AND RECORDKEEPING**

1. The Permittee shall enter all monitoring, testing and analytical data obtained in accordance with Conditions III.D, III.E, and III.F into the operating record.
2. Samples collected to meet the requirements of the groundwater monitoring program described in Conditions III.D. and III.E shall be collected and reported as identified in the table below. The results of the analyses conducted on the groundwater quality samples shall be submitted in accordance with this schedule. All additional data collected for the groundwater monitoring program as specified in Conditions III.D, III.E and III.F shall also be submitted to the Illinois EPA in accordance with this schedule.

<u>Sampling Event of Calendar Year</u>	<u>Samples to be Collected During the Months of</u>	<u>Results Submitted to the Illinois EPA by the Following</u>
First Quarter	January - February	August 1
Second Quarter	April - May	August 1
Third Quarter	July - August	February 1
Fourth Quarter	October - November	February 1

3. Groundwater surface elevation data measured pursuant to Condition III.F.1, shall be collected at least quarterly and submitted to the Illinois EPA as identified in Condition III.I.2.
4. Groundwater withdrawal rates collected and calculated pursuant to Condition III.E.5.a shall be submitted semi-annually in accordance with the schedule identified in Condition III.I.2.
5. Gradient control measurements collected pursuant to Condition III.E.5.b shall be collected at least quarterly and submitted to the Illinois EPA semi-annually as identified in Condition III.I.2.
6. Free product thickness data measured pursuant to Condition III.E.5.c, and reduction of hydrocarbons and refinery product data collected in accordance with Condition II.D of the Corrective Action Section, shall be collected at least quarterly and submitted to the Illinois EPA as identified in Condition III.I.2. Reporting information must also be included in Corrective Action Progress Reports required by Condition II.M.1.
7. The groundwater flow rate and direction, determined pursuant to Condition III.E.6, shall be submitted annually as a part of the first and second semi-annual reports as identified in Condition III.I.2.

8. Groundwater quality samples collected to meet the requirements of Condition III.E.1 shall be collected semi-annually and submitted to the Illinois EPA as identified in Condition III.I.2. The extent of dissolved contamination must be depicted on figures as needed to define the extent of contamination.
9. The Permittee shall report the surveyed elevation, as required by Condition III.F.2, of the top of the well casing ("stick-up"), referenced to MSL, in accordance with the following schedule:
  - a. For wells identified in Condition III.C.1 above, every five (5) years (during the second semi-annual sampling event), or at the request of the Illinois EPA, or whenever the elevation changes.
  - b. For any new wells, at the time of installation and reported in the as-built diagrams. Subsequent measurements shall be made every five (5) years (during the second quarter sampling event) or whenever the elevation changes.
10. Elevation of the bottom of each monitoring well identified in Condition III.C.1, referenced to MSL, is to be reported annually. This measurement shall be taken during the second quarter sampling event (Storet 72020).
11. Statistical evaluations, as required by Condition III.H, shall be submitted to the Illinois EPA as a part of the required 5-year GMZ Evaluation reports required by Condition III.E.2.e.
12. Information required by Conditions III.I.2, III.I.3, III.I.9 and III.I.10 must be submitted in an electronic format. The information is to be submitted as fixed-width text files formatted as found in the form, "Formatting Requirements for the 01 (and 02) Record of the Electronically Submitted Groundwater and Leachate Data" (LPC 160) located on the Illinois EPA website and in accordance with the schedule found in Condition III.I.2. Additional guidance regarding the submittal of the information in an electronic format can be found at the Illinois EPA website.
13. The Permittee shall submit a completed "RCRA Facility Groundwater, Leachate and Gas Reporting Form" (LPC 592) as a cover sheet for any notices or reports required by the facility's permit for identification purposes. Only one (1) copy of the LPC 592 must accompany the submittal. However, the Permittee must submit one (1) original and (excluding the groundwater and leachate monitoring results submitted in an electronic format) a minimum of two (2) copies of each notice or report to the Illinois EPA. The form is not to be used for permit modification requests.
14. The Permittee shall report all information to the Illinois EPA in a form which can be easily reviewed. All submittals must contain tables of data, drawings, and text (as necessary) to accurately describe the information contained in the submittal.

15. The Permittee shall submit a written report to the Illinois EPA, in accordance with the schedule found in Condition III.I.2, which discusses the effectiveness of the Groundwater Corrective Action Program. At a minimum, the report must:
  - a. Address the information requirements in Conditions III.C, III.D, III.E and III.F.
  - b. Evaluate the effectiveness of the hydraulic control and contaminant removal from the GMZ including the information required by Condition III.D.
  - c. Provide a discussion of any change in the quality of groundwater beneath the facility which has resulted from the corrective action.
  
16. If the Permittee evaluation, when required by Condition III.E.12, determines verification of contaminant control is necessary due to a lack of inward gradient, the Permittee will complete the following reporting and notification requirements in III.E.12:
  - a. Notify the Illinois EPA in writing within seven (7) days of the date the determination resampling is required.
  - b. Notify the Illinois EPA in writing within seven (7) days of the date the determination is made Contingency Monitoring is required.
  - c. Notify the Illinois EPA in writing within seven (7) days of the date the determination is made Contingency Monitoring does not meet the requirements for inward gradient and the permit-defined requirements for VOCs, the Permittee shall take steps to implement additional corrective measures as outlined in Condition III.E.12.g, and:
    - i. Notify the Illinois EPA in writing within seven (7) days of the date the determination is made.
    - ii. Submit a written report to the Illinois EPA within thirty (30) days describing the actions to be taken.
    - iii. Take necessary actions to meet applicable groundwater standards at GMZ Boundary wells.
  
17. If the indoor inhalation exposure route evaluation required by Condition II.E.14 demonstrates that the indoor inhalation pathway is complete, the Permittee must submit the evaluation and propose additional corrective action within thirty (30) days of the discovery of the exceedance for the Illinois EPA review and approval
  
18. If the Permittee determines that groundwater flow is not being adequately controlled, and/or the contaminant control evaluations indicate contaminants are migrating beyond the GMZ boundaries, the Permittee shall:

- a. Notify the Illinois EPA in writing within seven (7) days of the date that this determination is made.
- b. Take actions as necessary to regain the control of groundwater flow as required by Condition III.E.3.
- c. Submit a written report to the Illinois EPA within thirty (30) days describing the actions taken to regain control of groundwater flow. In addition, the report must contain information which demonstrates that groundwater flow is being adequately controlled.
- d. Submit a request for permit modification to the Illinois EPA within sixty (60) days describing any changes which must be made to the corrective action program to ensure that the groundwater flow is adequately controlled.

**J. REQUEST FOR PERMIT MODIFICATION**

1. If the Permittee determines that the Groundwater Corrective Action Program required by this permit no longer satisfies the requirements of 35 IAC 724.201, the Permittee must, within ninety (90) days, submit an application for permit modification to the Illinois EPA, Bureau of Land, Permit Section, to make any appropriate changes to the program which will satisfy the regulations.
2. Conditions in this section of the permit may be modified by the Illinois EPA in accordance with 35 IAC 702.183 and 705.128 if there is cause for such modification, as defined in 35 IAC 702.184. Causes for modification in this section of the regulations include, but are not limited to, alterations to the permitted facility, additional information which would have justified the application of different permit conditions at the time of permit issuance, and new regulations.

## SECTION IV: SPECIAL CONDITIONS

### A. REQUIRED FORMS

1. The Permittee shall provide a completed Illinois EPA permit application form LPC-PA23 with all additional information, permit modifications, and permit applications that are submitted to the Illinois EPA Bureau of Land.
2. The Permittee shall submit a current 39(i) certification and supporting documentation with all applications for a permit.

Note: If the Permittee desires to add additional staff as delegated signatories for future modifications, certifications, etc., the Permittee must meet the requirements of 35 IAC 702.126 and the delegated signatory individuals should also send in an individual 39(i) certification form.

### B. REPOSITORY

1. The Permittee shall maintain a repository at the Wood River Public Library, located at 326 E. Ferguson Avenue, Wood River, Illinois. The following information shall be sent to the repository:
  - a. A copy of the approved renewed RCRA corrective action permit.
  - b. All permit applications and permit modification requests.
  - c. All Illinois EPA responses to modification requests made to the RCRA corrective action permit (Log No. B-147R2).

### C. COMPLIANCE SCHEDULE

1. The following revisions must be met with regards to groundwater:
  - a. Within ninety (90) days of the effective date of this permit, install a new or replacement well or well pairs for G078, G030, G97L, and G87L to monitor the previously screened interval. It is noted only G078 no longer exists because the well was damaged.
  - b. Within ninety (90) days of the effective date of this permit, propose monitoring wells with screens positioned to adequately define the vertical boundary of the GMZ in Condition II.E.2.a.
  - c. A Water Well Survey (WWS) must be provided within ninety (90) days of the effective date of this permit to include a WWS as described in 35 IAC 1600.210 and the guidance document entitled, "Well Survey Procedures at Bureau of Land Permitted Facilities" provided as Attachment G to the permit.
2. The Permittee must prepare and submit an updated cost estimate for the completion of any corrective action required under this permit in order to provide financial assurance for the approved amount of that cost estimate within ninety (90) days of the date of the effective date of this permit, as required in accordance with 35 IAC 724.201. This cost estimate must include a minimum of 10% contingency for all items necessary to complete corrective action.

**SECTION V: STANDARD CONDITIONS****GENERAL REQUIREMENTS**

1. **EFFECT OF PERMIT.** The existence of a RCRA permit shall not constitute a defense to a violation of the Environmental Protection Act (Act) or Subtitle G, except for development, modification or operation without a permit. Issuance of this permit does not convey property rights or any exclusive privilege. Issuance of this permit does not authorize any injury to persons or property or invasion of other private rights, or infringement of state or local law or regulations. (35 Illinois Administrative Code (IAC) 702.181)
2. **PERMIT ACTIONS.** This permit may be modified, reissued or revoked for cause as specified in 35 IAC 703.270 through 703.273 and 702.186. The filing of a request by the Permittee for a permit modification or reissuance, or a notification of planned changes or anticipated noncompliance on the part of the Permittee does not stay the applicability or enforceability of any permit condition. (35 IAC 702.146)
3. **SEVERABILITY.** The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby. (35 IAC 705.202)
4. **PERMIT CONDITION CONFLICT.** In case of conflict between a special permit condition and a standard condition, the special condition will prevail. (35 IAC 702.160)
5. **DUTY TO COMPLY.** The Permittee shall comply with all conditions of this permit except for the extent and for the duration such noncompliance is authorized by an emergency permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; permit revocation or modification; or for denial of a permit renewal application. (35 IAC Code 702.141 and 703.242)
6. **DUTY TO REAPPLY.** If the Permittee wishes to continue an activity allowed by this permit after the expiration date of this permit, the Permittee must apply for a new permit at least 180 days before this permit expires, unless permission for a later date has been granted by the Illinois EPA. (35 IAC 702.142 and 703.125)
7. **PERMIT EXPIRATION.** This permit and all conditions herein will remain in effect beyond the permit's expiration date if the Permittee has submitted a timely, complete application (see 35 IAC 703.181-703.209) and through no fault of the Permittee the Illinois EPA has not issued a new permit as set forth in 35 IAC 702.125.
8. **NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE.** It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. (35 IAC 702.143)

9. **DUTY TO MITIGATE.** In the event of noncompliance with the permit, the Permittee shall take all reasonable steps to minimize releases to the environment and shall carry out such measures as are reasonable to prevent significant adverse impacts on human health or the environment. (35 IAC 702.144)
10. **PROPER OPERATION AND MAINTENANCE.** The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance include effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory, and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit. (35 IAC 702.145)
11. **DUTY TO PROVIDE INFORMATION.** The Permittee shall furnish to the Illinois EPA, within a reasonable time, any relevant information which the Illinois EPA may request to determine whether cause exists for modifying, revoking and reissuing or terminating this permit, or to determine compliance with this permit. The Permittee shall also furnish to the Illinois EPA, upon request, copies of records required to be kept by this permit. (35 IAC 702.148)
12. **INSPECTION AND ENTRY.** The Permittee shall allow an authorized representative of the Illinois EPA, upon the presentation of credentials and other documents as may be required by law, to:
  - a. Enter at reasonable times upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
  - b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
  - c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
  - d. Sample or monitor, at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the appropriate Act, any substances or parameters at any location. (35 IAC 702.149)
13. **MONITORING AND RECORDS.** (35 IAC 702.150)
  - a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The method used to obtain a representative sample of the waste must be the appropriate method from 35 IAC 721, Appendix A. Laboratory methods must be those specified in Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846, latest versions; Methods for Chemical Analysis



of Water and Wastes, EPA-600/4-79-020, latest versions; or an equivalent method as specified in the approved Waste Analysis Plan.

- b. The Permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports and records required by this permit, and records of all data used to complete the application for this permit for a period of at least three (3) years from the date of the sample, measurement, report or application. These periods may be extended by request of the Illinois EPA at any time. The Permittee shall maintain records from all groundwater monitoring wells and associated groundwater surface elevations, for the active life of the facility, and for disposal facilities for the post-closure care period as well.
  - c. Records of monitoring information shall include:
    - i. The date(s), exact place, and time of sampling or measurements;
    - ii. The individual(s) who performed the sampling or measurements;
    - iii. The date(s) analyses were performed;
    - iv. The individual(s) who performed the analyses;
    - v. The analytical technique(s) or method(s) used; and
    - vi. The result(s) of such analyses. (35 IAC 702.150)
14. **REPORTING PLANNED CHANGES.** The Permittee shall give written notice to the Illinois EPA as soon as possible of any planned physical alterations or additions to the permitted facility. In general, proposed changes to the facility will need to be submitted to the Illinois EPA as permit modification request that complies with the requirements of 35 IAC 703.280. (35 IAC 702.152(a))
15. **CONSTRUCTION CERTIFICATION.** For a new hazardous waste management facility, the permittee shall not commence treatment, storage, or disposal of hazardous waste; and for a facility being modified the Permittee shall not treat, store or dispose of hazardous waste in the modified portion of the facility, until:
- a. The Permittee has submitted to the Illinois EPA by certified mail or hand delivery a letter signed by the Permittee and a registered professional engineer stating that the facility has been constructed or modified in compliance with the permit; and
  - b.
    - 1. The Illinois EPA has inspected the modified or newly constructed facility and finds it is in compliance with the condition of the permit; or
    - 2. If, within fifteen (15) days of the date of submission of the letter in paragraph (a), the Permittee has not received notice from the Illinois EPA of its intent to

inspect, prior inspection is waived, and the Permittee may commence treatment, storage, or disposal of hazardous waste. (35 IAC 703.247)

16. **ANTICIPATED NONCOMPLIANCE.** The Permittee shall give advanced written notice to the Illinois EPA of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements, regulations, or the Act. (35 IAC 702.152(b))
17. **TRANSFER OF PERMITS.** This permit may not be transferred by the Permittee to a new owner or operator unless the permit has been modified or reissued pursuant to 35 IAC 703.260(b) or 703.272. Changes in the ownership or operational control of a facility must be made as a Class 1 modification with the prior written approval of the Illinois EPA. The new owner or operator shall submit a revised permit application no later than ninety (90) days prior to the scheduled change. (35 IAC 703.260)
18. **MONITORING REPORTS.** Monitoring results shall be reported at the intervals specified in the permit. (35 IAC 702.152(d))
19. **COMPLIANCE SCHEDULES.** Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than specified in 35 IAC 702.162. (35 IAC 702.152(e))
20. **TWENTY-FOUR HOUR REPORTING.**
  - a. The Permittee shall report to the Illinois EPA any noncompliance with the permit which may endanger human health or the environment. Any such information shall be reported orally within twenty-four (24) hours from the time the Permittee becomes aware of the following circumstances. This report shall include the following:
    - i. Information concerning the release of any hazardous waste that may cause an endangerment to public drinking water supplies.
    - ii. Information concerning the release or discharge of any hazardous waste or of a fire or explosion at the HWM facility, which could threaten the environment or human health outside the facility.
  - b. The description of the occurrence and its cause shall include:
    - i. Name, address, and telephone number of the owner or operator;
    - ii. Name, address, and telephone number of the facility;
    - iii. Date, time, and type of incident;
    - iv. Name and quantity of material(s) involved;
    - v. The extent of injuries, if any;

- vi. An assessment of actual or potential hazards to the environment and human health outside the facility, where applicable; and
  - vii. Estimated quantity and disposition of recovered material that resulted from the incident.
- c. A written submission shall also be provided within five (5) days of the time the Permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance including exact dates and times and if the noncompliance has not been corrected; the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance. The Illinois EPA may waive the five (5) day written notice requirement in favor of a written report within fifteen (15) days. (35 IAC .152(f) and 703.245(b)).
21. **OTHER NONCOMPLIANCE.** The Permittee shall report all instances of noncompliance not otherwise required to be reported under Standard Conditions 16, 19 and 20, at the time monitoring reports, as required by this permit, are submitted. The reports shall contain the information listed in Standard Condition 20. (35 IAC 702.152(g)).
22. **OTHER INFORMATION.** Where the Permittee becomes aware that it failed to submit any relevant facts in the permit application or submitted incorrect information in a permit application or in any report to the Illinois EPA, the Permittee shall promptly submit such facts or information. (35 IAC 702.152(h))
23. **SUBMITTAL OF REPORTS OR OTHER INFORMATION.** All written reports or other written information required to be submitted by the terms of this permit shall be sent to:
- Illinois Environmental Protection Agency  
Bureau of Land  
Permit Section - #33  
1021 North Grand Avenue East  
Post Office Box 19276  
Springfield, Illinois 62794-9276
24. **SIGNATORY REQUIREMENT.** All permit applications, reports or information submitted to the Illinois EPA shall be signed and certified as required by 35 IAC 702.126. (35 IAC .151)
25. **CONFIDENTIAL INFORMATION.** Any claim of confidentiality must be asserted in accordance with 35 IAC 702.103 and 35 IAC Part 161.
26. **DOCUMENTS TO BE MAINTAINED AT FACILITY SITE.** The Permittee shall maintain at the facility, until closure is complete, the following documents and amendments, revisions, and modifications to these documents:
- a. Post-closure plan as required by 35 IAC 724.218(a) and this permit.

- b. Cost estimate for facility closure as required by 35 IAC 724.242(d) and this permit.
- c. Operating record as required by 35 IAC 724.173 and this permit.
- d. Inspection schedules as required by 35 IAC 724.115(b) and this permit.

#### **GENERAL FACILITY STANDARDS**

- 27. **GENERATOR REQUIREMENTS.** Any hazardous waste generated at this facility shall be managed in accordance with the generator requirements at 35 IAC Part 722.
- 28. **SECURITY.** The Permittee shall comply with the security provisions of 35 IAC 724.114(b) and (c).
- 29. **GENERAL INSPECTION REQUIREMENTS.** The Permittee shall follow the approved inspection schedule. The Permittee shall remedy any deterioration or malfunction discovered by an inspection as required by 35 IAC 724.115(c). Records of inspections shall be kept as required by 35 IAC 724.115(d).
- 30. **CLOSURE REQUIREMENTS FOR ACCUMULATION AREAS.** The Permittee shall close containers storage areas, tanks, drip pads, or containment buildings used for the accumulation of on-site generated hazardous waste in accordance with the requirements identified at 35 IAC 722.117(a)(8).

#### **PREPAREDNESS AND PREVENTION**

- 31. **DESIGN AND OPERATION OF FACILITY.** The Permittee shall maintain and operate the facility to minimize the possibility of fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste constituents to air, soil, or surface water which could threaten human health or the environment. (35 IAC 724.131)
- 32. **REQUIRED EQUIPMENT.** The Permittee shall equip the facility with the equipment set forth in the approved contingency plan, as required by 35 IAC 724.132.
- 33. **TESTING AND MAINTENANCE OF EQUIPMENT.** The Permittee shall test and maintain the equipment specified in the contingency plan and this permit as necessary to assure its proper operation in time of emergency. Such testing and maintenance activities are set forth in the approved inspection schedule. (35 IAC 724.133)
- 34. **ACCESS TO COMMUNICATIONS OR ALARM SYSTEM.** The Permittee shall maintain access to the communications or alarm system as required by 35 IAC 724.134.
- 35. **REQUIRED AISLE SPACE.** The Permittee shall maintain aisle space as required by 35 IAC 724.135 and National Fire Protection Association (NFPA) requirements.
- 36. **ARRANGEMENTS WITH STATE AND LOCAL AUTHORITIES AND EMERGENCY RESPONSE CONTRACTORS.** The Permittee shall attempt to make emergency response

arrangements with State and local authorities and agreements with State emergency response teams and emergency response contractors and equipment suppliers as required by 35 IAC 724.137. If State or local officials refuse to enter in preparedness and prevention arrangements with the Permittee, the Permittee must document this refusal in the operating record.

### **RECORD KEEPING**

37. **OPERATING RECORD.** The Permittee shall maintain a written operating record at the facility in accordance with 35 IAC 724.173.

### **POST-CLOSURE**

38. **CARE AND USE OF PROPERTY.** The Permittee shall provide post-closure care for the facility as required by 35 IAC 724.217 and in accordance with the approved post-closure plan.
39. **AMENDMENT TO POST-CLOSURE PLAN.** The Permittee must amend the post-closure plan whenever a change in the facility operation plans, or facility design affects the post-closure plan or when an unexpected event has occurred which has affected the post-closure plan pursuant to 35 IAC 724.218(d).
40. **COST ESTIMATE FOR POST-CLOSURE.** The Permittee's original post-closure cost estimate, prepared in accordance with 35 IAC 724.244, must be:
- a. Adjusted for inflation either sixty (60) days prior to each anniversary of the date on which the first closure cost estimate was prepared or if using the financial test or corporate guarantee, within thirty (30) days after close of the firm's fiscal year.
  - b. Revised whenever there is a change in the facility's post-closure plan increasing the cost of closure.
  - c. Kept on record at the facility and updated. (35 IAC 724.244).
  - d. Maintained at the value approved by the Illinois EPA with annual adjustment for inflation and cannot be decreased unless approved by the Illinois EPA in a permit modification.
41. **FINANCIAL ASSURANCE FOR POST-CLOSURE CARE.** The Permittee shall demonstrate compliance with 35 IAC 724.245 by providing documentation of financial assurance, as required by 35 IAC 724.251, in at least the amount of the cost estimates required by Standard Condition 35. Changes in financial assurance mechanisms must be approved by the Illinois EPA pursuant to 35 IAC 724.245. Financial assurance documents submitted to the Illinois EPA should be directed to the following address:

Illinois Environmental Protection Agency  
Bureau of Land #24  
Financial Assurance Program  
1021 North Grand Avenue East  
P.O. Box 19276  
Springfield, IL 62794-9276

42. **INCAPACITY OF OWNERS OR OPERATORS, GUARANTORS, OR FINANCIAL INSTITUTIONS.** The Permittee shall comply with 35 IAC 724.248 whenever necessary.

## SECTION VI: REPORTING AND NOTIFICATION REQUIREMENTS

The reporting and notification requirements of each section of the permit are summarized below. This summary table is provided to "highlight" the various reporting and notification requirements of this permit but is not meant to supersede the requirements of the various sections of this permit.

Condition	Action	Due Date
<b>Section II: Corrective Action</b>		
H.4	Submit Phase I CMP Workplan.	Within 90 days of notification from Illinois EPA
I.1	Notification of Newly Identified SWMU/AOCs.	Within 30 days of discovery
I.3	Submittal of Assessment Plan for Newly Identified SWMU.	Within 90 days of request for plan from Illinois EPA
I.5	Submittal of SWMU Assessment Report for Newly Identified SWMU.	In accordance with schedule in assessment plan
J	Notification of Release from Existing SWMU.	Within 30 days of discovery
II.M.2	Annual Cost Estimate for Corrective Action	January 1 each year
II.L.1	Quarterly Corrective Action Progress Report: January – March April – June July-September October – December	May 1 August 1 November 1 March 1
II.L.2	Annual Report of Corrective Action Program Activities with Quarterly Report for October-December	March 1 of each year
II.L.3	Final Report for each parcel/area	As corrective action is completed
<b>Section III: Groundwater Corrective Action Program</b>		
C.3	Notification that well has been damaged or its structural integrity compromised.	Within 30 days of identification
C.5	Boring logs, construction diagrams and datasheets from installation and development of new/replaced well.	Within 30 days after well installed
C.2 General schedule for collection and reporting of groundwater data:		
Sampling Event of Calendar year	Collected During the Months of	Results Submitted to the Illinois EPA by the Following
First Quarter	January-February	August 1
Second Quarter	April-May	August 1

	Third Quarter Fourth Quarter	July-August October-November	February 1 February 1
I.3		Groundwater surface elevation data.	Quarterly as set forth in Condition III.I.2
I.4		Groundwater withdrawal rates.	Quarterly as set forth in Condition III.I.2
I.5		Gradient control measurements.	Semi-annually as set forth in Condition III.I.2
I.6		Free product thickness.	Semi-annually as set forth in Condition III.I.2 and quarterly per Condition II.M.1.
I.7		Groundwater flow rate and direction.	Annually as set forth in Condition III.I.2
I.8		Groundwater quality results.	Semi-annually as set forth in Condition III.I.2
I.9		The surveyed elevation of the top of well casing.	Every 5 years
I.10		Elevation of the bottom of each monitoring well.	Second quarter as set forth in Condition III.I.2
I.11		Report every 5 years the summary of annual statistical calculations	Every 5 years within GMZ evaluations
I.12		Electronic reporting of groundwater data	Semi-annually as set forth in Condition III.I.2
I.15		Report to Illinois EPA on effectiveness of corrective action program.	By August 1 of each year
I.16.a		Contaminants in Sentry Observation Wells or Demonstration Wells require resampling	Within 7 days of the determination
I.16.b		Contingency Monitoring is required	Within 7 days of the determination
I.16.c.i		Gradient is not maintained and VOCs are not met	Within 7 days of the date the determination is made
I.16.c.ii		Notify the Illinois EPA in writing describing the actions to be taken	Within 30 days
I.17		Submit an evaluation of the indoor inhalation pathway and propose additional corrective action.	Within 30 days of the discovery
I.18.a		Notify the Illinois EPA in writing that groundwater flow is not being adequately controlled	Within 7 days of the date the determination is made
I.18.b		Submit a report to Illinois EPA describing the actions taken to regain control of groundwater flow.	Within 30 days
I.18.c		Submit a request for permit modification to Illinois EPA describing	Within 60 days



	any changes to the corrective action program to regain control of groundwater flow.	
J.1	Modification of groundwater corrective action program.	Within 90 days of determination existing program does not meet the requirements of 35 IAC 724.201
<b>Section IV: Special Conditions</b>		
A.1	Submit LPC-PA23 form.	With all additional information, permit modifications, and permit applications
A.2	Submit 39i certification form.	With all permit applications
<b>Section V: Standard Conditions</b>		
6	Submit complete application for new permit	At least 180 days prior to permit expiration
11	Information requested by Illinois EPA and copies of records required to be kept by this permit.	Reasonable time
14	Notify Illinois EPA of planned physical alterations or additions.	As soon as possible
16	Notify Illinois EPA of changes which may result in permit noncompliance.	Advanced written notice to the Illinois EPA
17	Application for permit modification indicating permit is to be transferred.	90 days prior to change in ownership
20	Report to Illinois EPA any non-compliance which may endanger health or environment.	
	- via telephone	Within 24 hours after discovery
	- in writing	Within 5 days after discovery
21	Report all other instances of noncompliance.	At the time monitoring reports are submitted
34	Application for permit modification amending post-closure plan.	60 days prior to the proposed change in facility design or operation, or no later than 60 days after an unexpected event has occurred
35.a	Adjust post-closure cost estimates for inflation.	Within 60 days before anniversary date, or within 30 days after close of the firm's fiscal year.

35.b	Revision post-closure cost estimates.	As needed, within 90 days of discovery of revision
36	Change in financial assurance mechanism for post-closure.	As needed
37	Notify Illinois EPA of commencement of voluntary or involuntary bankruptcy proceedings.	Within 10 days after commencement of proceeding

## ATTACHMENTS



**ATTACHMENT A**  
**IDENTIFICATION OF APPROVED PERMIT APPLICATION**  
**ILLINOIS EPA NO. 1191150001**  
**USEPA NO. ILD980700967**  
**RCRA CORRECTIVE ACTION PERMIT LOG NO. B-147R2**



**ATTACHMENT A**  
**IDENTIFICATION OF APPROVED PERMIT APPLICATION**

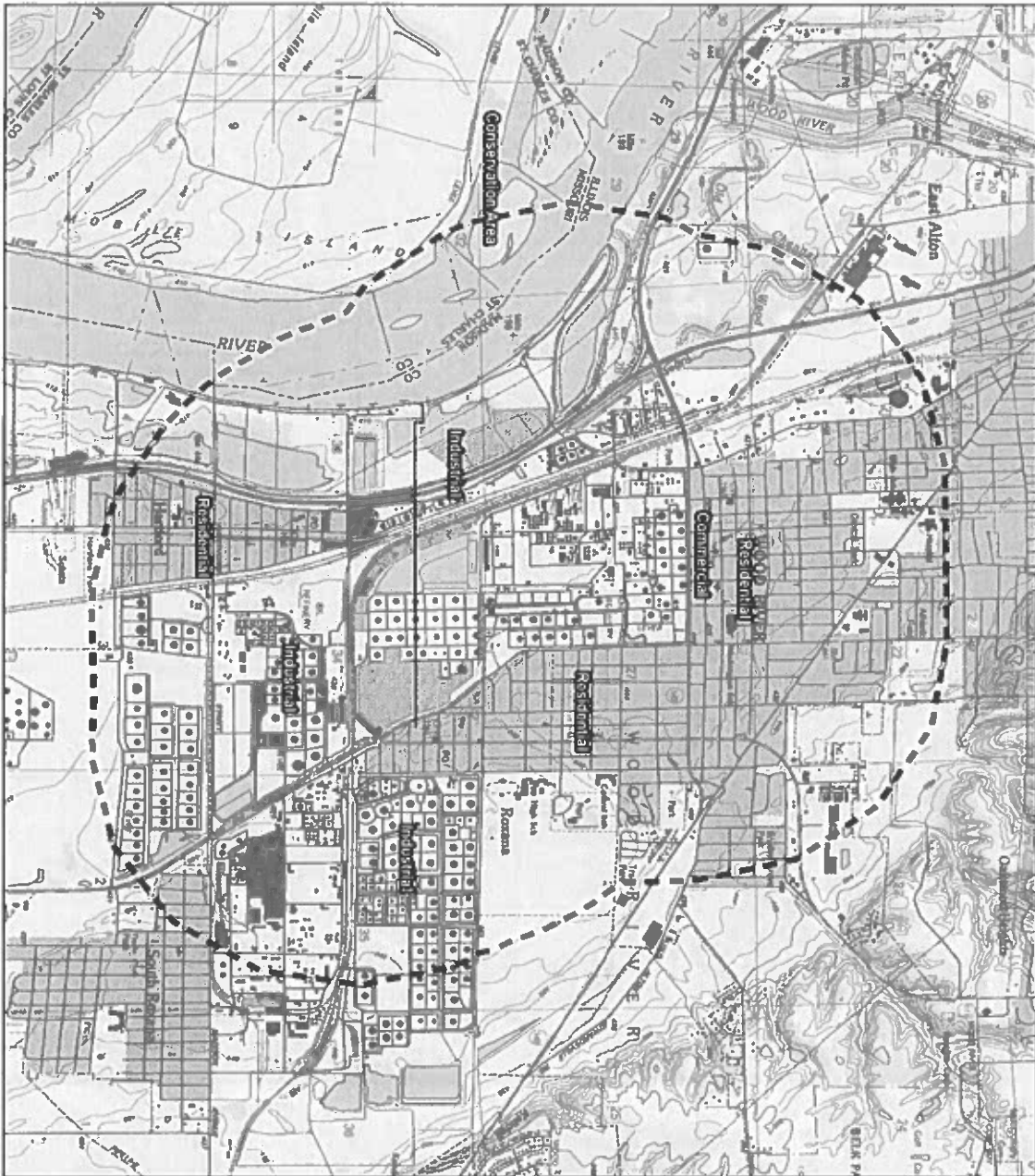
1. RCRA Post-Closure Renewal Application (Log No. B-147R2) dated October 8, 2020.
2. Additional Information for B-147R2- Replacement Pages submitted 1) Condition C.8.1.5 – Page 13 and 2) Exhibit C-1, Table 1- Page 4, dated April 28, 2022.
3. Time extension request for submittal of a response to the IEPA RCRA Permit Renewal Application NOD letter, dated July 5, 2024.
4. “Response to Illinois EPA Comments dated July 18, 2024” dated August 1, 2024.
5. Additional Information for B-147R2. Replacement pages, for Section C, dated August 29, 2024.





**ATTACHMENT B**  
**LOCATION MAP & DRAWING OF PERMITTED UNITS**  
**ILLINOIS EPA NO. 1191150001**  
**USEPA NO. ILD980700967**  
**RCRA CORRECTIVE ACTION PERMIT LOG NO. B-147R2**





**Legend**

- BP Main Plant Property - 1 mile
- BP Main Plant Property Boundary
- Boundary between Wood River and Hardwood

**FIGURE B-1**

**BP MAIN PLANT PROPERTY**  
+ 1 MILE TOPOGRAPHIC MAP  
WITH SURROUNDING LAND USE

**BP MAIN PLANT PROPERTY**  
WOOD RIVER, ILLINOIS

**wood.**  
1201 Centerwood Services  
Wood River, IL 62291

**bp**

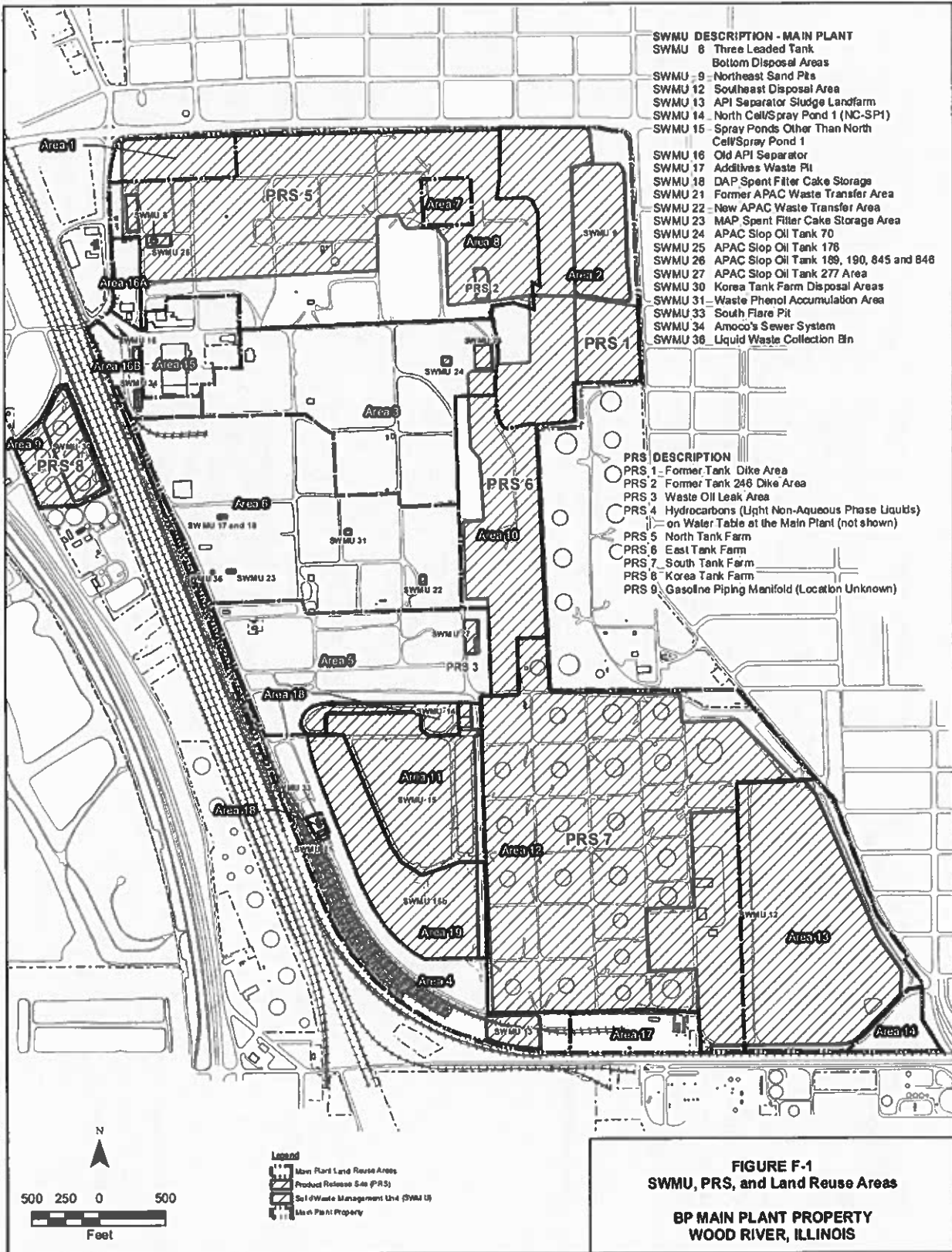
Scale: 1 inch = 2,000 feet

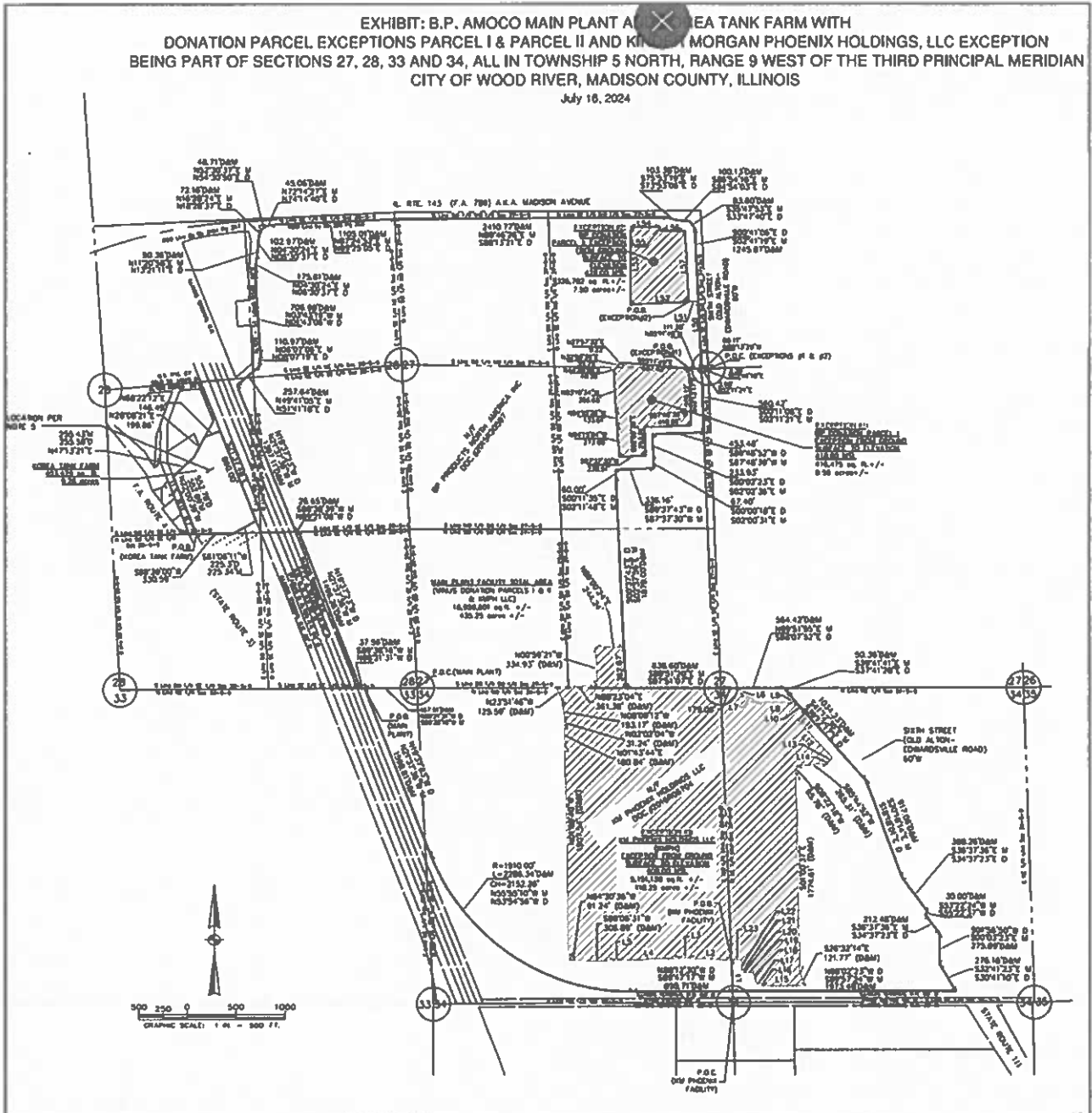
North Arrow

Scale bar: 2000, 1000, 0, 1000, 2000 Feet

1 inch = 2,000 feet

THIS MAP WAS PREPARED BY THE ENGINEERING DEPARTMENT OF THE BUREAU OF REVENUE AND CUSTOMS, U.S. DEPARTMENT OF THE TREASURY, IN ACCORDANCE WITH THE ACT OF MARCH 3, 1879, CHAP. 222, SECTION 2064, AND THE ACT OF MARCH 3, 1879, CHAP. 222, SECTION 2065, AS AMENDED.







**ATTACHMENT C**

**SUMMARY OF CORRECTIVE ACTION SUBMITTALS**

**ILLINOIS EPA NO. 1191150001**

**USEPA NO. ILD980700967**

**RCRA CORRECTIVE ACTION PERMIT LOG NO. B-147R2**





**ATTACHMENT C****SUMMARY OF CORRECTIVE ACTION SUBMITTALS**

The table below summarizes the plans/reports/documents submitted to Illinois EPA regarding the corrective action efforts at the BP/Main Plant facility in Wood River, Illinois.

## Note:

CCR = Current Conditions Report  
 GMZ = Groundwater Management Zone  
 NC-SP1 = North Cell of Spray Pond 1

RFI = RCRA Facility Investigation  
 SFP = South Flare Pit  
 SSI = Statistically Significant Increase

<u>Log No.</u>	<u>Submittal</u>	<u>Status</u>
B-147	RCRA Permit issued to facility, Section IV contains corrective action requirements.	Approved September 30, 1993
B-147	Proposed GMZ	Approved April 6, 1994
B-147-CA-1	RFI Phase I workplan	Approved September 7, 1994
B-147-CA-2	RFI Phase I report	Approved June 5, 2001
B-147-CA-3	Supplemental RFI Phase I report	Approved June 5, 2001
B-147-CA-4	Conceptual RFI Phase II/III workplan	Superseded by CA-7
B-147-CA-5	Investigation Workplan for Areas 1 and 2	Approved August 15, 2000
B-147-CA-6	Engineered Barrier Specification Report	Superseded by CA-9
B-147-CA-7	RFI Phase II/III workplan	Approved February 5, 2002
B-147-CA-8	Human Exposures Controlled (CA725) Demonstration	Superseded by CA-12
B-147-CA-9	Engineered Barrier Specification Report	Approved August 3, 2001
B-147-CA-10	"Comfort Letter" request for soils in Area 1	Approved July 9, 2001
B-147-CA-11	No Further Action Determination for Area 1	Approved December 5, 2001
B-147-CA-12	Human Exposures Controlled (CA725) Demonstration	Approved October 9, 2001

<u>Log No.</u>	<u>Submittal</u>	<u>Status</u>
B-147-CA-13	Request to incorporate two releases in Area 12 into corrective action program	Superseded by CA-16
B-147-CA-14	NFA for Area 2	Approved August 13, 2002
B-147-CA-15	Groundwater action Releases Under Control (CA750) Demonstration	Approved March 18, 2002
B-147-CA-16	Request to Incorporate two releases in Area 12 into corrective action program	Approved September 13, 2002
B-147-CA-17	CCR/Characterization Workplan for Area 4	Approved January 10, 2002
B-147-CA-18	GMZ Re-Evaluation	Approved March 13, 2002
B-147-CA-19	CCR/Characterization Workplan for Area 19	Approved March 20, 2002 (soils); April 9, 2002 (groundwater)
B-147-CA-20	CCR/Characterization Workplan for Area 15	Approved March 20, 2002 (soils); April 9, 2002 (groundwater)
B-147-CA-21	City of Wood River Ordinance and MOU to restrict groundwater use	Approved March 28, 2002
B-147-CA-22	CCR/Characterization workplan for Area 9	Approved September 5, 2002
B-147-CA-23	Modifications to Approved Phase II/III RFI workplan (CA-7)	Approved June 21, 2002
B-147-CA-24	CCR/Characterization Workplan for Area 6	Approved September 5, 2002
B-147-CA-25	CCR/Characterization workplan for Area 5	Approved September 27, 2002
B-147-CA-26	Revised CCR/Characterization workplan for Area 15	Approved September 27, 2002
B-147-CA-27	CCR/Characterization Workplan for Area 3	Approved September 27, 2002
B-147-CA-28	Comments on IEPA's January 10, 2002 letter regarding Area 4 (CA-17)	Approved September 5, 2002
B-147-CA-29	Draft ELUC for Area 1	Approved January 10, 2003

<u>Log No.</u>	<u>Submittal</u>	<u>Status</u>
B-147-CA-30	Investigation Report for Area 4	Approved August 22, 2003
B-147-CA-31	Investigation Report for Area 15	Approved November 19, 2003
B-147-CA-32	Revised Corrective Action Schedule	Approved February 7, 2003
B-147-CA-33	CCR/Characterization Workplan for Area 7/8	Approved August 7, 2003
B-147-CA-34	Revised Corrective Action Schedule	Superseded by B-147-CA-45
B-147-CA-35	Report on soil removal activities in Area 2	Approved August 11, 2003
B-147-CA-36	Area 15 Report-Addendum 1	Approved November 19, 2003
B-147-CA-37	Area 15 Report-Addendum 2	Approved November 19, 2003
B-147-CA-38	Extension request for submitting Area 12 CCR/Workplan	Approved December 30, 2004
B-147-CA-40	Draft ELUC for Area 2	Approved January 29, 2003
B-147-CA-41	CCR/Characterization Workplan for Area 10	Approved June 4, 2003
B-147-CA-42	Soil Removal Activities Report at Area 15	Approved June 16, 2004
B-147-CA-43	Draft ELUC for Area 15	Approved August 23, 2004
B-147-CA-44	Soil Removal Activities Report at Area 4	Approved September 15, 2004
B-147-CA-45	Revised Corrective Action Schedule	Approved December 30, 2004
B-147-CA-46	Recorded ELUC for Area 15	Approved September 29, 2005
B-147-CA-47	Draft ELUC for Area 4	Approved June 1, 2005
B-147-CA-48	Recorded ELUC for Area 1	Approved March 25, 2005
B-147-CA-49	Recorded ELUC for Area 2	Approved March 29, 2005
B-147-CA-50	Updated RFI Phase II/III Project Plan Schedule	Approved September 21, 2005
B-147-CA-51	2004-05 CCR Phytoremediation/Landfarming Remedial Measures at Tank 293	Approved December 29, 2005

<u>Log No.</u>	<u>Submittal</u>	<u>Status</u>
B-147-CA-52	Recorded ELUC for Area 4	Approved September 29, 2005
B-147-CA-53	Submittal regarding facility's GMZ	Approved January 24, 2006
B-147-CA-54	Summary of Phytoremediation/Landfarming Remedial Measures at Tank 293	Approved August 11, 2008
B-147-CA-55	Reevaluation of GMZ	Approved January 21, 2009
B-147-CA-56	Updated RFI Phase II/III Project Plan Schedule	Superseded by B-147R
B-147-CA-57	Investigation Report for Area 3	Soil comments e-mailed by IEPA February 25, 2008
B-147-CA-58	Investigation Report for Area 5	Disapproved June 22, 2007
B-147-CA-59	Investigation Report for Area 6	Superseded by B-147R-CA-29
B-147-CA-60	Demonstration that detection monitoring SSIs at NC-SP1 and SFP are from alternate source	Approved January 6, 2009
B-147-CA-61	Underground Piping Investigation Work Plan	Approved April 4, 2007 (eventually superseded by CA-90)
B-147-CA-62	Re-evaluation of GMZ	Approved January 21, 2009
B-147-CA-63	Demonstration that detection monitoring SSIs at NC-SP1 and SFP are from alternate source.	Approved January 6, 2009
B-147-CA-64	Underground Piping Work Plan for 7 and 8 Areas	Superseded by CA- 90
B-147-CA-65	Investigation Report for Area 19	Approved December 6, 2007
B-147-CA-66	Draft White Paper – Property Transfer Process	Approved March 31, 2009
B-147-CA-67	Demonstration that detection monitoring SSIs at NC-SP1 and SFP are from alternate source.	Approved January 6, 2009
B-147-CA-68	Information regarding two releases in Area 8	Approved August 13, 2007

<u>Log No.</u>	<u>Submittal</u>	<u>Status</u>
B-147-CA-69	Addendum to Area 5 Report	On January 30, 2009, IEPA required additional investigation be conducted in Area 5.
B-147-CA-70	Supplemental Report for Soil Sampling of NC-SP1 and SFP	Approved January 7, 2008 (NFA determination made for NC-SP1; additional work required for SFP).
B-147-CA-71	Area 5 Land Reuse Investigation Report	On January 30, 2009, IEPA sent letter requiring additional investigation in Area 5.
B-147-CA-72	Corrective Action Excavation in Area 5	On January 30, 2009, IEPA sent letter requiring additional investigation in Area 5.
B-147-CA-73	Area 5 Analytical Reports for Perched Groundwater	On January 30, 2009, IEPA sent letter requiring additional investigation in Area 5.
B-147-CA-74	2007 Annual Current Conditions Report – Phytoremediation at Tank 293	Approved August 11, 2008
B-147-CA-75	Area 5 Land Reuse Inventory Report and closure Plan, Revision 1	On January 30, 2009, IEPA sent letter requiring additional investigation in Area 5.
B-147-CA-76	Area 10 Land Reuse Investigation and Closure Plan	Superseded by B-147R-CA-4
B-147-CA-77	Demonstration that detection monitoring SSIs at NC-SP1 and SFP are from alternate source	Approved January 6, 2009
B-147-CA-78	Comments on IEPA's December 6, 2007 letter regarding the Area 19 Land Reuse Investigation Report and Closure Plan (CA-65)	Approved April 13, 2009
B-147-CA-79	Area 9 Land Reuse Report	Superseded by B-147R-CA-15
B-147-CA-80	Site-Wide Class II GW Determination	Disapproved December 17, 2012
B-147-CA-81	Area 7/8 Land Reuse Investigation Report and Closure Plan	Superseded by B-147R-CA-27
B-147-CA-82	2007 Annual Current Conditions Report, Phytoremediation/Landfarming at Tank 293	Approved August 11, 2008

<u>Log No.</u>	<u>Submittal</u>	<u>Status</u>
B-147-CA-83	Additional information regarding two releases in Area 8 (see CA-68)	Received June 4, 2008
B-147-CA-84	Area 16 CCR/Characterization Workplan	Approved May 5, 2009
B-147-CA-85	Demonstration that detection monitoring SSIs at NC-SP1 and SFP are from alternate source.	Approved January 6, 2009
B-147-CA-86	Area 17 CCR/Characterization Workplan	Approved May 5, 2009
B-147-CA-87	Underground Pipeline Work Plan	Superseded by B-147-CA-90
B-147-CA-88	Demonstration that detection monitoring SSIs at NC-SP1 and SFP are due to alternate source.	Approved January 6, 2009
B-147-CA-89	Additional information regarding Area 5 Investigation Report	On January 30, 2009, IEPA sent letter requiring additional investigation in Area 5.
B-147-CA-90	Underground Product Pipeline Investigation Workplan – Revision 1	Approved April 13, 2009
B-147-CA-91	Demonstration that detection monitoring SSIs at NC-SP1 and SFP are due to alternate source.	Approved as of the effective date of renewal permit.
B-147-CA-92	Response to Comments, Area 6 Land Reuse Investigation Report	Superseded by B-147R-CA-21
B-147-CA-93	CCR for Phytoremediation/Landfarming	Approved November 20, 2009
B-147-CA-94	Demonstration that detection monitoring SSIs at NC-SP1 and SFP are due to alternate source.	Approved as of the effective date of B-147R renewal permit (see B-147R below).
B-147-CA-95	Requested changes to IEPA's April 13, 2009 approval of the Underground Product Pipeline Investigation Workplan	Approved July 6, 2009
B-147-CA-96	Letter Regarding Vertical Parceling	Approved March 3, 2010
B-147-CA-97	Demonstration that detection monitoring SSIs at NC-SP1 and SFP are due to alternate source.	Approved as of the effective date of B-147R renewal permit (see B-147R below).

<u>Log No.</u>	<u>Submittal</u>	<u>Status</u>
B-147-CA-98	Demonstration that detection monitoring SSIs at NC-SP1 and SFP are due to alternate source.	Approved as of the effective date of B-147R renewal permit (see B-147R below).
B-147-CA-99	Proposal to evaluate: (1) the hydrocarbon recovery system at facility; and (2) arsenic impacts in Well RG36	Approved February 24, 2010
B-147-CA-100	Demonstration that detection monitoring SSIs at NC-SP1 and SFP are due to alternate source.	Approved as of the effective date of B-147R renewal permit (see B-147R below).
B-147-CA-101	Shallow investigation of South Flare Pit.	Approved as of the effective date of B-147R renewal permit (see B-147R below).
B-147-CA-102	Current Condition Report for phytoremediation landfarming at Tank 293.	Approved July 12, 2011
B-147-CA-103	Demonstration that detection monitoring statistical increases are not due to significant changes in groundwater quality.	Approved as of the effective date of B-147R renewal permit (see B-147R below).
B-147-CA-104	Response to request for improvement to hydrocarbon recovery system.	Approved August 31, 2011
B-147-CA-105	Demonstration that detection monitoring statistical increases are not due to significant changes in groundwater quality.	Approved as of the effective date of B-147R renewal permit (see B-147R below).
B-147-CA-106	Response to February 24, 2010 letter requiring improvements to hydrocarbon recovery system.	Approved August 31, 2011.
B-147-CA-107	Site-wide Geology Report and cone penetrometer logs.	Approved December 17, 2012
B-147-CA-108	Demonstration Regarding SSIs for NCSP1/SFP (2Q10)	Approved August 31, 2011
B-147-CA-109	SSI Demonstration for SFP (3Q10)	Approved August 31, 2011
B-147R	Renewed RCRA Permit	Approved March 4, 2011
B-147R-CA-1	2010 Report for Phytoremediation/Landfarming at Tank 293	Approved July 12, 2011

<u>Log No.</u>	<u>Submittal</u>	<u>Status</u>
B-147R-CA-2	Submittal Regarding GMZ Boundary Wells	Approved August 31, 2011
B-147R-CA-3	Area 11 CCR/Characterization Workplan	Approved January 24, 2012
B-147R-CA-4	Area 10 Comprehensive Report	Received May 5, 2011
B-147R-CA-5	Information Regarding the Arsenic Levels at Monitoring Wells RG36	Approved October 29, 2013
B-147R-CA-6	Draft ELUC for Donation Parcel in Area 2	Approved November 3, 2011 (see also B-147R-CA-12)
B-147R-CA-7	Draft ELUC for Area 2, excluding Donation Parcel	Superseded by B-147R-CA-11
R B-147-CA-8	Additional Information Regarding the Arsenic Levels at Monitoring Well RG36	Disapproved October 29, 2013
B-147R-CA-9	Draft ELUC for South Flare Pit	Superseded by B-147R-CA-18
B-147R-CA-10	Area 13 CCR/Characterization Work Plan	Approved October 26, 2012
B-147R-CA-11	Draft ELUC for Area 2, Excluding Donation Parcel	Approved November 3, 2011
B-147R-CA-12	Draft ELUC for Donation Parcel in Area 2	Approved November 3, 2011
B-147R-CA-13	Area 14 CCR/Characterization Workplan	Approved July 12, 2012
B-147R-CA-14	Response to August 31, 2011 IEPA letter (see R-CA-2)—improvements to HRS and GMZ	Approved October 29, 2013
B-147R-CA-15	Area 9 Comprehensive Report	Received December 15, 2011
B-147R-CA-16	Recorded ELUC for Donation Parcel in Area 2	Approved March 13, 2012
B-147R-CA-17	Recorded ELUC for Area 2, excluding Donation Parcel	Approved February 27, 2012
B-147R-CA-18	Revised Draft ELUC for South Flare Pit	Approved August 11, 2014
B-147R-CA-19	Area 5 Comprehensive Report	Received February 2, 2012



<u>Log No.</u>	<u>Submittal</u>	<u>Status</u>
B-147R-CA-20	2011 Report for Phytoremediation-Landfarming Project at Tank 293	Approved December 21, 2012
B-147R-CA-21	Area 6 Report	Received March 16, 2012
B-147R-CA-22	GMZ Re-Evaluation	Approved October 29, 2013
B-147R-CA-23	Site-Wide Class 2 Groundwater Demonstration	Approved December 17, 2012
B-147R-CA-24	Area 3 Current Conditions Report/Characterization Plan	Received May 10, 2012
B-147R-CA-25	Area 17 comprehensive land reuse investigation report and remediation plan	Received October 25, 2012
B-147R-CA-26	Extension request for submittal of response to 12/17/12 letter re: sitewide Class 2 Groundwater demonstration and cone penetration test.	Approved December 3, 2014
B-147R-CA-27	Area 7/8 comprehensive land reuse investigation report and remediation plan	Received December 17, 2012
B-147R-CA-28	Response to comments for the sitewide class 2 groundwater demonstration	Approved December 3, 2014
B-147R-CA-29	2012 annual current condition report: phytoremediation/landfarming remedial measures at Tank 293.	Approved November 13, 2013
B-147R-CA-30	Extension Request for Information Required by IEPA's Response to B-147R-CA-22	Approved February 9, 2016
B-147R-CA-31	Area 2 donation parcel ii current conditions rpt/vapor intrusion wp	Superseded by B-147R-CA-35
B-147R-CA-33	Response to 10/29/13 letter (condition 2.3(iv))	Approved February 9, 2016
B-147R-CA-34	Tank 293 annual current conditions report	Approved December 3, 2014
B-147R-CA-35	Area 2 donation parcel ii current conditions rpt and vapor intrusion wp.	Approved October 24, 2014
B-147R-CA-36	Response/schedule to 10/29/13 letter and 12/19/13 meeting	Approved June 10, 2014
B-147R-CA-37	Updated financial assurance cost estimates	Approved August 2, 2017

<u>Log No.</u>	<u>Submittal</u>	<u>Status</u>
B-147R-CA-38	Extension request to respond to IEPA's 12/29/13 letter	Approved June 10, 2014
B-147R-CA-39	Response to IEPA 2/14/13 email comments on the Area 9 Investigation Report (B-147R-CA-15)	Received May 5, 2014
B-147R-CA-40	Information Re: Existing HRS	Approved April 4, 2016
B-147R-CA-41	Updated Regarding HRS Evaluation	Approved April 4, 2016
B-147R-CA-42	Updated Regarding the Cone of Depression (COD) Evaluation	Approved January 19, 2016
B-147R-CA-43	Information Regarding filing ELUC	Approved October 27, 2015
B-147R-CA-44	Extension Request (GW)	Approved July 18, 2017
B-147R-CA-45	Area 16 Investigation Report and Remediation Plan	Approved June 14, 2016
B-147R-CA-46	Response to Comments Regarding Site-Wide Class II GW Demonstration	Received December 24, 2014
B-147R-CA-47	60 day extension Request (GW)	Approved July 18, 2017
B-147R-CA-48	Annual 2014 Current Conditions Report for Tank293	Approved January 16, 2015
B-147R-CA-49	GMZ Well Evaluation Report	Approved July 18, 2017
B-147R-CA-50	Potential TACO Based CA for Tank 293	Received June 17, 2015
B-147R-CA-51	Area 2 Donation Parcel II CCR & Vapor Intrusion Work Plan	Superseded by B-147R-CA-57 and R-CA-59
B-147R-CA-52	COD Well Performance Evaluation Report	Approved January 19, 2016
B-147R-CA-53	ELUC Submittal	Received July 15, 2015
B-147R-CA-54	GMZ Re-evaluation Report	Approved July 18, 2017
B-147R-CA-55	Evaluation of Significant Increase	Received April 23, 2015
B-147R-CA-56	COD Well Evaluation and Status Report	Approved January 19, 2016
B-147R-CA-57	Area 2 Donation Parcel II – Boundary Approval request	Approved August 22, 2016
B-147R-CA-58	ELUC	Approved July 18, 2016

<u>Log No.</u>	<u>Submittal</u>	<u>Status</u>
B-147R-CA-59	Area 2 Donation Parcel II – Vapor Intrusion Report	Approved August 22, 2016
B-147R-CA-60	HRS Evaluation Update	Approved April 4, 2016
B-147R-CA-61	HRS Evaluation Update	Approved April 4, 2016
B-147R-CA-63	2015 Annual CCR for Tank 293	Received March 1, 2016
B-147R--CA-64	Draft ELUC for Donation Parcel Area 2 (7.5-ac)	Approved February 28, 2017
B-147R--CA-65	Draft ELUC for Donation Parcel Area 2	Approved February 28, 2017
B-147R--CA-77	Revised Draft ELUC for Police Station Parcel (Area 2 7.5 acres -Top layer)	Approved May 4, 2017
B-147R--CA-78	Revised Draft ELUC for Police Station Parcel (Area 2 7.5 acres – Beneath the top layer)	Approved April 21, 2017
B-147R--CA-79	4 <sup>th</sup> Quarter 2016 Demonstration Report (SSIE)	Received April 24, 2017
B-147R--CA-80	Extension Request for Information Required by IEPA's Response to B-147R-CA-22	Received June 22, 2017
B-147R--CA-81	Proposed ELUC	Received July 10, 2017
B-147R-CA-82	Response to IEPA 7/18/27 letter regarding GMZ wells	Received October 16, 2017
B-147R-CA-83	Extension request for submittal of cost estimate	Received October 30, 2017
B-147R-CA-84	GMZ monitoring wells	Received October 16, 2017
B-147R-CA-85	Plan for GMZ optimization for compliance commitment agreement	Received January 2, 2018
B-147R-CA-86	Interim progress report - bioremediation pilot systems operations	Received April 2, 2018
B-147R-CA-87	Fourth Quarter 2017 GW demonstration report	Received April 12, 2018
B-147R-CA-88	Response to IEPA's 7/18/17 GMZ wells letter	Received May 1, 2018
B-147R-CA-89	GW Monitoring Optimization Report	Approved January 19, 2023

<u>Log No.</u>	<u>Submittal</u>	<u>Status</u>
B-147R-CA-90	Time Extension Request	Approved June 24, 2019
B-147R-CA-91	Remedial Action Selection Report and Main Plant Remedy Roadmap	Approved February 11, 2020
B-147R-CA-92	Performance Report-Pilot-Scale Bioremediation Systems	Approved February 11, 2020
B-147R-CA-93	Indoor Inhalation Exposure Route Evaluation & Work Plan	Denied May 30, 2019
B-147R-CA-94	State-wide Arsenic/Inorganic Demonstration Report	Approved June 24, 2019
B-147R-CA-95	4th Quarter 2018 Demonstration Report (Statistically Significant Increase Evaluation)	Approved February 27, 2020
B-147R-CA-96	Revised Indoor Inhalation Exposure Route Evaluation and Work plan	Received August 29, 2019
B-147R-CA-97	Site-wide inorganics and metals evaluation work plan schedule update letter	Received November 5, 2019
B-147R-CA-98	Action Plan for potential manmade pathway evaluation	Received November 26, 2019
B-147R-CA-99	Main Plant Area 10 Comprehensive land reuse Investigation Report	Received December 20, 2019
B-147R-CA-100		
B-147R-CA-101	2019 Annual Tank 293 Current Conditions Report	Received February 28, 2020
B-147R-CA-102	Documentation of monitoring well installation and abandonment	Received March 27, 2020
B-147R-CA-103	Proposed modification to 2Q 2020 GW Gauging & Monitoring in response to COVID-19 pandemic	
B-147R-CA-104	4th Quarter 2019 Demonstration Report	Received May 21, 2020
B-147R-CA-104	4th Quarter 2019 Demonstration Report (Statistically Significant Increase Evaluation)	Received April 30, 2020
B-147R-CA-105	RCRA Land reuse investigation assessments	Received June 22, 2020
B-147R-CA-106	Notification of COD Pumping and Equipment Status	Received July 29, 2020
B-147R-CA-107	COD pumping and equipment status update	Received September 16, 2020

<u>Log No.</u>	<u>Submittal</u>	<u>Status</u>
B-147R-CA-108	Request to update Main Plant Observation Monitoring Well Abandonment of G047	Received September 23, 2020
B-147R-CA-109	Site-wide inorganics and metals evaluation work plan	Received November 30 2020
B-147R-CA-110	Groundwater Management Zone Re-evaluation	Received December 21, 2020
B-147R-CA-111	Soil Gas Pathway Evaluation Report	Received June 8, 2021
B-147R-CA-112	Results in accordance with Site-Wide Inorganics and Metals Evaluation Report submitted on 12/20/18	Received January 26, 2022
B-147R-CA-113	Remedial Action Selection Report & Main Plant Remedy Roadmap. This is a follow up on IEPA correspondence dated 2-11-20	Received January 31, 2022
B-147R-CA-114	Monitoring Well Condition	Approved January 19, 2023
B-147R-CA-115	Proposed upgrades to the Cone of Depression (COD) Well System	Approved January 19, 2023
B-147R-CA-116	4th Quarter 2021 Demonstration Report	Received May 3, 2022
B-147R-CA-117	Northern GMZ Monitoring Wells G067/G068	Approved January 19, 2023
B-147R-CA-118	Well replacement extension request	Approved April 21, 2023
B-147R-CA-119	4th Quarter 2022 Demonstration Report	
B-147R-CA-120	Documentation of monitoring well installation and abandonment	Received July 21, 2023
B-147R-CA-121	Main Plant GMZ Well G078 Well Condition Notification letter in accordance with Condition V.D.4 of the RCRA permit	Received July 13, 2023
B-147R-CA-122	Corrective Action Mod request for the Korea tank Farm (Area 9) at the Main Plant	Approved November 20, 2023
B-147R-CA-123	Gradient Control Well G668 and G669 Condition Notification	Received September 13, 2023
B-147R-CA-124	Main Plant Observation Well G97L Well Conditions Notification letter in accordance with Condition V.D.4 of the RCRA	Received January 30, 2024
B-147R-CA-125	Main plant land reuse investigation data submittal of general background, sampling methods, analytical procedures, and analytical results for areas	Received March 12, 2024

<u>Log No.</u>	<u>Submittal</u>	<u>Status</u>
B-147R-CA-126	Additional info to the revised indoor inhalation exposure route eval and work plan dated 8/29/19 to provide an update on changed site conditions	Received April 16, 2024
B-147R-CA-127	Response to recommendation to vent well cap in the 8/3/23 Inspection Report	Received April 24, 2024
B-147R-CA-128	Main Plant Observation well G87L well condition Notification letter in accordance with Condition V.D.4 of RCRA permit	Received July 31, 2024

**ATTACHMENT D**  
**CORRECTIVE MEASURES PROGRAM REQUIREMENTS**  
**ILLINOIS EPA NO. 1191150001**  
**USEPA NO. ILD980700967**  
**RCRA CORRECTIVE ACTION PERMIT LOG NO. B-147R2**





## ATTACHMENT D

### CORRECTIVE MEASURES PROGRAM REQUIREMENTS

#### 1.0 INTRODUCTION/PURPOSE

RCRA corrective action projects typically consist of two phases: (1) A RCRA Facility Investigation (RFI) where an investigation is conducted at the solid waste management units (SWMU's) of concern at a facility; and (2) implementation of corrective measures needed to properly address any contaminant encountered during the RFI. This document has been developed to outline the procedures to be carried out to implement a corrective measure program.

#### 2.0 BRIEF OVERVIEW OF A RCRA CORRECTIVE MEASURES PROGRAM

Typically, at the end of an RFI, the concentration of contaminants present in the soil/sediments/groundwater/surface waters at a SWMU or other area of concern (AOC) is compared to remediation objectives developed in accordance with 35 IAC Part 742. If the contaminant levels are above these objectives, then some type of corrective measure must be completed to achieve these objectives. In addition, certain corrective measures may need to be carried out to support the established remediation objectives (i.e., the establishment of engineered barriers and/or institutional controls). However, at a unit where waste or high levels of contamination remains, a decision may be made to close the unit as a landfill and then provide post-closure rather than removing the material and/or achieving remediation objectives developed in accordance with 35 IAC Part 742.

To allow for a logical and orderly progression in developing and implementing necessary corrective measures, the Corrective Measures Program (CMP) being carried out in accordance with this RCRA permit should be carried out in five phases which build on each other. It is not necessary for a corrective measures program at a given SWMU or other AOC to follow these five (5) phases step-by-step; rather, phases can be combined and/or skipped, depending on the actual remedial measure selected. The overall CMP implemented must set forth a logical path for its implementation and allow for Illinois EPA oversight and approval throughout the entire process.

A brief discussion of the five (5) phases of a CMP is as follows:

1. Phase I is the conceptual design of the selected corrective measure(s).
2. Phase II is the development of final design plans for the corrective measure, including installation and operation/maintenance plans.
3. Phase III is the actual construction/installation of the selected corrective measure.
4. Phase IV is the operation, maintenance, and monitoring of the selected corrective measure to ensure it is properly protecting human health and the environment.
5. Phase V is the final demonstration/verification that the implemented corrective measure achieved the approved remedial objectives.

Sections 3.0 through 7.0 which follow provide a more detailed discussion of each of these five phases. Section 8.0 has been developed to describe the CMP which may be used in lieu of the afore-mentioned five phase procedure when soil removal is the selected remedy. It must be noted that work plans, reports, etc. must be developed to document how the Permittee carries out the required corrective measures program at each SWMU or other AOC. All such documents must be reviewed and approved by the Illinois EPA prior to their implementation.

### **3.0 PHASE I OF THE CMP**

Phase I of the CMP includes selection of the corrective measure to be taken and developing a basis for completing the final design of the measure. This effort should be documented in a Conceptual Design Report which describes the proposed corrective measure for each SWMU and other AOCs and provides a conceptual design for these measures. The main criteria for the Illinois EPA review are whether the proposed corrective measures are able to achieve the final cleanup objectives previously established by the Permittee and the Illinois EPA and/or provide the necessary institutional controls to prevent the migration of contaminants from the SWMU of concern. Based upon a review of the Conceptual Design Report, the Illinois EPA may approve the corrective measures, require revisions to the proposed corrective measures, or require that a new corrective measures proposal be submitted to the Illinois EPA.

The Conceptual Design Report should contain the following sections:

1. **Introduction/Purpose.** This section should contain: (1) general background information regarding the project; (2) the purpose and goals of the submittal; and (3) the scope of the project.
2. **Existing Site Conditions.** This section should contain a summary of the investigative activities conducted for each of the units of concern. Investigation analytical results should be provided in tabular form, and maps depicting both the horizontal and vertical extent of contamination at the site should be provided.
3. **Evaluation for Potential Future Migration.** Based on the existing site conditions, a conceptual model of the site should be developed and presented in this section. The potential for additional future migration of contamination for each of the units of concern must then be evaluated, especially those units which have been determined to have released hazardous waste/hazardous constituents to the groundwater. It may be helpful to develop conceptual models for contaminant migration. Of special concern in this evaluation are (1) the physical properties of the contaminants (solubility, volatility, mobility, etc.); and (2) existing site conditions (types of soil present, location of contamination, hydrology, geology, etc.).
4. **Corrective Measures Objectives.** This section should discuss the general objectives of the proposed corrective measure to be constructed/installed, and the ability of the proposed corrective measure to achieve the established remediation objectives (unless the selected corrective measure is closure as a landfill which will require proper establishment of a final cover and proper post-closure care of the closed unit).

5. Identification of Options Available. This section should contain a brief discussion of the various options available to achieve the corrective measures objectives for each unit. This discussion should identify: (1) a general overview of each option available, including how the option will achieve the stated objective; (2) the advantages associated with each option; (3) the disadvantages associated with each option and (4) an estimate of the cost associated with choosing each remedial option.
6. Description of Selected Corrective Measure. This section should contain a qualitative discussion of the corrective measure chosen, along with the rationale which was used to select this measure from all those identified initially. This discussion should include documentation that the selected corrective measure will be effective.
7. Identification of Design Criteria. This section should identify what information must be available to design the selected corrective measure.
8. Review of Available Information. This section should contain an evaluation of the existing information to ensure that it is sufficient to complete the design of the selected corrective measure. If insufficient information is available, then the report should contain procedures for collecting the required additional information.
9. Procedures for Completing the Design. This section should contain a description of the procedures which will be followed to complete the design of the corrective measure. This should include as appropriate:
  - a. Identification of the references and established guidance which will be used in designing the selected corrective measure. Justification for the selection of this procedure should also be provided.
  - b. A description of the procedures which will be used to complete the design of the corrective measure.
  - c. Identification of assumptions to be used in the design, and the impact these assumptions have on the overall corrective measure;
  - d. Significant data to be used in the design effort;
  - e. Identification and discussion of the major equations to be used in the design effort (including a reference to the source of the equations);
  - f. Sample calculations to be used in the design effort;
  - g. Conceptual process/schematic diagrams;
  - h. A site plan showing a preliminary layout of the selected corrective measure;
  - i. Tables giving preliminary mass balances;

j. Site safety and security provisions.

This information will form the technical basis for the detailed design of the remedial measure and the preparation of construction plans/specifications.

10. Identification of Required Permits. This section should identify and describe any necessary permits associated with the selected corrective measure, as well as the procedures which will be used to obtain these permits.
11. Long Lead Procurement Time Considerations. This section should identify any elements/components of the selected corrective measure which will require a large amount of time to obtain/install. The following issues should also be discussed: (1) the reason why it will take a large amount of time to obtain/install the item; (2) the length of time necessary for procurement and (3) recognized sources of such items.
12. Project Management. This section should contain information regarding the procedures and personnel which will be involved in completing the design of the selected corrective measure. A schedule for completing the design should also be provided.

#### 4.0 PHASE II OF THE CMP

Once the Illinois EPA approves the Conceptual Design Report, the facility should complete the design of the approved corrective action (Phase II of the CMP). Upon final completion of the design, a Final Design Report, consisting of final plans, specifications, construction work plan, etc., must be submitted to the Illinois EPA for review and approval.

Several documents must be submitted to the Illinois EPA as part of Phase II of the CMP. The following text describes the expected contents of the various documents which should be developed and submitted to the Illinois EPA as part of Phase II of the CMP.

1. Final Design Report and Construction Work Plan. The Final Design Report and Construction Work Plan must contain the detailed plans, specifications and drawings needed to construct the corrective measure. In addition, this document must contain (1) calculations, data etc., in support of the final design; and (2) a detailed description of the overall management strategy, construction quality assurance procedures and schedule for constructing the corrective measure. It must be noted that the approved Conceptual Design Report forms the basis for this final report. The information which should be provided in this document includes:
  - e. Introduction/Purpose. This portion of the document should: (1) provide background information regarding the project, (2) describe the purpose and goals of the project, and (3) describe the scope of the project.
  - f. Detailed Plans of the Design System, including the following:
    - 1) Plan views;

- 2) Section and supplementary views which, together with the specifications and general layouts, facilitate construction of the designed system;
  - 3) Dimensions and relative elevations of structures;
  - 4) Location and outline form of the equipment;
  - 5) Ground elevations; and
  - 6) Descriptive notations, as necessary, for clarity.
- c. **Technical Specifications.** Complete technical specifications for the construction of the system, including, but are not limited to, the following:
- 1) All construction information, not shown in the drawings, which is necessary to inform the contractor in detail as to the required quality of materials, workmanship, and fabrication of the project;
  - 2) The type, size, strength, and operating characteristics of the equipment;
  - 3) The complete requirements for all mechanical and electrical equipment, including machinery, valves, piping and jointing of pipe;
  - 4) Electrical apparatus, wiring and meters;
  - 5) Construction materials;
  - 6) Chemicals, when used;
  - 7) Miscellaneous appurtenances;
  - 8) Instruction for testing materials and equipment as necessary; and
  - 9) Availability of soil boring information.
- d. **Project Management.** A description of the construction management approach, including the levels of authority and responsibility, lines of communication and qualifications of key personnel who will direct corrective measures construction/installation must be provided in the work plan.
- e. **Construction Quality Assurance/Quality Control.** A construction quality assurance/quality control plan describing the procedures which will be followed to ensure the corrective measure is constructed/installed in accordance with the approved plans and specifications.

- f. **Schedule.** The work plan must contain a schedule for completion of all major activities associated with construction/installation of the selected corrective measures. All major points of the construction/installation should be highlighted.
  - g. **Waste Management Practices.** This portion of the document should identify the wastes anticipated to be generated during the construction/installation of the corrective measures and provide a description of the procedures for appropriate characterization and management of these wastes.
  - h. **Required Permits.** Copies of permit applications submitted to other Bureaus of the Illinois EPA for the selected corrective measure must be provided in the report. If it is determined that no permit is required for construction/installation and implementation of the corrective measures, rationale and justification must be provided to support this contention.
  - i. **Cleanup Verification.** The report must contain the procedures which will be followed that the approved remediation objectives have been achieved when operation of the system is completed.
2. **Operation and Maintenance Plan.** An Operation and Maintenance Plan must be developed and submitted as part of Phase II of the CMP. This plan should outline the procedures for performing operations, long term maintenance, and monitoring of the corrective measure.
- a. **Introduction and Purpose.** This portion of the document should provide a brief description of the facility operations, scope of the corrective measures project, and summary of the project objectives.
  - b. **System Description.** This portion of the document should provide a description of the corrective measure and significant equipment, including manufacturer's specifications. This portion of the permit should also include a narrative of how the selected system equipment is capable of complying with the final engineered design of the corrective measure.
  - c. **Operation and Maintenance Procedures.** This portion of the document should provide a description of the normal operation and maintenance procedures for the corrective measures system, including:
    - 1) Description of tasks for operation;
    - 2) Description of tasks for maintenance;
    - 3) Description of prescribed treatment or operation conditions; and
    - 4) Schedule showing the frequency of each operation and maintenance task.
  - d. **Inspection Schedule.** This portion of the document should provide a description of the procedures for inspection of the corrective measures system, including problems to look

for during the inspection procedure, specific inspection items, and frequency of the inspections.

- e. **Waste Management Practices.** This portion of the document should provide a description of the wastes generated by the corrective measure, and the appropriate procedures for proper characterization/management of these wastes.
- f. **Contingency Procedures.** This portion of the document should provide a description of the procedures which will address the following items:
  - 1) System breakdowns and operational problems including a list of redundant and emergency backup equipment and procedures;
  - 2) Alternative procedures (i.e., stabilization) which are to be implemented in the event that the corrective measure fails. The alternative procedures must be able to prevent release or threatened releases of hazardous wastes/hazardous constituents which may endanger human health and the environment, or exceed cleanup standards.
  - 3) Notification of facility and regulatory personnel in the event of a breakdown in the corrective measures, including written notification identifying what occurred, what response action is being taken and any potential impacts on human health and the environment.

## **5.0 PHASE III OF THE CMP**

Once the final design report is approved by the Illinois EPA, construction/installation of the approved corrective measure must commence. During this period, quarterly reports should be submitted which contain the following information:

- 1. Summary of activities completed during the reporting period;
- 2. An estimate of the percentage of the work completed;
- 3. Summaries of all actual or proposed changes to the approved plans and specifications or its implementation;
- 4. Summaries of all actual or potential problems encountered during the reporting period;
- 5. Proposal for correcting any problems; and
- 6. Projected work for the next reporting period.

Upon completion of construction/installation of the approved corrective measure, a Construction Completion Report must be submitted to the Illinois EPA documenting that these efforts were carried out in accordance with the Illinois EPA approved plans and specifications. This report should contain

a thorough description of the efforts that went into constructing/installing the corrective measure and demonstrate that the procedures in the Illinois EPA approved Final Design Report were followed during this effort. Such a report should be formatted in a logical and orderly manner and contain the following information:

1. An introduction discussing the background of the project and the purpose and scope of the corrective measure described in the report.
2. Identification of the plans, technical specifications and drawings which were used in constructing/installing the corrective measure. These specifications and drawings should have been approved by the Illinois EPA during Phase II.
3. Identification of any variations from the Illinois EPA approved plans, technical specifications and drawings used in construction/installing the corrective measure. Justification regarding the need to vary from the approved plans and specifications must also be provided.
4. A description of the procedures used to construct/install the corrective measure, including the procedures used for quality assurance and quality control.
5. As built drawings, including identification of any variations from the approved plans, technical specifications and drawings.
6. A summary of all test results from the construction/installation effort, including quality assurance/quality control testing.
7. Actual test results, including quality assurance/quality control test results. These results should be located in an attachment/appendix and be well organized.
8. Identification of any test results which did not meet the specified value and a description of the action taken in response to this failure, including re testing efforts.
9. Photographs documenting the various phases of construction.
10. A detailed discussion of how the construction/installation effort met the requirements of the approved Final Design Report.
11. A certification meeting the requirements of 35 IAC 702.126 by an independent qualified, licensed professional engineer and by an authorized representative of the owner/operator.

## **6.0 PHASE IV OF THE CMP**

Once the corrective measure has been constructed/installed, it must be operated, maintained and monitored in accordance with the approved plans and specifications (this is Phase IV of the CMP). During this period, quarterly reports must be submitted to the Illinois EPA documenting the results of these efforts. These reports include the following:



1. **Introduction.** A brief description of the facility operations, scope of the corrective measures project, and summary of the project objectives.
2. **System Description.** A description of the corrective measures constructed/installed at the site, and identify significant equipment.
3. **Monitoring Results.** A description of the monitoring and inspection procedures to be performed on the corrective measures. A summary of the monitoring results for the corrective measures, including copies of any laboratory analyses which document system effectiveness, provide a description of the monitoring procedures and inspections performed, and include a summary of the monitoring results for the corrective measure. Copies of all laboratory analytical results which document system monitoring must be provided.
4. **Effectiveness Determination.** Calculations and other relevant documentation which demonstrates the effectiveness of the selected corrective measure in remediating/stabilizing contamination to the extent anticipated by the corrective measures final design. Copies of relevant analytical data should be provided to substantiate this determination.
5. **System Effectiveness Recommendation.** Based upon the results of the effectiveness determination required under Item 4 above, recommendations on continued operation of the corrective measure must be provided. If the corrective measure is not performing in accordance with the final design, a recommendation on revisions or expansion of the system should be provided.

## **7.0 PHASE V OF THE CMP**

Once all corrective measures have been completed, a report must be developed documenting all the efforts which were carried out as part of implementing the corrective measure and demonstrating, as appropriate, that the approved remediation objectives have been achieved. This report should contain a compilation of all previous reports and also contain sufficient information to demonstrate that the approved remediation objectives have been achieved. It must be noted that such a report will not be developed for a unit closed as a landfill until the post-closure care period has been completed.

## **8.0 PROCEDURES WHICH SHOULD BE FOLLOWED WHEN SOIL REMOVAL IS THE SELECTED CORRECTIVE MEASURE**

Sections 2.0 through 6.0 above describe the procedures which should be followed when it is necessary to design a physical corrective measure (e.g., a final cover system, certain type of treatment system, etc.). However, such detail is not necessary if excavation/removal is selected as the remedial action for the contaminated soil encountered at the site. In general, a work plan should be developed for this effort (for Illinois EPA review and approval) which fully describes each step to be used in removing the contaminated soil from the property. This includes a description of (1) the equipment utilized in the removal effort, (2) the pattern followed in removing the soil; (3) the depth to which the soil will be removed; (4) management of the soil on-site after it is removed from the ground; (5) loading areas; (6) the ultimate destination of the soil; and (7) any other steps critical to the removal effort.

One way to conduct a soil removal effort is to collect and analyze a sufficient number of soil samples to clearly determine the horizontal and vertical extent of soil contamination prior to conducting the soil removal effort. The boundaries of soil which must be removed are defined by the Illinois EPA established cleanup objectives for the project. Soil excavation must extend to sample locations where soil test results indicate that the remediation objectives are met. Closure verification sampling is not necessary in such cases, if a registered professional engineer oversees the soil removal effort and certifies that the remediation limits extend to these boundaries.

Another way to conduct a soil removal effort is to collect and analyze a limited number of soil samples prior to the soil removal effort and to rely mainly on field observation to determine the extent of the soil removal. In such cases closure verification sampling is necessary. Soil samples must be collected for analysis from the bottom and sidewalls of the final excavation. The following sampling/analysis effort is necessary to demonstrate that the remaining soil meets the established cleanup objectives:

1. A grid system should be established over the excavation.
2. Samples should be collected from the floor of the excavation at each grid intersection, including intersections along the perimeter of the excavation.
3. Samples should be collected at 6-inch to 12-inch below the ground surface (bgs) along the excavation sidewalls at each grid intersection around the excavation perimeter. Samples must also be collected at the midpoint of the excavation wall at each grid intersection along the excavation perimeter.
4. Collection/analysis of all required samples must be in accordance with the procedures set forth in the approved plan.
5. Soil samples which must be analyzed for volatile organic compounds (VOCs) must be collected in accordance with the procedures set forth in Method 5035 of SW-846. In addition, such samples must be collected 6-inch to 12-inch beneath the floor/sidewalls of the excavation to minimize the possibility of volatilization of the contaminants prior to the collection of the samples.
6. No random sampling may be conducted to verify achievement of cleanup objectives have been met.

Additional soil must be removed, as necessary, until it can be demonstrated that the remaining soil in and around the area of concern meets the established cleanup objectives. Additional samples must be collected and analyzed in accordance with the procedures described above from areas where additional soil has been removed.

**ATTACHMENT E**

**SUMMARY OF HISTORICAL AND CURRENT HYDROCARBON RECOVERY AND  
REMEDIAL SYSTEMS AT THE MAIN PLANT FACILITY**

**ILLINOIS EPA NO. 1191150001**

**USEPA NO. ILD980700967**

**RCRA CORRECTIVE ACTION PERMIT LOG NO. B-147R2**



**ATTACHMENT E****SUMMARY OF HISTORICAL AND CURRENT HYDROCARBON RECOVERY AND  
REMEDIAL SYSTEMS AT THE MAIN PLANT FACILITY**

Updated as of September 2024

**A. SUMMARY**

The following subsections detail the historical and current remediation systems operated at the BP Main Plant to mitigate hydrocarbons and refinery product in accordance with Condition II.E of the facility's permit.

Historical remedial operations included a Hydrocarbon Recovery System (HRS) as an interim remedial measure (IRM), as discussed in Section C, below.

Current remedial operations include three pilot-scale Bioremediation Systems as successors to the HRS, which reached its limit of effectiveness. The Bioremediation Systems are being operated to mitigate hydrocarbons and refinery product, and to provide information on long-term performance and other essential data to evaluate the full-scale implementation of hydrocarbon and other refinery related product remediation at the BP Main Plant facility. These Bioremediation Systems include:

- Central Bioventing System (Section E)
- Sothern Biosparging/Bioventing System (Section F)
- Northern Air Sparge/Soil Vapor Extraction System (AS/SVE) (Section G)

**B. DEFINITIONS**

"Bioremediation systems" means systems or technologies that enhance the biodegradation of hydrocarbons, and preferentially remove compounds that are typically more toxic which results in compositional change. The biodegradation processes affect refinery product from the smear zone and vadose zone as it contributes to soil vapor and dissolved phase impacts. Systems to accomplish this include bioventing, biosparging, and AS/SVE systems or some combination of systems designed to remediate hydrocarbons. It may also include other technologies that could enhance bioremediation such as infiltration galleries or ambient air introduction that can increase oxygen to the subsurface to enhance aerobic biodegradation.

"Hydrocarbon Remediation Well" means any type of well, including Bioremediation System wells, installed to remediate hydrocarbons, from the smear zone and vadose zone.

"Remediating refinery product" means the use of physical, chemical, or biological means to remove or treat refinery product located from the smear zone or vadose zone as it contributes to dissolved phase impacts in order to reduce the mass present at the Site.

"Smear Zone" means the vertical profile of hydrocarbon impacted soil located across the area of groundwater fluctuations, between the high and low groundwater elevations.

"Vadose Zone" means the vertical profile of unsaturated soils located above the water table.

**C. HISTORICAL HYDROCARBON RECOVERY SYSTEM (HRS) OPERATION**

The HRS at the BP Main Plant facility was commissioned as an IRM in 1993 to hydraulically recover subsurface mobile LNAPL from above the water table. The original system included twenty-one (21) HRS extraction wells as listed below. Following seventeen (17) years of operation, sixteen (16) HRS wells were deactivated in 2010 based on declining LNAPL recovery. After seven (7) additional years of operation, the remaining five (5) HRS wells were deactivated in 2017 due to the system reaching its limit of performance effectiveness. As described in the technical memorandum by BP entitled, Hydrocarbon Recovery System (HRS) Evaluation, dated May 24, 2017, the HRS removed 6.5 million gallons of LNAPL over twenty-two (22) years of operation. However, despite this volume of mobile LNAPL having been removed, the HRS did not have a significant impact on dissolved phase concentrations in groundwater. Accordingly, installation and operation of three (3) pilot-scale bioremediation systems (as discussed below) was implemented as a replacement for the HRS, to provide information needed to design full-scale remedies to target the remaining LNAPL with the goal to reduce dissolved phase concentrations of benzene.

**Identification of Historical/Inactive HRS Wells**

IEPA Well No.	Facility Well No.	Well Depth (ft.)	Well Depth Elevation (ft. MSL)	Well Screen Interval (ft. MSL)
G601	RC-1	56.0	373.40	393.40 – 373.40
G602	RC-2	55.0	374.96	394.96 – 374.96
G603	RC-3	51.0	379.39	399.39 – 379.39
G604	RC-4	49.5	382.18	402.18 – 382.18
G606	RC-6	55.0	373.27	408.27 – 378.27
G607	RC-7	58.5	368.97	403.97 – 373.97
G608	RC-8	61.0	364.90	399.90 – 369.90
G609	RC-9	64.0	367.40	402.40 – 372.40
G610	RC-10	69.0	366.61	401.61 – 371.61
G611	RC-11	70.0	369.96	404.96 – 374.96
G612	RC-12	73.0	368.21	395.21 – 373.21
G615	RC-15	58.4	371.77	407.15 – 377.15
G617	RC-17	58.0	370.41	392.41 – 375.41
G618	RC-18	57.5	371.76	411.76 - 376.76
G619	RC-19	58.0	368.92	408.92 – 373.92
G629	RC-H-29	57.6	379.88	401.48 – 379.88
G605	RC-5	49.8	380.56	401.27 – 381.27
G613	RC-13	60.0	371.25	406.25 – 376.25
G614	RC-14	59.5	371.60	406.60 – 376.60
G616	RC-16	65.0	367.61	402.61 – 372.61
G620	RC-20	85.4	344.72	406.49 – 349.72

ft. MSL= feet above mean sea level

## **D. CURRENT HYDROCARBON REMEDIATION SYSTEMS OPERATIONS**

BP is currently operating three (3) pilot-scale bioremediation systems and has implemented pilot-scale passive bioventing in two (2) additional areas for remediation of groundwater and destruction of LNAPL impacts. These remedial approaches focus on in-situ remediation of hydrocarbons by delivering increased oxygen to the subsurface via different mechanisms as opposed to hydraulic recovery. Biodegradation also has the added benefit of not only removing LNAPL mass but changing the chemical composition of LNAPL in the subsurface, through sparging and venting, to mitigate impact to dissolved phase groundwater conditions. The locations of the bioremediation systems are depicted on Figure E-1.

The primary objectives of these bioremediation systems include:

- I. Progressing LNAPL remediation beyond what the HRS could achieve including dissolved phase risk reduction;
- II. Identification of technology combinations that will be flexible across water table conditions and optimize vapor treatment;
- III. Evaluation of alternative remedial approaches for hydrocarbon and LNAPL mitigation; and
- IV. Support for selection and design of appropriate final remedies.

Performance of the initial pilot-scale systems was presented in the October 2018 Performance Report – Pilot-Scale Bioremediation Systems (BP, 2018) and found enhanced biodegradation via all three (3) technologies (i.e., bioventing, biosparging, and AS/SVE) to be viable for remediation of groundwater and more effective at destruction of remaining LNAPL impacts than physical hydrocarbon recovery. The passive bioventing technologies implemented promote the same remedial mechanisms as active bioventing but utilize natural pressure changes between the vadose zone and surface to deliver oxygen into the vadose zone in the form of ambient air. The technologies all specifically enhance the removal rate of hydrocarbon compared to historical systems and promote compositional change to decrease concentrations of aromatic BTEX compounds at the site.

BP completed modifications to the pilot-scale bioremediation systems and technologies between 2019 to 2021 to maintain and enhance hydrocarbon remediation through treatment of expanded site areas at the BP Main Plant Property. Installation of air injection wells, piezometers, and soil vapor monitoring points (VMPs) was initiated in 2019 and completed during First Quarter 2020. Surveying of the newly installed wells was also completed in First Quarter 2020. Installation of requisite equipment and start-up activities were completed in 2020 and 2021. Passive bioventing was implemented in two of the initial pilot areas in 2021 and 2022, as previous remedial efforts progressed remediation in those area to the point where passive bioventing is able to deliver sufficient oxygen to maintain an aerobic vadose zone for enhanced bioremediation.

The three (3) expansion pilot bioremediation systems continue to operate as of 2024. Any changes to the operations or configuration of the systems is documented through an annual update to Attachment C of the permit as required by Section IV.C.8 of the permit. Information presented in the following previously submitted Class 1\* Permit modification requests has been incorporated into this exhibit: i) Attachment C Annual Update (1/31/2022); ii) Attachment C Annual Update (1/31/2023); and iii) Attachment C Annual Update (1/31/2024). The configuration and operation of the three pilot-scale bioremediation systems are detailed in Sections E (Central Biovent System), F (Southern Biosparge/Biovent System) and G (Northern AS/SVE System). Each section includes a timeline of operations, enhancements, and modifications for each system.

**E. PILOT-SCALE CENTRAL BIOVENTING SYSTEM**

A bioventing pilot test was performed to evaluate performance of this remedial approach and to quantify the mass remediation rate (and thus remediation timeframe) in comparison to more traditional LNAPL/contaminants of concern (COCs) removal systems, such as groundwater/LNAPL physical extraction, and, in comparison with natural biodegradation rates. Performance of the pilot-scale system was presented in the October 2018 Performance Report – Pilot-Scale Bioremediation Systems (BP, 2018). The pilot test finding is that bioventing is more effective at treating hydrocarbons through mass removal (biodegradation) and compositional change than physical removal of hydrocarbon.

The biovent system underwent an expansion in 2019-2020, including installation of additional biovent wells to treat a larger area to the west of the original biovent implementation area (Figure 3). Performance data from the initial pilot test was utilized in design of the expansion pilot system to more efficiently deliver oxygen into the subsurface. The monitoring network was also modified with the installation of additional piezometers and VMPs in 2019-2020. Active bioventing in six (6) biovent wells in the initial Central Biovent pilot system area was shut down in July 2020 and transitioned to passive bioventing in 2021 as part of the modifications to the current operating system. Full-time operation of the expanded Central Biovent System was initiated in April 2021.

The six (6) biovent wells from the initial biovent system area were converted to passive biovent wells by fitting one-way valves that allow ambient air into the vadose zone when negative pressure is present in the subsurface. In April 2023, Main Plant Observation Well G050 was also fitted for passive bioventing as an IRM to address LNAPL.

A timeline of system operations is provided below.

Time Period	Description	Wells
April 2017-June 2020	Initial pilot wells operate with active bioventing.	A3BVS-S, A3BVS-D, A3BVNW-S, A3BVNW-D, A3BVNE-S, A3BVNE-D
July 2020-March 2021	System shut down for completion of system	



	expansions and electrical system upgrades.	
April 2021-2024 (ongoing)	Expansion system wells operate with active bioventing.	A3BV-1A, A3BV-1B, A3BV-2A, A3BV2B, A3BV-3A, A3BV-3B, A3BV-4A, A3BV-4B, A3BV-5A, A3BV-5B, A3BV-6A, A3BV-6
December 2021- 2024 (ongoing)	Initial pilot wells used for passive bioventing.	A3BVS-S, A3BVS-D, A3BVNW-S, A3BVNW-D, A3BVNE-S, A3BVNE-D
April 2023-2024 (ongoing)	Main Plant Observation Well used for passive bioventing.	G050

### **System Description**

The pilot-scale biovent system equipment is designed to deliver sufficient air into the subsurface at low pressures to allow for aerobic respiration to dominate the treatment zone. Flow from a rotary vane compressor delivers air at total flow rates up to 60 standard cubic feet per minute (scfm) @ 10 pounds per square inch (psi), split into up to 12 of the 18 total biovent wells. Air from the compressor has a throttling valve, temperature indicator, check valve, and pressure indicator. The biovent process and instrumentation diagram is presented as Figure 2, and the biovent system schematic is presented as Figure 2A.

Flow from the equipment is routed through a 6-leg manifold. Each manifold leg has a flow control valve, rotameter-style flowmeter, and pressure gauge. Each manifold leg feeds up to two (2) biovent wells via aboveground piping. Each of the biovent well lateral legs has its own flow control valve and pressure indicator. Operation of each of the six (6) manifold legs is controlled with a normally closed solenoid controlled via a human machine interface (HMI) screen on an interior control panel. The system components are plumbed in a modular/mobile enclosure with environmental controls (e.g. lighting, heating, and ventilation).

Biovent configurations and flow rates are controlled by system valves, the Programmable Logic Controller (PLC) and HMI. The system is designed to operate up to 12 of the 18 total individual biovent points at a time in any combination. Individual point flow rates are between 1 to 20 scfm, with a combined rate of up to 60 scfm. Flow rates, pressures, and operational timing are monitored and maintained by system technicians and engineers.

### **Biovent System Layout and Well Network**

The pilot-scale biovent system layout and well network are depicted on Figure 3. The Central Biovent System remediation wells include 18 biovent wells, and performance monitoring utilizes a series of piezometers and VMPs as summarized below.

**Biovent Wells:** Eighteen (18) total biovent wells are present; six (6) were components of the initial system installation, and twelve (12) were installed during the system expansion. Biovent

well construction was designed to target the vadose zone directly above the water table under typical conditions.

**Piezometers:** Six (6) total piezometers were installed to monitor the shallow water table and identify LNAPL presence in the remediation areas. Piezometers supplement existing monitoring wells in the north (G99L) and south (G13L) of the expansion treatment area. One (1) additional deep monitoring well is present in the initial treatment area – A3AS-C.

**Vapor Monitoring Points:** A total of twenty (20) nested VMP locations are used to monitor the vadose zone to measure degradation. VMP depths are staggered to ensure granularity in measuring impacts and changing gradients. The twenty (20) nested VMPs are located at differing distances from the pilot test wells and throughout the treatment zones to allow for monitoring the influence of the system. Each location contains 3-4 nested VMPs for a total of 67 individual VMPs.

The wells comprising the Bioventing system are listed below:

Bioventing Hydrocarbon Remediation Wells

IEPA Well No.	Facility Well No.	Well Depth (ft.)	Well Depth Elevation (ft. MSL)	Well Screen Interval (ft. MSL)
A3AS-C	A3AS-C	70	361.19	366.19 - 361.19
A3BVS-S	A3BVS-S	25	406.27	416.27 - 406.27
A3BVS-D	A3BVS-D	35	396.20	406.20 - 396.20
A3BVNW-S	A3BVNW-S	25	406.05	416.05 - 406.05
A3BVNW-D	A3BVNW-D	35	396.11	406.11 - 396.11
A3BVNE-S	A3BVNE-S	25	406.27	416.27 - 406.27
A3BVNE-D	A3BVNE-D	35	396.28	406.28 - 396.28
A3BV-1A	A3BV-1A	32	397.77	407.77-397.77
A3BV-1B	A3BV-1B	32	397.24	407.24-397.24
A3BV-2A	A3BV-2A	32	397.72	407.72-397.72
A3BV-2B	A3BV-2B	32	397.02	407.02-397.02
A3BV-3A	A3BV-3A	32	398.35	408.35-398.35
A3BV-3B	A3BV-3B	32	399.09	409.09-399.09
A3BV-4A	A3BV-4A	32	396.96	406.96-396.96
A3BV-4B	A3BV-4B	32	397.71	407.71-397.71
A3BV-5A	A3BV-5A	32	398.58	408.58-398.58
A3BV-5B	A3BV-5B	32	398.77	408.77-398.77
A3BV-6A	A3BV-6A	32	399.35	409.35-399.35
A3BV-6B	A3BV-6B	32	399.16	409.16-399.16

Bioventing System Area Piezometers

IEPA Well No.	Facility Well No.	Well Depth (ft.)	Well Depth Elevation (ft. MSL)	Well Screen Interval (ft. MSL)
A3PZ-N	A3PZ-N	35	396.11	396.11 - 411.11

A3PZ-C	A3PZ-C	35	396.22	396.22 - 411.22
A3PZ-S	A3PZ-S	35	396.14	396.14 - 411.14
A3PZ-N2	A3PZ-N2	34	394.64	404.64-394.64
A3PZ-C2	A3PZ-C2	35	394.61	404.61-394.61
A3PZ-S2	A3PZ-S2	36	394.66	404.66-394.66

Bioventing System Area Vapor Monitoring Points

IEPA Well No.	Facility Well No.	Well Depth (ft.)	Well Screen Interval (ft. BGS)	Well Diameter (inches)
A3VMPNA-10	A3VMPNA-10	10	9.5-10	0.75
A3VMPNA-20	A3VMPNA-20	20	19.5-20	0.75
A3VMPNA-24	A3VMPNA-24	24	23.5-24	0.75
A3VMPNA-28	A3VMPNA-28	28	27.5-28	0.75
A3VMPNB-15	A3VMPNB-15	15	14.5-15	0.75
A3VMPNB-22	A3VMPNB-22	22	21.5-22	0.75
A3VMPNB-26	A3VMPNB-26	26	25.5-26	0.75
A3VMPNB-30	A3VMPNB-30	30	29.5-30	0.75
A3VMPC-10	A3VMPC-10	10	9.5-10	0.75
A3VMPC-20	A3VMPC-20	20	19.5-20	0.75
A3VMPC-24	A3VMPC-24	24	23.5-24	0.75
A3VMPC-28	A3VMPC-28	28	27.5-28	0.75
A3VMPSW-10	A3VMPSW-10	10	9.5-10	0.75
A3VMPSW-20	A3VMPSW-20	20	19.5-20	0.75
A3VMPSW-24	A3VMPSW-24	24	23.5-24	0.75
A3VMPSW-28	A3VMPSW-28	28	27.5-28	0.75
A3VMPSW-15	A3VMPSW-15	15	14.5-15	0.75
A3VMPSW-22	A3VMPSW-22	22	21.5-22	0.75
A3VMPSW-26	A3VMPSW-26	26	25.5-26	0.75
A3VMPSW-30	A3VMPSW-30	30	29.5-30	0.75
A3VMPSE-10	A3VMPSE-10	10	9.5-10	0.75
A3VMPSE-20	A3VMPSE-20	20	19.5-20	0.75
A3VMPSE-24	A3VMPSE-24	24	23.5-24	0.75
A3VMPSE-28	A3VMPSE-28	28	27.5-28	0.75
A3VMPSE-15	A3VMPSE-15	15	14.5-15	0.75
A3VMPSE-22	A3VMPSE-22	22	21.5-22	0.75
A3VMPSE-26	A3VMPSE-26	26	25.5-26	0.75
A3VMPSE-30	A3VMPSE-30	30	29.5-30	0.75
A3VMP1-S	A3VMP1-S	17	16-17	0.75
A3VMP1-M	A3VMP1-M	22	21-22	0.75
A3VMP1-D	A3VMP1-D	27	26-27	0.75
A3VMP2-S	A3VMP2-S	17	16-17	0.75
A3VMP2-M	A3VMP2-M	22	21-22	0.75
A3VMP2-D	A3VMP2-D	27	26-27	0.75
A3VMP3-S	A3VMP3-S	17	16-17	0.75
A3VMP3-M	A3VMP3-M	22	21-22	0.75

A3VMP3-D	A3VMP3-D	27	26-27	0.75
A3VMP4-S	A3VMP4-S	17	16-17	0.75
A3VMP4-M	A3VMP4-M	22	21-22	0.75
A3VMP4-D	A3VMP4-D	27	26-27	0.75
A3VMP5-S	A3VMP5-S	17	16-17	0.75
A3VMP5-M	A3VMP5-M	22	21-22	0.75
A3VMP5-D	A3VMP5-D	27	26-27	0.75
A3VMP6-S	A3VMP6-S	17	16-17	0.75
A3VMP6-M	A3VMP6-M	22	21-22	0.75
A3VMP6-D	A3VMP6-D	27	26-27	0.75
A3VMP7-S	A3VMP7-S	17	16-17	0.75
A3VMP7-M	A3VMP7-M	22	21-22	0.75
A3VMP7-D	A3VMP7-D	27	26-27	0.75
A3VMP8-S	A3VMP8-S	17	16-17	0.75
A3VMP8-M	A3VMP8-M	22	21-22	0.75
A3VMP8-D	A3VMP8-D	27	26-27	0.75
A3VMP9-S	A3VMP9-S	17	16-17	0.75
A3VMP9-M	A3VMP9-M	22	21-22	0.75
A3VMP9-D	A3VMP9-D	27	26-27	0.75
A3VMP10-S	A3VMP10-S	17	16-17	0.75
A3VMP10-M	A3VMP10-M	22	21-22	0.75
A3VMP10-D	A3VMP10-D	27	26-27	0.75
A3VMP11-S	A3VMP11-S	17	16-17	0.75
A3VMP11-M	A3VMP11-M	22	21-22	0.75
A3VMP11-D	A3VMP11-D	27	26-27	0.75
A3VMP12-S	A3VMP12-S	17	16-17	0.75
A3VMP12-M	A3VMP12-M	22	21-22	0.75
A3VMP12-D	A3VMP12-D	27	26-27	0.75
A3VMP13-S	A3VMP13-S	17	16-17	0.75
A3VMP13-M	A3VMP13-M	22	21-22	0.75
A3VMP13-D	A3VMP13-D	27	26-27	0.75

Bioventing System Area Deep Monitoring Well

IEPA Well No.	Facility Well No.	Well Depth (ft.)	Well Depth Elevation (ft. MSL)	Well Screen Interval (ft. MSL)
A3AS-C	A3AS-C	70	361.19	361.19 - 366.19

**F. PILOT-SCALE SOUTHERN BIOSPARGE/BIOVENT SYSTEM**

A biosparging/bioventing pilot test was performed to evaluate the performance of this remedial approach and quantify the mass remediation rate (and thus remediation timeframe) in comparison to more traditional LNAPL/COC removal systems, such as groundwater/LNAPL physical extraction, and, in comparison with natural biodegradation rates. The test was also intended to determine the efficiency of using a horizontal well for sparging, and whether this approach could potentially be used to serve as a barrier for contaminant migration in the dissolved phase. Performance of the pilot-scale system was presented in the October 2018

Performance Report – Pilot-Scale Bioremediation Systems (BP, 2018); the pilot test finding is that biosparging/bioventing is treating hydrocarbons more effectively than previous hydrocarbon recovery efforts.

The biosparge system was modified to treat a larger area to the north and west of the original implementation area and to include use of bioventing. When operating under the expanded bioventing scenario, flow from the existing compressor is routed through a flow amplifying air eductor and manifold to deliver air to 36 vertical biovent wells (as opposed to the original single horizontal biosparge well). The monitoring network was also expanded with the addition of piezometers and VMPs. The wells associated with the biosparge/biovent system expansion were installed in 2019-2020. Active biosparging in the horizontal well was shut down in September 2020 as part of the modifications to the current operating system. Full-time operation of the modified and expanded Southern Biosparge/Biovent System was initiated in July 2021.

In April 2023, BP Main Plant Observation Well G16L was converted to a passive biovent well by fitting a one-way valve to allow ambient air into the vadose zone when negative pressure is present in the subsurface. In December 2023, G16L was then converted to an active biovent well as part of the Pilot-Scale Southern Biosparge/Biovent System.

A timeline of system operations is provided below.

Time Period	Description	Wells
April 2017-September 2020	Initial horizontal well operates with active biosparging.	A5HBS
October 2020-June 2021	System shut down for completion of system expansions and electrical system upgrades.	
July 2021-2024 (ongoing)	Expansion system wells operate with active bioventing.	A5BV-1, A5BV-2, A5BV-3, A5BV-4, A5BV-5, A5BV-6, A5BV-7, A5BV-8, A5BV-9, A5BV-10, A5BV-11, A5BV-12, A5BV-13, A5BV-14, A5BV-15, A5BV-16, A5BV-17, A5BV-18, A5BV-19, A5BV-20, A5BV-21, A5BV-22, A5BV-23, A5BV-24, A5BV-25, A5BV-26, A5BV-27, A5BV-28, A5BV-29, A5BV-30, A5BV-31, A5BV-32, A5BV-33, A5BV-34, A5BV-35

April 2023- November 2023	Main Plant Observation Well used for passive bioventing.	G16L
December 2023- 2024 (ongoing)	Main Plant Observation Well used for active bioventing.	G16L

**System Description**

The biosparge/biovent pilot test system is designed to deliver air into the subsurface at moderate flow rates and pressure. The biosparge scenario volatilizes VOCs in the saturated zone and enhances biodegradation of those impacts via inducing aerobic conditions. The biovent scenario delivers air to the vadose zone to ensure aerobic conditions are present which enhances hydrocarbon biodegradation. Flow from a compressor delivers air at flow rates up to 150 scfm at 40 psi. Air from the compressor has a receiver tank, particulate filter, throttling valve, flow meter, and pressure gauge. The biosparge/biovent process and instrumentation diagram is presented as Figure 4, and the biosparge/biovent process flow schematic is presented as Figure 4A.

Under the biosparge scenario, flow from the equipment is routed directly to the biosparge horizontal well with a flow control valve, flowmeter, pressure regulator, and pressure gauge. Operation of the well is controlled with a normally-closed solenoid controlled via an HMI screen on an interior control panel. The system components are plumbed in a modular/mobile enclosure with environmental controls (e.g. lighting interior and exterior, heating, and ventilation).

Biosparge configurations and flow rates are controlled by system valves, the pressure regulator, PLC and HMI. The system is designed to operate the biosparge well at flow rates between 30 and 150 scfm but typically operates in the range of 50 to 85 scfm total flow. Flow rates, pressures, and operational timing are monitored and maintained by system technicians and engineers.

Under the biovent configuration, rather than running compressed air directly to the biosparge horizontal well, compressed air is run through an air eductor to boost flow rates up to 240 scfm at 10 psi in a manifold building with 36 manifold points. Each well on the manifold is equipped with a flow control valve, flowmeter, pressure regulator, and pressure gauge. Operation of each well is controlled with a normally-closed solenoid controlled via an HMI screen on an interior control panel. The manifold components are plumbed in a modular/mobile enclosure with environmental controls (e.g. lighting interior and exterior, heating, and ventilation).

**Biosparge System Layout and Well Network**

The biosparge/biovent system layout and well network are depicted on Figure 5. The Biosparge Remediation Well includes the horizontal biosparge well. There are 35 biovent remediation wells in the Southern Biosparge/Biovent System area, plus the monitoring well (G16L) to

which bioventing is being applied. Performance monitoring utilizes a series of piezometers and VMPs as summarized below.

#### Biosparge Horizontal Well:

One (1) horizontal biosparge well was installed for the pilot test. The biosparge well construction described below was designed to be placed at the bottom of groundwater impacts to create an oxygen curtain through which impacted water should pass. The screened portion of the well is 150 feet long and placed perpendicular to groundwater flow; the screen length allows for groundwater flow to be influenced within the targeted area even with minor temporal variations in groundwater flow.

Horizontal biosparge well construction specifications are summarized below:

- I. Horizontal directional drilling methodology;
- II. Installed at a depth of 45 ft-bgs;
- III. Screen length of 150 feet;
- IV. Riser length of 240 to 250 feet on each end of well (630 feet total length horizontally);
- V. 3-inch diameter, HDPE construction;
- VI. Custom slotting to uniformly sparge approximately 2 to 10 scfm per 10 horizontal feet of screen.

#### **Biovent Wells:**

Thirty-five (35) biovent wells were installed during the system expansion. Biovent well construction was designed to target the vadose zone directly above the groundwater table under typical conditions. In December 2023, G16L was converted to an active biovent well, for a current total of thirty-six (36) biovent wells.

#### **Piezometers:**

A total of twenty-two (22) piezometers were installed at three different depths – fifteen (15) shallow, six (6) mid, and one (1) deep to monitor the vertical extent of impacts in the water table. In the biosparge area, seven (7) wells were installed upgradient of the biosparge well and twelve (12) wells downgradient. In the biovent area, three (3) additional piezometers supplement existing monitoring wells in the treatment area (A6MW03, G048, and G049).

#### **Vapor Monitoring Points:**

Twenty-eight (28) nested VMPs were installed to monitor the vadose zone impacts. Each set of nested points contains two (2) to three (3) depths of monitoring points to assess the vadose zone vertically for a total of 81 points. VMP placement is meant to measure influence at different depths and measure the extent of influence perpendicular from the well screen orientation.

The wells comprising the Biosparging system are listed below:

Biosparging Hydrocarbon Remediation Well

IEPA Well No.	Facility Well No.	Well Depth (ft.)	Well Depth Elevation (ft. MSL)	Well Screen Interval (ft. MSL)
A5HBS*	A5HBS	45	varies*	(150 ft long)*

\*Horizontal Well

Bioventing Hydrocarbon Remediation Wells

IEPA Well No.	Facility Well No.	Well Depth (ft.)	Well Depth Elevation (ft. MSL)	Well Screen Interval (ft. MSL)
A5BV-1	A5BV-1	36	395.27	405.27-395.27
A5BV-2	A5BV-2	36	396.77	406.77-396.77
A5BV-3	A5BV-3	36	396.08	406.08-396.08
A5BV-4	A5BV-4	36	395.99	405.99-395.99
A5BV-5	A5BV-5	36	395.93	405.93-395.93
A5BV-6	A5BV-6	36	394.65	404.65-394.65
A5BV-7	A5BV-7	36	395.51	405.51-395.51
A5BV-8	A5BV-8	36	NS	NS
A5BV-9	A5BV-9	36	396.53	406.53-396.53
A5BV-10	A5BV-10	36	396.45	406.45-396.45
A5BV-11	A5BV-11	36	396.33	406.33-396.33
A5BV-12	A5BV-12	36	396.32	406.32-396.32
A5BV-13	A5BV-13	34	397.05	407.05-397.05
A5BV-14	A5BV-14	36	397.62	407.62-397.62
A5BV-15	A5BV-15	36	NS	NS
A5BV-16	A5BV-16	36	NS	NS
A5BV-17	A5BV-17	36	396.39	406.39-396.39
A5BV-18	A5BV-18	36	396.38	406.38-396.38
A5BV-20	A5BV-20	36	395.21	405.21-395.21
A5BV-21	A5BV-21	36	395.26	405.26-395.23
A5BV-22	A5BV-22	36	397.00	407.00-397.00
A5BV-23	A5BV-23	38	391.95	406.95-391.95
A5BV-24	A5BV-24	41	391.75	406.75-391.75
A5BV-25	A5BV-25	41	391.38	406.38-391.38
A5BV-26	A5BV-26	36	397.40	407.40-397.40
A5BV-27	A5BV-27	38	395.68	405.68-395.68
A5BV-28	A5BV-28	38	393.43	408.43-393.43
A5BV-29	A5BV-29	38	395.04	410.04-395.04
A5BV-31	A5BV-31	38	394.73	409.73-394.73
A5BV-32	A5BV-32	33	398.32	408.32-398.32
A5BV-33	A5BV-33	34	397.61	407.61-397.61
A5BV-34	A5BV-34	38	391.53	406.53-391.53
A5BV-35	A5BV-35	38	391.48	406.48-391.48
A5BV-36	A5BV-36	38	391.65	406.65-391.65



NS – Not surveyed, in a health and safety exclusion zone during surveying.

Biosparging/Bioventing System Area Piezometers

IEPA Well No.	Facility Well No.	Well Depth (ft.)	Well Depth Elevation (ft. MSL)	Well Screen Interval (ft. MSL)
A5PZN-S	A5PZN-S	40	389.29	389.29 - 399.29
A5PZNW-S	A5PZNW-S	38	391.56	391.56 - 401.56
A5PZNW-M	A5PZNW-M	45	384.51	384.51 - 389.51
A5PZW-S	A5PZW-S	39.5	390.44	390.44 - 400.44
A5PZW-M	A5PZW-M	45	385.07	385.07 - 390.07
A5PZW-D	A5PZW-D	65	365.04	365.04 - 370.04
A5PZW-S1	A5PZW-S1	40	389.51	389.51 - 399.51
A5PZW-S2	A5PZW-S2	40	389.85	389.85 - 399.85
A5PZSW-S	A5PZSW-S	40	389.82	389.82 - 399.82
A5PZSW-M	A5PZSW-M	45	384.86	384.86 - 389.86
A5PZNE-S	A5PZNE-S	40	389.51	389.51 - 399.51
A5PZNE-M	A5PZNE-M	45	384.51	384.51 - 389.51
A5PZE-S1	A5PZE-S1	40	389.93	389.93 - 399.93
A5PZE-S2	A5PZE-S2	40	390.72	390.72 - 400.72
A5PZE-M	A5PZE-M	45	384.62	384.62 - 389.62
A5PZSE-S	A5PZSE-S	40	389.79	389.79 - 399.79
A5PZSE-M	A5PZSE-M	45	384.71	384.71 - 389.71
A5PZS-S1	A5PZS-S1	40	389.51	389.51 - 399.51
A5PZS-S2	A5PZS-S2	40	389.90	389.90 - 399.90
A5PZ-1	A5PZ-1	40	392.47	402.47-392.47
A5PZ-2	A5PZ-2	40	391.59	401.59-391.59
A5PZ-3	A5PZ-3	40	NS	NS

Biosparging System Area Vapor Monitoring Points

IEPA Well No.	Facility Well No.	Well Depth (ft.)	Well Screen Interval (ft. BGS)	Well Diameter (inches)
A5VMPNW-S	A5VMPNW-S	10	9.5-10	0.75
A5VMPNW-M	A5VMPNW-M	20	19.5-20	0.75
A5VMPNW-D	A5VMPNW-D	25	24.5-25	0.75
A5VMPSW-S	A5VMPSW-S	10	9.5-10	0.75
A5VMPSW-M	A5VMPSW-M	20	19.5-20	0.75
A5VMPSW-D	A5VMPSW-D	25	24.5-25	0.75
A5VMPW-S	A5VMPW-S	10	9.5-10	0.75
A5VMPW-M	A5VMPW-M	20	19.5-20	0.75
A5VMPW-D	A5VMPW-D	25	24.5-25	0.75
A5VMPE-S	A5VMPE-S	10	9.5-10	0.75
A5VMPE-M	A5VMPE-M	20	19.5-20	0.75
A5VMPE-D	A5VMPE-D	25	24.5-25	0.75

A5VMP1-S	A5VMP1-S	23	22-23	0.75
A5VMP1-M	A5VMP1-M	28	27-28	0.75
A5VMP2-S	A5VMP2-S	23	22-23	0.75
A5VMP2-M	A5VMP2-M	28	27-28	0.75
A5VMP2-D	A5VMP2-D	33	32-33	0.75
A5VMP3-S	A5VMP3-S	22	21-22	0.75
A5VMP3-M	A5VMP3-M	27	26-27	0.75
A5VMP3-D	A5VMP3-D	32	31-32	0.75
A5VMP4-S	A5VMP4-S	22	21-22	0.75
A5VMP4-M	A5VMP4-M	29	28-29	0.75
A5VMP4-D	A5VMP4-D	33	32-33	0.75
A5VMP5-S	A5VMP5-S	23	22-23	0.75
A5VMP5-M	A5VMP5-M	28	27-28	0.75
A5VMP6-S	A5VMP6-S	21	20-21	0.75
A5VMP6-M	A5VMP6-M	26	25-26	0.75
A5VMP6-D	A5VMP6-D	31	30-31	0.75
A5VMP7-S	A5VMP7-S	21	20-21	0.75
A5VMP7-M	A5VMP7-M	26	25-26	0.75
A5VMP7-D	A5VMP7-D	31	30-31	0.75
A5VMP8-S	A5VMP8-S	22	21-22	0.75
A5VMP8-M	A5VMP8-M	27	26-27	0.75
A5VMP8-D	A5VMP8-D	32	31-32	0.75
A5VMP9-S	A5VMP9-S	20	19-20	0.75
A5VMP9-M	A5VMP9-M	25	24-25	0.75
A5VMP10-S	A5VMP10-S	20	19-20	0.75
A5VMP10-M	A5VMP10-M	25	24-25	0.75
A5VMP10-D	A5VMP10-D	30	29-30	0.75
A5VMP11-S	A5VMP11-S	22	21-22	0.75
A5VMP11-M	A5VMP11-M	27	26-27	0.75
A5VMP11-D	A5VMP11-D	32	31-32	0.75
A5VMP12-S	A5VMP12-S	22	21-22	0.75
A5VMP12-M	A5VMP12-M	27	26-27	0.75
A5VMP12-D	A5VMP12-D	32	31-32	0.75
A5VMP13-S	A5VMP13-S	22	21-22	0.75
A5VMP13-M	A5VMP13-M	27	26-27	0.75
A5VMP13-D	A5VMP13-D	32	31-32	0.75
A5VMP14-S	A5VMP14-S	22	21-22	0.75
A5VMP14-M	A5VMP14-M	27	26-27	0.75
A5VMP14-D	A5VMP14-D	32	31-32	0.75
A5VMP15-S	A5VMP15-S	22	21-22	0.75
A5VMP15-M	A5VMP15-M	27	26-27	0.75
A5VMP15-D	A5VMP15-D	32	31-32	0.75
A5VMP16-S	A5VMP16-S	22	21-22	0.75
A5VMP16-M	A5VMP16-M	27	26-27	0.75
A5VMP16-D	A5VMP16-D	32	31-32	0.75
A5VMP17-S	A5VMP17-S	22	21-22	0.75
A5VMP17-M	A5VMP17-M	27	26-27	0.75

A5VMP17-D	A5VMP17-D	32	31-32	0.75
A5VMP18-S	A5VMP18-S	22	21-22	0.75
A5VMP18-M	A5VMP18-M	27	26-27	0.75
A5VMP18-D	A5VMP18-D	32	31-32	0.75
A5VMP19-S	A5VMP19-S	22	21-22	0.75
A5VMP19-M	A5VMP19-M	27	26-27	0.75
A5VMP19-D	A5VMP19-D	32	31-32	0.75
A5VMP20-S	A5VMP20-S	24	23-24	0.75
A5VMP20-M	A5VMP20-M	28	27-28	0.75
A5VMP20-D	A5VMP20-D	32	31-32	0.75
A5VMP21-S	A5VMP21-S	22	21-22	0.75
A5VMP21-M	A5VMP21-M	27	26-27	0.75
A5VMP21-D	A5VMP21-D	32	31-32	0.75
A5VMP22-S	A5VMP22-S	22	21-22	0.75
A5VMP22-M	A5VMP22-M	27	26-27	0.75
A5VMP22-D	A5VMP22-D	35	34-35	0.75
A5VMP23-S	A5VMP23-S	22	21-22	0.75
A5VMP23-M	A5VMP23-M	27	26-27	0.75
A5VMP23-D	A5VMP23-D	32	31-32	0.75
A5VMP24-S	A5VMP24-S	23	22-23	0.75
A5VMP24-M	A5VMP24-M	28	27-28	0.75
A5VMP24-D	A5VMP24-D	32	31-32	0.75

**G. PILOT-SCALE AIR SPARGE / SOIL VAPOR EXTRACTION (AS/SVE) SYSTEM**

An AS/SVE pilot test was performed to evaluate performance of this remedial approach and quantify the mass remediation rate (and thus remediation timeframe) in comparison to more traditional LNAPL/COC removal systems, such as groundwater/LNAPL physical extraction, and, in comparison with natural biodegradation rates. The AS/SVE test is evaluating the combined effects air sparging below the water table for stripping of contaminants and enhancing aerobic biodegradation in the vadose zone and below the water table via introduction of ambient air. SVE is specifically utilized when biodegradation is insufficient to control the VOCs in soil gas during sparging or bioventing. Performance of the pilot-scale system was presented in the October 2018 Performance Report – Pilot-Scale Bioremediation Systems (BP, 2018); the pilot test finding is that AS/SVE is treating hydrocarbons more effectively than previous hydrocarbon recovery efforts.

The AS/SVE extraction system was modified to treat a larger area to the south, east, and west of the original AS/SVE pilot test area. This included installation of additional air sparge and soil vapor extraction wells. To treat the additional loading, a catalytic oxidizer is being used for the treatment of off-gases, a change from the previous granular activated carbon off-gas treatment system. The monitoring network was also modified with the addition of piezometers and VMPs. All of the expansion wells were installed in 2019-2020. The initial AS/SVE pilot system was shut down in July 2020 as part of the modifications to the current operating system. Full-time operation of the expanded AS/SVE System was initiated in December 2020.

The four SVE wells and four shallow piezometers from the initial AS/SVE system area were converted to passive biovent wells in December 2021 by fitting one-way valves that allow ambient air into the vadose zone when negative pressure is present in the subsurface.

A timeline of system operations is provided below.

Time Period	Description	Wells
June 2017-July 2020	Initial pilot wells operate AS/SVE with granular activated carbon (GAC) off-gas treatment.	A8AS-N, A8AS-W, A8AS-E, A8AS-S, A8AS-C, A8SVE-NW, A8SVE-NE, A8SVESW, A8SVE-SE
August 2020- November 2020	System shut down for completion of system expansions and electrical system upgrades.	
December 2020- 2024 (ongoing)	Expansion system wells operate AS/SVE with catalytic oxidizer off-gas treatment.	A8AS-1A, A8AS-1B, A8AS-1C, A8AS-2A, A8AS-2B, A8AS-2C, A8AS-3A, A8AS-3B, A8AS-3C, A8AS-4A, A8AS-4B, A8AS-4C, A8AS-5A, A8AS-5B, A8AS-5C, A8SVE-1A, A8SVE-1B, A8SVE-2A, A8SVE-2B, A8SVE-3A, A8SVE-3B
October 2022-2024 (ongoing)	Initial pilot SVE wells and shallow piezometers used for passive bioventing.	A8SVE-NW, A8SVE-NE, A8SVE-SW, A8SVE-SE, A8PZS-S, A8PZN-S, A8PZNE-S, A8PZSW-S

**System Description**

The AS/SVE pilot test system is designed to deliver air into the subsurface and capture resultant vapors. Flow from the AS compressor delivers air at total flow rates up to 150 scfm at 50 psi, split into up to fifteen (15) of the twenty (20) AS wells. Air from the blower has a receiver tank, particulate filter, throttling valve, flow meter, and pressure gauge. Flow from the SVE blower collects vapors at total flow rates up to 500 scfm at 60 inches of water column (iw), split among up to six (6) of the ten (10) SVE wells. Vapors collected from the blower pass through throttling valves, a moisture knockout tank, dilution valve, vacuum gauges, and particulate filter prior to entering the blower. After exiting the blower discharged vapors pass through a flow meter, pressure gauge, and temperature gauge prior to passing through a heat exchanger and catalytic oxidizer prior to discharging through a stack. The off-gas treatment via a catalytic oxidizer was installed in the third quarter of 2020 and is a change from granular activated carbon treatment utilized during initial pilot test operation.

Condensate collected in the moisture separator is drained via an automated pumping system to a condensate holding tank within the enclosure. This condensate is periodically pumped out manually and discharged to the catch basin in the wash down pad for entry into the site groundwater treatment system. The AS/SVE process and instrumentation plan is presented as Figure 6, and the AS/SVE system schematic is presented as Figure 6A.

AS flow is routed through a five (5)-point manifold and split to reach up to fifteen (15) of the twenty (20) AS wells. Each manifold leg has a solenoid valve, flow control valve, rotameter-style flowmeter, and pressure gauge. SVE flow is collected through a four (4)-point manifold to up to six (6) of the ten (10) SVE wells. Each manifold leg has a flow control valve, pilot-tube flowmeter, and vacuum gauge.

The system components are plumbed in a modular/mobile enclosure with interior/exterior lighting and environmental controls (e.g. heating and ventilation). Operational controls for the system include programmed/automated controls in the form of a PLC with HMI, individual equipment components, and automated operation of the process control valves. The gas flow capacities of the AS/SVE system are controlled by the air compressor and the SVE blower. AS compressor flow rates to the individual air sparge wells are between 1 and 30 scfm, with a combined rate of up to 150 scfm at 50 psi. Flow from the SVE blower collects vapors at total flow rates up to 500 scfm at 60 iw, split among the SVE wells. Flow rates, pressures, and operational timing are monitored and maintained by system technicians and engineers.

#### **AS/SVE System Layout and Well Network**

The AS/SVE system layout and well network are depicted on Figure 7. The Remediation Wells include twenty (20) AS wells and ten (10) SVE wells. At any given time, up to fifteen (15) AS wells and six (6) SVE wells can be active; the active Remediation Wells can be configured based on the capacity of the equipment and manifold listed above. Performance monitoring utilizes a series of piezometers and VMPs as summarized below.

**Air Sparge Wells:** Twenty (20) AS wells were installed in the treatment areas. The AS wells were installed to the full depth of groundwater impacts.

**SVE Wells:** Ten (10) SVE wells were installed to capture vapors created by the AS wells. The wells were placed to cover the AS well layout to ensure capture of any generated vapors.

**Piezometers:** A total of sixteen (16) piezometers were installed at three different depths - shallow, mid, and deep to monitor the full extent of impacts in groundwater. In the expansion area, the piezometers supplement existing monitoring wells in the treatment area (G85L and G86L). In June 2023, R85L, R85D, and R85A were installed to replace G85L, which was plugged and abandoned in November 2023.

**Vapor Monitoring Points:** Seventeen (17) nested VMPs were installed to monitor the vadose zone impacts. Each nested point contains three depths of monitoring points to assess the full vadose zone vertically, for a total of fifty-one (51) total VMPs.

The wells comprising the AS/SVE system are listed below:

Active AS/SVE Hydrocarbon Remediation Wells

IEPA Well No.	Facility Well No.	Well Depth (ft.)	Well Depth Elevation (ft. MSL)	Well Screen Interval (ft. MSL)
A8AS-N	A8AS-N	50	390.49	395.49 – 390.49
A8AS-W	A8AS-W	50	390.51	395.51 – 390.51
A8AS-C	A8AS-C	50	390.74	395.74 – 390.74
A8AS-E	A8AS-E	45	395.59	400.59 – 395.59
A8AS-S	A8AS-S	45	395.71	400.71 – 395.71
A8SVE-NW	A8SVE-NW	35	405.55	415.55 – 405.55
A8SVE-NE	A8SVE-NE	35	405.49	415.49 – 405.49
A8SVE-SW	A8SVE-SW	35	405.71	415.71 – 405.71
A8SVE-SE	A8SVE-SE	35	405.64	415.64 – 405.64
A8AS-1A	A8AS-1A	67	373.53	378.53-373.53
A8AS-1B	A8AS-1B	67	373.57	378.57-373.57
A8-AS-1C	A8-AS-1C	70	369.62	374.62-369.62
A8AS-2A	A8AS-2A	67	373.28	378.28-373.28
A8AS-2B	A8AS-2B	67	372.67	377.67-372.67
A8AS-2C	A8AS-2C	70	369.06	374.06-369.06
A8-AS-3A	A8-AS-3A	65	375.59	380.59-375.59
A8AS-3B	A8AS-3B	67	372.66	377.66-372.66
A8-AS-3C	A8-AS-3C	70	368.98	373.98-368.98
A8-AS-4A	A8-AS-4A	65	376.67	381.67-376.67
A8-AS-4B	A8-AS-4B	65	375.83	380.83-375.83
A8-AS-4C	A8-AS-4C	65	375.25	380.25-375.25
A8-AS-5A	A8-AS-5A	65	376.87	381.87-376.87
A8-AS-5B	A8-AS-5B	65	376.71	381.71-376.71
A8-AS-5C	A8-AS-5C	65	376.10	381.10-376.10
A8SVE-1A	A8SVE-1A	25	415.27	425.27-415.27
A8SVE-1B	A8SVE-1B	25	411.49	421.49-411.49
A8SVE-2A	A8SVE-2A	25	415.73	425.73-415.73
A8SVE-2B	A8SVE-2B	25	413.82	423.82-413.82
A8SVE-3A	A8SVE-3A	25	416.91	426.91-416.91
A8SVE-3B	A8SVE-3B	25	416.31	426.31-416.31

AS/SVE System Area Piezometers

IEPA Well No.	Facility Well No.	Well Depth (ft.)	Well Depth Elevation (ft. MSL)	Well Screen Interval (ft. MSL)
A8PZN-S	A8PZN-S	30	410.88	410.88 - 420.88
A8PZN-M	A8PZN-M	40	400.78	400.78 - 405.78
A8PZN-D	A8PZN-D	45	395.70	395.70 - 400.70
A8PZNW-S	A8PZNW-S	30	410.56	410.56 - 420.56
A8PZNW-M	A8PZNW-M	40	400.57	400.57 - 405.57
A8PZNW-D	A8PZNW-D	45	395.63	395.63 - 400.63

A8PZSE-S	A8PZSE-S	30	410.77	410.77 - 420.77
A8PZSE-M	A8PZSE-M	40	400.76	400.76 - 405.76
A8PZSE-D	A8PZSE-D	45	395.71	395.71 - 400.71
A8PZS-S	A8PZS-S	30	410.66	410.66 - 420.66
A8PZS-M	A8PZS-M	40	400.62	400.62 - 405.62
A8PZS-D	A8PZS-D	45	395.61	395.61 - 400.61
A8PZ-C	A8PZ-C	52	387.85	397.85-387.85
A8PZ-SE	A8PZ-SE	45	396.18	406.18-396.18
A8PZ-NE	A8PZ-NE	50	391.82	401.82-391.82
A8PZ-SW	A8PZ-SW	49	387.30	397.30-387.30

AS/SVE System Area Vapor Monitoring Points

IEPA Well No.	Facility Well No.	Well Depth (ft.)	Well Screen Interval (ft. BGS)	Well Diameter (inches)
A8VMPN-S	A8VMPN-S	10	9.5-10	0.75
A8VMPN-M	A8VMPN-M	20	19.5-20	0.75
A8VMPN-D	A8VMPN-D	25	24.5-25	0.75
A8VMPNE-S	A8VMPNE-S	10	9.5-10	0.75
A8VMPNE-M	A8VMPNE-M	20	19.5-20	0.75
A8VMPNE-D	A8VMPNE-D	25	24.5-25	0.75
A8VMPS-S	A8VMPS-S	10	9.5-10	0.75
A8VMPS-M	A8VMPS-M	20	19.5-20	0.75
A8VMPS-D	A8VMPS-D	25	24.5-25	0.75
A8VMPSW-S	A8VMPSW-S	10	9.5-10	0.75
A8VMPSW-M	A8VMPSW-M	20	19.5-20	0.75
A8VMPSW-D	A8VMPSW-D	25	24.5-25	0.75
A8VMP1-S	A8VMP1-S	5	4-5	0.75
A8VMP1-M	A8VMP1-M	15	14-15	0.75
A8VMP1-D	A8VMP1-D	25	24-25	0.75
A8VMP2-S	A8VMP2-S	5	4-5	0.75
A8VMP2-M	A8VMP2-M	15	14-15	0.75
A8VMP2-D	A8VMP2-D	25	24-25	0.75
A8VMP3-S	A8VMP3-S	5	4-5	0.75
A8VMP3-M	A8VMP3-M	15	14-15	0.75
A8VMP3-D	A8VMP3-D	25	24-25	0.75
A8VMP4-S	A8VMP4-S	5	4-5	0.75
A8VMP4-M	A8VMP4-M	15	14-15	0.75
A8VMP4-D	A8VMP4-D	25	24-25	0.75
A8VMP5-S	A8VMP5-S	5	4-5	0.75
A8VMP5-M	A8VMP5-M	15	14-15	0.75
A8VMP5-D	A8VMP5-D	25	24-25	0.75
A8VMP6-S	A8VMP6-S	5	4-5	0.75
A8VMP6-M	A8VMP6-M	15	14-15	0.75
A8VMP6-D	A8VMP6-D	25	24-25	0.75
A8VMP7-S	A8VMP7-S	5	4-5	0.75

A8VMP7-M	A8VMP7-M	15	14-15	0.75
A8VMP7-D	A8VMP7-D	25	24-25	0.75
A8VMP8-S	A8VMP8-S	5	4-5	0.75
A8VMP8-M	A8VMP8-M	15	14-15	0.75
A8VMP8-D	A8VMP8-D	25	24-25	0.75
A8VMP9-S	A8VMP9-S	5	4-5	0.75
A8VMP9-M	A8VMP9-M	15	14-15	0.75
A8VMP9-D	A8VMP9-D	25	24-25	0.75
A8VMP10-S	A8VMP10-S	5	4-5	0.75
A8VMP10-M	A8VMP10-M	15	14-15	0.75
A8VMP10-D	A8VMP10-D	25	24-25	0.75
A8VMP11-S	A8VMP11-S	5	4-5	0.75
A8VMP11-M	A8VMP11-M	15	14-15	0.75
A8VMP11-D	A8VMP11-D	25	24-25	0.75
A8VMP12-S	A8VMP12-S	5	4-5	0.75
A8VMP12-M	A8VMP12-M	15	14-15	0.75
A8VMP12-D	A8VMP12-D	25	24-25	0.75
A8VMP13-S	A8VMP13-S	5	4-5	0.75
A8VMP13-M	A8VMP13-M	15	14-15	0.75
A8VMP13-D	A8VMP13-D	25	24-25	0.75

**Figures to Attachment E:**

- E-1 -- Site Plan
- E-2 -- Process and Instrumentation Plan – Central Biovent System
- E-2A- Process Flow Schematic Central Biovent Area
- E-3 – Area 3 Biovent Expansion
- E-4 -- Process and Instrumentation Plan – Southern Biosparge System
- E-4A-Process Flow Schematic Southern Biosparge/Biovent Area
- E-5 – Area 5 Biosparge/ Biovent System Area
- E-6 – Process and Instrumentation Plan – Air Sparge/SVE System
- E-6A-Process Flow Schematic Northern AS/SVE Area
- E-7 – Northern Air Sparge/ Soil Vapor Extraction System Area



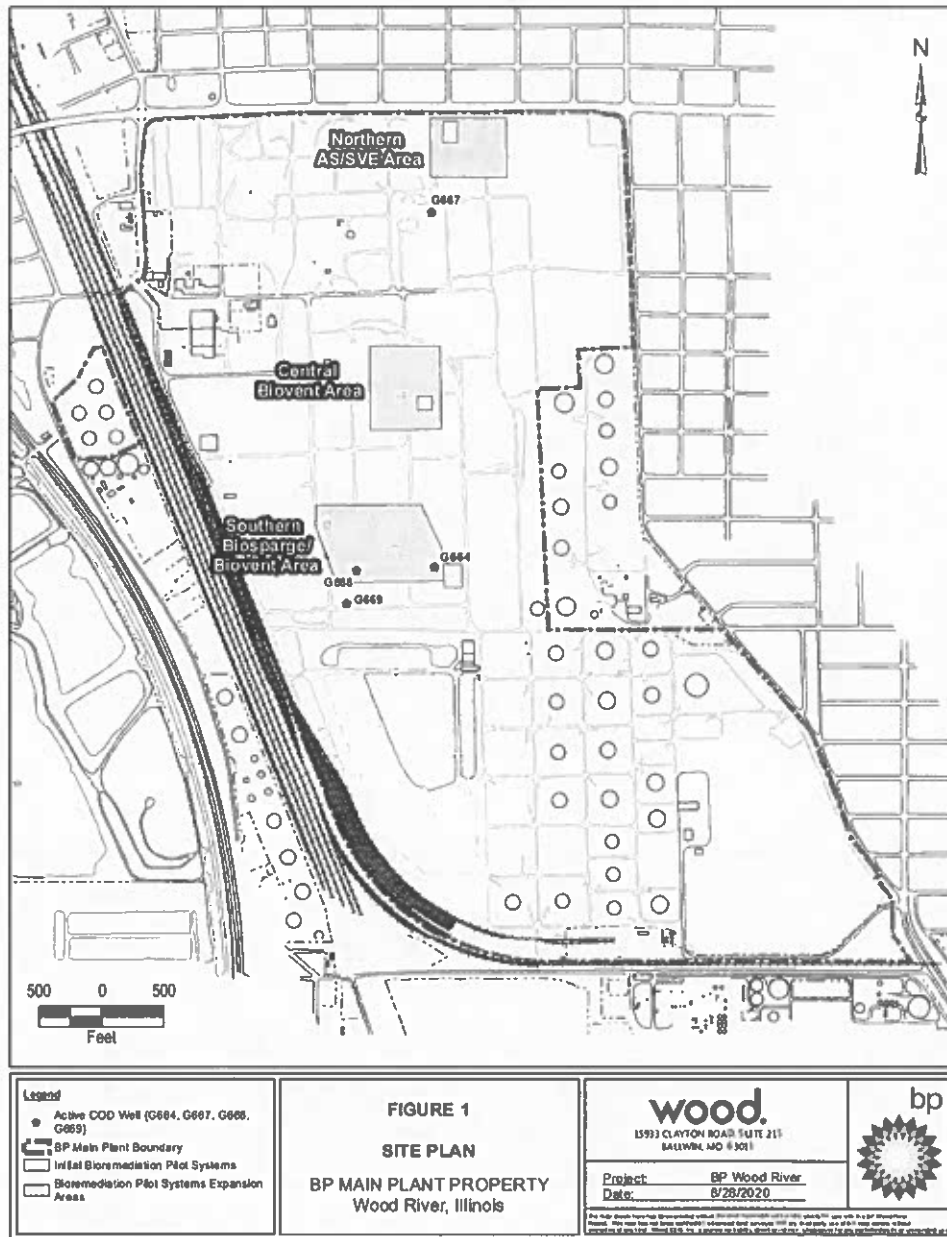


Figure E-1 -- Site Plan

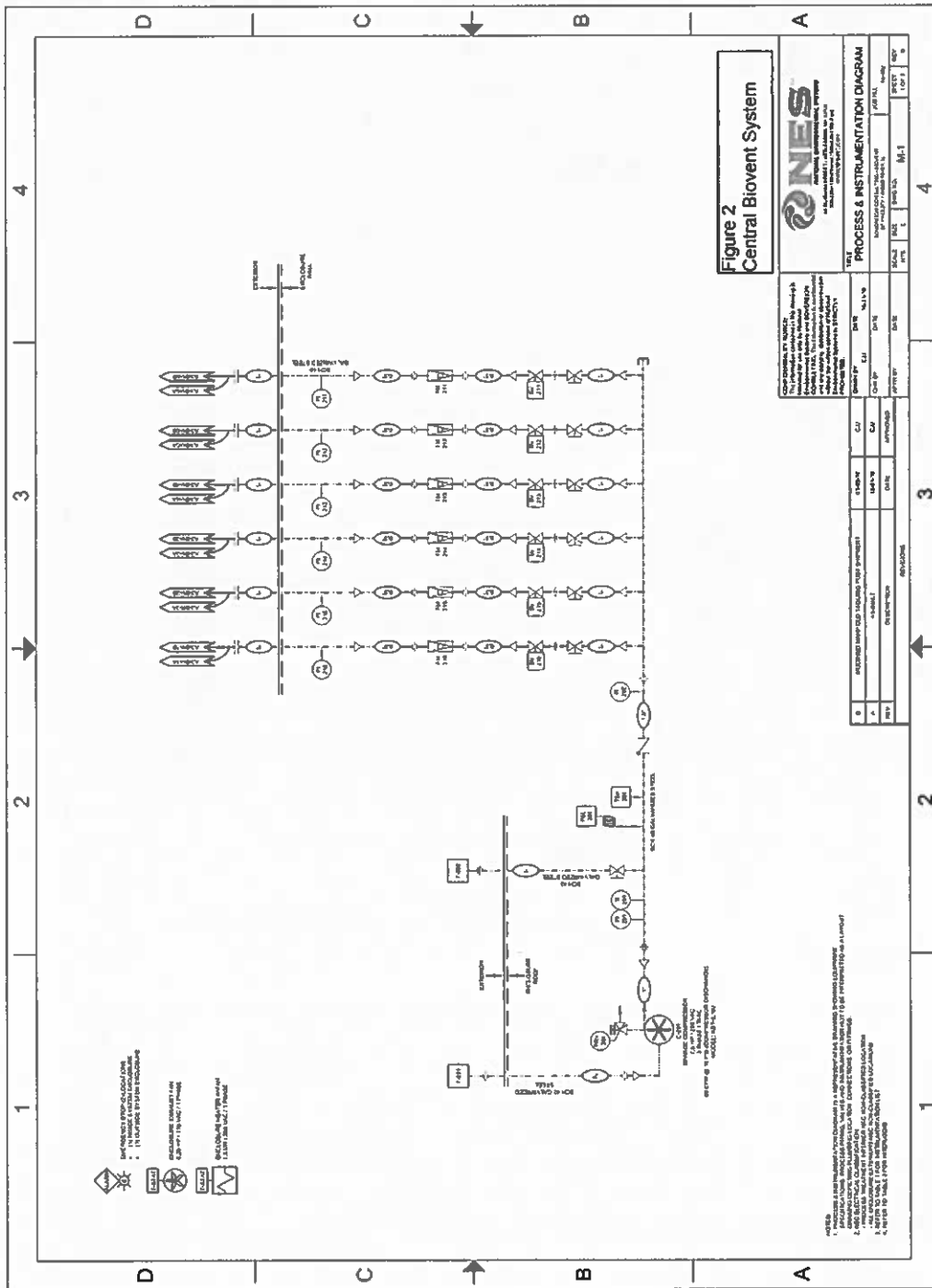
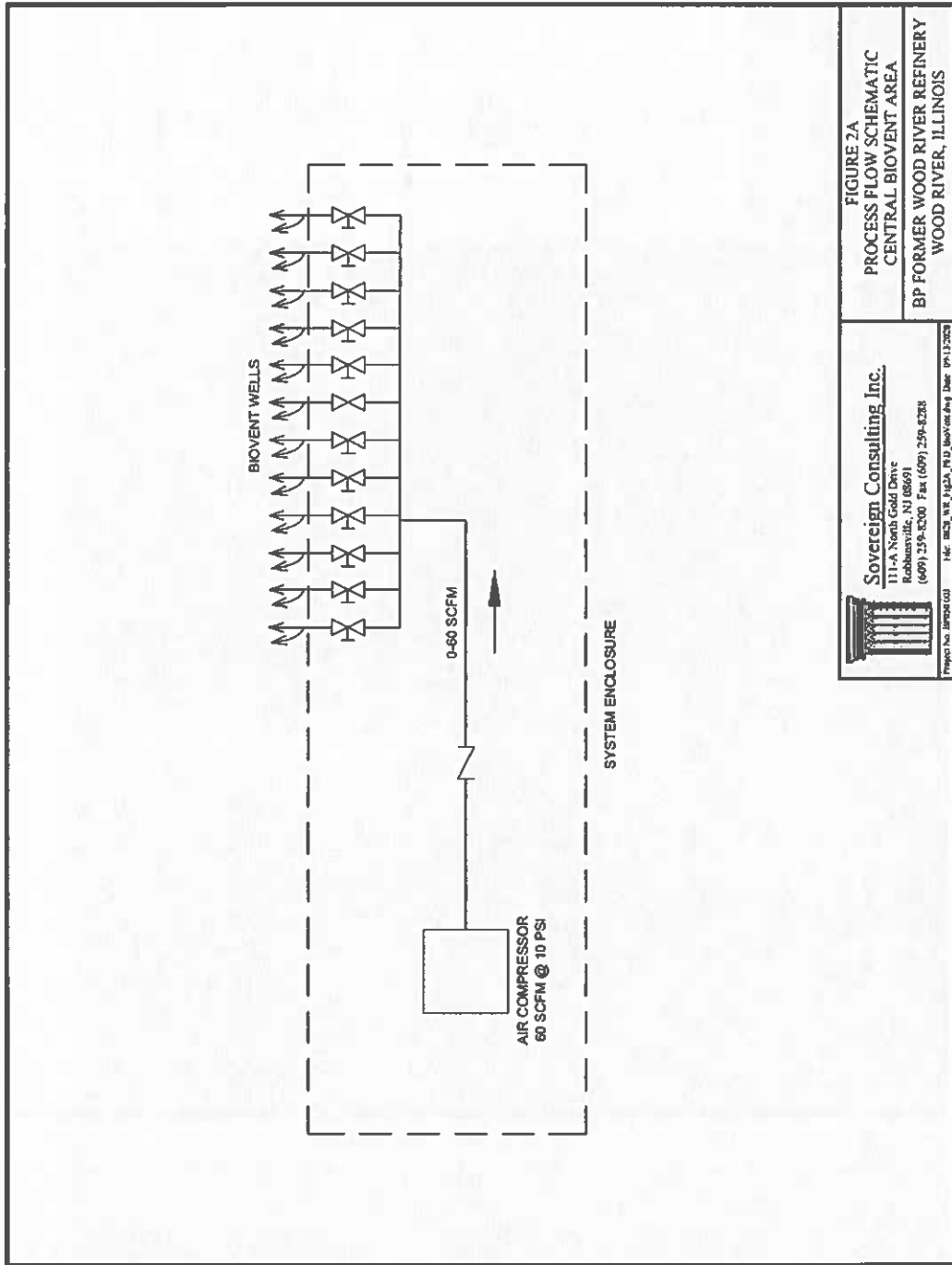


Figure E-2 -- Process and Instrumentation Plan – Central Biovent System




 <b>Sovereign Consulting, Inc.</b> 111-A North Gold Drive Robbinsville, NJ 08691 (609) 259-8200 Fax (609) 259-8288	<b>FIGURE 2A</b> <b>PROCESS FLOW SCHEMATIC</b> <b>CENTRAL BIOVENT AREA</b> <b>BP FORMER WOOD RIVER REFINERY</b> <b>WOOD RIVER, ILLINOIS</b>
<small>Project No. 20060503    Title: BCG, W.R. WOOD, P.D., Biovent Area, Date: 01/12/03</small>	

Figure E-2A- Process Flow Schematic Central Biovent Area

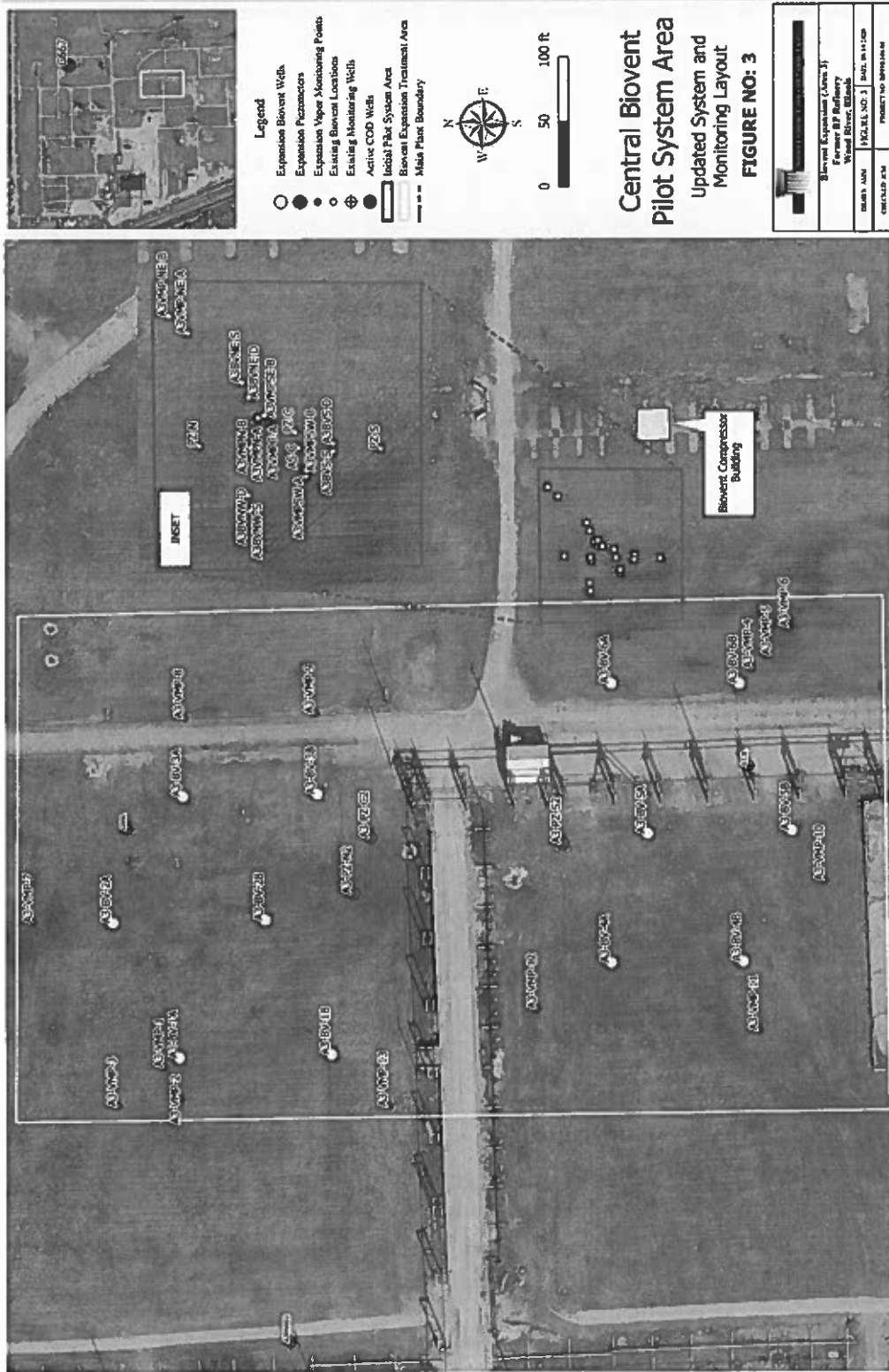


Figure E-3 – Area 3 Biovent Expansion

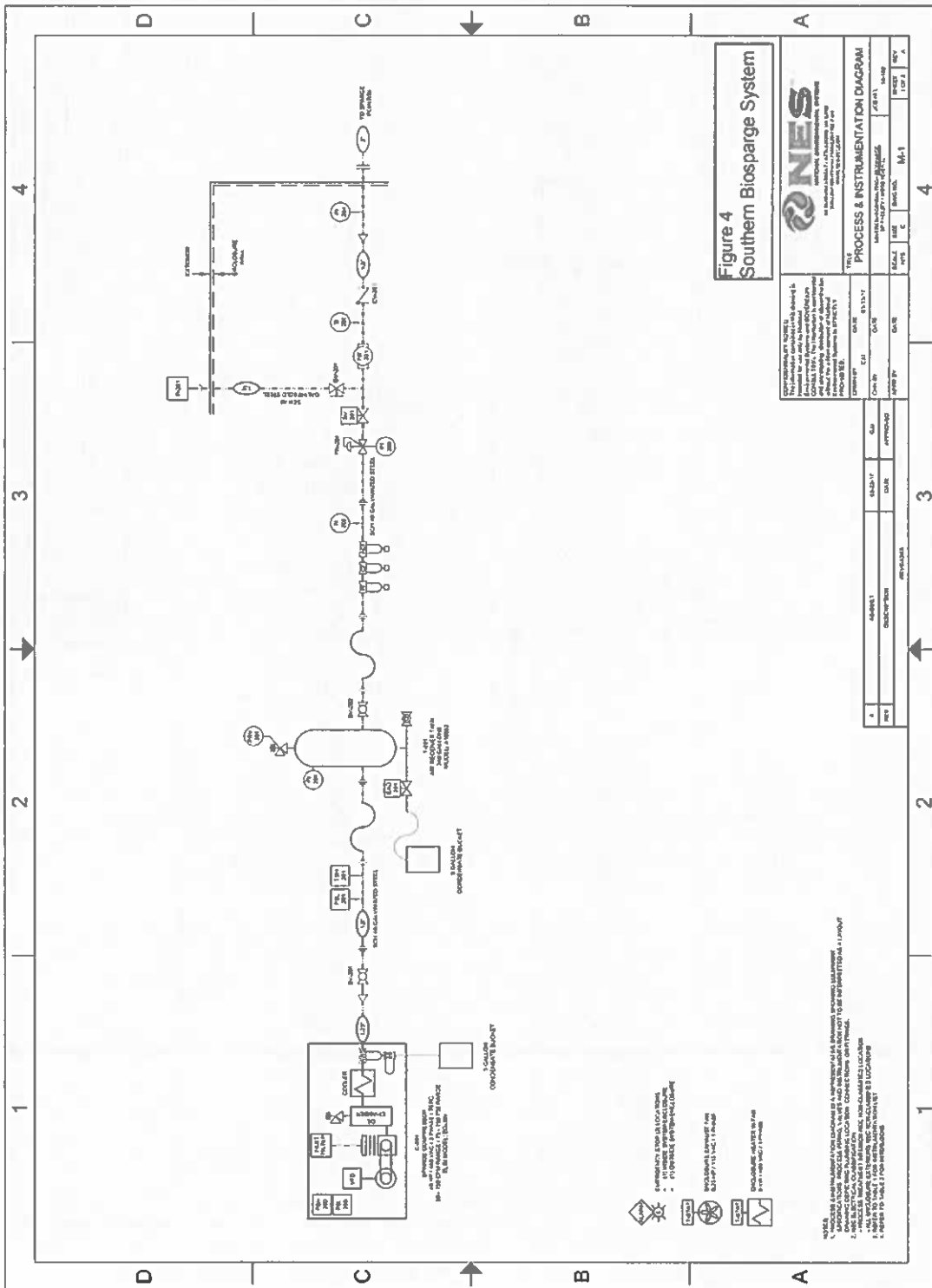
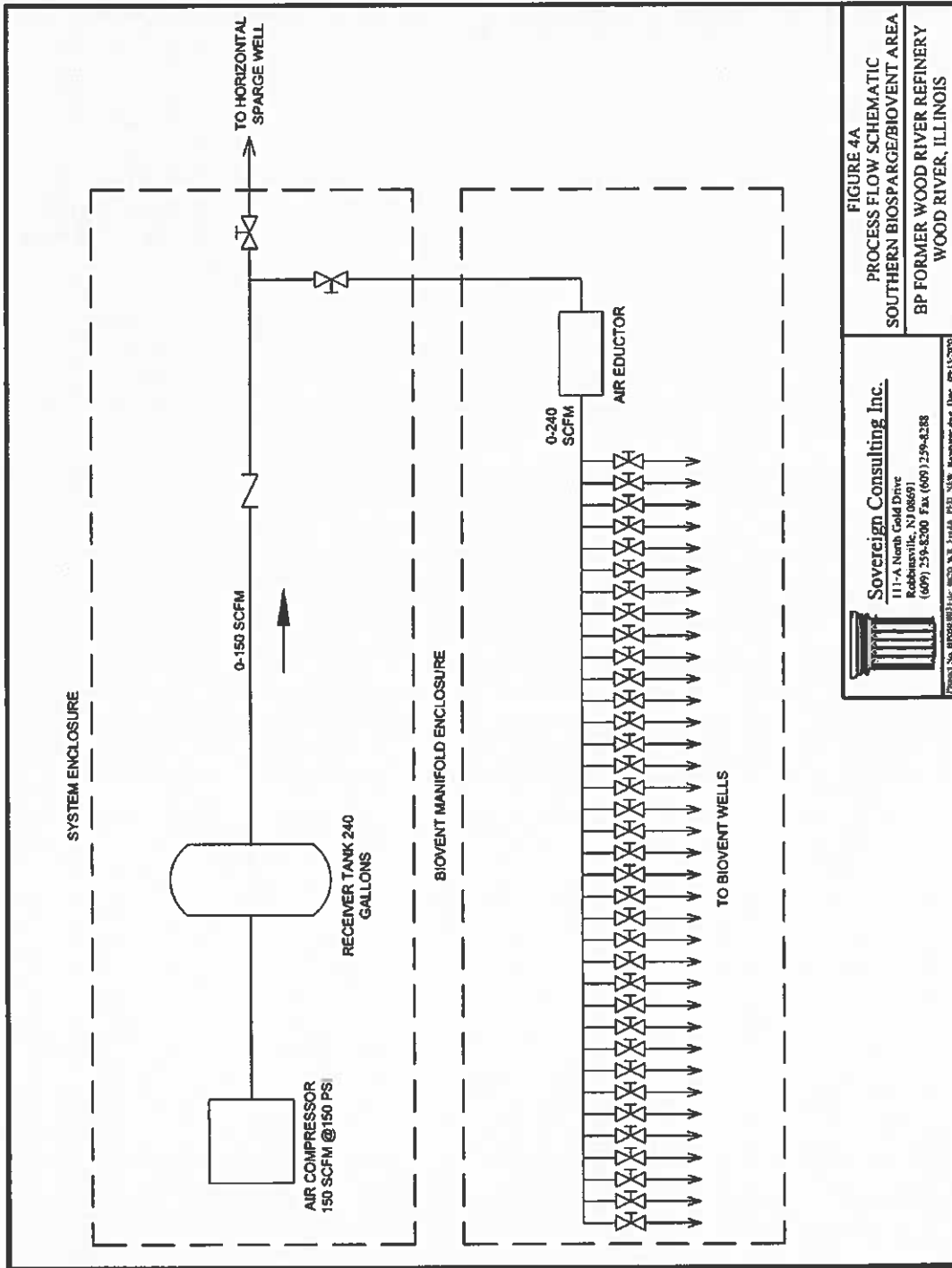


Figure E-4 -- Process and Instrumentation Plan -- Southern Biosparge System



**FIGURE 4A**  
 PROCESS FLOW SCHEMATIC  
 SOUTHERN BIOSPARGE/BIOVENT AREA  
 BP FORMER WOOD RIVER REFINERY  
 WOOD RIVER, ILLINOIS

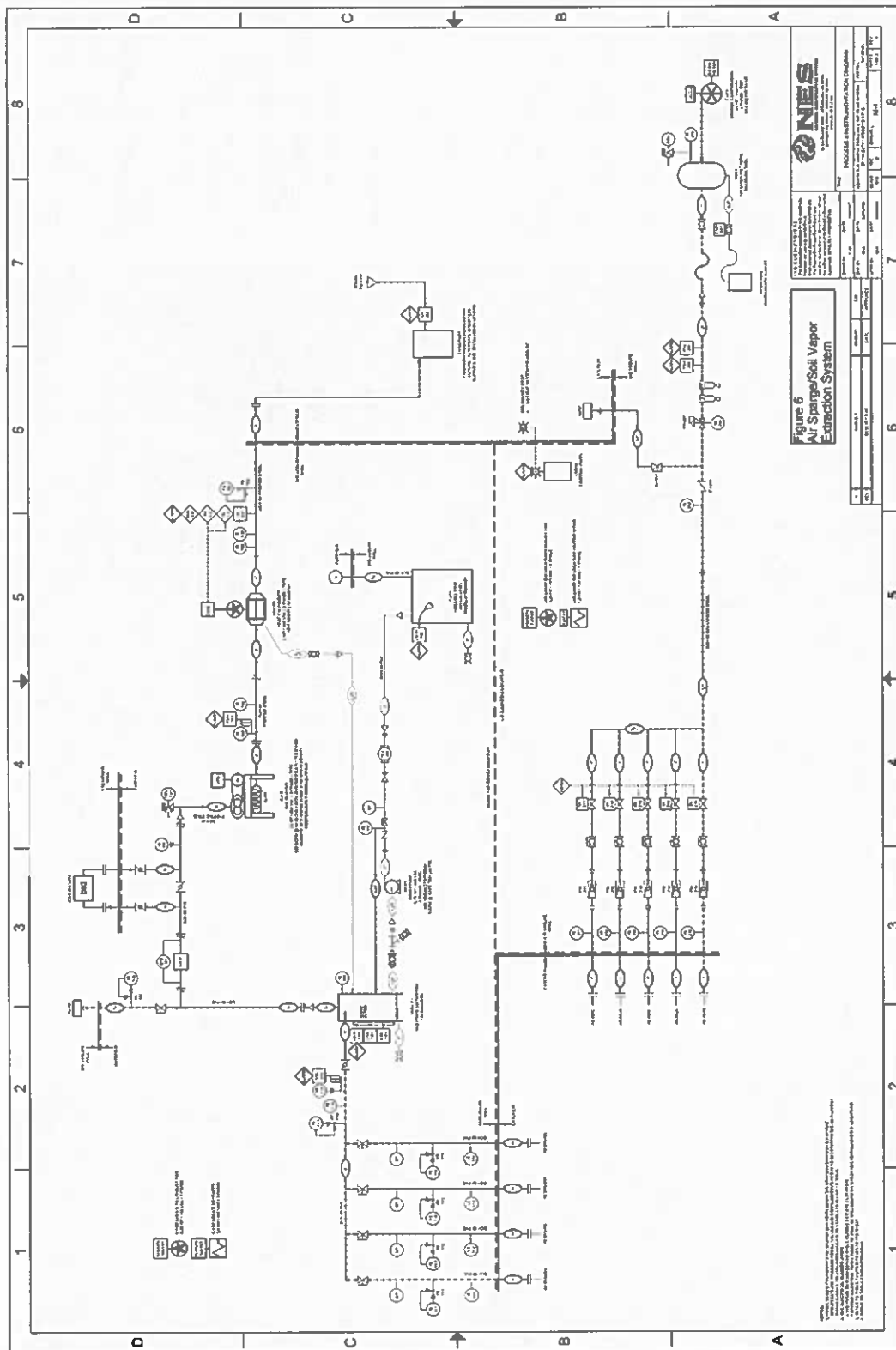
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Figure E-4A-Process Flow Schematic Southern Biosparge/Biovent Area

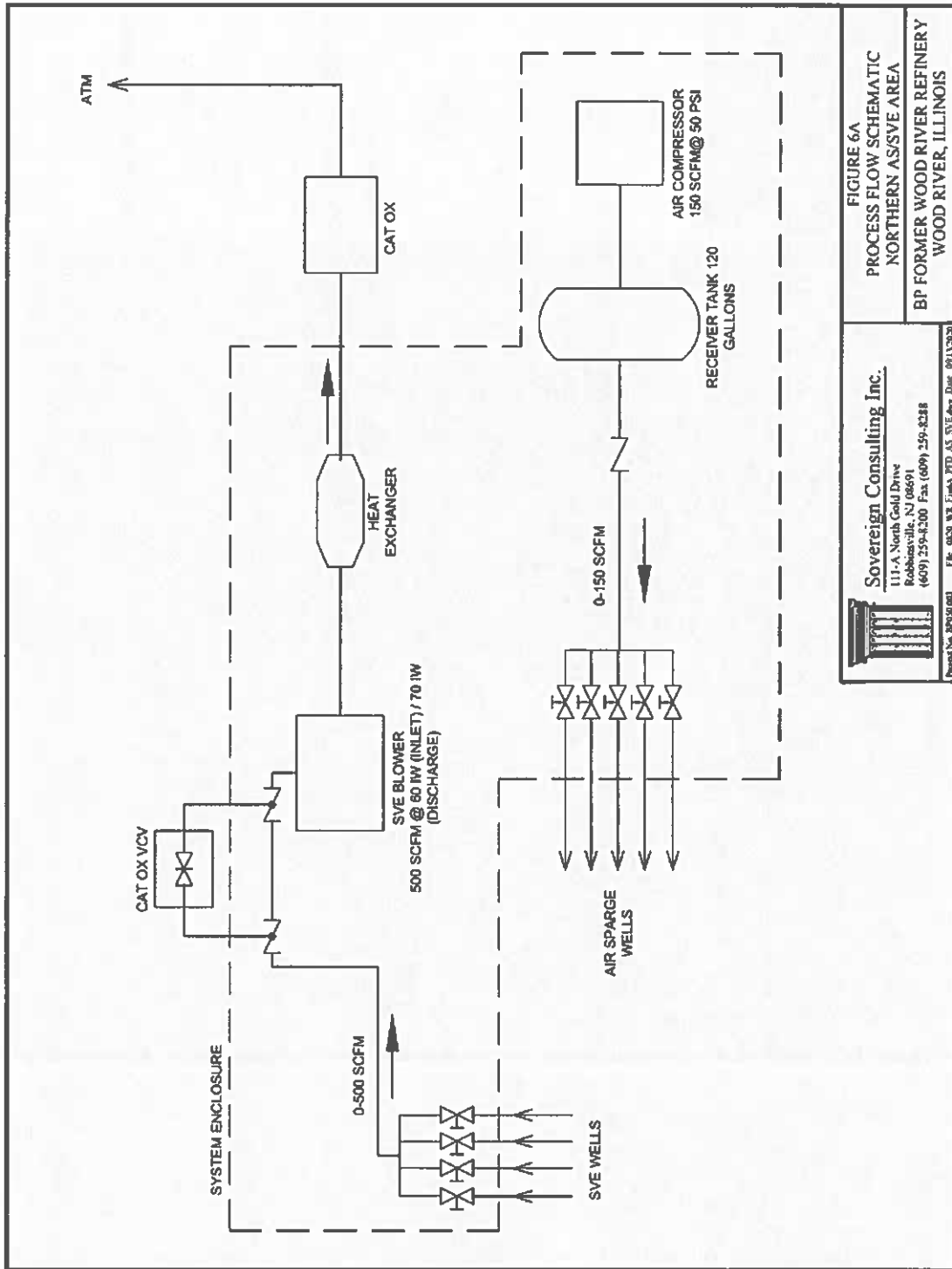


Figure E-5 – Area 5 Biosparge/ Biovent System Area



**Figure E-6 – Process and Instrumentation Plan – Air Sparge/SVE System**





**FIGURE 6A**  
**PROCESS FLOW SCHEMATIC**  
**NORTHERN AS/SVE AREA**  
**BP FORMER WOOD RIVER REFINERY**  
**WOOD RIVER, ILLINOIS**

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Project No. BP020-003 File: 0820\_WR\_FlowA\_PFD\_AS\_SVE.dwg Date: 09/11/2020

Figure E-6A-Process Flow Schematic Northern AS/SVE Area



Figure E-7 – Northern Air Sparge/ Soil Vapor Extraction System Area

**ATTACHMENT F**

**NORTHING AND EASTING WELL COORDINATES**

**ILLINOIS EPA NO. 1191150001**

**USEPA NO. ILD980700967**

**RCRA CORRECTIVE ACTION PERMIT LOG NO. B-147R2**



**ATTACHMENT F**  
**NORTHING AND EASTING WELL COORDINATES**

<b>Facility Well ID</b>	<b>IEPA Well ID</b>	<b>Northing</b>	<b>Easting</b>
G-01R	G002	2315679.6730	798263.3670
B-5D	G005	2320442.8070	794103.4080
B-6	G006	2321445.3990	792326.8380
B-8D	G008	2318701.1380	794139.4760
B-9	G009	2317504.0380	797808.5810
C-1	G011	2316145.9890	798128.1810
C-3	G013	2315486.7910	797313.6600
C-6	G016	2315568.4280	796545.3270
C-7	G017	2316068.8140	796709.5230
C-10	G020	2316846.4770	796084.5010
C-11	G021	2316032.8980	795553.1050
C-13	G023	2316726.7590	794627.7530
G-5	G045	2319331.7120	798107.7350
G-6	G046	2319352.1710	797717.7080
G-8	G048	2317665.9870	794905.3140
G-9	G049	2317730.1180	794933.0350
B-4R	G04R	2319383.4870	796886.7270
G-10	G050	2316647.7000	797276.8380
G-15	G055	2319304.5810	798579.1090
G-17	G057	2314016.8910	797192.5450
G18	G058	2313697.9150	797669.3160
G-19	G059	2314720.3470	796603.7740
G-22	G062	2316138.2830	798781.4700
G-24	G064	2317405.0010	798759.2780
G-25	G065	2318431.6080	798763.5760
G-27	G067	2317282.7860	798854.8410
G-28	G068	2317437.6450	798858.2920
G-33	G073	2316629.9380	798762.8210
G-39	G079	2314655.5710	796217.3950
G-42	G082	2315061.8680	796341.7040
G32R	G084	2315809.4730	798824.7170
G-26R	G085	2319412.1830	797888.5090
H-20	G10L	2318428.6930	796675.2540
SWMU12-MW02	G111	2321150.8470	792075.9720
G-H1	G112	2320408.7820	792141.5070
G128	G128	2321505.0490	791869.4520
H-23	G13L	2317555.5600	796223.3910
H-24	G14L	2318100.0690	796149.0410

Facility Well ID	IEPA Well ID	Northing	Easting
H-26A	G16L	2317933.9290	795414.3950
H-28	G18	2318392.0710	798666.2510
H-29	G19	2317302.5480	798664.2160
C-12R	G22R	2316821.8910	795303.2200
RP-1	G301	2318950.2690	793678.5400
RP-3D	G303	2317187.1060	793125.3120
RP-4D	G304	2316844.8760	794402.4720
RP-5	G305	2317182.2120	794484.3180
RP-6	G306	2317650.7810	794478.4090
RP-7D	G307	2318033.2090	794439.6030
H-30R	G30R	2316949.7660	798660.8350
H-31R	G31R	2316452.9700	798645.6100
H32R	G32R	2315452.6910	797881.6690
H-33	G33	2315831.1310	795895.8320
H-34	G34	2317227.4270	795061.9100
H-37	G37	2319887.0480	791941.2110
H-39	G39	2318294.9450	793276.9050
B-17	G417	2317985.3380	796482.1650
G-5B	G5B	2319331.6770	798112.5710
RC-1	G601	2317016.0710	797966.4900
RC-2	G602	2317021.1740	797306.8430
RC-3	G603	2317054.1820	796580.3380
RC-4	G604	2316673.2710	797256.1700
RC-5	G605	2317658.7670	794911.5820
RC-6	G606	2316366.9220	798334.8220
RC-7	G607	2316841.2620	798360.1430
RC-8	G608	2317174.6960	798373.7870
RC-9	G609	2317389.3470	798157.0880
RC-10	G610	2317589.3950	798369.7090
RC-11	G611	2317919.3640	798321.7330
RC-12	G612	2318326.6020	798335.2680
RC-13	G613	2317136.7880	795587.8480
RC-14	G614	2317659.8050	795257.5300
RC-15	G615	2317812.4390	795006.7230
RC-16	G616	2316988.7800	795311.7320
RC-17	G617	2316517.6020	797774.1780
RC-18	G618	2316620.1360	797976.4530
RC-19	G619	2316679.6860	798115.2650
RC-20	G620	2316673.3790	797366.0800
RC-H-29	G629	2317403.7210	798663.8640
G-29R	G69R	2317835.9950	798880.4770

Facility Well ID	IEPA Well ID	Northing	Easting
G-31	G71L	2318022.9480	798666.1450
G-34	G74L	2318878.5220	798776.9620
G-35	G75L	2318335.5340	798849.9300
G-36	G76L	2318005.7010	798852.2200
G-37	G77L	2317535.8570	798767.0950
H-3	G83L	2316856.7180	798243.9080
H-4	G84L	2317395.0430	798262.1620
H-6	G86L	2318343.7720	798335.5420
H-7	G87L	2315843.9780	797583.0780
H-9	G89L	2316801.1780	797725.1370
M-1D	G91	2320805.0380	793634.6680
H-11	G91L	2318078.0000	797797.7740
M-2D	G92	2320963.8860	793234.9600
H-12	G92L	2318520.0740	797772.2940
M-3D	G93L	2321139.3660	792810.7060
H-16	G96L	2318043.8500	797261.2130
H-17	G97L	2318509.0470	797205.0340
H-18	G98L	2315593.1660	796997.6950
H-19	G99L	2317507.8130	796699.9450
H-31B	H31B	2316448.2440	798648.0050
G-2D	R042	2319932.2010	793607.1120
G-23R	R063	2317101.3500	798768.1600
G-4DR	R083	2320117.5960	792916.8810
H-21R	R11L	2316250.0960	796182.4280
RP-2D	R302	2318146.3020	792164.0310
H36R	RG36	2318906.9170	796630.9950





**ATTACHMENT G**

**WATER WELL SURVEY GUIDANCE FOR RCRA FACILITIES**

**ILLINOIS EPA NO. 1191150001**

**USEPA NO. ILD980700967**

**RCRA CORRECTIVE ACTION PERMIT LOG NO. B-147R2**



## ATTACHMENT G

### WATER WELL SURVEY GUIDANCE FOR RCRA FACILITIES

In order to determine the impacts and potential impacts to potable water supply wells from soil, soil gas, or groundwater contamination, 35 IAC 1600, Subpart B establishes the minimum standards and requirements for performing water well surveys to ensure these wells are accurately identified and located. All Solid Waste permitted facilities, RCRA permitted facilities, and facilities pursuing RCRA closure, where exceedances of the applicable 35 IAC Part 620 groundwater quality standards (or in the case of RCRA closure, 35 IAC Part 742, Tier 1 groundwater remediation objectives), have the potential to impact potable water supply wells, must determine the existence and location of potable water supply wells as described in 35 IAC Part 1600 and this procedure. This procedure applies to projects that require the location of potable water wells to be identified as part of site investigation, corrective action activities, or Right to Know evaluation.

In order to meet these requirements, the facility in question must submit maps that identify the following:

1. All private, semi-private and non-community water system wells located at the property where the release occurred or within 200 feet of the property boundary where the release occurred;
2. All community water system wells located at the property where the release occurred or within 2,500 feet of the property boundary where the release occurred; and
3. All wellhead protection areas in which all or any portion of the property where the release occurred is located within that zone or area.

The facility must submit verification that all of the below sources have been investigated and the water well survey data (electronic, paper or physical) from these sources have been included on the map. This information shall be obtained from the following sources:

- Illinois State Geological Survey
- Illinois State Water Survey
- Illinois EPA Division of Public Water Supplies
- Illinois Department of Public Health
- County and Municipal Health Departments
- Local water supply entity (i.e., public water districts, public water supply companies), if data is not included in the previous listed sources.

If it is determined that groundwater contamination exceedances of the applicable 35 IAC Part 620, groundwater quality standards (or in the case of RCRA closure the 35 IAC Part 742, Tier 1, groundwater remediation objectives), are measured or modeled to migrate off-site, the area of the water well survey must be expanded based on the measured and/or modeled groundwater plume.

**NOTE:** If contamination at a remediation site cannot be modeled due to geological constraints (i.e. bedrock), the information requested above shall be collected inside a survey area to be determined by the Illinois EPA on a site-by-site basis.

Documentation of the results of the water well survey or the expanded water well survey, must include the following information:

- Map(s) to appropriate scale showing the location of community water supply wells, potable water supply wells, and all applicable wellhead protection areas of the wells identified in the survey. The location of the measured and modeled contamination plume shall also be shown on the map(s) if the measured or modeled plume extends off-site.
- Tables of potable water supply wells and their respective wellhead protection areas.
- Narrative to supplement the map(s) and table(s) identified above. This includes the person(s) contacted as part of the survey, that person's title, sources of information used, field observations, etc.
- Certification by a Licensed Professional Engineer or Licensed Professional Geologist that the entities listed above have been contacted as part of the well survey and the information obtained is included in the map(s), table(s) and narrative.

When data sources as identified above do not appear to have adequately identified the location of potable wells or site-specific conditions warrant, additional investigation may be required. Such conditions include, but are not limited to:

- The local water supply entity does not bill a residence/business located within the search area, and the other record searches do not show a potable well on the property; or
- The water well survey does not appear to identify an accurate number of potable wells for the area when the locational information is compared to aerial photography or local zoning maps which identify residential and commercial structures.

The additional investigation must include, at a minimum, notification in the form of written communication to properties within the water well survey area and may include a physical well survey (e.g. face-to-face interviews with property owners, a reconnaissance survey looking for wellheads, etc.)