

0312255142 - Cook County
Oak Park BP
Incident # 20011417, 20100294,
20090170
LUST TECH FILE



CORRECTIVE ACTION PLAN

100 W. Chicago Avenue
Oak Park, Illinois

IEMA Incident Nos. 20011417, 20090170, & 20100294
LPC No. 0312255142
ETS Project No. 21-0781A

Prepared for:

Hargobind, Inc.
100 W. Chicago Avenue
Oak Park, Illinois 60302

Prepared by:

ETS Environmental & Associates, LLC
204 Dearborn Court, Suite 124
Geneva, IL 60134
(630) 513-4710

June 12, 2025

IEPA
Division of Records Management
Releasable

OCT 06 2025
Reviewer: AMS



Illinois Environmental Protection Agency

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Oak Park BP
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1021 North Grand Avenue East • P.O. Box 19276 • Springfield • Ill.

The Agency is authorized to require this information under Section 4 and Title XVI of the Environmental Protection Act (415 ILCS 5/4, 5/57 - 57.19). Failure to disclose this information may result in a civil penalty of not to exceed \$50,000.00 for the violation and an additional civil penalty of not to exceed \$10,000.00 for each day during which the violation continues (415 ILCS 5/42). Any person who knowingly makes a false, fictitious, or fraudulent material statement or representation, orally or in writing, to the Agency, or to a unit of local government to which the Agency has delegated authority under subsection (r) of Section 4 of this Act, related to or required by this Act, a regulation adopted under this Act, any federal law or regulation for which the Agency has responsibility, or any permit, term, or condition thereof, commits a Class 4 felony, and each such statement or writing shall be considered a separate Class 4 felony. A person who, after being convicted under paragraph 415 ILCS 5/44 (h)(8), violates paragraph 415 ILCS 5/44 (h)(8) a second or subsequent time, commits a Class 3 felony. (415 ILCS 5/44). This form has been approved by the Forms Management Center.

Leaking Underground Storage Tank Program Corrective Action Plan

A. Site Identification

IEMA Incident # (6- or 8-digit): 20100294 IEPA LPC# (10-digit): 0312255142
Site Name: Oak Park BP
Site Address (Not a P.O. Box): 100 W. Chicago Avenue
City: Oak Park County: Cook ZIP Code: 60302

B. Site Information

1. Will the owner or operator seek reimbursement from the Underground Storage Tank Fund? Yes No
2. If yes, is the budget attached? Yes No
3. Is this an amended plan? Yes No
4. Identify the material(s) released: Unleaded Gasoline
5. This Corrective Action Plan is submitted pursuant to:
 a. 35 Ill. Adm. Code 731.166
 b. 35 Ill. Adm. Code 732.404
 c. 35 Ill. Adm. Code 734.335

C. Proposed Methods of Remediation

1. Soil Tier 2 Remediation Objectives, Highway Authority Agreement
2. Groundwater Groundwater Ordinance

D. Soil and Groundwater Investigation Results

(for incidents subject to 35 Ill. Adm. Code 731 only or 732 that were classified using Method One or Two, if not previously provided)

Provide the following:

1. Description of investigation activities performed to define the extents of soil and/or groundwater contamination;
2. Analytical results, chain-of-custody forms, and laboratory certifications;
3. Tables comparing analytical results to applicable remediation objectives;

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4. Boring logs;
5. Monitoring well logs; and
6. Site maps meeting the requirements of 35 Ill. Adm. Code 732.110(a) or 734.440 and showing:
 - a. Soil sample locations;
 - b. Monitoring well locations; and
 - c. Plumes of soil and groundwater contamination.

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E. Technical Information - Corrective Action Plan

Provide the following:

1. Executive summary identifying the objectives of the corrective action plan and the technical approach to be utilized to meet such objectives;
 - a. The major components (e.g., treatment, containment, removal) of the corrective action plan;
 - b. The scope of the problems to be addressed by the proposed corrective action; and
 - c. A schedule for implementation and completion of the plan;
2. Identification of the remediation objectives proposed for the site;
3. A description of the remedial technologies selected:
 - a. The feasibility of implementing the remedial technologies;
 - b. Whether the remedial technologies will perform satisfactorily and reliably until the remediation objectives are achieved; and
 - c. A schedule of when the technologies are expected to achieve the applicable remediation objectives;
4. A confirmation sampling plan that describes how the effectiveness of the corrective action activities will be monitored during their implementation and after their completion;
5. A description of the current and projected future uses of the site;
6. A description of engineered barriers or institutional controls that will be relied upon to achieve remediation objectives:
 - a. an assessment of their long-term reliability;
 - b. operating and maintenance plans;
 - c. maps showing area covered by barriers and institutional controls;
 - d. copies of the complete application(s) for planned Highway Authority Agreement(s); and
 - e. draft groundwater ordinance(s) and Environmental Land Use Controls.
7. The water supply well survey:
 - a. Map(s) showing locations of community water supply wells and other potable wells and the setback zone for each well;
 - b. Map(s) showing regulated recharge areas and wellhead protection areas;
 - c. Map(s) showing the current extent of groundwater contamination exceeding the most stringent Tier 1 remediation objectives;
 - d. Map(s) showing the modeled extent of groundwater contamination exceeding the most stringent Tier 1 remediation objectives;
 - e. Tables listing the setback zone for each community water supply well and other potable water supply wells;
 - f. A narrative identifying each entity contacted to identify potable water supply wells, the name and title of each person contacted, and any field observations associated with any wells identified; and
 - g. A certification from a Licensed Professional Engineer or Licensed Professional Geologist that the survey was conducted in accordance with the requirements and that documentation submitted includes information obtained as a result of the survey (certification of this plan satisfies this requirement);

8. Appendices:
 - a. References and data sources report that are organized; and
 - b. Field logs, well logs, and reports of laboratory analyses;
9. Site map(s) meeting the requirements of 35 Ill. Adm. Code 732.110(a) or 734.440;
10. Engineering design specifications, diagrams, schematics, calculations, manufacturer's specifications, etc.;
11. A description of bench/pilot studies;
12. Cost comparison between proposed method of remediation and other methods of remediation;
13. For the proposed Tier 2 or 3 remediation objectives, provide the following:
 - a. The equations used;
 - b. A discussion of how input variables were determined;
 - c. Map(s) depicting distances used in equations; and
 - d. Calculations; and
14. Provide documentation to demonstrate the following for alternative technologies:
 - a. The proposed alternative technology has a substantial likelihood of successfully achieving compliance with all applicable regulations and remediation objectives;
 - b. The proposed alternative technology will not adversely affect human health and safety or the environment;
 - c. The owner or operator will obtain all Illinois EPA permits necessary to legally authorize use of the alternative technology;
 - d. The owner or operator will implement a program to monitor whether the requirements of subsection (14)(a) have been met;
 - e. Within one year from the date of Illinois EPA approval, the owner or operator will provide to the Illinois EPA monitoring program results establishing whether the proposed alternative technology will successfully achieve compliance with the requirements of subsection (14)(a); and
 - f. Demonstration that the cost of alternative technology will not exceed the cost of conventional technology and is not substantially higher than at least two other alternative technologies, if available and technically feasible.

F. Exposure Pathway Exclusion

Provide the following:

1. A description of the tests to be performed in determining whether the following requirements will be met:
 - a. Attenuation capacity of the soil will not be exceeded for any of the organic contaminants;
 - b. Soil saturation limit will not be exceeded for any of the organic contaminants;
 - c. Contaminated soils do not exhibit any of the reactivity characteristics of hazardous waste per 35 Ill. Adm. Code 721.123;
 - d. Contaminated soils do not exhibit a $\text{pH} \leq 2.0$ or ≥ 12.5 ; and
 - e. Contaminated soils which contain arsenic, barium, cadmium, chromium, lead, mercury, or selenium (or their associated salts) do not exhibit any of the toxicity characteristics of hazardous waste per 35 Ill. Adm. Code 721.124.
2. A discussion of how any exposure pathways are to be excluded.

G. Signatures

All plans, budgets, and reports must be signed by the owner or operator and list the owner's or operator's full name, address, and telephone number.

UST Owner or Operator

Name Hargobind, Inc.
Contact Mr. Hardeep Singh
Address 100 W. Chicago Avenue
City Oak Park
State Illinois
Zip Code 60302
Phone _____
Email hargobindinc@gmail.com
Signature *WPS.*
Date 6/30/2025

Consultant

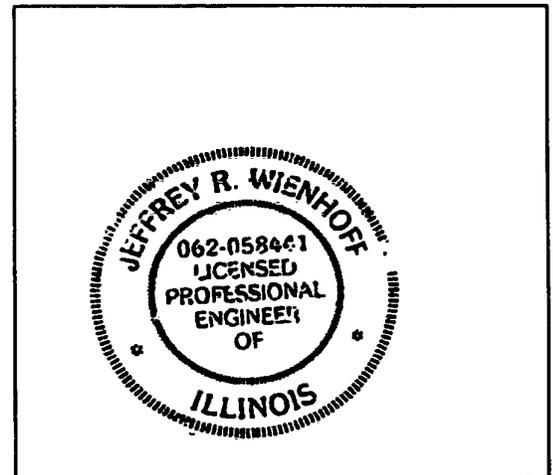
Company ETS Environmental & Associates, LLC
Contact R. Todd McCollister, PE
Address 204 Dearborn Court, Suite 124
City Geneva
State Illinois
Zip Code 60134
Phone 630-513-4710 ext. 311
Email ToddM@ets-environmental.com
Signature *Todd McCollister*
Date 07/02/2025

I certify under penalty of law that all activities that are the subject of this plan were conducted under my supervision or were conducted under the supervision of another Licensed Professional Engineer or Licensed Professional Geologist and reviewed by me; that this plan and all attachments were prepared under my supervision; that, to the best of my knowledge and belief, the work described in this plan has been completed in accordance with the Environmental Protection Act [415 ILCS 5], 35 Ill. Adm. Code 731, 732 or 734, and generally accepted standards and practices of my profession; and that the information presented is accurate and complete. I am aware there are significant penalties for submitting false statements or representations to the Illinois EPA, including but not limited to fines, imprisonment, or both as provided in Sections 44 and 57.17 of the Environmental Protection Act [415 ILCS 5/44 and 57.17].

Licensed Professional Engineer or Geologist

Name Jeffrey R. Wienhoff
Company ETS Environmental & Associates, LLC
Address 204 Dearborn Court, Suite 124
City Geneva
State Illinois
Zip Code 60134
Phone 217-726-7569
Ill. Registration No. 062-058441
License Expiration Date November 30, 2025
Signature *Jeffrey R. Wienhoff*
Date 7/2/2025

L.P.E. or L.P.G. Seal



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June 12, 2025

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APPENDICES

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Appendix B	Tier 2 Calculation Spreadsheets
Appendix C	Draft Highway Authority Agreement
Appendix D	Corrective Action Plan Budget

D. SOIL AND GROUNDWATER INVESTIGATION RESULTS

(for incidents subject to 35 Ill. Adm. Code 731 only or 732 that were classified using Method One or Two, if not previously provided)

This Site is subject to 734, therefore additional information requested can be found in the SICR.

Provide the following:

1. Description of investigation activities performed to define the extents of soil and/or groundwater contamination;

Please see the Site Investigation Completion Report (SICR), dated September 21, 2023 for detailed information pertaining to the extents of soil and groundwater impact. Illinois Environmental Protection Agency (IEPA) correspondence dated January 3, 2024, which approved the SICR is included in **Appendix A**.

To summarize, after Early Action, as well as Stage 1, Stage 2, and Stage 3 Site Investigation activities it has been determined that the petroleum impact has been delineated. The location of the Site is depicted on **Figure 1**. The general layout of the Site, site features, as well as sample locations (soil borings and monitoring wells) are depicted on **Figure 2**.

Soil Delineation:

The soil impact has been delineated on-Site by the following sample locations:

North:

A-1 and A-4

East:

C-2, A-2, and A-7

South:

C-1

West:

B-3, A-9, A-3, W-2, and W-3

The soil boring locations and extent of soil impacts are depicted on **Figure 3**.

Groundwater Delineation:

During investigative activities six (6) 2-inch monitoring wells (MW-1 through MW-5) were installed on-Site and two (2) temporary monitoring wells (TMW-1 and TMW-2) were installed off-Site to the south and the east, respectively. Groundwater samples collected from monitoring wells MW-1 through MW-6 were submitted for laboratory analysis of Benzene, Toluene, Ethylbenzene, Total Xylenes (BTEX), Methyl tert-butyl ether (MTBE), and Polynuclear Aromatics (PNAs) and groundwater samples collected from temporary monitoring wells TMW-1 and TMW-2 were submitted for laboratory analysis of BTEX and

MTBE. The groundwater impact has been physically delineated on-Site and off-Site by the following locations:

North:

MW-1

East:

TMW-2 and MW-2

South:

MW-2 and TMW-1

West:

MW-4 and MW-3

The monitoring well locations and extent of groundwater impacts are depicted on **Figure 4**.

2. Analytical results, chain-of-custody forms, and laboratory certifications;

Analytical results are summarized in the Tables section of this report. Analytical laboratory reports, chain-of-custody forms, and laboratory certifications were provided in the Site Investigation Completion Report as well as previous reports.

3. Tables comparing analytical results to applicable remediation objectives;

Tables comparing analytical results of soil and groundwater samples collected to date to applicable remediation objectives are located in the Tables section of this report.

4. Boring logs;

Boring logs associated with the Site Investigation activities are located in previous reports.

5. Monitoring well logs; and

Monitoring well logs associated with Site Investigation activities are located in previous reports.

6. Site maps meeting the requirements of 35 Ill. Adm. Code 732.110(a) or 734.440 and showing:

- a. Soil sample locations;**
- b. Monitoring well locations; and**
- c. Plumes of soil and groundwater contamination.**

Refer to the Figures section of this report.

E. TECHNICAL INFORMATION – CORRECTIVE ACTION PLAN

Provide the following:

1. Executive summary identifying the objectives of the corrective action plan and the technical approach to be utilized to meet such objectives;

a. The major components (e.g., treatment, containment, removal) of the corrective action plan;

This Corrective Action Plan (CAP) consists of managing the remaining impact in place using pathway exclusion (see below). Soil samples exceeding Tier 1 and Tier 2 Residential Soil Remediation Objectives (ROs) will be addressed with an Industrial/Commercial Use Restriction. A Construction Worker Caution will be utilized to address Construction Worker Soil Inhalation RO exceedances. Soil and groundwater impacts located within the right-of-way(s) of Chicago Avenue and North Taylor Avenue will be addressed through use of a Highway Authority Agreement (HAA). ETS notes that the Village of Oak Park has previously implemented HAAs at other facilities, and it is not anticipated the implementation of the proposed HAA will be an issue. Soil and groundwater exceedances exceeding Class I Groundwater Ingestion ROs will be addressed using an onsite groundwater use restriction and referenced HAA. Additionally, a restriction consisting of a requirement that any habitable structure on the Site be constructed on a concrete slab with no sumps will also be utilized to address the Indoor Inhalation Exposure Route.

b. The scope of the problems to be addressed by the proposed corrective action; and

Impacted soil and groundwater have been identified and delineated and will be managed in place using pathway evaluation and exclusion.

c. A schedule for implementation and completion of the plan;

Immediately following approval of this CAP, a HAA will be negotiated for the right-of-way(s) of Chicago Avenue and North Taylor Avenue with the Village of Oak Park. Once the HAA has been executed, a Corrective Action Completion Report (CACR) will be prepared and submitted. Following the issuance of the NFR letter, the monitoring wells at the site will be abandoned.

2. Identification of the remediation objectives proposed for the site;

Soil and groundwater remediation objectives (ROs) were obtained from 35 Ill. Adm. Code, Part 742, *Tiered Approach to Corrective Action Objectives (TACO)* and compared to Tier 1 Residential, Industrial/Commercial, and Construction Worker ROs for soil and Tier 1, Class I ROs for groundwater. Site specific Tier 2 ROs were developed and on-site soil impacts exceeding Tier 1 ROs were evaluated using these objectives.

3. A description of the remedial technologies selected:

a. The feasibility of implementing the remedial technologies;

This Corrective Action Plan does not propose any physical soil or groundwater remediation as part of corrective action activities. Identified impacts will be managed in place through pathway exclusion.

b. Whether the remedial technologies will perform satisfactorily and reliably until the remediation objectives are achieved; and

No physical soil or groundwater remediation is being proposed as part of this Corrective Action Plan. Proposed activities will consist of developing Tier 2 ROs and managing impacts in place.

c. A schedule of when the technologies are expected to achieve the applicable remediation objectives;

Immediately following approval of this CAP, a HAA will be negotiated for the right-of-way(s) of Chicago Avenue and North Taylor Avenue with the Village of Oak Park. Once the HAA has been executed, a Corrective Action Completion Report (CACR) will be prepared and submitted. Following the issuance of the NFR letter, the monitoring wells at the site will be abandoned.

4. A confirmation sampling plan that describes how the effectiveness of the corrective action activities will be monitored during their implementation and after their completion;

Physical soil remediation is not required and confirmation sampling is not being proposed. See below for a full pathway evaluation.

5. A description of the current and proposed future use of the site;

The Site is currently owned by Hargobind, Inc. and consists of one (1) parcel of land identified by Parcel Index Numbers (PIN) 16-05-324-033-0000 that encompasses approximately 0.27-acres of commercial land that is located within a mixed commercial and residential area. The Site currently operates as an active gasoline station and is anticipated to continue operating as an active gasoline station for the foreseeable future.

6. A description of engineered barriers or institutional controls that will be relied upon to achieve remediation objectives:

The use of institutional controls is discussed below in the pathway evaluation.

a. an assessment of their long-term reliability;

See below.

b. operation and maintenance plans; and

See below.

c. maps showing area covered by barriers and institutional controls;

See below.

7. The water supply well survey:

a. Map(s) showing locations of community water supply wells and other potable wells and the setback zone for each well;

Please refer to previous plans/reports for locations of community supply wells and other potable wells and the setback zones for each well. It should be noted that the site is not located within 200 feet of a private well and predicted extent of impact modeling did not extend into well setback areas.

b. Maps showing regulated recharge areas and well head protection areas;

Regulated recharge areas and well head protection areas are not located within 0.5 miles of the site. Please refer to previous plans/reports for locations of community supply wells and other potable wells and the setback zones for each well.

c. Maps(s) showing the current extent of groundwater contamination exceeding the most stringent Tier 1 remediation objectives;

Please see exposure pathway evaluation discussion below and the figures attached to this report.

d. Map(s) showing the modeled extent of groundwater contamination exceeding the most stringent Tier 1 remediation objectives;

Please see exposure pathway evaluation discussion below and the figures attached to this report.

e. Tables listing the setback zone for each community water supply well and other potable water supply wells;

Please refer to the discussion, figures and tables provided in the 45-Day Report dated May 26, 2010 and the SICR dated September 21, 2023. The water well survey conducted during the 45-Day Report identified one water well located within one mile of the Site, the closest of which is approximately 0.4 miles from the Site. Due to the age of the potable water well survey, ETS accessed the IEPA's online Source Water Assessment Program (SWAP) database to identify the locations of source water resources potentially affected by the release. ETS confirmed that no private water supply wells or non-community water supply wells are located within 200 feet of the Site; community water supply wells (CWS) are located within 2,500 feet of the Site; nor is the Site located within any wellhead protection areas or any regulated recharge areas.

Additionally, the Site is subject to the Village of Oak Park Ordinance No. 2001-0-107, which prohibits the potable use of groundwater occurring within the municipal boundaries as a potable source.

- f. **A narrative identifying each entity contacted to identify potable water supply wells, the name and title of each person contacted, and any field observations associated with any wells identified; and**

ETS utilized the IEPA SWAP database and historical information obtained in the previously referenced reports.

- g. **A certification from a Licensed Professional Engineer or Licensed Professional Geologist that the survey was conducted in accordance with the requirements and that documentation submitted included information obtained as a result of the survey (certification of this plan satisfies this requirement);**

Please refer to the SICR for the Professional Engineer Certification, which includes the receptor survey information.

8. Appendices:

- a. **References and data sources report that are organized; and**

Please refer to the figure, tables, and appendices contained within this report.

- b. **Field logs, well logs, and reports of laboratory analyses;**

Please refer to previous reports for boring and well logs as no new soil borings or monitoring wells have been advanced or installed. See the Tables section for the summarized analytical results and previous reports for the laboratory analytical reports and laboratory certifications.

9. Site map(s) meeting the requirements of 35 Ill. Adm. Code 732.110(a) or 734.440;

Please refer to the Figures section of this report for site maps.

10. Engineering design specifications, diagrams, schematics, calculations, manufacturer's specifications, etc.;

Not applicable at this time.

11. A description of bench/pilot studies;

Pilot or bench studies are not proposed.

12. Cost comparison between proposed method of remediation and other methods of remediation;

No physical remediation is proposed as part of corrective action activities. The proposed methods of addressing soil and groundwater impacts consists of developing Tier 2 ROs that will be used in conjunction with pathway evaluation and exclusion as well as reliance upon institutional controls.

13. For the proposed Tier 2 or 3 remediation objectives, provide the following:

a. The equations used;

Please see pathway evaluation below.

b. A discussion of how input variables were determined;

Please see pathway evaluation below.

c. Map(s) depicting distances used in equations; and

Please see pathway evaluation below.

d. Calculations; and

Please see pathway evaluation below.

14. Provide documentation to demonstrate the following for alternative technologies:

a. The proposed alternative technology has a substantial likelihood of successfully achieving compliance with all applicable regulations and remediation objectives;

b. The proposed alternative technology will not adversely affect human health and safety or the environment;

c. The owner or operator will obtain all Illinois EPA permits necessary to legally authorize use of the alternative technology;

d. The owner or operator will implement a program to monitor whether the requirements of subsection (14)(a) have been met;

e. Within one year from the date of Illinois EPA approval, the owner or operator will provide to the Illinois EPA monitoring program results established whether the proposed alternative technology will successfully achieve compliance with the requirements of subsection (14)(a); and

f. Demonstration that the cost of alternative technology will not exceed the cost of conventional technology and is not substantially higher than at least two other alternative technologies, if available and technically feasible.

Alternative technologies are not being proposed at this time.

F. EXPOSURE PATHWAY EXCLUSION

Provide the following:

1. A description of the tests to be performed in determining whether the following requirements will be met:

a. Attenuation capacity of the soil will not be exceeded for any of the organic contaminants;

A default value of 6,000 mg/kg for soils within the top meter and 2,000 mg/kg for soils below one meter of the surface were used. The analytical results of all soil samples collected during the site investigation did not exceed the soil attenuation capacity.

b. Soil saturation limit will not be exceeded for any organic contaminants;

The analytical results of all soil samples collected to date were compared to the TACO Tier 1 default soil saturation (C_{sat}) values as presented in 742 Appendix A, Table A. Review of the analytical data indicates no concentrations of any organic contaminants of concern exceed their respective C_{sat} values.

c. Contaminated soils do not exhibit any of reactivity characteristics of hazardous waste per 35 Ill. Adm. Code 721.123;

The COCs for this site do not exhibit any reactivity characteristics of hazardous waste based on a review of 35 IAC 721.123 subsection a) 1 through 8, and subsection b).

d. Contaminated soils do not exhibit a pH of ≤ 2.0 or ≥ 12.5 ; and

Based on the soils encountered during site investigation activities and since the contaminants of concern are associated with BTEX, MTBE, and PNAs, it is unlikely for soils on-Site to exhibit corrosive or caustic characteristics.

e. Contaminated soils which contain arsenic, barium, cadmium, chromium, lead, mercury, or selenium (or their associated salts) do not exhibit any of the toxicity characteristics of hazardous wastes per 35 Ill. Adm. Code 721.124

None of the constituents above are COCs at the Site; therefore, this section does not apply.

2. A discussion of how any exposure pathways are to be excluded.

Groundwater Classification

The Site groundwater was classified as Class I groundwater based on the following criteria:

- Hydraulic conductivity: 3.14×10^{-5} centimeters per second (cm/s), based on aquifer testing performed on monitoring well MW-4 on June 13, 2023. Refer to the SICR for the hydraulic conductivity calculations.
- Depth to groundwater: approximately 9 to 14 below ground surface while drilling and was based on observations made during Site Investigation activities.

- Based on the results of hydraulic gradient calculations groundwater appears to flow in a southwesterly direction.
- Hydraulic gradient: 0.01568 ft/ft calculated using monitoring well locations MW-1 through MW-6. Refer to the SICR for the hydraulic gradient calculations.

The Site hydrology did not meet all the criteria to be categorized as Class II groundwater, therefore the Site was classified as Class I groundwater.

Soil Ingestion Exposure Route

The soil sample analytical results were compared to the IEPA Tier 1 Soil ROs for the Soil Ingestion Exposure Route. Benzene was identified in two (2) soil samples exceeding the most stringent Tier 1 Soil ROs for the Soil Ingestion Exposure Route and are summarized in the table below:

Sample Location	Sample Depth	Date	Contaminant of Concern	Residential Soil Ingestion ROs (mg/Kg)	Commercial Soil Ingestion ROs (mg/kg)	Sample Result (mg/Kg)
E-3	8.5	4/12/2010	Benzene	12	100	26.7
A-8-2	6'	2/9/2016	Benzene	12	100	17.3

Green = Residential Soil Ingestion Exceedance
 Blue = Commercial Soil Ingestion Exceedance

The identified Tier 1 Residential Soil Ingestion Exposure Route exceedances will be addressed through use of an Industrial/Commercial Use Restriction.

Construction Worker Soil Ingestion Exposure Route

The soil sample analytical results were compared to the IEPA Tier 1 Soil ROs for the Construction Worker Ingestion Exposure Route. None of the collected soil samples had concentrations of BTEX, MTBE, or PNAs exceeding the most stringent Tier 1 SROs for the Construction Worker Ingestion Exposure Route. No further evaluation of the Construction Worker Soil Ingestion Exposure Route will be performed.

Soil Inhalation Exposure Route

The soil sample analytical results were compared to the IEPA Tier 1 Soil ROs for the Soil Inhalation Exposure Route. One or more of the contaminants of concern (BTEX, MTBE, and PNAs) were identified in soil samples exceeding Tier 1 Soil Inhalation ROs and are summarized in the table below:

Sample Location	Sample Depth	Date	Contaminant of Concern	Residential Soil Inhalation ROs (mg/Kg)	Commercial Soil Inhalation ROs (mg/kg)	Sample Result (mg/Kg)
N-2	8.5'	4/12/2010	Benzene	0.8	1.6	1.84
S-1	8.5'	4/12/2010	Benzene	0.8	1.6	1.24

Sample Location	Sample Depth	Date	Contaminant of Concern	Residential Soil Inhalation ROs (mg/Kg)	Commercial Soil Inhalation ROs (mg/kg)	Sample Result (mg/Kg)
S-2	8.5'	4/12/2010	Benzene	0.8	1.6	2.29
E-3	8.5'	4/12/2010	Benzene	0.8	1.6	26.7
W-3	8.5'	4/12/2010	Benzene	0.8	1.6	7.97
A-8-1	4'	2/9/2016	Benzene	0.8	1.6	10.5
A-8-2	6'	2/9/2016	Benzene	0.8	1.6	17.3

Green = Residential Inhalation

Blue = Commercial Inhalation

Equation S6 (Industrial/Commercial Remediation Objectives for Carcinogenic Contaminants) was used to calculate Tier 2 Soil Inhalation SROs for residential and commercial properties. The table below summarizes the results.

Sample Location	Sample Depth	Date	Contaminant of Concern	Tier 2 Residential Inhalation SROs (mg/Kg)	Tier 2 Commercial Inhalation SROs (mg/kg)	Sample Result (mg/Kg)
N-2	8.5'	4/12/2010	Benzene	16.3	31.2	1.84
S-1	8.5'	4/12/2010	Benzene	16.3	31.2	1.24
S-2	8.5'	4/12/2010	Benzene	16.3	31.2	2.29
E-3	8.5'	4/12/2010	Benzene	16.3	31.2	26.7
W-3	8.5'	4/12/2010	Benzene	16.3	31.2	7.97
A-8-1	4'	2/9/2016	Benzene	16.3	31.2	10.5
A-8-2	6'	2/9/2016	Benzene	16.3	31.2	17.3

Bold Sample Result = Exceeds Tier 2 Residential Soil Inhalation RO

Based on the results of the Tier 2 calculations, Benzene was identified in soil samples E-3 (8.5') and A-8-2 (6') exceeding the Tier 2 Residential Soil Inhalation SRO. The identified Tier 2 Residential Soil Inhalation Exposure Route exceedances will be addressed through use of an Industrial/Commercial Use Restriction. The Tier 2 calculations are included in Appendix B.

Construction Worker Inhalation Exposure Route

The soil sample analytical results were compared to the IEPA Tier 1 Soil ROs for the Construction Worker Soil Inhalation Exposure Route. One or more of the contaminants of concern (BTEX, MTBE, and PNAs) were identified in soil samples exceeding Tier 1 Construction Worker Soil Inhalation ROs and are summarized in the table below.

Sample Location	Sample Depth	Date	Contaminant of Concern	Construction Worker Inhalation SROs (mg/kg)	Sample Result (mg/Kg)
E-3	8.5'	4/12/2010	Benzene	2.2	26.7
W-3	8.5'	4/12/2010	Benzene	2.2	7.97
A-8-1	4'	2/9/2016	Benzene	2.2	10.5
			Naphthalene	1.8	2.7

Sample Location	Sample Depth	Date	Contaminant of Concern	Construction Worker Inhalation SROs (mg/kg)	Sample Result (mg/Kg)
A-8-2	6'	2/9/2016	Benzene	2.2	17.3
			Ethylbenzene	58	77.5
			Naphthalene	1.8	15.5
A-8-3	12'	2/9/2016	Naphthalene	1.8	4.01
N-2	8.5'	4/12/2010	Total Xylenes	5.6	6.77
S-1	8.5'	4/12/2010	Total Xylenes	5.6	22.9
S-2	8.5'	4/12/2010	Total Xylenes	5.6	24
E-3	8.5'	4/12/2010	Total Xylenes	5.6	42.6

Equation S7 (Industrial/Commercial Remediation Objectives for Carcinogenic Contaminants) and Equation S5 (Industrial/Commercial Remediation Objectives for Noncarcinogenic Contaminants) were used to calculate Tier 2 Soil Inhalation SROs for commercial properties. The table below summarizes the results.

Sample Location	Sample Depth	Date	Contaminant of Concern	Tier 2 Construction Worker Soil Inhalation ROs (mg/kg)	Sample Result (mg/Kg)
E-3	8.5'	4/12/2010	Benzene	43.8	26.7
			Total Xylenes	388*	42.6
W-3	8.5'	4/12/2010	Benzene	43.8	7.97
A-8-1	4'	2/9/2016	Benzene	43.8	10.5
			Naphthalene	10.5	2.7
A-8-2	6'	2/9/2016	Benzene	43.8	17.3
			Ethylbenzene	487*	77.5
			Naphthalene	10.5	15.5
A-8-3	12'	2/9/2016	Naphthalene	10.5	4.01
N-2	8.5'	4/12/2010	Total Xylenes	388*	6.77
S-1	8.5'	4/12/2010	Total Xylenes	388*	22.9
S-2	8.5'	4/12/2010	Total Xylenes	388*	24

Bold Sample Result = Exceeds Tier 2 Construction Worker Inhalation RO

* = Tier 2 C_{sat}

Based on the results of the Tier 2 calculations, Naphthalene was identified in one (1) soil sample A-8-2 (6') exceeding the Tier 2 Construction Worker Soil Inhalation SRO. It is worth noting that the Tier 2 ROs associated with Ethylbenzene and Total Xylenes corresponds to the Tier 2 soil saturation limit (C_{sat}) since the calculated Tier 2 ROs for the Construction Worker Soil Inhalation Exposure Route exceeded the Tier 2 C_{sat} limit. The above referenced Tier 2 Construction Worker Soil Inhalation Exposure Route exceedance will be addressed with a Construction Worker Caution Notification. The Tier 2 calculations are included in **Appendix B**.

Soil Component to the Groundwater Ingestion Exposure Route

The soil sample analytical results were compared to the IEPA Tier 1 ROs for the Soil Component of Groundwater Ingestion Exposure Route. One or more of the contaminants of concern (BTEX, MTBE, and PNAs) were identified in soil samples exceeding the Tier 1 soil ROs for Class I Groundwater Ingestion Exposure Route and are summarized in the table below:

Sample Location	Sample Depth	Date	Contaminant of Concern	Soil Component of Class I Groundwater Ingestion SROs (mg/Kg)	Sample Result (mg/Kg)
N-1	8.5'	4/12/2010	Benzene	0.03	0.227
N-2	8.5'	4/12/2010	Benzene	0.03	1.84
S-1	8.5'	4/12/2010	Benzene	0.03	1.24
S-2	8.5'	4/12/2010	Benzene	0.03	2.29
E-3	8.5'	4/12/2010	Benzene	0.03	26.7
			Ethylbenzene	13	14.2
W-3	8.5'	4/12/2010	Benzene	0.03	7.97
			Ethylbenzene	13	15.7
I-7	15'	4/12/2010	Benzene	0.03	0.0525
A-5-1	4'	2/9/2016	Benzene	0.03	0.473
A-5-2	6'	2/9/2016	MTBE	0.32	0.712
A-8-1	4'	2/9/2016	Benzene	0.03	10.5
			Ethylbenzene	13	23.3
A-8-2	6'	2/9/2016	Benzene	0.03	17.3
			Ethylbenzene	13	77.5
			Naphthalene	12	15.5
B-4-1	4'	7/26/2016	Benzene	0.03	0.147
B-4-2	6.5'	7/26/2016	Benzene	0.03	0.544
B-5-1	4'	7/26/2016	Benzene	0.03	0.195
B-5-2	6.5'	7/26/2016	Benzene	0.03	0.52

Equation S28 was used to calculate the potential leachate concentration for each sample location exceeding the Tier 1 Class I SROs. Based on the solutions of S28, the potential leachate concentrations are summarized in the table below.

Sample Location	Sample Depth	Contaminant of Concern	Groundwater Ingestion Class I ROs (mg/L)	Potential Leachate Concentration (mg/L)
N-1	8.5'	Benzene	0.005	0.004
N-2	8.5'	Benzene	0.005	0.032
S-1	8.5'	Benzene	0.005	0.021
S-2	8.5'	Benzene	0.005	0.039
E-3	8.5'	Benzene	0.005	0.458
		Ethylbenzene	0.7	0.2
W-3	8.5'	Benzene	0.005	0.137
		Ethylbenzene	0.7	0.3

Sample Location	Sample Depth	Contaminant of Concern	Groundwater Ingestion Class I ROs (mg/L)	Potential Leachate Concentration (mg/L)
I-7	15'	Benzene	0.005	0.001
A-5-1	4'	Benzene	0.005	0.008
A-5-2	6'	MTBE	0.07	0.01
A-8-1	4'	Benzene	0.005	0.180
		Ethylbenzene	0.7	0.4
A-8-2	6'	Benzene	0.005	0.297
		Ethylbenzene	0.7	1.3
		Naphthalene	0.14	0.27
B-4-1	4'	Benzene	0.005	0.003
B-4-2	6.5'	Benzene	0.005	0.009
B-5-1	4'	Benzene	0.005	0.003
B-5-2	6.5'	Benzene	0.005	0.009

Bold Potential Leachate Concentration = Exceeds Class I Groundwater Ingestion RO

As indicated in the above table twelve (12) soil sample locations had predicted leachate concentrations exceeding Class I Groundwater Remediation Objectives (GROs) and additional evaluation of these exceedances was performed using Equation R26 to determine that the maximum predicted extent of impacts (see below). The remaining sample locations had predicted leachate concentrations that were less than Class I GROs and further evaluation of these locations will not be performed.

Sample Location	Sample Depth	Contaminant of Concern	Distance to Compliance	Concentration at Distance (mg/L)
N-2	8.5'	Benzene	9-feet	0.005
S-1	8.5'	Benzene	7-feet	0.005
S-2	8.5'	Benzene	11-feet	0.005
E-3	8.5'	Benzene	28-feet	0.005
W-3	8.5'	Benzene	19-feet	0.005
A-5-1	4'	Benzene	2-feet	0.005
A-8-1	4'	Benzene	21-feet	0.005
A-8-2	6'	Benzene	24-feet	0.005
		Ethylbenzene	0.75-feet	0.7
		Naphthalene	1-feet	0.14
B-4-2	6.5'	Benzene	3-feet	0.005
B-5-2	6.5'	Benzene	3-feet	0.005

Based on the results of the R26 calculations the maximum distance to meet compliance with Class I GROs is 28-feet from soil sample location E-3 8.5'. Off-Site soil exceedances will be addressed with a HAA for Chicago Avenue and North Taylor Avenue. On-Site soil impacts as well as the modeled extent of soil impacts will be addressed with an onsite groundwater use restriction and HAA. The maximum predicted extent of impacts is depicted on Figure 5. The proposed Highway Authority Agreement Areas are depicted on Figure 6. A Draft Highway Authority Agreement is included in Appendix C.

Groundwater Component of the Groundwater Ingestion Exposure Route

Tier 1 Evaluation

The groundwater sample analytical results were compared to the Tier 1 Class I GROs. The following groundwater samples had concentrations of one or more of the contaminants of concern exceeding Class I GROs and are summarized in the table below:

Sample Location	Date	Contaminant of Concern	Groundwater Ingestion Class I ROs (mg/L)	Sample Result (mg/L)
MW-5	8/4/2016	Benzene	0.005	0.408
		MTBE	0.07	0.114
MW-6	7/14/2017	Benzene	0.005	0.0969
		MTBE	0.07	1.49

No other groundwater samples had concentrations of BTEX, MTBE, or PNAs exceeding the Tier 1 Class I GROs. Further evaluation will be provided below. The locations of the Class I groundwater exceedances are depicted on **Figure 4**.

Tier 2 Evaluation

Equation R26 was used to calculate the maximum predicted extent of groundwater impacts exceeding Class I GROs. The table below lists the results of the calculations.

Sample Location	Contaminant of Concern	Distance to Compliance	Concentration at Distance (mg/L)
MW-5	Benzene	27-feet	0.005
	MTBE	2-feet	0.07
MW-6	Benzene	16-feet	0.005
	MTBE	16-feet	0.07

Based on the results of the R26 calculations the maximum distance to meet compliance with Class I GROs is 27-feet from monitoring well location MW-5. The identified groundwater exceedances as well as the modeled extent of groundwater impacts will be addressed with an onsite groundwater use restriction and HAA. The maximum predicted extent of impacts is depicted on **Figure 5**.

Groundwater Indoor Inhalation Exposure Route

The groundwater analytical results were compared to the IEPA Tier 1 GROs for the Indoor Inhalation Exposure Route. Groundwater samples collected from the following locations exceeded one or more of the contaminants of concern for the Tier 1 Commercial Indoor Inhalation Exposure Route GROs and are summarized in the table below:

Sample Location	Date	Contaminant of Concern	Residential Groundwater Indoor Inhalation (mg/L)	Commercial Groundwater Indoor Inhalation (mg/L)	Sample Result (mg/L)
MW-5	8/4/2016	Benzene	0.11	0.41	0.408

No other groundwater samples had concentrations of BTEX, MTBE, or PNAs exceeding the Tier 1 GROs for the Indoor Inhalation Exposure Route. The Groundwater Indoor Inhalation Exposure Route exceedance associated with groundwater sample MW-5 will be addressed with an Industrial/Commercial Use Restriction. Additionally, a restriction consisting of a requirement that any habitable structure on the Site be constructed on a concrete slab with no sumps will also be utilized to address the Indoor Inhalation Exposure Route.

Conclusions

Based on the Tier 2 calculations discussed above, the exposure pathways will be excluded by the following institutional controls: Industrial/Commercial Use Restriction, Construction Worker Caution Notification, HAA, onsite groundwater use restriction, and concrete base with no sumps restriction. Upon completion of proposed activities, a Corrective Action Completion Report (CACR) will be prepared and submitted for IEPA review and approval. The location of the HAA areas are depicted on **Figure 6**. The proposed costs associated with this CAP are included in **Appendix D**.

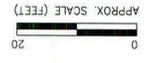
FIGURES



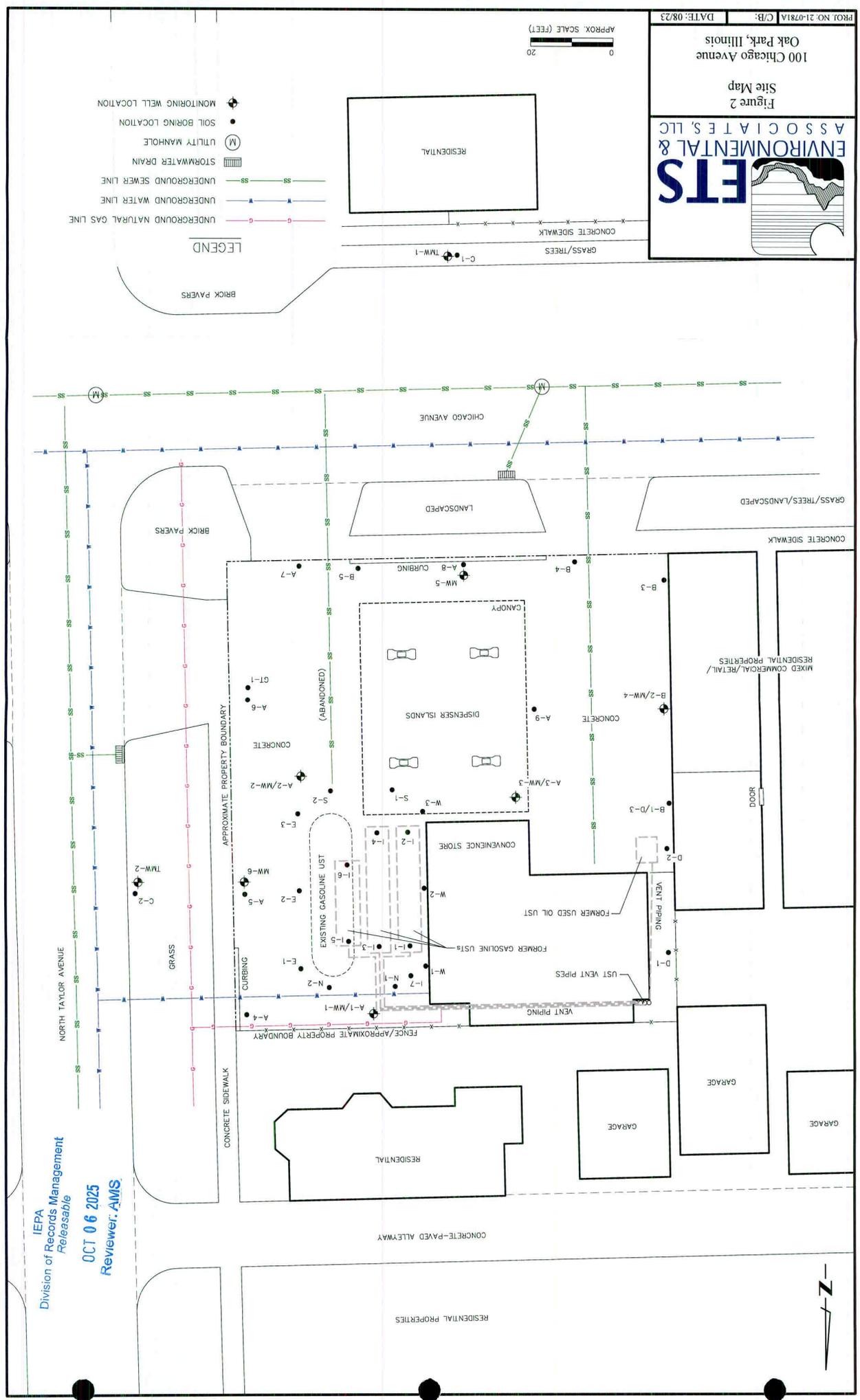
FIGURE 1
SITE LOCATION MAP
100 W. CHICAGO AVENUE
OAK PARK, ILLINOIS

APPROXIMATE SCALE
0.2mi

MAP DATE
2021



- LEGEND**
- MONITORING WELL LOCATION
 - SOIL BORING LOCATION
 - UTILITY MANHOLE
 - STORMWATER DRAIN
 - UNDERGROUND SEWER LINE
 - UNDERGROUND WATER LINE
 - UNDERGROUND NATURAL GAS LINE



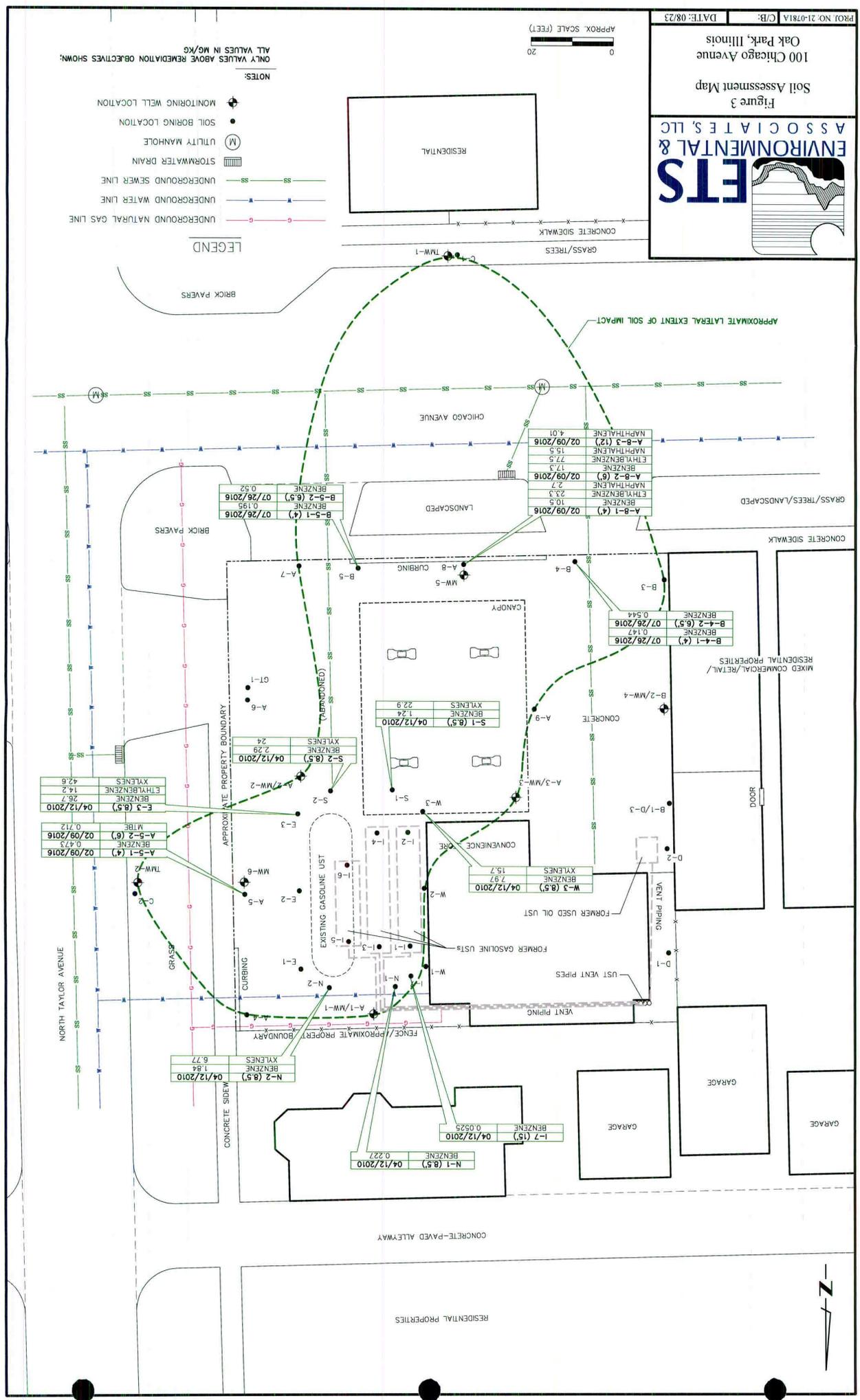
IEPA
Division of Records Management
Releasable
OCT 06 2025
Reviewer: AMS



APPROX. SCALE (FEET)
 0 20

NOTES:
 ALL VALUES IN MG/KG
 ONLY VALUES ABOVE REMEDIATION OBJECTIVES SHOWN.

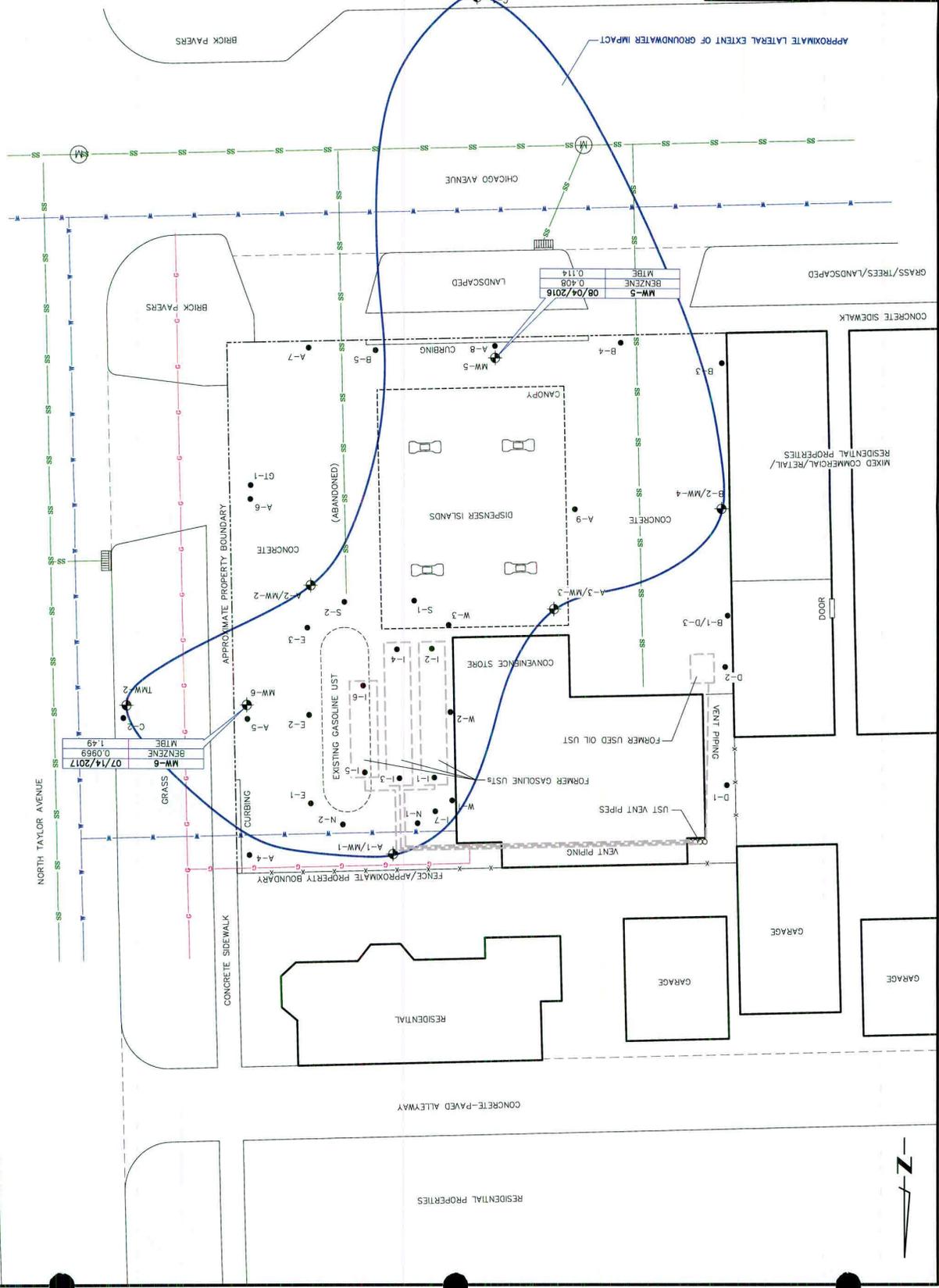
- LEGEND
- UNDERGROUND NATURAL GAS LINE
 - UNDERGROUND WATER LINE
 - UNDERGROUND SEWER LINE
 - STORMWATER DRAIN
 - UTILITY MANHOLE
 - SOIL BORING LOCATION
 - MONITORING WELL LOCATION



APPROX. SCALE (FEET)
 0 20

ALL VALUES IN MG/L
 ONLY VALUES ABOVE REMEDIATION OBJECTIVES SHOWN:

- LEGEND
- UNDERGROUND NATURAL GAS LINE
 - UNDERGROUND WATER LINE
 - UNDERGROUND SEWER LINE
 - STORMWATER DRAIN
 - UTILITY MANHOLE
 - SOIL BORING LOCATION
 - MONITORING WELL LOCATION



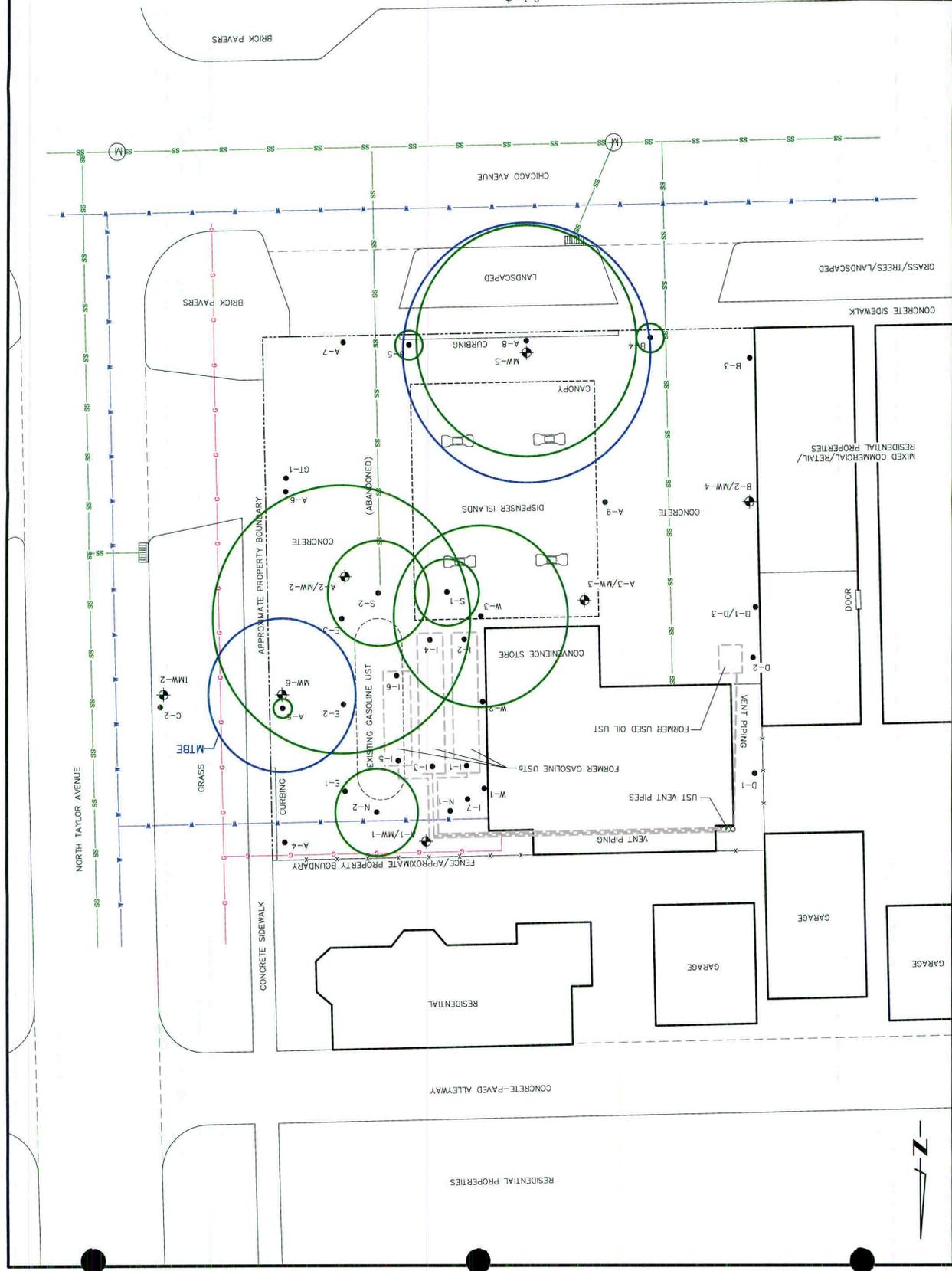
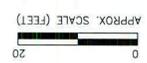
MW-9	08/04/2016	BENZENE	0.408
		MTBE	0.114

MW-6	07/14/2017	BENZENE	0.0869
		MTBE	1.49

NOTE: ALL RADII CALCULATED ON THE BASIS OF BENZENE CONCENTRATIONS EXCEPT FOR MW-6 AS MARKED (MTBE)

LEGEND

- PREDICTED EXTENT BASED ON GROUNDWATER CONCENTRATIONS
- PREDICTED EXTENT BASED ON SOIL CONCENTRATIONS
- ⊕ MONITORING WELL LOCATION
- SOIL BORING LOCATION
- Ⓜ UTILITY MANHOLE
- ▨ STORMWATER DRAIN
- SS — UNDERGROUND SEWER LINE
- — UNDERGROUND WATER LINE
- ○ — UNDERGROUND NATURAL GAS LINE



TABLES

Soil BTEX/MTBE Analytical Results
100 W. Chicago Avenue
Oak Park, Illinois
Project No. 21-0781A

SAMPLE ID	DATE	DEPTH (FEET)	BENZENE	TOLUENE	ETHYL-BENZENE	TOTAL XYLENES	MTBE
N-1	04/12/10	8.5	0.227 ^{1,2}	< 0.5	< 0.5	< 0.5	< 0.32
N-2	04/12/10	8.5	1.84 ^{1,2,6,7}	< 0.5	< 0.5	6.77 ⁸	< 0.32
S-1	04/12/10	8.5	1.24 ^{1,2,6}	8.16	3.58	22.9 ⁸	< 0.32
S-2	04/12/10	8.5	2.29 ^{1,2,6,7}	11.6	4.52	24 ⁸	< 0.32
E-1	04/12/10	8.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
E-2	04/12/10	8.5	< 0.005	< 0.005	< 0.005	< 0.005	0.322
E-3	04/12/10	8.5	26.7 ^{1,2,3,6,7,8}	1.38	14.2 ¹	42.6 ⁸	< 0.32
W-1	04/12/10	8.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
W-2	04/12/10	8.5	< 0.005	< 0.005	< 0.005	0.0088	< 0.005
W-3	04/12/10	8.5	7.97 ^{1,2,6,7,8}	1.4	15.7 ¹	4.52	< 0.32
I-1	04/12/10	15	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
I-2	04/12/10	15	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
I-3	04/12/10	15	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
I-4	04/12/10	15	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
I-5	04/12/10	15	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
I-6	04/12/10	15	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
I-7	04/12/10	15	0.0525 ¹	< 0.5	< 0.5	< 0.5	< 0.32
A-1-1	02/09/16	4	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-1-2	02/09/16	7.5	< 0.005	< 0.005	< 0.005	< 0.005	0.0545
A-1-3	02/09/16	12.5	< 0.005	< 0.005	< 0.005	< 0.005	0.0185
A-2-1	02/09/16	2.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-2-2	02/09/16	7.5	< 0.005	< 0.005	< 0.005	< 0.005	0.0126
A-2-3	02/09/16	12.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-3-1	02/09/16	4	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-3-2	02/09/16	8	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-3-3	02/09/16	12.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-4-1	02/09/16	2.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-4-2	02/09/16	7.5	< 0.005	< 0.005	< 0.005	< 0.005	0.0934
A-4-3	02/09/16	12.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-5-1	02/09/16	4	0.473 ^{1,2}	0.008	< 0.005	0.0257	0.166
A-5-2	02/09/16	6	< 0.005	< 0.005	< 0.005	< 0.005	0.712 ^{1,2}
A-5-3	02/09/16	12.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-6-1	02/09/16	2.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
SOIL COMPONENT TO GROUNDWATER INGESTION	CLASS I		0.03	12	13	150	0.32
	CLASS II		0.17	29	19	150	0.32
INGESTION REMEDIATION OBJECTIVES	RESIDENTIAL		12	16,000	7,800	16,000	780
	COMMERCIAL		100	410,000	200,000	410,000	20,000
	CONST. WORKER		2,300	410,000	20,000	41,000	2,000
INHALATION REMEDIATION OBJECTIVES	RESIDENTIAL		0.8	650	400	320	8,800
	COMMERCIAL		1.6	650	400	320	8,800
	CONST. WORKER		2.2	42	58	5.6	140

Results in mg/kg

- 1-Class I Soil Component to Groundwater Remediation Objective exceeded
- 2-Class II Soil Component to Groundwater Remediation Objective exceeded
- 3-Residential Ingestion Remediation Objective exceeded
- 4-Commercial Ingestion Remediation Objective exceeded
- 5-Construction Worker Ingestion Remediation Objective exceeded
- 6-Residential Inhalation Remediation Objective exceeded
- 7-Commercial Inhalation Remediation Objective Exceeded
- 8-Construction Worker Inhalation Remediation Objective exceeded
- 9-Smoke and test indicator Soil base B, 1 was exceeded in soil base D, 2



Soil BTEX/MTBE Analytical Results
100 W. Chicago Avenue
Oak Park, Illinois
Project No. 21-0781A

SAMPLE ID	DATE	DEPTH (FEET)	BENZENE	TOLUENE	ETHYL-BENZENE	TOTAL XYLENES	MTBE
A-6-2	02/09/16	7.5	< 0.005	< 0.005	< 0.005	< 0.005	0.01
A-6-3	02/09/16	12.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-7-1	02/09/16	4	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-7-2	02/09/16	6	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-7-3	02/09/16	10.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-8-1	02/09/16	4	10.5 ^{1,2,6,7,8}	< 0.5	23.3 ^{1,2}	0.925	< 0.32
A-8-2	02/09/16	6	17.3 ^{1,2,3,6,7,8}	< 0.5	77.5 ^{1,2,8}	4.77	< 0.32
A-8-3	02/09/16	12	0.0151	< 0.005	0.0228	< 0.005	< 0.005
A-9-1	02/09/16	2.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-9-2	02/09/16	7.5	< 0.005	< 0.005	< 0.005	< 0.005	0.059
A-9-3	02/09/16	10.1	< 0.005	< 0.005	< 0.005	< 0.005	0.0087
B-1-1	07/26/16	2.5	0.0848 ^{1,2}	< 0.5	1.08	6.49 ^{1,2}	< 0.32
B-1-2	07/26/16	7.5	< 0.005	< 0.005	< 0.005	< 0.005	0.506 ^{1,2}
B-1-3	07/26/16	12.5	< 0.005	< 0.005	< 0.005	< 0.005	0.188
B-2-1	07/26/16	2.5	< 0.005	< 0.005	< 0.005	< 0.005	0.01
B-2-2	07/26/16	7.5	< 0.005	< 0.005	< 0.005	< 0.005	0.134
B-2-3	07/26/16	12.5	< 0.005	< 0.005	< 0.005	< 0.005	0.0153
B-3-1	07/26/16	2.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
B-3-2	07/26/16	7	< 0.005	< 0.005	< 0.005	< 0.005	0.273
B-3-3	07/26/16	12.5	< 0.005	< 0.005	< 0.005	< 0.005	0.0075
B-4-1	07/26/16	4	0.147 ¹	< 0.005	< 0.005	0.0065	< 0.005
B-4-2	07/26/16	6.5	0.544 ^{1,2}	< 0.005	< 0.005	< 0.005	0.0228
B-4-3	07/26/16	12	0.0073	< 0.005	< 0.005	< 0.005	< 0.005
B-5-1	07/26/16	4	0.195 ^{1,2}	< 0.5	< 0.5	< 0.5	< 0.32
B-5-2	07/26/16	6.5	0.52 ^{1,2}	0.0065	< 0.005	< 0.005	0.0463
B-5-3	07/26/16	12	< 0.005	< 0.005	< 0.005	< 0.005	0.032
C-1-1	07/12/17	2.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
C-1-2	07/12/17	7.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
C-2-1	07/12/17	4	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
C-2-2	07/12/17	6	< 0.005	< 0.005	< 0.005	< 0.005	0.0065
D-1	02/06/23	3	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
D-1	02/06/23	7	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
D-1	02/06/23	11	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
SOIL COMPONENT TO GROUNDWATER INGESTION	CLASS I		0.03	12	13	150	0.32
	CLASS II		0.17	29	19	150	0.32
INGESTION REMEDIATION OBJECTIVES	RESIDENTIAL		12	16,000	7,800	16,000	780
	COMMERCIAL		100	410,000	200,000	410,000	20,000
	CONST. WORKER		2,300	410,000	20,000	41,000	2,000
INHALATION REMEDIATION OBJECTIVES	RESIDENTIAL		0.8	650	400	320	8,800
	COMMERCIAL		1.6	650	400	320	8,800
	CONST. WORKER		2.2	42	58	5.6	140

Results in mg/kg

- 1-Class I Soil Component to Groundwater Remediation Objective exceeded
- 2-Class II Soil Component to Groundwater Remediation Objective exceeded
- 3-Residential Ingestion Remediation Objective exceeded
- 4-Commercial Ingestion Remediation Objective exceeded
- 5-Construction Worker Ingestion Remediation Objective exceeded
- 6-Residential Inhalation Remediation Objective exceeded
- 7-Commercial Inhalation Remediation Objective Exceeded
- 8-Construction Worker Inhalation Remediation Objective exceeded



Soil BTEX/MTBE Analytical Results
100 W. Chicago Avenue
Oak Park, Illinois
Project No. 21-0781A

SAMPLE ID	DATE	DEPTH (FEET)	BENZENE	TOLUENE	ETHYL-BENZENE	TOTAL XYLENES	MTBE
D-2	02/06/23	3	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
D-2	02/06/23	6	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0061
D-3	06/13/23	1.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
D-3	06/13/23	7.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.099
D-3	06/13/23	11	< 0.005	< 0.005	< 0.005	< 0.005	< 0.095
SOIL COMPONENT TO GROUNDWATER INGESTION	CLASS I		0.03	12	13	150	0.32
	CLASS II		0.17	29	19	150	0.32
INGESTION REMEDIATION OBJECTIVES	RESIDENTIAL		12	16,000	7,800	16,000	780
	COMMERCIAL		100	410,000	200,000	410,000	20,000
	CONST. WORKER		2,300	410,000	20,000	41,000	2,000
INHALATION REMEDIATION OBJECTIVES	RESIDENTIAL		0.8	650	400	320	8,800
	COMMERCIAL		1.6	650	400	320	8,800
	CONST. WORKER		2.2	42	58	5.6	140

Results in mg/kg

- 1-Class I Soil Component to Groundwater Remediation Objective exceeded
- 2-Class II Soil Component to Groundwater Remediation Objective exceeded
- 3-Residential Ingestion Remediation Objective exceeded
- 4-Commercial Ingestion Remediation Objective exceeded
- 5-Construction Worker Ingestion Remediation Objective exceeded
- 6-Residential Inhalation Remediation Objective exceeded
- 7-Commercial Inhalation Remediation Objective Exceeded
- 8-Construction Worker Inhalation Remediation Objective exceeded
- 9-Struck-out text indicates Soil boring B-1 was resampled via soil boring D-3



Table 2

Soil PNA Analytical Results
 100 W. Chicago Avenue
 Oak Park, Illinois
 Project No. 21-0781A

CONSTITUENT	SOIL COMPONENT OF GROUNDWATER/INGESTION		INGESTION REMEDIATION OBJECTIVES		INHALATION REMEDIATION OBJECTIVES		N-1 8.5' 4/12/10	W-1 8.5' 4/12/10	I-7 15' 4/12/10	A-1-1 4' 2/9/16	A-1-2 7.5' 2/9/16	A-1-3 12.5' 2/9/16	A-2-1 2.5' 2/9/16	A-2-2 7.5' 2/9/16	A-2-3 12.5' 2/9/16	A-3-1 4' 2/9/16	A-3-2 8' 2/9/16	A-3-3 12.5' 2/9/16	A-4-1 2.5' 2/9/16	
	Class I	Class II	Residential	Commercial	Residential	Commercial														Residential
Aceaphthene	570	2,900	4700	120,000	NE	NE	1.05	<0.05	10.4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aceaphthylene	85	420	2,300	61,000	NE	NE	0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	12,000	59,000	23,000	610,000	NE	NE	1.19	<0.05	5.38	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benz(a)anthracene	2	8	1.8*	8	NE	NE	1.54	<0.0087	1.73	<0.0087	<0.0087	<0.0087	0.0122	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087
Benzo(a)pyrene	8	82	2.1*	2.1*	NE	NE	1.37	<0.015	1.7	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Benzo(b)fluoranthene	5	25	2.1*	8	NE	NE	1.55	<0.011	1.85	<0.011	<0.011	<0.011	0.013	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Benzo(k)fluoranthene	49	250	9	78	NE	NE	0.793	<0.011	1.01	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Benzo(g,h,i)perylene	27,000	130,000	2,300	61,000	NE	NE	0.893	<0.05	0.97	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	160	800	88	780	NE	NE	1.38	<0.05	2.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	2	7.6	0.42*	0.8	NE	NE	0.227	<0.02	0.253	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Fluoranthene	4,300	21,000	3,100	82,000	NE	NE	5.92	<0.05	6.6	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	560	2,800	3,100	82,000	NE	NE	0.997	<0.05	11.4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	14	69	1.6*	8	NE	NE	0.958	<0.029	1.11	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029
Naphthalene	12	18	1,600	41,000	170	270	0.254	<0.025	1.33	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Phenanthrene	210	1,100	2,300	61,000	NE	NE	4.1	<0.05	31.6	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	4,200	21,000	2,300	61,000	NE	NE	3.86	<0.05	6.46	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Units in mg/kg

NE = No remediation objective established

Bold indicates above method detection limit

Shade indicates above Tier 1

* Metro Background Concentration

Struck-out text indicates Soil Boring B-1 was resampled via Soil Boring B-3



Table 2

Soil PNA Analytical Results
 100 W. Chicago Avenue
 Oak Park, Illinois
 Project No. 21-0781A

CONSTITUENT	SOIL COMPONENT OF GROUNDWATER/INGESTION		INGESTION REMEDIATION OBJECTIVES		INHALATION REMEDIATION OBJECTIVES		A-4-2		A-4-3		A-5-1		A-5-2		A-5-3		A-6-1		A-6-2		A-6-3		A-7-1		A-7-2		A-7-3		A-8-1			
	Class I	Class II	Residential	Commercial	Residential	Commercial	Residential	Commercial	Residential	Commercial	Residential	Commercial	Residential	Commercial	Residential	Commercial	Residential	Commercial	Residential	Commercial	Residential	Commercial	Residential	Commercial	Residential	Commercial	Residential	Commercial	Residential	Commercial		
Arenaphthene	570	2,900	4700	120,000	NE	NE	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Acenaphthylene	85	420	2,300	61,000	NE	NE	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Anthracene	12,000	59,000	23,000	610,000	NE	NE	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Benzo(a)anthracene	2	8	1.8*	8	NE	NE	NE	NE	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Benzo(a)pyrene	8	82	2.1*	17	NE	NE	NE	NE	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Benzo(b)fluoranthene	5	25	2.1*	170	NE	NE	NE	NE	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Benzo(k)fluoranthene	49	250	9	78	NE	NE	NE	NE	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Benzo(g,h)perylene	27,000	130,000	2,300	61,000	NE	NE	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	160	800	88	780	NE	NE	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	2	7.6	0.42*	17	NE	NE	NE	NE	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Fluoranthene	4,300	21,000	3,100	82,000	NE	NE	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	560	2,800	3,100	82,000	NE	NE	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indene(1,2,3-cd)pyrene	14	69	1.6*	8	NE	NE	NE	NE	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029
Naphthalene	12	18	1,600	41,000	NE	NE	NE	NE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Phenanthrene	210	1,100	2,300	61,000	NE	NE	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	4,200	21,000	2,300	61,000	NE	NE	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05



Units in mg/kg
 NE = No remediation objective established
 Bold i indicates above method detection limit
 Shade indicates above Tier 1
 * Metro Background Concentration
 Struck-out text indicates Soil Boring B-1 was resampled via Soil Boring B-3

Table 2

Soil PNA Analytical Results
 100 W. Chicago Avenue
 Oak Park, Illinois
 Project No. 21-0781A

CONSTITUENT	SOIL COMPONENT OF GROUNDWATER/INGESTION		INGESTION REMEDIATION OBJECTIVES		INHALATION REMEDIATION OBJECTIVES		B-3-2 7' 07/26/16	B-3-3 12.5' 07/26/16	B-4-1 4' 07/26/16	B-4-2 6.5' 07/26/16	B-4-3 12' 07/26/16	B-5-1 4' 07/26/16	B-5-2 6.5' 07/26/16	B-5-3 12' 07/26/16	C-1-1 2.5' 07/12/17	C-1-2 7.5' 07/12/17	C-2-1 4' 07/12/17	C-2-2 6' 07/12/17	
	Class I	Class II	Residential	Commercial	Residential	Commercial													Const. Worker
Acenaphthene	570	2,900	4700	120,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Acenaphthylene	85	420	2,300	61,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Anthracene	12,000	59,000	23,000	610,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Benzo(a)anthracene	2	8	1.8*	8	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Benzo(a)pyrene	8	82	2.1*	2.1*	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Benzo(b)fluoranthene	5	25	2.1*	17	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Benzo(k)fluoranthene	49	250	9	78	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Benzo(ghi)perylene	27,000	130,000	2,300	61,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Chrysene	160	800	88	780	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Dibenz(a,h)anthracene	2	7.6	0.42*	0.8	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Fluoranthene	4,300	21,000	3,100	82,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Fluorene	560	2,800	3,100	82,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Indeno(1,2,3-cd)pyrene	14	69	1.6*	8	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Naphthalene	12	18	1,600	41,000	170	270	1.8	0.209	0.209	0.209	0.209	0.209	0.209	0.209	0.209	0.209	0.209	0.209	0.209
Phenanthrene	210	1,100	2,300	61,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Pyrene	4,200	21,000	2,300	61,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Units in mg/kg
 NE = No remediation objective established
 Bold indicates above method detection limit
 Shade indicates above Tier 1
 * Metro Background Concentration
 Struck-out text indicates Soil Boring B-1 was resampled via Soil Boring B-3



Table 2

Soil PNA Analytical Results
 100 W. Chicago Avenue
 Oak Park, Illinois
 Project No. 21-0781A

CONSTITUENT	SOIL COMPONENT OF GROUNDWATER/INGESTION		INGESTION REMEDIATION OBJECTIVES		INHALATION REMEDIATION OBJECTIVES		D-3 1.5' 06/13/23	D-3 7.5' 06/13/23	D-3 11' 06/13/23
	Class I	Class II	Residential	Commercial	Residential	Commercial			
Acenaphthene	570	2,900	4700	120,000	120,000	NE	NE	<0.33	<0.33
Acenaphthylene	85	420	2,300	61,000	61,000	NE	NE	<0.33	<0.33
Anthracene	12,000	59,000	23,000	610,000	610,000	NE	NE	<0.33	<0.33
Benzo(a)anthracene	2	8	1.8*	8	170	NE	NE	<0.33	<0.33
Benzo(a)pyrene	8	82	2.1*	2.1*	17	NE	NE	<0.09	<0.09
Benzo(b)fluoranthene	5	25	2.1*	8	170	NE	NE	<0.33	<0.33
Benzo(k)fluoranthene	49	250	9	78	1,700	NE	NE	<0.33	<0.33
Benzo(ghi)perylene	27,000	130,000	2,300	61,000	61,000	NE	NE	<0.33	<0.33
Chrysene	160	800	88	780	17,000	NE	NE	<0.33	<0.33
Dibenz(a,h)anthracene	2	7.6	0.42*	0.8	17	NE	NE	<0.09	<0.09
Fluoranthene	4,200	21,000	3,100	82,000	82,000	NE	NE	<0.33	<0.33
Fluorene	560	2,800	3,100	82,000	82,000	NE	NE	<0.33	<0.33
Indeno(1,2,3-cd)pyrene	14	69	1.6*	8	170	NE	NE	<0.33	<0.33
Naphthalene	12	18	1,600	41,000	4,100	170	270	<0.33	0.96
Phenanthrene	210	1,100	2,300	61,000	61,000	NE	NE	<0.33	<0.33
Pyrene	4,200	21,000	2,300	61,000	61,000	NE	NE	<0.33	<0.33

Units in mg/kg
 NE = No remediation objective established
 Bold indicates above method detection limit
 Shade indicates above Tier I
 * Metro Background Concentration
 Struck-out text indicates Soil Boring B-1 was resampled via Soil Boring B-3



Groundwater BTEX/MTBE Analytical Results
100 W. Chicago Avenue
Oak Park, Illinois
Project No. 21-0781A

SAMPLE ID	DATE	BENZENE	TOLUENE	ETHYLBENZENE	TOTAL XYLENES	MTBE
MW-1	3/9/16	< 0.005	< 0.005	< 0.005	< 0.005	0.0694
MW-2	3/9/16	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
MW-3	3/9/16	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
MW-4	8/4/16	< 0.005	< 0.005	< 0.005	< 0.005	0.769 ^{4,3}
MW-4	6/13/23	< 0.005	< 0.005	< 0.005	< 0.005	0.008
MW-5	8/4/16	0.408 ^{1,2,3}	< 0.005	0.152	0.0365	0.114 ^{1,2}
MW-6	7/14/17	0.0969 ^{1,2}	< 0.005	< 0.005	< 0.005	1.49 ^{1,2}
TMW-1	2/6/23	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TMW-2	2/6/23	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
GROUNDWATER REMEDIALTION OBJECTIVES	CLASS I	0.005	1	0.7	10	0.07
	CLASS II	0.025	2.5	1	10	0.07
GROUNDWATER INDOOR INHALATION	Residential	0.11	530	0.37	30	1,900
	Commercial	0.41	530	1.4	93	6,800

Units in mg/L

1 = Class I Remediation Objectives exceeded

2 = Class II Remediation Objectives exceeded

3 = Residential GW Indoor Inhalation Objectives exceeded

4 = Commercial GW Indoor Inhalation Objectives exceeded

* This site has been evaluated based on Class I Remediation Objectives



Groundwater PNA Analytical Results
 100 W. Chicago Avenue
 Oak Park, Illinois
 Project No. 21-0781A

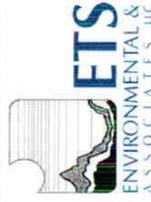
CONSTITUENT	GROUNDWATER REMEDIATION OBJECTIVES		GROUNDWATER INDOOR INHALATION		MW-1 3/9/16	MW-2 3/9/16	MW-3 3/9/16	MW-4 8/4/16	MW-5 8/4/16	MW-6 7/14/17
	CLASS I	CLASS II	Residential	Commercial						
Acenaphthene	0.42	2.1	NE	NE	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	0.21	1.05	NE	NE	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	2.1	10.5	NE	NE	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(a)anthracene	0.00013	0.00065	NE	NE	<0.00013	<0.00013	<0.00013	<0.00013	<0.00013	<0.00013
Benzo(a)pyrene	0.0002	0.002	NE	NE	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Benzo(b)fluoranthene	0.00018	0.0009	NE	NE	<0.00018	<0.00018	<0.00018	<0.00018	<0.00018	<0.00018
Benzo(k)-fluoranthene	0.00017	0.00085	NE	NE	<0.00017	<0.00017	<0.00017	<0.00017	<0.00017	<0.00017
Benzo(g,h,i)-perylene	0.21	1.05	NE	NE	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Chrysene	0.0015	0.0075	NE	NE	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015
Dibenz(a,h)-anthracene	0.0003	0.0015	NE	NE	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Fluoranthene	0.28	1.4	NE	NE	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Fluorene	0.28	1.4	NE	NE	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Indeno(1,2,3-cd)-pyrene	0.00043	0.00215	NE	NE	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Naphthalene	0.14	0.22	0.075	0.32	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phenanthrene	0.21	1.05	NE	NE	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Pyrene	0.21	1.05	NE	NE	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002

Units in mg/L

NE= Not Established

Bold indicates above method detection limit

Shade indicates above Tier 1



APPENDIX A

IEPA Correspondence dated January 3, 2024



ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

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

JB PRITZKER, GOVERNOR

JOHN J. KIM, DIRECTOR

(217) 524-3300

CERTIFIED MAIL

9589 0710 5270 1328 8641 28

JAN 03 2024

Hargobind, Inc.
Hardeep Singh
100 West Chicago Avenue
Oak Park, Illinois 60302

Re: LPC #0312255142 -- Cook County
Oak Park/Oak Park BP
100 West Chicago
Leaking UST Incident Nos. 20011417, 20090170 and 20100294
Leaking UST Technical File

Dear Mr. Singh:

The Illinois Environmental Protection Agency (Illinois EPA) has reviewed the Site Investigation Completion Report (report) submitted for the above-referenced incident. This report, dated September 21, 2023, was received by the Illinois EPA on October 2, 2023. Citations in this letter are from the Environmental Protection Act (415 ILCS 5) (Act) and Title 35 of the Illinois Administrative Code (35 Ill. Adm. Code).

The Illinois EPA has determined that the requirements of Title XVI of the Act have been satisfied (Sections 57.7(a)(5) and 57.7(c) of the Act and 35 Ill. Adm. Code 734.505(b) and 734.510(a)). Therefore, the report is approved.

Pursuant to Sections 57.7(b)(2) and (3) and 57.12(c) and (d) of the Act and 35 Ill. Adm. Code 734.100, 734.125, and 734.335(a), the Illinois EPA requires submittal of a Corrective Action Plan and budget within 30 days from the date of this letter to:

Illinois Environmental Protection Agency
Bureau of Land - #24
Leaking Underground Storage Tank Section
1021 North Grand Avenue East
Post Office Box 19276
Springfield, IL 62794-9276

Please note that the Illinois EPA does not require the submission of a budget if the owner or operator does not intend to seek payment from the Underground Storage Tank Fund.

2125 S. First Street, Champaign, IL 61820 (217) 278-5800
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

Page 2

Please submit all correspondence in duplicate and include the Re: block shown at the beginning of this letter.

If you have any questions or need further assistance, please contact the undersigned at (217) 524-6942 or at Matt.Urish@illinois.gov.

Sincerely,



Matthew Urish, P.G.
Project Manager
Special Projects and Financial Unit
Leaking Underground Storage Tank Section
Bureau of Land

c: Brian Gray, ETS Environmental & Associates, LLC (electronic copy),
BOL File

APPENDIX B

Tier 2 Calculation Spreadsheets

EQUATIONS S20, S21 & S24 FOR DERIVATION OF TOTAL SOIL POROSITY, WATER-FILLED SOIL POROSITY & AIR-FILLED SOIL POROSITY

Site Name
Oak Park BP

S24 - Equation for Derivation of Total Soil Porosity,
 $\eta (L_{\text{pore}}/L_{\text{soil}})$

$$\eta = 1 - \frac{\rho_b}{\rho_s}$$

SYMBOL	PARAMETER	UNITS	PARAMETER VALUES
ρ_b	Dry Soil Bulk Density	g/cm ³	Site-Specific Value
ρ_s	Soil Particle Density	g/cm ³	Site-Specific Value

INPUT PARAMETERS FOR η

$\rho_b =$ 1.67 g/cm³
 $\rho_s =$ 2.65 g/cm³

$$\eta = 0.37 L_{\text{pore}}/L_{\text{soil}}$$

S20 - Equation for Derivation of Water-Filled Soil Porosity,
 $\theta_w (L_{\text{water}}/L_{\text{soil}})$

$$\theta_w = \eta \cdot \left(\frac{I}{K_s}\right)^{1/(2b+3)}$$

SYMBOL	PARAMETER	UNITS	PARAMETER VALUES
η	Total Soil Porosity	$L_{\text{pore}}/L_{\text{soil}}$	Calculated Value Equation S24 in TACO
I	Infiltration Rate	m/yr	0.3
Soil Texture	USDA Soil Texture Classification	----	Site-Specific Value Appendix C, Illust. C
K_s	Saturated Hydraulic Conductivity	m/yr	Site-Specific Value Appendix C, Table K
$1/(2b+3)$	Exponential in Equation S20	unitless	Site-Specific Value Appendix C, Table K

Ks Values	
Sand	1,830
Loamy Sand	540
Sandy Loam	230
Silt Loam	120
Loam	60
Sandy Loam Clay	40
Silt Clay Loam	13
Clay Loam	20
Sandy Clay	10
Silt Clay	8

1/(2b+3) Values	
Sand	0.090
Loamy Sand	0.085
Sandy Loam	0.080
Silt Loam	0.074
Loam	0.073
Sandy Loam Clay	0.058
Silt Clay Loam	0.054
Clay Loam	0.050
Sandy Clay	0.042
Silt Clay	0.042

INPUT PARAMETERS FOR θ_w

$\eta =$ 0.37 $L_{\text{pore}}/L_{\text{soil}}$ Soil Texture = Silt Clay
 $I =$ 0.3 m/yr $K_s =$ 8 m/yr
 $1/(2b+3) =$ 0.042

$$\theta_w = 0.32 L_{\text{water}}/L_{\text{soil}}$$

S21 - Equation for Derivation of Air-Filled Soil Porosity,
 $\theta_a (L_{\text{air}}/L_{\text{soil}})$

$$\theta_a = \eta - \theta_w$$

SYMBOL	PARAMETER	UNITS	PARAMETER VALUES
η	Total Soil Porosity	$L_{\text{pore}}/L_{\text{soil}}$	Calculated Value Equation S24 in TACO
θ_w	Water-Filled Soil Porosity	$L_{\text{water}}/L_{\text{soil}}$	Calculated Value Equation S20 in TACO

INPUT PARAMETERS FOR θ_a

$\eta =$ 0.37 g/cm³
 $\theta_w =$ 0.32 g/cm³

$$\theta_a = 0.05 L_{\text{air}}/L_{\text{soil}}$$

EQUATION S10 FOR DERIVATION OF APPARENT DIFFUSIVITY (D_A)

Site Name
Carl Baessler Ltd.

S10 - Equation for Derivation of Apparent Diffusivity,
 D_A (cm^2/s)

$$D_A = \frac{(\theta_a^{3.33} \cdot D_i \cdot H') + (\theta_w^{3.33}) \cdot D_w}{\eta^2} \cdot \frac{1}{(\rho_b \cdot K_d) + \theta_w + (\theta_a \cdot H')}$$

SYMBOL	PARAMETER	UNITS	PARAMETER VALUES
θ_a	Air-Filled Soil Porosity	$L_{\text{air}}/L_{\text{soil}}$	Gravel = 0.05
			Sand = 0.14
			Silt = 0.24
			Clay = 0.19, or Calculated Value
θ_w	Water-Filled Soil Porosity	$L_{\text{water}}/L_{\text{soil}}$	Gravel = 0.20
			Sand = 0.18
			Silt = 0.16
			Clay = 0.17, or Calculated Value
D_i	Diffusivity in Air	cm^2/s	Chemical-Specific Benzene = 0.0880
D_w	Diffusivity in Water	cm^2/s	Chemical-Specific Benzene = 0.0000102
H'	Henry's Law Constant	unitless	Chemical-Specific Benzene = 0.230
η	Total Soil Porosity	$L_{\text{pore}}/L_{\text{soil}}$	Calculated Value Equation S24 in TACO
ρ_b	Dry Soil Bulk Density	g/cm^3	Site-Specific Value
K_d	Soil-Water Partition Coefficient	cm^3/g	Calculated Value Equation S19 in TACO

S24 - Total Soil Porosity ($L_{\text{pore}}/L_{\text{soil}}$)

$$\eta = 1 - \frac{\rho_b}{\rho_s}$$

S19 - Soil Water Partition Coefficient (cm^3/g)

$$K_d = K_{oc} \cdot f_{oc}$$

SYMBOL	PARAMETER	UNITS	PARAMETER VALUES
ρ_b	Dry Soil Bulk Density	g/cm^3	Site-Specific Value
ρ_s	Soil Particle Density	g/cm^3	Site-Specific Value
K_{oc}	Organic Carbon Partition Coefficient	cm^3/g	Chemical-Specific Benzene = 50.0
f_{oc}	Organic Carbon Content of Soil	g/g	Site-Specific Value

INPUT PARAMETERS FOR η

$\rho_b =$	1.67	g/cm^3
$\rho_s =$	2.65	g/cm^3
$\eta =$	0.37	$L_{\text{pore}}/L_{\text{soil}}$

INPUT PARAMETERS FOR K_d

$K_{oc} =$	50.0	cm^3/g
$f_{oc} =$	0.0156	g/g
$K_d =$	0.78	cm^3/g

INPUT PARAMETER VALUES FOR DERIVATION OF APPARENT DIFFUSIVITY, D_A (cm^2/s)

$\theta_a =$	0.05	$L_{\text{air}}/L_{\text{soil}}$
$\theta_w =$	0.32	$L_{\text{water}}/L_{\text{soil}}$
$D_i =$	0.0880	cm^2/s
$D_w =$	0.0000102	cm^2/s
$H' =$	0.230	

$\eta =$	0.37	g/cm^3
$\rho_b =$	1.67	g/cm^3
$K_d =$	0.78	m^3/kg

$$D_A = 4.63\text{E-}06 \text{ cm}^2/\text{s}$$

BENZENE

EQUATION S10 FOR DERIVATION OF APPARENT DIFFUSIVITY (D_A)

Site Name
Oak Park BP

S10 - Equation for Derivation of Apparent Diffusivity,
 D_A (cm^2/s)

$$D_A = \frac{(\theta_a^{3.33} \cdot D_i \cdot H') + (\theta_w^{3.33}) \cdot D_w}{\eta^2} \cdot \frac{1}{(\rho_b \cdot K_d) + \theta_w + (\theta_a \cdot H')}$$

SYMBOL	PARAMETER	UNITS	PARAMETER VALUES
θ_a	Air-Filled Soil Porosity	L_{air}/L_{soil}	Gravel = 0.05 Sand = 0.14 Silt = 0.24 Clay = 0.19, or Calculated Value
θ_w	Water-Filled Soil Porosity	L_{water}/L_{soil}	Gravel = 0.20 Sand = 0.18 Silt = 0.16 Clay = 0.17, or Calculated Value
D_i	Diffusivity in Air	cm^2/s	Chemical-Specific Naphthalene = 0.0590
D_w	Diffusivity in Water	cm^2/s	Chemical-Specific Naphthalene = 0.00000750
H'	Henry's Law Constant	unitless	Chemical-Specific Naphthalene = 0.0197
η	Total Soil Porosity	L_{pore}/L_{soil}	Calculated Value Equation S24 in TACO
ρ_b	Dry Soil Bulk Density	g/cm^3	Site-Specific Value
K_d	Soil-Water Partition Coefficient	cm^3/g	Calculated Value Equation S19 in TACO

S24 - Total Soil Porosity (L_{pore}/L_{soil})

$$\eta = 1 - \frac{\rho_b}{\rho_s}$$

S19 - Soil Water Partition Coefficient (cm^3/g)

$$K_d = K_{oc} \cdot f_{oc}$$

SYMBOL	PARAMETER	UNITS	PARAMETER VALUES
ρ_b	Dry Soil Bulk Density	g/cm^3	Site-Specific Value
ρ_s	Soil Particle Density	g/cm^3	Site-Specific Value
K_{oc}	Organic Carbon Partition Coefficient	cm^3/g	Chemical-Specific Naphthalene = 500
f_{oc}	Organic Carbon Content of Soil	g/g	Site-Specific Value

INPUT PARAMETERS FOR η

$\rho_b =$ 1.67 g/cm^3
 $\rho_s =$ 2.65 g/cm^3
 $\eta =$ 0.37 L_{pore}/L_{soil}

INPUT PARAMETERS FOR K_d

$K_{oc} =$ 500 cm^3/g
 $f_{oc} =$ 0.0156 g/g
 $K_d =$ 7.80 cm^3/g

INPUT PARAMETER VALUES FOR DERIVATION OF APPARENT DIFFUSIVITY, D_A (cm^2/s)

$\theta_a =$ 0.05 L_{air}/L_{soil}
 $\theta_w =$ 0.32 L_{water}/L_{soil}
 $D_i =$ 0.0590 cm^2/s
 $D_w =$ 0.00000750 cm^2/s
 $H' =$ 0.0197

$\eta =$ 0.37 g/cm^3
 $\rho_b =$ 1.67 g/cm^3
 $K_d =$ 7.80 m^3/kg

$$D_A = 1.20\text{E-}07 \text{ cm}^2/\text{s}$$

NAPHTHALENE

EQUATION S10 FOR DERIVATION OF APPARENT DIFFUSIVITY (D_A)

Site Name
Oak Park BP

S10 - Equation for Derivation of Apparent Diffusivity,
 D_A (cm^2/s)

$$D_A = \frac{(\theta_a^{3.33} \cdot D_i \cdot H') + (\theta_w^{3.33}) \cdot D_w}{\eta^2} \cdot \frac{1}{(\rho_b \cdot K_d) + \theta_w + (\theta_a \cdot H')}$$

SYMBOL	PARAMETER	UNITS	PARAMETER VALUES
θ_a	Air-Filled Soil Porosity	L_{air}/L_{soil}	Gravel = 0.05 Sand = 0.14 Silt = 0.24 Clay = 0.19, or Calculated Value
θ_w	Water-Filled Soil Porosity	L_{water}/L_{soil}	Gravel = 0.20 Sand = 0.18 Silt = 0.16 Clay = 0.17, or Calculated Value
D_i	Diffusivity in Air	cm^2/s	Chemical-Specific Ethylbenzene = 0.0750
D_w	Diffusivity in Water	cm^2/s	Chemical-Specific Ethylbenzene = 0.00000780
H'	Henry's Law Constant	unitless	Chemical-Specific Ethylbenzene = 0.324
η	Total Soil Porosity	L_{pore}/L_{soil}	Calculated Value Equation S24 in TACO
ρ_b	Dry Soil Bulk Density	g/cm^3	Site-Specific Value
K_d	Soil-Water Partition Coefficient	cm^3/g	Calculated Value Equation S19 in TACO

S24 - Total Soil Porosity (L_{pore}/L_{soil})

$$\eta = 1 - \frac{\rho_b}{\rho_s}$$

S19 - Soil Water Partition Coefficient (cm^3/g)

$$K_d = K_{oc} \cdot f_{oc}$$

SYMBOL	PARAMETER	UNITS	PARAMETER VALUES
ρ_b	Dry Soil Bulk Density	g/cm^3	Site-Specific Value
ρ_s	Soil Particle Density	g/cm^3	Site-Specific Value
K_{oc}	Organic Carbon Partition Coefficient	cm^3/g	Chemical-Specific Ethylbenzene = 320
f_{oc}	Organic Carbon Content of Soil	g/g	Site-Specific Value

INPUT PARAMETERS FOR η

$\rho_b =$ 1.67 g/cm^3
 $\rho_s =$ 2.65 g/cm^3
 $\eta =$ 0.37 L_{pore}/L_{soil}

INPUT PARAMETERS FOR K_d

$K_{oc} =$ 320 cm^3/g
 $f_{oc} =$ 0.0156 g/g
 $K_d =$ 4.99 cm^3/g

INPUT PARAMETER VALUES FOR DERIVATION OF APPARENT DIFFUSIVITY, D_A (cm^2/s)

$\theta_a =$ 0.05 L_{air}/L_{soil}
 $\theta_w =$ 0.32 L_{water}/L_{soil}
 $D_i =$ 0.0750 cm^2/s
 $D_w =$ 0.00000780 cm^2/s
 $H' =$ 0.324

$\eta =$ 0.37 g/cm^3
 $\rho_b =$ 1.67 g/cm^3
 $K_d =$ 4.99 m^3/kg

$$D_A = 9.62\text{E-}07 \text{ cm}^2/\text{s}$$

ETHYLBENZENE

EQUATION S10 FOR DERIVATION OF APPARENT DIFFUSIVITY (D_A)

Site Name
Oak Park BP

S10 - Equation for Derivation of Apparent Diffusivity,
 D_A (cm^2/s)

$$D_A = \frac{(\theta_a^{3.33} \cdot D_i \cdot H') + (\theta_w^{3.33}) \cdot D_w}{\eta^2} \cdot \frac{1}{(\rho_b \cdot K_d) + \theta_w + (\theta_a \cdot H')}$$

SYMBOL	PARAMETER	UNITS	PARAMETER VALUES
θ_a	Air-Filled Soil Porosity	L_{air}/L_{soil}	Gravel = 0.05 Sand = 0.14 Silt = 0.24 Clay = 0.19, or Calculated Value
θ_w	Water-Filled Soil Porosity	L_{water}/L_{soil}	Gravel = 0.20 Sand = 0.18 Silt = 0.16 Clay = 0.17, or Calculated Value
D_i	Diffusivity in Air	cm^2/s	Chemical-Specific Total Xylenes = 0.0735
D_w	Diffusivity in Water	cm^2/s	Chemical-Specific Total Xylenes = 0.00000923
H'	Henry's Law Constant	unitless	Chemical-Specific Total Xylenes = 0.271
η	Total Soil Porosity	L_{pore}/L_{soil}	Calculated Value Equation S24 in TACO
ρ_b	Dry Soil Bulk Density	g/cm^3	Site-Specific Value
K_d	Soil-Water Partition Coefficient	cm^3/g	Calculated Value Equation S19 in TACO

S24 - Total Soil Porosity (L_{pore}/L_{soil})

$$\eta = 1 - \frac{\rho_b}{\rho_s}$$

S19 - Soil Water Partition Coefficient (cm^3/g)

$$K_d = K_{oc} \cdot f_{oc}$$

SYMBOL	PARAMETER	UNITS	PARAMETER VALUES
ρ_b	Dry Soil Bulk Density	g/cm^3	Site-Specific Value
ρ_s	Soil Particle Density	g/cm^3	Site-Specific Value
K_{oc}	Organic Carbon Partition Coefficient	cm^3/g	Chemical-Specific Total Xylenes = 398
f_{oc}	Organic Carbon Content of Soil	g/g	Site-Specific Value

INPUT PARAMETERS FOR η

$$\rho_b = 1.67 \text{ g}/\text{cm}^3$$

$$\rho_s = 2.65 \text{ g}/\text{cm}^3$$

$$\eta = 0.37 \text{ } L_{pore}/L_{soil}$$

INPUT PARAMETERS FOR K_d

$$K_{oc} = 398 \text{ cm}^3/\text{g}$$

$$f_{oc} = 0.0156 \text{ g}/\text{g}$$

$$K_d = 6.21 \text{ cm}^3/\text{g}$$

INPUT PARAMETER VALUES FOR DERIVATION OF APPARENT DIFFUSIVITY, D_A (cm^2/s)

$$\theta_a = 0.05 \text{ } L_{air}/L_{soil}$$

$$\theta_w = 0.32 \text{ } L_{water}/L_{soil}$$

$$D_i = 0.0735 \text{ cm}^2/\text{s}$$

$$D_w = 0.00000923 \text{ cm}^2/\text{s}$$

$$H' = 0.271$$

$$\eta = 0.37 \text{ g}/\text{cm}^3$$

$$\rho_b = 1.67 \text{ g}/\text{cm}^3$$

$$K_d = 6.21 \text{ m}^3/\text{kg}$$

$$D_A = 6.84\text{E-}07 \text{ cm}^2/\text{s}$$

TOTAL XYLENES

The Agency is authorized to require this information under Section 4 and Title XVI of the Environmental Protection Act (415 ILCS 5/4, 5/57 - 57.17). Failure to disclose this information may result in a civil penalty of not to exceed \$50,000.00 for the violation and an additional civil penalty of not to exceed \$10,000.00 for each day during which the violation continues (415 ILCS 5/42). Any person who knowingly makes a false material statement or representation in any label, manifest, record, report, permit, or license, or other document filed, maintained or used for the purpose of compliance with Title XVI commits a Class 4 felony. Any second or subsequent offense after conviction hereunder is a Class 3 felony (415 ILCS 5/57.17). This form has been approved by the Forms Management Center.

Illinois Environmental Protection Agency Leaking Underground Storage Tank Program SSL Input Parameters for Use with Tier 2 Calculations

A. Site Identification

IEMA Incident # (6- or 8-digit): 20100294 IEPA LPC # (10-digit): 0312255142
 Site Name: Oak Park BP
 Site Address (not a P.O. Box): 100 W. Chicago Avenue
 City: Oak Park County: Cook Zip Code: 60302
 Leaking UST Technical File

B. Tier 2 Calculation Information

Equation(s) Used (ex: S12, S17, S28): S6, S7 and S26/S27: Inhalation of Carcinogens SROs
 Contact Information for Individual Who Performed Calculations: Noel Wubbena
noelw@ets-environmental.com
 Land Use: Res., Ind./Com. & Const. Worker Soil Type: Silt Clay
 Groundwater: Class I Class II
 Mass Limit: Yes No If Yes, then Specify Acreage: 0.5 1 2 5 10 30

- Mass Limit Acreage other than defaults must always be rounded up.
- Failure to use site-specific parameters where allowed could affect payment from the Underground Storage Tank Fund.
- Maps depicting source width, plume dimensions, distance, etc. must also be submitted.
- Inputs must be submitted in the designated unit.

Symbol	Unit	Symbol	Unit
AT (ingestion) =	yr	d _a =	m
AT (inhalation) =	yr	d _s =	m
AT _c = 70	yr	D _A = 0.00000463	cm ² /s
BW =	kg	D _i =	cm ² /s
C _{sat} =	mg/kg	D _w =	cm ² /s
C _w =	mg/L	DF =	unitless
d =	m	ED (ingestion of carcinogens) =	yr

Incident #: 20100294Chemical: BenzeneLand Use: Res., Ind./Com., CW

Symbol		Unit	Symbol		Unit
ED (inhalation of carcinogens)	= see page 3	yr	K_{oc}	=	cm ³ /g or L/kg
ED (ingestion of noncarcinogens)	=	yr	K_s	=	m/yr
ED (inhalation of noncarcinogens)	=	yr	L	=	m
ED (ingestion of groundwater)	=	yr	PEF	=	m ³ /kg
ED_{M-L}	= 70	yr	PEF'	=	m ³ /kg
EF	= see page 3	d/yr	Q/C (VF equations)	= 85.81	(g/m ² -s)/(kg/m ³)
F(x)	= 0.194	unitless	Q/C (PEF equations)	=	(g/m ² -s)/(kg/m ³)
f_{oc}	=	g/g	RfC	=	mg/m ³
GW_{obj}	=	mg/L	RfD _o	=	mg/(kg-d)
H'	=	unitless	S	=	mg/L
i	=	m/m	SF _o	=	(mg/kg-d) ⁻¹
l	= 0.3	m/yr	T	=	s
l_{M-L}	= 0.18	m/yr	T_{M-L}	= 30	yr
$IF_{soil-adj}$	= 114	(mg-yr)/(kg-d)	THQ	= 1	unitless
IR_{soil}	=	mg/d	TR	= 0.000001	unitless
IR_w	=	L/d	U_m	= 4.69	m/s
K	=	m/yr	URF	= see page 3	(μg/m ³) ⁻¹
K_d (non-ionizing organics)	=	cm ³ /g or L/kg	U_t	= 11.32	kg/m ³
K_d (ionizing organics)	=	cm ³ /g or L/kg	V	=	unitless
K_d (inorganics)	=	cm ³ /g or L/kg	VF	= 59,467	m ³ /kg

Symbol	Unit
VF' = 401.44	m ³ /kg
VF _{M-L}	m ³ /kg
VF' _{M-L}	m ³ /kg
η	L _{pore} /L _{soil}
θ _a	L _{air} /L _{soil}

Symbol	Unit
θ _w	L _{water} /L _{soil}
ρ _b = 1.67	kg/L or g/cm ³
ρ _s	g/cm ³
ρ _w = 1	g/cm ³
1/(2b+3)	unitless

Equation	Result	Unit(s)
S1 =		mg/kg
S2 =		mg/kg
S3 =		mg/kg
S4 =		mg/kg
S5 =		mg/kg
S6 = See Boxes Below		mg/L
S7 = See Box Below		mg/kg
S17 =		mg/kg
S28 =		mg/kg
S29 =		mg/L

Exposure Frequency (EF):
(days/year)

Residential = 350
Industrial/Commercial = 250
Construction Worker = 30

Exposure Duration (ED):
(years)

Residential = 30
Industrial/Commercial = 25
Construction Worker = 1

Inhalation Unit Risk Factor (URF):
[(ug/m³)-1]

Benzene = 0.0000078

Solution to Equation S6: (mg/kg) Residential	Solution to Equation S6: (mg/kg) Industrial/Commercial	Solution to Equation S7: (mg/kg) Construction Worker
Benzene = 16.3	Benzene = 31.2	Benzene = 43.8

**EQUATIONS S6 AND S7 FOR INHALATION OF VOLATILE CONTAMINANTS IN SOIL
(CARCINOGENS)**

**Site Name
Oak Park BP**

Residential, Industrial/Commercial
Remediation Objectives for Carcinogenic
Contaminants (mg/kg)

$$TR \cdot AT_c \cdot 365 \frac{d}{yr} \cdot URF \cdot 1000 \frac{\mu g}{mg} \cdot EF \cdot ED \cdot \frac{1}{VF}$$

Construction Worker Remediation Objectives for
Carcinogenic Contaminants (mg/kg)

$$TR \cdot AT_c \cdot 365 \frac{d}{yr} \cdot URF' \cdot 1000 \frac{\mu g}{mg} \cdot EF \cdot ED \cdot \frac{1}{VF'}$$

SYMBOL	PARAMETER	UNITS	PARAMETER VALUES
AT _c	AVERAGING TIME FOR CARCINOGENS	year	70
ED	EXPOSURE DURATION FOR INHALATION OF CARCINOGEN	year	RESIDENTIAL 30 INDUS/COMM. 25 CONST WRKR 1
EF	EXPOSURE FREQUENCY	d/yr	RESIDENTIAL 350 INDUS/COMM. 250 CONST WRKR 30
TR	TARGET CANCER RISK	unitless	RESIDENTIAL 10 ⁻⁴ INDUS/COMM. 10 ⁻⁶ CONST WRKR 10 ⁻⁴
URF	INHALATION UNIT RISK FACTOR	(^{mg} /m ³) ⁻¹	7.8x10 ⁻⁶ benzene
VF	VOLATILIZATION FACTOR	m ³ /kg	REFER TO EQ. S8& S9 WITHIN TACO

S8 - Volatilization Factor for the Inhalation
Exposure Route - Residential,
Industrial/Commercial (m³/kg)

$$VF = \frac{Q}{C} \cdot \frac{(3.14 \cdot D_A \cdot T)^{1/2}}{2 \cdot \rho_b \cdot D_A} \cdot 10^{-4}$$

S9 - Volatilization Factor for the Inhalation Exposure
Route - Construction Worker (m³/kg)

$$VF' = \frac{VF}{10}$$

SYMBOL	PARAMETER	UNITS	PARAMETER VALUES
D _A	APPARENT DIFFUSIVITY	cm ² /s	CALCULATED VALUE
P _b	DRY BULK DENSITY	g/cm ³	1.5, OR GRAVEL=2.0 SAND=1.8 SILT=1.6 CLAY=1.7, OR SITE SPECIFIC
Q/C	INVERSE OF THE MEAN CONCENTRATION AT THE CENTER OF A SQUARE SOURCE	(g m ⁻² ·s)/(kg m ³)	RESIDENTIAL 68.81 INDUS/COMM. 85.81 CONST WRKR 85.81 OR 742, Appendix C, Table H: Q/C by Source Area
T	EXPOSURE INTERVAL	s	RESIDENTIAL 9.5*10 ⁸ INDUS/COMM. 7.9*10 ⁸ CONST WRKR 3.6*10 ⁸

INPUT PARAMETERS FOR VF RES/INDUS/COM PROP

D _A =	4.63E-06 cm ² /s
P _b =	1.67 g/cm ³
Q/C=	68.81 (g/m ² ·s)/(kg/m ³) (Residential)
Q/C=	85.81 (g/m ² ·s)/(kg/m ³) (Industrial/Commercial)
T =	9.5E+08 s (Residential)
T =	7.9E+08 s (Industrial / Commercial)
VF=	52.293 m ³ /kg (Residential)
VF=	59.467 m ³ /kg (Industrial/Commercial)

INPUT PARAMETERS FOR VF' CONSTRUCTION WORKER

D _A =	4.63E-06 cm ² /s
P _b =	1.67 g/cm ³
Q/C=	85.81 (g/m ² ·s)/(kg/m ³)
T=	3.6E+06 s
VF=	401 m ³ /kg

INPUT PARAMETER VALUES RES/INDUS/COM PROP

AT _c =	70 year
ED=	30 year (Residential)
ED=	25 year (Industrial/Commercial)
EF=	350 d/yr (Residential)
EF=	250 d/yr (Industrial/Commercial)
TR=	1.00E-06 unitless
URF=	7.80E-06 (^{mg} /m ³) ⁻¹
VF=	52292.72 m ³ /kg (Residential)
VF=	59467.45 m ³ /kg (Industrial/Commercial)

INPUT PARAMETER VALUES FOR CONSTRUCTION WORKERS

AT _c =	70 year
ED=	1 year
EF=	30 d/yr
TR=	1.00E-06 unitless
URF=	7.80E-06 (^{mg} /m ³) ⁻¹
VF=	401.44 m ³ /kg

Residential Inhalation Remediation Objective (S6) =	16.3 mg/kg	Construction Worker Inhalation Remediation Objective (S7) =	43.8 mg/kg
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Industrial/Commercial Inhalation Remediation Objective (S6) =	31.2 mg/kg
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Tier 1 Non-Exceedence Check (value of SRO will change if Tier 2 SRO is less than Tier 1 SRO):

Soil Remediation Objective (Residential Inhalation) =	16.3 mg/kg
Soil Remediation Objective (Industrial/Commercial Inhalation) =	31.2 mg/kg
Soil Remediation Objective (Construction Worker Inhalation) =	43.8 mg/kg

BENZENE

The Agency is authorized to require this information under Section 4 and Title XVI of the Environmental Protection Act (415 ILCS 5/4, 5/57 - 57.17). Failure to disclose this information may result in a civil penalty of not to exceed \$50,000.00 for the violation and an additional civil penalty of not to exceed \$10,000.00 for each day during which the violation continues (415 ILCS 5/42). Any person who knowingly makes a false material statement or representation in any label, manifest, record, report, permit, or license, or other document filed, maintained or used for the purpose of compliance with Title XVI commits a Class 4 felony. Any second or subsequent offense after conviction hereunder is a Class 3 felony (415 ILCS 5/57.17). This form has been approved by the Forms Management Center.

Illinois Environmental Protection Agency Leaking Underground Storage Tank Program SSL Input Parameters for Use with Tier 2 Calculations

A. Site Identification

IEMA Incident # (6- or 8-digit): 20100294 IEPA LPC # (10-digit): 0312255142
 Site Name: Oak Park BP
 Site Address (not a P.O. Box): 100 W. Chicago Avenue
 City: Oak Park County: Cook Zip Code: 60302
 Leaking UST Technical File

B. Tier 2 Calculation Information

Equation(s) Used (ex: S12, S17, S28): S4, S5, S26 & S27: Inhalation of Non-Carcinogens SROs
 Contact Information for Individual Who Performed Calculations: Noel Wubbena
noelw@ets-environmental.com
 Land Use: Indust/Com & Const Worker Soil Type: Silt Clay
 Groundwater: Class I Class II
 Mass Limit: Yes No If Yes, then Specify Acreage: 0.5 1 2 5 10 30

- Mass Limit Acreage other than defaults must always be rounded up.
- Failure to use site-specific parameters where allowed could affect payment from the Underground Storage Tank Fund.
- Maps depicting source width, plume dimensions, distance, etc. must also be submitted.
- Inputs must be submitted in the designated unit.

Symbol	Unit	Symbol	Unit
AT (ingestion) =	yr	d _a =	m
AT (inhalation) =	see page 3	d _s =	m
AT _c =	70	D _A =	cm ² /s
BW =	kg	D _i =	cm ² /s
C _{sat} =	mg/kg	D _w =	cm ² /s
C _w =	mg/L	DF =	unitless
d =	m	ED (ingestion of carcinogens) =	yr

Incident #: 20100294

Chemical: EX / Naphthalene

Land Use: CW

Symbol		Unit	Symbol		Unit
ED (inhalation of carcinogens)	=	yr	K_{oc}	=	cm ³ /g or L/kg
ED (ingestion of noncarcinogens)	=	yr	K_s	=	m/yr
ED (inhalation of noncarcinogens)	= see page 3	yr	L	=	m
ED (ingestion of groundwater)	=	yr	PEF	=	m ³ /kg
ED_{M-L}	= 70	yr	PEF'	=	m ³ /kg
EF	= see page 3	d/yr	Q/C (VF equations)	= 85.81	(g/m ² -s)/(kg/m ³)
F(x)	= 0.194	unitless	Q/C (PEF equations)	=	(g/m ² -s)/(kg/m ³)
f_{oc}	=	g/g	RfC	= see page 3	mg/m ³
GW_{obj}	=	mg/L	RfD _o	=	mg/(kg-d)
H'	=	unitless	S	=	mg/L
i	=	m/m	SF _o	=	(mg/kg-d) ⁻¹
l	= 0.3	m/yr	T	=	s
l_{M-L}	= 0.18	m/yr	T_{M-L}	= 30	yr
$IF_{soil-adj}$	= 114	(mg-yr)/(kg-d)	THQ	= 1	unitless
IR_{soil}	=	mg/d	TR	=	unitless
IR_w	=	L/d	U_m	= 4.69	m/s
K	=	m/yr	URF	=	(μg/m ³) ⁻¹
K_d (non-ionizing organics)	=	cm ³ /g or L/kg	U_t	= 11.32	kg/m ³
K_d (ionizing organics)	=	cm ³ /g or L/kg	V	=	unitless
K_d (inorganics)	=	cm ³ /g or L/kg	VF	=	m ³ /kg

Incident #: 20100294

Chemical: EX / Naphthalene

Land Use: CW

Symbol	Unit
VF'	m^3/kg
VF_{M-L}	m^3/kg
VF'_{M-L}	m^3/kg
η	L_{pore}/L_{soil}
θ_a	L_{air}/L_{soil}

Symbol	Unit
θ_w	L_{water}/L_{soil}
ρ_b	$1.67 \text{ kg/L or g/cm}^3$
ρ_s	g/cm^3
ρ_w	1 g/cm^3
$1/(2b+3)$	unitless

Equation	Result	Unit(s)
S1	=	mg/kg
S2	=	mg/kg
S3	=	mg/kg
S4	= See Boxes Below	mg/kg
S5	= See Box Below	mg/kg
S6	=	mg/L
S7	=	mg/kg
S17	=	mg/kg
S28	=	mg/kg
S29	=	mg/L

Averaging Time (AT):
(years)

Construction Worker = 0.115

Exposure Frequency (EF):
(days/year)

Construction Worker = 30

Exposure Duration (ED):
(years)

Construction Worker = 1

Inhalation Reference Concentration (RfC):
(mg/m³)

Ethylbenzene - chronic = 1.0
 Ethylbenzene - subchronic = 1.0
 Total Xylenes - chronic = 0.1
 Total Xylenes - subchronic = 0.4
 Naphthalene - chronic = 0.003
 Naphthalene - subchronic = 0.003

Solution to Equation S4: (mg/kg) Residential	Solution to Equation S4: (mg/kg) Industrial/Commercial	Solution to Equation S5: (mg/kg) Construction Worker
		Ethylbenzene = 487* Total Xylenes = 388* Naphthalene = 10.5 * = Soil Saturation Limit

EQUATIONS S4 AND S5 FOR INHALATION OF VOLATILE CONTAMINANTS IN SOIL (NONCARCINOGENS)

Site Name
Oak Park BP

Residential, Industrial/Commercial
Remediation Objectives for
Noncarcinogenic Contaminants (mg/kg)

$$\frac{THQ \cdot AT \cdot 365 \frac{d}{yr}}{EF \cdot ED \cdot \left(\frac{1}{RfC} \cdot \frac{1}{VF} \right)}$$

Construction Worker Remediation Objectives for
Noncarcinogenic Contaminants (mg/kg)

$$\frac{THQ \cdot AT \cdot 365 \frac{d}{yr}}{EF \cdot ED \cdot \left(\frac{1}{RfC} \cdot \frac{1}{VF'} \right)}$$

SYMBOL	PARAMETER	UNITS	PARAMETER VALUES
AT	AVERAGING TIME FOR NONCARCINOGENS	YEAR	RESIDENTIAL 30
			INDUS/COMM. 25
			CONST WRKR 0.115
ED	EXPOSURE DURATION FOR INHALATION OF NONCARCINOGENS	YEAR	RESIDENTIAL 30
			INDUS/COMM. 25
			CONST WRKR 1
EF	EXPOSURE FREQUENCY	D/YR	RESIDENTIAL 350
			INDUS/COMM. 250
			CONST WRKR 30
RfC	INHALATION REFERENCE CONCENTRATION	MG/M ³	RESIDENTIAL 0.003
			INDUS/COMM. 0.003
			CONST WRKR 0.003
THQ	TARGET HAZARD QUOTIENT	UNITLESS	1
VF	VOLATILIZATION FACTOR	m ³ /kg	REFER TO EQ. S8& S9 WITHIN TACO

S9 - Volatilization Factor for the Inhalation
Exposure Route - Construction Worker
(m³/kg)

$$VF = \frac{Q}{C} \cdot \frac{(3.14 \cdot D_A \cdot T)^{1/2}}{2 \cdot \rho_b \cdot D_A} \cdot 10^{-4}$$

S9 - Volatilization Factor for the Inhalation Exposure
Route - Construction Worker (m³/kg)

$$VF' = \frac{VF}{10}$$

SYMBOL	PARAMETER	UNITS	PARAMETER VALUES
D _A	APPARENT DIFFUSIVITY	cm ² /s	CALCULATED VALUE
P _b	DRY BULK DENSITY	g/cm ³	1.5. OR
			GRAVEL=2.0
			SAND=1.8
			SILT=1.6
			CLAY=1.7. OR SITE SPECIFIC
Q/C	INVERSE OF THE MEAN CONCENTRATION AT THE CENTER OF A SQUARE SOURCE	(g/m ² -s)/(kg/m ³)	RESIDENTIAL 68.81
			INDUS/COMM. 85.81
			CONST WRKR 85.81
			OR 742. Appendix C, Table H: Q/C by Source Area
T	EXPOSURE INTERVAL	S	RESIDENTIAL 9.5*10 ⁸
			INDUS/COMM. 7.9*10 ⁸
			CONST WRKR 3.6*10 ⁸

INPUT PARAMETERS FOR VF RES/INDUS/COM PROP

D _A =	1.20E-07	cm ² /s
P _b =	1.67	g/cm ³
Q/C=	68.81	(g/m ² -s)/(kg/m ³) (Residential)
Q/C=	85.81	(g/m ² -s)/(kg/m ³) (Industrial/Commercial)
T =	9.5E+08	s (Residential)
T =	7.9E+08	s (Industrial / Commercial)
VF=	324,819	m ³ /kg (Residential)
VF=	369,385	m ³ /kg (Industrial/Commercial)

INPUT PARAMTERS FOR CONSTRUCTION WORKER

D _A =	1.20E-07	cm ² /s
P _b =	1.67	g/cm ³
Q/C=	85.81	(g/m ² -s)/(kg/m ³)
T =	3.6E+06	s
VF=	2,494	m ³ /kg

INPUT PARAMETER VALUES RES/INDUS/COM PROP

AT=	30	year (Residential)
AT=	25	year (Industrial/Commercial)
ED=	30	year (Residential)
ED=	25	year (Industrial/Commercial)
EF=	350	d/yr (Residential)
EF=	250	d/yr (Industrial/Commercial)
RfC=	0.003	mg/m ³
THQ	1	unitless
VF _{M-L} =	324818.75	m ³ /kg (Residential)
VF _{M-L} =	369384.94	m ³ /kg (Industrial/Commercial)

INPUT PARAMETER VALUES FOR CONSTRUCTION WORKERS

AT=	0.115	year
ED=	1	year
EF=	30	d/yr
RfC=	0.003	mg/m ³
THQ	1	unitless
VF _{M-L} =	2493.54	m ³ /kg

Residential Inhalation Remediation Objective (S4) =	1,016.2	mg/kg	Construction Worker Inhalation Remediation Objective (S5) =	10.47	mg/kg
Industrial/Commercial Inhalation Remediation Objective (S4) =	1,617.9	mg/kg			

Tier 1 Non-Exceedence Check (value of SRO will change if Tier 2 SRO is less than Tier 1 SRO):

Soil Remediation Objective (Residential Inhalation) =	1,016 mg/kg
Soil Remediation Objective (Industrial/Commercial Inhalation) =	1,618 mg/kg
Soil Remediation Objective (Construction Worker Inhalation) =	10.5 mg/kg

NAPHTHALENE

**EQUATIONS S4 AND S5 FOR INHALATION OF VOLATILE CONTAMINANTS IN SOIL
(NONCARCINOGENS)**

**Site Name
Oak Park BP**

Residential, Industrial/Commercial
Remediation Objectives for Noncarcinogenic
Contaminants (mg/kg)

$$\frac{THQ \cdot AT \cdot 365 \frac{d}{yr}}{EF \cdot ED \cdot \left(\frac{1}{RfC} \cdot \frac{1}{VF} \right)}$$

Construction Worker Remediation Objectives for
Noncarcinogenic Contaminants (mg/kg)

$$\frac{THQ \cdot AT \cdot 365 \frac{d}{yr}}{EF \cdot ED \cdot \left(\frac{1}{RfC} \cdot \frac{1}{VF'} \right)}$$

SYMBOL	PARAMETER	UNITS	PARAMETER VALUES
AT	AVERAGING TIME FOR NONCARCINOGENS	YEAR	RESIDENTIAL 30
			INDUS/COMM. 25
			CONST WRKR 0.115
ED	EXPOSURE DURATION FOR INHALATION OF CARCINOGEN	YEAR	RESIDENTIAL 30
			INDUS/COMM. 25
			CONST WRKR 1
EF	EXPOSURE FREQUENCY	D/YR	RESIDENTIAL 350
			INDUS/COMM. 250
			CONST WRKR 30
RfC	INHALATION REFERENCE CONCENTRATION	MG/M ³	RESIDENTIAL 1.0
			INDUS/COMM. 1.0
			CONST WRKR 9.0
THQ	TARGET HAZARD QUOTIENT	UNITLESS	1
VF	VOLATILIZATION FACTOR	m ³ /kg	REFER TO EQ. S8 & S9 WITHIN TACO

S8 - Volatilization Factor for the Inhalation
Exposure Route - Residential,
Industrial/Commercial (m³/kg)

$$VF = \frac{Q}{C} \cdot \frac{(3.14 \cdot D_A \cdot T)^{1/2}}{2 \cdot \rho_b \cdot D_A} \cdot 10^{-4}$$

S9 - Volatilization Factor for the Inhalation Exposure
Route - Construction Worker (m³/kg)

$$VF' = \frac{VF}{10}$$

SYMBOL	PARAMETER	UNITS	PARAMETER VALUES
D _A	APPARENT DIFFUSIVITY	cm ² /s	CALCULATED VALUE
P _b	DRY BULK DENSITY	g/cm ³	1.5, OR GRAVEL=2.0
			SAND=1.8
			SILT=1.6
			CLAY=1.7, OR SITE SPECIFIC
Q/C	INVERSE OF THE MEAN CONCENTRATION AT THE CENTER OF A SQUARE SOURCE	(g/m ² -s)/(kg/m ³)	RESIDENTIAL 68.81
			INDUS/COMM. 85.81
T	EXPOSURE INTERVAL	S	CONST WRKR 85.81
			OR 742, Appendix C, Table H: Q/C by Source Area
			RESIDENTIAL 9.5*10 ⁴
			INDUS/COMM. 7.9*10 ⁴
			CONST WRKR 3.6*10 ⁶

INPUT PARAMETERS FOR VF RES/INDUS/COM PROP

D _A =	9.62E-07	cm ² /s
P _b =	1.67	g/cm ³
Q/C=	68.81	(g/m ² -s)/(kg/m ³) (Residential)
Q/C=	85.81	(g/m ² -s)/(kg/m ³) (Industrial/Commercial)
T =	9.5E+08	s (Residential)
T =	7.9E+08	s (Industrial / Commercial)
VF=	114.721	m ³ /kg (Residential)
VF=	130.461	m ³ /kg (Industrial/Commercial)

INPUT PARAMETERS FOR CONSTRUCTION WORKER

D _A =	9.62E-07	cm ² /s
P _b =	1.67	g/cm ³
Q/C=	85.81	(g/m ² -s)/(kg/m ³)
T =	3.6E+06	s
VF=	881	m ³ /kg

INPUT PARAMETER VALUES RES/INDUS/COM PROP

AT=	30	year (Residential)
AT=	25	year (Industrial/Commercial)
ED=	30	year (Residential)
ED=	25	year (Industrial/Commercial)
EF=	350	d/yr (Residential)
EF=	250	d/yr (Industrial/Commercial)
RfC=	1.0	mg/m ³
THQ	1	unitless
VF=	114.721	m ³ /kg (Residential)
VF=	130.461	m ³ /kg (Industrial/Commercial)

INPUT PARAMETER VALUES FOR CONSTRUCTION WORKERS

AT=	0.115	year
ED=	1	year
EF=	30	d/yr
RfC=	9.0	mg/m ³
THQ	1	unitless
VF=	881	m ³ /kg

Residential Inhalation Remediation Objective (S4) =	119,637.96	mg/kg	Construction Worker Inhalation Remediation Objective (S5) =	11,090.01	mg/kg
Industrial/Commercial Inhalation Remediation Objective (S4) =	190,473.75	mg/kg			

Soil Saturation Limit Exceedence Check (value of SRO will change if soil saturation limit is exceeded for chemical):

Soil Remediation Objective (Residential Inhalation) =	487 mg/kg	Tier 2 Csat Value
Soil Remediation Objective (Industrial/Commercial Inhalation) =	487 mg/kg	Tier 2 Csat Value
Soil Remediation Objective (Construction Worker Inhalation) =	487 mg/kg	Tier 2 Csat Value

Tier 1 Non-Exceedence Check (value of SRO will change if Tier 2 SRO is less than Tier 1 SRO):

Soil Remediation Objective (Residential Inhalation) =	487 mg/kg
Soil Remediation Objective (Industrial/Commercial Inhalation) =	487 mg/kg
Soil Remediation Objective (Construction Worker Inhalation) =	487 mg/kg

EQUATIONS S4 AND S5 FOR INHALATION OF VOLATILE CONTAMINANTS IN SOIL (NONCARCINOGENS)

Site Name
Oak Park BP

Residential, Industrial/Commercial
Remediation Objectives for Noncarcinogenic
Contaminants (mg/kg)

$$\frac{THQ \cdot AT \cdot 365 \frac{d}{yr}}{EF \cdot ED \cdot \left(\frac{1}{RfC} \cdot \frac{1}{VF} \right)}$$

Construction Worker Remediation Objectives for
Noncarcinogenic Contaminants (mg/kg)

$$\frac{THQ \cdot AT \cdot 365 \frac{d}{yr}}{EF \cdot ED \cdot \left(\frac{1}{RfC} \cdot \frac{1}{VF'} \right)}$$

SYMBOL	PARAMETER	UNITS	PARAMETER VALUES
AT	AVERAGING TIME FOR NONCARCINOGENS	YEAR	RESIDENTIAL 30 INDUS/COMM. 25 CONST WRKR 0.115
ED	EXPOSURE DURATION FOR INHALATION OF NONCARCINOGENS	YEAR	RESIDENTIAL 30 INDUS/COMM. 25 CONST WRKR 1
EF	EXPOSURE FREQUENCY	D/YR	RESIDENTIAL 350 INDUS/COMM. 250 CONST WRKR 30
RfC	INHALATION REFERENCE CONCENTRATION	MG/M ³	RESIDENTIAL 0.1 INDUS/COMM. 0.1 CONST WRKR 0.4
THQ	TARGET HAZARD QUOTIENT	UNTILLESS	1
VF	VOLATILIZATION FACTOR	m ³ /kg	REFER TO EQ. S8 & S9 WITHIN TACO

<p>S8 - Volatilization Factor for the Inhalation Exposure Route - Residential, Industrial/Commercial (m³/kg)</p> $VF = \frac{Q}{C} \cdot \frac{(3.14 \cdot D_A \cdot T)^{1/2}}{2 \cdot \rho_b \cdot D_A} \cdot 10^{-4}$	<p>S9 - Volatilization Factor for the Inhalation Exposure Route - Construction Worker (m³/kg)</p> $VF' = \frac{VF}{10}$
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SYMBOL	PARAMETER	UNITS	PARAMETER VALUES
D _A	APPARENT DIFFUSIVITY	cm ² /s	CALCULATED VALUE
P _b	DRY BULK DENSITY	g/cm ³	1.5, OR GRAVEL=2.0 SAND=1.8 SILT=1.6 CLAY=1.7, OR SITE SPECIFIC
Q/C	INVERSE OF THE MEAN CONCENTRATION AT THE CENTER OF A SQUARE SOURCE	(g m ⁻² s)/(kg m ³)	RESIDENTIAL 68.81 INDUS/COMM. 85.81 CONST WRKR 85.81 OR 742 Appendix C, Table H: Q/C by Source Area
T	EXPOSURE INTERVAL	s	RESIDENTIAL 9.5*10 ⁴ INDUS/COMM. 7.9*10 ⁴ CONST WRKR 3.6*10 ⁴

INPUT PARAMETERS FOR VF RES/INDUS/COM PROP

D _A =	6.84E-07	cm ² /s
P _b =	1.67	g/cm ³
Q/C=	68.81	(g/m ² -s)/(kg/m ³) (Residential)
Q/C=	85.81	(g/m ² -s)/(kg/m ³) (Industrial/Commercial)
T =	9.5E+08	s (Residential)
T =	7.9E+08	s (Industrial / Commercial)
VF=	136.052	m ³ /kg (Residential)
VF=	154.718	m ³ /kg (Industrial/Commercial)

INPUT PARAMTERS FOR CONSTRUCTION WORKER

D _A =	6.84E-07	cm ² /s
P _b =	1.67	g/cm ³
Q/C=	85.81	(g/m ² -s)/(kg/m ³)
T =	3.6E+06	s
VF=	1.044	m ³ /kg

INPUT PARAMETER VALUES RES/INDUS/COM PROP

AT=	30	year (Residential)
AT=	25	year (Industrial/Commercial)
ED=	30	year (Residential)
ED=	25	year (Industrial/Commercial)
EF=	350	d/yr (Residential)
EF=	250	d/yr (Industrial/Commercial)
RfC=	0.1	mg/m ³
THQ	1	unitless
VF=	136.052	m ³ /kg (Residential)
VF=	154.718	m ³ /kg (Industrial/Commercial)

INPUT PARAMETER VALUES FOR CONSTRUCTION WORKERS

AT=	0.115	year
ED=	1	year
EF=	30	d/yr
RfC=	0.4	mg/m ³
THQ	1	unitless
VF=	1.044	m ³ /kg

Residential Inhalation Remediation Objective (S4) = 14,188.2 mg/kg	Construction Worker Inhalation Remediation Objective (S5) = 584.5 mg/kg
Industrial/Commercial Inhalation Remediation Objective (S4) = 22,588.9 mg/kg	

Soil Saturation Limit Exceedence Check (value of SRO will change if soil saturation limit is exceeded for chemical):

Soil Remediation Objective (Residential Inhalation) = 388 mg/kg	Tier 2 Csat Value
Soil Remediation Objective (Industrial/Commercial Inhalation) = 388 mg/kg	Tier 2 Csat Value
Soil Remediation Objective (Construction Worker Inhalation) = 388 mg/kg	Tier 2 Csat Value

Tier 1 Non-Exceedence Check (value of SRO will change if Tier 2 SRO is less than Tier 1 SRO):

Soil Remediation Objective (Residential Inhalation) = 388 mg/kg
Soil Remediation Objective (Industrial/Commercial Inhalation) = 388 mg/kg
Soil Remediation Objective (Construction Worker Inhalation) = 388 mg/kg

TOTAL XYLENES

The Agency is authorized to require this information under Section 4 and Title XVI of the Environmental Protection Act (415 ILCS 5/4, 5/57 - 57.17). Failure to disclose this information may result in a civil penalty of not to exceed \$50,000.00 for the violation and an additional civil penalty of not to exceed \$10,000.00 for each day during which the violation continues (415 ILCS 5/42). Any person who knowingly makes a false material statement or representation in any label, manifest, record, report, permit, or license, or other document filed, maintained or used for the purpose of compliance with Title XVI commits a Class 4 felony. Any second or subsequent offense after conviction hereunder is a Class 3 felony (415 ILCS 5/57.17). This form has been approved by the Forms Management Center.

Illinois Environmental Protection Agency Leaking Underground Storage Tank Program SSL Input Parameters for Use with Tier 2 Calculations

A. Site Identification

IEMA Incident # (6- or 8-digit): 20100294 IEPA LPC # (10-digit): 0312255142

Site Name: Oak Park BP

Site Address (not a P.O. Box): 100 W. Chicago Avenue

City: Oak Park County: Cook Zip Code: 60302

Leaking UST Technical File

B. Tier 2 Calculation Information

Equation(s) Used (ex: S12, S17, S28): S28/S18: Soil Leaching to Groundwater

Contact Information for Individual Who Performed Calculations: Noel Wubbena
noelw@ets-environmental.com

Land Use: not applicable Soil Type: Silt Clay

Groundwater: Class I Class II

Mass Limit: Yes No If Yes, then Specify Acreage: 0.5 1 2 5 10 30

- Mass Limit Acreage other than defaults must always be rounded up.
- Failure to use site-specific parameters where allowed could affect payment from the Underground Storage Tank Fund.
- Maps depicting source width, plume dimensions, distance, etc. must also be submitted.
- Inputs must be submitted in the designated unit.

Symbol	Unit	Symbol	Unit
AT (ingestion) =	yr	d _a =	m
AT (inhalation) =	yr	d _s =	2.5908 m
AT _c =	70 yr	D _A =	cm ² /s
BW =	kg	D _i =	cm ² /s
C _{sat} =	mg/kg	D _w =	cm ² /s
C _w =	mg/L	DF =	20 unitless
d =	2 m	ED (ingestion of carcinogens) =	yr

Incident #: 20100294

Chemical: B, E, MTBE, & Naph

Land Use: not applicable

Symbol	Unit	Symbol	Unit
ED (inhalation of carcinogens)	yr	K_{oc}	cm^3/g or L/kg
ED (ingestion of noncarcinogens)	yr	K_s	m/yr
ED (inhalation of noncarcinogens)	yr	L	m
ED (ingestion of groundwater)	yr	PEF	m^3/kg
ED_{M-L}	70 yr	PEF'	m^3/kg
EF	d/yr	Q/C (VF equations)	$(g/m^2-s)/(kg/m^3)$
F(x)	0.194 unitless	Q/C (PEF equations)	$(g/m^2-s)/(kg/m^3)$
f_{oc}	g/g	RfC	mg/m^3
GW_{obj}	mg/L	RfD _o	$mg/(kg-d)$
H'	unitless	S	mg/L
i	m/m	SF _o	$(mg/kg-d)^{-1}$
I	0.3 m/yr	T	s
I_{M-L}	0.18 m/yr	T_{M-L}	30 yr
$IF_{soil-adj}$	114 $(mg-yr)/(kg-d)$	THQ	1 unitless
IR_{soil}	mg/d	TR	unitless
IR_w	L/d	U_m	4.69 m/s
K	m/yr	URF	$(\mu g/m^3)^{-1}$
K_d (non-ionizing organics)	cm^3/g or L/kg	U_t	11.32 kg/m^3
K_d (ionizing organics)	cm^3/g or L/kg	V	unitless
K_d (inorganics)	cm^3/g or L/kg	VF	m^3/kg

Incident #: 20100294

Chemical: B, E, MTBE, & Naph

Land Use: not applicable

Symbol	Unit
VF'	m ³ /kg
VF _{M-L}	m ³ /kg
VF' _{M-L}	m ³ /kg
η	L _{pore} /L _{soil}
θ _a	L _{air} /L _{soil}

Symbol	Unit
θ _w	L _{water} /L _{soil}
ρ _b	1.67 kg/L or g/cm ³
ρ _s	g/cm ³
ρ _w	1 g/cm ³
1/(2b+3)	unitless

Equation	Result	Unit(s)
S1	=	mg/kg
S2	=	mg/kg
S3	=	mg/kg
S4	=	mg/kg
S5	=	mg/kg
S6	=	mg/L
S7	=	mg/kg
S17	=	mg/kg
S28	=	mg/kg
S29	=	mg/L

**Source Area Concentration Values:
(mg/Kg)**

N-1 (8.5') Benzene: 0.227
N-2 (8.5') Benzene: 1.84
S-1 (8.5') Benzene: 1.24
S-2 (8.5') Benzene: 2.29
E-3 (8.5') Benzene: 26.7
E-3 (8.5') Ethylbenzene: 14.2
W-3 (8.5') Benzene: 7.97
W-3 (8.5') Ethylbenzene: 15.7
I-7 (15') Benzene: 0.0525
A-5-1 (4') Benzene: 0.473
A-5-2 (6') MTBE: 0.712
A-8-1 (4') Benzene: 10.5
A-8-1 (4') Ethylbenzene: 23.3
A-8-2 (6') Benzene: 17.3
A-8-2 (6') Ethylbenzene: 77.5
A-8-2 (6') Naphthalene: 15.5
B-4-1 (4') Benzene: 0.147
B-4-2 (6.5') Benzene: 0.544
B-5-1 (4') Benzene: 0.195
B-5-2 (6.5') Benzene: 0.52

**Soil to Groundwater Leachate Potential (GW_{obj}):
(mg/L)**

N-1 (8.5') Benzene: 0.004	W-3 (8.5') Ethylbenzene: 0.3	A-8-2 (6') Ethylbenzene: 1.3
N-2 (8.5') Benzene: 0.032	I-7 (15') Benzene: 0.001	A-8-2 (6') Naphthalene: 0.27
S-1 (8.5') Benzene: 0.021	A-5-1 (4') Benzene: 0.008	B-4-1 (4') Benzene: 0.003
S-2 (8.5') Benzene: 0.039	A-5-2 (6') MTBE: 0.01	B-4-2 (6.5') Benzene: 0.009
E-3 (8.5') Benzene: 0.458	A-8-1 (4') Benzene: 0.180	B-5-1 (4') Benzene: 0.003
E-3 (8.5') Ethylbenzene: 0.2	A-8-1 (4') Ethylbenzene: 0.4	B-5-2 (6.5') Benzene: 0.009
W-3 (8.5') Benzene: 0.137	A-8-2 (6') Benzene: 0.297	

**SOIL TO GROUNDWATER POTENTIAL LEACHATE CONCENTRATION
MASS-LIMIT REMEDIATION OBJECTIVE FOR SOIL COMPONENT OF THE
GROUNDWATER INGESTION EXPOSURE ROUTE
SSL EQUATIONS S28 & S18**

Site Details		Sample Details
Site Name & Location:	Oak Park BP Oak Park, Illinois	Sample Location: N-1 Sample Depth (feet): 8.5'
LUST Incident Number(s):	20011417, 20090170, & 20100294	Analyte: Benzene
Exposure Pathway:	Soil Component of Groundwater Ingestion	Soil Concentration in mg/kg: 0.227
Groundwater Classification:	Class I	

SSL Equation S28

$$\text{Remediation Objective (RO)} = \frac{(C_w \cdot I_{M-L} \cdot ED_{M-L})}{(\rho_b \cdot d_s)}$$

(milligrams per kilogram, mg/kg)

SSL Equation S18

$$\text{Target Soil Leachate Concentration } C_w = DF \cdot GW_{obj}$$

(milligrams per liter, mg/L)

Model Parameters Inputs:

Symbol	Unit	Parameter	Values
R.O.	mg/kg	Soil Concentration at Point Source	0.227
I_{M-L}	m/yr	Infiltration Rate	0.18
ED_{M-L}	year	Exposure Duration for Eq S28	70
ρ_b	g/cm ³	Dry Soil Bulk Density	1.67
d_s	m	Depth of Source	2.5908
DF	unitless	Dilution Factor	20

Model Calculated Outputs:

C_w	mg/L	Target Soil Leachate Concentration	0.077948125
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.003897406
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.004
IEPA TACO Tier 1 Groundwater Remediation Objectives			
		<u>Analyte</u>	<u>Class I</u>
		Benzene	0.005
		<u>Class II</u>	0.025

**Soil to Groundwater Potential Leachate Concentration vs.
IEPA TACO Tier 1 Groundwater Remediation Objective**

Will leach above IEPA TACO Tier 1 GRO for Class I Groundwater? *No*

Will leach above IEPA TACO Tier 1 GRO for Class II Groundwater? *No*

**SOIL TO GROUNDWATER POTENTIAL LEACHATE CONCENTRATION
 MASS-LIMIT REMEDIATION OBJECTIVE FOR SOIL COMPONENT OF THE
 GROUNDWATER INGESTION EXPOSURE ROUTE
 SSL EQUATIONS S28 & S18**

Site Details		Sample Details
Site Name & Location:	Oak Park BP Oak Park, Illinois	Sample Location: N-2 Sample Depth (feet): 8.5'
LUST Incident Number(s):	20011417, 20090170, & 20100294	Analyte: Benzene
Exposure Pathway:	Soil Component of Groundwater Ingestion	
Groundwater Classification:	Class I	Soil Concentration in mg/kg: 1.84

SSL Equation S28

Remediation Objective (RO) =
$$\frac{(C_w \cdot I_{M-L} \cdot ED_{M-L})}{(\rho_b \cdot d_s)}$$

 (milligrams per kilogram, mg/kg)

SSL Equation S18

Target Soil Leachate Concentration $C_w = DF \cdot GW_{obj}$
 (milligrams per liter, mg/L)

Model Parameters Inputs:

Symbol	Unit	Parameter	Values
R.O.	mg/kg	Soil Concentration at Point Source	1.840
I_{M-L}	m/yr	Infiltration Rate	0.18
ED_{M-L}	year	Exposure Duration for Eq S28	70
ρ_b	g/cm ³	Dry Soil Bulk Density	1.67
d_s	m	Depth of Source	2.5908
DF	unitless	Dilution Factor	20

Model Calculated Outputs:

C_w	mg/L	Target Soil Leachate Concentration	0.631826210
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.031591310
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.032
IEPA TACO Tier 1 Groundwater Remediation Objectives			
		<u>Analyte</u>	<u>Class I</u>
		Benzene	0.005
		<u>Class II</u>	0.025

**Soil to Groundwater Potential Leachate Concentration vs.
 IEPA TACO Tier 1 Groundwater Remediation Objective**

Will leach above IEPA TACO Tier 1 GRO for Class I Groundwater? **Yes**
 Will leach above IEPA TACO Tier 1 GRO for Class II Groundwater? **Yes**

**SOIL TO GROUNDWATER POTENTIAL LEACHATE CONCENTRATION
MASS-LIMIT REMEDIATION OBJECTIVE FOR SOIL COMPONENT OF THE
GROUNDWATER INGESTION EXPOSURE ROUTE
SSL EQUATIONS S28 & S18**

Site Details		Sample Details
Site Name & Location:	Oak Park BP Oak Park, Illinois	Sample Location: S-1 Sample Depth (feet): 8.5'
LUST Incident Number(s):	20011417, 20090170, & 20100294	Analyte: Benzene
Exposure Pathway:	Soil Component of Groundwater Ingestion	Soil Concentration in mg/kg: 1.24
Groundwater Classification:	Class I	

SSL Equation S28

$$\text{Remediation Objective (RO)} = \frac{(C_w \cdot I_{M-L} \cdot ED_{M-L})}{(\rho_b \cdot d_s)}$$

(milligrams per kilogram, mg/kg)

SSL Equation S18

$$\text{Target Soil Leachate Concentration } C_w = DF \cdot GW_{obj}$$

(milligrams per liter, mg/L)

Model Parameters Inputs:

Symbol	Unit	Parameter	Values
R.O.	mg/kg	Soil Concentration at Point Source	1.240
I_{M-L}	m/yr	Infiltration Rate	0.18
ED_{M-L}	year	Exposure Duration for Eq S28	70
ρ_b	g/cm ³	Dry Soil Bulk Density	1.67
d_s	m	Depth of Source	2.5908
DF	unitless	Dilution Factor	20

Model Calculated Outputs:

C_w	mg/L	Target Soil Leachate Concentration	0.425795924
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.021289796
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.021
IEPA TACO Tier 1 Groundwater Remediation Objectives			
		<u>Analyte</u>	<u>Class I</u>
		Benzene	0.005
		<u>Class II</u>	0.025

**Soil to Groundwater Potential Leachate Concentration vs.
IEPA TACO Tier 1 Groundwater Remediation Objective**

Will leach above IEPA TACO Tier 1 GRO for Class I Groundwater? **Yes**

Will leach above IEPA TACO Tier 1 GRO for Class II Groundwater? **No**

SOIL TO GROUNDWATER POTENTIAL LEACHATE CONCENTRATION
MASS-LIMIT REMEDIATION OBJECTIVE FOR SOIL COMPONENT OF THE
GROUNDWATER INGESTION EXPOSURE ROUTE
SSL EQUATIONS S28 & S18

Site Details		Sample Details	
Site Name & Location:	Oak Park BP Oak Park, Illinois	Sample Location:	S-2
LUST Incident Number(s):	20011417, 20090170, & 20100294	Sample Depth (feet):	8.5'
Exposure Pathway:	Soil Component of Groundwater Ingestion	Analyte:	Benzene
Groundwater Classification:	Class I	Soil Concentration in mg/kg:	2.29

SSL Equation S28

Remediation Objective (RO) =
$$\frac{(C_w \cdot I_{M-L} \cdot ED_{M-L})}{(\rho_b \cdot d_s)}$$

(milligrams per kilogram, mg/kg)

SSL Equation S18

Target Soil Leachate Concentration $C_w = DF \cdot GW_{obj}$
(milligrams per liter, mg/L)

Model Parameters Inputs:

Symbol	Unit	Parameter	Values
R.O.	mg/kg	Soil Concentration at Point Source	2.290
I_{M-L}	m/yr	Infiltration Rate	0.18
ED_{M-L}	year	Exposure Duration for Eq S28	70
ρ_b	g/cm ³	Dry Soil Bulk Density	1.67
d_s	m	Depth of Source	2.5908
DF	unitless	Dilution Factor	20

Model Calculated Outputs:

C_w	mg/L	Target Soil Leachate Concentration	0.786348924
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.039317446
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.039
<u>IEPA TACO Tier 1 Groundwater Remediation Objectives</u>			
		<u>Analyte</u>	<u>Class I</u>
		Benzene	0.005
		<u>Class II</u>	0.025

Soil to Groundwater Potential Leachate Concentration vs.
IEPA TACO Tier 1 Groundwater Remediation Objective

Will leach above IEPA TACO Tier 1 GRO for Class I Groundwater? **Yes**
Will leach above IEPA TACO Tier 1 GRO for Class II Groundwater? **Yes**

SOIL TO GROUNDWATER POTENTIAL LEACHATE CONCENTRATION
MASS-LIMIT REMEDIATION OBJECTIVE FOR SOIL COMPONENT OF THE
GROUNDWATER INGESTION EXPOSURE ROUTE
SSL EQUATIONS S28 & S18

Site Details		Sample Details	
Site Name & Location:	Oak Park BP Oak Park, Illinois	Sample Location:	E-3
LUST Incident Number(s):	20011417, 20090170, & 20100294	Sample Depth (feet):	8.5'
Exposure Pathway:	Soil Component of Groundwater Ingestion	Analyte:	Benzene
Groundwater Classification:	Class I	Soil Concentration in mg/kg:	26.7

SSL Equation S28

Remediation Objective (RO) =
$$\frac{(C_w \cdot I_{M-L} \cdot ED_{M-L})}{(\rho_b \cdot d_s)}$$

(milligrams per kilogram, mg/kg)

SSL Equation S18

Target Soil Leachate Concentration $C_w = DF \cdot GW_{obj}$
(milligrams per liter, mg/L)

Model Parameters Inputs:

Symbol	Unit	Parameter	Values
R.O.	mg/kg	Soil Concentration at Point Source	26.700
I_{M-L}	m/yr	Infiltration Rate	0.18
ED_{M-L}	year	Exposure Duration for Eq S28	70
ρ_b	g/cm ³	Dry Soil Bulk Density	1.67
d_s	m	Depth of Source	2.5908
DF	unitless	Dilution Factor	20

Model Calculated Outputs:

C_w	mg/L	Target Soil Leachate Concentration	9.168347714
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.458417386
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.458
<u>IEPA TACO Tier 1 Groundwater Remediation Objectives</u>			
		<u>Analyte</u>	<u>Class I</u>
		Benzene	0.005
		<u>Class II</u>	0.025

Soil to Groundwater Potential Leachate Concentration vs.
IEPA TACO Tier 1 Groundwater Remediation Objective

Will leach above IEPA TACO Tier 1 GRO for Class I Groundwater? **Yes**
Will leach above IEPA TACO Tier 1 GRO for Class II Groundwater? **Yes**

**SOIL TO GROUNDWATER POTENTIAL LEACHATE CONCENTRATION
MASS-LIMIT REMEDIATION OBJECTIVE FOR SOIL COMPONENT OF THE
GROUNDWATER INGESTION EXPOSURE ROUTE
SSL EQUATIONS S28 & S18**

Site Details		Sample Details	
Site Name & Location:	Oak Park BP Oak Park, Illinois	Sample Location:	E-3
LUST Incident Number(s):	20011417, 20090170, & 20100294	Sample Depth (feet):	8.5'
Exposure Pathway:	Soil Component of Groundwater Ingestion	Analyte:	Ethylbenzene
Groundwater Classification:	Class I	Soil Concentration in mg/kg:	14.2

SSL Equation S28

$$\text{Remediation Objective (RO)} = \frac{(C_w \cdot I_{M-L} \cdot ED_{M-L})}{(\rho_b \cdot d_s)}$$

(milligrams per kilogram, mg/kg)

SSL Equation S18

$$\text{Target Soil Leachate Concentration } C_w = DF \cdot GW_{obj}$$

(milligrams per liter, mg/L)

Model Parameters Inputs:

Symbol	Unit	Parameter	Values
R.O.	mg/kg	Soil Concentration at Point Source	14.200
I_{M-L}	m/yr	Infiltration Rate	0.18
ED_{M-L}	year	Exposure Duration for Eq S28	70
ρ_b	g/cm ³	Dry Soil Bulk Density	1.67
d_s	m	Depth of Source	2.5908
DF	unitless	Dilution Factor	20

Model Calculated Outputs:

C_w	mg/L	Target Soil Leachate Concentration	4.876050095
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.243802505
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.2
IEPA TACO Tier 1 Groundwater Remediation Objectives			
		<u>Analyte</u>	<u>Class I</u>
		Ethylbenzene	0.7
		<u>Class II</u>	1

**Soil to Groundwater Potential Leachate Concentration vs.
IEPA TACO Tier 1 Groundwater Remediation Objective**

Will leach above IEPA TACO Tier 1 GRO for Class I Groundwater? **No**

Will leach above IEPA TACO Tier 1 GRO for Class II Groundwater? **No**

SOIL TO GROUNDWATER POTENTIAL LEACHATE CONCENTRATION
MASS-LIMIT REMEDIATION OBJECTIVE FOR SOIL COMPONENT OF THE
GROUNDWATER INGESTION EXPOSURE ROUTE
SSL EQUATIONS S28 & S18

Site Details		Sample Details
Site Name & Location:	Oak Park BP Oak Park, Illinois	Sample Location: W-3 Sample Depth (feet): 8.5'
LUST Incident Number(s):	20011417, 20090170, & 20100294	Analyte: Benzene
Exposure Pathway:	Soil Component of Groundwater Ingestion	Soil Concentration in mg/kg: 7.97
Groundwater Classification:	Class I	

SSL Equation S28

$$\text{Remediation Objective (RO)} = \frac{(C_w \cdot I_{M-L} \cdot ED_{M-L})}{(\rho_b \cdot d_s)}$$

(milligrams per kilogram, mg/kg)

SSL Equation S18

$$\text{Target Soil Leachate Concentration } C_w = DF \cdot GW_{obj}$$

(milligrams per liter, mg/L)

Model Parameters Inputs:

Symbol	Unit	Parameter	Values
R.O.	mg/kg	Soil Concentration at Point Source	7.970
I_{M-L}	m/yr	Infiltration Rate	0.18
ED_{M-L}	year	Exposure Duration for Eq S28	70
ρ_b	g/cm ³	Dry Soil Bulk Density	1.67
d_s	m	Depth of Source	2.5908
DF	unitless	Dilution Factor	20

Model Calculated Outputs:

C_w	mg/L	Target Soil Leachate Concentration	2.736768962
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.136838448
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.137
<u>IEPA TACO Tier 1 Groundwater Remediation Objectives</u>			
		<u>Analyte</u>	<u>Class I</u>
		Benzene	0.005
		<u>Class II</u>	0.025

Soil to Groundwater Potential Leachate Concentration vs.
IEPA TACO Tier 1 Groundwater Remediation Objective

Will leach above IEPA TACO Tier 1 GRO for Class I Groundwater? **Yes**

Will leach above IEPA TACO Tier 1 GRO for Class II Groundwater? **Yes**

**SOIL TO GROUNDWATER POTENTIAL LEACHATE CONCENTRATION
MASS-LIMIT REMEDIATION OBJECTIVE FOR SOIL COMPONENT OF THE
GROUNDWATER INGESTION EXPOSURE ROUTE
SSL EQUATIONS S28 & S18**

Site Details		Sample Details
Site Name & Location:	Oak Park BP Oak Park, Illinois	Sample Location: W-3 Sample Depth (feet): 8.5'
LUST Incident Number(s):	20011417, 20090170, & 20100294	Analyte: Ethylbenzene
Exposure Pathway:	Soil Component of Groundwater Ingestion	
Groundwater Classification:	Class I	Soil Concentration in mg/kg: 15.7

SSL Equation S28

$$\text{Remediation Objective (RO)} = \frac{(C_w \cdot I_{M-L} \cdot ED_{M-L})}{(\rho_b \cdot d_s)}$$

(milligrams per kilogram, mg/kg)

SSL Equation S18

$$\text{Target Soil Leachate Concentration } C_w = DF \cdot GW_{obj}$$

(milligrams per liter, mg/L)

Model Parameters Inputs:

Symbol	Unit	Parameter	Values
R.O.	mg/kg	Soil Concentration at Point Source	15.700
I_{M-L}	m/yr	Infiltration Rate	0.18
ED_{M-L}	year	Exposure Duration for Eq S28	70
ρ_b	g/cm ³	Dry Soil Bulk Density	1.67
d_s	m	Depth of Source	2.5908
DF	unitless	Dilution Factor	20

Model Calculated Outputs:

C_w	mg/L	Target Soil Leachate Concentration	5.391125810
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.269556290
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.3
IEPA TACO Tier 1 Groundwater Remediation Objectives			
		<u>Analyte</u>	<u>Class I</u>
		Ethylbenzene	0.7
			<u>Class II</u>
			1

**Soil to Groundwater Potential Leachate Concentration vs.
IEPA TACO Tier 1 Groundwater Remediation Objective**

Will leach above IEPA TACO Tier 1 GRO for Class I Groundwater? *No*

Will leach above IEPA TACO Tier 1 GRO for Class II Groundwater? *No*

**SOIL TO GROUNDWATER POTENTIAL LEACHATE CONCENTRATION
MASS-LIMIT REMEDIATION OBJECTIVE FOR SOIL COMPONENT OF THE
GROUNDWATER INGESTION EXPOSURE ROUTE
SSL EQUATIONS S28 & S18**

Site Details		Sample Details
Site Name & Location:	Oak Park BP Oak Park, Illinois	Sample Location: I-7 Sample Depth (feet): 15'
LUST Incident Number(s):	20011417, 20090170, & 20100294	Analyte: Benzene
Exposure Pathway:	Soil Component of Groundwater Ingestion	
Groundwater Classification:	Class I	Soil Concentration in mg/kg: 0.0525

SSL Equation S28

$$\text{Remediation Objective (RO)} = \frac{(C_w \cdot I_{M-L} \cdot ED_{M-L})}{(\rho_b \cdot d_s)}$$

(milligrams per kilogram, mg/kg)

SSL Equation S18

$$\text{Target Soil Leachate Concentration } C_w = DF \cdot GW_{obj}$$

(milligrams per liter, mg/L)

Model Parameters Inputs:

Symbol	Unit	Parameter	Values
R.O.	mg/kg	Soil Concentration at Point Source	0.053
I_{M-L}	m/yr	Infiltration Rate	0.18
ED_{M-L}	year	Exposure Duration for Eq S28	70
ρ_b	g/cm ³	Dry Soil Bulk Density	1.67
d_s	m	Depth of Source	2.5908
DF	unitless	Dilution Factor	20

Model Calculated Outputs:

C_w	mg/L	Target Soil Leachate Concentration	0.018027650
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.000901383
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.001
IEPA TACO Tier 1 Groundwater Remediation Objectives			
		<u>Analyte</u>	<u>Class I</u>
		Benzene	0.005
		<u>Class II</u>	0.025

**Soil to Groundwater Potential Leachate Concentration vs.
IEPA TACO Tier 1 Groundwater Remediation Objective**

Will leach above IEPA TACO Tier 1 GRO for Class I Groundwater? *No*

Will leach above IEPA TACO Tier 1 GRO for Class II Groundwater? *No*

**SOIL TO GROUNDWATER POTENTIAL LEACHATE CONCENTRATION
MASS-LIMIT REMEDIATION OBJECTIVE FOR SOIL COMPONENT OF THE
GROUNDWATER INGESTION EXPOSURE ROUTE
SSL EQUATIONS S28 & S18**

Site Details		Sample Details
Site Name & Location:	Oak Park BP Oak Park, Illinois	Sample Location: A-5-1 Sample Depth (feet): 4'
LUST Incident Number(s):	20011417, 20090170, & 20100294	Analyte: Benzene
Exposure Pathway:	Soil Component of Groundwater Ingestion	Soil Concentration in mg/kg: 0.473
Groundwater Classification:	Class I	

SSL Equation S28

$$\text{Remediation Objective (RO)} = \frac{(C_w \cdot I_{M-L} \cdot ED_{M-L})}{(\rho_b \cdot d_s)}$$

(milligrams per kilogram, mg/kg)

SSL Equation S18

$$\text{Target Soil Leachate Concentration } C_w = DF \cdot GW_{obj}$$

(milligrams per liter, mg/L)

Model Parameters Inputs:

Symbol	Unit	Parameter	Values
R.O.	mg/kg	Soil Concentration at Point Source	0.473
I_{M-L}	m/yr	Infiltration Rate	0.18
ED_{M-L}	year	Exposure Duration for Eq S28	70
ρ_b	g/cm ³	Dry Soil Bulk Density	1.67
d_s	m	Depth of Source	2.5908
DF	unitless	Dilution Factor	20

Model Calculated Outputs:

C_w	mg/L	Target Soil Leachate Concentration	0.162420542	
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.008121027	
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.008	
IEPA TACO Tier 1 Groundwater Remediation Objectives				
		Analyte	Class I	Class II
		Benzene	0.005	0.025

**Soil to Groundwater Potential Leachate Concentration vs.
IEPA TACO Tier 1 Groundwater Remediation Objective**

Will leach above IEPA TACO Tier 1 GRO for Class I Groundwater? **Yes**

Will leach above IEPA TACO Tier 1 GRO for Class II Groundwater? **No**

SOIL TO GROUNDWATER POTENTIAL LEACHATE CONCENTRATION
MASS-LIMIT REMEDIATION OBJECTIVE FOR SOIL COMPONENT OF THE
GROUNDWATER INGESTION EXPOSURE ROUTE
SSL EQUATIONS S28 & S18

Site Details		Sample Details	
Site Name & Location:	Oak Park BP Oak Park, Illinois	Sample Location:	A-5-2
LUST Incident Number(s):	20011417, 20090170, & 20100294	Sample Depth (feet):	6'
Exposure Pathway:	Soil Component of Groundwater Ingestion	Analyte:	MTBE
Groundwater Classification:	Class I	Soil Concentration in mg/kg:	0.712

SSL Equation S28

$$\text{Remediation Objective (RO)} = \frac{(C_w \cdot I_{M-L} \cdot ED_{M-L})}{(\rho_b \cdot d_s)}$$

(milligrams per kilogram, mg/kg)

SSL Equation S18

$$\text{Target Soil Leachate Concentration } C_w = DF \cdot GW_{obj}$$

(milligrams per liter, mg/L)

Model Parameters Inputs:

Symbol	Unit	Parameter	Values
R.O.	mg/kg	Soil Concentration at Point Source	0.712
I_{M-L}	m/yr	Infiltration Rate	0.18
ED_{M-L}	year	Exposure Duration for Eq S28	70
ρ_b	g/cm ³	Dry Soil Bulk Density	1.67
d_s	m	Depth of Source	2.5908
DF	unitless	Dilution Factor	20

Model Calculated Outputs:

C_w	mg/L	Target Soil Leachate Concentration	0.244489272
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.012224464
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.01
IEPA TACO Tier 1 Groundwater Remediation Objectives			
		<u>Analyte</u>	<u>Class I</u>
		MTBE	0.07
		<u>Class II</u>	0.07

Soil to Groundwater Potential Leachate Concentration vs.
IEPA TACO Tier 1 Groundwater Remediation Objective

Will leach above IEPA TACO Tier 1 GRO for Class I Groundwater? *No*
 Will leach above IEPA TACO Tier 1 GRO for Class II Groundwater? *No*

**SOIL TO GROUNDWATER POTENTIAL LEACHATE CONCENTRATION
MASS-LIMIT REMEDIATION OBJECTIVE FOR SOIL COMPONENT OF THE
GROUNDWATER INGESTION EXPOSURE ROUTE
SSL EQUATIONS S28 & S18**

Site Details		Sample Details
Site Name & Location:	Oak Park BP Oak Park, Illinois	Sample Location: A-8-1 Sample Depth (feet): 4'
LUST Incident Number(s):	20011417, 20090170, & 20100294	Analyte: Benzene
Exposure Pathway:	Soil Component of Groundwater Ingestion	Soil Concentration in mg/kg: 10.5
Groundwater Classification:	Class I	

SSL Equation S28

Remediation Objective (RO) =
$$\frac{(C_w \cdot I_{M-L} \cdot ED_{M-L})}{(\rho_b \cdot d_s)}$$

(milligrams per kilogram, mg/kg)

SSL Equation S18

Target Soil Leachate Concentration $C_w = DF \cdot GW_{obj}$
(milligrams per liter, mg/L)

Model Parameters Inputs:

Symbol	Unit	Parameter	Values
R.O.	mg/kg	Soil Concentration at Point Source	10.500
I_{M-L}	m/yr	Infiltration Rate	0.18
ED_{M-L}	year	Exposure Duration for Eq S28	70
ρ_b	g/cm ³	Dry Soil Bulk Density	1.67
d_s	m	Depth of Source	2.5908
DF	unitless	Dilution Factor	20

Model Calculated Outputs:

C_w	mg/L	Target Soil Leachate Concentration	3.605530000
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.180276500
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.180
IEPA TACO Tier 1 Groundwater Remediation Objectives			
		<u>Analyte</u>	<u>Class I</u>
		Benzene	0.005
		<u>Class II</u>	0.025

**Soil to Groundwater Potential Leachate Concentration vs.
IEPA TACO Tier 1 Groundwater Remediation Objective**

Will leach above IEPA TACO Tier 1 GRO for Class I Groundwater? **Yes**
Will leach above IEPA TACO Tier 1 GRO for Class II Groundwater? **Yes**

SOIL TO GROUNDWATER POTENTIAL LEACHATE CONCENTRATION
MASS-LIMIT REMEDIATION OBJECTIVE FOR SOIL COMPONENT OF THE
GROUNDWATER INGESTION EXPOSURE ROUTE
SSL EQUATIONS S28 & S18

Site Details		Sample Details	
Site Name & Location:	Oak Park BP Oak Park, Illinois	Sample Location:	A-8-1
LUST Incident Number(s):	20011417, 20090170, & 20100294	Sample Depth (feet):	4'
Exposure Pathway:	Soil Component of Groundwater Ingestion	Analyte:	Ethylbenzene
Groundwater Classification:	Class I	Soil Concentration in mg/kg:	23.3

SSL Equation S28

Remediation Objective (RO) =
$$\frac{(C_w \cdot I_{M-L} \cdot ED_{M-L})}{(\rho_b \cdot d_s)}$$

(milligrams per kilogram, mg/kg)

SSL Equation S18

Target Soil Leachate Concentration $C_w = DF \cdot GW_{obj}$
(milligrams per liter, mg/L)

Model Parameters Inputs:

Symbol	Unit	Parameter	Values
R.O.	mg/kg	Soil Concentration at Point Source	23.300
I_{M-L}	m/yr	Infiltration Rate	0.18
ED_{M-L}	year	Exposure Duration for Eq S28	70
ρ_b	g/cm ³	Dry Soil Bulk Density	1.67
d_s	m	Depth of Source	2.5908
DF	unitless	Dilution Factor	20

Model Calculated Outputs:

C_w	mg/L	Target Soil Leachate Concentration	8.000842762
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.400042138
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.4
<u>IEPA TACO Tier 1 Groundwater Remediation Objectives</u>			
		<u>Analyte</u>	
		<u>Class I</u>	<u>Class II</u>
		Ethylbenzene	0.7 1

Soil to Groundwater Potential Leachate Concentration vs.
IEPA TACO Tier 1 Groundwater Remediation Objective

Will leach above IEPA TACO Tier 1 GRO for Class I Groundwater? *No*
Will leach above IEPA TACO Tier 1 GRO for Class II Groundwater? *No*

**SOIL TO GROUNDWATER POTENTIAL LEACHATE CONCENTRATION
MASS-LIMIT REMEDIATION OBJECTIVE FOR SOIL COMPONENT OF THE
GROUNDWATER INGESTION EXPOSURE ROUTE
SSL EQUATIONS S28 & S18**

Site Details		Sample Details
Site Name & Location:	Oak Park BP Oak Park, Illinois	Sample Location: A-8-2 Sample Depth (feet): 6'
LUST Incident Number(s):	20011417, 20090170, & 20100294	Analyte: Benzene
Exposure Pathway:	Soil Component of Groundwater Ingestion	Soil Concentration in mg/kg: 17.3
Groundwater Classification:	Class I	

SSL Equation S28

Remediation Objective (RO) = $\frac{(C_w \cdot I_{M-L} \cdot ED_{M-L})}{(\rho_b \cdot d_s)}$
(milligrams per kilogram, mg/kg)

SSL Equation S18

Target Soil Leachate Concentration $C_w = DF \cdot GW_{obj}$
(milligrams per liter, mg/L)

Model Parameters Inputs:

Symbol	Unit	Parameter	Values
R.O.	mg/kg	Soil Concentration at Point Source	17.300
I_{M-L}	m/yr	Infiltration Rate	0.18
ED_{M-L}	year	Exposure Duration for Eq S28	70
ρ_b	g/cm ³	Dry Soil Bulk Density	1.67
d_s	m	Depth of Source	2.5908
DF	unitless	Dilution Factor	20

Model Calculated Outputs:

C_w	mg/L	Target Soil Leachate Concentration	5.940539905
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.297026995
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.297
IEPA TACO Tier 1 Groundwater Remediation Objectives			
		<u>Analyte</u>	<u>Class I</u>
		<u>Class II</u>	
		Benzene	0.005
			0.025

**Soil to Groundwater Potential Leachate Concentration vs.
IEPA TACO Tier 1 Groundwater Remediation Objective**

Will leach above IEPA TACO Tier 1 GRO for Class I Groundwater? **Yes**
Will leach above IEPA TACO Tier 1 GRO for Class II Groundwater? **Yes**

**SOIL TO GROUNDWATER POTENTIAL LEACHATE CONCENTRATION
MASS-LIMIT REMEDIATION OBJECTIVE FOR SOIL COMPONENT OF THE
GROUNDWATER INGESTION EXPOSURE ROUTE
SSL EQUATIONS S28 & S18**

Site Details		Sample Details
Site Name & Location:	Oak Park BP Oak Park, Illinois	Sample Location: A-8-2 Sample Depth (feet): 6'
LUST Incident Number(s):	20011417, 20090170, & 20100294	Analyte: Ethylbenzene
Exposure Pathway:	Soil Component of Groundwater Ingestion	Soil Concentration in mg/kg: 77.5
Groundwater Classification:	Class I	

SSL Equation S28

$$\text{Remediation Objective (RO)} = \frac{(C_w \cdot I_{M-L} \cdot ED_{M-L})}{(\rho_b \cdot d_s)}$$

(milligrams per kilogram, mg/kg)

SSL Equation S18

$$\text{Target Soil Leachate Concentration } C_w = DF \cdot GW_{obj}$$

(milligrams per liter, mg/L)

Model Parameters Inputs:

Symbol	Unit	Parameter	Values
R.O.	mg/kg	Soil Concentration at Point Source	77.500
I_{M-L}	m/yr	Infiltration Rate	0.18
ED_{M-L}	year	Exposure Duration for Eq S28	70
ρ_b	g/cm ³	Dry Soil Bulk Density	1.67
d_s	m	Depth of Source	2.5908
DF	unitless	Dilution Factor	20

Model Calculated Outputs:

C_w	mg/L	Target Soil Leachate Concentration	26.612245238
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	1.330612262
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	1.3
IEPA TACO Tier 1 Groundwater Remediation Objectives			
		<u>Analyte</u>	<u>Class I</u>
		Ethylbenzene	0.7
		<u>Class II</u>	1

**Soil to Groundwater Potential Leachate Concentration vs.
IEPA TACO Tier 1 Groundwater Remediation Objective**

Will leach above IEPA TACO Tier 1 GRO for Class I Groundwater? **Yes**

Will leach above IEPA TACO Tier 1 GRO for Class II Groundwater? **Yes**

**SOIL TO GROUNDWATER POTENTIAL LEACHATE CONCENTRATION
MASS-LIMIT REMEDIATION OBJECTIVE FOR SOIL COMPONENT OF THE
GROUNDWATER INGESTION EXPOSURE ROUTE
SSL EQUATIONS S28 & S18**

Site Details		Sample Details
Site Name & Location:	Oak Park BP Oak Park, Illinois	Sample Location: A-8-2 Sample Depth (feet): 6'
LUST Incident Number(s):	20011417, 20090170, & 20100294	Analyte: Naphthalene
Exposure Pathway:	Soil Component of Groundwater Ingestion	
Groundwater Classification:	Class I	Soil Concentration in mg/kg: 15.5

SSL Equation S28

Remediation Objective (RO) =
$$\frac{(C_w \cdot I_{M-L} \cdot ED_{M-L})}{(\rho_b \cdot d_s)}$$

(milligrams per kilogram, mg/kg)

SSL Equation S18

Target Soil Leachate Concentration $C_w = DF \cdot GW_{obj}$
(milligrams per liter, mg/L)

Model Parameters Inputs:

Symbol	Unit	Parameter	Values
R.O.	mg/kg	Soil Concentration at Point Source	15.500
I_{M-L}	m/yr	Infiltration Rate	0.18
ED_{M-L}	year	Exposure Duration for Eq S28	70
ρ_b	g/cm ³	Dry Soil Bulk Density	1.67
d_s	m	Depth of Source	2.5908
DF	unitless	Dilution Factor	20

Model Calculated Outputs:

C_w	mg/L	Target Soil Leachate Concentration	5.322449048
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.266122452
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.27
IEPA TACO Tier 1 Groundwater Remediation Objectives			
		<u>Analyte</u>	<u>Class I</u>
		Naphthalene	0.14
		<u>Class II</u>	0.22

**Soil to Groundwater Potential Leachate Concentration vs.
IEPA TACO Tier 1 Groundwater Remediation Objective**

Will leach above IEPA TACO Tier 1 GRO for Class I Groundwater? **Yes**
Will leach above IEPA TACO Tier 1 GRO for Class II Groundwater? **Yes**

SOIL TO GROUNDWATER POTENTIAL LEACHATE CONCENTRATION
MASS-LIMIT REMEDIATION OBJECTIVE FOR SOIL COMPONENT OF THE
GROUNDWATER INGESTION EXPOSURE ROUTE
SSL EQUATIONS S28 & S18

Site Details		Sample Details	
Site Name & Location:	Oak Park BP Oak Park, Illinois	Sample Location:	B-4-1
LUST Incident Number(s):	20011417, 20090170, & 20100294	Sample Depth (feet):	4'
Exposure Pathway:	Soil Component of Groundwater Ingestion	Analyte:	Benzene
Groundwater Classification:	Class I	Soil Concentration in mg/kg:	0.147

SSL Equation S28

Remediation Objective (RO) =
$$\frac{(C_w \cdot I_{M-L} \cdot ED_{M-L})}{(\rho_b \cdot d_s)}$$

(milligrams per kilogram, mg/kg)

SSL Equation S18

Target Soil Leachate Concentration $C_w = DF \cdot GW_{obj}$
(milligrams per liter, mg/L)

Model Parameters Inputs:

Symbol	Unit	Parameter	Values
R.O.	mg/kg	Soil Concentration at Point Source	0.147
I_{M-L}	m/yr	Infiltration Rate	0.18
ED_{M-L}	year	Exposure Duration for Eq S28	70
ρ_b	g/cm ³	Dry Soil Bulk Density	1.67
d_s	m	Depth of Source	2.5908
DF	unitless	Dilution Factor	20

Model Calculated Outputs:

C_w	mg/L	Target Soil Leachate Concentration	0.050477420
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.002523871
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.003
<u>IEPA TACO Tier 1 Groundwater Remediation Objectives</u>			
		<u>Analyte</u>	<u>Class I</u>
		Benzene	0.005
		<u>Class II</u>	0.025

Soil to Groundwater Potential Leachate Concentration vs.
IEPA TACO Tier 1 Groundwater Remediation Objective

Will leach above IEPA TACO Tier 1 GRO for Class I Groundwater? *No*
Will leach above IEPA TACO Tier 1 GRO for Class II Groundwater? *No*

**SOIL TO GROUNDWATER POTENTIAL LEACHATE CONCENTRATION
MASS-LIMIT REMEDIATION OBJECTIVE FOR SOIL COMPONENT OF THE
GROUNDWATER INGESTION EXPOSURE ROUTE
SSL EQUATIONS S28 & S18**

Site Details		Sample Details	
Site Name & Location:	Oak Park BP Oak Park, Illinois	Sample Location:	B-4-2
LUST Incident Number(s):	20011417, 20090170, & 20100294	Sample Depth (feet):	6.5'
Exposure Pathway:	Soil Component of Groundwater Ingestion	Analyte:	Benzene
Groundwater Classification:	Class I	Soil Concentration in mg/kg:	0.544

SSL Equation S28

Remediation Objective (RO) =
$$\frac{(C_w \cdot I_{M-L} \cdot ED_{M-L})}{(\rho_b \cdot d_s)}$$

(milligrams per kilogram, mg/kg)

SSL Equation S18

Target Soil Leachate Concentration $C_w = DF \cdot GW_{obj}$
(milligrams per liter, mg/L)

Model Parameters Inputs:

Symbol	Unit	Parameter	Values
R.O.	mg/kg	Soil Concentration at Point Source	0.544
I_{M-L}	m/yr	Infiltration Rate	0.18
ED_{M-L}	year	Exposure Duration for Eq S28	70
ρ_b	g/cm ³	Dry Soil Bulk Density	1.67
d_s	m	Depth of Source	2.5908
DF	unitless	Dilution Factor	20

Model Calculated Outputs:

C_w	mg/L	Target Soil Leachate Concentration	0.186800792
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.009340040
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.009
IEPA TACO Tier 1 Groundwater Remediation Objectives			
		<u>Analyte</u>	<u>Class I</u>
		Benzene	0.005
		<u>Class II</u>	0.025

**Soil to Groundwater Potential Leachate Concentration vs.
IEPA TACO Tier 1 Groundwater Remediation Objective**

Will leach above IEPA TACO Tier 1 GRO for Class I Groundwater? **Yes**
Will leach above IEPA TACO Tier 1 GRO for Class II Groundwater? **No**

**SOIL TO GROUNDWATER POTENTIAL LEACHATE CONCENTRATION
MASS-LIMIT REMEDIATION OBJECTIVE FOR SOIL COMPONENT OF THE
GROUNDWATER INGESTION EXPOSURE ROUTE
SSL EQUATIONS S28 & S18**

Site Details		Sample Details
Site Name & Location:	Oak Park BP Oak Park, Illinois	Sample Location: B-5-1 Sample Depth (feet): 4'
LUST Incident Number(s):	20011417, 20090170, & 20100294	Analyte: Benzene
Exposure Pathway:	Soil Component of Groundwater Ingestion	Soil Concentration in mg/kg: 0.195
Groundwater Classification:	Class I	

SSL Equation S28

$$\text{Remediation Objective (RO)} = \frac{(C_w \cdot I_{M-L} \cdot ED_{M-L})}{(\rho_b \cdot d_s)}$$

(milligrams per kilogram, mg/kg)

SSL Equation S18

$$\text{Target Soil Leachate Concentration } C_w = DF \cdot GW_{obj}$$

(milligrams per liter, mg/L)

Model Parameters Inputs:

Symbol	Unit	Parameter	Values
R.O.	mg/kg	Soil Concentration at Point Source	0.195
I_{M-L}	m/yr	Infiltration Rate	0.18
ED_{M-L}	year	Exposure Duration for Eq S28	70
ρ_b	g/cm ³	Dry Soil Bulk Density	1.67
d_s	m	Depth of Source	2.5908
DF	unitless	Dilution Factor	20

Model Calculated Outputs:

C_w	mg/L	Target Soil Leachate Concentration	0.066959843
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.003347992
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.003
IEPA TACO Tier 1 Groundwater Remediation Objectives			
		<u>Analyte</u>	<u>Class I</u>
		Benzene	0.005
		<u>Class II</u>	0.025

**Soil to Groundwater Potential Leachate Concentration vs.
IEPA TACO Tier 1 Groundwater Remediation Objective**

Will leach above IEPA TACO Tier 1 GRO for Class I Groundwater? *No*

Will leach above IEPA TACO Tier 1 GRO for Class II Groundwater? *No*

**SOIL TO GROUNDWATER POTENTIAL LEACHATE CONCENTRATION
MASS-LIMIT REMEDIATION OBJECTIVE FOR SOIL COMPONENT OF THE
GROUNDWATER INGESTION EXPOSURE ROUTE
SSL EQUATIONS S28 & S18**

Site Details		Sample Details
Site Name & Location:	Oak Park BP Oak Park, Illinois	Sample Location: B-5-2 Sample Depth (feet): 6.5'
LUST Incident Number(s):	20011417, 20090170, & 20100294	Analyte: Benzene
Exposure Pathway:	Soil Component of Groundwater Ingestion	
Groundwater Classification:	Class I	Soil Concentration in mg/kg: 0.52

SSL Equation S28

Remediation Objective (RO) =
$$\frac{(C_w \cdot I_{M-L} \cdot ED_{M-L})}{(\rho_b \cdot d_s)}$$

(milligrams per kilogram, mg/kg)

SSL Equation S18

Target Soil Leachate Concentration $C_w = DF \cdot GW_{obj}$
(milligrams per liter, mg/L)

Model Parameters Inputs:

Symbol	Unit	Parameter	Values
R.O.	mg/kg	Soil Concentration at Point Source	0.520
I_{M-L}	m/yr	Infiltration Rate	0.18
ED_{M-L}	year	Exposure Duration for Eq S28	70
ρ_b	g/cm ³	Dry Soil Bulk Density	1.67
d_s	m	Depth of Source	2.5908
DF	unitless	Dilution Factor	20

Model Calculated Outputs:

C_w	mg/L	Target Soil Leachate Concentration	0.178559581
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.008927979
GW_{obj}	mg/L	Soil to Groundwater Potential Leachate Concentration	0.009
IEPA TACO Tier 1 Groundwater Remediation Objectives			
		<u>Analyte</u>	<u>Class I</u>
		Benzene	0.005
		<u>Class II</u>	0.025

**Soil to Groundwater Potential Leachate Concentration vs.
IEPA TACO Tier 1 Groundwater Remediation Objective**

Will leach above IEPA TACO Tier 1 GRO for Class I Groundwater? **Yes**

Will leach above IEPA TACO Tier 1 GRO for Class II Groundwater? **No**

The Agency is authorized to require this information under Section 4 and Title XVI of the Environmental Protection Act (415 ILCS 5/4, 5/57 - 57.17). Failure to disclose this information may result in a civil penalty of not to exceed \$50,000.00 for the violation and an additional civil penalty of not to exceed \$10,000.00 for each day during which the violation continues (415 ILCS 5/42). Any person who knowingly makes a false material statement or representation in any label, manifest, record, report, permit, or license, or other document filed, maintained or used for the purpose of compliance with Title XVI commits a Class 4 felony. Any second or subsequent offense after conviction hereunder is a Class 3 felony (415 ILCS 5/57.17). This form has been approved by the Forms Management Center.

Illinois Environmental Protection Agency Leaking Underground Storage Tank Program RBCA Input Parameters for Use with Tier 2 Calculations

A. Site Identification

IEMA Incident # (6- or 8-digit): 20100294 IEPA LPC # (10-digit): 0312255142

Site Name: Oak Park BP

Site Address (not a P.O. Box): 100 W. Chicago Avenue

City: Oak Park County: Cook Zip Code: 60302

Leaking UST Technical File

B. Tier 2 Calculation Information

Equation(s) Used (ex: R12, R14, R26): R26: Benzene

Contact Information for Individual Who Performed Calculations: Noel Wubbena

noelw@ets-environmental.com

Land Use: Not Applicable Soil Type: Silty Clay

Groundwater: Class I Class II

Mass Limit: Yes No If Yes, then Specify Acreage: 0.5 1 2 5 10 30

Result from S18/S28 used in R26? Yes No Specify C_{source} from S18/S28 see page 3 mg/L

- Mass Limit Acreage other than defaults must always be rounded up.
- Failure to use site-specific parameters where allowed could affect payment from the Underground Storage Tank Fund.
- Maps depicting source width, plume dimensions, distance, etc. must also be submitted.
- Inputs must be submitted in the designated unit.

Symbol	Unit	Symbol	Unit
AT_c	yr	d	cm
AT_n	yr	D^{air}	cm ² /s
BW	kg	D^{water}	cm ² /s
C_{source}	mg/L	D_s^{eff}	cm ² /s
$C_{(x)}$	mg/L	ED	yr
$C_{(x)}/C_{source}$	unitless	EF	d/yr

Incident #: 20100294Chemical: BenzeneLand Use: Not Applicable

Symbol		Unit	Symbol		Unit
erf	=	unitless	RAF _d (PNAs)	= 0.05	unitless
f _{oc}	=	g/g	RAF _d (inorganics)	= 0	unitless
GW _{comp}	=	mg/L	RAF ₀	= 1.0	unitless
GW _{source}	=	mg/L	RBSL _{air} (carcinogenic)	=	µg/m ³
H'	=	cm ³ _{water} /cm ³ _{air}	RBSL _{air} (noncarcinogenic)	=	µg/m ³
i	= 0.0157	cm/cm	RfD _i	=	mg/kg-d
l	= 30	cm/yr	RfD _o	=	mg/kg-d
IR _{air}	= 20	m ³ /d	SA	= 3,160	cm ² /d
IR _{soil}	=	mg/d	S _d	= 200	cm
IR _w	=	L/d	S _w	= 4,053.84	cm
K	= 2.713	cm/d for R15, R19, R26; cm/yr for R24	SF _i	=	(mg/kg-d) ⁻¹
K _{oc}	=	cm ³ /g or L/kg	SF _o	=	(mg/kg-d) ⁻¹
k _s (non-ionizing organics)	=	cm ³ _{water} /g _{soil}	THQ	= 1	unitless
k _s (ionizing organics)	=	cm ³ _{water} /g _{soil}	TR	=	unitless
k _s (inorganics)	=	cm ³ _{water} /g _{soil}	U	=	cm/d
L _s	= 100	cm	U _{air}	= 225	cm/s
LF _{sw}	=	(mg/L _{water}) / (mg/kg _{soil})	U _{gw}	=	cm/yr
M	= 0.5	mg/cm ²	VF _p	=	kg/m ³
Pe	= 6.9 · 10 ⁻¹⁴	g/cm ² -s	VF _{samb}	=	(mg/m ³ _{air})/mg/kg _{soil} or kg/m ³
RAF _d	= 0.5	unitless	VF _{ss}	=	kg/m ³

Incident #: 20100294

Chemical: Benzene

Land Use: Not Applicable

Symbol		Unit
W	=	cm
w	=	g _{water} /g _{soil}
X	= see below	cm
α _x	=	cm
α _y	=	cm
α _z	=	cm
δ _{air}	= 200	cm
δ _{gw}	= 200	cm

Symbol		Unit
θ _{as}	=	cm ³ _{air} /cm ³ _{soil}
θ _{ws}	=	cm ³ _{water} /cm ³ _{soil}
θ _T	= 0.36	cm ³ /cm ³ _{soil}
λ	= 0.0009	d ⁻¹
π	= 3.1416	
ρ _b	=	g/cm ³
ρ _w	= 1	g/cm ³
τ	= 9.46 · 10 ⁸	s

Csource Values: (mg/L)

Equation	Result	Unit(s)
R1	=	mg/kg
R2	=	mg/kg
R7	=	mg/kg
R8	=	mg/kg
R12	=	mg/kg
R25	=	mg/L

<p>N-2 (8.5') Benzene: 0.032 S-1 (8.5') Benzene: 0.021 S-2 (8.5') Benzene: 0.039 E-3 (8.5') Benzene: 0.458 W-3 (8.5') Benzene: 0.137 A-5-1 (4') Benzene: 0.008 A-8-1 (4') Benzene: 0.180 A-8-2 (6') Benzene: 0.297 B-4-2 (6.5') Benzene: 0.009 B-5-2 (6.5') Benzene: 0.009</p>

Maximum Predicted Extent of Groundwater Impact (X):
(feet from point source)

<p>N-2 (8.5') Benzene: 9-feet S-1 (8.5') Benzene: 7-feet S-2 (8.5') Benzene: 11-feet E-3 (8.5') Benzene: 28-feet W-3 (8.5') Benzene: 19-feet A-5-1 (4') Benzene: 2-feet A-8-1 Benzene: 21-feet A-8-2 Benzene: 24-feet B-4-2 (6.5') Benzene: 3-feet B-5-2 (6.5') Benzene: 3-feet</p>
--

The Agency is authorized to require this information under Section 4 and Title XVI of the Environmental Protection Act (415 ILCS 5/4, 5/57 - 57.17). Failure to disclose this information may result in a civil penalty of not to exceed \$50,000.00 for the violation and an additional civil penalty of not to exceed \$10,000.00 for each day during which the violation continues (415 ILCS 5/42). Any person who knowingly makes a false material statement or representation in any label, manifest, record, report, permit, or license, or other document filed, maintained or used for the purpose of compliance with Title XVI commits a Class 4 felony. Any second or subsequent offense after conviction hereunder is a Class 3 felony (415 ILCS 5/57.17). This form has been approved by the Forms Management Center.

Illinois Environmental Protection Agency Leaking Underground Storage Tank Program RBCA Input Parameters for Use with Tier 2 Calculations

A. Site Identification

IEMA Incident # (6- or 8-digit): 20100294 IEPA LPC # (10-digit): 0312255142

Site Name: Oak Park BP

Site Address (not a P.O. Box): 100 W. Chicago Avenue

City: Oak Park County: Cook Zip Code: 60302

Leaking UST Technical File

B. Tier 2 Calculation Information

Equation(s) Used (ex: R12, R14, R26): R26: Ethylbenzene

Contact Information for Individual Who Performed Calculations: Noel Wubbena

noelw@ets-environmental.com

Land Use: Not Applicable Soil Type: Silty Clay

Groundwater: Class I Class II

Mass Limit: Yes No If Yes, then Specify Acreage: 0.5 1 2 5 10 30

Result from S18/S28 used in R26? Yes No Specify C_{source} from S18/S28 see page 3 mg/L

- Mass Limit Acreage other than defaults must always be rounded up.
- Failure to use site-specific parameters where allowed could affect payment from the Underground Storage Tank Fund.
- Maps depicting source width, plume dimensions, distance, etc. must also be submitted.
- Inputs must be submitted in the designated unit.

Symbol		Unit	Symbol		Unit
AT_c	=	70	d	=	cm
AT_n	=		D_{air}	=	cm ² /s
BW	=	70	D_{water}	=	cm ² /s
C_{source}	=	see page 3	D_s^{eff}	=	cm ² /s
$C_{(x)}$	=	0.7	ED	=	yr
$C_{(x)}/C_{source}$	=		EF	=	d/yr
		mg/L			
		kg			
		unitless			

Incident #: 20100294Chemical: EthylbenzeneLand Use: Not Applicable

Symbol		Unit	Symbol		Unit
erf	=	unitless	RAF _d (PNAs)	=	0.05 unitless
f _{oc}	=	g/g	RAF _d (inorganics)	=	0 unitless
GW _{comp}	=	mg/L	RAF ₀	=	1.0 unitless
GW _{source}	=	mg/L	RBSL _{air} (carcinogenic)	=	µg/m ³
H'	=	cm ³ _{water} /cm ³ _{air}	RBSL _{air} (noncarcinogenic)	=	µg/m ³
i	=	0.0157 cm/cm	RfD _i	=	mg/kg-d
l	=	30 cm/yr	RfD _o	=	mg/kg-d
IR _{air}	=	20 m ³ /d	SA	=	3,160 cm ² /d
IR _{soil}	=	mg/d	S _d	=	200 cm
IR _w	=	L/d	S _w	=	4,053.84 cm
K	=	2.713 cm/d for R15, R19, R26; cm/yr for R24	SF _i	=	(mg/kg-d) ⁻¹
K _{oc}	=	cm ³ /g or L/kg	SF _o	=	(mg/kg-d) ⁻¹
k _s (non-ionizing organics)	=	cm ³ _{water} /g _{soil}	THQ	=	1 unitless
k _s (ionizing organics)	=	cm ³ _{water} /g _{soil}	TR	=	unitless
k _s (inorganics)	=	cm ³ _{water} /g _{soil}	U	=	cm/d
L _s	=	100 cm	U _{air}	=	225 cm/s
LF _{sw}	=	(mg/L _{water}) / (mg/kg _{soil})	U _{gw}	=	cm/yr
M	=	0.5 mg/cm ²	VF _p	=	kg/m ³
Pe	=	6.9 · 10 ⁻¹⁴ g/cm ² -s	VF _{samb}	=	(mg/m ³ _{air})/mg/kg _{soil} or kg/m ³
RAF _d	=	0.5 unitless	VF _{ss}	=	kg/m ³

Incident #: 20100294

Chemical: Ethylbenzene

Land Use: Not Applicable

Symbol		Unit
W	=	cm
w	=	g _{water} /g _{soil}
X	= see below	cm
α_x	=	cm
α_y	=	cm
α_z	=	cm
δ_{air}	= 200	cm
δ_{gw}	= 200	cm

Symbol		Unit
θ_{as}	=	cm ³ _{air} /cm ³ _{soil}
θ_{ws}	=	cm ³ _{water} /cm ³ _{soil}
θ_T	= 0.36	cm ³ /cm ³ _{soil}
λ	= 0.003	d ⁻¹
π	= 3.1416	
ρ_b	=	g/cm ³
ρ_w	= 1	g/cm ³
τ	= 9.46 · 10 ⁸	s

C_{source} Values: (mg/L)

Equation	Result	Unit(s)
R1	=	mg/kg
R2	=	mg/kg
R7	=	mg/kg
R8	=	mg/kg
R12	=	mg/kg
R25	=	mg/L

<p>A-8-2 Ethylbenzene: 1.3</p>

Maximum Predicted Extent of Groundwater Impact (X):
(feet from point source)

<p>A-8-2 Ethylbenzene: 0.75-feet</p>

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Illinois Environmental Protection Agency Leaking Underground Storage Tank Program RBCA Input Parameters for Use with Tier 2 Calculations

A. Site Identification

IEMA Incident # (6- or 8-digit): 20100294 IEPA LPC # (10-digit): 0312255142

Site Name: Oak Park BP

Site Address (not a P.O. Box): 100 W. Chicago Avenue

City: Oak Park County: Cook Zip Code: 60302

Leaking UST Technical File

B. Tier 2 Calculation Information

Equation(s) Used (ex: R12, R14, R26): R26: Naphthalene

Contact Information for Individual Who Performed Calculations: Noel Wubbena

noelw@ets-environmental.com

Land Use: Not Applicable Soil Type: Silty Clay

Groundwater: Class I Class II

Mass Limit: Yes No If Yes, then Specify Acreage: 0.5 1 2 5 10 30

Result from S18/S28 used in R26? Yes No Specify C_{source} from S18/S28 see page 3 mg/L

- Mass Limit Acreage other than defaults must always be rounded up.
- Failure to use site-specific parameters where allowed could affect payment from the Underground Storage Tank Fund.
- Maps depicting source width, plume dimensions, distance, etc. must also be submitted.
- Inputs must be submitted in the designated unit.

Symbol		Unit	Symbol		Unit
AT_c	=	70	d	=	cm
AT_n	=		D_{air}	=	cm ² /s
BW	=	70	D_{water}	=	cm ² /s
C_{source}	=	see page 3	D_s^{eff}	=	cm ² /s
$C_{(x)}$	=	0.14	ED	=	yr
$C_{(x)}/C_{source}$	=		EF	=	d/yr
		unitless			

Incident #: 20100294

Chemical: Naphthalene

Land Use: Not Applicable

Symbol		Unit	Symbol		Unit
erf	=	unitless	RAF _d (PNAs)	= 0.05	unitless
f _{oc}	=	g/g	RAF _d (inorganics)	= 0	unitless
GW _{comp}	=	mg/L	RAF ₀	= 1.0	unitless
GW _{source}	=	mg/L	RBSL _{air} (carcinogenic)	=	µg/m ³
H'	=	cm ³ _{water} /cm ³ _{air}	RBSL _{air} (noncarcinogenic)	=	µg/m ³
i	= 0.0157	cm/cm	RfD _i	=	mg/kg-d
l	= 30	cm/yr	RfD _o	=	mg/kg-d
IR _{air}	= 20	m ³ /d	SA	= 3,160	cm ² /d
IR _{soil}	=	mg/d	S _d	= 200	cm
IR _w	=	L/d	S _w	= 4,053.84	cm
K	= 2.713	cm/d for R15, R19, R26; cm/yr for R24	SF _i	=	(mg/kg-d) ⁻¹
K _{oc}	=	cm ³ /g or L/kg	SF _o	=	(mg/kg-d) ⁻¹
k _s (non-ionizing organics)	=	cm ³ _{water} /g _{soil}	THQ	= 1	unitless
k _s (ionizing organics)	=	cm ³ _{water} /g _{soil}	TR	=	unitless
k _s (inorganics)	=	cm ³ _{water} /g _{soil}	U	=	cm/d
L _s	= 100	cm	U _{air}	= 225	cm/s
LF _{sw}	=	(mg/L _{water}) / (mg/kg _{soil})	U _{gw}	=	cm/yr
M	= 0.5	mg/cm ²	VF _p	=	kg/m ³
Pe	= 6.9 · 10 ⁻¹⁴	g/cm ² -s	VF _{samb}	=	(mg/m ³ _{air})/mg/kg _{soil} or kg/m ³
RAF _d	= 0.5	unitless	VF _{ss}	=	kg/m ³

Incident #: 20100294

Chemical: Naphthalene

Land Use: Not Applicable

Symbol		Unit
W	=	cm
w	=	g _{water} /g _{soil}
X	= see below	cm
α_x	=	cm
α_y	=	cm
α_z	=	cm
δ_{air}	= 200	cm
δ_{gw}	= 200	cm

Symbol		Unit
θ_{as}	=	cm ³ _{air} /cm ³ _{soil}
θ_{ws}	=	cm ³ _{water} /cm ³ _{soil}
θ_T	= 0.36	cm ³ /cm ³ _{soil}
λ	= 0.0027	d ⁻¹
π	= 3.1416	
ρ_b	=	g/cm ³
ρ_w	= 1	g/cm ³
τ	= 9.46 · 10 ⁸	s

Csource Values: (mg/L)

Equation	Result	Unit(s)
R1	=	mg/kg
R2	=	mg/kg
R7	=	mg/kg
R8	=	mg/kg
R12	=	mg/kg
R25	=	mg/L

<p>A-8-2 Naphthalene: 0.27</p>

Maximum Predicted Extent of Groundwater Impact (X):
(feet from point source)

<p>A-8-2 Naphthalene: 1-feet</p>

DISSOLVED HYDROCARBON CONCENTRATION ALONG CENTERLINE
MAXIMUM PREDICTED EXTENT OF GROUNDWATER IMPACT MODELING
RBCA EQUATION R26

Site Details	Sample Details
Site Name & Location: 100 W. Chicago Avenue Oak Park, Illinois LUST Incident Number(s): 20011417, 20090170, & 20100294 Exposure Pathway: Soil Component of Groundwater Ingestion Groundwater Classification: Class I	Sample Location: N-2 Sample Depth (feet): 8.5' Analyte: Benzene

Concentration at the source (C_{source})= mg/L

Distance along centerline of the plume coming from the source (X)= ft = cm

First order degradation constant (λ)= /day if benzene. lambda=0.0009/day

Aquifer hydraulic conductivity (K)= cm/sec = cm/day

Hydraulic gradient (i)= m/m

Total soil porosity (θ_T)= cm³/cm³ soil

Source width perpendicular to GW flow direction in horizontal plane (S_w)= ft = cm

Source width perpendicular to GW flow direction in vertical plane (S_d)= ft = cm (assuming complete mixing)

Porosity
Gravel=0.25
Sand=0.32
Silt=0.40
Clay=0.36
Default=0.43

Calculated Parameters

DO NOT ENTER VALUES HERE!

Longitudinal dispersivity	Ax=	<input style="width: 100px;" type="text" value="27.432"/> cm
Transverse dispersivity	Ay=	<input style="width: 100px;" type="text" value="9.144"/> cm
Vertical dispersivity	Az=	<input style="width: 100px;" type="text" value="1.3716"/> cm
Specific discharge	U=	<input style="width: 100px;" type="text" value="0.11816448"/> cm/day
Sw/(4*SQRT(Ay*X))	B=	<input style="width: 100px;" type="text" value="20.2353056"/>
Sd/(2*SQRT(Az*X))	C=	<input style="width: 100px;" type="text" value="5.15952248"/>
Error function	erf(B)=	<input style="width: 100px;" type="text" value="1"/> To determine error function values,
Error function	erf(C)=	<input style="width: 100px;" type="text" value="1"/> see F46 & K46 in the linear interpolation section.

Actual B value= Actual C value=

Automatic calculations : Actual erf(B) Actual erf(C)=

Solutions

$C_{(x)}$
 mg/l
 C_{source}
 mg/l

Computation of erf(x)

Source: Abramowitz, M. and I. A. Stegun, 1972, Handbook of Mathematical Functions, Dover Publications, New York, page 299, formula 7.1.26

Maximum error in computation = 1.5×10^{-7}

x=	20.2353056	5.15952248
p=	0.3275911	0.3275911
a1=	0.254829592	0.254829592
a2=	-0.284496736	-0.284496736
a3=	1.421413741	1.421413741
a4=	-1.453152027	-1.453152027
a5=	1.061405429	1.061405429
f=	0.131080393	0.371717689
erf(x)=	1	1

**DISSOLVED HYDROCARBON CONCENTRATION ALONG CENTERLINE
MAXIMUM PREDICTED EXTENT OF GROUNDWATER IMPACT MODELING
RBCA EQUATION R26**

Site Details	Sample Details
Site Name & Location: 100 W. Chicago Avenue Oak Park, Illinois LUST Incident Number(s): 20011417, 20090170, & 20100294 Exposure Pathway: Soil Component of Groundwater Ingestion Groundwater Classification: Class I	Sample Location: S-1 Sample Depth (feet): 8.5' Analyte: Benzene

Concentration at the source (C_{source})= mg/L

Distance along centerline of the plume coming from the source (X)= ft = cm

First order degradation constant (λ)= /day if benzene, lambda=0.0009/day

Aquifer hydraulic conductivity (K)= cm/sec = cm/day

Hydraulic gradient (i)= m/m

Total soil porosity (θ_T)= cm³/cm³ soil

Porosity
Gravel=0.25
Sand=0.32
Silt=0.40
Clay=0.36
Default=0.43

Source width perpendicular to GW flow direction in horizontal plane (S_w)= ft = cm

Source width perpendicular to GW flow direction in vertical plane (S_d)= ft = cm (assuming complete mixing)

Calculated Parameters

DO NOT ENTER VALUES HERE!

Longitudinal dispersivity	Ax=	<input style="width: 100px;" type="text" value="21.336"/> cm
Transverse dispersivity	Ay=	<input style="width: 100px;" type="text" value="7.112"/> cm
Vertical dispersivity	Az=	<input style="width: 100px;" type="text" value="1.0668"/> cm
Specific discharge	U=	<input style="width: 100px;" type="text" value="0.11816448"/> cm/day
Sw/(4*SQRT(Ay*X))	B=	<input style="width: 100px;" type="text" value="26.01682148"/>
Sd/(2*SQRT(Az*X))	C=	<input style="width: 100px;" type="text" value="6.63367176"/>
Error function	erf(B)=	<input style="width: 100px;" type="text" value="1"/> To determine error function values,
Error function	erf(C)=	<input style="width: 100px;" type="text" value="1"/> see F46 & K46 in the linear interpolation section.

Actual B value= Actual C value=

Automatic calculations : Actual erf(B) Actual erf(C)=

Solutions

$C_{(x)}$
 mg/l

C_{source}
 mg/l

Computation of erf(x)

Source: Abramowitz, M. and I. A. Stegun, 1972, Handbook of Mathematical Functions, Dover Publications, New York, page 299, formula 7.1.26

Maximum error in computation = 1.5×10^{-7}

x=	26.01682148	6.63367176
p=	0.3275911	0.3275911
a1=	0.254829592	0.254829592
a2=	-0.284496736	-0.284496736
a3=	1.421413741	1.421413741
a4=	-1.453152027	-1.453152027
a5=	1.061405429	1.061405429
f=	0.105010258	0.315146062
erf(x)=	1	1

DISSOLVED HYDROCARBON CONCENTRATION ALONG CENTERLINE
MAXIMUM PREDICTED EXTENT OF GROUNDWATER IMPACT MODELING
RBCA EQUATION R26

Site Details	Sample Details
Site Name & Location: 100 W. Chicago Avenue Oak Park, Illinois LUST Incident Number(s): 20011417, 20090170, & 20100294 Exposure Pathway: Soil Component of Groundwater Ingestion Groundwater Classification: Class I	Sample Location: S-2 Sample Depth (feet): 8.5' Analyte: Benzene

Concentration at the source (C_{source})= 0.039 mg/L

Distance along centerline of the plume coming from the source (X)= 11.00 ft = 335.28 cm

First order degradation constant (λ)= 0.0009 /day if benzene, lambda=0.0009/day

Aquifer hydraulic conductivity (K)= 3.140E-05 cm/sec = 2.713 cm/day

Hydraulic gradient (i)= 0.0157 m/m

Total soil porosity (θ_T)= 0.36 cm³/cm³ soil

Source width perpendicular to GW flow direction in horizontal plane (S_w)= 133 ft = 4,053.84 cm

Source width perpendicular to GW flow direction in vertical plane (S_d)= 6.57 ft = 200 cm (assuming complete mixing)

Porosity
Gravel=0.25
Sand=0.32
Silt=0.40
Clay=0.36
Default=0.43

Calculated Parameters

DO NOT ENTER VALUES HERE!

Longitudinal dispersivity	Ax=	33.528 cm
Transverse dispersivity	Ay=	11.176 cm
Vertical dispersivity	Az=	1.6764 cm
Specific discharge	U=	0.11816448 cm/day
Sw/(4*SQRT(Ay*X))	B=	16.55615912
Sd/(2*SQRT(Az*X))	C=	4.221427484
Error function	erf(B)=	1 To determine error function values,
Error function	erf(C)=	0.999999998 see F46 & K46 in the linear interpolation section.

Actual B value= 16.55615912 Actual C value= 4.221427484

Automatic calculations : Actual erf(B) 1 Actual erf(C)= 0.999999998

Solutions

$C_{(x)}$
0.005 mg/l
 C_{source}
0.00 mg/l

Computation of erf(x)

Source: Abramowitz, M. and I. A. Stegun, 1972, Handbook of Mathematical Functions, Dover Publications, New York, page 299, formula 7.1.26

Maximum error in computation = 1.5×10^{-7}

x=	16.55615912	4.221427484
p=	0.3275911	0.3275911
a1=	0.254829592	0.254829592
a2=	-0.284496736	-0.284496736
a3=	1.421413741	1.421413741
a4=	-1.453152027	-1.453152027
a5=	1.061405429	1.061405429
f=	0.155674724	0.419656356
erf(x)=	1	0.999999998

**DISSOLVED HYDROCARBON CONCENTRATION ALONG CENTERLINE
MAXIMUM PREDICTED EXTENT OF GROUNDWATER IMPACT MODELING
RBCA EQUATION R26**

Site Details	Sample Details
Site Name & Location: 100 W. Chicago Avenue Oak Park, Illinois LUST Incident Number(s): 20011417, 20090170, & 20100294 Exposure Pathway: Soil Component of Groundwater Ingestion Groundwater Classification: Class I	Sample Location: E-3 Sample Depth (feet): 8.5' Analyte: Benzene

Concentration at the source (C_{source})= mg/L

Distance along centerline of the plume coming from the source (X)= ft = cm

First order degradation constant (λ)= /day if benzene, lambda=0.0009/day

Aquifer hydraulic conductivity (K)= cm/sec = cm/day

Hydraulic gradient (i)= m/m

Total soil porosity (θ_T)= cm³/cm³ soil

Porosity
Gravel=0.25
Sand=0.32
Silt=0.40
Clay=0.36
Default=0.43

Source width perpendicular to GW flow direction in horizontal plane (S_w)= ft = cm

Source width perpendicular to GW flow direction in vertical plane (S_d)= ft = cm (assuming complete mixing)

Calculated Parameters

DO NOT ENTER VALUES HERE!

Longitudinal dispersivity	Ax=	<input style="width: 100px;" type="text" value="85.344"/> cm
Transverse dispersivity	Ay=	<input style="width: 100px;" type="text" value="28.448"/> cm
Vertical dispersivity	Az=	<input style="width: 100px;" type="text" value="4.2672"/> cm
Specific discharge	U=	<input style="width: 100px;" type="text" value="0.11816448"/> cm/day
Sw/(4*SQRT(Ay*X))	B=	<input style="width: 100px;" type="text" value="6.50420537"/>
Sd/(2*SQRT(Az*X))	C=	<input style="width: 100px;" type="text" value="1.65841794"/>
Error function	erf(B)=	<input style="width: 100px;" type="text" value="1"/> To determine error function values,
Error function	erf(C)=	<input style="width: 100px;" type="text" value="0.980991176"/> see F46 & K46 in the linear interpolation section.

Actual B value= Actual C value=

Automatic calculations : Actual erf(B) Actual erf(C)=

Solutions

$C_{(x)}$
 mg/l
 C_{source}
 mg/l

Computation of erf(x)

Source: Abramowitz, M. and I. A. Stegun, 1972, Handbook of Mathematical Functions, Dover Publications, New York, page 299, formula 7.1.26

Maximum error in computation = 1.5×10^{-7}

x=	6.50420537	1.65841794
p=	0.3275911	0.3275911
a1=	0.254829592	0.254829592
a2=	-0.284496736	-0.284496736
a3=	1.421413741	1.421413741
a4=	-1.453152027	-1.453152027
a5=	1.061405429	1.061405429
=	0.319415363	0.647969315
erf(x)=	1	0.980991176

**DISSOLVED HYDROCARBON CONCENTRATION ALONG CENTERLINE
MAXIMUM PREDICTED EXTENT OF GROUNDWATER IMPACT MODELING
RBCA EQUATION R26**

Site Details	Sample Details
Site Name & Location: 100 W. Chicago Avenue Oak Park, Illinois LUST Incident Number(s): 20011417, 20090170, & 20100294 Exposure Pathway: Soil Component of Groundwater Ingestion Groundwater Classification: Class I	Sample Location: W-3 Sample Depth (feet): 8.5' Analyte: Benzene

Concentration at the source (C_{source})= mg/L

Distance along centerline of the plume coming from the source (X)= ft = cm

First order degradation constant (λ)= /day if benzene, lambda=0.0009/day

Aquifer hydraulic conductivity (K)= cm/sec = cm/day

Hydraulic gradient (i)= m/m

Total soil porosity (θ_T)= cm³/cm³ soil

Porosity
Gravel=0.25
Sand=0.32
Silt=0.40
Clay=0.36
Default=0.43

Source width perpendicular to GW flow direction in horizontal plane (S_w)= ft = cm

Source width perpendicular to GW flow direction in vertical plane (S_d)= ft = cm (assuming complete mixing)

Calculated Parameters

DO NOT ENTER VALUES HERE!

Longitudinal dispersivity	Ax=	<input style="width: 100px;" type="text" value="57.912"/> cm
Transverse dispersivity	Ay=	<input style="width: 100px;" type="text" value="19.304"/> cm
Vertical dispersivity	Az=	<input style="width: 100px;" type="text" value="2.8956"/> cm
Specific discharge	U=	<input style="width: 100px;" type="text" value="0.11816448"/> cm/day
Sw/(4*SQRT(Ay*X))	B=	<input style="width: 100px;" type="text" value="9.585144756"/>
Sd/(2*SQRT(Az*X))	C=	<input style="width: 100px;" type="text" value="2.443984333"/>
Error function	erf(B)=	<input style="width: 100px;" type="text" value="1"/> To determine error function values,
Error function	erf(C)=	<input style="width: 100px;" type="text" value="0.999452292"/> see F46 & K46 in the linear interpolation section.

Actual B value= Actual C value=

Automatic calculations : Actual erf(B) Actual erf(C)=

Solutions

$C_{(x)}$
 mg/l

C_{source}
 mg/l

Computation of erf(x)

Source: Abramowitz, M. and I. A. Stegun, 1972, Handbook of Mathematical Functions, Dover Publications, New York, page 299, formula 7.1.26

Maximum error in computation = 1.5×10^{-7}

x=	9.585144756	2.443984333
p=	0.3275911	0.3275911
a1=	0.254829592	0.254829592
a2=	-0.284496736	-0.284496736
a3=	1.421413741	1.421413741
a4=	-1.453152027	-1.453152027
a5=	1.061405429	1.061405429
=	0.24154542	0.555361945
erf(x)=	1	0.999452292

**DISSOLVED HYDROCARBON CONCENTRATION ALONG CENTERLINE
MAXIMUM PREDICTED EXTENT OF GROUNDWATER IMPACT MODELING
RBCA EQUATION R26**

Site Details	Sample Details
Site Name & Location: 100 W. Chicago Avenue Oak Park, Illinois LUST Incident Number(s): 20011417, 20090170, & 20100294 Exposure Pathway: Soil Component of Groundwater Ingestion Groundwater Classification: Class I	Sample Location: A-5-1 Sample Depth (feet): 4' Analyte: Benzene

Concentration at the source (C_{source})= mg/L

Distance along centerline of the plume coming from the source (X)= ft = cm

First order degradation constant (λ)= /day if benzene, lambda=0.0009/day

Aquifer hydraulic conductivity (K)= cm/sec = cm/day

Hydraulic gradient (i)= m/m

Total soil porosity (θ_T)= cm³/cm³ soil

Source width perpendicular to GW flow direction in horizontal plane (S_w)= ft = cm

Source width perpendicular to GW flow direction in vertical plane (S_d)= ft = cm (assuming complete mixing)

Porosity
Gravel=0.25
Sand=0.32
Silt=0.40
Clay=0.36
Default=0.43

Calculated Parameters

DO NOT ENTER VALUES HERE!

Longitudinal dispersivity	Ax=	<input style="width: 100px;" type="text" value="6.096"/>	cm	
Transverse dispersivity	Ay=	<input style="width: 100px;" type="text" value="2.032"/>	cm	
Vertical dispersivity	Az=	<input style="width: 100px;" type="text" value="0.3048"/>	cm	
Specific discharge	U=	<input style="width: 100px;" type="text" value="0.11816448"/>	cm/day	
Sw/(4*SQRT(Ay*X))	B=	<input style="width: 100px;" type="text" value="91.05887519"/>		
Sd/(2*SQRT(Az*X))	C=	<input style="width: 100px;" type="text" value="23.21785116"/>		
Error function	erf(B)=	<input style="width: 100px;" type="text" value="1"/>		To determine error function values,
Error function	erf(C)=	<input style="width: 100px;" type="text" value="1"/>		see F46 & K46 in the linear interpolation section.

Actual B value= Actual C value=

Automatic calculations : Actual erf(B) Actual erf(C)=

Solutions

$C_{(x)}$
 mg/l

C_{source}
 mg/l

Computation of erf(x)

Source: Abramowitz, M. and I. A. Stegun, 1972, Handbook of Mathematical Functions, Dover Publications, New York, page 299, formula 7.1.26

Maximum error in computation = 1.5×10^{-7}

x=	91.05887519	23.21785116
p=	0.3275911	0.3275911
a1=	0.254829592	0.254829592
a2=	-0.284496736	-0.284496736
a3=	1.421413741	1.421413741
a4=	-1.453152027	-1.453152027
a5=	1.061405429	1.061405429
l=	0.032435858	0.116198523
erf(x)=	1	1

**DISSOLVED HYDROCARBON CONCENTRATION ALONG CENTERLINE
MAXIMUM PREDICTED EXTENT OF GROUNDWATER IMPACT MODELING
RBCA EQUATION R26**

Site Details	Sample Details
Site Name & Location: 100 W. Chicago Avenue Oak Park, Illinois LUST Incident Number(s): 20011417, 20090170, & 20100294 Exposure Pathway: Soil Component of Groundwater Ingestion Groundwater Classification: Class I	Sample Location: A-8-1 Sample Depth (feet): 4' Analyte: Benzene

Concentration at the source (C_{source})= 0.180 mg/L

Distance along centerline of the plume coming from the source (X)= 21.00 ft = 640.08 cm

First order degradation constant (λ)= 0.0009 /day if benzene, lambda=0.0009/day

Aquifer hydraulic conductivity (K)= 3.140E-05 cm/sec = 2.713 cm/day

Hydraulic gradient (i)= 0.0157 m/m

Total soil porosity (θ_T)= 0.36 cm³/cm³ soil

Porosity
Gravel=0.25
Sand=0.32
Silt=0.40
Clay=0.36
Default=0.43

Source width perpendicular to GW flow direction in horizontal plane (S_w)= 133 ft = 4,053.84 cm

Source width perpendicular to GW flow direction in vertical plane (S_d)= 6.57 ft = 200 cm (assuming complete mixing)

Calculated Parameters

DO NOT ENTER VALUES HERE!

Longitudinal dispersivity	Ax=	64.008 cm
Transverse dispersivity	Ay=	21.336 cm
Vertical dispersivity	Az=	3.2004 cm
Specific discharge	U=	0.11816448 cm/day
Sw/(4*SQRT(Ay*X))	B=	8.672273827
Sd/(2*SQRT(Az*X))	C=	2.21122392
Error function	erf(B)=	1 To determine error function values,
Error function	erf(C)=	0.998234724 see F46 & K46 in the linear interpolation section.

Actual B value= 8.672273827 Actual C value= 2.21122392

Automatic calculations : Actual erf(B) 1 Actual erf(C)= 0.998234724

Solutions

$C_{(x)}$
0.005 mg/l

C_{source}
0.00 mg/l

Computation of erf(x)

Source: Abramowitz, M. and I. A. Stegun, 1972, Handbook of Mathematical Functions, Dover Publications, New York, page 299, formula 7.1.26

Maximum error in computation = 1.5×10^{-7}

x=	8.672273827	2.21122392
p=	0.3275911	0.3275911
a1=	0.254829592	0.254829592
a2=	-0.284496736	-0.284496736
a3=	1.421413741	1.421413741
a4=	-1.453152027	-1.453152027
a5=	1.061405429	1.061405429
e=	0.260351598	0.579919495
erf(x)=	1	0.998234724

**DISSOLVED HYDROCARBON CONCENTRATION ALONG CENTERLINE
MAXIMUM PREDICTED EXTENT OF GROUNDWATER IMPACT MODELING
RBCA EQUATION R26**

Site Details	Sample Details
Site Name & Location: 100 W. Chicago Avenue Oak Park, Illinois LUST Incident Number(s): 20011417, 20090170, & 20100294 Exposure Pathway: Soil Component of Groundwater Ingestion Groundwater Classification: Class I	Sample Location: A-8-2 Sample Depth (feet): 6' Analyte: Benzene

Concentration at the source (C_{source})= mg/L

Distance along centerline of the plume coming from the source (X)= ft = cm

First order degradation constant (λ)= /day if benzene, lambda=0.0009/day

Aquifer hydraulic conductivity (K)= cm/sec = cm/day

Hydraulic gradient (i)= m/m

Total soil porosity (θ_T)= cm³/cm³_{soil}

Porosity
Gravel=0.25
Sand=0.32
Silt=0.40
Clay=0.36
Default=0.43

Source width perpendicular to GW flow direction in horizontal plane (S_w)= ft = cm

Source width perpendicular to GW flow direction in vertical plane (S_v)= ft = cm (assuming complete mixing)

Calculated Parameters

DO NOT ENTER VALUES HERE!

Longitudinal dispersivity	Ax=	<input style="width: 100px;" type="text" value="73.152"/> cm
Transverse dispersivity	Ay=	<input style="width: 100px;" type="text" value="24.384"/> cm
Vertical dispersivity	Az=	<input style="width: 100px;" type="text" value="3.6576"/> cm
Specific discharge	U=	<input style="width: 100px;" type="text" value="0.11816448"/> cm/day
Sw/(4*SQRT(Ay*X))	B=	<input style="width: 100px;" type="text" value="7.588239599"/>
Sd/(2*SQRT(Az*X))	C=	<input style="width: 100px;" type="text" value="1.93482093"/>
Error function	erf(B)=	<input style="width: 100px;" type="text" value="1"/> To determine error function values,
Error function	erf(C)=	<input style="width: 100px;" type="text" value="0.993785513"/> see F46 & K46 in the linear interpolation section.

Actual B value= Actual C value=

Automatic calculations : Actual erf(B) Actual erf(C)=

Solutions

$C_{(x)}$
 mg/l
 C_{source}
 mg/l

Computation of erf(x)

Source: Abramowitz, M. and I. A. Stegun, 1972, Handbook of Mathematical Functions, Dover Publications, New York, page 299, formula 7.1.26

Maximum error in computation = 1.5×10^{-7}

x=	7.588239599	1.93482093
p=	0.3275911	0.3275911
a1=	0.254829592	0.254829592
a2=	-0.284496736	-0.284496736
a3=	1.421413741	1.421413741
a4=	-1.453152027	-1.453152027
a5=	1.061405429	1.061405429
t=	0.28687492	0.612058738
erf(x)=	1	0.993785513

**DISSOLVED HYDROCARBON CONCENTRATION ALONG CENTERLINE
MAXIMUM PREDICTED EXTENT OF GROUNDWATER IMPACT MODELING
RBCA EQUATION R26**

Site Details	Sample Details
Site Name & Location: 100 W. Chicago Avenue Oak Park, Illinois LUST Incident Number(s): 20011417, 20090170, & 20100294 Exposure Pathway: Soil Component of Groundwater Ingestion Groundwater Classification: Class I	Sample Location: A-8-2 Sample Depth (feet): 6' Analyte: Ethylbenzene

Concentration at the source (C_{source})= mg/L

Distance along centerline of the plume coming from the source (X)= ft = cm

First order degradation constant (λ)= /day if ethylbenzene, lambda=0.003/day

Aquifer hydraulic conductivity (K)= cm/sec = cm/day

Hydraulic gradient (i)= m/m

Total soil porosity (θ_T)= cm³/cm³ soil

Source width perpendicular to GW flow direction in horizontal plane (S_w)= ft = cm

Source width perpendicular to GW flow direction in vertical plane (S_d)= ft = cm (assuming complete mixing)

Porosity
Gravel=0.25
Sand=0.32
Silt=0.40
Clay=0.36
Default=0.43

Calculated Parameters

DO NOT ENTER VALUES HERE!

Longitudinal dispersivity	Ax=	<input style="width: 100px;" type="text" value="2.286"/> cm
Transverse dispersivity	Ay=	<input style="width: 100px;" type="text" value="0.762"/> cm
Vertical dispersivity	Az=	<input style="width: 100px;" type="text" value="0.1143"/> cm
Specific discharge	U=	<input style="width: 100px;" type="text" value="0.11816448"/> cm/day
Sw/(4*SQRT(Ay*X))	B=	<input style="width: 100px;" type="text" value="242.8236672"/>
Sd/(2*SQRT(Az*X))	C=	<input style="width: 100px;" type="text" value="61.91426976"/>
Error function	erf(B)=	<input style="width: 100px;" type="text" value="1"/> To determine error function values,
Error function	erf(C)=	<input style="width: 100px;" type="text" value="1"/> see F46 & K46 in the linear interpolation section.

Actual B value= Actual C value=

Automatic calculations : Actual erf(B) Actual erf(C)=

Solutions

$C_{(x)}$
 mg/l
 C_{source}
 mg/l

Computation of erf(x)

Source: Abramowitz, M. and I. A. Stegun, 1972, Handbook of Mathematical Functions, Dover Publications, New York, page 299, formula 7.1.26

Maximum error in computation = 1.5×10^{-7}

x=	242.8236672	61.91426976
p=	0.3275911	0.3275911
a1=	0.254829592	0.254829592
a2=	-0.284496736	-0.284496736
a3=	1.421413741	1.421413741
a4=	-1.453152027	-1.453152027
a5=	1.061405429	1.061405429
e=	0.012415131	0.04698682
erf(x)=	1	1

**DISSOLVED HYDROCARBON CONCENTRATION ALONG CENTERLINE
MAXIMUM PREDICTED EXTENT OF GROUNDWATER IMPACT MODELING
RBCA EQUATION R26**

Site Details	Sample Details
Site Name & Location: 100 W. Chicago Avenue Oak Park, Illinois LUST Incident Number(s): 20011417, 20090170, & 20100294 Exposure Pathway: Soil Component of Groundwater Ingestion Groundwater Classification: Class I	Sample Location: A-8-2 Sample Depth (feet): 6' Analyte: Naphthalene

Concentration at the source (C_{source})= mg/L

Distance along centerline of the plume coming from the source (X)= ft = cm

First order degradation constant (λ)= /day if naphthalene, $\lambda=0.0027$ /day

Aquifer hydraulic conductivity (K)= cm/sec = cm/day

Hydraulic gradient (i)= m/m

Total soil porosity (θ_p)= cm³/cm³ soil

Source width perpendicular to GW flow direction in horizontal plane (S_w)= ft = cm

Source width perpendicular to GW flow direction in vertical plane (S_d)= ft = cm (assuming complete mixing)

Porosity
Gravel=0.25
Sand=0.32
Silt=0.40
Clay=0.36
Default=0.43

Calculated Parameters

DO NOT ENTER VALUES HERE!

Longitudinal dispersivity	Ax=	<input style="width: 100px;" type="text" value="3.048"/> cm
Transverse dispersivity	Ay=	<input style="width: 100px;" type="text" value="1.016"/> cm
Vertical dispersivity	Az=	<input style="width: 100px;" type="text" value="0.1524"/> cm
Specific discharge	U=	<input style="width: 100px;" type="text" value="0.11816448"/> cm/day
$S_w/(4*\text{SQRT}(A_y*X))$	B=	<input style="width: 100px;" type="text" value="182.1177504"/>
$S_d/(2*\text{SQRT}(A_z*X))$	C=	<input style="width: 100px;" type="text" value="46.43570232"/>
Error function	erf(B)=	<input style="width: 100px;" type="text" value="1"/> To determine error function values,
Error function	erf(C)=	<input style="width: 100px;" type="text" value="1"/> see F46 & K46 in the linear interpolation section.

Actual B value= Actual C value=

Automatic calculations : Actual erf(B) Actual erf(C)=

Solutions

$C_{(x)}$
 mg/l

C_{source}
 mg/l

Computation of erf(x)

Source: Abramowitz, M. and I. A. Stegun, 1972, Handbook of Mathematical Functions, Dover Publications, New York, page 299, formula 7.1.26

Maximum error in computation = 1.5×10^{-7}

x=	182.1177504	46.43570232
p=	0.3275911	0.3275911
a1=	0.254829592	0.254829592
a2=	-0.284496736	-0.284496736
a3=	1.421413741	1.421413741
a4=	-1.453152027	-1.453152027
a5=	1.061405429	1.061405429
=	0.016485286	0.061682998
erf(x)=	1	1

**DISSOLVED HYDROCARBON CONCENTRATION ALONG CENTERLINE
MAXIMUM PREDICTED EXTENT OF GROUNDWATER IMPACT MODELING
RBCA EQUATION R26**

Site Details	Sample Details
Site Name & Location: 100 W. Chicago Avenue Oak Park, Illinois LUST Incident Number(s): 20011417, 20090170, & 20100294 Exposure Pathway: Soil Component of Groundwater Ingestion Groundwater Classification: Class I	Sample Location: B-4-2 Sample Depth (feet): 6.5' Analyte: Benzene

Concentration at the source (C_{source})= mg/L

Distance along centerline of the plume coming from the source (X)= ft = cm

First order degradation constant (λ)= /day if benzene, lambda=0.0009/day

Aquifer hydraulic conductivity (K)= cm/sec = cm/day

Hydraulic gradient (i)= m/m

Total soil porosity (θ_T)= cm³/cm³ soil

Porosity
Gravel=0.25
Sand=0.32
Silt=0.40
Clay=0.36
Default=0.43

Source width perpendicular to GW flow direction in horizontal plane (S_w)= ft = cm

Source width perpendicular to GW flow direction in vertical plane (S_d)= ft = cm (assuming complete mixing)

Calculated Parameters

DO NOT ENTER VALUES HERE!

Longitudinal dispersivity	Ax=	<input style="width: 100px;" type="text" value="9.144"/> cm
Transverse dispersivity	Ay=	<input style="width: 100px;" type="text" value="3.048"/> cm
Vertical dispersivity	Az=	<input style="width: 100px;" type="text" value="0.4572"/> cm
Specific discharge	U=	<input style="width: 100px;" type="text" value="0.11816448"/> cm/day
Sw/(4*SQRT(Ay*X))	B=	<input style="width: 100px;" type="text" value="60.70591679"/>
Sd/(2*SQRT(Az*X))	C=	<input style="width: 100px;" type="text" value="15.47856744"/>
Error function	erf(B)=	<input style="width: 100px;" type="text" value="1"/> To determine error function values,
Error function	erf(C)=	<input style="width: 100px;" type="text" value="1"/> see F46 & K46 in the linear interpolation section.

Actual B value= Actual C value=

Automatic calculations : Actual erf(B) Actual erf(C)=

Solutions

$C_{(x)}$
 mg/l

C_{source}
 mg/l

Computation of erf(x)

Source: Abramowitz, M. and I. A. Stegun, 1972, Handbook of Mathematical Functions, Dover Publications, New York, page 299, formula 7.1.26

Maximum error in computation = 1.5×10^{-7}

x=	60.70591679	15.47856744
p=	0.3275911	0.3275911
a1=	0.254829592	0.254829592
a2=	-0.284496736	-0.284496736
a3=	1.421413741	1.421413741
a4=	-1.453152027	-1.453152027
a5=	1.061405429	1.061405429
=	0.047877316	0.164727252
erf(x)=	1	1

DISSOLVED HYDROCARBON CONCENTRATION ALONG CENTERLINE
MAXIMUM PREDICTED EXTENT OF GROUNDWATER IMPACT MODELING
RBCA EQUATION R26

Site Details	Sample Details
Site Name & Location: 100 W. Chicago Avenue Oak Park, Illinois LUST Incident Number(s): 20011417, 20090170, & 20100294 Exposure Pathway: Soil Component of Groundwater Ingestion Groundwater Classification: Class I	Sample Location: B-5-2 Sample Depth (feet): 6.5' Analyte: Benzene

Concentration at the source (C_{source})= mg/L

Distance along centerline of the plume coming from the source (X)= ft = cm

First order degradation constant (λ)= /day if benzene, lambda=0.0009/day

Aquifer hydraulic conductivity (K)= cm/sec = cm/day

Hydraulic gradient (i)= m/m

Total soil porosity (θ_T)= cm³/cm³ soil

Porosity
Gravel=0.25
Sand=0.32
Silt=0.40
Clay=0.36
Default=0.43

Source width perpendicular to GW flow direction in horizontal plane (S_w)= ft = cm

Source width perpendicular to GW flow direction in vertical plane (S_v)= ft = cm (assuming complete mixing)

Calculated Parameters

DO NOT ENTER VALUES HERE!

Longitudinal dispersivity	Ax=	<input style="width: 100px;" type="text" value="9.144"/> cm
Transverse dispersivity	Ay=	<input style="width: 100px;" type="text" value="3.048"/> cm
Vertical dispersivity	Az=	<input style="width: 100px;" type="text" value="0.4572"/> cm
Specific discharge	U=	<input style="width: 100px;" type="text" value="0.11816448"/> cm/day
Sw/(4*SQRT(Ay*X))	B=	<input style="width: 100px;" type="text" value="60.70591679"/>
Sd/(2*SQRT(Az*X))	C=	<input style="width: 100px;" type="text" value="15.47856744"/>
Error function	erf(B)=	<input style="width: 100px;" type="text" value="1"/> To determine error function values,
Error function	erf(C)=	<input style="width: 100px;" type="text" value="1"/> see F46 & K46 in the linear interpolation section.

Actual B value= Actual C value=

Automatic calculations : Actual erf(B) Actual erf(C)=

Solutions

$C_{(x)}$
 mg/l
 C_{source}
 mg/l

Computation of erf(x)

Source: Abramowitz, M. and I. A. Stegun, 1972, Handbook of Mathematical Functions, Dover Publications, New York, page 299, formula 7.1.26

Maximum error in computation = 1.5×10^{-7}

x=	60.70591679	15.47856744
p=	0.3275911	0.3275911
a1=	0.254829592	0.254829592
a2=	-0.284496736	-0.284496736
a3=	1.421413741	1.421413741
a4=	-1.453152027	-1.453152027
a5=	1.061405429	1.061405429
f=	0.047877316	0.164727252
erf(x)=	1	1

The Agency is authorized to require this information under Section 4 and Title XVI of the Environmental Protection Act (415 ILCS 5/4, 5/57 - 57.17). Failure to disclose this information may result in a civil penalty of not to exceed \$50,000.00 for the violation and an additional civil penalty of not to exceed \$10,000.00 for each day during which the violation continues (415 ILCS 5/42). Any person who knowingly makes a false material statement or representation in any label, manifest, record, report, permit, or license, or other document filed, maintained or used for the purpose of compliance with Title XVI commits a Class 4 felony. Any second or subsequent offense after conviction hereunder is a Class 3 felony (415 ILCS 5/57.17). This form has been approved by the Forms Management Center.

Illinois Environmental Protection Agency Leaking Underground Storage Tank Program RBCA Input Parameters for Use with Tier 2 Calculations

A. Site Identification

IEMA Incident # (6- or 8-digit): 20100294 IEPA LPC # (10-digit): 0312255142
 Site Name: Oak Park BP
 Site Address (not a P.O. Box): 100 W. Chicago Avenue
 City: Oak Park County: Cook Zip Code: 60302
 Leaking UST Technical File

B. Tier 2 Calculation Information

Equation(s) Used (ex: R12, R14, R26): R26: Benzene
 Contact Information for Individual Who Performed Calculations: Noel Wubbena
noelw@ets-environmental.com
 Land Use: Not Applicable Soil Type: Silty Clay
 Groundwater: Class I Class II
 Mass Limit: Yes No If Yes, then Specify Acreage: 0.5 1 2 5 10 30
 Result from S18/S28 used in R26? Yes No Specify C_{source} from S18/S28 see page 3 mg/L

- Mass Limit Acreage other than defaults must always be rounded up.
- Failure to use site-specific parameters where allowed could affect payment from the Underground Storage Tank Fund.
- Maps depicting source width, plume dimensions, distance, etc. must also be submitted.
- Inputs must be submitted in the designated unit.

Symbol	Unit	Symbol	Unit
AT _c = 70	yr	d =	cm
AT _n =	yr	D ^{air} =	cm ² /s
BW = 70	kg	D ^{water} =	cm ² /s
C _{source} = see page 3	mg/L	D _s ^{eff} =	cm ² /s
C _(x) = 0.005	mg/L	ED =	yr
C _(x) /C _{source} =	unitless	EF =	d/yr

Incident #: 20100294

Chemical: Benzene

Land Use: Not Applicable

Symbol		Unit	Symbol		Unit
erf	=	unitless	RAF _d (PNAs)	= 0.05	unitless
f _{oc}	=	g/g	RAF _d (inorganics)	= 0	unitless
GW _{comp}	=	mg/L	RAF ₀	= 1.0	unitless
GW _{source}	=	mg/L	RBSL _{air} (carcinogenic)	=	µg/m ³
H'	=	cm ³ _{water} /cm ³ _{air}	RBSL _{air} (noncarcinogenic)	=	µg/m ³
i	= 0.0157	cm/cm	RfD _i	=	mg/kg-d
l	= 30	cm/yr	RfD _o	=	mg/kg-d
IR _{air}	= 20	m ³ /d	SA	= 3,160	cm ² /d
IR _{soil}	=	mg/d	S _d	= 200	cm
IR _w	=	L/d	S _w	= 4,053.84	cm
K	= 2.713	cm/d for R15, R19, R26; cm/yr for R24	SF _i	=	(mg/kg-d) ⁻¹
K _{oc}	=	cm ³ /g or L/kg	SF _o	=	(mg/kg-d) ⁻¹
k _s (non-ionizing organics)	=	cm ³ _{water} /g _{soil}	THQ	= 1	unitless
k _s (ionizing organics)	=	cm ³ _{water} /g _{soil}	TR	=	unitless
k _s (inorganics)	=	cm ³ _{water} /g _{soil}	U	=	cm/d
L _s	= 100	cm	U _{air}	= 225	cm/s
LF _{sw}	=	(mg/L _{water}) / (mg/kg _{soil})	U _{gw}	=	cm/yr
M	= 0.5	mg/cm ²	VF _p	=	kg/m ³
Pe	= 6.9 · 10 ⁻¹⁴	g/cm ² -s	VF _{samb}	=	(mg/m ³ _{air})/mg/kg _{soil} or kg/m ³
RAF _d	= 0.5	unitless	VF _{ss}	=	kg/m ³

Incident #: 20100294

Chemical: Benzene

Land Use: Not Applicable

Symbol		Unit
W	=	cm
w	=	g_{water}/g_{soil}
X	= see below	cm
α_x	=	cm
α_y	=	cm
α_z	=	cm
δ_{air}	= 200	cm
δ_{gw}	= 200	cm

Symbol		Unit
θ_{as}	=	cm^3_{air}/cm^3_{soil}
θ_{ws}	=	cm^3_{water}/cm^3_{soil}
θ_T	= 0.36	cm^3/cm^3_{soil}
λ	= 0.0009	d ⁻¹
π	= 3.1416	
ρ_b	=	g/cm^3
ρ_w	= 1	g/cm^3
τ	= $9.46 \cdot 10^8$	s

Csource Values: (mg/L)

Equation	Result	Unit(s)
R1	=	mg/kg
R2	=	mg/kg
R7	=	mg/kg
R8	=	mg/kg
R12	=	mg/kg
R25	=	mg/L

MW-5 Benzene: 0.408
 MW-6 Benzene: 0.0969

Maximum Predicted Extent of Groundwater Impact (X):
 (feet from point source)

MW-5 Benzene: 27-feet
 MW-6 Benzene: 16-feet

The Agency is authorized to require this information under Section 4 and Title XVI of the Environmental Protection Act (415 ILCS 5/4, 5/57 - 57.17). Failure to disclose this information may result in a civil penalty of not to exceed \$50,000.00 for the violation and an additional civil penalty of not to exceed \$10,000.00 for each day during which the violation continues (415 ILCS 5/42). Any person who knowingly makes a false material statement or representation in any label, manifest, record, report, permit, or license, or other document filed, maintained or used for the purpose of compliance with Title XVI commits a Class 4 felony. Any second or subsequent offense after conviction hereunder is a Class 3 felony (415 ILCS 5/57.17). This form has been approved by the Forms Management Center.

Illinois Environmental Protection Agency Leaking Underground Storage Tank Program RBCA Input Parameters for Use with Tier 2 Calculations

A. Site Identification

IEMA Incident # (6- or 8-digit): 20100294 IEPA LPC # (10-digit): 0312255142
 Site Name: Oak Park BP
 Site Address (not a P.O. Box): 100 W. Chicago Avenue
 City: Oak Park County: Cook Zip Code: 60302
 Leaking UST Technical File

B. Tier 2 Calculation Information

Equation(s) Used (ex: R12, R14, R26): R26: MTBE
 Contact Information for Individual Who Performed Calculations: Noel Wubbena
noelw@ets-environmental.com
 Land Use: Not Applicable Soil Type: Silty Clay
 Groundwater: Class I Class II
 Mass Limit: Yes No If Yes, then Specify Acreage: 0.5 1 2 5 10 30
 Result from S18/S28 used in R26? Yes No Specify C_{source} from S18/S28 see page 3 mg/L

- Mass Limit Acreage other than defaults must always be rounded up.
- Failure to use site-specific parameters where allowed could affect payment from the Underground Storage Tank Fund.
- Maps depicting source width, plume dimensions, distance, etc. must also be submitted.
- Inputs must be submitted in the designated unit.

Symbol	Unit	Symbol	Unit
AT _c	= 70 yr	d	= cm
AT _n	= yr	D ^{air}	= cm ² /s
BW	= 70 kg	D ^{water}	= cm ² /s
C _{source}	= see page 3 mg/L	D _s ^{eff}	= cm ² /s
C _(x)	= 0.07 mg/L	ED	= yr
C _(x) /C _{source}	= unitless	EF	= d/yr

Incident #: 20100294Chemical: MTBELand Use: Not Applicable

Symbol		Unit	Symbol		Unit
erf	=	unitless	RAF _d (PNAs)	=	0.05 unitless
f _{oc}	=	g/g	RAF _d (inorganics)	=	0 unitless
GW _{comp}	=	mg/L	RAF ₀	=	1.0 unitless
GW _{source}	=	mg/L	RBSL _{air} (carcinogenic)	=	μg/m ³
H'	=	cm ³ _{water} /cm ³ _{air}	RBSL _{air} (noncarcinogenic)	=	μg/m ³
i	=	0.0157 cm/cm	RfD _i	=	mg/kg-d
l	=	30 cm/yr	RfD _o	=	mg/kg-d
IR _{air}	=	20 m ³ /d	SA	=	3,160 cm ² /d
IR _{soil}	=	mg/d	S _d	=	200 cm
IR _w	=	L/d	S _w	=	4,053.84 cm
K	=	2.713 cm/d for R15, R19, R26; cm/yr for R24	SF _i	=	(mg/kg-d) ⁻¹
K _{oc}	=	cm ³ /g or L/kg	SF _o	=	(mg/kg-d) ⁻¹
k _s (non-ionizing organics)	=	cm ³ _{water} /g _{soil}	THQ	=	1 unitless
k _s (ionizing organics)	=	cm ³ _{water} /g _{soil}	TR	=	unitless
k _s (inorganics)	=	cm ³ _{water} /g _{soil}	U	=	cm/d
L _s	=	100 cm	U _{air}	=	225 cm/s
LF _{sw}	=	(mg/L _{water}) /(mg/kg _{soil})	U _{gw}	=	cm/yr
M	=	0.5 mg/cm ²	VF _p	=	kg/m ³
Pe	=	6.9 · 10 ⁻¹⁴ g/cm ² -s	VF _{samb}	=	(mg/m ³ _{air})/mg/kg _{soil} or kg/m ³
RAF _d	=	0.5 unitless	VF _{ss}	=	kg/m ³

Incident #: 20100294

Chemical: MTBE

Land Use: Not Applicable

Symbol		Unit
W	=	cm
w	=	g _{water} /g _{soil}
X	= see below	cm
α_x	=	cm
α_y	=	cm
α_z	=	cm
δ_{air}	= 200	cm
δ_{gw}	= 200	cm

Symbol		Unit
θ_{as}	=	cm ³ _{air} /cm ³ _{soil}
θ_{ws}	=	cm ³ _{water} /cm ³ _{soil}
θ_T	= 0.36	cm ³ /cm ³ _{soil}
λ	= 0.000963	d ⁻¹
π	= 3.1416	
ρ_b	=	g/cm ³
ρ_w	= 1	g/cm ³
τ	= 9.46 · 10 ⁸	s

C_{source} Values: (mg/L)

Equation	Result	Unit(s)
R1	=	mg/kg
R2	=	mg/kg
R7	=	mg/kg
R8	=	mg/kg
R12	=	mg/kg
R25	=	mg/L

MW-5 MTBE: 0.114 MW-6 MTBE: 1.49

Maximum Predicted Extent of Groundwater Impact (X):
(feet from point source)

MW-5 MTBE: 2-feet MW-6 MTBE: 16-feet

DISSOLVED HYDROCARBON CONCENTRATION ALONG CENTERLINE
MAXIMUM PREDICTED EXTENT OF GROUNDWATER IMPACT MODELING
RBCA EQUATION R26

Site Details	Sample Details
Site Name & Location: 100 W. Chicago Avenue Oak Park, Illinois LUST Incident Number(s): 20011417, 20090170, & 20100294 Exposure Pathway: Soil Component of Groundwater Ingestion Groundwater Classification: Class I	Sample Location: MW-5 Sample Depth (feet): --- Analyte: Benzene

Concentration at the source (C_{source})= mg/L

Distance along centerline of the plume coming from the source (X)= ft = cm

First order degradation constant (λ)= /day if benzene, lambda=0.0009/day

Aquifer hydraulic conductivity (K)= cm/sec = cm/day

Hydraulic gradient (i)= m/m

Total soil porosity (θ_T)= cm³/cm³ soil

Porosity
Gravel=0.25
Sand=0.32
Silt=0.40
Clay=0.36
Default=0.43

Source width perpendicular to GW flow direction in horizontal plane (S_w)= ft = cm

Source width perpendicular to GW flow direction in vertical plane (S_d)= ft = cm (assuming complete mixing)

Calculated Parameters

DO NOT ENTER VALUES HERE!

Longitudinal dispersivity	Ax=	<input style="width: 100px;" type="text" value="82.296"/> cm
Transverse dispersivity	Ay=	<input style="width: 100px;" type="text" value="27.432"/> cm
Vertical dispersivity	Az=	<input style="width: 100px;" type="text" value="4.1148"/> cm
Specific discharge	U=	<input style="width: 100px;" type="text" value="0.11816448"/> cm/day
Sw/(4*SQRT(Ay*X))	B=	<input style="width: 100px;" type="text" value="6.745101866"/>
Sd/(2*SQRT(Az*X))	C=	<input style="width: 100px;" type="text" value="1.719840827"/>
Error function	erf(B)=	<input style="width: 100px;" type="text" value="1"/> To determine error function values,
Error function	erf(C)=	<input style="width: 100px;" type="text" value="0.984993502"/> see F46 & K46 in the linear interpolation section.

Actual B value= Actual C value=

Automatic calculations : Actual erf(B) Actual erf(C)=

Solutions

$C_{(x)}$
 mg/l

C_{source}
 mg/l

Computation of erf(x)

Source: Abramowitz, M. and I. A. Stegun, 1972, Handbook of Mathematical Functions, Dover Publications, New York, page 299, formula 7.1.26

Maximum error in computation = 1.5×10^{-7}

x=	6.745101866	1.719840827
p=	0.3275911	0.3275911
a1=	0.254829592	0.254829592
a2=	-0.284496736	-0.284496736
a3=	1.421413741	1.421413741
a4=	-1.453152027	-1.453152027
a5=	1.061405429	1.061405429
t=	0.311561874	0.639629711
erf(x)=	1	0.984993502

DISSOLVED HYDROCARBON CONCENTRATION ALONG CENTERLINE
MAXIMUM PREDICTED EXTENT OF GROUNDWATER IMPACT MODELING
RBCA EQUATION R26

Site Details	Sample Details
Site Name & Location: 100 W. Chicago Avenue Oak Park, Illinois LUST Incident Number(s): 20011417, 20090170, & 20100294 Exposure Pathway: Soil Component of Groundwater Ingestion Groundwater Classification: Class I	Sample Location: MW-5 Sample Depth (feet): --- Analyte: MTBE

Concentration at the source (C_{source})= 0.114 mg/L

Distance along centerline of the plume coming from the source (X)= 2.00 ft = 60.96 cm

First order degradation constant (λ)= 0.000963 /day if mtbe, lambda=0.000963/day

Aquifer hydraulic conductivity (K)= 3.140E-05 cm/sec = 2.713 cm/day

Hydraulic gradient (i)= 0.0157 m/m

Total soil porosity (θ_T)= 0.36 cm³/cm³ soil

Source width perpendicular to GW flow direction in horizontal plane (S_w)= 133 ft = 4,053.84 cm

Source width perpendicular to GW flow direction in vertical plane (S_d)= 6.57 ft = 200 cm (assuming complete mixing)

Porosity
Gravel=0.25
Sand=0.32
Silt=0.40
Clay=0.36
Default=0.43

Calculated Parameters

DO NOT ENTER VALUES HERE!

Longitudinal dispersivity A_x = 6.096 cm
Transverse dispersivity A_y = 2.032 cm
Vertical dispersivity A_z = 0.3048 cm
Specific discharge U= 0.11816448 cm/day
 $Sw/(4*\sqrt{A_y*X})$ B= 91.05887519
 $Sd/(2*\sqrt{A_z*X})$ C= 23.21785116
Error function erf(B)= 1 To determine error function values,
Error function erf(C)= 1 see F46 & K46 in the linear interpolation section.

Actual B value= 91.05887519 Actual C value= 23.21785116

Automatic calculations : Actual erf(B) 1 Actual erf(C)= 1

Solutions

$C_{(x)}$
0.07 mg/l
 C_{source}
0.00 mg/l

Computation of erf(x)

Source: Abramowitz, M. and I. A. Stegun, 1972, Handbook of Mathematical Functions, Dover Publications, New York, page 299, formula 7.1.26

Maximum error in computation = 1.5×10^{-7}

x=	91.05887519	23.21785116
p=	0.3275911	0.3275911
a1=	0.254829592	0.254829592
a2=	-0.284496736	-0.284496736
a3=	1.421413741	1.421413741
a4=	-1.453152027	-1.453152027
a5=	1.061405429	1.061405429
=	0.032435858	0.116198523
erf(x)=	1	1

**DISSOLVED HYDROCARBON CONCENTRATION ALONG CENTERLINE
MAXIMUM PREDICTED EXTENT OF GROUNDWATER IMPACT MODELING
RBCA EQUATION R26**

Site Details	Sample Details
Site Name & Location: 100 W. Chicago Avenue Oak Park, Illinois LUST Incident Number(s): 20011417, 20090170, & 20100294 Exposure Pathway: Soil Component of Groundwater Ingestion Groundwater Classification: Class I	Sample Location: MW-6 Sample Depth (feet): --- Analyte: Benzene

Concentration at the source (C_{source})= mg/L

Distance along centerline of the plume coming from the source (X)= ft = cm

First order degradation constant (λ)= /day if benzene, lambda=0.0009/day

Aquifer hydraulic conductivity (K)= cm/sec = cm/day

Hydraulic gradient (i)= m/m

Total soil porosity (θ_T)= cm³/cm³ soil

Porosity
Gravel=0.25
Sand=0.32
Silt=0.40
Clay=0.36
Default=0.43

Source width perpendicular to GW flow direction in horizontal plane (S_w)= ft = cm

Source width perpendicular to GW flow direction in vertical plane (S_d)= ft = cm (assuming complete mixing)

Calculated Parameters

DO NOT ENTER VALUES HERE!

Longitudinal dispersivity	Ax=	<input style="width: 100px;" type="text" value="48.768"/> cm
Transverse dispersivity	Ay=	<input style="width: 100px;" type="text" value="16.256"/> cm
Vertical dispersivity	Az=	<input style="width: 100px;" type="text" value="2.4384"/> cm
Specific discharge	U=	<input style="width: 100px;" type="text" value="0.11816448"/> cm/day
Sw/(4*SQRT(Ay*X))	B=	<input style="width: 100px;" type="text" value="11.3823594"/>
Sd/(2*SQRT(Az*X))	C=	<input style="width: 100px;" type="text" value="2.902231395"/>
Error function	erf(B)=	<input style="width: 100px;" type="text" value="1"/> To determine error function values,
Error function	erf(C)=	<input style="width: 100px;" type="text" value="0.999959437"/> see F46 & K46 in the linear interpolation section.

Actual B value= Actual C value=

Automatic calculations : Actual erf(B) Actual erf(C)=

Solutions

$C_{(x)}$
 mg/l

C_{source}
 mg/l

Computation of erf(x)

Source: Abramowitz, M. and I. A. Stegun, 1972, Handbook of Mathematical Functions, Dover Publications, New York, page 299, formula 7.1.26

Maximum error in computation = 1.5×10^{-7}

x=	11.3823594	2.902231395
p=	0.3275911	0.3275911
a1=	0.254829592	0.254829592
a2=	-0.284496736	-0.284496736
a3=	1.421413741	1.421413741
a4=	-1.453152027	-1.453152027
a5=	1.061405429	1.061405429
=	0.211471946	0.512624618
erf(x)=	1	0.999959437

DISSOLVED HYDROCARBON CONCENTRATION ALONG CENTERLINE
MAXIMUM PREDICTED EXTENT OF GROUNDWATER IMPACT MODELING
RBCA EQUATION R26

Site Details	Sample Details
Site Name & Location: 100 W. Chicago Avenue Oak Park, Illinois LUST Incident Number(s): 20011417, 20090170, & 20100294 Exposure Pathway: Soil Component of Groundwater Ingestion Groundwater Classification: Class I	Sample Location: MW-6 Sample Depth (feet): --- Analyte: MTBE

Concentration at the source (C_{source})= 1.49 mg/L

Distance along centerline of the plume coming from the source (X)= 16.00 ft = 487.68 cm

First order degradation constant (λ)= 0.000963 /day if mtbe, lambda=0.000963/day

Aquifer hydraulic conductivity (K)= 3.140E-05 cm/sec = 2.713 cm/day

Hydraulic gradient (i)= 0.0157 m/m

Total soil porosity (θ_p)= 0.36 cm³/cm³ soil

Porosity
Gravel=0.25
Sand=0.32
Silt=0.40
Clay=0.36
Default=0.43

Source width perpendicular to GW flow direction in horizontal plane (S_w)= 133 ft = 4,053.84 cm

Source width perpendicular to GW flow direction in vertical plane (S_d)= 6.57 ft = 200 cm (assuming complete mixing)

Calculated Parameters

DO NOT ENTER VALUES HERE!

Longitudinal dispersivity	Ax=	48.768 cm
Transverse dispersivity	Ay=	16.256 cm
Vertical dispersivity	Az=	2.4384 cm
Specific discharge	U=	0.11816448 cm/day
Sw/(4*SQRT(Ay*X))	B=	11.3823594
Sd/(2*SQRT(Az*X))	C=	2.902231395
Error function	erf(B)=	1 To determine error function values,
Error function	erf(C)=	0.999959437 see F46 & K46 in the linear interpolation section.

Actual B value= 11.3823594 Actual C value= 2.902231395

Automatic calculations : Actual erf(B) 1 Actual erf(C)= 0.999959437

Solutions

$C_{(x)}$
0.07 mg/l

C_{source}
0.00 mg/l

Computation of erf(x)

Source: Abramowitz, M. and I. A. Stegun, 1972, Handbook of Mathematical Functions, Dover Publications, New York, page 299, formula 7.1.26

Maximum error in computation = 1.5×10^{-7}

x=	11.3823594	2.902231395
p=	0.3275911	0.3275911
a1=	0.254829592	0.254829592
a2=	-0.284496736	-0.284496736
a3=	1.421413741	1.421413741
a4=	-1.453152027	-1.453152027
a5=	1.061405429	1.061405429
t=	0.211471946	0.512624618
erf(x)=	1	0.999959437

APPENDIX C

Draft Highway Authority Agreement



Illinois Environmental Protection Agency

Bureau of Land • 1021 N. Grand Avenue E. • P.O. Box 19276 • Springfield • Illinois • 62794-9276

HIGHWAY AUTHORITY AGREEMENT

This Agreement is entered into this ____ day of _____, 20__ pursuant to 35 Ill. Adm. Code 742.1020 by and between the (1) Hargobind, Inc. ("Property Owner") [or, in the case of a petroleum leaking underground storage tank (UST), the owner/operator of the tank ("Owner/Operator")] and (2) Village of Oak Park [Name of Entity in Control of the Right-of-Way] ("Highway Authority"), collectively known as the "Parties."

[Use this paragraph for sites with petroleum leaking underground storage tank(s)]

WHEREAS, Hargobind, Inc. is the owner or operator of one or more leaking underground storage tanks presently or formerly located at 100 W. Chicago Avenue, Oak Park, IL ("the Site");

[Use this paragraph for sites that do not have petroleum leaking USTs]

WHEREAS, _____ is the owner of the property located at _____ ("the Site");

WHEREAS, as a result of one or more releases of contaminants from the above referenced USTs ("the Release(s)"), soil and/or groundwater contamination at the Site exceeds the Tier 1 residential remediation objectives of 35 Ill. Adm. Code 742;

WHEREAS, the soil and/or groundwater contamination exceeding Tier 1 residential remediation objectives extends or may extend into the Highway Authority's right-of-way;

WHEREAS, the Owner/Operator or Property Owner is conducting corrective action in response to the Release(s);

WHEREAS, the Parties desire to prevent groundwater beneath the Highway Authority's right-of-way that exceeds Tier 1 remediation objectives from use as a supply of potable or domestic water and to limit access to soil within the right-of-way that exceeds Tier 1 residential remediation objectives so that human health and the environment are protected during and after any access;

NOW, THEREFORE, the Parties agree as follows:

1. The recitals set forth above are incorporated by reference as if fully set forth herein.
2. [Use this paragraph if IEMA has issued an incident number] The Illinois Emergency Management Agency has assigned incident number(s) 20100294 to the Release(s).
3. Attached as Exhibit A is a scaled map(s) prepared by the Owner/Operator that shows the Site and surrounding area and delineates the current and estimated future extent of soil and groundwater contamination above the applicable Tier 1 residential remediation objectives as a result of the Release(s). [Use the following sentence if either soil or groundwater is not contaminated above applicable Tier 1 residential remediation objectives: _____ is not contaminated above the applicable Tier 1 residential remediation objectives.]
4. Attached as Exhibit B is a table(s) prepared by the Owner/Operator that lists each contaminant of concern that exceeds its Tier 1 residential remediation objective, its Tier 1 residential remediation objective and its concentrations within the zone where Tier 1 residential remediation objectives are exceeded. The locations of the concentrations listed in Exhibit B are identified on the map(s) in Exhibit A.

5. Attached as Exhibit C is a scaled map prepared by the Owner/Operator showing the area of the Highway Authority's right-of-way that is governed by this agreement ("Right-of-Way"). Because Exhibit C is not a surveyed plat, the Right-of-Way boundary may be an approximation of the actual Right-of-Way lines.
6. *[Use this paragraph if samples have not been collected within the Right-of-Way, sampling within the Right-of-Way is not practical, and contamination does not extend beyond the Right-of-Way.]* Because the collection of samples within the Right-of-Way is not practical, the Parties stipulate that, based on modeling, soil and groundwater contamination exceeding Tier 1 residential remediation objectives does not and will not extend beyond the boundaries of the Right-of- Way.
7. The Highway Authority stipulates it has jurisdiction over the Right-of-Way that gives it sole control over the use of the groundwater and access to the soil located within or beneath the Right-of-Way.
8. The Highway Authority agrees to prohibit within the Right-of-Way all potable and domestic uses of groundwater exceeding Tier 1 residential remediation objectives.
9. The Highway Authority further agrees to limit access by itself and others to soil within the Right-of-Way exceeding Tier 1 residential remediation objectives. Access shall be allowed only if human health (including worker safety) and the environment are protected during and after any access. The Highway Authority may construct, reconstruct, improve, repair, maintain and operate a highway upon the Right-of-Way, or allow others to do the same by permit. In addition, the Highway Authority and others using or working in the Right-of-Way under permit have the right to remove soil or groundwater from the Right-of-Way and dispose of the same in accordance with applicable environmental laws and regulations. The Highway Authority agrees to issue all permits for work in the Right-of-Way, and make all existing permits for work in the Right-of-Way, subject to the following or a substantially similar condition:

As a condition of this permit the permittee shall request the office issuing this permit to identify sites in the Right-of-Way where a Highway Authority Agreement governs access to soil that exceeds the Tier 1 residential remediation objectives of 35 Ill. Adm. Code 742. The permittee shall take all measures necessary to protect human health (including worker safety) and the environment during and after any access to such soil.

10. This agreement shall be referenced in the Agency's no further remediation determination issued for the Release(s).
11. The Agency shall be notified of any transfer of jurisdiction over the Right-of-Way at least 30 days prior to the date the transfer takes effect. This agreement shall be null and void upon the transfer unless the transferee agrees to be bound by this agreement as if the transferee were an original party to this agreement. The transferee's agreement to be bound by the terms of this agreement shall be memorialized at the time of transfer in a writing ("Rider") that references this Highway Authority Agreement and is signed by the Highway Authority, or subsequent transferor, and the transferee.
12. This agreement shall become effective on the date the Agency issues a no further remediation determination for the Release(s). It shall remain effective until the Right-of-Way is demonstrated to be suitable for unrestricted use and the Agency issues a new no further remediation determination to reflect there is no longer a need for this agreement, or until the agreement is otherwise terminated or voided.
13. In addition to any other remedies that may be available, the Agency may bring suit to enforce the terms of this agreement or may, in its sole discretion, declare this agreement null and void if any of the Parties or any transferee violates any term of this agreement. The Parties or transferee shall be notified in writing of any such declaration.
14. This agreement shall be null and void if a court of competent jurisdiction strikes down any part or provision of the agreement.
15. This agreement supersedes any prior written or oral agreements or understandings between the Parties on the subject matter addressed herein. It may be altered, modified or amended only upon the written consent and agreement of the Parties.
16. Any notices or other correspondence regarding this agreement shall be sent to the Parties at following addresses:

Manager, Division of Remediation Management
Bureau of Land
Illinois Environmental Protection Agency
P.O. Box 19276
Springfield, IL 62974-9276

Village of Oak Park

(Contact at Highway Authority)

Address 123 Madison Street

City Oak Park

State Illinois

Zip Code 60302

Property Owner or Owner/Operator

Name Hargobind, Inc.

Address 100 W. Chicago Avenue

City Oak Park

State Illinois

Zip Code 60302

IN WITNESS WHEREOF, the Parties have caused this agreement to be signed by their duly authorized representatives.

[NAME OF LOCAL GOVERNMENT]

Date: _____

By: _____

Its: _____

Property Owner or Owner/Operator

Date: _____

By: _____

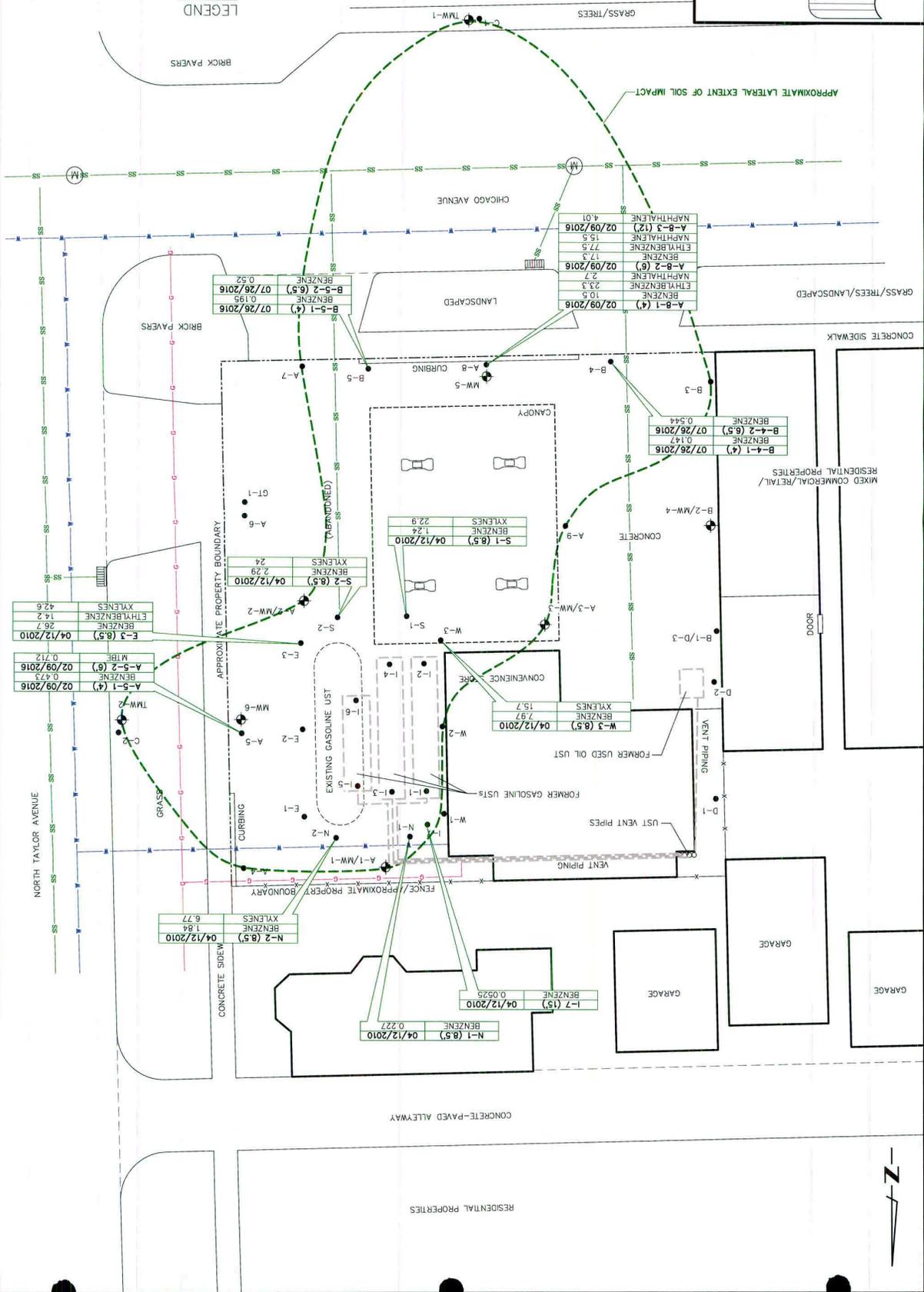
Title

EXHIBIT A



NOTES:
 ALL VALUES IN MG/KG
 ONLY VALUES ABOVE REMEDIATION OBJECTIVES SHOWN.

- LEGEND
- UNDERGROUND NATURAL GAS LINE
 - UNDERGROUND WATER LINE
 - UNDERGROUND SEWER LINE
 - STORMWATER DRAIN
 - UTILITY MANHOLE
 - SOIL BORING LOCATION
 - MONITORING WELL LOCATION



A-B-1 (4)	02/09/2016	BENZENE	10.5
A-B-1 (4)	02/09/2016	ETHYLBENZENE	23.3
A-B-1 (4)	02/09/2016	NAPHTHALENE	2.7
A-B-2 (6)	02/09/2016	BENZENE	17.3
A-B-2 (6)	02/09/2016	ETHYLBENZENE	7.5
A-B-2 (6)	02/09/2016	NAPHTHALENE	15.5
A-B-3 (12)	02/09/2016	BENZENE	4.01
A-B-3 (12)	02/09/2016	ETHYLBENZENE	15.5
A-B-3 (12)	02/09/2016	NAPHTHALENE	15.5

B-5-1 (4)	07/26/2016	BENZENE	0.195
B-5-2 (6.5)	07/26/2016	BENZENE	0.52

B-4-1 (4)	07/26/2016	BENZENE	0.147
B-4-2 (6.5)	07/26/2016	BENZENE	0.544

S-1 (8.5)	04/12/2010	BENZENE	1.24
S-1 (8.5)	04/12/2010	XYLENES	22.9

S-2 (8.5)	04/12/2010	BENZENE	2.29
S-2 (8.5)	04/12/2010	XYLENES	24

E-3 (8.5)	04/12/2010	ETHYLBENZENE	14.2
E-3 (8.5)	04/12/2010	XYLENES	42.6
A-5-2 (6)	02/09/2016	BENZENE	26.7
A-5-2 (6)	02/09/2016	MTBE	0.712
A-5-1 (4)	02/09/2016	BENZENE	0.475

W-3 (8.5)	04/12/2010	BENZENE	7.97
W-3 (8.5)	04/12/2010	XYLENES	15.7

N-2 (8.5)	04/12/2010	BENZENE	1.84
N-2 (8.5)	04/12/2010	XYLENES	6.77

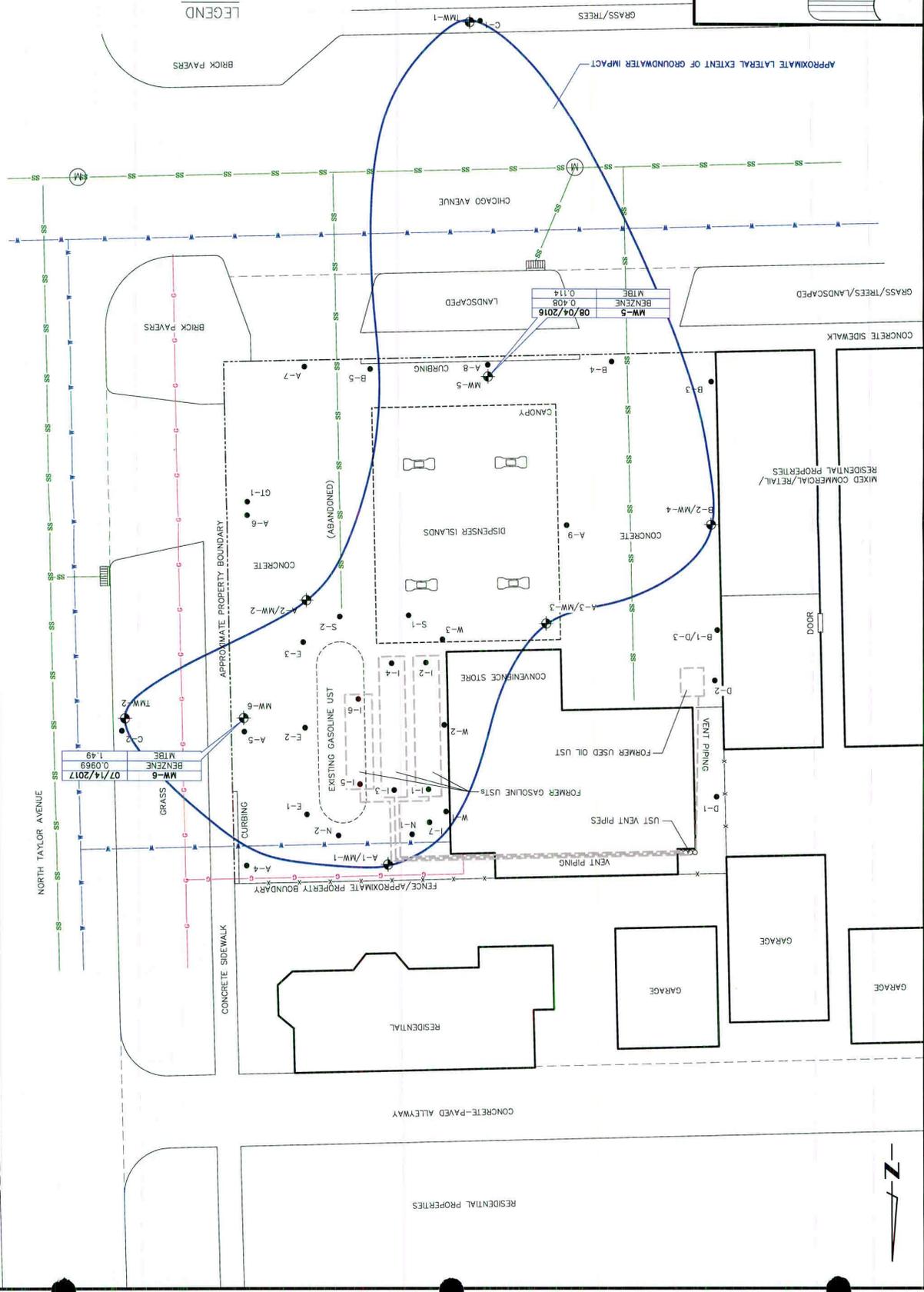
N-1 (8.5)	04/12/2010	BENZENE	0.227
N-1 (8.5)	04/12/2010	XYLENES	0.932



APPROX. SCALE (FEET)
 0 20

NOTES:
 ONLY VALUES ABOVE REMEDIATION OBJECTIVES SHOWN:

- LEGEND**
- UNDERGROUND NATURAL GAS LINE
 - ▲— UNDERGROUND WATER LINE
 - SS— UNDERGROUND SEWER LINE
 - ▨ STORMWATER DRAIN
 - (M) UTILITY MANHOLE
 - SOIL BORING LOCATION
 - ⊕ MONITORING WELL LOCATION

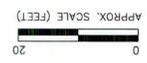


MW-5	08/04/2016	0.408
BENZENE		
MTR		0.114

MW-6	07/14/2017	1.49
BENZENE		0.0869
MTR		



NOTE: ALL RADIi CALCULATED ON THE BASIS OF BENZENE CONCENTRATIONS
 EXCEPT FOR MW-6 AS MARKED (MTBE)



- LEGEND**
- PREDICTED EXTENT BASED ON GROUNDWATER CONCENTRATIONS
 - PREDICTED EXTENT BASED ON SOIL CONCENTRATIONS
 - ⊕ MONITORING WELL LOCATION
 - SOIL BORING LOCATION
 - Ⓜ UTILITY MANHOLE
 - ▭ STORMWATER DRAIN
 - SS — UNDERGROUND SEWER LINE
 - — UNDERGROUND WATER LINE
 - ○ — UNDERGROUND NATURAL GAS LINE

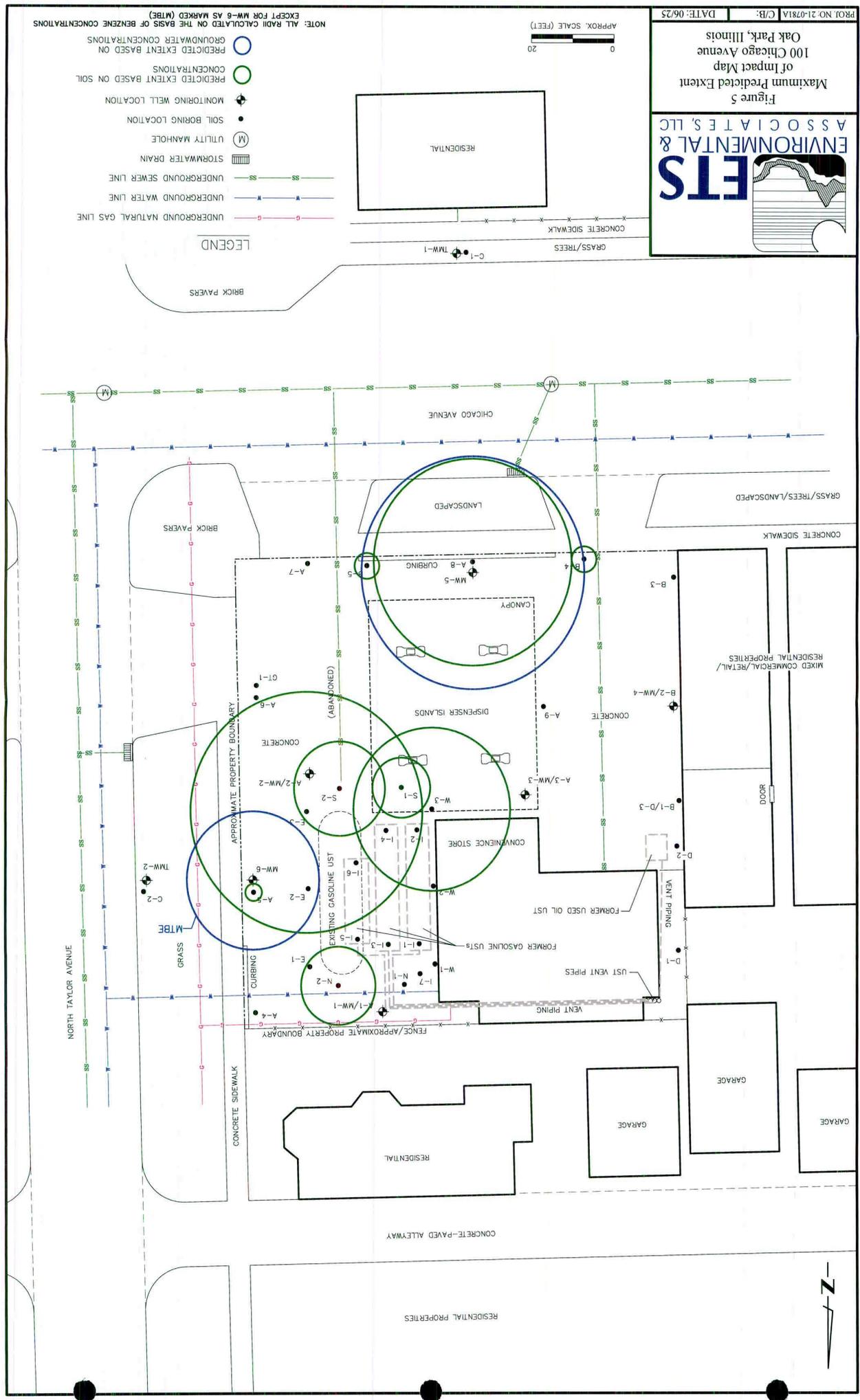


EXHIBIT B

Soil BTEX/MTBE Analytical Results
100 W. Chicago Avenue
Oak Park, Illinois
Project No. 21-0781A

SAMPLE ID	DATE	DEPTH (FEET)	BENZENE	TOLUENE	ETHYL-BENZENE	TOTAL XYLENES	MTBE
N-1	04/12/10	8.5	0.227 ^{1,2}	< 0.5	< 0.5	< 0.5	< 0.32
N-2	04/12/10	8.5	1.84 ^{1,2,6,7}	< 0.5	< 0.5	6.77 ⁸	< 0.32
S-1	04/12/10	8.5	1.24 ^{1,2,6}	8.16	3.58	22.9 ⁸	< 0.32
S-2	04/12/10	8.5	2.29 ^{1,2,6,7}	11.6	4.52	24 ⁸	< 0.32
E-1	04/12/10	8.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
E-2	04/12/10	8.5	< 0.005	< 0.005	< 0.005	< 0.005	0.322
E-3	04/12/10	8.5	26.7 ^{1,2,3,6,7,8}	1.38	14.2 ¹	42.6 ⁸	< 0.32
W-1	04/12/10	8.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
W-2	04/12/10	8.5	< 0.005	< 0.005	< 0.005	0.0088	< 0.005
W-3	04/12/10	8.5	7.97 ^{1,2,6,7,8}	1.4	15.7 ¹	4.52	< 0.32
I-1	04/12/10	15	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
I-2	04/12/10	15	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
I-3	04/12/10	15	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
I-4	04/12/10	15	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
I-5	04/12/10	15	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
I-6	04/12/10	15	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
I-7	04/12/10	15	0.0525 ¹	< 0.5	< 0.5	< 0.5	< 0.32
A-1-1	02/09/16	4	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-1-2	02/09/16	7.5	< 0.005	< 0.005	< 0.005	< 0.005	0.0545
A-1-3	02/09/16	12.5	< 0.005	< 0.005	< 0.005	< 0.005	0.0185
A-2-1	02/09/16	2.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-2-2	02/09/16	7.5	< 0.005	< 0.005	< 0.005	< 0.005	0.0126
A-2-3	02/09/16	12.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-3-1	02/09/16	4	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-3-2	02/09/16	8	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-3-3	02/09/16	12.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-4-1	02/09/16	2.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-4-2	02/09/16	7.5	< 0.005	< 0.005	< 0.005	< 0.005	0.0934
A-4-3	02/09/16	12.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-5-1	02/09/16	4	0.473 ^{1,2}	0.008	< 0.005	0.0257	0.166
A-5-2	02/09/16	6	< 0.005	< 0.005	< 0.005	< 0.005	0.712 ^{1,2}
A-5-3	02/09/16	12.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-6-1	02/09/16	2.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
SOIL COMPONENT TO GROUNDWATER INGESTION	CLASS I		0.03	12	13	150	0.32
	CLASS II		0.17	29	19	150	0.32
INGESTION REMEDIATION OBJECTIVES	RESIDENTIAL		12	16,000	7,800	16,000	780
	COMMERCIAL		100	410,000	200,000	410,000	20,000
	CONST. WORKER		2,300	410,000	20,000	41,000	2,000
INHALATION REMEDIATION OBJECTIVES	RESIDENTIAL		0.8	650	400	320	8,800
	COMMERCIAL		1.6	650	400	320	8,800
	CONST. WORKER		2.2	42	58	5.6	140

1-Class I Soil Component to Groundwater Remediation Objective exceeded
 2-Class II Soil Component to Groundwater Remediation Objective exceeded
 3-Residential Ingestion Remediation Objective exceeded
 4-Commercial Ingestion Remediation Objective exceeded
 5-Construction Worker Ingestion Remediation Objective exceeded
 6-Residential Inhalation Remediation Objective exceeded
 7-Commercial Inhalation Remediation Objective Exceeded
 8-Construction Worker Inhalation Remediation Objective exceeded
 9-Struck-out text indicates Soil boring B-1 was resampled via soil boring D-3

Results in mg/kg



Soil BTEX/MTBE Analytical Results
100 W. Chicago Avenue
Oak Park, Illinois
Project No. 21-0781A

SAMPLE ID	DATE	DEPTH (FEET)	BENZENE	TOLUENE	ETHYL-BENZENE	TOTAL XYLENES	MTBE
A-6-2	02/09/16	7.5	< 0.005	< 0.005	< 0.005	< 0.005	0.01
A-6-3	02/09/16	12.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-7-1	02/09/16	4	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-7-2	02/09/16	6	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-7-3	02/09/16	10.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-8-1	02/09/16	4	10.5 ^{1,2,6,7,8}	< 0.5	23.3 ^{1,2}	0.925	< 0.32
A-8-2	02/09/16	6	17.3 ^{1,2,3,6,7,8}	< 0.5	77.5 ^{1,2,8}	4.77	< 0.32
A-8-3	02/09/16	12	0.0151	< 0.005	0.0228	< 0.005	< 0.005
A-9-1	02/09/16	2.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
A-9-2	02/09/16	7.5	< 0.005	< 0.005	< 0.005	< 0.005	0.059
A-9-3	02/09/16	10.1	< 0.005	< 0.005	< 0.005	< 0.005	0.0087
B-1-1	07/26/16	2.5	0.0848 ^{4,9}	< 0.5	1.08	6.49 ^{8,9}	< 0.32
B-1-2	07/26/16	7.5	< 0.005	< 0.005	< 0.005	< 0.005	0.506 ^{4,9}
B-1-3	07/26/16	12.5	< 0.005	< 0.005	< 0.005	< 0.005	0.188
B-2-1	07/26/16	2.5	< 0.005	< 0.005	< 0.005	< 0.005	0.01
B-2-2	07/26/16	7.5	< 0.005	< 0.005	< 0.005	< 0.005	0.134
B-2-3	07/26/16	12.5	< 0.005	< 0.005	< 0.005	< 0.005	0.0153
B-3-1	07/26/16	2.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
B-3-2	07/26/16	7	< 0.005	< 0.005	< 0.005	< 0.005	0.273
B-3-3	07/26/16	12.5	< 0.005	< 0.005	< 0.005	< 0.005	0.0075
B-4-1	07/26/16	4	0.147 ¹	< 0.005	< 0.005	0.0065	< 0.005
B-4-2	07/26/16	6.5	0.544 ^{1,2}	< 0.005	< 0.005	< 0.005	0.0228
B-4-3	07/26/16	12	0.0073	< 0.005	< 0.005	< 0.005	< 0.005
B-5-1	07/26/16	4	0.195 ^{1,2}	< 0.5	< 0.5	< 0.5	< 0.32
B-5-2	07/26/16	6.5	0.52 ^{1,2}	0.0065	< 0.005	< 0.005	0.0463
B-5-3	07/26/16	12	< 0.005	< 0.005	< 0.005	< 0.005	0.032
C-1-1	07/12/17	2.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
C-1-2	07/12/17	7.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
C-2-1	07/12/17	4	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
C-2-2	07/12/17	6	< 0.005	< 0.005	< 0.005	< 0.005	0.0065
D-1	02/06/23	3	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
D-1	02/06/23	7	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
D-1	02/06/23	11	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
SOIL COMPONENT TO GROUNDWATER INGESTION	CLASS I		0.03	12	13	150	0.32
	CLASS II		0.17	29	19	150	0.32
INGESTION REMEDIATION OBJECTIVES	RESIDENTIAL		12	16,000	7,800	16,000	780
	COMMERCIAL		100	410,000	200,000	410,000	20,000
	CONST. WORKER		2,300	410,000	20,000	41,000	2,000
INHALATION REMEDIATION OBJECTIVES	RESIDENTIAL		0.8	650	400	320	8,800
	COMMERCIAL		1.6	650	400	320	8,800
	CONST. WORKER		2.2	42	58	5.6	140

- 1-Class I Soil Component to Groundwater Remediation Objective exceeded
- 2-Class II Soil Component to Groundwater Remediation Objective exceeded
- 3-Residential Ingestion Remediation Objective exceeded
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- 6-Residential Inhalation Remediation Objective exceeded
- 7-Commercial Inhalation Remediation Objective Exceeded
- 8-Construction Worker Inhalation Remediation Objective exceeded
- 9-Struck-out text indicates Soil boring B-1 was resampled via soil boring D-3

Results in mg/kg



Soil BTEX/MTBE Analytical Results
100 W. Chicago Avenue
Oak Park, Illinois
Project No. 21-0781A

SAMPLE ID	DATE	DEPTH (FEET)	BENZENE	TOLUENE	ETHYL-BENZENE	TOTAL XYLENES	MTBE
D-2	02/06/23	3	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
D-2	02/06/23	6	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0061
D-3	06/13/23	1.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
D-3	06/13/23	7.5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.099
D-3	06/13/23	11	< 0.005	< 0.005	< 0.005	< 0.005	< 0.095
SOIL COMPONENT TO GROUNDWATER INGESTION	CLASS I		0.03	12	13	150	0.32
	CLASS II		0.17	29	19	150	0.32
INGESTION REMEDIATION OBJECTIVES	RESIDENTIAL		12	16,000	7,800	16,000	780
	COMMERCIAL		100	410,000	200,000	410,000	20,000
	CONST. WORKER		2,300	410,000	20,000	41,000	2,000
INHALATION REMEDIATION OBJECTIVES	RESIDENTIAL		0.8	650	400	320	8,800
	COMMERCIAL		1.6	650	400	320	8,800
	CONST. WORKER		2.2	42	58	5.6	140

Results in mg/kg

- 1-Class I Soil Component to Groundwater Remediation Objective exceeded
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Table 2
Soil PNA Analytical Results
100 W. Chicago Avenue
Oak Park, Illinois
Project No. 21-0781A

CONSTITUENT	SOIL COMPONENT OF GROUNDWATER/INGESTION		INGESTION REMEDIATION OBJECTIVES		INHALATION REMEDIATION OBJECTIVES		N-1 8.5' 4/12/10	W-1 8.5' 4/12/10	1-7 15' 4/12/10	A-1-1 4' 2/9/16	A-1-2 7.5' 2/9/16	A-1-3 12.5' 2/9/16	A-2-1 2.5' 2/9/16	A-2-2 7.5' 2/9/16	A-2-3 12.5' 2/9/16	A-3-1 4' 2/9/16	A-3-2 8' 2/9/16	A-3-3 12.5' 2/9/16	A-4-1 2.5' 2/9/16	
	Class I	Class II	Residential	Commercial	Residential	Commercial														Residential
Acenaphthene	570	2,900	4700	120,000	NE	NE	1.05	<0.05	10.4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	85	420	2300	61,000	NE	NE	0.85	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	12,000	59,000	23,000	610,000	NE	NE	1.19	<0.05	5.38	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)anthracene	2	8	1.8*	8	NE	NE	1.54	<0.0087	1.73	<0.0087	<0.0087	<0.0087	0.0122	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087
Benzo(b)fluoranthene	8	82	2.1*	17	NE	NE	1.37	<0.015	1.7	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Benzo(k)fluoranthene	5	25	2.1*	8	NE	NE	1.55	<0.011	1.85	<0.011	<0.011	<0.011	0.013	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Benzo(e)pyrene	49	250	9	78	NE	NE	0.793	<0.011	1.01	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Benzo(g,h)perylene	27,000	130,000	2,300	61,000	NE	NE	0.893	<0.05	0.97	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	160	800	88	780	NE	NE	1.38	<0.05	2.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	2	7.6	0.42*	0.8	NE	NE	0.227	<0.02	0.253	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Fluoranthene	4,300	21,000	3,100	82,000	NE	NE	5.92	<0.05	6.6	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	560	2,800	3,100	82,000	NE	NE	0.997	<0.05	11.4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indene(1,2,3-cd)pyrene	14	69	1.6*	8	NE	NE	0.958	<0.029	1.11	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029	<0.029
Naphthalene	12	18	1,600	41,000	170	270	0.254	<0.025	1.33	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Phenanthrene	210	1,100	2,300	61,000	NE	NE	4.1	<0.05	31.6	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	4,200	21,000	2,300	61,000	NE	NE	3.86	<0.05	6.46	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Units in mg/kg

NE = No remediation objective established

Bold indicates above method detection limit

Strike indicates above Tier 1

* Metro Background Concentration

Struck-out text indicates Soil Boring B-1 was resampled via Soil Boring B-3



Table 2

Soil PNA Analytical Results
 100 W. Chicago Avenue
 Oak Park, Illinois
 Project No. 21-0781A

CONSTITUENT	SOIL COMPONENT OF GROUNDWATER/INGESTION		INGESTION REMEDIATION OBJECTIVES		INHALATION REMEDIATION OBJECTIVES		A-4-2		A-4-3		A-5-1		A-5-2		A-5-3		A-6-1		A-6-2		A-6-3		A-7-2		A-7-3		A-8-1		
	Class I	Class II	Residential	Commercial	Const. Worker	Residential	Commercial	Const. Worker	2/9/16		2/9/16		2/9/16		2/9/16		2/9/16		2/9/16		2/9/16		2/9/16		2/9/16		2/9/16		
									7.5'	12.5'	4'	6'	7.5'	12.5'	2.5'	4'	6'	7.5'	12.5'	4'	6'	7.5'	12.5'	4'	6'	7.5'	12.5'	4'	6'
Aceanthrene	570	2,900	4700	120,000	120,000	NE	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aceanthrylene	85	420	2,300	61,000	61,000	NE	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	12,000	59,000	23,000	610,000	610,000	NE	NE	NE	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087
Benzo(a)anthracene	2	8	1.8*	8	170	NE	NE	NE	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Benzo(b)fluoranthene	8	82	2.1*	8	170	NE	NE	NE	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Benzo(k)fluoranthene	5	25	2.1*	8	1,700	NE	NE	NE	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011
Benzo(a)pyrene	49	250	9	78	61,000	NE	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(g,h)perylene	27,000	130,000	2,300	61,000	61,000	NE	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	160	800	88	780	17,000	NE	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenz(a,h)anthracene	2	7.6	0.42*	0.8	17	NE	NE	NE	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Fluoranthene	4,300	21,000	3,100	82,000	82,000	NE	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	560	2,800	3,100	82,000	82,000	NE	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	14	69	1.6*	8	170	NE	NE	NE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Naphthalene	12	18	1.600	41,000	41,000	170	270	NE	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Phenanthrene	210	1,100	2,300	61,000	61,000	NE	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	4,200	21,000	2,300	61,000	61,000	NE	NE	NE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Units in mg/kg
 NE = No remediation objective established
 Bold indicates above method detection limit
 Struck-out text indicates Soil Boring B-1 was resampled via Soil Boring B-3



Table 2

Soil PNA Analytical Results
 100 W. Chicago Avenue
 Oak Park, Illinois
 Project No. 21-0781A

CONSTITUENT	SOIL COMPONENT OF GROUNDWATER/INGESTION		INGESTION REMEDIATION OBJECTIVES		INHALATION REMEDIATION OBJECTIVES		A-8-3 12' 2/9/16	A-9-1 2.5' 2/9/16	A-9-2 7.5' 2/9/16	A-9-3 10.1' 2/9/16	B-1-1 2.5' 07/26/16	B-1-2 7.5' 07/26/16	B-1-3 12.5' 07/26/16	B-2-1 2.5' 07/26/16	B-2-2 7.5' 07/26/16	B-2-3 12.5' 07/26/16	B-3-1 2.5' 07/26/16	
	Class I	Class II	Residential	Commercial	Residential	Commercial												Const. Worker
Acenaphthene	570	2,900	4700	120,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Acenaphthylene	85	420	2,300	61,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Anthracene	12,000	59,000	23,000	610,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Benzo(a)anthracene	2	8	1.8*	8	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Benzo(a)pyrene	8	2.1*	2.1*	17	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Benzo(b)fluoranthene	5	25	2.1*	8	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Benzo(k)fluoranthene	49	250	9	78	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Benzo(ghi)perylene	27,000	130,000	2,300	61,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Chrysene	160	800	88	780	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Dibenz(a,h)anthracene	2	7.6	0.42*	0.8	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Fluoranthene	4,300	21,000	3,100	82,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Fluorene	560	2,800	3,100	82,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Indeno(1,2,3-cd)pyrene	14	69	1.6*	8	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Naphthalene	12	18	1,600	41,000	170	270	1.8	4.01	15.5	4.01	0.075	0.344	0.065	0.344	0.076	0.151	0.221	0.221
Phenanthrene	210	1,100	2,300	61,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Pyrene	4,200	21,000	2,300	61,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Units in mg/kg

NE = No remediation objective established

Bold indicates above method detection limit

Shade indicates above Tier 1

* Metro Background Concentration

Struck-out text indicates Soil Boring B-1 was resampled via Soil Boring B-3



Table 2

Soil PNA Analytical Results
 100 W. Chicago Avenue
 Oak Park, Illinois
 Project No. 21-0781A

CONSTITUENT	SOIL COMPONENT OF GROUNDWATER INGESTION		INGESTION REMEDIATION OBJECTIVES		INHALATION REMEDIATION OBJECTIVES		B-3-2 7' 07/26/16	B-3-3 12.5' 07/26/16	B-4-1 4' 07/26/16	B-4-2 6.5' 07/26/16	B-4-3 12' 07/26/16	B-5-1 4' 07/26/16	B-5-2 6.5' 07/26/16	B-5-3 12' 07/26/16	C-1-1 2.5' 07/12/17	C-1-2 7.5' 07/12/17	C-2-1 4' 07/12/17	C-2-2 6' 07/12/17
	Class I	Class II	Residential	Commercial	Residential	Commercial												
	570	2,900	4700	120,000	120,000	120,000												
Acenaphthene	85	420	2,300	61,000	61,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Acenaphthylene	12,000	59,000	23,000	610,000	610,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Anthracene	2	8	1.8*	8	170	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Benzo(a)anthracene	8	82	2.1*	2.1*	17	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Benzo(a)pyrene	5	25	2.1*	8	170	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Benzo(b)fluoranthene	49	250	9	78	1,700	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Benzo(k)fluoranthene	27,000	130,000	2,300	61,000	61,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Benzo(ghi)perylene	160	800	88	780	17,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Chrysene	2	7.6	0.42*	0.8	17	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Dibenz(a,h)anthracene	4,300	21,000	3,100	82,000	82,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Fluoranthene	560	2,800	3,100	82,000	82,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Fluorene	14	69	1.6*	8	170	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Indeno(1,2,3-cd)pyrene	12	18	1,600	41,000	4,100	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Naphthalene	210	1,100	2,300	61,000	61,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Phenanthrene	4,200	21,000	2,300	61,000	61,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Units in mg/kg
 NE = No remediation objective established
 Bold indicates above method detection limit
 Shade indicates above Tier 1
 * Metro Background Concentration
 Struck-out text indicates Soil Boring B-1 was resampled via Soil Boring B-3



Table 2

Soil PNA Analytical Results
 100 W. Chicago Avenue
 Oak Park, Illinois
 Project No. 21-0781A

CONSTITUENT	SOIL COMPONENT OF GROUNDWATER/INGESTION		INGESTION REMEDIATION OBJECTIVES		INHALATION REMEDIATION OBJECTIVES		D-3 1.5' 06/13/23	D-3 7.5' 06/13/23	D-3 11' 06/13/23
	Class I	Class II	Residential	Commercial	Residential	Commercial			
	570	2,900	4700	120,000	NE	NE			
Acenaphthene	85	420	2,300	61,000	NE	NE	<0.33	<0.33	<0.33
Acenaphthylene	12,000	59,000	23,000	610,000	NE	NE	<0.33	<0.33	<0.33
Anthracene	2	8	1.8*	8	NE	NE	<0.33	<0.33	<0.33
Benzo(a)anthracene	8	82	2.1*	2.1*	NE	NE	<0.09	<0.09	<0.09
Benzo(a)pyrene	5	25	2.1*	8	NE	NE	<0.33	<0.33	<0.33
Benzo(b)fluoranthene	49	250	9	78	NE	NE	<0.33	<0.33	<0.33
Benzo(k)fluoranthene	27,000	130,000	2,300	61,000	NE	NE	<0.33	<0.33	<0.33
Benzo(ghi)perylene	160	800	88	780	NE	NE	<0.33	<0.33	<0.33
Chrysene	2	7.6	0.42*	0.8	NE	NE	<0.09	<0.09	<0.09
Dibenz(a,h)anthracene	4,300	21,000	3,100	82,000	NE	NE	<0.33	<0.33	<0.33
Fluoranthene	560	2,800	3,100	82,000	NE	NE	<0.33	<0.33	<0.33
Indeno(1,2,3-cd)pyrene	14	69	1.6*	8	NE	NE	<0.33	<0.33	<0.33
Naphthalene	12	18	1,600	41,000	170	270	<0.33	<0.33	0.96
Phenanthrene	210	1,100	2,300	61,000	NE	NE	<0.33	<0.33	<0.33
Pyrene	4,200	21,000	2,300	61,000	NE	NE	<0.33	<0.33	<0.33



Units in mg/kg
 NE = No remediation objective established
 Bold indicates above method detection limit
 Shaded indicates above Tier 1
 * Metro Background Concentration
 Struck-out text indicates Soil Boring B-1 was resampled via Soil Boring B-3

Groundwater BTEX/MTBE Analytical Results
100 W. Chicago Avenue
Oak Park, Illinois
Project No. 21-0781A

SAMPLE ID	DATE	BENZENE	TOLUENE	ETHYLBENZENE	TOTAL XYLENES	MTBE
MW-1	3/9/16	< 0.005	< 0.005	< 0.005	< 0.005	0.0694
MW-2	3/9/16	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
MW-3	3/9/16	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
MW-4	8/4/16	< 0.005	< 0.005	< 0.005	< 0.005	0.769 ^{4,3}
MW-4	6/13/23	< 0.005	< 0.005	< 0.005	< 0.005	0.008
MW-5	8/4/16	0.408 ^{1,2,3}	< 0.005	0.152	0.0365	0.114 ^{1,2}
MW-6	7/14/17	0.0969 ^{1,2}	< 0.005	< 0.005	< 0.005	1.49 ^{1,2}
TMW-1	2/6/23	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TMW-2	2/6/23	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
GROUNDWATER REMEDIALTION OBJECTIVES	CLASS I	0.005	1	0.7	10	0.07
	CLASS II	0.025	2.5	1	10	0.07
GROUNDWATER INDOOR INHALATION	Residential	0.11	530	0.37	30	1,900
	Commercial	0.41	530	1.4	93	6,800

Units in mg/L

1 = Class I Remediation Objectives exceeded

2 = Class II Remediation Objectives exceeded

3 = Residential GW Indoor Inhalation Objectives exceeded

4 = Commercial GW Indoor Inhalation Objectives exceeded

* This site has been evaluated based on Class I Remediation Objectives



Groundwater PNA Analytical Results
 100 W. Chicago Avenue
 Oak Park, Illinois
 Project No. 21-0781A

CONSTITUENT	GROUNDWATER REMEDIATION OBJECTIVES		GROUNDWATER INDOOR INHALATION		MW-1 3/9/16	MW-2 3/9/16	MW-3 3/9/16	MW-4 8/4/16	MW-5 8/4/16	MW-6 7/14/17
	CLASS I	CLASS II	Residential	Commercial						
Acenaphthene	0.42	2.1	NE	NE	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	0.21	1.05	NE	NE	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	2.1	10.5	NE	NE	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(a)anthracene	0.00013	0.00065	NE	NE	<0.00013	<0.00013	<0.00013	<0.00013	<0.00013	<0.00013
Benzo(a)pyrene	0.0002	0.002	NE	NE	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Benzo(b)fluoranthene	0.00018	0.0009	NE	NE	<0.00018	<0.00018	<0.00018	<0.00018	<0.00018	<0.00018
Benzo(k)-fluoranthene	0.00017	0.00085	NE	NE	<0.00017	<0.00017	<0.00017	<0.00017	<0.00017	<0.00017
Benzo(g,h,i)-perylene	0.21	1.05	NE	NE	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Chrysene	0.0015	0.0075	NE	NE	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015
Dibenz(a,h)-anthracene	0.0003	0.0015	NE	NE	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Fluoranthene	0.28	1.4	NE	NE	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Fluorene	0.28	1.4	NE	NE	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Indeno(1,2,3-cd)-pyrene	0.00043	0.00215	NE	NE	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Naphthalene	0.14	0.22	0.075	0.32	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Phenanthrene	0.21	1.05	NE	NE	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Pyrene	0.21	1.05	NE	NE	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002

Units in mg/L

NE = Not Established

Bold indicates above method detection limit

Shade indicates above Tier 1

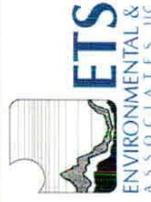
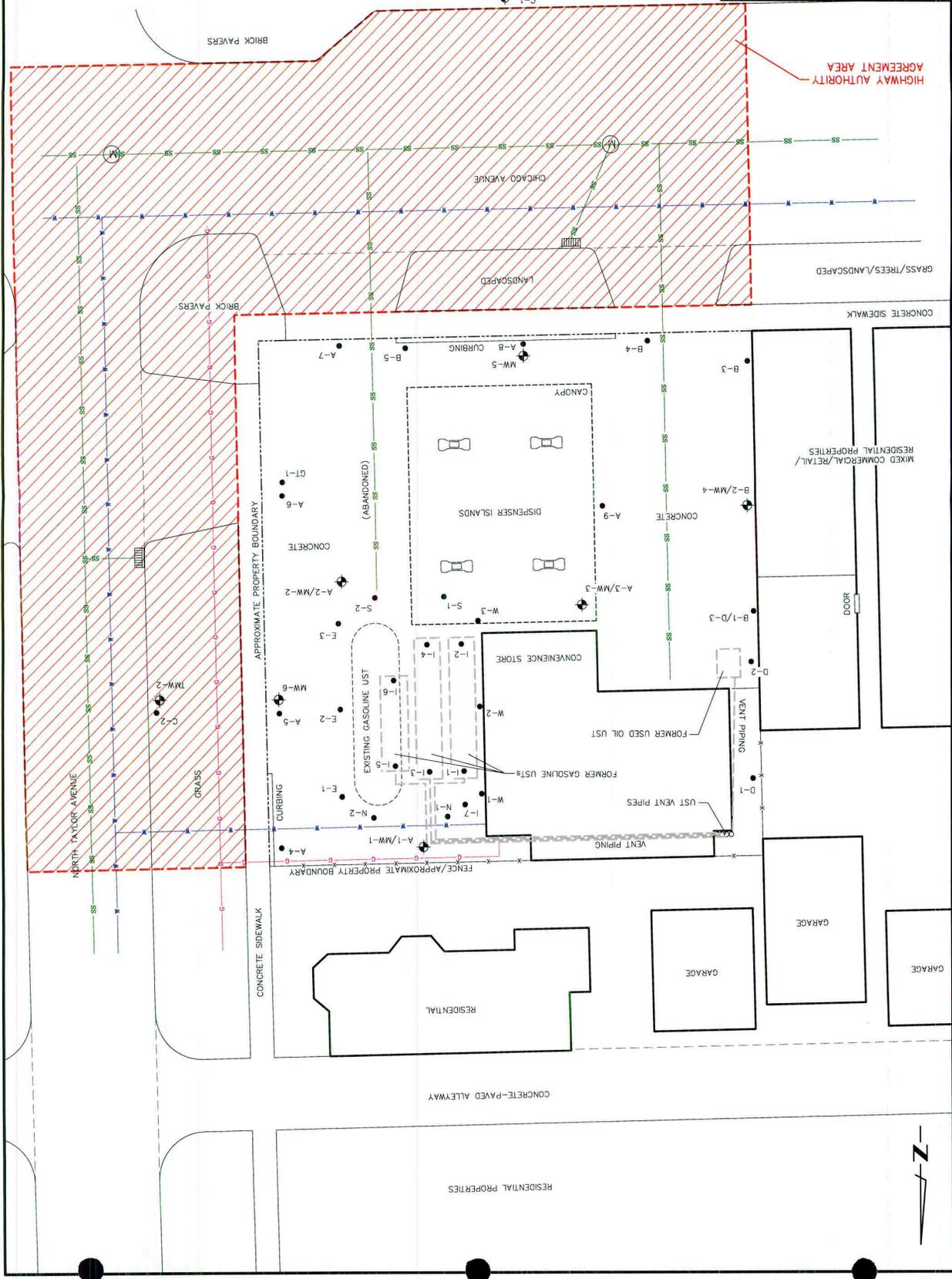


EXHIBIT C

100 Chicago Avenue
Oak Park, Illinois
Proposed Institutional Controls
Figure 6



- LEGEND**
- MONITORING WELL LOCATION
 - SOIL BORING LOCATION
 - UTILITY MANHOLE
 - STORMWATER DRAIN
 - UNDERGROUND SEWER LINE
 - UNDERGROUND WATER LINE
 - UNDERGROUND NATURAL GAS LINE



APPENDIX D

Corrective Action Plan Budget



Illinois Environmental Protection Agency

1021 North Grand Avenue East • P.O. Box 19276 • Springfield • Illinois • 62794-9276 • (217) 782-3397

General Information for the Budget and Billing Forms

LPC #: 0312255142 County: Cook
 City: Oak Park Site Name: Oak Park BP
 Site Address: 100 W. Chicago Avenue
 Date this form was prepared: Jun 9, 2025

List all IEMA Incident numbers associated with this package:

20011417. 20090170. & 20100294

List all other incidents associated with this site that are not associated with this package:

This form is being submitted as a (check one, if applicable):

- Billing Package
- Budget Amendment (Budget amendments must include only the costs over the previous budget.)
- Budget Proposal

Please provide the name(s) and date(s) of report(s) documenting the costs requested:

Name(s): Corrective Action Plan _____

Date(s): June 12, 2025 _____

This package is being submitted for the site activities indicated below:

35 Ill. Adm. Code 734:

- Early Action
- Free Product Removal after Early Action
- Site Investigation Stage 1: Stage 2: Stage 3:
- Corrective Action

35 Ill. Adm. Code 732:

- Early Action
- Free Product Removal after Early Action
- Site Classification
- Low Priority Corrective Action
- High Priority Corrective Action

35 Ill. Adm. Code 731:

- Site Investigation
- Corrective Action

General Information for the Budget and Billing Forms

The following address will be used as the mailing address for checks and any final determination letters regarding payment from the Fund for this package.

Pay to the order of: Hargobind, Inc.

Send in care of: Mr. Hardeep Singh

Address: 100 W. Chicago Avenue

City: Oak Park

State: IL

Zip: 60302

The payee is the: Owner Operator (Check one or both.)

ms.
Signature of the owner or operator of the UST(s) (required)

6/30/2025
Date

Hardeep Singh
Printed name of the owner or operator of the UST(s) (required)

W-9 must be submitted.
[Click here to print off a W-9 Form.](#)

Email: hargobindinc@gmail.com

Number of petroleum USTs in Illinois presently owned or operated by the owner or operator; any subsidiary, parent or joint stock company of the owner or operator; and any company owned by any parent, subsidiary or joint stock company of the owner or operator:

Fewer than 101: 101 or more:

Please list all tanks that have ever been located at the site and tanks that are presently located at the site.

Product Stored in UST	Size (gallons)	Did UST have a release?	Incident No.	Type of Release Tank Leak / Overfill / Piping Leak
Gasoline	6,000	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	20011417, 20091070, +	Tank Leak
Gasoline	6,000	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	20011417, 20091070, +	Tank Leak
Gasoline	4,000	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	20011417, 20091070, +	Tank Leak
Heating Oil	1,000	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Gasoline	14,000	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Gasoline	6,000	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Used Oil	375	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	20020981	Overfill
		Yes <input type="checkbox"/> No <input type="checkbox"/>		

Budget Summary

Choose the applicable regulation: 734 732

734	Free Product	Stage 1 Site Investigation	Stage 2 Site Investigation	Stage 3 Site Investigation	Corrective Action
Drilling and Monitoring Well Costs Form	\$	\$	\$	\$	\$.00
Analytical Costs Form	\$	\$	\$	\$	\$.00
Remediation and Disposal Costs Form	\$	\$	\$	\$	\$.00
UST Removal and Abandonment Costs Form	\$	\$	\$	\$	\$.00
Paving, Demolition, and Well Abandonment Costs Form	\$	\$	\$	\$	\$ 1,385.10
Consulting Personnel Costs Form	\$	\$	\$	\$	\$ 13,109.58
Consultant's Materials Costs Form	\$	\$	\$	\$	\$.00
Handling Charges Form	Handling charges will be determined at the time a billing package is submitted to the Illinois EPA. The amount of allowable handling charges will be determined in accordance with the Handling Charges Form.				
Total	\$	\$	\$	\$	\$ 14,494.68

Paving, Demolition, and Well Abandonment Costs Form

A. Concrete and Asphalt Placement/Replacement

Number of Square Feet	Asphalt or Concrete	Thickness (inches)	Cost (\$) per Square Foot	Replacement or Placement for an Engineered Barrier	Total Cost
		.00			

Total Concrete and Asphalt Placement/Replacement Costs:	
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B. Building Destruction or Dismantling and Canopy Removal

Item to Be Destroyed, Dismantled, or Removed	Unit Cost (\$)	Total Cost (\$)

Total Building Destruction or Dismantling and Canopy Removal Costs:	
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Consulting Personnel Costs Form

Employee Name	Personnel Title	Hours	Rate* (\$)	Total Cost
Remediation Category	Task			
	Senior Project Manager	24.00	153.87	\$3,692.88
CCAP	Corrective Action Plan Preparation			
	Senior Project Manager	6.00	153.87	\$923.22
CCAP-Budget	Corrective Action Plan Budget Preparation			
	Senior Prof. Engineer	3.00	200.03	\$600.09
CCAP	Corrective Action Plan & Budget Review and Certification			
	Senior Acct. Technician	8.00	84.62	\$676.96
CA-Pay	Corrective Action Claim Prep: CAP & Budget			
	Senior Prof. Engineer	1.00	200.03	\$200.03
CA-Pay	Corrective Action Claim Review and Cert.: CAP & Budget			
	Senior Project Manager	12.00	153.87	\$1,846.44
HAA	Village of Oak Park Highway Authority Agreement(s) preparation, negotiation, & execution			
	Senior Project Manager	24.00	153.87	\$3,692.88
CACR	Corrective Action Completion Report Preparation			
	Senior Prof. Engineer	3.00	200.03	\$600.09
CACR	Corrective Action Completion Report Review and Certification			
	Senior Acct. Technician	8.00	84.62	\$676.96
CA-Pay	Corrective Action Claim Prep: ICs and CACR prep.			

Employee Name		Personnel Title	Hours	Rate* (\$)	Total Cost
Remediation Category	Task				
		Senior Prof. Engineer	200.03	1.00	\$200.03
CA-Pay	Corrective Action Claim Review and Cert.: ICs and CACR prep.				

*Refer to the applicable Maximum Payment Amounts document.

Total of Consulting Personnel Costs	\$13,109.58
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Owner/Operator and Licensed Professional Engineer/Geologist Budget Certification Form

I hereby certify that I intend to seek payment from the UST Fund for costs incurred while performing corrective action activities for Leaking UST incident 20011417, 20090170, & 20100294. I further certify that the costs set forth in this budget are for necessary activities and are reasonable and accurate to the best of my knowledge and belief. I also certify that the costs included in this budget are not for corrective action in excess of the minimum requirements of 415 ILCS 5/57, no costs are included in this budget that are not described in the corrective action plan, and no costs exceed Subpart H: Maximum Payment Amounts, Appendix D Sample Handling and Analysis amounts, and Appendix E Personnel Titles and Rates of 35 Ill. Adm. Code 732 or 734. I further certify that costs ineligible for payment from the Fund pursuant to 35 Ill. Adm. Code 732.606 or 734.630 are not included in the budget proposal or amendment. Such ineligible costs include but are not limited to:

- Costs associated with ineligible tanks.
- Costs associated with site restoration (e.g., pump islands, canopies).
- Costs associated with utility replacement (e.g., sewers, electrical, telephone, etc.).
- Costs incurred prior to IEMA notification.
- Costs associated with planned tank pulls.
- Legal fees or costs.
- Costs incurred prior to July 28, 1989.
- Costs associated with installation of new USTs or the repair of existing USTs.

Owner/Operator: Hargobind, Inc.

Authorized Representative: Hardeep Singh

Title: _____

Signature: _____

Hardeep Singh

Date: 6/30/2025

Subscribed and sworn to before me the 30 day of JUNE, 2025

[Signature]

(Notary Public)

Seal:



In addition, I certify under penalty of law that all activities that are the subject of this plan, budget, or report were conducted under my supervision or were conducted under the supervision of another Licensed Professional Engineer or Licensed Professional Geologist and reviewed by me; that this plan, budget, or report and all attachments were prepared under my supervision; that, to the best of my knowledge and belief, the work described in the plan, budget, or report has been completed in accordance with the Environmental Protection Act [415 ILCS 5/57], 35 Ill. Adm. Code 732 or 734, and generally accepted standards and practices of my profession; and that the information presented is accurate and complete. I am aware there are significant penalties for submitting false statements or representations to the Illinois EPA, including but not limited to fines, imprisonment, or both as provided in Sections 44 and 57.17 of the Environmental Protection Act [415 ILCS 5/44 and 57.17].

L.P.E./L.P.G.: Jeffrey Wienhoff

L.P.E./L.P.G. Seal: _____

L.P.E./L.P.G. Signature: _____

[Signature]

Date: 6/18/25

Subscribed and sworn to before me the 18 day of June, 2025

[Signature]

(Notary Public)

Seal:



The Illinois EPA is authorized to require this information under 415 ILCS 5/44. Disclosure of this information is required. Failure to do so may result in the delay or denial of any budget or payment requested hereunder.



Office of the Illinois
State Fire Marshal
"Partnering With the Fire Service to Protect Illinois"

CERTIFIED MAIL - RECEIPT REQUESTED #7014 1200 (2001 0140 9310

September 24, 2015

Hargobind, Inc.
100 W. Chicago Ave.
Oak Park, IL 60302

In Re: Facility No. 2-001069
IEMA Incident No: 10-0294
Oak Park City
100 W. Chicago Avenue
Oak Park, Cook Co., IL

Dear Applicant:

The Reimbursement Eligibility and Deductible Application received on August 19, 2015 for the above referenced occurrence has been reviewed. The following determinations have been made based upon this review.

You have filed an "Election to Proceed as Owner" and have received acceptance from the Illinois Environmental Protection Agency. It has been determined, therefore, that you are eligible to seek payment of costs in excess of \$10,000. The costs must be in response to the occurrence referenced above and associated with the following tanks:

Eligible Tanks

- Tank 1 6,000 gallon Gasoline
- Tank 2 6,000 gallon Gasoline
- Tank 3 4,000 gallon Gasoline

You must contact the Illinois Environmental Protection Agency to receive a packet of Agency billing forms for submitting your request for payment.

An owner or operator is eligible to access the Underground Storage Tank Fund if the eligibility requirements are satisfied:

1. Neither the owner nor the operator is the United States Government,
2. The tank does not contain fuel which is exempt from the Motor Fuel Tax Law,
3. The costs were incurred as a result of a confirmed release of any of the following substances:

"Fuel", as defined in Section 1.19 of the Motor Fuel Tax Law

Aviation fuel

Heating oil

Kerosene

Used oil, which has been refined from crude oil used in a motor vehicle, as defined in Section 1.3 of the Motor Fuel Tax Law.

4. The owner or operator registered the tank and paid all fees in accordance with the statutory and regulatory requirements of the Gasoline Storage Act.
5. The owner or operator notified the Illinois Emergency Management Agency of a confirmed release, the costs were incurred after the notification and the costs were a result of a release of a substance listed in this Section. Costs of corrective action or indemnification incurred before providing that notification shall not be eligible for payment.
6. The costs have not already been paid to the owner or operator under a private insurance policy, other written agreement, or court order.
7. The costs were associated with "corrective action".

This constitutes the final decision as it relates to your eligibility and deductibility. We reserve the right to change the deductible determination should additional information that would change the determination become available. An underground storage tank owner or operator may appeal the decision to the Illinois Pollution Control Board (Board), pursuant to Section 57.9 (c) (2). An owner or operator who seeks to appeal the decision shall file a petition for a hearing before the Board within 35 days of the date of mailing of the final decision. (35 Illinois Administrative Code 105.504(b)).

For information regarding the filing of an appeal, please contact:

Clerk
Illinois Pollution Control Board
State of Illinois Center
100 West Randolph, Suite 11-500
Chicago, Illinois 60601
(312) 814-3620

The following tanks are also listed for this site:

Tank 4	1,000 gallon Heating Oil
Tank 5	14,000 gallon Gasoline
Tank 6	6,000 gallon Gasoline
Tank 7	375 gallon Used Oil

Your application indicates that there has not been a release from these tanks under this incident number. You may be eligible to seek payment of corrective action costs associated with these tanks if it is determined that there has been a release from one or more of these tanks. Once it is determined that there has been a release from one or more of these tanks you may submit a separate application for an eligibility determination to seek corrective action costs associated with this/these tanks.