ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

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

BRUCE RAUNER, GOVERNOR ALEC MESSINA, DIRECTOR

SRP Tech
Blackbrothers Company
LPC No: 0990555005

MEMORANDUM

Date: October 4, 2018

To: Cleanup Objectives Review and Evaluation Group (CORE)

From: Jeff Guy, Voluntary Site Remediation Unit
Neelu Lowder, Manager, Voluntary Site Remediation Unit

Subject: 0990555005/LaSalle County
Mendota/Black Brothers Company
Site Remediation Program/Technical Reports

Recommendations Requested from CORE

The attached memorandum is presented to CORE to request concurrence with a Tier 3 evaluation developed in general accordance with 35 Illinois Administrative Code (35 IAC) Section 742.935 to support development of Tier 3 remediation objectives for groundwater.

Background Information

In January 2017, the United States Environmental Protection Agency (U.S. EPA) published updated ingestion and inhalation toxicity values for benzo(a)pyrene in its online Integrated Risk Information System (IRIS). In response to the U.S. EPA IRIS update, the Illinois EPA updated its table "Toxicity Values for Tier 2 and Tier 3 Calculations" posted on the Tiered Approach to Corrective Action Objectives (TACO) webpage (Illinois EPA 2017) to include the benzo(a)pyrene toxicity values and toxicity values for six associated carcinogenic polynuclear aromatic hydrocarbons (PNAs): benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene. The updated carcinogenic-PNA toxicity values were used to calculate Tier 3 remediation objectives for further evaluation of the groundwater ingestion exposure route at the site. Appendix N (attached) presents the PNA remediation objectives calculations. The Illinois EPA verified the Tier 3 groundwater remediation objectives. Post-remediation groundwater analytical data will be compared the proposed Tier 3 objectives for PNAs.

Site Description

The former manufactured gas plant (MGP) is in the City of Mendota, LaSalle County, Illinois, located at the southeast corner of 5th Street and 9th Avenue. The former MGP was constructed in 1875 and operated until 1941. Coal carbonization was the only process known to have been used at the MGP and reported production levels reportedly ranged from 3,200,000 cubic feet per year to more than 22,000,000 cubic feet per year. None of the former MGP buildings or above-grade structures currently remain, but the exact date of demolition of those structures is unknown. The

site consists of the former MGP property (approximately 0.65 area), a portion of the adjacent BBC property and adjacent City of Mendota property – for a total of 1.3 acres.

The site is currently covered by an asphalt parking lot, as well as a small one-story brick building which is currently used as a parking garage for Black Brothers Company (BBC) vehicles. Landscaping and grassy areas are present along portions of the north and west boundaries of the site. In 1966, BBC purchased the former MGP property from Northern Illinois Gas. BBC produces equipment associated with laminating and roll coating. The property surrounding the former MGP to the east and south has always been zoned for industrial uses and over time has all been purchased by BBC.

The former MGP is bound to the north by City-owned parkway with Mendota Creek, then 5th Street, and then residential properties alongside a service business district, successively to the north of the former MGP property. To the south is BBC property consisting of the continuation of the asphalt parking lot, as well as BBC's two-story brick office and manufacturing building, with the BNSF Railway Company tracks, successively to the south. To the east is BBC property consisting of the continuation of the asphalt parking lot, with BBC buildings currently used as a warehouse and for manufacturing located immediately east of the asphalt lot. Beyond the BBC property to the east is the Buckman Iron & Metal Company, Inc., which is a metal recycling center. The area immediately west of the former MGP is City-owned parkway, 9th Avenue, then residential properties and a small asphalt parking lot located to the southwest.

RECs

Major features historically located on the site included the following: retorts and purifiers, two (2) gas holders, two (2) crude oil tanks, coal piles, a tar well, and other MGP apparatus such as the tar/oil separator and miscellaneous small buildings.

Investigation Summary

Site investigations were conducted in three phases from 2011 through 2013. Prior to remediation, investigation activities included excavation of nine (9) test pits, advancement of 31 soil borings and 196 soil probes, as well as the installation of four (4) shallow groundwater monitoring wells, seven (7) soil gas probes and two (2) sub-slab soil gas probes. A total of 247 soil samples, seven (7) groundwater samples, seven (7) soil gas samples and two (2) sub-slab soil gas samples were collected and submitted for chemical analyses. Four (4) quarters of groundwater sampling, which included the collection of 16 groundwater samples, were conducted. Soil and groundwater samples were analyzed for the focused list of MGP constituents, total petroleum hydrocarbons (TPH), pH, and/or fraction of organic carbon (f_{oc}). In addition to environmental samples, 10 soil samples were collected for geotechnical testing.

Soil borings and soil probes were advanced at depths ranging from 3 feet bgs to 70 feet below ground surface (bgs). Soil samples were collected both inside and outside historic structures and historical features. In addition, a grid-based, random sampling scheme was generated for soil sampling. Regarding the groundwater investigation, the well screen intervals were approximately 5-15 feet bgs. Soil gas sampling was also performed at from depths between 3-5 feet bgs at seven (7) locations.

Proposed Remediation

Excavation of contaminated soil is proposed throughout the entire site to a maximum depth of 28 feet bgs. Confirmation groundwater will be collected upon completion of remedial activities to demonstrate compliance with the proposed Tier 3 remediation groundwater remediation objectives.

Illinois EPA Toxicity Assessment Unit (TAU) Review Comments

As found in the attached e-mail correspondence, the Illinois EPA TAU generated comments based on the review of the PNA evaluation, which is provided in Appendix N of the June 2018 *Revised Site Investigation Report/Remediation Objectives Report/Remedial Action Plan* (received August 7, 2018/Log No. 18-67167). The comments were based on a review PNA objectives for all exposure routes (as proposed in Appendix N). As found in the Illinois EPA e-mail dated October 3, 2018, the Illinois TAU provided a corrected remediation objectives table and associated comments. The proposed objectives for the soil migration to Class I groundwater and Class I groundwater are acceptable. However, the Illinois EPA TAU corrected the residential and construction worker outdoor inhalation objectives.

It should be noted that the lowest soil remediation objectives are proposed as the cleanup objectives for this project, as summarized on Table 47 attached. For PNAs, the objectives correspond to either the residential ingestion remediation objective or the soil migration to Class I groundwater remediation objective.

Summary

This memorandum is presented to CORE to request concurrence with a Tier 3 evaluation developed in general accordance with 35 Illinois Administrative Code (35 IAC) Section 742.935 to support development of Tier 3 remediation objectives for groundwater.

Attachments:

- Appendix N from June 2018 *Revised Site Investigation Report/Remediation Objectives Report/Remedial Action Plan* (received August 7, 2018/Log No. 18-67167)
- Table 47 from June 2018 Revised Site Investigation Report/Remediation Objectives Report/Remedial Action Plan (received August 7, 2018/Log No. 18-67167)
- Illinois EPA e-mail correspondence from Illinois EPA TAU dated October 2, 2018 – with tables
- Illinois EPA e-mail correspondence from Illinois EPA TAU dated October 3, 2018 – with tables and updated review comments

0990555005/LaSalle County
Mendota/Black Brothers Company
Site Remediation Program/Technical Reports

Recommendation:
The Remediation Applicant (RA) is requesting approval of Tier 3 groundwater remediation objectives for various polynuclear aromatic hydrocarbons (PNAs) based on updated toxicity values. Post-remediation groundwater analytical results from will be compared the proposed Tier 3 objectives for PNAs.

☐ Concur with action or resolution proposed by the project manager

☒ Concur with action or resolution proposed by the project manager with the following conditions: Adding tables - irrevelant using the injection numbers

☐ Reject action or resolution proposed by the project manager

☐ Request the following information before issuing a final CORE recommendation:

Section Manager _____ Date 10/4/18

Unit Manager Wendy Lawson Date 10/4/18

Project Manager _____ Date 10/4/18

Notes:

APPENDIX N
Carcinogenic PAH Evaluation
Mendota MGP - Black Brothers Company Site
Revised SI/ROR/RAP

Appendix N
Remediation Objective Calculations for Carcinogenic PAHs
Revised Site Investigation/Remediation Objectives Report/Remedial Action Plan
Mendota MGP – Black Brothers Company Site

N-1. INTRODUCTION

The Mendota MGP – Black Brothers Company Site is being evaluated pursuant to the Illinois Environmental Protection Agency (Illinois EPA) Tiered Approach to Corrective Action Objectives (TACO), presented in (Title 35 of the Illinois Administrative Code [IAC], Part 742, 2013).

In January 2017, the United States Environmental Protection Agency (USEPA) published updated ingestion and inhalation toxicity values for benzo(a)pyrene in its online Integrated Risk Information System (IRIS). In response to the USEPA IRIS update, the Illinois EPA updated its "Toxicity Values for Tier 2 and Tier 3 Calculations" tables posted on the TACO webpage to include the benzo(a)pyrene toxicity values and toxicity values for the six other carcinogenic PAHs including benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene. Although USEPA published updated toxicity values only for benzo(a)pyrene, Illinois EPA calculated toxicity values for the other six PAHs using the USEPA carcinogenic PAH toxicity equivalency factors (TEFs) published in the *Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons* (USEPA 1993).

The recently published carcinogenic PAH toxicity values were used to calculate Tier 2 and Tier 3 remediation objectives for further evaluation of soil and groundwater at the site. This appendix presents the PAH Tier 2 and Tier 3 remediation objectives calculations for the relevant chemicals and exposure routes. The calculations were performed for the ingestion and outdoor inhalation exposure routes for residential, industrial/commercial and construction worker receptors. Remediation objectives were also calculated for the soil component and direct ingestion component of the Class I groundwater ingestion exposure route.

N-2. CALCULATIONS

The Tier 2 and Tier 3 remediation objectives were calculated according to the procedures outlined in TACO as follows:

- The Soil Screening Level (SSL) equations from TACO, Appendix C, Table A: SSL Equations were used to calculate the Tier 2 and Tier 3 remediation objectives, with the exception of the noncarcinogenic groundwater ingestion remediation objective. This remediation objective was calculated using an equation adapted from Equation R2 in TACO, Appendix C, Table C: RBCA Equations.

- Default human intake factors, e.g. body weight and exposure duration, and default soil physical parameters found in TACO, Appendix C, Table B: SSL Parameters were used in the calculations, consistent with the parameters used to develop Tier 1 remediation objectives.

- The toxicity data listed for each chemical in the TACO online toxicity tables, updated in January 2017, were used as input parameters (Illinois EPA 2017).

- Non-carcinogenic remediation objectives were calculated for chemicals if toxicity data was available for the calculation. The only chemical with applicable non-carcinogenic toxicity data is benzo(a)pyrene.

- The TACO Tier 1 Soil Remediation Objectives tables (Appendix B, Table A and Table B) do no list inhalation remediation objectives for carcinogenic PAHs. The explanation in the footnotes to the tables is that "No toxicity criteria [is] available for the route of exposure." Inhalation toxicity criteria is available for carcinogenic PAHs in the Illinois EPA online Tier 2 and Tier 3 toxicity values tables; therefore, Tier 2 outdoor inhalation remediation objectives were calculated for the PAHs.

- The outdoor inhalation remediation objectives were calculated using TACO SSL Equations 11, 12, 13 and 14 for inhalation of particulate matter that incorporate a particulate emission factor (PEF). The PEF equations were selected because the carcinogenic PAHs are high-molecular weight semivolatile chemicals with physical properties that cause them to adsorb to soil and remain immobile rather than partition to water or volatilize to air (ATSDR 1995). Additionally, these PAHs are excluded from the TACO list of Volatile Chemicals for the Indoor Inhalation Exposure Route (TACO, Appendix A, Table J).

Table N-1 presents a summary of the calculated TACO Tier 2 and Tier 3 remediation objectives for the residential, industrial/commercial, and construction worker ingestion and inhalation, and groundwater ingestion exposure routes. Tables N-2 through N-6 present the default input parameters, references for chemical-specific input parameters and equations used to calculate remediation objectives for residential, industrial/commercial construction worker receptors and the soil component and groundwater component of groundwater ingestion, respectively. Tables N-7 through N-14 present remediation objectives calculations.

N-3. REFERENCES

Agency for Toxic Substances and Disease Registry, 1995. *Toxicological Profile for Polycyclic Aromatic Hydrocarbons (PAHs) prepared by the Syracuse Research Corporation*, Oak Ridge National Laboratory.

Illinois Administrative Code (IAC), 2013. Title 35: Environmental Protection, Subtitle G: Waste Disposal, Chapter I: Pollution Control Board, Subchapter f: Risk Based Cleanup Objectives, Part 742, Tiered Approach to Corrective Action Objectives.

Illinois Environmental Protection Agency (Illinois EPA), 2017. Toxicity Values for Tier 2 and Tier 3 Calculations. Internet Address: http://www.epa.illinois.gov/topics/cleanup-programs/taco/index. Accessed March 2017.

United States Environmental Protection Agency (USEPA), 1993. *Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons.* Document Number EPA/600/R-93/089. July.

USEPA, 2017. Integrated Risk Information System: Benzo(a)pyrene entries. Internet Address: https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?substance_nmbr=136. Accessed March 2017.

Table N-1
Summary of Remediation Objectives for Carcinogenic PAHs
Revised Site Investigation/Remediation Objectives Report/Remedial Action Plan
Mendota MGP - Black Brothers Company Site

Compound	Residential		Industrial/Commercial		Construction Worker		Soil Component of Groundwater Ingestion	Groundwater Ingestion
	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class I (mg/L)
Benzo(a)anthracene	6.4	54,000	57	84,000	1,200	1,000,000	14	0.00085
Benzo(b)fluoranthene	6.4	54,000	57	84,000	1,200	1,000,000	36	0.00085
Benzo(k)fluoranthene	64	540,000	570	840,000	12,000	1,000,000	340	0.0085
Benzo(a)pyrene	0.64	2,800	5.7	3,600	61	5,200	8*	0.0002 **
Chrysene	640	1,000,000	5,700	1,000,000	120,000	1,000,000	1,400	0.085
Dibenzo(a,h)anthracene	0.64	5,400	5.7	8,400	120	180,000	8.5	0.0003 **
Indeno(1,2,3,cd)pyrene	6.4	54,000	57	84,000	1,200	1,000,000	110	0.00085

Notes:

1) PAH - polynuclear aromatic hydrocarbon
2) RO - Remediation Objective
3) mg/kg - milligrams per kilogram
4) mg/L - milligrams per liter
5) * - The calculated remediation objectives for soil migration to groundwater was more stringent than Tier 1 so value shown is Tier 1 remediation objective.
6) ** - Value is the acceptable detection limit (ADL) from TACO, Appendix B, Table E.
7) See Tables N-2 through N-6 for inputs and equations and Tables N-7 through N-14 for calculations of ROs.

Table N-2
Input Values for Residential Calculations
Remediation Objectives for Carcinogenic PAHs
Revised Site Investigation/Remediation Objectives Report/Remedial Action Plan
Mendota MGP - Black Brothers Company Site

Symbol	Parameter	Units	Equation/Reference	Input Value[1]
Soil Ingestion Exposure Parameters				
AT_c	Averaging time for carcinogens	year	TACO Appendix C, Table B	70
AT_{nc}	Averaging time for noncarcinogens	year	TACO Appendix C, Table B	6
BW_{nc}	Body weight for noncarcinogens	kg	TACO Appendix C, Table B	15
ED	Exposure duration	year	TACO Appendix C, Table B	6
EF	Exposure frequency	day/year	TACO Appendix C, Table B	350
$IF_{soil-adj}$	Age adjusted soil ingestion factor for carcinogens	(mg-yr)/(kg-day)	TACO Appendix C, Table B	114
IR_{soil}	Ingestion rate	mg/day	TACO Appendix C, Table B	200
RfD_o	Reference dose	mg/kg-day	TACO Website[2]	Chemical-Specific
SF_o	Oral slope factor	$(mg/kg\text{-}day)^{-1}$	TACO Website[2]	Chemical-Specific
THQ	Target hazard quotient	unitless	TACO Appendix C, Table B	1
TR	Target risk	unitless	TACO Appendix C, Table B	1×10^{-6}
Soil Ingestion Remediation Objectives Equations[3]				
$RO_{ingestion}^{carc}$ Equation S2	Soil ingestion remediation objective for carcinogenic chemicals	mg/kg	$\frac{TR \bullet AT_c \bullet 365\frac{d}{yr}}{SF_o \bullet 10^{-6}\frac{kg}{mg} \bullet EF \bullet IF_{soil-adj}}$	
$RO_{ingestion}^{nc}$ Equation S1	Soil ingestion remediation objective for noncarcinogenic chemicals	mg/kg	$\frac{THQ \bullet BW \bullet AT \bullet 365\frac{d}{yr}}{\frac{1}{RfD_O} \bullet 10^{-6}\frac{kg}{mg} \bullet EF \bullet ED \bullet IR_{soil}}$	

Notes:
1) Numerical values are TACO, Appendix C, Table B default values.
2) Illinois EPA TACO website "Toxicity Values for Tier 2 and 3 Calculations" (see references).
3) Equations are from TACO, Appendix C, Table A.
4) carc - carcinogenic chemicals
5) nc - noncarcinogenic chemicals
6) Noncarcinogenic equation used for benzo(a)pyrene, the only carcinogenic PAH with noncarcinogenic toxicity in Illinois EPA toxicity tables.

Table N-2 (Continued)
Input Values for Residential Calculations
Remediation Objectives for Carcinogenic PAHs
Revised Site Investigation/Remediation Objectives Report/Remedial Action Plan
Mendota MGP - Black Brothers Company Site

Symbol	Parameter	Units	Equation/Reference	Input Value[1]
Soil Outdoor Inhalation Exposure Parameters				
AT_c	Averaging time for carcinogens	year	TACO Appendix C, Table B	70
AT_{nc}	Averaging time for noncarcinogens	year	TACO Appendix C, Table B	30
ED	Exposure duration	year	TACO Appendix C, Table B	30
EF	Exposure frequency	day/year	TACO Appendix C, Table B	350
PEF	Particulate emission factor	m^3/kg	TACO Appendix C, Table B	1.32×10^9
RfC	Reference concentration	mg/m^3	TACO Website[2]	Chemical-Specific
THQ	Target hazard quotient	unitless	TACO Appendix C, Table B	1
TR	Target risk	unitless	TACO Appendix C, Table B	1×10^{-6}
URF	Unit risk factor	$(\mu g/m^3)^{-1}$	TACO Website[2]	Chemical-Specific
Soil Outdoor Inhalation Remediation Objectives Equations [3]				
$RO_{inhalation}^{carc}$ (Fugitive Dust) Residential and Industrial/Commercial Equation S13	Soil outdoor inhalation remediation objective for carcinogenic chemicals	mg/kg	$\frac{TR \bullet AT_C \bullet 365\frac{d}{yr}}{URF \bullet 1{,}000\frac{ug}{mg} \bullet EF \bullet ED \bullet \frac{1}{PEF}}$	
$RO_{inhalation}^{nc}$ (Fugitive Dust) Residential and Industrial/Commercial Equation S11	Soil outdoor inhalation remediation objective for noncarcinogenic chemicals	mg/kg	$\frac{THQ \bullet AT \bullet 365\frac{d}{yr}}{EF \bullet ED \bullet \left(\frac{1}{RfC} \bullet \frac{1}{PEF}\right)}$	

Notes:
1) Numerical values are TACO, Appendix C, Table B default values.
2) Illinois EPA TACO website "Toxicity Values for Tier 2 and 3 Calculations" (see references).
3) Equations are from TACO, Appendix C, Table A.
4) carc - carcinogenic chemicals
5) nc - noncarcinogenic chemicals
6) Noncarcinogenic equation used for benzo(a)pyrene, the only carcinogenic PAH with noncarcinogenic toxicity in Illinois EPA toxicity tables.

Table N-3
Input Values for Industrial/Commercial Calculations
Remediation Objectives for Carcinogenic PAHs
Revised Site Investigation/Remediation Objectives Report/Remedial Action Plan
Mendota MGP - Black Brothers Company Site

Symbol	Parameter	Units	Equation/Reference	Input Value[1]
		Soil Ingestion Exposure Parameters		
AT_c	Averaging time for carcinogens	year	TACO Appendix C, Table B	70
AT_{nc}	Averaging time for noncarcinogens	year	TACO Appendix C, Table B	25
BW_c	Body weight for carcinogens	kg	TACO Appendix C, Table B	70
BW_{nc}	Body weight for noncarcinogens	kg	TACO Appendix C, Table B	70
ED	Exposure duration	year	TACO Appendix C, Table B	25
EF	Exposure frequency	day/year	TACO Appendix C, Table B	250
IR_{soil}	Ingestion rate	mg/day	TACO Appendix C, Table B	50
RfD_o	Reference dose	mg/kg-day	TACO Website[2]	Chemical-Specific
SF_o	Oral slope factor	$(mg/kg\text{-}day)^{-1}$	TACO Website[2]	Chemical-Specific
THQ	Target hazard quotient	unitless	TACO Appendix C, Table B	1
TR	Target risk	unitless	TACO Appendix C, Table B	1×10^{-6}
		Soil Ingestion Remediation Objectives Equations[3]		
$RO_{ingestion}^{carc}$ Equation S3	Soil ingestion remediation objective for carcinogenic chemicals	mg/kg	$\frac{TR \bullet BW \bullet AT_c \bullet 365\frac{d}{yr}}{SF_o \bullet 10^{-6}\frac{kg}{mg} \bullet EF \bullet ED \bullet IR_{soil}}$	
$RO_{ingestion}^{nc}$ Equation S1	Soil ingestion remediation objective for noncarcinogenic chemicals	mg/kg	$\frac{THQ \bullet BW \bullet AT \bullet 365\frac{d}{yr}}{\frac{1}{RfD_O} \bullet 10^{-6}\frac{kg}{mg} \bullet EF \bullet ED \bullet IR_{soil}}$	

Notes:
1) Numerical values are TACO, Appendix C, Table B default values.
2) Illinois EPA TACO website "Toxicity Values for Tier 2 and 3 Calculations" (see references).
3) Equations are from TACO, Appendix C, Table A.
4) carc - carcinogenic chemicals
5) nc - noncarcinogenic chemicals
6) Noncarcinogenic equation used for benzo(a)pyrene, the only carcinogenic PAH with noncarcinogenic toxicity in Illinois EPA toxicity tables.

Table N-3 (Continued)
Input Values for Industrial/Commercial Calculations
Remediation Objectives for Carcinogenic PAHs
Revised Site Investigation/Remediation Objectives Report/Remedial Action Plan
Mendota MGP - Black Brothers Company Site

Symbol	Parameter	Units	Equation/Reference	Input Value[1]
Soil Outdoor Inhalation Exposure Parameters				
AT_c	Averaging time for carcinogens	year	TACO Appendix C, Table B	70
AT_{nc}	Averaging time for noncarcinogens	year	TACO Appendix C, Table B	25
ED	Exposure duration	year	TACO Appendix C, Table B	25
EF	Exposure frequency	day/year	TACO Appendix C, Table B	250
PEF	Particulate emission factor	m^3/kg	TACO Appendix C, Table B	1.24×10^9
RfC	Reference concentration	mg/m^3	TACO Website[2]	Chemical-Specific
THQ	Target hazard quotient	unitless	TACO Appendix C, Table B	1
TR	Target risk	unitless	TACO Appendix C, Table B	1×10^{-6}
URF	Unit risk factor	$(\mu g/m^3)^{-1}$	TACO Website[2]	Chemical-Specific
Soil Outdoor Inhalation Remediation Objectives Equations [3]				
$RO_{inhalation}^{carc}$ (Fugitive Dust) Residential and Industrial/Commercial Equation S13	Soil outdoor inhalation remediation objective for carcinogenic chemicals	mg/kg	$\frac{TR \bullet AT_c \bullet 365\frac{d}{yr}}{URF \bullet 1{,}000\frac{ug}{mg} \bullet EF \bullet ED \bullet \frac{1}{PEF}}$	
$RO_{inhalation}^{nc}$ (Fugitive Dust) Residential and Industrial/Commercial Equation S11	Soil outdoor inhalation remediation objective for noncarcinogenic chemicals	mg/kg	$\frac{THQ \bullet AT \bullet 365\frac{d}{yr}}{EF \bullet ED \bullet \left(\frac{1}{RfC} \bullet \frac{1}{PEF}\right)}$	

Notes:
1) Numerical values are TACO, Appendix C, Table B default values.
2) Illinois EPA TACO website "Toxicity Values for Tier 2 and 3 Calculations" (see references).
3) Equations are from TACO, Appendix C, Table A.
4) carc - carcinogenic chemicals
5) nc - noncarcinogenic chemicals
6) Noncarcinogenic equation used for benzo(a)pyrene, the only carcinogenic PAH with noncarcinogenic toxicity in Illinois EPA toxicity tables.

Table N-4
Input Values for Construction Worker Calculations
Remediation Objectives for Carcinogenic PAHs
Revised Site Investigation/Remediation Objectives Report/Remedial Action Plan
Mendota MGP - Black Brothers Company Site

Symbol	Parameter	Units	Equation/Reference	Input Value[1]
Soil Ingestion Exposure Parameters				
AT_c	Averaging time for carcinogens	year	TACO Appendix C, Table B	70
AT_{nc}	Averaging time for noncarcinogens	year	TACO Appendix C, Table B	0.115
BW_c	Body weight for carcinogens	kg	TACO Appendix C, Table B	70
BW_{nc}	Body weight for noncarcinogens	kg	TACO Appendix C, Table B	70
ED	Exposure duration	year	TACO Appendix C, Table B	1
EF	Exposure frequency	day/year	TACO Appendix C, Table B	30
IR_{soil}	Ingestion rate	mg/day	TACO Appendix C, Table B	480
$RfD_{o\text{-}sc}$	Reference dose (subchronic)	mg/kg-day	TACO Website[2]	Chemical-Specific
SF_o	Oral slope factor	$(mg/kg\text{-}day)^{-1}$	TACO Website[2]	Chemical-Specific
THQ	Target hazard quotient	unitless	TACO Appendix C, Table B	1
TR	Target risk	unitless	TACO Appendix C, Table B	1×10^{-6}
Soil Ingestion Remediation Objectives Equations[3]				
$RO_{ingestion}^{carc}$ Equation S3	Soil ingestion remediation objective for carcinogenic chemicals	mg/kg	$\frac{TR \bullet BW \bullet AT_c \bullet 365\frac{d}{yr}}{SF_o \bullet 10^{-6}\frac{kg}{mg} \bullet EF \bullet ED \bullet IR_{soil}}$	
$RO_{ingestion}^{nc}$ Equation S1	Soil ingestion remediation objective for noncarcinogenic chemicals	mg/kg	$\frac{THQ \bullet BW \bullet AT \bullet 365\frac{d}{yr}}{\frac{1}{RfD_O} \bullet 10^{-6}\frac{kg}{mg} \bullet EF \bullet ED \bullet IR_{soil}}$	

Notes:
1) Numerical values are TACO, Appendix C, Table B default values.
2) Illinois EPA TACO website "Toxicity Values for Tier 2 and 3 Calculations" (see references).
3) Equations are from TACO, Appendix C, Table A.
4) carc - carcinogenic chemicals
5) nc - noncarcinogenic chemicals
6) Noncarcinogenic equation used for benzo(a)pyrene, the only carcinogenic PAH with noncarcinogenic toxicity in Illinois EPA toxicity tables.

Table N-4 (Continued)
Input Values for Construction Worker Calculations
Remediation Objectives for Carcinogenic PAHs
Revised Site Investigation/Remediation Objectives Report/Remedial Action Plan
Mendota MGP - Black Brothers Company Site

Symbol	Parameter	Units	Equation/Reference	Input Value[1]
		Soil Outdoor Inhalation Exposure Parameters		
AT_c	Averaging time for carcinogens	year	TACO Appendix C, Table B	70
AT_{nc}	Averaging time for noncarcinogens	year	TACO Appendix C, Table B	0.115
ED	Exposure duration	year	TACO Appendix C, Table B	1
EF	Exposure frequency	day/year	TACO Appendix C, Table B	30
PEF'	Particulate emission factor adjusted for agitation for construction worker	m^3/kg	TACO Appendix C, Table B	1.24×10^8
RfC_{sc}	Reference concentration (subchronic)	mg/m^3	TACO Website[2]	Chemical-Specific
THQ	Target hazard quotient	unitless	TACO Appendix C, Table B	1
TR	Target risk	unitless	TACO Appendix C, Table B	1×10^{-6}
URF	Unit risk factor	$(\mu g/m^3)^{-1}$	TACO Website[2]	Chemical-Specific
		Soil Outdoor Inhalation Remediation Objectives Equations [3]		
$RO_{inhalation}^{carc}$ (Fugitive Dust) Construction Worker Equation S12	Soil outdoor inhalation remediation objective for carcinogenic chemicals	mg/kg	$\frac{TR \bullet AT_c \bullet 365\frac{d}{yr}}{URF \bullet 1{,}000\frac{ug}{mg} \bullet EF \bullet ED \bullet \frac{1}{PEF'}}$	
$RO_{inhalation}^{nc}$ (Fugitive Dust) Construction Worker Equation S14	Soil outdoor inhalation remediation objective for noncarcinogenic chemicals	mg/kg	$\frac{THQ \bullet AT \bullet 365\frac{d}{yr}}{EF \bullet ED \bullet \left(\frac{1}{RfC} \bullet \frac{1}{PEF'}\right)}$	

Notes:
1) Numerical values are TACO, Appendix C, Table B default values.
2) Illinois EPA TACO website "Toxicity Values for Tier 2 and 3 Calculations" (see references).
3) Equations are from TACO, Appendix C, Table A.
4) carc - carcinogenic chemicals
5) nc - noncarcinogenic chemicals
6) Noncarcinogenic equation used for benzo(a)pyrene, the only carcinogenic PAH with noncarcinogenic toxicity in Illinois EPA toxicity tables.

Table N-5
Input Values for Soil Component of Class I Groundwater Ingestion Calculations
Remediation Objectives for Carcinogenic PAHs
Revised Site Investigation/Remediation Objectives Report/Remedial Action Plan
Mendota MGP - Black Brothers Company Site

Symbol	Parameter	Units	Equation/Reference	Input Value[1]
Soil Component of the Groundwater Ingestion Exposure Parameters				
C_w	Target soil leachate concentration	mg/L	TACO Appendix C, Table A	Calculated Value
H'	Henry's Law constant	unitless	TACO Appendix C, Table E	Chemical-Specific
K_d	Soil-water partition coefficient	cm^3/g or L/kg	TACO Appendix C, Table A	Calculated Value
$\theta_a^{subsurface}$	Air-filled soil porosity	L_{air}/L_{soil}	TACO Appendix C, Table B	0.13
$\theta_w^{subsurface}$	Water-filled soil porosity	L_{water}/L_{soil}	TACO Appendix C, Table B	0.30
ρ_b	Dry soil bulk density	kg/L or g/cm^3	TACO Appendix C, Table B	1.5
Soil Component of Groundwater Ingestion Remediation Objectives Equation[2]				
$RO_{SC\text{-}GW}$ Equation S17	Soil component of groundwater ingestion remediation objective	mg/kg	$C_w \bullet \left[K_d + \frac{(\theta_w + \theta_a \bullet H')}{\rho_b} \right]$	
Variables for Calculated Soil Component of Groundwater Ingestion Remediation Objectives Parameters				
DF	Dilution factor	unitless	TACO Appendix C, Table B	20
$f_{oc}^{subsurface}$	Organic carbon content	g/g	TACO Appendix C, Table B	0.002
GW_{obj}	Groundwater remediation objective	mg/L	Calculated value	Chemical-Specific
K_{oc}	Organic carbon partition coefficient	cm^3/g or L/kg	TACO Appendix C, Table E	Chemical-Specific
Equations for Calculated Soil Component of Groundwater Ingestion Remediation Objectives Parameters[2]				
C_w Equation S18	Target soil leachate concentration	mg/L	$C_w = DF \bullet GW_{obj}$	
K_d Equation S19	Soil-water partition coefficient	(m^3/kg)	$K_d = K_{oc} \bullet f_{oc}$	

Notes:
1) Numerical values are TACO, Appendix C, Table B default values.
2) Equations are from TACO, Appendix C, Table A.
3) See table N-14 for calculated groundwater remediation objectives.

Table N-6
Input Values for Class I Groundwater Ingestion Calculations
Remediation Objectives for Carcinogenic PAHs
Revised Site Investigation/Remediation Objectives Report/Remedial Action Plan
Mendota MGP - Black Brothers Company Site

Symbol	Parameter	Units	Equation/Reference	Input Value[1]
		Groundwater Ingestion Exposure Parameters		
AT_c	Averaging time for carcinogens	year	TACO Appendix C, Table D	70
AT_{nc}	Averaging time for noncarcinogens	year	TACO Appendix C, Table D	30
BW	Adult body weight	kg	TACO Appendix C, Table D	70
ED	Exposure duration	year	TACO Appendix C, Table D	30
EF	Exposure frequency	day/year	TACO Appendix C, Table D	350
IR_{water}	Ingestion rate	L/day	TACO Appendix C, Table D	2
RfD_o	Reference dose	mg/kg-day	TACO Website[2]	Chemical-Specific
SF_o	Oral slope factor	$(mg/kg\text{-}day)^{-1}$	TACO Website[2]	Chemical-Specific
THQ	Target hazard quotient	unitless	TACO Appendix C, Table B	1
TR	Target risk	unitless	TACO Appendix C, Table D	1×10^{-6}
		Groundwater Ingestion Remediation Objectives Equations[3]		
Class I $RO_{ingestion}^{carc}$ Equation S23	Groundwater ingestion remediation objective for carcinogenic chemicals	mg/L	$\frac{TR \bullet BW \bullet AT_c \bullet 365\frac{d}{yr}}{SF_o \bullet IR_w \bullet EF \bullet ED}$	
Class I $RO_{ingestion}^{nc}$ Equation S1 (adapted for groundwater)	Groundwater ingestion remediation objective for noncarcinogenic chemicals	mg/L	$\frac{THQ \cdot BW \cdot AT \cdot 365\frac{d}{yr}}{\frac{1}{RfD_o} \cdot EF \cdot ED \cdot IR_{water}}$	

Notes:
1) Numerical values are TACO, Appendix C, Table D default values, residential.
2) Illinois EPA TACO website "Toxicity Values for Tier 2 and 3 Calculations" (see references).
3) Equations are from TACO, Appendix C, Table C; noncarcinogenic ingestion RO adapted from Equation S1.
4) carc - carcinogenic chemicals
5) nc - noncarcinogenic chemicals
6) Noncarcinogenic equation used for benzo(a)pyrene, the only carcinogenic PAH with noncarcinogenic toxicity in Illinois EPA toxicity tables.

Table N-7
Calculation of Residential Soil Ingestion
Remediation Objectives for Carcinogenic PAHs
Revised Site Investigation/Remediation Objectives Report/Remedial Action Plan
Mendota MGP - Black Brothers Company Site

	Chemical-Specific Input Parameters Ingestion		Calculation of Soil Ingestion Remediation Objectives		
Compound/Analyte	SF_o $(mg/kg\text{-}day)^{-1}$	RfD_o (mg/kg-day)	$RO_{ingestion}^{carc}$ (mg/kg)	$RO_{ingestion}^{nc}$ (mg/kg)	Selected $RO_{ingestion}^{*}$ (mg/kg)
Benzo(a)anthracene	0.10	NA	6.4	NC	6.4
Benzo(b)fluoranthene	0.10	NA	6.4	NC	6.4
Benzo(k)fluoranthene	0.01	NA	64	NC	64
Benzo(a)pyrene	1.00	0.0003	0.64	23	0.64
Chrysene	0.00	NA	640	NC	640
Dibenzo(a,h)anthracene	1.00	NA	0.64	NC	0.64
Indeno(1,2,3-c,d)pyrene	0.10	NA	6.4	NC	6.4

Notes:
1) RO - remediation objective
2) See Table N-2 for chemical-specific parameter sources and RO equations.
3) * - If carcinogenic and non-carcinogenic ROs were calculated for a chemical, the lower of the two ROs was selected to evaluate the exposure route.
4) NA - Toxicity information is not available.
5) NC - Not calculated because toxicity information is not available.

Table N-8
Calculation of Residential Soil Outdoor Inhalation
Remediation Objectives for Carcinogenic PAHs
Revised Site Investigation/Remediation Objectives Report/Remedial Action Plan
Mendota MGP - Black Brothers Company Site

	Chemical-Specific Input Parameters Outdoor Inhalation		Calculation of Soil Outdoor Inhalation Remediation Objectives		
Compound/Analyte	URF $(\mu g/m^3)^{-1}$	RfC (mg/m^3)	$RO_{inhalation}^{carc}$ (mg/kg)	$RO_{inhalation}^{nc}$ (mg/kg)	Selected $RO_{inhalation}^{*}$ (mg/kg)
Benzo(a)anthracene	6.0E-05	NA	5.4E+04	NC	54,000
Benzo(b)fluoranthene	6.0E-05	NA	5.4E+04	NC	54,000
Benzo(k)fluoranthene	6.0E-06	NA	5.4E+05	NC	540,000
Benzo(a)pyrene	6.0E-04	2E-06	5.4E+03	2.8E+03	2,800
Chrysene	6.0E-07	NA	5.4E+06	NC	1,000,000
Dibenzo(a,h)anthracene	6.0E-04	NA	5.4E+03	NC	5,400
Indeno(1,2,3-c,d)pyrene	6.0E-05	NA	5.4E+04	NC	54,000

Notes:
1) RO - remediation objective
2) See Table N-2 for chemical-specific parameter sources and RO equations.
3) * - If carcinogenic and non-carcinogenic ROs were calculated for a chemical, the lower of the two ROs was selected to evaluate the exposure route, unless selected RO was greater than 1,000,000, in which case 1,000,000 mg/kg is RO. (RO cannot be greater than 1,000,000 mg/kg because 1,000,000 mg equals 1 kg.)
4) NA - Toxicity information is not available.
5) NC - Not calculated because toxicity information is not available.

Table N-9
Calculation of Industrial/Commercial Soil Ingestion
Remediation Objectives for Carcinogenic PAHs
Revised Site Investigation/Remediation Objectives Report/Remedial Action Plan
Mendota MGP - Black Brothers Company Site

Compound/Analyte	Chemical-Specific Input Parameters Ingestion		Calculation of Soil Ingestion Remediation Objectives		
	SF_o $(mg/kg\text{-}day)^{-1}$	RfD_o (mg/kg-day)	$RO_{ingestion}^{carc}$ (mg/kg)	$RO_{ingestion}^{nc}$ (mg/kg)	Selected $RO_{ingestion}^{*}$ (mg/kg)
Semivolatile Organic Compounds (SVOCs)					
Benzo(a)anthracene	1.0E-01	NA	5.7E+01	NC	57
Benzo(b)fluoranthene	1.0E-01	NA	5.7E+01	NC	57
Benzo(k)fluoranthene	1.0E-02	NA	5.7E+02	NC	570
Benzo(a)pyrene	1.0E+00	3E-04	5.7E+00	610	5.7
Chrysene	1.0E-03	NA	5.7E+03	NC	5,700
Dibenzo(a,h)anthracene	1.0E+00	NA	5.7E+00	NC	5.7
Indeno(1,2,3-c,d)pyrene	1.0E-01	NA	5.7E+01	NC	57

Notes:
1) RO - remediation objective
2) See Table N-3 for chemical-specific parameter sources and RO equations.
3) * - If carcinogenic and non-carcinogenic ROs were calculated for a chemical, the lower of the two ROs was selected to evaluate the exposure route.
4) NA - Toxicity information is not available.
5) NC - Not calculated because toxicity information is not available.

Table N-10
Calculation of Industrial/Commercial Soil Outdoor Inhalation
Remediation Objectives for Carcinogenic PAHs
Revised Site Investigation/Remediation Objectives Report/Remedial Action Plan
Mendota MGP - Black Brothers Company Site

Compound/Analyte	Chemical-Specific Input Parameters Outdoor Inhalation		Calculation of Soil Outdoor Inhalation Remediation Objectives		
	URF $(\mu g/m^3)^{-1}$	RfC (mg/m^3)	$RO_{inhalation}^{carc}$ (mg/kg)	$RO_{inhalation}^{nc}$ (mg/kg)	Selected $RO_{inhalation}^{*}$ (mg/kg)
Volatile Organic Compounds (VOCs)					
Benzo(a)anthracene	6.0E-05	NA	8.4E+04	NC	84,000
Benzo(b)fluoranthene	6.0E-05	NA	8.4E+04	NC	84,000
Benzo(k)fluoranthene	6.0E-06	NA	8.4E+05	NC	840,000
Benzo(a)pyrene	6.0E-04	2E-06	8.0E+03	3,600	3,600
Chrysene	6.0E-07	NA	1.0E+06	NC	1,000,000
Dibenzo(a,h)anthracene	6.0E-04	NA	8.4E+03	NC	8,400
Indeno(1,2,3-c,d)pyrene	6.0E-05	NA	8.4E+04	NC	84,000

Notes:
1) RO - remediation objective
2) See Table N-3 for chemical-specific parameter sources and RO equations.
3) * - If carcinogenic and non-carcinogenic ROs were calculated for a chemical, the lower of the two ROs was selected to evaluate the exposure route, unless selected RO was greater than 1,000,000, in which case 1,000,000 mg/kg is RO. (RO cannot be greater than 1,000,000 mg/kg because 1,000,000 mg equals 1 kg.)
4) NA - Toxicity information is not available.
5) NC - Not calculated because toxicity information is not available.

Table N-11
Calculation of Construction Worker Soil Ingestion
Remediation Objectives for Carcinogenic PAHs
Revised Site Investigation/Remediation Objectives Report/Remedial Action Plan
Mendota MGP - Black Brothers Company Site

	Chemical-Specific Input Parameters Ingestion		Calculation of Soil Ingestion Remediation Objectives		
Compound/Analyte	SF_o $(mg/kg\text{-}day)^{-1}$	$RfD_{o\text{-}sc}$ (mg/kg-day)	$RO_{ingestion}^{carc}$ (mg/kg)	$RO_{ingestion}^{nc}$ (mg/kg)	Selected $RO_{ingestion}$* (mg/kg)
Benzo(a)anthracene	1.0E-01	NA	1.2E+03	NC	1,200
Benzo(b)fluoranthene	1.0E-01	NA	1.2E+03	NC	1,200
Benzo(k)fluoranthene	1.0E-02	NA	1.2E+04	NC	12,000
Benzo(a)pyrene	1.0E+00	3E-04	1.2E+02	6.1E+01	61
Chrysene	1.0E-03	NA	1.2E+05	NC	120,000
Dibenzo(a,h)anthracene	1.0E+00	NA	1.2E+02	NC	120
Indeno(1,2,3-c,d)pyrene	1.0E-01	NA	1.2E+03	NC	1,200

Notes:
1) RO - remediation objective
2) See Table N-4 for chemical-specific parameter sources and RO equations.
3) * - If carcinogenic and non-carcinogenic ROs were calculated for a chemical, the lower of the two ROs was selected to evaluate the exposure route.
4) NA - Toxicity information is not available.
5) NC - Not calculated because toxicity information is not available.

Table N-12
Calculation of Construction Worker Soil Outdoor Inhalation
Remediation Objectives for Carcinogenic PAHs
Revised Site Investigation/Remediation Objectives Report/Remedial Action Plan
Mendota MGP - Black Brothers Company Site

Compound/Analyte	URF $(\mu g/m^3)^{-1}$	RfC_{sc} (mg/m^3)	Calculation of Soil Outdoor Inhalation Remediation Objectives		
			$RO_{inhalation}^{carc}$ (mg/kg)	$RO_{inhalation}^{nc}$ (mg/kg)	Selected $RO_{inhalation}^{*}$ (mg/kg)
Benzo(a)anthracene	6.0E-05	NA	1.8E+06	NC	1,000,000
Benzo(b)fluoranthene	6.0E-05	NA	1.8E+06	NC	1,000,000
Benzo(k)fluoranthene	6.0E-06	NA	1.8E+07	NC	1,000,000
Benzo(a)pyrene	6.0E-04	3E-05	1.8E+05	5.2E+03	5,200
Chrysene	6.0E-07	NA	1.8E+08	NC	1,000,000
Dibenzo(a,h)anthracene	6.0E-04	NA	1.8E+05	NC	180,000
Indeno(1,2,3-c,d)pyrene	6.0E-05	NA	1.8E+06	NC	1,000,000

Notes:
1) RO - remediation objective
2) See Table N-3 for chemical-specific parameter sources and RO equations.
3) * - If carcinogenic and non-carcinogenic ROs were calculated for a chemical, the lower of the two ROs was selected to evaluate the exposure route, unless selected RO was greater than 1,000,000, in which case 1,000,000 mg/kg is RO. (RO cannot be greater than 1,000,000 mg/kg because 1,000,000 mg equals 1 kg.)
4) NA - Toxicity information is not available.
5) NC - Not calculated because toxicity information is not available.

Table N-13
Calculation of Soil Component of Class I Groundwater Ingestion
Remediation Objectives for Carcinogenic PAHs
Revised Site Investigation/Remediation Objectives Report/Remedial Action Plan
Mendota MGP - Black Brothers Company Site

Compound/Analyte	Chemical-Specific Input Parameters Soil Component of Groundwater Ingestion			Calculated Input Parameters Soil Component of Groundwater Ingestion		Calculation of Class I Soil Soil Component of Groundwater Ingestion
	GW_{obj} (mg/L)	K_{oc} (cm^3/g)	H' (unitless)	C_w (mg/L)	K_D (cm^3/g)	RO_{sc-GW} (mg/kg)
Semivolatile Organic Compounds (SVOCs)						
Benzo(a)anthracene	8.5E-04	4.00E+05	1.39E-04	1.7E-02	8.0E+02	14
Benzo(b)fluoranthene	8.5E-04	1.05E+06	4.55E-03	1.7E-02	2.1E+03	36
Benzo(k)fluoranthene	8.5E-03	1.00E+06	3.40E-05	1.7E-01	2.0E+03	340
Benzo(a)pyrene*	8.5E-05	7.90E+05	4.50E-05	1.7E-03	1.6E+03	2.7
Chrysene	8.5E-02	4.00E+05	3.90E-03	1.7E+00	8.0E+02	1,400
Dibenzo(a,h)anthracene	8.5E-05	2.50E+06	6.10E-07	1.7E-03	5.0E+03	8.5
Indeno(1,2,3-c,d)pyrene	8.5E-04	3.10E+06	6.56E-05	1.7E-02	6.2E+03	110

Notes:
1) RO - remediation objective
2) See Table N-5 for chemical-specific parameter sources.
3) See Table N-5 for calculated input parameter equations and RO equations.
4) GWobj calculated using the new SFo (see Table N-14)
5) * - The carcinogenic groundwater ingestion RO was more conservative than the noncarcinogenic RO for benzo(a)pyrene; therefore, it was used to calculate the the soil component of groundwater ingestion RO.

Table N-14
Calculation of Class I Groundwater Ingestion
Remediation Objectives for Carcinogenic PAHs
Revised Site Investigation/Remediation Objectives Report/Remedial Action Plan
Mendota MGP - Black Brothers Company Site

Compound/Analyte	Chemical Specific Input Parameters Groundwater Ingestion		Calculation of Class I Groundwater Ingestion ROs			
	SF_o $(mg/kg\text{-}day)^{-1}$	RfD_o (mg/kg-day)	$RO_{ingestion}^{carc}$ (mg/L)	$RO_{ingestion}^{nc}$ (mg/L)	TACO ADL (mg/L)	Selected $RO_{Ingestion}$* (mg/kg)
Benzo(a)anthracene	1.0E-01	NA	0.00085	NC	0.00013	0.00085
Benzo(b)fluoranthene	1.0E-01	NA	0.00085	NC	0.00018	0.00085
Benzo(k)fluoranthene	1.0E-02	NA	0.0085	NC	0.00017	0.0085
Benzo(a)pyrene	1.0E+00	3.0E-04	0.000085	0.011	0.0002	0.0002
Chrysene	1.0E-03	NA	0.085	NC	0.0015	0.085
Dibenzo(a,h)anthracene	1.0E+00	NA	0.000085	NC	0.0003	0.0003
Indeno(1,2,3-c,d)pyrene	1.0E-01	NA	0.00085	NC	0.00043	0.00085

Notes:
1) RO - remediation objective
2) See Table N-6 for chemical-specific parameter sources and RO equations.
3) Acceptable detection limit (ADL) values are from TACO, Appendix B, Table E.
4) * - If carcinogenic and non-carcinogenic ROs were calculated for a constituent for the ingestion exposure route, the lower of the two ROs was selected to evaluate the exposure route. If the ADL was greater than the selected calculated RO, it was selected as the RO.

Table 47
Soil Remediation Objectives Summary
Revised Site Investigation/Remediation Objectives Report/Remedial Action Plan
Mendota MGP - Black Brothers Company Site

Compound/Analyte	Residential Ingestion Remediation Objective	Construction Worker Ingestion Remediation Objective	Residential Outdoor Inhalation Remediation Objective	Construction Worker Outdoor Inhalation Remediation Objective	Soil Migration to Class I Groundwater Remediation Objective	Lowest Remediation Objective
Volatile Organic Compounds (milligrams per kilogram [mg/kg])						
Benzene	12	2,300	0.8	2.2	0.03	0.03
Ethylbenzene	–	–	–	58	13	13
Styrene	–	–	–	–	4	4
Toluene	–	–	650	42	12	12
Xylenes, Total	–	–	320	5.6	150	5.6
Phenols (mg/kg)						
2,4-Dimethylphenol	–	–	–	–	9	9
2-Methylphenol	–	–	–	–	15	15
4-Methylphenol	–	–	–	2,400*	11*	11
Phenol	–	–	–	–	100	100
Polynuclear Aromatic Hydrocarbons (mg/kg)						
Acenaphthene	–	–	–	–	570	570
Acenaphthylene	2,300*	–	–	–	43*	43
Benzo(a)anthracene	6.4†	1,200†	–	–	14†	6.4
Benzo(b)fluoranthene	6.4†	1,200†	–	–	36†	6.4
Benzo(k)fluoranthene	64†	–	–	–	340†	64
Benzo(a)pyrene	0.64†	61†	2,800†	–	8	0.64
Chrysene	640†	–	–	–	1,400†	640
Dibenzo(a,h)anthracene	0.64†	120†	–	–	8.5†	0.64
Fluoranthene	3,100	–	–	–	4,300	3,100
Fluorene	3,100	–	–	–	560	560
Indeno(1,2,3-cd)pyrene	6.4†	1,200†	–	–	110†	6.4
Naphthalene	1,600	4,100	170	1.8	12	1.8
Phenanthrene	2,300*	–	–	–	140*	140
Pyrene	2,300	–	–	–	4,200	2,300
Dibenzofuran	78*	820*	–	–	2.6*	2.6
2-Methylnaphthalene	310*	820*	–	–	2.9*	2.9
Metals (mg/kg)						
Arsenic	11.3**	–	–	–	–	11.3
Lead	400	700	–	–	–	400
Mercury	23	–	10	1.48‡	–	1.48
Cyanide, Total	–	–	–	–	40	40
SPLP Metals (milligrams per liter [mg/L])						
SPLP Cadmium	–	–	–	–	0.005	0.005
SPLP Lead	–	–	–	–	0.0075	0.0075
SPLP Mercury	–	–	–	–	0.002	0.002

Notes:
1) Constituents shown were retained as constituents of concern for one or more exposure routes.
2) – - The applicable screening level for this constituent was not exceeded for this exposure route.
3) * - Non-TACO chemical remdiation objective, calculated in Appendix L.
4) † - Value is a Tier 2 remediation objective, calculated in Appendix N.
5) ‡ - Value is a Tier 3 remediation objective, calculated in Section 9.
6) ** - Remediation objective is the background concentration for a metropolitan area (35 IAC 742, Appendix A, Tables G & H).
7) SPLP - Synthetic Precipitation Leaching Procedure

Illinois EPA FOIA Exemption Reference Sheet

SID: 13045

Agency ID: 170000211278
Bureau ID: 0990555005
Site Name: Black Brothers Co
Site Address1: 501 9th Ave
Site Address2:
Site City: Mendota State: IL Zip: 61342-

Media File Type: LAND

This record has been determined to be partially or wholly exempt from public disclosure

Exemption Type:

Portion Removed

Exempt Doc #: 10 **Document Date:** 10/4 /2018 **Staff:** EMI

Document Description: MEMO: GUY/LOWDER TO CORE -- EMAIL THREAD (10/02/18) HAWBAKER TO GUY

Category ID: 31A **Category Description:** SITE REMEDIATION - TECHNICAL **Exempt Type:** Portion Removed

Permit ID: **Date of Determination:** 10/29/2018