**UNITED STATES DISTRICT COURT**
**DISTRICT OF NEBRASKA**

UNITED STATES OF AMERICA,

Plaintiff,

v. Civil Action No. 8:24-cv-425

Black Hills Nebraska Gas, LLC,

Brightspeed Kansas Holdings, LLC,

and

Nebraska Public Power District.

Defendants.

**CONSENT DECREE**

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# I. BACKGROUND

1. The United States of America ("United States"), on behalf of the Administrator of the United States Environmental Protection Agency ("EPA"), filed a complaint in this matter under sections 106 and 107 of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA") against Black Hills Nebraska Gas, LLC, d/b/a Black Hills Energy ("Black Hills"), Brightspeed Kansas Holdings, LLC ("Brightspeed Kansas Holdings"), and Nebraska Public Power District ("NPPD").

2. The United States in its complaint seeks, *inter alia*: (1) reimbursement of costs incurred by EPA and the Department of Justice ("DOJ") for response actions at the Iowa-Nebraska Light & Power Company Superfund Site in Norfolk, Nebraska ("Site"), together with accrued interest; and (2) performance by the defendants of a response action at the Site consistent with the National Contingency Plan, 40 C.F.R. part 300 ("NCP").

3. In accordance with the NCP and section 121(f)(1)(F) of CERCLA, EPA notified the State of Nebraska ("State") on March 31, 2023, of negotiations with potentially responsible parties ("PRPs") regarding the implementation of the remedial design and remedial action ("RD/RA") for the Site, and EPA has provided the State with an opportunity to participate in such negotiations and to be a party to this Consent Decree ("Decree").

4. In accordance with section 122(j)(1) of CERCLA, EPA notified the U.S. Department of the Interior on April 3, 2023, of negotiations with PRPs regarding the release of hazardous substances that may have resulted in injury to the natural resources under federal trusteeship and encouraged the trustee(s) to participate in the negotiation of this Decree.

5. The defendants that have entered into this Decree ("Settling Defendants") do not admit any liability to Plaintiff arising out of the transactions or occurrences alleged in the complaint, nor do they acknowledge that the release or threatened release of hazardous substance(s) at or from the Site constitutes an imminent and substantial endangerment to the public health or welfare or the environment.

6. In accordance with section 105 of CERCLA, EPA listed the Site on the National Priorities List ("NPL"), set forth at 40 C.F.R. part 300, Appendix B, by publication in the Federal Register on April 7, 2016, 81 Fed. Reg. 20252.

7. Subsurface soil and groundwater samples collected by the EPA at the Site in 1990, 1991, and 1992 were found to be contaminated with manufactured gas plant-related compounds, including PAHs (pyrene, naphthalene, benzo(a)anthracene, benzo(b)fluoranthene, phenanthrene, chrysene, and indeno(1,2,3-cd)pyrene)), BTEX, and metals.

8. In April 2007, the EPA entered into an Administrative Settlement Agreement and Order on Consent ("ASAOC") for Engineering Evaluation/Cost Analysis ("EE/CA") with Centel Corporation, Black Hills, and NPPD. In 2022, Centel Corporation ("Centel") converted into Brightspeed Kansas Holdings, LLC, a limited liability company, which is the successor in interest to Centel in this matter. The primary goals of the EE/CA were to develop removal action

goals for impacted media, to identify potential removal action technologies and approaches, and to develop and evaluate removal alternatives to address the coal-tar contamination. The EE/CA site characterization field investigation activities were conducted between November and December 2007, June and July 2009, and January 2010. The field investigation activities were designed to gather data to better define and characterize the subsurface geology and site hydrogeology, the extent of soil dense non-aqueous phase liquid, and dissolved-phase groundwater contamination, and to support an assessment of the human health and ecological risks posed by the release of hazardous substances at the Site. Based on reports obtained from the Nebraska Department of Environmental Quality, the EE/CA Site Characterization Report identified 30 leaking underground storage tanks within 0.25 mile of the Site. The recommended removal action alternative included building demolition, excavation and disposal of contaminated soils, site restoration, and groundwater monitoring for at least ten years as a post-removal site control.

9. In August 2013, the EPA issued an Enforcement Action Memorandum and entered into an ASAOC for Removal Action with Centel, Black Hills, and NPPD. In 2014, on-site buildings were demolished and approximately 10,425 tons of contaminated soil were excavated and transported off-site for disposal. The Site was restored with a concrete parking lot on the Black Hills parcel and a fenced gravel lot on the NPPD parcel. The on-site construction and restoration activities were completed in June 2014.

10. In May 2017, in response to a release or a substantial threat of a release of hazardous substances at or from the Site, EPA entered into an ASAOC with Centel, Black Hills, and NPPD for the performance of a remedial investigation ("RI") and feasibility study ("FS") in accordance with 40 C.F.R. § 300.430. Centel completed a RI for the Site on December 15, 2020.

11. In 2020, EPA divided the Site into two Operable Units: Operable Unit 1 ("OU 1"), consisting of source materials (remaining soil contamination and DNAPL) and Operable Unit 2 ("OU 2"), consisting of sitewide groundwater. Remedial actions will occur in a phased manner: the OU 1 remedial action will be conducted to address the source materials prior to evaluating remedial alternatives to address the OU 2 sitewide groundwater.

12. Centel completed a FS for OU 1 on March 10, 2022. In accordance with section 117 of CERCLA and 40 C.F.R § 300.430(f), EPA published notice of the completion of the FS and of the proposed plan for remedial action for OU 1 on April 22, 2022, in a major local newspaper of general circulation. EPA provided an opportunity for written and oral comments from the public on the proposed plan for remedial action. A copy of the transcript of the public meeting and comments received are available to the public as part of the administrative record upon which the Division Director of the Superfund and Emergency Management Division, EPA Region 7, based the selection of the response action.

13. EPA selected a remedial action to be implemented at OU 1, which is embodied in a final Record of Decision for OU 1, executed on September 26, 2022 ("Record of Decision"). The Record of Decision includes a summary of responses to the public comments. Notice of the final plan was published in accordance with section 117(b) of CERCLA.

14. Based on the information currently available, EPA has determined that the Work will be properly and promptly conducted by Settling Defendants if conducted in accordance with this Decree.

15. The Parties recognize, and the Court by entering this Decree finds, that this Decree has been negotiated by the Parties in good faith, that implementation of this Decree will expedite the cleanup of the Site and will avoid prolonged and complicated litigation between the Parties, and that this Decree is fair, reasonable, in the public interest, and consistent with CERCLA.

NOW, THEREFORE, it is hereby **ORDERED** and **DECREED** as follows:

## II. JURISDICTION AND VENUE

16. This Court has jurisdiction over the subject matter of this action under 28 U.S.C. §§ 1331 and 1345, and sections 106, 107 and 113(b) of CERCLA, and personal jurisdiction over the Parties. Venue lies in this District under section 113(b) of CERCLA and 28 U.S.C. §§ 1391(b), and 1395(a), because the Site is located in this judicial district. This Court retains jurisdiction over the subject matter of this action and over the Parties for the purpose of resolving disputes arising under this Decree, entering orders modifying this Decree, or effectuating or enforcing compliance with this Decree. Settling Defendants may not challenge the terms of this Decree or this Court's jurisdiction to enter and enforce this Decree.

## III. PARTIES BOUND

17. This Decree is binding upon the United States and upon Settling Defendants and their successors. Unless the United States otherwise consents, (a) any change in ownership or corporate or other legal status of any Settling Defendant, including any transfer of assets, or (b) any Transfer of the Site or any portion thereof, does not alter any of Settling Defendants' obligations under this Decree. Settling Defendants' responsibilities under this Decree cannot be assigned except under a modification executed in accordance with ¶ 79.

18. In any action to enforce this Decree, Settling Defendants may not raise as a defense the failure of any of their officers, directors, employees, agents, contractors, subcontractors, or any person representing Settling Defendants to take any action necessary to comply with this Decree. Settling Defendants shall provide notice of this Decree to each person representing Settling Defendants with respect to the Site or the Work. Settling Defendants shall provide notice of this Decree to each contractor performing any Work and shall ensure that notice of the Decree is provided to each subcontractor performing any Work.

## IV. DEFINITIONS

19. Subject to the next sentence, terms used in this Decree that are defined in CERCLA or the regulations promulgated under CERCLA have the meanings assigned to them in CERCLA and the regulations promulgated under CERCLA. Whenever the terms set forth below are used in this Decree, the following definitions apply:

"CERCLA" means the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §§ 9601-9675.

"Consent Decree" or "Decree" means this consent decree, all appendixes attached hereto (listed in Section XIX), and all deliverables incorporated into the Decree under ¶ 7.6 of the SOW. If there is a conflict between a provision in Sections I through XXIV and a provision in any appendix or deliverable, the provision in Sections I through XXIV controls.

"Day" or "day" means a calendar day. In computing any period under this Decree, the day of the event that triggers the period is not counted and, where the last day is not a working day, the period runs until the close of business of the next working day. "Working day" means any day other than a Saturday, Sunday, or federal or State holiday.

"DOJ" means the United States Department of Justice.

"Effective Date" means the date upon which the Court's approval of this Decree is recorded on its docket.

"EPA" means the United States Environmental Protection Agency.

"Fund" means the Hazardous Substance Superfund established under section 9507 of the Internal Revenue Code, 26 I.R.C. § 9507.

"Future Response Costs" means all costs (including direct, indirect, payroll, contractor, travel, and laboratory costs) that the United States: (a) pays between January 31, 2023, and the Effective Date; and (b) pays after the Effective Date in implementing, overseeing, or enforcing this Decree, including: (i) in developing, reviewing and approving deliverables generated under this Decree; (ii) in overseeing Settling Defendants' performance of the Work; (iii) in assisting or taking action to obtain access or use restrictions under ¶ 27.e; (iv) in securing, implementing, monitoring, maintaining, or enforcing Institutional Controls, including any compensation paid; (v) in taking action under ¶ 36 (Access to Financial Assurance); (vi) in taking response action described in ¶ 63 because of Settling Defendants' failure to take emergency action under ¶ 5.4 of the SOW; (vii) in implementing a Work Takeover under ¶ 26; (viii) in implementing community involvement activities including the cost of any technical assistance grant provided under section 117(e) of CERCLA; (ix) in enforcing this Decree, including all costs paid under Section XII (Dispute Resolution) and all litigation costs; and (x) in conducting periodic reviews in accordance with section 121(c) of CERCLA. Future Response Costs also includes all Interest accrued after January 31, 2023, on EPA's unreimbursed costs under section 107(a) of CERCLA.

"Including" or "including" means "including but not limited to."

"Institutional Controls" means Proprietary Controls (*i.e.*, easements or covenants running with the land that (i) limit land, water, or other resource use, provide access rights, or both and (ii) are created under common law or statutory law by an instrument that is recorded, or for which notice is recorded, in the appropriate land records office) and state or local laws, regulations, ordinances, zoning restrictions, or other governmental controls or notices that: (a) limit land, water, or other resource use to minimize the potential for human exposure to Waste Material at or in connection with the Site; (b) limit land, water, or other resource use to

implement, ensure noninterference with, or ensure the protectiveness of the Remedial Action; (c) provide information intended to modify or guide human behavior at or in connection with the Site; or (d) any combination thereof.

"Interest" means interest at the rate specified for interest on investments of the Fund, as provided under section 107(a) of CERCLA, compounded annually on October 1 of each year. The applicable rate of interest will be the rate in effect at the time the interest accrues. The rate of interest is subject to change on October 1 of each year. As of the date of lodging of this Decree, rates are available online at https://www.epa.gov/superfund/superfund-interest-rates.

"National Contingency Plan" or "NCP" means the National Oil and Hazardous Substances Pollution Contingency Plan promulgated under section 105 of CERCLA, codified at 40 C.F.R. part 300, and any amendments thereto.

"Owner Settling Defendants" means the following Settling Defendants who own or control all or a portion of the Site: Nebraska Public Power District and Black Hills Nebraska Gas, LLC (d/b/a Black Hills Energy).

"Paragraph" or "¶" means a portion of this Decree identified by an Arabic numeral or an upper- or lower-case letter.

"Parties" means the United States and Settling Defendants.

"Performance Standards" means the cleanup levels and other measures of achievement of the remedial action objectives, as set forth in the Record of Decision.

"Plaintiff" means the United States.

"RCRA" means the Solid Waste Disposal Act, 42 U.S.C. §§ 6901-6992k, (also known as the Resource Conservation and Recovery Act).

"Record of Decision" means the EPA decision document that memorializes the selection of the remedial action relating to the Operable Unit 1 at the Site signed on September 26, 2022, by the Division Director of the Superfund and Emergency Management Division, EPA Region 7, and all attachments thereto. The Record of Decision is attached as Appendix A.

"Remedial Action" means the remedial action selected in the Record of Decision.

"Remedial Design" means those activities to be undertaken by Settling Defendants to develop plans and specifications for implementing the Remedial Action as set forth in the SOW.

"Scope of the Remedy" means the scope of the remedy set forth in ¶ 1.3 of the SOW.

"Section" means a portion of this Decree identified by a Roman numeral.

"Settling Defendants" means the Brightspeed Kansas Holdings, LLC, Black Hills Nebraska Gas, LLC (d/b/a Black Hills Energy), and Nebraska Public Power District. As used in

this Decree, this definition means all settling defendants, collectively, and each settling defendant, individually.

"Site" means the Iowa-Nebraska Light & Power Company Superfund Site, located west of 7th Street between Norfolk and Madison Avenues in Norfolk, Madison County, Nebraska, and depicted generally on the map attached as Appendix C.

"State" means the State Nebraska.

"Statement of Work" or "SOW" means the document attached as Appendix B, which describes the activities Settling Defendants must perform to implement and maintain the effectiveness of the Remedial Action.

"Transfer" means to sell, assign, convey, lease, mortgage, or grant a security interest in, or where used as a noun, a sale, assignment, conveyance, or other disposition of any interest by operation of law or otherwise.

"United States" means the United States of America and each department, agency, and instrumentality of the United States, including EPA.

"Waste Material" means (a) any "hazardous substance" under Section 101(14) of CERCLA; (b) any pollutant or contaminant under section 101(33) of CERCLA; (c) any "solid waste" under section 1004(27) of RCRA; and (d) any "hazardous material" under Neb. Rev. St. § 81-1567(2).

"Work" means all obligations of Settling Defendants under Sections VI (Performance of the Work) through IX (Indemnification and Insurance).

"Work Settling Defendant" means Brightspeed Kansas Holdings, LLC.

"Work Takeover" means EPA's assumption of the performance of any of the Work in accordance with ¶ 26.

## V. OBJECTIVES

20. The objectives of the Parties in entering into this Decree are to protect public health, welfare, and the environment through the implementation and maintenance of a response action at the Site by Settling Defendants, to pay Future Response Costs of Plaintiff, and to resolve and settle the claims of Plaintiff against Settling Defendants as provided in this Decree.

## VI. PERFORMANCE OF THE WORK

21. Consistent with ¶ 23 of this Decree, Settling Defendants shall finance, develop, implement, operate, maintain, and monitor the effectiveness of the Remedial Action all in accordance with the SOW, any modified SOW and all EPA-approved, conditionally approved, or modified deliverables as required by the SOW or modified SOW.

22. Nothing in this Decree and no EPA approval of any deliverable required under this Decree constitutes a warranty or representation by EPA that completion of the Work will achieve the Performance Standards.

23. Settling Defendants' obligations to finance and perform the Work and to pay amounts due under this Decree are joint and several. In the event of the insolvency of any Settling Defendant or if any Settling Defendant cannot or will not fulfill its obligations under this Decree, the other Settling Defendants remain jointly and severally liable for satisfying all the requirements of this Decree, including, but not limited to, completing any Work not satisfactorily completed by Work Settling Defendant. In the event Work Settling Defendant becomes insolvent or fails to complete the Work as required by this Decree and the attached SOW, Owner Settling Defendants are jointly and severally liable to complete the Work and shall be responsible for maintaining financial assurance, maintaining insurance, and making any payments, including payments for stipulated penalties, that are or become due under this Decree.

24. **Modifications to the Remedial Action and Further Response Actions**

a. Nothing in this Decree limits EPA's authority to modify the Remedial Action or to select further response actions for the Site in accordance with the requirements of CERCLA and the NCP. Nothing in this Decree limits Settling Defendants' rights, under sections 113(k)(2) or 117 of CERCLA, to comment on any modified or further response actions proposed by EPA.

b. If EPA modifies the Remedial Action in order to achieve or maintain the Performance Standards, or both, or to carry out and maintain the effectiveness of the Remedial Action, and such modification is consistent with the Scope of the Remedy, then Work Settling Defendant shall implement the modification as provided in ¶ 24.c.

c. Upon receipt of notice from EPA that it has modified the Remedial Action as provided in ¶ 24.b and requesting that Work Settling Defendant implement the modified Remedial Action, Work Settling Defendant shall implement the modification, subject to their right to initiate dispute resolution under Section XII within 30 days after receipt of EPA's notice. Work Settling Defendant shall modify the SOW, or related work plans, or both in accordance with the Remedial Action modification or, if Work Settling Defendant invokes dispute resolution, in accordance with the final resolution of the dispute. The Remedial Action modification, the approved modified SOW, and any related work plans will be deemed to be incorporated into and enforceable under this Decree.

d. Notwithstanding any other provision in ¶ 24, any modification to implement an amendment to the Record of Decision that "fundamentally alters the basic features" of the Remedial Action within the meaning of 40 C.F.R. § 300.435(c)(2)(ii) shall be considered a material modification under, and may only be implemented in accordance with, ¶ 79.

25. **Compliance with Applicable Law**. Nothing in this Decree affects Settling Defendants' obligations to comply with all applicable federal and state laws and regulations. Settling Defendants must also comply with all applicable or relevant and appropriate requirements of all federal and state environmental laws as set forth in the Record of Decision

and the SOW. The activities conducted in accordance with this Decree, if approved by EPA, will be deemed to be consistent with the NCP as provided under section 300.700(c)(3)(ii).

26. **Work Takeover**

a. If EPA determines that Work Settling Defendant (i) has ceased to perform any of the Work required under this Section; (ii) is seriously or repeatedly deficient or late in performing the Work required under this Section; or (iii) is performing the Work required under this Section in a manner that may cause an endangerment to human health or the environment, EPA may issue a notice of Work Takeover to Work Settling Defendant, including a description of the grounds for the notice and a period of time ("Remedy Period") within which Work Settling Defendant must remedy the circumstances giving rise to the notice. The Remedy Period will be 20 days, unless EPA determines in its unreviewable discretion that there may be an endangerment, in which case the Remedy Period will be ten (10) days.

b. If, by the end of the Remedy Period, Work Settling Defendant does not remedy to EPA's satisfaction the circumstances giving rise to the notice of Work Takeover, EPA may notify Settling Defendants and, as it deems necessary, commence a Work Takeover.

c. EPA may conduct the Work Takeover during the pendency of any dispute under Section XII but shall terminate the Work Takeover if and when: (i) Work Settling Defendant remedies, to EPA's satisfaction, the circumstances giving rise to the notice of Work Takeover; or (ii) upon the issuance of a final determination under Section XII (Dispute Resolution) that EPA is required to terminate the Work Takeover.

## VII. PROPERTY REQUIREMENTS

27. **Agreements Regarding Access and Noninterference**

a. As used in this Section, "Affected Property" means any real property, including the Site, where EPA determines, at any time, that access; land, water, or other resource use restrictions; Institutional Controls; or any combination thereof, are needed to implement the Remedial Action.

b. Work Settling Defendant shall use best efforts to secure from the owner(s), other than an Owner Settling Defendant, of all Affected Property, an agreement, enforceable by Work Settling Defendant and by Plaintiff, requiring such owner to provide Plaintiff and Work Settling Defendant, and their respective representatives, contractors, and subcontractors with access at all reasonable times to such owner's property to conduct any activity regarding the Decree, including the following:

(1) implementing the Work and overseeing compliance with the Decree;

(2) conducting investigations of contamination at or near the Site;

(3) assessing the need for, planning, or implementing additional response actions at or near the Site;

(4) determining whether the Site is being used in a manner that is prohibited or restricted, or that may need to be prohibited or restricted under the Decree; and

(5) implementing, monitoring, maintaining, reporting on, and enforcing any land, water, or other resource use restrictions.

c. Further, each agreement required under ¶ 27.b must commit the owner to refrain from using its property in any manner that EPA determines will pose an unacceptable risk to human health or to the environment as a result of exposure to Waste Material, or will interfere with or adversely affect the implementation, integrity, or protectiveness of the Remedial Action.

d. As used in this Section, "best efforts" means the efforts that a reasonable person in the position of Work Settling Defendant would use to achieve the goal in a timely manner, including the cost of employing professional assistance and the payment of reasonable sums of money to secure access and/or use restriction agreements.

e. Work Settling Defendant shall provide to EPA a copy of each agreement required under ¶ 27.b. If Work Settling Defendant cannot accomplish what is required through best efforts in a timely manner, they shall notify EPA, and include a description of the steps taken to achieve the requirements. If the United States deems it appropriate, it may assist Work Settling Defendant, or take independent action, to obtain such access or use restrictions.

28. **Access and Noninterference by Owner Settling Defendant**. The Owner Settling Defendant shall: (a) provide Plaintiff and Work Settling Defendant, and their representatives, contractors, and subcontractors with access at all reasonable times to the Site to conduct any activity regarding the Decree, including those listed in ¶ 27.b; and (b) refrain from using the Site in any manner that EPA determines will pose an unacceptable risk to human health or to the environment because of exposure to Waste Material, or will interfere with or adversely affect the implementation, integrity, or protectiveness of the Remedial Action.

29. If EPA determines in a decision document prepared in accordance with the NCP that Institutional Controls in the form of state or local laws, regulations, ordinances, zoning restrictions, or other governmental controls or notices are appropriate, Work Settling Defendant shall cooperate with EPA's efforts to secure and ensure compliance with such Institutional Controls.

30. Notwithstanding any provision of the Decree, EPA and the State retain all of their access authorities and rights, as well as all of its rights to require land, water, or other resource use restrictions and Institutional Controls, including related enforcement authorities, under CERCLA, RCRA, and any other applicable statute or regulations.

## VIII. FINANCIAL ASSURANCE

31. To ensure completion of the Work required under Section VI, Work Settling Defendant shall secure financial assurance, initially in the amount of $7,900,000 ("Estimated Cost of the Work"), for the benefit of EPA. The financial assurance must be one or more of the mechanisms listed below, in a form substantially identical to the relevant sample documents

available from EPA, and be satisfactory to EPA. As of the date of lodging of this Decree, the sample documents can be found under the "Financial Assurance - Settlements" category on the Cleanup Enforcement Model Language and Sample Documents Database at https://cfpub.epa.gov/compliance/models/. Work Settling Defendant may use multiple mechanisms if they are limited to surety bonds guaranteeing payment, letters of credit, trust funds, insurance policies, or some combination thereof. The following are acceptable mechanisms:

a. a surety bond guaranteeing payment, performance of the Work, or both, that is issued by a surety company among those listed as acceptable sureties on federal bonds as set forth in Circular 570 of the U.S. Department of the Treasury;

b. an irrevocable letter of credit, payable to EPA or at the direction of EPA, that is issued by an entity that has the authority to issue letters of credit and whose letter-of-credit operations are regulated and examined by a federal or state agency;

c. a trust fund established for the benefit of EPA that is administered by a trustee that has the authority to act as a trustee and whose trust operations are regulated and examined by a federal or state agency;

d. a policy of insurance that provides EPA with acceptable rights as a beneficiary thereof and that is issued by an insurance carrier that has the authority to issue insurance policies in the applicable jurisdiction(s) and whose insurance operations are regulated and examined by a federal or state agency;

e. a demonstration by Work Settling Defendant that it meets the relevant test criteria of ¶ 32, accompanied by a standby funding commitment that requires Work Settling Defendant to pay funds to or at the direction of EPA, up to the amount financially assured through the use of this demonstration in the event of a Work Takeover; or

f. a guarantee to fund or perform the Work executed in favor of EPA by a company: (1) that is a direct or indirect parent company of Work Settling Defendant or has a "substantial business relationship" (as defined in 40 C.F.R. § 264.141(h)) with Work Settling Defendant; and (2) demonstrates to EPA's satisfaction that it meets the financial test criteria of ¶ 32.

32. If Work Settling Defendant seeks to provide financial assurance by means of a demonstration or guarantee under ¶ 31.e or 31.f it must, within 30 days after the Effective Date:

a. demonstrate that:

(1) Work Settling Defendant or its guarantor has:

i. two of the following three ratios: a ratio of total liabilities to net worth less than 2.0; a ratio of the sum of net income plus depreciation, depletion, and amortization to total liabilities greater than 0.1; and a ratio of current assets to current liabilities greater than 1.5; and

ii. net working capital and tangible net worth each at least six times the sum of the Estimated Cost of the Work and the amounts, if any, of other federal, state, or tribal environmental obligations financially assured through the use of a financial test or guarantee; and

iii. tangible net worth of at least $10 million; and

iv. assets located in the United States amounting to at least 90 percent of total assets or at least six times the sum of the Estimated Cost of the Work and the amounts, if any, of other federal, state, or tribal environmental obligations financially assured through the use of a financial test or guarantee; or

(2) Work Settling Defendant or its guarantor has:

i. a current rating for its senior unsecured debt of AAA, AA, A, or BBB as issued by Standard and Poor's or Aaa, Aa, A or Baa as issued by Moody's; and

ii. tangible net worth at least six times the sum of the Estimated Cost of the Work and the amounts, if any, of other federal, state, or tribal environmental obligations financially assured through the use of a financial test or guarantee; and

iii. tangible net worth of at least $10 million; and

iv. assets located in the United States amounting to at least 90 percent of total assets or at least six times the sum of the Estimated Cost of the Work and the amounts, if any, of other federal, state, or tribal environmental obligations financially assured through the use of a financial test or guarantee; and

b. submit to EPA for Work Settling Defendant or its guarantor: (1) a copy of an independent certified public accountant's report of the entity's financial statements for the latest completed fiscal year, which must not express an adverse opinion or disclaimer of opinion; and (2) a letter from its chief financial officer and a report from an independent certified public accountant substantially identical to the sample letter and reports available from EPA. As of the date of lodging of this Decree, a sample letter and report is available under the "Financial Assurance - Settlements" subject list category on the Cleanup Enforcement Model Language and Sample Documents Database at https://cfpub.epa.gov/compliance/models/.

33. If Work Settling Defendant is providing financial assurance by means of a demonstration or guarantee under ¶ 31.e or 31.f it must also:

a. annually resubmit the documents described in ¶ 32.b within 90 days after the close of Work Settling Defendant's or its guarantor's fiscal year;

b. notify EPA within 30 days after Work Settling Defendant or its guarantor determines that it no longer satisfies the relevant financial test criteria and requirements set forth in this Section; and

c. provide to EPA, within 30 days of EPA's request, reports of the financial condition of Work Settling Defendant or its guarantor in addition to those specified in ¶ 32.b; EPA may make such a request at any time based on a belief that Work Settling Defendant or its guarantor may no longer meet the financial test requirements of this Section.

34. Work Settling Defendant shall, within 30 days after the Effective Date, seek EPA's approval of the form of Work Settling Defendant's financial assurance. Within 30 days after such approval, Work Settling Defendant shall secure all executed or otherwise finalized mechanisms or other documents consistent with the EPA-approved form of financial assurance and shall submit such mechanisms and documents to the Regional Financial Management Officer, to DOJ, and to EPA.

35. Work Settling Defendant shall diligently monitor the adequacy of the financial assurance. If Work Settling Defendant becomes aware of any information indicating that the financial assurance provided under this Section is inadequate or otherwise no longer satisfies the requirements of this Section, Work Settling Defendant shall notify EPA of such information within seven days. If EPA determines that the financial assurance provided under this Section is inadequate or otherwise no longer satisfies the requirements of this Section, EPA will notify Work Settling Defendant of such determination. Work Settling Defendant shall, within 30 days after notifying EPA or receiving notice from EPA under this Paragraph, secure and submit to EPA for approval a proposal for a revised or alternative financial assurance mechanism that satisfies the requirements of this Section. EPA may extend this deadline for such time as is reasonably necessary for Work Settling Defendant, in the exercise of due diligence, to secure and submit to EPA a proposal for a revised or alternative financial assurance mechanism, not to exceed 60 days. Work Settling Defendant shall follow the procedures of ¶ 37 in seeking approval of, and submitting documentation for, the revised or alternative financial assurance mechanism. Work Settling Defendant's inability to secure financial assurance in accordance with this Section does not excuse performance of any other requirement of this Decree.

36. **Access to Financial Assurance**

a. If EPA issues a notice of a Work Takeover under ¶ 26.b, then, in accordance with any applicable financial assurance mechanism, including the related standby funding commitment, EPA may require that any funds guaranteed be paid in accordance with ¶ 36.d.

b. If EPA is notified that the issuer of a financial assurance mechanism intends to cancel the mechanism, and Work Settling Defendant fails to provide an alternative financial assurance mechanism in accordance with this Section at least 30 days prior to the cancellation date, the funds guaranteed under such mechanism must be paid prior to cancellation in accordance with ¶ 36.d.

c. If, upon issuance of a notice of a Work Takeover under ¶ 26.b, either: (1) EPA is unable for any reason to promptly secure the resources guaranteed under any applicable

financial assurance mechanism including the related standby funding commitment, whether in cash or in kind, to continue and complete the Work; or (2) the financial assurance is a demonstration or guarantee under ¶ 31.e or 31.f, then EPA is entitled to demand an amount, as determined by EPA, sufficient to cover the cost of the remaining Work to be performed. Work Settling Defendant shall, within 30 days after such demand, pay the amount demanded as directed by EPA.

d. Any amounts required to be paid under this ¶ 36 must be, as directed by EPA: (i) paid to EPA in order to facilitate the completion of the Work by EPA or by another person; or (ii) deposited into an interest-bearing account, established at a duly chartered bank or trust company that is insured by the FDIC, in order to facilitate the completion of the Work by another person. If payment is made to EPA, EPA may deposit the payment into the Fund or into the Special Account to be retained and used to conduct or finance response actions at or in connection with the Site, or to be transferred by EPA to the Fund.

37. **Modification of Amount, Form, or Terms of Financial Assurance**. Beginning after the first anniversary of the Effective Date, and no more than once per calendar year, Work Settling Defendant may submit a request to change the form, terms, or amount of the financial assurance mechanism. Any such request must be submitted to EPA in accordance with ¶ 34, and must include an estimate of the cost of the remaining Work, an explanation of the bases for the cost calculation, and a description of the proposed changes, if any, to the form or terms of the financial assurance. EPA will notify Work Settling Defendant of its decision regarding the request. Work Settling Defendant may initiate dispute resolution under Section XII regarding EPA's decision within 30 days after receipt of the decision. Work Settling Defendant may modify the form, terms, or amount of the financial assurance mechanism only: (a) in accordance with EPA's approval; or (b) in accordance with any resolution of a dispute under Section XII. Work Settling Defendant shall submit to EPA, within 30 days after receipt of EPA's approval or consistent with the terms of the resolution of the dispute, documentation of the change to the form, terms, or amount of the financial assurance instrument.

38. **Release, Cancellation, or Discontinuation of Financial Assurance**. Settling Defendants may release, cancel, or discontinue any financial assurance provided under this Section only: (a) if EPA issues a Certification of Work Completion under ¶ 5.7 of the SOW; (b) in accordance with EPA's approval of such release, cancellation, or discontinuation; or (c) if there is a dispute regarding the release, cancellation or discontinuance of any financial assurance, in accordance with the agreement, final administrative decision, or final judicial decision resolving such dispute under Section XII.

## IX. INDEMNIFICATION AND INSURANCE

39. **Indemnification**

a. Plaintiff does not assume any liability by entering into this Decree or by virtue of any designation of Settling Defendants as EPA's authorized representative under section 104(e)(1) of CERCLA. Settling Defendants shall indemnify and save and hold harmless Plaintiff and its officials, agents, employees, contractors, subcontractors, and representatives for or from any claims or causes of action arising from, or on account of, negligent or other

wrongful acts or omissions of Settling Defendants, their officers, directors, employees, agents, contractors, subcontractors, and any persons acting on Settling Defendants' behalf or under their control, in carrying out activities under this Decree, including any claims arising from any designation of Settling Defendants as EPA's authorized representatives under section 104(e)(1) of CERCLA. Further, Settling Defendants agree to pay Plaintiff all costs it incurs including attorneys' fees and other expenses of litigation and settlement arising from, or on account of, claims made against Plaintiff based on negligent or other wrongful acts or omissions of Settling Defendants, their officers, directors, employees, agents, contractors, subcontractors, and any persons acting on their behalf or under their control in carrying out activities under with this Decree. Plaintiff may not be held out as a party to any contract entered into by or on behalf of Settling Defendants in carrying out activities under this Decree. The Settling Defendants and any such contractor may not be considered an agent of Plaintiff.

b. Plaintiff shall give Settling Defendants notice of any claim for which Plaintiff plans to seek indemnification in accordance with this ¶ 39, and shall consult with Settling Defendants prior to settling such claim.

40. Settling Defendants covenant not to sue and shall not assert any claim or cause of action against Plaintiff for damages or reimbursement or for set-off of any payments made or to be made to Plaintiff, arising from or on account of any contract, agreement, or arrangement between any one or more of Settling Defendants and any person for performance of Work or other activities on or relating to the Site, including claims on account of construction delays. In addition, Settling Defendants shall indemnify and save and hold Plaintiff harmless with respect to any claims for damages or reimbursement arising from or on account of any contract, agreement, or arrangement between any one or more of Settling Defendants and any person for performance of work at or relating to the Site, including claims on account of construction delays.

41. **Insurance**. Work Settling Defendant shall secure, by no later than 15 days before commencing any on-site Work, the following insurance: (a) commercial general liability insurance with limits of liability of $1 million per occurrence; (b) automobile liability insurance with limits of liability of $1 million per accident; and (c) umbrella liability insurance with limits of liability of $5 million in excess of the required commercial general liability and automobile liability limits. The insurance policy must name Plaintiff as an additional insured with respect to all liability arising out of the activities performed by or on behalf of Work Settling Defendant under this Decree. Work Settling Defendant shall maintain this insurance until the first anniversary after issuance of EPA's Certification of Remedial Action Completion under ¶ 5.6 of the SOW. In addition, for the duration of this Decree, Work Settling Defendant shall satisfy, or shall ensure that their contractors or subcontractors satisfy, all applicable laws and regulations regarding the provision of worker's compensation insurance for all persons performing the Work on behalf of Work Settling Defendant in furtherance of this Decree. Prior to commencement of the Work, Work Settling Defendant shall provide to EPA certificates of such insurance and a copy of each insurance policy. Work Settling Defendant shall resubmit such certificates and copies of policies each year on the anniversary of the Effective Date. If Work Settling Defendant demonstrates by evidence satisfactory to EPA that any contractor or subcontractor maintains insurance equivalent to that described above, or insurance covering the same risks but in a lesser amount, then, with respect to that contractor or subcontractor, Work Settling Defendant need

provide only that portion of the insurance described above that is not maintained by the contractor or subcontractor. Work Settling Defendant shall ensure that all submittals to EPA under this Paragraph identify the Iowa-Nebraska Light & Power Company Superfund Site, Norfolk, Nebraska and the civil action number of this case.

## X. PAYMENTS FOR RESPONSE COSTS

42. **Payments by Settling Defendants for Future Response Costs**

a. **Periodic Bills**. On a periodic basis, EPA will send Settling Defendants a bill for Future Response Costs, including a cost summary listing direct and indirect costs paid by EPA, its contractors, subcontractors, and DOJ. Settling Defendants may initiate a dispute under Section XII regarding a Future Response Cost billing, but only if the dispute relates to one or more of the following issues: (i) whether EPA has made an arithmetical error; (ii) whether EPA has included a cost item that is not within the definition of Future Response Costs; or (iii) whether EPA has paid excess costs as a direct result of an EPA action that was inconsistent with a specific provision or provisions of the NCP. Settling Defendants must specify in the Notice of Dispute the contested costs and the basis for the objection.

b. **Payment of Bill**. Subject to ¶ 23, Work Settling Defendant shall pay the bill, or if any entity has initiated dispute resolution, the uncontested portion of the bill, if any, within 30 days after receipt of the bill. Subject to ¶ 23, Work Settling Defendant shall pay the contested portion of the bill determined to be owed, if any, within 30 days after the determination regarding the dispute. Each payment for: (i) the uncontested bill or portion of bill, if late, and (ii) the contested portion of the bill determined to be owed, if any, must include an additional amount for Interest accrued from the date of receipt of the bill through the date of payment. Subject to ¶ 23, Work Settling Defendant shall make payment at https://www.pay.gov using the "EPA Miscellaneous Payments Cincinnati Finance Center" link, and including references to the Site/Spill ID and DJ numbers listed in ¶ 77 and the purpose of the payment. Subject to ¶ 23, Work Settling Defendant shall send notices of this payment to DOJ and EPA.

43. **Deposit of Payments**. EPA may, in its unreviewable discretion, deposit the amounts paid under ¶ 42.b in the Fund, in the Special Account, or both. EPA may, in its unreviewable discretion, retain and use any amounts deposited in the Special Account to conduct or finance response actions at or in connection with the Site, or transfer those amounts to the Fund.

## XI. FORCE MAJEURE

44. "Force majeure," for purposes of this Decree, means any event arising from causes beyond the control of Settling Defendants, of any entity controlled by Settling Defendants, or of Settling Defendants' contractors that delays or prevents the performance of any obligation under this Decree despite Settling Defendants' best efforts to fulfill the obligation. Given the need to protect public health and welfare and the environment, the requirement that Settling Defendants exercise "best efforts to fulfill the obligation" includes using best efforts to anticipate any potential force majeure and best efforts to address the effects of any potential force majeure (a) as it is occurring and (b) following the potential force majeure such that the

delay and any adverse effects of the delay are minimized to the greatest extent possible. "Force majeure" does not include financial inability to complete the Work or a failure to achieve the Performance Standards.

45. If any event occurs for which Settling Defendants will or may claim a force majeure, Settling Defendants shall notify EPA's Project Coordinator by email. The deadline for the initial notice is 5 days after the date Settling Defendants first knew or should have known that the event would likely delay performance. Settling Defendants shall be deemed to know of any circumstance of which any contractor of, subcontractor of, or entity controlled by Settling Defendants knew or should have known. Within 5 days thereafter, Settling Defendants shall send a further notice to EPA that includes: (i) a description of the event and its effect on Settling Defendants' completion of the requirements of the Decree; (ii) a description of all actions taken or to be taken to prevent or minimize the adverse effects or delay; (iii) the proposed extension of time for Settling Defendants to complete the requirements of the Decree; (iv) a statement as to whether, in the opinion of Settling Defendants, such event may cause or contribute to an endangerment to public health or welfare, or the environment; and (v) all available proof supporting their claim of force majeure. Failure to comply with the notice requirements herein regarding an event precludes Settling Defendants from asserting any claim of force majeure regarding that event, provided, however, that if EPA, despite late or incomplete notice, is able to assess to its satisfaction whether the event is a force majeure under ¶ 44 and whether Settling Defendants have exercised their best efforts under ¶ 44, EPA may, in its unreviewable discretion, excuse in writing Settling Defendants' failure to submit timely or complete notices under this Paragraph.

46. EPA will notify Settling Defendants of its determination whether Settling Defendants are entitled to relief under ¶ 44, and, if so, the duration of the extension of time for performance of the obligations affected by the force majeure. An extension of the time for performance of the obligations affected by the force majeure shall not, of itself, extend the time for performance of any other obligation. Settling Defendants may initiate dispute resolution under Section XII regarding EPA's determination within 15 days after receipt of the determination. In any such proceeding, Settling Defendants have the burden of proving that they are entitled to relief under ¶ 44 and that their proposed extension was or will be warranted under the circumstances.

47. The failure by EPA to timely complete any activity under the Decree or the SOW is not a violation of the Decree, provided, however, that if such failure prevents Settling Defendants from timely completing a requirement of the Decree, Settling Defendants may seek relief under this Section.

## XII. DISPUTE RESOLUTION

48. Unless otherwise provided in this Decree, Settling Defendants must use the dispute resolution procedures of this Section to resolve any dispute arising under this Decree. Settling Defendants shall not initiate a dispute challenging the Record of Decision. The United States may enforce any requirement of the Decree that is not the subject of a pending dispute under this Section.

49. A dispute will be considered to have arisen when one or more parties sends a written notice of dispute ("Notice of Dispute"). A notice is timely if sent within 30 days after receipt of the EPA notice or determination giving rise to the dispute, or within 15 days in the case of a force majeure determination. Disputes arising under this Decree must in the first instance be the subject of informal negotiations between the parties to the dispute. The period for informal negotiations may not exceed 20 days after the dispute arises, unless the parties to the dispute otherwise agree. If the Parties cannot resolve the dispute by informal negotiations, the position advanced by EPA is binding unless Settling Defendants initiate formal dispute resolution under ¶ 50.

50. **Formal Dispute Resolution**

a. **Statements of Position**. Settling Defendants may initiate formal dispute resolution by serving on the Plaintiff, within 20 days after the conclusion of informal dispute resolution under ¶ 49, an initial Statement of Position regarding the matter in dispute. The Plaintiff's responsive Statement of Position is due within 20 days after receipt of the initial Statement of Position. All Statements of Position must include supporting factual data, analysis, opinion, and other documentation. A reply, if any, is due within 10 days after receipt of the response. If appropriate, EPA may extend the deadlines for filing Statements of Position for up to 45 days and may allow the submission of supplemental Statements of Position.

b. **Formal Decision**. The Director of the Superfund & Emergency Management Division, EPA Region 7, will issue a formal decision resolving the dispute ("Formal Decision") based on the statements of position and any replies and supplemental statements of position. The Formal Decision is binding on Settling Defendants unless they timely seek judicial review under ¶ 51.

c. **Compilation of Administrative Record**. EPA shall compile an administrative record regarding the dispute, which must include all statements of position, replies, supplemental statements of position, and the Formal Decision.

51. **Judicial Review**

a. Settling Defendants may obtain judicial review of the Formal Decision by filing, within 20 days after receiving it, a motion with the Court and serving the motion on all Parties. The motion must describe the matter in dispute and the relief requested. The parties to the dispute shall brief the matter in accordance with local court rules.

b. **Review on the Administrative Record**. Judicial review of disputes regarding the following issues must be on the administrative record: (i) the adequacy or appropriateness of deliverables required under the Decree; (ii) the adequacy of the performance of the Remedial Action; (iii) whether a Work Takeover is warranted under ¶ 26; (iv) determinations about financial assurance under Section VIII; (v) EPA's selection of modified or further response actions; (vi) any other items requiring EPA approval under the Decree; and (vii) any other disputes that the Court determines should be reviewed on the administrative record. For all of these disputes, Settling Defendants bear the burden of demonstrating that the Formal Decision was arbitrary and capricious or otherwise not in accordance with law.

c. Judicial review of any dispute not governed by ¶ 51.b shall be governed by applicable principles of law.

52. **Escrow Account**. For disputes regarding a Future Response Cost billing, Settling Defendants shall: (a) establish, in a duly chartered bank or trust company, an interest-bearing escrow account that is insured by the Federal Deposit Insurance Corporation ("FDIC"); (b) remit to that escrow account funds equal to the amount of the contested Future Response Costs; and (c) send to EPA copies of the correspondence and of the payment documentation (e.g., the check) that established and funded the escrow account, including the name of the bank, the bank account number, and a bank statement showing the initial balance in the account. EPA may, in its unreviewable discretion, waive the requirement to establish the escrow account. Settling Defendants shall cause the escrow agent to pay the amounts due to EPA under ¶ 42, if any, by the deadline for such payment in ¶ 42. Settling Defendants are responsible for any balance due under ¶ 42 after the payment by the escrow agent.

53. The initiation of dispute resolution procedures under this Section does not extend, postpone, or affect in any way any requirement of this Decree, except as EPA agrees, or as determined by the Court. Stipulated penalties with respect to the disputed matter will continue to accrue, but payment is stayed pending resolution of the dispute, as provided in ¶ 56.

## XIII. STIPULATED PENALTIES

54. Unless the noncompliance is excused under Section XI (Force Majeure), subject to ¶ 23, Work Settling Defendant is liable to the United States for the following stipulated penalties:

a. for any failure: (i) to pay any amount due under Section X; (ii) to establish and maintain financial assurance in accordance with Section VIII; (iii) to maintain insurance in accordance with Paragraph 41; or (iv) to submit timely or adequate deliverables under Section 8 of the SOW:

| Period of Noncompliance | Penalty Per Noncompliance Per Day |
|---|---|
| 1st through 14th day | $500 |
| 15th through 30th day | $1,000 |
| 31st day and beyond | $3,000 |

b. for any failure to submit timely or adequate deliverables required by this Decree other than those specified in ¶ 54.a:

| Period of Noncompliance | Penalty Per Noncompliance Per Day |
|---|---|
| 1st through 14th day | $500 |
| 15th through 30th day | $800 |
| 31st day and beyond | $2,000 |

55. **Work Takeover Penalty**. If EPA commences a Work Takeover, subject to ¶ 23, Work Settling Defendant is liable for a stipulated penalty in the amount of $250,000. This

stipulated penalty is in addition to the remedy available to EPA under ¶ 36 (Access to Financial Assurance) to fund the performance of the Work by EPA.

56. **Accrual of Penalties**. Stipulated penalties accrue from the date performance is due, or the day a noncompliance occurs, whichever is applicable, until the date the requirement is completed or the final day of the correction of the noncompliance. Nothing in this Decree prevents the simultaneous accrual of separate penalties for separate noncompliance with this Decree. Stipulated penalties accrue regardless of whether Settling Defendants have been notified of their noncompliance, and regardless of whether Settling Defendants have initiated dispute resolution under Section XII, provided, however, that no penalties will accrue as follows:

a. with respect to a submission that EPA subsequently determines is deficient under ¶ 7.6 of the SOW, during the period, if any, beginning on the 31st day after EPA's receipt of such submission until the date that EPA notifies Settling Defendants of any deficiency;

b. with respect to a matter that is the subject of dispute resolution under Section XII, during the period, if any, beginning on the 21st day after the later of the date that EPA's Statement of Position is received or the date that the Settling Defendants' reply thereto (if any) is received until the date of the Formal Decision under ¶ 50.b; or

c. with respect to a matter that is the subject of judicial review by the Court under ¶ 51, during the period, if any, beginning on the 31st day after the Court's receipt of the final submission regarding the dispute until the date that the Court issues a final decision regarding such dispute.

57. **Demand and Payment of Stipulated Penalties**. EPA may send Settling Defendants a demand for stipulated penalties. The demand will include a description of the noncompliance and will specify the amount of the stipulated penalties owed. Settling Defendants may initiate dispute resolution under Section XII within 30 days after receipt of the demand. Subject to ¶ 23, Work Settling Defendant shall pay the amount demanded or, if an entity has initiated dispute resolution, the uncontested portion of the amount demanded, within 30 days after receipt of the demand. Subject to ¶ 23, Work Settling Defendant shall pay the contested portion of the penalties determined to be owed, if any, within 30 days after the resolution of the dispute. Each payment for: (a) the uncontested penalty demand or uncontested portion, if late; and (b) the contested portion of the penalty demand determined to be owed, if any, must include an additional amount for Interest accrued from the date of receipt of the demand through the date of payment. Subject to ¶ 23, Work Settling Defendant shall make payment at https://www.pay.gov using the link for "EPA Miscellaneous Payments Cincinnati Finance Center," including references to the Site/Spill ID and DJ numbers listed in ¶ 77, and the purpose of the payment. Subject to ¶ 23, Work Settling Defendants shall send a notice of this payment to DOJ and EPA. The payment of stipulated penalties and Interest, if any, does not alter any obligation by Settling Defendants under the Decree.

58. Nothing in this Decree limits the authority of the United States: (a) to seek any remedy otherwise provided by law for a failure to pay stipulated penalties or interest; or (b) to seek any other remedies or sanctions available by virtue of noncompliance with this Decree or of the statutes and regulations upon which it is based, including penalties under section 122(*l*) of

CERCLA, provided, however, that the United States may not seek civil penalties under section 122(*l*) of CERCLA for any noncompliance for which a stipulated penalty is provided for in this Decree, except in the case of a willful noncompliance with this Decree.

59. Notwithstanding any other provision of this Section, the United States may, in its unreviewable discretion, waive any portion of stipulated penalties that have accrued under this Decree.

## XIV. COVENANTS BY PLAINTIFF

60. **Covenants for Settling Defendant**s. Subject to ¶¶ 61 and 62, the United States covenants not to sue or to take administrative action against Settling Defendants under sections 106 and 107(a) of CERCLA regarding the Work, and Future Response Costs.

61. The covenants under ¶ 60: (a) take effect upon the Effective Date; (b) are conditioned on the satisfactory performance by Settling Defendants of the requirements of this Decree; (c) extend to the successors of each Settling Defendant but only to the extent that the alleged liability of the successor of the Settling Defendant is based solely on its status as a successor of the Settling Defendant; and (d) do not extend to any other person.

62. **General Reservations**. Notwithstanding any other provision of this Decree, the United States reserves, and this Decree is without prejudice to, all rights against Settling Defendants regarding the following:

a. liability for failure by Settling Defendants to meet a requirement of this Decree;

b. liability arising from the past, present, or future disposal, release, or threat of release of Waste Material outside of the Site;

c. liability based on Settling Defendants' ownership of the Site when such ownership commences after Settling Defendants' signature of this Decree;

d. liability based on Settling Defendants' operation of the Site when such operation commences after Settling Defendants' signature of this Decree and does not arise solely from Settling Defendants' performance of the Work;

e. liability based on Settling Defendants' transportation, treatment, storage, or disposal, or arrangement for transportation, treatment, storage, or disposal of Waste Material at or in connection with the Site, after signature of this Decree by Settling Defendants, other than as provided in the Record of Decision, under this Decree, or ordered by EPA;

f. liability for additional operable units at the Site or the final response action;

g. liability, prior to achievement of Performance Standards, for additional response actions that EPA determines are necessary to achieve and maintain Performance Standards or to carry out and maintain the effectiveness of the Remedial Action, but that are not covered by ¶ 24.b; and

h. criminal liability.

63. Subject to ¶ 60, nothing in this Decree limits any authority of Plaintiff to take, direct, or order all appropriate action to protect human health and the environment or to prevent, abate, respond to, or minimize an actual or threatened release of Waste Material on, at, or from the Site, or to request a Court to order such action.

## XV. COVENANTS BY SETTLING DEFENDANTS

64. **Covenants by Settling Defendant**s

a. Subject to ¶ 65, Settling Defendants covenant not to sue and shall not assert any claim or cause of action against the United States under CERCLA, section 7002(a) of RCRA, the United States Constitution, the Tucker Act, 28 U.S.C. § 1491, the Equal Access to Justice Act, 28 U.S.C. § 2412, the State Constitution, State law, or at common law regarding the Work, past response actions relating to the Site, and Future Response Costs.

b. Subject to ¶ 65, Settling Defendants covenant not to seek reimbursement from the Fund through CERCLA or any other law for costs of the Work and past response actions regarding the Site, and Future Response Costs.

65. **Settling Defendants' Reservation**. The covenants in ¶ 64 do not apply to any claim or cause of action brought, or order issued, after the Effective Date by the United States to the extent such claim, cause of action, or order is within the scope of a reservation under ¶¶ 62.a through 62.g.

## XVI. EFFECT OF SETTLEMENT; CONTRIBUTION

66. The Parties agree and the Court finds that: (a) the complaint filed by the United States in this action is a civil action within the meaning of section 113(f)(1) of CERCLA; (b) this Decree constitutes a judicially approved settlement under which each Settling Defendant has, as of the Effective Date, resolved its liability to the United States within the meaning of sections 113(f)(2) and 113(f)(3)(B) of CERCLA; and (c) each Settling Defendant is entitled, as of the Effective Date, to protection from contribution actions or claims as provided by section 113(f)(2) of CERCLA, or as may be otherwise provided by law, for the "matters addressed" in this Decree. The "matters addressed" in this Decree are the Work and Future Response Costs, provided, however, that if the United States exercises rights under the reservations in ¶¶ 62.a through 62.g, the "matters addressed" in this Decree will no longer include those response costs or response actions that are within the scope of the exercised reservation.

67. Each Settling Defendant shall, with respect to any suit or claim brought by it for matters related to this Decree, notify DOJ and EPA no later than 60 days prior to the initiation of such suit or claim. Each Settling Defendant shall, with respect to any suit or claim brought against it for matters related to this Decree, notify DOJ and EPA within 10 days after service of the complaint on such Settling Defendant. In addition, each Settling Defendant shall notify DOJ

and EPA within 10 days after service or receipt of any Motion for Summary Judgment and within 10 days after receipt of any order from a court setting a case for trial.

68. **Res Judicata and Other Defenses**. In any subsequent administrative or judicial proceeding initiated against any Settling Defendant by Plaintiff for injunctive relief, recovery of response costs, or other appropriate relief relating to the Site, Settling Defendants shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, claim preclusion (res judicata), issue preclusion (collateral estoppel), claim-splitting, or other defenses based upon any contention that the claims raised by the United States in the subsequent proceeding were or should have been brought in the instant case.

69. Nothing in this Decree diminishes the right of the United States under section 113(f)(2) and (3) of CERCLA to pursue any person not a party to this Decree to obtain additional response costs or response action and to enter into settlements that give rise to contribution protection pursuant to section 113(f)(2).

## XVII. RECORDS

70. **Settling Defendant Certification**. Each Settling Defendant certifies individually that (a) it has implemented a litigation hold on documents and electronically stored information relating to the Site, including information relating to its potential liability under CERCLA regarding the Site, since the earlier of notification of potential liability by EPA in the April 10, 2023 special notice letter or the filing of suit against it regarding the Site; (b) to the best of its knowledge and belief, it has complied with the record retention requirements of all prior ASAOCs; and (c) it has fully complied with any and all EPA requests for information under sections 104(e) and 122(e) of CERCLA, and section 3007 of RCRA.

71. **Retention of Records and Information**

a. Settling Defendants shall retain, and instruct their contractors and agents to retain, the following documents and electronically stored data ("Records") until 10 years after the Certification Completion of the Work under SOW ¶ 5.7 (the "Record Retention Period"):

(1) All records regarding Settling Defendants' liability under CERCLA regarding the Site;

(2) All reports, plans, permits, and documents submitted to EPA in accordance with this Decree, including all underlying research and data regarding the Site; and

(3) All data developed by, or on behalf of, Settling Defendants in the course of performing the Remedial Action.

b. Settling Defendants shall retain all Records regarding the liability of any person under CERCLA regarding the Site during the Record Retention Period.

c. At the end of the Record Retention Period, Settling Defendants shall notify EPA that it has 90 days to request the Settling Defendants' Records subject to this Section. Settling

Defendants shall retain and preserve their Records subject to this Section until 90 days after EPA's receipt of the notice. These record retention requirements apply regardless of any corporate record retention policy.

72. Settling Defendants shall provide to EPA, upon request, copies of all Records and information required to be retained under this Section. Settling Defendants shall also make available to EPA, for purposes of investigation, information gathering, or testimony, their employees, agents, or representatives with knowledge of relevant facts concerning the performance of the Work.

73. **Privileged and Protected Claims**

a. Settling Defendants may assert that all or part of a record requested by Plaintiff is privileged, or protected as provided under federal law, in lieu of providing the record, provided that Settling Defendants comply with ¶ 73.b, and except as provided in ¶ 73.c.

b. If Settling Defendants assert a claim of privilege or protection, they shall provide Plaintiff with the following information regarding such record: its title; its date; the name, title, affiliation (e.g., company or firm), and address of the author, of each addressee, and of each recipient; a description of the record's contents; and the privilege or protection asserted. If a claim of privilege or protection applies only to a portion of a record, Settling Defendants shall provide the record to Plaintiff in redacted form to mask the privileged or protected portion only. Settling Defendants shall retain all records that they claim to be privileged or protected until Plaintiff has had a reasonable opportunity to dispute the privilege or protection claim and any such dispute has been resolved in Settling Defendants' favor.

c. Settling Defendants shall not make any claim of privilege or protection regarding: (1) any data regarding the Site, including all sampling, analytical, monitoring, hydrogeologic, scientific, chemical, radiological or engineering data, or the portion of any other record that evidences conditions at or around the Site; or (2) the portion of any record that Settling Defendants are required to create or generate in accordance with this Decree.

74. **Confidential Business Information (CBI) Claims**. Settling Defendants may claim that all or part of a record provided to Plaintiff under this Section is CBI to the extent permitted by and in accordance with section 104(e)(7) of CERCLA and 40 C.F.R. § 2.203(b). Settling Defendants shall segregate and shall clearly identify all records or parts thereof submitted under this Decree for which they claim is CBI by labeling each page or each electronic file "claimed as confidential business information" or "claimed as CBI." Records that Settling Defendants claim to be CBI will be afforded the protection specified in 40 C.F.R. part 2, subpart B. If no CBI claim accompanies records when they are submitted to EPA, or if EPA notifies Settling Defendants that the records are not entitled to confidential treatment under the standards of section 104(e)(7) of CERCLA or 40 C.F.R. part 2, subpart B, the public may be given access to such records without further notice to Settling Defendants.

75. In any proceeding under this Decree, validated sampling or monitoring data generated in accordance with the SOW and reviewed and approved by EPA, if relevant to the proceeding, is admissible as evidence, without objection.

76. Notwithstanding any provision of this Decree, Plaintiff retains all of its information gathering and inspection authorities and rights, including enforcement actions related thereto, under CERCLA, RCRA, and any other applicable statutes or regulations.

## XVIII. NOTICES AND SUBMISSIONS

77. All agreements, approvals, consents, deliverables, modifications, notices, notifications, objections, proposals, reports, waivers, and requests specified in this Decree must be in writing unless otherwise specified. Whenever a notice is required to be given or a report or other document is required to be sent by one Party to another under this Decree, it must be sent as specified below. All notices under this Section are effective upon receipt, unless otherwise specified. In the case of emailed notices, there is a rebuttable presumption that such notices are received on the same day that they are sent. Any Party may change the method, person, or address applicable to it by providing notice of such change to all Parties. Settling Defendants shall copy the State when submitting or resubmitting any deliverable or report required pursuant to the SOW.

| | |
|---|---|
| As to DOJ: | *via email to*:<br>eescdcopy.enrd@usdoj.gov<br>Re: DJ # 90-11-3-12784 |
| As to EPA: | *via email to*:<br>tinococastaneda.paulina@epa.gov<br>Re: Site/Spill ID # NED986373678 |
| As to the Regional Financial Management Officer: | *via email to*:<br>mccloud.norma@epa.gov<br>Re: Site/Spill ID # NED986373678 |
| As to State: | *via email to*:<br>guthrie.kris@nebraska.gov<br>Re: Site/Spill ID # NED986373678 |

As to Settling Defendants:

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ATTN: Legal Department
1414 15th Street, P.O. Box 499
Columbus, NE 68602-0499

Lamson, Dugan & Murray, LLP
ATTN: Brian J. Brislen
10306 Regency Parkway Drive
Omaha, NE 68114

## XIX. APPENDIXES

78. The following appendixes are attached to and incorporated into this Decree:

"Appendix A" is the Record of Decision.

"Appendix B" is the SOW.

"Appendix C" is the map of the Site.

## XX. MODIFICATIONS TO DECREE

79. Except as provided in ¶ 24 of the Decree and ¶ 7.6 of the SOW (Approval of Deliverables), nonmaterial modifications to Sections I through XXIV and the Appendixes must be in writing and are effective when signed (including electronically signed) by the Parties. Material modifications to Sections I through XXIV and the Appendixes must be in writing, signed (which may include electronically signed) by the Parties, and are effective upon approval by the Court.

## XXI. SIGNATORIES

80. The undersigned representative of the United States and each undersigned representative of a Settling Defendant certifies that he or she is fully authorized to enter into the terms and conditions of this Decree and to execute and legally bind such Party to this document.

## XXII. PRE-ENTRY PROVISIONS

81. If for any reason the Court should decline to approve this Decree in the form presented, this agreement, except for ¶ 82 and ¶ 83, is voidable at the sole discretion of any Party and its terms may not be used as evidence in any litigation between the Parties.

82. This Decree will be lodged with the Court for at least 30 days for public notice and comment in accordance with section 122(d)(2) of CERCLA and 28 C.F.R. § 50.7. The United States may withdraw or withhold its consent if the comments regarding the Decree disclose facts or considerations that indicate that the Decree is inappropriate, improper, or inadequate.

83. Settling Defendants agree not to oppose or appeal the entry of this Decree.

## XXIII. INTEGRATION

84. This Decree constitutes the entire agreement among the Parties regarding the subject matter of the Decree and supersedes all prior representations, agreements, and understandings, whether oral or written, regarding the subject matter of the Decree.

## XXIV. FINAL JUDGMENT

85. Upon entry of this Decree by the Court, this Decree constitutes a final judgment under Fed. R. Civ. P. 54 and 58 among the Parties.

SO **ORDERED** this ___ day of _____, 202_.

_____

United States District Judge

Signature Page for Consent Decree in *U.S. v. Black Hills Nebraska Gas, LLC, et al.* (D. Neb.)

**FOR THE UNITED STATES:**

Todd Kim
Assistant Attorney General
U.S. Department of Justice
Environment and Natural Resources Division

11/1/2024
Dated

/s/ *Danica Anderson Glaser*
Danica Anderson Glaser
Senior Counsel
Rachel Fullmer
Trial Attorney
U.S. Department of Justice
Environment and Natural Resources
Division Environmental Enforcement Section
P.O. Box 7611, Ben Franklin Station
Washington, DC 20044
202-514-5270
danica.glaser@usdoj.gov

Signature Page for Consent Decree in *U.S. v. Black Hills Nebraska Gas, LLC, et al.* (D. Neb.)

**FOR THE U.S. ENVIRONMENTAL PROTECTION AGENCY:**

ROBERT JURGENS Digitally signed by ROBERT JURGENS Date: 2024.10.23 14:29:18 -05'00'

Robert D. Jurgens
Division Director
Superfund & Emergency Management Division
U.S. Environmental Protection Agency Region 7
11201 Renner Boulevard
Lenexa, Kansas 66219

DANIEL LYSKOWSKI Digitally signed by DANIEL LYSKOWSKI Date: 2024.10.24 08:34:37 -05'00'

Daniel Lyskowski
Attorney-Adviser
U.S. Environmental Protection Agency Region 7
11201 Renner Boulevard
Lenexa, Kansas 66219

Signature Page for Consent Decree in *U.S. v. Black Hills Nebraska Gas, LLC, et al.* (D. Neb.)

**FOR: BRIGHTSPEED KANSAS HOLDINGS, LLC**

10/11/2024
Dated

DocuSigned by:
F3F3C88B4BAC44E...

Name: Steve Tugentman
Title: EVP and Chief Legal Officer
Address: 1120 S.Tryon St Charlotte, NC 28203

If the Decree is not approved by the Court within 60 days after the date of lodging, and the United States requests, this Settling Defendant agrees to accept service of the complaint by mail, and to execute a waiver of service of a summons under Rule 4 of the Federal Rules of Civil Procedure and any applicable local rules of this Court. **This Settling Defendant hereby designates the agent below to accept service of the complaint by mail and to execute the Rule 4 waiver of service.** This Settling Defendant understands that it does not need to file an answer to the complaint until it has executed the waiver of service or otherwise has been served with the complaint.

Name: Steve Tugentman
Title: EVP and Chief Legal Officer
Company: Brightspeed
Address: 1120 S. Tryon St., Suite 700
Charlotte, NC 28203
Phone:
email: Steven.tugentman@brightspeed.com

Signature Page for Consent Decree in *U.S. v. Black Hills Nebraska Gas, LLC, et al.* (D. Neb.)

**FOR: BLACK HILLS NEBRASKA GAS, LLC**

10/15/2024
Dated

Amy K. Koenig

Name: Amy K. Koenig
Title: VP – Governance, Corporate Secretary and Deputy General Counsel
Address: 7001 Mt. Rushmore Road
Rapid City, SD 57702

If the Decree is not approved by the Court within 60 days after the date of lodging, and the United States requests, this Settling Defendant agrees to accept service of the complaint by mail, and to execute a waiver of service of a summons under Rule 4 of the Federal Rules of Civil Procedure and any applicable local rules of this Court. **This Settling Defendant hereby designates the agent below to accept service of the complaint by mail and to execute the Rule 4 waiver of service.** This Settling Defendant understands that it does not need to file an answer to the complaint until it has executed the waiver of service or otherwise has been served with the complaint.

Name: Adam Buhrman
Title: Corporate Counsel
Company: Black Hills Corporation
Address: 2287 College Road
Council Bluffs, Iowa 51503
Phone: 402-221-2630
email: Adam.buhrman@blackhillscorp.com

**FOR: NEBRASKA PUBLIC POWER DISTRICT**

Sept 30, 2024
Dated

Name: Tim Rogers
Title: NPPD Environmental Manager
Address: 1414 15th Street, P.O. Box 499
Columbus, NE 68602-0499
tfroger@nppd.com

If the Decree is not approved by the Court within 60 days after the date of lodging, and the United States requests, Settling Defendant agrees to accept service of the complaint by mail, and to execute a waiver of service of a summons under Rule 4 of the Federal Rules of Civil Procedure and any applicable local rules of this Court. **This Settling Defendant hereby designates the agent below to accept service of the complaint by mail and to execute the Rule 4 waiver of service.** Settling Defendant understands that it does not need to file an answer to the complaint until it has executed the waiver of service or otherwise has been served with the complaint.

Name: Tim Rogers
Title: Environmental Manager
Company: Nebraska Public Power District
Address: 1414 15th Street
Columbus, NE 68601
Phone: 402-563-5355
email: TFroger@nppd.com

# Appendix A: Record of Decision

# RECORD OF DECISION

## IOWA-NEBRASKA LIGHT & POWER CO. SITE

## OPERABLE UNIT 1 – SOURCE MATERIALS
## NORFOLK, MADISON COUNTY, NEBRASKA

**Prepared by:**

**U.S. Environmental Protection Agency**
**Region 7**
**11201 Renner Blvd**
**Lenexa, Kansas 66219**

**September 2022**

# TABLE OF CONTENTS

## Part I: DECLARATION

### Site Name and Location

Site Name: Iowa-Nebraska Light & Power CO. Site, Operable Unit 1 (OU 1)

Site Location: Norfolk, Madison County, Nebraska

Lead Agency: United States Environmental Protection Agency

Support Agency: Nebraska Department of Environment and Energy

Site Identification Number: EPA ID #: NED986373678

### Statement of Basis and Purpose

This decision document presents the Selected Remedy for source materials, which is designated as Operable Unit (OU) 1 of the Iowa-Nebraska Light & Power CO. Superfund Site (Site) in Norfolk, Madison County, Nebraska. This decision was made in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Section 121, as amended by the Superfund Amendments and Reauthorization Act (SARA) and, to the extent practicable, the National Oil and Hazardous Substance Pollution Contingency Plan (NCP) (40 C.F.R. § 300.430(f)(4)(ii)). This decision is based on the Administrative Record (AR) file for this Site which is located at the following information repositories:

| | |
|---|---|
| U.S. Environmental Protection Agency<br>Region 7<br>11201 Renner Blvd<br>Lenexa, Kansas 66219 | Site Profile Page Link<br><br>https://www.epa.gov/superfund/IowaNebraskaLightandPowerCo |

The Site consists of two OUs, OU 1 is the subject of this ROD. OU 1 is designated as source materials which includes the remaining soil contamination and dense nonaqueous phase liquid (DNAPL). OU 2 is designated as sitewide groundwater. Figure 1 depicts the site location. The long-term remedial strategy for this National Priorities List (NPL) site will be managed as a phased approach. The remedial action to reduce and/or eliminate source materials will be conducted prior to evaluating remedial alternatives to address OU 2. The state of Nebraska, as represented by the Nebraska Department of Environment and Energy (NDEE), concurs with the Selected Remedy for OU 1. NDEE provided a letter of concurrence on May 3, 2022, which is included in Appendix G.

### Assessment of the Site

The response action selected in this Record of Decision (ROD) is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

### Description of Selected Remedy

The Selected Remedy for OU 1, source materials, is in-situ thermal treatment (ISTT).

The remedial action objectives (RAOs) for the OU 1 remedial action include:

- Prevent exposure via inhalation of contaminants of concern (COCs) through vapor intrusion from soil gas that exceed the $10^{-6}$ cancer risks and/or a hazard index of 1 for non-cancer risks.

- Prevent incidental ingestion, dermal contact, and inhalation of airborne particulates of COCs from source materials that exceed the $10^{-6}$ cancer risks and/or a hazard index of 1 for non-cancer risks.

- Prevent the migration and leaching potential of COCs in soil that would result in groundwater contamination above levels that are protective of beneficial use (i.e., drinking water use).

- Minimize the further migration of COCs from the DNAPL area to the groundwater plume.

The OU 1 COCs include benzene, toluene, ethylbenzene, and total xylenes (BTEXs) and polycyclic aromatic hydrocarbons (PAHs). The cleanup levels were based on the leaching potential of contaminants in soil and are indicated in the table below. These cleanup levels are based on the protection-to-groundwater values. Cleanup levels were not developed for the heavier PAHs remaining in soil, which will be immobile compared to the lighter volatile organic compounds (VOCs) that have migrated into groundwater.

| Soil Analytical Results and Cleanup Levels | | | |
|---|---|---|---|
| **Contaminant of Concern** | **Maximum Concentration (mg/kg)** | **Cleanup Level (mg/kg)** | **Cleanup Level (µg/kg)** |
| Benzene | 3.41 | 0.052 | 52 |
| Toluene | 0.896 | 13.8 | 13,800 |
| Ethylbenzene | 87.5 | 45.6 | 45,600 |
| Total Xylenes | 257 | 633 | 633,000 |
| Naphthalene | 473 | 0.0076 | 7.6 |
| Benzo(a)pyrene | 56 | 4.8 | 4,800 |

mg/kg – milligrams per kilogram
µg/kg – microgram per kilogram

The remedial action for OU 1, source materials will be the initial remedial action for the Site and will be negotiated in a Consent Decree for Remedial Design/Remedial Action (RD/RA) with the respondents. The long-term remedial strategy will be managed as a phased approach. The OU 1 remedial action will be conducted to address the source materials prior to evaluating remedial alternatives to address the OU 2 sitewide groundwater. This phased remedial approach is preferred as it will initially focus on eliminating the continued leaching potential of the soil contamination into the water table, thus preventing further impacts to the drinking water aquifer and will minimize the further migration of contaminants from the DNAPL area to the groundwater plume. Following completion of the OU 1 remedial action, remedial alternatives to address the sitewide groundwater will be evaluated and a preferred alternative will eventually be proposed and selected in an additional ROD for OU 2. Principal threat wastes are highly toxic or highly mobile materials that may present a significant risk to human health or the environment if exposure were to occur. They include liquids and other materials having high concentrations of toxic compounds (e.g., solvents). Consistent with the NCP and the EPA

guidance, the identification of principal threat waste is made on a site-specific basis. The source area contamination associated with OU 1 is "principal threat waste" because of the presence of DNAPL. The DNAPL constitutes a principal threat waste as it is source material that acts as a reservoir for migration of contamination to groundwater.

The major components of the Selected Remedy for OU 1, source materials, are:

- ISTT including common elements of vapor monitoring and mitigation, institutional controls (ICs), groundwater sampling and performance monitoring.

**Statutory Determinations**

The EPA has determined the Selected Remedy is protective of human health and the environment, will comply with federal and state requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and will utilize permanent solutions and alternative treatment technologies evaluated during the selection of remedial alternatives to the maximum extent practicable.

The remedy also satisfies the statutory preference for treatment as a principal element (i.e., reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment).

The OU 1 remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, five-year reviews (FYR) will be required for the OU 1 remedial action.

**ROD Data Certification Checklist**

The following information is included in the Decision Summary section of this ROD. Additional information can be found in the AR file for this site.

- COCs and their respective concentrations (Section 6.0)
- Baseline risk represented by the COCs (Section 8.0)
- Cleanup levels established for COCs and the basis for these levels (Sections 6.0 and 9.0)
- How source materials constituting principal threats were addressed (Section 12.0)
- Current and reasonably anticipated future land use (Section 7.0)
- Potential land and groundwater use that will be available at the Site because of the Selected Remedy (Section 7.0)
- Estimated costs (Sections 10, 11.7 and 13.3)
- Key factors(s) that led to selecting the remedy (Section 13.0)

**Authorizing Signature**

_____

Robert D. Jurgens, Director
Superfund and Emergency Management Division

## Part II: DECISION SUMMARY

### 1.0 Site Name, Location and Brief Description

The U.S. Environmental Protection Agency, the lead agency, in consultation with the Nebraska Department of Environment and Energy (NDEE), the support agency, prepared this Record of Decision (ROD) to document the selection of in-situ thermal treatment (ISTT) for operable unit (OU) 1 at the Iowa-Nebraska Light & Power CO. Superfund Site (Site). This project is funded as a potentially responsible party (PRP)-lead site with the EPA oversight. The EPA and respondents will negotiate a Consent Decree for Remedial Design/Remedial Action (RD/RA) to implement the ISTT at OU 1.

This ROD certifies that the remedy selection process was carried out in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) 42 U.S.C. § 9617, as amended, and, to the extent practicable, in accordance with the National Oil and Hazardous Substance Pollution Contingency Plan (NCP) 40 C.F.R. § 300.430(f)(4), respectively.

This ROD highlights key information from the Remedial Investigation (RI) report, Baseline Risk Assessment (BLRA) report, Feasibility Study (FS) report and Proposed Plan for OU 1 recently released for the Site. These and other documents regarding the upcoming remedial action are available in the Site Administrative Record (AR) located at the EPA Region 7 Office at the address listed below or the Site Profile Page link.

| | |
|---|---|
| U.S. Environmental Protection Agency Region 7<br>11201 Renner Boulevard<br>Lenexa, Kansas 66219 | Site Profile Page<br><br>https://www.epa.gov/superfund/IowaNebraskaLightandPowerCo |

The Site is a former manufactured gas plant (FMGP) that was located west of 7th Street between Norfolk and Madison Avenues in Norfolk, Madison County, Nebraska. The site properties are currently owned by Black Hills Energy (BHE) and Nebraska Public Power District (NPPD). Figure 2 depicts the site properties and FMGP layout. The Site properties are approximately one and a half acres in size and the associated groundwater contaminant plume is approximately three acres and extends east/southeast to 5th Street and Madison Avenue. Figures 10 through 13 depict the benzene and naphthalene plumes associated with the Site.

The Site is located approximately 120 miles northwest of Lincoln, Nebraska. Norfolk is the economic center for an area encompassing six counties. Basic economic activities of Norfolk are manufacturing, farming (both livestock and grain), education, retailing and wholesaling. Norfolk is the major retail trade center of Northeast Nebraska. The Site consists of one contaminant source area that originates in the downtown area associated with the FMGP operations that began between 1907-1909 and ceased in 1948.

The EPA identification number is NED986373678. A citizen can use the EPA identification number on the EPA's website to obtain additional information on the Site.

## 2.0 Site History and Enforcement Activities

The Site was first owned by Norfolk Light & Fuel Company in 1902. The FMGP operations began between 1907-1909 and ceased in 1948. The FMGP originally produced gas by the Tenney water gas process but was converted to carbureted water gas in 1932. The FMGP operations resulted in wastes, including coal tar, being released into the environment.

The Site has changed ownership and operation several times throughout its history. The Site is currently owned by BHE and NPPD. The Centel Corporation is the successor to the FMGP operations. PRP search activities for the site consisted of completing a PRP Search Report in July 2012. All three parties were signatories to prior administrative orders for the Engineering Evaluation/Cost Analysis (EE/CA), the removal action and the RI/FS. BHE and NPPD were obligated by the orders to provide access and Centel was required to conduct the work.

The Site was discovered in October 1990 when the EPA conducted a Preliminary Assessment which included a site visit and a background search. A Site Investigation (SI) was subsequently conducted in 1992 which included collecting soil and groundwater samples to determine if a release of coal tar associated with the FMGP operations had occurred. The SI analytical results determined semi-volatile organic compounds (SVOCs) commonly associated with MGP operations and typically attributed to coal tar wastes were detected in both soil and groundwater at the Site.

In 2001, the EPA conducted an Expanded Site Investigation (ESI) to verify the presence of residual contamination from the coal gasification process remaining at the Site; and if verified, to characterize any source(s) of contamination identified; and to determine whether the groundwater in the site area is contaminated. Based on the results of the previous investigations and the ESI, the most likely source of the groundwater contamination was determined to be the location of the former 10,000 cubic foot ($ft^3$) gas holder beneath the FMGP building on the northern portion of the Site (Figure 2). Subsurface soil and groundwater samples collected were found to be contaminated with FMGP-related compounds: polycyclic aromatic hydrocarbons (PAHs), light, aromatic compounds, and metals. The presence of these contaminants in the subsurface clearly identified the former belowground gas holder area as the source of soil and groundwater contamination at the Site.

In 2007, the EPA entered an AOC with the respondents to conduct an EE/CA. The EE/CA consisted of conducting additional site characterization activities which included electrical conductivity probing using direct push technology (DPT), DPT soil and groundwater probing, monitoring well installation, soil and groundwater sampling and dense non-aqueous phase liquid (DNAPL) delineation by laser-induced fluorescence DPT probing. The data generated were used to complete a BLRA for the Site which determined that future populations could potentially be exposed to unacceptable risks from indoor air exposure via vapor intrusion and due to contact with contaminated soil and groundwater. The results of the EE/CA were documented in the EE/CA Alternative Evaluation Report dated June 2012 which recommended the preferred removal action alternative to address these risks as soil excavation and groundwater monitoring.

In 2013, the EPA entered an AOC with the respondents to conduct a non-time-critical removal action to implement the preferred removal action alternative from the EE/CA. The non-time critical removal action included excavation and off-site disposal or treatment of contaminated soils; limitations on future land use, including, but not limited to prohibiting future residential development of the site and restrictions on groundwater usage and groundwater monitoring as a post removal site control.

In August 2013, the EPA issued an Enforcement Action Memorandum under the authority of CERCLA § 104(a), 42 U.S.C. § 9604(a), and the NCP, 40 C.F.R. Part 300 to address the contaminated source area soils. Between January and June 2014, the respondents conducted the non-time-critical removal action which resulted in the excavation and disposal of approximately 10,495 tons of contaminated soil. Figures 4 and 5 depict the extent of the excavation. Clean backfill was placed and compacted on both the BHE and NPPD parcels. The BHE parcel was restored to a concrete parking lot and the NPPD parcel was restored to a fenced gravel lot.

Following completion of the non-time-critical removal action, Environmental Covenants (ECs) were recorded on the BHE parcel and NPPD parcel in December 2014 and March 2016, respectively. The purpose of ECs is to ensure protection of human health and the environment by minimizing the potential for exposure to the contamination that remains on the properties and to ensure that the properties are not developed, used, maintained, or operated in a manner which may result in unacceptable exposures to residual contamination. The ECs document activity and use limitations on both parcels which include not using the properties for residential, child-care or school use; prohibiting the extraction and use of groundwater underlying the properties; and limiting any digging, drilling, excavating, constructing, earth moving or other land disturbing activities that occur beneath the property without prior written notice to the EPA. The ECs are included in Appendix J.

The site was proposed to the National Priorities List (NPL) in September 2015. In April 2016, the site was placed final on the NPL based on the potential for the groundwater contamination associated with the site to impact the east municipal well field located 0.5 mile downgradient of the site.

In 2017, the EPA entered an AOC with the respondents to conduct a RI/FS. The RI consisted of advancing DPT electrical conductivity probes downgradient of the site; DPT groundwater probes to collect samples for chemical analysis; soil probes for geotechnical and leachate testing; installing and developing additional monitoring wells; collecting groundwater measurements and samples from site monitoring wells; and collecting DNAPL measurements and samples and removing DNAPL from site wells. Groundwater levels were also collected over time in select wells with transducers.

The EPA Superfund Program manages this project as a PRP-lead site since there is a viable responsible party that has been identified for the site. The respondents have negotiated the AOCs to conduct the EE/CA, removal action and RI/FS in good faith and have completed the required work under each order.

## 3.0 Community Participation

The EPA completed the Community Involvement Plan in 2012 which is included in the AR for the Site. The RI Report, Rev. 3 dated December 15, 2020, the FS Report, Rev. 4 dated March 10, 2022, and the Proposed Plan for the Iowa-Nebraska Light & Power CO. Superfund Site in Norfolk, Madison County, Nebraska, were made available to the public in April 2022. They can be found in the AR file and the information repository maintained at the EPA Region 7 offices at 11201 Renner Boulevard, Lenexa, Kansas, and at the site profile page link: https://www.epa.gov/superfund/IowaNebraskaLightandPowerCo. The notice of the availability of these documents was published in the local newspaper, *The Norfolk Daily News*, on April 22, 2022, and April 29, 2022, and is included in Appendix H. A public comment period was held from April 25, 2022, to May 24, 2022. A virtual public meeting was held on May 3, 2022, through Zoom to present the Proposed Plan to a broader community audience than those that had already been involved at the Site. At that meeting, representatives from the EPA presented the site history and the preferred remedial

alternative to address OU 1. No verbal or written comments were received from the community by the EPA regarding the preferred alternative during the public comment period. The NDEE presented a letter of concurrence on the Selected Remedy on May 3, 2022, which is in Appendix G.

No information has been obtained during the RI/FS process that would indicate any changes in the anticipated future land uses and potential future beneficial uses of groundwater.

## 4.0 Scope and Role of Operable Unit or Response Action

As with many Superfund sites, the problems at the Iowa-Nebraska Light & Power CO. Superfund Site are complex. As a result, the EPA has divided the Site into two OUs:

- OU 1: Source materials (remaining soil contamination and DNAPL)
- OU 2: Sitewide groundwater

This ROD addresses OU 1. The remedial action for OU 1, source materials, will be the initial remedial action for the Site. The EPA intends to negotiate a Consent Decree for RD/RA. The long-term remedial strategy will be managed as a phased approach. The OU 1 remedial action will be conducted to address the source materials prior to evaluating remedial alternatives to address the OU 2 sitewide groundwater. This phased remedial approach is preferred as it will initially focus on eliminating the continued leaching potential of the soil contamination into the water table, thus preventing further impacts to the drinking water aquifer and will minimize the further migration of contaminants from the DNAPL area to the groundwater plume. Following completion of the OU 1 remedial action, remedial alternatives to address the sitewide groundwater will be evaluated and a preferred alternative will eventually be proposed and selected in an additional ROD for OU 2.

## 5.0 Site Characteristics

This section of the ROD provides a brief overview of the Site, including its physical description, climate setting, topography, hydrology, geology, hydrogeology, the nature and extent of contamination and the conceptual site model (CSM). This summary of the site characteristics is based on previous investigations and response actions conducted by the respondents with oversight by the EPA. Detailed information about the site's characteristics can be found in documents in the AR, specifically the *Final RI Report, Rev. 3 (2020)* and the *Final FS Report, Rev.4 (2022).*

### 5.1 Conceptual Site Model

Health risks may occur when there is contact with a chemical by a receptor population. Exposed populations may ingest, inhale, or dermally absorb a chemical or contaminant of potential concern (COPC) to complete an exposure pathway and potentially may experience an adverse health risk. Exposure pathways are determined by the locations of sources, types of release mechanisms, types of fate and transport mechanisms, and the locations and activities of the receptors. The CSM identifies the pathway of COPCs from their primary source(s), through possible routes of exposure, to the potential receptor. The CSM was developed during the planning phase, prior to the field investigation activities, and then refined as more information became available. The human health CSM for OU 1 is included in Section 8.0 of the ROD. A range of potential human receptors, both current and future, have potentially been and could be exposed. These include residents, industrial/commercial workers, construction workers and utility workers.

The soil at OU 1 is contaminated with PAHs and BTEXs because of historical releases to the environment from the FMGP. The groundwater at OU 2 is contaminated with VOCs and semi-VOCs because of historical releases to the environment from the FMGP site. An evaluation of the leaching potential from soil to groundwater was conducted to determine the likelihood of residual soil contamination in the alley and along the 7th Street right of way to leach to groundwater. The evaluation focused on BTEXs and naphthalene since these are the MGP-related chemicals with the greatest potential to leach from the soil and migrate to groundwater. The evaluation conducted suggested that naphthalene concentrations in the alley and the 7th Street right of way pose a long-term risk to potentially impact groundwater from contaminant leaching. Residual benzene and ethylbenzene concentrations pose a lower risk; the risk for toluene and xylenes is considered negligible. Based on the leaching potential, the cleanup levels for COCs in soil are based on the protection-to-groundwater values.

The city of Norfolk's water supply relies on a blend of water from west municipal wells M-6 through M-13 and east municipal wells M-1, M-3, M-4, and M-5 when operational. The east municipal wells are currently operated during the summer months based on seasonal demand. Transducer data collected in 2019 and 2020 from site monitoring wells indicates a decrease in groundwater levels at site monitoring wells while the east municipal wells are operational. Based on this decrease in groundwater levels in site wells during east municipal well operations, it has been determined that there is connectivity between the shallow alluvial aquifer and deeper bedrock aquifer. Although the lateral extent of the groundwater contaminant plume did not change, there may be potential impacts to the vertical hydraulic gradient near the edge of the plume since drawdown was observed in downgradient monitoring wells during pumping of the east municipal wells.

The CSM for the site is included in Appendix C, Figure 16.

### 5.2 Overview of the Site

Norfolk is located within Madison County in northeastern Nebraska. The city of Norfolk, population of 24,400 in 2020, is the largest city in Madison County. Based on the city's comprehensive plan, the acreage is zoned approximately 30.2% residential, 15.5% public/civil use, 13.8% agricultural and 11.8% commercial. The site is in downtown Norfolk and consists of areas both north and south of the alley bisecting 7th and 8th Streets: BHE owns the property straddling the alley and NPPD owns the remainder of the site to the south. The BHE parcel is paved with concrete and is used for vehicle parking. The NPPD parcel is fenced off and contains a maintenance building and an electrical substation, with the remainder covered with gravel for parking and equipment storage.

Based on the 2018 City of Norfolk Zoning Map, the site properties are in a light industrial district zoning area and are not used for residential use. The general site area is zoned for multiple uses, including downtown and mixed uses, public facilities, retail, and single family residential. The buildings immediately west of the BHE parcel contain a warehouse area, and several businesses including a kitchen remodeling showroom, a bridal shop and a tile shop. The closest residences are located along the west side of 8th Street across the street from the NPPD parcel.

The north fork of the Elkhorn River is located approximately 0.7 mile east of the Site. The east municipal well field is located approximately 0.5 mile east of the Site.

The FMGP was located at the intersection of Norfolk Avenue and 7th Street. Figure 2 depicts the historical MGP structures and equipment. The groundwater contaminant plume associated with the Site

migrates to the east/southeast approximately 0.16 miles. Figures 10 through 13 depict the naphthalene and benzene plumes.

### 5.3 Climate

The climate in Madison County is continental, which varies widely throughout the seasons from extremely cold with frequent snowfall during the winter to hot and humid with widespread thunderstorms during the summer. The average annual temperature ranges from 47.3 degrees Fahrenheit (°F) to 53.2°F. In winter, the average minimum temperature is 14.7°F. In summer, the average maximum temperature is 84.7°F. Precipitation averages 26.57 inches per year with most occurring between April and September as rain. The average seasonal snowfall is 29.02 inches.

### 5.4 Area of Historical or Archeological Significance

There were no known areas of historical or archeological significance identified at the Site.

### 5.5 Stratigraphy

Alluvium and glacial till underlay the Site and areas immediately downgradient of the Site. The upper portion of the alluvium consists of approximately 10 to 15 feet of mostly stiff, low plasticity sandy or silty clay. The lower portion of the alluvium is composed of a medium to coarse grained sand with a few discontinuous clay lenses. Underlying the alluvium is glacial till composed mostly of very stiff sandy or silty clay. Figure 16 depicts the CSM for the Site.

### 5.6 Regional Geology

The soil in the site area has been classified as Muir silty clay loam of the Elkhorn River, underlain by glacial till. These soils consist mostly of stiff, low plasticity sandy to silty clay and are nearly level on low stream terraces, are well drained, and have slow surface run-off and moderate permeability. The soils formed from the silty alluvium in the floodplain of the Elkhorn River.

The City of Norfolk is within the alluvial plains of the Elkhorn River and its tributary, the North Fork of the Elkhorn River. The unconsolidated materials underlying the area consist of stream alluvium deposited by rivers. The northwestern portion of the city is underlain by glacial and loess deposits that create gently sloping to steep hills. The unconsolidated deposits are of Quarternary-age and have a thickness of 40 feet in the flood plain to 55 feet in areas containing glacial till and loess.

Underlying the consolidated materials are the 450-foot-thick rocks of the Upper and Lower Cretaceous. The Colorado Group is comprised primarily of shaly chalk and limestone (Niobrara Formation) and shale with some sandstone. The lower Dakota Group is primarily sandstone with some shale. These groups are underlain by Pennsylvanian-aged rock, consisting of shale, limestone sandstone and coal.

### 5.7 Site Geology

The site is underlain by alluvium and glacial till deposits. The upper portion of the alluvium consists of approximately ten to fifteen feet of mostly stiff, low plasticity sandy or silty clay. The lower portion of the alluvium is composed of a medium to coarse grained sands with a few discontinuous clay lenses. One clay lens is present within the sand layer underneath a portion of the Site at approximately 26 feet bgs. This lens was identified in EC-09 and EC-03 and was also observed in the soil boring for MW-02B.

However, the lens was not identified in any other EC probe or soil boring indicating the lens is not continuous throughout the site area.

### 5.8 Regional Hydrogeology

The primary aquifers in the area are a surficial aquifer formed by alluvial and glacial deposits and the deeper Colorado Group and Dakota Group aquifers. Private wells in the Norfolk area and the municipal water wells near the West Water Treatment Plant (wells M-6 to M-13), located approximately 3.5 miles west of town, draw water from the surficial aquifer (same as the site monitoring wells). Based on information from the city, the west wells range in depth between 50.67 and 65 feet. The municipal wells at the East Water Treatment Plant (M-1 to M-5), located approximately 0.5 mile east of the site, draw water from the deeper Colorado aquifer. Based on a camera inspection conducted at wells M-1, M-3 and M-4 in July 2019, and city records, the east municipal wells draw water from 45 to 117 feet bgs and are cased with cast iron pipe to at least the top of the limestone bedrock with open bore holes within the bedrock. There is no screen below the top of bedrock. Based on information obtained from the city, well M-2 is 127 feet deep, and M-5 is 117 feet deep. Well M-2 is an inactive well located adjacent to M-1. Figure 14 depicts the location of the east municipal wells.

The City of Norfolk's water supply is a blend of water from west municipal wells M-6 through M-13 and east municipal wells M-1, M-3, M-4 and M-5 when operational. Currently, the east municipal wells are only operated during the summer months (June, July, August). The city has indicated there is a potential for the East Water Treatment Plant to operate full time in the future based on municipal water demand.

A survey was performed by searching the Nebraska Department of Natural Resources database of registered groundwater wells. There are 249 registered wells within one mile of the site classified as monitoring (225), recovery (3), irrigation (1), heat pump (2), ground exchange (1), commercial/industrial (1), domestic (1), and other (14). The five municipal wells at the East Water Treatment Plant were not listed in the database. Most wells identified in the immediate site area appear to be monitoring wells. The nearest domestic wells are located approximately 0.8 mile northeast and 1 mile southeast of the site at 211 Sycamore Avenue and 901 South Birch, respectively. No domestic wells in the site vicinity are known to be present.

In 2021, the City of Norfolk passed Ordinance No. 5725 which requires all premises, residential, commercial, or industrial businesses within city limits and the city's two-mile extraterritorial zoning jurisdiction to be directly connected to a public water distribution main if the property is located within three hundred (300) feet of a public water distribution main. Connection to a public water distribution main will be required upon failure of an existing domestic well or at the time of new construction. The ordinance also states all new private water wells for premises located within three hundred (300) feet of a public water distribution main will be prohibited after March 15, 2021, unless approved by the public works director. The city ordinance is in Appendix I.

### 5.9 Site Hydrogeology

Groundwater levels have been measured in all site monitoring wells during the routine groundwater sampling events. During the June 2021 groundwater sampling event groundwater levels were measured in the 36 site monitoring wells to verify the groundwater flow direction. The depth to groundwater was similar to historic levels of 11-12 feet bgs. Figure 9 shows the groundwater surface elevation in June 2021 for the "A" level monitoring wells which are monitoring wells screened in the uppermost water-

bearing zone from 10-20 feet bgs. The contours indicate a general groundwater flow across the site to the southeast which is consistent with previous sampling events. The site monitoring well construction details and screening intervals are included in Table 26 of Appendix E.

DNAPL has also been measured during each routine sampling event. The measurements were performed by lowering a stainless-steel measuring device to the bottom of each well and recording the amount of DNAPL adhering to the device upon withdrawal from the well. Table 27 of Appendix E contains the observed DNAPL measurements.

During the time of the initial RI fieldwork, the east municipal wells were not operational, and groundwater flow within the surficial aquifer was observed to have a natural eastward trend toward the river. To determine if pumping of the east municipal wells affects groundwater flow closer to the MGP site, transducers were installed in upgradient wells MW-01A/B and downgradient wells MW-14A/B, MW-16A/B and MW-17A/B. Water levels were recorded every 30 minutes from July 17, 2019, through May 20, 2020. The results from July 17 through October 2, 2019, shown in Table 4-2 of RI Report provide a snapshot of water levels before, during and after the east municipal wells operational period.

In May 2020, in anticipation of the longer-term water level monitoring, the recording frequency was changed to once a day. Water levels were collected from downgradient wells MW-08A/B, MW-14A/B, MW-16A/B, and MW-17A/B from May 21 through September 21 to capture the June, July and August pumping operations; however, the city ceased operations on September 15. Therefore, the results shown in Table 4-3 of RI Report only account for 6 days following the shutdown. Figure 14 shows the location of the east municipal wells in relationship with the site monitoring wells and groundwater flow.

The transducer data show that water levels in the downgradient monitoring wells decreased during the entire period of operation and recovered after the city ceased operations of the east municipal wells. The transducer data also showed decreasing water levels even after the city wells were repaired by mid-July. While drawdown was observed in monitoring wells during the periods of pumping, no significant shift in groundwater flow direction was observed, suggesting that while pumping influenced water levels nearer the site, incomplete capture may be present from the east municipal wells. Although the lateral extent of the plume did not change, it is possible the vertical gradient of the edge of the plume was affected by observed drawdown in downgradient wells. Additional groundwater characterization will be completed during the OU 2 RI.

The operating east municipal wells draw water from approximately 45 to 117 feet bgs and appear to be installed to withdraw water from limestone bedrock, compared to the site-related monitoring wells that are installed no deeper than 34.5 feet in the overlying alluvium. Based on the observed decrease in groundwater levels in site wells during pumping, there is apparent hydraulic connectivity between the shallow alluvial and deeper bedrock aquifers.

Aquifer testing was completed during the EE/CA site characterization phase in 12 of 14 monitoring wells. Slug test data were evaluated using Starpoint Super Slug Software, Version 2.2. The Hvorslev method of slug test analysis was used to estimate hydraulic conductivity for each well. Boring logs of FMGP site wells and wells within the surrounding area of the east municipal wells that are deeper than 30 feet indicate glacial till, clay, or shale between the limestone and alluvial sand. This infers that some type of confining unit exists between the alluvial and bedrock aquifers. Therefore, the Hvorslev method was determined to be applicable and appropriate. Calculated hydraulic conductivity ranges from $1.41x10^{-3}$ centimeters per second (cm/sec) in MW-01A to $2.11x10^{-1}$ cm/sec in MW-05B. The average hydraulic conductivity of the upper and lower portions of the alluvial sand is $9.18x10^{-3}$ and $1.56x10^{-2}$

cm/sec, respectively. The horizontal flow velocities were calculated to be 45 feet per year in the upper portion of the alluvial sand and 86 feet per year in the lower portion of the alluvial sand. The slug test data are presented in Appendix K of the RI Report.

Consistent with the *Guidelines for Ground-Water Classification Under the EPA Ground-Water Protection Strategy* (EPA, 1986), the groundwater beneath the site is classified as a current and potential source of drinking water. The depth to groundwater at site monitoring wells collected in 2021 ranged between 11 to 12 feet bgs. The groundwater flow direction is to the east/southeast.

### 5.10 Sampling Strategy

The EPA Superfund program manages this project as a PRP-led site since there is a viable responsible party that has been identified for the site. The respondents have negotiated the AOCs to conduct the EE/CA, removal action and RI/FS in good faith and have completed the required work under each order. The AOC for RI/FS was effective on May 11, 2017.

Sampling activities for the RI were performed during numerous field events beginning in 2018 and consisted of geologic logging by advancing electrical conductivity probes downgradient of the site, groundwater direct push technology probes to collect samples for chemical analysis, soil probes to collect samples for geotechnical and leachate testing, installation and development of monitoring wells, collecting groundwater measurements and samples from site monitoring wells, collecting DNAPL measurements, samples and removing DNAPL from site wells, surveying newly installed wells and collecting water levels from select wells with transducers. The RI field work conducted in summarized in the sections below.

*Electrical Conductivity Probing*

Three electrical conductivity (EC) probes (EC-10, EC-11 and EC-12) were advanced with DPT downgradient of the site to determine the lithology of the soil in the groundwater investigation areas. EC probes were advanced until refusal with a hydraulic direct push probing unit in multiple locations between 3$^{rd}$ and 5$^{th}$ Streets. Refusal depth ranged from 47 to 55 feet bgs. The locations of the EC probes are shown on Figure 17.

EC probing was used to determine the top and bottom of the sand unit where groundwater probe samples were collected. The results indicate that the top of the sand layer is approximately 12 feet bgs and the bottom of the sand layer is approximately 32 feet bgs, which is consistent with historical EC probe results. In previous probes EC-10 and EC-12, a 5 to 7-foot sand layer was encountered approximately two to three feet below the top of the till.

*Groundwater Direct Push Technology Probing and Sampling*

Based on the sand layer depths determined by the EC probing, thirteen groundwater probes were advanced with DPT to determine the horizontal and vertical extent of groundwater contamination further downgradient than investigated during the EE/CA and other historical fieldwork. Initially a minimum of eight probes were planned to be advanced. However, based on the data from those probes, five additional probes were advanced to better define the extent of groundwater contamination. The locations of the groundwater probes are depicted on Figure 17. Samples from at least two depth intervals were taken from each probe: 12 to 16 feet and 28 to 32 feet bgs. In GWP-19, GWP-21, and GWP-22, a third

sample was collected from the sand layer that was encountered within the till only at these locations, which were advanced farther to the southeast than previously investigated.

At each location, the groundwater probe was advanced to the deepest sampling interval. Groundwater samples were collected by purging the probes using new polyethylene tubing and a peristaltic pump until the water was relatively free of sediment, approximately one to two gallons. Once a sample was collected, the probe was raised to the shallow or intermediate interval and the process was repeated. The groundwater samples were field-screened for benzene using Frog-4000TM field gas chromatograph. The instrument was calibrated for a benzene range of 0.8 to 40 micrograms per liter (ug/L). The five additional probes were advanced based on the field GC data.

All groundwater samples collected were also submitted to Pace Analytical of Lenexa, KS, for VOC analysis by SW-846 Method 8260 to verify gas chromatograph results. The 12 samples from the first four groundwater probe locations were analyzed under expedited 24-hour turnaround to verify that the field gas chromatograph was operating as expected as the data were used to make field decisions for locating groundwater probes.

*Soil Probing and Sampling*

In 2018, one soil probe was advanced with DPT outside of the investigation area along 6$^{th}$ Street to collect soil sample for geotechnical testing to evaluate the hydrologic properties of subsurface material in the site area. One shallow (15-20 feet) and one deep (27-32 feet) soil sample were collected using a direct push macro sampler and submitted to the GSI soil laboratory. Samples were submitted for grain size analysis. As originally proposed in the work plan, a Shelby tube sampler for collecting soil bulk density and total porosity samples was unable to be advanced due to saturated heaving sands. The grain size analysis reports are provided in Appendix D of the RI Report.

In 2020, seven DPT probes were advanced in the alley and along the 7$^{th}$ Street right of way for analysis by the soil synthetic precipitation leaching procedure (SPLP). Probe locations are shown on Figure 18. Shallow (6-8 feet) and deep (12-14 feet) soil samples were collected from each probe using direct push macro sampler and submitted to Pace Analytical. Fifteen soil samples were analyzed for SPLP by SW-846 Method 1312 and BTEX and naphthalene by SW-846 Method 8260. The SPLP leachate was additionally analyzed for BTEX and naphthalene.

*Monitoring Well Installation and Development*

A total of 19 permanent groundwater monitoring wells were installed between March 25 and April 10, 2019, to provide additional monitoring points in the site area. Except for MW-09A/B, MW-10A and MW-11 A/B, whose locations were originally proposed in the work plan, the well locations were based on the groundwater probing results. The additional wells provide sentinel locations to monitor the downgradient extent of the plume, monitor the lateral extent of the downgradient portion of the plume and provide monitoring points to differentiate FMGP-related from leaking underground storage tank (LUST)-related contamination in the downtown area. Figure 8 of Appendix C shows the locations of all site monitoring wells.

Table 26 of Appendix E provides the monitoring well construction information for the entire network.

All monitoring wells were developed using a submersible pump and surged during development to remove sediment and obtain clear water. Water quality parameters were collected after the purge water

was relatively free of sediment. Approximately 30 to 50 gallons were removed from each well. The development water was containerized in a 1,000-gallon polyethylene tank and stored on site for subsequent offsite treatment and disposal.

*Monitoring Well Sampling*

In June 2018, groundwater samples were collected from upgradient wells MW-01A/B and cross-gradient wells MW-06A/B. These samples were analyzed for C3-C12 Quantitative Molecular Characterization by gas chromatograph/mass spectrometry to determine concentrations of paraffins, isoparaffins, aromatics, naphthalene, and olefins (PIANO) analysis for comparison to DNAPL collected from MW-02A.

In April and August 2019, groundwater levels were measured in all site monitoring wells and groundwater samples were collected. Upgradient wells MW-01A/B were not sampled in April or August due to a historical lack of detections. Cross-gradient wells MW-18A/B were not sampled in August due to a lack of detections and distance from the plume. The samples were analyzed for VOCs by SW-846 Method 8260 and SVOCs by SW-846 Method 8270. Samples collected in April from 12 wells along the plume centerline were analyzed for geochemical parameters to assess the naturally occurring biological processes that have already been observed in the plume as well as to provide data to assess potential remedial technologies. The geochemical parameters included alkalinity, carbon dioxide, chloride, total and dissolved iron and manganese, methane, ethane, ethene, nitrate/nitrite, sulfate, sulfide, total organic carbon, chemical oxygen demand and biological oxygen demand.

To delineate between the MGP-related contamination and contamination associated with LUST sites in the area, groundwater samples from 13 monitoring wells were analyzed by forensic testing, including C3-C12 PIANO analysis of gasoline range compounds and/or parent and alkylated PAH analysis. The purpose was to compare and confirm the forensic results for samples collected in June 2018.

Following water level measurements and prior to sample collection, groundwater was purged using a low flow sampling method with a peristaltic pump and disposable polyethylene tubing. The purge water flowed through an In-Situ MP-Troll 9500 flow-through cell to measure oxidation-reduction potential (ORP), temperature, pH, conductivity, dissolved oxygen (DO) and turbidity to determine groundwater stability in wells. During well development, MW-10A, MW-11B, MW-12A and MW-14A contained visible sheen; MW-10A and MW-11B exhibited a characteristic tar odor; and MW-12A and MW-14A exhibited a distinctly different odor.

*DNAPL Sampling and Monitoring*

In May 2018, a DNAPL sample was collected from well MW-02A and analyzed for C3-C12 Quantitative Molecular Characterization by gas chromatograph/mass spectrometry (PIANO analysis). The data were compared to groundwater samples collected from select monitoring wells downgradient of the source area.

To assess the recoverability of DNAPL, MW-02A, MW-02B, MW-10A, and MW-11B were periodically measured during well installation and groundwater sampling fieldwork for the presence of DNAPL. Levels were also checked in May, August, and October 2019, May and September 2020. In April 2019, wells MW-02A and MW-11B contained enough DNAPL to warrant removal (greater than 0.25 feet). No DNAPL has been observed in well MW-10A. The DNAPL water mixture was removed

from the wells was solidified with an oil absorbent material and stored in a 55-gallon drum for disposal at a later date. Table 25 in Appendix E includes the DNAPL measurements in site monitoring wells.

*Municipal Well Camera Inspection*

In October 2019, three of the City's five east municipal water supply wells were inspected to supplement the groundwater flow evaluation. The city provided total well depths for all wells but only screened intervals for well M-5. Therefore, wells M-1, M-3 and M-4 were inspected by televising the wells.

To complete the inspection, Downey Drilling removed the turbine pumps using a truck-mounted crane from the three wells and lowered a camera to a total depth. It was observed that the wells are cased with cast iron to at least the top of bedrock with open bore holes within the bedrock. There was no screen within the bedrock. The construction infers that the intent was to remove water from the fractured limestone bedrock. The casings for both M-3 and M-4 had significant holes or deterioration near the bottom of the casings where the limestone bedrock was visible.

The city repaired wells M-1, M-3, M-4 and M-5 by July 15, 2020. New column pipes and pumps were installed in all wells. A new liner was installed in M-4.

Table 28 in Appendix E presents the total depths, screened intervals, and pumping capacities of the east municipal wells, either provided by the city or from the inspection.

*Transducer Data Collection*

Water levels were collected from select monitoring wells to evaluate potential drawdown effects from the pumping of the east municipal water supply wells. Transducers were installed in upgradient wells MW-01A/B and downgradient wells MW-14A/B, MW-16A/B and MW-17A/B to record water levels from July 17, 2019, through May 20, 2020. On May 21, the transducers in MW-01A/B were moved to MW-08A/B and water levels were recorded from May 21 through September 21. The results indicate a decrease in groundwater levels while the east municipal wells are operational. Based on this decrease in groundwater levels in site wells during east municipal well operations, it has been determined that there is connectivity between the shallow alluvial aquifer and deeper bedrock aquifer. Although the lateral extent of the groundwater contaminant plume did not change, it is possible the vertical gradient near the edge of the plume was impacted due to the observed drawdown in downgradient monitoring wells.

### 5.11 Known or Suspected Sources of Contamination

The soil at OU 1 is contaminated with PAHs and BTEXs because of historical releases to the environment from the FMGP. The groundwater at OU 2 is contaminated with VOCs and SVOCs because of historical releases to the environment from the FMGP. An evaluation of the leaching potential from soil to groundwater was conducted to determine the likelihood of residual soil contamination in the alley and along the 7$^{th}$ Street right of way to leach to groundwater. The evaluation focused on BTEXs and naphthalene since these are the FMGP-related chemicals with the greatest potential to leach from the soil and migrate to groundwater. The evaluation conducted suggested that naphthalene concentrations in the alley and the 7$^{th}$ Street right of way pose a long-term risk to potentially impact groundwater from contaminant leaching. Residual benzene and ethylbenzene concentrations pose a lower risk; the risk for toluene and xylenes is considered negligible. Based on the

leaching potential, the cleanup levels for COCs in soil are based on the protection-to-groundwater values.

The primary source of groundwater contamination are highly concentrated residuals in the form of DNAPL that remain within groundwater beneath the FMGP and immediately downgradient of the FMGP. However, as discussed above, the residual soil contamination in the vadose zone also exhibits a potential to leach to groundwater. Figure 7 shows the extent of the DNAPL. DNAPL has been measured and recovered in MW-2A and MW-2B since 2015 and in MW-11B since 2019 when it was installed. DNAPL was measured in 2015 at MW-2A at 5.04 feet thick and is currently at the base of measuring stick. The minimal recovery in wells since 2019 may indicate DNAPL surrounding the wells is nearing residual saturation. The overall area containing DNAPL is 52,000 square feet.

## 6.0 Nature and Extent of Contamination

RI field data acquired during the 2018, 2019 and 2020 field investigations were evaluated in conjunction with groundwater probe and monitoring well chemical data to further assess the nature and extent of groundwater contamination in the site area. Historical releases of FMGP residuals resulted in impacts to soil and groundwater at the site. Most of the soil contamination was addressed during the 2014 non-time-critical removal action. During the 2014 removal action, the below grade structures associated with the FMGP operations were removed and approximately 10,495 tons of contaminated soil and debris were excavated from the site. Based on the confirmation sampling, residual soil contamination exists in the vadose zone underneath the alley bisecting 7$^{th}$ and 8$^{th}$ Street and underneath 7$^{th}$ Street adjoining the site.

The primary source of groundwater contaminants are highly concentrated residuals in the form of DNAPL that remain within groundwater immediately downgradient of the FMGP. The overall area containing DNAPL is 52,000 square feet. However, as discussed above, residual soil contamination in the vadose zone also exhibits a significant potential to leach to groundwater. The most prevalent contaminants in the groundwater are benzene and naphthalene, which are common chemicals associated with both FMGP and LUST sites. Figures 8 through 14 show the locations of the LUST sites located in the downtown area near the site.

Based on the remaining soil contamination within the alley and 7$^{th}$ Street right of way, the respondents conducted an evaluation of the leaching potential from soil to groundwater to determine the likelihood of the residual soil contamination in the alley and along the 7$^{th}$ Street right of way to leach to groundwater. The evaluation focused on BTEX compounds and naphthalene since these are the FMGP-related constituents with the greatest potential to leach from the soil and migrate to groundwater. The evaluation conducted suggested that naphthalene concentrations remaining in the alley and 7$^{th}$ Street right of way pose a long-term risk to potentially impact the groundwater from contaminant leaching. Residual benzene and ethylbenzene concentrations pose a lower risk; the risk for toluene and xylenes is considered negligible. Based on the leaching potential, the cleanup levels for COCs in soil are based on the protection of groundwater-to-(soil-to-groundwater) values.

Cleanup levels were not developed for the heavier PAHs remaining in soil, which will be immobile compared to the lighter VOCs that have migrated into groundwater. The estimated extent of the vadose zone soil contamination to be addressed under the OU 1 remedial action covers an area of approximately 19,400 square feet. The estimated volume of remaining soil contamination to be addressed is 10,200 cubic yards. Figure 6 depicts the extent of the soil contamination to be addressed under the OU 1

remedial action. The maximum soil concentrations and the associated cleanup levels for the OU 1 COCs are included below.

| Soil Analytical Results and Cleanup Levels | | | |
|---|---|---|---|
| **Contaminant of Concern** | **Maximum Concentration (mg/kg)** | **Cleanup Levels (mg/kg)** | **Cleanup Levels (µg/kg)** |
| Benzene | 3.41 | 0.052 | 52 |
| Toluene | 0.896 | 13.8 | 13,800 |
| Ethylbenzene | 87.5 | 45.6 | 45,600 |
| Total Xylenes | 257 | 633 | 633,000 |
| Naphthalene | 473 | 0.0076 | 7,6 |
| Benzo(a)pyrene | 56 | 4.8 | 4,800 |

mg/kg – milligrams per kilogram
µg/kg – micrograms per kilogram

Principal threat wastes are highly toxic or highly mobile materials that may present a significant risk to human health or the environment if exposure were to occur. They include liquids and other materials having high concentrations of toxic compounds (e.g., solvents). Consistent with the NCP and EPA guidance, the identification of principal threat waste is made on a site-specific basis. The source area contamination associated with OU 1 is "principal threat waste" because of the presence of DNAPL. The DNAPL constitutes a principal threat waste as it is source material that acts as a reservoir for migration of contamination to groundwater.

The site also consists of a groundwater contaminant plume which is designated as OU 2 that originates at the source area and migrates to the east/southeast approximately 0.16 miles. The East Municipal Water Treatment Plant is approximately 0.5 mile east of the site. As indicated in Section 4.0, following completion of the OU 1 remedial action, remedial alternatives to address the sitewide groundwater will be evaluated and a preferred alternative will eventually be proposed and selected in an additional ROD for OU 2. Figures 10 through 13 depict benzene and naphthalene plumes and Figure 14 depicts the locations of the east municipal water supply wells. Consistent with the *Guidelines for Ground-Water Classification Under the EPA Ground-Water Protection Strategy* (EPA, 1986), the groundwater beneath the site is classified as current and potential source of drinking water.

Contaminated soil and groundwater can result in a vapor intrusion (VI) pathway. A VI pathway occurs when vapors form beneath buildings and structures and enter those buildings through cracks in basements and foundations as well as through utility conduits and other openings. Multiple lines of evidence are utilized when evaluating the VI pathway at a site. Indoor air, sub-slab soil gas and soil gas samples were collected at multiple locations throughout the site to evaluate the VI pathway.
Soil gas and/or indoor air and ambient air samples were collected over five sampling events from February 2015 to June 2016. Soil gas samples were collected from near-slab ports located adjacent to the west end of the buildings (along 8$^{th}$ Street) and from sub-slab ports installed within the warehouse area of the building adjacent to the west side of the removal action excavation area. Indoor air samples were collected from the warehouse area and adjacent businesses located west of the warehouse. The VI sampling and evaluation determined that based on the current use of the warehouse, VI from FMGP-related contaminants does not pose an unacceptable risk to occupants of the building. No VI mitigation was warranted.

## 7.0 Current and Potential Future Site and Resource Uses

The city Norfolk has a population of over 24,000 and is the largest city in Madison County according to the 2017 U.S. census data. The average resident age is 36.2 years. Based on a comprehensive plan update completed for the City in February 2017, the population of Norfolk is expected to exceed 29,600 by 2040. Based on the city's comprehensive plan, the acreage is zoned approximately 30.2% residential, 15.5% public/civil use, 13.8% agricultural, and 11.8% commercial. The remaining areas are vacant, or city operated rights-of-way. Future growth and development are anticipated to occur incrementally for the next 20 years.

The site is located near the middle of downtown Norfolk. During the removal action, contaminated soils were excavated, and the area was backfilled with clean fill and capped to prevent additional exposure. Site improvements included a paved parking lot on the northern portion for the adjoining commercial properties. The rest consists of a vacant building, vacant gravel lot, and a small substation. The immediate area is surrounded by residential and commercial activities. Both the NPPD and BHE properties have ECs in place that include activity and use limitations. The city's comprehensive plan does not include any zoning changes or downtown improvements that would impact the site in the foreseeable future.

Groundwater is the primary source of drinking water for the city of Norfolk and is also used for industrial, commercial, agricultural (livestock and irrigation) and domestic purposes. The future groundwater uses will likely remain the same. The nearest municipal well to the site utilized for drinking water is M-5, which is located about .5 mile east/downgradient of the site property. The East Water Treatment Plant consists of four active municipal wells that are currently operated during summer months based on seasonal demand. The east municipal wells draw water from the deeper Colorado aquifer and range in depth from 45 to 117 feet.

The groundwater in the Site has been designated as an EPA Class II Aquifer, a current and potential source of drinking water. The state of Nebraska has designated the groundwater as a Class GA Groundwater Supply. Class GA Groundwater designates a groundwater supply which is currently being used as a public drinking water supply or is proposed to be used as a public drinking water supply. Contamination detected in the source materials at OU 1 is contributing to the groundwater contaminant plume.

## 8.0 Summary of Site Risks

This section summarizes the results of the BLRA, which consists of a Human Health Risk Assessment (HHRA) and an Ecological Risk Assessment (ERA). The HHRA for the site was finalized in 2019 as part of the RI. See Appendix D for information on how human health risk is calculated. These BLRAs (before any cleanup) provide the basis for taking a response action and identify exposure pathways. Risk assessments examine existing and potential future risks that could occur if conditions at a site do not change. The NCP has set a target risk range of $1x10^{-4}$ to $1x10^{-6}$ for excess lifetime carcinogenic risk and a target hazard index (HI) of no greater than one for non-carcinogenic risks. The response actions selected in this ROD are necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

## 8.1 Summary of Human Health Risk Assessment

An HHRA identifies the potential exposure pathways through which people may be exposed to Site contaminants, the toxicity of the contaminants present, and the potential for carcinogenic and non-carcinogenic effects to occur from exposure to the contaminants. Chemical contaminants that are ingested (consumed), inhaled (breathed), or dermally absorbed (via skin contact) may present carcinogenic or non-carcinogenic risk to different organs of the human body.

The HHRA for OU 1 was conducted for the Site as part of the RI/FS to estimate the risks and hazards to human receptors associated with current and future potential uses. The HHRA is an analysis of the potential adverse human health effects caused by exposure to the hazardous substances in the absence of any actions to control or mitigate the exposures. It provides the basis for taking a response action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action.

A four-step process is used in the HHRA to assess the site-related cancer risks and non-cancer health hazards. The four-step process: 1) identification of COPCs and calculation of exposure point concentrations (EPCs); 2) assessment of potential exposures; 3) assessment of toxicity of COPCs; and 4) calculation of the risk-based exposures, toxicity, and concentrations of COPCs. At the end of the risk-assessment process, those COPCs found to pose an unacceptable human or ecological risk, called risk drivers, are identified as COCs.

The 2019 HHRA for the site was conducted prior to separating the site into OU 1 and OU 2 and evaluated risks associated with soil exposure into four separate areas (1) BHE property, (2) NPPD property, (3) alley between NPPD and BHE properties, and (4) 7$^{th}$ Street and Norfolk Avenue right of way. Cancer risks to future residents, construction utility workers and commercial/industrial workers at the NPPD property and BHE property are all within the EPA's acceptable risk range of $1x10^{-6}$ (1 in 1,000,000) to $1x10^{-4}$ (1 in 10,000). Cancer risks to future residents exposed to soil within the alley and groundwater exceed the $10^{-4}$ values which indicates an unacceptable cancer risk. At all four areas evaluated, the HI exceeded one for future residents exposed to both soil in the alley and groundwater, the HIs were 3.82 and 517, respectively. For all other exposure scenarios, the HI was less than one and considered insignificant.

The BLRA estimates what risks the Site poses if no action were taken. It provides the basis for taking a response action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. This section of the ROD summarizes the results of the BLRA for this Site.

### 8.1.1 Identification of Chemicals of Concern

Data evaluated for the HHRA consisted of the analytical results from soil samples collected primarily on the BHE and NPPD parcels as well as the alley that separates the FMGP. Groundwater samples were collected from the monitoring wells installed on the site.

The COCs for the site were determined by first selecting the COPCs. COPCs were identified using the results of a risk-based screening. Maximum detected concentrations and maximum laboratory reporting limits (for non-detections) were compared to RSLs. COPCs are generally selected as a subset of all chemicals or contaminants positively identified at the Site. The process of determining the COPCs for

OU 1 included a detailed evaluation of the analytical data, a careful analysis of the source of contamination and areas that the source impacts and a review of site characteristics.

For the purposes of selecting COPCs for OU 1, the analytical data were grouped by media. Soil samples and associated analytical results were grouped based on sample location within the limits of the NPPD and BHE parcels, the alley between the two parcels, and the City of Norfolk right-of-way along 7th Street and Norfolk Avenue. Two rounds of groundwater data were collected from monitoring wells installed during the RI field investigation. Based on the recommended procedures outlined in *Determining Groundwater Exposure Point Concentrations, Supplemental Guidance* (EPA, 2014a), sample data from core plume monitoring well locations MW-04, MW-07, MW-08, MW-11, and MW-14 are used to assess risk downgradient of the FMGP site properties. COPCs identified for OU 1 included BTEXs, PAHS including acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indene(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene and arsenic.

Arsenic was identified as a COC in the Proposed Plan. However, based on the data collected, the maximum concentration of 17.6 mg/kg results in a cancer risk of $2.6 \times 10^{-5}$ which is within the acceptable cancer risk range. The average concentration of arsenic of 8.0 mg/kg when used in the RSL calculator indicates a cancer risk of $1.2 \times 10^{-5}$ which is also within the acceptable risk range. The resulting risk evaluating the maximum concentration detected as well as the average is within the acceptable risk range, and both are likely not significantly different than natural background concentrations of arsenic found in this area of town. Given the likelihood that these concentrations represent naturally occurring concentrations, a cleanup level is not necessary for arsenic for OU 1.

COPCs not associated with MGP operations were identified in groundwater at the Site and were not retained as COCs. Chemicals detected included chlorinated VOCs, VOCs associated with other types of petroleum contamination such as methyl; tertiary butyl ether, and common laboratory contaminants such as methylene chloride and acetone. Chlorinated VOCs are not chemicals associated with MGP sites but other industrial uses such as dry cleaning and degreasing; methyl tertiary butyl ether is a fuel additive.

The primary COCs detected in groundwater are BTEXs and PAHs, with the expected chemicals benzene, naphthalene, and benzo(a)pyrene driving the risk.

### 8.1.2 Exposure Assessment

Exposure refers to the contact or potential contact of an individual (the receptor) with a contaminant. The exposure assessment evaluates the magnitude, frequency, duration, and route of potential exposure. The reasonable maximum exposure (RME) scenarios are developed using current exposure pathways given existing land uses and exposures which might reasonably be predicted based upon expected or logical future land use assumptions. Table A-4 in Appendix A of the BLRA includes information related to the inputs and parameters for the RME scenarios.

The exposure assessment process involved four main steps:

- Characterization of the exposure setting (physical environment and potential receptors)
- Identification of exposure pathways (constituent sources, exposure points, and exposure routes)
- Quantification of pathway-specific exposures (EPCs, calculation of receptor intakes, and exposure assumptions)

- Identification of uncertainties in the exposure assessment

The BLRA Report documented Site conditions that were used in the characterization of the exposure setting. These Site conditions included information about the physical setting including location, current condition of site properties, zoning information about surrounding properties, site-specific hydrogeology and well survey information.

Based on the nature of the COCs detected and the physical characteristics of the site, the potential routes of contaminant migration relevant to human exposure included the following for the site:

- Incidental ingestion, dermal contact, and inhalation of airborne particulates from surface soil,
- Incidental ingestion, dermal contact, and inhalation of volatile contaminants released from subsurface soil,
- Ingestion, dermal contact, and inhalation of volatile contaminants in groundwater.

The HHRA evaluated the exposure points associated with each medium. The determination of exposure routes was based on the media contaminated and the anticipated activities at the exposure point. Exposure routes for each receptor at the site are provided below.

- Future Commercial/Industrial Workers-Surface Soil – NPPD Property (0-2 feet) – If the gravel surface was removed, future onsite workers (outdoor) may be exposed to COCs via incidental ingestion, dermal contact, and inhalation of airborne particulates.
- Future Adult and Child Residents-Surface Soil – NPPD Property (0-2 feet) – If the gravel surface was removed, future residents may be exposed to COCs via incidental ingestion, dermal contact, and inhalation of airborne particulates.
- Future Construction Workers-Subsurface Soil – NPPD Property (2-10 feet) – During future excavation for utility repair or construction activities, onsite workers may be exposed to COCs in soil via incidental ingestion, dermal contact, and inhalation of volatile contaminants released from soil.
- Future Construction Utility Workers-Subsurface Soil – BHE Property (0-10 feet) – During future excavation for utility repair or construction activities, onsite workers may be exposed to COCs in soil via ingestion, dermal contact, and inhalation of volatile contaminants released from soil.
- Future Adult and Child Residents-Surface Soil – Alley Between NPPD and BHE Properties (0-2 feet) – If the surface was removed, future residents may be exposed to COCs via incidental ingestion, dermal contact, and inhalation of airborne particulates.
- Future Construction Worker-Subsurface Soil – Alley Between NPPD and BHE Properties (0-10 feet) – During future excavation for utility repair or construction activities, workers may be exposed to COCs in soil via incidental ingestion, dermal contact, and inhalation of volatile contaminants released from soil.
- Future Adult and Child Residents-Surface Soil – 7$^{th}$ Street and Norfolk Avenue ROW (0-2 feet) – If the surface was removed, future residents may be exposed to COCs via incidental ingestion, dermal contact, and inhalation of airborne particulates.
- Future Construction Worker-Subsurface Soil – 7$^{th}$ Street and Norfolk Avenue ROW (0-10 feet) – During future excavation for utility repair or construction activities, workers may be exposed to COCs in soil via incidental ingestion, dermal contract, and inhalation of volatile contaminants released from soil.
- Future Onsite/Offsite Adult and Child Residents-Groundwater – It is possible that MGP-related groundwater contaminants could migrate further away from the site and impact potable water

wells. Residents may be exposed to COCs in groundwater via ingestion, dermal contact, and inhalation of volatile contaminants.

An exposure point concentration (EPC) is the concentration of a COPC in an environmental medium that may reach the potential receptor. The exposure concentration is typically defined as the average concentration contacted by the receptor at the exposure point. A conservative estimate of this average concentration is the 95$^{th}$ percent upper confidence limit of the arithmetic mean. Contaminant concentrations that were reported as "not detected" were included in the assessment to calculate EPCs. Data from duplicate samples were included in the assessment consistent with the approach used during the EE/CA risk assessment.

Due to small sample sets for the groundwater assessment, the maximum concentration detected had to be used as the EPC for many COCs when the recommended UCL exceeded the maximum concentration. Except for arsenic, the maximum concentration detected in MW-11 was used to assess risk. ProUCL cannot be used for sample sets less than five.

Tables A-2.1 through A-2.8 of Appendix A of the BLRA present the calculated EPCs for soil and groundwater.

The HHRA developed EPCs for the following groups of data for the site:

- Incidental ingestion of soil,
- Dermal contact with soil,
- Inhalation of particulates,
- Inhalation of volatilized contaminants,
- Ingestion of groundwater,
- Dermal contact with groundwater, and
- Inhalation of VOCs from groundwater vapors.

The HHRA for the site demonstrated that cancer risks to future residents, construction utility workers and commercial/industrial workers at the NPPD property and the BHE property are all within the EPA's acceptable risk range of $1x10^{-6}$ (1 in 1,000,000) to $1x10^{-4}$ (1 in 10,000). Cancer risks to future residents exposed to soil within the alley and groundwater exceed the $10^{-4}$ values which indicates an unacceptable cancer risk. At all four areas evaluated, the HI exceeded one for future residents exposed to both soil in the alley and groundwater, the HIs were 3.82 and 517, respectively. For all other exposure scenarios, the HI was less than one and considered insignificant.

### 8.1.3 Toxicity Assessment

The Toxicity assessment describes the relationship between a dose of a chemical and potential likelihood of an adverse health effect. The purpose of the toxicity assessment is to quantitatively estimate inherent toxicity of COPCs for use in risk characterization. In the context of the regulatory risk assessment process, potential effects of chemicals are separated into two categories: carcinogenic (cancer) and non-carcinogenic (non-cancer) effects. This division relates to current EPA policy that mechanisms of action for these endpoints differ. The EPA generally assumes conservatively that carcinogenic chemicals do not exhibit a response threshold (EPA 1986, 2005B), while non-carcinogenic effects are universally recognized as threshold phenomena. However, chemicals believed to be carcinogenic may also be capable of producing non-carcinogenic risks.

For the oral and dermal routes of exposure, toxicity values for carcinogens, also known as cancer slope factors (CSF), are expressed in units of cancer incidence per unit dose of chemical. For the inhalation route of exposure, cancer risk is assessed with inhalation unit risk (IUR) values. IUR is the upper-bound excess lifetime cancer risk estimated to result from continuous exposure to an agent at a concentration of 1 $\mu g/m^3$ in air.

For non-carcinogens, the toxicity values or reference doses (RfD) are expressed in terms of a threshold value below which adverse effects are not expected to be observed. Non-cancer risk is assessed using reference concentrations (RfC). An RfC is an estimate of a continuous inhalation exposure to the human population that is likely to be without an appreciable risk of deleterious effects during a lifetime.

There are five standard descriptors used to describe a chemical carcinogenic hazard potential based on a weight of evidence analysis. They are as follows: "Carcinogenic to Humans," "Probable Human Carcinogen," "Possible Human Carcinogen," "Not Classifiable as to Human Carcinogenicity," and "Likely to be Carcinogenic to Humans." PCE is classified as "Likely to be Carcinogenic to Humans" and TCE is classified as "Carcinogenic to Humans."

Toxicity values were obtained from the following hierarchy of sources in accordance with the EPA's Office of Solid Waste and Emergency Response Directive 9285.7-53:

- Tier 1 – The EPA's Integrated Risk Information System (IRIS)
- Tier 2 – Provisional Peer-Reviewed Toxicity Values (PPRTV) derived by the EPA's Superfund Health Risk Technical Support Center for the EPA Superfund Program
- Tier 3 – Other peer-reviewed values including: Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels; California Environmental Protection Agency, or Cal/EPA; and the EPA Superfund Program's Health Effects Assessment Summary Tables values (HEAST).

Tables 9 and 10 include cancer toxicity data summary and Tables 11 and 12 include noncancer toxicity data summary in Appendix E for the site.

### 8.1.4 Risk Characterization

For carcinogens, risks are generally expressed as the incremental probability of an individual's developing cancer over a lifetime because of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

$$Risk = CDI \times SF$$

where: risk = a unitless probability (e.g., 2E-05) of an individual's developing cancer
CDI = chronic daily intake averaged over 70 years (mg/kg-day)
SF = slope factor, expressed as (mg/kg-day)-1.

These risks are probabilities that usually are expressed in scientific notation (e.g., $1x10^{-6}$). An excess lifetime cancer risk of $1x10^{-6}$ indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in 1,000,000 chance of developing cancer because of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual's developing cancer from all other causes has been estimated to be as high as one in three.

Current Superfund regulations for acceptable exposures specify an upper value of cancer risk as between $1x10^{-4}$ to $1x10^{-6}$. The goal of protection is less than $1x10^{-6}$ for cancer risk.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with a reference dose (RfD) derived from a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of exposure to toxicity is called a hazard quotient (HQ). An HQ<1 indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. The Hazard Index (HI) is generated by adding the HQs for all chemical(s) of concern that affect the same target organ (i.e., liver) or that act through the same mechanism of action within a medium or across all media to which a given individual may reasonably be exposed. An HI<1 indicates that, based on the sum of all HQ's from different contaminants and exposure routes, toxic noncarcinogenic effects from all contaminants are unlikely. An HI>1 indicates that site-related exposures may present a risk to human health.

The HQ is calculated as follows:

Non-cancer HQ = CDI/RfD

where:

CDI = Chronic daily intake
RfD = reference dose

CDI and Rfd are expressed in the same units and represent the same exposure period (i.e., chronic, sub-chronic, or short-term).

Non-carcinogenic and carcinogenic risks were evaluated for each exposure pathway and scenario by integrating the exposure doses calculated in the exposure assessment with the toxicity criteria identified in the toxicity assessment for the COCs. The results of the risk characterization were summarized in the BLRA Report and are included in Appendix E Tables 13 through 24 of this ROD.

### 8.1.5 Uncertainties

Uncertainties are inherent in the process of quantitative risk assessment due to use of environmental sampling results, assumptions regarding exposure, and quantitative representation of chemical toxicity. The uncertainties in the risk assessment are associated with all steps in the risk assessment process. This is due to assumptions made regarding the analytical data used, the characterization of exposure routes, the accuracy and completeness of available toxicity information, and the risk characterization itself. Section 6.0 of the BLRA dated November 2019 for the site discusses each of these areas in more detail.

### 8.1.6 Summary of Human Health Risks and Hazards

The focus of the BLRA was to evaluate the potential risks to future receptor populations associated with residual soil contamination outside of the removal action excavation areas and the risk associated with contamination in groundwater. The risks associated with the soil exposure pathway are within the acceptable ranges established by the EPA for all pathways evaluated except for the residential scenario for the alley between the BHE parcels. It is unlikely that this area would ever be repurposed for residential use as it supports multiple underground utility lines as a right-of-way between two non-

residential properties and ECs are in place on these surrounding properties prohibiting residential development.

Future populations could potentially be exposed to an unacceptable risk due to contact with contaminated groundwater. The risk is primarily associated with naphthalene; however, other BTEXs, PAHs, and arsenic additionally pose unacceptable risks. The risk is overestimated as the maximum concentration detected for many chemicals of concern was used to assess the risks.

Cancer risks to future residents, construction utility workers and commercial/industrial workers at the NPPD property and BHE property are all within the EPA's acceptable risk range of $1x10^{-6}$ (1 in 1,000,000) to $1x10^{-4}$ (1 in 10,000). Cancer risks to future residents exposed to soil within the alley and groundwater exceed the $10^{-4}$ values ($4.6 \times 10^{-3}$ and $3.2 \times 10^{0}$, respectively) which indicates an unacceptable cancer risk. At all four areas evaluated, the hazard index (HI) exceeded 1 for future residents exposed to both soil in the alley and groundwater, the HIs were 3.82 and 517, respectively. For all other exposure scenarios, the HI was less than 1 and considered insignificant.

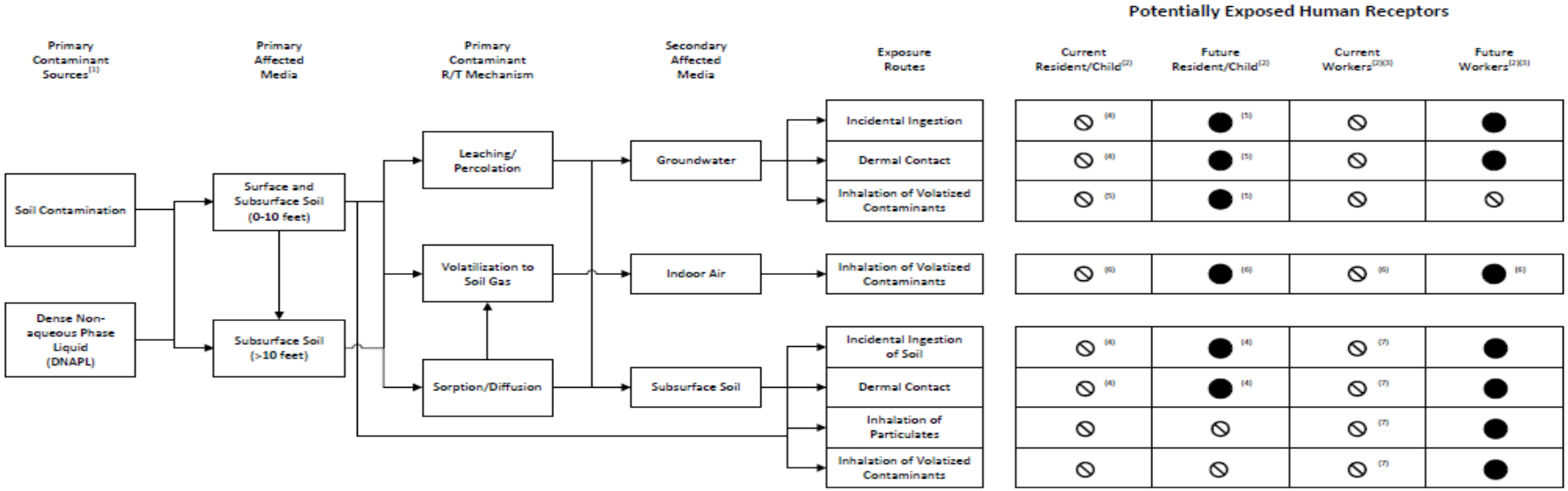
Tables 23 and 24 of the Appendix E include a summary of the carcinogenic and noncarcinogenic risks, respectively, associated with the site.

### 8.2 Summary of Ecological Risk Assessment

The ecological risk assessment that was conducted for the EE/CA site characterization is still applicable. Norfolk is within or near the habitat of several species that are listed on Nebraska's threatened or endangered species list, which is maintained by the National Resources Conservation Service of Nebraska. These habitats include nesting areas for the Bald Eagle, Interior Least Tern, and the Piping Plovers and the migration corridor for the Eskimo Curlew. Reptiles and mammals listed include the Massasuga (a type of rattlesnake) and the River Otter. Norfolk is also within the potential habitat for two endangered plants: the Small White Lady's Slipper and the Western Prairie-fringed Orchid. As part of the original risk assessment completed for the site during the EE/CA, the potential for ecological impacts was assessed and it was determined, because the site is located near the middle of downtown Norfolk, it is not expected that MGP-related contamination will impact any of these species.

Human Health Conceptual Site Model – OU 1

The human health conceptual site model integrated and summarized the information concerning sources, constituent migration pathways and exposure routes into a combination of exposure pathways. The human health conceptual site model identified the key potential release mechanisms, transport media, exposure points, exposure media, exposure routes and potential receptors for the Site.




**Abbreviations:**

R/T = Release/Transport

**Notes:**

⊘ = Incomplete exposure pathway.

● = Potentially complete exposure pathway.

(1) = Includes onsite and offsite areas (NPPD property, BHE property, 7th Street ROW, and alley between NPPD & BHE properties).

(2) = No current populations are exposed to soil or groundwater due to concrete/gravel barrier, lack of potable water wells within the plume, and institutional controls preventing the installation of wells within city limits. Therefore, exposures are based on a future use scenario.

(3) = Types of workers includes industrial, commercial, construction, and utility.

(4) = No onsite residents due to environmental covenant preventing residential development; however, potential residential development could be considered as a future use of the property.

(5) = There are no potable water wells installed within the limits of the plume, and a city ordinance is in place to prevent installation of private wells within city limits.

(6) = The potential for vapor intrusion for buildings adjacent to the site was assessed following the removal action. It was determined there was not an unacceptable risk. However, in situ remedial technologies may increase this risk during implementation.

(7) = Although the site is currently covered by pavement, gravel, or buildings, if the surface material or buildings were removed, there would be a potential for exposure in areas outside of the removal action area.

**Norfolk MGP Site**
**Human Health Conceptual Site Model**
BLACK & VEATCH

### 8.3 Basis for Remedial Action

The response action selected in this ROD is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. BTEXs and PAHs have impacted soil at the site. The COCs contained in the source area soils at OU 1 are migrating into the groundwater and presenting a threat to the drinking water aquifer. The selected remedy for OU 1 will prevent the migration of COCs in soil that would result in groundwater contamination above levels that are protective of beneficial use (i.e., drinking water use) and will minimize the further migration of COCs from the DNAPL area to the groundwater plume.

## 9.0 Remedial Action Objectives

Remedial action objectives (RAOs) consist of medium-specific or location-specific goals for protecting human health and the environment. RAOs provide a general description of what the cleanup will accomplish (e.g., restoration of ground water to drinking water levels). These goals typically serve as the design basis for the remedy. Discussion of RAOs provides a basis for evaluating the cleanup options for the Site and an understanding of how the risks identified in the previous section will be addressed by the response action. The RAOs also serve to facilitate the FYR determination of protectiveness of human health and the environment.

The RAOs for OU 1 are:

- Prevent exposure via inhalation of COCs through vapor intrusion from soil gas that exceed the $10^{-6}$ cancer risks and/or a hazard of 1 for non-cancer risks.

- Prevent incidental ingestion, dermal contact, and inhalation of airborne particulates of COCs from source materials that exceed the $10^{-6}$ cancer risks and/or a hazard index of 1 for non-cancer risks.

- Prevent the migration and leaching potential of COCs in soil that would result in groundwater contamination above levels that are protective of beneficial use (i.e., drinking water use).

- Minimize the further migration of COCs from the DNAPL area to the groundwater plume.

The Selected Remedy for OU 1 will prevent the continued migration of COCs from contaminated soils to groundwater by reducing the soil concentrations to below the cleanup levels for benzene and naphthalene which are 52 micrograms per kilogram (µg/kg) and 7.6 µg/kg, respectively. Benzene and naphthalene have the greatest potential to leach to groundwater based on the leachability study conducted at the site. These cleanup levels were derived from the maximum contaminant level (MCL)-based protection of groundwater soil screening level (SSL) for benzene and the risk-based SSL for naphthalene published in the May 2020 Regional Screening Level table that was then multiplied by a dilution attenuation factor (DAF) of 20. The screening level protective of groundwater for benzene in soil is 2.6 µg/kg and for naphthalene is 0.38 µg/kg. From the SSL Guidance, the DAF of 20 was selected using a weight of evidence approach which considers the EPA's Composite Model for Leachate Migration with Transformation and results applying the SSL dilution model to 300 groundwater sites across the United States. Concentrations exceeding the cleanup levels of 52 µg/kg and 7.6 µg/kg for both benzene and naphthalene, respectively, were detected throughout the unsaturated zone to the top of the water table at approximately 12 feet bgs. The OU 1 remedial action will also reduce concentrations of toluene to 13,800 µg/kg, ethylbenzene to 45,600 µg/kg, total xylenes to 633,000 µg/kg and

benzo(a)pyrene to 4,800 µg/kg. The OU 1 remedial action will reduce the inhalation exposure to building occupants from COCs in soil gas, originating from source materials, above levels determined to present a human health risk from soil gas to building occupants.

There are no federal or state cleanup standards for benzene and naphthalene soil contamination. Therefore, the EPA established site-specific cleanup levels for soil. The site-specific cleanup levels for soil will prevent the continued migration of benzene and naphthalene from soil to groundwater.

## 10.0 Description of Alternatives

This section provides a brief explanation of the remedial alternatives developed for OU 1. The numbering of the alternatives in the Proposed Plan and in this ROD were revised to Alternatives 1 through 4 which differ from the FS Report, Rev. 4. Capital costs are those expenditures that are required to construct a remedial alternative. Operation and maintenance (O&M) costs are those post-construction costs necessary to ensure or verify the continued effectiveness of a remedial alternative and are estimated on an annual basis. Present-worth cost is the amount of money if invested in the current year, would be sufficient to cover all the costs over time associated with the project, calculated using a discount rate of seven percent. Construction time is the time required to construct and implement the alternative and does not include the time required to design the remedy or procure contracts for design and construction.

The description of each alternative in this section contains information so that the comparative analysis of alternatives in the next section of the ROD can focus on the differences or similarities among alternatives with respect to the nine evaluation criteria pursuant to the NCP § 300.430(e)(9).

### OU 1 Remedial Alternatives

### No Action Alternative

***Alternative 1 – No Action***

Estimated Capital Cost: $0
Estimated O&M Cost: $0
Estimated Present-Worth Cost: $0
Estimated Construction Timeframe: None
Estimated Time to Attain RAOs: Does not meet RAOs

In accordance with 40 C.F.R. § 300.430(e)(6), the NCP requires that the EPA consider the "no action" alternative against which other remedial alternatives can be compared. Under this alternative, no remedial actions will be conducted. No attempts will be made to monitor or control exposure to contaminants. If this alternative was implemented, the RAOs would not be achieved. In addition, applicable or relevant and appropriate requirements (ARARs) would not be met. This alternative will not be given further consideration.

***Alternative 2 – Soil Excavation, In-situ Chemical Oxidation***

Estimated Capital Cost: $9,640,000
Estimated O&M Cost: $770,000
Estimated Present-Worth Cost: $10,410,000

Estimated Construction Timeframe: 1 year
Estimated Time to Attain RAOs: 5 years

Alternative 2 consists of excavation and off-site disposal of the soil from the vadose zone and using in-situ chemical oxidation (ISCO) to address the DNAPL in the saturated zone. The depth of the soil excavation would be dependent on the water table level at the time of the remedial action. Most recent water level measurements at the site indicate the depth to water is around 15 feet bgs. The excavated area would be backfilled with clean, compacted fill material to within 2 feet of final grade. The remaining 2 feet would be backfilled with compacted gravel and concrete or asphalt.

ISCO would involve injecting a chemical oxidant into the subsurface to directly treat and reduce the DNAPL contaminant mass in the saturated zone. The oxidation reaction occurs wherever there is contact between the oxidant and organic contaminants. Common oxidizing agents include ozone, hydrogen peroxide, potassium permanganate, persulfate, and Fenton's reagent (hydrogen peroxide and iron).

***Alternative 3 – Thermally Enhanced Soil Vapor Extraction***

Estimated Capital Cost: $9,300,000
Estimated O&M Cost: $1,300,000
Estimated Present-Worth Cost: $10,600,000
Estimated Construction Timeframe: 1 year
Estimated Time to Attain RAOs: 5 years

Alternative 3 involves using thermally enhanced soil vapor extraction (SVE) to address the vadose zone contamination and ISCO for weathering DNAPL in the saturated zone. The application of ISCO under this alternative would be essentially the same as for Alternative 2, less aggressive monitoring/mitigation is expected as the multiple vapor extraction wells installed to collect VOCs would draw them away from the adjacent building.

Thermally enhanced SVE vary from ISTT such that the vapor extraction process can be enhanced from applying heat at lower temperatures (e.g., <100°C) and requires less energy to operate. The entire subsurface does not need to be evenly heated as the main mechanism for contaminant removal is through vacuum extraction. Thermally enhanced SVE will also promote the natural degradation of contaminants in soil through increased oxygen and temperature.

Once extracted, the contaminated vapors are treated prior to releasing to atmospheric air. Common treatment technologies for off gas are granulated activated carbon (GAC) absorption and catalytic or thermal oxidation. The thermal system would be operated for a minimum of 6 months and the SVE system would be operated during the heating period and possibly up to two years to extract contaminants during the soil cool off period.

***Alternative 4 – In-Situ Thermal Treatment***

Estimated Capital Cost: $7,590,000
Estimated O&M Cost: $310,000
Estimated Present-Worth Cost: $7,900,000
Estimated Construction Timeframe: 2-3 months
Estimated Time to Attain RAOs: 4 years

Alternative 4 would include treating both the unsaturated and saturated zones with ISTT which involves heating the subsurface to temperatures around 100°C to destroy or remove contaminants. The heat vaporizes VOCs and reduces the viscosity of DNAPL, so it moves more easily through soil for collection or destroys VOCs in-situ through pyrolysis. There are multiple thermal treatment options including electrical resistance heating (ERH), thermal conductive heating (TCH) and steam enhanced extraction (SEE).

In a typical ERH application, an electric current is passed through electrodes installed within the contaminated zone to increase the temperature of the soil. The increase in temperature raises the vapor pressure of both VOCs and SVOCs, resulting in volatilization and recovery. With TCH, the subsurface temperature is increased through conductive heat transfer. Heat is applied to the subsurface through vertical rods that contain electrically powered heating elements. SEE achieves subsurface heating through steam injection into wells and extraction of hot fluids from multi-phase extraction wells. SEE provides a mass transfer pathway of DNAPL through the steam injection so it can be collected through extraction wells. Extracted DNAPL and vapor phase organics are treated through catalytic or thermal oxidation, chemical oxidation, or GAC absorption; DNAPL may also be disposed of off-site.

Heat would be applied to the subsurface for at least 6 months. The off gas and collected DNAPL would be periodically sampled and tested to determine the effectiveness of treatment and when it is considered complete. “Hot” testing of soil can also be completed during treatment to determine the effectiveness. Soil sampling would be performed post-treatment for additional confirmation of effectiveness, after the subsurface is allowed to cool for 6 to 8 months.

Common Elements and Distinguishing Features of Each Alternative

Alternatives 2 through 4 for OU 1 include common elements. These common elements apply to all alternatives, except the “No Action” alternative. The common elements for OU 1 include vapor monitoring and mitigation, institutional controls (ICs), groundwater sampling and performance monitoring. Vapor monitoring during the remediation would verify that the community and adjacent building occupants are protected. ICs are non-engineered instruments, such as administrative and legal controls, that help minimize the potential for exposure to contamination and/or protect the integrity of the response action. The BHE and NPPD parcels have ECs in place which detail activity and use limitations to be protective of human health and the environment. An additional EC may be warranted to minimize potential exposures to any remaining heavy PAHs within the alley where the utility corridor is located.

## 11.0 Summary of Comparative Analysis of Alternatives

Section 300.430(f)(5)(i) of the NCP requires that the EPA evaluate and compare the remedial cleanup alternatives based on the nine evaluation criteria listed below. The first two criteria, overall protection of human health and the environment and compliance with ARARs are threshold criteria that must be met for the Selected Remedy. The Selected Remedy must then represent the best balance of the following five primary balancing criteria: long-term effectiveness and permanence; reduction of toxicity, mobility or volume of contaminants through treatment; short-term effectiveness; implementability and cost. The final two criteria, state and community acceptance are referred to as modifying criteria. The table below provides a breakdown of capital, O&M, and periodic cost for the alternatives. Table 1 in Appendix E presents a summary of the comparative analysis using a qualitative rating system to assess the degree to which each alternative satisfies the threshold and balancing criteria.

### 11.1 Overall Protection of Human Health and the Environment

This threshold criterion addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or ICs.

All the alternatives, except the no-action alternative, are protective of human health and the environment by eliminating, reducing, or controlling risks through treatment or removal of contaminated soil and DNAPL. As a result, the no action alternative was eliminated from consideration under the remaining eight evaluation criteria.

Alternatives 2, 3 and 4 would be protective of human health and the environment because they would reduce the risk of human contact by removing contaminants from the unsaturated zone and treating (weathering) the DNAPL in the saturated zone, subsequently reducing contaminant migration from the source materials. Alternatives 2, 3 and 4 would achieve RAOs by preventing the migration and leaching potential of COCs in soil that would result in groundwater contamination above levels that are protective of beneficial use (i.e., drinking water use) and will minimize the further migration of COCs from the DNAPL area to the groundwater plume. Reducing soil concentrations will also reduce the inhalation exposure to building occupants to COCs in soil gas, originating from contaminated soil.

### 11.2 Compliance with Applicable or Relevant and Appropriate Requirements

This threshold criterion addresses whether an alternative will comply with federal and state environmental statutes, regulations and other requirements that pertain to the site or whether a waiver is justified. Section 121(d) of CERCLA and NCP § 300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate requirements referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4).

"Applicable requirements" are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable. "Relevant and appropriate requirements" are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate.

Alternatives 2, 3 and 4 would meet their respective ARARs from federal and state laws. The ARARs for this action are outlined in Appendix F of this ROD.

### 11.3 Long-Term Effectiveness and Permanence

This criterion evaluates expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time once clean-up levels have been met. This criterion

includes the consideration of residual risk that will remain on-site following remediation and the adequacy and reliability of controls.

Alternatives 2 rates moderate regarding long-term effectiveness because excavated soils would not be destroyed, they would be moved to a permitted landfill. The intent of the ISCO under Alternative 2 would be to treat the entire mass of contaminants, it may be difficult to ensure that all DNAPL has been addressed and that chemicals do not become soluble and contribute to the dissolved phase groundwater plume. Alternative 3 rates low-to-moderate for long-term effectiveness. Even with closely spaced vapor extraction wells, all heavier PAHs throughout the vadose zone may not be removed. Alternative 4 rates high for long-term effectiveness since ISTT is highly effective at removing and destroying VOCs and heavy PAHs and other SVOCs from both the vadose and saturated soils.

### 11.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

This criterion evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants; the degree of expected reduction in toxicity, mobility, or volume; the type and quantity of treatment residuals; the degree to which the treatment will be irreversible; and the number of residuals.

Alternative 2 rates moderate since excavation and disposal of soil contamination will not reduce the toxicity, mobility, or volume of contaminants through treatment. ISCO would reduce the volume of toxicity of the contamination through oxidation. Alternative 3 rates moderate since the application of thermally enhanced SVE would reduce the mobility and volume of contamination in the vadose zone but it is likely some residual contamination would remain consisting primarily of the heavier PAHs and tar components. Alternative 4 rates high since ISTT would substantially reduce the toxicity, mobility, and volume of contamination in the vadose and saturated zones by either destroying or capturing VOCs and DNAPL through extraction wells.

### 11.5 Short-Term Effectiveness

This criterion evaluates the short-term risks that might be posed to the community, to workers and to the environment during construction and operation of the remedy until cleanup levels are achieved.

Alternatives 2, 3 and 4 rate moderate for short-term effectiveness. Exposure risks for remedial action workers and adjacent populations during implementation of all alternatives evaluated are minimal and can be easily monitored and controlled with appropriate health and safety procedures.

### 11.6 Implementability

This criterion evaluates the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.
Alternatives 2 rates low for implementability due to the difficulty of the excavation portion of the alternative because of the presence of multiple utilities and an adjacent building and the need to close 7$^{th}$ Street during implementation. Alternatives 3 and 4 rate low to moderate for implementability. Alternative 3 would be readily implementable using mostly conventional drilling and probing equipment. Implementation of Alternative 4 would be complicated due to infrastructure and access from multiple property owners, the technology is routinely implemented in areas with significant infrastructure and heavily trafficked areas, as well as below buildings.

### 11.7 Cost

This criterion evaluates the estimated capital costs, O&M costs, and present-value costs of each alternative. Total costs for each alternative consist of direct capital costs, indirect capital costs and O&M costs. Direct capital costs are those directly attributable to construction activity, such as materials, labor, and equipment. Indirect capital costs are administrative and overhead expenses associated with construction activity and may include engineering expenses, licenses and permits and contingency allowances. O&M costs are post-construction expenses that are necessary to ensure the effectiveness of the remedial action.

The estimated present worth cost for Alternative 3 is the highest, and the estimated present worth cost of Alternative 4 is the lowest. The O&M costs for Alternative 3 are the highest and are lowest for Alternative 4. The main differences in costs are related to the capital costs for construction and implementation for Alternatives 2, 3, and 4.

Cost estimates are expected to be accurate within a range of +50 to -30 percent.

| Cost Comparisons of Remedial Alternatives | | | | |
|---|---|---|---|---|
| | **Alternative 1** | **Alternative 2** | **Alternative 3** | **Alternative 4** |
| **Capital Cost** | $0 | $9,640,000 | $9,300,000 | $7,590,000 |
| **O&M Cost (annual)** | $0 | $770,000 | $1,300,000 | $310,000 |
| **Present-Worth Cost** | $0 | $10,410,000 | $10,600,000 | $7,900,000 |
| **Estimated Construction Timeframe** | None | 1 year | 1 year | 2-3 months |
| **Estimated Time to Attain RAOs** | Does not meet RAOs | 5 years | 5 years | 4 years |

### 11.8 State/Support Agency Acceptance

This criterion considers whether the state, based on its review of the information, concurs with, opposes, or has no comment on the EPA's Preferred Alternative. The state of Nebraska, as represented by the NDEE, concurs with the Selected Remedy, Alternative 4, as outlined in the Proposed Plan for the Site. The NDEE provided a letter of concurrence which is in Appendix G.

### 11.9 Community Acceptance

This criterion considers whether the local community agrees with the EPA's analyses and Preferred Alternative. Comments received on the Proposed Plan are important indicators of community acceptance.
The Proposed Plan with the Preferred Alternative for remediating OU 1 was made available to the public on April 25, 2022, and a public comment period was held from April 25, 2022, to May 24, 2022. During the public comment period, the EPA solicited comments from the public at a virtual public meeting on May 3, 2022. The EPA also encouraged the public to submit comments through other forms of communication, including traditional mail, electronic mail, telephone, and internet submission via the site profile page. No comments were submitted during the public comment period. Community acceptance of the Preferred Alternative was evaluated after the public comment period ended. Based on the evaluation, the community is supportive of Alternative 4, ISTT.

## 12.0 Principal Threat Wastes

The NCP establishes an expectation that the EPA will use treatment to address the principal threats posed by a site wherever practicable (40 C.F.R. § 300.430(a)(1)(iii)(A)). Identifying principal threat wastes combines concepts of both hazard and risk. In general, principal threat wastes are those source materials considered to be highly toxic or highly mobile which generally cannot be contained in a reliable manner or would present a significant risk to human health, or the environment should exposure occur. Conversely, non-principal threat wastes are those source materials that generally can be reliably contained and that would present only a low risk in the event of exposure. The way the principal threats are addressed will determine whether the statutory preference for treatment as a principal element is satisfied.

The source area contamination associated with OU 1 is "principal threat waste" because of the presence of DNAPL. The DNAPL constitutes a principal threat waste as it is source material that acts as a reservoir for migration of contamination to groundwater.

## 13.0 Selected Remedy

This section expands upon the details of the Selected Remedy for OU 1 from that which was provided in the Description of Alternatives section of the ROD. This section provides the appropriate level of detail about the engineering details and estimated costs for the Selected Remedy so that the design engineer has enough information to initiate the design phase of the response action. This will minimize the likelihood of unanticipated changes to the scope and intent of the Selected Remedy. This discussion is organized into four sections: (1) Summary of the Rationale for the Selected Remedy (2) Description of the Selected Remedy, (3) Summary of Estimated Remedy Costs, and (4) Expected Outcomes of Selected Remedy.

### 13.1 Summary of the Rationale for the Selected Remedy

Alternative 4 was selected over the other alternatives because it is expected to achieve RAOs in a short timeframe and will prevent the migration of COCs in soil that would result in groundwater contamination above levels that are protective of beneficial use (i.e., drinking water use) and will minimize the further migration of contaminants from the DNAPL area to the groundwater plume. Alternative 4 will reduce contaminant concentrations within the source area soils to meet the cleanup levels for benzene of 52 µg/kg and naphthalene of 7.6 µg/kg. These two contaminants have the highest potential to leach to groundwater. ISTT is a proven treatment technology that is effective in removing and destroying VOCs from both the vadose and saturated zones within the low-permeability alluvium material of clays and silts. ISTT could remove up to 99% of the VOCs and up to 75-85% of heavy PAHs and DNAPL. The remaining heavier PAHs will be immobile following treatment and would not continue impacting groundwater.

Based on the information currently available, the EPA and NDEE believe the Selected Remedy meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. The EPA expects the Selected Remedy to satisfy the following statutory requirements of CERCLA § 121(b): 1) be protective of human health and the environment; 2) comply with ARARs; 3) be cost effective; and 4) utilize permanent solutions and alternative treatment technologies to the maximum extent practicable.

### 13.2 Description of the Selected Remedy

The Selected Remedy includes ISTT which could include the use of either or a combination of ERH, SEE or TCH. Alternative 4 involves heating the subsurface to volatilize contaminants for vapor removal from the subsurface. The heat vaporizes VOCs and reduces the viscosity of DNAPL, so it moves more easily though soil for collection or destroys VOCs in-situ through pyrolysis. While ERH can be used to treat contamination in both the unsaturated and saturated zones, SEE is only applicable to saturated zone and TCH is only applicable to the unsaturated zone.

In a typical ERH application, an electric current is passed through electrodes installed within the contaminated zone to increase the temperature of the soil. The increase in temperature to around 100°C raises the vapor pressure of both VOCs and SVOCs, resulting in volatilization and recovery. SEE achieves subsurface heating through steam injection into wells and extraction of hot fluids from multi-phase extraction wells. In addition, SEE provides a mass transfer pathway of DNAPL through the steam injection so it can be collected through extraction wells. ERH is generally more suitable for lower permeability soils while SEE is more applicable in higher permeability materials so the steam can propagate through the soil. With TCH, the subsurface is heated through vertical rods that contain electrically powered heating elements. TCH technologies can heat the subsurface to temperatures up to 700°C; however, ISTT vendors indicate heating the subsurface to 300°C should be sufficient. Extracted DNAPL and vapor phase organics are treated through catalytic or thermal oxidation, chemical oxidation, or GAC adsorption; DNAPL may also be transported off-site for disposal.

It is expected that a combination of ISTT technologies would be implemented to address OU 1 at the site. Directional or angled drilling may be required to treat the DNAPL plume located underneath the buildings or the railroad tracks east of 7$^{th}$ Street. While closure of 7$^{th}$ Street may not be required as the thermal treatment equipment could be installed below grade, closure could simplify the installation and operation process.

Heating the subsurface will impact the integrity of the communications duct, its contents, and the gas line in the alley. These utilities will need to be either relocated or protected during heating to implement this alternative. The utilities could be protected by placing thermal insulation around the lines or water quenching of the material around the line to prevent heating the subsurface. A combination of the protection methods could be used along with operating the system to avoid heating the area containing these utilities.

Thermostats monitor the distribution of heat in the subsurface to ensure the temperature of the subsurface reaches 100°C. Heat would be applied to the subsurface for approximately 6 months. The off gas and collected DNAPL will be periodically sampled and tested to determine the effectiveness of treatment. “Hot” testing of the soil can also be completed during treatment to determine effectiveness. Soil sampling would also be performed post-treatment for additional confirmation of effectiveness, after the subsurface cools for six to eight months.

At least two years of quarterly groundwater monitoring will be conducted after the completion of treatment operations to monitor the effectiveness of the ISTT in enhancing the degradation of the downgradient dissolved phase plume.

Vapor mitigation measures are inherent in the application of the ISTT and include surface capping of the treatment area and capturing and treating off-gas. To further mitigate the vapor intrusion risk, an active sub-slab ventilation system will be installed to protect the occupants of the building. To verify that

mitigation measures are protective, weekly soil gas sampling and indoor air monitoring will be conducted throughout the operations period and at least during the initial stages of the cool down period.

Alternative 4 construction can likely be completed in two to three months and achieve RAOs in approximately four years.

**OU 1 Source Materials**

The estimated extent and volumes of source materials is presented below.

*Soil Area*
The overall area of contaminated soil is 19,400 square feet. Figure 6 depicts the soil contamination footprint. The volumes of contaminated soil by depth areas as follows:

- 0-15 feet: 3,000 cubic yards (alley and 7th Street right of way)
- 3-15 feet: 5,300 cubic yards (NPPD property)
- 11-15 feet: 1,900 cubic yards (BHE property)

*DNAPL Area*
The overall area containing DNAPL is 52,000 square feet. Figure 7 depicts the DNAPL footprint. The volumes of DNAPL impacted areas are as follows:

- 15-35 feet: 9,200 cubic yards
- 17-25 feet: 5,900 cubic yards
- 22-25 feet: 2,500 cubic yards
- 27-35 feet: 1,400 cubic yards
- 31-32 feet: 140 cubic yards

### 13.3 Summary of the Estimated Remedy Costs

The information in this cost estimate summary table is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements may occur because of new information and data collected during the engineering design of the remedial alternative. Major changes may be documented in the form of a memorandum in the AR file, an explanation of significant differences or a ROD Amendment. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

The cost estimates for all the remedial alternatives, including the Selected Remedy, to address the source materials at OU 1 are documented in the FS Report, Rev. 4.

**Cost Estimate for Selected Remedy – Alternative 4**

Estimated Capital Cost: $7,590,000
Estimated O&M Cost: $310,000
Estimated Present-Worth Cost: $7,900,000

### 13.4 Expected Outcomes of the Selected Remedy

The Selected Remedy for OU 1 is ISTT. This remedy will: 1) be protective of human health and the environment; 2) comply with ARARs; 3) be cost effective; and 4) utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. The Selected Remedy is expected to achieve the RAOs identified for this OU. The RAOs include:

- Prevent exposure via inhalation of COCs through vapor intrusion from soil gas that exceed the $10^{-6}$ cancer risks and/or a hazard index of 1 for non-cancer risks.

- Prevent incidental ingestion, dermal contact, and inhalation of airborne particulates of COCs from source materials that exceed the $10^{-6}$ cancer risks and/or a hazard index of 1 for non-cancer risks.

- Prevent the migration and leaching potential of COCs in soil that would result in groundwater contamination above levels that are protective of beneficial use (i.e., drinking water use).

- Minimize the further migration of COCs from the DNAPL area to the groundwater plume.

The Selected Remedy for OU 1 will attain RAOs in approximately four years.

## 14.0 Statutory Determinations

Under CERCLA §121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element and a bias against off-site disposal of untreated wastes. The following sections discuss how the Selected Remedy for OU 1 will meet these statutory requirements.

### 14.1 Protection of Human Health and the Environment

The Selected Remedy for OU 1, Alternative 4, will protect human health and the environment by treating the contaminated source materials associated with the site. The Selected Remedy for OU 1 will prevent the inhalation exposure to COCs through vapor intrusion from soil gas and will prevent incidental ingestion, dermal contact, and inhalation of airborne particulates of COCs from source materials. The ISTT will significantly reduce the overall contaminant mass in the unsaturated and saturated zones and should substantially decrease the release of chemicals to the dissolved phase contaminant plume. The treatment of the contaminated soil in the unsaturated zone will prevent the migration and leaching potential of COCs in soil that would result in groundwater contamination above levels that are protective of beneficial use (i.e., drinking water use). The Selected Remedy for OU 1 will also minimize the further migration of COCs from the DNAPL area to the groundwater plume.
The Selected Remedy is protective of human health and the environment as it will reduce the risk of human contact by removing most VOCs and SVOCs from the unsaturated zone and substantially treating the DNAPL in the saturated zone subsequently reducing contaminant migration from the source.

### 14.2 Compliance with ARARs

Section 121(d)(2) of CERCLA; 42 U.S.C. 9621(d)(2); NCP, 40 C.F.R. Part 300; and guidance and policy issued by the EPA require that remedial actions conducted under CERCLA achieve a degree or level of cleanup which, at a minimum, attains any standard, requirement, criteria or limitation under any federal environmental law or any promulgated standard, requirement, criteria or limitation under a state environmental or facility siting law that is more stringent than any federal standard is legally applicable to the hazardous substance or pollutant or contaminant concerned or is relevant and appropriate under

the circumstances of the release or threatened release of such hazardous substance or pollutant or contaminant. The identified standards, requirements, criteria, or limitations thus adopted from other environmental laws, which govern on-site cleanup activities at this site, are referred to as ARARs.

For on-site cleanup activities under Section 121(e)(1) of CERCLA, the EPA is not required to obtain any federal, state, or local permits. For action conducted on-site, the Selected Remedy will comply with the substantive (non-administrative) requirements of the identified federal and state laws.

The Selected Remedy of ISTT will comply with all ARARs in Appendix F.

### 14.3 Cost-Effectiveness

In the lead agency's judgment, the Selected Remedy is cost-effective and represent a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness." (NCP § 300.430(f)(1)(ii)(D)). This was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfied the threshold criteria (i.e., were both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs and hence this alternative represents a reasonable value for the money to be spent.

The estimated present worth cost of the Selected Remedy for OU 1 is $7,900,000. Alternative 4 is the least expensive remedy evaluated for OU 1. Appendix E, Table 25 of the ROD presents the present-worth cost estimate for the Selected Remedy for OU 1, Alternative 4. The information in the cost estimate is based on the best available information regarding the Selected Remedy.

### 14.4 Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable (MEP)

The EPA has determined that the Selected Remedy represents the maximum extent to which permanent solution and treatment technologies can be utilized in a practicable manner at the Site. Of those alternatives that are protective of human health and the environment and comply with ARARs, the EPA has determined that the Selected Remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element and bias against off-site treatment and disposal and considering State and community acceptance.

The Selected Remedy will address OU 1 source materials and will achieve significant reductions in COC concentrations in soil, preventing the continued migration of contamination into groundwater. The Selected Remedy will also minimize the further migration of COCs from the DNAPL area to the groundwater plume.

### 14.5 Preference for Treatment as a Principal Element

By treating the contaminated soils and DNAPL by ISTT, the Selected Remedy addresses principal threats posed by the site using treatment technologies. By utilizing treatment as a significant portion of

the remedy, the statutory preference for remedies that employ treatment as a principal element is satisfied.

### 14.6 Five-Year Review Requirements

Section 121(c) of CERCLA and the NCP § 300.430(f)(5)(iii)(C) provide the statutory and legal basis for conducting FYRs. Because this remedy for OU 1 will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of the remedial action to ensure the remedy is, or will continue to be, protective of human health and the environment.

## 15.0 Documentation of Significant Changes

To fulfill CERCLA § 117(b) and NCP §§ 300.430(f)(5)(iii)(B) and 300.430(f)(3)(ii)(A), the ROD must document and discuss the reasons for any significant changes made to the Selected Remedy. Changes described in this section must be limited to those that could have been reasonably anticipated by the public from the time the Proposed Plan and the RI/FS Report(s) were released for the public comment to the final selection of the remedy. The Proposed Plan, which identified the Preferred Alternative for OU 1, was released for public comment in April 2022. The EPA received a letter of concurrence from NDEE on May 3, 2022, which is included in Appendix G. It was determined that no significant changes to the remedy for OU 1, as originally identified in the Proposed Plan, were necessary or appropriate.

## PART III: RESPONSIVENESS SUMMARY

This Responsiveness Summary has been prepared in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) and the National Contingency Plan (NCP) 40 C.F.R § 300.430(f).

The Proposed Plan and supporting documents included in the AR file were made available for public review and comment from April 25, 2022, to May 24, 2022. A virtual public meeting was held on May 3, 2022, with several Norfolk community members in attendance. The public was supportive of the Preferred Alternative for OU 1. There were no questions or comments received during the public meeting that would suggest changes in or opposition to the Preferred Alternative. No written comments from the local community were received during the public comment period. The NDEE sent a letter concurring with the Preferred Alternative dated May 3, 2022, which is included in Appendix G. A copy of the transcript from the public meeting is included in the AR file for the Site.

# APPENDIX A

# ACRONYMS

| | |
|---|---|
| AOC | Administrative Settlement Agreement and Order on Consent |
| ARARs | Applicable or Relevant and Appropriate Requirements |
| AR | Administrative Record |
| bgs | below ground surface |
| BHE | Black Hills Energy |
| BLRA | Baseline Risk Assessment |
| BTEX | Benzene, Toluene, Ethylbenzene, Total Xylenes |
| CERCLA | Comprehensive Environmental Response, Compensation and Liability Act |
| CERCLIS | Comprehensive Environmental Response, Compensation and Liability Information System |
| COCs | Contaminants of Concern |
| COPC | Contaminant of Potential Concern |
| CSM | Conceptual Site Model |
| DNAPL | Dense Nonaqueous Phase Liquid |
| DPT | Direct push technology |
| EC | Environmental Covenant |
| EE/CA | Engineering Evaluation/Cost Analysis |
| EPA | U.S. Environmental Protection Agency |
| EPC | Exposure Point Concentration |
| ERA | Ecological Risk Assessment |
| ERH | Electrical resistance heating |
| FMGP | Former Manufactured Gas Plant |
| FYR | Five-Year Review |
| HHRA | Human Health Risk Assessment |
| HI | Hazard Index |
| ICs | Institutional Controls |
| ISTT | In Situ Thermal Treatment |
| MCL | Maximum Contaminant Level |
| mg/kg | milligram per kilogram |
| NCP | National Oil and Hazardous Substance Pollution Contingency Plan |
| NDEE | Nebraska Department of Environment and Energy |
| NPL | National Priorities List |
| NPPD | Nebraska Public Power District |
| O&M | Operation and Maintenance |
| OU | Operable Unit |
| PAHs | Polycyclic Aromatic Hydrocarbons |
| PRP | Potentially responsible party |
| RAO | Remedial Action Objective |
| RD | Remedial Design |
| RI/FS | Remedial Investigation/Feasibility Study |
| RME | Reasonable maximum exposure |
| ROD | Record of Decision |
| SARA | Superfund Amendments and Reauthorization Act |
| SEE | Steam enhanced extraction |
| SVE | Soil vapor extraction |
| SVOCs | Semi-Volatile Organic Compounds |
| TCH | Thermal conductive heating |
| µg/kg | micrograms per kilogram |

| | |
|---|---|
| VI | Vapor Intrusion |
| VOC | Volatile Organic Compound |

# APPENDIX B

# GLOSSARY OF TERMS

***Administrative Record:*** The body of documents the EPA uses to form the basis for selection of a response.

***Applicable or Relevant and Appropriate Requirements (ARARs):*** Section 121(d)(2)(A) of CERCLA incorporates into law the CERCLA Compliance Policy, which specifies that Superfund remedial actions meet any Federal standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate requirements. Also included in the provision is State ARARs must be met if they are more stringent than Federal requirements.

***Capital Costs:*** Expenses related to the labor, equipment, and material costs of construction.

***Carcinogenic (cancer) Risk*:** Carcinogenic risks are probabilities usually expressed in scientific notation (e.g., $1 \times 10^{-6}$). An excess carcinogenic risk of $1 \times 10^{-6}$ indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in 1,000,000 chance of developing cancer because of a site-related exposure.

***Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA):*** Enacted by Congress in 1980 to give the federal government the authority to clean up hazardous waste sites and established the Hazardous Substance Trust Fund, commonly called Superfund, to pay for cleanups.

***Cleanup Levels****:* Medium- and contaminant-specific goals set to be achieved because of the RAOs (e.g., treatment of contaminated groundwater to MCLs.)

***Contaminant of Concern (COC)*:** The chemical substances found at the site at concentrations that may pose an unacceptable risk to human health and the environment.

***Feasibility Study (FS)*:** The report that presents the identification and evaluation of the most appropriate technical approaches to address contamination problems at a Superfund site.

***Hazard Index (HI):*** The hazard index serves as a conservative summary of pathway and receptor non-cancer risks. A hazard index of 1 or lower means toxics are unlikely to cause adverse non-cancer health effects over a lifetime of exposure. However, a hazard index greater than 1 doesn't necessarily mean adverse effects are likely. The EPA evaluates this on a case-by-case basis.

***Maximum Contaminant Level (MCL):*** Established by the Safe Drinking Water Act as the maximum permissible level of a contaminant in water which is delivered to any user of a public water system.

***National Oil and Hazardous Substances Pollution Contingency Plan (NCP)*:** The federal governments blueprint for responding to both oil spills and hazardous substance releases.

***National Priorities List (NPL):*** The EPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial response.

***Operable Unit (OU):*** A distinct portion of a Superfund site or a distinct action at a Superfund site. An operable unit may be established based on a particular type of contamination, contaminated media (e.g., soil, water), source of contamination, and/or some physical boundary or restraint.

***Operation and Maintenance Costs (O&M):*** The cost and time frame of operating labor, maintenance, materials, energy, disposal, and administrative components of the remedy.

***Present Worth Cost:*** The present worth of a future investment or payment that is calculated using a predetermined discount or interest rate. Present Worth Cost is the amount of money, which is invested in the current year, would be sufficient to cover all the costs over time associated with a remedial action.

***Proposed Plan:*** A document requesting public input on a proposed remedial alternative.

***Record of Decision (ROD)*:** A document which is a consolidated source of information about the site, the remedy selection process, and the selected remedy for a cleanup under CERCLA.

***Reference dose levels:*** An estimate of a daily oral exposure to the human population, including sensitive subpopulations, that is likely to be without an appreciable risk of adverse health effects during a lifetime.

***Remedial Action:*** Action taken to clean up contamination at a site to acceptable standards.

***Remedial Action Objectives (RAOs):*** General descriptions of what the cleanup will accomplish (e.g., prevent the migration of contamination in soil to groundwater).

***Remedial Investigation (RI):*** A detailed study of a site. The RI may include an investigation of air, soil, surface water, and groundwater to determine the source(s), types of contaminants, and extent of contamination at a site.

***Vapor Intrusion:*** Migration of hazardous vapors from any subsurface vapor source, such as contaminated soil or groundwater, through the soil and into overlying buildings or structures.

***Volatile Organic Compound (VOC):*** An organic compound which evaporates readily to the atmosphere.

# APPENDIX C

# FIGURES

**FIGURE 1 – Site Location Map**

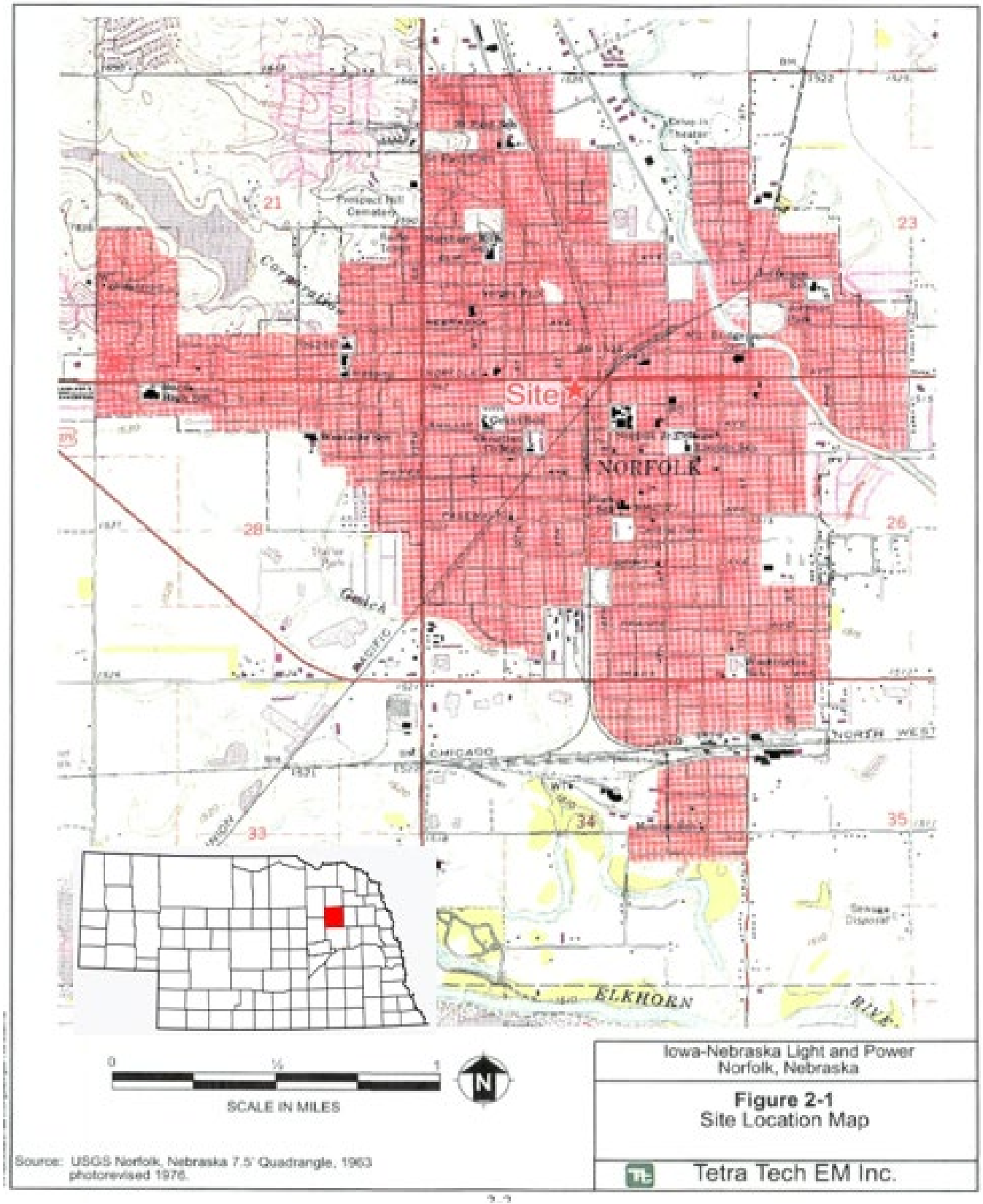


**FIGURE 2 – Former Manufactrued Gas Plant Structures**

**FIGURE 3 – Non-Time Critical Removal Action Map**

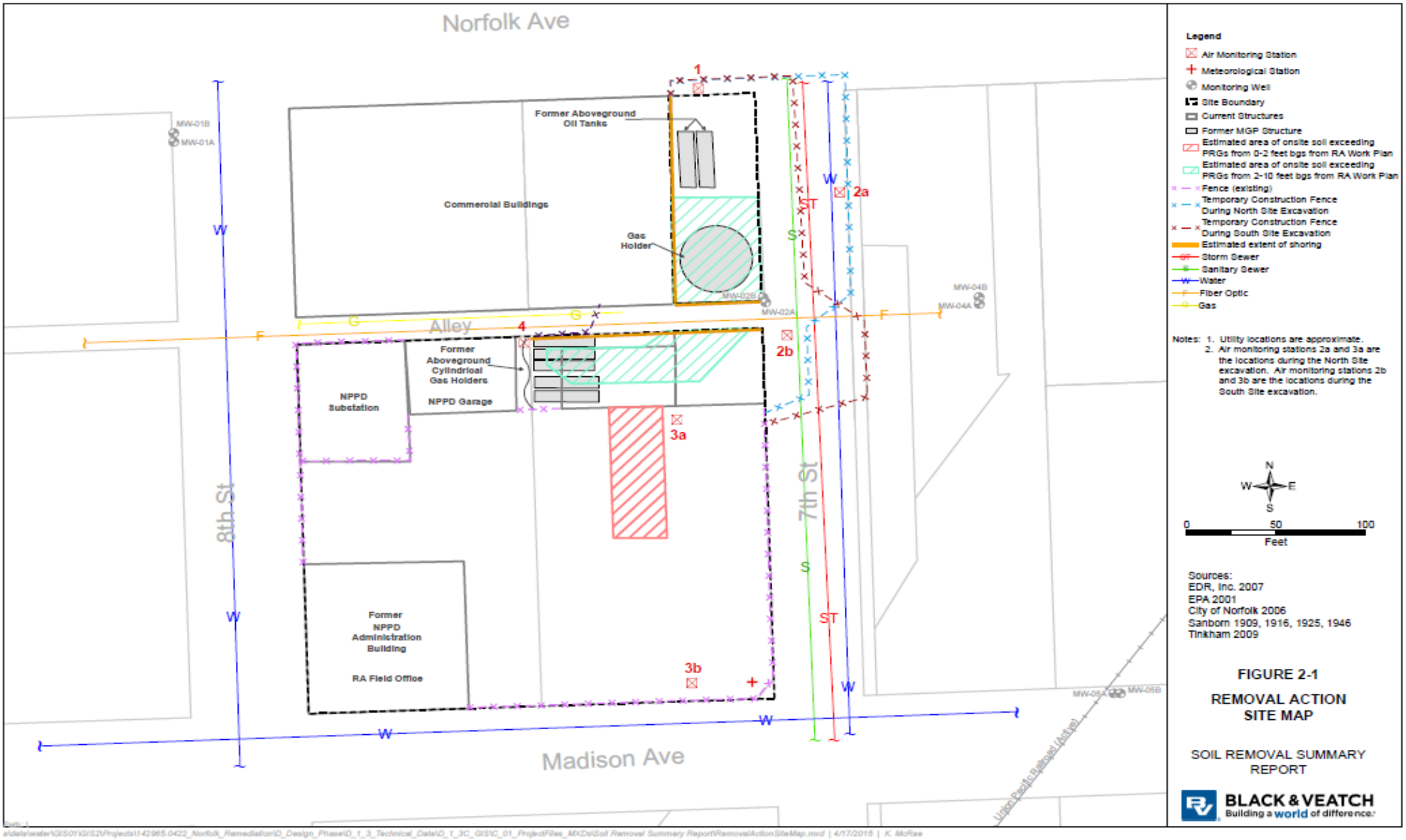


**FIGURE 4 – Non-Time-Critical Removal Action Excavation Wall Confirmation Sample Locations**

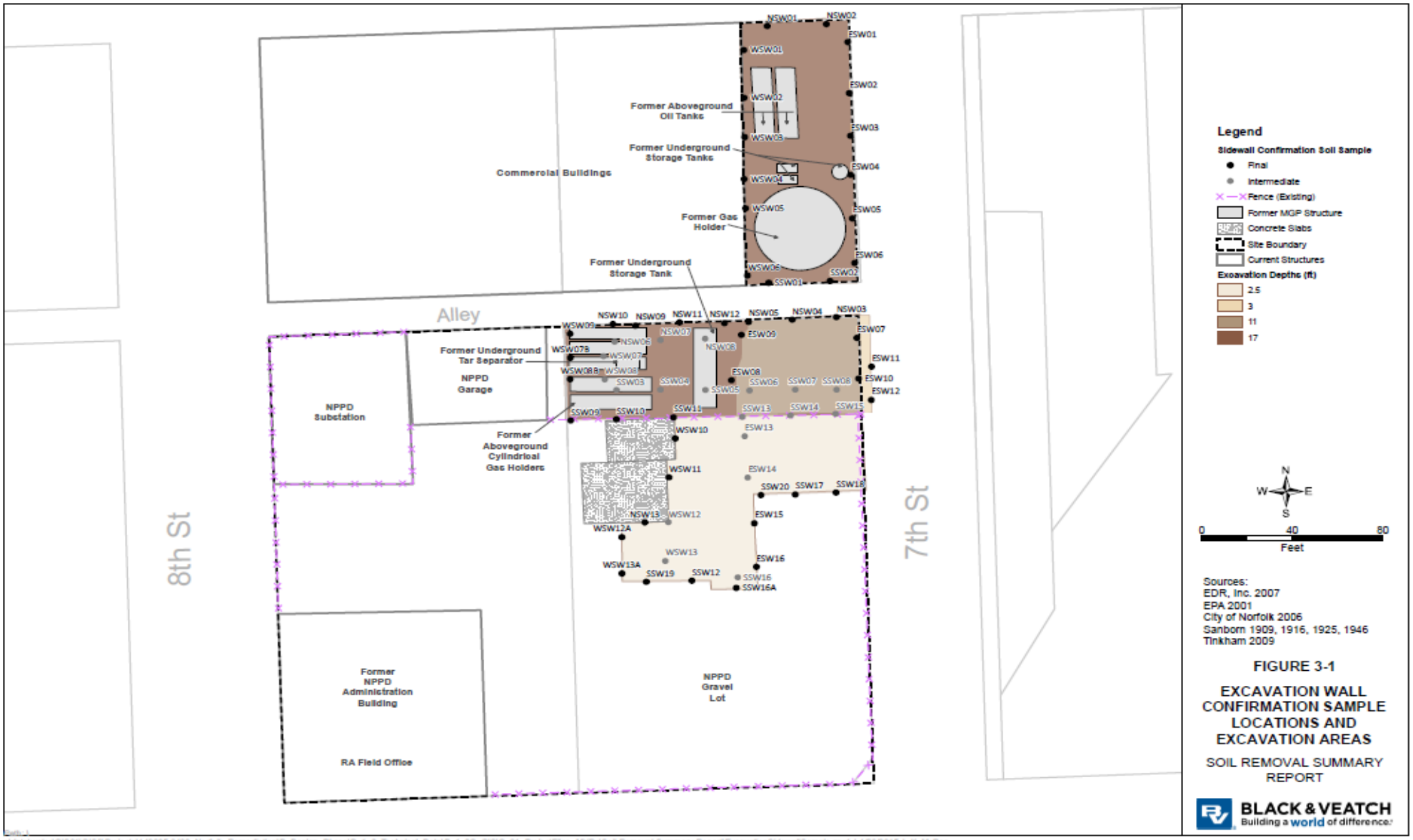


**FIGURE 5 - Non-Time-Critical Removal Action Excavation Base Confirmation Sample Locations**

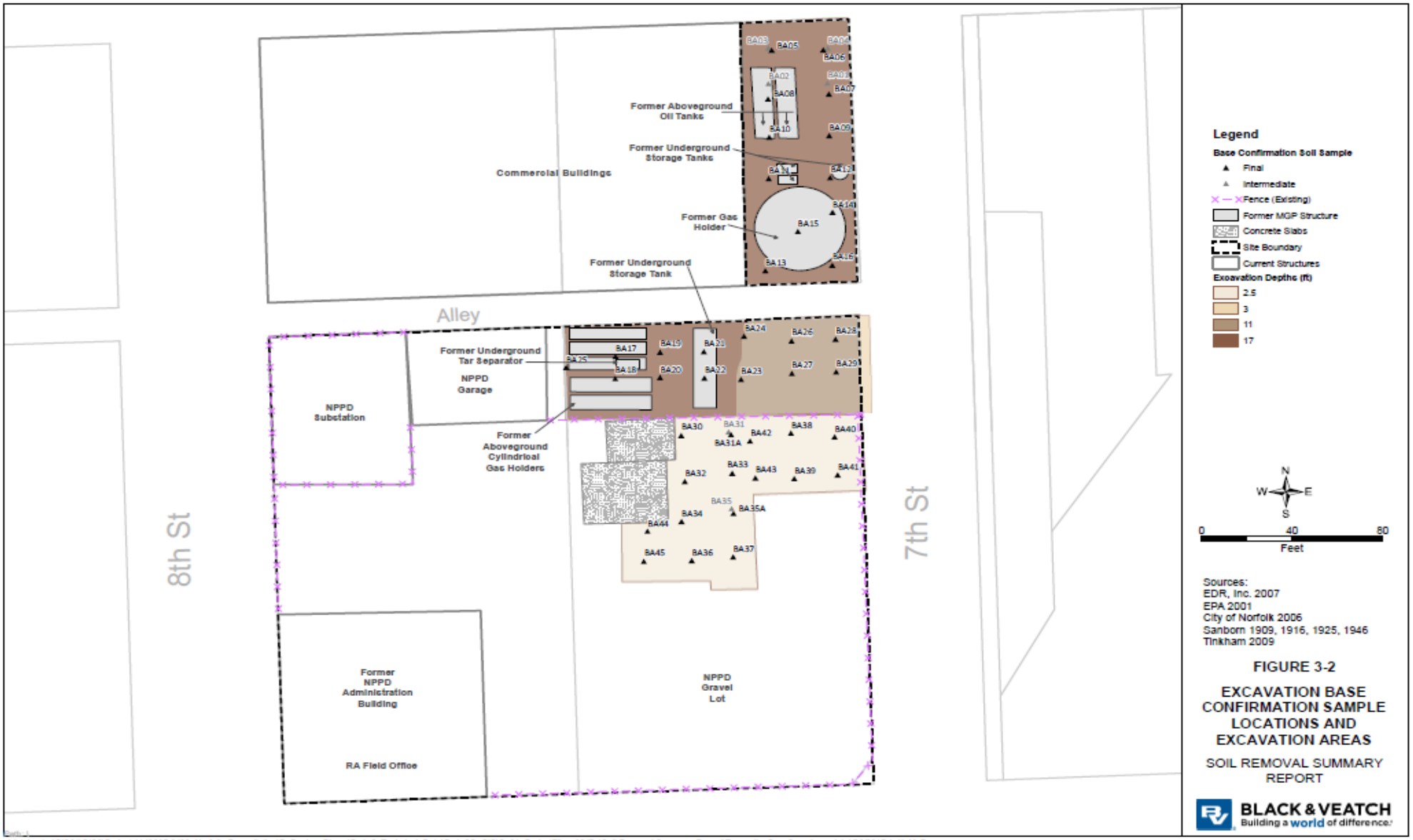


**FIGURE 6 - OU 1 Estimated Footprint of Source Material (Remaining Soil Contamination)**

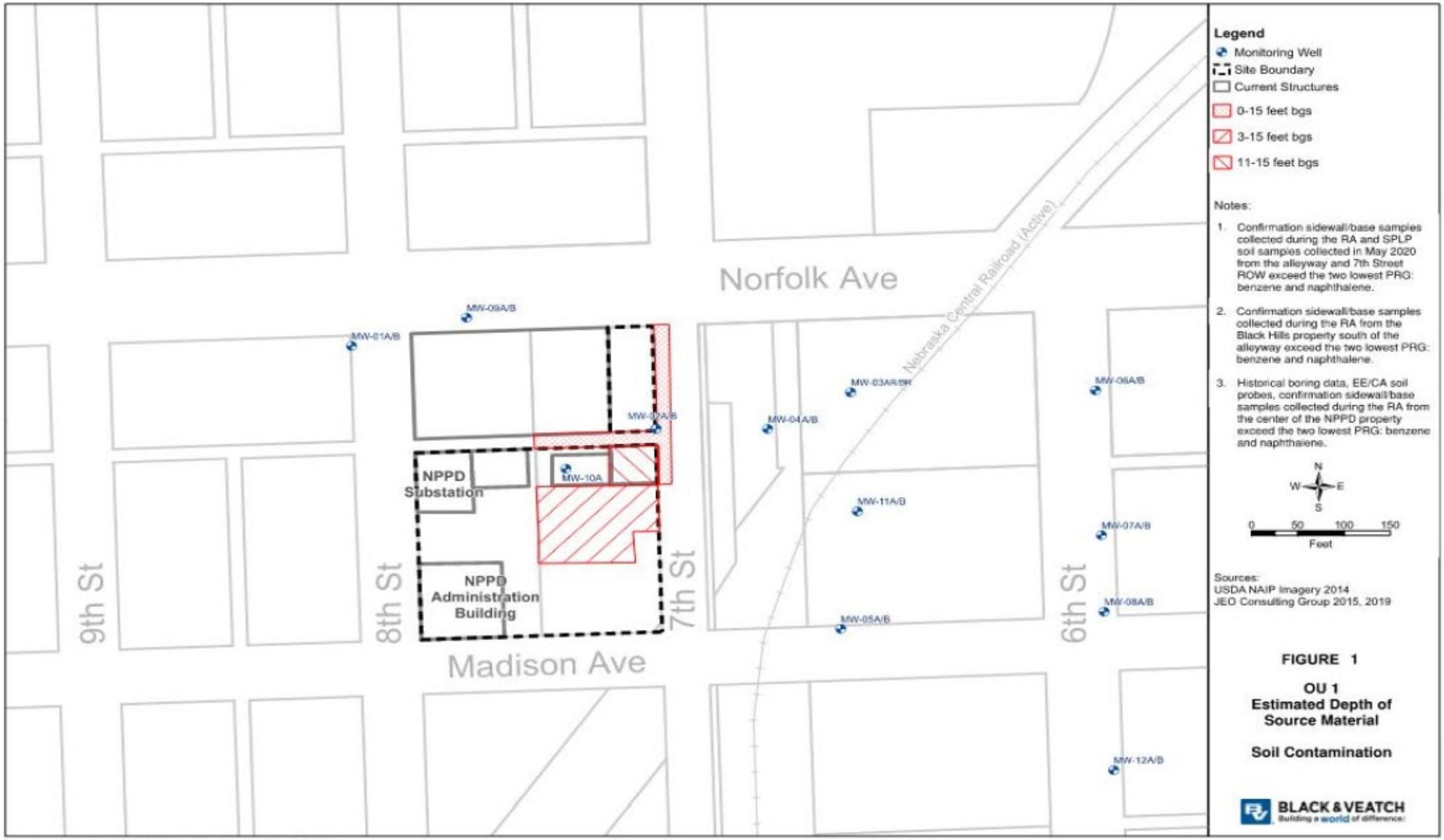


**FIGURE 7 – OU 1 Dense Non-aqueous Phase Liquid Footprint**

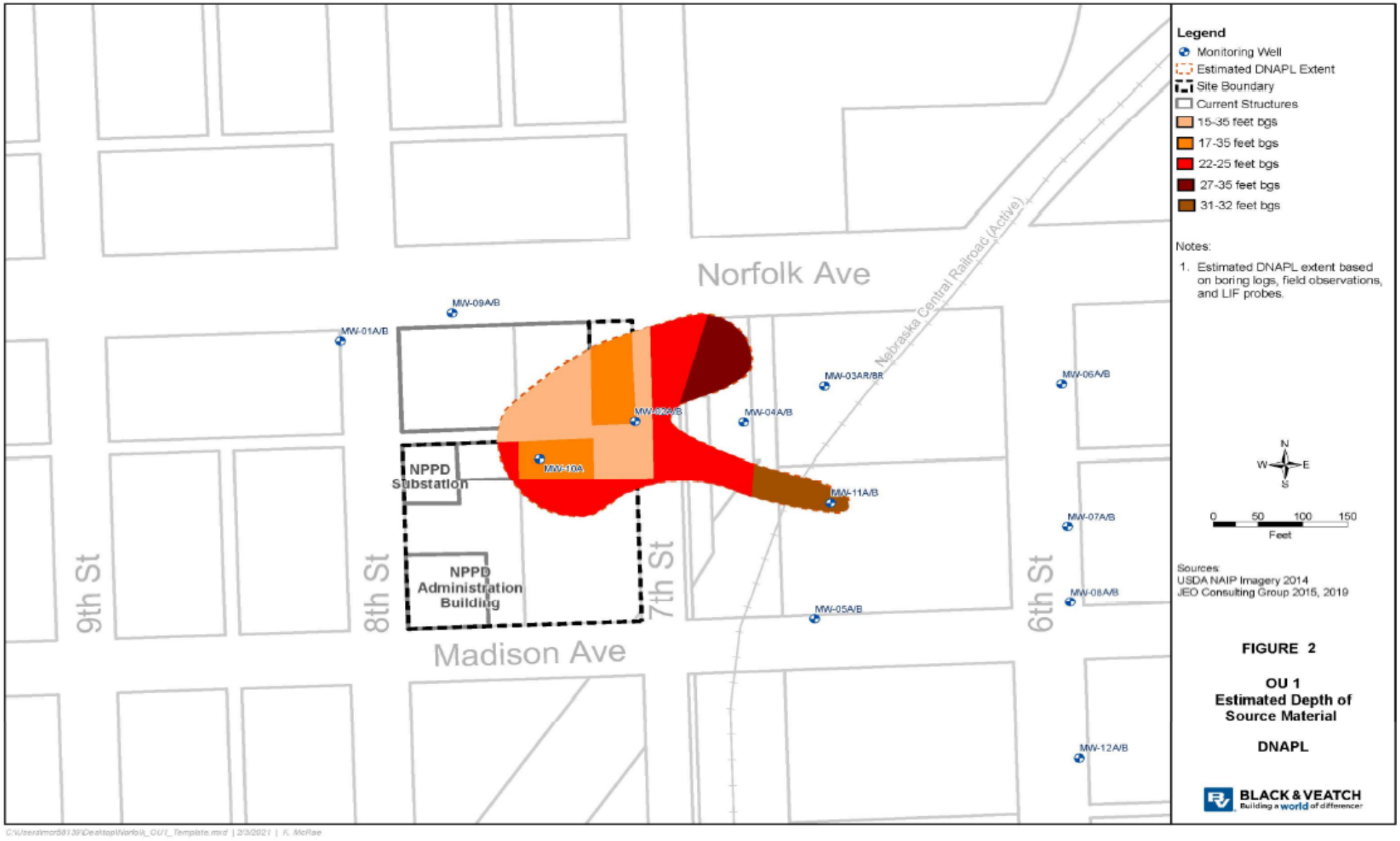
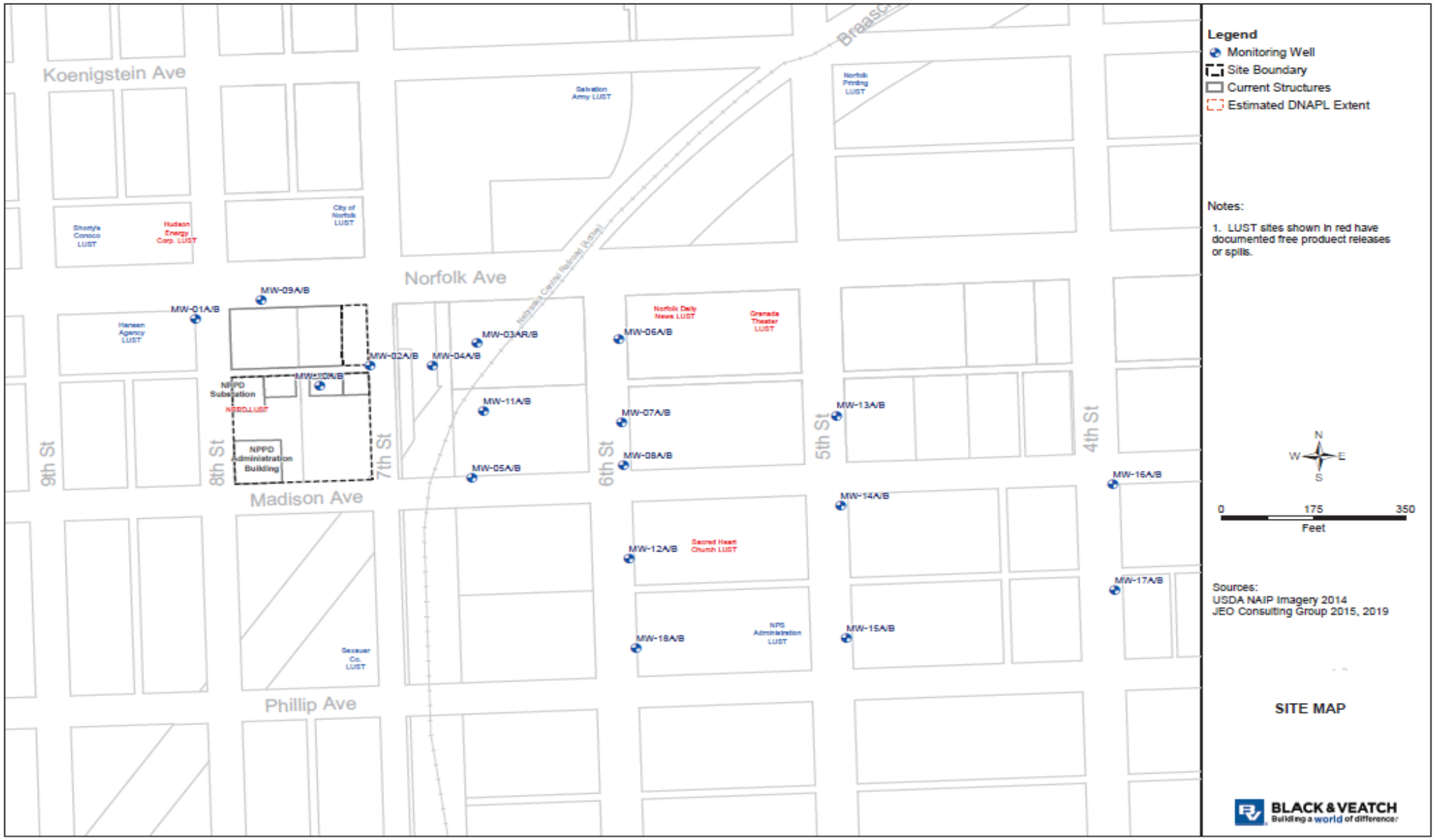


**FIGURE 8 – Site Monitoring Well Location Map**




\\NA\data\water\GIS01\Projects\142965.0422_Norfolk_Remediation\D_Design_Phase\D_1_3_Technical_Data\D_1_3C_GIS\C_01_ProjectFiles_MXDs\2019_RI_FS\April2019_SiteMap.mxd | 6/14/2019 | K. McRae

**FIGURE 9 – Groundwater Surface Elevation Map (June 2021)**

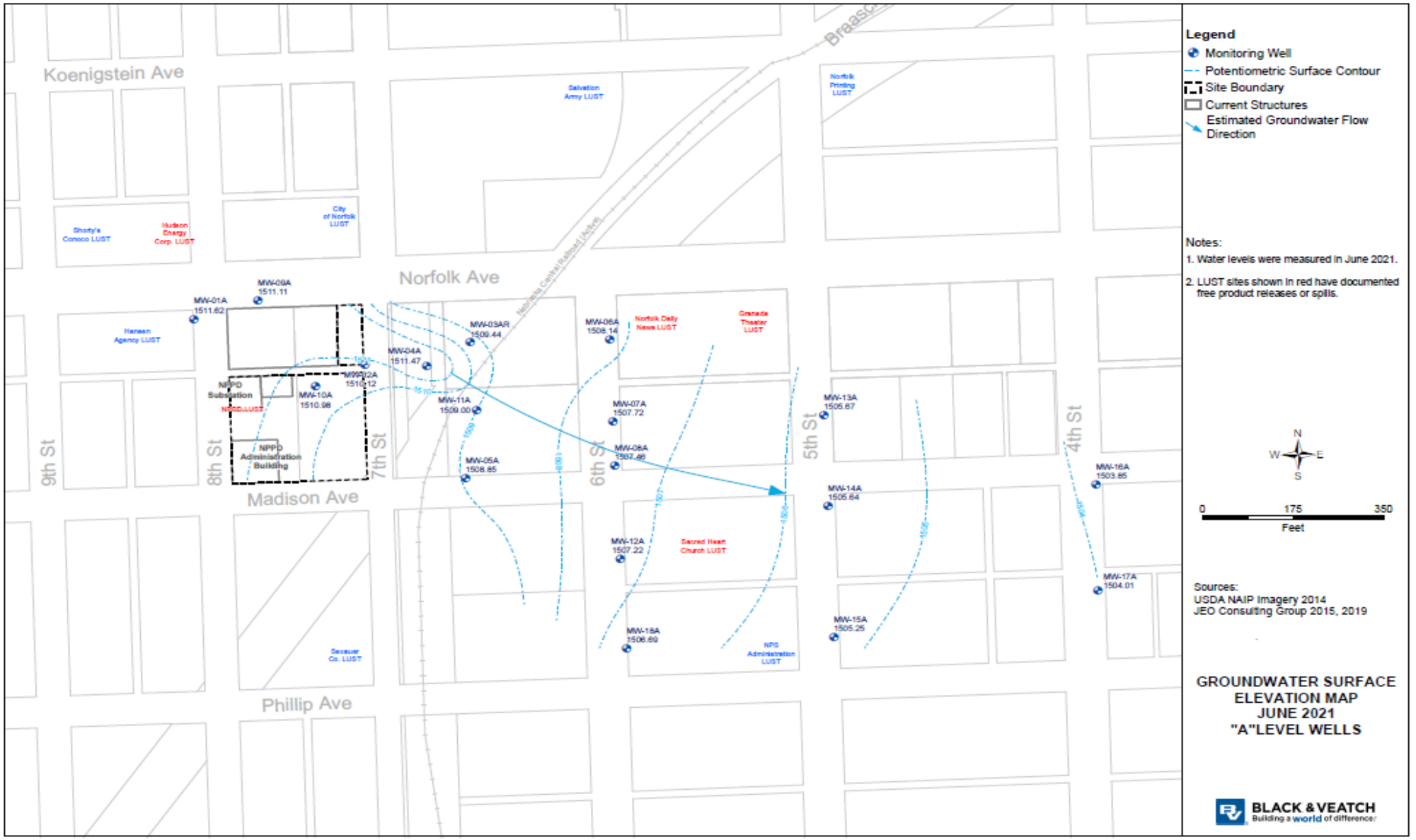
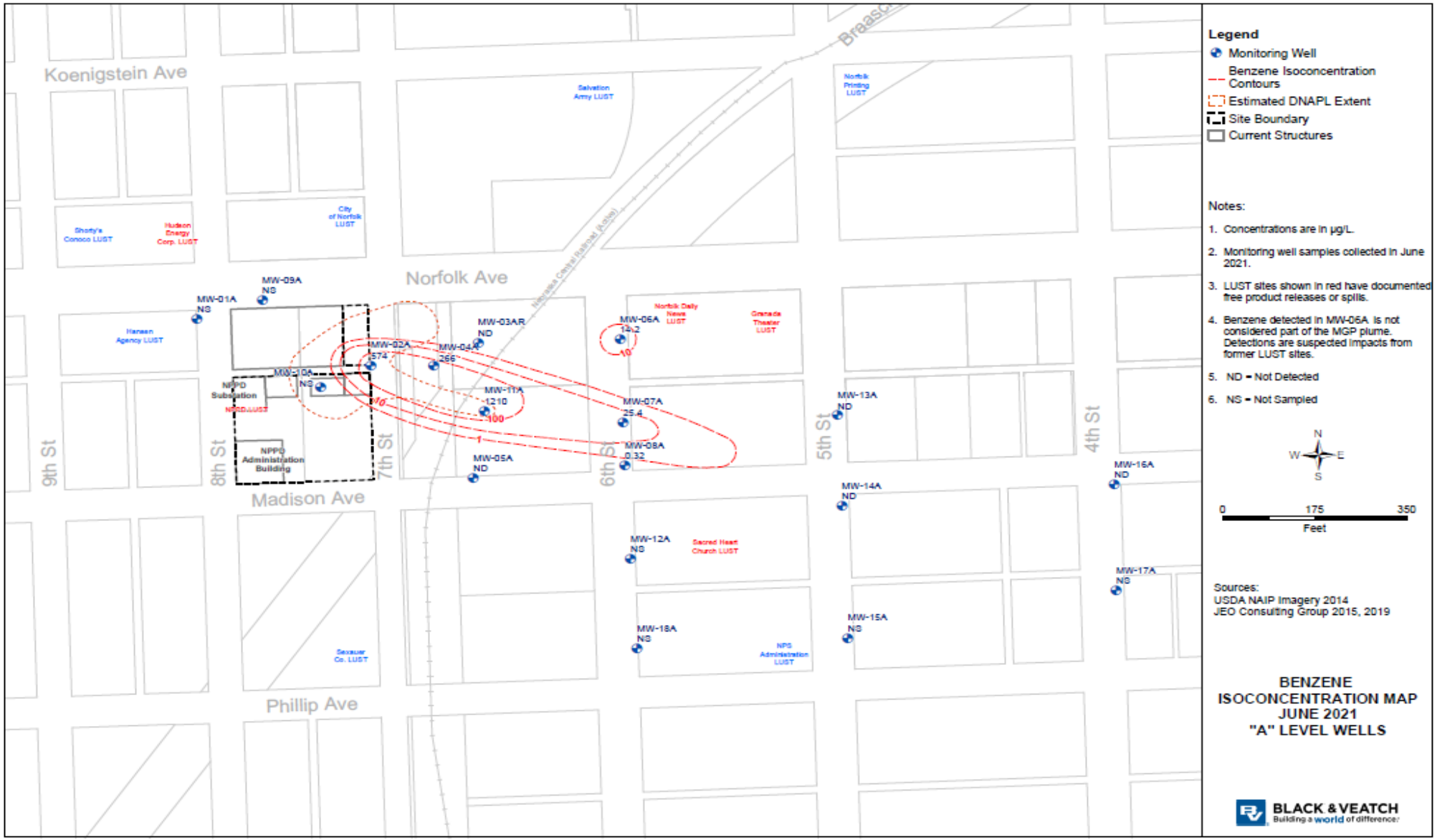


**FIGURE 10 – Benzene Isoconcentration Map (June 2021) "A" Level Wells**




\\NA\data\water\GIS01\Projects\142965.0422_Norfolk_Remediation\D_Design_Phase\D_1_3_Technical_Data\D_1_3C_GIS\C_01_ProjectFiles_MXDs\2021_RI_FS\June2021_BenzeneIsoPlume_A_Level.mxd | 10/15/2021 | K. McRae

**FIGURE 11 – Benzene Isoconcentration Map (June 2021) "B" Level Wells**

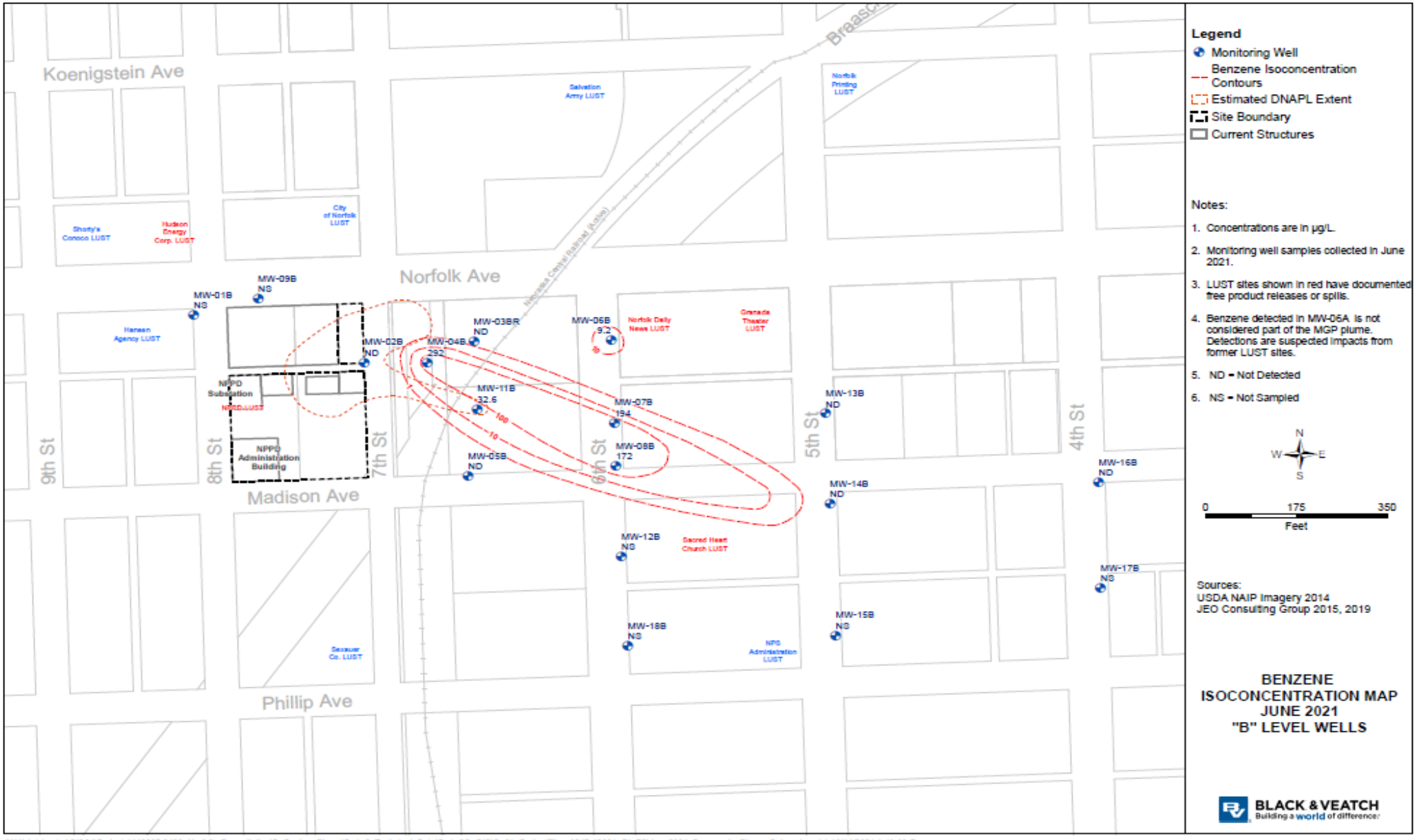


**FIGURE 12 – Naphthalene Isoconcentration Map (June 2021) "A" Level Wells**

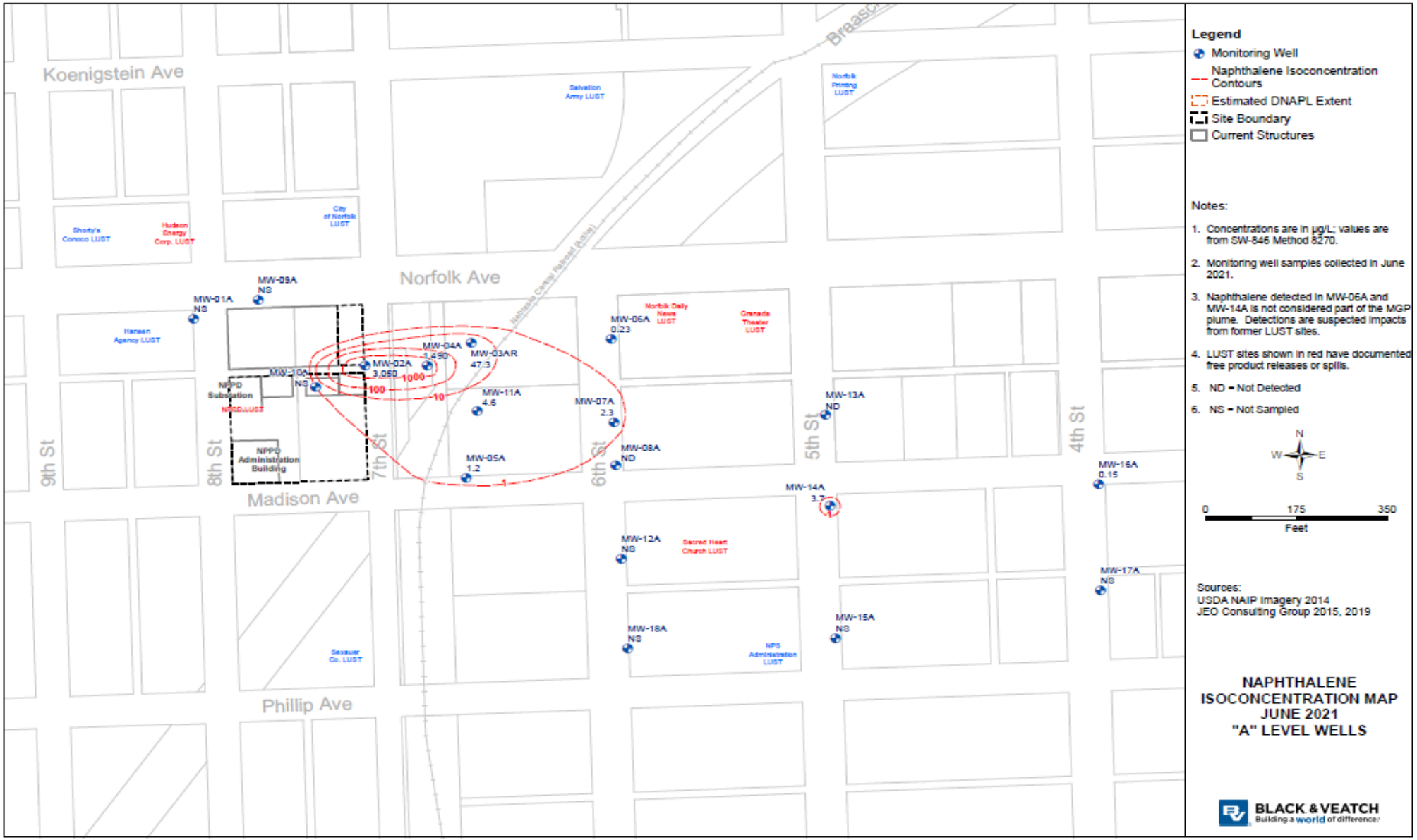


**FIGURE 13 – Naphthalene Isoconcentration Map (June 2021) "B" Level Wells**

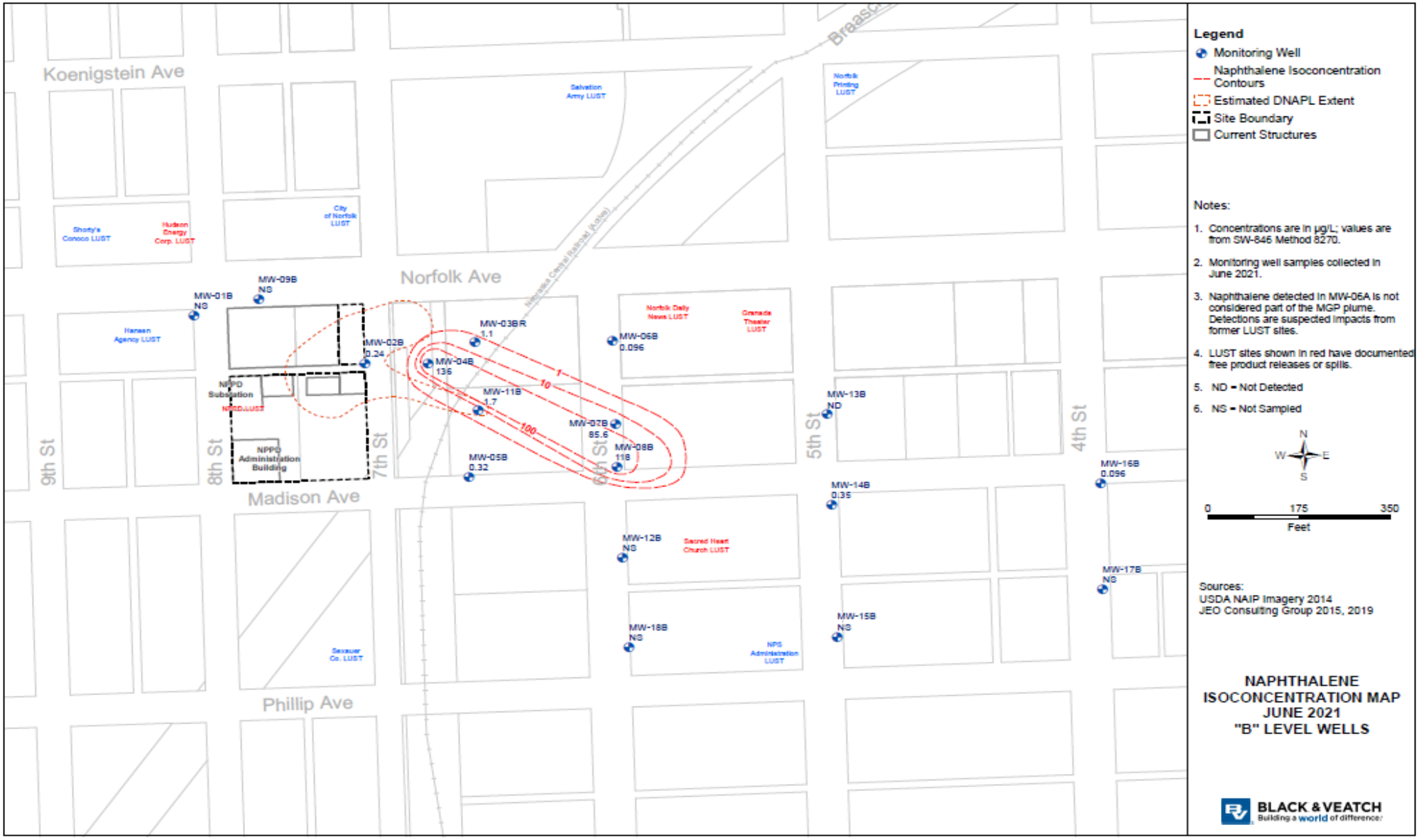


**FIGURE 14 – East Municipal Well Locations**

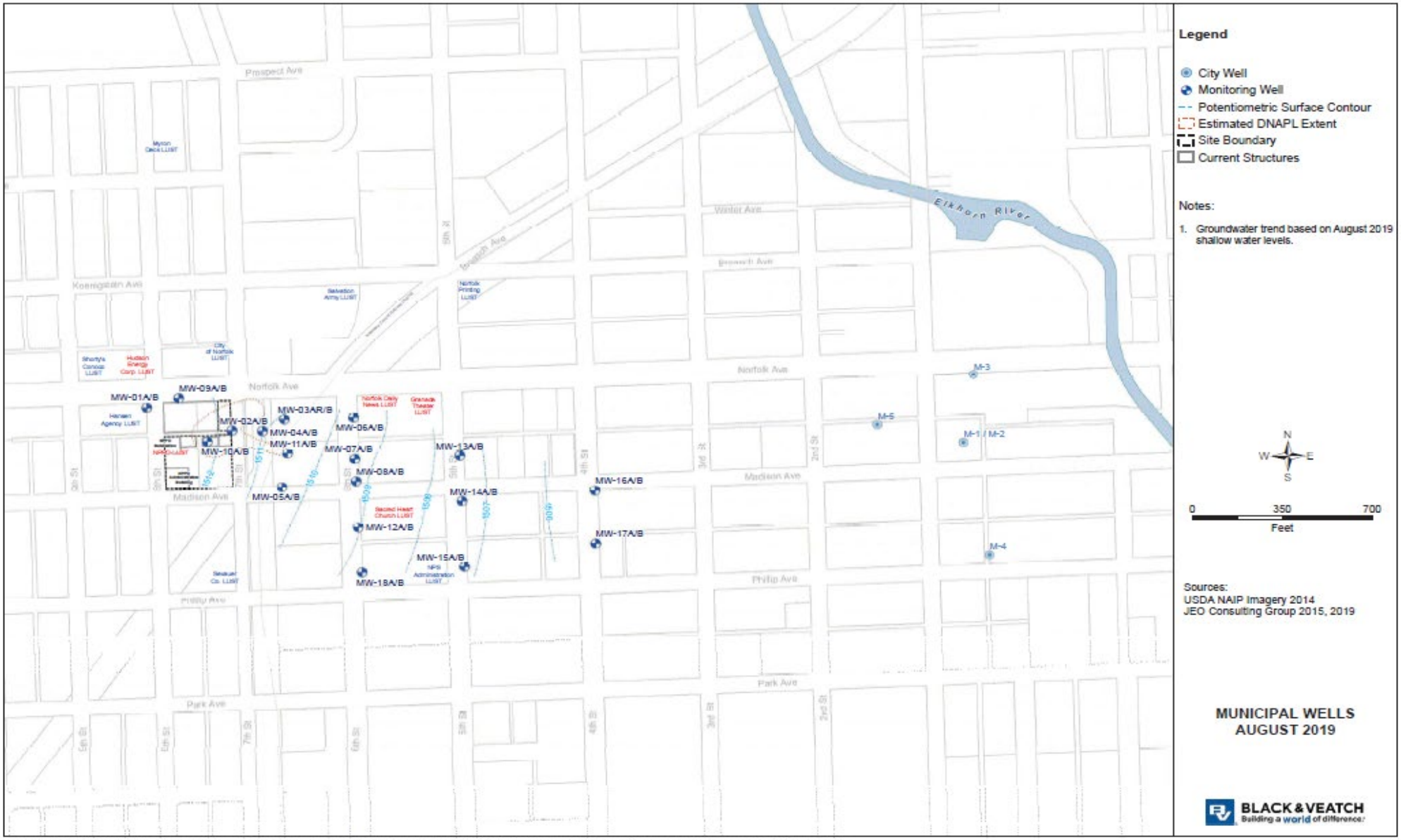


**FIGURE 15 - Geologic Cross-Section**

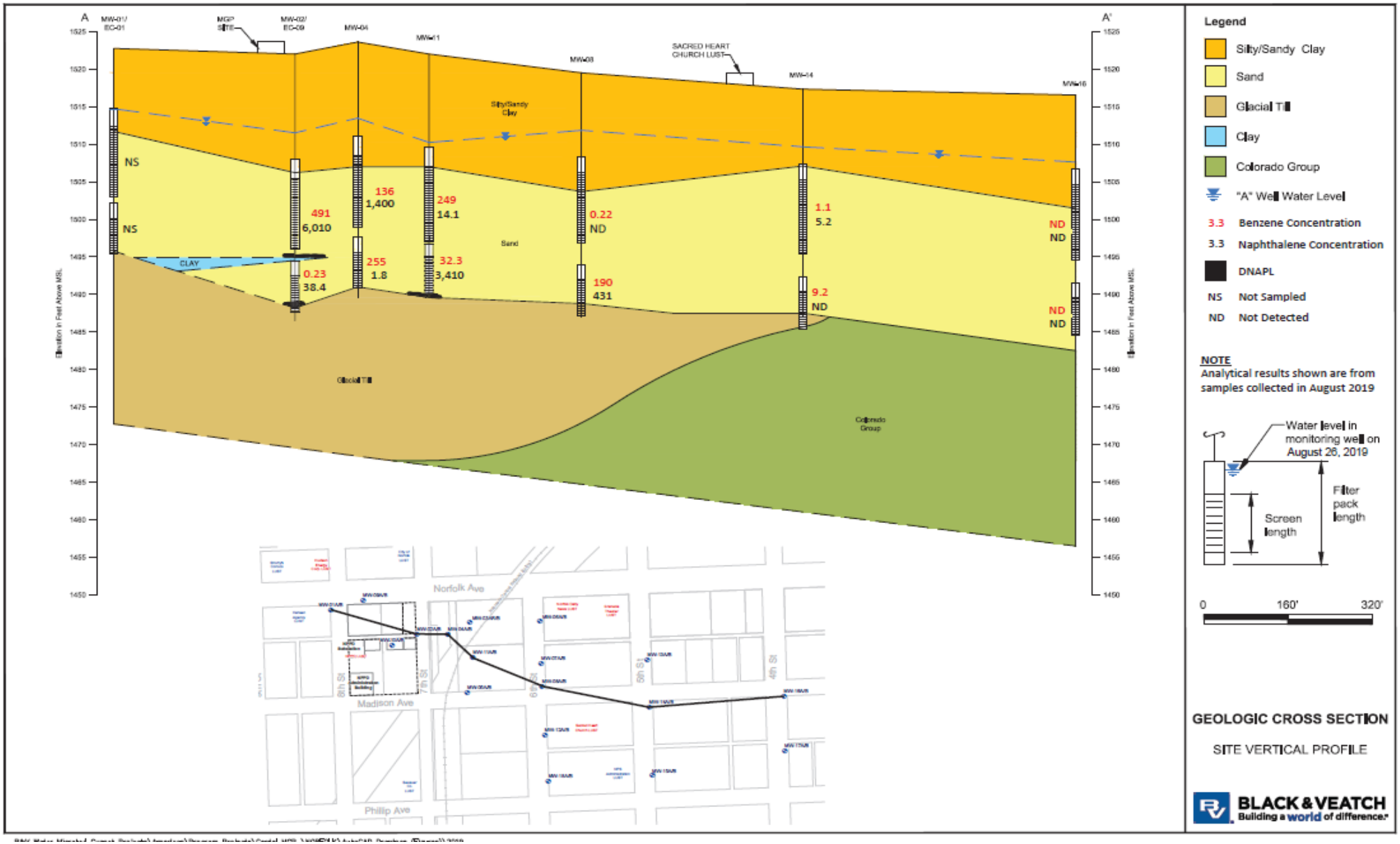


**FIGURE 16 – Conceptual Site Model**

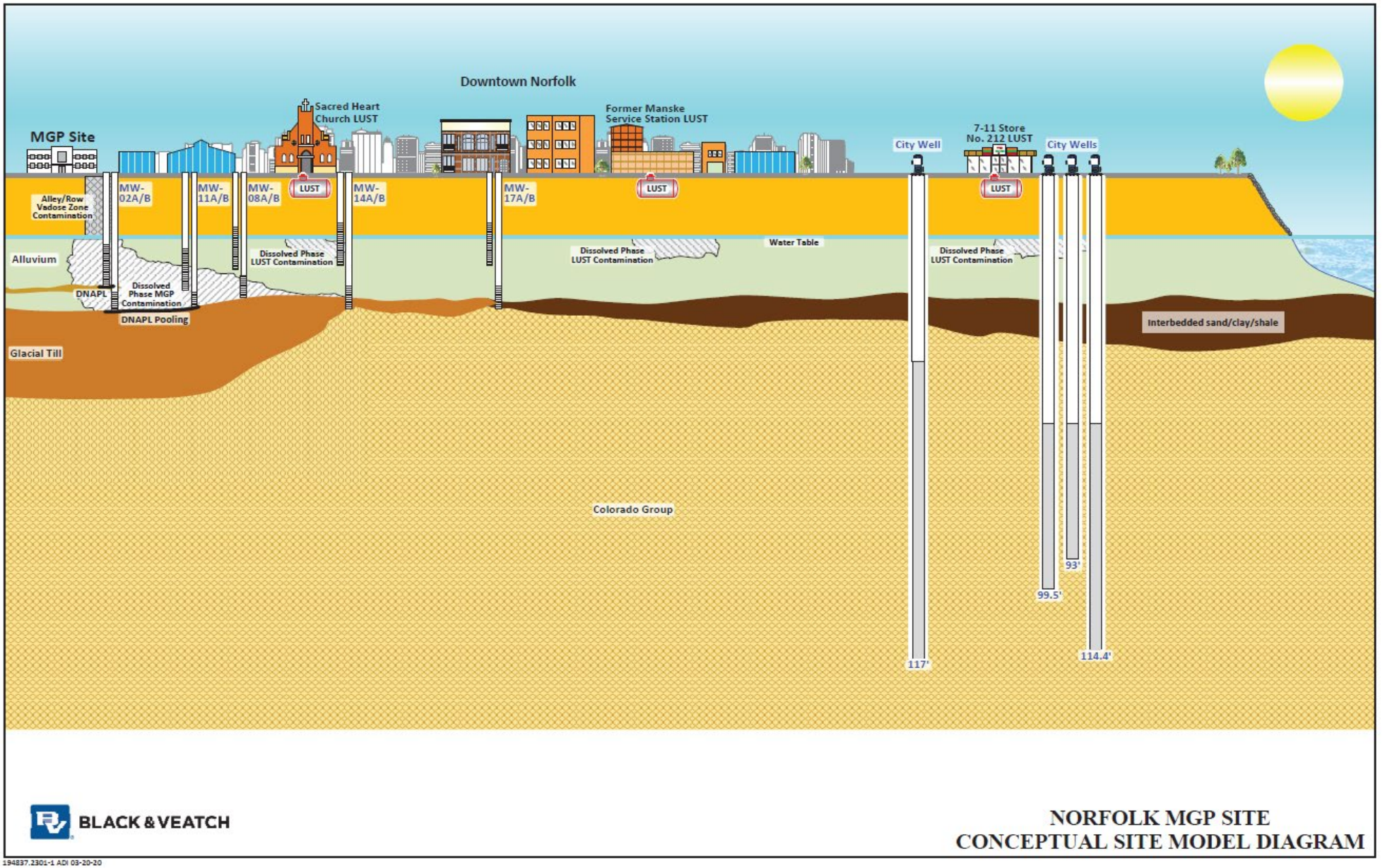


**FIGURE 17 – Electrical Conductivity and Groundwater Probe Locations**

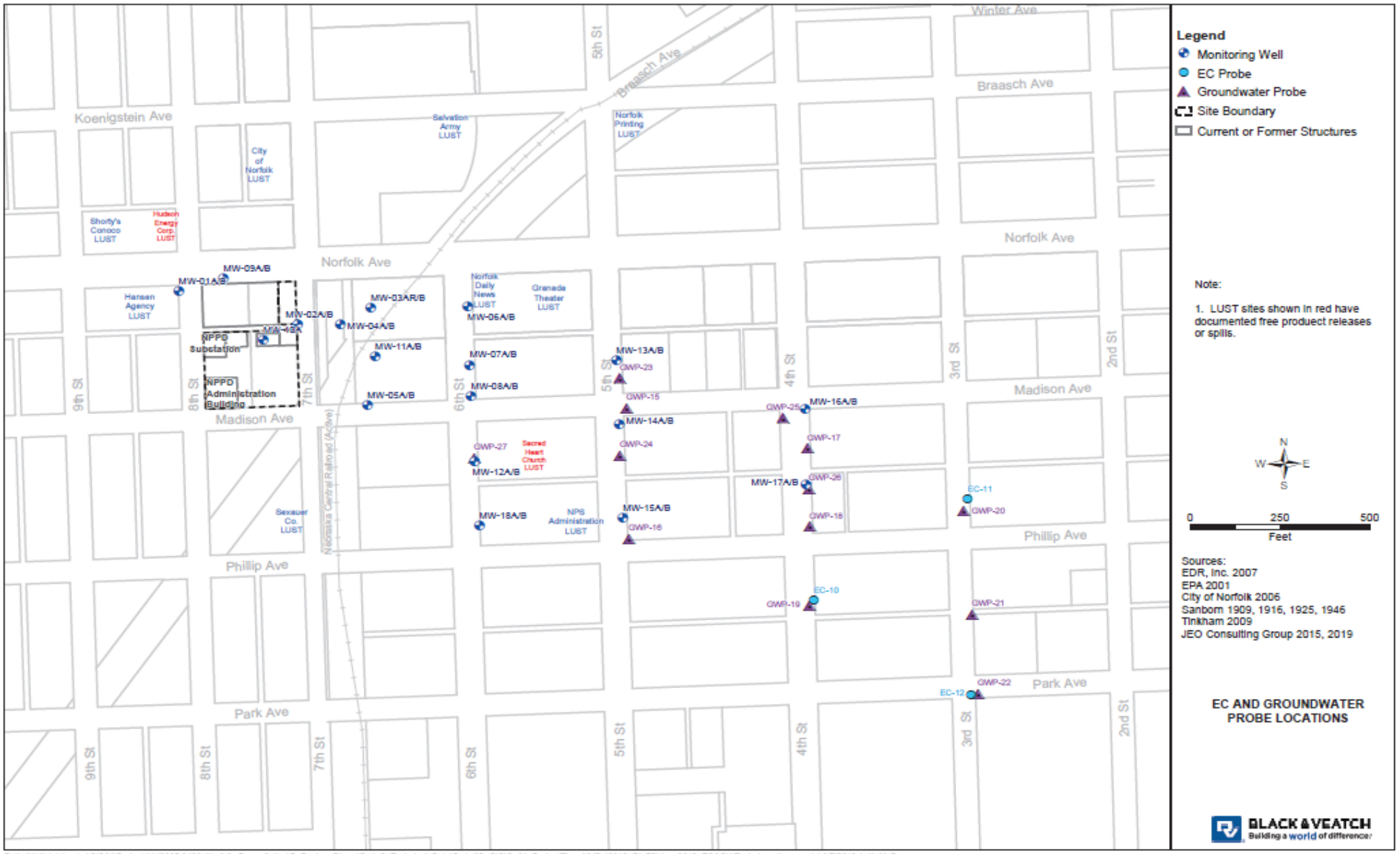
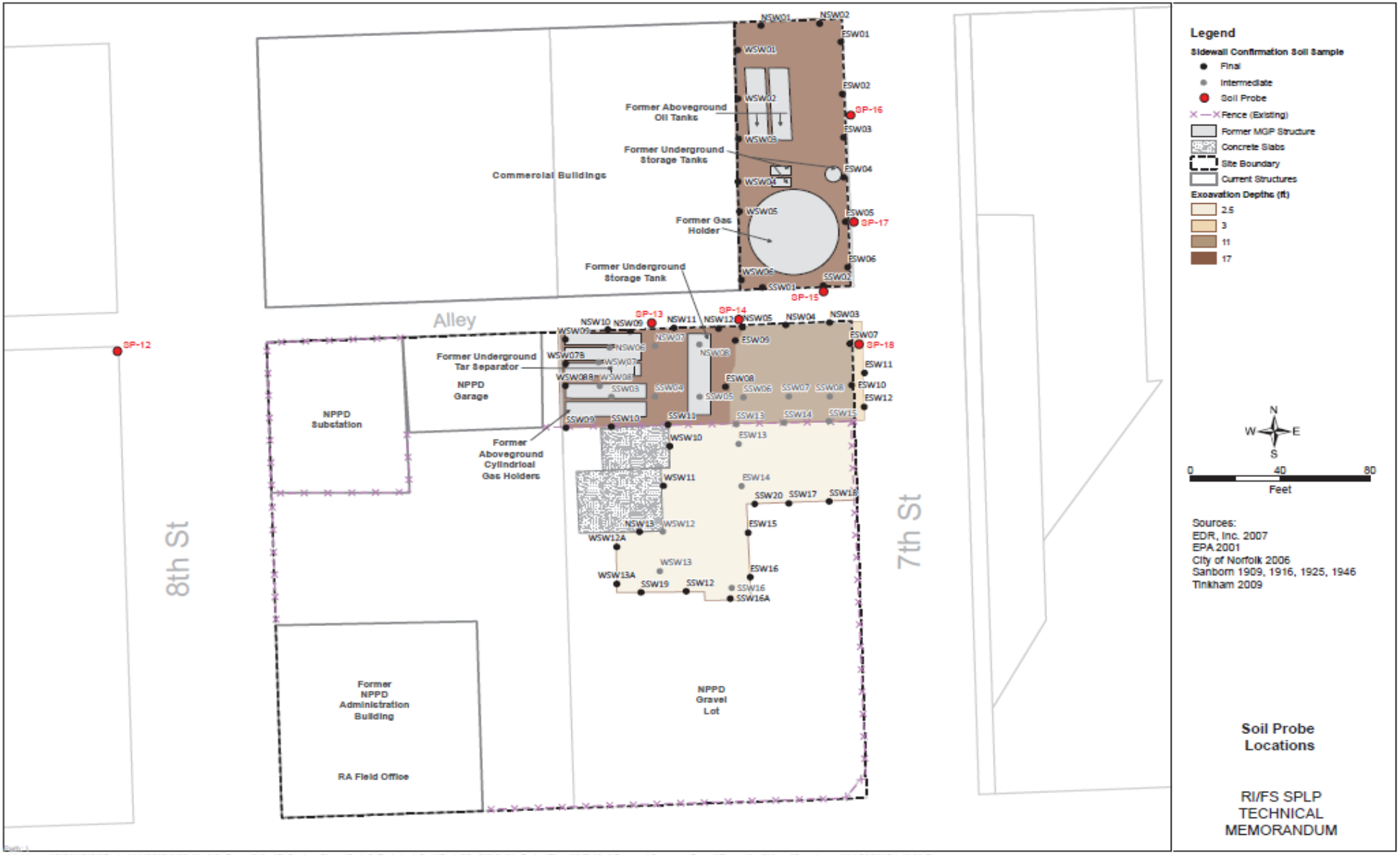


**FIGURE 18 – Soil Probe Locations**



# APPENDIX D

## HOW IS HUMAN HEALTH RISK CALCULATED?

**HOW IS HUMAN HEALTH RISK CALCULATED?**

A Superfund Human Health Risk Assessment (HHRA) estimates the baseline risk. The baseline risk is an estimate of the likelihood of developing cancer or non-cancer health effects if no cleanup action is taken at a site. To estimate baseline risk at a Superfund site, the EPA undertakes a four-step process:

Step 1: Analyze Contamination

Step 2: Estimate Exposure

Step 3: Assess Potential Health Dangers

Step 4: Characterize Site Risk

In Step 1, the EPA looks at the concentrations of contaminants found at a site as well as past scientific studies on the effects these contaminants have had on people (or animals, when human studies are unavailable). Comparison between site-specific concentrations and concentrations reported in past studies helps the EPA to determine which concentrations are most likely to pose the greatest threat to human health.

In Step 2, the EPA considers the different ways that people might be exposed to contaminants identified on Step 1, the concentrations that people might be exposed to, and the potential frequency and duration of such exposure. Using this information, the EPA calculates a "reasonable maximum exposure" scenario, which portrays the highest level of exposure that could reasonably be expected to occur.

In Step 3, the EPA use the information from Step 2 combined with information on the toxicity of each chemical to assess potential risks. The EPA considers two types of risk: cancer and non-cancer. The likelihood of any kind of cancer resulting from a site is generally expressed as an upper bound probability (e.g., a "1 in 10,000 chance"). For every 10,000 people that could be exposed, one extra cancer may occur as a result of exposure to site contaminants. An extra cancer case means that one more person could get cancer than would normally be expected to from all other causes. For non-cancer health effects, the EPA calculates a "hazard index" (HI). The key concept here is that a "threshold level" (measured usually as an HI of less than 1) exists below which non-cancer health effects are no longer predicted.

In Step 4, the EPA determines whether site risks are great enough to cause health problems for people at or near the site. The results of the three previous steps are combined, evaluated, and summarized. The EPA adds up the potential risks from the individual contaminants and exposure pathways and calculates a total site risk.

Cancer risks between $10^{-4}$ and $10^{-6}$, and a non-cancer HI of 1 or less are considered acceptable for Superfund sites.

# APPENDIX E

# TABLES

**TABLE 1**
**COMPARISON OF ALTERNATIVES FOR OPERABLE UNIT 1**

| CERCLA Evaluation Criteria | No Action | Excavation/ISCO/ Vapor Monitoring-Mitigation | Thermally Enhanced SVE/ISCO/Vapor Monitoring-Mitigation | ISTT/Vapor Monitoring -Mitigation |
|---|---|---|---|---|
| 1-Protection of Human Health and the Environment | Not Protective | Protective | Protective | Protective |
| 2-Compliance with ARARs | No | Complies | Complies | Complies |
| 3-Long-Term Effectiveness | NA | Moderate | Low to moderate | High |
| 4-Reduction of Toxicity, Mobility, and Volume | NA | Moderate | Moderate | High |
| 5-Short-Term Effectiveness | NA | Moderate | Moderate | Moderate |
| 6-Implementability | NA | Difficult | Moderate to difficult | Moderate to difficult |
| 7-Cost | NA | $10,410,000 | $10,600,000 | $7,900,000 |
| 8-State Acceptance | NA | TBD | TBD | TBD |
| 9-Community Acceptance | NA | TBD | TBD | TBD |

# TABLE 2
# SUMMARY OF CONTAMINANTS OF CONCERN
# SURFACE SOIL
# NEBRASKA PUBLIC POWER DISTRICT PROPERTY

| | |
|---|---|
| Scenario Timeframe: | Future |
| Medium: | Surface Soil |
| Exposure Medium: | Soil (0-2 ft bgs) and Air |

| Exposure Point | CAS Number | Chemical | Minimum Concentration | Maximum Concentration | Units | Location of Maximum Concentration | Detection Frequency | Range of Detection Limits | Concentration Used for Screening | Screening Toxicity Value (N/C) | Potential ARAR/TBC Value [1] | Potential ARAR/TBC Source | COPC Flag (Y/N) | Rationale for Selection |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil (0-2 ft bgs) | 83-32-9 | Acenaphthene | 0.023 | 0.0845 | mg/kg | SSW18 | 9/21 | 0.0209-0.4 | MAX | N | 3,600 | EPA PRG | N | MGP-related |
| Soil (0-2 ft bgs) | 208-96-8 | Acenaphthylene | 0.0338 | 8.43 | mg/kg | SSW09 | 16/21 | 0.0209-0.4 | MAX | --- | --- | --- | Y | MGP-related |
| Soil (0-2 ft bgs) | 120-12-7 | Anthracene | 0.028 | 1.41 | mg/kg | SSW09 | 15/21 | 0.0209-0.4 | MAX | N | 18,000 | EPA PRG | N | MGP-related |
| Soil (0-2 ft bgs) | 7440-38-2 | Arsenic | 1 | 14.9 | mg/kg | SSW09 | 21/21 | 0.23-1.3 | MAX | C | 0.68 | EPA PRG | Y | Potential MGP-related |
| Soil (0-2 ft bgs) | 71-43-2 | Benzene | ND | ND | mg/kg | --- | 0/21 | 0.0025-0.013 | --- | C | 1.2 | EPA PRG | N | MGP-related |
| Soil (0-2 ft bgs) | 56-55-3 | Benzo(a)anthracene | 0.0449 | 1.9 | mg/kg | SSW20 | 18/21 | 0.0209-0.013 | MAX | C | 1.1 | EPA PRG | Y | MGP-related |
| Soil (0-2 ft bgs) | 50-32-8 | Benzo(a)pyrene | 0.0436 | 1.63 | mg/kg | SSW20 | 19/21 | 0.0209-0.013 | MAX | C | 0.11 | EPA PRG | Y | MGP-related |
| Soil (0-2 ft bgs) | 205-99-2 | Benzo(b)fluoranthene | 0.106 | 2.85 | mg/kg | SSW20 | 19/21 | 0.0209-0.013 | MAX | C | 1.1 | EPA PRG | Y | MGP-related |
| Soil (0-2 ft bgs) | 191-24-2 | Benzo(g,h,i)perylene | 0.0749 | 1.77 | mg/kg | SSW09 | 19/21 | 0.0209-0.013 | MAX | --- | --- | --- | Y | MGP-related |
| Soil (0-2 ft bgs) | 207-08-9 | Benzo(k)fluoranthene | ND | ND | mg/kg | --- | 0/21 | 0.0209-0.4 | --- | C | 11 | EPA PRG | N | MGP-related |
| Soil (0-2 ft bgs) | 218-01-9 | Chrysene | 0.0306 | 1.8 | mg/kg | SSW20 | 19/21 | 0.0209-0.4 | MAX | C | 110 | EPA PRG | N | MGP-related |
| Soil (0-2 ft bgs) | 53-70-3 | Dibenzo(a,h)anthracene | 0.0329 | 0.376 | mg/kg | WSW09 | 15/21 | 0.0209-0.4 | MAX | C | 0.11 | EPA PRG | Y | MGP-related |
| Soil (0-2 ft bgs) | 100-41-4 | Ethylbenzene | ND | ND | mg/kg | --- | 0/21 | 0.0025-0.013 | --- | N | 5.8 | EPA PRG | N | MGP-related |
| Soil (0-2 ft bgs) | 206-44-0 | Fluoranthene | 0.0845 | 3.28 | mg/kg | SSW20 | 19/21 | 0.0209-0.4 | MAX | N | 2,400 | EPA PRG | N | MGP-related |
| Soil (0-2 ft bgs) | 86-73-7 | Fluorene | 0.0258 | 1.01 | mg/kg | SSW09 | 9/21 | 0.0209-0.4 | MAX | N | 2,400 | EPA PRG | N | MGP-related |
| Soil (0-2 ft bgs) | 193-39-5 | Indeno(1,2,3-cd)pyrene | 0.0612 | 0.893 | mg/kg | SSW09 | 19/21 | 0.0209-0.4 | MAX | C | 1.1 | EPA PRG | N | MGP-related |
| Soil (0-2 ft bgs) | 91-20-3 | Naphthalene | 0.0325 | 1.3 | mg/kg | SSW09 | 15/21 | 0.0209-0.4 | MAX | C | 3.8 | EPA PRG | N | MGP-related |
| Soil (0-2 ft bgs) | 85-01-8 | Phenanthrene | 0.0288 | 1.61 | mg/kg | SSW20 | 20/21 | 0.0209-0.4 | MAX | --- | --- | --- | Y | MGP-related |
| Soil (0-2 ft bgs) | 129-00-0 | Pyrene | 0.0313 | 2.71 | mg/kg | SSW20 | 20/21 | 0.0209-0.4 | MAX | N | 1,800 | EPA PRG | N | MGP-related |
| Soil (0-2 ft bgs) | 108-88-3 | Toluene | ND | ND | mg/kg | --- | 0/21 | 0.0025-0.013 | --- | N | 4,900 | EPA PRG | N | MGP-related |
| Soil (0-2 ft bgs) | 1330-20-7 | Xylene (total) | ND | ND | mg/kg | --- | 0/21 | 0.0025-0.013 | --- | N | 580 | EPA PRG | N | MGP-related |

# TABLE 3
# SUMMARY OF CONTAMINANTS OF CONCERN
# SUBSURFACE SOIL
# NEBRASKA PLUBLIC POWER DISTRICT PROPERTY

| | |
|---|---|
| Scenario Timeframe: | Future |
| Medium: | Subsurface Soil |
| Exposure Medium: | Soil (2-10 ft bgs) and Air |

| Exposure Point | CAS Number | Chemical | Minimum Concentration | Maximum Concentration | Units | Location of Maximum Concentration | Detection Frequency | Range of Detection Limits | Concentration Used for Screening | Screening Toxicity Value (N/C) | Potential ARAR/TBC Value [1] | Potential ARAR/TBC Source | COPC Flag (Y/N) | Rationale for Selection |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil (2-10 ft bgs) | 83-32-9 | Acenaphthene | 0.0283 | 3.05 | mg/kg | BA42 | 14/24 | 0.004-1.16 | MAX | N | 3,600 | EPA PRG | N | MGP-related |
| Soil (2-10 ft bgs) | 208-96-8 | Acenaphthylene | 0.0641 | 3.9 | mg/kg | BA35A | 19/24 | 0.004-1.16 | MAX | --- | --- | --- | Y | MGP-related |
| Soil (2-10 ft bgs) | 120-12-7 | Anthracene | 0.0723 | 9.3 | mg/kg | BA42 | 19/24 | 0.004-1.16 | MAX | N | 18,000 | EPA PRG | N | MGP-related |
| Soil (2-10 ft bgs) | 7440-38-2 | Arsenic | 2.8 | 14.2 | mg/kg | BA35A | 24/24 | 0.00031-2.5 | MAX | C | 0.68 | EPA PRG | Y | Potential MGP-related |
| Soil (2-10 ft bgs) | 71-43-2 | Benzene | ND | ND | mg/kg | --- | 0/24 | 2.7-6.4 | --- | C | 1.2 | EPA PRG | N | MGP-related |
| Soil (2-10 ft bgs) | 56-55-3 | Benzo(a)anthracene | 0.106 | 26.2 | mg/kg | BA42 | 20/24 | 0.004-1.16 | MAX | C | 1.1 | EPA PRG | Y | MGP-related |
| Soil (2-10 ft bgs) | 50-32-8 | Benzo(a)pyrene | 0.0992 | 21.5 | mg/kg | BA42 | 20/24 | 0.004-1.16 | MAX | C | 0.11 | EPA PRG | Y | MGP-related |
| Soil (2-10 ft bgs) | 205-99-2 | Benzo(b)fluoranthene | 0.18 | 36.6 | mg/kg | BA35A | 20/24 | 0.004-1.16 | MAX | C | 1.1 | EPA PRG | Y | MGP-related |
| Soil (2-10 ft bgs) | 191-24-2 | Benzo(g,h,i)perylene | 0.0765 | 11.2 | mg/kg | BA42 | 20/24 | 0.004-1.16 | MAX | --- | --- | --- | Y | MGP-related |
| Soil (2-10 ft bgs) | 207-08-9 | Benzo(k)fluoranthene | ND | ND | mg/kg | --- | 0/24 | 0.004-1.16 | --- | C | 11 | EPA PRG | N | MGP-related |
| Soil (2-10 ft bgs) | 218-01-9 | Chrysene | 0.105 | 24.7 | mg/kg | BA42 | 20/24 | 0.004-1.16 | MAX | C | 110 | EPA PRG | N | MGP-related |
| Soil (2-10 ft bgs) | 53-70-3 | Dibenzo(a,h)anthracene | 0.0348 | 3.45 | mg/kg | BA42 | 16/24 | 0.004-1.16 | MAX | C | 0.11 | EPA PRG | Y | MGP-related |
| Soil (2-10 ft bgs) | 100-41-4 | Ethylbenzene | ND | ND | mg/kg | --- | 0/24 | 0.0027-0.0064 | --- | N | 5.8 | EPA PRG | N | MGP-related |
| Soil (2-10 ft bgs) | 206-44-0 | Fluoranthene | 0.0315 | 51.3 | mg/kg | BA42 | 21/24 | 0.004-1.16 | MAX | N | 2,400 | EPA PRG | N | MGP-related |
| Soil (2-10 ft bgs) | 86-73-7 | Fluorene | 0.0315 | 3 | mg/kg | BA42 | 16/24 | 0.004-1.16 | MAX | N | 2,400 | EPA PRG | N | MGP-related |
| Soil (2-10 ft bgs) | 193-39-5 | Indeno(1,2,3-cd)pyrene | 0.0632 | 9.43 | mg/kg | BA42 | 20/24 | 0.004-1.16 | MAX | C | 1.1 | EPA PRG | Y | MGP-related |
| Soil (2-10 ft bgs) | 91-20-3 | Naphthalene | 0.0408 | 6.31 | mg/kg | SP-09 | 21/24 | 0.004-1.16 | MAX | C | 3.8 | EPA PRG | Y | MGP-related |
| Soil (2-10 ft bgs) | 85-01-8 | Phenanthrene | 0.01 | 41.5 | mg/kg | BA35A | 21/24 | 0.004-1.16 | MAX | --- | --- | --- | Y | MGP-related |
| Soil (2-10 ft bgs) | 129-00-0 | Pyrene | 0.0312 | 43.7 | mg/kg | BA42 | 21/24 | 0.004-1.16 | MAX | N | 1,800 | EPA PRG | N | MGP-related |
| Soil (2-10 ft bgs) | 108-88-3 | Toluene | 0.0068 | 0.0077 | mg/kg | SP-09 | 2/24 | 0.0027-0.0064 | MAX | N | 4,900 | EPA PRG | N | MGP-related |
| Soil (2-10 ft bgs) | 1330-20-7 | Xylene (total) | 0.0103 | 0.0103 | mg/kg | SP-09 | 1/24 | 0.0027-0.0064 | MAX | N | 580 | EPA PRG | N | MGP-related |

# TABLE 4
# SUMMARY OF CONTAMINANTS OF CONCERN
# SUBSURFACE SOIL
# BLACK HILLS ENERGY PROPERTY

| | |
|---|---|
| Scenario Timeframe: | Future |
| Medium: | Subsurface |
| Exposure Medium: | Soil (0-10 ft bgs) and Air |

| Exposure Point | CAS Number | Chemical | Minimum Concentration | Maximum Concentration | Units | Location of Maximum Concentration | Detection Frequency | Range of Detection Limits | Concentration Used for Screening | Screening Toxicity Value (N/C) | Potential ARAR/TBC Value [1] | Potential ARAR/TBC Source | COPC Flag (Y/N) | Rationale for Selection |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil (0-10 ft bgs) | 83-32-9 | Acenaphthene | 0.003 | 89 | mg/kg | WSW02 | 7/7 | 0.0021-1.94 | MAX | N | 3,600 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 208-96-8 | Acenaphthylene | 0.201 | 13.6 | mg/kg | WSW02 | 7/7 | 0.0021-1.94 | MAX | --- | --- | --- | Y | MGP-related |
| Soil (0-10 ft bgs) | 120-12-7 | Anthracene | 0.0506 | 40.3 | mg/kg | WSW02 | 7/7 | 0.0021-1.94 | MAX | N | 18,000 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 7440-38-2 | Arsenic | 5.8 | 10.6 | mg/kg | WSW01 | 7/7 | 0.36-0.37 | MAX | C | 0.68 | EPA PRG | Y | Potential MGP-related |
| Soil (0-10 ft bgs) | 71-43-2 | Benzene | 0.826 | 5.09 | mg/kg | WSW05 | 5/7 | 0.0032-0.802 | MAX | C | 1.2 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 56-55-3 | Benzo(a)anthracene | 0.013 | 25.2 | mg/kg | WSW02 | 7/7 | 0.0021-1.94 | MAX | C | 1.1 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 50-32-8 | Benzo(a)pyrene | 0.0457 | 19.3 | mg/kg | WSW02 | 7/7 | 0.0021-1.94 | MAX | C | 0.11 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 205-99-2 | Benzo(b)fluoranthene | 0.0281 | 22.9 | mg/kg | WSW02 | 7/7 | 0.0021-1.94 | MAX | C | 1.1 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 191-24-2 | Benzo(g,h,i)perylene | 0.335 | 10.5 | mg/kg | WSW02 | 7/7 | 0.0021-1.94 | MAX | --- | --- | --- | Y | MGP-related |
| Soil (0-10 ft bgs) | 207-08-9 | Benzo(k)fluoranthene | 0.0163 | 0.0163 | mg/kg | WSW01 | 1/7 | 0.0021-1.94 | MAX | C | 11 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 218-01-9 | Chrysene | 0.0152 | 24.5 | mg/kg | WSW02 | 7/7 | 0.0021-1.94 | MAX | C | 110 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 53-70-3 | Dibenzo(a,h)anthracene | 0.0094 | 2.33 | mg/kg | WSW02 | 7/7 | 0.0021-1.94 | MAX | C | 0.11 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 100-41-4 | Ethylbenzene | 5.89 | 28.1 | mg/kg | WSW03 | 6/7 | 0.0032-1.62 | MAX | N | 5.8 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 206-44-0 | Fluoranthene | 0.005 | 62.9 | mg/kg | WSW02 | 7/7 | 0.0021-1.94 | MAX | N | 2,400 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 86-73-7 | Fluorene | 0.006 | 48.3 | mg/kg | WSW02 | 7/7 | 0.0021-1.94 | MAX | N | 2,400 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 193-39-5 | Indeno(1,2,3-cd)pyrene | 0.0881 | 6.99 | mg/kg | WSW02 | 7/7 | 0.0021-1.94 | MAX | C | 1.1 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 91-20-3 | Naphthalene | 0.0101 | 284 | mg/kg | WSW02 | 7/7 | 0.0021-1.94 | MAX | C | 3.8 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 85-01-8 | Phenanthrene | 0.0086 | 175 | mg/kg | WSW02 | 7/7 | 0.0021-1.94 | MAX | --- | --- | --- | Y | MGP-related |
| Soil (0-10 ft bgs) | 129-00-0 | Pyrene | 0.014 | 79.1 | mg/kg | WSW02 | 7/7 | 0.0021-1.94 | MAX | N | 1,800 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 108-88-3 | Toluene | 0.215 | 1.4 | mg/kg | WSW05 | 5/7 | 0.0032-0.802 | MAX | N | 4,900 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 1330-20-7 | Xylene (total) | 7.59 | 36.6 | mg/kg | WSW03 | 6/7 | 0.0032-0.802 | MAX | N | 580 | EPA PRG | N | MGP-related |

# TABLE 5
# SUMMARY OF CONTAMINANTS OF CONCERN
# SURFACE SOIL
# ALLEY BETWEEN PARCELS

| | |
|---|---|
| Scenario Timeframe: | Future |
| Medium: | Surface |
| Exposure Medium: | Soil (0-2 ft bgs) and Air |

| Exposure Point | CAS Number | Chemical | Minimum Concentration | Maximum Concentration | Units | Location of Maximum Concentration | Detection Frequency | Range of Detection Limits | Concentration Used for Screening | Screening Toxicity Value (N/C) | Potential ARAR/TBC Value [1] | Potential ARAR/TBC Source | COPC Flag (Y/N) | Rationale for Selection |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil (0-10 ft bgs) | 83-32-9 | Acenaphthene | 0.0279 | 0.375 | mg/kg | NSW12 | 3/7 | 0.023-2.84 | MAX | N | 3,600 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 208-96-8 | Acenaphthylene | 0.537 | 82.1 | mg/kg | NSW11 | 6/7 | 0.023-2.84 | MAX | --- | --- | --- | Y | MGP-related |
| Soil (0-10 ft bgs) | 120-12-7 | Anthracene | 0.158 | 23.7 | mg/kg | NSW11 | 6/7 | 0.023-2.84 | MAX | N | 18,000 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 7440-38-2 | Arsenic | 5.4 | 17.6 | mg/kg | NSW12 | 7/7 | 0.37-0.46 | MAX | C | 0.68 | EPA PRG | Y | Potential MGP-related |
| Soil (0-10 ft bgs) | 71-43-2 | Benzene | 0.297 | 0.297 | mg/kg | NSW05 | 1/7 | 0.003-0.173 | MAX | C | 1.2 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 56-55-3 | Benzo(a)anthracene | 0.0523 | 13.9 | mg/kg | NSW11 | 6/7 | 0.023-2.84 | MAX | C | 1.1 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 50-32-8 | Benzo(a)pyrene | 0.111 | 56 | mg/kg | NSW11 | 6/7 | 0.023-2.84 | MAX | C | 0.11 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 205-99-2 | Benzo(b)fluoranthene | 0.187 | 58.3 | mg/kg | NSW11 | 6/7 | 0.023-2.84 | MAX | C | 1.1 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 191-24-2 | Benzo(g,h,i)perylene | 0.063 | 41.1 | mg/kg | NSW11 | 7/7 | 0.023-2.84 | MAX | --- | --- | --- | Y | MGP-related |
| Soil (0-10 ft bgs) | 207-08-9 | Benzo(k)fluoranthene | ND | ND | mg/kg | --- | 0/7 | 0.023-2.84 | --- | C | 11 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 218-01-9 | Chrysene | 0.0531 | 19.9 | mg/kg | NSW11 | 6/7 | 0.023-2.84 | MAX | C | 110 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 53-70-3 | Dibenzo(a,h)anthracene | 0.0691 | 6.11 | mg/kg | NSW11 | 6/7 | 0.023-2.84 | MAX | C | 0.11 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 100-41-4 | Ethylbenzene | ND | ND | mg/kg | --- | 0/7 | 0.003-0.173 | --- | N | 5.8 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 206-44-0 | Fluoranthene | 0.0367 | 14 | mg/kg | NSW11 | 5/7 | 0.023-2.84 | MAX | N | 2,400 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 86-73-7 | Fluorene | 0.04 | 12.2 | mg/kg | NSW11 | 4/7 | 0.023-2.84 | MAX | N | 2,400 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 193-39-5 | Indeno(1,2,3-cd)pyrene | 0.0691 | 18.7 | mg/kg | NSW11 | 7/7 | 0.023-2.84 | MAX | C | 1.1 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 91-20-3 | Naphthalene | 0.0402 | 18.5 | mg/kg | NSW11 | 4/7 | 0.023-2.84 | MAX | C | 3.8 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 85-01-8 | Phenanthrene | 0.302 | 22.2 | mg/kg | NSW11 | 4/7 | 0.023-2.84 | MAX | --- | --- | --- | Y | MGP-related |
| Soil (0-10 ft bgs) | 129-00-0 | Pyrene | 0.0641 | 30.6 | mg/kg | NSW11 | 5/7 | 0.023-2.84 | MAX | N | 1,800 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 108-88-3 | Toluene | ND | ND | mg/kg | --- | 0/7 | 0.003-0.173 | --- | N | 4,900 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 1330-20-7 | Xylene (total) | 0.412 | 0.412 | mg/kg | NSW05 | 1/7 | 0.003-0.173 | MAX | N | 580 | EPA PRG | N | MGP-related |

# TABLE 6
# SUMMARY OF CONTAMINANTS OF CONCERN
# SUBSURFACE SOIL
# ALLEY BETWEEN PARCELS

| | |
|---|---|
| Scenario Timeframe: | Future |
| Medium: | Subsurface |
| Exposure Medium: | Soil (0-10 ft bgs) and Air |

| Exposure Point | CAS Number | Chemical | Minimum Concentration | Maximum Concentration | Units | Location of Maximum Concentration | Detection Frequency | Range of Detection Limits | Concentration Used for Screening | Screening Toxicity Value (N/C) | Potential ARAR/TBC Value [1] | Potential ARAR/TBC Source | COPC Flag (Y/N) | Rationale for Selection |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil (0-10 ft bgs) | 83-32-9 | Acenaphthene | 0.0279 | 73 | mg/kg | SSW02 | 10/16 | 0.0212-2.84 | MAX | N | 3,600 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 208-96-8 | Acenaphthylene | 0.0491 | 82.1 | mg/kg | NSW11 | 13/16 | 0.0205-2.84 | MAX | --- | --- | --- | Y | MGP-related |
| Soil (0-10 ft bgs) | 120-12-7 | Anthracene | 0.0464 | 38.7 | mg/kg | SSW02 | 13/16 | 0.0205-2.84 | MAX | N | 18,000 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 7440-38-2 | Arsenic | 5.4 | 17.6 | mg/kg | NSW12 | 16/16 | 0.33-2.5 | MAX | C | 0.68 | EPA PRG | Y | Potential MGP-related |
| Soil (0-10 ft bgs) | 71-43-2 | Benzene | 0.0082 | 7.72 | mg/kg | NSW05 | 5/16 | 0.0029-1.6 | MAX | C | 1.2 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 56-55-3 | Benzo(a)anthracene | 0.031 | 23.1 | mg/kg | SSW02 | 13/16 | 0.0205-2.84 | MAX | C | 1.1 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 50-32-8 | Benzo(a)pyrene | 0.0506 | 56 | mg/kg | NSW11 | 12/16 | 0.0205-2.84 | MAX | C | 0.11 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 205-99-2 | Benzo(b)fluoranthene | 0.0403 | 58.3 | mg/kg | NSW11 | 12/16 | 0.0205-2.84 | MAX | C | 1.1 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 191-24-2 | Benzo(g,h,l)perylene | 0.063 | 41.1 | mg/kg | NSW11 | 13/16 | 0.0205-2.84 | MAX | --- | --- | --- | Y | MGP-related |
| Soil (0-10 ft bgs) | 207-08-9 | Benzo(k)fluoranthene | 0.0316 | 0.0316 | mg/kg | NSW09 | 1/16 | 0.0205-2.84 | MAX | C | 11 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 218-01-9 | Chrysene | 0.0531 | 22.8 | mg/kg | SSW02 | 12/16 | 0.0205-2.84 | MAX | C | 110 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 53-70-3 | Dibenzo(a,h)anthracene | 0.0285 | 6.11 | mg/kg | NSW11 | 11/16 | 0.0205-2.84 | MAX | C | 0.11 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 100-41-4 | Ethylbenzene | 0.0043 | 76.4 | mg/kg | NSW05 | 6/16 | 0.0029-1.6 | MAX | N | 5.8 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 206-44-0 | Fluoranthene | 0.0367 | 37.1 | mg/kg | SSW02 | 12/16 | 0.0205-2.84 | MAX | N | 2,400 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 86-73-7 | Fluorene | 0.04 | 38.7 | mg/kg | SSW02 | 10/16 | 0.0212-2.84 | MAX | N | 2,400 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 193-39-5 | Indeno(1,2,3-cd)pyrene | 0.064 | 18.7 | mg/kg | NSW11 | 13/16 | 0.0205-2.84 | MAX | C | 1.1 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 91-20-3 | Naphthalene | 0.0402 | 231 | mg/kg | SSW02 | 11/16 | 0.023-2.84 | MAX | C | 3.8 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 85-01-8 | Phenanthrene | 0.11 | 113 | mg/kg | SSW02 | 11/16 | 0.0212-2.84 | MAX | --- | --- | --- | Y | MGP-related |
| Soil (0-10 ft bgs) | 129-00-0 | Pyrene | 0.0641 | 46.1 | mg/kg | SSW02 | 12/16 | 0.0205-2.84 | MAX | N | 1,800 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 108-88-3 | Toluene | 0.0403 | 3.69 | mg/kg | NSW05 | 3/16 | 0.0029-1.6 | MAX | N | 4,900 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 1330-20-7 | Xylene (total) | 0.0169 | 180 | mg/kg | NSW05 | 7/16 | 0.0029-1.6 | MAX | N | 580 | EPA PRG | N | MGP-related |

# TABLE 7
# SUMMARY OF CONTAMINANTS OF CONCERN
# SUBSURFACE SOIL
# 7TH STREET AND NORFOLK AVENUE RIGHT OF WAY

| | |
|---|---|
| Scenario Timeframe: | Future |
| Medium: | Subsurface |
| Exposure Medium: | Soil (0-10 ft bgs) and Air |

| Exposure Point | CAS Number | Chemical | Minimum Concentration | Maximum Concentration | Units | Location of Maximum Concentration | Detection Frequency | Range of Detection Limits | Concentration Used for Screening | Screening Toxicity Value (N/C) | Potential ARAR/TBC Value [1] | Potential ARAR/TBC Source | COPC Flag (Y/N) | Rationale for Selection |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil (0-10 ft bgs) | 83-32-9 | Acenaphthene | 0.0043 | 0.425 | mg/kg | ESW12 | 4/7 | 0.0021-0.0313 | MAX | N | 3,600 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 208-96-8 | Acenaphthylene | 0.0133 | 0.252 | mg/kg | ESW06 | 6/7 | 0.0021-0.0313 | MAX | --- | --- | --- | Y | MGP-related |
| Soil (0-10 ft bgs) | 120-12-7 | Anthracene | 0.0082 | 0.21 | mg/kg | ESW12 | 6/7 | 0.0021-0.0313 | MAX | N | 18,000 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 7440-38-2 | Arsenic | 7.2 | 12 | mg/kg | ESW11 | 7/7 | 0.33-3.3 | MAX | C | 0.68 | EPA PRG | Y | Potential MGP-related |
| Soil (0-10 ft bgs) | 71-43-2 | Benzene | ND | ND | mg/kg | --- | 0/7 | 0.0031-0.0033 | --- | C | 1.2 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 56-55-3 | Benzo(a)anthracene | 0.0255 | 0.869 | mg/kg | ESW06 | 6/7 | 0.0021-0.0313 | MAX | C | 1.1 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 50-32-8 | Benzo(a)pyrene | 0.0355 | 1 | mg/kg | ESW06 | 7/7 | 0.0021-0.0313 | MAX | C | 0.11 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 205-99-2 | Benzo(b)fluoranthene | 0.0321 | 1.65 | mg/kg | ESW06 | 7/7 | 0.0021-0.0313 | MAX | C | 1.1 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 191-24-2 | Benzo(g,h,i)perylene | 0.0445 | 0.856 | mg/kg | ESW06 | 6/7 | 0.0021-0.0313 | MAX | --- | --- | --- | Y | MGP-related |
| Soil (0-10 ft bgs) | 207-08-9 | Benzo(k)fluoranthene | ND | ND | mg/kg | --- | 0/7 | 0.0021-0.0313 | --- | C | 11 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 218-01-9 | Chrysene | 0.0381 | 0.914 | mg/kg | ESW06 | 6/7 | 0.0021-0.0313 | MAX | C | 110 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 53-70-3 | Dibenzo(a,h)anthracene | 0.0095 | 0.196 | mg/kg | ESW06 | 4/7 | 0.0021-0.0313 | MAX | C | 0.11 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 100-41-4 | Ethylbenzene | ND | ND | mg/kg | --- | 0/7 | 0.0031-0.0033 | --- | N | 5.8 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 206-44-0 | Fluoranthene | 0.0507 | 1.41 | mg/kg | ESW06 | 6/7 | 0.0021-0.0313 | MAX | N | 2,400 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 86-73-7 | Fluorene | 0.0046 | 0.181 | mg/kg | ESW12 | 4/7 | 0.0021-0.0313 | MAX | N | 2,400 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 193-39-5 | Indeno(1,2,3-cd)pyrene | 0.0327 | 0.671 | mg/kg | ESW06 | 6/7 | 0.0021-0.0313 | MAX | C | 1.1 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 91-20-3 | Naphthalene | 0.0345 | 0.15 | mg/kg | ESW06 | 5/7 | 0.0021-0.0313 | MAX | C | 3.8 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 85-01-8 | Phenanthrene | 0.0637 | 0.582 | mg/kg | ESW12 | 6/7 | 0.0021-0.0313 | MAX | --- | --- | --- | Y | MGP-related |
| Soil (0-10 ft bgs) | 129-00-0 | Pyrene | 0.0485 | 1.34 | mg/kg | ESW06 | 6/7 | 0.00032-0.0313 | MAX | N | 1,800 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 108-88-3 | Toluene | ND | ND | mg/kg | --- | 0/7 | 0.0031-0.0033 | --- | N | 4,900 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 1330-20-7 | Xylene (total) | ND | ND | mg/kg | --- | 0/7 | 0.0021-0.0294 | --- | N | 580 | EPA PRG | N | MGP-related |

# TABLE 7 CONTINUED
# SUMMARY OF CONTAMINANTS OF CONCERN
# SUBSURFACE SOIL
# 7TH STREET AND NORFOLK AVENUE RIGHT OF WAY

| | |
|---|---|
| Scenario Timeframe: | Future |
| Medium: | Subsurface |
| Exposure Medium: | Soil (0-10 ft bgs) and Air |

| Exposure Point | CAS Number | Chemical | Minimum Concentration | Maximum Concentration | Units | Location of Maximum Concentration | Detection Frequency | Range of Detection Limits | Concentration Used for Screening | Screening Toxicity Value (N/C) | Potential ARAR/TBC Value [1] | Potential ARAR/TBC Source | COPC Flag (Y/N) | Rationale for Selection |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil (0-10 ft bgs) | 83-32-9 | Acenaphthene | 0.0043 | 30.9 | mg/kg | ESW04 | 11/17 | 0.0019-0.573 | MAX | N | 3,600 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 208-96-8 | Acenaphthylene | 0.0055 | 5.24 | mg/kg | ESW07 | 14/17 | 0.0019-0.554 | MAX | --- | --- | --- | Y | MGP-related |
| Soil (0-10 ft bgs) | 120-12-7 | Anthracene | 0.0031 | 13.2 | mg/kg | ESW07 | 14/17 | 0.0019-0.573 | MAX | N | 18,000 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 7440-38-2 | Arsenic | 5.9 | 12 | mg/kg | ESW11 | 17/17 | 0.31-0.41 | MAX | C | 0.68 | EPA PRG | Y | Potential MGP-related |
| Soil (0-10 ft bgs) | 71-43-2 | Benzene | 0.0597 | 1.24 | mg/kg | ESW07 | 5/17 | 0.003-0.304 | MAX | C | 1.2 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 56-55-3 | Benzo(a)anthracene | 0.0038 | 9.36 | mg/kg | ESW07 | 14/17 | 0.0019-0.554 | MAX | C | 1.1 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 50-32-8 | Benzo(a)pyrene | 0.0059 | 7.46 | mg/kg | ESW07 | 14/17 | 0.0019-0.554 | MAX | C | 0.11 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 205-99-2 | Benzo(b)fluoranthene | 0.0039 | 9.15 | mg/kg | ESW07 | 15/17 | 0.0019-0.554 | MAX | C | 1.1 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 191-24-2 | Benzo(g,h,i)perylene | 0.0062 | 1.81 | mg/kg | ESW06 | 14/17 | 0.0019-0.554 | MAX | --- | --- | --- | Y | MGP-related |
| Soil (0-10 ft bgs) | 207-08-9 | Benzo(k)fluoranthene | 0.004 | 0.004 | mg/kg | NSW02 | 1/17 | 0.0019-0.554 | MAX | C | 11 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 218-01-9 | Chrysene | 0.0058 | 6.84 | mg/kg | ESW07 | 14/17 | 0.0019-0.554 | MAX | C | 110 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 53-70-3 | Dibenzo(a,h)anthracene | 0.0076 | 0.651 | mg/kg | ESW04 | 11/17 | 0.0019-0.554 | MAX | C | 0.11 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 100-41-4 | Ethylbenzene | 0.276 | 8.66 | mg/kg | ESW04 | 6/17 | 0.003-0.304 | MAX | N | 5.8 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 206-44-0 | Fluoranthene | 0.0061 | 16.3 | mg/kg | ESW07 | 14/17 | 0.0019-0.573 | MAX | N | 2,400 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 86-73-7 | Fluorene | 0.0033 | 14 | mg/kg | ESW04 | 12/17 | 0.0019-0.573 | MAX | N | 2,400 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 193-39-5 | Indeno(1,2,3-cd)pyrene | 0.0041 | 1.48 | mg/kg | ESW07 | 14/17 | 0.0019-0.554 | MAX | C | 1.1 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 91-20-3 | Naphthalene | 0.0072 | 130 | mg/kg | ESW04 | 14/17 | 0.0019-0.573 | MAX | C | 3.8 | EPA PRG | Y | MGP-related |
| Soil (0-10 ft bgs) | 85-01-8 | Phenanthrene | 0.0031 | 47.4 | mg/kg | ESW07 | 15/17 | 0.0019-0.573 | MAX | --- | --- | --- | Y | MGP-related |
| Soil (0-10 ft bgs) | 129-00-0 | Pyrene | 0.0077 | 25 | mg/kg | ESW07 | 14/17 | 0.0019-0.573 | MAX | N | 1,800 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 108-88-3 | Toluene | 0.0102 | 0.552 | mg/kg | ESW04 | 4/17 | 0.003-0.304 | MAX | N | 4,900 | EPA PRG | N | MGP-related |
| Soil (0-10 ft bgs) | 1330-20-7 | Xylene (total) | 0.322 | 12.3 | mg/kg | ESW07 | 6/17 | 0.003-0.304 | MAX | N | 580 | EPA PRG | N | MGP-related |

# TABLE 8
# SUMMARY OF CONTAMINANTS OF CONCERN
# GROUNDWATER

| | |
|---|---|
| Scenario Timeframe: | Future |
| Medium: | Groundwater |
| Exposure Medium: | Groundwater and Air |

| Exposure Point | CAS Number | Chemical | Minimum Concentration | Maximum Concentration | Units | Location of Maximum Concentration | Detection Frequency | Range of Detection Limits | Concentration Used for Screening | Screening Toxicity Value (N/C) | Potential ARAR/TBC Value [1] | Potential ARAR/TBC Source | COPC Flag (Y/N) | Rationale for Selection |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Groundwater | 83-32-9 | Acenaphthene | 49.4 | 2670 | ug/L | MW-11 | 10/10 | 0.33-34.6 | MAX | N | 530 | EPA PRG | Y | MGP-related |
| Groundwater | 208-96-8 | Acenaphthylene | 4.1 | 297 | ug/L | MW-11 | 5/10 | 0.35-36.5 | MAX | --- | --- | --- | Y | MGP-related |
| Groundwater | 120-12-7 | Anthracene | 1.2 | 992 | ug/L | MW-11 | 9/10 | 0.27-28.8 | MAX | N | 1,800 | EPA PRG | N | MGP-related |
| Groundwater | 7440-38-2 | Arsenic | 3.7 | 35.8 | ug/L | MW-08 | 17/10 | 3.4-4.5 | MAX | C | 0.052 | EPA PRG | Y | Potential MGP-related |
| Groundwater | 71-43-2 | Benzene | 7.1 | 857 | ug/L | MW-11 | 10/10 | 0.079-4 | MAX | C | 0.46 | EPA PRG | Y | MGP-related |
| Groundwater | 56-55-3 | Benzo(a)anthracene | 5.9 | 490 | ug/L | MW-11 | 2/10 | 0.26-27.9 | MAX | C | 0.03 | EPA PRG | Y | MGP-related |
| Groundwater | 50-32-8 | Benzo(a)pyrene | 5.2 | 384 | ug/L | MW-11 | 2/10 | 0.33-34.6 | MAX | C | 0.025 | EPA PRG | Y | MGP-related |
| Groundwater | 205-99-2 | Benzo(b)fluoranthene | 6 | 427 | ug/L | MW-11 | 2/10 | 0.32-33.7 | MAX | C | 0.250 | EPA PRG | Y | MGP-related |
| Groundwater | 191-24-2 | Benzo(g,h,i)perylene | 153 | 153 | ug/L | MW-11 | 1/10 | 0.36-38.5 | MAX | --- | --- | --- | Y | MGP-related |
| Groundwater | 207-08-9 | Benzo(k)fluoranthene | ND | ND | ug/L | --- | 0/10 | 0.38-40.4 | --- | C | 2.5 | EPA PRG | N | MGP-related |
| Groundwater | 218-01-9 | Chrysene | 5.1 | 491 | ug/L | MW-11 | 2/10 | 0.33-34.6 | MAX | C | 25 | EPA PRG | Y | MGP-related |
| Groundwater | 53-70-3 | Dibenzo(a,h)anthracene | ND | ND | ug/L | --- | 0/10 | 0.41-43.3 | --- | C | 0.025 | EPA PRG | N | MGP-related |
| Groundwater | 100-41-4 | Ethylbenzene | 4 | 1370 | ug/L | MW-11 | 10/10 | 0.12-6 | MAX | N | 1.5 | EPA PRG | Y | MGP-related |
| Groundwater | 206-44-0 | Fluoranthene | 2.1 | 1210 | ug/L | MW-11 | 6/10 | 0.34-35.6 | MAX | N | 80 | EPA PRG | Y | MGP-related |
| Groundwater | 86-73-7 | Fluorene | 7.9 | 1190 | ug/L | MW-11 | 10/10 | 0.31-32.7 | MAX | N | 29 | EPA PRG | Y | MGP-related |
| Groundwater | 193-39-5 | Indeno(1,2,3-cd)pyrene | 100 | 100 | ug/L | MW-11 | 1/10 | 0.29-30.8 | MAX | C | 0.250 | EPA PRG | Y | MGP-related |
| Groundwater | 91-20-3 | Naphthalene | 5.2 | 15800 | ug/L | MW-11 | 10/10 | 0.33-173 | MAX | C | 0.17 | EPA PRG | Y | MGP-related |
| Groundwater | 85-01-8 | Phenanthrene | 1 | 3960 | ug/L | MW-11 | 10/10 | 0.31-32.7 | MAX | --- | --- | --- | Y | MGP-related |
| Groundwater | 129-00-0 | Pyrene | 0.82 | 1770 | ug/L | MW-11 | 7/10 | 0.25-26.9 | MAX | N | 120 | EPA PRG | Y | MGP-related |
| Groundwater | 108-88-3 | Toluene | 0.8 | 510 | ug/L | MW-11 | 10/10 | 0.14-7 | MAX | N | 1,100 | EPA PRG | N | MGP-related |
| Groundwater | 1330-20-7 | Xylene (total) | 43.4 | 1050 | ug/L | MW-11 | 10/10 | 0.34-17 | MAX | N | 190 | EPA PRG | Y | MGP-related |

**TABLE 9**
**CANCER DATA TOXICITY SUMMARY**
**ORAL/DERMAL**

| Chemical of Potential Concern | Oral Cancer Slope Factor | | Oral Absorption Efficiency for Dermal | Absorbed Cancer Slope Factor | | Weight of Evidence/ Cancer Guideline Description | Oral CSF | |
|---|---|---|---|---|---|---|---|---|
| | Value | Units | | Value | Units | | Source | Date |
| Acenaphthene | --- | kg-day/mg | --- | --- | kg-day/mg | --- | --- | 11/1/1990 |
| Acenaphthylene | --- | kg-day/mg | --- | --- | kg-day/mg | --- | --- | 1/1/1991 |
| Anthracene | --- | kg-day/mg | --- | --- | kg-day/mg | --- | --- | 1/1/1991 |
| Arsenic | 1.5 | kg-day/mg | 95% | 1.5 | kg-day/mg | A | IRIS | 6/1/1995 |
| Benzene | 0.055 | kg-day/mg | 100% | 0.055 | kg-day/mg | A | IRIS | 4/17/2003 |
| Benzo(a)anthracene | 0.73 | kg-day/mg | 89% | 0.73 | kg-day/mg | B2 | EPA9 | 3/1/1994 |
| Benzo(a)pyrene | 7.3 | kg-day/mg | 89% | 7.3 | kg-day/mg | B2 | IRIS | 7/1/1992 |
| Benzo(b)fluoranthene | 0.73 | kg-day/mg | 89% | 0.73 | kg-day/mg | B2 | EPA9 | 3/1/1994 |
| Benzo(g,h,i)perylene | --- | kg-day/mg | --- | --- | kg-day/mg | D | IRIS | 12/1/1990 |
| Benzo(k)fluoranthene | 0.073 | kg-day/mg | 89% | 0.073 | kg-day/mg | B2 | EPA9 | 3/1/1994 |
| Chrysene | 0.0073 | kg-day/mg | 89% | 0.0073 | kg-day/mg | B2 | EPA9 | 3/1/1994 |
| Dibenzo(a,h)anthracene | 7.3 | kg-day/mg | 89% | 7.3 | kg-day/mg | B2 | EPA9 | 3/1/1994 |
| Ethylbenzene | 0.011 | kg-day/mg | --- | --- | kg-day/mg | --- | --- | 3/1/1991 |
| Fluoranthene | --- | kg-day/mg | --- | --- | kg-day/mg | D | IRIS | 12/1/1990 |
| Fluorene | --- | kg-day/mg | --- | --- | kg-day/mg | D | IRIS | 12/1/1990 |
| Indeno(1,2,3-cd)pyrene | 0.73 | kg-day/mg | 89% | 0.73 | kg-day/mg | B2 | EPA9 | 3/1/1994 |
| Naphthalene | --- | kg-day/mg | --- | --- | kg-day/mg | C | IRIS | 9/17/1998 |
| Phenanthrene | --- | kg-day/mg | --- | --- | kg-day/mg | D | IRIS | 12/1/1990 |
| Pyrene | --- | kg-day/mg | --- | --- | kg-day/mg | D | IRIS | 1/1/1991 |
| Toluene | --- | kg-day/mg | --- | --- | kg-day/mg | --- | --- | 9/23/2005 |
| Xylene (total) | --- | kg-day/mg | --- | --- | kg-day/mg | --- | --- | 2/21/2003 |

**TABLE 10**
**CANCER DATA TOXICITY SUMMARY**
**INHALATION**

| Chemical of Potential Concern | Unit Risk | | Adjustment | Weight of Evidence/Cancer Guideline Description | Unit Risk : Inhalation CSF | |
|---|---|---|---|---|---|---|
| | Value | Units | | | Source | Date |
| Acenaphthene | --- | $(ug/m^3)^{-1}$ | --- | --- | --- | 3/1/1994 |
| Acenaphthylene | --- | $(ug/m^3)^{-1}$ | --- | --- | --- | 7/1/1992 |
| Anthracene | --- | $(ug/m^3)^{-1}$ | --- | --- | --- | 3/1/1994 |
| Arsenic | 0.0043 | $(ug/m^3)^{-1}$ | 3500 | A | EPA3 | 2/21/2003 |
| Benzene | 0.0000078 | $(ug/m^3)^{-1}$ | 3500 | A | EPA3 | 11/1/1990 |
| Benzo(a)anthracene | 0.00011 | $(ug/m^3)^{-1}$ | --- | B2 | EPA3 | 12/1/1990 |
| Benzo(a)pyrene | 0.0011 | $(ug/m^3)^{-1}$ | --- | B2 | EPA3 | 3/1/1994 |
| Benzo(b)fluoranthene | 0.00011 | $(ug/m^3)^{-1}$ | --- | B2 | EPA3 | 3/1/1994 |
| Benzo(g,h,i)perylene | --- | $(ug/m^3)^{-1}$ | --- | D | --- | 3/1/1994 |
| Benzo(k)fluoranthene | 0.00011 | $(ug/m^3)^{-1}$ | --- | B2 | EPA3 | 3/1/1991 |
| Chrysene | 0.000011 | $(ug/m^3)^{-1}$ | --- | B2 | EPA3 | 12/1/1990 |
| Dibenzo(a,h)anthracene | 0.0012 | $(ug/m^3)^{-1}$ | --- | B2 | EPA3 | 12/1/1990 |
| Ethylbenzene | 0.0000025 | $(ug/m^3)^{-1}$ | --- | --- | EPA3 | 1/1/1991 |
| Fluoranthene | --- | $(ug/m^3)^{-1}$ | --- | D | --- | 3/1/1994 |
| Fluorene | --- | $(ug/m^3)^{-1}$ | --- | D | --- | 9/17/1998 |
| Indeno(1,2,3-cd)pyrene | 0.00011 | $(ug/m^3)^{-1}$ | --- | B2 | EPA3 | 12/1/1990 |
| Naphthalene | 0.000034 | $(ug/m^3)^{-1}$ | --- | C | EPA3 | 1/1/1991 |
| Phenanthrene | --- | $(ug/m^3)^{-1}$ | --- | D | --- | 9/23/2005 |
| Pyrene | --- | $(ug/m^3)^{-1}$ | --- | D | --- | 6/1/1995 |
| Toluene | --- | $(ug/m^3)^{-1}$ | --- | --- | --- | 1/1/1991 |
| Xylene (total) | --- | $(ug/m^3)^{-1}$ | --- | --- | --- | 4/17/2003 |

**TABLE 11**
**NONCANCER DATA TOXICITY SUMMARY**
**ORAL/DERMAL**

| Chemical of Potential Concern | Chronic/ Subchronic | Oral RfD | | Oral Absorption Efficiency for Dermal | Absorbed RfD for Dermal | | Primary Target Organ(s) | Combined Uncertainty Factors | RfD:Target Organ(s) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Value | Units | | Value | Units | | | Source | Date |
| Acenaphthene | chronic | 0.06 | mg/kg-day | 89% | 0.06 | mg/kg-day | liver | 3000 | IRIS | 11/1/1990 |
| Acenaphthylene | --- | --- | mg/kg-day | --- | --- | mg/kg-day | --- | --- | --- | 1/1/1991 |
| Anthracene | chronic | 0.3 | mg/kg-day | 89% | 0.3 | mg/kg-day | --- | 3000 | IRIS | 1/1/1991 |
| Arsenic | chronic | 0.0003 | mg/kg-day | 95% | 0.0003 | mg/kg-day | skin | 3 | IRIS | 6/1/1995 |
| Benzene | chronic | 0.004 | mg/kg-day | 100% | 0.004 | mg/kg-day | lymphocytes | 300 | IRIS | 4/17/2003 |
| Benzo(a)anthracene | --- | --- | mg/kg-day | --- | --- | mg/kg-day | --- | --- | --- | 3/1/1994 |
| Benzo(a)pyrene | chronic | 0.0003 | mg/kg-day | --- | 0.0003 | mg/kg-day | --- | 300 | IRIS | 1/1/2017 |
| Benzo(b)fluoranthene | --- | --- | mg/kg-day | --- | --- | mg/kg-day | --- | --- | --- | 3/1/1994 |
| Benzo(g,h,i)perylene | --- | --- | mg/kg-day | --- | --- | mg/kg-day | --- | --- | --- | 12/1/1990 |
| Benzo(k)fluoranthene | --- | --- | mg/kg-day | --- | --- | mg/kg-day | --- | --- | --- | 3/1/1994 |
| Chrysene | --- | --- | mg/kg-day | --- | --- | mg/kg-day | --- | --- | --- | 3/1/1994 |
| Dibenzo(a,h)anthracene | --- | --- | mg/kg-day | --- | --- | mg/kg-day | --- | --- | --- | 3/1/1994 |
| Ethylbenzene | chronic | 0.1 | mg/kg-day | 100% | 0.1 | mg/kg-day | liver, kidney | 1000 | IRIS | 3/1/1991 |
| Fluoranthene | chronic | 0.04 | mg/kg-day | 89% | 0.04 | mg/kg-day | kidney, liver, blood | 3000 | IRIS | 12/1/1990 |
| Fluorene | chronic | 0.04 | mg/kg-day | 89% | 0.04 | mg/kg-day | blood | 3000 | IRIS | 12/1/1990 |
| Indeno(1,2,3-cd)pyrene | --- | --- | mg/kg-day | --- | --- | mg/kg-day | --- | --- | --- | 3/1/1994 |
| Naphthalene | chronic | 0.02 | mg/kg-day | 89% | 0.02 | mg/kg-day | body weight | 3000 | IRIS | 9/17/1998 |
| Phenanthrene | --- | --- | mg/kg-day | --- | --- | mg/kg-day | --- | --- | --- | 12/1/1990 |
| Pyrene | chronic | 0.03 | mg/kg-day | 89% | 0.03 | mg/kg-day | kidney | 3000 | IRIS | 1/1/1991 |
| Toluene | chronic | 0.08 | mg/kg-day | 100% | 0.08 | mg/kg-day | kidney, nasal epithelium | 3000 | IRIS | 9/23/2005 |
| Xylene (total) | chronic | 0.2 | mg/kg-day | 100% | 0.2 | mg/kg-day | body weight | 1000 | IRIS | 2/21/2003 |

**TABLE 12**
**NONCANCER DATA TOXICITY SUMMARY**
**INHALATION**

| Chemical of Potential Concern | Chronic/ Subchronic | Inhalation RfC | | Primary Target Organ(s) | Combined Uncertainty Factors | RfC : Target Organ(s) | |
|---|---|---|---|---|---|---|---|
| | | Value | Units | | | Source | Date |
| Acenaphthene | --- | --- | $mg/m^3$ | --- | --- | EPA9 | 11/1/1990 |
| Acenaphthylene | --- | --- | $mg/m^3$ | --- | --- | --- | 1/1/1991 |
| Anthracene | --- | --- | $mg/m^3$ | --- | --- | EPA9 | 1/1/1991 |
| Arsenic | --- | 1.50E-05 | $mg/m^3$ | --- | --- | --- | 6/1/1995 |
| Benzene | chronic | 3.0E-02 | $mg/m^3$ | lymphocytes | 300 | IRIS | 4/17/2003 |
| Benzo(a)anthracene | --- | --- | $mg/m^3$ | --- | --- | --- | 3/1/1994 |
| Benzo(a)pyrene | chronic | 2.0E-06 | $mg/m^3$ | --- | --- | --- | 7/1/1992 |
| Benzo(b)fluoranthene | --- | --- | $mg/m^3$ | --- | --- | --- | 3/1/1994 |
| Benzo(g,h,i)perylene | --- | --- | $mg/m^3$ | --- | --- | --- | 12/1/1990 |
| Benzo(k)fluoranthene | --- | --- | $mg/m^3$ | --- | --- | --- | 3/1/1994 |
| Chrysene | --- | --- | $mg/m^3$ | --- | --- | --- | 3/1/1994 |
| Dibenzo(a,h)anthracene | --- | --- | $mg/m^3$ | --- | --- | --- | 3/1/1994 |
| Ethylbenzene | chronic | 1.0E+00 | $mg/m^3$ | developmental toxicity | 300 | IRIS | 3/1/1991 |
| Fluoranthene | --- | --- | $mg/m^3$ | --- | --- | EPA9 | 12/1/1990 |
| Fluorene | --- | --- | $mg/m^3$ | --- | --- | EPA9 | 12/1/1990 |
| Indeno(1,2,3-cd)pyrene | --- | --- | $mg/m^3$ | --- | --- | --- | 3/1/1994 |
| Naphthalene | chronic | 3.0E-03 | $mg/m^3$ | nasal epithelium | 3000 | IRIS | 9/17/1998 |
| Phenanthrene | --- | --- | $mg/m^3$ | --- | --- | --- | 12/1/1990 |
| Pyrene | --- | --- | $mg/m^3$ | --- | --- | EPA9 | 1/1/1991 |
| Toluene | chronic | 5.0E+00 | $mg/m^3$ | neurological effects | 10 | IRIS | 9/23/2005 |
| Xylene (total) | chronic | 1.0E-01 | $mg/m^3$ | motor coordination | 300 | IRIS | 2/21/2003 |

# TABLE 13
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# NEBRASKA PUBLIC POWER DISTRICT PROPERTY
# FUTURE COMMERCIAL/INDUSTRIAL WORKER

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Commercial/Industrial Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC Value | EPC Units | Cancer Risk Calculations: SF/IUR $SF_O$ | SF/IUR $SF_{ABS}$ | SF/IUR Units | Cancer Risk | Non-Cancer Hazard Calculations: RfD/RfC $RfD_O$ | RfD/RfC $RfD_{ABS}$ | RfD/RfC Units | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Surface Soil (0-2 ft) | Soil | Dermal Contact | Dermal | Acenaphthene | 0.0396 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.06 | 0.06 | mg/kg-day | 2.8E-07 |
| | | | | Acenaphthylene | 2.278 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Anthracene | 0.404 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.3 | 0.3 | mg/kg-day | 5.7E-07 |
| | | | | Arsenic | 7.538 | mg/kg | 1.5 | 1.5 | $(mg/kg\text{-}day)^{-1}$ | 4.0E-07 | 0.0003 | 0.0003 | mg/kg-day | 2.5E-03 |
| | | | | Benzene | --- | mg/kg | 0.055 | 0.055 | $(mg/kg\text{-}day)^{-1}$ | --- | 0.004 | 0.004 | mg/kg-day | --- |
| | | | | Benzo(a)anthracene | 0.741 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 8.2E-08 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(a)pyrene | 0.708 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 7.8E-07 | 0.0003 | 0.0003 | mg/kg-day | 1.0E-03 |
| | | | | Benzo(b)fluoranthene | 1.319 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 1.5E-07 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(g,h,I)perylene | 0.658 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Benzo(k)fluoranthene | --- | mg/kg | 0.073 | 0.073 | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Chrysene | 0.854 | mg/kg | 0.0073 | 0.0073 | $(mg/kg\text{-}day)^{-1}$ | 9.4E-10 | --- | --- | mg/kg-day | --- |
| | | | | Dibenzo(a,h)anthracene | 0.182 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 2.0E-07 | --- | --- | mg/kg-day | --- |
| | | | | Ethylbenzene | --- | mg/kg | 0.011 | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.1 | 0.1 | mg/kg-day | --- |
| | | | | Fluoranthene | 1.195 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 1.3E-05 |
| | | | | Fluorene | 0.297 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 3.1E-06 |
| | | | | Indeno(1,2,3-cd)pyrene | 0.457 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 5.1E-08 | --- | --- | mg/kg-day | --- |
| | | | | Naphthalene | 0.373 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.02 | 0.02 | mg/kg-day | 7.9E-06 |
| | | | | Phenanthrene | 0.776 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Pyrene | 1.238 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.03 | 0.03 | mg/kg-day | 1.7E-05 |
| | | | | Toluene | --- | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.08 | 0.08 | mg/kg-day | --- |
| | | | | Xylene (total) | --- | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.2 | 0.2 | mg/kg-day | --- |
| | | | Exp. Route Total | | | | | | | 1.7E-06 | | | | 3.5E-03 |
| | | Exposure Point Total | | | | | | | | 1.7E-06 | | | | 3.5E-03 |
| | Exposure Medium Total | | | | | | | | | 1.7E-06 | | | | 3.5E-03 |

# TABLE 13 CONTINUED
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# NEBRASKA PUBLIC POWER DISTRICT PROPERTY
# FUTURE COMMERCIAL/INDUSTRIAL WORKER

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Commercial/Industrial Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC | | Cancer Risk Calculations | | | | Non-Cancer Hazard Calculations | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | SF/IUR | | | Cancer Risk | RfD/RfC | | | |
| | | | | | Value | Units | $SF_O$ | $SF_{ABS}$ | Units | | $RfD_O$ | $RfD_{ABS}$ | Units | Hazard Quotient |
| Surface Soil (0-2 ft) | Soil | Incidental Ingestion | Ingestion | Acenaphthene | 0.0396 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.06 | 0.06 | mg/kg-day | 5.1E-07 |
| | | | | Acenaphthylene | 2.278 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Anthracene | 0.404 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.3 | 0.3 | mg/kg-day | 1.0E-06 |
| | | | | Arsenic | 7.538 | mg/kg | 1.5 | 1.5 | $(mg/kg\text{-}day)^{-1}$ | 3.1E-06 | 0.0003 | 0.0003 | mg/kg-day | 1.9E-02 |
| | | | | Benzene | --- | mg/kg | 0.055 | 0.055 | $(mg/kg\text{-}day)^{-1}$ | --- | 0.004 | 0.004 | mg/kg-day | --- |
| | | | | Benzo(a)anthracene | 0.741 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 1.5E-07 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(a)pyrene | 0.708 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 1.4E-06 | 0.0003 | 0.0003 | mg/kg-day | 1.8E-03 |
| | | | | Benzo(b)fluoranthene | 1.319 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 2.6E-07 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(g,h,i)perylene | 0.658 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Benzo(k)fluoranthene | --- | mg/kg | 0.073 | 0.073 | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Chrysene | 0.854 | mg/kg | 0.0073 | 0.0073 | $(mg/kg\text{-}day)^{-1}$ | 1.7E-09 | --- | --- | mg/kg-day | --- |
| | | | | Dibenzo(a,h)anthracene | 0.182 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 3.7E-07 | --- | --- | mg/kg-day | --- |
| | | | | Ethylbenzene | --- | mg/kg | 0.011 | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.1 | 0.1 | mg/kg-day | --- |
| | | | | Fluoranthene | 1.195 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 2.3E-05 |
| | | | | Fluorene | 0.297 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 5.7E-06 |
| | | | | Indeno(1,2,3-cd)pyrene | 0.457 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 9.2E-08 | --- | --- | mg/kg-day | --- |
| | | | | Naphthalene | 0.373 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.02 | 0.02 | mg/kg-day | 1.4E-05 |
| | | | | Phenanthrene | 0.776 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Pyrene | 1.238 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.03 | 0.03 | mg/kg-day | 3.2E-05 |
| | | | | Toluene | --- | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.08 | 0.08 | mg/kg-day | --- |
| | | | | Xylene (total) | --- | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.2 | 0.2 | mg/kg-day | --- |
| | | | Exp. Route Total | | | | | | | 5.4E-06 | | | | 2.1E-02 |
| | | Exposure Point Total | | | | | | | | 5.4E-06 | | | | 2.1E-02 |
| | Exposure Medium Total | | | | | | | | | 5.4E-06 | | | | 2.1E-02 |

# TABLE 13 CONTINUED
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# NEBRASKA PUBLIC POWER DISTRICT PROPERTY
# FUTURE COMMERCIAL/INDUSTRIAL WORKER

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Commercial/Industrial Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC Value | EPC Units | Cancer Risk Calculations SF/IUR $SF_O$ | SF/IUR $SF_{ABS}$ | SF/IUR Units | Cancer Risk | Non-Cancer Hazard Calculations RfD/RfC $RfD_O$ | RfD/RfC $RfD_{ABS}$ | RfD/RfC Units | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Surface Soil (0-2 ft) | Air | Fugitive Dust Emissions/ Volatiles Released to Air | Inhalation | Acenaphthene | 0.0396 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Acenaphthylene | 2.278 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Anthracene | 0.404 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Arsenic | 7.538 | mg/kg | 0.0043 | | $(ug/m^3)^{-1}$ | 1.7E-09 | 0.000015 | | $mg/m^3$ | 7.6E-05 |
| | | | | Benzene | --- | mg/kg | 0.0000078 | | $(ug/m^3)^{-1}$ | --- | 0.03 | | $mg/m^3$ | --- |
| | | | | Benzo(a)anthracene | 0.741 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 9.6E-11 | --- | | $mg/m^3$ | --- |
| | | | | Benzo(a)pyrene | 0.708 | mg/kg | 0.0011 | | $(ug/m^3)^{-1}$ | 6.3E-10 | 0.000002 | | $mg/m^3$ | 8.0E-04 |
| | | | | Benzo(b)fluoranthene | 1.319 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 1.2E-10 | --- | | $mg/m^3$ | --- |
| | | | | Benzo(g,h,I)perylene | 0.658 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Benzo(k)fluoranthene | --- | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Chrysene | 0.854 | mg/kg | 0.000011 | | $(ug/m^3)^{-1}$ | 1.1E-11 | --- | | $mg/m^3$ | --- |
| | | | | Dibenzo(a,h)anthracene | 0.182 | mg/kg | 0.0012 | | $(ug/m^3)^{-1}$ | 9.8E-11 | --- | | $mg/m^3$ | --- |
| | | | | Ethylbenzene | --- | mg/kg | 0.0000025 | | $(ug/m^3)^{-1}$ | --- | 1 | | $mg/m^3$ | --- |
| | | | | Fluoranthene | 1.195 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Fluorene | 0.297 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Indeno(1,2,3-cd)pyrene | 0.457 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 2.2E-11 | --- | | $mg/m^3$ | --- |
| | | | | Naphthalene | 0.373 | mg/kg | 0.000034 | | $(ug/m^3)^{-1}$ | 2.6E-10 | 0.003 | | $mg/m^3$ | 7.1E-06 |
| | | | | Phenanthrene | 0.776 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Pyrene | 1.238 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Toluene | --- | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | 5 | | $mg/m^3$ | --- |
| | | | | Xylene (total) | --- | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | 0.1 | | $mg/m^3$ | --- |
| | | | Exp. Route Total | | | | | | | 3.0E-09 | | | | 8.9E-04 |
| | | Exposure Point Total | | | | | | | | 3.0E-09 | | | | 8.9E-04 |
| | Exposure Medium Total | | | | | | | | | 3.0E-09 | | | | 8.9E-04 |
| Medium Total | | | | | | | | | | 7.1E-06 | | | | 2.6E-02 |
| Total Receptor Risk/Hazard | | | | | | | | | | 7.1E-06 | | | | 2.6E-02 |

# TABLE 14
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# NEBRASKA PUBLIC POWER DISTRICT PROPERTY
# FUTURE RESIDENT

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC | | Cancer Risk Calculations | | | | Non-Cancer Hazard Calculations | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | SF/IUR | | | Cancer Risk | RfD/RfC | | | |
| | | | | | Value | Units | $SF_O$ | $SF_{ABS}$ | Units | | $RfD_O$ | $RfD_{ABS}$ | Units | Hazard Quotient |
| Surface Soil (0-2 ft) | Soil | Dermal Contact | Dermal | Acenaphthene | 0.0396 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.06 | 0.06 | mg/kg-day | 2.6E-06 |
| | | | | Acenaphthylene | 2.278 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Anthracene | 0.404 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.3 | 0.3 | mg/kg-day | 5.3E-06 |
| | | | | Arsenic | 7.538 | mg/kg | 1.5 | 1.5 | $(mg/kg\text{-}day)^{-1}$ | 1.4E-06 | 0.0003 | 0.0003 | mg/kg-day | 2.3E-02 |
| | | | | Benzene | --- | mg/kg | 0.055 | 0.055 | $(mg/kg\text{-}day)^{-1}$ | --- | 0.004 | 0.004 | mg/kg-day | --- |
| | | | | Benzo(a)anthracene | 0.741 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 1.2E-06 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(a)pyrene | 0.708 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 1.1E-05 | 0.0003 | 0.0003 | mg/kg-day | 9.3E-03 |
| | | | | Benzo(b)fluoranthene | 1.319 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 2.1E-06 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(g,h,i)perylene | 0.658 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Benzo(k)fluoranthene | --- | mg/kg | 0.073 | 0.073 | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Chrysene | 0.854 | mg/kg | 0.0073 | 0.0073 | $(mg/kg\text{-}day)^{-1}$ | 1.4E-08 | --- | --- | mg/kg-day | --- |
| | | | | Dibenzo(a,h)anthracene | 0.182 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 2.9E-06 | --- | --- | mg/kg-day | --- |
| | | | | Ethylbenzene | --- | mg/kg | 0.011 | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.1 | 0.1 | mg/kg-day | --- |
| | | | | Fluoranthene | 1.195 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 1.2E-04 |
| | | | | Fluorene | 0.297 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 2.9E-05 |
| | | | | Indeno(1,2,3-cd)pyrene | 0.457 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 7.3E-07 | --- | --- | mg/kg-day | --- |
| | | | | Naphthalene | 0.373 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.02 | 0.02 | mg/kg-day | 7.4E-05 |
| | | | | Phenanthrene | 0.776 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Pyrene | 1.238 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.03 | 0.03 | mg/kg-day | 1.6E-04 |
| | | | | Toluene | --- | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.08 | 0.08 | mg/kg-day | --- |
| | | | | Xylene (total) | --- | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.2 | 0.2 | mg/kg-day | --- |
| | | | Exp. Route Total | | | | | | | 2.0E-05 | | | | 3.3E-02 |
| | | Exposure Point Total | | | | | | | | 2.0E-05 | | | | 3.3E-02 |
| | Exposure Medium Total | | | | | | | | | 2.0E-05 | | | | 3.3E-02 |

# TABLE 14 CONTINUED
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# NEBRASKA PUBLIC POWER DISTRICT PROPERTY
# FUTURE RESIDENT

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC | | Cancer Risk Calculations | | | | Non-Cancer Hazard Calculations | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | SF/IUR | | | Cancer Risk | RfD/RfC | | | |
| | | | | | Value | Units | $SF_O$ | $SF_{ABS}$ | Units | | $RfD_O$ | $RfD_{ABS}$ | Units | Hazard Quotient |
| Surface Soil (0-2 ft) | Soil | Incidental Ingestion | Ingestion | Acenaphthene | 0.0396 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.06 | 0.06 | mg/kg-day | 8.4E-06 |
| | | | | Acenaphthylene | 2.278 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Anthracene | 0.404 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.3 | 0.3 | mg/kg-day | 1.7E-05 |
| | | | | Arsenic | 7.538 | mg/kg | 1.5 | 1.5 | $(mg/kg\text{-}day)^{-1}$ | 1.6E-05 | 0.0003 | 0.0003 | mg/kg-day | 3.2E-01 |
| | | | | Benzene | --- | mg/kg | 0.055 | 0.055 | $(mg/kg\text{-}day)^{-1}$ | --- | 0.004 | 0.004 | mg/kg-day | --- |
| | | | | Benzo(a)anthracene | 0.741 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 3.5E-06 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(a)pyrene | 0.708 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 3.4E-05 | 0.0003 | 0.0003 | mg/kg-day | 3.0E-02 |
| | | | | Benzo(b)fluoranthene | 1.319 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 6.3E-06 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(g,h,i)perylene | 0.658 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Benzo(k)fluoranthene | --- | mg/kg | 0.073 | 0.073 | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Chrysene | 0.854 | mg/kg | 0.0073 | 0.0073 | $(mg/kg\text{-}day)^{-1}$ | 4.1E-08 | --- | --- | mg/kg-day | --- |
| | | | | Dibenzo(a,h)anthracene | 0.182 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 8.7E-06 | --- | --- | mg/kg-day | --- |
| | | | | Ethylbenzene | --- | mg/kg | 0.011 | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.1 | 0.1 | mg/kg-day | --- |
| | | | | Fluoranthene | 1.195 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 3.8E-04 |
| | | | | Fluorene | 0.297 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 9.5E-05 |
| | | | | Indeno(1,2,3-cd)pyrene | 0.457 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 2.2E-06 | --- | --- | mg/kg-day | --- |
| | | | | Naphthalene | 0.373 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.02 | 0.02 | mg/kg-day | 2.4E-04 |
| | | | | Phenanthrene | 0.776 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Pyrene | 1.238 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.03 | 0.03 | mg/kg-day | 5.3E-04 |
| | | | | Toluene | --- | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.08 | 0.08 | mg/kg-day | --- |
| | | | | Xylene (total) | --- | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.2 | 0.2 | mg/kg-day | --- |
| | | | Exp. Route Total | | | | | | | 7.1E-05 | | | | 3.5E-01 |
| | | Exposure Point Total | | | | | | | | 7.1E-05 | | | | 3.5E-01 |
| | Exposure Medium Total | | | | | | | | | 7.1E-05 | | | | 3.5E-01 |

# TABLE 14 CONTINUED
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# NEBRASKA PUBLIC POWER DISTRICT PROPERTY
# FUTURE RESIDENT

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC Value | EPC Units | Cancer Risk Calculations: SF/IUR $SF_O$ | SF/IUR $SF_{ABS}$ | SF/IUR Units | Cancer Risk | Non-Cancer Hazard Calculations: RfD/RfC $RfD_O$ | RfD/RfC $RfD_{ABS}$ | RfD/RfC Units | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Surface Soil (0-2 ft) | Air | Fugitive Dust Emissions/ Volatiles Released to Air | Inhalation | Acenaphthene | 0.0396 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Acenaphthylene | 2.278 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Anthracene | 0.404 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Arsenic | 7.538 | mg/kg | 0.0043 | | $(ug/m^3)^{-1}$ | 9.8E-09 | 0.000015 | | $mg/m^3$ | 3.5E-04 |
| | | | | Benzene | --- | mg/kg | 0.0000078 | | $(ug/m^3)^{-1}$ | --- | 0.03 | | $mg/m^3$ | --- |
| | | | | Benzo(a)anthracene | 0.741 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 1.2E-09 | --- | | $mg/m^3$ | --- |
| | | | | Benzo(a)pyrene | 0.708 | mg/kg | 0.0011 | | $(ug/m^3)^{-1}$ | 7.9E-09 | 0.000002 | | $mg/m^3$ | 2.5E-04 |
| | | | | Benzo(b)fluoranthene | 1.319 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 1.5E-09 | --- | | $mg/m^3$ | --- |
| | | | | Benzo(g,h,i)perylene | 0.658 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Benzo(k)fluoranthene | --- | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Chrysene | 0.854 | mg/kg | 0.000011 | | $(ug/m^3)^{-1}$ | 1.4E-10 | --- | | $mg/m^3$ | --- |
| | | | | Dibenzo(a,h)anthracene | 0.182 | mg/kg | 0.0012 | | $(ug/m^3)^{-1}$ | 1.2E-09 | --- | | $mg/m^3$ | --- |
| | | | | Ethylbenzene | --- | mg/kg | 0.0000025 | | $(ug/m^3)^{-1}$ | --- | 1 | | $mg/m^3$ | --- |
| | | | | Fluoranthene | 1.195 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Fluorene | 0.297 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Indeno(1,2,3-cd)pyrene | 0.457 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 2.6E-10 | --- | | $mg/m^3$ | --- |
| | | | | Naphthalene | 0.373 | mg/kg | 0.000034 | | $(ug/m^3)^{-1}$ | 3.8E-12 | 0.003 | | $mg/m^3$ | 8.8E-08 |
| | | | | Phenanthrene | 0.776 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Pyrene | 1.238 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Toluene | --- | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | 5 | | $mg/m^3$ | --- |
| | | | | Xylene (total) | --- | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | 0.1 | | $mg/m^3$ | --- |
| | | | Exp. Route Total | | | | | | | 2.2E-08 | | | | 6.0E-04 |
| | | Exposure Point Total | | | | | | | | 2.2E-08 | | | | 6.0E-04 |
| | Exposure Medium Total | | | | | | | | | 2.2E-08 | | | | 6.0E-04 |
| Medium Total | | | | | | | | | | 9.0E-05 | | | | 3.9E-01 |
| Total Receptor Risk/Hazard | | | | | | | | | | 9.0E-05 | | | | 3.9E-01 |

# TABLE 15
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# NEBRASKA PUBLIC POWER DISTRICT PROPERTY
# FUTURE CONSTRUCTION/UTILITY WORKER

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Construction/Utility Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC | | Cancer Risk Calculations | | | | Non-Cancer Hazard Calculations | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | SF/IUR | | | Cancer Risk | RfD/RfC | | | Hazard Quotient |
| | | | | | Value | Units | $SF_O$ | $SF_{ABS}$ | Units | | $RfD_O$ | $RfD_{ABS}$ | Units | |
| Subsurface Soil (2-10 ft) | Soil | Dermal Contact | Dermal | Acenaphthene | 1.049 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.06 | 0.06 | mg/kg-day | 2.1E-05 |
| | | | | Acenaphthylene | 1.023 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Anthracene | 3.048 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.3 | 0.3 | mg/kg-day | 1.2E-05 |
| | | | | Arsenic | 7.588 | mg/kg | 1.5 | 1.5 | $(mg/kg\text{-}day)^{-1}$ | 4.4E-08 | 0.0003 | 0.0003 | mg/kg-day | 6.9E-03 |
| | | | | Benzene | --- | mg/kg | 0.055 | 0.055 | $(mg/kg\text{-}day)^{-1}$ | --- | 0.004 | 0.004 | mg/kg-day | --- |
| | | | | Benzo(a)anthracene | 8.343 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 1.0E-07 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(a)pyrene | 8.251 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 1.0E-06 | 0.0003 | 0.0003 | mg/kg-day | 3.2E-02 |
| | | | | Benzo(b)fluoranthene | 15.57 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 1.9E-07 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(g,h,i)perylene | 4.197 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Benzo(k)fluoranthene | --- | mg/kg | 0.073 | 0.073 | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Chrysene | 8.103 | mg/kg | 0.0073 | 0.0073 | $(mg/kg\text{-}day)^{-1}$ | 1.0E-09 | --- | --- | mg/kg-day | --- |
| | | | | Dibenzo(a,h)anthracene | 1.367 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 1.7E-07 | --- | --- | mg/kg-day | --- |
| | | | | Ethylbenzene | --- | mg/kg | 0.011 | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.1 | 0.1 | mg/kg-day | --- |
| | | | | Fluoranthene | 17.79 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 5.2E-04 |
| | | | | Fluorene | 1.357 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 4.0E-05 |
| | | | | Indeno(1,2,3-cd)pyrene | 3.712 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 4.6E-08 | --- | --- | mg/kg-day | --- |
| | | | | Naphthalene | 1.797 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.02 | 0.02 | mg/kg-day | 1.1E-04 |
| | | | | Phenanthrene | 13.5 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Pyrene | 14.5 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.03 | 0.03 | mg/kg-day | 5.7E-04 |
| | | | | Toluene | 0.00182 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.08 | 0.08 | mg/kg-day | --- |
| | | | | Xylene (total) | 0.0103 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.2 | 0.2 | mg/kg-day | --- |
| | | | Exp. Route Total | | | | | | | 1.6E-06 | | | | 4.1E-02 |
| | | Exposure Point Total | | | | | | | | 1.6E-06 | | | | 4.1E-02 |
| | Exposure Medium Total | | | | | | | | | 1.6E-06 | | | | 4.1E-02 |

# TABLE 15 CONTINUED
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# NEBRASKA PUBLIC POWER DISTRICT PROPERTY
# FUTURE CONSTRUCTION/UTILITY WORKER

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Construction/Utility Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC Value | EPC Units | Cancer Risk Calculations SF/IUR $SF_O$ | SF/IUR $SF_{Abs}$ | SF/IUR Units | Cancer Risk | Non-Cancer Hazard Calculations RfD/RfC $RfD_O$ | RfD/RfC $RfD_{Abs}$ | RfD/RfC Units | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Subsurface Soil (2-10 ft) | Soil | Incidental Ingestion | Ingestion | Acenaphthene | 1.049 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.06 | 0.06 | mg/kg-day | 4.9E-05 |
| | | | | Acenaphthylene | 1.023 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Anthracene | 3.048 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.3 | 0.3 | mg/kg-day | 2.9E-05 |
| | | | | Arsenic | 7.588 | mg/kg | 1.5 | 1.5 | $(mg/kg\text{-}day)^{-1}$ | 4.6E-07 | 0.0003 | 0.0003 | mg/kg-day | 7.1E-02 |
| | | | | Benzene | --- | mg/kg | 0.055 | 0.055 | $(mg/kg\text{-}day)^{-1}$ | --- | 0.004 | 0.004 | mg/kg-day | --- |
| | | | | Benzo(a)anthracene | 8.343 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 2.5E-07 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(a)pyrene | 8.251 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 2.4E-06 | 0.0003 | 0.0003 | mg/kg-day | 7.8E-02 |
| | | | | Benzo(b)fluoranthene | 15.57 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 4.6E-07 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(g,h,i)perylene | 4.197 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Benzo(k)fluoranthene | --- | mg/kg | 0.073 | 0.073 | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Chrysene | 8.103 | mg/kg | 0.0073 | 0.0073 | $(mg/kg\text{-}day)^{-1}$ | 2.4E-09 | --- | --- | mg/kg-day | --- |
| | | | | Dibenzo(a,h)anthracene | 1.367 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 4.0E-07 | --- | --- | mg/kg-day | --- |
| | | | | Ethylbenzene | --- | mg/kg | 0.011 | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.1 | 0.1 | mg/kg-day | --- |
| | | | | Fluoranthene | 17.79 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 1.3E-03 |
| | | | | Fluorene | 1.357 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 9.6E-05 |
| | | | | Indeno(1,2,3-cd)pyrene | 3.712 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 1.1E-07 | --- | --- | mg/kg-day | --- |
| | | | | Naphthalene | 1.797 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.02 | 0.02 | mg/kg-day | 2.5E-04 |
| | | | | Phenanthrene | 13.5 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Pyrene | 14.5 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.03 | 0.03 | mg/kg-day | 1.4E-03 |
| | | | | Toluene | 0.00182 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.08 | 0.08 | mg/kg-day | 6.4E-08 |
| | | | | Xylene (total) | 0.0103 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.2 | 0.2 | mg/kg-day | 1.5E-07 |
| | | | Exp. Route Total | | | | | | | 4.1E-06 | | | | 1.5E-01 |
| | | Exposure Point Total | | | | | | | | 4.1E-06 | | | | 1.5E-01 |
| | Exposure Medium Total | | | | | | | | | 4.1E-06 | | | | 1.5E-01 |

# TABLE 15 CONTINUED
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# NEBRASKA PUBLIC POWER DISTRICT PROPERTY
# FUTURE CONSTRUCTION/UTILITY WORKER

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Construction/Utility Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC | | Cancer Risk Calculations | | | | Non-Cancer Hazard Calculations | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | SF/IUR | | | | RfD/RfC | | | |
| | | | | | Value | Units | $SF_O$ | $SF_{ABS}$ | Units | Cancer Risk | $RfD_O$ | $RfD_{ABS}$ | Units | Hazard Quotient |
| Subsurface Soil (2-10 ft) | Air | Fugitive Dust Emissions/ Volatiles Released to Air | Inhalation | Acenaphthene | 1.049 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Acenaphthylene | 1.023 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Anthracene | 3.048 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Arsenic | 7.588 | mg/kg | 0.0043 | | $(ug/m^3)^{-1}$ | --- | 0.000015 | | $mg/m^3$ | 8.5E-05 |
| | | | | Benzene | --- | mg/kg | 0.0000078 | | $(ug/m^3)^{-1}$ | --- | 0.03 | | $mg/m^3$ | --- |
| | | | | Benzo(a)anthracene | 8.343 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 4.8E-11 | --- | | $mg/m^3$ | --- |
| | | | | Benzo(a)pyrene | 8.251 | mg/kg | 0.0011 | | $(ug/m^3)^{-1}$ | 3.3E-10 | 0.000002 | | $mg/m^3$ | 1.0E-02 |
| | | | | Benzo(b)fluoranthene | 15.57 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 6.1E-11 | --- | | $mg/m^3$ | --- |
| | | | | Benzo(g,h,i)perylene | 4.197 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Benzo(k)fluoranthene | --- | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Chrysene | 8.103 | mg/kg | 0.000011 | | $(ug/m^3)^{-1}$ | 4.6E-12 | --- | | $mg/m^3$ | --- |
| | | | | Dibenzo(a,h)anthracene | 1.367 | mg/kg | 0.0012 | | $(ug/m^3)^{-1}$ | 3.3E-11 | --- | | $mg/m^3$ | --- |
| | | | | Ethylbenzene | --- | mg/kg | 0.0000025 | | $(ug/m^3)^{-1}$ | --- | 1 | | $mg/m^3$ | --- |
| | | | | Fluoranthene | 17.79 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Fluorene | 1.357 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Indeno(1,2,3-cd)pyrene | 3.712 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 8.1E-12 | --- | | $mg/m^3$ | --- |
| | | | | Naphthalene | 1.797 | mg/kg | 0.000034 | | $(ug/m^3)^{-1}$ | 5.6E-11 | 0.003 | | $mg/m^3$ | 3.8E-05 |
| | | | | Phenanthrene | 13.5 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Pyrene | 14.5 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Toluene | 0.00182 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | 5 | | $mg/m^3$ | 7.1E-11 |
| | | | | Xylene (total) | 0.0103 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | 0.1 | | $mg/m^3$ | 1.4E-08 |
| | | | Exp. Route Total | | | | | | | 5.4E-10 | | | | 1.1E-02 |
| | | Exposure Point Total | | | | | | | | 5.4E-10 | | | | 1.1E-02 |
| | Exposure Medium Total | | | | | | | | | 5.4E-10 | | | | 1.1E-02 |
| Total Receptor Risk/Hazard | | | | | | | | | | 5.7E-06 | | | | 2.0E-01 |

# TABLE 16
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# BLACK HILLS ENERGY PROPERTY
# FUTURE CONSTRUCTION/UTILITY WORKER

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Construction/Utility Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC Value | EPC Units | Cancer Risk Calculations: SF/IUR $SF_O$ | SF/IUR $SF_{ABS}$ | SF/IUR Units | Cancer Risk | Non-Cancer Hazard Calculations: RfD/RfC $RfD_O$ | RfD/RfC $RfD_{ABS}$ | RfD/RfC Units | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Subsurface Soil (0-10 ft) | Soil | Dermal Contact | Dermal | Acenaphthene | 61.86 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.06 | 0.06 | mg/kg-day | 1.2E-03 |
| | | | | Acenaphthylene | 9.963 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Anthracene | 27.89 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.3 | 0.3 | mg/kg-day | 1.1E-04 |
| | | | | Arsenic | 9.191 | mg/kg | 1.5 | 1.5 | $(mg/kg\text{-}day)^{-1}$ | 5.4E-08 | 0.0003 | 0.0003 | mg/kg-day | 8.3E-03 |
| | | | | Benzene | 3.042 | mg/kg | 0.055 | 0.055 | $(mg/kg\text{-}day)^{-1}$ | --- | 0.004 | 0.004 | mg/kg-day | --- |
| | | | | Benzo(a)anthracene | 16.83 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 2.1E-07 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(a)pyrene | 11.58 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 1.4E-06 | 0.0003 | 0.0003 | mg/kg-day | 4.5E-02 |
| | | | | Benzo(b)fluoranthene | 13.88 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 1.7E-07 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(g,h,i)perylene | 9.736 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Benzo(k)fluoranthene | 0.0163 | mg/kg | 0.073 | 0.073 | $(mg/kg\text{-}day)^{-1}$ | 2.0E-11 | --- | --- | mg/kg-day | --- |
| | | | | Chrysene | 15.79 | mg/kg | 0.0073 | 0.0073 | $(mg/kg\text{-}day)^{-1}$ | 1.9E-09 | --- | --- | mg/kg-day | --- |
| | | | | Dibenzo(a,h)anthracene | 2.33 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 2.9E-07 | --- | --- | mg/kg-day | --- |
| | | | | Ethylbenzene | 19.16 | mg/kg | 0.011 | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.1 | 0.1 | mg/kg-day | --- |
| | | | | Fluoranthene | 39.58 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 1.2E-03 |
| | | | | Fluorene | 34.52 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 1.0E-03 |
| | | | | Indeno(1,2,3-cd)pyrene | 3.995 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 4.9E-08 | --- | --- | mg/kg-day | --- |
| | | | | Naphthalene | 229.1 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.02 | 0.02 | mg/kg-day | 1.3E-02 |
| | | | | Phenanthrene | 114.6 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Pyrene | 49.56 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.03 | 0.03 | mg/kg-day | 1.9E-03 |
| | | | | Toluene | 1.019 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.08 | 0.08 | mg/kg-day | --- |
| | | | | Xylene (total) | 25.32 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.2 | 0.2 | mg/kg-day | --- |
| | | | Exp. Route Total | | | | | | | 2.2E-06 | | | | 7.3E-02 |
| | | Exposure Point Total | | | | | | | | 2.2E-06 | | | | 7.3E-02 |
| | Exposure Medium Total | | | | | | | | | 2.2E-06 | | | | 7.3E-02 |

# TABLE 16 CONTINUED
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# BLACK HILLS ENERGY PROPERTY
# FUTURE CONSTRUCTION/UTILITY WORKER

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Construction/Utility Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC | | Cancer Risk Calculations | | | | Non-Cancer Hazard Calculations | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | SF/IUR | | | Cancer Risk | RfD/RfC | | | Hazard Quotient |
| | | | | | Value | Units | $SF_O$ | $SF_{ABS}$ | Units | | $RfD_O$ | $RfD_{ABS}$ | Units | |
| Subsurface Soil (0-10 ft) | Soil | Incidental Ingestion | Ingestion | Acenaphthene | 61.86 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.06 | 0.06 | mg/kg-day | 2.9E-03 |
| | | | | Acenaphthylene | 9.963 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Anthracene | 27.89 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.3 | 0.3 | mg/kg-day | 2.6E-04 |
| | | | | Arsenic | 9.191 | mg/kg | 1.5 | 1.5 | $(mg/kg\text{-}day)^{-1}$ | 5.6E-07 | 0.0003 | 0.0003 | mg/kg-day | 8.7E-02 |
| | | | | Benzene | 3.042 | mg/kg | 0.055 | 0.055 | $(mg/kg\text{-}day)^{-1}$ | 6.8E-09 | 0.004 | 0.004 | mg/kg-day | 2.1E-03 |
| | | | | Benzo(a)anthracene | 16.83 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 5.0E-07 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(a)pyrene | 11.58 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 3.4E-06 | 0.0003 | 0.0003 | mg/kg-day | 1.1E-01 |
| | | | | Benzo(b)fluoranthene | 13.88 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 4.1E-07 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(g,h,i)perylene | 9.736 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Benzo(k)fluoranthene | 0.0163 | mg/kg | 0.073 | 0.073 | $(mg/kg\text{-}day)^{-1}$ | 4.8E-11 | --- | --- | mg/kg-day | --- |
| | | | | Chrysene | 15.79 | mg/kg | 0.0073 | 0.0073 | $(mg/kg\text{-}day)^{-1}$ | 4.7E-09 | --- | --- | mg/kg-day | --- |
| | | | | Dibenzo(a,h)anthracene | 2.33 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 6.9E-07 | --- | --- | mg/kg-day | --- |
| | | | | Ethylbenzene | 19.16 | mg/kg | 0.011 | --- | $(mg/kg\text{-}day)^{-1}$ | 8.5E-09 | 0.1 | 0.1 | mg/kg-day | 5.4E-04 |
| | | | | Fluoranthene | 39.58 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 2.8E-03 |
| | | | | Fluorene | 34.52 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 2.4E-03 |
| | | | | Indeno(1,2,3-cd)pyrene | 3.995 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 1.2E-07 | --- | --- | mg/kg-day | --- |
| | | | | Naphthalene | 229.1 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.02 | 0.02 | mg/kg-day | 3.2E-02 |
| | | | | Phenanthrene | 114.6 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Pyrene | 49.56 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.03 | 0.03 | mg/kg-day | 4.7E-03 |
| | | | | Toluene | 1.019 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.08 | 0.08 | mg/kg-day | 3.6E-05 |
| | | | | Xylene (total) | 25.32 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.2 | 0.2 | mg/kg-day | 3.6E-04 |
| | | | Exp. Route Total | | | | | | | 5.7E-06 | | | | 2.4E-01 |
| | | Exposure Point Total | | | | | | | | 5.7E-06 | | | | 2.4E-01 |
| | Exposure Medium Total | | | | | | | | | 5.7E-06 | | | | 2.4E-01 |

# TABLE 16 CONTINUED
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# BLACK HILLS ENERGY PROPERTY
# FUTURE CONSTRUCTION/UTILITY WORKER

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Construction/Utility Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC Value | EPC Units | Cancer Risk Calculations SF/IUR $SF_O$ | SF/IUR $SF_{ABS}$ | SF/IUR Units | Cancer Risk | Non-Cancer Hazard Calculations RfD/RfC $RfD_O$ | RfD/RfC $RfD_{ABS}$ | RfD/RfC Units | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Subsurface Soil (0-10 ft) | Air | Fugitive Dust Emissions/ Volatiles Released to Air | Inhalation | Acenaphthene | 61.86 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Acenaphthylene | 9.963 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Anthracene | 27.89 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Arsenic | 9.191 | mg/kg | 0.0043 | | $(ug/m^3)^{-1}$ | --- | 0.000015 | | $mg/m^3$ | 1.0E-04 |
| | | | | Benzene | 3.042 | mg/kg | 0.0000078 | | $(ug/m^3)^{-1}$ | 2.0E-08 | 0.03 | | $mg/m^3$ | 5.9E-03 |
| | | | | Benzo(a)anthracene | 16.83 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 9.7E-11 | --- | | $mg/m^3$ | --- |
| | | | | Benzo(a)pyrene | 11.58 | mg/kg | 0.0011 | | $(ug/m^3)^{-1}$ | 4.6E-10 | 0.000002 | | $mg/m^3$ | 1.5E-02 |
| | | | | Benzo(b)fluoranthene | 13.88 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 5.5E-11 | --- | | $mg/m^3$ | --- |
| | | | | Benzo(g,h,i)perylene | 9.736 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Benzo(k)fluoranthene | 0.0163 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 6.5E-14 | --- | | $mg/m^3$ | --- |
| | | | | Chrysene | 15.79 | mg/kg | 0.000011 | | $(ug/m^3)^{-1}$ | 9.0E-12 | --- | | $mg/m^3$ | --- |
| | | | | Dibenzo(a,h)anthracene | 2.33 | mg/kg | 0.0012 | | $(ug/m^3)^{-1}$ | 5.6E-11 | --- | | $mg/m^3$ | --- |
| | | | | Ethylbenzene | 19.16 | mg/kg | 0.0000025 | | $(ug/m^3)^{-1}$ | --- | 1 | | $mg/m^3$ | 3.2E-09 |
| | | | | Fluoranthene | 39.58 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Fluorene | 34.52 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Indeno(1,2,3-cd)pyrene | 3.995 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 8.7E-12 | --- | | $mg/m^3$ | --- |
| | | | | Naphthalene | 229.1 | mg/kg | 0.000034 | | $(ug/m^3)^{-1}$ | 7.1E-09 | 0.003 | | $mg/m^3$ | 4.9E-03 |
| | | | | Phenanthrene | 114.6 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Pyrene | 49.56 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Toluene | 1.019 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | 5 | | $mg/m^3$ | 4.0E-08 |
| | | | | Xylene (total) | 25.32 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | 0.1 | | $mg/m^3$ | 3.5E-05 |
| | | | Exp. Route Total | | | | | | | 2.8E-08 | | | | 2.6E-02 |
| | | Exposure Point Total | | | | | | | | 2.8E-08 | | | | 2.6E-02 |
| | Exposure Medium Total | | | | | | | | | 2.8E-08 | | | | 2.6E-02 |
| Total Receptor Risk/Hazard | | | | | | | | | | 7.9E-06 | | | | 3.4E-01 |

# TABLE 17
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# ALLEY BETWEEN PARCELS
# FUTURE RESIDENT

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC | | Cancer Risk Calculations | | | | Non-Cancer Hazard Calculations | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | SF/IUR | | | Cancer Risk | RfD/RfC | | | |
| | | | | | Value | Units | $SF_O$ | $SF_{ABS}$ | Units | | $RfD_O$ | $RfD_{ABS}$ | Units | Hazard Quotient |
| Surface Soil (0-2 ft) | Soil | Dermal Contact | Dermal | Acenaphthene | 0.282 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.06 | 0.06 | mg/kg-day | 1.9E-05 |
| | | | | Acenaphthylene | 82.1 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Anthracene | 23.7 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.3 | 0.3 | mg/kg-day | 3.1E-04 |
| | | | | Arsenic | 14.3 | mg/kg | 1.5 | 1.5 | $(mg/kg\text{-}day)^{-1}$ | 2.6E-06 | 0.0003 | 0.0003 | mg/kg-day | 4.3E-02 |
| | | | | Benzene | 0.297 | mg/kg | 0.055 | 0.055 | $(mg/kg\text{-}day)^{-1}$ | --- | 0.004 | 0.004 | mg/kg-day | --- |
| | | | | Benzo(a)anthracene | 13.9 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 2.2E-05 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(a)pyrene | 56 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 8.9E-04 | 0.0003 | 0.0003 | mg/kg-day | 7.4E-01 |
| | | | | Benzo(b)fluoranthene | 58.3 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 9.3E-05 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(g,h,i)perylene | 41.1 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Benzo(k)fluoranthene | --- | mg/kg | 0.073 | 0.073 | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Chrysene | 19.9 | mg/kg | 0.0073 | 0.0073 | $(mg/kg\text{-}day)^{-1}$ | 3.2E-07 | --- | --- | mg/kg-day | --- |
| | | | | Dibenzo(a,h)anthracene | 6.11 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 9.7E-05 | --- | --- | mg/kg-day | --- |
| | | | | Ethylbenzene | --- | mg/kg | 0.011 | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.1 | 0.1 | mg/kg-day | --- |
| | | | | Fluoranthene | 14 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 1.4E-03 |
| | | | | Fluorene | 12.2 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 1.2E-03 |
| | | | | Indeno(1,2,3-cd)pyrene | 18.7 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 3.0E-05 | --- | --- | mg/kg-day | --- |
| | | | | Naphthalene | 8.822 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.02 | 0.02 | mg/kg-day | 1.7E-03 |
| | | | | Phenanthrene | 22.2 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Pyrene | 14.46 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.03 | 0.03 | mg/kg-day | 1.9E-03 |
| | | | | Toluene | --- | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.08 | 0.08 | mg/kg-day | --- |
| | | | | Xylene (total) | 0.412 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.2 | 0.2 | mg/kg-day | --- |
| | | | Exp. Route Total | | | | | | | 1.1E-03 | | | | 7.9E-01 |
| | | Exposure Point Total | | | | | | | | 1.1E-03 | | | | 7.9E-01 |
| | Exposure Medium Total | | | | | | | | | 1.1E-03 | | | | 7.9E-01 |

# TABLE 17 CONTINUED
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# ALLEY BETWEEN PARCELS
# FUTURE RESIDENT

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC | | Cancer Risk Calculations | | | | Non-Cancer Hazard Calculations | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | SF/IUR | | | Cancer Risk | RfD/RfC | | | |
| | | | | | Value | Units | $SF_O$ | $SF_{ABS}$ | Units | | $RfD_O$ | $RfD_{ABS}$ | Units | Hazard Quotient |
| Surface Soil (0-2 ft) | Soil | Incidental Ingestion | Ingestion | Acenaphthene | 0.282 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.06 | 0.06 | mg/kg-day | 6.0E-05 |
| | | | | Acenaphthylene | 82.1 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Anthracene | 23.7 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.3 | 0.3 | mg/kg-day | 1.0E-03 |
| | | | | Arsenic | 14.3 | mg/kg | 1.5 | 1.5 | $(mg/kg\text{-}day)^{-1}$ | 3.1E-05 | 0.0003 | 0.0003 | mg/kg-day | 6.1E-01 |
| | | | | Benzene | 0.297 | mg/kg | 0.055 | 0.055 | $(mg/kg\text{-}day)^{-1}$ | 1.1E-07 | 0.004 | 0.004 | mg/kg-day | --- |
| | | | | Benzo(a)anthracene | 13.9 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 6.6E-05 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(a)pyrene | 56 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 2.7E-03 | 0.0003 | 0.0003 | mg/kg-day | 2.4E+00 |
| | | | | Benzo(b)fluoranthene | 58.3 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 2.8E-04 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(g,h,i)perylene | 41.1 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Benzo(k)fluoranthene | --- | mg/kg | 0.073 | 0.073 | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Chrysene | 19.9 | mg/kg | 0.0073 | 0.0073 | $(mg/kg\text{-}day)^{-1}$ | 9.5E-07 | --- | --- | mg/kg-day | --- |
| | | | | Dibenzo(a,h)anthracene | 6.11 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 2.9E-04 | --- | --- | mg/kg-day | --- |
| | | | | Ethylbenzene | --- | mg/kg | 0.011 | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.1 | 0.1 | mg/kg-day | --- |
| | | | | Fluoranthene | 14 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 4.5E-03 |
| | | | | Fluorene | 12.2 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 3.9E-03 |
| | | | | Indeno(1,2,3-cd)pyrene | 18.7 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 8.9E-05 | --- | --- | mg/kg-day | --- |
| | | | | Naphthalene | 8.822 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.02 | 0.02 | mg/kg-day | 5.6E-03 |
| | | | | Phenanthrene | 22.2 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Pyrene | 14.46 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.03 | 0.03 | mg/kg-day | 6.2E-03 |
| | | | | Toluene | --- | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.08 | 0.08 | mg/kg-day | --- |
| | | | | Xylene (total) | 0.412 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.2 | 0.2 | mg/kg-day | --- |
| | | | Exp. Route Total | | | | | | | 3.4E-03 | | | | 3.0E+00 |
| | | Exposure Point Total | | | | | | | | 3.4E-03 | | | | 3.0E+00 |
| | Exposure Medium Total | | | | | | | | | 3.4E-03 | | | | 3.0E+00 |

# TABLE 17 CONTINUED
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# ALLEY BETWEEN PARCELS
# FUTURE RESIDENT

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC Value | EPC Units | Cancer Risk Calculations SF/IUR $SF_O$ | SF/IUR $SF_{ABS}$ | SF/IUR Units | Cancer Risk | Non-Cancer Hazard Calculations RfD/RfC $RfD_O$ | RfD/RfC $RfD_{ABS}$ | RfD/RfC Units | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Surface Soil (0-2 ft) | Air | Fugitive Dust Emissions/ Volatiles Released to Air | Inhalation | Acenaphthene | 0.282 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Acenaphthylene | 82.1 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Anthracene | 23.7 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Arsenic | 14.3 | mg/kg | 0.0043 | | $(ug/m^3)^{-1}$ | 1.9E-08 | 0.000015 | | $mg/m^3$ | 6.7E-04 |
| | | | | Benzene | 0.297 | mg/kg | 0.0000078 | | $(ug/m^3)^{-1}$ | 7.0E-13 | 0.03 | | $mg/m^3$ | 7.0E-09 |
| | | | | Benzo(a)anthracene | 13.9 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 2.3E-08 | --- | | $mg/m^3$ | --- |
| | | | | Benzo(a)pyrene | 56 | mg/kg | 0.0011 | | $(ug/m^3)^{-1}$ | 6.3E-07 | 0.000002 | | $mg/m^3$ | 2.0E-02 |
| | | | | Benzo(b)fluoranthene | 58.3 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 6.5E-08 | --- | | $mg/m^3$ | --- |
| | | | | Benzo(g,h,i)perylene | 41.1 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Benzo(k)fluoranthene | --- | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Chrysene | 19.9 | mg/kg | 0.000011 | | $(ug/m^3)^{-1}$ | 3.3E-09 | --- | | $mg/m^3$ | --- |
| | | | | Dibenzo(a,h)anthracene | 6.11 | mg/kg | 0.0012 | | $(ug/m^3)^{-1}$ | 3.9E-08 | --- | | $mg/m^3$ | --- |
| | | | | Ethylbenzene | --- | mg/kg | 0.0000025 | | $(ug/m^3)^{-1}$ | --- | 1 | | $mg/m^3$ | --- |
| | | | | Fluoranthene | 14 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Fluorene | 12.2 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Indeno(1,2,3-cd)pyrene | 18.7 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 1.1E-08 | --- | | $mg/m^3$ | --- |
| | | | | Naphthalene | 8.822 | mg/kg | 0.000034 | | $(ug/m^3)^{-1}$ | 9.1E-11 | 0.003 | | $mg/m^3$ | 2.1E-06 |
| | | | | Phenanthrene | 22.2 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Pyrene | 14.46 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Toluene | --- | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | 5 | | $mg/m^3$ | --- |
| | | | | Xylene (total) | 0.412 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | 0.1 | | $mg/m^3$ | 2.9E-09 |
| | | | Exp. Route Total | | | | | | | 7.9E-07 | | | | 2.0E-02 |
| | | Exposure Point Total | | | | | | | | 7.9E-07 | | | | 2.0E-02 |
| | Exposure Medium Total | | | | | | | | | 7.9E-07 | | | | 2.0E-02 |
| Medium Total | | | | | | | | | | 4.6E-03 | | | | 3.8E+00 |
| Total Receptor Risk/Hazard | | | | | | | | | | 4.6E-03 | | | | 3.8E+00 |

# TABLE 18
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# ALLEY BETWEEN PARCELS
# FUTURE CONSTRUCTION/UTILITY WORKER

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Construction/Utility Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC Value | EPC Units | Cancer Risk Calculations: SF/IUR $SF_O$ | SF/IUR $SF_{ABS}$ | SF/IUR Units | Cancer Risk | Non-Cancer Hazard Calculations: RfD/RfC $RfD_O$ | RfD/RfC $RfD_{ABS}$ | RfD/RfC Units | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Subsurface Soil (0-10 ft) | Soil | Dermal Contact | Dermal | Acenaphthene | 34.13 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.06 | 0.06 | mg/kg-day | 6.7E-04 |
| | | | | Acenaphthylene | 38.19 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Anthracene | 17.79 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.3 | 0.3 | mg/kg-day | 7.0E-05 |
| | | | | Arsenic | 10.73 | mg/kg | 1.5 | 1.5 | $(mg/kg\text{-}day)^{-1}$ | 6.2E-08 | 0.0003 | 0.0003 | mg/kg-day | 9.7E-03 |
| | | | | Benzene | 4.07 | mg/kg | 0.055 | 0.055 | $(mg/kg\text{-}day)^{-1}$ | --- | 0.004 | 0.004 | mg/kg-day | --- |
| | | | | Benzo(a)anthracene | 10.46 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 1.3E-07 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(a)pyrene | 25.05 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 3.1E-06 | 0.0003 | 0.0003 | mg/kg-day | 9.8E-02 |
| | | | | Benzo(b)fluoranthene | 24.83 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 3.0E-07 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(g,h,i)perylene | 18.45 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Benzo(k)fluoranthene | 0.0316 | mg/kg | 0.073 | 0.073 | $(mg/kg\text{-}day)^{-1}$ | 3.9E-11 | --- | --- | mg/kg-day | --- |
| | | | | Chrysene | 11.45 | mg/kg | 0.0073 | 0.0073 | $(mg/kg\text{-}day)^{-1}$ | 1.4E-09 | --- | --- | mg/kg-day | --- |
| | | | | Dibenzo(a,h)anthracene | 2.674 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 3.3E-07 | --- | --- | mg/kg-day | --- |
| | | | | Ethylbenzene | 40.42 | mg/kg | 0.011 | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.1 | 0.1 | mg/kg-day | --- |
| | | | | Fluoranthene | 16.22 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 4.8E-04 |
| | | | | Fluorene | 17.58 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 5.2E-04 |
| | | | | Indeno(1,2,3-cd)pyrene | 7.852 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 9.6E-08 | --- | --- | mg/kg-day | --- |
| | | | | Naphthalene | 113 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.02 | 0.02 | mg/kg-day | 6.7E-03 |
| | | | | Phenanthrene | 50.8 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Pyrene | 22 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.03 | 0.03 | mg/kg-day | 8.6E-04 |
| | | | | Toluene | 0.842 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.08 | 0.08 | mg/kg-day | --- |
| | | | | Xylene (total) | 102.9 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.2 | 0.2 | mg/kg-day | --- |
| | | | Exp. Route Total | | | | | | | 4.0E-06 | | | | 1.2E-01 |
| | | Exposure Point Total | | | | | | | | 4.0E-06 | | | | 1.2E-01 |
| | Exposure Medium Total | | | | | | | | | 4.0E-06 | | | | 1.2E-01 |

# TABLE 18 CONTINUED
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# ALLEY BETWEEN PARCELS
# FUTURE CONSTRUCTION/UTILITY WORKER

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Construction/Utility Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC | | Cancer Risk Calculations | | | | Non-Cancer Hazard Calculations | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | SF/IUR | | | Cancer Risk | RfD/RfC | | | Hazard Quotient |
| | | | | | Value | Units | $SF_O$ | $SF_{ABS}$ | Units | | $RfD_O$ | $RfD_{ABS}$ | Units | |
| Subsurface Soil (0-10 ft) | Soil | Incidental Ingestion | Ingestion | Acenaphthene | 34.13 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.06 | 0.06 | mg/kg-day | 1.6E-03 |
| | | | | Acenaphthylene | 38.19 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Anthracene | 17.79 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.3 | 0.3 | mg/kg-day | 1.7E-04 |
| | | | | Arsenic | 10.73 | mg/kg | 1.5 | 1.5 | $(mg/kg\text{-}day)^{-1}$ | 6.5E-07 | 0.0003 | 0.0003 | mg/kg-day | 1.0E-01 |
| | | | | Benzene | 4.07 | mg/kg | 0.055 | 0.055 | $(mg/kg\text{-}day)^{-1}$ | 9.0E-09 | 0.004 | 0.004 | mg/kg-day | 2.9E-03 |
| | | | | Benzo(a)anthracene | 10.46 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 3.1E-07 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(a)pyrene | 25.05 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 7.4E-06 | 0.0003 | 0.0003 | mg/kg-day | 2.4E-01 |
| | | | | Benzo(b)fluoranthene | 24.83 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 7.3E-07 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(g,h,i)perylene | 18.45 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Benzo(k)fluoranthene | 0.0316 | mg/kg | 0.073 | 0.073 | $(mg/kg\text{-}day)^{-1}$ | 9.3E-11 | --- | --- | mg/kg-day | --- |
| | | | | Chrysene | 11.45 | mg/kg | 0.0073 | 0.0073 | $(mg/kg\text{-}day)^{-1}$ | 3.4E-09 | --- | --- | mg/kg-day | --- |
| | | | | Dibenzo(a,h)anthracene | 2.674 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 7.9E-07 | --- | --- | mg/kg-day | --- |
| | | | | Ethylbenzene | 40.42 | mg/kg | 0.011 | --- | $(mg/kg\text{-}day)^{-1}$ | 1.8E-08 | 0.1 | 0.1 | mg/kg-day | 1.1E-03 |
| | | | | Fluoranthene | 16.22 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 1.1E-03 |
| | | | | Fluorene | 17.58 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 1.2E-03 |
| | | | | Indeno(1,2,3-cd)pyrene | 7.852 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 2.3E-07 | --- | --- | mg/kg-day | --- |
| | | | | Naphthalene | 113 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.02 | 0.02 | mg/kg-day | 1.6E-02 |
| | | | | Phenanthrene | 50.8 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Pyrene | 22 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.03 | 0.03 | mg/kg-day | 2.1E-03 |
| | | | | Toluene | 0.842 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.08 | 0.08 | mg/kg-day | 3.0E-05 |
| | | | | Xylene (total) | 102.9 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.2 | 0.2 | mg/kg-day | 1.5E-03 |
| | | | Exp. Route Total | | | | | | | 1.0E-05 | | | | 3.6E-01 |
| | | Exposure Point Total | | | | | | | | 1.0E-05 | | | | 3.6E-01 |
| | Exposure Medium Total | | | | | | | | | 1.0E-05 | | | | 3.6E-01 |

# TABLE 18 CONTINUED
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# ALLEY BETWEEN PARCELS
# FUTURE CONSTRUCTION/UTILITY WORKER

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Construction/Utility Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC Value | EPC Units | Cancer Risk Calculations SF/IUR $SF_O$ | SF/IUR $SF_{ABS}$ | SF/IUR Units | Cancer Risk | Non-Cancer Hazard Calculations RfD/RfC $RfD_O$ | RfD/RfC $RfD_{ABS}$ | RfD/RfC Units | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Subsurface Soil (0-10 ft) | Air | Fugitive Dust Emissions/ Volatiles Released to Air | Inhalation | Acenaphthene | 34.13 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Acenaphthylene | 38.19 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Anthracene | 17.79 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Arsenic | 10.73 | mg/kg | 0.0043 | | $(ug/m^3)^{-1}$ | --- | 0.000015 | | $mg/m^3$ | 1.2E-04 |
| | | | | Benzene | 4.07 | mg/kg | 0.0000078 | | $(ug/m^3)^{-1}$ | 2.7E-08 | 0.03 | | $mg/m^3$ | 8.0E-03 |
| | | | | Benzo(a)anthracene | 10.46 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 6.0E-11 | --- | | $mg/m^3$ | --- |
| | | | | Benzo(a)pyrene | 25.05 | mg/kg | 0.0011 | | $(ug/m^3)^{-1}$ | 9.9E-10 | 0.000002 | | $mg/m^3$ | 3.2E-02 |
| | | | | Benzo(b)fluoranthene | 24.83 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 9.7E-11 | --- | | $mg/m^3$ | --- |
| | | | | Benzo(g,h,i)perylene | 18.45 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Benzo(k)fluoranthene | 0.0316 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 1.3E-13 | --- | | $mg/m^3$ | --- |
| | | | | Chrysene | 11.45 | mg/kg | 0.000011 | | $(ug/m^3)^{-1}$ | 6.5E-12 | --- | | $mg/m^3$ | --- |
| | | | | Dibenzo(a,h)anthracene | 2.674 | mg/kg | 0.0012 | | $(ug/m^3)^{-1}$ | 6.4E-11 | --- | | $mg/m^3$ | --- |
| | | | | Ethylbenzene | 40.42 | mg/kg | 0.0000025 | | $(ug/m^3)^{-1}$ | --- | 1 | | $mg/m^3$ | 6.8E-09 |
| | | | | Fluoranthene | 16.22 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Fluorene | 17.58 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Indeno(1,2,3-cd)pyrene | 7.852 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 1.7E-11 | --- | | $mg/m^3$ | --- |
| | | | | Naphthalene | 113 | mg/kg | 0.000034 | | $(ug/m^3)^{-1}$ | 3.5E-09 | 0.003 | | $mg/m^3$ | 2.4E-03 |
| | | | | Phenanthrene | 50.8 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Pyrene | 22 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Toluene | 0.842 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | 5 | | $mg/m^3$ | 3.3E-08 |
| | | | | Xylene (total) | 102.9 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | 0.1 | | $mg/m^3$ | 1.4E-04 |
| | | | Exp. Route Total | | | | | | | 3.1E-08 | | | | 4.2E-02 |
| | | Exposure Point Total | | | | | | | | 3.1E-08 | | | | 4.2E-02 |
| | Exposure Medium Total | | | | | | | | | 3.1E-08 | | | | 4.2E-02 |
| Total Receptor Risk/Hazard | | | | | | | | | | 1.4E-05 | | | | 5.2E-01 |

# TABLE 19
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# 7th STREET AND NORFOLK AVENUE RIGHT OF WAY
# FUTURE RESIDENT

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC Value | EPC Units | Cancer Risk Calculations SF/IUR $SF_O$ | $SF_{ABS}$ | SF/IUR Units | Cancer Risk | Non-Cancer Hazard Calculations RfD/RfC $RfD_O$ | $RfD_{ABS}$ | RfD/RfC Units | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Surface Soil (0-2 ft) | Soil | Dermal Contact | Dermal | Acenaphthene | 0.235 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.06 | 0.06 | mg/kg-day | 1.5E-05 |
| | | | | Acenaphthylene | 0.172 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Anthracene | 0.163 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.3 | 0.3 | mg/kg-day | 2.1E-06 |
| | | | | Arsenic | 10.19 | mg/kg | 1.5 | 1.5 | $(mg/kg\text{-}day)^{-1}$ | 1.9E-06 | 0.0003 | 0.0003 | mg/kg-day | 3.1E-02 |
| | | | | Benzene | --- | mg/kg | 0.055 | 0.055 | $(mg/kg\text{-}day)^{-1}$ | --- | 0.004 | 0.004 | mg/kg-day | --- |
| | | | | Benzo(a)anthracene | 0.753 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 1.2E-06 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(a)pyrene | 0.849 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 1.4E-05 | 0.0003 | 0.0003 | mg/kg-day | 1.1E-02 |
| | | | | Benzo(b)fluoranthene | 1.65 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 2.6E-06 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(g,h,i)perylene | 0.463 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Benzo(k)fluoranthene | --- | mg/kg | 0.073 | 0.073 | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Chrysene | 0.72 | mg/kg | 0.0073 | 0.0073 | $(mg/kg\text{-}day)^{-1}$ | 1.1E-08 | --- | --- | mg/kg-day | --- |
| | | | | Dibenzo(a,h)anthracene | 0.106 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 1.7E-06 | --- | --- | mg/kg-day | --- |
| | | | | Ethylbenzene | --- | mg/kg | 0.011 | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.1 | 0.1 | mg/kg-day | --- |
| | | | | Fluoranthene | 0.781 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 7.7E-05 |
| | | | | Fluorene | 0.104 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 1.0E-05 |
| | | | | Indeno(1,2,3-cd)pyrene | 0.351 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 5.6E-07 | --- | --- | mg/kg-day | --- |
| | | | | Naphthalene | 0.107 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.02 | 0.02 | mg/kg-day | 2.1E-05 |
| | | | | Phenanthrene | 0.444 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Pyrene | 0.84 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.03 | 0.03 | mg/kg-day | 1.1E-04 |
| | | | | Toluene | --- | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.08 | 0.08 | mg/kg-day | --- |
| | | | | Xylene (total) | --- | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.2 | 0.2 | mg/kg-day | --- |
| | | | Exp. Route Total | | | | | | | 2.1E-05 | | | | 4.2E-02 |
| | | Exposure Point Total | | | | | | | | 2.1E-05 | | | | 4.2E-02 |
| | Exposure Medium Total | | | | | | | | | 2.1E-05 | | | | 4.2E-02 |

# TABLE 19 CONTINUED
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# 7th STREET AND NORFOLK AVENUE RIGHT OF WAY
# FUTURE RESIDENT

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC Value | EPC Units | Cancer Risk Calculations SF/IUR $SF_O$ | $SF_{ABS}$ | SF/IUR Units | Cancer Risk | Non-Cancer Hazard Calculations RfD/RfC $RfD_O$ | $RfD_{ABS}$ | RfD/RfC Units | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Surface Soil (0-2 ft) | Soil | Incidental Ingestion | Ingestion | Acenaphthene | 0.235 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.06 | 0.06 | mg/kg-day | 5.0E-05 |
| | | | | Acenaphthylene | 0.172 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Anthracene | 0.163 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.3 | 0.3 | mg/kg-day | 6.9E-06 |
| | | | | Arsenic | 10.19 | mg/kg | 1.5 | 1.5 | $(mg/kg\text{-}day)^{-1}$ | 2.2E-05 | 0.0003 | 0.0003 | mg/kg-day | 4.3E-01 |
| | | | | Benzene | --- | mg/kg | 0.055 | 0.055 | $(mg/kg\text{-}day)^{-1}$ | --- | 0.004 | 0.004 | mg/kg-day | --- |
| | | | | Benzo(a)anthracene | 0.753 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 3.6E-06 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(a)pyrene | 0.849 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 4.0E-05 | 0.0003 | 0.0003 | mg/kg-day | 3.6E-02 |
| | | | | Benzo(b)fluoranthene | 1.65 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 7.9E-06 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(g,h,i)perylene | 0.463 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Benzo(k)fluoranthene | --- | mg/kg | 0.073 | 0.073 | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Chrysene | 0.72 | mg/kg | 0.0073 | 0.0073 | $(mg/kg\text{-}day)^{-1}$ | 3.4E-08 | --- | --- | mg/kg-day | --- |
| | | | | Dibenzo(a,h)anthracene | 0.106 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 5.1E-06 | --- | --- | mg/kg-day | --- |
| | | | | Ethylbenzene | --- | mg/kg | 0.011 | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.1 | 0.1 | mg/kg-day | --- |
| | | | | Fluoranthene | 0.781 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 2.5E-04 |
| | | | | Fluorene | 0.104 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 3.3E-05 |
| | | | | Indeno(1,2,3-cd)pyrene | 0.351 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 1.7E-06 | --- | --- | mg/kg-day | --- |
| | | | | Naphthalene | 0.107 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.02 | 0.02 | mg/kg-day | 6.8E-05 |
| | | | | Phenanthrene | 0.444 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Pyrene | 0.84 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.03 | 0.03 | mg/kg-day | 3.6E-04 |
| | | | | Toluene | --- | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.08 | 0.08 | mg/kg-day | --- |
| | | | | Xylene (total) | --- | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.2 | 0.2 | mg/kg-day | --- |
| | | | Exp. Route Total | | | | | | | 8.1E-05 | | | | 4.7E-01 |
| | | Exposure Point Total | | | | | | | | 8.1E-05 | | | | 4.7E-01 |
| | Exposure Medium Total | | | | | | | | | 8.1E-05 | | | | 4.7E-01 |

# TABLE 19 CONTINUED
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# 7th STREET AND NORFOLK AVENUE RIGHT OF WAY
# FUTURE RESIDENT

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Resident |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC Value | EPC Units | Cancer Risk Calculations SF/IUR $SF_O$ | SF/IUR $SF_{ABS}$ | SF/IUR Units | Cancer Risk | Non-Cancer Hazard Calculations RfD/RfC $RfD_O$ | RfD/RfC $RfD_{ABS}$ | RfD/RfC Units | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Surface Soil (0-2 ft) | Air | Fugitive Dust Emissions/ Volatiles Released to Air | Inhalation | Acenaphthene | 0.235 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Acenaphthylene | 0.172 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Anthracene | 0.163 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Arsenic | 10.19 | mg/kg | 0.0043 | | $(ug/m^3)^{-1}$ | 1.3E-08 | 0.000015 | | $mg/m^3$ | 4.8E-04 |
| | | | | Benzene | --- | mg/kg | 0.0000078 | | $(ug/m^3)^{-1}$ | --- | 0.03 | | $mg/m^3$ | --- |
| | | | | Benzo(a)anthracene | 0.753 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 1.3E-09 | --- | | $mg/m^3$ | --- |
| | | | | Benzo(a)pyrene | 0.849 | mg/kg | 0.0011 | | $(ug/m^3)^{-1}$ | 9.5E-09 | 0.000002 | | $mg/m^3$ | 3.0E-04 |
| | | | | Benzo(b)fluoranthene | 1.65 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 1.8E-09 | --- | | $mg/m^3$ | --- |
| | | | | Benzo(g,h,i)perylene | 0.463 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Benzo(k)fluoranthene | --- | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Chrysene | 0.72 | mg/kg | 0.000011 | | $(ug/m^3)^{-1}$ | 1.2E-10 | --- | | $mg/m^3$ | --- |
| | | | | Dibenzo(a,h)anthracene | 0.106 | mg/kg | 0.0012 | | $(ug/m^3)^{-1}$ | 6.7E-10 | --- | | $mg/m^3$ | --- |
| | | | | Ethylbenzene | --- | mg/kg | 0.0000025 | | $(ug/m^3)^{-1}$ | --- | 1 | | $mg/m^3$ | --- |
| | | | | Fluoranthene | 0.781 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Fluorene | 0.104 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Indeno(1,2,3-cd)pyrene | 0.351 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 2.0E-10 | --- | | $mg/m^3$ | --- |
| | | | | Naphthalene | 0.107 | mg/kg | 0.000034 | | $(ug/m^3)^{-1}$ | 1.1E-12 | 0.003 | | $mg/m^3$ | 2.5E-08 |
| | | | | Phenanthrene | 0.444 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Pyrene | 0.84 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Toluene | --- | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | 5 | | $mg/m^3$ | --- |
| | | | | Xylene (total) | --- | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | 0.1 | | $mg/m^3$ | --- |
| | | | Exp. Route Total | | | | | | | 2.7E-08 | | | | 7.8E-04 |
| | | Exposure Point Total | | | | | | | | 2.7E-08 | | | | 7.8E-04 |
| | Exposure Medium Total | | | | | | | | | 2.7E-08 | | | | 7.8E-04 |
| Medium Total | | | | | | | | | | 1.0E-04 | | | | 5.1E-01 |
| Total Receptor Risk/Hazard | | | | | | | | | | 1.0E-04 | | | | 5.1E-01 |

# TABLE 20
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# 7th STREET AND NORFOLK AVENUE RIGHT OF WAY
# FUTURE CONSTRUCTION/UTILITY WORKER

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Construction/Utility Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC Value | EPC Units | Cancer Risk Calculations SF/IUR $SF_O$ | SF/IUR $SF_{ABS}$ | SF/IUR Units | Cancer Risk | Non-Cancer Hazard Calculations RfD/RfC $RfD_O$ | RfD/RfC $RfD_{ABS}$ | RfD/RfC Units | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Subsurface Soil (0-10 ft) | Soil | Dermal Contact | Dermal | Acenaphthene | 10.01 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.06 | 0.06 | mg/kg-day | 2.0E-04 |
| | | | | Acenaphthylene | 2.229 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Anthracene | 6.75 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.3 | 0.3 | mg/kg-day | 2.6E-05 |
| | | | | Arsenic | 8.784 | mg/kg | 1.5 | 1.5 | $(mg/kg\text{-}day)^{-1}$ | 5.1E-08 | 0.0003 | 0.0003 | mg/kg-day | 8.0E-03 |
| | | | | Benzene | 0.287 | mg/kg | 0.055 | 0.055 | $(mg/kg\text{-}day)^{-1}$ | --- | 0.004 | 0.004 | mg/kg-day | --- |
| | | | | Benzo(a)anthracene | 4.205 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 5.2E-08 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(a)pyrene | 3.284 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 4.0E-07 | 0.0003 | 0.0003 | mg/kg-day | 1.3E-02 |
| | | | | Benzo(b)fluoranthene | 3.854 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 4.7E-08 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(g,h,i)perylene | 0.98 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Benzo(k)fluoranthene | 0.004 | mg/kg | 0.073 | 0.073 | $(mg/kg\text{-}day)^{-1}$ | 4.9E-12 | --- | --- | mg/kg-day | --- |
| | | | | Chrysene | 3.326 | mg/kg | 0.0073 | 0.0073 | $(mg/kg\text{-}day)^{-1}$ | 4.1E-10 | --- | --- | mg/kg-day | --- |
| | | | | Dibenzo(a,h)anthracene | 0.225 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 2.8E-08 | --- | --- | mg/kg-day | --- |
| | | | | Ethylbenzene | 2.702 | mg/kg | 0.011 | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.1 | 0.1 | mg/kg-day | --- |
| | | | | Fluoranthene | 7.76 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 2.3E-04 |
| | | | | Fluorene | 7.382 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 2.2E-04 |
| | | | | Indeno(1,2,3-cd)pyrene | 0.812 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 1.0E-08 | --- | --- | mg/kg-day | --- |
| | | | | Naphthalene | 111.9 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.02 | 0.02 | mg/kg-day | 6.6E-03 |
| | | | | Phenanthrene | 24.37 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Pyrene | 11.52 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.03 | 0.03 | mg/kg-day | 4.5E-04 |
| | | | | Toluene | 0.124 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.08 | 0.08 | mg/kg-day | --- |
| | | | | Xylene (total) | 3.632 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.2 | 0.2 | mg/kg-day | --- |
| | | | Exp. Route Total | | | | | | | 5.9E-07 | | | | 2.9E-02 |
| | | Exposure Point Total | | | | | | | | 5.9E-07 | | | | 2.9E-02 |
| | Exposure Medium Total | | | | | | | | | 5.9E-07 | | | | 2.9E-02 |

# TABLE 20 CONTINUED
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# 7th STREET AND NORFOLK AVENUE RIGHT OF WAY
# FUTURE CONSTRUCTION/UTILITY WORKER

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Construction/Utility Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC | | Cancer Risk Calculations | | | | Non-Cancer Hazard Calculations | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | SF/IUR | | | Cancer Risk | RfD/RfC | | | Hazard Quotient |
| | | | | | Value | Units | $SF_O$ | $SF_{ABS}$ | Units | | $RfD_O$ | $RfD_{ABS}$ | Units | |
| Subsurface Soil (0-10 ft) | Soil | Incidental Ingestion | Ingestion | Acenaphthene | 34.13 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.06 | 0.06 | mg/kg-day | 1.6E-03 |
| | | | | Acenaphthylene | 38.19 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Anthracene | 17.79 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.3 | 0.3 | mg/kg-day | 1.7E-04 |
| | | | | Arsenic | 10.73 | mg/kg | 1.5 | 1.5 | $(mg/kg\text{-}day)^{-1}$ | 6.5E-07 | 0.0003 | 0.0003 | mg/kg-day | 1.0E-01 |
| | | | | Benzene | 4.07 | mg/kg | 0.055 | 0.055 | $(mg/kg\text{-}day)^{-1}$ | 9.0E-09 | 0.004 | 0.004 | mg/kg-day | 2.9E-03 |
| | | | | Benzo(a)anthracene | 10.46 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 3.1E-07 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(a)pyrene | 25.05 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 7.4E-06 | 0.0003 | 0.0003 | mg/kg-day | 2.4E-01 |
| | | | | Benzo(b)fluoranthene | 24.83 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 7.3E-07 | --- | --- | mg/kg-day | --- |
| | | | | Benzo(g,h,i)perylene | 18.45 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Benzo(k)fluoranthene | 0.0316 | mg/kg | 0.073 | 0.073 | $(mg/kg\text{-}day)^{-1}$ | 9.3E-11 | --- | --- | mg/kg-day | --- |
| | | | | Chrysene | 11.45 | mg/kg | 0.0073 | 0.0073 | $(mg/kg\text{-}day)^{-1}$ | 3.4E-09 | --- | --- | mg/kg-day | --- |
| | | | | Dibenzo(a,h)anthracene | 2.674 | mg/kg | 7.3 | 7.3 | $(mg/kg\text{-}day)^{-1}$ | 7.9E-07 | --- | --- | mg/kg-day | --- |
| | | | | Ethylbenzene | 40.42 | mg/kg | 0.011 | --- | $(mg/kg\text{-}day)^{-1}$ | 1.8E-08 | 0.1 | 0.1 | mg/kg-day | 1.1E-03 |
| | | | | Fluoranthene | 16.22 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 1.1E-03 |
| | | | | Fluorene | 17.58 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.04 | 0.04 | mg/kg-day | 1.2E-03 |
| | | | | Indeno(1,2,3-cd)pyrene | 7.852 | mg/kg | 0.73 | 0.73 | $(mg/kg\text{-}day)^{-1}$ | 2.3E-07 | --- | --- | mg/kg-day | --- |
| | | | | Naphthalene | 113 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.02 | 0.02 | mg/kg-day | 1.6E-02 |
| | | | | Phenanthrene | 50.8 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | --- | --- | mg/kg-day | --- |
| | | | | Pyrene | 22 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.03 | 0.03 | mg/kg-day | 2.1E-03 |
| | | | | Toluene | 0.842 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.08 | 0.08 | mg/kg-day | 3.0E-05 |
| | | | | Xylene (total) | 102.9 | mg/kg | --- | --- | $(mg/kg\text{-}day)^{-1}$ | --- | 0.2 | 0.2 | mg/kg-day | 1.5E-03 |
| | | | Exp. Route Total | | | | | | | 1.0E-05 | | | | 3.6E-01 |
| | | Exposure Point Total | | | | | | | | 1.0E-05 | | | | 3.6E-01 |
| | Exposure Medium Total | | | | | | | | | 1.0E-05 | | | | 3.6E-01 |

# TABLE 20 CONTINUED
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# 7th STREET AND NORFOLK AVENUE RIGHT OF WAY
# FUTURE CONSTRUCTION/UTILITY WORKER

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Construction/Utility Worker |
| Receptor Age: | Adult |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC Value | EPC Units | Cancer Risk Calculations: SF/IUR $SF_O$ | SF/IUR $SF_{ABS}$ | SF/IUR Units | Cancer Risk | Non-Cancer Hazard Calculations: RfD/RfC $RfD_O$ | RfD/RfC $RfD_{ABS}$ | RfD/RfC Units | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Subsurface Soil (0-10 ft) | Air | Fugitive Dust Emissions/ Volatiles Released to Air | Inhalation | Acenaphthene | 34.13 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Acenaphthylene | 38.19 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Anthracene | 17.79 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Arsenic | 10.73 | mg/kg | 0.0043 | | $(ug/m^3)^{-1}$ | --- | 0.000015 | | $mg/m^3$ | 1.2E-04 |
| | | | | Benzene | 4.07 | mg/kg | 0.0000078 | | $(ug/m^3)^{-1}$ | 2.7E-08 | 0.03 | | $mg/m^3$ | 8.0E-03 |
| | | | | Benzo(a)anthracene | 10.46 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 6.0E-11 | --- | | $mg/m^3$ | --- |
| | | | | Benzo(a)pyrene | 25.05 | mg/kg | 0.0011 | | $(ug/m^3)^{-1}$ | 9.9E-10 | 0.000002 | | $mg/m^3$ | 3.2E-02 |
| | | | | Benzo(b)fluoranthene | 24.83 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 9.7E-11 | --- | | $mg/m^3$ | --- |
| | | | | Benzo(g,h,i)perylene | 18.45 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Benzo(k)fluoranthene | 0.0316 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 1.3E-13 | --- | | $mg/m^3$ | --- |
| | | | | Chrysene | 11.45 | mg/kg | 0.000011 | | $(ug/m^3)^{-1}$ | 6.5E-12 | --- | | $mg/m^3$ | --- |
| | | | | Dibenzo(a,h)anthracene | 2.674 | mg/kg | 0.0012 | | $(ug/m^3)^{-1}$ | 6.4E-11 | --- | | $mg/m^3$ | --- |
| | | | | Ethylbenzene | 40.42 | mg/kg | 0.0000025 | | $(ug/m^3)^{-1}$ | --- | 1 | | $mg/m^3$ | 6.8E-09 |
| | | | | Fluoranthene | 16.22 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Fluorene | 17.58 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Indeno(1,2,3-cd)pyrene | 7.852 | mg/kg | 0.00011 | | $(ug/m^3)^{-1}$ | 1.7E-11 | --- | | $mg/m^3$ | --- |
| | | | | Naphthalene | 113 | mg/kg | 0.000034 | | $(ug/m^3)^{-1}$ | 3.5E-09 | 0.003 | | $mg/m^3$ | 2.4E-03 |
| | | | | Phenanthrene | 50.8 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Pyrene | 22 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | --- | | $mg/m^3$ | --- |
| | | | | Toluene | 0.842 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | 5 | | $mg/m^3$ | 3.3E-08 |
| | | | | Xylene (total) | 102.9 | mg/kg | --- | | $(ug/m^3)^{-1}$ | --- | 0.1 | | $mg/m^3$ | 1.4E-04 |
| | | | Exp. Route Total | | | | | | | 3.1E-08 | | | | 4.2E-02 |
| | | Exposure Point Total | | | | | | | | 3.1E-08 | | | | 4.2E-02 |
| | Exposure Medium Total | | | | | | | | | 3.1E-08 | | | | 4.2E-02 |
| Total Receptor Risk/Hazard | | | | | | | | | | 1.1E-05 | | | | 4.4E-01 |

# TABLE 21
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# GROUNDWATER PLUME
# FUTURE OFFSITE RESIDENT

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Offsite Resident |
| Receptor Age: | Adult/Child |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC | | Cancer Risk Calculations | | | | | Non-Cancer Hazard Calculations | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Intake Concentration | | SF/IUR | | | Intake Concentration | | RfD/RfC | | Hazard |
| | | | | | Value | Units | Value | Units | Value | Units | Cancer Risk | Value | Units | Value | Units | Quotient |
| Ground Water | Ground Water | Private Well Use | Ingestion | Acenaphthene | 1.488 | mg/L | 1.9E-02 | mg/kg-day | --- | $(mg/kg-day)^{-1}$ | --- | 7.42E-02 | $(mg/kg-day)^{-1}$ | 6.00E-02 | mg/kg-day | 1.2E+00 |
| | | | | Acenaphthylene | 0.2271 | mg/L | 2.9E-03 | mg/kg-day | --- | $(mg/kg-day)^{-1}$ | --- | 1.13E-02 | $(mg/kg-day)^{-1}$ | --- | mg/kg-day | --- |
| | | | | Anthracene | 0.7243 | mg/L | 9.3E-03 | mg/kg-day | --- | $(mg/kg-day)^{-1}$ | --- | 3.61E-02 | $(mg/kg-day)^{-1}$ | 3.00E-01 | mg/kg-day | --- |
| | | | | Arsenic | 0.01229 | mg/L | 1.6E-04 | mg/kg-day | 1.5E+00 | $(mg/kg-day)^{-1}$ | 2.4E-04 | 6.13E-04 | $(mg/kg-day)^{-1}$ | 3.00E-04 | mg/kg-day | 2.0E+00 |
| | | | | Benzene | 0.3715 | mg/L | 4.8E-03 | mg/kg-day | 5.5E-02 | $(mg/kg-day)^{-1}$ | 2.6E-04 | 1.85E-02 | $(mg/kg-day)^{-1}$ | 4.00E-03 | mg/kg-day | 4.6E+00 |
| | | | | Benzo(a)anthracene | 0.49 | mg/L | 2.0E-02 | mg/kg-day | 7.3E-01 | $(mg/kg-day)^{-1}$ | 1.4E-02 | 2.44E-02 | $(mg/kg-day)^{-1}$ | --- | mg/kg-day | --- |
| | | | | Benzo(a)pyrene | 0.384 | mg/L | 1.5E-02 | mg/kg-day | 7.3E+00 | $(mg/kg-day)^{-1}$ | 1.1E-01 | 1.91E-02 | $(mg/kg-day)^{-1}$ | 3.00E-04 | mg/kg-day | --- |
| | | | | Benzo(b)fluoranthene | 0.427 | mg/L | 1.7E-02 | mg/kg-day | 7.3E-01 | $(mg/kg-day)^{-1}$ | 1.2E-02 | 2.13E-02 | $(mg/kg-day)^{-1}$ | --- | mg/kg-day | --- |
| | | | | Benzo(g,h,i)perylene | 0.153 | mg/L | 2.0E-03 | mg/kg-day | --- | $(mg/kg-day)^{-1}$ | --- | 7.63E-03 | $(mg/kg-day)^{-1}$ | --- | mg/kg-day | --- |
| | | | | Benzo(k)fluoranthene | --- | mg/L | --- | mg/kg-day | 7.3E-02 | $(mg/kg-day)^{-1}$ | --- | --- | $(mg/kg-day)^{-1}$ | --- | mg/kg-day | --- |
| | | | | Chrysene | 0.491 | mg/L | 2.0E-02 | mg/kg-day | 7.3E-03 | $(mg/kg-day)^{-1}$ | 1.4E-04 | 2.45E-02 | $(mg/kg-day)^{-1}$ | --- | mg/kg-day | --- |
| | | | | Dibenzo(a,h)anthracene | --- | mg/L | --- | mg/kg-day | 7.3E+00 | $(mg/kg-day)^{-1}$ | --- | --- | $(mg/kg-day)^{-1}$ | --- | mg/kg-day | --- |
| | | | | Ethylbenzene | 0.6884 | mg/L | 8.8E-03 | mg/kg-day | 1.1E-02 | $(mg/kg-day)^{-1}$ | 9.7E-05 | 3.43E-02 | $(mg/kg-day)^{-1}$ | 1.00E-01 | mg/kg-day | 3.4E-01 |
| | | | | Fluoranthene | 0.3639 | mg/L | 4.7E-03 | mg/kg-day | --- | $(mg/kg-day)^{-1}$ | --- | 1.81E-02 | $(mg/kg-day)^{-1}$ | 4.00E-02 | mg/kg-day | --- |
| | | | | Fluorene | 0.6519 | mg/L | 8.4E-03 | mg/kg-day | --- | $(mg/kg-day)^{-1}$ | --- | 3.25E-02 | $(mg/kg-day)^{-1}$ | 4.00E-02 | mg/kg-day | --- |
| | | | | Indeno(1,2,3-cd)pyrene | 0.1 | mg/L | 4.0E-03 | mg/kg-day | 7.3E-01 | $(mg/kg-day)^{-1}$ | 2.9E-03 | 4.99E-03 | $(mg/kg-day)^{-1}$ | --- | mg/kg-day | --- |
| | | | | Naphthalene | 12.282 | mg/L | 1.6E-01 | mg/kg-day | --- | $(mg/kg-day)^{-1}$ | --- | 6.12E-01 | $(mg/kg-day)^{-1}$ | 2.00E-02 | mg/kg-day | 3.1E+01 |
| | | | | Phenanthrene | 3.96 | mg/L | 5.1E-02 | mg/kg-day | --- | $(mg/kg-day)^{-1}$ | --- | 1.97E-01 | $(mg/kg-day)^{-1}$ | --- | mg/kg-day | --- |
| | | | | Pyrene | 0.5322 | mg/L | 6.8E-03 | mg/kg-day | --- | $(mg/kg-day)^{-1}$ | --- | 2.65E-02 | $(mg/kg-day)^{-1}$ | 3.00E-02 | mg/kg-day | 8.8E-01 |
| | | | | Toluene | 0.3208 | mg/L | 4.1E-03 | mg/kg-day | --- | $(mg/kg-day)^{-1}$ | --- | 1.60E-02 | $(mg/kg-day)^{-1}$ | 8.00E-02 | mg/kg-day | --- |
| | | | | Xylene (total) | 0.4608 | mg/L | 5.9E-03 | mg/kg-day | --- | $(mg/kg-day)^{-1}$ | --- | 2.30E-02 | $(mg/kg-day)^{-1}$ | 2.00E-01 | mg/kg-day | 1.1E-01 |
| | | | Exp. Route Total | | | | | | | | 1.4E-01 | | | | | 4.0E+01 |
| | | Exposure Point Total | | | | | | | | | 1.4E-01 | | | | | 4.0E+01 |
| | Exposure Medium Total | | | | | | | | | | 1.4E-01 | | | | | 4.0E+01 |

# TABLE 21 CONTINUED
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# GROUNDWATER PLUME
# FUTURE OFFSITE RESIDENT

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Offsite Resident |
| Receptor Age: | Adult/Child |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC Value | EPC Units | Cancer Risk Calculations: Intake Concentration Value | Intake Concentration Units | SF/IUR Value | SF/IUR Units | Cancer Risk | Non-Cancer Hazard Calculations: Intake Concentration Value | Intake Concentration Units | RfD/RfC Value | RfD/RfC Units | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ground Water | Ground Water | Private Well Use | Dermal Adsorption | Acenaphthene | 1.488 | mg/L | 2.6E-02 | mg/kg-day | --- | $(mg/kg-day)^{-1}$ | --- | 1.3E-01 | $(mg/kg-day)^{-1}$ | 6.00E-02 | mg/kg-day | --- |
| | | | | Acenaphthylene | 0.2271 | mg/L | --- | mg/kg-day | --- | $(mg/kg-day)^{-1}$ | --- | --- | $(mg/kg-day)^{-1}$ | --- | mg/kg-day | --- |
| | | | | Anthracene | 0.7243 | mg/L | 2.4E-02 | mg/kg-day | --- | $(mg/kg-day)^{-1}$ | --- | 1.2E-01 | $(mg/kg-day)^{-1}$ | 3.00E-01 | mg/kg-day | --- |
| | | | | Arsenic | 0.01229 | mg/L | 7.9E-02 | mg/kg-day | 1.5E+00 | $(mg/kg-day)^{-1}$ | --- | 7.3E-06 | $(mg/kg-day)^{-1}$ | 3.00E-04 | mg/kg-day | --- |
| | | | | Benzene | 0.3715 | mg/L | 6.9E-05 | mg/kg-day | 5.5E-02 | $(mg/kg-day)^{-1}$ | 3.8E-06 | 4.8E-04 | $(mg/kg-day)^{-1}$ | 4.00E-03 | mg/kg-day | 1.2E-01 |
| | | | | Benzo(a)anthracene | 0.49 | mg/L | 2.7E-01 | mg/kg-day | 7.3E-01 | $(mg/kg-day)^{-1}$ | 1.9E-01 | 4.3E-01 | $(mg/kg-day)^{-1}$ | --- | mg/kg-day | --- |
| | | | | Benzo(a)pyrene | 0.384 | mg/L | 3.2E-01 | mg/kg-day | 7.3E+00 | $(mg/kg-day)^{-1}$ | 2.3E+00 | 5.1E-01 | $(mg/kg-day)^{-1}$ | 3.00E-04 | mg/kg-day | --- |
| | | | | Benzo(b)fluoranthene | 0.427 | mg/L | 2.0E-01 | mg/kg-day | 7.3E-01 | $(mg/kg-day)^{-1}$ | 1.5E-01 | 3.3E-01 | $(mg/kg-day)^{-1}$ | --- | mg/kg-day | --- |
| | | | | Benzo(g,h,i)perylene | 0.153 | mg/L | --- | mg/kg-day | --- | $(mg/kg-day)^{-1}$ | --- | --- | $(mg/kg-day)^{-1}$ | --- | mg/kg-day | --- |
| | | | | Benzo(k)fluoranthene | --- | mg/L | --- | mg/kg-day | 7.3E-02 | $(mg/kg-day)^{-1}$ | --- | --- | $(mg/kg-day)^{-1}$ | --- | mg/kg-day | --- |
| | | | | Chrysene | 0.491 | mg/L | 2.9E-02 | mg/kg-day | 7.3E-03 | $(mg/kg-day)^{-1}$ | 2.1E-04 | 4.7E-02 | $(mg/kg-day)^{-1}$ | --- | mg/kg-day | --- |
| | | | | Dibenzo(a,h)anthracene | --- | mg/L | --- | mg/kg-day | 7.3E+00 | $(mg/kg-day)^{-1}$ | --- | --- | $(mg/kg-day)^{-1}$ | --- | mg/kg-day | --- |
| | | | | Ethylbenzene | 0.6884 | mg/L | 5.0E-03 | mg/kg-day | --- | $(mg/kg-day)^{-1}$ | --- | 2.5E-02 | $(mg/kg-day)^{-1}$ | 1.00E-01 | mg/kg-day | 2.5E-01 |
| | | | | Fluoranthene | 0.3639 | mg/L | 3.1E-02 | mg/kg-day | --- | $(mg/kg-day)^{-1}$ | --- | 1.5E-01 | $(mg/kg-day)^{-1}$ | 4.00E-02 | mg/kg-day | --- |
| | | | | Fluorene | 0.6519 | mg/L | 1.6E-02 | mg/kg-day | --- | $(mg/kg-day)^{-1}$ | --- | 7.6E-02 | $(mg/kg-day)^{-1}$ | 4.00E-02 | mg/kg-day | --- |
| | | | | Indeno(1,2,3-cd)pyrene | 0.1 | mg/L | 1.0E-01 | mg/kg-day | 7.3E-01 | $(mg/kg-day)^{-1}$ | 7.3E-02 | 1.6E-01 | $(mg/kg-day)^{-1}$ | --- | mg/kg-day | --- |
| | | | | Naphthalene | 12.282 | mg/L | 9.8E-02 | mg/kg-day | --- | $(mg/kg-day)^{-1}$ | --- | 4.8E-01 | $(mg/kg-day)^{-1}$ | 2.00E-02 | mg/kg-day | 2.4E+01 |
| | | | | Phenanthrene | 3.96 | mg/L | --- | mg/kg-day | --- | $(mg/kg-day)^{-1}$ | --- | --- | $(mg/kg-day)^{-1}$ | --- | mg/kg-day | --- |
| | | | | Pyrene | 0.5322 | mg/L | 3.0E-02 | mg/kg-day | --- | $(mg/kg-day)^{-1}$ | --- | 1.4E-01 | $(mg/kg-day)^{-1}$ | 3.00E-02 | mg/kg-day | --- |
| | | | | Toluene | 0.3208 | mg/L | 1.4E-03 | mg/kg-day | --- | $(mg/kg-day)^{-1}$ | --- | 6.6E-03 | $(mg/kg-day)^{-1}$ | 8.00E-02 | mg/kg-day | --- |
| | | | | Xylene (total) | 0.4608 | mg/L | 3.4E-03 | mg/kg-day | --- | $(mg/kg-day)^{-1}$ | --- | 1.7E-02 | $(mg/kg-day)^{-1}$ | 2.00E-01 | mg/kg-day | 8.3E-02 |
| | | | Exp. Route Total | | | | | | | | 2.7E+00 | | | | | 2.4E+01 |
| | | Exposure Point Total | | | | | | | | | 2.7E+00 | | | | | 2.4E+01 |
| | Exposure Medium Total | | | | | | | | | | 2.7E+00 | | | | | 2.4E+01 |

# TABLE 21 CONTINUED
# SUMMARY OF POTENTIAL HUMAN HEALTH CANCER RISKS AND NON-CANCER HAZARDS
# GROUNDWATER PLUME
# FUTURE OFFSITE RESIDENT

| | |
|---|---|
| Scenario Timeframe: | Future |
| Receptor Population: | Offsite Resident |
| Receptor Age: | Adult/Child |

| Medium | Exposure Medium | Exposure Point | Exposure Route | Chemical of Potential Concern | EPC Value | EPC Units | Cancer Risk Calculations: Intake Concentration Value | Intake Concentration Units | SF/IUR Value | SF/IUR Units | Cancer Risk | Non-Cancer Hazard Calculations: Intake Concentration Value | Intake Concentration Units | RfD/RfC Value | RfD/RfC Units | Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ground Water | Air | Water Vapors | Inhalation | Acenaphthene | 1.488 | mg/L | 2.6E+02 | $ug/m^3$ | --- | $(ug/m^3)^{-1}$ | --- | --- | $(mg/m^3)^{-1}$ | --- | $mg/m^3$ | --- |
| | | | | Acenaphthylene | 0.2271 | mg/L | 4.0E+01 | $ug/m^3$ | --- | $(ug/m^3)^{-1}$ | --- | --- | $(mg/m^3)^{-1}$ | --- | $mg/m^3$ | --- |
| | | | | Anthracene | 0.7243 | mg/L | 1.3E+02 | $ug/m^3$ | --- | $(ug/m^3)^{-1}$ | --- | --- | $(mg/m^3)^{-1}$ | --- | $mg/m^3$ | --- |
| | | | | Arsenic | 0.01229 | mg/L | 2.2E+00 | $ug/m^3$ | 4.3E-03 | $(ug/m^3)^{-1}$ | 9.4E-03 | --- | $(mg/m^3)^{-1}$ | 1.50E-05 | $mg/m^3$ | --- |
| | | | | Benzene | 0.3715 | mg/L | 6.6E+01 | $ug/m^3$ | 7.8E-06 | $(ug/m^3)^{-1}$ | 5.2E-04 | 4.1E-02 | $(mg/m^3)^{-1}$ | 3.00E-02 | $mg/m^3$ | 1.4E+00 |
| | | | | Benzo(a)anthracene | 0.49 | mg/L | 2.4E+02 | $ug/m^3$ | 1.1E-04 | $(ug/m^3)^{-1}$ | 2.7E-02 | --- | $(mg/m^3)^{-1}$ | --- | $mg/m^3$ | --- |
| | | | | Benzo(a)pyrene | 0.384 | mg/L | 1.9E+02 | $ug/m^3$ | 1.1E-03 | $(ug/m^3)^{-1}$ | 2.1E-01 | --- | $(mg/m^3)^{-1}$ | 2.00E-06 | $mg/m^3$ | --- |
| | | | | Benzo(b)fluoranthene | 0.427 | mg/L | 2.1E+02 | $ug/m^3$ | 1.1E-04 | $(ug/m^3)^{-1}$ | 2.3E-02 | --- | $(mg/m^3)^{-1}$ | --- | $mg/m^3$ | --- |
| | | | | Benzo(g,h,i)perylene | 0.153 | mg/L | 2.7E+01 | $ug/m^3$ | --- | $(ug/m^3)^{-1}$ | --- | --- | $(mg/m^3)^{-1}$ | --- | $mg/m^3$ | --- |
| | | | | Benzo(k)fluoranthene | --- | mg/L | #VALUE! | $ug/m^3$ | 1.1E-04 | $(ug/m^3)^{-1}$ | --- | --- | $(mg/m^3)^{-1}$ | --- | $mg/m^3$ | --- |
| | | | | Chrysene | 0.491 | mg/L | 2.4E+02 | $ug/m^3$ | 1.1E-05 | $(ug/m^3)^{-1}$ | 2.7E-03 | --- | $(mg/m^3)^{-1}$ | --- | $mg/m^3$ | --- |
| | | | | Dibenzo(a,h)anthracene | --- | mg/L | #VALUE! | $ug/m^3$ | 1.2E-03 | $(ug/m^3)^{-1}$ | --- | --- | $(mg/m^3)^{-1}$ | --- | $mg/m^3$ | --- |
| | | | | Ethylbenzene | 0.6884 | mg/L | 1.2E+02 | $ug/m^3$ | 2.5E-06 | $(ug/m^3)^{-1}$ | 3.1E-04 | 7.6E-02 | $(mg/m^3)^{-1}$ | 1.00E+00 | $mg/m^3$ | 7.6E-02 |
| | | | | Fluoranthene | 0.3639 | mg/L | 6.5E+01 | $ug/m^3$ | --- | $(ug/m^3)^{-1}$ | --- | --- | $(mg/m^3)^{-1}$ | --- | $mg/m^3$ | --- |
| | | | | Fluorene | 0.6519 | mg/L | 1.2E+02 | $ug/m^3$ | --- | $(ug/m^3)^{-1}$ | --- | --- | $(mg/m^3)^{-1}$ | --- | $mg/m^3$ | --- |
| | | | | Indeno(1,2,3-cd)pyrene | 0.1 | mg/L | 4.9E+01 | $ug/m^3$ | 1.1E-04 | $(ug/m^3)^{-1}$ | 5.4E-03 | --- | $(mg/m^3)^{-1}$ | --- | $mg/m^3$ | --- |
| | | | | Naphthalene | 12.282 | mg/L | 2.2E+03 | $ug/m^3$ | 3.4E-05 | $(ug/m^3)^{-1}$ | 7.4E-02 | 1.4E+00 | $(mg/m^3)^{-1}$ | 3.00E-03 | $mg/m^3$ | 4.5E+02 |
| | | | | Phenanthrene | 3.96 | mg/L | 7.1E+02 | $ug/m^3$ | --- | $(ug/m^3)^{-1}$ | --- | --- | $(mg/m^3)^{-1}$ | --- | $mg/m^3$ | --- |
| | | | | Pyrene | 0.5322 | mg/L | 9.5E+01 | $ug/m^3$ | --- | $(ug/m^3)^{-1}$ | --- | --- | $(mg/m^3)^{-1}$ | --- | $mg/m^3$ | --- |
| | | | | Toluene | 0.3208 | mg/L | 5.7E+01 | $ug/m^3$ | --- | $(ug/m^3)^{-1}$ | --- | --- | $(mg/m^3)^{-1}$ | 5.00E+00 | $mg/m^3$ | --- |
| | | | | Xylene (total) | 0.4608 | mg/L | 8.2E+01 | $ug/m^3$ | --- | $(ug/m^3)^{-1}$ | --- | 5.1E-02 | $(mg/m^3)^{-1}$ | 1.00E-01 | $mg/m^3$ | 5.1E-01 |
| | | | Exp. Route Total | | | | | | | | 3.5E-01 | | | | | 4.5E+02 |
| | | Exposure Point Total | | | | | | | | | 3.5E-01 | | | | | 4.5E+02 |
| | Exposure Medium Total | | | | | | | | | | 3.5E-01 | | | | | 4.5E+02 |
| Total Receptor Risk/Hazard | | | | | | | | | | | 3.2E+00 | | | | | 5.2E+02 |

**TABLE 22**
**SUMMARY OF CARCINOGENIC RISK**

| Receptor Population | COC (Risk > $1x10^{-6}$) | Carcinogenic Risk |
|---|---|---|
| Site Commercial/Industrial Worker (Soil, 0-2 feet) – NPPD Property | Benzo(a)pyrene | $7.1 \times 10^{-6}$ |
| Onsite Adult/Child Resident (Soil, 0-2 feet) – NPPD Property | Arsenic, benzo(a)pyrene, dibenzo(a,h)anthracene | $9.0 \times 10^{-5}$ |
| Site Construction/Utility Worker (Soil 2-10 feet) – NPPD Property | Benzo(a)pyrene | $5.7 \times 10^{-6}$ |
| Site Construction/Utility Worker (Soil 0-10 feet) – BHE Property | Benzo(a)pyrene | $7.9 \times 10^{-6}$ |
| Onsite Adult/Child Resident (Soil, 0-2 feet) – Alley | Arsenic, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(1, 2, 3-cd)pyrene | $4.6 \times 10^{-3}$ |
| Site Construction/Utility Worker (Soil 0-10 feet) – Alley | Benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene | $1.4 \times 10^{-5}$ |
| Onsite Adult/Child Resident (Soil, 0-2 feet) – City of Norfolk ROW | Arsenic, benzo(a)pyrene, benzo(b)fluoranthene | $1.0 \times 10^{-4}$ |
| Site Construction/Utility Worker (Soil 0-10 feet) – City of Norfolk ROW | Benzo(a)pyrene | $1.1 \times 10^{-5}$ |
| Onsite/Offsite Adult/Child Resident (Groundwater) | Benzene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, ethylbenzene, indeno(1, 2, 3-cd)pyrene, naphthalene | $3.2 \times 10^{0}$ |
| | Arsenic | $9.6 \times 10^{-3}$ |

**TABLE 23**
**SUMMARY OF NONCARCINOGENIC RISK**

| Receptor Population | COC (HI > 0.1) | HI |
|---|---|---|
| Site Commercial/Industrial Worker (Soil, 0-2 feet) – NPPD Property | None | 0.026 |
| Onsite Adult/Child Resident (Soil, 0-2 feet) – NPPD Property | Arsenic | 0.39 |
| Site Construction/Utility Worker (Soil 2-10 feet) – NPPD Property | Benzo(a)pyrene | 0.20 |
| Site Construction/Utility Worker (Soil 0-10 feet) – BHE Property | Benzo(a)pyrene | 0.34 |
| Onsite Adult/Child Resident (Soil, 0-2 feet) – Alley | Arsenic, benzo(a)pyrene | 3.82 |
| Site Construction/Utility Worker (Soil 0-10 feet) – Alley | Arsenic, benzo(a)pyrene | 0.52 |
| Onsite Adult/Child Resident (Soil, 0-2 feet) – City of Norfolk ROW | Arsenic | 0.51 |
| Site Construction/Utility Worker (Soil 0-10 feet) – City of Norfolk ROW | Arsenic, benzo(a)pyrene | 0.44 |
| Onsite/Offsite Adult/Child Resident (Groundwater) | Acenaphthylene, benzene, ethylbenzene, naphthalene, pyrene, total xylenes | 517 |
| | Arsenic | 2 |

# TABLE 24
# SELECTED REMEDY COST ESTIMATE
# ALTERNATIVE 4 – IN-SITU THERMAL TREATMENT

| In Situ Thermal Treatment Cost Estimate – ERH & SEE | | | | |
|---|---|---|---|---|
| **Item** | **Unit** | **Quantity** | **Unit Price** | **Item Total** |
| Site Preparation [1] | LS | 1 | $10,000 | $10,000 |
| In Situ Thermal Treatment [2] [3] [4] | LS | 1 | $4,600,000 | $4,600,000 |
| Utilities Protection [5] | LS | 1 | $100,000 | $100,000 |
| Vapor Monitoring and Mitigation [6] | LS | 1 | $450,000 | $450,000 |
| **CONSTRUCTION TOTAL** | | | | **$5,160,000** |
| Bid Contingency [7] | 20% | | | $1,032,000 |
| Scope Contingency [7] | 15% | | | $774,000 |
| Construction Management [7] | 6% | | | $310,000 |
| Remedial Design [7] | 6% | | | $310,000 |
| **TOTAL CAPITAL COST** | | | | **$7,590,000** |
| **ANNUAL COSTS** | | | | |
| Groundwater Monitoring and Reporting [8] | Yearly | 2 | $140,000 | $280,000 |
| Technical Support | 10% | | | $28,000 |
| **ANNUAL COST TOTAL** | | | | **$310,000** |

Notes:

[1] Vendor estimate for similar MGP removal action.

[2] Estimate cost from vendor using a combination of ERH for the unsaturated zone and steam injection for saturated zone.

[3] Cost includes work plan, permitting, electrical usage, treatment, site O&M, and confirmatory sampling.

[4] Assumes one confirmation sampling event during system operation and one at system shutdown.

[5] Assumes cost for protecting the fiber optic trunk line and relocation of the gas line in the alley.

[6] Assumes 2 indoor air sample and 1 from existing port per week during treatment operation, vendor provided cost for installation of vapor cap over the treatment area, and active sub-slab suction.

[7] Percentages are in accordance with EPA's guidance document "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", published in July 2000.

[8] Assumes 4 sampling events per year and one report.

**TABLE 25**
**MONITORING WELL CONSTRUCTION INFORMATION**

| Well | Top of Casing[1] | Total Depth (feet bgs) | Screened Interval | |
|---|---|---|---|---|
| | | | Top[1] | Bottom[1] |
| MW-01A | 1522.35 | 20.2 | 1512.43 | 1502.93 |
| MW-01B | 1522.31 | 27.6 | 1500.16 | 1495.36 |
| MW-02A | 1521.47 | 26.4 | 1505.44 | 1495.94 |
| MW-02B | 1521.57 | 34.5 | 1492.67 | 1487.87 |
| MW-03AR | 1522.29 | 25.9 | 1507.25 | 1497.45 |
| MW-03BR | 1522.47 | 34.5 | 1493.57 | 1488.77 |
| MW-04A | 1523.22 | 25.0 | 1508.57 | 1499.07 |
| MW-04B | 1523.23 | 33.0 | 1495.59 | 1490.79 |
| MW-05A | 1522.40 | 20.3 | 1512.41 | 1502.91 |
| MW-05B | 1521.80 | 35.5 | 1492.28 | 1487.48 |
| MW-06A | 1520.54 | 23.2 | 1507.53 | 1498.03 |
| MW-06B | 1520.51 | 32.3 | 1493.51 | 1488.71 |
| MW-07A | 1519.17 | 23.1 | 1506.38 | 1496.88 |
| MW-07B | 1519.07 | 32.5 | 1492.03 | 1487.23 |
| MW-08A | 1518.41 | 22.3 | 1507.01 | 1497.21 |
| MW-08B | 1518.50 | 29.5 | 1494.60 | 1489.80 |
| MW-09A | 1520.81 | 20.0 | 1511.38 | 1501.58 |
| MW-09B | 1520.84 | 28.0 | 1498.21 | 1493.41 |
| MW-10A | 1522.68 | 27.0 | 1506.12 | 1496.32 |
| MW-11A | 1522.00 | 25.0 | 1507.54 | 1497.74 |
| MW-11B | 1522.06 | 32.0 | 1495.34 | 1490.54 |
| MW-12A | 1519.16 | 22.0 | 1507.79 | 1497.99 |
| MW-12B | 1519.28 | 32.0 | 1492.49 | 1487.69 |
| MW-13A | 1518.02 | 20.0 | 1503.61 | 1498.81 |
| MW-13B | 1518.06 | 32.0 | 1496.45 | 1486.65 |
| MW-14A | 1517.34 | 22.0 | 1505.89 | 1496.09 |
| MW-14B | 1517.38 | 32.0 | 1490.74 | 1485.94 |
| MW-15A | 1518.40 | 22.0 | 1506.85 | 1497.05 |
| MW-15B | 1518.52 | 32.0 | 1491.76 | 1486.96 |
| MW-16A | 1516.55 | 22.0 | 1505.23 | 1495.43 |
| MW-16B | 1516.75 | 32.0 | 1490.05 | 1485.25 |
| MW-17A | 1515.96 | 22.0 | 1504.50 | 1494.70 |
| MW-17B | 1515.90 | 32.0 | 1489.33 | 1484.53 |
| MW-18A | 1519.34 | 22.0 | 1507.89 | 1498.09 |
| MW-18B | 1519.30 | 32.0 | 1492.67 | 1487.87 |

Notes:
[1] Elevations are in feet above mean sea level (msl).

**TABLE 26**
**DNAPL LEVEL IN MONITORING WELLS**

| Date | DNAPL Thickness (feet) | | |
|---|---|---|---|
| | MW-02A | MW-02B | MW-11B |
| 8/2015 | 5.04 | No measurable | Not yet installed |
| 11/2015 | 5.08 | No measurable | Not yet installed |
| 2/2016 | 4.83 | No measurable | Not yet installed |
| 6/2016 | 4.08 | No measurable | Not yet installed |
| 3/27/2018 | 5.83 (3.5 feet remained after sampling for hazardous waste characteristics) | 0.17 | Not yet installed |
| 5/16/2018 | 3.00 (after removal, 0.17 foot remained) | 0.17 | Not yet installed |
| 7/11/2018 | 0.58 | 0.17 (after removal, none remained) | Not yet installed |
| 4/3/2019 | 0.58 (after removal, no DNAPL remained) | Base of measuring stick | Not measured |
| 4/4/2019 | 0.042 | 0.042 | 1.25 |
| 4/5/2019 | 0.063 | 0.042 | 1.25 |
| 4/6/2019 | 0.083 | 0.042 | 1.25 |
| 4/7/2019 | 0.083 | 0.042 | 1.25 |
| 4/8/2019 | 0.083 | 0.042 | 1.25 (after removal, no DNAPL remained) |
| 5/15/2019 | 0.042 | 0.042 | 0.042 |
| 8/27/2019 | Base of measuring stick | 0.0 | Base of measuring stick |
| 10/2/2019 | Base of measuring stick | 0.0 | Base of measuring stick |
| 5/21/2020 | 0.16 streaks | 0.0 | Base of measuring stick |
| 9/21/2020 | Base of measuring stick | 0.0 | Base of measuring stick |

**TABLE 27**
**EAST MUNICIPAL WELL INFORMATION**

| Well ID | Year Drilled | Well Depth (ft) | Length Open to Rock (ft) (from video) | Reported Pump Capacities (gpm) |
|---|---|---|---|---|
| M-1 | 1929 | 115 | 55 | 900-930 |
| M-3 | 1928 | 93 | 21 | 500-520 |
| M-4 | 1947 | 100 | 38 | 670-750 |
| M-5 | 1955 | 117 | 72 | 1000-1220 |

**APPENDIX F**

**ARARs**

| Federal Action-Specific ARARs | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Filter by Statute** | **Authority** | **Citation** | **OU 1** | **Requirement** | **Status** | **Synopsis of Requirement** | **Action to be Taken to Attain Requirement** |
| CAA | Clean Air Act (CAA)<br><br>42 USC §7401 et seq. | 40 CFR Part 50 - National Primary and Secondary Ambient Air Quality Standards (NAAQS) | Alt 3 - Thermally Enhanced Soil Vapor Extraction<br>Alt 4 - In-Situ Thermal Treatment | National Primary and Secondary Ambient Air Quality Standards (NAAQS) | Applicable | National Primary Ambient Air Quality Standards in 40 CFR Part 50 define levels of air quality which "are necessary, with an adequate margin of safety, to protect the public health".<br><br>National Secondary Ambient Air Quality Standards define levels of air quality "necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant". | All alternatives would comply with the ambient air quality standards by treatment and monitoring. |
| CAA | Clean Air Act (CAA)<br><br>42 USC §7401 et seq. | 40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants (NESHAP) | Alt 3 - Thermally Enhanced Soil Vapor Extraction<br>Alt 4 - In-Situ Thermal Treatment | National Emission Standards for Hazardous Air Pollutants (NESHAP) - Action-specific standards | Applicable | 40 CFR Part 61 sets NESHAP for the following substances, designated as hazardous air pollutants: asbestos, benzene, beryllium, coke oven emissions, inorganic arsenic, mercury, radionuclides and vinyl chloride.<br><br>NESHAP also sets standards for "other substances...that included consideration of the serious health effects, including cancer, from ambient air exposure to the substance". These "other substances" are as follows: acrylonitrile, 1,3-butadiene, cadmium, carbon tetrachloride, chlorinated benzenes, chlorofluorocarbon—113, chloroform, chloroprene, chromium, copper, epichlorohydrin, ethylene dichloride, ethylene oxide, hexachlorocyclopentadiene, manganese, methyl chloroform, methylene chloride, nickel, perchloroethylene, phenol, polycyclic organic matter, toluene, trichloroethylene, vinylidene chloride zinc and zinc oxide. | All alternatives would comply with the NESHAP requirements by providing treatment and monitoring of any emmissions associated with the remedial actions. |
| CAA | Clean Air Act (CAA)<br><br>42 USC §7401 et seq. | 40 CFR Part 63 - National Emission Standards for Hazardous Air Pollutants for Source Categories | Alt 3 - Thermally Enhanced Soil Vapor Extraction<br>Alt 4 - In-Situ Thermal Treatment | National Emission Standards for Hazardous Air Pollutants for Source Categories - Action-specific standards | Relevant and Appropriate | 40 CFR Part 63 sets NESHAP for "specific categories of stationary sources that emit (or have the potential to emit) one or more hazardous air pollutants listed in this part..." and applies to "all hazardous waste combustors: hazardous waste incinerators, hazardous waste cement kilns, hazardous waste lightweight aggregate kilns, hazardous waste solid fuel boilers, hazardous waste liquid fuel boilers, and hazardous waste hydrochloric acid production furnaces.<br><br>The standards in 40 CFR Part 63 are independent of the standards in 40 CFR Part 61. | All alternatives would comply with the NESHAP requirements by providing treatment and monitoring of any emmissions associated with the remedial actions. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| RCRA | Resource Conservation and Recovery Act (RCRA)<br><br>42 USC §6901 et seq. | 40 CFR Parts 239-258 - Solid Waste:<br>40 CFR Part 257 - Criteria for classification of solid waste disposal facilities and practices | Alt 2 - Soil Excavation and In-Situ Chemical Oxidation | Criteria for solid waste - Contaminant-specific standards | Applicable | Criteria for classification of solid waste disposal facilities and practices in 40 CFR Part 257 define different types of facilities regulated under RCRA. | The excavation and disposal remedial action will comply with these requirements by classifying solid waste and disposal at an approved facility. |
| RCRA | Resource Conservation and Recovery Act (RCRA)<br><br>42 USC §6901 et seq. | 40 CFR Parts 260-282 - Hazardous Waste:<br>40 CFR Part 261 - Indentification and listing of hazardous waste | Alt 2 - Soil Excavation and In-Situ Chemical Oxidation | Standards for indentifying hazardous waste - Contaminant-specific standards | Applicable | 40 CFR Part 261 defines the term "hazardous waste" and identifies those hazardous waste subject to regulations under parts 262-265, 268, and parts 270, 271 and 124, which are subject to the notification requirements of section 3010 of RCRA. | The excavation and disposal remedial action will comply with these requirements by identifying hazardous waste during excavation activities. |
| RCRA | Resource Conservation and Recovery Act (RCRA)<br><br>42 USC §6901 et seq. | 40 CFR Parts 260-282 - Hazardous Waste:<br>40 CFR Part 262 - Standards applicable to generators of hazardous waste | Alt 2 - Soil Excavation and In-Situ Chemical Oxidation | Regulations for generators of hazardous waste - Action-specific regulations | Applicable | 40 CFR Part 262 establishes "standards for generators of hazardous waste as defined by 40 CFR 260.10". | The excavation and disposal remedial action will comply with these requirements by identifying hazardous waste during excavation activities. |
| RCRA | Resource Conservation and Recovery Act (RCRA)<br><br>42 USC §6901 et seq. | 40 CFR Parts 260-282 - Hazardous Waste:<br>40 CFR Part 263 - Standards applicable to transporters of hazardous waste | Alt 2 - Soil Excavation and In-Situ Chemical Oxidation | Regulations for transporters of hazardous waste - Action-specific regulations | Applicable | 40 CFR Part 263 establishes "standards which apply to persons transporting hazardous waste within the United States if the transportation requires a manifest under 40 CFR part 262". | The excavation and disposal remedial action will comply with these requirements by identifying hazardous waste during excavation and transportation activities. |

**State Action-Specific ARARs**

| Filter by Statute | Authority | Citation | OU 1 | Requirement | Status | Synopsis of Requirement | Action to be Taken to Attain Requirement |
|---|---|---|---|---|---|---|---|
| NAC | Nebraska Administrative Code Title 122 - Rules and Regulations for Underground Injection and Mineral Production Wells | NAC Title 122, Chapter 6 Sections 003 and 005 - Authorization of Class V Injection Wells | Alt 2 - Soil Excavation and In-Situ Checmical Oxidation<br>Alt 3 - Thermally Enhanced Soil Vapor Extraction<br>Atl 4 - In-Situ Thermal Treatment | A Class V well shall not endanger the health and safety of persons or cause pollution of the environment. A Class V well authorization shall not exceed 10 years. | Applicable | Rules and regulations for underground injection and Class V injection wells. | These requirements are potentially applicable to the in-situ thermal treatment and ISCO injections. Authorization from NDEE would be obtained to construct the Class V UIC injection wells. |
| NAC | Nebraska Administrative Code Title 122 - Rules and Regulations for Underground Injection and Mineral Production Wells | NAC Title 122, Chapter 10 Sections 006 and 007 - Class V Injection Well Authorization Application; Information Requirements | Alt 2 - Soil Excavation and In-Situ Checmical Oxidation<br>Alt 3 - Thermally Enhanced Soil Vapor Extraction<br>Atl 4 - In-Situ Thermal Treatment | The UIC program makes a determination based on a groundwater review if the type of fluid to be injected is permissible or if additional steps need to be taken. | Relevant and Appropriate | Any person who proposes or operates a Class V underground injection well, which meets the requirements in Chapter 6 of this Title, shall submit an application to the Director. For new injection wells, the application shall be filed at least 180 days before the construction is planned to begin, including plans for testing, drilling and construction. | The UIC program uses this information to make a determination on if the type of substrate is acceptable for injection or if any additional requirements are needed before an injection well is constructed or operated. No form needs to be filled out and EPA would not need to wait for approval or any other type of feedback before proceeding with injections after the information is sent to the UIC program. |

| State Action-Specific ARARs | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Filter by Statute** | **Authority** | **Citation** | **OU 1** | **Requirement** | **Status** | **Synopsis of Requirement** | **Action to be Taken to Attain Requirement** |
| NAC | Nebraska Administrative Code Title 122 - Rules and Regulations for Underground Injection and Mineral Production Wells | NAC Title 122, Chapter 17 Sections 005.01 and 005.04 - Construction Requirements; Class I, III and V Injection Wells and Mineral Production Wells | Alt 2 - Soil Excavation and In-Situ Checmical Oxidation<br>Alt 3 - Thermally Enhanced Soil Vapor Extraction<br>Atl 4 - In-Situ Thermal Treatment | Requirements for Class V wells including minimum set back distances, construction requirements and injection requirements. | Applicable | Rules and regulations for underground injection and construction of Class V injection wells. | These requirements are potentially applicable to the in-situ thermal treatment and ISCO injections. Authorization from NDEE would be obtained to construct the Class V UIC injection wells. |
| NAC | Nebraska Administrative Code Title 122 - Rules and Regulations for Underground Injection and Mineral Production Wells | NAC Title 122, Chapter 19 Section 002.03 - Operating Requirements; Class V Injection Wells and Mineral Production Wells | Alt 2 - Soil Excavation and In-Situ Checmical Oxidation<br>Alt 3 - Thermally Enhanced Soil Vapor Extraction<br>Atl 4 - In-Situ Thermal Treatment | Operating requirements for Class V injection wells. | Applicable | Rules and regulations for underground injection operation of Class V injection wells. | These requirements are potentially applicable to the in-situ thermal treatment and ISCO injections. Authorization from NDEE would be obtained to construct and operate the Class V UIC injection wells. |
| NAC | Nebraska Administrative Code. Title 128 - Nebraska Hazardous Waste Regulations | NAC Title 128, Chapter 3 Section 010 - Identification and Listing of Hazardous Waste | Alt 2 - Soil Excavation and In-Situ Chemical Oxidation | A solid waste exhibits the characteristic of toxicity if, by application of the toxicity characteristic leaching procedure, the extract from a represnetative sample of the waste contains a contaminant at a concentration equal to or greater than that specified for the contaminant. | Applicable | Criteria for identifying the characteristic of hazardous waste. Section 010 - Toxicity characteristic. | Waste will be characterized to determine if it is a hazardous waste. |
| NAC | Nebraska Administrative Code. Title 128 - Nebraska Hazardous Waste Regulations | NAC - Title 128 Chapter 4, Section 002 - Determination, Notification, Reporting and Recordkeeping | Alt 2 - Soil Excavation and In-Situ Chemical Oxidation | A person who generates a solid waste must determine if the waste is a hazardous waste. | Applicable | Establishes the determinations, notifications and reporting requirements for generators of hazardous waste. | Waste will be characterized to determine if it is a hazardous waste. |
| NAC | Nebraska Administrative Code. Title 128 - Nebraska Hazardous Waste Regulations | NAC Title 128, Chapter 8 Sections 006, 007 and 008, Chapter 9 Sections 001, 007, Chapter 10, Sections 001, 003, 004 - Special Requirements for Hazardous Waste Generated by Conditionally Exempt Small Quantity Generators | Alt 2 - Soil Excavation and In-Situ Chemical Oxidation | Requirements for generators for packaging, labeling and marking containers of hazardous waste, for accumulating hazardous waste on site without having a permit, and for containers of hazardous waste including:<br>- Maintained in good condition<br>- Closed during storage except to add or remove waste<br>- Inspected weekly for leaks or deterioration<br>- Closed by removing all waste and residue | Applicable | Chapter 8 includes special requirements for hazardous waste generated by conditionally exempt small quantity generators. Chapter 9 includes requirements for small quantity generators of hazardous waste. Chapter 10 includes requirements for large quantity generators of hazardous waste. | Alternative 2 would generate waste, including waste from dewatering the excavation, for off-site disposal. The dewatering waste would be containerized and characterized when it is generated to determine if it meets the definition of RCRA characteristic waste. Waste soil generated needs to either be containerized, or have an Area of Contamination (AOC) requested if soil is temporarily stockpiled, prior to TCLP testing to determine the appropriate disposal method. |

| State Action-Specific ARARs | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Filter by Statute** | **Authority** | **Citation** | **OU 1** | **Requirement** | **Status** | **Synopsis of Requirement** | **Action to be Taken to Attain Requirement** |
| NAC | Nebraska Administrative Code. Title 128 - Nebraska Hazardous Waste Regulations | NAC Title 128, Chapter 20 Section 005.01A - Land Disposal Restrictions | Alt 2 - Soil Excavation and In-Situ Chemical Oxidation | Requirements for generators of hazardous waste. | Applicable | A generator of hazardous waste must determine if the waste has to be treated before it can be land disposed. | The waste would be characterized at the point of generation to determine if the waste must be treated prior to land disposal. If necessary, treatment to comply with land disposal restrictions would occur off site, and so are independently applicable requirements. |
| NAC | Nebraska Administrative Code. Title 128 - Nebraska Hazardous Waste Regulations | NAC Title 128, Chapter 21 Section 016 - Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities | Alt 2 - Soil Excavation and In-Situ Chemical Oxidation | An owner or operator may store non-flowing remediation waste in a staging pile that is used during remedial operations at a facility. The staging pile must facilitate a reliable, effective, and protective remedy; be designed to prevent or minimize releases of hazardous waste into the environment and minimize or adequately control cross-media transfer; and must not operate for more than 2 years, unless an extension is granted. | Relevant and Appropriate | Standards in Chapter 21 apply to owners and operators of all facilities which treat, store or dispose of hazardous wastes. | Excavated contaiminated soil will be temporarily stockpiled prior to characterization and off-site disposal. |
| NAC | Nebraska Administraive Code. Title 128 - Nebraska Hazardous Waste Regulations | NAC Title 128, Chapter 21 Sections 007 and 012 | Alt 2 - Soil Excavation and In-Situ Chemical Oxidation | The owner or operator must close the facility in a manner that minimizes the need for further maintenance; and controls, minimizes, or eliminates post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products. At closure, the owner or operator must remove or decontaminate all waste residues, contaminated containment system components, contaminated subsoil, structures and equipment contaminated with waste and leachate, and manage them as hazardous waste. | Relevant and Appropriate | NAC, Title 128, Chapter 21, § 007 adopts 40 CFR § 264.111 identified as a potential federal action-specific ARAR by reference. NAC Title 128, Chapter 21, § 012 adopts 40 CFR § 264.258(a) identified as a potential action-specific ARAR by reference.The location of the stockpile would be determined in the remedial design. If the stockpile is located in an uncontaminated area, closure will also comply with 40 CFR §§264.258(a) and 264.111. | If excavated soil is stockpiled in an uncontaminated area, the area will be properly maintained and closed following completion of the remedial action. |

| State Action-Specific ARARs | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Filter by Statute** | **Authority** | **Citation** | **OU 1** | **Requirement** | **Status** | **Synopsis of Requirement** | **Action to be Taken to Attain Requirement** |
| NAC | Nebraska Administrative Code. Title 128 - Nebraska Hazardous Watse Regulations | NAC Title 128, Chapter 21 Section 009 | Alt 2 - Soil Excavation and In-Situ Chemical Oxidation | Containers that store hazardous waste must be: Maintained in good condition, Compatible with the waste stored, Closed during storage except to add or remove waste, Inspected weekly for deterioration, Placed on a sloped, crack-free base, and protected from contact with accumulated liquid, Kept at least 50 feet from the facility if the waste is ignitable or reactive, Separated with use of dikes if the waste is ignitable or reactive, Closed by removing all hazardous waste and residues. | Applicable | NAC, Title 128, Chapter 21, § 009 adopts 40 CFR §§ 264.170- 264.178 identified as potential federal action-specific ARARs by reference. Waste from construction and operation of the treatment systems would be stored in containers before off-site disposal. | Waste from construction and operation of the treatment systems would be stored in containers before off-site disposal. |
| NAC | Nebraska Administrative Code. Title 128 - Nebraska Hazardous Waste Regulations | NAC Title 128, Chapter 21 Section 001.04 - Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities | Alt 2 - Soil Excavation and In-Situ Checmical Oxidation<br>Alt 3 - Thermally Enhanced Soil Vapor Extraction<br>Atl 4 - In-Situ Thermal Treatment | Owners and operators must comply with provisions identified in Section 001.04:<br>- Obtain a detailed chemical and physical analysis or a representative sample of the waste to be managed.<br>- Prevent people entering the active portion of the site.<br>- Inspect the site for malfunctions, deterioration, operator errors and discharges that may lead to the release of hazardous waste into the environment. | Relevant and Appropriate | Standards in Chapter 21 apply to owners and operators of all facilities which treat, store or dispose of hazardous wastes. | Construction and operation of the SVE and the in-situ thermal treatment systems will generate waste. The substantive provisions of this regulation are potentially relevant and appropriate to cleanup activities at OU 3. |
| NAC | Nebraska Administrative Code. Title 129 - Air Quality Regulations | NAC Title 129, Chapter 5 Sections 001.01 and 001.02 - Operating Permits - When Required | Alt 3 - Thermally Enhanced Soil Vapor Extraction<br>Alt 4 - In-Situ Thermal Treatment | Class I (major source) operating permits are required for a major source of emissions of hazardous air pollutants (a unit that emits or has potential to emit 10 tons per year or more of any hazardous air pollutant).<br><br>Class II (minor source) operating permits are required for a source of emissions of hazardous air pollutants (a unit that emits or has potential to emit 5 tons per year or more of any hazardous air pollutant). | Applicable | Standards in Chapter 5 apply to operating permit requirements related to emissions of hazardous waste. | Pursuant to CERCLA § 121(e), permits are not required for the portions of the remedial action that occur entirely on site. The air emissions would occur entirely on site; therefore, a Class I or Class II permit is not required. However, the substantive provisions (the regulated quantity of emissions of hazardous air pollutants) are necessary to determine if air pollution control equipment is necessary and, if so, what air pollution control equipment is required. |

| State Action-Specific ARARs | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Filter by Statute** | **Authority** | **Citation** | **OU 1** | **Requirement** | **Status** | **Synopsis of Requirement** | **Action to be Taken to Attain Requirement** |
| NAC | Nebraska Administrative Code. Title 129 - Air Quality Regulations | NAC Title 129, Chapter 8 Sections 002 and 015.01 - Operating Permit Content | Alt 3 - Thermally Enhanced Soil Vapor Extraction<br>Alt 4 - In-Situ Thermal Treatment | Each Class I and Class II operating permit shall specify emissions limitations and standards. | Applicable | Standards in Capter 8 apply to emissions limitations and standards. | Pursuant to CERCLA § 121(e), permits are not required for the portions of the remedial action that occur entirely on site. The air emissions would occur entirely on site; therefore, a permit to is not required. However, the substantive provisions (emissions limitations and standards) are necessary to determine if air pollution control equipment is necessary and, if so, what air pollution control equipment is required. |
| NAC | Nebraska Administrative Code. Title 129 - Air Quality Regulations | NAC Title 129, Chapter 17 Section 001.01 - Construction Permits - When Required | Alt 3 - Thermally Enhanced Soil Vapor Extraction<br>Alt 4 - In-Situ Thermal Treatment | Without a permit to construct, no person shall cause construction of a stationary source of emissions that has potential to emit 2.5 tons per year of any hazardous air pollutant or an aggregate of 10 tons per year of any hazardous air pollutants, including fugitive dusts. | Applicable | Standards in Chapter 17 apply to construction permit requirements related to emissions of hazardous waste. | Permits are not required if remedial action is conducted on-site. However, substantive provisions are necessary to determine if air pollution control equipment is necessary and, if so, what air pollution control equipment is required. |
| NAC | Nebraska Administrative Code. Title 129 - Air Quality Regulations | NAC Title 129, Chapter 27 Sections 002 and 003 - Hazardous Air Pollutants; Maximum Achievable Control Technology (MACT) | Alt 3 - Thermally Enhanced Soil Vapor Extraction<br>Alt 4 - In-Situ Thermal Treatment | A permit to construct will be issued to sources with potential to emit 10 tons per year of any hazardous air pollutant or 2.5 tons per year or more of any combination of hazardous air pollutants only if the maximum achievable control technology is to be applied. | Applicable | Standards in Chaoter 27 apply to requirements for new, modified or reconstructed sources of hazardous air pollutants. | Permits are not required if remedial action is conducted on-site. However, substantive provisions are necessary to determine if air pollution control equipment is necessary and, if so, what air pollution control equipment is required. |
| NAC | Nebraska Administrative Code. Title 129 - Air Quality Regulations | NAC Title 129, Chapter 32, Section 001, Handling of particulate matter | Alt 2 - Soil Excavation and In-Situ Chemical Oxidation | No person may cause or permit handling, transporting, or storage of any material in a manner that may allow particulate matter to become airborne in such quantities and concentrations that it remains visible in the ambient air beyond the premises where it originates. | Applicable | The excavation and soil storage will occur in a commercial part of the city where dust and particulates could extend beyond the premises where the excavation and soil handling will occur. | Dust suppression will be used to control emissions. |
| NAC | Nebraska Administrative Code. Title 129 - Air Quality Regulations | NAC Title 129, Chapter 32, Section 002, Construction, use, or demolition | Alt 2 - Soil Excavation and In-Situ Chemical Oxidation | No person may cause or permit an open area to be constructed or used without applying all such reasonable measures to prevent particulate matter from becoming airborne so that it remains visible beyond the premises where it originates. | Applicable | The excavation and soil storage will occur in a commercial part of the city where dust and particulates could extend beyond the premises where the excavation and soil handling will occur. | Dust suppression will be used to control emissions. |

| State Action-Specific ARARs | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Filter by Statute** | **Authority** | **Citation** | **OU 1** | **Requirement** | **Status** | **Synopsis of Requirement** | **Action to be Taken to Attain Requirement** |
| NAC | Nebraska Administrative Code Title 132 - Integrated Soild Waste Management Regulations | NAC Title 132, Chapters 1 and 13 - Special Wastes | Alt 2 - Soil Excavation and In-Situ Chemical Oxidation | Wastes shall be classified as special wastes by the departmenmt on a case-by-case basis. The department shall make a determination based upon the characteristics and properties of soild waste. See Title 132 Chapter 13 Section 002 for the details on classifying special waste. | Applicable | Standards in Chapter 13 include the classification of special waste. | Classification of special wastes will be done in accordance with Title 132, Chapter 13. |
| NAC | Nebraska Administrative Code. Title 171 - Rules and Regulations - State of Nebraska Board of Geologists | NAC Title 171, Chapter 3 - Licensure of Professional Geologists from other Jurisdictions | Alt 2 - Soil Excavation and In-Situ Chemical Oxidation<br>Alt 3 - Thermally Enhanced Soil Vapor Extraction<br>Atl 4 - In-Situ Thermal Treatment | Anyone practicing geology in the State must be a Professional Geologist (PG), or under the direction of a PG. | Relevant and Appropriate | Rules and Regulations for State of Nebraska Board of Geologists. | If an in-state contractor is utilized on the site, a licensed geologist would be required. If out of state contractors are utilized, the geologist would not need to be licensed but it would need to be determined that the contractor possesses an appropriate amount of knowledge, education and experience. |
| NAC | Nebraska Administrative Code. Title 178 - Nebraska Department of Health | NAC Title 178, Chapter 10, Section 10-003.01 | Alt 2 - Soil Excavation and In-Situ Chemical Oxidation<br>Alt 3 - Thermally Enhanced Soil Vapor Extraction<br>Atl 4 - In-Situ Thermal Treatment | Anyone drilling wells in the State of Nebraska must be a licensed well driller or contractor. | Relevant and Appropriate | Rules and Regulations for Well Drillers | If an in-state contractor is utilized on the site, a licensed well driller would be required. If out of state contractors are utilized, the geologist would not need to be licensed but it would need to be determined that the contractor possesses an appropriate amount of knowledge, education and experience. |
| NAC | Nebraska Administrative Code. Title 178 - Nebraska Department of Health | NAC Title 178, Chapter 12 - Water well constructions, pump installation and water | Alt 2 - Soil Excavation and In-Situ Chemical Oxidation<br>Alt 3 - Thermally Enhanced Soil Vapor Extraction<br>Atl 4 - In-Situ Thermal Treatment | General requirements for location and construction of groundwater wells, requirements for the construction of groundwater monitoring wells, and requirements for decommissioning wells. | Applicable | These regulations apply to the construction, location, and decommissioning of water wells, the installation of pumps and pumping equipment, the collection of water samples from water wells, and the inspection of installed water well equipment and chemigation regulation devices. | Groundwater monitoring wells will be constructed and decommissioned in accordance with requirements in Chapter 12. All wells will be registered with the Department of Natural Resources and notify the department when wells are abanodoned. |

| Federal Location-Specific ARARs | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Filter by Statute** | **Authority** | **Citation** | **Location (Site Feature or Characteristic)** | **Requirement** | **Status** | **Synopsis of Requirement** | **Action to be Taken to Attain Requirement** |
| ESA | Endangered Species Act (ESA)<br><br>List of Endangered Species | 50 CFR Part 17 - Endangered and threatened wildlife and plants | Norfolk, Nebraska | The ESA provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The lead federal agencies for implementing ESA are the U.S. Fish and Wildlife Service (FWS) and the U.S. National Oceanic and Atmospheric Administration (NOAA) Fisheries Service. The FWS maintains a worldwide list of endangered species. Species include birds, insects, fish, reptiles, mammals, crustaceans, flowers, grasses, and trees.<br><br>Predecessors or also known as: Endangered Species Conservation Act | Applicable | The law requires federal agencies, in consultation with the U.S. Fish and Wildlife Service and/or the NOAA Fisheries Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The law also prohibits any action that causes a "taking" of any listed species of endangered fish or wildlife. | As part of the original risk assessment completed for the site during the EE/CA, the potential for ecological impacts was assessed and it was determined, because the site is located near the middle of downtown Norfolk, it is not expected that MGP-related contamination will impact any of these species. |
| **State Location-Specific ARARs** | | | | | | | |
| NAC | Nebraska Administrative Code (NAC) Title 163 - Nebraska Nongame and Endangered Species Act | NAC Title 163, Chapter 4, Section 004 - Threatened and Endangered Species | Norfolk, Nebraska | Taking of massasauga or timber rattlesnake will not be considered unlawful it if is done for the immediate protection of the health of humans, livestock or pets. | Applicable | Requires consultation with the Nebraska Game and Parks Commission regarding actions which may affect threatened or endangered species and their critical habitat. | As part of the original risk assessment completed for the site during the EE/CA, the potential for ecological impacts was assessed and it was determined, because the site is located near the middle of downtown Norfolk, it is not expected that MGP-related contamination will impact any of these species. |

| To-Be-Considered Materials | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Filter** | **Authority** | **Reference Document** | **Medium 1** | **Requirement** | **Status2** | **Synopsis of Requirement 3** | **Action to be Taken to Attain Requirement 4** |
| No TBCs identified. | | | | | | | |

| Federal Chemical-Specific ARARs | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Filter by Statute** | **Authority** | **Citation** | **Medium** | **Requirement** | **Status** | **Synopsis of Requirement** | **Action to be Taken to Attain Requirement** |
| RCRA | Resource Conservation and Recovery Act (RCRA)<br><br>42 USC §6901 et seq. | 40 CFR Parts 239-258 - Solid Waste:<br>40 CFR Part 257 - Criteria for classification of solid waste disposal facilities and practices | Soil | Criteria for solid waste - Chemical-specific and Action-specific standards | Applicable | Criteria for classification of solid waste disposal facilities and practices in 40 CFR Part 257 define different types of facilities regulated under RCRA. | Contaminated soil will be evaluated against RCRA criteria for solid waste. The selected remedy will dispose of the solid waste in compliance with RCRA standards. |
| RCRA | Resource Conservation and Recovery Act (RCRA)<br><br>42 USC §6901 et seq. | 40 CFR Parts 260-282 - Hazardous Waste:<br>40 CFR Part 261 - Indentification and listing of hazardous waste | Soil | Standards for indentifying hazardous wasted - Chemical-specific and Action-specific standards | Applicable | 40 CFR Part 261 defines the term "hazardous waste" and identifies those hazardous waste subject to regulations under parts 262-265, 268, and parts 270, 271 and 124, which are subject to the notification requirements of section 3010 of RCRA. | Contaminated soil will be evaluated against RCRA criteria for hazardous waste. The selected remedy will treat and dispose of the hazradous waste in compliance with RCRA standards. |

| State Chemical-Specific ARARs |
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| No State Chemical-Specific ARARs were identified. |

**APPENDIX G**

**NEBRASKA DEPARTMENT OF ENVIRONMENT AND ENERGY CONCURRENCE LETTER**

NEBRASKA

Good Life. Great Resources.

DEPT. OF ENVIRONMENT AND ENERGY

MAY 3 – 2022

Pete Ricketts, Governor

Scott Hayes, Acting Director
Superfund and Emergency Management Division
U.S. Environmental Protection Agency, Region 7
11201 Renner Boulevard
Lenexa, KS 66219

RE: Iowa-Nebraska Light & Power Co., Operable Unit 1
Facility ID: 77312
Program ID: SF NED986373678
Subject: Concurrence Determination for Proposed Plan for Remedial Action

Dear Mr. Hayes:

The Nebraska Department of Environment and Energy (NDEE) has reviewed the Proposed Plan, dated April 18, 2022, for Remedial Action at Operable Units (OU) 1, designated as source materials, at the Iowa-Nebraska Light & Power Company site in Norfolk, Nebraska. Former manufactured gas plant (FMGP) operations resulted in wastes, including coal tar, being released into the environment and impacting soil, soil gas, and groundwater that has the potential to impact municipal wells. Approximately 10,495 tons of contaminated soil have been excavated and disposed of from the site. However, highly concentrated residuals in the form of dense non-aqueous phase liquid (DNAPL) remains in groundwater at and immediately downgradient of the FMGP. In addition, polycyclic aromatic hydrocarbons (PAHs) and benzene, toluene, ethylbenzene, and xylenes (BTEXs) in soil have the potential to continue to leach from soil and migrate to groundwater, and PAHs and BTEXs in soil gas have the potential to migrate into buildings posing an inhalation exposure risk to building occupants.

The Preferred Alternative in the Proposed Plan is in-situ thermal treatment (ISTT). ISTT is expected to reduce soil contamination by using heat to volatilize, collect, and remove contaminants from soils in OU 1. This will prevent the migration and leaching potential of PAHs and BTEXs in soil and DNAPL that would result in groundwater contamination above levels that are protective of drinking water use. ISTT will reduce the migration of contaminant vapor from soil gas, preventing exposure via inhalation through vapor intrusion. ISTT will also prevent incidental ingestion, dermal contact, and inhalation of airborne particulates from source materials. The estimated time to attain the Remedial Action Objectives at OU 1 is four years, at an estimated present-worth cost of $7,900,000. Following completion of the OU 1 remedial action, remedial alternatives to address OU 2 (sitewide groundwater) will be evaluated and selected in an additional Record of Decision.


Department of Environment and Energy
P.O. Box 98922
Lincoln, Nebraska 68509-8922

Jim Macy, Director
OFFICE 402-471-2186 FAX 402-471-2909
ndee.moreinfo@nebraska.gov

NDEE supports the remedial action described in the Proposed Plan dated April 18, 2022. Please contact Sarah Klescewski or Erik Jacobson at (402) 471-2186 if you have any comments or concerns.

Sincerely,

Jim Macy
Director

CC: Owens Hull, EPA Region 7 Remedial Project Manager
Pamela Houston, EPA Region 7 Community Involvement Coordinator

**APPENDIX H**

**PUBLIC NOTICE DISPLAY AD**

EPA

# PUBLIC NOTICE

**Public Comment Period for Proposed Plan and Public Meeting**

Iowa-Nebraska Light & Power Co. Superfund Site
Norfolk, Madison County, Nebraska
April 2022

**Region 7**
Iowa, Kansas,
Missouri, Nebraska
and Nine Tribal Nations

The U.S. Environmental Protection Agency (EPA) Region 7 invites the public to comment on the Proposed Plan for the Iowa-Nebraska Light & Power Co. Superfund Site in Norfolk, Nebraska. **Oral and written comments will be accepted during the 30-day public comment period, which will begin April 25, 2022, and end May 25, 2022.** The public may submit their comments to EPA prior to the close of the comment period by sending them to: Pamela Houston, EPA Region 7 (ORA/OPA), 11201 Renner Boulevard, Lenexa, KS 66219; houston.pamela@epa.gov; 1-800-223-0425.

EPA will hold a Virtual Public Meeting to provide information and answer questions on the Proposed Plan. The meeting will be held:

**Tuesday, May 3, 2022, 6 to 8 p.m.**
Go to this weblink to join at the time of the event:
www.epa.gov/superfund/IowaNebraskaLightandPowerCo
If you prefer to join by phone: 1-669-254-5252 (conference ID: 1619332722)

Site project information is available to the public at web repositories, including the Proposed Plan (in the Administrative Record). To view cleanup documents, please visit EPA's Site Profile Page at the weblink above. If you don't have internet access, you can view these documents online at this location: **Norfolk Public Library**, 308 Prospect Avenue, Norfolk, NE 68701; 402-844-2100.

EPA is committed to providing reasonable accommodations to individuals with disabilities. For reasonable accommodations at the Virtual Public Meeting, please contact Troi Augustine at 1-800-223-0425 or augustine.troi@epa.gov.

If you have questions about the site, please contact **Pamela Houston**, EPA Community Involvement Coordinator, at houston.pamela@epa.gov or 913-551-7699.

(April 22, 29, 2022)

U.S. Environmental Protection Agency, Region 7
11201 Renner Boulevard, Lenexa, KS 66219
Toll-free: 1-800-223-0425

L23515
ZNEZ

**APPENDIX I**

**CITY ORDINANCE NO. 5725**

3/15/2021 all 3 readings

ORDINANCE NO. 5725

AN ORDINANCE OF THE CITY OF NORFOLK, NEBRASKA TO REPEAL SECTION 26-4 OF THE OFFICIAL CITY CODE RELATED TO WATER EMERGENCY RESTRICTIONS AND ENACT A NEW SECTION 26-4 IN ITS PLACE TO ADDRESS LAWN IRRIGATION; TO AMEND SECTION 26-5 OF THE CODE TO REMOVE THE REFERENCE TO SECTION 26-4 RELATED TO VIOLATIONS; TO ENACT SECTIONS 26-10 AND 26-10.1 OF THE CODE UNDER CHAPTER 26, ARTICLE II, DIVISION I TO REQUIRE PREMISES LOCATED WITHIN 300 FEET OF A PUBLIC WATER DISTRIBUTION MAIN TO BE CONNECTED TO PUBLIC WATER; TO PROVIDE WHEN THIS ORDINANCE SHALL BE IN FULL FORCE AND EFFECT; AND TO PROVIDE FOR THE PUBLICATION OF THIS ORDINANCE IN PAMPHLET FORM.

BE IT ORDAINED BY THE MAYOR AND CITY COUNCIL OF THE CITY OF NORFOLK, NEBRASKA:

Section 1. That Section 26-4 of the Official City Code be repealed and a new Section 26-4 be enacted to read as follows:

~~**Sec. 26-4. Water emergency restriction; alternate days.**~~

~~When directed by the city administrator or his or her authorized representative, except as provided by section 26-3 above, water restrictions shall be as follows: All city water customers whose street address ends in an even number shall use city water upon their premises for the purpose of watering lawns, gardens, trees or shrubs on even numbered days of the week only; and all city water customers whose street address ends in an odd number shall use city water upon their premises for the purpose of watering lawns, gardens, trees or shrubs on odd numbered days of the week only.~~

**Sec. 26-4. Lawn irrigation.**

Lawn irrigation should be limited as follows:

(a) Properties with street addresses ending in even numbers (0, 2, 4, 6 and 8) should limit outdoor water use to Wednesdays, Fridays and Sundays.

(b) Properties with street addresses ending in odd numbers (1, 3, 5, 7 and 9) should limit outdoor water use to Tuesdays, Thursdays and Saturdays.

Section 2. That Section 26-5 of the Official City Code be and the same is hereby amended to read as follows:

**Sec. 26-5. Water emergency; violation, penalty.**

Notwithstanding the provisions of sSection 26-17 of the Official City Code, violations of ~~sections~~ Section 26-3 ~~and 26-4~~ shall constitute an offense, and upon conviction thereof shall be punishable by the general penalty provision found at sSection 1-16 of the Official City Code.

Section 3. That Sections 26-10 and 26-10.1 of the Official City Code be and the same are hereby enacted under Chapter 26, Article II, Division I to read as follows:

**Sec. 26-10. Connection to water systems.**

(a) All premises, residential, commercial or industrial businesses within the city limits and the city's two mile extraterritorial zoning jurisdiction shall be directly connected to a public water distribution main if the property is located within three hundred (300) feet of a public water distribution main. Connection to a public water distribution main will be required upon failure of an existing domestic well or at the time of new construction. Well failure is defined as the point at which the well is no longer functional and the drilling of a new well is needed.

(b) All new private water wells for premises located within three hundred (300) feet of a public water distribution main will be prohibited after *(insert date Ordinance approved)* unless approved by the public works director.

**Sec. 26-10.1 Connection to water systems, waiver.**

(a) The owner of a property may request a waiver of the required water connection from the city council, after review and approval by the public works director, if the distance from any portion of the habitable building or structure to the public water distribution main system exceeds four hundred fifty (450) feet measured along the most direct route available by street, alley or easement to the public water distribution main.

(b) The owner of property for which a waiver is being sought shall file an application with the city clerk. The city clerk shall place the request on the next regular city council meeting agenda. Said waiver shall only be granted after a hearing and an affirmative vote of three-fourths (3/4) of all members of the city council. The city council in granting such a waiver shall

have the power to place any reasonable restrictions or conditions on said waiver that the city council deems necessary to give effect to the intent of this section.

(c) If a domestic well is allowed and the well becomes impacted by groundwater that is classified or deemed to be contaminated, the property owner will be required to hookup to the public water distribution main if the distance from any portion of the habitable building or structure is located within four hundred fifty (450) feet measured along the most direct route available by street, alley or easement to the public water distribution water main.

Section 4. That the effective date of this Ordinance shall be from and after its passage, approval and publication in pamphlet form as required by law.

PASSED AND APPROVED this 15th day of March, 2021.

ATTEST:

Brianna Duerst, City Clerk

Josh Moenning, Mayor

Approved as to form: _____
Danielle Myers-Noelle, City Attorney

CITY OF NORFOLK SEAL INCORPORATED SEPT. 12, 1881 NEBRASKA

**APPENDIX J**

**ENVIRONMENTAL COVENANTS**

STINSON
LEONARD
STREET

Sarah Toevs Sullivan
816.691.2610 **DIRECT**
816.412.9328 **DIRECT FAX**
sarah.sullivan@stinsonleonard.com

January 5, 2015

**Federal Express**

Barbara Peterson
Senior Assistant Regional Counsel
U.S. EPA
11201 Renner Boulevard
Lenexa, KS 66219

Re: Iowa/Nebraska Light& Power Former MGP Site
Environmental Covenant

Dear Barbara:

Enclosed please find a certified copy of the environmental covenant recorded by Black Hills/Nebraska Gas Utility Company, LLC, with respect to BHE's property at 701 Norfolk Avenue, Norfolk, NE in accordance with the Administrative Settlement Agreement and Order on Consent dated August 22, 2013 relating to the above-referenced site.

Sincerely,

Stinson Leonard Street LLP

Sarah Toevs Sullivan

SS:SLS

Enclosure

cc: Mike Pogany (w/enc.)

2:10

05415

No 05415 ✓ #Pages 10
Doc Tax $
Fee $ PAM $ 7.00
Fees Pd $ 64.00 Con Fee $ 57.00
Ck# 0201
Refund Due

THE STATE OF NEBRASKA } ss.
MADISON COUNTY

This instrument filed for record
the 19 day of December 20 14
at 2:10 P.M. and recorded in
Book 2014 Page 05415
Nancy J. Gross
Register of Deeds

Black Hills Energy Po Box 1249 Norfolk NE 68702-1249

Space Above for Recorder's Use Only

After filing, return to: Mike Pogany, Black Hills/Nebraska Gas Utility Company, PO Box 1400, Rapid City, SD 57709-1400

# ENVIRONMENTAL COVENANT

This Environmental Covenant is entered into this 2nd day of December 2014, by and between Black Hills /Nebraska Gas Utility Company, LLC, a Delaware limited liability company, ("Grantor" and "Holder/Grantee"), and the United States Environmental Protection Agency (EPA) ("Agency") pursuant to the Nebraska Uniform Environmental Covenants Act, Neb. Rev. Stat. §§ 76-2601 to 76-2613.

## RECITALS:

A. Grantor is the owner of certain real property located at 701 Norfolk Avenue, Norfolk, Madison County, Nebraska, which is legally described as follows (the "Property"):

> Lots 1 and 2 of Chas. B. Durland's subdivision of Lots 1, 2, and 3 in Block 1 of Koenigstein's Third Addition to Norfolk, Madison County, Nebraska; and Lot 4, Block 1, Koenigstein's Third Addition to Norfolk, Madison County, Nebraska.

B. Holder/Grantee is Black Hills /Nebraska Gas Utility Company, LLC, a Delaware limited liability company, owner of the Property.

C. The Property was previously owned and operated by Centel Corporation, a Delaware corporation ("Centel") and its corporate predecessors used the Property for the production of manufactured gas from approximately 1902-1948.

D. The Property was identified as the site of potential releases of hazardous substances, pollutants and/or contaminants onto the ground and into the groundwater underlying the Property, and is referred to as the Iowa/Nebraska Light & Power Former Manufactured Gas Plant ("MGP") Superfund site, EPA ID No. NED986373678.

E. Pursuant to an August 22, 2013 Administrative Settlement Agreement and Order on Consent issued by the U.S. Environmental Protection Agency ("EPA") under Sections 104, 107 and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. §§ 9604, 9607 and 9622, as amended ("CERCLA"),

Centel and Nebraska Public Power District (NPPD) conducted an environmental response project at the Property and certain adjoining areas. This environmental response project involved the removal and off-site disposal of the most heavily contaminated soils at the Property, however, residual contamination remains at various depths in the saturated soils beneath the Property and in the groundwater underlying the Property and certain adjoining areas. These contaminants include polynuclear aromatic hydrocarbon ("PAH") constituents; benzene, toluene, ethylbenzene and total xylenes ("BTEX") compounds; and/or contaminants from MGP-related processes; hereinafter known collectively as "Site Contaminants."

F. Grantor and Centel have entered into that certain Memorandum of Easement Agreement dated as of March 11, 2011and recorded in the Office of the Register of Deeds of Madison County, Nebraska, on March 23, 2011, Book 2011-03, Page 1139-1143 Inc., wherein Grantor granted to Centel an easement for purposes of Centel completing the following: (a) carrying out investigation and remediation work, engineering controls or institutional controls on the Property in accordance with the Administrative Settlement Agreement and Order on Consent For Removal Action and any such administrative or judicial orders and agreements, including those arising from or as may be ordered by a local, state or federal government, regulatory agency or authority; or (b) carrying out the intention of the Allocation, Indemnification and Access Agreement dated as of March 11, 2011, by and between Grantor and Centel.

G. The Agency, as defined in Neb. Rev. Stat. § 76-2602, is the EPA.

H. The administrative record for the Iowa/Nebraska Light & Power FMGP Superfund Site is available to the public and is located at the Norfolk Public Library, 308 Prospect Avenue, Norfolk, Nebraska, 68701, and at EPA's offices located at 11201 Renner Boulevard, Lenexa, Kansas, 66219.

**NOW, THEREFORE,**

Grantor hereby declares that the Property will hereinafter be bound by, held, sold and conveyed subject to the terms, conditions, obligations, and restrictions set forth herein, which will run with the land, in perpetuity, unless amended or terminated pursuant to Paragraph 10 below.

1. Representations and Warranties. Grantor warrants to the other signatories to this Covenant that:

a. The Grantor is the sole fee title owner of the Property;
b. The Grantor holds sufficient fee title to the Property to grant the rights and interests described in this Environmental Covenant free of any conflicting legal and equitable claims; and
c. Except for the above-referenced Memorandum of Easement Agreement by and between Grantor and Centel, Grantor has identified no other persons holding legal or equitable interests, including but not limited to contract buyers, mortgage holders, other consensual lien holders, and lessees.

2. Purpose. The purpose of this Environmental Covenant is to ensure protection of human health and the environment by minimizing the potential for exposure to the contamination that remains on the Property and to ensure that the Property is not developed, used, maintained or operated in a manner which may result in unacceptable exposures to residual contamination.

3. Running with the Land. This Environmental Covenant is perpetual and conveys to the Holder/Grantee real property rights that run with the land, and gives to the Agency the right to enforce the activity and use limitations set forth in Paragraph 4 below. The terms, conditions, obligations, and limitations in this Environmental Covenant are binding on Grantor, its successors, assigns, and transferees, and all persons, corporations or other entities obtaining or succeeding to any right, title or interest in the Property. Acceptance of any conveyance, transfer, lease or sublease of the Property, or any part thereof, will bind each transferee, and it successors, transferees, heirs, and assigns to the terms, conditions, obligations, and limitations set forth herein during their respective period of ownership or occupancy, as applicable. Notice of any transfer of any interest in the Property must be promptly provided to EPA by the transferor. Grantor is bound by the terms, conditions, obligations and limitations in this Environmental Covenant only during its period of ownership or occupancy after the effective date. This Environmental Covenant in no way amends, modifies, limits, or releases Grantor, NPPD or Centel from their duties and obligations, if any, under the above-referenced Administrative Settlement Agreement and Order on Consent.

4. Activity and Use Limitations. The Property is subject to the following activity and use limitations:

   a. The Property shall not be used for residential, recreational child care or school use.
   b. Existing remedial systems to control and/or abate vapor intrusion of Site Contaminants into any existing enclosed buildings at the Property must be operated and maintained in accordance with standards for protectiveness of human health and the environment.
   c. Any new construction of enclosed buildings at the Property must prevent, or include remedial systems to control and/or abate, vapor intrusion of Site Contaminants into any such new construction at the Property, and must be operated and maintained in accordance with standards for protectiveness of human health and the environment.
   d. Extraction and use of the groundwater underlying the Property, except for investigation or remediation approved by EPA is prohibited.
   e. Except where excavation is necessary to prevent or address a previously unknown threat to human health or the environment, including without limitation a natural gas pipeline leak, any digging, drilling, excavating, constructing, earth moving or other land disturbing activities that extend below the depths of contaminated soil excavated during the environmental removal action conducted at the Property, as depicted on the Removal Action Site Map attached to this Environmental Covenant as Exhibit A, are prohibited without five days' prior written notice to EPA.

05415

5. Reserved Rights of Grantor. Grantor hereby reserves unto itself and its successors all rights and privileges in and to the use of the Property which are not incompatible with the activity and limitations set forth above.

6. Enforcement. The terms of this Environmental Covenant may be enforced in a civil action for injunctive or other equitable relief by Holder/Grantee and by the Agency in accordance with Neb. Rev. Stat. § 76-2611. Failure to exercise such rights of enforcement will in no event bar subsequent enforcement and shall not be deemed a waiver of any right to take action to enforce any non-compliance. Nothing in this Environmental Covenant shall limit the Agency from exercising any authority under applicable law. The prevailing party in any action to enforce this Environmental Covenant is entitled to recover all costs of such action, including reasonable attorney fees and damages pursuant to Neb. Rev. Stat § 76-2611(d).

7. Rights of Access. Grantor and any then-current owner hereby grants to the Agency, their agents, contractors, and employees, the right of access to the Property to monitor compliance with the terms, conditions, obligations, and limitations of this Environmental Covenant. Nothing in this Environmental Covenant shall limit or otherwise affect the Agency's right of entry and access or the Agency's authority to take response actions under applicable law.

8. Notice Upon Conveyance. Each instrument hereafter conveying any interest in the Property or any portion of the Property, including but not limited to, deeds, leases, and mortgages, shall contain a notice of the activity and use limitations set forth in this Environmental Covenant, and provide the recording information for this Environmental Covenant. The notice shall be in substantially the form set forth below. Within thirty (30) days of the date any such instrument of conveyance is executed, the Grantor or then-owner must provide the Agency with a certified copy of said instrument and its recording reference in the Madison County Register of Deeds.

NOTICE: THE INTEREST CONVEYED HEREBY IS SUBJECT TO AN ENVIRONMENTAL COVENANT DATED _____, RECORDED IN THE OFFICE OF THE REGISTER OF DEEDS OF MADISON COUNTY, NEBRASKA ON _____, IN [DOCUMENT _____, BOOK _____, PAGE ____]. THE ENVIRONMENTAL COVENANT CONTAINS THE FOLLOWING ACTIVITY AND USE LIMITATIONS:

a. The Property shall not be used for residential, recreational, child care or school use.
b. Existing remedial systems to control and/or abate vapor intrusion of Site Contaminants into any existing enclosed buildings at the Property must be operated and maintained in accordance with standards for protectiveness of human health and the environment.
c. Any new construction of enclosed buildings at the Property must prevent, or include remedial systems to control and/or abate, vapor intrusion of Site Contaminants into any such new construction at the Property, and must be operated and maintained in accordance with standards for protectiveness of human health and the environment.

05415

d. Extraction and use of ground water underlying the Property, except for investigation or remediation approved by EPA is prohibited.
e. Except where excavation is necessary to prevent or address a previously unknown threat to human health or the environment, including without limitation a natural gas pipeline leak, any digging, drilling, excavating, constructing, earth moving or other land disturbing activities that extend below the depths of contaminated soil excavated during the environmental removal action conducted at the Property, as depicted on the Removal Action Site Map attached to this Environmental Covenant as Exhibit A, are prohibited without five days' prior written notice to EPA.

9. Waiver of Certain Defenses. The parties bound by this Environmental Covenant hereby waive any defense to the enforcement of this Environmental Covenant based on laches, estoppel, statute of limitations, or prescription.

10. Amendment and Termination. Amendment or termination of this Environmental Covenant shall comply with Neb. Rev. Stat. § 76-2610. The terms of this Environmental Covenant may be modified or terminated by written consent of EPA, the then current fee simple title owner, and all original signatories unless exempted by Neb. Rev. Stat. § 76-2610. The amendment or termination is not effective until the document evidencing consent of all necessary persons is properly recorded. If not by consent, any amendment or termination of this Environmental Covenant shall be as provided by Neb. Rev. Stat. § 76-2609 and such additional terms as specified in this Environmental Covenant. As provided in Neb. Rev. Stat. § 76-2610(c), except for an assignment undertaken pursuant to a governmental reorganization, assignment of an environmental covenant to a new holder is an amendment.

11. Severability. If any provision of this Environmental Covenant is found to be unenforceable in any respect, the validity, legality, and enforceability of the remaining provisions shall not in any way be affected or impaired.

12. Captions. The captions in this Environmental Covenant are for convenience and reference only and are not a part of this instrument and shall have no effect upon construction or interpretation.

13. Governing Law. This Environmental Covenant shall be governed by and interpreted in accordance with the laws of the State of Nebraska.

14. Recordation. Within thirty (30) days after the date of the Agency's approval of this Environmental Covenant, the Grantor shall record the Environmental Covenant, in the same manner as a deed to the Property, with the Madison County Register of Deeds.

15. Effective Date. The effective date of this Environmental Covenant is the date upon which the fully executed Environmental Covenant has been recorded as a deed record for the Property with the Madison County Register of Deeds.

05415

16. Distribution of Environmental Covenant. Within sixty (60) days of the effective date, the Grantor shall distribute a file- and date-stamped copy of the recorded Environmental Covenant to each person identified in Neb. Rev. Stat. §§ 76-2607(a) and 76-2608(c), including but not limited to the City of Norfolk, Nebraska.

17. Notice. Unless otherwise notified in writing by the Agency, any document or communication required by this Environmental Covenant shall be submitted to:

If to the Agency:

Director
Superfund Division
U.S. Environmental Protection Agency
11201 Renner Boulevard
Lenexa, KS 66219

If to Grantor and Holder/Grantee:

Black Hills/Nebraska Gas Utility Company, LLC
P. O. Box 1400
Rapid City, SD 57709-1400

[REMAINDER OF THIS PAGE IS INTENTIONALLY LEFT BLANK]
[SIGNATURE PAGES FOLLOW]

05415

IN WITNESS WHEREOF, the parties hereto have executed this instrument the day and year first above written.

**FOR GRANTOR:**

**BLACK HILLS/NEBRASKA GAS UTILITY COMPANY, LLC**

By: _____

Title: VP NEBRASKA OPERATIONS

STATE OF Nebraska )
) ss.
COUNTY OF Lancaster )

The foregoing instrument was acknowledged before me this 5th day of November, 2014, by Jeffrey Sylvester the Vice President, ~~by~~ _____ of Black Hills/Nebraska Gas Utility Company, LLC, a Delaware limited liability company, having acknowledged that he/she held the position or title set forth above and that he/she signed the instrument on behalf of the corporation by proper authority and that the instrument was the act of the corporation for the purpose therein stated.

Gabriel Wayne Tramp
Notary Public

GENERAL NOTARY - State of Nebraska
GABRIEL WAYNE TRAMP
My Comm. Exp. March 11, 2016

05415

IN WITNESS WHEREOF, the parties hereto have executed this instrument the day and year first above written.

**FOR HOLDER/GRANTEE:**

**BLACK HILLS/NEBRASKA GAS UTILITY COMPANY, LLC**

By: _____

Title: VP NEBRASKA OPERATIONS

STATE OF Nebraska )
) ss.
COUNTY OF Lancaster )

The foregoing instrument was acknowledged before me this 5th day of November, 2014, by Jeffrey Sylvester the Vice President, ~~by~~ _____ of Black Hills/Nebraska Gas Utility Company, LLC, a Delaware limited liability company, having acknowledged that he/she held the position or title set forth above and that he/she signed the instrument on behalf of the corporation by proper authority and that the instrument was the act of the corporation for the purpose therein stated.

Gabriel Wayne Tramp
Notary Public

GENERAL NOTARY - State of Nebraska
GABRIEL WAYNE TRAMP
My Comm. Exp. March 11, 2016

**IN WITNESS WHEREOF, the parties hereto have executed this instrument the day and year first above written.**

**FOR AGENCY:**

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

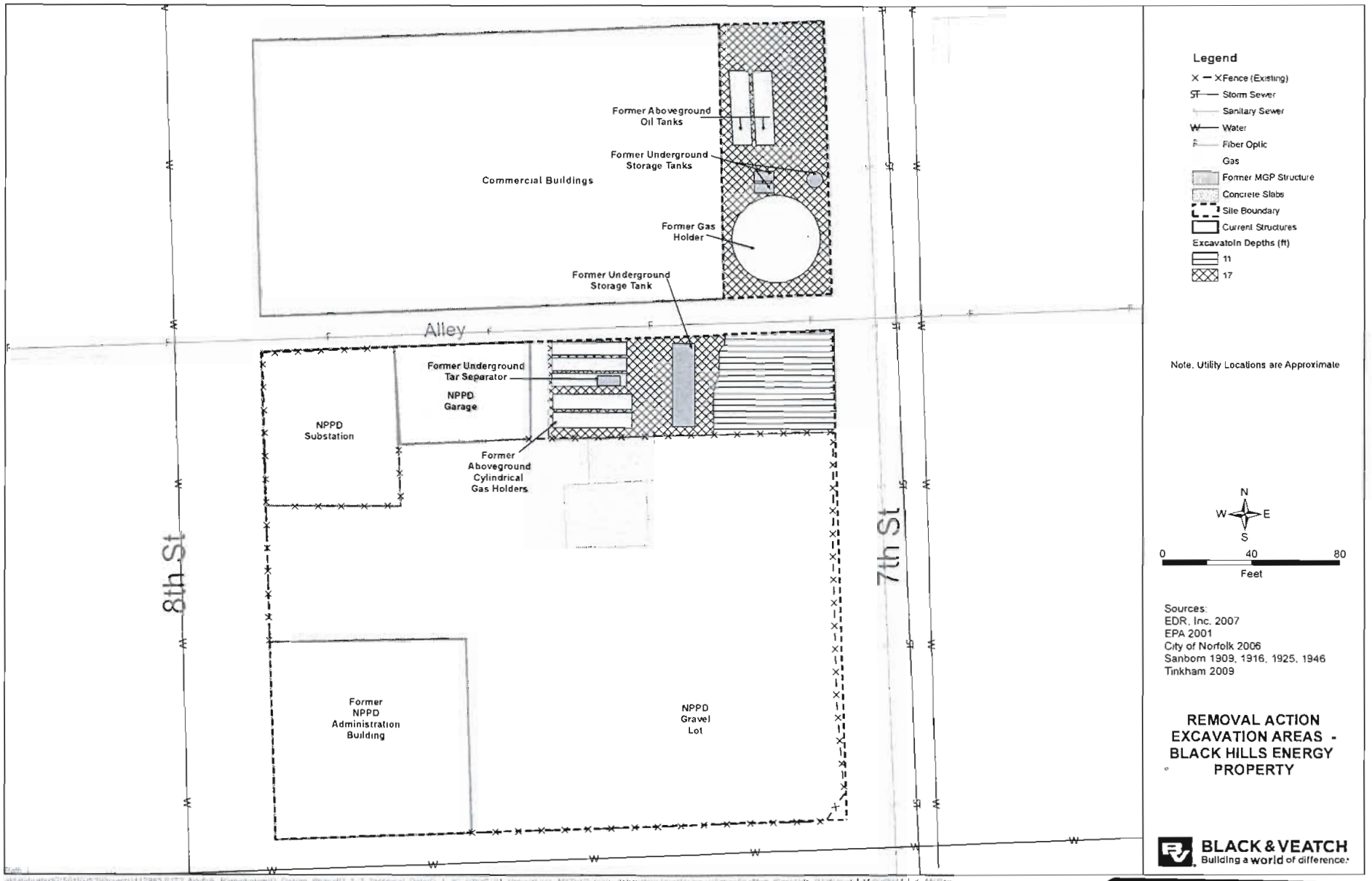
By: _____
Robert Jackson
Acting Director
Superfund Division

STATE OF KANSAS )
) ss.
COUNTY OF JOHNSON )

The foregoing instrument was acknowledged before me this 2nd day of December, 2014, by Robert Jackson, the Acting Director of the United States Environmental Protection Agency, Region 7, Superfund Division, having acknowledged that she holds the position set forth above and that she signed the instrument on behalf of the United States Environmental Protection Agency by proper authority and that the instrument was the act of such entity for the purpose therein stated.

_____
Notary Public

KENT JOHNSON
NOTARY PUBLIC
STATE OF KANSAS
My Appt. Exp 7/23/15




EXHIBIT
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No 01129 ✓ #Pages 8
Doc Tax $
Fee $ P&M $ 6.00
Fees Pd $ 52.00 Gen Fee $ 46.00
Ck# 8528
Refund Due

THE STATE OF NEBRASKA }ss.
MADISON COUNTY

This instrument filed for record
the 22 day of March 20 16
at 8:30 A.M. and recorded in
Book 2016 Page 01129
Nancy J. Gross
Register of Deeds

Nebraska Public Power District
P.O Box 499
Columbus, NE 68602

Space Above for Recorder's Use Only

## ENVIRONMENTAL COVENANT

This Environmental Covenant is entered into this 9th day of March, 2016, by and between Nebraska Public Power District, a public corporation and political subdivision of the State of Nebraska, as grantor and grantee/holder ("NPPD"), and the United States Environmental Protection Agency (EPA) ("Agency") pursuant to the Nebraska Uniform Environmental Covenants Act, Neb. Rev. Stat. §§ 76-2601 to 76-2613.

### RECITALS:

A. NPPD is the owner of certain real property located at 720 West Madison Avenue, Norfolk, Madison County, Nebraska, which is legally described as follows (the "Property"):

> Lots 5 through 13, inclusive, Block 1 of Koenigstein's Third Addition to Norfolk, and the vacated alley adjacent to Lots 5 through 12 of said Block 1, Madison County, Nebraska.

B. The Property was included in the description of a site of potential releases of hazardous substances, pollutants and/or contaminants onto the ground and into the groundwater underlying the Property, and is referred to as the Iowa/Nebraska Light & Power Former Manufactured Gas Plant ("MGP") Superfund site ("the Site"), EPA ID No. NED986373678.

C. Pursuant to an August 7, 2013 Administrative Settlement Agreement and Order on Consent For Removal Action issued by the U.S. Environmental Protection Agency ("EPA") under Sections 104, 107 and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. §§ 9604, 9607 and 9622, as amended ("CERCLA"), Centel Corporation, a Delaware corporation ("Centel") conducted an environmental response project at the Site and certain adjoining areas. This environmental response project involved the removal and off-site disposal of the most heavily contaminated soils at the Site, however, residual contamination remains at various depths in the saturated soils beneath the Site and in the groundwater underlying

the Site and certain adjoining areas. These contaminants include polynuclear aromatic hydrocarbon ("PAH") constituents; benzene, toluene, ethylbenzene and total xylenes ("BTEX") compounds; and/or contaminants from MGP-related processes; hereinafter known collectively as "Site Contaminants."

D. The Agency, as defined in Neb. Rev. Stat. § 76-2602, is the EPA.

E. The administrative record for the Iowa/Nebraska Light & Power FMGP Superfund Site is available to the public and is located at the Norfolk Public Library, 308 Prospect Avenue, Norfolk, Nebraska, 68701, and at EPA's offices located at 11201 Renner Boulevard, Lenexa, Kansas, 66219.

**NOW, THEREFORE,**

NPPD hereby declares that the Property will hereinafter be bound by, held, sold and conveyed subject to the terms, conditions, obligations, and restrictions set forth herein, which will run with the land, in perpetuity, unless amended or terminated pursuant to Paragraph 10 below.

1. Representations and Warranties. Grantor warrants to the other signatories to this Covenant that:

a. NPPD is the sole fee title owner of the Property;
b. NPPD holds sufficient fee title to the Property to grant the rights and interests described in this Environmental Covenant free of any conflicting legal and equitable claims; and
c. No other persons except for NPPD hold any legal or equitable interests in the Property.

2. Purpose. The purpose of this Environmental Covenant is to ensure protection of human health and the environment by minimizing the potential for exposure to the contamination that remains on the Property and to ensure that the Property is not developed, used, maintained or operated in a manner which may result in unacceptable exposures to residual contamination.

3. Running with the Land. This Environmental Covenant is perpetual and conveys to NPPD real property rights and obligations that run with the land, and gives to the Agency the right to enforce the activity and use limitations set forth in Paragraph 4 below. The terms, conditions, obligations, and limitations in this Environmental Covenant are binding on NPPD, its successors, assigns, and transferees, and all persons, corporations or other entities obtaining or succeeding to any right, title or interest in the Property. Acceptance of any conveyance, transfer, lease or sublease of the Property, or any part thereof, will bind each transferee, and it successors, transferees, heirs, and assigns to the terms, conditions, obligations, and limitations set forth herein during their respective period of ownership or occupancy, as applicable. Notice of any transfer of any interest in the Property must be promptly provided to EPA by the transferor. NPPD is bound by the terms, conditions, obligations and limitations in this Environmental Covenant only during its period of ownership or occupancy after the Effective Date. This

Environmental Covenant in no way amends, modifies, limits, or releases NPPD from its duties and obligations, if any, under the above-referenced Administrative Settlement Agreement and Order on Consent For Removal Action.

4. Activity and Use Limitations. The Property is subject to the following activity and use limitations:

a. The Property shall not be used for residential, child care or school use.
b. Existing remedial systems to control and/or abate vapor intrusion of Site Contaminants into any existing enclosed buildings at the Property must be operated and maintained in accordance with standards for protectiveness of human health and the environment.
c. Any new construction of enclosed buildings at the Property must prevent, or include remedial systems to control and/or abate, vapor intrusion of Site Contaminants into any such new construction at the Property, and must be operated and maintained in accordance with standards for protectiveness of human health and the environment.
d. Extraction and use of the groundwater underlying the Property, except for investigation or remediation approved by EPA is prohibited.
e. Except where such excavation is necessary to prevent or address a substantial previously unknown threat to human health or the environment, including without limitation, a natural gas pipeline leak or an emergency where electrical service must be restored to NPPD's customers, including the City of Norfolk, NPPD, the holder of the Property, will provide EPA five days' prior written notice prior to the commencement of any digging, drilling, excavating, constructing, earth moving, or other land disturbing activities that occur below an existing building, renovation or demolition of existing structures on the Property; provided, however, that so long as NPPD is the holder of the Property, NPPD shall only be required to provide such notice to EPA where such activities extend below the depth of five feet below the ground surface.

5. Reserved Rights of NPPD. NPPD hereby reserves unto itself and its successors all rights and privileges in and to the use of the Property which are not incompatible with the activity and limitations set forth above.

6. Enforcement. The terms of this Environmental Covenant may be enforced in a civil action for injunctive or other equitable relief by NPPD and by the Agency in accordance with Neb. Rev. Stat. § 76-2611. Failure to exercise such rights of enforcement will in no event bar subsequent enforcement and shall not be deemed a waiver of any right to take action to enforce any non-compliance. Nothing in this Environmental Covenant shall limit the Agency from exercising any authority under applicable law. The prevailing party in any action to enforce this Environmental Covenant is entitled to recover all costs of such action, including reasonable attorney fees and damages pursuant to Neb. Rev. Stat § 76-2611(d).

7. Rights of Access. NPPD and any then-current owner hereby grants to the Agency, their agents, contractors, and employees, the right of access to the Property to

monitor compliance with the terms, conditions, obligations, and limitations of this Environmental Covenant. Nothing in this Environmental Covenant shall limit or otherwise affect the Agency's right of entry and access or the Agency's authority to take response actions under applicable law.

8. Notice Upon Conveyance. Each instrument hereafter conveying any interest in the Property or any portion of the Property, including but not limited to, deeds, leases, and mortgages, shall contain a notice of the activity and use limitations set forth in this Environmental Covenant, and provide the recording information for this Environmental Covenant. The notice shall be in substantially the form set forth below. Within thirty (30) days of the date any such instrument of conveyance is executed, NPPD or then-owner must provide the Agency with a certified copy of said instrument and its recording reference in the Madison County Register of Deeds.

> NOTICE: THE INTEREST CONVEYED HEREBY IS SUBJECT TO AN ENVIRONMENTAL COVENANT DATED _____, RECORDED IN THE OFFICE OF THE REGISTER OF DEEDS OF MADISON COUNTY, NEBRASKA ON _____, IN [DOCUMENT _____, BOOK _____, PAGE ____]. THE ENVIRONMENTAL COVENANT CONTAINS THE FOLLOWING ACTIVITY AND USE LIMITATIONS:
>
> a. The Property shall not be used for residential, recreational, child care or school use.
> b. Existing remedial systems to control and/or abate vapor intrusion of Site Contaminants into any existing enclosed buildings at the Property must be operated and maintained in accordance with standards for protectiveness of human health and the environment.
> c. Any new construction of enclosed buildings at the Property must prevent, or include remedial systems to control and/or abate, vapor intrusion of Site Contaminants into any such new construction at the Property, and must be operated and maintained in accordance with standards for protectiveness of human health and the environment.
> d. Extraction and use of ground water underlying the Property, except for investigation or remediation approved by EPA is prohibited.
> e. Except where such excavation is necessary to prevent or address a substantial previously unknown threat to human health or the environment, including without limitation a natural gas pipeline leak, the holder of the Property will provide EPA five days' prior written notice prior to the commencement of any digging, drilling, excavating, constructing, earth moving, or other land disturbing activities that extend below an existing building or extend below the depth of two feet below ground surface, including any repair, renovation or demolition of existing structures on the Property that extend beyond such depth.

9. Waiver of Certain Defenses. The parties bound by this Environmental Covenant hereby waive any defense to the enforcement of this Environmental Covenant based on laches, estoppel, statute of limitations, or prescription.

10. Amendment and Termination. Amendment or termination of this Environmental Covenant shall comply with Neb. Rev. Stat. § 76-2610. The terms of this Environmental Covenant may be modified or terminated by written consent of EPA, the then current fee simple title owner, and all original signatories unless exempted by Neb. Rev. Stat. § 76-2610. The amendment or termination is not effective until the document evidencing consent of all necessary persons is properly recorded. If not by consent, any amendment or termination of this Environmental Covenant shall be as provided by Neb. Rev. Stat. § 76-2609 and such additional terms as specified in this Environmental Covenant. As provided in Neb. Rev. Stat. § 76-2610(c), except for an assignment undertaken pursuant to a governmental reorganization, assignment of an environmental covenant to a new holder is an amendment.

11. Severability. If any provision of this Environmental Covenant is found to be unenforceable in any respect, the validity, legality, and enforceability of the remaining provisions shall not in any way be affected or impaired.

12. Captions. The captions in this Environmental Covenant are for convenience and reference only and are not a part of this instrument and shall have no effect upon construction or interpretation.

13. Governing Law. This Environmental Covenant shall be governed by and interpreted in accordance with the laws of the State of Nebraska.

14. Recordation. Within thirty (30) days after the date of the Agency's approval of this Environmental Covenant, the Grantor shall record the Environmental Covenant, in the same manner as a deed to the Property, with the Madison County Register of Deeds.

15. Effective Date. The Effective Date of this Environmental Covenant is the date upon which the fully executed Environmental Covenant has been recorded as a deed record for the Property with the Madison County Register of Deeds.

16. Distribution of Environmental Covenant. Within sixty (60) days of the Effective Date, the Grantor shall distribute a file- and date-stamped copy of the recorded Environmental Covenant to each person identified in Neb. Rev. Stat. §§ 76-2607(a) and 76-2608(c), including but not limited to the City of Norfolk, Nebraska.

17. Notice. Unless otherwise notified in writing by the Agency, any document or communication required by this Environmental Covenant shall be submitted to:

If to the Agency:

Director
Superfund Division
U.S. Environmental Protection Agency
11201 Renner Boulevard
Lenexa, KS 66219

If to NPPD:

Nebraska Public Power District
P.O. Box 499
1414 15th Street
Columbus, NE 68602-0499
ATTN: Corporate Environmental Manager

[REMAINDER OF THIS PAGE IS INTENTIONALLY LEFT BLANK]
[SIGNATURE PAGES FOLLOW]

IN WITNESS WHEREOF, the parties hereto have executed this instrument the day and year first above written.

**FOR NPPD:**

**NEBRASKA PUBLIC POWER DISTRICT**

By: _____
John C. McClure
Title: Vice President and General Counsel

STATE OF NEBRASKA )
)
COUNTY OF PLATTE )

The foregoing instrument was acknowledged before me this 16th day of February, 2016, by John C. McClure, Vice President and General Counsel of Nebraska Public Power District, a public corporation and political subdivision of the State of Nebraska, having acknowledged that he holds the position or title set forth above and that he signed the instrument on behalf of the corporation by proper authority and that the instrument was the act of the corporation for the purpose therein stated.

GENERAL NOTARY - State of Nebraska
JANIE THOMAS
My Comm. Exp. Sept. 1, 2018

_____
Notary Public

IN WITNESS WHEREOF, the parties hereto have executed this instrument the day and year first above written.

**FOR AGENCY:**

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

By: Mary P. Peterson

Mary P. Peterson
Director
Superfund Division

STATE OF KANSAS )
)
COUNTY OF WYANDOTTE )

The foregoing instrument was acknowledged before me this 9th day of March, 2016, by Mary P. Peterson, the Director of the United States Environmental Protection Agency, Region 7, Superfund Division, having acknowledged that she holds the position set forth above and that she signed the instrument on behalf of the United States Environmental Protection Agency by proper authority and that the instrument was the act of such entity for the purpose therein stated.

NOTARY PUBLIC - State of Kansas
MILADY R. PETERS
My Appt. Expires 10/14/19

Notary Public

# Appendix B: Statement of Work

# REMEDIAL DESIGN/REMEDIAL ACTION

# STATEMENT OF WORK

# IOWA-NEBRASKA LIGHT & POWER CO. SUPERFUND SITE

# OPERABLE UNIT 1

# NORFOLK, MADISON COUNTY, NEBRASKA

**TABLE OF CONTENTS**

# 1. INTRODUCTION

**1.1 Purpose of SOW**. This SOW sets forth the procedures and requirements for implementing the Work.

**1.2 Structure of the SOW**

- Section 2 (Community Involvement) sets forth EPA's and Work Settling Defendant's responsibilities for community involvement.
- Section 3 (Coordination and Supervision) contains the provisions for selecting the Supervising Contractor and Project Coordinators regarding the Work.
- Section 4 (Remedial Design) sets forth the process for developing the Remedial Design, which includes the submission of specified primary deliverables.
- Section 5 (Remedial Action) sets forth requirements regarding the completion of the Remedial Action, including primary deliverables related to completion of the Remedial Action.
- Section 6 (Reporting) sets forth Work Settling Defendant's reporting obligations.
- Section 7 (Deliverables) describes the contents of the supporting deliverables and the general requirements regarding Work Settling Defendant's submission of, and EPA's review of, approval of, comment on, and/or modification of, the deliverables.
- Section 8 (Schedules) sets forth the schedule for submitting the primary deliverables, specifies the supporting deliverables that must accompany each primary deliverable, and sets forth the schedule of milestones regarding the completion of the Remedial Action.
- Section 9 (References) provides a list of references, including URLs.

**1.3** The Scope of the Remedy includes the actions described in Section 13 of the Record of Decision for Operable Unit 1. The selected remedy includes in-situ thermal treatment of the source materials designated as Operable Unit 1. The remedy additionally includes at least two years of quarterly groundwater monitoring to measure the effectiveness of the in-situ thermal treatment. The groundwater data collected may be used to support completion of the Operable Unit 2 Remedial Investigation/Feasibility Study.

**1.4** The terms used in this SOW that are defined in CERCLA, in regulations promulgated under CERCLA, or in the Consent Decree ("Decree"), have the meanings assigned to them in CERCLA, in such regulations, or in the Decree, except that the term "Paragraph" or "¶" means a paragraph of the SOW, and the term "Section" means a section of the SOW, unless otherwise stated.

# 2. COMMUNITY INVOLVEMENT

**2.1 Community Involvement Responsibilities**

(a) EPA has the lead responsibility for developing and implementing community involvement activities at the Site. Prior to the non-time-critical removal action, EPA developed a Community Involvement Plan ("CIP") for the Site dated September 2012. In accordance with 40 C.F.R. § 300.435(c), EPA shall review

the existing CIP and determine whether it should be revised to describe further public involvement activities during the Work that are not already addressed or provided for in the existing CIP.

(b) If requested by EPA, Work Settling Defendant shall participate in community involvement activities, including: (1) designation of a Community Involvement Coordinator ("CI Coordinator"); (2) participation in public meetings that may be held or sponsored by EPA to explain activities at or relating to the Site (with interpreters present for community members with limited English proficiency); and (3) the preparation of information regarding the Work for dissemination to the public, with consideration given to including mass media and/or Internet notification. Work Settling Defendant's support of EPA's community involvement activities may include providing online access to initial submissions and updates of deliverables to: (1) any Community Advisory Groups, (2) any Technical Assistance Grant ("TAG") recipients and their advisors, and (3) other entities to provide them with a reasonable opportunity for review and comment. EPA may describe in its CIP Work Settling Defendant's responsibilities for community involvement activities. All community involvement activities conducted by Work Settling Defendant at EPA's request are subject to EPA's oversight.

(c) In addition to deliverables already described herein, Work Settling Defendant shall submit a Community Impacts Mitigation Plan ("CIMP") for EPA comment. Work Settling Defendant shall submit the CIMP at the time of submitting the Preliminary Remedial Design. Work Settling Defendant shall develop the CIMP in accordance with all applicable regulations, guidances, and policies (see Section 9 (References)). Work Settling Defendant shall update the CIMP as necessary or appropriate during the course of the Work and/or as requested by EPA. The CIMP describes all activities including any to address concerns of EJ and disadvantaged communities to be performed: (1) to reduce and manage the impacts from remedy implementation (*e.g.*, air emissions, traffic, noise, odor, temporary or permanent relocation) to residential areas, schools, playgrounds, healthcare facilities, or recreational or impacted public areas ("Community Areas") from and during remedy implementation, (2) to conduct monitoring, if necessary, in Community Areas of impacts from remedy implementation, (3) to expeditiously communicate validated remedy implementation monitoring data, (4) to make adjustments during remedy implementation in order to further reduce and manage impacts from remedy implementation to affected Community Areas, (5) to expeditiously restore community resources damaged during remediation such as roads and culverts, and (6) to mitigate the economic effects that the Remedial Action will have on the community by structuring remediation contracts to allow more local business participation. The CIMP should contain information about impacts to Community Areas that is sufficient to assist EPA's Project Coordinator in performing the evaluations recommended under the *Superfund Community Involvement Handbook*, OLEM 9230.0-51 (March 2020), pp. 53-56.

(d) If requested by EPA, Work Settling Defendant shall develop and provide to EPA information about the design and implementation of the remedy including: (1) any validated data from monitoring of impacts to communities as provided in the CIMP; (2) results from unvalidated sampling as provided under ¶ 7.7(e)(7); (3) a copy of the CIMP; (4) schedules prepared under Section 8; (5) dates that Work Settling Defendant completed each task listed in the schedules; and (6) digital photographs of the Work being performed, together with descriptions of the Work depicted in each photograph, the purpose of the Work, the equipment being used, and the location of the Work. The EPA Project Coordinator may use this information for communication to the public via EPA's website, social media, or local and mass media. The information provided to EPA should be suitable for sharing with the public and the education levels of the community as indicated in EJ Screen. Translations should be in the dominant language(s) of community members with limited English proficiency.

## 3. COORDINATION AND SUPERVISION

### 3.1 Project Coordinators

(a) Work Settling Defendant's Project Coordinator must have sufficient technical expertise to coordinate the Work. Work Settling Defendant's Project Coordinator may not be an attorney representing any Work Settling Defendant in this matter and may not act as the Supervising Contractor. Work Settling Defendant's Project Coordinator may assign other representatives, including other contractors, to assist in coordinating the Work.

(b) EPA shall designate and notify the Work Settling Defendant of EPA's Project Coordinator[s] and Alternate Project Coordinator[s]. EPA may designate other representatives, which may include its employees, contractors, and/or consultants, to oversee the Work. EPA's Project Coordinator/Alternate Project Coordinator will have the same authority as a remedial project manager and/or an on-scene coordinator, as described in the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"). This includes the authority to halt the Work and/or to conduct or direct any necessary response action when it is determined that conditions at the Site constitute an emergency or may present an immediate threat to public health or welfare or the environment due to a release or threatened release of Waste Material.

**3.2 Supervising Contractor**. Work Settling Defendant's proposed Supervising Contractor must have sufficient technical expertise to supervise the Work and a quality assurance system that complies with the most recent version of *Quality Systems for Environmental*

*Data and Technology Programs -- Requirements with Guidance for Use* (American National Standard), ANSI/ASQC E4 (Feb. 2014).

**3.3 Procedures for Disapproval/Notice to Proceed**

(a) Work Settling Defendant shall designate, and notify EPA, within 20 days after the Effective Date, of the name[s], title[s], contact information, and qualifications of the Work Settling Defendant's proposed Project Coordinator and Supervising Contractor, whose qualifications shall be subject to EPA's review for verification based on objective assessment criteria (*e.g.*, experience, capacity, technical expertise) and do not have a conflict of interest with respect to the project.

(b) EPA shall issue notices of disapproval and/or authorizations to proceed regarding any proposed Project Coordinator and Supervising Contractor, as applicable. If EPA issues a notice of disapproval, Work Settling Defendant shall, within 45 days, submit to EPA a list of supplemental proposed Project Coordinators and/or Supervising Contractors, as applicable, including a description of the qualifications of each. Work Settling Defendant may select any coordinator/contractor covered by an authorization to proceed and shall, within 30 days, notify EPA of Work Settling Defendant's selection.

(c) EPA may disapprove the proposed Project Coordinator, the Supervising Contractor, or both, based on objective assessment criteria (*e.g.*, experience, capacity, technical expertise), if they have a conflict of interest regarding the project, or any combination of these factors.

(d) Work Settling Defendant may change their Project Coordinator and/or Supervising Contractor, or both, by following the procedures of ¶¶ 3.3(a) and 3.3(b).

## 4. REMEDIAL DESIGN

**4.1 Remedial Design Work Plan ("RDWP")**. Work Settling Defendant shall submit a RDWP for EPA approval. The RDWP must include:

(a) Plans for implementing all Remedial Design activities identified in this SOW, in the RDWP, or required by EPA to be conducted to develop the Remedial Design;

(b) A description of the overall management strategy for performing the Remedial Design, including a proposal for phasing of design and construction, if applicable;

(c) A description of the proposed general approach to contracting, construction, operation, maintenance, and monitoring of the Remedial Action as necessary to implement the Work;

(d) A description of the responsibility and authority of all organizations and key personnel involved with the development of the Remedial Design;

(e) Descriptions of any areas requiring clarification and/or anticipated problems (*e.g.*, data gaps);

(f) Descriptions of any applicable permitting requirements and other regulatory requirements;

(g) Description of plans for obtaining access in connection with the Work, such as property acquisition, property leases, and/or easements; and

(h) The following supporting deliverables described in ¶ 7.7 (Supporting Deliverables): Health and Safety Plan and Emergency Response Plan.

**4.2** **Contractor Selection.** Following approval of the RDWP and because the technology to be implemented as the Remedy involves potentially proprietary information, the Work shall be bid to pre-qualified contractors, contractor selected, and contracting executed prior to Remedial Design. Procurement documents shall include the EPA-approved RDWP and data and site constraints needed to provide an accurate bid.

**4.3** Work Settling Defendant shall communicate regularly with EPA to discuss design issues as necessary, as directed or determined by EPA. At a minimum, this will include providing a summary of design status in the monthly progress report, as well as any problems or concerns, and actions to be taken for resolution.

**4.4** **Preliminary (30%) Remedial Design**. Work Settling Defendant shall prepare and submit a Preliminary (30%) Remedial Design ("Preliminary Remedial Design") for EPA's comment. The Preliminary Remedial Design must include:

(a) A design criteria report, as described in the *Remedial Design/Remedial Action Handbook*, EPA 540/R-95/059 (June 1995);

(b) Preliminary drawings and specifications;

(c) Descriptions of permit requirements, if applicable;

(d) A description of how the Remedial Action will be implemented in a manner that minimizes environmental impacts in accordance with EPA's *Principles for Greener Cleanups* (Aug. 2009);

(e) A description of monitoring and control measures to protect human health and the environment, such as air monitoring, and measures to reduce and manage traffic, noise, odors, and dust, during the Remedial Action in accordance with the Community Involvement Handbook pp. 53-66 (text box on p. 55) to minimize community impacts;

(f) Any proposed revisions to the Remedial Action Schedule that is set forth in ¶ 8.3 (Remedial Action Schedule); and

(g) Updates of all supporting deliverables required to accompany the RDWP and the following additional supporting deliverables described in ¶ 7.7 (Supporting Deliverables): Field Sampling Plan; Quality Assurance Project Plan; Site Wide Monitoring Plan; CIMP, Construction Quality Assurance/Quality Control Plan; Transportation and Off-Site Disposal Plan; and O&M Plan.

**4.5** **Pre-final (90%) Remedial Design**. Work Settling Defendant shall submit the Pre-final (90%) Remedial Design ("Pre-final Remedial Design") for EPA's comment. The Pre-final Remedial Design must be a continuation and expansion of the Preliminary Remedial Design and must address EPA's comments regarding the implementation of the Preliminary Remedial Design. The Pre-final Remedial Design will serve as the approved Final (100%) Remedial Design ("Final Remedial Design") if EPA approves the Pre-final Remedial Design without comments. The Pre-final Remedial Design must include:

(a) A complete set of construction drawings and specifications that are: (1) certified by a registered professional engineer; (2) suitable for procurement; and (3) follow the Construction Specifications Institute's MasterFormat;

(b) A survey and engineering drawings showing existing Site features, such as elements, property borders, easements, and Site conditions;

(c) A specification for photographic documentation of the Remedial Action; and

(d) Updates of all supporting deliverables required to accompany the Preliminary (30%) Remedial Design.

**4.6** **Final (100%) Remedial Design**. Work Settling Defendant shall submit the Final (100%) Remedial Design for EPA approval. The Final Remedial Design must address EPA's comments on the Pre-final Remedial Design and must include final versions of all Pre-final Remedial Design deliverables.

## 5. REMEDIAL ACTION

**5.1** **Remedial Action Work Plan ("RAWP")**. Work Settling Defendant shall submit a RAWP for EPA approval that includes:

(a) A proposed Remedial Action Construction Schedule;

(b) An updated Health and Safety Plan that covers activities during the Remedial Action; and

(c) Plans for satisfying permitting requirements, including obtaining permits for off-site activity and for satisfying substantive requirements of permits for on-site activity.

**5.2 Meetings and Inspections**

(a) **Preconstruction Conference**. Work Settling Defendant shall hold a preconstruction conference with EPA and others as directed or approved by EPA and as described in the *Remedial Design/Remedial Action Handbook*, EPA 540/R-95/059 (June 1995). Work Settling Defendant shall prepare minutes of the conference and shall distribute the minutes to all Parties within 30 days following the preconstruction conference.

(b) **Periodic Communications**. During the construction portion of the Remedial Action (Remedial Action Construction), Work Settling Defendant shall communicate regularly on a weekly basis with EPA, and others as directed or determined by EPA, to discuss construction issues. At a minimum, this shall include submitting a weekly Remedial Action Progress Report that details work completed the previous week. It may be appropriate to schedule on-site meetings or conference calls during construction. Work Settling Defendant shall distribute an agenda and list of attendees to all Parties prior to each meeting or telephone call. Work Settling Defendant shall prepare minutes of the meetings or calls and shall distribute the minutes to all Parties.

(c) **Inspections**

(1) EPA or its representative shall conduct periodic inspections of or have an on-site presence during the Work. At EPA's request, the Supervising Contractor or other designee shall accompany EPA or its representative during inspections.

(2) If requested by EPA with reasonable notice, Work Settling Defendant shall provide office space for EPA personnel to perform their oversight duties. The minimum office requirements are a private office with at least 150 square feet of floor space, an office desk with chair, a four-drawer file cabinet, access to facsimile, or other means of reproduction, wireless internet access, and on-site sanitation facilities.

(3) Upon written notification by EPA of any deficiencies in the Remedial Action Construction, Work Settling Defendant shall take all necessary steps to correct the deficiencies and/or bring the Remedial Action Construction into compliance with the approved Final Remedial Design, any approved design changes, and/or the approved RAWP. If applicable, Work Settling Defendant shall comply with any reasonable schedule provided by EPA in its notice of deficiency.

**5.3 Permits**

(a) As provided in CERCLA § 121(e), and Section 300.400(e) of the NCP, no permit is required for any portion of the Work conducted entirely on-site *(i.e.*, within the areal extent of contamination or in very close proximity to the contamination and necessary for implementation of the Work). Where any portion of the Work that is

not on-site requires a federal or state permit or approval, Work Settling Defendant shall submit timely and complete applications and take all other actions necessary to obtain all such permits or approvals.

(b) Work Settling Defendant may seek relief under the provisions of Section XI (Force Majeure) of the Decree for any delay in the performance of the Work resulting from a failure to obtain, or a delay in obtaining, any permit or approval referenced in ¶ 5.3(a) and required for the Work, provided that they have submitted timely and complete applications and taken all other reasonable and necessary actions to obtain all such permits or approvals.

(c) Nothing in the Decree or this SOW constitutes a permit issued under any federal or state statute or regulation.

**5.4 Emergency Response and Reporting**

(a) **Emergency Action**. If any event occurs during performance of the Work that causes or threatens to cause a release of Waste Material on, at, or from the Site and that either constitutes an emergency situation or that may present an immediate threat to public health or welfare or the environment, Work Settling Defendant shall: (1) immediately take all appropriate action to prevent, abate, or minimize such release or threat of release; (2) immediately notify the authorized EPA officer (as specified in ¶ 5.4(c)) orally; and (3) take such actions in consultation with the authorized EPA officer and in accordance with all applicable provisions of the Health and Safety Plan, the Emergency Response Plan, and any other deliverable approved by EPA under the SOW.

(b) **Release Reporting**. Upon the occurrence of any event during performance of the Work that Work Settling Defendant is required to report under CERCLA § 103 or Section 304 of the Emergency Planning and Community Right-to-Know Act ("EPCRA"), Work Settling Defendant shall immediately notify the authorized EPA officer orally.

(c) The "authorized EPA officer" for purposes of immediate oral notifications and consultations under ¶ 5.4(a) and ¶ 5.4(b) is the EPA Project Coordinator, the EPA Alternate Project Coordinator (if the EPA Project Coordinator is unavailable), or the EPA Emergency Response Unit, Region 7 (if neither EPA Project Coordinator is available).

(d) For any event covered by ¶ 5.4(a) and ¶ 5.4(b), Work Settling Defendant shall: (1) within 14 days after the onset of such event, submit a report to EPA describing the actions or events that occurred and the measures taken, and to be taken, in response thereto; and (2) within 30 days after the conclusion of such event, submit a report to EPA describing all actions taken in response to such event.

(e) The reporting requirements under ¶ 5.4 are in addition to the reporting required by CERCLA § 103 or EPCRA § 304.

**5.5 Off-Site Shipments**

(a) Work Settling Defendant may ship hazardous substances, pollutants, and contaminants from the Site to an off-Site facility only if they comply with CERCLA § 121(d)(3), and 40 C.F.R. § 300.440. Work Settling Defendant will be deemed to be in compliance with CERCLA § 121(d)(3) and 40 C.F.R. § 300.440 regarding a shipment if Work Settling Defendant obtains a prior determination from EPA that the proposed receiving facility for such shipment is acceptable under the criteria of 40 C.F.R. § 300.440(b).

(b) Work Settling Defendant may ship Waste Material from the Site to an out-of-state waste management facility only if, prior to any shipment, they provide notice to the appropriate state environmental official in the receiving facility's state and to the EPA Project Coordinator. This notice requirement will not apply to any off-Site shipments when the total quantity of all such shipments does not exceed 10 cubic yards. The notice must include the following information, if available: (1) the name and location of the receiving facility; (2) the type and quantity of Waste Material to be shipped; (3) the schedule for the shipment; and (4) the method of transportation. Work Settling Defendant also shall notify the state environmental official referenced above and the EPA Project Coordinator of any major changes in the shipment plan, such as a decision to ship the Waste Material to a different out-of-state facility. Work Settling Defendant shall provide the notice after the award of the contract for Remedial Action construction and before the Waste Material is shipped.

(c) Work Settling Defendant may ship Investigation Derived Waste (IDW) from the Site to an off-Site facility only if they comply with CERCLA § 121(d)(3), 40 C.F.R. § 300.440, *EPA's Guide to Management of Investigation Derived Waste*, OSWER 9345.3-03FS (Jan. 1992). Wastes shipped off-Site to a laboratory for characterization, and RCRA hazardous wastes that meet the requirements for an exemption from RCRA under 40 CFR § 261.4(e) shipped off-site for treatability studies, are not subject to 40 C.F.R. § 300.440.

**5.6 Certification of Remedial Action Completion**

(a) **Remedial Action Completion Inspection.** The Remedial Action is "Complete" for purposes of this ¶ 5.6 when the Remedial Action has been fully performed and the Performance Standards have been achieved. Work Settling Defendant shall schedule an inspection for the purpose of obtaining EPA's Certification of Remedial Action Completion. The inspection must be attended by Work Settling Defendant and EPA and/or their representatives.

(b) **Remedial Action Report**. Following the inspection, Work Settling Defendant shall submit a Remedial Action Report to EPA requesting EPA's Certification of Remedial Action Completion. The report must: (1) include certifications by a registered professional engineer and by Work Settling Defendant's Project Coordinator that the Remedial Action is complete; (2) include as-built drawings

signed and stamped by a registered professional engineer; (3) be prepared in accordance with Chapter 2 (Remedial Action Completion) of EPA's *Close Out Procedures for NPL Sites* guidance, OLEM 9320.2-23 (June 2022), as supplemented by *Guidance for Management of Superfund Remedies in Post Construction*, OLEM 9200.3-105 (February 2017); (4) contain monitoring data to demonstrate that Performance Standards have been achieved; and (5) be certified in accordance with ¶ 7.5 (Certification).

(c) If EPA concludes that the Remedial Action is not Complete, EPA shall so notify Work Settling Defendant. EPA's notice must include a description of any deficiencies. EPA's notice may include a schedule for addressing such deficiencies or may require Work Settling Defendant to submit a schedule for EPA approval. Work Settling Defendant shall perform all activities described in the notice in accordance with the schedule.

(d) If EPA concludes, based on the initial or any subsequent Monitoring Report requesting Certification of Remedial Action Completion, that the Remedial Action is Complete, EPA shall so certify to Work Settling Defendant. This certification will constitute the Certification of Remedial Action Completion for purposes of the Decree, including Section XIV of the Decree (Covenants by Plaintiffs). Certification of Remedial Action Completion will not affect Work Settling Defendant's remaining obligations under the Decree.

**5.7 Certification of Work Completion**

(a) **Work Completion Inspection.** Work Settling Defendant shall schedule an inspection for the purpose of obtaining EPA's Certification of Work Completion. The inspection must be attended by Work Settling Defendant and EPA and/or their representatives.

(b) Work Completion Report. Following the inspection, Work Settling Defendant shall submit a report to EPA requesting EPA's Certification of Work Completion. The report must: (1) include certifications by a registered professional engineer and by Work Settling Defendant's Project Coordinator that the Work, including all O&M activities, is complete; and (2) be certified in accordance with ¶ 7.5 (Certification). If the Remedial Action Report submitted under ¶ 5.6(b) includes all elements required under this ¶ 5.7(b), then the Remedial Action Report suffices to satisfy all requirements under this ¶ 5.7(b).

(c) If EPA concludes that the Work is not complete, EPA shall so notify Work Settling Defendant. EPA's notice must include a description of the activities that Work Settling Defendant must perform to complete the Work. EPA's notice must include specifications and a schedule for such activities or must require Work Settling Defendant to submit specifications and a schedule for EPA approval. Work Settling Defendant shall perform all activities described in the notice or in the EPA-approved specifications and schedule.

(d) If EPA concludes, based on the initial or any subsequent report requesting Certification of Work Completion, that the Work is complete, EPA shall so certify in writing to Work Settling Defendant. Issuance of the Certification of Work Completion does not affect the following continuing obligations: (1) obligations under Sections VII (Property Requirements), and XVII (Records) of the Decree; (2) Institutional Control obligations; (3) reimbursement of EPA's Future Response Costs under Section X (Payment for Response Costs) of the Decree.

## 6. REPORTING

**6.1** **Progress Reports**. Commencing with the month following lodging of the Decree and until EPA approves the Remedial Action Completion, Work Settling Defendant shall submit progress reports to EPA on a monthly basis, unless indicated otherwise or as otherwise requested by EPA. During Remedial Action Construction, Work Settling Defendant shall submit a weekly report. All reports prepared pursuant to this Section must cover all activities that took place during the prior reporting period, including:

(a) The actions that have been taken toward achieving compliance with the Decree;

(b) A summary of all results of sampling, tests, and all other data received or generated by Work Settling Defendant;

(c) A description of all deliverables that Work Settling Defendant submitted to EPA;

(d) A description of all activities relating to Remedial Action Construction that are scheduled for the next quarter;

(e) An updated Remedial Action Construction Schedule, together with information regarding percentage of completion, delays encountered or anticipated that may affect the future schedule for implementation of the Work, and a description of efforts made to mitigate those delays or anticipated delays;

(f) A description of any modifications to the work plans or other schedules that Work Settling Defendant has proposed or that has been approved by EPA; and

(g) A description of all activities undertaken in support of the Community Involvement Plan ("CIP") during the reporting period and those to be undertaken in the next quarter.

**6.2** **Notice of Progress Report Schedule Changes**. If the schedule for any activity described in the Progress Reports, including activities required to be described under ¶ 6.1(d), changes, Work Settling Defendant shall notify EPA of such change at least seven days before performance of the activity.

## 7. DELIVERABLES

**7.1** **Applicability**. Work Settling Defendant shall submit deliverables for EPA approval or for EPA comment as specified in the SOW. If neither is specified, the deliverable does

not require EPA's approval or comment. Paragraphs 7.2 (In Writing) through 7.4 (Technical Specifications) apply to all deliverables. Paragraph 7.5 (Certification) applies to any deliverable that is required to be certified. Paragraph 7.6 (Approval of Deliverables) applies to any deliverable that is required to be submitted for EPA approval. Work Settling Defendant shall copy the State when submitting or resubmitting any deliverable or report required pursuant to the SOW.

**7.2** **In Writing**. As provided in ¶ 75 of the Decree, all deliverables under this SOW must be in writing unless otherwise specified.

**7.3** **General Requirements for Deliverables.** All deliverables must be submitted by the deadlines in the Remedial Design Schedule or Remedial Action Schedule, as applicable. Work Settling Defendant shall submit all deliverables to EPA in electronic form. Technical specifications for sampling and monitoring data and spatial data are addressed in ¶ 7.4. All other deliverables shall be submitted to EPA in the electronic form specified by the EPA Project Coordinator.

**7.4** **Technical Specifications**

(a) Sampling and monitoring data should be submitted in Scribe Compatible Electronic Data Deliverable ("EDD") format. Other delivery methods may be allowed if electronic direct submission presents a significant burden or as technology changes.

(b) Spatial data, including spatially-referenced data and geospatial data, should be submitted: (1) in the ESRI File Geodatabase format; and (2) as unprojected geographic coordinates in decimal degree format using North American Datum 1983 ("NAD83") or World Geodetic System 1984 (WGS84) as the datum. If applicable, submissions should include the collection method(s). Projected coordinates may optionally be included but must be documented. Spatial data should be accompanied by metadata, and such metadata should be compliant with the Federal Geographic Data Committee ("FGDC") Content Standard for Digital Geospatial Metadata and its EPA profile, the EPA Geospatial Metadata Technical Specification. An add-on metadata editor for ESRI software, the EPA Metadata Editor ("EME"), complies with these FGDC and EPA metadata requirements and is available at https://edg.epa.gov/EME/.

(c) Each file must include an attribute name for each site unit or sub-unit submitted. Consult https://www.epa.gov/geospatial/geospatial-policies-and-standards for any further available guidance on attribute identification and naming.

(d) Spatial data submitted by Work Settling Defendant does not, and is not intended to, define the boundaries of the Site.

**7.5** **Certification**. All deliverables that require compliance with this paragraph must be signed by the Work Settling Defendant's Project Coordinator, or other responsible official of Work Settling Defendant, and must contain the following statement:

> I certify under penalty of perjury that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

**7.6** **Approval of Deliverables**

(a) **Initial Submissions**

(1) After review of any deliverable that is required to be submitted for EPA approval under the Decree or the SOW, EPA shall: (i) approve, in whole or in part, the submission; (ii) approve the submission upon specified conditions; (iii) disapprove, in whole or in part, the submission; or (iv) any combination of the foregoing.

(2) EPA also may modify the initial submission to cure deficiencies in the submission if: (i) EPA determines that disapproving the submission and awaiting a resubmission would cause substantial disruption to the Work; or (ii) previous submission(s) have been disapproved due to material defects and the deficiencies in the initial submission under consideration indicate a bad faith lack of effort to submit an acceptable deliverable.

(b) **Resubmissions**. Upon receipt of a notice of disapproval under ¶ 7.6(a) (Initial Submissions), or if required by a notice of approval upon specified conditions under ¶ 7.6(a), Work Settling Defendant shall, within 45 days or such longer time as specified by EPA in such notice, correct the deficiencies and resubmit the deliverable for approval. After review of the resubmitted deliverable, EPA may: (1) approve, in whole or in part, the resubmission; (2) approve the resubmission upon specified conditions; (3) modify the resubmission; (4) disapprove, in whole or in part, the resubmission, requiring Work Settling Defendant to correct the deficiencies; or (5) any combination of the foregoing.

(c) **Implementation**. Upon approval, approval upon conditions, or modification by EPA under ¶ 7.6(a) (Initial Submissions) or ¶ 7.6(b) (Resubmissions), of any deliverable, or any portion thereof: (1) such deliverable, or portion thereof, will be incorporated into and enforceable under the Decree; and (2) Work Settling

Defendant shall take any action required by such deliverable, or portion thereof. The implementation of any non-deficient portion of a deliverable submitted or resubmitted under ¶ 7.6(a) or ¶ 7.6(b) does not relieve Work Settling Defendant of any liability for stipulated penalties under Section XIII (Stipulated Penalties) of the Decree.

(d) If: (1) an initially submitted deliverable contains a material defect and the conditions are met for modifying the deliverable under ¶ 7.6(a)(2); or (2) a resubmitted deliverable contains a material defect; then the material defect constitutes a lack of compliance for purposes of this Paragraph.

**7.7** **Supporting Deliverables**. In addition to deliverables already described herein, Work Settling Defendant shall submit each of the following supporting deliverables for EPA approval, except as specifically provided. Work Settling Defendant shall develop the deliverables in accordance with all applicable regulations, guidances, and policies (see Section 9 (References)). Work Settling Defendant shall update each of these supporting deliverables as necessary or appropriate during the course of the Work, and/or as requested by EPA.

(a) **Health and Safety Plan ("HASP")**. The HASP describes all activities to be performed to protect on site personnel and area residents from physical, chemical, and all other hazards posed by the Work. Work Settling Defendant shall develop the HASP in accordance with EPA's *Emergency Responder Health and Safety Manual* and Occupational Safety and Health Administration ("OSHA") requirements under 29 C.F.R. §§ 1910 and 1926. The HASP should cover Remedial Design activities and should be, as appropriate, updated to cover activities during the Remedial Action and updated to cover activities after Remedial Action completion. EPA does not approve the HASP but will review it to ensure that all necessary elements are included and that the plan provides for the protection of human health and the environment.

(b) **Emergency Response Plan ("ERP")**. The ERP is to be submitted, which can be submitted as a stand-alone document or the elements may be incorporated in the HASP, and must describe procedures to be used in the event of an accident or emergency at the Site (for example, power outages, water impoundment failure, treatment plant failure, slope failure, etc.). The ERP must include:

(1) Name of the person or entity responsible for responding in the event of an emergency incident;

(2) Plan and date(s) for meeting(s) with the local community, including local, State, and federal agencies involved in the cleanup, as well as local emergency squads and hospitals;

(3) Spill Prevention, Control, and Countermeasures ("SPCC") Plan (if applicable), consistent with the regulations under 40 C.F.R. part 112,

describing measures to prevent, and contingency plans for, spills and discharges;

(4) Notification activities in accordance with ¶ 5.4(b) (Release Reporting) in the event of a release of hazardous substances requiring reporting under CERCLA § 103 or EPCRA § 304; and

(5) A description of all necessary actions to ensure compliance with ¶ 5.4 of the SOW in the event of an occurrence during the performance of the Work that causes or threatens a release of Waste Material from the Site that constitutes an emergency or may present an immediate threat to public health or welfare or the environment.

(c) **Field Sampling Plan ("FSP")**. The FSP addresses all sample collection activities. The FSP must be written so that a field sampling team unfamiliar with the project would be able to gather the samples and field information required. Work Settling Defendant shall develop the FSP in accordance with *Guidance for Conducting Remedial Investigations and Feasibility Studies*, EPA/540/G 89/004 (Oct. 1988).

(d) **Quality Assurance Project Plan ("QAPP")**. The QAPP must include a detailed explanation of Work Settling Defendant's quality assurance, quality control, and chain of custody procedures for all treatability, design, compliance, and monitoring samples. Work Settling Defendant shall develop the QAPP in accordance with EPA Directive CIO 2105.1 (Environmental Information Quality Policy, 2021), the most recent version of *Quality Management Systems for Environmental Information and Technology Programs – Requirements with Guidance for Use*, ASQ/ANSI E-4 (Feb. 2014, and *Guidance for Quality Assurance Project Plans*, EPA QA/G-5, EPA Office of Environmental Information (Dec. 2002). Work Settling Defendant shall collect, produce, and evaluate all environmental information at the Site in accordance with the approved QAPP.

(e) **Site Wide Monitoring Plan ("SWMP")**. The purpose of the SWMP is to obtain baseline information regarding the extent of contamination in affected media at the Site; to obtain information, through short- and long- term monitoring, about the movement of and changes in contamination throughout the Site, before and during implementation of the Remedial Action; to obtain information regarding contamination levels to determine whether Performance Standards are achieved; and to obtain information to determine whether to perform additional actions, including further Site monitoring. The data to be collected pursuant to the SWMP may be used by Work Settling Defendant to support the completion of the Operable Unit 2 Remedial Investigation/Feasibility Study. The SWMP must include:

(1) Description of the environmental media to be monitored;

(2) Description of the data collection parameters, including existing and proposed monitoring devices and locations, schedule and frequency of monitoring, analytical parameters to be monitored, and analytical methods employed;

(3) Description of how performance data will be analyzed, interpreted, and reported, and/or other Site-related requirements;

(4) Description of verification sampling procedures;

(5) Description of deliverables that will be generated in connection with monitoring, including sampling schedules, laboratory records, monitoring reports, and monthly and annual reports to EPA and State agencies;

(6) Description of proposed additional monitoring and data collection actions (such as increases in frequency of monitoring, and/or installation of additional monitoring devices in the affected areas) in the event that results from monitoring devices indicate changed conditions (such as higher than expected concentrations of the contaminants of concern or groundwater contaminant plume movement);

(7) A plan to immediately provide to EPA any unvalidated sampling data from Community Areas as defined in ¶ 2.1(c) affected by the remedy that exceed removal management levels or three times remedial cleanup levels, whichever is lower; and

(8) A plan to expedite sampling and analysis in Community Areas as defined in ¶ 2.1(c) affected by the remedy (particularly in situations where EPA determines that unvalidated sampling data indicates substantial exceedances of cleanup standards), including procedures for expedited analysis, validation, and communication of sampling results to affected communities.

(f) **Construction Quality Assurance Plan ("CQAP") and Construction Quality Control Plan ("CQCP")**. The purpose of the CQAP is to describe planned and systemic activities that provide confidence that the Remedial Action construction will satisfy all plans, specifications, and related requirements, including quality objectives. The purpose of the CQCP is to describe the activities to verify that Remedial Action construction has satisfied all plans, specifications, and related requirements, including quality objectives. The CQAP/CQCP ("CQA/CP") must:

(1) Identify, and describe the responsibilities of, the organizations and personnel implementing the CQA/CP;

(2) Describe the Performance Standards required to be met to achieve Completion of the Remedial Action;

(3) Describe the activities to be performed: (i) to provide confidence that Performance Standards will be met; and (ii) to determine whether Performance Standards have been met;

(4) Describe verification activities, such as inspections, sampling, testing, monitoring, and production controls, under the CQA/CP;

(5) Describe industry standards and technical specifications used in implementing the CQA/CP;

(6) Describe procedures for tracking construction deficiencies from identification through corrective action;

(7) Describe procedures for documenting all CQA/CP activities; and

(8) Describe procedures for retention of documents and for final storage of documents.

(g) **Transportation and Off-Site Disposal Plan ("TODP")**. The TODP describes plans to ensure compliance with ¶ 5.5 (Off-Site Shipments). The TODP must include:

(1) Proposed times and routes for off-site shipment of Waste Material;

(2) Identification of communities, including underserved communities referred to in Executive Order 14008, § 222(b) (Feb. 1, 2021), affected by shipment of Waste Material; and

(3) Description of plans to minimize impacts (*e.g.*, noise, traffic, dust, odors) on affected communities.

(h) **O&M Plan**. The O&M Plan describes the requirements for inspecting, operating, and maintaining the Remedial Action. Work Settling Defendant shall develop the O&M Plan in accordance with *Guidance for Management of Superfund Remedies in Post Construction*, OLEM 9200.3-105 (Feb. 2017). The O&M Plan must include the following additional requirements:

(1) Confirmation that the selected remedy remains protective of human health and the environment;

(2) Description of activities to be performed to periodically review and determine if the ICs are having their intended effect, and if not, procedures for the development, approval and implementation of alternative, more effective ICs;

(3) **O&M Reporting**. Description of records and reports that will be generated during O&M, such as daily operating logs, laboratory records, records of operating costs, reports regarding emergencies, personnel and

maintenance records, monitoring reports, and monthly and annual reports to EPA; and

(4) Description of corrective action in case of systems failure, including: (i) alternative procedures to prevent the release or threatened release of Waste Material which may endanger public health and the environment; (ii) analysis of vulnerability and additional resource requirements should a failure occur; (iii) notification and reporting requirements should O&M systems fail or be in danger of imminent failure; and (iv) community notification requirements.

## 8. SCHEDULES

**8.1 Applicability and Revisions**. All deliverables and tasks required under this SOW must be submitted or completed by the deadlines or within the time durations listed in the Remedial Design and Remedial Action Schedules set forth below. Work Settling Defendant may submit proposed revised Remedial Design Schedules or Remedial Action Schedules for EPA approval. Upon EPA's approval, the revised Remedial Design and/or Remedial Action Schedules supersede the Remedial Design and Remedial Action Schedules set forth below, and any previously-approved Remedial Design and/or Remedial Action Schedules.

**8.2 Remedial Design Schedule**

| | **Description of Deliverable, Task** | **¶ Ref.** | **Deadline** |
|---|---|---|---|
| 1 | Remedial Design Work Plan (RDWP) | 4.1 | 90 days after EPA's Authorization to Proceed regarding Supervising Contractor (¶ 3.3). |
| 2 | Supporting Deliverables: HASP ERP | 4.1 | 90 days after EPA's Authorization to Proceed regarding Supervising Contractor (¶ 3.3). |
| 3 | Preliminary (30%) Remedial Design | 4.4 | 120 days after EPA approval of Final RDWP |
| 4 | Supporting Deliverables: FSP, QAPP, SWMP, CIMP, CQAP, CQCP, TODP, and O&M Plan | 4.4 | 120 days after EPA approval of Final RDWP |
| 5 | Pre-final (90%) Remedial Design | 4.5 | 60 days after EPA comments on the Preliminary Remedial Design |
| 6 | Final (100%) Remedial Design | 4.6 | 30 days after EPA comments on Pre-final Remedial Design |

**8.3 Remedial Action Schedule**

| | **Description of Deliverable / Task** | **¶ Ref.** | **Deadline** |
|---|---|---|---|
| 1 | Remedial Action Work Plan (RAWP) | 5.1 | 60 days after EPA Notice of Authorization to Proceed with Remedial Action |
| 2 | Pre-Construction Conference | 5.2(a) | Per RAWP |
| 3 | Start of Construction | | Per RAWP |
| 4 | Remedial Action Completion Inspection | 5.6 | 60 days after Performance Standards have been achieved |
| 5 | Remedial Action Report | 5.6(b) | 60 days after the Remedial Action Completion Inspection. |
| 7 | Work Completion Inspection | 5.7(a) | 60 days after the Work, including all O&M activities, is complete |
| 8 | Work Completion Report | 5.7(b) | 60 days after the Work Completion Inspection |

## 9. REFERENCES

**9.1** The following regulations and guidance documents, among others, may apply to the Work. Any item for which a specific URL is not provided below is available on one of the three EPA web pages listed in ¶ 9.2:

- A Compendium of Superfund Field Operations Methods, OSWER 9355.0-14, EPA/540/P-87/001a (Aug. 1987).
- CERCLA Compliance with Other Laws Manual, Part I: Interim Final, OSWER 9234.1-01, EPA/540/G-89/006 (Aug. 1988).
- Guidance for Conducting Remedial Investigations and Feasibility Studies, OSWER 9355.3-01, EPA/540/G-89/004 (Oct. 1988).
- CERCLA Compliance with Other Laws Manual, Part II, OSWER 9234.1-02, EPA/540/G-89/009 (Aug. 1989).
- Guidance on EPA Oversight of Remedial Designs and Remedial Actions Performed by Potentially Responsible Parties, OSWER 9355.5-01, EPA/540/G90/001 (Apr.1990).
- Guidance on Expediting Remedial Design and Remedial Actions, OSWER 9355.5-02, EPA/540/G-90/006 (Aug. 1990).
- Guide to Management of Investigation-Derived Wastes, OSWER 9345.3-03FS (Jan. 1992).
- Permits and Permit Equivalency Processes for CERCLA On-Site Response Actions, OSWER 9355.7-03 (Feb. 1992).
- Guidance for Conducting Treatability Studies under CERCLA, OSWER 9380.3-10, EPA/540/R-92/071A (Nov. 1992).
- National Oil and Hazardous Substances Pollution Contingency Plan; Final Rule, 40 C.F.R. part 300 (Oct. 1994).
- Guidance for Scoping the Remedial Design, OSWER 9355.0-43, EPA/540/R-95/025 (Mar. 1995).
- Remedial Design/Remedial Action Handbook, OSWER 9355.0-04B, EPA/540/R-95/059 (June 1995).
- EPA Guidance for Data Quality Assessment, Practical Methods for Data Analysis, QA/G-9, EPA/600/R-96/084 (July 2000).
- Comprehensive Five-year Review Guidance, OSWER 9355.7-03B-P, EPA/540-R-01-007 (June 2001).
- Guidance for Quality Assurance Project Plans, EPA QA/G-5, EPA Office of Environmental Information (Dec. 2002) https://www.epa.gov/quality/guidance-quality-assurance-project-plans-epa-qag-5.
- Institutional Controls: Third-Party Beneficiary Rights in Proprietary Controls, OECA (Apr. 2004).
- EPA Guidance on Systematic Planning Using the Data Quality Objectives Process, QA/G-4, EPA/240/B-06/001 (Feb. 2006).
- EPA Requirements for Quality Management Plans, QA/R-2, EPA/240/B-01/002 (Mar. 2001, reissued May 2006).

- EPA National Geospatial Data Policy, CIO Policy Transmittal 05-002 (Aug. 2005), https://www.epa.gov/geospatial/epa-national-geospatial-data-policy.
- Summary of Key Existing EPA CERCLA Policies for Groundwater Restoration, OSWER 9283.1-33 (June 2009).
- Principles for Greener Cleanups (Aug. 2009), https://www.epa.gov/greenercleanups/epa-principles-greener-cleanups.
- Providing Communities with Opportunities for Independent Technical Assistance in Superfund Settlements, Interim (Sep. 2009).
- Close Out Procedures for National Priorities List Sites, OSWER 9320.2-23 (June 2022).
- Groundwater Road Map: Recommended Process for Restoring Contaminated Groundwater at Superfund Sites, OSWER 9283.1-34 (July 2011).
- Recommended Evaluation of Institutional Controls: Supplement to the "Comprehensive Five-Year Review Guidance," OSWER 9355.7-18 (Sep. 2011).
- Plan EJ 2014: Legal Tools, EPA Office of General Counsel (Dec. 2011), https://www.epa.gov/environmentaljustice/plan-ej-2014-legal-tools.
- Construction Specifications Institute's MasterFormat, available from the Construction Specifications Institute, http://www.csinet.org/masterformat.
- Updated Superfund Response and Settlement Approach for Sites Using the Superfund Alternative Approach, OSWER 9200.2-125 (Sep. 2012)
- Institutional Controls: A Guide to Planning, Implementing, Maintaining, and Enforcing Institutional Controls at Contaminated Sites, OSWER 9355.0-89, EPA/540/R-09/001 (Dec. 2012), https://semspub.epa.gov/work/HQ/175446.pdf.
- Institutional Controls: A Guide to Preparing Institutional Controls Implementation and Assurance Plans at Contaminated Sites, OSWER 9200.0-77, EPA/540/R-09/02 (Dec. 2012), https://semspub.epa.gov/work/HQ/175449.pdf.
- EPA's Emergency Responder Health and Safety Manual, OSWER 9285.3-12 (July 2005 and updates), https://www.epaosc.org/_HealthSafetyManual/manual-index.htm.
- Broader Application of Remedial Design and Remedial Action Pilot Project Lessons Learned, OSWER 9200.2-129 (Feb. 2013).
- Guidance for Evaluating Completion of Groundwater Restoration Remedial Actions, OSWER 9355.0-129 (Nov. 2013).
- Groundwater Remedy Completion Strategy: Moving Forward with the End in Mind, OSWER 9200.2-144 (May 2014).
- Quality Management Systems for Environmental Information and Technology Programs -- Requirements with Guidance for Use, ASQ/ANSI E-4 (February 2014), available at https://webstore.ansi.org/.
- Guidance for Management of Superfund Remedies in Post Construction, OLEM 9200.3-105 (Feb. 2017), https://www.epa.gov/superfund/superfund-post-construction-completion.

- Advanced Monitoring Technologies and Approaches to Support Long-Term Stewardship (July 20, 2018), https://www.epa.gov/enforcement/use-advanced-monitoring-technologies-and-approaches-support-long-term-stewardship.
- Superfund Community Involvement Handbook, OLEM 9230.0-51 (March 2020). More information on Superfund community involvement is available on the Agency's Superfund Community Involvement Tools and Resources web page at https://www.epa.gov/superfund/superfund-community-involvement-tools-and-resources.
- EPA directive CIO 2105.1 (Environmental Information Quality Policy, 2021), https://www.epa.gov/sites/production/files/2021-04/documents/environmental_information_quality_policy.pdf.

**9.2** A more complete list may be found on the following EPA web pages:

- Laws, Policy, and Guidance at https://www.epa.gov/superfund/superfund-policy-guidance-and-laws;
- Search Superfund Documents at https://www.epa.gov/superfund/search-superfund-documents; and
- Test Methods Collections at: https://www.epa.gov/measurements/collection-methods.

**9.3** For any regulation or guidance referenced in the Decree or SOW, the reference will be read to include any subsequent modification, amendment, or replacement of such regulation or guidance. Such modifications, amendments, or replacements apply to the Work only after Work Settling Defendant receives notification from EPA of the modification, amendment, or replacement.

# Appendix C: Map of Site

**FIGURE 2 – Former Manufactrued Gas Plant Structures**