UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION 5

IN THE MATTER OF:

South Plant MGP Site
Waukegan, Illinois

North Shore Gas Company

Respondent

ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT FOR REMEDIAL DESIGN

EPA Region 5
CERCLA Docket No. V-W-15-C-027

Proceeding under Sections 104, 106, 107 and 122 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended, 42 U.S.C. §§9604, 9606, 9607 and 9622

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I. JURISDICTION AND GENERAL PROVISIONS

1. This Administrative Settlement Agreement and Order on Consent ("Settlement Agreement") is entered into voluntarily by the United States Environmental Protection Agency ("EPA") and North Shore Gas Company ("Respondent"). This Settlement Agreement provides that Respondent shall undertake a Remedial Design ("RD"), including various procedures and technical analyses, to produce a detailed set of plans and specifications for implementation of the Remedial Action selected in EPA's July 30, 2015 Interim Record of Decision ("ROD") for the South Plant MGP Site ("Site"). The Site is located at 2 North Pershing Road and 1 South Pershing Road, Waukegan, Lake County, Illinois, encompassing approximately 23 acres (Appendix B, Figure 1). The Site includes the location of the Respondent's former manufactured gas plant ("MGP") facility, which covered approximately 1.9 acres. In addition, Respondent shall reimburse the United States for certain response costs that it incurs, as provided herein.

2. This Settlement Agreement is issued under the authority vested in the President of the United States by Sections 104, 106, 107 and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, 42 U.S.C. §§ 9604, 9606, 9607 and 9622 ("CERCLA"). This authority was delegated to the EPA Administrator by Executive Order 12580 (52 Fed. Reg. 2923, Jan. 29, 1987), and further delegated to Regional Administrators by EPA Delegation No. 14-14-C. This authority was further delegated by the Regional Administrator, EPA, Region 5 to the Director, Superfund Division, EPA, Region 5 by Regional Delegation No. 14-14-C on May 2, 1996.

3. EPA and Respondent recognize that this Settlement Agreement has been negotiated in good faith and that the actions undertaken by the Respondent in accordance with this Settlement Agreement do not constitute an admission of any liability. Respondent does not admit, and retains the right to controvert in any subsequent proceedings other than proceedings to implement or enforce this Settlement Agreement, the validity of the findings of fact, conclusions of law and determinations in Sections IV and V of this Settlement Agreement. Respondent agrees to comply with and be bound by the terms of this Settlement Agreement and further agrees that they will not contest the basis or validity of this Settlement Agreement or its terms.

4. The objectives of EPA and Respondent in entering into this Settlement Agreement are to protect public health or welfare or the environment at the Site by the design of response actions at the Site by Respondent, to reimburse response costs of EPA, and to resolve the claims of EPA against Respondent as provided in this Settlement Agreement.

5. In accordance with the National Oil and Hazardous Substances Pollution Contingency Plan,40 C.F.R. Part 300, *et seq.*, as amended ("NCP"), and Section 121(f)(1)(F) of CERCLA, 42 U.S.C. § 9621(f)(1)(F), EPA notified the State of Illinois (the "State") on August 4, 2015, of negotiations with potentially responsible parties regarding the implementation of the remedial design for the Site, and EPA has provided the State with an opportunity to participate in such negotiations and be a party to this Settlement Agreement.

6. In accordance with Section 122(j)(1) of CERCLA, 42 U.S.C. § 9622(j)(1), EPA notified the U.S. Department of Interior (DOI) on August 4, 2015 of negotiations with potentially responsible parties 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 Settlement Agreement.

II. PARTIES BOUND

7. This Settlement Agreement applies to and is binding upon EPA and upon Respondent and its agents, successors and assigns. Any change in ownership or corporate status of Respondent including, but not limited to, any transfer of assets or real or personal property shall not alter Respondent's responsibilities under this Settlement Agreement. The signatories to this Settlement Agreement certify that they are authorized to execute and legally bind the parties they represent.

8. Respondent shall ensure that its contractors, subcontractors, and representatives receive a copy of this Settlement Agreement and comply with this Settlement Agreement within 14 days after the Effective Date of this Settlement Agreement or after the date of such retention. Respondent shall be responsible for any noncompliance with this Settlement Agreement.

III. DEFINITIONS

9. Unless otherwise expressly provided herein, terms used in this Settlement Agreement that are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in CERCLA or its implementing regulations. Whenever terms listed below are used in this Settlement Agreement, in the documents attached to this Settlement Agreement, or incorporated by reference in to this Settlement Agreement, the following definitions shall apply:

a. "CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§ 9601, *et seq.*

b. "Day" shall mean a calendar day. In computing any period of time under this Settlement Agreement, where the last day would fall on a Saturday, Sunday, or Federal holiday, the period shall run until the close of business of the next working day.

c. "Effective Date" shall be the effective date of this Settlement Agreement as provided in Section XXVIII (Effective Date and Subsequent Modification).

d. "EPA" shall mean the United States Environmental Protection Agency and any successor departments or agencies of the United States.

e. "Future Response Costs" shall mean all costs, including, but not limited to, direct and indirect costs, that the United States incurs in reviewing or developing plans, reports, technical memoranda and other items pursuant to this Settlement Agreement, conducting

community relations, providing technical assistance grants to community groups (if any), verifying the Work, or otherwise implementing, overseeing, or enforcing this Settlement Agreement, including but not limited to, payroll costs, contractor costs), travel costs, laboratory costs, the costs incurred pursuant to Paragraph 55 (costs and attorneys' fees and any monies paid to secure access, including the amount of just compensation), and Paragraph 91 (Work Takeover). Future Response Costs shall also include all Interim Costs.

f. "IEPA" shall mean the Illinois Environmental Protection Agency and any successor departments or agencies of the State.

g. "Institutional controls" shall mean non-engineered instruments, such as administrative and/or legal controls, that help to minimize the potential for human exposure to contamination and/or protect the integrity of a remedy by limiting land and/or resource use. Examples of institutional controls include easements and restrictive covenants, zoning restrictions, special building permit requirements, and well drilling prohibitions.

h. "Interest" shall mean interest at the rate specified for interest on investments of the EPA Hazardous Substance Superfund established by 26 U.S.C. § 9507, compounded annually, in accordance with CERCLA §107(a), 42 U.S.C. § 9607(a). The applicable rate of interest shall 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.

i. "Interim Response Costs" shall mean all costs, including direct and indirect costs, (a) paid by the United States in connection with the Site before the Effective Date, or (b) incurred prior to the Effective Date, but paid after that date.

j. "MGP" shall mean manufactured gas plant.

k. "NCP" or "National Contingency Plan" shall mean the National Oil and Hazardous Substances Pollution Contingency Plan promulgated pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, codified at 40 C.F.R. Part 300, *et seq.,* and any amendments thereto.

l. "Settlement Agreement" or "Consent Order" shall mean this Administrative Settlement Agreement and Order on Consent and all appendices attached hereto. In the event of a conflict between this Settlement Agreement and any appendix, this Settlement Agreement shall control.

m. "Paragraph" shall mean a portion of this Settlement Agreement identified by an Arabic numeral.

n. "Parties" shall mean EPA and Respondent.

o. "Performance Standards" shall mean the cleanup standards and other measures of achievement of the goals of the Remedial Action, set forth in Section 2.8 of the ROD and Section III of the SOW.

p. "Record of Decision" or "ROD" shall mean the EPA Interim Record of Decision relating to the Site, and all attachments thereto that the Regional Administrator, EPA Region 5, or his/her delegate, signed on July 30, 2015.

q. "Remedial Design" or "RD" shall mean those activities that Respondent shall undertake to develop the final plans and specifications for the Remedial Action pursuant to the Remedial Design Work Plan.

r. "Remedial Design Work Plan" shall mean the document developed pursuant to Paragraph 34 of this Settlement Agreement and approved by EPA, and any amendments thereto.

s. "Respondent" or "NSG" shall mean North Shore Gas Company.

t. "Section" shall mean a portion of this Settlement Agreement identified by a Roman numeral and includes one or more paragraphs.

u. "Site" shall mean the South Plant MGP Site, encompassing approximately 23 acres, located at 2 North Pershing Road and 1 South Pershing Road, Waukegan, Illinois as described in the ROD.

v. "State" shall mean the State of Illinois.

w. "Statement of Work" or "SOW" shall mean the Statement of Work for implementation of the Remedial Design, and any modifications made thereto in accordance with this Settlement Agreement, as set forth in Appendix A to this Settlement Agreement. The Statement of Work is incorporated into this Settlement Agreement and is an enforceable part of this Settlement Agreement as are any modifications made thereto in accordance with this Settlement Agreement.

x. "TAP" shall mean technical assistance plan.

y. "Waste Material" shall mean (i) any "hazardous substance" under Section 101(14) of CERCLA, 42 U.S.C. § 9601(14); (ii) any pollutant or contaminant under Section 101(33) of CERCLA, 42 U.S.C. § 9601(33); and (iii) any "solid waste" under Section 1004(27) of RCRA, 42 U.S.C. § 6903(27).

z. "Work" shall mean all activities Respondent is required to perform under this Settlement Agreement, except those required by Section XIV (Retention of Records).

IV. FINDINGS OF FACT

10. MGPs operated to provide gas from coal or oil. MGPs were constructed with similar facilities and generated similar wastes using defined manufacturing processes. The gas manufacturing and purification processes produced by-products and residues that include tars, sludges, lampblack, light oils, spent oxide wastes, petroleum hydrocarbons, benzene, cyanide, metals and phenols. Residues often occur at the same locations at former MGP sites (e.g., near

the former gas holders, tar stumps, and lampblack separators). The wastes contain a number of known and suspected carcinogens and other potentially hazardous chemicals.

11. The Site is approximately 23 acres which includes the 1.9-acre former South Plant MGP property located at 2 North Pershing Road and 1 South Pershing Road in Waukegan, Lake County, Illinois (the "MGP property") and several adjacent properties where MGP-derived contaminants have been found. The Site is located in an industrial/commercial area and the former MGP property is currently vacant, with vegetation covering the surface. The City of Waukegan's Lakefront-Downtown Master Plan (2003) and Design Guidelines (2005) show the Site as being located in a future area of open space recreational use and mixed-use, marina-based development.

12. The Waukegan Pipeline Service Company constructed the original South Plant MGP in 1897 and the Waukegan Gas, Light, and Fuel Company purchased it in 1898. NSG purchased the facility in 1900 and leased the southern 0.37 acres from the EJ&E Railroad. The facility was comprised of three gas holders ranging in capacity from 50,000 to 518,000 cubic feet; an office building with a storage room; a coal shed; boilers; oil and tar tanks; an engine house; ammonia stills; and a generator house. The South Plant MGP operated on a full time basis from 1898 to 1927. NSG shut it down in 1927 but later operated it as a peak production unit during high demand periods between 1935 and 1946. NSG permanently closed the South Plant MGP in 1946 and demolished it in 1951.

13. The South Plant MGP generated various by-products and wastes, such as coal tar, ammonia, cyanide, ammonium sulfate, sulfur, wastewater sludges, ash, and tar/oil emulsions. These materials contain polynuclear aromatic hydrocarbons (PAHs) such as naphthalene and benzo(a)pyrene; petroleum hydrocarbons such as benzene, toluene, ethylbenzene, and xylene (BTEX); metals such as arsenic and lead; cyanide; and phenolic compounds. Varying levels of these contaminants have been found in the Site soil, groundwater, and adjacent surface water and sediment samples.

14. Groundwater is encountered at 7 to 10 feet below ground surface ("bgs") and flows east toward Lake Michigan. Public water in the area is obtained from Lake Michigan (the water intakes for the City of Waukegan are approximately 5,000 feet northeast of the Site) and no private potable wells are located within the vicinity of the Site. Groundwater samples collected at the Site from 2001 to 2005 contained VOCs (primarily BTEX), SVOCs (primarily PAHs), cyanide, and metals. Visible hydrocarbons were observed at or below the water table at the Site. Free-phase tar has been measured at thicknesses of up to 1.5 feet in wells on the former MGP property and at thicknesses of more than 5 feet in wells 560 feet down-gradient of the former MGP property on the Waukegan Port District property and within 160 feet of Waukegan Harbor. Tar is being recovered from monitoring and recovery wells located on-Site.

15. NSG has conducted contaminant investigations and cleanup activities at the Site since the early 1990s. Most of these pre-CERCLA cleanup actions were conducted in accordance with Illinois' voluntary Site Remediation Program (SRP). These investigations include a CERCLA Screening Site Inspection ("SSI") performed by the IEPA. The 1993 SSI report recommended assigning the Site a medium priority status. The investigations focused on identifying sources of MGP residuals and evaluating soil and groundwater conditions. NSG dug test pits, took soil borings, and installed groundwater monitoring wells. Groundwater and soil

samples were analyzed for a variety of chemicals of potential concern (COPC). NSG also worked to delineate the extent of the groundwater contaminant plume and the DNAPL pool.

16. Between December 2003 and February 2004, NSG excavated soil above the water table on the former MGP property and disposed of it off-site as part of a focused remediation effort. Excavation of the top 3.5 feet of soil across the entire property was completed along with deeper excavation of suspected source material areas in certain areas. Material removed from excavated areas consisted of fill, soil, suspected source material (characterized as tar-impacted fill/soil), piping, and debris. After successful removal of suspected source material, confirmation sampling indicated impacted material above the water table was removed satisfactorily, except under the Pershing Road right-of-way and along the west property boundary. NSG then installed a plastic liner in the excavations and backfilled them with clean soil. NSG also installed plastic liners along the sidewalls of excavations next to Pershing Road and along the western property line to help prevent residual contaminants from moving into the clean imported backfill. NSG disposed of about 19,223 tons of excavated material as nonhazardous special waste at a nearby licensed landfill. This remediation effort did not address impacted soils located beneath the water table and did not include excavation of all impacted soils identified above the water table, but rather focused on those soils exhibiting the greatest degree of impacts. No soil remediation activities have been conducted at the Waukegan Port District and Akzo Nobel properties.

17. NSG began DNAPL recovery from 19 vertical extraction wells located on the former MGP property and Waukegan Port District properties in April 2006 and its DNAPL recovery efforts continue to this day. During recovery operations, the DNAPL is pumped from the wells into Department of Transportation (DOT)-approved steel drums, which are then sealed, labeled, manifested, and transported to a facility in Houston, Texas, where the DNAPL is blended as fuel to be used by local cement kilns. From April 2006 to May 2007, NSG pumped DNAPL from the wells at approximate 3-week intervals, moving to six-week intervals from May 2007 to the present. As of January 2015, approximately 1,370 gallons of DNAPL have been recovered. The DNAPL recovery wells located in the Waukegan Port District Administration building parking lot and boat parking lot have accounted for almost 80 percent of the DNAPL recovered to-date.

18. In July 2007, EPA and NSG entered into an Administrative Settlement Agreement and Order on Consent (AOC) that required NSG to conduct a Remedial Investigation/Feasibility Study (RI/FS) at both the South Plant and the North Plant former MGP sites in Waukegan (Docket No. V-W-07-C-877). WEC Business Services LLC (WEC Business Services), an affiliate of NSG, is currently conducting the RI/FS under this AOC. WEC Business Services completed the South Plant MGP Site RI report on January 22, 2014, and completed a Focused FS (FFS) report to address the DNAPL on April 9, 2015.

19. On July 30, 2015, EPA issued an Interim ROD to address the DNAPL at the site. Once the remedy is installed and the action completed, EPA will work to select a final remedy to address site groundwater and soil contaminants as well as potential soil vapor intrusion risks.

20. The Site has not been proposed to the National Priorities List.

21. The Respondent is North Shore Gas Company, owner of a portion of the Site and the owner and operator at the time of disposal of hazardous substances.

V. CONCLUSIONS OF LAW AND DETERMINATIONS

Based on the Findings of Fact set forth above, and the Administrative Record supporting this Settlement Agreement, EPA has determined that:

22. The Site is a "facility" as defined in Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).

23. The contamination found at the Site, as identified in the Findings of Fact above, includes "hazardous substances" as defined in Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).

24. The Respondent is a "person" as defined in Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).

25. The Respondent is a responsible party under Section 107 of CERCLA, 42 U.S.C. § 9607.

a. Respondent is the "owner" and/or "operator" of all or part of the facility, as defined by Section 101(20) of CERCLA, 42 U.S.C. § 9601(20), and within the meaning of Section 107(a)(1) of CERCLA, 42 U.S.C. § 9607(a)(1) .

b. Respondent was the "owner" and/or "operator" of the facility at the time of disposal of hazardous substances at the facility, as defined by Section 101(20) of CERCLA, 42 U.S.C. § 9601(20), and within the meaning of Section 107(a)(2) of CERCLA, 42 U.S.C. § 9607(a)(2).

26. The conditions described in Paragraphs 11 to 17 of the Findings of Fact above constitute an actual or threatened "release" of a hazardous substance from the facility as defined by Section 101(22) of CERCLA, 42 U.S.C.§ 9601(22). .

VI. SETTLEMENT AGREEMENT AND ORDER

27. Based upon the foregoing Findings of Fact, Conclusions of Law, Determinations, and the Administrative Record for this Site, it is hereby Ordered and Agreed that the Respondent shall comply with all provisions of this Settlement Agreement, including, but not limited to, all attachments to this Settlement Agreement and all documents incorporated by reference into this Settlement Agreement.

VII. DESIGNATION OF PROJECT MANAGERS AND COORDINATORS

28. Respondent shall retain one or more contractor(s) to perform the Work and shall notify EPA of the name(s) and qualifications of such contractor(s) within thirty (30) days of the Effective Date. Respondent shall also notify EPA of the name(s) and qualification(s) of any other contractor(s) or subcontractor(s) retained to perform the Work at least thirty (30) days prior to commencement of such Work. EPA retains the right to disapprove of any or all of the contractors and/or subcontractors retained by Respondent. If EPA disapproves of a selected contractor, Respondent shall retain a different contractor and shall notify EPA of that contractor's name and qualifications within thirty (30) days of EPA's disapproval. With respect to any contractor proposed to be Supervising Contractor, Respondent shall demonstrate that the proposed contractor has a quality system that complies with ANSI/ASQC E4-1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs," (American National Standard, January 5, 1995), by submitting a copy of the proposed contractor's Quality Management Plan (QMP). The QMP should be prepared in accordance with "EPA Requirements for Quality Management Plans (QA/R-2)" (EPA/240/B-01/002, March 2001) or equivalent documentation as determined by EPA. EPA will issue a notice of disapproval or an authorization to proceed. Any decision not to require submission of the contractor's QMP should be documented in a memorandum from the EPA Project Cordinator and Regional Quality Assurance personnel to the Site file.

29. Within fifteen (15) days after the Effective Date, Respondent shall designate a Project Coordinator who shall be responsible for administration of all actions by Respondent required by this Settlement Agreement and shall submit to EPA the designated Project Coordinator's name, address, telephone number, and qualifications. To the greatest extent possible, the Project Coordinator shall be present on Site or readily available during Site Work. EPA retains the right to disapprove of the designated Project Coordinator. If EPA disapproves of the designated Project Coordinator, Respondent shall retain a different Project Coordinator and shall notify EPA of that person's name, address, telephone number and qualifications within fifteen (15) days following EPA's disapproval. Receipt by Respondent's Project Coordinator of any notice or communication from EPA relating to this Settlement Agreement shall constitute receipt by the Respondent. Respondent has designated Narendra M. Prasad of WEC Business Services as its Project Coordinator.

30. EPA has designated Ross del Rosario of the Superfund Division, Region 5 as its Project Coordinator. EPA will notify Respondent of a change in its designation of the Project Coordinator. Except as otherwise provided in this Settlement Agreement, Respondent shall direct all submissions required by this Settlement Agreement to the Project Coordinator at 77 West Jackson, SR-6J, Chicago, Illinois 60604-3590

31. EPA's Project Coordinator shall have the authority lawfully vested in a Remedial Project Manager ("RPM") and On-Scene Coordinator ("OSC") by the NCP. In addition, EPA's Project Coordinator shall have the authority consistent with the NCP to halt any Work required by this Settlement Agreement, and to take any necessary response action when s/he determines that conditions at the Site may present an immediate endangerment to public health or welfare or the environment. The absence of the EPA Project Coordinator from the areas under study pursuant to this Settlement Agreement shall not be cause for the stoppage or delay of Work.

32. EPA and Respondent shall have the right, subject to Paragraph 29, to change their respective designated Project Coordinator. Respondent shall notify EPA fifteen (15) days before such a change is made. The initial notification by either party may be made orally, but shall be promptly followed by a written notice.

VIII. WORK TO BE PERFORMED

33. Respondent shall perform all action necessary to implement the Statement of Work.

34. Work Plan and Implementation.

a. Within sixty (60) days after the Effective Date, Respondent shall submit to EPA and the State a work plan for the design of the Remedial Action at the Site ("Remedial Design Work Plan" or "RD Work Plan"). The RD Work Plan shall provide for design of the remedy set forth in the ROD, in accordance with the SOW and for achievement of the Performance Standards and other requirements set forth in the ROD, this Settlement Agreement, and/or the SOW. Upon its approval by EPA pursuant to Section IX (EPA Approval of Plans and Other Submissions), the Remedial Design Work Plan shall be incorporated into and become enforceable under this Settlement Agreement.

b. The RD Work Plan shall include plans and schedules for implementation of all remedial design and pre-design tasks identified in the SOW, including, but not limited to, plans and schedules for the completion of: (1) design sampling and analysis plan (including, but not limited to, a Remedial Design Quality Assurance Project Plan ("RD QAPP") in accordance with Paragraph 41 (Quality Assurance and Sampling); and (2) a Construction Quality Assurance Plan; (3) a Pre-design Work Plan; (4) preliminary design submittal; (5) a Health and Safety Plan; and (6) a pre-final/final design submittal. In addition, the RD Work Plan shall include a schedule for completion of the Remedial Action Work Plan.

c. Upon approval of the RD Work Plan by EPA pursuant to Section IX (EPA Approval of Plans and Other Submissions), after a reasonable opportunity for review and comment by the State, and submittal of the Health and Safety Plan for all field activities to EPA and the State, Respondent shall implement the RD Work Plan. Respondent shall submit to EPA and the State all plans, submittals, and other deliverables required under the approved RD Work Plan in accordance with the approved schedule for review. Unless otherwise directed by EPA, Respondent shall not commence further Remedial Design activities at the Site prior to approval of the Remedial Design Work Plan.

d. The preliminary design submittal shall include, at a minimum, the following: (1) design criteria; (2) results of treatability studies; (3) results of additional field sampling and pre-design work, if conducted; (4) project delivery strategy; (5) preliminary plans, drawings, and sketches; (6) required specifications in outline form; and (7) a preliminary construction schedule.

e. The pre-final/final design submittal shall include, at a minimum, the following: (1) final plans and specifications; (2) Operation and Maintenance Plan; (3) Construction Quality Assurance Project Plan ("CQAPP"); (4) Field Sampling Plan (directed at measuring progress towards meeting Performance Standards); and (5) Contingency Plan. The CQAPP, which shall detail the approach to

quality assurance during construction activities at the Site, shall specify a quality assurance official ("QA Official"), independent of the Project Coordinator, to conduct a quality assurance program during the construction phase of the project.

35. Health and Safety Plan. In accordance with the schedule set forth in the SOW , Respondent shall prepare and submit to EPA for review and comment a plan that ensures the protection of the public health and safety during performance of on-Site work under this Settlement Agreement. This plan shall be prepared in accordance with EPA's Standard Operating Safety Guide (PUB 9285.1-03, PB 92963414, June 1992). In addition, the plan shall comply with all currently applicable Occupational Safety and Health Administration ("OSHA") regulations found at 29 C.F.R. Part 1910. If EPA determines that it is appropriate, the plan shall also include contingency planning. Respondent shall incorporate all changes to the plan recommended by EPA and shall implement the plan during the pendency of the remedial action.

36. Respondent shall conduct all work in accordance with the SOW, the ROD, CERCLA, the NCP, and all applicable EPA guidance. The Project Coordinator shall use his or her best efforts to inform Respondent if new or revised guidances may apply to the Work.

37. Respondent shall perform the tasks and submit the deliverables that the SOW sets forth. EPA will approve, approve with conditions, modify, or disapprove each deliverable that Respondent submits under this Settlement Agreement and the SOW, pursuant to Section IX (EPA Approval of Plans and Other Submissions). Each deliverable must include all listed items as well as items that the RD Work Plan indicates Respondent shall prepare and submit to EPA for review and approval.

38. Upon EPA's approval, this Settlement Agreement incorporates any reports, plans, specifications, schedules, and attachments that this Settlement Agreement or the SOW requires. With the exception of extensions that EPA allows in writing or certain provisions within Section XVII of this Settlement Agreement (*Force Majeure*), any non-compliance with such EPA-approved reports, plans, specifications, schedules, and attachments shall be considered a violation of this Settlement Agreement and will subject Respondent to stipulated penalties in accordance with Section XVIII of this Settlement Agreement (Stipulated Penalties).

39. If any unanticipated or changed circumstances exist at the Site that may significantly affect the Work or schedule, Respondent shall notify the EPA Project Coordinator by telephone within 24 hours of discovery of such circumstances. Such notification is in addition to any notification required by Section XVII (*Force Majeure*).

40. If EPA determines that additional tasks, including, but not limited to, additional investigatory work or engineering evaluation, are necessary to complete the Work, EPA shall notify Respondent in writing. Respondent shall submit a workplan to EPA for the completion of such additional tasks within thirty (30) days of receipt of such notice, or such longer time as EPA agrees. The workplan shall be completed in accordance with the same standards, specifications, and requirements of other deliverables pursuant to this Settlement Agreement. EPA will review and comment on, as well as approve, approve with conditions, modify, or disapprove the workplan pursuant to Section IX (EPA Approval of Plans and Other Submissions). Upon approval or approval with modifications of the workplan, Respondent shall implement the additional work in accordance with the schedule of the approved workplan. Failure to comply with this Subsection, including, but

not limited to, failure to submit a satisfactory workplan, shall subject Respondent to stipulated penalties as set forth in Section XVIII (Stipulated Penalties).

41. Quality Assurance and Sampling.

a. All sampling and analyses performed pursuant to this Settlement Agreement shall conform to EPA direction, approval, and guidance regarding sampling, quality assurance/quality control ("QA/QC"), data validation, and chain of custody procedures. Respondent shall ensure that work performed, samples taken and analyses conducted conform to the requirements of the SOW, the approved QAPP, the approved RD Work Plan and guidance identified therein. Respondent shall follow, as appropriate, "Quality Assurance/Quality Control Guidance for Removal Activities: Sampling QA/QC Plan and Data Validation Procedures" (OSWER Directive No. 9360.4-01, April 1, 1990), as guidance for QA/QC and sampling. Respondent shall only use laboratories that have a documented Quality System that complies with ANSI/ASQC E-4 1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs" (American National Standard, January 5, 1995), and "EPA Requirements for Quality Management Plans (QA/R-2)" (EPA/240/B-01/002, March 2001), or equivalent documentation as determined by EPA.

b. Upon request by EPA, Respondent shall have a laboratory that meets the requirements described in Subparagraph 41(a) of this Settlement Agreement analyze samples submitted by EPA for QA monitoring. Respondent shall provide to EPA the QA/QC procedures followed by all sampling teams and laboratories performing data collection and/or analysis.

c. Upon request by EPA, Respondent shall allow EPA or its authorized representatives to take split and/or duplicate samples. Respondent shall notify EPA not less than 30 days in advance of any sample collection activity, unless shorter notice is agreed to by EPA. EPA shall have the right to take any additional samples that EPA deems necessary. Upon request, EPA shall allow Respondent to take split or duplicate samples of any samples it takes as part of its oversight of Respondent's implementation of the Work.

d. Respondent shall summarize and submit to EPA the results of all sampling and/or tests or other analytical data that they generated, or was/were generated on its behalf, with respect to implementing this Settlement Agreement in the monthly progress reports that the SOW requires. Respondent shall maintain custody of all information and data that the Final Remedial Design Report and any deliverable relied upon or referenced. Upon EPA's request, Respondent shall provide such information and data to EPA.

e. Respondent shall report all communications that it has with local, state, or other federal authorities related to the Remedial Design Work in the monthly progress reports.

f. If, at any time during the Remedial Design process, Respondent becomes aware of the need for additional data beyond the scope of the approved Work Plans, Respondent shall have an affirmative obligation to submit to EPA's Project Coordinator, within twenty (20) days, a memorandum documenting the need for additional data.

42. Community Involvement Plan and Technical Assistance Plan.

a. EPA will prepare a Community Involvement Plan(s), in accordance with EPA

guidance and the NCP. As requested by EPA, Respondent shall provide information supporting EPA's community relations plan and shall participate in the preparation of such information for dissemination to the public and in public meetings that may be held or sponsored by EPA to explain activities at, or concerning, the Site

b. Within thirty (30) days of a request by EPA, Respondent shall provide EPA with a Technical Assistance Plan ("TAP") for providing and administering up to $50,000 of Respondent's funds to be used by a qualified community group to hire independent technical advisers during the Work conducted pursuant to this Settlement Agreement. The TAP shall state that Respondent will provide and administer any additional amounts needed if the selected community group has demonstrated such a need as provided in the SOW. Upon its approval by EPA, the TAP shall be incorporated into and become enforceable under this Settlement Agreement.

43. Emergency Response and Notification of Releases.

a. In the event of any action or occurrence during performance of the Work which causes or threatens a release of Waste Material from the Site that constitutes an emergency situation or may present an immediate threat to public health or welfare or the environment, Respondent shall immediately take all appropriate action. Respondent shall take these actions in accordance with all applicable provisions of this Settlement Agreement, including, but not limited to, the Health and Safety Plan, to prevent, abate or minimize such release or endangerment caused or threatened by the release. Respondent shall also immediately notify the EPA Project Coordinator or, in the event of his/her unavailability, the Regional Duty Officer, EPA Region 5 Emergency Planning and Response Branch at (Tel: (312) 353-2318) and the National Response Center at (800) 424-8802 of the incident or Site conditions. In the event that Respondent fails to take appropriate response action as required by this Paragraph, and EPA takes such action instead, Respondent shall reimburse EPA for all costs of the response action not inconsistent with the NCP pursuant to Section XV (Payment of Response Costs).

b. In addition, Respondent shall submit a written report to EPA within seven (7) days after each release, setting forth the events that occurred and the measures taken or to be taken to mitigate any release or endangerment caused or threatened by the release and to prevent the reoccurrence of such a release. This reporting requirement is in addition to, and not in lieu of, reporting under Section 103(c) of CERCLA, 42 U.S.C. § 9603(c), and Section 304 of the Emergency Planning and Community Right-To-Know Act of 1986, 42 U.S.C. §§ 11004, *et seq.*

IX. EPA APPROVAL OF PLANS AND OTHER SUBMISSIONS

44. After review of any plan, report or other item that is required to be submitted for approval pursuant to this Settlement Agreement, including the SOW, EPA, after a reasonable opportunity for review and comment by the State, shall: (a) approve, in whole or in part, the submission; (b) approve the submission upon specified conditions; (c) modify the submission to cure the deficiencies; (d) disapprove, in whole or in part, the submission, directing that the Respondent modify the submission; or (e) any combination of the above. However, EPA shall not modify a submission without first providing Respondent at least one notice of deficiency and

an opportunity to cure within fifteen (15) days, except where to do so would cause serious disruption to the Work or where previous submission(s) have been disapproved due to material defects.

45. In the event of approval, approval upon conditions, or modification by EPA, pursuant to Subparagraph 44(a), (b), (c) or (e), Respondent shall proceed to take any action required by the plan, report or other item, as approved or modified by EPA subject only to its right to invoke the Dispute Resolution procedures set forth in Section XVI (Dispute Resolution) with respect to the modifications or conditions made by EPA. Following EPA approval or modification of a submittal or portion thereof, Respondent shall not thereafter alter or amend such submittal or portion thereof unless directed by EPA. In the event that EPA modifies the submission to cure the deficiencies pursuant to Subparagraph 44(c) and the submission had a material defect, EPA retains the right to seek stipulated penalties, as provided in Section XVIII (Stipulated Penalties).

46. Resubmission

a. Upon receipt of a notice of disapproval, Respondent shall, within fifteen (15) days or such longer time as specified by EPA in such notice, correct the deficiencies and resubmit the plan, report, or other item for approval. Any stipulated penalties applicable to the submission, as provided in Section XVIII, shall accrue during the 15-day period or otherwise specified period but shall not be payable unless the resubmission is disapproved or modified due to a material defect as provided in Paragraphs 44 and 45.

b. Notwithstanding the receipt of a notice of disapproval, Respondent shall proceed to take any action required by any non-deficient portion of the submission unless otherwise directed by EPA. Implementation of any non-deficient portion of a submission shall not relieve Respondent of any liability for stipulated penalties under Section XVIII (Stipulated Penalties).

c. Respondent shall not proceed further with any subsequent activities or tasks at the Site until receiving EPA approval, approval on condition, or modification of the RD Work Plan. While awaiting EPA approval on these deliverables, Respondent shall proceed with all other tasks and activities which may be conducted independently of these deliverables, in accordance with the schedule set forth under this Settlement Agreement .

d. For all remaining deliverables not enumerated above in Subparagraph 46(c), Respondent shall proceed will all subsequent tasks, activities and deliverables without awaiting EPA approval on the submitted deliverable. EPA reserves the right to stop Respondent from proceeding further, either temporarily or permanently, on any task, activity or deliverable at any point.

47. If EPA disapproves a resubmitted plan, report or other item, or portion thereof, EPA may direct Respondent to correct the deficiencies. EPA also retains the right to modify or develop the plan, report or other item. Respondent shall implement any such plan, report, or item as corrected, modified or developed by EPA, subject only to Respondent's right to invoke the procedures set forth in Section XVI (Dispute Resolution).

48. If upon resubmission, a plan, report, or item is disapproved or modified by EPA due to a material defect, Respondent shall be deemed to have failed to submit such plan, report, or item timely and adequately unless Respondent invokes the dispute resolution procedures in accordance with Section XVI (Dispute Resolution) and EPA's action is revoked or substantially modified pursuant to a Dispute Resolution decision issued by EPA or superseded by an agreement reached pursuant to that Section. The provisions of Section XVI (Dispute Resolution) and Section XVIII (Stipulated Penalties) shall govern the implementation of the Work and accrual and payment of any stipulated penalties during Dispute Resolution. If EPA's disapproval or modification is not otherwise revoked, substantially modified or superseded as a result of a decision or agreement reached pursuant to the Dispute Resolution process set forth in Section XVI, stipulated penalties shall accrue for such violation from the date on which the initial submission was originally required, as provided in Section XVIII.

49. In the event that EPA takes over some of the tasks, Respondent shall incorporate and integrate information supplied by EPA into the final reports.

50. All plans, reports, and other items submitted to EPA under this Settlement Agreement shall, upon approval or modification by EPA, be incorporated into and enforceable under this Settlement Agreement. In the event EPA approves or modifies a portion of a plan, report, or other item submitted to EPA under this Settlement Agreement, the approved or modified portion shall be incorporated into and enforceable under this Settlement Agreement.

51. Neither the failure of EPA to expressly approve or disapprove of Respondent's submissions within a specified time period, nor the absence of comments, shall be construed as approval by EPA.

X. PROGRESS REPORTS

52. Reporting.

a. Respondent shall submit a written progress report to EPA and the State concerning actions undertaken pursuant to this Settlement Agreement every 30th day after the date of receipt of EPA's approval of the RD Work Plan until termination of this Settlement Agreement, unless otherwise directed in writing by the Project Coordinator. These reports shall describe all significant developments during the preceding period, including the actions performed and any problems encountered, analytical data received during the reporting period, and the developments anticipated during the next reporting period, including a schedule of actions to be performed, anticipated problems, and planned resolutions of past or anticipated problems.

b. Respondent shall submit two (2) copies of all plans, reports, or other submissions required by this Settlement Agreement, the Statement of Work, or any approved work plan. Upon request by EPA, Respondent shall submit such documents in electronic form.

53. Final Report. Within thirty (30) days after completion of all Work required by this Settlement Agreement, Respondent shall submit for EPA review and approval a final report summarizing the actions taken to comply with this Settlement Agreement. The final report shall include the following certification signed by a person who supervised or directed the preparation of that report:

> To the best of my knowledge, after thorough investigation, I certify that the information contained in, or accompanying, this submission is 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.

XI. SITE ACCESS AND INSTITUTIONAL CONTROLS

54. If Respondent owns or controls the Site, or any other property where access is needed to implement this Settlement Agreement, Respondent shall, commencing on the Effective Date, provide EPA, the State, and their representatives, including contractors, with access at all reasonable times to the Site, or such other property, to conduct any activity related to this Settlement Agreement. Respondent shall, at least thirty (30) days prior to the conveyance of any interest in real property at the Site, give written notice to the transferee that the property is subject to this Settlement Agreement and written notice to EPA and the State of the proposed conveyance, including the name and address of the transferee. Respondent also agrees to require that its successors comply with the immediately preceding sentence, this Section, and Section XII (Access to Information).

55. Where any action under this Settlement Agreement is to be performed in areas owned by or in possession of someone other than the Respondent, the Respondent shall use its best efforts to obtain all necessary access agreements within thirty (30) days after the Effective Date, or as otherwise specified in writing by the EPA Project Coordinator. Respondent shall immediately notify EPA if, after using its best efforts, they are unable to obtain such agreements. For purposes of this Paragraph, "best efforts" includes the payment of reasonable sums of money in consideration of access. Respondent shall describe in writing their efforts to obtain access. EPA may then assist Respondent in gaining access, to the extent necessary to effectuate the response actions described herein, using such means as EPA deems appropriate. Respondent shall reimburse EPA for all costs and attorney's fees incurred by the United States in obtaining such access, in accordance with the procedures in Section XV (Payment of Response Costs).

56. Notwithstanding any provision of this Settlement Agreement, EPA and the State retain all of their access authorities and rights, including enforcement authorities related thereto, under CERCLA, RCRA, and any other applicable statutes or regulations.

57. If Respondent cannot obtain access agreements, EPA may obtain access for Respondent, perform those tasks or activities with EPA contractors, or terminate the Settlement Agreement. In the event that EPA performs those tasks or activities with EPA contractors and does not terminate the Settlement Agreement, Respondent shall perform all other activities not requiring access to the Site, and shall reimburse EPA for all costs incurred in performing such

activities. Respondent shall integrate the results of any such tasks undertaken by EPA into its reports and deliverables.

XII. ACCESS TO INFORMATION

58. Respondent shall provide to EPA and the State, upon request, copies of all documents and information within their possession or control or that of their contractors or agents relating to activities at the Site or to the implementation of this Settlement Agreement, including, but not limited to, sampling, analysis, chain of custody records, manifests, trucking logs, receipts, reports, sample traffic routing, correspondence, or other documents or information related to the Work. Respondent shall also make available to EPA and the State, for purposes of investigation, information gathering, or testimony, their employees, agents, or representatives with knowledge of relevant facts concerning the performance of the Work.

59. Respondent may assert business confidentiality claims covering part or all of the documents or information submitted to EPA and the State under this Settlement Agreement to the extent permitted by and in accordance with Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7), and 40 C.F.R. § 2.203(b). Documents or information determined to be confidential by EPA will be afforded the protection specified in 40 C.F.R. Part 2, Subpart B. If no claim of confidentiality accompanies documents or information when it is submitted to EPA and the State, or if EPA has notified Respondent that the documents or information are not confidential 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 documents or information without further notice to Respondent. Respondent shall segregate and clearly identify all documents or information submitted under this Settlement Agreement for which Respondent assert business confidentiality claims.

60. Respondent may assert that certain documents, records, and other information are privileged under the attorney-client privilege or any other privilege recognized by federal law. If the Respondent asserts such a privilege in lieu of providing documents, it shall provide EPA and the State with the following: a) the title of the document, record, or information; b) the date of the document, record, or information; c) the name and title of the author of the document, record, or information; d) the name and title of each addressee and recipient; e) a description of the contents of the document, record, or information; and f) the privilege asserted by Respondent. However, no documents, reports or other information created or generated pursuant to the requirements of this Settlement Agreement shall be withheld on the grounds that they are privileged.

61. No claim of confidentiality shall be made with respect to any data, including, but not limited to, all sampling, analytical, monitoring, hydrogeologic, scientific, chemical, or engineering data, or any other documents or information evidencing conditions at, or around, the Site.

XIII. RETENTION OF RECORDS

62. During the pendency of this Settlement Agreement and until 10 years after the Respondent's receipt of EPA's notification that work has been completed, Respondent shall preserve and retain all non-identical copies of documents, records, and other information (including documents, records, or other information in electronic form) now in its possession or control or which come into its possession or control that relate in any manner to the performance of the Work or the liability of any person under CERCLA with respect to the Site, regardless of any corporate retention policy to the contrary. Until ten (10) years after notification that work has been completed, Respondent shall also instruct its contractors and agents to preserve all documents, records, and other information of whatever kind, nature, or description relating to performance of the Work.

63. At the conclusion of this document retention period, Respondent shall notify EPA at least ninety (90) days prior to the destruction of any such records or documents, and, upon request by EPA, Respondent shall deliver any such records or documents to EPA. Respondent may assert that certain documents, records and other information are privileged under the attorney-client privilege or any other privilege recognized by federal law. If Respondent asserts such a privilege, it shall provide EPA with the following: (i) the title of the document, record, or information; (ii) the date of the document, record, or information; (iii) the name and title of the author of the document, record, or information; (iv) the name and title of each addressee and recipient; (v) a description of the subject of the document, record, or information; and (vi) the privilege asserted by Respondent. However, no documents, reports or other information created or generated pursuant to the requirements of this Settlement Agreement shall be withheld on the grounds that they are privileged.

64. The Respondent hereby certifies that to the best of its knowledge and belief, after thorough inquiry, it has not altered, mutilated, discarded, destroyed or otherwise disposed of any records, documents or other information (other than identical copies) relating to its potential liability regarding the Site since notification of potential liability by EPA or the State or the filing of suit against it regarding the Site and that it has fully complied with any and all EPA requests for information pursuant to Sections 104(e) and 122(e) of CERCLA, 42 U.S.C. §§ 9604(e) and 9622(e), and Section 3007 of RCRA, 42 U.S.C. § 6927.

XIV. COMPLIANCE WITH OTHER LAWS

65. Respondent shall undertake all action that this Settlement Agreement requires in accordance with the requirements of all applicable local, state, and federal laws and regulations, unless an exemption from such requirements is specifically provided by law or in this Settlement Agreement. The activities conducted pursuant to this Settlement Agreement, if approved by EPA, shall be considered consistent with the NCP.

66. Except as provided in Section 121(e) of CERCLA, 42 U.S.C. § 9621(e), and the NCP, no permit shall be required for any portion of the Work conducted entirely on-site. Where any portion of the Work requires a federal or state permit or approval, Respondent shall submit

timely applications and take all other actions necessary to obtain and to comply with all such permits or approvals.

67. This Settlement Agreement is not, and shall not be construed to be, a permit issued pursuant to any federal or state statute or regulation.

XV. PAYMENT OF RESPONSE COSTS

68. Payments for Future Response Costs.

a. Respondent shall pay EPA all Future Response Costs not inconsistent with the NCP. On a periodic basis, but at least one (1) year after the Effective Date, EPA will send Respondent a bill requiring payment that includes an Itemized Cost Summary, which includes direct and indirect costs incurred by EPA, including the costs of its contractors. Respondent shall make all payments within thirty (30) days of receipt of each bill requiring payment, except as otherwise provided in Paragraph 70 of this Settlement Agreement, according to the following procedures.

(i) If the payment amount demanded in the bill is for $10,000 or greater, payment shall be made to EPA by Electronic Funds Transfer ("EFT") in accordance with current EFT procedures to be provided to Respondent by EPA Region 5. Payment shall be accompanied by a statement identifying the name and address of the party making payment, the Site name, EPA Region 5, the Site/Spill ID Number B5HQ.

(ii) If the amount demanded in the bill is less than $10,000, the Respondent may in lieu of the EFT procedures in Subparagraph 68(a)(i) make all payments required by this Paragraph by a certified or cashier's check or checks made payable to "EPA Hazardous Substance Superfund," referencing the name and address of the party making the payment, and the EPA Site/Spill ID Number B5HQ. Respondent shall send the check(s) to:

U.S. Environmental Protection Agency
Superfund Payments
Cincinnati Finance Center
PO Box 979076
St. Louis, MO 63197-9000

b. At the time of payment, Respondent shall send notice that payment has been made to:

Peter Felitti
Site Attorney
Office of Regional Counsel
Mail Code C-14J
77 West Jackson
Chicago, IL 60604-3590

Ross del Rosario
Remedial Project Manager
Superfund Division
Mail Code SR-6J
77 West Jackson
Chicago, IL 60604-3590

c. The total amount that Respondent shall pay pursuant to Subparagraph 68(a) shall be deposited in the South Plant MGP Special Account within the EPA Hazardous Substance Superfund 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 EPA Hazardous Substance Superfund.

69. If the event that the payments for Future Response Costs are not made within thirty (30) days of Respondent's receipt of a bill, Respondent shall pay Interest on the unpaid balance. The Interest on unpaid Future Response Costs shall begin to accrue on the date of the bill and shall continue to accrue until the date of payment. If EPA receives a partial payment, Interest shall accrue on any unpaid balance. Payments of Interest made under this Paragraph shall be in addition to such other remedies or sanctions available to the United States by virtue of Respondent's failure to make timely payments under this Section, including but not limited to, payments of stipulated penalties pursuant to Section XVIII. Respondent shall make all payments required by this Paragraph in the manner described in Paragraph 68.

70. Respondent may contest payment of any Future Response Costs under Paragraph 68 if it determines that EPA has made an accounting error or if it believes EPA incurred excess costs as a direct result of an EPA action that was inconsistent with the NCP. Such objection shall be made in writing within thirty (30) days of receipt of the bill and must be sent to the EPA Project Coordinator. Any such objection shall specifically identify the contested Future Response Costs and the basis for objection. In the event of an objection, Respondent shall within the 30 day period pay all uncontested Future Response Costs to EPA in the manner described in Paragraph 68. Simultaneously, Respondent shall establish an interest-bearing escrow account in a federally-insured bank duly chartered in the State of Illinois and remit to that escrow account funds equivalent to the amount of the contested Future Response Costs. Respondent shall send to the EPA Project Coordinator a copy of the transmittal letter and check paying the uncontested Future Response Costs, and a copy of the correspondence that establishes and funds the escrow account, including, but not limited to, information containing the identity of the bank and bank account under which the escrow account is established as well as a bank statement showing the initial balance of the escrow account. Simultaneously with establishment of the escrow account, Respondent shall initiate the Dispute Resolution procedures in Section XVI (Dispute Resolution). If EPA prevails in the dispute, within five (5) days of the resolution of the dispute, Respondent shall pay the sums due (with accrued interest) to EPA in the manner described in Paragraph 68. If Respondent prevails concerning any aspect of the contested costs, Respondent shall pay that portion of the costs (plus associated accrued interest) for which it did not prevail to EPA in the manner described in Paragraph 68. Respondent shall be disbursed any balance of the escrow account. The dispute resolution procedures set forth in this Paragraph in conjunction with the procedures set forth in Section XVI (Dispute Resolution) shall be the exclusive mechanisms for resolving disputes regarding Respondent's obligation to reimburse EPA for its Future Response Costs.

XVI. DISPUTE RESOLUTION

71. Unless this Settlement Agreement expressly provides otherwise, the dispute resolution procedures of this Section shall be the exclusive mechanism for resolving disputes arising under this Settlement Agreement. The Parties shall attempt to resolve any disagreements concerning this Settlement Agreement expeditiously and informally.

72. If the Respondent objects to any EPA action taken pursuant to this Settlement Agreement, including billings for Future Response Costs, it shall notify EPA in writing of its objection(s) within fifteen (15) days of such action, unless the objection(s) has/have been resolved informally. EPA and Respondent shall have thirty (30) days from EPA's receipt of Respondent's written objection(s) to resolve the dispute (the "Negotiation Period"). The Negotiation Period may be extended at the sole discretion of EPA. Such extension may be granted verbally but must be confirmed in writing to be effective.

73. Any agreement reached by the Parties pursuant to this Section shall be in writing and shall, upon signature by the Parties, be incorporated into and become an enforceable part of this Settlement Agreement. If the Parties are unable to reach an agreement within the Negotiation Period, an EPA management official at the Superfund Branch Chief level or higher will issue a written decision. EPA's decision shall be incorporated into and become an enforceable part of this Settlement Agreement. Respondent's obligations under this Settlement Agreement shall not be tolled by submission of any objection for dispute resolution under this Section. Following resolution of the dispute, as provided by this Section, Respondent shall fulfill the requirement that was the subject of the dispute in accordance with the agreement reached or with EPA's decision, whichever occurs. Respondent shall proceed in accordance with EPA's final decision regarding the matter in dispute, regardless of whether Respondent agrees with the decision.

XVII. FORCE MAJEURE

74. Respondent agrees to perform all requirements of this Settlement Agreement within the time limits established under this Settlement Agreement, unless the performance is delayed by a *force majeure*. For purposes of this Settlement Agreement, *force majeure* is defined as any event arising from causes beyond the control of Respondent or of any entity controlled by Respondent, including but not limited to its contractors and subcontractors, which delays or prevents performance of any obligation under this Settlement Agreement despite Respondent's best efforts to fulfill the obligation. The requirement that Respondent exercise "best efforts to fulfill the obligation" includes using best efforts to anticipate any potential *force majeure* event: (a) as it is occurring; and (b) following the potential *force majeure* event, such that the delay is minimized to the greatest extent possible. *Force majeure* does not include financial inability to complete the Work or increased cost of performance.

75. If any event occurs or has occurred that may delay the performance of any obligation under this Settlement Agreement, whether or not caused by a *force majeure* event, Respondent shall notify EPA orally within forty-eight (48) hours of when Respondent first knew that the event might cause a delay. Within five (5) business days thereafter, Respondent shall provide to

EPA in writing an explanation and description of the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay; Respondent's rationale for attributing such delay to a *force majeure* event if it intends to assert such a claim; and a statement as to whether, in the opinion of the Respondent, such event may cause or contribute to an endangerment to public health, welfare or the environment. Failure to comply with the above requirements shall preclude Respondent from asserting any claim of *force majeure* for that event for the period of time of such failure to comply and for any additional delay caused by such failure.

76. If EPA agrees that the delay or anticipated delay is attributable to *a force majeure* event, the time for performance of the obligations under this Settlement Agreement that are affected by the *force majeure* event will be extended by EPA for such time as is necessary to complete those obligations. An extension of the time for performance of the obligations affected by the *force majeure* event shall not, of itself, extend the time for performance of any other obligation. If EPA does not agree that the delay or anticipated delay has been or will be caused by a *force majeure* event, EPA will notify Respondent in writing of its decision. If EPA agrees that the delay is attributable to a *force majeure* event, EPA will notify Respondent in writing of the length of the extension, if any, for performance of the obligations affected by the *force majeure* event.

XVIII. STIPULATED PENALTIES

77. The Respondent shall be liable to EPA for stipulated penalties in the amounts set forth in Paragraphs 78 and 79 for failure to comply with any of the requirements of this Settlement Agreement specified below unless excused under Section XVII (Force Majeure). "Compliance" by the Respondent shall include completion of the activities under this Settlement Agreement or any work plan or other plan approved under this Settlement Agreement identified below in accordance with all applicable requirements of law, this Settlement Agreement, the SOW, and any plans or other documents approved by EPA pursuant to this Settlement Agreement and within the specified time schedules established by, and approved under, this Settlement Agreement.

78. Stipulated Penalty Amounts - Work. The following stipulated penalties shall accrue per violation per day for a) failure to submit timely or adequate plans, reports or other documents as required by Section VIII (Work to be Performed) or b) for failure to implement the approved RD Work Plan.

Penalty Per Violation (Per Day)	Period of Noncompliance (Days)
$ 100	1-14
$ 200	15-30

$ 1,000	31-60
$5,000	61 and beyond

79. Stipulated Penalty Amounts - Reports. The following stipulated penalties shall accrue per violation per day for failure to submit timely or adequate reports pursuant to Paragraphs 52 and 53:

Penalty Per Violation (Per Day)	Period of Noncompliance (Days)
$ 100	1-14
$ 200	15-30
$ 1,000	31-60
$5,000	61 and beyond

80. In the event that EPA assumes performance of a portion or all of the Work pursuant to Paragraph 91, Respondent shall be liable for a stipulated penalty in the amount of $50,000.

81. All penalties shall begin to accrue on the day after the complete performance is due or the day a violation occurs, and shall continue to accrue through the final day of the correction of the noncompliance or completion of the activity. However, stipulated penalties shall not accrue: (i) with respect to a deficient submission under Section VIII (Work to be Performed), during the period, if any, beginning on the 31st day after EPA's receipt of such submission until the date that EPA notifies Respondent of any deficiency; and (ii) with respect to a decision by the EPA Management Official at the Superfund Branch Chief level or higher, under Paragraph 73 of Section XVI (Dispute Resolution), during the period, if any, beginning on the 31st day after the Negotiation Period begins until the date that the EPA management official issues a final decision regarding such dispute. Nothing herein shall prevent the simultaneous accrual of separate penalties for separate violations of this Settlement Agreement.

82. Following EPA's determination that Respondent has failed to comply with a requirement of this Settlement Agreement, EPA may give Respondent written notification of the same and describe the noncompliance. EPA may send Respondent a written demand for the payment of the penalties. However, penalties shall accrue as provided in the preceding Paragraph regardless of whether EPA has notified Respondent of a violation.

83. All penalties accruing under this Section shall be due and payable to EPA within thirty (30) days of Respondent's receipt from EPA of a demand for payment of the penalties, unless Respondent invokes the dispute resolution procedures in accordance with Section XVI (Dispute Resolution). All payments to EPA under this Section shall be paid by certified or cashier's check(s) made payable to "EPA Hazardous Substances Superfund," shall be mailed to U.S. Environmental Protection Agency, Fines and Penalties, Cincinnati Finance Center, P.O.

Box 979007, St. Louis, MO 63197-9000, shall indicate that the payment is for stipulated penalties, and shall reference the Site name, EPA Region and Site/Spill ID Number B5HQ, the EPA Docket Number, and the name and address of the party making payment. Copies of check(s) paid pursuant to this Section, and any accompanying transmittal letter(s) shall be sent to EPA as provide in Paragraph 68.

84. The payment of penalties shall not alter in any way Respondent's obligation to complete performance of the Work required under this Settlement Agreement.

85. Penalties shall continue to accrue during any dispute resolution period, but need not be paid until thirty (30) days after the dispute is resolved by agreement or by receipt of EPA's decision.

86. If Respondent fails to pay stipulated penalties when due, EPA may institute proceedings to collect the penalties, as well as Interest. Respondent shall pay Interest on the unpaid balance, which shall begin to accrue on the date of demand made pursuant to Paragraph 82.

87. Nothing in this Settlement Agreement shall be construed as prohibiting, altering, or in any way limiting the ability of EPA to seek any other remedies or sanctions available by virtue of Respondent's violation of this Settlement Agreement or of the statutes and regulations upon which it is based, including, but not limited to, penalties pursuant to Section 122(l) of CERCLA, 42 U.S.C. § 9622(l), and punitive damages pursuant to Section 107(c)(3) of CERCLA, 42 U.S.C. § 9607(c)(3). Provided, however, that EPA shall not seek civil penalties pursuant to Section 122(l) of CERCLA or punitive damages pursuant to Section 107(c)(3) of CERCLA for any violation for which a stipulated penalty is provided herein, except in the case of a willful violation of this Settlement Agreement or in the event that EPA assumes performance of a portion or all of the Work pursuant to Section XX (Reservation of Rights by EPA), Paragraph 91. Notwithstanding any other provision of this Section, EPA may, in its unreviewable discretion, waive any portion of stipulated penalties that have accrued pursuant to this Settlement Agreement.

XIX. COVENANT NOT TO SUE BY EPA

88. In consideration of the actions that will be performed and the payments that will be made by Respondent under the terms of this Settlement Agreement, and except as otherwise specifically provided in this Settlement Agreement, EPA covenants not to sue or to take administrative action against Respondent pursuant to Sections 106 and 107(a) of CERCLA, 42 U.S.C. §§ 9606 and 9607(a), for performance of the Work and for recovery of Future Response Costs. This covenant not to sue shall take effect upon the Effective Date and is conditioned upon the complete and satisfactory performance by Respondent of all obligations under this Settlement Agreement, including, but not limited to, payment of Future Response Costs pursuant to Section XV(Payment of Response Costs). This covenant not to sue extends only to Respondent and does not extend to any other person.

XX. RESERVATIONS OF RIGHTS BY EPA

89. Except as specifically provided in this Settlement Agreement, nothing herein shall limit the power and authority of EPA or the United States to take, direct, or order all actions necessary to protect public health, welfare, or the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances, pollutants or contaminants, or hazardous or solid waste on, at, or from the Site. Further, except as specifically provided in this Settlement Agreement, nothing herein shall prevent EPA from seeking legal or equitable relief to enforce the terms of this Settlement Agreement, from taking other legal or equitable action as it deems appropriate and necessary, or from requiring Respondent in the future to perform additional activities pursuant to CERCLA or any other applicable law.

90. The covenant not to sue set forth in Section XIX above does not pertain to any matters other than those expressly identified therein. EPA reserves, and this Settlement Agreement is without prejudice to, all rights against Respondent with respect to all other matters, including, but not limited to:

a. claims based on a failure by Respondent to meet a requirement of this Settlement Agreement;

b. liability for costs not included within the definition of Future Response Costs;

c. liability for performance of response action other than the Work;

d. criminal liability;

e. liability for damages for injury to, destruction of, or loss of natural resources, and for the costs of any natural resource damage assessments;

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

g. liability for costs incurred or to be incurred by the Agency for Toxic Substances and Disease Registry related to the Site.

91. Work Takeover. In the event EPA determines that Respondent has ceased implementation of any portion of the Work, is seriously or repeatedly deficient or late in its performance of the Work, or is implementing the Work in a manner that may cause an endangerment to human health or the environment, EPA may assume the performance of any or all portion(s) of the Work as EPA determines necessary. Respondent may invoke the procedures set forth in Section XVI (Dispute Resolution) to dispute EPA's determination that takeover of the Work is warranted under this Paragraph. Costs that the United States incurs in performing the Work pursuant to this Paragraph shall be considered Future Response Costs that Respondent shall pay pursuant to Section XV (Payment of Response Costs). Notwithstanding any other provision of this

Settlement Agreement, EPA retains all authority and reserves all rights to take any and all response actions authorized by law.

XXI. COVENANT NOT TO SUE BY RESPONDENT

92. Respondent covenants not to sue and agrees not to assert any claims or causes of action against the United States, or its contractors or employees, with respect to the Work, past response actions, Future Response Costs, or this Settlement Agreement, including, but not limited to:

a. any direct or indirect claim for reimbursement from the Hazardous Substance Superfund established by 26 U.S.C. § 9507, based on Sections 106(b)(2), 107, 111, 112, or 113 of CERCLA, 42 U.S.C. §§ 9606(b)(2), 9607, 9611, 9612, or 9613, or any other provision of law;

b. any claim arising out of the Work or arising out of the response actions for which the Future Response Costs have been or will be incurred, including any claim under the United States Constitution, the Illinois Constitution, the Tucker Act, 28 U.S.C. § 1491, the Equal Access to Justice Act, 28 U.S.C. § 2412, as amended, or at common law; or

c. any claim against the United States pursuant to Sections 107 and 113 of CERCLA, 42 U.S.C. §§ 9607 and 9613, relating to the Work or payment of Future Response Costs.

93. Except as provided in Paragraph 96, these covenants not to sue shall not apply in the event the United States brings a cause of action or issues an order pursuant to the reservations set forth in Subparagraphs 90 (b), (c), and (e) - (g), but only to the extent that Respondent's claims arise from the same response action, response costs, or damages that the United States is seeking pursuant to the applicable reservation.

94. Respondent reserves, and this Settlement Agreement is without prejudice to, claims against the United States subject to the provisions of Chapter 171 of Title 28 of the United States Code, for money damages for injury or loss of property or personal injury or death caused by the negligent or wrongful act or omission of any employee of the United States while acting within the scope of his office or employment under circumstances where the United States, if a private person, would be liable to the claimant in accordance with the law of the place where the act or omission occurred. However, any such claim shall not include a claim for any damages caused, in whole or in part, by the act or omission of any person, including any contractor, who is not a federal employee as that term is defined in 28 U.S.C. § 2671; nor shall any such claim include a claim based on EPA's selection of response actions, or the oversight or approval of Respondent' plans or activities. The foregoing applies only to claims that are brought pursuant to any statute other than CERCLA and for which the waiver of sovereign immunity is found in a statute other than CERCLA.

95. Nothing in this Agreement shall be deemed to constitute approval or preauthorization of a claim within the meaning of Section 111 of CERCLA, 42 U.S.C. § 9611, or 40 C.F.R. § 300.700(d).

96. Respondent agrees not to assert any claims and to waive all claims or causes of action that it may have for all matters relating to the Site, including for contribution, against any person where the person's liability to Respondent with respect to the Site is based solely on having arranged for disposal or treatment, or for transport for disposal or treatment, of hazardous substances at the Site, or having accepted for transport for disposal or treatment of hazardous substances at the Site, if all or part of the disposal, treatment, or transport occurred before April 1, 2001, and the total amount of material containing hazardous substances contributed by such person to the Site was less than 110 gallons of liquid materials or 200 pounds of solid materials.

97. The waiver in Paragraph 96 shall not apply with respect to any defense, claim, or cause of action that a Respondent may have against any person meeting the above criteria, if such person asserts a claim or cause of action relating to the Site against such Respondent. This waiver also shall not apply to any claim or cause of action against any person meeting the above criteria, if EPA determines:

a. that such person has failed to comply with any EPA requests for information or administrative subpoenas issued pursuant to Section 104(e) or 122(e) of CERCLA, 42 U.S.C. §§ 9604(e) or 9622(e), or Section 3007 of RCRA, 42 U.S.C. § 6927, or has impeded or is impeding, through action or inaction, the performance of a response action or natural resource restoration with respect to the Site, or has been convicted of a criminal violation for the conduct to which this waiver would apply and that conviction has not been vitiated on appeal or otherwise; or

b. that the materials containing hazardous substances contributed to the Site by such person have contributed significantly, or could contribute significantly, either individually or in the aggregate, to the cost of response action or natural resource restoration at the Site.

98. Agreement Not to Challenge Listing. Respondent agrees not to seek judicial review of a decision to list the Site on the NPL at any time after the Effective Date of this Settlement Agreement based on a claim that changed Site conditions that resulted from the performance of the Work in any way affected the basis for listing the Site.

XXII. OTHER CLAIMS

99. By issuance of this Settlement Agreement, the United States and EPA assume no liability for injuries or damages to persons or property resulting from any acts or omissions of Respondent. The United States or EPA shall not be deemed a party to any contract entered into by Respondent or its directors, officers, employees, agents, successors, representatives, assigns, contractors, or consultants in carrying out actions pursuant to this Settlement Agreement.

100. Except as expressly provided in Section XXI, Paragraph 96 and Section XIX (Covenant Not to Sue by EPA), nothing in this Settlement Agreement constitutes a satisfaction of or release from any claim or cause of action against Respondent or any person not a party to this Settlement Agreement, for any liability such person may have under CERCLA, other statutes, or common law, including but not limited to any claims of the United States for costs, damages and interest under Sections 106 and 107 of CERCLA, 42 U.S.C. §§ 9606 and 9607.

101. No action or decision by EPA pursuant to this Settlement Agreement shall give rise to any right to judicial review, except as set forth in Section 113(h) of CERCLA, 42 U.S.C. § 9613(h).

XXIII. CONTRIBUTION PROTECTION

102. The Parties agree that the Respondent is entitled, as of the Effective Date, to protection from contribution actions or claims as provided by Sections 113(f)(2) and 122(h)(4) of CERCLA, 42 U.S.C. §§ 9613(f)(2) and 9622(h)(4), for "matters addressed" in this Settlement Agreement. The "matters addressed" in this Settlement Agreement are the Work and Future Response Costs. Nothing in this Settlement Agreement precludes the United States or Respondent from asserting any claims, causes of action, or demands against any person not parties to this Settlement Agreement for indemnification, contribution, or cost recovery.

XXIV. INDEMNIFICATION

103. Respondent shall indemnify, save and hold harmless the United States, its officials, agents, contractors, subcontractors, employees and representatives from any and all claims or causes of action arising from, or on account of negligent or other wrongful acts or omissions of Respondent, its officers, directors, employees, agents, contractors, or subcontractors, in carrying out actions pursuant to this Settlement Agreement. In addition, Respondent agrees to pay the United States all costs incurred by the United States, including but not limited to attorney fees and other expenses of litigation and settlement, arising from or on account of claims made against the United States based on negligent or other wrongful acts or omissions of Respondent, its officers, directors, employees, agents, contractors, subcontractors and any persons acting on their behalf or under their control, in carrying out activities pursuant to this Settlement Agreement. The United States shall not be held out as a party to any contract entered into by or on behalf of Respondent in carrying out activities pursuant to this Settlement Agreement. Neither Respondent nor any such contractor shall be considered an agent of the United States.

104. The United States shall give Respondent notice of any claim for which the United States plans to seek indemnification pursuant to this Section and shall consult with Respondent prior to settling such claim.

105. Respondent waives all claims against the United States for damages or reimbursement or for set-off of any payments made or to be made to the United States, arising from or on account of any contract, agreement, or arrangement between the Respondent and any person for performance of Work on or relating to the Site. In addition, Respondent shall indemnify and hold harmless the United States with respect to any and all claims for damages or reimbursement arising from or on account of any contract, agreement, or arrangement between the Respondent and any person for performance of Work on or relating to the Site.

XXV. INSURANCE

106. At least thirty (30) days prior to commencing any On-Site Work under this Settlement Agreement, Respondent shall secure, and shall maintain for the duration of this

Settlement Agreement, comprehensive general liability insurance and automobile insurance with limits of $2 million, combined single limit, naming the United States as an additional insured. Within the same period, Respondent shall provide EPA with certificates of such insurance and a copy of each insurance policy. Respondent shall submit such certificates and copies of policies each year on the anniversary of the Effective Date. In addition, for the duration of the Settlement Agreement, Respondent 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 Respondent in furtherance of this Settlement Agreement. If Respondent demonstrates by evidence satisfactory to EPA that any contractor or subcontractor maintains insurance equivalent to that described above, or insurance covering some or all of the same risks but in an equal or lesser amount, then Respondent need provide only that portion of the insurance described above which is not maintained by such contractor or subcontractor.

XXVI. FINANCIAL ASSURANCE

107. Within thirty (30) days of the Effective Date, Respondent shall establish and maintain financial security for the benefit of EPA in the amount of five hundred thousand dollars ($500,000) in one or more of the following form to secure the full and final completion of Work by Respondent:

a. a surety bond unconditionally guaranteeing payment and/or performance of the Work;

b. one or more irrevocable letters of credit, payable to or at the direction of EPA, issued by financial institution(s) acceptable in all respects to EPA equaling the total estimated cost of the Work;

c. a trust fund administered by a trustee acceptable in all respects to EPA;

d. a policy of insurance issued by an insurance carrier acceptable in all respects to EPA, which ensures the payment and/or performance of the Work;

e. a corporate guarantee to perform the Work provided by one or more parent corporations or subsidiaries of Respondent, or by one or more unrelated corporations that have a substantial business relationship with the Respondent; including a demonstration that any such company satisfied the financial test requirements of 40 C.F.R. § 264.143(f); and/or

f. a corporate guarantee to perform the Work by the Respondent, including a demonstration that the Respondent satisfies the requirements of 40 C.F.R. §264.143(f).

108. Any and all financial assurance instruments provided pursuant to this Section shall be in form and substance satisfactory to EPA, determined in EPA's sole discretion. In the event that EPA determines at any time that the financial assurances provided pursuant to this Section (including, without limitation, the instrument(s) evidencing such assurances) are inadequate,

Respondent shall, within thirty (30) days of receipt of notice of EPA's determination, obtain and present to EPA for approval one of the other forms of financial assurance listed in Paragraph 107, above. In addition, if at any time EPA notifies Respondent that the anticipated cost of completing the Work has increased, then, within thirty (30) days of such notification, Respondent shall obtain and present to EPA for approval a revised form of financial assurance (otherwise acceptable under this Section) that reflects such cost increase. Respondent's inability to demonstrate financial ability to complete the Work shall in no way excuse performance of any activities required under this Settlement Agreement.

109. If Respondent seeks to ensure completion of the Work through a guarantee pursuant to Subparagraph 107(e) or 107(f) of this Settlement Agreement, Respondent shall (i) demonstrate to EPA's satisfaction that the guarantor satisfies the requirements of 40 C.F.R. § 264.143(f); and (ii) resubmit sworn statements conveying the information required by 40 C.F.R. § 264.143(f) annually, on the anniversary of the Effective Date, to EPA. For the purposes of this Settlement Agreement, wherever 40 C.F.R. § 264.143(f) references "sum of current closure and post-closure costs estimates and the current plugging and abandonment costs estimates," the current cost estimate of $500,000 for the Work at the Site shall be used in relevant financial test calculations.

110. If, after the Effective Date, Respondent can show that the estimated cost to complete the remaining Work had diminished below the amount set forth in Paragraph 107 of this Section, Respondent may, on any anniversary date of the Effective Date, or at any other time agreed to by the Parties, reduce the amount of the financial security provided under this Section to the estimated cost of the remaining Work to be performed. Respondent shall submit a proposal for such reduction to EPA, in accordance with the requirements of this Section, and may reduce the amount of the security after receiving written approval from EPA. In the event of a dispute, Respondent may change the form of financial assurance required hereunder only in accordance with a final decision resolving such dispute pursuant to Section XVI (Dispute Resolution).

111. Respondent may change the form of financial assurance provided under this Section at any time, upon notice to and prior written approval by EPA, provided that EPA determines that the new form of assurance meets the requirements of this Section. In the event of a dispute, Respondent may change the form of the financial assurance only in accordance with the written decision resolving the dispute.

XXVII. INTEGRATION/APPENDICES

112. This Settlement Agreement, its appendices, and any deliverables, technical memoranda, specifications, schedules, documents, plans, reports (other than progress reports), etc. that will be developed pursuant to this Settlement Agreement and become incorporated into and enforceable under this Settlement Agreement constitute the final, complete and exclusive agreement and understanding among the Parties with respect to the settlement embodied in this Settlement Agreement. The parties acknowledge that there are no representations, agreements or understandings relating to the settlement other than those expressly contained in this Settlement Agreement.

113. In the event of a conflict between any provision of this Settlement Agreement and the provisions of any document attached to this Settlement Agreement or submitted or approved pursuant to this Settlement Agreement, the provisions of this Settlement Agreement shall control.

114. The following appendices are attached to and incorporated into this Settlement Agreement:

- "Appendix A" is the SOW.
- "Appendix B" is the Interim ROD.

XXVIII. EFFECTIVE DATE AND SUBSEQUENT MODIFICATION

115. This Settlement Agreement shall be effective ten (10) days after the Settlement Agreement is signed by EPA's Director of the Superfund Division or his/her delegatee.

116. This Settlement Agreement may be amended by mutual agreement of EPA and Respondent. Amendments shall be in writing and shall be effective when signed by EPA. EPA Project Coordinators do not have the authority to sign amendments to the Settlement Agreement.

117. No informal advice, guidance, suggestion, or comment by the EPA Project Coordinator or other EPA representatives regarding reports, plans, specifications, schedules, or any other writing submitted by Respondent shall relieve Respondent of its obligation to obtain any formal approval required by this Settlement Agreement, or to comply with all requirements of this Settlement Agreement, unless it is formally modified.

XXIX. NOTICE OF COMPLETION OF WORK

118. When EPA determines that all Work has been fully performed for the Site, with the exception of any continuing obligations required by this Settlement Agreement, including but not limited to payment of Future Response Costs and record retention, EPA will provide written notice to Respondent. If EPA determines that any such Work has not been completed in accordance with this Settlement Agreement, EPA will notify Respondent, provide a list of the deficiencies, and require that the Respondent modify the Work Plan if appropriate in order to correct such deficiencies. Respondent shall implement the modified and approved Work Plan and shall submit the required deliverable(s) in accordance with the EPA notice. Failure by Respondent to implement the approved modified RD Planning Documents or other work plan shall be a violation of this Settlement Agreement.

Agreed this 14th day of September, 2015.

For ~~Respondent~~ NORTH SHORE GAS COMPANY

Signature: _____ BFO (for)

Name: Charles R. Matthews

Title: President and Chief Executive Officer

Address: 200 East Randolph Drive

Chicago, IL 60602

It is so ORDERED AND AGREED this 24th day of September, 2015.

BY: _____ DATE: 9/24/15

for RICHARD C KARL, Director
Superfund Division
U.S. Environmental Protection Agency
Region 5

EFFECTIVE DATE: 10/4/15

APPENDIX A

APPENDIX A
STATEMENT OF WORK
FOR THE REMEDIAL DESIGN AT THE NSG FORMER SOUTH PLANT MANUFACTURED GAS PLANT SUPERFUND ALTERNATIVE SITE, WAUKEGAN, ILLINOIS

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I. PURPOSE

This Statement of Work (SOW) sets forth requirements for conducting the Remedial Design (RD) as set forth in the Interim Record of Decision (ROD) for the North Shore Gas Former South Plant Manufactured Gas Plant Superfund Alternative Site ("South Plant Site" or "Site"), which was signed by the Superfund Division Director, U.S. EPA (EPA) Region 5 on July 30, 2015. Respondent, North Shore Gas Company, shall design the Remedial Action (RA) at the South Plant Site in accordance with the ROD, the SOW, the approved Remedial Design Work Plan (RD Work Plan), EPA Superfund Remedial Design Guidance, and any other approved plans and guidance provided by EPA. A partial list of guidance documents is provided in Section VII of this document.

II. DESCRIPTION OF THE REMEDIAL ACTION

Respondent shall design the RA to meet the performance standards and specifications set forth in the ROD and this SOW. Performance standards shall include remedial action objectives, standards of control, quality criteria, and other substantive requirements, criteria, or limitations, including all Applicable or Relevant and Appropriate Requirements (ARARs), as set forth in the ROD, SOW, and/or the Administrative Settlement Agreement and Order on Consent (AOC). Compliance shall be demonstrated by satisfying these performance standards. The components of the RD are described below.

- Mobile Dense Non-aqueous Phase Liquid (DNAPL) will be recovered to the extent practicable using a co-located horizontal well system. One set of wells will be used to inject water into the ground to locally increase the hydraulic gradient, which will act to push the mobile DNAPL towards the recovery wells. The DNAPL will be collected and shipped off-site for disposal.

- Prior to being re-injected into the horizontal well system, any groundwater collected with recovered DNAPL will be treated on-site to meet Illinois groundwater standards to the extent practicable.

III. SCOPE OF REMEDIAL DESIGN

The RD shall consist of the following four major tasks or phases.

A. Remedial Design Work Plan

Within sixty (60) days after the Effective Date of the AOC, Respondent shall submit a draft RD Work Plan to EPA and IEPA for review and comment. The content of the Work Plan shall include:

- An overall management strategy for performing the RD and RA at the Site in accordance with the ROD and the SOW;

- A schedule for fulfilling the RD objectives and for completing the RD;

- A schedule for the planned work for delivery or execution of the milestones stated in the AOC and the SOW;

- An identification of the responsibility and authority of all key personnel and organizations involved in the implementation of the RD; and

- A description of the qualifications of key personnel directing the RD including contractor personnel.

Following comments by EPA, Respondent shall prepare and submit a final RD Work Plan which fully and satisfactorily addresses EPA comments on the draft RD Work Plan. The final RD Work Plan shall include a response to comments explaining how each of EPA's comments on the draft RD Work Plan was addressed in the final RD Work Plan. Respondent shall submit the final RD Work Plan to EPA and IEPA within thirty (30) days of the receipt of EPA's comments on the draft RD Work Plan. Respondent shall submit any subsequent revisions to the RD Work Plan, if required, to EPA and IEPA within a reasonable period of time not to exceed thirty (30) days after receipt of any additional comments on the final RD Work Plan.

B. Pre-Design Work Plan

Within sixty (60) days after EPA issues approval of the Final RD Work Plan, Respondent shall submit a draft Pre-Design Work Plan to EPA and IEPA for review and comment. The content of the Work Plan shall include:

- Means and methods for completing a topographic survey.
- Location, means and methods for implementing a subsurface investigation to assess the depth to the confining layer and thickness/relative mobility of free product within the DNAPL plume.
- Means and methods for collecting field data to support an evaluation of pumping rates and draw down from wells to be installed as part of the RA.
- Means and methods for collecting representative samples of groundwater and DNAPL and performing bench-scale treatability testing for design of the phase separation and groundwater treatment system

Following comments by EPA, Respondent shall prepare and submit a final Pre-Design Work Plan which fully and satisfactorily addresses EPA comments on the draft Pre-Design Work Plan. The final Pre-Design Work Plan shall include a response to comments explaining how each of EPA's comments on the draft Pre-Design Work Plan was addressed in the final Pre-Design Work Plan. Respondent shall submit the final Pre-Design Work Plan to EPA and IEPA within thirty (30) days of the receipt of EPA's comments on the draft Pre-Design Work Plan. Respondent shall submit any subsequent revisions to the Pre-Design Work Plan, if required, to EPA and IEPA within a reasonable period of time not to exceed thirty (30) days after receipt of any additional comments on the final Pre-Design Work Plan.

C. Preliminary Remedial Design

1. Required Content

Respondent shall submit the Preliminary Design within sixty (60) days of completion of the Pre-Design Investigation and receipt of analytical results when the design effort is approximately 30 percent complete. The Preliminary Design submittal shall include or discuss, at a minimum, the following:

- Design assumptions and parameters, including design restrictions, and process performance criteria;
- Proposed cleanup verification methods, including compliance with ARARs;
- Outline of required specifications;
- Proposed siting/locations of processes/construction activity;
- Expected long-term monitoring and operation requirements;
- Real estate, easement, and permit requirements;
- Preliminary construction schedule, including contracting strategy.

2. Media-Specific Plans

The following draft plans shall be submitted in outline form as part of the draft Preliminary Remedial Design submittal:

- Groundwater Monitoring Plan
- DNAPL Reduction Performance Plan

The fully developed Groundwater Monitoring Plan and DNAPL Reduction Performance Plan will be incorporated within the Final O&M Plan and will be submitted as part of the Pre-final Design.

All plans and specifications shall be developed in accordance with EPA's "Superfund Remedial Design and Remedial Action Guidance" (OSWER Directive No. 9355.0-4A), and shall demonstrate that the RA shall meet all objectives of the ROD, the AOC, and this SOW, including all performance standards.

3. Additional Plans

The following draft plans shall be submitted on a schedule described in the RD Work Plan:

- Draft Quality Assurance Project Plan (QAPP)
- Draft Health and Safety Plan (HASP)
- Draft Contingency Plan (if stand-alone)
- Draft Field Sampling Plan
- Draft Construction Quality Assurance Plan (CQAP)
- Draft O&M Plan

D. Pre-final Design/Final Design

Respondent shall submit the Pre-final Design within sixty (60) days of receipt of EPA comments on the Preliminary Design when the design effort is 95 percent (%) complete. If any modifications to the design are necessary, Respondent shall submit the Final Design within thirty (30) days of receipt of EPA comments on the Pre-final Design. The Pre-final Design shall fully address all comments made to the preceding design submittal. The Final Design shall fully address all comments made to the Pre-final Design and shall include reproducible drawings and specifications suitable for bid advertisement. The Pre-final Design shall serve as the Final Design if EPA has no further comments and issues the notice to proceed.

The Pre-final and Final Design submittals shall include the following:

- Final Quality Assurance Project Plan (QAPP)
- Final Health and Safety Plan (HASP)
- Final Contingency Plan (if stand-alone)
- Final Field Sampling Plan (FSP)
- Final Construction Quality Assurance Plan (CQAP)
- Final O&M Plan
- Capital and O&M Cost Estimate. This cost estimate shall refine the cost estimate provided in the Focused Feasibility Study to reflect the detail presented in the Final Design.

IV. SUPPORTING PLANS FOR REMEDIAL DESIGN

This section describes the required contents of each of the supporting plans. The documents listed in this section shall be prepared by Respondent and submitted in accordance with the schedule in Section VI of this SOW. All plans shall be submitted to EPA and IEPA, and are subject to EPA approval, in consultation with IEPA. For all revised submittals under this Section, Respondent shall identify all changes to the submittal that were not a direct result of addressing agency comments and shall explain the reasoning for said change.

A. Groundwater Monitoring Plan

Respondent shall prepare and submit a Groundwater Monitoring Plan as part of the RD submittals. This submittal shall include, but not be limited to, monitoring the quality of extracted groundwater that is treated prior to reinjection to the ground

B. DNAPL Reduction Performance Plan

Respondent shall prepare a DNAPL Reduction Performance Plan to track progress with removing mobile DNAPL, in accordance with performance standards described in the approved Focused Feasibility Study. This shall include, but be not limited, to developing and updating decline curve charts to track DNAPL removal rates.

C. Quality Assurance Project Plan (QAPP)

Respondent shall develop a Site-specific QAPP, covering sample analysis and data handling for samples collected in all phases of future Site work, based upon the AOC and guidance provided by EPA. The QAPP shall be based upon and refer to the Multi-Site QAPP prepared for Remedial Investigation/Feasibility Study (RI/FS) activities and shall be consistent with the requirements of the EPA Contract Lab Program (CLP) for laboratories proposed outside the CLP. The QAPP shall also be prepared in accordance with the *Intergovernmental Data Quality Task Force Uniform Federal Policy for QAPPs*, EPA-505-B-04-900A, March 2005 (UFP-QAPP). The UFP-QAPP describes policy, organization, and functional activities, and the data quality objectives and measures necessary to achieve adequate data for use in planning and documenting the sampling investigation. The UFP-QAPP shall at a minimum include:

1. Project description
   a. Facility location history
   b. Past data collection activity
   c. Project scope
   d. Sample network design
   e. Parameters to be tested and frequency
   f. Project schedule

2. Project organization and responsibility

3. Quality organization and responsibility
   a. Level of quality control effort
   b. Accuracy, precision and sensitivity of analysis
   c. Completeness, representativeness and comparability

4. Sampling procedures

5. Sample custody
   a. Field-specific custody procedures
   b. Laboratory chain-of-custody procedures

6. Calibration procedures and frequency
   a. Field instruments/equipment
   b. Laboratory instruments

7. Analytical procedures
   a. Non-contract laboratory program analytical methods
   b. Field screening and analytical protocol
   c. Laboratory procedures

8. Internal quality control checks
   a. Field measurements
   b. Laboratory analysis

9. Data reduction, validation, and reporting
   a. Data reduction
   b. Data validation
   c. Data reporting

10. Performance and system audits
   a. Internal audits of field activity
   b. Internal laboratory audit
   c. External field audit
   d. External laboratory audit

11. Preventive maintenance
   a. Routine preventive maintenance procedures and schedules
   b. Field instruments/equipment
   c. Laboratory instruments

12. Specific routine procedures to assess data precision, accuracy, and completeness
   a. Field measurement data
   b. Laboratory data

13. Corrective Action
   a. Sample collection/field measurement

b. Laboratory analysis

14. Quality assurance reports to management

Respondent shall submit a draft QAPP to EPA for review and approval.

D. Health and Safety Plan (HASP)

Respondents shall develop a HASP which is designed to protect on-Site personnel and area residents from physical, chemical and all other hazards posed by this remedial action. The HASP shall be based upon and refer to the Multi-Site HASP prepared for RI/FS activities and shall follow EPA guidance and all OSHA requirements as outlined in 29 C.F.R. §§ 1910 and 1926, and shall develop the performance levels and criteria necessary to address the following areas:

1. Facility description
2. Personnel
3. Levels of protection
4. Safe work practices and safeguards
5. Medical surveillance
6. Personal and environmental air monitoring
7. Personal protective equipment
8. Personal hygiene
9. Decontamination - personal and equipment
10. Site work zones
11. Contaminant control
12. Contingency and emergency planning
13. Logs, reports and record keeping

E. Contingency Plan [Stand Alone or in HASP]

Respondents shall submit a Contingency Plan describing procedures to be used in the event of an accident or emergency at the Site. The Contingency Plan shall be prepared in accordance with 40 C.F.R. § 300.150 of the National Contingency Plan and shall include, at a minimum, the following:

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. First aid medical information;
4. Air Monitoring Plan (if applicable); and
5. Spill Prevention, Control, and Countermeasures (SPCC) Plan (if applicable), as specified in 40 C.F.R. Part 109, describing measures to prevent and contingency plans for potential spills and discharges from materials handling and transportation.

F. Field Sampling Plan (FSP)

Respondent shall develop a FSP in accordance with the *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*, October 1988. The FSP shall be based upon and refer to the Multi-Site FSP prepared for RI/FS activities, should supplement the QAPP and address all sample collection activities.

G. Construction Quality Assurance Plan (CQAP)

Respondent shall submit a CQAP which describes the Site-specific components of the quality assurance program which shall ensure that the completed project meets or exceeds all design criteria, plans, and specifications. The CQAP shall contain, at a minimum, the following elements:

1. Responsibilities and authorities of all organizations and key personnel involved in the design and construction of the remedial action.

2. Qualifications of the Quality Assurance Official to demonstrate he possesses the training and experience necessary to fulfill his identified responsibilities.

3. Protocols for sampling and testing used to monitor construction.

4. Identification of proposed quality assurance sampling activities including the sample size, locations, frequency of testing, acceptance and rejection data sheets, problem identification and corrective measures reports, evaluation reports, acceptance reports, and final documentation. A description of the provisions for final storage of all records consistent with the requirements of the AOC shall be included.

5. Reporting requirements for CQAP activities shall be described in detail in the CQAP. This shall include such items as daily summary reports, inspection data sheets, problem identification and corrective measures reports, design acceptance reports, and final documentation. Provisions for the final storage of all records shall be presented in the CQAP.

6. Respondent shall dispose of any removed debris off-site, as appropriate, to an appropriate approved landfill or other approved facility. These waste streams include but are not limited to: personnel protective equipment and soils, sediment, solids, and liquids resulting from decontamination of equipment, additional investigations, and RA construction.

H. Operation and Maintenance Plan (O & M Plan)

Respondent shall describe the operation and maintenance (O&M) of the DNAPL recovery system and associated equipment. O&M activities shall include groundwater monitoring and reporting; tracking progress of DNAPL recovery (e.g., % mobile DNAPL removed); inspection and maintenance of the DNAPL recovery system, including the network of injection and

extraction wells; inspection and maintenance of groundwater treatment system. Appropriate interim groundwater monitoring may require the installation of additional monitoring wells or abandonment of existing wells that are no longer necessary. The need for and scope of long-term Site-wide groundwater monitoring will be determined by the future Site-wide Record of Decision.

V. Section V- Technical Assistance Plans (TAP)

1.1 Settling Defendant's Responsibilities for Technical Assistance

1.1.1 If EPA requests, Settling Defendant shall arrange for a qualified community group to receive the services of a technical advisor(s) who can: (i) help group members understand Site cleanup issues (specifically, to interpret and comment on Site-related documents developed under this SOW); and (ii) share this information with others in the community. The technical advisor(s) will be independent from the Settling Defendant. Settling Defendant's TAP assistance will be limited to $50,000, except as provided in ¶1.1.4.3, and will end when EPA issues the Certification of Work Completion. Settling Defendant shall implement this requirement under a Technical Assistance Plan (TAP).

1.1.2 If EPA requests, Settling Defendant shall cooperate with EPA in soliciting interest from community groups regarding a TAP grant at the Site. If more than one community group expresses an interest in a TAP grant, Settling Defendant shall cooperate with EPA in encouraging the groups to submit a single, joint application for a TAP grant.

1.1.3 If EPA requests, Settling Defendant shall, within 30 days, submit a proposed TAP for EPA approval. The TAP must describe the Settling Defendant's plans for the qualified community group to receive independent technical assistance. The TAP must include the following elements:

.1 For Settling Defendant to arrange for publication of a notice in local media explaining how interested community groups may submit an application for a TAP grant. If EPA has already received a Letter of Intent to apply for a TAP grant from a community group, the notice should explain how other interested groups may also try to combine efforts with the LOI group or submit their own applications, by a reasonable specified deadline;

.2 For Settling Defendant to review the application(s) received and determine the eligibility of the community group(s). The proposed TAP must include eligibility criteria as follows:

.2.1 A community group is eligible if it is: (i) comprised of people who are affected by the release or threatened release at the Site; (ii) incorporated as a not-for-profit organization for the purposes of the Site or otherwise established as a charitable organization that operates within the geographical range of the Site and is already

incorporated as a non-for-profit organization; and (iii) able to demonstrate its ability to adequately and responsibly manage TAP-related responsibilities.

.2.2 A community group is ineligible if it is: (i) a potentially responsible party (PRP) at the Site, represents such a PRP, or receives money or services from a PRP (other than through the TAP); (ii) affiliated with a national organization; (iii) an academic institution; (iv) a political subdivision; (v) a tribal government; or (vi) a group established or presently sustained by any of the above ineligible entities; or (vii) a group in which any of the above ineligible entities is represented.

.3 For Settling Defendant to notify EPA of its determination on eligibility of the applicant group(s) to ensure that the determination is consistent with the SOW before notifying the group(s);

.4 If more than one community group submits a timely application, for Settling Defendant to review each application and evaluate each application based on the following elements:

.4.1 The extent to which the group is representative of those persons affected by the Site; and

.4.2 The effectiveness of the group's proposed system for managing TAP-related responsibilities, including its plans for working with its technical advisor and for sharing Site-related information with other members of the community.

.5 For Settling Defendant to document its evaluation of, and its selection of, a qualified community group, and to brief EPA regarding its evaluation process and choice. EPA may review Settling Defendant's evaluation process to determine whether the process satisfactorily follows the criteria in ¶1.1.3.4. TAP assistance may be awarded to only one qualified group at a time;

.6 For Settling Defendant to notify all applicant(s) about Settling Defendant's decision;

.7 For Settling Defendant to designate a person (TAP Coordinator) to be their primary contact with the selected community group;

.8 A description of Settling Defendant's plans to implement the requirements of ¶1.1.4 (Agreement with Selected Community Group); and

.9 For Settling Defendant to submit quarterly progress reports regarding the implementation of the TAP.

1.1.4 Agreement with Selected Community Group

.1 Settling Defendant shall negotiate an agreement with the selected community group that specifies the duties of Settling Defendant and the community group. The agreement must specify the activities that may be reimbursed under the TAP and the activities that may not be reimbursed under the TAP. The list of allowable activities must be consistent with 40 C.F.R. § 35.4070 (e.g., obtaining the services of an advisor to help the group understand the nature of the environmental and public health hazards at the Site and the various stages of the response action, and communicating Site information to others in the community). The list of non-allowable activities must be consistent with 40 C.F.R. § 35.4075 (e.g., activities related to litigation or political lobbying).

.2 The agreement must provide that Settling Defendant's review of the Community Group's recommended choice for Technical Advisor will be limited, consistent with 40 C.F.R. § 35.4190 and § 35.4195, to criteria such as whether the advisor has relevant knowledge, academic training, and relevant experience as well as the ability to translate technical information into terms the community can understand.

.3 The agreement must provide that the Community Group is eligible for additional TAP assistance, if it can demonstrate that it has effectively managed its TAP responsibilities to date, and that at least three of the following ten factors are satisfied:

.3.1 EPA expects that more than eight years (beginning with the initiation of the RD) will pass before construction completion will be achieved;

.3.2 EPA requires treatability studies or evaluation of new and innovative technologies;

.3.3 EPA reopens the ROD;

.3.4 The public health assessment (or related activities) for the Site indicates the need for further health investigations and/or health-related activities;

.3.5 After Settling Defendant's selection of the Community Group for the TAP, EPA designates additional Operable Units at the Site;

.3.6 EPA issues an Explanation of Significant Differences for the ROD;

.3.7 After Settling Defendant's selection of the Community Group, a legislative or regulatory change results in significant new Site information;

.3.8 Significant public concern about the Site exists, as evidenced, e.g., by relatively large turnout at meetings, the need for multiple meetings, the need for numerous copies of documents to inform community members, etc.;

.3.9 Any other factor that, in EPA's judgment, indicates that the Site is unusually complex; or

.3.10 An RD costing at least $2 million was performed at the Site.

.4 Settling Defendant is entitled to retain any unobligated TAP funds upon EPA's Certification of Work Completion.

.5 Settling Defendant shall submit a draft of the proposed agreement to EPA for its comments.

VI. Summary of Major Deliverables/Schedule

A summary of the general project schedule and reporting requirements contained in this SOW is presented below. The general project schedule may be modified if the Respondent submits a proposal to accommodate site access or other site-specific constraints and EPA approves such a request.

Deliverable	Due Date
Submit proposal for Supervising Contractor	Thirty (30) days after the Effective Date of the AOC.
Draft Remedial Design Work Plan	Sixty (60) days after the Effective Date of the AOC
Final Remedial Design Work Plan	Thirty (30) days after receipt of EPA comments on Draft RD Work Plan.
Draft Pre-Design Work Plan	Sixty (60) days after receipt of EPA approval of Final RD Work Plan.
Final Pre-Design Work Plan	Thirty (30) days after receipt of EPA comments on Draft Pre-Design Work Plan.
Preliminary Design (30%) , including but not limited to: •	Sixty (60) days after completion of Pre-Design Investigation and Receipt of analytical results.
Draft Quality Assurance Project Plan Draft Health and Safety Plan Draft Contingency Plan (if stand-alone) Draft Field Sampling Plan Draft Construction Quality Assurance Plan Draft O&M Plan	In accordance with schedule described in the Remedial Design Work Plan.
Additional Plans:	

Deliverable	Due Date
Groundwater Monitoring Plan	Same as Preliminary Design
DNAPL Reduction Performance Plan	Same as Preliminary Design
Pre-Final Design (95%), including but not limited to: • Final Quality Assurance Project Plan • Final Health and Safety Plan • Final Contingency Plan (if stand-alone) • Final Field Sampling Plan • Final Construction Quality Assurance Plan • Final O&M Plan	Sixty (60) days after receipt of EPA comments on Preliminary Design Documents.
Final Design Documents (100%)	Thirty (30) days after receipt of EPA comments on Pre-final Design.
Progress Reports	Thirty (30) days after the end of each monthly reporting period.

VII. REGULATIONS AND GUIDANCE DOCUMENTS

The following list, although not comprehensive, comprises many of the regulations and guidance documents that apply to the RD/RA process:

American National Standards Practices for Respiratory Protection. American National Standards Institute Z88.2-1980, March 11, 1981.

ARCS Construction Contract Modification Procedures September 89, OERR Directive 9355.5-01/FS.

CERCLA Compliance with Other Laws Manual, Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, August 1988 (DRAFT), OSWER Directive No. 9234.1-01 and -02.

Community Relations in Superfund — A Handbook, U.S. EPA, Office of Emergency and Remedial Response, June 1988, OSWER Directive No. 9230.0-3B.

A Compendium of Superfund Field Operations Methods, Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, EPA/540/P-87/001a, August 1987, OSWER Directive No. 9355.0-14.

Construction Quality Assurance for Hazardous Waste Land Disposal Facilities, U.S. EPA, Office of Solid Waste and Emergency Response, October 1986, OSWER Directive No. 9472.003.

Contractor Requirements for the Control and Security of RCRA Confidential Business Information, March 1984.

Data Quality Objectives for Remedial Response Activities, U.S. EPA, Office of Emergency and Remedial Response and Office of Waste Programs Enforcement, EPA/540/G-87/003, March 1987, OSWER Directive No. 9335.0-7B.

Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual, U.S.
EPA Region W, Environmental Services Division, April 1, 1986 (revised periodically).

EPA NEIC Policies and Procedures Manual, EPA-330/9-78-001-R, May 1978, revised November 1984.

Federal Acquisition Regulation, Washington, DC: U.S. Government Printing Office (revised periodically).

Guidance on EPA Oversight of Remedial Designs and Remedial Actions Performed by Potential Responsible Parties, U.S. EPA Office of Emergency and Remedial Response, EPA/540/G-90/001, April 1990.

Guidance on Expediting Remedial Design and Remedial Actions, EPA/540/G-90/006, August 1990.

Guidance on Remedial Actions for Contaminated Groundwater at Superfund Sites, U.S. EPA Office of Emergency and Remedial Response (DRAFT), OSWER Directive No. 9283.1-2.

Guide for Conducting Treatability Studies Under CERCLA, U.S. EPA, Office of Emergency and Remedial Response, Prepublication version.

Guide to Documenting Cost and Performance for Remediation Projects, Publication EPA-542-B-95-002, March 1995.

Guide to Management of Investigation-Derived Wastes, U.S. EPA, Office of Solid Waste and Emergency Response, Publication 9345.3-03FS, January 1992.

Guidelines and Specifications for Preparing Quality Assurance Project Plans, U.S. EPA, Office of Research and Development, Cincinnati, OH, QAMS-004/80, December 29, 1980.

Health and Safety Requirements of Employees Employed in Field Activities, U.S. EPA, Office of Emergency and Remedial Response, July 12, 1982, EPA Order No. 1440.2.

Interim Guidance on Compliance with Applicable of Relevant and Appropriate Requirements, U.S. EPA, Office of Emergency and Remedial Response, July 9, 1987, OSWER Directive No. 9234.0-05.

Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans, U.S. EPA, Office of Emergency and Remedial Response, QAMS-005/80, December 1980.

Methods for Evaluating the Attainment of Cleanup Standards: Vol. 1, Soils and Solid Media, February 1989, EPA 23/02-89-042; Vol. 2, Groundwater (Jul 1992).

National Oil and Hazardous Substances Pollution Contingency Plan; Final Rule, Federal Register 40 C.F.R. Part 300, March 8, 1990.

NIOSH Manual of Analytical Methods, 2nd edition. Volumes I-VII for the 3rd edition, Volumes I and II, National Institute of Occupational Safety and Health.

Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, National Institute of Occupational Safety and Health/Occupational Health and Safety Administration/United States Coast Guard/Environmental Protection Agency, October 1985.

Permits and Permit Equivalency Processes for CERCLA On-Site Response Actions, February 19, 1992, OSWER Directive 9355.7-03.

Procedure for Planning and Implementing Off-Site Response Actions, Federal Register, Volume 50, Number 214, November 1985, pages 45933-45937.

Procedures for Completion and Deletion of NPL Sites, U.S. EPA, Office of Emergency and Remedial Response, April 1989, OSWER Directive No. 9320.2-3A.

Quality in the Constructed Project: A Guideline for Owners, Designers and Constructors, Volume 1, Preliminary Edition for Trial Use and Comment, American Society of Civil Engineers, May 1988.

Remedial Design/Remedial Action (RD/RA) Handbook, U.S. EPA, Office of Solid Waste and Emergency Response (OSWER) 9355.0-04B, EPA 540/R-95/059, June 1995.

Revision of Policy Regarding Superfund Project Assignments, OSWER Directive No. 9242.3-08, December 10, 1991. [Guidance, p. 2-2]

Scoping the Remedial Design (Fact Sheet), February 1995, OSWER Publ. 9355-5-21 FS.

Standard Operating Safety Guides, U.S. EPA, Office of Emergency and Remedial Response, November 1984.

Standards for the Construction Industry, Code of Federal Regulations, Title 29, Part 1926, Occupational Health and Safety Administration.

Standards for General Industry, Code of Federal Regulations, Title 29, Part 1910, Occupational Health and Safety Administration.

Structure and Components of 5-Year Reviews, OSWER Directive No. 9355.7-02, May 23, 1991. [Guidance, p. 3-5]

Superfund Guidance on EPA Oversight of Remedial Designs and Remedial Actions Performed by Potentially Responsible Parties, April 1990, EPA/540/G-90/001.

Superfund Remedial Design and Remedial Action Guidance, U.S. EPA, Office of Emergency and Remedial Response, June 1986, OSWER Directive No. 9355.0-4A.

Superfund Response Action Contracts (Fact Sheet), May 1993, OSWER Publ. 9242.2-08FS.

Treatability Studies Under CERCLA, Final. U.S. EPA, Office of Solid Waste and Emergency Response, EPA/540/R-92/071a, October 1992.

USEPA Contract Laboratory Program Statement of Work for Inorganic Analysis, U.S. EPA, Office of Emergency and Remedial Response, July 1988.

USEPA Contract Laboratory Program Statement of Work for Organic Analysis, U.S. EPA, Office of Emergency and Remedial Response, February 1988.

User's Guide to the EPA Contract Laboratory Program, U.S. EPA, Sample Management Office, August 1982.

Value Engineering (Fact Sheet), U.S. EPA, Office of Solid Waste and Emergency Response, Publication 9355.5-03FS, May 1990.

APPENDIX B

North Shore Gas – Former South Plant Manufactured Gas Plant Waukegan, Lake County, Illinois

Record of Decision For Interim Action

DNAPL Contamination

U.S. Environmental Protection Agency Region 5

77 W Jackson Blvd
Chicago, IL 60604

July 2015

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LIST OF ACRONYMS AND ABBREVIATIONS

ARARs	Applicable or Relevant and Appropriate Requirements
AOC	Administrative Order on Consent
bgs	Below ground surface
BLRA	Baseline Human Health Risk Assessment
CDI	Chronic Daily Intake
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	CERCLA Information System
COC	Contaminant of Concern
COPC	Contaminant of Potential Concern
CSM	Conceptual Site Model
DNAPL	Dense Nonaqueous Phase Liquid
EPA	U.S. Environmental Protection Agency
ELCR	Excess lifetime cancer risk
ERH	Electric Resistance Heating
EJ & E	Elgin Joliet and Eastern Railroad
ERA	Ecological Risk Assessment
FFS	Focused Feasibility Study
FS	Feasibility Study
FWS	Fish and Wildlife Service
FYR	Five-Year Review
HDD	Horizontal Directional Drilling
HHRA	Human Health Risk Assessment
HQ	Hazard quotient
IC	Institutional control
Illinois EPA	Illinois Environmental Protection Agency
mg/kg	Milligram per kilogram
MGP	Manufactured Gas Plant
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List

LIST OF ACRONYMS AND ABBREVIATIONS – CONT'D

NSG	North Shore Gas Company
PAH	Polynuclear Aromatic Hydrocarbon
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RfD	Reference dose
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SL	Screening level
SLERA	Screening Level Ecological Risk Assessment
SRP	Site Remediation Program
SSI	Supplemental Site Inspection
TOC	Total Organic Carbon
VI	Vapor Intrusion
VOC	Volatile Organic Compound
WPD	Waukegan Port District

Part 1 – Declaration

1.1 Site Name and Location

North Shore Gas Former South Plant MGP Superfund Alternative Site
CERCLIS ID# ILD984809228
Waukegan, Lake County, Illinois

1.2 Statement of Basis and Purpose

This Record of Decision (ROD) presents the interim remedial action (the "selected remedy") that the U.S. Environmental Protection Agency (EPA) chose to address the pool of undissolved tar-like material, which is classified as a dense, nonaqueous phase liquid (DNAPL), that is beneath the North Shore Gas (NSG) Former South Plant Manufactured Gas Plant (MGP) Superfund Alternative site in Waukegan, Illinois. The DNAPL is a continual source of groundwater contamination at the South Plant MGP site and is considered a principal threat waste. Implementing the selected remedy to address the DNAPL will significantly reduce the source of groundwater contamination and would then allow EPA to select a final remedial action to address contaminated soil and groundwater and potential soil vapor intrusion risks. EPA's decision to select an interim remedial action for DNAPL was made in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative Record file for the site (see Appendix 2).

The Illinois Environmental Protection Agency (Illinois EPA) has indicated its concurrence with the selected remedy. EPA will place the State's concurrence letter into the site Administrative Record upon receipt.

1.3 Assessment of Site

The interim remedial action described in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

1.4 Description of Selected Remedy

The selected remedy consists of the enhanced recovery of mobile DNAPL using a network of co-located horizontal groundwater injection and DNAPL recovery wells. Some DNAPL could be removed using horizontal recovery wells alone; however, by pumping water into co-located horizontal injection wells, a localized increase in hydraulic gradient will result, which will then increase the rate of migration of mobile DNAPL towards the recovery wells. Recovered DNAPL will be collected and shipped off-site for thermal treatment and disposal and any recovered groundwater will be treated on-site and re-used in the DNAPL recovery process.

The estimated cost to implement the selected remedy is $10.6 million and it will take approximately 8 years to extract all recoverable DNAPL from the ground.

1.5 Statutory Determinations

The selected interim remedy is protective of human health and the environment and will be consistent with any final site remedial actions, complies with federal and state requirements that are applicable or relevant and appropriate to this limited-scope action, and is cost-effective. The statutory preference for treatment of principal threat waste will be met because recovered DNAPL will be thermally treated (*i.e.*, used as fuel in a cement kiln oven) to reduce its volume and toxicity.

The selected interim remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, therefore, EPA will conduct a statutory review within five years after initiation of remedial action to ensure that the selected interim remedy continues to be protective of human health and the environment.

1.6 Data Certification Checklist

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

Information Item	Section in Record of Decision
Chemicals of concern and their respective concentrations	2.2 and 2.5
Baseline risks represented by the chemicals of concern	2.2 and 2.7
Cleanup levels established for chemicals of concern and the basis for these levels	2.8
How source materials constituting principal threats are addressed	2.11
Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater use in the baseline risk assessment and the ROD	2.6
Potential land and groundwater use that will be available at the site as a result of the selected remedy	2.6; groundwater will not be fully restored in this remedy.
Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected	2.10 and Table 3
Key factor(s) that led to selecting the remedy (*i.e.*, a description of how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, and highlighted criteria key to the decision)	2.10, 2.12, 2.13, and Table 2

1.7 Authorizing Signature

EPA, as the lead agency for the NSG Former South Plant MGP Superfund Alternative site (ILD982073785), formally authorizes this Interim Record of Decision.

Richard C. Karl, Director
Superfund Division
U.S. Environmental Protection Agency
Region 5

7-30-15
Date

Illinois EPA, as the support agency for the NSG Former South Plant MGP Superfund Alternative site (ILD982073785), has indicated their concurrence with this Interim Record of Decision. Their concurrence letter will be added to the Administrative Record (Appendix 1 of this ROD) upon receipt.

Part 2 – Decision Summary

2.1 Site Name, Location, and Brief Description

The nearly 23-acre NSG South Plant MGP site includes the 1.9-acre former South Plant MGP facility property located at 2 North Pershing Road and 1 South Pershing Road in Waukegan, Illinois (see Figure 1), and several adjacent properties where MGP-derived contaminants have been found (see Figure 2). The adjacent parcels include:

- The Waukegan Port District (WPD)-owned property located to the east of the former MGP parcel on Lake Michigan. The 13.1-acre WPD parcel includes a marina, a visitor center/administration building, a maintenance building, and asphalt-paved parking lots.
- The Akzo Nobel Aerospace Coatings, Inc. (Akzo) parcel located east/southeast of the former MGP and adjacent to Lake Michigan. The 6.2-acre property consists of buildings used for manufacturing paints and coatings and asphalt-paved parking lots.
- The Elgin, Joliet and Eastern (EJ&E) Railroad tracks and right-of-way located east and at the south end of the former MGP property. This parcel is approximately 0.7 acres.
- The City of Waukegan-owned parcels located southeast of the former MGP site between the EJ&E, Akzo, and WPD properties. One parcel is a vacated former city street that abuts a Commonwealth Edison substation and others include nearby roads and associated right-of-ways, totaling 0.5 acres.

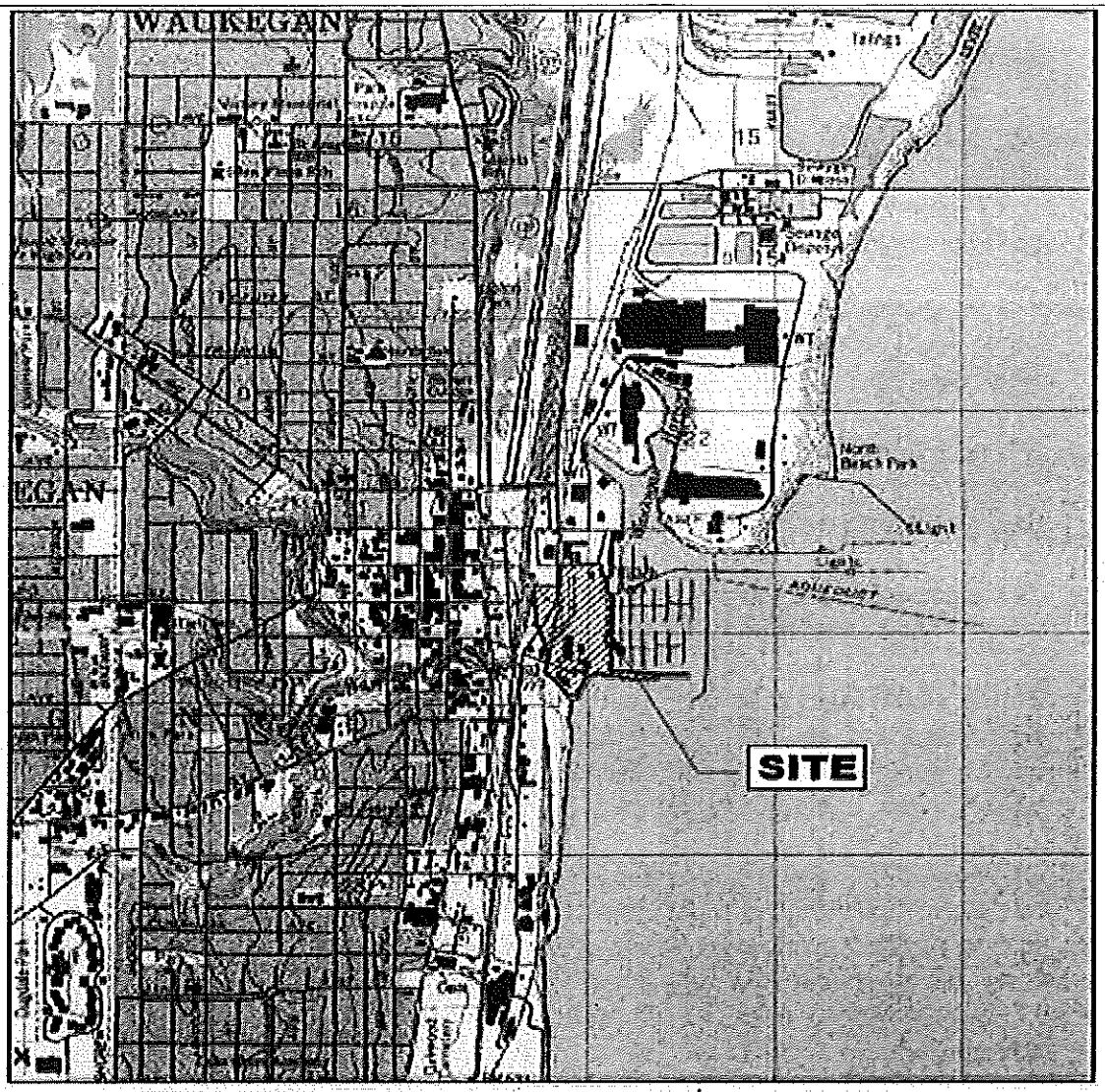
The South Plant MGP property is bounded to the north by a city-owned parking lot and to the west by a Union Pacific Railroad train yard. There are no known MGP residuals on these adjacent properties and both are upgradient of the former MGP site based on the localized groundwater flow direction. South Waukegan Harbor and Lake Michigan are located approximately 600 feet east of the former MGP property. The Waukegan River is located approximately 1,000 feet south of the former MGP property and flows east past the Akzo property into Lake Michigan. South Waukegan Harbor was constructed in the mid-1980s as a marina for recreational boats and has a southern exit to Lake Michigan (see Figure 2).

2.2 Site History and Enforcement Activities

Site History

The Waukegan Pipeline Service Company constructed the original South Plant MGP in 1897 and the Waukegan Gas, Light, and Fuel Company purchased it in 1898. NSG purchased the facility in 1900 and leased the southern 0.37 acres from the EJ&E Railroad. Aerial surveys and available information indicate that this facility was comprised of three gas holders ranging in capacity from 60,000 to 518,000 cubic feet; an office building with a storage room; a coal shed; boilers; oil and tar tanks; an engine house; ammonia stills; and a generator house. The South Plant MGP

Figure 1: Site Location



operated on a full-time basis from 1898 to 1927. NSG shut it down in 1927 but later operated it as a peak production unit during high demand periods between 1935 and 1946 (see Figure 3). NSG permanently closed the South Plant MGP in 1946 and demolished it in 1951.

MGPs such as the South Plant facility were industrial facilities that were found in every sizable town or city in the U.S. from the 1820s to right after World War II. MGPs heated coal in large industrial ovens to produce manufactured gas used for street lighting, heating, and cooking. After the war, natural gas use replaced manufactured gas use because it was abundant, lower priced, and cleaner burning. Some MGPs continued to operate after the war, but most ceased operations

Figure 2: NSG Former South Plant MGP site property boundaries

by the 1960s and were torn down. Typically, the above-ground structures, such as buildings, tar/oil tanks, and storage sheds, were demolished and the foundations were backfilled, leaving hardly any visible traces of the former operations. Below-ground structures such as underground piping and storage tanks, along with residual contaminants, were often left behind.

History of Remedial Activities

NSG has conducted contaminant investigations and cleanup activities at the South Plant MGP site since the early 1990s. Most of these pre-CERCLA cleanup actions were conducted in accordance with Illinois' voluntary Site Remediation Program (SRP). The investigations focused on identifying sources of MGP residuals and evaluating soil and groundwater conditions. NSG dug test pits, took soil borings, and installed groundwater monitoring wells. Groundwater and soil samples were analyzed for a variety of chemicals of potential concern. NSG also worked to delineate the extent of the groundwater contaminant plume and the DNAPL pool.

Previous Environmental Investigations

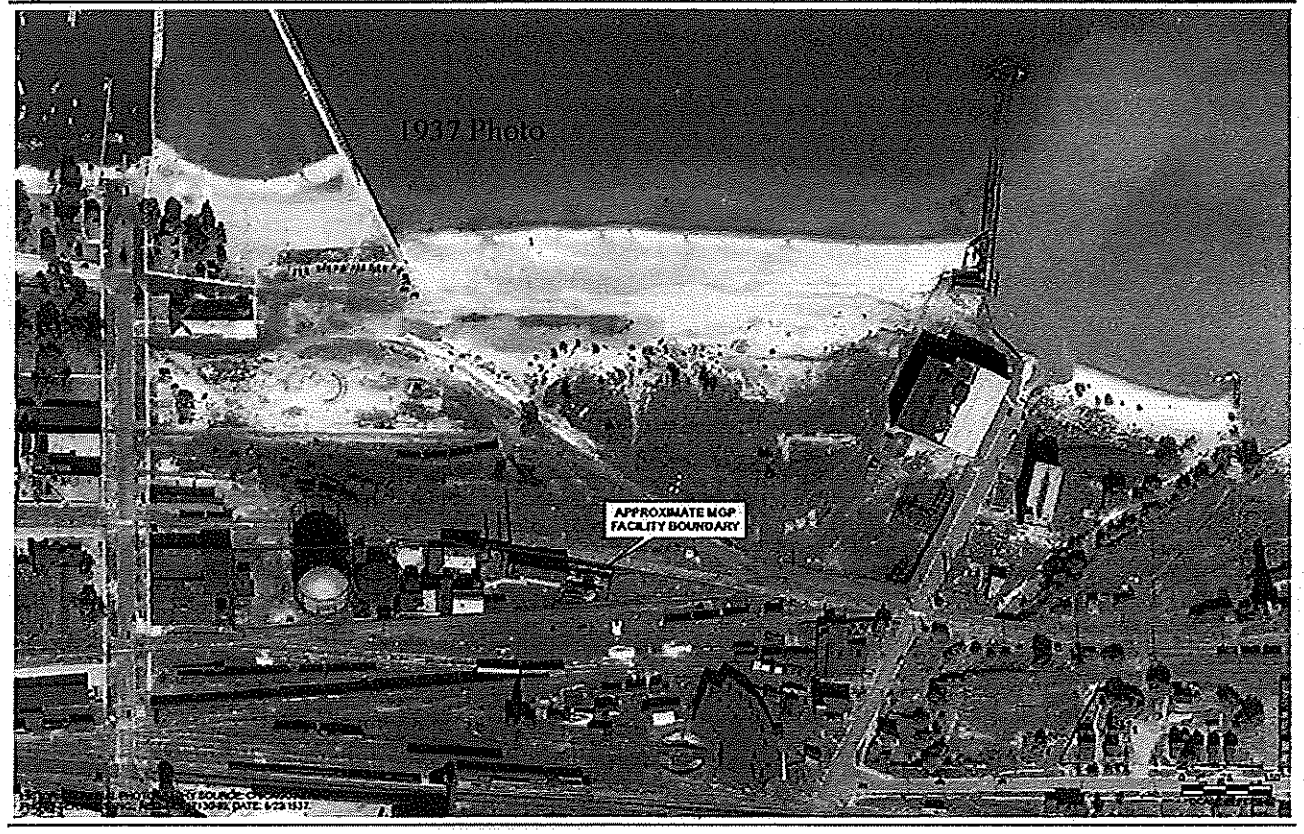
Illinois EPA conducted a Preliminary Site Inspection in September 1991 and a Screening Site Inspection (SSI) in November 1991, collecting 11 surface soil samples on the former MGP property as part of the SSI. Based on the preliminary site inspection and the sampling results, Illinois EPA recommended that the South Plant MGP site be placed into the EPA Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) and that the site be assigned a medium-priority status. The state issued several reports summarizing these site activities, including:

- CERCLA Preliminary Assessment Report, NSG Plant (Illinois EPA, 1991)
- CERCLA 1992 Screening Site Inspection, NSG Plant (Illinois EPA, 1992)

Next, in the early 1990s, NSG conducted a preliminary site investigation to determine the potential environmental impacts of the former MGP contaminants. The preliminary site investigation showed that chemical compounds associated with past MGP activities may be present in subsurface soils. NSG conducted a follow-up site investigation in 1999 to compile and evaluate previously-collected data, evaluate the nature and extent of impacts, and obtain additional data to assess potential health risks at the MGP property. NSG evaluated most of the former MGP parcel excluding the paved portions (Pershing Road and South Harbor Place), completing eight test trenches and four soil borings (which were converted into temporary piezometers). Soil samples were analyzed for volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), and total organic carbon (TOC). Groundwater samples were analyzed for VOCs, PAHs, metals, and cyanide. NSG issued several reports summarizing the site investigations, including:

- Preliminary Site Investigation South Plant MGP, Waukegan, IL (Barr Engineering, April 1993)
- Site Investigation Report, Former South Plant MGP (Barr Engineering, June 2002)

Figure 3: Aerial view of South Plant MGP (1937)



Most of the soil samples showed contaminant impacts in the upper 3 feet of the soil column. Impacts from both tar-like and petroleum compounds were suspected to be present in soil and groundwater, with suspected petroleum-like material found at or near the water table.

Between 2002 and 2006, NGS conducted additional investigations on its MGP property and on surrounding properties. These investigations were completed for specific objectives, and are summarized below:

June – Sept. 2002	NGS conducted sampling activities to further delineate the lateral and vertical extent of source material on the MGP property. Analytical results indicated that soil and groundwater samples had high levels of PAHs and benzene, toluene, ethylbenzene, and xylene (BTEX). Source material was observed and characterized as tar-saturated soil and DNAPL. (Supplemental site Investigation Report (Feb. 2003))
July 2003	NSG performed further definition of the extent of suspected source material (based on visual characterization) at the former MGP property. COPCs in soil above the water table included BTEX, PAHs, arsenic, and lead. NSG subsequently proposed to remove the top 3.5 feet of soil across the entire MGP parcel and to remove source material in some locations to the water table (to about 7 feet below ground surface (bgs)). (Report to Illinois EPA, November 2003)
June – Aug. 2003	NSG took samples to delineate the extent of groundwater impacts on the WPD property. Three areas on the WPD property exhibited tar-like DNAPL or tar-saturated soil. These impacts were observed between 6 and 16 feet bgs.
Feb. - March 2004	NSG advanced soil borings and probes on the Akzo property to characterize soils deeper than 10 feet bgs and found MGP- and petroleum-like odors in most locations. (Report to Illinois EPA, March 2004)
May 2004	NSG further sampled groundwater under the WPD property, identifying areas characterized as having tar-like DNAPL or tar-saturated soil on the southeast corner of the boat parking lot and the northwest corner of the visitor parking lot. These impacts were observed between 6 and 22 feet bgs. (Report to Illinois EPA, July 2005)
May 2005	NSG conducted a ground-penetrating radar survey to determine whether former MGP structures were beneath Pershing Road and identified potential subsurface features and anomalies. (Report to Illinois EPA, July 2005)
May – Aug. 2005	NSG completed groundwater investigation activities on the MGP and WPD properties. The objective was to obtain groundwater data for both properties during a single sampling event. Additional groundwater monitoring wells were installed, bringing the total to 60 (42 on the MGP and 18 on the WPD properties) to date. Nine 6-inch diameter vertical DNAPL recovery wells were

also installed on the former MGP and WPD property to the east. WPD property wells installed to the east are located in the boat parking lot, the maintenance building parking area, and the Administration building parking lot. (Report to Illinois EPA, August 2007)

Aug. 2005 — NSG conducted a DNAPL investigation on the MGP and WPD properties and installed additional groundwater monitoring wells and took soil samples for forensic analysis. Results indicated that petroleum hydrocarbons are present, but the majority of impacts on the WPD property are MGP-related.

Dec. 2005 — NSG collected five soil gas samples from a depth of approximately 4.7 to 5 feet bgs in the vicinity of the WPD maintenance building. Evaluation of the soil gas results using the Johnson and Ettinger Model (EPA 1991) indicated a low risk potential for vapor intrusion (VI) to indoor air within the WPD maintenance building. (Report to Illinois EPA, June 2006)

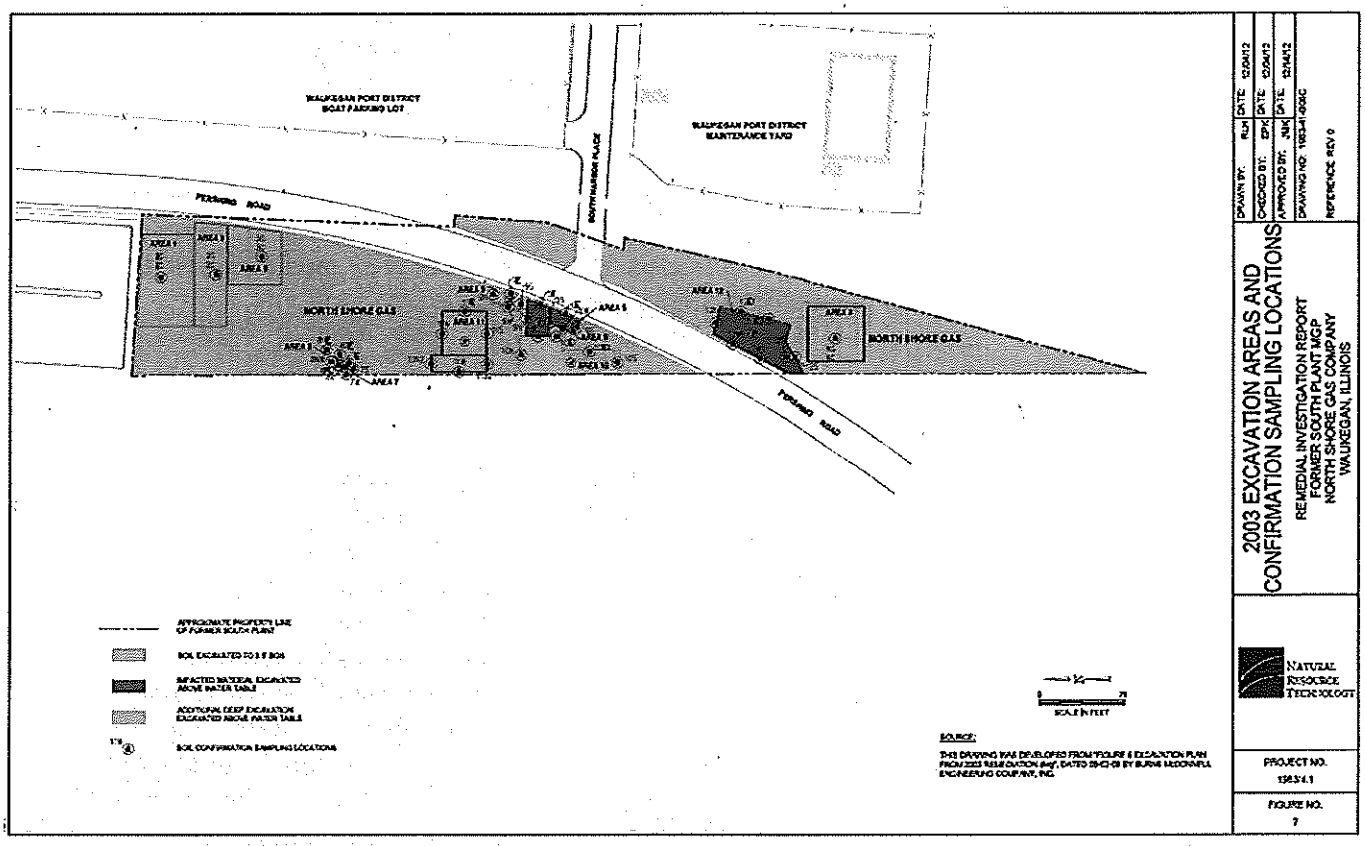
Sept. 2006 — NSG completed a second round of groundwater sampling to again obtain water quality data from the MGP and WPD properties during a single sampling event. Samples were collected from 67 of the now 87 monitoring wells. (Report to Illinois EPA, September 2007).

Early Response Actions

Source Excavation: Between December 2003 and February 2004, NSG excavated soil down to the depth of groundwater (3.5 to 7 feet bgs) on the former South Plant MGP property and disposed of it off-site as part of a focused remediation effort. This work was performed under the State's voluntary SRP. Excavation of the top 3.5 feet of soil across the entire property was completed along with deeper excavation of suspected source material areas in certain areas. Material removed from excavated areas consisted of fill, soil, suspected source material (characterized as tar-impacted fill/soil), piping, and debris. After successful removal of suspected source material, confirmation sampling indicated impacted material above the water table was removed satisfactorily, except under the Pershing Road right-of-way and along the west property boundary (see Figure 4). NSG then installed a plastic liner in the excavations and backfilled them with clean soil. NSG also installed plastic liners along the sidewalls of excavations next to Pershing Road and along the western property line to help prevent residual contaminants from moving into the clean imported backfill. NSG disposed of about 19,223 tons of excavated material as nonhazardous special waste at a nearby licensed landfill. (Report to Illinois EPA, March 2005)

DNAPL Recovery: NSG began DNAPL recovery from 19 vertical extraction wells located on the former MGP and WPD properties in April 2006 and its DNAPL recovery efforts continue to this day. During recovery operations, the DNAPL is pumped from the wells into Department of Transportation (DOT)-approved steel drums, which are then sealed, labeled, manifested, and transported to a facility in Houston, Texas, where the DNAPL is blended as fuel to be used by

Figure 4: Previous response action at NSG Former South Plant MGP (2003 – 2004)



local cement kilns. From April 2006 to May 2007, NSG pumped DNAPL from the wells at approximate 3-week intervals, moving to six-week intervals from May 2007 to the present. As of January 2015, approximately 1,370 gallons of DNAPL have been recovered. The DNAPL recovery wells located in the WPD Administration building parking lot and boat parking lot have accounted for almost 80 percent of the DNAPL recovered to-date.

Enforcement Activities

In July 2007, EPA and NSG entered into an Administrative Order on Consent (AOC) that required NSG to conduct a Remedial Investigation/Feasibility Study (RI/FS) at both the South Plant and the North Plant former MGP sites in Waukegan (Docket No. V-W-07-C-877). Integrys Business Support, LLC (Integrys), which was formed in 2007 with the merger of NSG and other area utilities, performed the RI/FS under the AOC, with EPA oversight. EPA approved the RI report on January 22, 2014 and the Focused FS (FFS) report that addresses the DNAPL contamination on April 9, 2015. EPA placed both reports and supporting documentation into the site Administrative Record (see Appendix 2). In June 2015, Wisconsin Energy Corporation (WEC) acquired Integrys, forming the WEC Energy Group.

2.3 Community Participation Activities

EPA relies on public input so that the remedy selected for each Superfund site meets the needs and concerns of the local community. After issuing the Proposed Plan on April 29, 2015, EPA mailed fact sheets to interested parties in the area, informing them about EPA's preferred alternative to address DNAPL contamination at the site. The fact sheet described the preferred alternative, along with the basis for the Agency's proposal, and the opportunity to provide comments, if any, during the comment period from May 6, 2015 to June 5, 2015. In addition, an open house and public meeting about EPA's preferred alternative was held on May 20, 2015 in the Lilac Cottage facility at Bowen Park, 1911 Sheridan Road in Waukegan.

EPA received several verbal, written, and electronic comments during the 30-day comment period. Substantive comments are addressed in the Responsiveness Summary, which is Part 3 of this document.

EPA maintains the South Plant MGP site Administrative Record at two public repositories: the EPA Region 5 Records Center at Room 711, 77 West Jackson Boulevard (7th Floor), Chicago, Illinois; and the Waukegan Public Library, 128 N. County Seat, Waukegan, Illinois.

2.4 Scope and Role of Response Action

This ROD is an interim remedial action to recover DNAPL contamination that is the primary source of groundwater contamination at the site. Once the remedy is installed and the action completed, EPA will work to select a final remedy to address site groundwater and soil contaminants as well as potential soil vapor intrusion risks.

2.5 Site Characteristics

Physical Characteristics

The NSG Former South Plant MGP site is located in Waukegan, Lake County, Illinois along the western shore of Lake Michigan (see Figure 1). The ground surface around the site consists of grassy vegetation, buildings, and asphalt-paved parking lots and roads. The site is not located within a 100-year floodplain. The population of Waukegan is approximately 89,000, based on 2010 U.S. Census Bureau data. The surrounding area is generally flat, with a mean elevation of approximately 597 feet above sea level. The climate is typically continental, with some modification by Lake Michigan. Average monthly temperatures range from about 21°F in January to about 73°F in July.

Cultural and Natural Resource Features

Illinois Department of Conservation's Natural Heritage Database lists no federal or state threatened and endangered species or pristine natural areas located on the site. The U.S. Fish and Wildlife Service (FWS) did identify the federally endangered Piping Plover, a migratory bird, as having a critical habitat approximately 0.5 miles northeast of the site. The North and South Harbor marinas, located adjacent and east of the site, are used by recreational boaters during the boating season from about April 1 to November 1. Large commercial freighters use the North Harbor as well. Beach Park is located adjacent to the North Harbor Marina and North Beach Park is located about 0.5 miles northeast of the site along Lake Michigan

Surface Water Hydrology

The South Harbor Marina and Lake Michigan are located about 600 feet east of the South Plant MGP property. The Waukegan River, located approximately 1,000 feet south of the South Plant MGP, flows east past the Akzo parcel into Lake Michigan and drains a 12 square mile watershed area. The watershed is highly urbanized, containing only 13 percent undisturbed land, and lack of a natural floodplain area has limited expansion of flow in the Waukegan River, causing erosion to occur in the channel itself. Currently, few storm water detention basins exist and bank erosion in the area is a direct cause of sedimentation into Lake Michigan. Erosion in the channel releases urban contaminants that affect the water and sediment quality in the river and at its mouth. However, it is unlikely the river influences Lake Michigan currents for any more than the briefest periods during large storm events.

Site Geology

The shallow groundwater in the Waukegan area is generally limited to sand and gravel horizons in unconsolidated soil and in fractured bedrock aquifers. The unconsolidated materials in the site area consist primarily of clay with isolated lenses of sand and are not considered productive aquifers. Recharge to the aquifers is primarily by precipitation and infiltration.

The geology encountered beneath the site is composed of a sand/silty sand layer from the surface to an average depth of 15 feet underlain by a clay layer.

The following stratigraphic units are found at the site:

- Fill – Primarily sand with lesser amounts of gravel, slag, and wood fragments. Thickness ranges from 2 feet on the west side of the site to 20 feet adjacent to Waukegan Harbor. In paved areas, the fill includes approximately 3 inches of asphalt and up to 8 inches of sub-base.
- Sand Unit – Primarily natural fine-grained silty sand of alluvial origin. The top of the sand unit was encountered from 1 to 4 feet bgs, with an average thickness of approximately 14 feet.
- Clay Unit – Primarily very stiff to hard, low plasticity silty clay. Top of clay was encountered at depths ranging from 14 to 18 feet bgs across the majority of the site but was present as shallow as 4.5 to 6 feet bgs in the vicinity of the Waukegan River.

The sand unit is the main water-bearing unit at the site. Shallow groundwater is encountered at about 7 feet bgs and groundwater contours indicate an easterly flow toward Lake Michigan. Subsequent groundwater flow measurements beginning in November 2009 continue to indicate this easterly flow direction (see Figure 5).

No municipal or private drinking water wells are located at the site or within a one-mile radius of the site. The City of Waukegan obtains its municipal water supply from Lake Michigan. By ordinance, water wells in the county are not permitted in areas where a public water supply is available. In cases where a public water supply is not available, potable water wells may only be permitted after approval from the county health department.

Nature and Extent of DNAPL Contamination

When it was operating, the former South Plant MGP facility generated various by-products and wastes, such as coal tar, ammonia, cyanide, ammonium sulfate, sulfur, wastewater sludges, ash, and tar/oil emulsions. These materials contain PAHs such as naphthalene and benzo(a)pyrene; petroleum hydrocarbons such as benzene, toluene, ethylbenzene, and xylene (BTEX); metals such as arsenic and lead; cyanide; and phenolic compounds. Varying levels of these contaminants have been found in the site soil, groundwater, and adjacent surface water and sediment samples.

The remedial investigation (RI) found that DNAPL was a continuing source of contamination to the groundwater and that two distinct zones of DNAPL impacts were present at the site. The first zone was a 150-ft wide DNAPL plume that radiates from the north side of the former MGP facility, following a localized depression in the confining clay layer and extending to the northeast under South Harbor Place Drive into the southwest corner of the WPD parking lot. The second zone of DNAPL impact radiates to the southeast of the former MGP where the plume is approximately 200 feet wide, underneath the WPD maintenance building and the Akzo facility to a localized depression in the confining clay layer located west of the WPD Administration Building, where the plume is approximately 425 feet wide. NSG calculated in the FFS report that the overall areal extent of the DNAPL plume is 278,600 square feet (roughly 6 acres), with an estimated total volume of 527,000 gallons of tar-like material (see Figure 6).

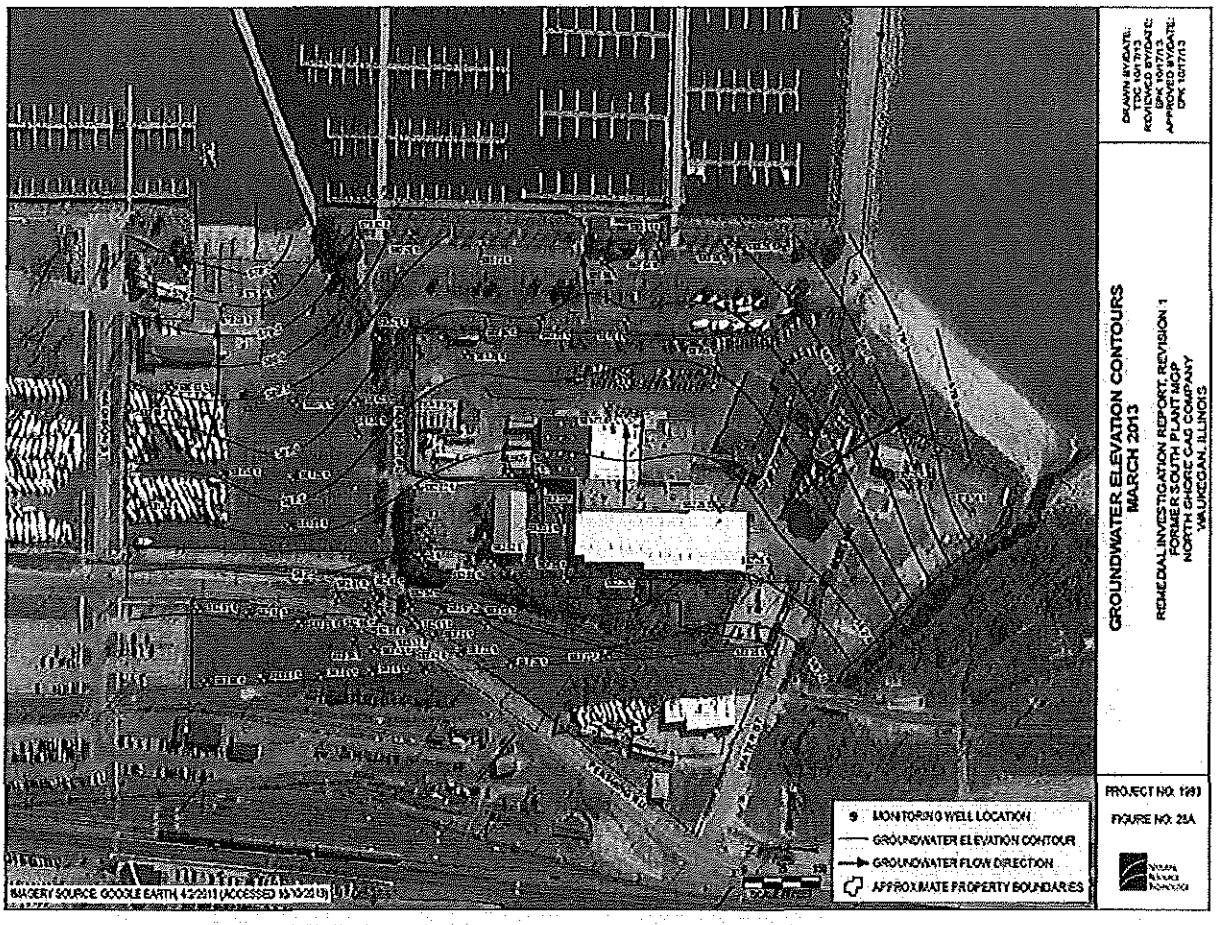
Contaminants of Concern (COCs)

As noted above, the site DNAPL is a continuing source of contamination to area groundwater. Primary COCs in the site groundwater contaminant plume include PAHs such as naphthalene and benzo(a)pyrene; BTEX compounds; and metals such as arsenic and lead.

Conceptual Site Model

A conceptual site model (CSM) in the approved RI Report provides a graphic representation on the results of the investigation (see Figure 7). Among other things, the CSM depicted the

Figure 5: Groundwater Flow



presence of DNAPL just below the upper aquifer. The groundwater currently exceeds screening levels for COCs, with the DNAPL the primary contributor of contamination in that media.

2.6 Current and Potential Future Land and Resource Uses

The MGP property is currently zoned as commercial/recreational, while the WPD, Akzo, EJ&E, and City of Waukegan parcels are zoned general industrial. The city's Lakefront Downtown

Master Plan (July 2003) calls for the MGP site area to be developed into mixed-use property with marina-related services, retail, residential, and open space. This master plan has not been implemented at this time. In spring 2015, the Canadian National Railway, as owners of the adjacent EJ & E railroad track, petitioned the federal government to abandon the tracks running along the site. Part of the proposal would transfer ownership of the abandoned track bed to the city. If approved, removal of the railroad tracks and transferring ownership to the city could potentially open greater options on redeveloping land presently occupied by the tracks.

2.7 Summary of Site Risks

The CSM provides a graphical representation on the source(s) of contamination found at the site, the various exposure pathways the source(s) can take, and actual/potential receptors found at the site (see Figure 6). Specifically, the RI found that DNAPL was a continuing source of contamination to the groundwater and that the overall areal extent of the DNAPL is about 6 acres containing an estimated total volume of 527,000 gallons of tar-like material.

As part of the RI report, Integrys conducted a Baseline Risk Assessment (BLRA), which evaluated the potential for human health and ecological risks associated with site contaminants. Primary contaminants of concern (COCs) in the site groundwater contaminant plume included PAHs such as naphthalene and benzo(a)pyrene; BTEX compounds; and metals such as arsenic and lead. The human health risk assessment (HHRA) component of the BLRA addressed potential risks to people from contaminated soil and groundwater in the terrestrial (upland) portion of the site, along with potential exposures to contaminants in the surface water and sediments at the site (at the marina, beach, and in Lake Michigan). However, the ecological risk assessment (ERA) only focused on the water bodies adjacent to the site because EPA determined that the site itself did not contain terrestrial habitat requiring an ecological risk evaluation.

Human Health Risk Assessment

Carcinogens: For carcinogenic compounds, risk is given as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a carcinogen. Values are expressed as "excess lifetime cancer risk" (ELCR) because the risk would be in addition to the risk of developing cancer from other causes such as smoking or exposure to too much sun. ELCRs are often expressed in scientific notation (e.g., $1x10^{-6}$); an ELCR of $1x10^{-6}$ indicates that an individual experiencing the reasonable maximum chemical exposure estimate has an extra 1 in 1 million chance of developing cancer as a result of site-related exposure. The chance of an individual developing cancer from all other causes has been estimated to be as high as 1 in 3. EPA's target risk range for site-related exposures is $1x10^{-4}$ to $1x10^{-6}$ ELCR.

ELCR is calculated using the following equation: ELCR = CDI x SF

where: ELCR = a unitless probability (e.g., 2×10^{-5})

CDI = chronic daily chemical intake averaged over 70 years (mg/kg-day)

SF = cancer slope factor, expressed as $(mg/kg\text{-}day)^{-1}$.

Figure 6: Conceptual Site Model

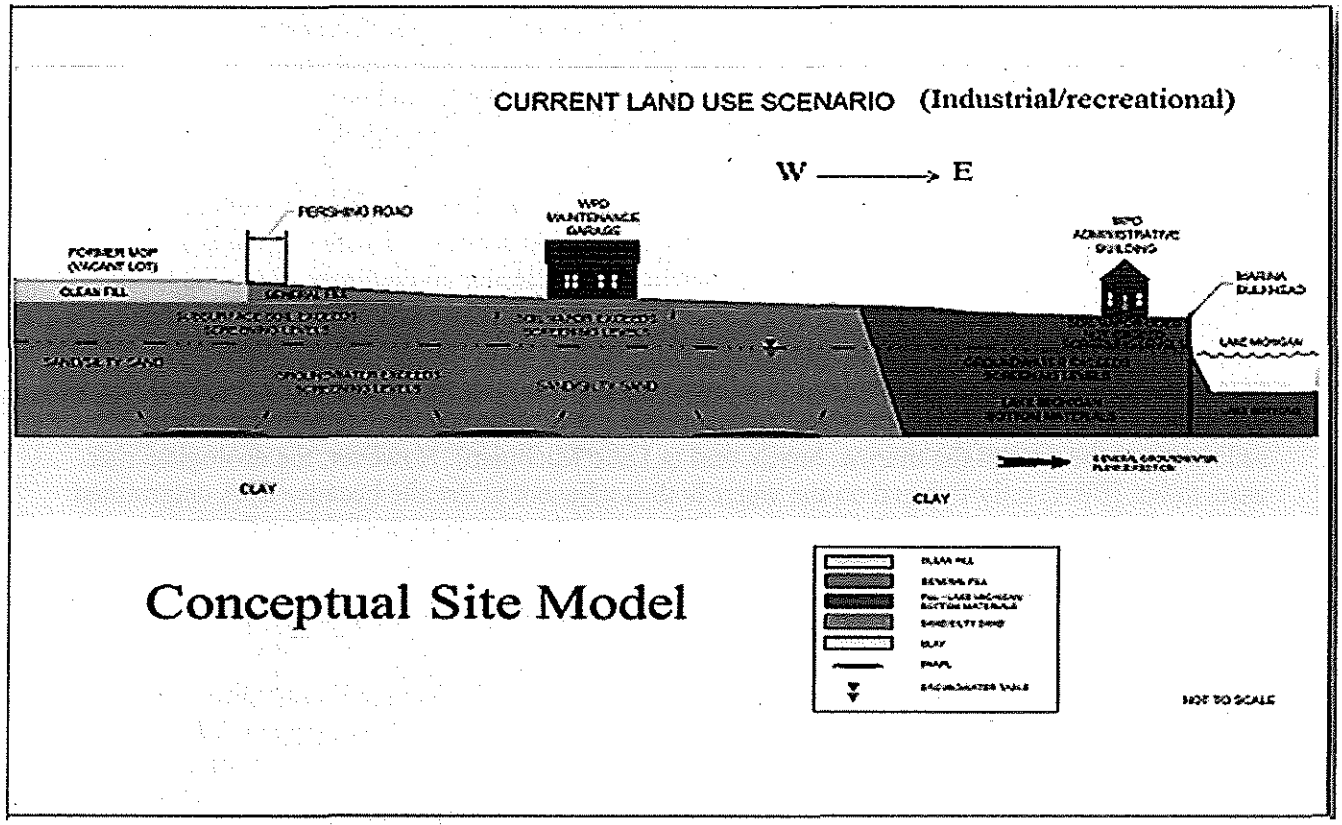
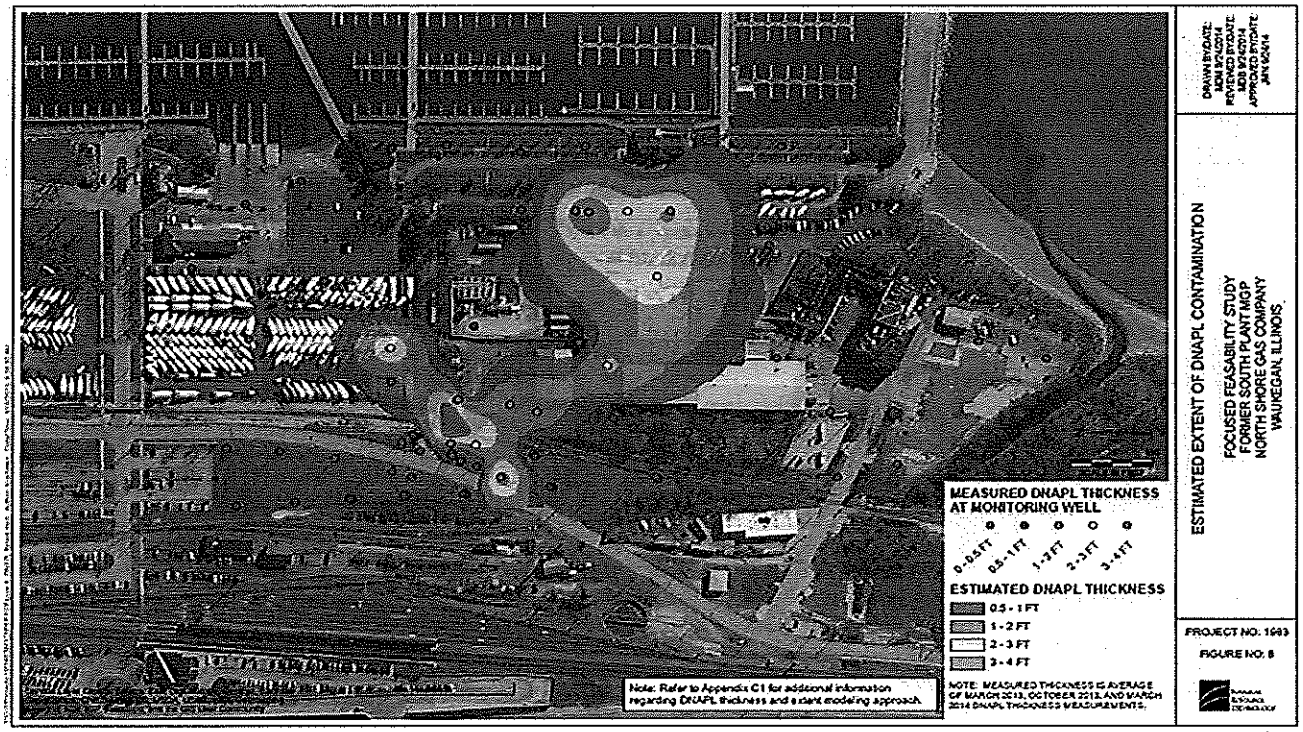


Figure 7: Extent of DNAPL Contamination



A COC is considered to present a current and/or future potential unacceptable risk if the calculated ELCR is greater than EPA's target risk range.

Non-carcinogens: EPA calculates a hazard quotient (HQ) for each COC. The HQ is the ratio of the estimated exposure level to a chemical compound over a specified period of time to a reference dose of the same substance that may cause deleterious health effects over the same exposure period. The potential for non-carcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., lifetime) with a reference dose (RfD) derived for 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 non-carcinogenic effects from that chemical are unlikely.

An HI is generated by adding the HQs for all chemicals of concern that affect the same target organ (e.g., 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 non-carcinogenic 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: $HQ = CDI/RfD$

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).

The area around the South Plant MGP site is currently zoned for industrial, commercial, and recreational uses, with the potential for residential use if the city's master plan is implemented. Thus, human health risks at the site were assessed for both commercial/industrial (current) and residential (future) receptors. Each scenario was evaluated against potential exposure pathways, as summarized in the following table:

Receptor	Exposure Pathways
Industrial or commercial worker	Incidental ingestion, dermal contact, vapor intrusion, and inhalation of DNAPL-affected soil (as a result of soil disturbance)
Construction worker	Incidental ingestion/dermal contact/inhalation of DNAPL-affected soils (as a result of soil disturbance), and groundwater, surface water, and sediment via dermal contact and inhalation
Recreational visitor	Incidental ingestion of surface water and sediment/dermal contact with surface water and sediment potentially impacted by DNAPL

Resident (future use)	Incidental soil ingestion/dermal contact/inhalation (including vapor intrusion from DNAPL-impacted subsurface soil and groundwater)

Human Health Risk Characterization

DNAPL is primarily a source of contamination in site soil, groundwater, and soil gas rather than a direct health risk itself. Thus, a comprehensive human health risk assessment specific to DNAPL was not completed. The BLRA did evaluate exposure pathways to DNAPL as part of the evaluation of potential health risks due to COCs in soil, groundwater, and soil vapor. A summary of some of these exposure pathways is included below:

Groundwater: Exposure to groundwater in construction excavations in each area of the site could potentially be associated with unacceptable risks because DNAPL is present near or below the water table in one or more wells. However, only construction workers having direct exposure to groundwater or inhaling vapors in excavations at or below the water table (as shallow as 3–5 feet bgs but typically averaging between 6.5 to 8.5 feet bgs) would be at potential risk. The potential for exposure of construction workers to groundwater in excavations is likely limited due to safety considerations other than those related to DNAPL exposure. However, because exposure to groundwater containing DNAPL or associated vapors is assumed to present unacceptable risks to construction workers, appropriate steps should be taken to prevent such exposure.

Surface Soil: There are very few areas of the site where surface soils are both exposed and where residual DNAPL-like contaminants are present. Most surface soils are either clean soil that have been imported after remediation was completed or are located below pavement preventing human exposure. There are some areas on the Akzo property where surface soils are not under pavement (areas with ornamental trees), but these areas are not near the former MGP parcel and are not expected to have been impacted by the former MGP activities.

Soil Vapor: The potential vapor intrusion exposure pathway was evaluated using soil vapor samples taken at depths ranging from 3.5 to 5 feet bgs, with sub-slab samples taken at 1 foot bgs.

Potential impacts were found and are associated with dissolved chemical levels in groundwater rather than the DNAPL itself.

Conclusions from the HHRA

The following conclusions were made in the HHRA:

- DNAPL is a continuing source of groundwater contamination. The groundwater does not meet drinking-water standards in any of the areas evaluated, and it should not be used for that purpose. Estimated risks would exceed the risk management range under a residential tap water scenario for all areas.
- Because of the presence of DNAPL in one or more wells on each site parcel, construction worker exposures to subsurface soils, groundwater, and soil vapor on

each property should be assumed to be associated with the potential for unacceptable risks if intrusive construction activities occur in the future.

- Potential vapor intrusion risks are present (under the residential or industrial scenarios) at the Akzo and WPD parcels. Health risks for the Akzo area are within the risk management range for current (industrial) use. For future residential use, ELCRs were within or at the high end of the risk management range but HQ values were greater than 1. For the WPD area, risks were at the upper end of the risk management range for current industrial use, and above the risk management range for future potential residential use.

Ecological Risk Assessment

The BLRA evaluated the ecological risks at the site and concluded that the upland area does not support habitat for ecological receptors due to the developed nature of the properties, consistent with the commercial/industrial zoning of the land. The screening level ecological risk assessment (SLERA) also concluded that the nature and concentration of the COCs detected in surface water and sediment in the marina, city beach, and open-water environment is not expected to pose an ecological concern. Potential ecological risks associated with DNAPL that could discharge into the marina will be addressed through upland DNAPL management.

2.8 Remedial Action Objectives

Remedial Action Objectives (RAOs) are cleanup goals specific to media for protecting human health and/or the environment. RAOs are based on unacceptable risks, anticipated current and future land use, objectives of the action and expectations and statutory requirements. The following RAO was developed to protect the public and environment from potential health risks posed by DNAPL at the site:

- Reduce the mass and mobility of recoverable DNAPL to the extent practicable.

Cleanup levels

Cleanup levels for DNAPL have not been established since it's a source of contamination, not a media. However, EPA estimates that about 95 percent of the DNAPL may be recoverable.

2.9 Description of Alternatives

The DNAPL remedial alternatives evaluated in the FFS are summarized below:

- D1 - No Action
- D2 - Institutional Controls (Figure 8)
- D3 - Vertical Engineered Barrier (Figure 9)
- D4 - Horizontal Well DNAPL Recovery (Figure 10)
- D5 – Physically-Enhanced DNAPL Recovery (Figure 11)
- D6 – Chemically-Enhanced DNAPL Recovery (Figure 12)
- D7 – Thermally-Enhanced DNAPL Recovery (Figure 13)

The following is a description of the DNAPL remedial alternatives:

DI – No Action

Under the No Action alternative, EPA would take no further actions to address potential exposure to the tar-like DNAPL at the site or to address the DNAPL as a continual source of groundwater and potential surface water contamination. The No Action alternative is included in the list of DNAPL alternatives evaluated in the FFS to be consistent with the NCP and it is used as a baseline for comparisons to the other DNAPL alternatives. Because no actions would be taken to reduce the mass or mobility of the DNAPL and thus site contamination above health-based limits would be left onsite, EPA would need to conduct a five year review (FYR) at the site every 5 years for as long as contaminants remain above health-based limits at the site.

D2 – Institutional Controls

Under Alternative D2, EPA would place institutional controls (ICs) on the site to minimize exposure to DNAPL. ICs would consist of both administrative and legal controls. Since the primary mechanism for human exposure to DNAPL would be through consumption of groundwater contaminated by DNAPL, Alternative D2 would place ICs on the site parcels to restrict the use of groundwater as a drinking water source until drinking water standards are met. The ICs would also require worker cautions as well as health and safety planning to protect potential future construction workers from exposure to DNAPL compounds in the groundwater.

Groundwater ICs would best be a combination of a local ordinance enacted by the Waukegan City Council creating a restricted groundwater use zone that prohibits the use of DNAPL-impacted groundwater as a potable water supply and the placement of a Uniform Environmental Covenant (under 765 ILCS Chapter 22) on the site parcels to provide additional assurances that the IC will continue to be enforced in the event of property transfer or changes in future land use. An IC Implementation Plan would be developed to detail groundwater-use restrictions and document procedures for effectively implementing the ICs. Because no actions would be taken to reduce the mass or mobility of the DNAPL and thus site contamination above health-based limits would be left onsite, EPA would need to conduct a FYR at the site every 5 years for as long as contaminants remain above health-based limits at the site.

D3 – Vertical Engineered Barrier

Under Alternative D3, EPA would install a low-permeability vertical engineered barrier around the DNAPL plume. Vertical barriers are typically constructed with soil-bentonite ("slurry wall"), high-density polyethylene (HDPE), or steel sheet piles. The vertical engineered barrier would be keyed into the underlying confining clay layer a minimum of 3 feet. The confining clay layer would limit downward migration of DNAPL and the low permeability vertical engineered barrier would limit the lateral migration of DNAPL. The engineered barrier would contain both the groundwater and DNAPL, thereby reducing mobility of DNAPL compounds in partial accordance with the RAO. Because no additional actions would be taken to reduce the mass of the DNAPL and thus site contamination above health-based limits would be left onsite, EPA would need to conduct a FYR at the site every 5 years for as long as contaminants remain above health-based limits at the site.

D4 – Horizontal Well DNAPL Recovery

NSG is currently operating a network of vertical DNAPL recovery wells at the site. However, these wells have removed a limited volume of DNAPL since initial operations began in 2006. Under Alternative D4, a network of horizontal recovery wells would be installed above the clay-confining layer at site locations that are within and downgradient of accumulated DNAPL. DNAPL would pass through the horizontal well screen and flow via gravity within the sloped horizontal well to a collection sump. The DNAPL would then be pumped into collection containers for off-site treatment and disposal.

Compared to the existing vertical DNAPL recovery wells, the horizontal DNAPL recovery wells will have a significantly greater screened interval within the DNAPL bearing zone and will thus be much more effective at recovering DNAPL, although it is estimated that DNAPL recovery would occur over a 30-year period before the mass and mobility is reduced to the extent practicable.

Three primary horizontal well installation methods were evaluated as part of Alternative D4 – traditional trench, one-pass trench, and horizontal directional drilling. The preferred method would be developed during the remedial design phase. Each is briefly described below:

Traditional trench installation would involve an excavator cutting narrow trenches to a depth of approximately 20 feet bgs in the DNAPL areas, placing the horizontal wells into the excavations, placing washed stone over the wells to protect the pipe and locally increase hydraulic conductivity, and then backfilling the excavations with clean soil or fill. This method would require saw cutting of and removal of pavement along well alignments and the use of trench boxes or a slurry wall to prevent collapse of the sandy soil during installation. While potentially implementable at this site, traditional trench installation is better suited for a site with more cohesive soil, a depth of excavation shallower than groundwater, minimal surface improvements (e.g., pavement), and minimal subsurface utility crossings.

The **one-pass trenching** technique uses a specialized trenching machine that simultaneously removes soil, installs perforated pipe, and places granular backfill into the excavation. The simultaneous installation avoids the need for trench stabilization. One-pass trenching can achieve depths up to 30 feet bgs. Similar to the traditional trench method, the one-pass method requires saw cutting and removal of pavement along the proposed trench alignment. Also similar to the traditional trench method, the one-pass method typically includes backfilling the trench with washed stone. While potentially implementable at this site, one-pass trenching is better suited for sites with minimal surface improvements (e.g., pavement) and minimal subsurface utility crossings.

Horizontal directional drilling (HDD) is a trenchless horizontal well installation method. The equipment and procedures are intended to minimize temporary operational disruption, surface damage, and restoration. Surface impacts are limited to two work areas, one on the entry side and one on the exit side. Horizontal and vertical control of the HDD drill bit between the entry and exit side is performed using magnetic steering tools in conjunction with a surface monitoring system. The locator provides information to the operator to allow real-time path corrections to

follow the planned bore path. Some systems directly transmit the location information to a display on the drill rig to automatically control the drill path.

Some unique advantages of horizontal drilling include: minimal site preparation and restoration costs because disturbance is limited to entry and exit points; comparatively easy utility crossings; and reduced soil management and disposal volumes. Some unique disadvantages include: limited effectiveness in drilling through stone and cobbles and reliance on the permeability of the surrounding soil rather than installation of a high permeability granular backfill. Due to the discrete land disturbance associated with pipe installation using HDD, installation does not allow backfill around the pipe. Therefore, the pipe will be in direct contact with the subsurface soil and subject to potential pipe clogging, particularly if installed in soil containing a significant fraction of fine material. There is also some uncertainty regarding the effectiveness of a horizontal well system due to possible stratification of subsurface soil; whereas trenching overcomes stratified soil layers by cutting through the soil profile.

EPA would need to conduct a FYR at the site every five years for as long as contaminants remain above health-based limits at the site.

D5 – Physically-Enhanced DNAPL Recovery

Under Alternative D5, EPA would physically enhance DNAPL recovery efforts through the use of simultaneous groundwater extraction and injection. Groundwater injection will locally increase hydraulic gradients, thereby increasing the rate of DNAPL migration toward recovery wells. Alternative D5 would involve installation of both injection and extraction wells, as well as a phase-separation and groundwater treatment facility. It is estimated that DNAPL recovery would occur over a 8-year period before the mass and mobility is reduced to the extent practicable.

Physically-enhanced recovery can be performed using a variety of methods and can be implemented using horizontal or vertical wells. Two primary approaches, separate-phase extraction and multi-phase extraction, are described below:

Separate-phase extraction would use dedicated DNAPL and dedicated groundwater extraction pumps in a single vertical well. A low-flow DNAPL recovery pump would be placed at the bottom of the well in the DNAPL zone and a standard groundwater pump would be installed above the DNAPL-bearing interval. The groundwater pump would extract a limited volume of DNAPL, which would be removed by a phase-separation unit. The collected DNAPL would be sent off site for treatment and disposal and extracted groundwater would be treated on site prior to re-injection into the ground. Alternatively, extraction could occur in separate but collocated wells. Separate-phase extraction is most applicable to sites with relatively thick accumulations of DNAPL, such as at this site.

Multi-phase extraction would use a single pump in each well to simultaneously remove DNAPL and groundwater. The DNAPL/water mixture would be run through a phase-separator to collect DNAPL for off-site treatment and disposal and extracted groundwater would be treated on site prior to re-injection into the ground. Because the DNAPL would be emulsified in the extracted water, phase separation would be comparatively more challenging and may result in a

higher percentage of water remaining in the separated DNAPL. The increased water content will make DNAPL treatment more challenging. Multi-phase extraction is most applicable for sites with relatively thin accumulations of DNAPL, which is not typical at this site.

EPA would need to conduct a FYR at the site every five years as long as contaminants above health-based limits remain at the site.

D6 – Chemically-Enhanced DNAPL Recovery

Under Alternative D6, EPA would enhance DNAPL recovery using injection of chemical surfactants. The mobilized DNAPL would be recovered using the extraction techniques similar to those described in Alternative D5. Therefore, implementation of Option D6 will involve installation of both injection and extraction wells, as well as a phase-separation and groundwater treatment facility. It is estimated that DNAPL recovery would occur over a 4-year period before the mass and mobility is reduced to the extent practicable.

Typically, chemically enhanced DNAPL recovery is performed using surfactants and there are several varieties available for the remediation and oil recovery markets. Surfactant injections are often amended with electrolytes, polymers, co-solvents, or oxidants to further increase surfactant effectiveness. Laboratory bench-scale studies are critical to select the proper type and concentration of surfactant and amendment.

Surfactants are only effective at enhancing the recoverability when in direct contact with DNAPL. As a result, having an accurate understanding of the DNAPL plume and the subsurface geology and geochemistry is critical to determining injection zones, well spacing, chemical volume, and other criteria. Application can be performed using either horizontal or vertical wells and DNAPL recovery can either be performed in the same well used for chemical injection or in a separate, downgradient recovery well. Introducing chemicals to the subsurface that may not be recovered is a concern with this alternative.

EPA would need to conduct a FYR at the site every five years as long as contaminants above health-based limits remain at the site.

D7 – Thermally-Enhanced Recovery

Under Alternative D7, EPA would increase the temperature of the subsurface to enhance DNAPL recovery or even to thermally destroy the DNAPL in place. It is estimated that DNAPL recovery would occur over a 4-year period before the mass and mobility is reduced to the extent practicable.

Typical thermal treatment technologies include steam-enhanced extraction, electric resistance heating (ERH), and conductive heating. Each type of thermal treatment technology, as it applies to recovery of DNAPL, is summarized below:

Steam-enhanced extraction would use steam injected under pressure into the DNAPL zone through injection wells, which increases the subsurface temperature and causes the DNAPL to mobilize and be displaced. The DNAPL can then be recovered using multi-phase extraction wells. The more volatile DNAPL constituents, e.g., BTEX and naphthalene, would also be

volatilized by the increased subsurface temperatures. This method primarily relies on conductive and convective heat transfer to increase subsurface temperatures. As a result, this technology is best suited for soil with moderate to high permeability and limited subsurface obstructions, as is the case for this site. The maximum subsurface temperature is limited by the temperature of the injected steam (about 100 degrees Celsius).

EPA would need to conduct a FYR at the site every five years as long as contaminants above health-based limits remain at the site.

2.10 Comparative Analysis of Alternatives

EPA uses nine criteria to evaluate remedial alternatives before selecting a remedy (see Table 1).

Table 1: The Nine Criteria

EVALUATION CRSITERIA FOR SUPERFUND REMEDIAL ALTERNATIVES
Threshold Criteria
1. **Overall Protection of Human Health and the Environment** determines whether an alternative eliminates, reduces, or controls threats to the public health and the environment through engineering controls, treatment, or ICs.
2. **Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)** evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirement that pertain to the site, or whether a waiver is justified.
Balancing Criteria
3. **Long-term Effectiveness and Performance** considers the ability of an alternative to maintain protection of human health and the environment over time.
4. **Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment** evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.
5. **Short-term Effectiveness** considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.
6. **Implementability** considers the technical and administrative feasibility of implementing the alternative, including factors such as relative availability of goods and services.
7. **Cost** includes estimated capital and annual operation and maintenance costs, as well as present worth cost. Present worth cost is the total of an alternative over time in today's dollar value. Cost estimates are expected to be accurate within a range of +50% to -30%.
Modifying Criteria
8. **State Acceptance** considers whether the State agrees with EPA's analyses and recommendations, as described in the RI/FS and the Proposed Plan.

9. **Community Acceptance** considers whether the local community agrees with EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

Comparative analysis of DNAPL Remedial Alternatives

Below is the narrative evaluating the relative performance of each alternative described above against the nine criteria, noting how each compares to the other alternatives under consideration. A more detailed analysis of the DNAPL alternatives is found in the FFS. For convenience, Table 2 provides a summary of the comparison of the DNAPL remedial alternatives.

1. Overall Protection of Human Health and the Environment

Alternative D1 (No Action) would not be protective of human health and the environment as the DNAPL would remain mostly unabated as a source of groundwater contamination.

Alternative D2 would be protective of human health by using ICs to prevent consumption of contaminated groundwater at the site. While the current concentrations of COCs detected in surface water and sediments do not presently pose an ecological concern, the lack of engineering controls may change this assessment as DNAPL-contaminated groundwater migrates to the lake.

Alternative D3 would be protective of human health and the environment because it would contain the DNAPL in place and prevent further migration of DNAPL-contaminated groundwater towards the lake.

Alternatives D4, D5, D6, and D7 would be protective of human health and the environment because DNAPL would be recovered over time and prevent further migration of DNAPL-contaminated groundwater towards the lake.

2. Compliance with ARARs

The list of ARARs for DNAPL remediation was provided in the Proposed Plan and is included in this document as Table 5. There are no ARARs that directly apply to implementation of Alternatives D1 and D2. However, neither Alternative D1 nor D2 would result in compliance with chemical-specific groundwater ARARs.

Alternatives D3, D4, D5, D6, and D7 would meet all potential ARARs that would apply to the various technologies.

3. Long-Term Effectiveness and Permanence

Alternative D1 has no ability to maintain effective protectiveness of human health and the environment over time.

Alternative D2 would meet the long-term effectiveness and permanence criterion if effective and enforceable ICs are placed on the site and the DNAPL does not migrate. It is uncertain if the

DNAPL would be contained on site permanently which could result in a future unacceptable discharge to the lake.

Alternative D3 would meet the long-term effectiveness criterion for human health and the environment. Vertical engineered barriers are a well-established, long-term remedy used to contain DNAPL at former MGP sites and can provide protection in excess of 30 years.

Alternatives D4, D5, D6, and D7 would meet the long-term effectiveness and permanence criterion because a large volume of DNAPL would be permanently removed from the environment and treated. Permanent removal and treatment provides for greater long-term effectiveness and permanence than Alternative D3, which is a containment-only remedy.

4. Reduction of Toxicity, Mobility, or Volume through Treatment

Alternatives D1 and D2 do not treat DNAPL to reduce the toxicity, mobility, and volume of contamination. Alternative D3 reduces the mobility of DNAPL by containing it in place, but provides no treatment.

Alternatives D4, D5, D6, and D7 will reduce the toxicity, mobility, and volume of DNAPL through treatment, but to varying degrees. Alternatives D5, D6, and D7 are more aggressive treatment methods and are expected to remove more DNAPL from the ground in comparison to Alternative D4.

5. Short-Term Effectiveness

Alternatives D1 and D2 provide no short term risks to workers or the public while being implemented. However, it is estimated that at least 6 months would be required to obtain necessary permissions to place ICs on the site under Alternative D2.

Alternative D3 would present some short-term risks during implementation and operation and maintenance. It is estimated that 12 months would be required to install the vertical engineered barrier and groundwater gradient control system, which would immediately limit the off-site migration of DNAPL. There is a risk that the community could be exposed to a minimal amount of MGP-residuals during construction via air emissions from exposed contaminated soil, while workers would need to wear standard protective equipment during remedy construction and operation and maintenance (O&M). It is expected that the short-term risks would be effectively managed with health and safety measures.

Alternative D4 would present some short-term risks. It is estimated that 6 months would be required to install the horizontal recovery well and sump system. It is estimated that DNAPL recovery would occur over a 30-year period before the mass and mobility is reduced to the extent practicable. The community could be exposed to a minimal amount of MGP-residuals during construction via air emissions from exposed contaminated soil or DNAPL, while workers would need to wear standard protective equipment during remedy construction and O&M. It is expected that the short-term risks would be effectively managed with health and safety measures.

Alternative D5 would present some short-term risks. It is estimated that 12 months will be required to install the horizontal recovery wells, groundwater injection and extraction wells, install the treatment plant and necessary recovery/power lines. It is estimated that DNAPL recovery would occur over an 8-year period before the mass and mobility is reduced to the extent practicable. The community could be exposed to a minimal amount of MGP-residuals during construction via air emissions from exposed contaminated soil or DNAPL, while workers would need to wear standard protective equipment during remedy construction and O&M. It is expected that the short-term risks would be effectively managed with health and safety measures.

Alternative D6 would present some short-term risks. It is estimated that 12 months will be required to install the horizontal recovery wells, groundwater injection and extraction wells, install the treatment plant, surfactant injection system, and necessary recovery/power lines. It is estimated that DNAPL recovery would occur over a 4-year period before the mass and mobility is reduced to the extent practicable. The community could be exposed to a minimal amount of MGP-residuals during construction via air emissions from exposed contaminated soil or DNAPL, while workers would need to wear standard protective equipment during remedy construction and O&M. It is expected that the short-term risks would be effectively managed with health and safety measures.

Alternative D7 would present some short-term risks. It is estimated that up to 12 months would be required to install the thermally-enhanced recovery systems. It is estimated that DNAPL recovery would occur over a 4-year period before the mass and mobility is reduced to the extent practicable. The community may be exposed to minimal amounts of contaminants due to an increased rate of diffusion of contaminants due to increased subsurface temperatures. This risk would be minimized by not heating underneath occupied buildings and implementing vapor controls. The community could also be exposed to a minimal amount of MGP-residuals during construction via air emissions from exposed contaminated soil or DNAPL, while workers would need to wear standard protective equipment during remedy construction and O&M. It is expected that the short-term risks would be effectively managed with health and safety measures.

6. Implementability

Alternatives D1 and D2 are readily implementable. Coordination with the various property owners is likely to present some administrative challenges for placement of ICs.

Alternative D3 is implementable as vertical barrier walls are easily installed and materials are readily available. Installation will be challenging at this site due to extensive utility crossings, working adjacent to the railroad, and the need to coordinate with property owners.

Alternative D4 would be implementable as recovery trench alignments and HDD construction methods could be used to minimize or avoid utility and property owner conflicts.

Alternatives D5 and D6 would be implementable, but challenging. Recovery trench alignments and proposed construction methods could be selected to minimize or avoid utility and property owner conflicts. However, pump controls, power, and piping will require connection to a treatment plant proposed to be placed on the MGP parcel. This connection would be completed

through directionally drilled borings under the railroad tracks, and trenching through the Akzo and WPD properties to the wells. Coordination of directional drilling under the railroad tracks and trenching through the Akzo and WPD properties are technically implementable, but could be an administrative challenge.

Alternative D7 would be implementable, but even more challenging than Alternatives D5 and D6. Thermally-enhanced extraction is technically implementable; however, there are many implementation challenges. Installation and operation of the thermal system would require careful coordination and access agreements with Akzo and WPD to allow electrode and recovery infrastructure to be installed on these properties. Typically, the electrodes need to be located on a 15-20-foot spacing, so there is limited flexibility to accommodate access restrictions within a desired treatment zone. The limited flexibility to adjust well locations is particularly relevant to active roadways, railroads, and industrial buildings.

7. Cost

The present worth cost of each alternative, using a 7 percent discount rate, is shown in Table 3. The No Action alternative (D1) had cost associated with conducting five-year reviews.

8. State Acceptance

Illinois EPA has indicated that it will concur with the selected remedy.

9. Community Acceptance

The community has not objected to the selected remedy, as evidenced by comments received during the public comment period. Some commenters indicated support for the selected remedy, while others indicated that construction should proceed without delay so that redevelopment efforts at the site can move forward (see Responsiveness Summary).

2.11 Principal Threat Waste

The DNAPL is a continuing source of groundwater contamination at the site and represents a principal threat waste that needs to be addressed, preferably by treatment, due to its toxicity, mobility, and volume. The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP §300.430(a)(1)(iii)(A)). 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.

EPA has determined that the statutory preference for treatment as a principal element would be satisfied under Alternatives D4 through D7.

Figure 8: Alternative D2 – Conceptual Limits of Institutional Controls

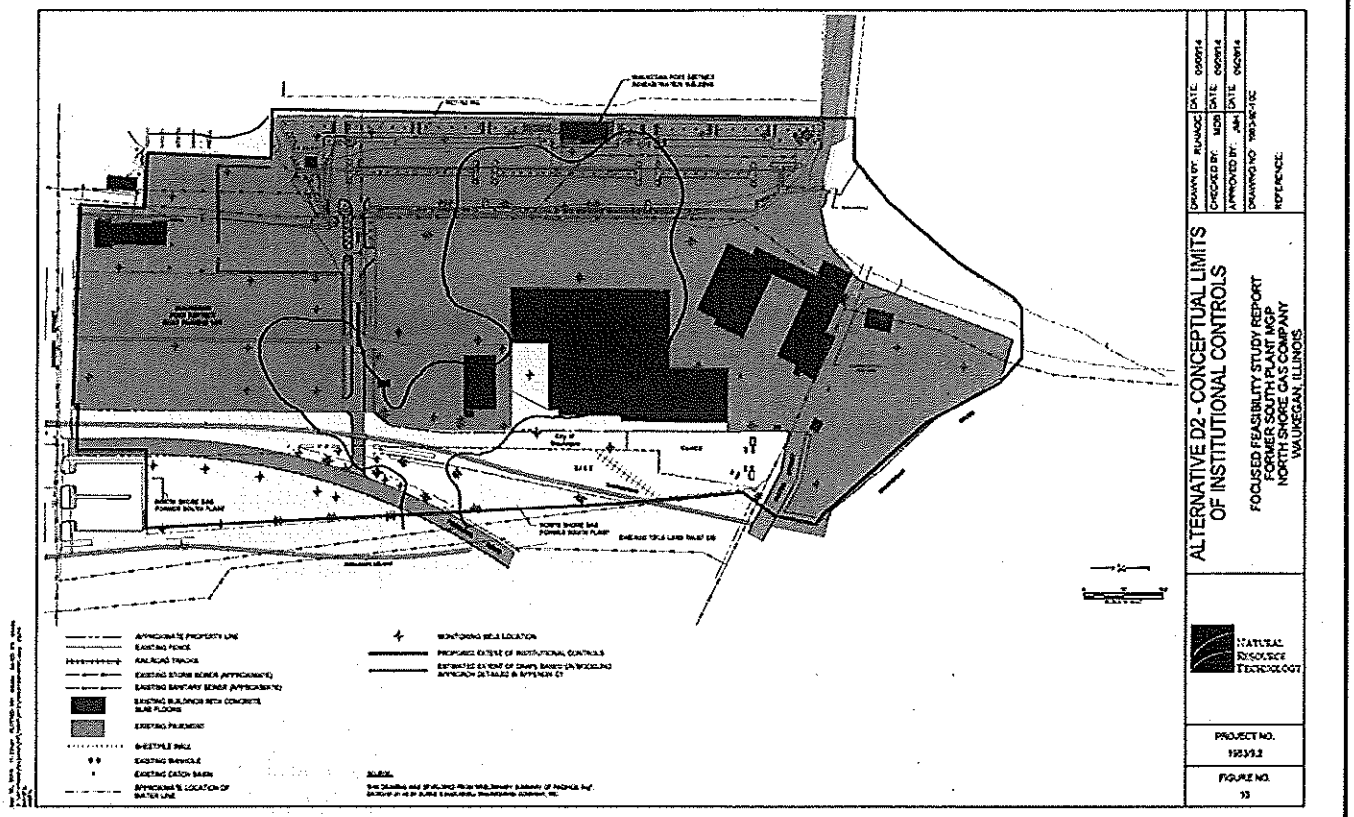


Figure 9: Alternative D3 – Conceptual Vertical Engineered Barrier

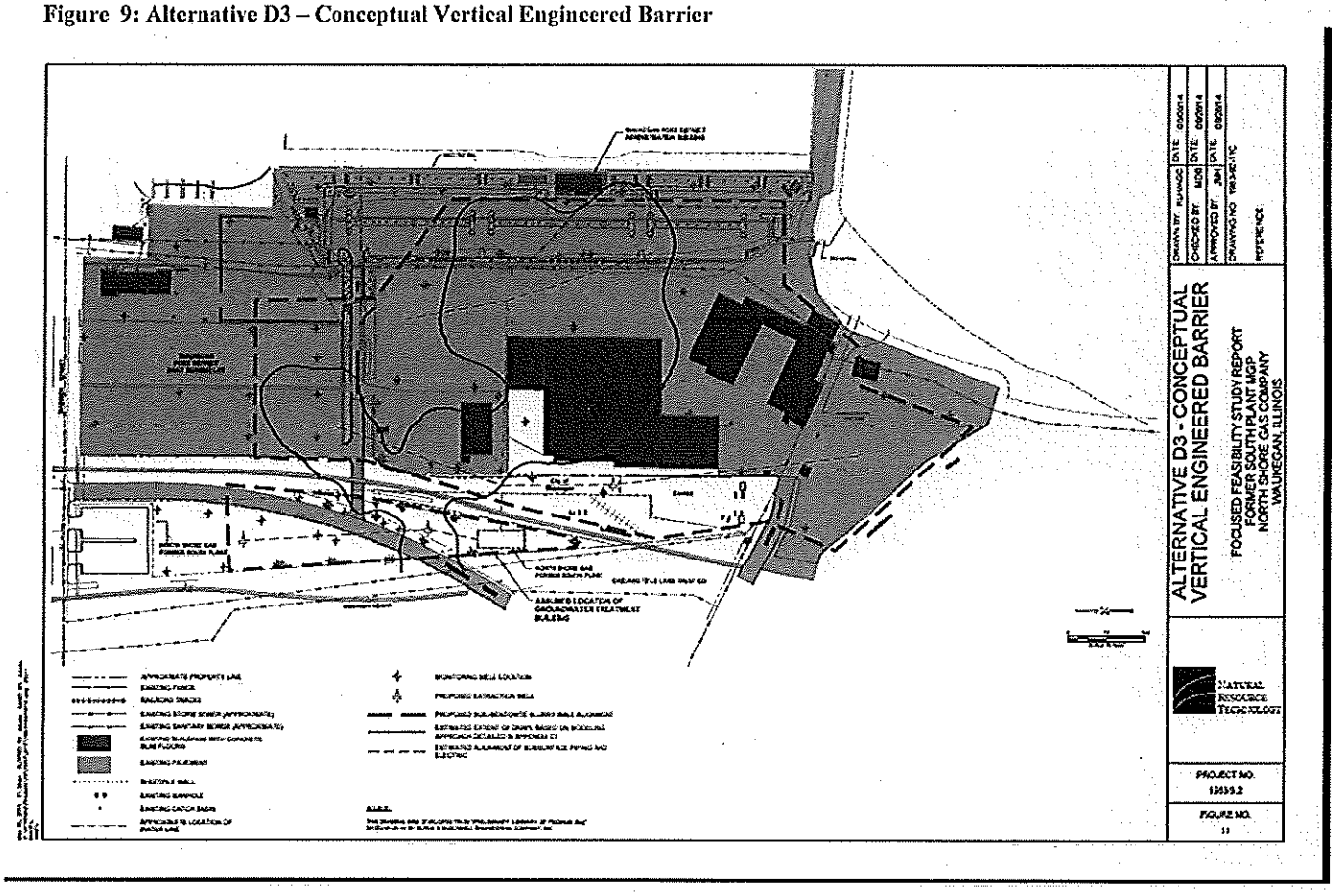


Figure 10: Alternative D4 – Conceptual Horizontal Well DNAPL Recovery System

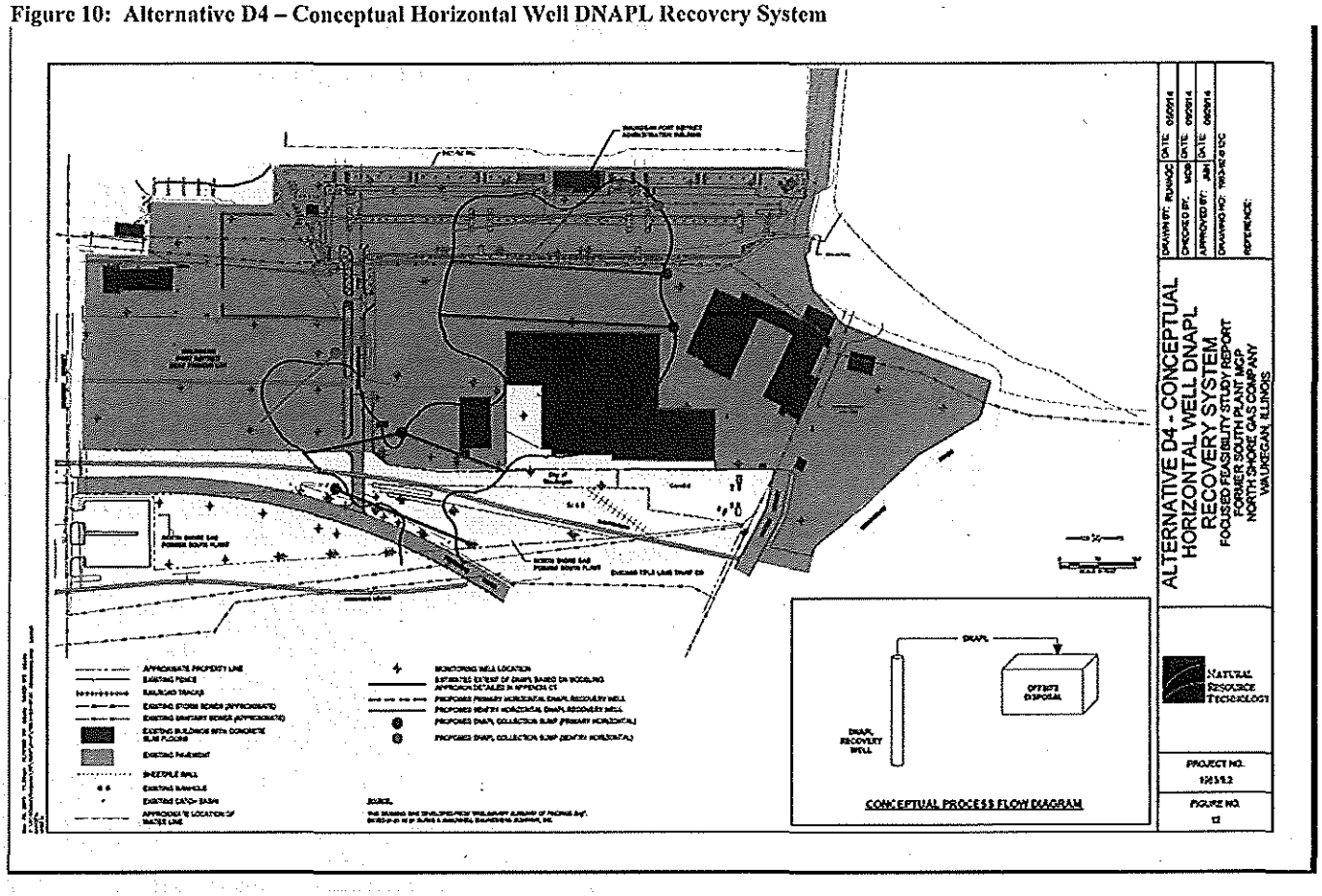


Figure 11: Alternative D5 – Conceptual Physically Enhanced DNAPL Recovery System

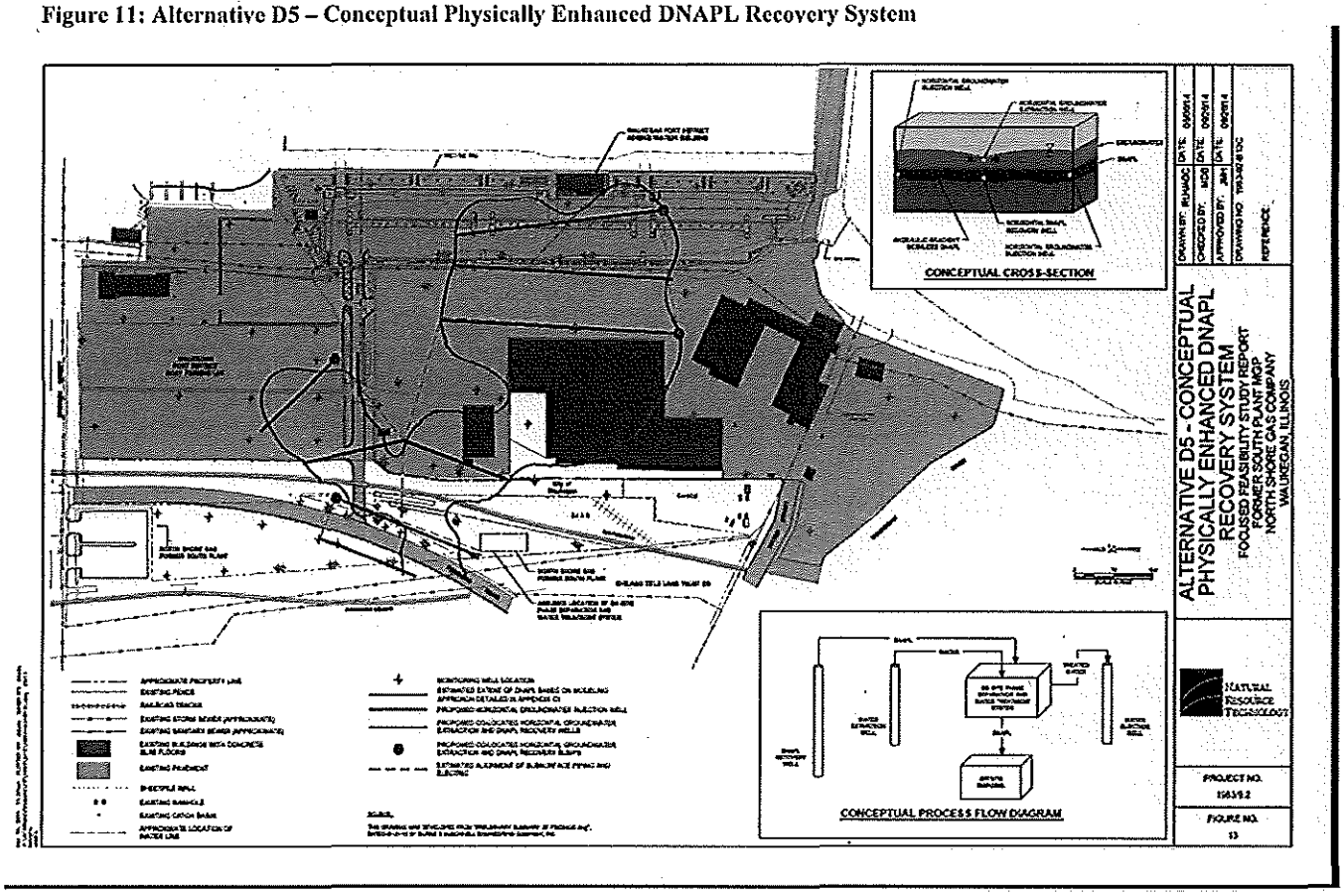


Figure 12: Alternative D6 – Conceptual Chemically Enhanced DNAPL Recovery System

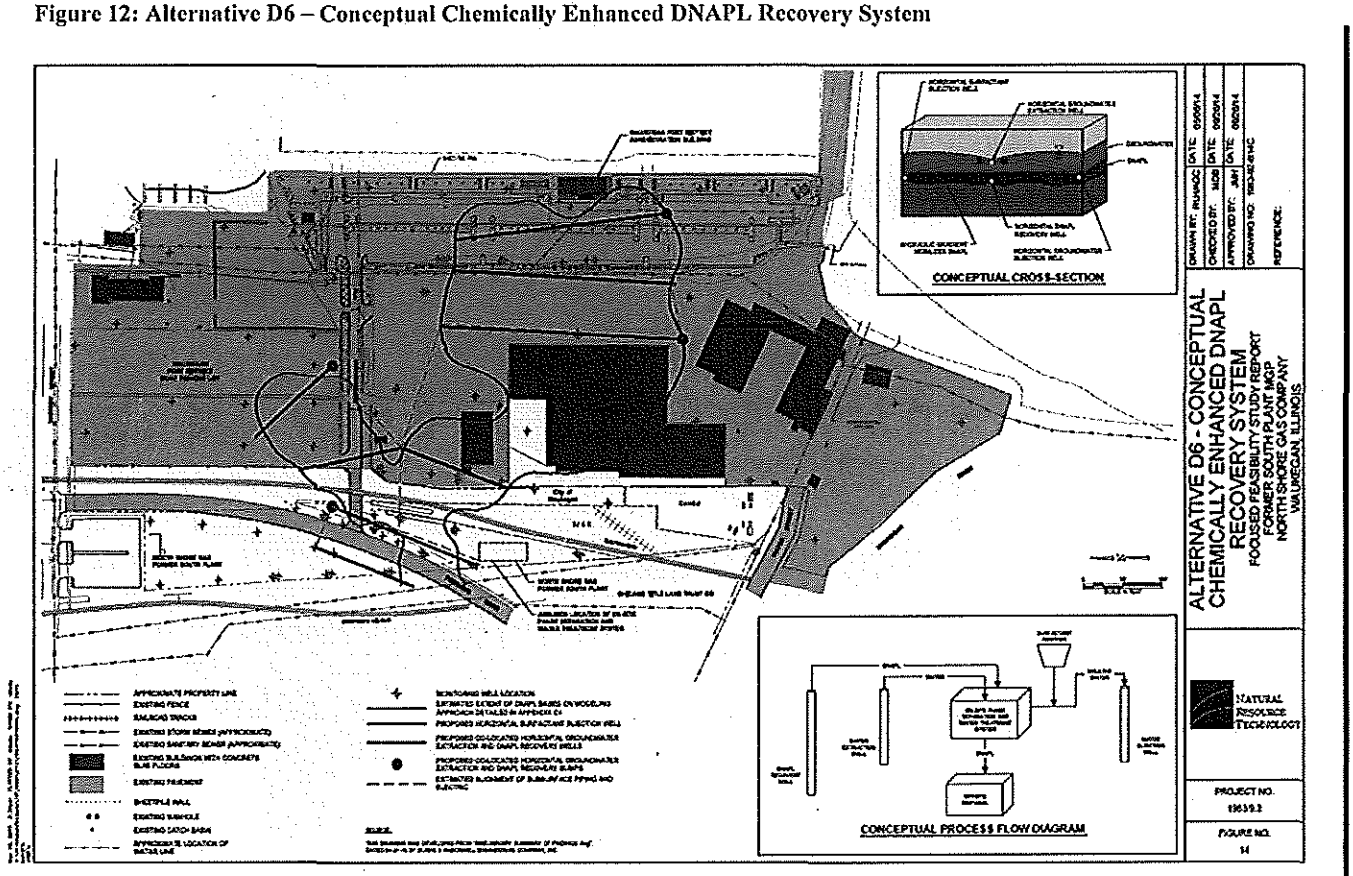


Figure 13: Alternative D7 – Conceptual Thermally Enhanced DNAPL Recovery System

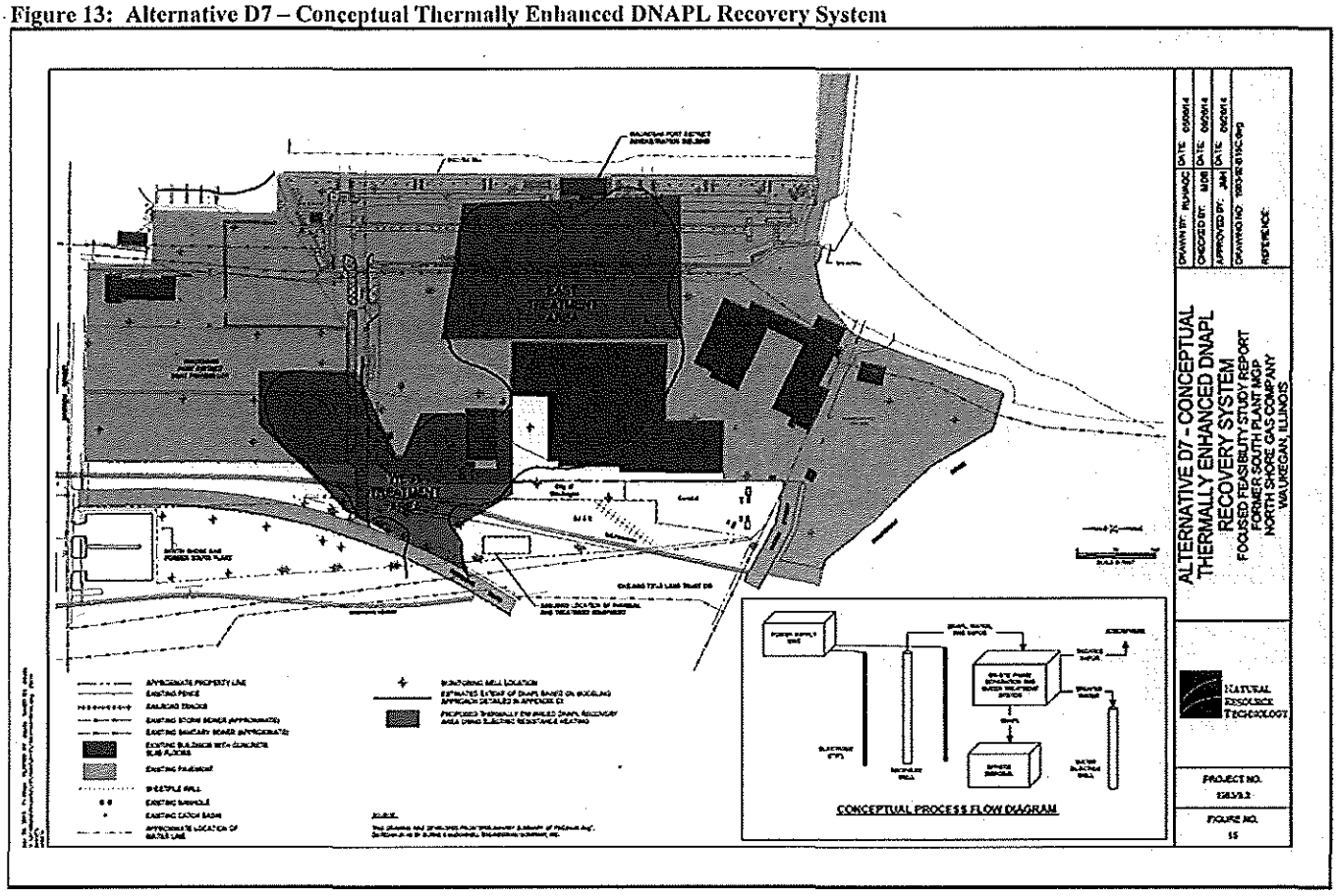


Table 2: Summary of Comparing DNAPL Remedial Alternatives

Evaluation Criteria	DNAPL Remedial Options						
	D1- No Action	*D2 – ICs*	*D3 – Vertical Eng. Barrier*	*D4 – Horizontal Well DNAPL Recovery*	*D5 – Physically Enhanced DNAPL Recovery*	*D6 Chemically Enhanced DNAPL Recovery*	*D7- Thermally Enhanced DNAPL Recovery*
Threshold Criteria							
Protection of human Health and Environment	*Does Not Meet*	*Meets*	*Meets*	*Meets*	*Meets*	*Meets*	*Meets*
Compliance with ARARs	*Does not Meet*	*Partially Meets*	*Partially Meets*	*Meets*	*Meets*	*Meets*	*Meets*
Balancing Criteria							
Long-Term Effectiveness and Permanence	*Does Not Meet*	*Partially Meets*	*Meets*	*Meets*	*Meets*	*Meets*	*Meets*
Reduction of Toxicity, Mobility, or Volume Through Treatment	*Does Not Meet*	*Does Not Meet*	*Does Not Meet*	*Meets*	*Meets*	*Meets*	*Meets*
Short-Term Effectiveness	*Meets*	*Meets*	*Meets*	*Meets*	*Meets*	*Meets*	*Meets*
Implementability	*N/A*	*Meets*	*Meets*	*Meets*	*Partially Meets*	*Partially Meets*	*Partially Meets*
Cost	*$50,000*	*$129,000*	*$13.4 million*	*$4.6 million*	*$10.6 million*	*$14.3 million*	*$33.8 million*
State Acceptance	***State concurs with selected remedy (Alternative D5)***						
Community Acceptance	***Community has no objection to selected remedy. Some commenters want cleanup to proceed without delay so redevelopment efforts can move forward.***						

Table 3 – Detailed Costs of Each DNAPL Alternative (using 7% discount rate)

Alternative	Total Capital Cost ($)	Duration of Operation (Years)	Total O&M Cost, No Discount Factor	Total Present Value Cost of O&M	Total Present Value Cost of Alternative
D1 – No Action	$ 0	0	$120,000	$50,000	$50,000
D2 – Institutional Control	$79,000	30	$120,000	$50,000	$129,000
D3 – Vertical Engineered Barrier	$3,684,000	30	$23,000,000	$9,614,000	$13,400,000
D4 – Horizontal Well DNAPL Recovery	$1,839,000	31	$7,000,000	$2,808,000	$4,647,000
D5 – Physically-Enhanced DNAPL Recovery	$4,446,000	8	$8,000,000	$6,130,000	$10,576,000
D6 – Chemically-Enhanced DNAPL Recovery	$8,845,000	4	$6,500,000	$5,490,000	$14,335,000
D7 – Thermally-Enhanced DNAPL Recovery	$26,968,000	4	$8,024,000	$6,800,000	$33,768,000

Table 4: Applicable or Relevant and Appropriate Requirements (ARARs) for DNAPL Remediation

Chemical-Specific ARARs/TBC

STANDARD, REQUIREMENT, CRITERIA, LIMITATION	CITATION	MEDIA	POTENTIAL ARAR / TBC	APPLICABLE REMEDIAL ALTERNATIVES	REQUIREMENT/COMMENTS
ILLINOIS					
Groundwater Quality Standards	415 ILCS 55, 35 Ill. Admin. Code (IAC) 620	Groundwater	Applicable	All	Establishes groundwater quality standards; Class I standards are equivalent to federal Safe Drinking Water Act Maximum Contaminant Levels
FEDERAL					
~ None Identified ~					

Location-Specific ARARs/TBC

STANDARD, REQUIREMENT, CRITERIA, LIMITATION	CITATION	MEDIA	POTENTIAL ARAR / TBC	APPLICABLE REMEDIAL ALTERNATIVES	REQUIREMENT/COMMENTS
ILLINOIS					
Illinois Endangered Species Protection Act	520 ILCS 10/3	Endangered/ threatened Species and habitat	Potentially Applicable	All	Establishes regulations limiting the possession transportation, or removal of endangered animals or plants.
Do Not Disturb Endangered Species	17 IAC 1075	Endangered/ threatened Species and habitat	Potentially Applicable	All	Establishes regulations limiting disturbance of rare and endangered species.
FEDERAL					
Endangered Species Act (ESA)	Species/habitat protection (50 C.F.R. Parts 17 and 402)	Endangered/ threatened Species and habitat	Potentially Applicable	All	Applies if threatened and/or endangered species are present in vicinity of site
Migratory Bird Treaty Act (MBTA)	16 U.S.C. §§703-712	Migratory species	Potentially Applicable	All	Requires protection of international migratory birds by ensuring that site activities do not unnecessarily affect migratory birds.

Action-Specific ARARs

STANDARD, REQUIREMENT, CRITERIA, LIMITATION	CITATION	MEDIA	POTENTIAL ARAR / TBC	POTENTIALLY APPLICABLE REMEDIAL ALTERNATIVES	REQUIREMENT/COMMENTS
ILLINOIS					
Effluent Standards	415 ILCS 5/13, 35 IAC 304	Surface Waters	Potentially Applicable	Potentially Applicable to Alternatives 3,5,6,7, if remedy involves surface water discharge	Establishes maximum concentrations of various contaminants that may be discharged to the waters of the State
Odors	415 ILCS 5/13, 35 IAC 245	Air	Relevant and Appropriate	Alternatives 3,4,5,6, & 7	Establishes procedures to determine the presence of of nuisance odor
Sound Emissions Standards and Limitations for Property Line Noise Sources	415 ILCS 5/13, 35 IAC 901	Noise	Relevant and Appropriate	Alternatives 3,4,5,6, & 7	Establishes limitations on the frequency and decibel of any property-line-noise-source
Uniform Environmental Covenants Act	765 ILCS 122	Soil and Groundwater	Applicable	Alternative 2	Establishes activity and use limitations means restrictions or obligations on real property resulting from impacts resulting from an environmental response project
Control of Organic Compound Emissions	415 ILCS 5/10, 35 IAC 218	Air	Relevant and Appropriate	Alternatives 3,4,5,6, & 7	Establishes standards and limitations for emissions of organic material and volatile organic material from stationary sources.
National Pollutant Discharge Elimination System (NPDES)	415 ILCS 5/13, 35 IAC 309	Surface Waters	Potentially Applicable	Potentially Applicable to Alternatives 3,5,6,7, if remedy involves surface water discharge	Regulates discharges to navigable waterways; applicable for point source discharges occurring during remedial action
Solid Waste Management	415 ILCS 5/22, 35 IAC 807-832	Solid Waste	Applicable	Alternatives 3,4,5,6, & 7	Applies generally to the storage, transportation and disposal of solid wastes; potential ARAR for management of media containing non-hazardous waste during remedial action
Air Quality Standards	415 ILCS 5/10, 35 IAC 212, 218, 243	Air	Relevant and Appropriate	Alternatives 3,4,5,6, & 7	Establishes air quality standards; potential ARAR for control of emissions or dust from management of contaminated media during remedial action

Table 4: Action-Specific ARARs (Cont'd)

STANDARD, REQUIREMENT, CRITERIA, LIMITATION	CITATION	MEDIA	POTENTIAL ARAR / TBC	POTENTIALLY APPLICABLE REMEDIAL ALTERNATIVES	REQUIREMENT/COMMENTS
Groundwater Protection Standards	415 ILCS 30, 77 IAC 920; 415 ILCS 55, 35 IAC 620	Groundwater	Applicable	Alternatives 3,4,5,6, & 7	ARAR for the design, construction, installation, abandonment and documentation of groundwater monitoring wells
RCRA and Underground Injection Control (UIC) Permit Program	35 IAC 702	Groundwater	Applicable	Alternatives,5,6, & 7	Applies to the procedure for obtaining permits required under the RCRA and UIC programs.
UIC Permit Program	35 IAC 704	Groundwater	Applicable	Alternatives,5,6, & 7	ARAR for the requirements of obtaining a UIC permit
Procedures for Permit Issuance	35 IAC 705	Groundwater	Applicable	Alternatives,5,6, & 7	Applies to the procedure that IEPA must follow to issue RCRA and UIC permits.
UIC Operating Requirements	35 IAC 730	Groundwater	Applicable	Alternatives,5,6, & 7	ARAR for the technical criteria and standards for the UIC program.
Hazardous Waste Injection Restrictions	35 IAC 738	Groundwater	Applicable	Alternatives,5,6, & 7	Identifies hazardous wastes that are restricted from disposal into Class I injection wells and defines those circumstances under which a waste, otherwise prohibited from injection, may be injected.
FEDERAL					
Clean Air Act (CAA)	Air Quality Standards (40 C.F.R. § 50)	Air	Relevant and Appropriate	Alternatives 3,4,5,6, & 7	Establishes federal standards for various pollutants from mobile construction/remediation sources
Clean Water Act (CWA) (Section 304)	Water quality standards (40 C.F.R. 21 131)	Surface Water	TBC	Potentially Applicable to Alternatives 3,5,6,7, if remedy involves surface water discharge	Federal WQS are ARARs for point source discharges where state has not adopted standards. Federal WQS are TBC for Wisconsin and Illinois as Wisconsin and Illinois have adopted WQS applicable to point source discharges from remedial action; refer to the Illinois ARARs.
CWA	National Pollutant Discharge Elimination System (NPDES)	Surface Waters	Potentially Applicable	Potentially Applicable to Alternatives 3,5,6,7, if remedy involves surface water discharge	ARAR for any wastewater discharge of treated groundwater during course of remediation; establishes criteria and standards for imposing treatment requirements in permits
RCRA	Municipal Solid Waste Landfills (40 C.F.R. Part 258)	Offsite land disposal non-hazardous waste	Applicable	Alternatives 3,4,5,6, & 7	Applicable to remedial actions that involve generation of non-hazardous waste minimum national criteria for management on non-hazardous waste

2.12 Selected Remedy

EPA selects Alternative D5 – Physically Enhanced DNAPL Recovery, to address the DNAPL contamination at the site (see Figure 7).

Description of the Selected Remedy

The selected remedy consists of the recovery of DNAPL using a co-located horizontal well system. One set of wells will be used to inject water into the ground to locally increase the hydraulic gradient, which will act to push the mobile DNAPL towards the recovery wells. The DNAPL will be collected and shipped off-site for thermal treatment and disposal.

Prior to being re-injected to the horizontal well system, any water collected with recovered DNAPL will be treated on-site to meet Illinois groundwater standards to the extent practicable.

2.13 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 applicable or relevant and appropriate requirements (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. In addition, 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 narrative discusses how the selected remedy meets these statutory requirements.

The selected remedy, Alternative D5 – Physically Enhanced DNAPL Recovery, is not designed to be the final remedial action at the site, but will be protective of human health and environment by removing DNAPL mass from the aquifer, thereby minimizing the potential for DNAPL-contaminated groundwater to migrate to Lake Michigan and the Waukegan River. Further, DNAPL recovery is expected to improve the quality of groundwater and soil vapor, enabling a suitable remedy to be selected for these media in a final ROD. Removal of DNAPL will also reduce potential exposures by future construction workers performing excavations at the site.

Alternative D5 will also comply with location and site-specific ARARs identified in the FFS (see Figure 11). Long-term effectiveness and permanence will be achieved by Alternative D5 by effectively and aggressively removing the recoverable portion of the DNAPL at a relatively short time period (8 years) and sending it off site for thermal treatment. Alternative D5 will be implementable because equipment and supplies are readily available for construction of the remedy. Alternative D5 will be short-term effective because construction time is of a short duration and workers and the community can be protected through standard safety measures. The estimated cost and time to complete remediation of DNAPL contamination at the site is as follows:

Estimated Capital Cost: $4,446,000
Estimated Total Annual O&M Costs: $6,130,000
Estimated Total Present Worth Cost: $10,576,000
Estimated Construction/Implementation Timeframe: 8 years

Five-Year Review Requirements

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review of the remedy's protectiveness will be conducted every five years after initiation of remedial action to ensure that the remedy remains protective of human health and the environment.

2.14 Documentation of Significant Changes

EPA's Proposed Plan for addressing DNAPL contamination at the site was released for public comment, via a fact sheet the Agency issued on May 6, 2015. A 30-day comment period from May 6 to June 5, 2015 was provided to the public to comment on EPA's Preferred Alternative, described in more detail in EPA's Proposed Plan dated April 29, 2015. An open house and public meeting was held in Waukegan, IL on May 20, 2015 to provide additional information and answer questions the public may have on EPA's Preferred Alternative. Electronic, written, and verbal comments were received by the Agency during the comment period and a responsiveness summary has been prepared to respond to these comments. The responsiveness summary is included in this document as Appendix A. EPA has determined that no significant changes to the preferred alternative in the Proposed Plan was necessary or appropriate.

Part 3 – Responsiveness Summary

Overview

In accordance with CERCLA Section 117, 42 U.S.C. Section 9617, EPA released the Proposed Plan and Administrative Record on May 6, 2015 and the public comment period ran through June 5, 2015, to allow interested parties to comment on the Proposed Plan. EPA held an open house/availability session and public meeting regarding the Proposed Plan on May 20, 2015 at the Lilac Cottage facility in Bowen Park, 1911 North Sheridan, Waukegan, Illinois. While 10-15 people attended the open house/availability session, only 2 stayed for the formal public meeting. Representatives from Illinois EPA and the potentially responsible party (Integrys), along with a Waukegan alderman, were among those that attended the meeting. A written transcript from the public meeting and the written comments received in entirety can be found in the Administrative Record.

EPA also participated in a Waukegan Harbor Citizens' Advisory Group (CAG) meeting on May 21, 2015 at the same location and provided an abbreviated version of what the agency presented during the May 20th public meeting. The CAG meeting was attended by the Illinois Department of Natural Resources (IDNR) and the same Waukegan alderman who was present during the public meeting.

This Responsiveness Summary provides both a summary of the public comments EPA received regarding the Proposed Plan and EPA's response to those comments. EPA received a small number of written, electronic, and verbal comments during the public comment period. Copies of comments received are included in the Administrative Record for the site. The Administrative Record index is attached as Appendix 2 to this ROD. EPA, in consultation with Illinois EPA, carefully considered all of the information in the Administrative Record prior to selecting the remedy documented in this ROD. Complete copies of the Proposed Plan, Administrative Record, and other pertinent documents are available at the Waukegan Public Library, 128 N. County Street, Waukegan, Illinois, as well the EPA Region 5 Superfund Division Records Center, 77 West Jackson Boulevard, 7th floor, Chicago, Illinois.

Comments received/EPA Responses

Comment:

"Please explain why the draft RI report submittal was delayed until 12/12 and its approval until 2014. I understand that the North Plant process is ahead in its schedule. Its RI report was approved in 3/12. Both plant investigations started at the same time with an AOC in 2007. I don't believe the public is served well by such a delay. Please explain the reasoning behind allowing Integrys to drag its feet."
Response:

EPA signed Administrative Orders on Consent (AOCs) in July 2007 and in October 2008 with Wisconsin Public Service Corporation, North Shore Gas, and Peoples Gas – recently Integrys and now WEC - to conduct a remedial investigation and feasibility study (RI/FS)

at 20 former MGP sites in Wisconsin and Illinois. These sites include seven sites in Wisconsin, 11 in Chicago, and two sites in Waukegan (South Plant and North Plant). Previously, the site owners addressed some contamination at some sites under the two states' voluntary cleanup programs. Illinois EPA conducted environmental inspections at the Waukegan South Plant MGP site starting in the early 1990s and North Shore Gas performed a response action there in 2003-2004 (with Illinois EPA oversight) to remove over 19,000 tons of contaminated soil from the site.

Under the AOCs, Integrys entered the 20 sites into EPA's Superfund Alternative (SA) site program so that the sites could be more quickly addressed as if they were on the Superfund National Priorities List (NPL), even though they are not actually on the NPL. Addressing the sites under the SA approach saves the time EPA needs to conduct a Superfund Site Inspection, perform a Hazard Ranking System scoring, and propose a site for inclusion on the NPL via the Federal Register and use it to evaluate the MGP sites sooner.

An integral part of the MGP site SA approach is addressing the "worst sites first." To this end, Integrys has agreed to conduct removal actions at several MGP sites to address free product found in the soil or in river sediment. Integrys has removed for off-site disposal over a million tons of contaminated soil from the Crawford Station MGP site in south Chicago, dredged river sediment from the Marinette and Two Rivers MGP sites in northeastern Wisconsin, and removed or stabilized in place tons of contaminated soil at the North Plant MGP site in Waukegan (in addition to the South Plant removal work mentioned above). Meanwhile, Integrys' contractors were taking soil, groundwater, and sediment samples at the MGP sites to assess site conditions and provide a guide for conducting the RIs at each site.

After the AOCs were signed, site planning documents and quality assurance documents for all the sites first needed to be written for EPA review and approval. After approval, Integrys began to collect data for the South Plant site RI in 2009 and generally completed all fieldwork by the end of 2011. The draft RI report was submitted to EPA for review in December 2012. EPA and the state provided a number of comments on the draft RI to Integrys, which then had to be rewritten, leading to final approval in January 2014. The time taken was necessary to ensure the RI was done properly and completely. The North Plant site has no RI report drafted as yet, so the South Plant site is ahead of it in terms of schedule.

Because the South Plant RI report noted a complex cleanup environment, EPA decided to focus on removal of the DNAPL at the site before evaluating and selecting a final soil and groundwater cleanup remedy. The DNAPL is considered a principal threat waste, so EPA's attention is currently on the safe, swift, and effective removal of the DNAPL from the site.

Comment:

"Please discuss if the different remedies have different cleanup co-benefits, e.g. would thermal enhanced recovery also reduce soil contamination?"

Response:

The four types of remedies evaluated to address dense, nonaquaeous phase liquid (DNAPL) at South Plant would likely have none to limited effects on soil contamination. The No Action alternative would not address the DNAPL or contaminated soil. Institutional controls alone could be effective at limiting human exposure, but do not treat or further contain any site contamination. The containment remedy evaluated in the Focused FS would contain the NAPL contamination underground, but not provide additional benefit with respect to soil contamination.

For the various DNAPL recovery methods, neither horizontal wells (alone) nor the water flooding method would likely address soil contamination. The surfactant and thermal recovery methods could address soil contamination, but probably not fully. Once the DNAPL remedy is in place, EPA and Integrys will be evaluating soil (and groundwater) remedies in a subsequent FS for South Plant.

Comment:

"Please explain why EPA states that "the public should not come on site" at the North Plant in your fact sheet, while big parts of the South Plant are publicly accessible. What is the difference? Please compare the amount of contamination at both sites and explain what public health threats those pose."

Response:

The North Plant site had MGP-related contaminants exposed at the surface (which were colloquially described as the "Waukegan Tar Pits" at some CAG meetings), which meant that people trespassing on the site might be exposed to PAHs and other contaminants. South Plant is publically accessible because some of the areas are paved or have buildings over them, which create a barrier to exposure. Also, North Shore Gas conducted a soil removal action in 2003-4 to address surface soil contaminants at South Plant. Thus, residual contaminants are not as accessible as they are at North Plant.

MGP contaminants may include polynuclear aromatic hydrocarbons (PAHs), BTEX (benzene, toluene, xylene, ethylbenzene), and heavy metals (arsenic). Some of the contaminants are carcinogenic (e.g. benzene, benzo(a)pyrene) and some are not. Dermal exposure, ingestion, and inhalation of these compounds could have short or long term toxic effects, depending on the intake amounts and duration, or long-term carcinogenic effects, again depending on the intake amounts and duration of exposures.

Comment:

"The turnout at the public meeting was very low. Please highlight what measures you will undertake to enhance public participation. I note here that the CAG on its website did not mention the meeting, nor did they update their website to include the May CAG agenda before the May CAG meeting which I understand you attended. Another opportunity lost."

Response:

EPA has put together an updated plan to involve the Waukegan community in Superfund matters. The plan is available in the information repository at the Waukegan Library. For South Plant, as with OMC, Johns-Manville, and others, EPA issues written updates from time to time and sometimes provides them in English and Spanish in an attempt to reach a wider audience. Spanish language fact sheets may be delivered to area churches for distribution. For South Plant, EPA issued a fact sheet announcing the proposed plan and start of a comment period to those on our site mailing list. EPA also held a daytime open house and an evening public meeting on May 20 as a means to reach a wider audience. All pertinent documents related to this action (e.g., RI report, DNAPL FFS, proposed plan, etc.) were made available in the site repository for public viewing.

EPA is often present at the Waukegan CAG monthly meetings, but we do not run the CAG, set its agenda, distribute its notices, or update its website. We will communicate your concern about the lack of communication about CAG activities to the CAG.

Comment:

"Do whatever is required to clean up the property. However, do not deny access or parking for access to the government lighthouse pier for the shore-bound fishing people who fish from that structure, and the many lakefront visitors who enjoy taking nightly evening strolls out to the lighthouse and back while enjoying an ice cream cone. These are all seasonal traditions in Waukegan. Thank you for asking for comments."

Response:

A work plan for designing and constructing the site remedy will be developed and access issues will be considered prior to actual work. While there is the possibility that access restrictions to the area described above may be necessary, the health and safety of people working at the site and/or using facilities near the site is a key determining factor what, if any, areas of the site will require some form of access control, if any. To this end, EPA will work with the responsible party to ensure the construction work will proceed in a safe and protective manner and limiting impact of the construction work on access to lakefront facilities, to the extent possible.

Comment:

"If using Plan D5 – How will products be moved "off site" and where will it end up?"

Response:

The recovered DNAPL will be transported by truck to a licensed RCRA treatment, storage, and disposal facility in Texas where it will be blended with similarly high-BTU liquids and burned as fuel in a local cement kiln.

Comment:

"What impact does the proposed plan have on any development activity at the harbor in the future?"

Response:

Addressing DNAPL will allow EPA to ultimately decide on a final remedy for the site. The cleaner the site becomes, the less restrictions will be required for future site property redevelopment.

Comment:

"Should a developer show interest in moving forward with the Master Plan developed in 2003 within the next 7 years, which calls for residential/mixed-use development, does this project or does the presence of contaminants preclude this area from any development activity during that time? Why or why not?"

Response:

As a matter of policy, EPA encourages the redevelopment of Superfund sites, which is a benefit to the community and surrounding area. Stakeholder discussions on redeveloping this site, such as recommendations in the city's 2003 Master Plan, may be useful to EPA as it makes a decision on the final cleanup plan.

Any potential site redevelopment before a final remedy is chosen and implemented, would have to be evaluated in coordination with EPA to assure that it would not hamper eventual full site cleanup. It is possible that redevelopment activity would need to be delayed or restructured in order to assure proper site cleanup.

Comment:

The following letter was received by EPA electronically on May 29, 2015:

integrys™

Integrys Business Support, LLC
200 North Adams Street
P.O. Box 19001
Green Bay, WI 54307-9001
www.integrysgroup.com

May 29, 2015

VIA E-MAIL: leon.heriberto@epa.gov

Heriberto León
Superfund Community Involvement Coordinator
US EPA Region 5
77 W. Jackson Blvd. (SI-7J)
Chicago, IL 60604-3590

Subject: North Shore Gas (NSG) South Plant Former MGP Public Comment

Dear Mr. León,

As you are aware, Integrys Business Support (Integrys), in support of North Shore Gas Company (NSG), has been working with the United States Environmental Protection Agency (USEPA) for nearly a decade to investigate the former "South Plant" manufactured gas plant site for the purpose of eventually cleaning it up.

In 2013, we summarized this environmental data and findings in a Remedial Investigation Report which was approved by USEPA in 2014. Based on the findings of the Remedial Investigation Report, Integrys/NSG was directed by USEPA to develop a Focused Feasibility Study to present cleanup options for the Dense Non Aqueous Phase Liquid (DNAPL) impacting the groundwater deep underneath South Plant site. Seven alternatives were presented in this report which was submitted to, and approved by USEPA in 2015. Three of these were the focus of multiple meetings between USEPA and Integrys:

D4 – Install horizontal extraction wells and pump out the DNAPL through these wells
D5 – Physically enhance the DNAPL recovery
D6 – Chemically enhance the DNAPL recovery

These alternatives were evaluated independently in the Focused Feasibility Study; however, the advantages of implementing these alternatives in a methodical manner were presented in the Study's Conclusion. In multiple meetings, Integrys/NSG strongly recommended to USEPA that a selected remedy should first start with D4, to remove as much as the DNAPL as practical, before moving to a more aggressive technology such as D5 or D6. Attached is a flowchart illustrating how our proposed staged remedial approach would work. We feel that this more methodical approach is less likely to cause unintended adverse environmental consequences.

Specifically, we have concerns that initiating the cleanup with the USEPA-proposed remedy of D5 (groundwater injection and DNAPL pumping) without first performing significant DNAPL removal (as proposed in D4) may actually exacerbate the situation. Our concern is that injecting groundwater could potentially push the DNAPL beyond its current extents into Lake Michigan and/or divide the one plume into multiple isolated plumes making further DNAPL remediation more difficult.

Given the lack of human exposure to this deep DNAPL, we do not feel the theoretical benefits of D5 outweigh the potential environmental risks of not first starting with D4. These concerns are described in more technical detail in the USEPA-approved Focused Feasibility Study. In addition, design and implementation of D4 is estimated to take one year less than design and implementation of D5, resulting in a more timely startup to DNAPL remediation activities.

Integrys/NSG strongly recommends that USEPA reconsider a more methodical approach as previously discussed. Regardless of USEPA's decision, we will continue our ongoing effort to clean-up the site and improve the natural environment.

If you have any questions, please do not hesitate to contact me at 920-433-2643.

Sincerely,

Brian F. Bartoszek, P.E.
Manager, Environmental Services Department
Integrys Business Support (providing support for North Shore Gas)

Response:

EPA acknowledges the concerns brought forth by Integrys related to immediately using Alternative D5 (the selected remedy) versus a staged approach that initially uses Alternative D4 and then moves forward using enhanced recovery methods. These concerns include pushing the DNAPL plume beyond its current boundaries and the possibility of dividing a single plume into multiple plumes, making remediation more difficult. To address these concerns, Integrys recommends a more methodical approach of starting with a less aggressive approach (Alternative D4) and then possibly moving to a more aggressive alternative (D5 or D6), making the decision to change based on a flowchart developed as part of the Focused FS (FFS).

However, EPA believes the selected remedy (Alternative D5) represents the best balance among the nine criteria. In particular, Alternative D4 alone had been estimated to take 31 years to complete, while Alternative D5 would only take 8 years to complete, a significant reduction in recovery time. Also, the FFS did note that the potential for the DNAPL plume to expand beyond its present boundaries under D5 can be minimized by placing the recovery wells at certain locations in the constructed well network. For these reasons, EPA has selected Alternative D5.

Appendix 1 - Illinois Environmental Protection Agency Concurrence Letter

Appendix 2 - Administrative Record Index

U.S. ENVIRONMENTAL PROTECTION AGENCY
REMEDIAL ACTION

ADMINISTRATIVE RECORD
FOR THE
NORTH SHORE GAS SOUTH PLANT SITE
WAUKEGAN, LAKE COUNTY, ILLINOIS

ORIGINAL
JANUARY 27, 2014
SEMS ID: 910536

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	910518	1/10/14	Kahler, J., and E. Kovatch, Natural Resource Technology, Inc.	del Rosario, R., U.S. EPA	Final Remedial Investigaiton Report	11353
2	467794	1/22/14	del Rosario, R., U.S. EPA	Prasad, N., Integrys Business Support	U.S. EPA Approval of Remedial Investigaiton Report	1

UPDATE 1
APRIL 14, 2015
SEMS ID: 915339

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	915337	2/25/15	Lake, P., IEPA	del Rosario, R., U.S. EPA	Letter re: Focused Feasibility Study Revision 1	3
2	915333	2/26/15	del Rosario, R., U.S. EPA	Prasad, N., Integrys Business Support	Letter re: Draft Focused Feasibility Study Report Revision 1 (Comments Attached)	6
3	915334	3/30/15	Byker, M., and J. Hagen, Natural Resource Technology, Inc.	del Rosario, R., U.S. EPA	Focused Feasibility Study Report Revision 2 (Cover Letter Attached)	158
4	915338	3/31/15	Lake, P., IEPA	del Rosario, R., U.S. EPA	Letter re: Focused Feasibility Study Revision 2	1
5	915335	4/9/15	Byker, M., Natural Resource Technology, Inc.	del Rosario, R., U.S. EPA	Email re: Revised Pages for NSG South Plant Focused Feasibility Study Report Revision 2	1

6	915336	4/9/15	del Rosario, R., U.S. EPA	Prasad, N., Integerys Business Solutions, LLC	Letter re: Draft Focused Feasibility Study Report Revision 2	1

UPDATE 2
APRIL 30, 2015
SEMS ID: 915350

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	915349	4/28/15	U.S. EPA	Public	Proposed Plan for DNAPL Cleanup	30

UPDATE 3
MAY 11, 2015
SEMS ID: 915359

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	915351	5/1/15	U.S. EPA	Public	Fact Sheet - EPA Proposes Cleanup Plan for Tar Pollution	8
2	915358	5/1/15	U.S. EPA	Public	Public Notice: Accepting Comments on the Cleanup Plan for Tar Pollution	1

UPDATE 4
MAY 12, 2015
SEMS ID: 915361

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	915360	5/6/15	CH2M	Lake County News-Sun	Tearsheet/Public Notice- U.S. EPA Accepting Comments on the Cleanup Plan for Tar Pollution	1

UPDATE 5
MAY 29, 2015
SEMS ID: 915372

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	915371	5/20/15	Jensen Litigation Solutions	U.S. EPA	Transcript of Public Meeting for Proposed Cleanup Plan	52