IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF IOWA
CENTRAL DIVISION

UNITED STATES OF AMERICA

Plaintiff,

v.

INTERSTATE POWER AND LIGHT COMPANY,

KANSAS CITY POWER AND LIGHT COMPANY,

AND

CITY OF MASON CITY, IOWA,

Defendants.

CIVIL ACTION NO. C02-3030-MWB

REMEDIAL DESIGN AND REMEDIAL ACTION CONSENT DECREE

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REMEDIAL DESIGN AND REMEDIAL ACTION CONSENT DECREE

I. BACKGROUND

A. The United States of America ("United States"), on behalf of the Administrator of the United States Environmental Protection Agency ("EPA"), filed a complaint in this matter pursuant to Sections 106 and 107 of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), 42 U.S.C. §§ 9606, 9607.

B. The United States in its complaint seeks, inter alia: (1) reimbursement of costs incurred by EPA and the Department of Justice for response actions at the Mason City Coal Gasification Superfund Site (the "Site") in Mason City, Iowa, together with accrued interest; and (2) performance of studies and response work by the defendants at the Site consistent with the

National Oil and Hazardous Substances Pollution Contingency Plan, 40 C F R. Part 300 (as amended) ("NCP").

C. In accordance with the NCP and Section 121(f)(1)(F) of CERCLA, 42 U.S.C § 9621(f)(1)(F), EPA notified the State of Iowa (the "State") on December 6, 2000 of negotiations with potentially responsible parties regarding the implementation of the remedial design and remedial action for the Site, and EPA has provided the State with an opportunity to participate in such negotiations and be a party to this Consent Decree.

D. In accordance with Section 122(j)(1) of CERCLA, 42 U S C. § 9622(j)(1), EPA notified the U.S. Department of Interior's natural resource trustee on December 6, 2000 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 provided the trustee(s) with an opportunity to participate in the negotiation of this Consent Decree

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

F. Pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, EPA placed the Site on the National Priorities List, set forth at 40 C.F.R Part 300, by publication in the Federal Register on December 16, 1994, 59 Fed. Reg. 65206.

G. In response to a release or a substantial threat of a release of a hazardous substance(s) at or from the Site, the Settling Defendants commenced on October 1, 1991, a Remedial

Investigation and Feasibility Study ("RI/FS") for the Site pursuant to 40 C F.R § 300 430

H. EPA approved a Remedial Investigation ("RI") Report on September 17, 1993, a RI Addendum on September 22, 1994, a Feasibility Study ("FS") Report on December 9, 1994, and a Feasibility Study Addendum Report on November 14, 2000.

I. Pursuant to Section 117 of CERCLA, 42 U.S C § 9617, EPA published notice of the completion of the FS and of the proposed plan for remedial action on July 24, 2000, in a major local newspaper of general circulation. EPA provided an opportunity for written and oral comments from the public on the proposed plan for remedial action. A copy of the transcript of the public meeting is available to the public as part of the administrative record upon which the Regional Administrator based the selection of the response action

J The decision by EPA on the remedial action to be implemented at the Site is embodied in a final Record of Decision ("ROD"), executed on September 19, 2000, on which the State has given its concurrence. The remedy selected in the ROD includes a contingency remedy, which shall be implemented if determined necessary by EPA to protect public health or welfare or the environment The ROD includes a responsiveness summary to the public comments. Notice of the final plan was published in accordance with Section 117(b) of CERCLA, 42 U S.C. § 9617(b).

K. Based on the information presently available to EPA, EPA believes that the Work will be properly and promptly conducted by the Settling Defendants if conducted in accordance with the requirements of this Consent Decree and its appendices

L Solely for the purposes of Section 113(j) of CERCLA, 42 U.S.C. § 9613(j), the Remedial Action selected by the ROD and the Work to be performed by the Settling Defendants

shall constitute a response action taken or ordered by the President

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

NOW, THEREFORE, it is hereby ORDERED, ADJUDGED, and DECREED.

II. JURISDICTION

1. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331, 1345, and 42 U.S C. §§ 9606, 9607, and 9613(b). This Court also has personal jurisdiction over the Settling Defendants Solely for the purposes of this Consent Decree and the underlying complaint, Settling Defendants waive all objections and defenses that they may have to jurisdiction of the Court or to venue in this District Settling Defendants shall not challenge the terms of this Consent Decree or this Court's jurisdiction to enter and enforce this Consent Decree.

III. PARTIES BOUND

2. This Consent Decree applies to and is binding upon the United States and upon Settling Defendants and their successors and assigns. Any change in ownership or corporate status of a Settling Defendant including, but not limited to, any transfer of assets or real or personal property, shall in no way alter such Settling Defendant's responsibilities under this Consent Decree.

3 Settling Defendants shall provide a copy of this Consent Decree to each contractor

hired to perform the Work (as defined below) required by this Consent Decree and to each person representing any Settling Defendant with respect to the Site or the Work and shall condition all contracts entered into hereunder upon performance of the Work in conformity with the terms of this Consent Decree. Settling Defendants or their contractors shall provide written notice of the Consent Decree to all subcontractors hired to perform any portion of the Work required by this Consent Decree. Settling Defendants shall nonetheless be responsible for ensuring that their contractors and subcontractors perform the Work contemplated herein in accordance with this Consent Decree. With regard to the activities undertaken pursuant to this Consent Decree, each contractor and subcontractor shall be deemed to be in a contractual relationship with the Settling Defendants within the meaning of Section 107(b)(3) of CERCLA, 42 U.S.C. § 9607(b)(3).

IV DEFINITIONS

4. Unless otherwise expressly provided herein, terms used in this Consent Decree which are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in CERCLA or in such regulations. Whenever terms listed below are used in this Consent Decree or in the appendices attached hereto and incorporated hereunder, the following definitions shall apply:

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

"Consent Decree" shall mean this Decree and all appendices attached hereto (listed in Section XXIX). In the event of conflict between this Decree and any appendix, this Decree shall control.

"Day" shall mean a calendar day unless expressly stated to be a working day "Working day" shall mean a day other than a Saturday, Sunday, or Federal holiday. In computing any period of time under this Consent Decree, 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.

"Effective Date" shall be the effective date of this Consent Decree as provided in Paragraph 107.

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

"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 and other items pursuant to this Consent Decree, verifying the Work, or otherwise implementing, overseeing, or enforcing this Consent Decree, including, but not limited to, payroll costs, contractor costs, travel costs, laboratory costs, the costs incurred pursuant to Sections VII, IX (including, but not limited to, the cost of attorney time and any monies paid to secure access and/or to secure or implement institutional controls including, but not limited to, the amount of just compensation), XV, and Paragraph 89 of Section XXI. Future Response Costs shall also include all Interim Response Costs.

"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 on October 1 of each year, in accordance with 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

"Interim Response Costs" shall mean all costs, including direct and indirect costs, (a) paid by the United States in connection with the Site between May 31, 2001 and the effective date of this Consent Decree, or (b) incurred prior to the effective date of this Consent Decree but paid after the effective date.

"IDNR" shall mean the Iowa Department of Natural Resources and any successor department or agencies of the State of Iowa

"National Contingency Plan" or "NCP" 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, and any amendments thereto

"Operation and Maintenance" or "O & M" shall mean all activities required to maintain the effectiveness of the Remedial Action as required under the Operation and Maintenance Plan approved or developed by EPA pursuant to this Consent Decree and the Statement of Work (SOW)

"Owner Settling Defendants" shall mean Interstate Power and Light Company and the City of Mason City, Iowa

"Paragraph" shall mean a portion of this Consent Decree identified by an arabic numeral or an upper case letter.

"Parties" shall mean the United States and the Settling Defendants

"Past Response Costs" shall mean all costs, including, but not limited to, direct and indirect costs, that the United States paid at or in connection with the Site through May 31, 2001, plus Interest on all such costs which has accrued pursuant to 42 U.S.C. § 9607(a) through such date

"Performance Standards" shall mean the cleanup standards set forth in Section 8 0 of the ROD and Section III.A of the SOW.

"Plaintiff" shall mean the United States.

"RCRA" shall mean the Solid Waste Disposal Act, as amended, 42 U S C. §§ 6901 *et seq* (also known as the Resource Conservation and Recovery Act).

"Record of Decision" or "ROD" shall mean the EPA Record of Decision relating to the Site signed on September 19, 2000, by the Regional Administrator, EPA Region VII, or his/her delegate, and all attachments thereto. The ROD is attached as Appendix A.

"Remedial Action" shall mean those activities, except for Operation and Maintenance, to be undertaken by the Settling Defendants to implement the ROD, in accordance with the SOW, the final Remedial Design described below in paragraph 11, and other plans approved by EPA. Remedial Action includes, if determined necessary by EPA, a contingency remedy identified in the ROD or an alternative contingency remedy approved by EPA

"Section" shall mean a portion of this Consent Decree identified by a roman numeral

"Settling Defendants" shall mean Interstate Power and Light Company, Kansas City Power & Light Company; and the City of Mason City, Iowa

"Site" shall mean the Mason City Coal Gasification Plant Superfund Site, encompassing approximately 2 1/3 acres, located at Delaware Avenue and Fifth Street S E. in Mason City, Cerro Gordo County, Iowa and depicted generally on the map attached as Appendix C

"State" shall mean the State of Iowa.

"Statement of Work" or "SOW" shall mean the statement of work for implementation of the Remedial Design, Remedial Action, and Operation and Maintenance at the Site, as set forth

in Appendix B to this Consent Decree and any modifications made in accordance with this Consent Decree.

"Supervising Contractor" shall mean the principal contractor retained by the Settling Defendants to supervise and direct the implementation of the Work under this Consent Decree

"United States" shall mean the United States of America

"Waste Material" shall mean (1) any "hazardous substance" under Section 101(14) of CERCLA, 42 U.S.C. § 9601(14), (2) any pollutant or contaminant under Section 101(33) of CERCLA 42 U S C. § 9601(33), and (3) any "solid waste" under Section 1004(27) of RCRA, 42 U S C § 6903(27)

"Work" shall mean all activities Settling Defendants are required to perform under this Consent Decree, except those required by Section XXV (Retention of Records) Work includes, if determined necessary by EPA, the contingency remedy identified in the ROD or an alternative contingency remedy approved by EPA

V GENERAL PROVISIONS

5 Objectives of the Parties

The objectives of the Parties in entering into this Consent Decree are to protect public health or welfare or the environment at the Site by the design and implementation of response actions at the Site by the Settling Defendants, to reimburse response costs of the Plaintiff, and to resolve the claims of Plaintiff against Settling Defendants as provided in this Consent Decree.

6 Commitments by Settling Defendants

a. Settling Defendants shall finance and perform the Work in accordance with this Consent Decree, the ROD, the SOW, and all work plans and other plans, standards,

specifications, and schedules set forth herein or developed by Settling Defendants and approved by EPA pursuant to this Consent Decree. Settling Defendants shall also reimburse the United States for Past Response Costs and Future Response Costs as provided in this Consent Decree.

b The obligations of Settling Defendants to finance and perform the Work and to pay amounts owed the United States under this Consent Decree are joint and several. In the event of the insolvency or other failure of any one or more Settling Defendants to implement the requirements of this Consent Decree, the remaining Settling Defendants shall complete all such requirements

7 Compliance with Applicable Law

All activities undertaken by Settling Defendants pursuant to this Consent Decree shall be performed in accordance with the requirements of all applicable federal and state laws and regulations. Settling Defendants must also comply with all applicable or relevant and appropriate requirements of all federal and state environmental laws as set forth in the ROD and the SOW The activities conducted pursuant to this Consent Decree, if approved by EPA, shall be considered to be consistent with the NCP

8. Permits

a. As provided in Section 121(e) of CERCLA and Section 300.400(e) of the NCP, no permit shall be required for any portion of the Work conducted entirely on-site (i e., within the areal extent of contamination or in very close proximity to the contamination and necessary for implementation of the Work) Where any portion of the Work that is not on-site requires a federal or state permit or approval, Settling Defendants shall submit timely and complete applications and take all other actions necessary to obtain all such permits or approvals

b The Settling Defendants may seek relief under the provisions of Section XVIII (Force Majeure) of this Consent Decree for any delay in the performance of the Work resulting from a failure to obtain, or a delay in obtaining, any permit required for the Work

c This Consent Decree is not, and shall not be construed to be, a permit issued pursuant to any federal or state statute or regulation

9. Notice to Successors-in-Title

a With respect to any property owned or controlled by the Owner Settling Defendants that is located within the Site, within 28 days after the entry of this Consent Decree, the Owner Settling Defendants shall submit to EPA for review and approval a notice to be filed with the Recorder's Office or Registry of Deeds or other appropriate land records office, of Cerro Gordo County, State of Iowa, which shall provide notice to all successors-in-title that the property is part of the Site; that EPA selected a remedy for the Site on September 19, 2000 which includes a contingency remedy, if necessary; that potentially responsible parties have entered into a Consent Decree requiring implementation of the remedy; and that EPA has been provided access to the Site for the purposes of conducting any activity related to the Consent Decree Such notice shall identify the United States District Court in which the Consent Decree was filed, the name and civil action number of this case, and the date the Consent Decree was entered by the Court. The Owner Settling Defendants shall record the notice within 21 days of EPA's approval of the notice The Owner Settling Defendants shall provide EPA with a certified copy of the recorded notice within 14 days of recording such notice

b At least 30 days prior to the conveyance of any interest in property located within the Site including, but not limited to, fee interests, leasehold interests, and mortgage interests, the

Owner Settling Defendant(s) conveying the interest shall give the grantee written notice of (i) this Consent Decree; (ii) any instrument by which an interest in real property has been conveyed that confers a right of access to the Site (hereinafter referred to as "access easements") pursuant to Section IX (Access and Institutional Controls), and; (iii) any instrument by which an interest in real property has been conveyed that confers a right to enforce restrictions on the use of such property (hereinafter referred to as "restrictive covenants") pursuant to Section IX (Access and Institutional Controls). At least 30 days prior to such conveyance, the Owner Settling Defendant(s) conveying the interest shall also give written notice to EPA and the State of Iowa, including the name and address of the grantee, and the date on which notice of the Consent Decree, access easements, and/or restrictive covenants was given to the grantee

c In the event of any such conveyance, the Owner Settling Defendant's obligations under this Consent Decree, including, but not limited to, its obligation to provide or secure access and institutional controls, as well as to abide by such institutional controls, pursuant to Section IX (Access and Institutional Controls) of this Consent Decree, shall continue to be met by the Owner Settling Defendant(s). In no event shall the conveyance release or otherwise affect the liability of the Owner Settling Defendant(s) to comply with all provisions of this Consent Decree, absent the prior written consent of EPA. If the United States approves, the grantee may perform some or all of the Work under this Consent Decree.

VI. PERFORMANCE OF THE WORK BY SETTLING DEFENDANTS

10. Selection of Supervising Contractor

a. · All aspects of the Work to be performed by Settling Defendants pursuant to Sections VI (Performance of the Work by Settling Defendants), VII (Remedy Review), VIII

(Quality Assurance, Sampling and Data Analysis), and XV (Emergency Response) of this Consent Decree shall be under the direction and supervision of the Settling Defendants who will select and supervise the Supervising Contractor. The selection of the Supervising Contractor shall be subject to disapproval by EPA. Within 21 days after receipt of notice from EPA of the lodging of this Consent Decree, Settling Defendants shall notify EPA in writing of the name, title, and qualifications of any contractor proposed to be the Supervising Contractor. With respect to any contractor proposed to be Supervising Contractor, Settling Defendants 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. If at any time thereafter, Settling Defendants propose to change a Supervising Contractor, Settling Defendants shall give such notice to EPA and must obtain an authorization to proceed from EPA before the new Supervising Contractor performs, directs, or supervises any Work under this Consent Decree.

b. If EPA disapproves a proposed Supervising Contractor, EPA will notify Settling Defendants in writing. Settling Defendants shall submit to EPA a list of contractors, including the qualifications of each contractor, that would be acceptable to them within 30 days of receipt of EPA's disapproval of the contractor previously proposed. EPA will provide written notice of

the names of any contractor(s) that it disapproves and an authorization to proceed with respect to any of the other contractors Settling Defendants may select any contractor from that list that is not disapproved and shall notify EPA of the name of the contractor selected within 21 days of EPA's authorization to proceed

c If EPA fails to provide written notice of its authorization to proceed or disapproval as provided in this Paragraph and this failure prevents the Settling Defendants from meeting one or more deadlines in a plan approved by the EPA pursuant to this Consent Decree, Settling Defendants may seek relief under the provisions of Section XVIII (Force Majeure) hereof

11 Remedial Design.

a Within 60 days after EPA's issuance of an authorization to proceed pursuant to Paragraph 10, Settling Defendants shall submit to EPA and the State a Remedial Design The Remedial Design 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 Consent Decree and/or the SOW. Upon its approval by EPA, after a reasonable opportunity for review and comment by the State, the Remedial Design shall be incorporated into and become enforceable under this Consent Decree.

b The Remedial Design shall include plans and schedules for implementation of all remedial design and pre-design tasks identified in the SOW

c Upon approval of the Remedial Design by EPA, after a reasonable opportunity for review and comment by the State, Settling Defendants shall implement the Remedial Design The Settling Defendants shall submit to EPA and the State all plans, submittals and other

deliverables required under the approved Remedial Design in accordance with the approved schedule for review and approval pursuant to Section XI (EPA Approval of Plans and Other Submissions)

d The Remedial Design submittal shall be developed in accordance with the SOW and shall include, at a minimum, the following (1) the overall management strategy for performing the design, construction, operation and maintenance of the Remedial Action, (2) a Monitoring Well Location and Installation Plan; (3) a Groundwater Monitoring Plan; (4) a Quality Assurance Project Plan (QAPP) in accordance with Section VIII (Quality Assurance, Sampling and Data Analysis); (5) a Construction Quality Assurance Plan, (6) a Health and Safety Plan for field design activities which conforms to the applicable Occupational Safety and Health Administration and EPA requirements, including, but not limited to, 29 C F R § 1910 120, (7) a Contingency Plan/Contingency Remedy Plan, (8) a Capital and Operation and Maintenance Cost Estimate, and (9) a Project Schedule for the installation and implementation of the Remedial Action

12 Remedial Action

a Settling Defendants shall perform the Remedial Action in accordance with the SOW and as specified in the Remedial Design. Settling Defendant City of Mason City, at no expense to the other Settling Defendants, shall provide access to the City's sewer and obtain necessary permits, to the extent such permits are required, for the completion of the response actions required under the Consent Decree and the SOW Performance of the Remedial Action includes the following activities described in the SOW. (1) a pre-final inspection, (2) a final inspection, and (3) an Interim Remedial Action Report.

b Within 30 days of approval of the Interim Remedial Action Report by EPA, after a reasonable opportunity for review and comment by the State, Settling Defendants shall submit an O&M Plan to EPA, prepared in accordance with the SOW. The O&M Plan shall include, at a minimum, the following: (1) description of normal operation and maintenance; (2) description of potential operating problems, (3) description of any routine monitoring and laboratory testing in addition to that described in the Groundwater Monitoring Plan, (4) description of alternate O&M; (5) corrective action, (6) description of equipment; and (7) description of records and reporting mechanisms required

c Upon approval of the O&M Plan by EPA, after a reasonable opportunity for review and comment by the State, Settling Defendants shall implement O&M in accordance with the O&M Plan.

d Within 30 days of full performance of the Remedial Action, as described in the SOW, Settling Defendants shall prepare a Remedial Action Report in accordance with the SOW.

13. The Settling Defendants shall continue to implement the Remedial Action and O&M until the Performance Standards are achieved and for so long thereafter as is otherwise required under this Consent Decree, as specified in the SOW.

14. Modification of the SOW or Related Plans

a If EPA determines that modification to the work specified in the SOW and/or in plans developed pursuant to the SOW is necessary to achieve and maintain the Performance Standards or to carry out and maintain the effectiveness of the remedy set forth in the ROD, EPA may require that such modification be incorporated in the SOW and/or such plans. Provided, however, that a modification may only be required pursuant to this Paragraph to the extent that it

is consistent with the scope of the remedy selected in the ROD

b For the purposes of this Paragraph 14 and Paragraphs 51 and 52 only, the "scope of the remedy selected in the ROD" includes:

i monitored natural attenuation of groundwater,

ii. restrictions on the site prohibiting residential development, the construction of basements in any buildings, and the installation of any water supply wells for municipal, industrial, or domestic purposes,

iii continued listing of the site on the Registry of Hazardous Waste or Hazardous Substance Disposal Sites pursuant to Iowa Administrative Code 455B.426, and,

iv if a contingency remedy is determined necessary by EPA, the contingency remedy set forth in the ROD

c If Settling Defendants object to any modification determined by EPA to be necessary pursuant to this Paragraph, they may seek dispute resolution pursuant to Section XIX (Dispute Resolution), and Paragraph 69 (Record Review) The SOW and/or related plans shall be modified in accordance with final resolution of the dispute

d. Settling Defendants shall implement any work required by any modifications incorporated in the SOW and/or in plans developed pursuant to the SOW in accordance with this Paragraph.

e. Nothing in this Paragraph shall be construed to limit EPA's authority to require performance of further response actions as otherwise provided in this Consent Decree

15 Contingency Remedy

a The contingency remedy set forth in the ROD shall be implemented by the Settling

Defendants if the Performance Standards have not been met as specified in the SOW and EPA determines that any one or more of the following conditions are not being met: (1) an examination of the groundwater chemistry identifies conditions that are favorable for the occurrence of biodegradation; (2) a reduction in the concentration of PAHs and BETX along the flow path downgradient of the former source area occurs, or (3) monitoring and modeling results indicate that natural attenuation is occurring at a rate sufficient to prevent the spread of the contaminant plume.

b Within 30 days of receipt of notification of EPA's determination detailed in 15 a, the Settling Defendants may propose alternative remedial actions to EPA for EPA's review.

c. At any time after the 30 day period for proposing alternative remedial actions as provided in Paragraph 15.b, EPA may determine that it is necessary to implement the contingency remedy set forth in the ROD or an alternative proposed by the Settling Defendants If EPA determines that it is appropriate under CERCLA or the NCP, the agency may publish an ESD or a ROD Amendment reflecting this determination Settling Defendants agree to perform the contingency remedy set forth in the ROD, or an alternative proposed by the Settling Defendants and selected by EPA for implementation, in accordance with the procedures and time periods set forth in Paragraphs 10-14 of this Consent Decree. Unless otherwise agreed by EPA, the 30 day time period for submitting a work plan for the design of the Remedial Action for the contingency remedy, or an alternative proposed by the Settling Defendants and selected by EPA for implementation, shall commence upon receipt of EPA's notification to the Settling Defendants that it is necessary to implement the contingency remedy set forth in the ROD, or an alternative proposed by the Settling Defendants.

d Settling Defendants may invoke the procedures set forth in Section XIX (Dispute Resolution) to dispute (1) EPA's determination that any of the conditions of Paragraph 15.a are not being met, or (2) EPA's determination of whether to implement the contingency remedy set forth in the ROD Disputes pertaining to these determinations shall be resolved pursuant to Paragraph 69 (Record Review)

e. Settling Defendant City of Mason City shall provide access to the City's sewer system to discharge treated groundwater, if necessary, at no cost to the other Settling Defendants.

16 Settling Defendants acknowledge and agree that nothing in this Consent Decree, the SOW, or the Remedial Design constitutes a warranty or representation of any kind by Plaintiff that compliance with the work requirements set forth in the SOW and the Remedial Design will achieve the Performance Standards

17 a Settling Defendants shall, prior to any off-Site shipment of Waste Material from the Site to an out-of-state waste management facility, provide written notification to the appropriate state environmental official in the receiving facility's state and to the EPA Project Coordinator of such shipment of Waste Material. However, this notification requirement shall not apply to any off-Site shipments when the total volume of all such shipments will not exceed 10 cubic yards

1. The Settling Defendants shall include in the written notification the following information, where available: (1) the name and location of the facility to which the Waste Material is to be shipped, (2) the type and quantity of the Waste Material to be shipped, (3) the expected schedule for the shipment of the Waste Material; and (4) the method of transportation. The Settling Defendants shall notify the state in which the planned receiving facility is located of

major changes in the shipment plan, such as a decision to ship the Waste Material to another facility within the same state, or to a facility in another state.

2 The identity of the receiving facility and state will be determined by the Settling Defendants following the award of the contract for Remedial Action construction The Settling Defendants shall provide the information required by Paragraph 17 a as soon as practicable after the award of the contract and before the Waste Material is actually shipped.

b. Before shipping any hazardous substances, pollutants, or contaminants from the Site to an off-site location, Settling Defendants shall obtain EPA's certification that the proposed receiving facility is operating in compliance with the requirements of CERCLA Section 121(d)(3) and 40 C F.R 300 440. Settling Defendants shall only send hazardous substances, pollutants, or contaminants from the Site to an off-site facility that complies with the requirements of the statutory provision and regulations cited in the preceding sentence

VII. REMEDY REVIEW

18 Periodic Review. Settling Defendants shall conduct any studies and investigations as requested by EPA, in order to permit EPA to conduct reviews of whether the Remedial Action is protective of human health and the environment at least every five years as required by Section 121(c) of CERCLA and any applicable regulations.

19. EPA Selection of Further Response Actions If EPA determines, at any time, that the Remedial Action is not protective of human health and the environment, EPA may select further response actions for the Site in accordance with the requirements of CERCLA and the NCP.

20. Opportunity to Comment. Settling Defendants and, if required by Sections 113(k)(2) or 117 of CERCLA, the public, will be provided with an opportunity to comment on any further

response actions proposed by EPA as a result of the review conducted pursuant to Section 121(c) of CERCLA and to submit written comments for the record during the comment period.

21 Settling Defendants' Obligation to Perform Further Response Actions If EPA selects further response actions for the Site, the Settling Defendants shall undertake such further response actions to the extent that the reopener conditions in Paragraph 85 or Paragraph 86 (United States' reservations of liability based on unknown conditions or new information) are satisfied. Settling Defendants may invoke the procedures set forth in Section XIX (Dispute Resolution) to dispute (1) EPA's determination that the reopener conditions of Paragraph 85 or Paragraph 86 of Section XXI (Covenants Not to Sue by Plaintiff) are satisfied, (2) EPA's determination that the Remedial Action is not protective of human health and the environment, or, (3) EPA's selection of the further response actions. Disputes pertaining to whether the Remedial Action is protective or to EPA's selection of further response actions shall be resolved pursuant to Paragraph 69 (record review) This paragraph does not apply to response actions relating solely to releases of hazardous substances from sources other than the former manufactured gas plant that operated at the Site For the purpose of this paragraph, the "former manufactured gas plant" shall mean the manufactured gas plant and all associated buildings and facilities, including, but not limited to, storage areas, storage structures and waste areas Settling Defendants have the burden of showing that a release of hazardous substances is solely from a source other than the former manufactured gas plant that operated at the Site

22 Submissions of Plans. If Settling Defendants are required to perform the further response actions pursuant to Paragraph 21, they shall submit a plan for such work to EPA for approval in accordance with the procedures set forth in Section VI (Performance of the Work by

Settling Defendants) and shall implement the plan approved by EPA in accordance with the provisions of this Decree

VIII QUALITY ASSURANCE, SAMPLING, AND DATA ANALYSIS

23. Settling Defendants shall use quality assurance, quality control, and chain of custody procedures for all samples in accordance with "EPA Requirements for Quality Assurance Project Plans (QA/R5)" (EPA/240/B-01/003, March 2001), "Guidance for Quality Assurance Project Plans (QA/G-5)" (EPA/600/R-98/018, February 1998), and subsequent amendments to such guidelines upon notification by EPA to Settling Defendants of such amendment Amended guidelines shall apply only to procedures conducted after such notification. Prior to the commencement of any monitoring project under this Consent Decree, Settling Defendants shall submit to EPA for approval, after a reasonable opportunity for review and comment by the State, a Quality Assurance Project Plan ("QAPP") that is consistent with the SOW, the NCP and applicable guidance documents. If relevant to the proceeding, the Parties agree that validated sampling data generated in accordance with the QAPP(s) and reviewed and approved by EPA shall be admissible as evidence, without objection, in any proceeding under this Decree. Settling Defendants shall ensure that EPA personnel and its authorized representatives are allowed access at reasonable times to all laboratories utilized by Settling Defendants in implementing this Consent Decree. In addition, Settling Defendants shall ensure that such laboratories shall analyze all samples submitted by EPA pursuant to the QAPP for quality assurance monitoring Settling Defendants shall ensure that the laboratories they utilize for the analysis of samples taken pursuant to this Decree perform all analyses according to accepted EPA methods Accepted EPA methods consist of those methods which are documented in the "Contract Lab

Program Statement of Work for Inorganic Analysis" and the "Contract Lab Program Statement of Work for Organic Analysis," dated February 1988, and any amendments made thereto during the course of the implementation of this Decree; however, upon approval by EPA, after opportunity for review and comment by the State, the Settling Defendants may use other analytical methods which are as stringent as or more stringent than the CLP- approved methods Settling Defendants shall ensure that all laboratories they use for analysis of samples taken pursuant to this Consent Decree participate in an EPA or EPA-equivalent QA/QC program Settling Defendants shall only use laboratories that have a documented Quality System which 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), and "EPA Requirements for Quality Management Plans (QA/R-2)," (EPA/240/B-01/002, March 2001) or equivalent documentation as determined by EPA EPA may consider laboratories accredited under the National Environmental Laboratory Accreditation Program (NELAP) as meeting the Quality System requirements Settling Defendants shall ensure that all field methodologies utilized in collecting samples for subsequent analysis pursuant to this Decree will be conducted in accordance with the procedures set forth in the QAPP approved by EPA.

24. Upon request, the Settling Defendants shall allow split or duplicate samples to be taken by EPA or their authorized representatives. Settling Defendants shall notify EPA not less than 28 days in advance of any sample collection activity unless shorter notice is agreed to by EPA. In addition, EPA shall have the right to take any additional samples that EPA deem necessary. Upon request, EPA shall allow the Settling Defendants to take split or duplicate

samples of any samples it takes as part of the Plaintiff's oversight of the Settling Defendants' implementation of the work.

25. Settling Defendants shall submit to EPA and the State two (2) copies of the results of all sampling and/or tests or other data obtained or generated by or on behalf of Settling Defendants with respect to the Site and/or the implementation of this Consent Decree unless EPA agrees otherwise.

26. Notwithstanding any provision of this Consent Decree, the United States hereby retains all of its information gathering and inspection authorities and rights, including enforcement actions related thereto, under CERCLA, RCRA and any other applicable statutes or regulations

IX. ACCESS AND INSTITUTIONAL CONTROLS

27 If the Site, or any other property where access and/or land/water use restrictions are needed to implement this Consent Decree, is owned or controlled by any of the Settling Defendants, such Settling Defendants shall:

a After receipt of notice from EPA of the lodging of this Consent Decree, provide the United States and its representatives, including EPA and its contractors as well as the other Settling Defendants who do not own or control the Site, with access at all reasonable times to the Site, or such other property, for the purpose of conducting any activity related to this Consent Decree including, but not limited to, the following activities:

(1) Monitoring the Work;

(2) Verifying any data or information submitted to the United States,

(3) Conducting investigations relating to contamination at or near the Site,

(4) Obtaining samples,

(5) Assessing the need for, planning, or implementing additional response actions at or near the Site,

(6) Implementing the Work pursuant to the conditions set forth in Paragraph 87 of this Consent Decree,

(7) Inspecting and copying records, operating logs, contracts, or other documents maintained or generated by Settling Defendants or their agents, consistent with Section XXIV (Access to Information),

(8) Assessing Settling Defendants' compliance with this Consent Decree;

(9) Determining whether the Site or other property is being used in a manner that is prohibited or restricted, or that may need to be prohibited or restricted, by or pursuant to this Consent Decree, and

(10) Assessing implementation of quality assurance and quality control practices as defined in the approved Quality Assurance Project Plans.

b After receipt of notice from EPA of the lodging of this Consent Decree, refrain from using the Site, or such other property, in any manner that would interfere with or adversely affect the implementation, integrity, or protectiveness of the remedial measures to be performed pursuant to this Consent Decree. Such restrictions include, but are not limited to (1) the construction, installation, maintenance or use of any wells on the described property for the purpose of extracting water for human drinking purposes, bathing, swimming or for the irrigation of food or feed crops; (2) the inclusion of basements in buildings constructed on the site for industrial or commercial uses, and, (3) any type of residential development on the site.

c Execute and record in the Recorder's Office or Registry of Deeds or other appropriate land records office, of Cerro Gordo County, State of Iowa, restrictive covenants running with the land, that grant the right to enforce the land/water use restrictions listed in Paragraph 27 b of this Consent Decree, or other restrictions that EPA determines are necessary to implement, ensure non-interference with, or ensure the protectiveness of the remedial measures to be performed pursuant to this Consent Decree. Such Settling Defendants shall grant the right to enforce the land/water use restrictions to the United States, on behalf of EPA, and its representatives Such Settling Defendants shall, within 90 days of receipt of notice from EPA of the lodging of this Consent Decree, submit to EPA for review and approval with respect to such property.

(1) Draft restrictive covenants, in substantially the form attached hereto as Appendix D, that are enforceable under the laws of the State of Iowa; and

(2) A current title insurance commitment or some other evidence of title acceptable to EPA, which shows title to the land described in the covenant to be free and clear of all prior liens and encumbrances (except for bonded indenture of Interstate Power Company dated January 1, 1948, filed March 9, 1957, and recorded in Book 158 of Land Mortgages on page 358, and all Supplements thereto, including the Eighteenth Supplemental Indenture dated as of September 15, 1991, filed October 1, 1991, Vol 91 Inst 8286, or when those liens or encumbrances are approved by EPA or when, despite best efforts, Settling Defendants are unable to obtain release or subordination of such prior liens or encumbrances).

Within 15 days of EPA's approval and acceptance of the restrictive covenants and the title evidence, such Settling Defendants shall update the title search and, if it is determined that

nothing has occurred since the effective date of the commitment or report to affect the title adversely, record the restrictive covenants with the Recorder's Office or Registry of Deeds or other appropriate office of Cerro Gordo County, State of Iowa Within 30 days of recording the restrictive covenants, such Settling Defendants shall provide EPA with a final title insurance policy, or other final evidence of title acceptable to EPA, and a certified copy of the original recorded covenant showing the clerk's recording stamps If the covenant is to be conveyed to the United States, the covenant and title evidence (including final title evidence) shall be prepared in accordance with the U.S. Department of Justice Title Standards 2001, and approval of the sufficiency of title must be obtained as required by 40 U S.C. § 255.

28 If the Site, or any other property where access and/or land/water use restrictions are needed to implement this Consent Decree, is owned or controlled by persons other than any of the Settling Defendants, Settling Defendants shall use best efforts to secure from such persons·

a an agreement to provide access thereto for Settling Defendants, as well as for the United States on behalf of EPA, and the State, as well as their representatives (including contractors), for the purpose of conducting any activity related to this Consent Decree including, but not limited to, those activities listed in Paragraph 27 a of this Consent Decree, and

b an agreement, enforceable by the Settling Defendants and the United States, to refrain from using the Site, or such other property, in any manner that would interfere with or adversely affect the implementation, integrity, or protectiveness of the remedial measures to be performed pursuant to this Consent Decree. Such restrictions include, but are not limited to (1) the construction, installation, maintenance or use of any wells on the described property for the purpose of extracting water for human drinking purposes, bathing, swimming or for the irrigation

of food or feed crops; (2) the inclusion of basements in buildings constructed on the site for industrial or commercial uses, and, (3) any type of residential development on the site

29. For purposes of Paragraph 28 of this Consent Decree, "best efforts" includes the payment of reasonable sums of money in consideration of access, access easements, land/water use restrictions, restrictive easements, and/or an agreement to release or subordinate a prior lien or encumbrance. If (a) any access or land/water use restriction agreements required by Paragraphs 28.a of this Consent Decree are not obtained within 45 days of the date of entry of this Consent Decree, (b) any access easements or restrictive covenants required by Paragraph 28 b of this Consent Decree are not submitted to EPA in draft form within 45 days of the date of entry of this Consent Decree, or (c) Settling Defendants are unable to obtain an agreement pursuant to Paragraph 26.c (1) or Paragraph 27.c.(1) from the holder of a prior lien or encumbrance to release or subordinate such lien or encumbrance to the easement being created pursuant to this consent decree within 45 days of the date of entry of this consent decree, Settling Defendants shall promptly notify the United States in writing, and shall include in that notification a summary of the steps that Settling Defendants have taken to attempt to comply with Paragraph 28 of this Consent Decree. The United States may, as it deems appropriate, assist Settling Defendants in obtaining access or land/water use restrictions, either in the form of contractual agreements or in the form of easements running with the land, or in obtaining the release or subordination of a prior lien or encumbrance. Settling Defendants shall reimburse the United States in accordance with the procedures in Section XVI (Payments for Response Costs), for all costs incurred, direct or indirect, by the United States in obtaining such access and/or land/water use restrictions, and/or the release/subordination of prior liens or encumbrances

including, but not limited to, the cost of attorney time and the amount of monetary consideration paid or just compensation.

30 If EPA determines that land/water use restrictions in the form of state or local laws, regulations, ordinances or other governmental controls are needed to implement the remedy selected in the ROD, ensure the integrity and protectiveness thereof, or ensure non-interference therewith, Settling Defendants shall cooperate with EPA's efforts to secure such governmental controls.

31 Notwithstanding any provision of this Consent Decree, the United States retains all of its access authorities and rights, as well as all of its rights to require land/water use restrictions, including enforcement authorities related thereto, under CERCLA, RCRA and any other applicable statute or regulations

X REPORTING REQUIREMENTS

32 In addition to any other requirement of this Consent Decree, Settling Defendants shall submit to EPA and the State the analytical results of each groundwater sampling event, as outlined in the Groundwater Monitoring Plan, within 90 days of each sampling event. Settling Defendants shall also submit to EPA and the State two (2) copies of written Annual Progress Reports that: (a) describe the actions which have been taken toward achieving compliance with this Consent Decree during the reporting period, (b) include a summary of all results of sampling and tests and all other data received or generated by Settling Defendants or their contractors or agents in the reporting period, (c) identify all deliverables required by this Consent Decree completed and submitted during the reporting period; (d) describe all actions, including, but not limited to, data collection and implementation of plans, which are scheduled for the next

reporting period and provide other information relating to the progress of construction, including, but not limited to, critical path diagrams, Gantt charts and Pert charts; (e) include information regarding percentage of completion, unresolved delays encountered or anticipated that may affect the future schedule for implementation of the Work, and a description of efforts made to mitigate those delays or anticipated delays, (f) include any modifications to the plans or other schedules that Settling Defendants have proposed to EPA or that have been approved by EPA; and (g) describe all activities undertaken in support of the Community Relations Plan during the reporting period and those to be undertaken in the next reporting period. The Annual Progress Reports shall include an opinion as to whether all of the following conditions are being met. (1) an examination of the groundwater chemistry identifies conditions that are favorable for the occurrence of biodegradation; (2) a reduction in the concentration of PAHs and BETX along the flow path downgradient of the former source area occurs; and (3) monitoring and modeling results indicate that natural attenuation is occurring at a rate sufficient to prevent the spread of the contaminant plume In addition, the Annual Progress Reports shall include an opinion as to whether the remedy continues to be protective. Annual Progress Reports shall be submitted annually beginning 90 days after completion of the fourth round of quarterly groundwater sampling and continue to be submitted annually until Settling Defendants submit the Remedial Action Report. Annual Progress Reports shall be due within 90 days of the end of the reporting period and shall be submitted until EPA notifies the Settling Defendants pursuant to Paragraph 52.b of Section XIV (Certification of Completion), or prior to a request for Certification of Completion, if EPA notifies the Settling Defendants otherwise. If requested by EPA, Settling Defendants shall also provide briefings for EPA to discuss the progress of the Work

33. The Settling Defendants shall notify EPA of any change in the schedule described in the Annual Progress Reports for the performance of any activity, including, but not limited to, data collection and implementation of plans, no later than seven days prior to the performance of the activity

34 Upon the occurrence of any event during performance of the Work that Settling Defendants are required to report pursuant to Section 103 of CERCLA or Section 304 of the Emergency Planning and Community Right-to-know Act (EPCRA), Settling Defendants shall within 24 hours of the onset of such event orally notify the EPA Project Coordinator or the Alternate EPA Project Coordinator (in the event of the unavailability of the EPA Project Coordinator), or, in the event that neither the EPA Project Coordinator or Alternate EPA Project Coordinator is available, the Emergency Response Section, Region VII, United States Environmental Protection Agency These reporting requirements are in addition to the reporting required by CERCLA Section 103 and/or EPCRA Section 304

35. Within 20 days of the onset of such an event, Settling Defendants shall furnish to Plaintiff a written report, signed by the Settling Defendants' Project Coordinator, setting forth the events which occurred and the measures taken, and to be taken, in response thereto Within 30 days of the conclusion of such an event, Settling Defendants shall submit a report setting forth all actions taken in response thereto.

36 Settling Defendants shall submit two copies of all plans, reports, and data required by the SOW, the Remedial Design, or any other approved plans to EPA in accordance with the schedules set forth in such plans. Settling Defendants shall simultaneously submit one copy of all such plans, reports and data to the State. Upon request by EPA Settling Defendants shall

submit in electronic form all portions of any report or other deliverable Settling Defendants are required to submit pursuant to the provisions of this Consent Decree.

37. All reports and other documents submitted by Settling Defendants to EPA (other than the Annual Progress Reports referred to above) which purport to document Settling Defendants' compliance with the terms of this Consent Decree shall be signed by an authorized representative of the Settling Defendants.

XI EPA APPROVAL OF PLANS AND OTHER SUBMISSIONS

38. After review of any plan, report or other item which is required to be submitted for approval pursuant to this Consent Decree, EPA, after 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 Settling Defendants modify the submission, or (e) any combination of the above However, EPA shall not modify a submission without first providing Settling Defendants at least one notice of deficiency and an opportunity to cure within 21 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 and the deficiencies in the submission under consideration indicate a bad faith lack of effort to submit an acceptable deliverable.

39. In the event of approval, approval upon conditions, or modification by EPA, pursuant to Paragraph 38(a), (b), or (c), Settling Defendants shall proceed to take any action required by the plan, report, or other item, as approved or modified by EPA subject only to their right to invoke the Dispute Resolution procedures set forth in Section XIX (Dispute Resolution) with

respect to the modifications or conditions made by EPA In the event that EPA modifies the submission to cure the deficiencies pursuant to Paragraph 38(c) and the submission has a material defect, EPA retains its right to seek stipulated penalties, as provided in Section XX (Stipulated Penalties)

40 Resubmission of Plans.

a Upon receipt of a notice of disapproval pursuant to Paragraph 38(d), Settling Defendants shall, within 21 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 XX (Stipulated Penalties), shall accrue during the 21 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 41 and 42

b Notwithstanding the receipt of a notice of disapproval pursuant to Paragraph 38(d), Settling Defendants shall proceed, at the direction of EPA, to take any action required by any non-deficient portion of the submission. Implementation of any non-deficient portion of a submission shall not relieve Settling Defendants of any liability for stipulated penalties under Section XX (Stipulated Penalties).

41 In the event that a resubmitted plan, report or other item, or portion thereof, is disapproved by EPA, EPA may again require the Settling Defendants to correct the deficiencies, in accordance with the preceding Paragraphs. EPA also retains the right to modify or develop the plan, report or other item Settling Defendants shall implement any such plan, report, or item as modified or developed by EPA, subject only to their right to invoke the procedures set forth in

Section XIX (Dispute Resolution)

42. If upon resubmission, a plan, report, or item is disapproved or modified by EPA due to a material defect, Settling Defendants shall be deemed to have failed to submit such plan, report, or item timely and adequately unless the Settling Defendants invoke the dispute resolution procedures set forth in Section XIX (Dispute Resolution) and EPA's action is overturned pursuant to that Section The provisions of Section XIX (Dispute Resolution) and Section XX (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 upheld, stipulated penalties shall accrue for such violation from the date on which the initial submission was originally required, as provided in Section XX (Stipulated Penalties)

43 All plans, reports, and other items required to be submitted to EPA under this Consent Decree shall, upon approval or modification by EPA, be enforceable under this Consent Decree In the event that EPA approves or modifies a portion of a plan, report, or other item required to be submitted to EPA under this Consent Decree, the approved or modified portion shall be enforceable under this Consent Decree.

XII. PROJECT COORDINATORS

44. Within 20 days after receipt of notice from EPA of the lodging this Consent Decree, Settling Defendants and EPA will notify each other, in writing, of the name, address and telephone number of their respective designated Project Coordinators and Alternate Project Coordinators. If a Project Coordinator or Alternate Project Coordinator initially designated is changed, the identity of the successor will be given to the other Parties at least five working days before the changes occur, unless impracticable, but in no event later than the actual day the

change is made. The Settling Defendants' Project Coordinator shall be subject to disapproval by EPA and shall have the technical expertise sufficient to adequately oversee all aspects of the Work. The Settling Defendants' Project Coordinator shall not be an attorney for any of the Settling Defendants in this matter He or she may assign other representatives, including other contractors, to serve as a Site representative for oversight of performance of daily operations during remedial activities

45. Plaintiff may designate other representatives, including, but not limited to, EPA employees, and federal contractors and consultants, to observe and monitor the progress of any activity undertaken pursuant to this Consent Decree EPA's Project Coordinator and Alternate Project Coordinator shall have the authority lawfully vested in a Remedial Project Manager (RPM) and an On-Scene Coordinator (OSC) by the National Contingency Plan, 40 C.F.R. Part 300. In addition, EPA's Project Coordinator or Alternate Project Coordinator shall have authority, consistent with the National Contingency Plan, to halt any Work required by this Consent Decree and to take any necessary response action when s/he determines that conditions at the Site constitute an emergency situation or may present an immediate threat to public health or welfare or the environment due to release or threatened release of Waste Material EPA's Project Coordinator and Settling Defendants' Project Coordinator will meet as requested by EPA

XIII ASSURANCE OF ABILITY TO COMPLETE WORK

46. Within 30 days of entry of this Consent Decree, Settling Defendants shall establish and maintain financial security in the amount of $650,000 in one or more of the following forms:

a. A surety bond guaranteeing performance of the Work;

b. One or more irrevocable letters of credit equaling the total estimated cost of the Work;

c. A trust fund;

d. A guarantee to perform the Work by one or more parent corporations or subsidiaries, or by one or more unrelated corporations that have a substantial business relationship with at least one of the Settling Defendants, or

e. A demonstration that one or more of the Settling Defendants satisfy the requirements of 40 C F.R. Part 264.143(f)

47. If the Settling Defendants seek to demonstrate the ability to complete the Work through a guarantee by a third party pursuant to Paragraph 46 d of this Consent Decree, Settling Defendants shall demonstrate that the guarantor satisfies the requirements of 40 C.F.R Part 264 143(f) If Settling Defendants seek to demonstrate their ability to complete the Work by means of the financial test or the corporate guarantee pursuant to Paragraph 46 d or 46.e, they shall resubmit sworn statements conveying the information required by 40 C F.R Part 264 143(f) annually, on the anniversary of the Effective Date In the event that EPA, after a reasonable opportunity for review and comment by the State, determines at any time that the financial assurances provided pursuant to this Section are inadequate, Settling Defendants shall, within 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 46 of this Consent Decree. Settling Defendants' inability to demonstrate financial ability to complete the Work shall not excuse performance of any activities required under this Consent Decree.

48. If Settling Defendants can show that the estimated cost to complete the remaining

Work has diminished below the amount set forth in Paragraph 46 above after entry of this Consent Decree, Settling Defendants may, on any anniversary date of entry of this Consent Decree, 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. Settling Defendants 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 upon approval by EPA. In the event of a dispute, Settling Defendants may reduce the amount of the security in accordance with the final administrative or judicial decision resolving the dispute.

49. Settling Defendants may change the form of financial assurance provided under this Section at any time, upon notice to and approval by EPA, provided that the new form of assurance meets the requirements of this Section. In the event of a dispute, Settling Defendants may change the form of the financial assurance only in accordance with the final administrative or judicial decision resolving the dispute

50. Within 45 days after being notified by EPA that it is necessary to implement the contingency remedy, Settling Defendants must establish and maintain financial security in accordance with the provisions of Paragraphs 46-49, but in an amount equal to EPA's estimated cost of the contingency remedy.

XIV. CERTIFICATION OF COMPLETION

51. Completion of the Remedial Action.

a Within 30 days after Settling Defendants conclude that the Remedial Action has been fully performed and that Performance Standards have been met as specified in the SOW, Settling Defendants shall schedule and conduct a pre-certification inspection to be attended by

Settling Defendants and EPA. If, after the pre-certification inspection, the Settling Defendants still believe that the Remedial Action has been fully performed and the Performance Standards have been attained, they shall submit a written Remedial Action report requesting certification to EPA for approval, with a copy to the State, pursuant to Section XI (EPA Approval of Plans and Other Submissions) within 30 days of the inspection In the report, a registered professional engineer and the Settling Defendants' Project Coordinator shall state that the Remedial Action has been completed in full satisfaction of the requirements of this Consent Decree. The written Remedial Action report shall include as-built drawings signed and stamped by a professional engineer. The report shall contain the following statement, signed by a responsible corporate official of a Settling Defendant or the Settling Defendants' Project Coordinator.

> 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

If, after completion of the pre-certification inspection and receipt and review of the written Remedial Action report, EPA, after reasonable opportunity for review and comment by the State, determines that the Remedial Action or any portion thereof has not been completed in accordance with this Consent Decree or that the Performance Standards have not been achieved, EPA will notify Settling Defendants in writing of the activities that must be undertaken by Settling Defendants pursuant to this Consent Decree to complete the Remedial Action and achieve the Performance Standards. Provided, however, that EPA may only require Settling Defendants to perform such activities pursuant to this Paragraph to the extent that such activities are consistent with the "scope of the remedy selected in the ROD," as that phrase is defined in

Paragraph_14 b EPA will set forth in the notice a schedule for performance of such activities consistent with the Consent Decree and the SOW or require the Settling Defendants to submit a schedule to EPA for approval pursuant to Section XI (EPA Approval of Plans and Other Submissions) Settling Defendants shall perform all activities described in the notice in accordance with the specifications and schedules established pursuant to this Paragraph, subject to their right to invoke the dispute resolution procedures set forth in Section XIX (Dispute Resolution).

b. If EPA concludes, based on the initial or any subsequent report requesting Certification of Completion and after a reasonable opportunity for review and comment by the State, that the Remedial Action has been performed in accordance with this Consent Decree and that the Performance Standards have been achieved, EPA will so certify in writing to Settling Defendants This certification shall constitute the Certification of Completion of the Remedial Action for purposes of this Consent Decree, including, but not limited to, Section XXI (Covenants Not to Sue by Plaintiff) Certification of Completion of the Remedial Action shall not affect Settling Defendants' obligations under this Consent Decree

52 Completion of the Work.

a. Within 90 days after Settling Defendants conclude that all phases of the Work (including O & M), have been fully performed, Settling Defendants shall schedule and conduct a pre-certification inspection to be attended by Settling Defendants and EPA. If, after the pre-certification inspection, the Settling Defendants still believe that the Work has been fully performed, Settling Defendants shall submit a written report by a registered professional engineer stating that the Work has been completed in full satisfaction of the requirements of this

Consent Decree. The report shall contain the following statement, signed by a responsible corporate official of a Settling Defendant or the Settling Defendants' Project Coordinator:

> 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

If, after review of the written report, EPA, after reasonable opportunity for review and comment by the State, determines that any portion of the Work has not been completed in accordance with this Consent Decree, EPA will notify Settling Defendants in writing of the activities that must be undertaken by Settling Defendants pursuant to this Consent Decree to complete the Work. Provided, however, that EPA may only require Settling Defendants to perform such activities pursuant to this Paragraph to the extent that such activities are consistent with the "scope of the remedy selected in the ROD," as that phrase is defined in Paragraph 14 b EPA will set forth in the notice a schedule for performance of such activities consistent with the Consent Decree and the SOW or require the Settling Defendants to submit a schedule to EPA for approval pursuant to Section XI (EPA Approval of Plans and Other Submissions). Settling Defendants shall perform all activities described in the notice in accordance with the specifications and schedules established therein, subject to their right to invoke the dispute resolution procedures set forth in Section XIX (Dispute Resolution).

b. If EPA concludes, based on the initial or any subsequent request for Certification of Completion by Settling Defendants and after a reasonable opportunity for review and comment by the State, that the Work has been performed in accordance with this Consent

Decree, EPA will so notify the Settling Defendants in writing

XV. EMERGENCY RESPONSE

53 In the event of any action or occurrence during the 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, Settling Defendants shall, subject to Paragraph 54, immediately take all appropriate action to prevent, abate, or minimize such release or threat of release, and shall immediately notify the EPA's Project Coordinator, or, if the Project Coordinator is unavailable, EPA's Alternate Project Coordinator If neither of these persons is available, the Settling Defendants shall notify the EPA Emergency Response Unit, Region VII Settling Defendants shall take such actions in consultation with EPA's Project Coordinator or other available authorized EPA officer and in accordance with all applicable provisions of the Health and Safety Plans, the Contingency Plans, and any other applicable plans or documents developed pursuant to the SOW. In the event that Settling Defendants fail to take appropriate response action as required by this Section, and EPA or, as appropriate, the State takes such action instead, Settling Defendants shall reimburse EPA all costs of the response action not inconsistent with the NCP pursuant to Section XVI (Reimbursement of Response Costs).

54. Nothing in the preceding Paragraph or in this Consent Decree shall be deemed to limit any authority of the United States: (a) to take all appropriate action to protect human health and the environment or to prevent, abate, respond to, or minimize an actual or threatened release of Waste Material on, at, or from the Site, or (b) to direct or order such action, or seek an order from the Court, to protect human health and the environment or to prevent, abate, respond to, or

minimize an actual or threatened release of Waste Material on, at, or from the Site, subject to Section XXI (Covenants Not to Sue by Plaintiff).

XVI. PAYMENTS FOR RESPONSE COSTS

55. Payments for Past Response Costs.

a. Within 45 days of the Effective Date, Settling Defendants shall pay to EPA $23,678.46 in payment for Past Response Costs. Payment shall be made by FedWire Electronic Funds Transfer ("EFT") to the U.S. Department of Justice account in accordance with current EFT procedures, referencing EPA Site/Spill ID Number 076B, and DOJ Case Number 90-11-3-07398. Payment shall be made in accordance with instructions provided to the Settling Defendants by the Financial Litigation Unit of the United States Attorney's Office for the Northern District of Iowa following lodging of the Consent Decree. Any payments received by the Department of Justice after 4:00 p.m. (Eastern Time) will be credited on the next business day.

b. At the time of payment, Settling Defendants shall send notice that payment has been made to the United States, to EPA and to the Regional Financial Management Officer, in accordance with Section XXVI (Notices and Submissions).

c. The total amount to be paid by Settling Defendants pursuant to Subparagraph 55.a shall be deposited in the EPA Hazardous Substance Superfund.

56. Payments for Future Response Costs.

a. Settling Defendants shall pay to EPA all Future Response Costs not inconsistent with the National Contingency Plan. On a periodic basis the United States will send Settling Defendants a bill requiring payment that includes a SCORPIOS Report which includes direct and

indirect costs incurred by EPA and its contractors. Settling Defendants shall make all payments within 45 days of Settling Defendants' receipt of each bill requiring payment, except as otherwise provided in Paragraph 57. Settling Defendants shall 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, EPA Site/Spill ID # 076B, and DOJ Case Number 90-11-3-07398 Settling Defendants shall send the check(s) to:

Mellon Bank
Attention Superfund Accounting
EPA Region VII (Comptroller Branch)
P O Box 360748M
Pittsburgh, Pennsylvania 15251

b At the time of payment, Settling Defendants shall send notice that payment has been made to the United States, to EPA and to the Regional Financial Management Officer, in accordance with Section XXVI (Notices and Submissions).

c The total amount to be paid by Settling Defendants pursuant to Subparagraph 56.a shall be deposited in the EPA Hazardous Substance Superfund

57 Settling Defendants may contest payment of any Future Response Costs under Paragraph 56 if they determine that the United States has made an accounting error or if they allege that a cost item that is included represents costs that are inconsistent with the NCP. Such objection shall be made in writing within 45 days of receipt of the bill and must be sent to the United States pursuant to Section XXVI (Notices and Submissions) Any such objection shall specifically identify the contested Future Response Costs and the basis for objection In the event of an objection, the Settling Defendants shall within the 45 day period pay all uncontested

Future Response Costs to the United States in the manner described in Paragraph 56. Simultaneously, the Settling Defendants shall establish an interest-bearing escrow account in a federally-insured bank duly chartered in the State of Iowa and remit to that escrow account funds equivalent to the amount of the contested Future Response Costs. The Settling Defendants shall send to the United States, as provided in Section XXVI (Notices and Submissions), 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, the Settling Defendants shall initiate the Dispute Resolution procedures in Section XIX (Dispute Resolution). If the United States prevails in the dispute, within 10 days of the resolution of the dispute, the Settling Defendants shall pay the sums due (with accrued interest) to the United States in the manner described in Paragraph 56. If the Settling Defendants prevail concerning any aspect of the contested costs, the Settling Defendants shall pay that portion of the costs (plus associated accrued interest) for which they did not prevail to the United States in the manner described in Paragraph 56; Settling Defendants 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 XIX (Dispute Resolution) shall be the exclusive mechanisms for resolving disputes regarding the Settling Defendants' obligation to reimburse the United States for its Future Response Costs.

58. In the event that the payments required by Subparagraph 55 a are not made within 45

days of the Effective Date or the payments required by Paragraph 56 are not made within 45 days of the Settling Defendants' receipt of the bill, Settling Defendants shall pay Interest on the unpaid balance The Interest to be paid on Past Response Costs under this Paragraph shall begin to accrue 45 days after the Effective Date. The Interest on Future Response Costs shall begin to accrue 45 days after the date of the bill The Interest shall accrue through the date of the Settling Defendant's payment. Payments of Interest made under this Paragraph shall be in addition to such other remedies or sanctions available to Plaintiffs by virtue of Settling Defendants' failure to make timely payments under this Section including, but not limited to, payment of stipulated penalties pursuant to Paragraph 73 . The Settling Defendants shall make all payments required by this Paragraph in the manner described in Paragraph 56

XVII. INDEMNIFICATION AND INSURANCE

59. Settling Defendants' Indemnification of the United States

a The United States does not assume any liability by entering into this agreement or by virtue of any designation of Settling Defendants as EPA's authorized representatives under Section 104(e) of CERCLA. Settling Defendants shall indemnify, save and hold harmless the United States and its officials, agents, employees, contractors, subcontractors, or representatives for or from any and all claims or causes of action arising from, or on account of, negligent or other wrongful acts or omissions of Settling Defendants, their officers, directors, employees, agents, contractors, subcontractors, and any persons acting on their behalf or under their control, in carrying out activities pursuant to this Consent Decree, including, but not limited to, any claims arising from any designation of Settling Defendants as EPA's authorized representatives under Section 104(e) of CERCLA Further, the Settling Defendants agree to pay the United

States all costs it incurs including, but not limited to, attorneys 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 Settling Defendants, their officers, directors, employees, agents, contractors, subcontractors, and any persons acting on their behalf or under their control, in carrying out activities pursuant to this Consent Decree The United States shall not be held out as a party to any contract entered into by or on behalf of Settling Defendants in carrying out activities pursuant to this Consent Decree. Neither the Settling Defendants nor any such contractor shall be considered an agent of the United States.

b The United States shall give Settling Defendants notice of any claim for which the United States plans to seek indemnification pursuant to Paragraph 59, and shall consult with Settling Defendants prior to settling such claim

60 Settling Defendants waive 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 any one or more of Settling Defendants and any person for performance of Work on or relating to the Site, including, but not limited to, claims on account of construction delays In addition, Settling Defendants 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 any one or more of Settling Defendants and any person for performance of Work on or relating to the Site, including, but not limited to, claims on account of construction delays

61. No later than 15 days before commencing any on-site Work, Settling Defendants

shall secure, and shall maintain until the first anniversary of EPA's Certification of Completion of the Remedial Action pursuant to Subparagraph 51 b of Section XIV (Certification of Completion) comprehensive general liability insurance with limits of $1,000,000, combined single limit, and automobile liability insurance with limits of $500,000, combined single limit, naming the United States as an additional insured In addition, for the duration of this Consent Decree, Settling Defendants 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 Settling Defendants in furtherance of this Consent Decree Prior to commencement of the Work under this Consent Decree, Settling Defendants shall provide to EPA certificates of such insurance and a copy of each insurance policy Settling Defendants shall resubmit such certificates and copies of policies each year on the anniversary of the Effective Date. If Settling Defendants demonstrate by evidence satisfactory to EPA that any contractor or subcontractor maintains insurance equivalent to that described above, or insurance covering the same risks but in a lesser amount, then, with respect to that contractor or subcontractor, Settling Defendants need provide only that portion of the insurance described above which is not maintained by the contractor or subcontractor.

XVIII. FORCE MAJEURE

62. "Force majeure," for purposes of this Consent Decree, is defined as any event arising from causes beyond the control of the Settling Defendants, of any entity controlled by Settling Defendants, or of Settling Defendants' contractors, that delays or prevents the performance of any obligation under this Consent Decree despite Settling Defendants' best efforts to fulfill the obligation The requirement that the Settling Defendants exercise "best efforts to fulfill the

obligation" includes using best efforts to anticipate any potential force majeure event and best efforts to address the effects of any potential force majeure event (1) as it is occurring and (2) 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 a failure to attain the Performance Standards

63. If any event occurs or has occurred that may delay the performance of any obligation under this Consent Decree, whether or not caused by a force majeure event, the Settling Defendants shall notify orally EPA's Project Coordinator or, in his or her absence, EPA's Alternate Project Coordinator or, in the event both of EPA's designated representatives are unavailable, the Director of the Superfund Division, EPA Region VII, within 10 days of when Settling Defendants first knew that the event might cause a delay. Within 5 days thereafter, Settling Defendants shall provide in writing to EPA 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; the Settling Defendants' rationale for attributing such delay to a force majeure event if they intend to assert such a claim, and a statement as to whether, in the opinion of the Settling Defendants, such event may cause or contribute to an endangerment to public health, welfare or the environment The Settling Defendants shall include with any notice all available documentation supporting their claim that the delay was attributable to a force majeure. Failure to comply with the above requirements shall preclude Settling Defendants 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. Settling Defendants shall be

deemed to know of any circumstance of which Settling

Defendants, any entity controlled by Settling Defendants, or Settling Defendants' contractors knew or should have known

64 If EPA, after a reasonable opportunity for review and comment by the State, agrees that the delay or anticipated delay is attributable to a force majeure event, the time for performance of the obligations under this Consent Decree that are affected by the force majeure event will be extended by EPA, after a reasonable opportunity for review and comment by the State, 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 will not, of itself, extend the time for performance of any other obligation, but EPA may, in its unreviewable discretion, allow such extension If EPA, after a reasonable opportunity for review and comment by the State, does not agree that the delay or anticipated delay has been or will be caused by a force majeure event, EPA will notify the Settling Defendants in writing of its decision If EPA, after a reasonable opportunity for review and comment by the State, agrees that the delay is attributable to a force majeure event, EPA will notify the Settling Defendants in writing of the length of the extension, if any, for performance of the obligations affected by the force majeure event

65. If the Settling Defendants elect to invoke the dispute resolution procedures set forth in Section XIX (Dispute Resolution), they shall do so no later than 20 days after receipt of EPA's notice In any such proceeding, Settling Defendants shall have the burden of demonstrating by a preponderance of the evidence that the delay or anticipated delay has been or will be caused by a force majeure event, that the duration of the delay or the extension sought was or will be warranted under the circumstances, that best efforts were exercised to avoid and mitigate the

effects of the delay, and that Settling Defendants complied with the requirements of Paragraphs 62 and 63, above If Settling Defendants carry this burden, the delay at issue shall be deemed not to be a violation by Settling Defendants of the affected obligation of this Consent Decree identified to EPA and the Court

XIX. DISPUTE RESOLUTION

66 Unless otherwise expressly provided for in this Consent Decree, the dispute resolution procedures of this Section shall be the exclusive mechanism to resolve disputes arising under or with respect to this Consent Decree. However, the procedures set forth in this Section shall not apply to actions by the United States to enforce obligations of the Settling Defendants that have not been disputed in accordance with this Section.

67 Any dispute which arises under or with respect to this Consent Decree shall in the first instance be the subject of informal negotiations between the parties to the dispute The period for informal negotiations shall not exceed 25 days from the time the dispute arises, unless it is modified by written agreement of the parties to the dispute The dispute shall be considered to have arisen when one party sends the other parties a written Notice of Dispute

68. Statements of Position.

a. In the event that the parties cannot resolve a dispute by informal negotiations under the preceding Paragraph, then the position advanced by EPA shall be considered binding unless, within 14 days after the conclusion of the informal negotiation period, Settling Defendants invoke the formal dispute resolution procedures of this Section by serving on the United States a written Statement of Position on the matter in dispute, including, but not limited to, any factual data, analysis or opinion supporting that position and any supporting documentation relied upon

by the Settling Defendants The Statement of Position shall specify the Settling Defendants' position as to whether formal dispute resolution should proceed under Paragraph 69 or Paragraph 70.

b Within 14 days after receipt of Settling Defendants' Statement of Position, EPA will serve on Settling Defendants its Statement of Position, including, but not limited to, any factual data, analysis, or opinion supporting that position and all supporting documentation relied upon by EPA. EPA's Statement of Position shall include a statement as to whether formal dispute resolution should proceed under Paragraph 69 or 70 Within 10 days after receipt of EPA's Statement of Position, Settling Defendants may submit a Reply.

c If there is disagreement between EPA and the Settling Defendants as to whether dispute resolution should proceed under Paragraph 69 or 70, the parties to the dispute shall follow the procedures set forth in the paragraph determined by EPA to be applicable. However, if the Settling Defendants ultimately appeal to the Court to resolve the dispute, the Court shall determine which paragraph is applicable in accordance with the standards of applicability set forth in Paragraphs 69 and 70.

69. Formal dispute resolution for disputes pertaining to the selection or adequacy of any response action, and all other disputes that are accorded review on the administrative record under applicable principles of administrative law shall be conducted pursuant to the procedures set forth in this Paragraph. For purposes of this Paragraph, the adequacy of any response action includes, without limitation: (1) the adequacy or appropriateness of plans, procedures to implement plans, or any other items requiring approval by EPA under this Consent Decree; and (2) the adequacy of the performance of response actions taken pursuant to this Consent Decree.

Nothing in this Consent Decree shall be construed to allow any dispute by Settling Defendants regarding the validity of the ROD's provisions

a An administrative record of the dispute shall be maintained by EPA and shall contain all statements of position, including supporting documentation, submitted pursuant to this Section. Where appropriate, EPA may allow submission of supplemental statements of position by the parties to the dispute.

b. The Director of the Superfund Division, EPA Region VII, will issue a final administrative decision resolving the dispute based on the administrative record described in Paragraph 69.a This decision shall be binding upon the Settling Defendants, subject only to the right to seek judicial review pursuant to Paragraph 69 c and d

c Any administrative decision made by EPA pursuant to Paragraph 69 b shall be reviewable by this Court, provided that a motion for judicial review of the decision is filed by the Settling Defendants with the Court and served on all Parties within 14 days of receipt of EPA's decision. The motion shall include a description of the matter in dispute, the efforts made by the parties to resolve it, the relief requested, and the schedule, if any, within which the dispute must be resolved to ensure orderly implementation of this Consent Decree. The United States may file a response to Settling Defendants' motion.

d. In proceedings on any dispute governed by this Paragraph, Settling Defendants shall have the burden of demonstrating that the decision of the Superfund Division Director is arbitrary and capricious or otherwise not in accordance with law. Judicial review of EPA's decision shall be on the administrative record compiled pursuant to Paragraph 69 a.

70 Formal dispute resolution for disputes that neither pertain to the selection or

adequacy of any response action nor are otherwise accorded review on the administrative record under applicable principles of administrative law, shall be governed by this Paragraph.

a Following receipt of Settling Defendants' Statement of Position submitted pursuant to Paragraph 68, the Director of the Superfund Division, EPA Region VII, will issue a final decision resolving the dispute The Waste Management Division Director's decision shall be binding on the Settling Defendants unless, within 10 days of receipt of the decision, the Settling Defendants file with the Court and serve on the parties a motion for judicial review of the decision setting forth the matter in dispute, the efforts made by the parties to resolve it, the relief requested, and the schedule, if any, within which the dispute must be resolved to ensure orderly implementation of the Consent Decree. The United States may file a response to Settling Defendants' motion

b Notwithstanding Paragraph L of Section I (Background) of this Consent Decree, judicial review of any dispute governed by this Paragraph shall be governed by applicable principles of law

71 The invocation of formal dispute resolution procedures under this Section shall not extend, postpone or affect in any way any obligation of the Settling Defendants under this Consent Decree, not directly in dispute, unless EPA or the Court agrees otherwise. Stipulated penalties with respect to the disputed matter shall continue to accrue but payment shall be stayed pending resolution of the dispute as provided in Paragraph 80 Notwithstanding the stay of payment, stipulated penalties shall accrue from the first day of noncompliance with any applicable provision of this Consent Decree In the event that the Settling Defendants do not prevail on the disputed issue, stipulated penalties shall be assessed and paid as provided in

Section XX (Stipulated Penalties).

XX STIPULATED PENALTIES

72. Settling Defendants shall be liable for stipulated penalties in the amounts set forth in Paragraphs 73 and 74 to the United States for failure to comply with the requirements of this Consent Decree specified below, unless excused under Section XVIII (Force Majeure). "Compliance" by Settling Defendants shall include completion of the activities under this Consent Decree or any work plan or other plan approved under this Consent Decree identified below in accordance with all applicable requirements of law, this Consent Decree, the SOW, and any plans or other documents approved by EPA pursuant to this Consent Decree and within the specified time schedules established by and approved under this Consent Decree

73 Stipulated Penalty Amounts - Major Deliverables.

a The following stipulated penalties shall accrue per violation per day for any noncompliance identified in Subparagraph 73.b

Penalty Per Violation Per Day	Period of Noncompliance
$ 1,250 00	1st through 14th day
$ 2,500.00	15th through 30th day
$ 4,000 00	31st day and beyond

b Compliance Milestones.

(1) Submission of Remedial Design

(2) Submission of Interim RA Report

(3) Submission of RA Report

(4) Submission of the Operation and Maintenance Plan

74 Stipulated Penalty Amounts - Minor Deliverables.

a The following stipulated penalties shall accrue per violation per day for any noncompliance identified in Subparagraph 74 b·

Penalty Per Violation Per Day	Period of Noncompliance
$ 1,000.00	1st through 14th day
$ 1,500 00	15th through 30th day
$ 2,000 00	31st day and beyond

b Compliance Milestones

(1) Submission of Annual Progress Reports

(2) Submission of Draft Restrictive Covenants

(3) Recording of Restrictive Covenants

75 In the event that EPA assumes performance of a portion or all of the Work pursuant to Paragraph 89 of Section XXI (Covenants Not to Sue by Plaintiff), Settling Defendants shall be liable for a stipulated penalty in the amount of seventy-five (75) percent of EPA's costs of performing the Work. Payment of the stipulated penalty will not resolve Settling Defendants' liability for response costs

76 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· (1) with respect to a deficient submission under Section XI (EPA Approval of Plans and Other Submissions), during the period, if any, beginning on the 31st day after EPA's receipt of such submission until the date that EPA notifies Settling Defendants of any deficiency; (2) with

respect to a decision by the Director of the Superfund Division, EPA Region VII, under Paragraph 69 b or 70.a of Section XIX (Dispute Resolution), during the period, if any, beginning on the 21st day after the date that Settling Defendants' reply to EPA's Statement of Position is received until the date that the Director issues a final decision regarding such dispute; or (3) with respect to judicial review by this Court of any dispute under Section XIX (Dispute Resolution), during the period, if any, beginning on the 31st day after the Court's receipt of the final submission regarding the dispute until the date that the Court issues a final decision regarding such dispute. Nothing herein shall prevent the simultaneous accrual of separate penalties for separate violations of this Consent Decree.

77. Following EPA's determination that Settling Defendants have failed to comply with a requirement of this Consent Decree, EPA may give Settling Defendants written notification of the same and describe the noncompliance EPA may send the Settling Defendants 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 the Settling Defendants of a violation.

78. All penalties accruing under this Section shall be due and payable to the United States within 30 days of the Settling Defendants' receipt from EPA of a demand for payment of the penalties, unless Settling Defendants invoke the Dispute Resolution procedures under Section XIX (Dispute Resolution). All payments to the United States under this Section shall be paid by certified or cashier's check(s) made payable to "EPA Hazardous Substances Superfund," shall be mailed to the following address, shall indicate that the payment is for stipulated penalties, and shall reference the EPA Region and Site/Spill ID #076B, the DOJ Case Number 90-11-3-07398,

and the name and address of the party making payment

Mellon Bank
EPA Region VII Superfund
FNMG Section
P.O Box 360748M
Pittsburgh, Pennsylvania 15251

Copies of check(s) paid pursuant to this Section, and any accompanying transmittal letter(s), shall be sent to the United States as provided in Section XXVI (Notices and Submissions), and to the Financial Management Officer, Office of Policy and Management, U S EPA Region VII, 901 N Fifth Street, Kansas City, Kansas 66101.

79. The payment of penalties shall not alter in any way Settling Defendants' obligation to complete the performance of the Work required under this Consent Decree

80. Penalties shall continue to accrue as provided in Paragraph 76 during any dispute resolution period, but need not be paid until the following

a If the dispute is resolved by agreement or by a decision of EPA that is not appealed to this Court, accrued penalties determined to be owing shall be paid to EPA within 25 days of the agreement or the receipt of EPA's decision or order;

b If the dispute is appealed to this Court and the United States prevails in whole or in part, Settling Defendants shall pay all accrued penalties determined by the Court to be owed to EPA within 60 days of receipt of the Court's decision or order, except as provided in Subparagraph c below;

c If the District Court's decision is appealed by any Party, Settling Defendants shall pay all accrued penalties determined by the District Court to be owing to the United States into an interest-bearing escrow account within 60 days of receipt of the Court's decision or order

Penalties shall be paid into this account as they continue to accrue, at least every 60 days Within 15 days of receipt of the final appellate court decision, the escrow agent shall pay the balance of the account to EPA or to Settling Defendants to the extent that they prevail

81. If Settling Defendants fail to pay stipulated penalties when due, the United States may institute proceedings to collect the penalties, as well as interest Settling Defendants shall pay Interest on the unpaid balance, which shall begin to accrue on the date of demand made pursuant to Paragraph 78.

82. Nothing in this Consent Decree shall be construed as prohibiting, altering, or in any way limiting the ability of the United States to seek any other remedies or sanctions available by virtue of Settling Defendants' violation of this Decree or of the statutes and regulations upon which it is based, including, but not limited to, penalties pursuant to Section 122(l) of CERCLA. Provided, however, that the United States shall not seek civil penalties pursuant to Section 122(l) of CERCLA for any violation for which a stipulated penalty is provided herein, except in the case of a willful violation of the Consent Decree

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

XXI COVENANTS NOT TO SUE BY PLAINTIFF

84. In consideration of the actions that will be performed and the payments that will be made by the Settling Defendants under the terms of the Consent Decree, and except as specifically provided in Paragraphs 85, 86, and 88 of this Section, the United States covenants not to sue or to take administrative action against Settling Defendants pursuant to Sections 106

and 107(a) of CERCLA relating to the Site Except with respect to future liability, these covenants not to sue shall take effect upon the receipt by EPA of the first payment required by Paragraph 55.a of Section XVI (Payments For Response Costs). With respect to future liability, these covenants not to sue shall take effect upon Certification of Completion of the Remedial Action by EPA pursuant to Paragraph 51.b of Section XIV (Certification of Completion) These covenants not to sue are conditioned upon the satisfactory performance by Settling Defendants of their obligations under this Consent Decree. These covenants not to sue extend only to the Settling Defendants and do not extend to any other person

85 United States' Pre-certification Reservations. Notwithstanding any other provision of this Consent Decree, the United States reserves, and this Consent Decree is without prejudice to, the right to institute proceedings in this action or in a new action, or to issue an administrative order seeking to compel Settling Defendants

a. to perform further response actions relating to the Site or

b. to reimburse the United States for additional costs of response if, prior to Certification of Completion of the Remedial Action

(1) conditions at the Site, previously unknown to EPA, are discovered, or

(2) information, previously unknown to EPA, is received, in whole or in part, and EPA determines that these previously unknown conditions or information together with any other relevant information indicates that the Remedial Action is not protective of human health or the environment

86 United States' Post-certification Reservations Notwithstanding any other provision of this Consent Decree, the United States reserves, and this Consent Decree is without prejudice

to, the right to institute proceedings in this action or in a new action, or to issue an administrative order seeking to compel Settling Defendants:

a to perform further response actions relating to the Site or

b. to reimburse the United States for additional costs of response if, subsequent to Certification of Completion of the Remedial Action:

(1) conditions at the Site, previously unknown to EPA, are discovered, or

(2) information, previously unknown to EPA, is received, in whole or in part, and these previously unknown conditions or this information together with other relevant information indicate that the Remedial Action is not protective of human health or the environment.

87 For purposes of Paragraph 85, the information and the conditions known to EPA shall include only that information and those conditions known to EPA as of the date the ROD was signed and set forth in the Record of Decision for the Site and the administrative record supporting the Record of Decision For purposes of Paragraph 86, the information and the conditions known to EPA shall include only that information and those conditions known to EPA as of the date of Certification of Completion of the Remedial Action and set forth in the Record of Decision, the administrative record supporting the Record of Decision, the post-ROD administrative record, or in any information received by EPA pursuant to the requirements of this Consent Decree prior to Certification of Completion of the Remedial Action

88. General reservations of rights The United States reserves, and this Consent Decree is without prejudice to, all rights against Settling Defendants with respect to all matters not expressly included within Plaintiff's covenant not to sue. Notwithstanding any other provision of this Consent Decree, the United States reserves all rights against Settling Defendants with

respect to

a. claims based on a failure by Settling Defendants to meet a requirement of this Consent Decree,

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

c liability based upon the Settling Defendants' ownership or operation of the Site, or upon the Settling Defendants' transportation, treatment, storage, or disposal, or the arrangement for the transportation, treatment, storage, or disposal of Waste Material at or in connection with the Site, other than as provided in the ROD, the Work, or otherwise ordered by EPA, after signature of this Consent Decree by the Settling Defendants;

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

e criminal liability;

f liability for violations of federal or state law which occur during or after implementation of the Remedial Action, and

g. liability, prior to Certification of Completion of the Remedial Action, for additional response actions that EPA determines are necessary to achieve Performance Standards, but that cannot be required pursuant to Paragraph 14 (Modification of the SOW or Related Plans).

89. Work Takeover In the event EPA determines that Settling Defendants have ceased implementation of any portion of the Work, are seriously or repeatedly deficient or late in their performance of the Work, or are implementing the Work in a manner which may cause an

endangerment to human health or the environment, EPA may assume the performance of all or any portions of the Work as EPA determines necessary Settling Defendants may invoke the procedures set forth in Section XIX (Dispute Resolution), Paragraph 69, to dispute EPA's determination that takeover of the Work is warranted under this Paragraph. Costs incurred by the United States in performing the Work pursuant to this Paragraph shall be considered Future Response Costs that Settling Defendants shall pay pursuant to Section XVI (Payments For Response Costs)

90 Notwithstanding any other provision of this Consent Decree, the United States retains all authority and reserves all rights to take any and all response actions authorized by law

XXII. COVENANTS BY SETTLING DEFENDANTS

91. Covenant Not to Sue Subject to the reservations in Paragraph 92, Settling Defendants hereby covenant not to sue and agree not to assert any claims or causes of action against the United States with respect to the Site or this Consent Decree, including, but not limited to.,

a. any direct or indirect claim for reimbursement from the Hazardous Substance Superfund (established pursuant to the Internal Revenue Code, 26 U S C. § 9507) through CERCLA Sections 106(b)(2), 107, 111, 112, 113 or any other provision of law,

b. any claims against the United States, including any department, agency or instrumentality of the United States under CERCLA Sections 107 or 113 related to the Site, or

c any claims arising out of response activities at or in connection with the Site, including any claim under the United States Constitution, the [State] 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

92. The Settling Defendants reserve, and this Consent Decree 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 the Settling Defendants' plans or activities The foregoing applies only to claims which 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,

93 Nothing in this Consent Decree shall be deemed to constitute 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).

94. Settling Defendants agree not to assert any claims and to waive all claims or causes of action that they may have for all matters relating to the Site, including for contribution, against any person where the person's liability to Settling Defendants 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

a. the materials contributed by such person to the Site containing hazardous substances did not exceed the greater of (i) 0.002% of the total volume of waste at the Site, or (ii) 110 gallons of liquid materials or 200 pounds of solid materials.

b This waiver shall not apply to any claim or cause of action against any person meeting the above criteria if EPA has determined that the materials contributed to the Site by such person contributed or could contribute significantly to the costs of response at the Site. This waiver also shall not apply with respect to any defense, claim, or cause of action that a Settling Defendant may have against any person if such person asserts a claim or cause of action relating to the Site against such Settling Defendant.

XXIII EFFECT OF SETTLEMENT, CONTRIBUTION PROTECTION

95 Except as provided in Paragraph 94 (Waiver of Claims Against De Micromis Parties), nothing in this Consent Decree shall be construed to create any rights in, or grant any cause of action to, any person not a Party to this Consent Decree. The preceding sentence shall not be construed to waive or nullify any rights that any person not a signatory to this decree may have under applicable law. Except as provided in Paragraph 94 (Waiver of Claims Against De Micromis Parties), each of the Parties expressly reserves any and all rights (including, but not limited to, any right to contribution), defenses, claims, demands, and causes of action which each Party may have with respect to any matter, transaction, or occurrence relating in any way to the Site against any person not a Party hereto.

96 The Parties agree, and by entering this Consent Decree this Court finds, that the Settling Defendants are entitled, as of the Effective Date, to protection from contribution actions

or claims as provided by CERCLA Section 113(f)(2), 42 U S C § 9613(f)(2) for matters addressed in this Consent Decree. The "matters addressed" are Past Response Costs and all response actions taken and to be taken in connection with the remedy selected for the Site as set forth in the ROD. The "matters addressed" in this Consent Decree do not include those response actions or those response costs or natural resource damages as to which the United States has reserved its rights under Section XXI (Covenants Not to Sue by Plaintiff) of this Consent Decree, in the event that the United States asserts rights against Settling Defendants coming within the scope of any such reservation.

97 The Settling Defendants agree that with respect to any suit or claim for contribution brought by them for matters related to this Consent Decree they will notify the United States in writing no later than 60 days prior to the initiation of such suit or claim

98 The Settling Defendants also agree that with respect to any suit or claim for contribution brought against them for matters related to this Consent Decree they will notify in writing the United States within 10 days of service of the complaint on them In addition, Settling Defendants shall notify the United States within 10 days of service or receipt of any Motion for Summary Judgment and within 10 days of receipt of any order from a court setting a case for trial.

99. In any subsequent administrative or judicial proceeding initiated by the United States for injunctive relief, recovery of response costs, or other appropriate relief relating to the Site, Settling Defendants shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, res judicata, collateral estoppel, issue preclusion, claim-splitting, or other defenses based upon any contention that the claims raised by the United States in the subsequent

proceeding were or should have been brought in the instant case, provided, however, that nothing in this Paragraph affects the enforceability of the covenants not to sue set forth in Section XXI (Covenants Not to Sue by Plaintiff).

XXIV. ACCESS TO INFORMATION

100 Settling Defendants shall provide to EPA, 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 Consent Decree, 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. Settling Defendants shall also make available to EPA, for purposes of investigation, information gathering, or testimony, their employees, agents, or representatives with knowledge of relevant facts concerning the performance of the Work.

101. Business Confidential and Privileged Documents

a Settling Defendants may assert business confidentiality claims covering part or all of the documents or information submitted to Plaintiff under this Consent Decree 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 they are submitted to EPA, or if EPA has notified Settling Defendants that the documents or information are not confidential under the standards of Section 104(e)(7) of CERCLA, the public may be given access to such documents or information without further notice to Settling Defendants.

b The Settling Defendants 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 Settling Defendants assert such a privilege in lieu of providing documents, they shall provide the Plaintiff with the following. (1) the title of the document, record, or information; (2) the date of the document, record, or information; (3) the name and title of the author of the document, record, or information, (4) the name and title of each addressee and recipient; (5) a description of the contents of the document, record, or information: and (6) the privilege asserted by Settling Defendants. However, no documents, reports or other information created or generated pursuant to the requirements of the Consent Decree shall be withheld on the grounds that they are privileged.

102 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.

XXV RETENTION OF RECORDS

103. Until 6 years after the Settling Defendants' receipt of EPA's notification pursuant to Paragraph 52 b of Section XIV (Certification of Completion of the Work), each Settling Defendant shall preserve and retain all non-identical copies of records and documents (including records or documents in electronic form) now in its possession or control or which come into its possession or control that relate in any manner to its liability under CERCLA with respect to the Site, provided, however, that Settling Defendants who are potentially liable as owners or operators of the Site must retain, in addition, all documents and records that relate to the liability

of any other person under CERCLA with respect to the Site Each Settling Defendant must also retain, and instruct its contractors and agents to preserve, for the same period of time specified above all non-identical copies of the last draft or final version of any documents or records (including documents or records 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, provided, however, that each Settling Defendant (and its contractors and agents) must retain, in addition, copies of all data generated during the performance of the Work and not contained in the aforementioned documents required to be retained. Each of the above record retention requirements shall apply regardless of any corporate retention policy to the contrary

104 At the conclusion of this document retention period, Settling Defendants shall notify the United States at least 90 days prior to the destruction of any such records or documents, and, upon request by the United States, Settling Defendants shall deliver any such records or documents to EPA. The Settling Defendants 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 Settling Defendants assert such a privilege, they shall provide the Plaintiffs with the following: (1) the title of the document, record, or information; (2) the date of the document, record, or information; (3) the name and title of the author of the document, record, or information; (4) the name and title of each addressee and recipient, (5) a description of the subject of the document, record, or information, and (6) the privilege asserted by Settling Defendants. However, no documents, reports or other information created or generated pursuant to the requirements of the Consent Decree shall be withheld on the grounds that they are privileged.

105 Each Settling Defendant hereby certifies individually 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 the United States 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 Section 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

XXVI. NOTICES AND SUBMISSIONS

106 Whenever, under the terms of this Consent Decree, written notice is required to be given or a report or other document is required to be sent by one Party to another, it shall be directed to the individuals at the addresses specified below, unless those individuals or their successors give notice of a change to the other Parties in writing All notices and submissions shall be considered effective upon receipt, unless otherwise provided Written notice as specified herein shall constitute complete satisfaction of any written notice requirement of the Consent Decree with respect to the United States, EPA, and the Settling Defendants, respectively.

As to the United States

Chief, Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
P.O Box 7611
Washington, D C 20044-7611
Re: DOJ # 90-11-3-07398

and

Michael J. Sanderson
Director, Superfund Division
United States Environmental Protection Agency
Region VII
901 N. Fifth Street
Kansas City, Kansas 66101

As to EPA:

Diana Engeman
EPA Project Coordinator
United States Environmental Protection Agency
Region VII
901 N Fifth Street
Kansas City, Kansas 66101

As to the Settling Defendants:

Interstate Power and Light Company.

Bruce A Greer
Manager, Environmental Services
Alliant Energy Corporate Services, Inc.
222 W. Washington Avenue
Madison, WI 53703-2793

cc: Daniel L. Siegfried, Esq.
Senior Attorney
Alliant Energy Corporate Services, Inc.
200 First Street SE
P.O. Box 351
Cedar Rapids, IA 52406-0351

Kansas City Power & Light Company	John Horn Kansas City Power & Light Company 1201 Walnut Street P.O. Box 418679 Kansas City, MO 64141-9679
	cc: Michael D Hockley, Esq Spencer Fane Britt & Browne LLP 1000 Walnut Street, Suite 1400 Kansas City, MO 64106-2140
City of Mason City	Tim Moerman City Administrator 10 1st Street N.W Mason City, IA 50401
	cc: Herman (Chip) Folkers City Attorney 23 3rd Street N.W., Suite 200 Mason City, IA 50401

XXVII. EFFECTIVE DATE

107. The effective date of this Consent Decree shall be the date upon which this Consent Decree is entered by the Court, except as otherwise provided herein

XXVIII. RETENTION OF JURISDICTION

108 This Court retains jurisdiction over both the subject matter of this Consent Decree and the Settling Defendants for the duration of the performance of the terms and provisions of this Consent Decree for the purpose of enabling any of the Parties to apply to the Court at any time for such further order, direction, and relief as may be necessary or appropriate for the construction or modification of this Consent Decree, or to effectuate or enforce compliance with its terms, or to resolve disputes in accordance with Section XIX (Dispute Resolution) hereof.

XXIX APPENDICES

109 The following appendices are attached to and incorporated into this Consent Decree.

"Appendix A" is the ROD;

"Appendix B" is the SOW;

"Appendix C" is the map of the Site,

"Appendix D" is the draft declaration of restrictive covenants.

XXX. COMMUNITY RELATIONS

110. Settling Defendants shall propose to EPA their participation in the community relations plan to be developed by EPA. EPA will determine the appropriate role for the Settling Defendants under the Plan. Settling Defendants shall also cooperate with EPA in providing information regarding the Work to the public As requested by EPA, Settling Defendants shall participate in the preparation of such information for dissemination to the public and in public meetings which may be held or sponsored by EPA to explain activities at or relating to the Site

XXXI. MODIFICATION

111. Schedules specified in this Consent Decree for completion of the Work may be modified by agreement of EPA and the Settling Defendants All such modifications shall be made in writing.

112. Except as provided in Paragraph 14 ("Modification of the SOW or Related Plans"), no material modifications shall be made to the SOW without written notification to and written approval of the United States, Settling Defendants, and the Court, if such modifications fundamentally alter the basic features of the selected remedy within the meaning of 40 C.F R

300 435(c)(2)(B)(ii) Prior to providing its approval to any modification, the United States will provide the State with a reasonable opportunity to review and comment on the proposed modification Modifications to the SOW that do not materially alter that document, or material modifications to the SOW that do not fundamentally alter the basic features of the selected remedy within the meaning of 40 C.F.R.300 435(c)(2)(B)(ii), may be made by written agreement between EPA, after providing the State with a reasonable opportunity to review and comment on the proposed modification, and the Settling Defendants. A determination by EPA that the contingency remedy is necessary, and any resulting amendment to the SOW, shall not be considered a modification of the SOW

113 Nothing in this Decree shall be deemed to alter the Court's power to enforce, supervise or approve modifications to this Consent Decree.

XXXII. LODGING AND OPPORTUNITY FOR PUBLIC COMMENT

114 This Consent Decree shall be lodged with the Court for a period of not less than 30 days for public notice and comment in accordance with Section 122(d)(2) of CERCLA, 42 U S.C § 9622(d)(2), and 28 C F R. § 50 7 The United States reserves the right to withdraw or withhold its consent if the comments regarding the Consent Decree disclose facts or considerations which indicate that the Consent Decree is inappropriate, improper, or inadequate. Settling Defendants consent to the entry of this Consent Decree without further notice.

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

XXXIII. SIGNATORIES/SERVICE

116 Each undersigned representative of a Settling Defendant to this Consent Decree and the Assistant Attorney General for the Environment and Natural Resources Division of the Department of Justice certifies that he or she is fully authorized to enter into the terms and conditions of this Consent Decree and to execute and legally bind such Party to this document

117 Each Settling Defendant hereby agrees not to oppose entry of this Consent Decree by this Court or to challenge any provision of this Consent Decree unless the United States has notified the Settling Defendants in writing that it no longer supports entry of the Consent Decree

118. Each Settling Defendant shall identify, on the attached signature page, the name, address and telephone number of an agent who is authorized to accept service of process by mail on behalf of that Party with respect to all matters arising under or relating to this Consent Decree Settling Defendants hereby agree to accept service in that manner and to waive the formal service requirements set forth in Rule 4 of the Federal Rules of Civil Procedure and any applicable local rules of this Court, including, but not limited to, service of a summons

XXXIV. FINAL JUDGMENT

119 This Consent Decree and its appendices constitute the final, complete, and exclusive agreement and understanding among the parties with respect to the settlement embodied in the Consent Decree The parties acknowledge that there are no representations, agreements or understandings relating to the settlement other than those expressly contained in this Consent Decree.

120. Upon approval and entry of this Consent Decree by the Court, this Consent Decree shall constitute a final judgment between and among the United States and the Settling

Defendants The Court finds that there is no just reason for delay and therefore enters this judgment as a final judgment under Fed R. Civ P. 54 and 58

SO ORDERED THIS 26th DAY OF July, 2002.

Mark W. Bennett
U S. DISTRICT COURT JUDGE

Copies mailed on 7/29/02
to counsel of record or pro se parties as shown on the docket sheet.
Deputy Clerk

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. Interstate Power and Light Company, Kansas City Power & Light Company, and City of Mason City, Iowa, relating to the Mason City Coal Gasification Plant Superfund Site

FOR THE UNITED STATES OF AMERICA

Thomas L. Sansonetti
Assistant Attorney General
Environment and Natural Resources Division
U S Department of Justice

4/18/02
Date

Walker B Smith
Principal Deputy Section Chief
Environmental Enforcement Section
Assistant Attorney General
Environment and Natural Resources Division
U S. Department of Justice
Washington, D C. 20530

4/19/02
Date

Paul Gormley
Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
P.O. Box 7611
Washington, D C 20044-7611

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. Interstate Power and Light Company, Kansas City Power & Light Company, and City of Mason City, Iowa, relating to the Mason City Coal Gasification Plant Superfund Site.

2-28-02
Date

James B. Gulliford
Regional Administrator, Region VII
U S. Environmental Protection Agency
901 N. Fifth Street
Kansas City, Kansas 66101

2-25-02
Date

Jenna M. Wischmeyer
Assistant Regional Counsel
U S Environmental Protection Agency
Region VII
901 N. Fifth Street
Kansas City, Kansas 66101

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. Interstate Power and Light Company, Kansas City Power & Light Company, and City of Mason City, Iowa, relating to the Mason City Coal Gasification Plant Superfund Site.

FOR INTERSTATE POWER AND LIGHT COMPANY

2-19-02
Date

Signature: _____
Name (print): Pamela Wegner
Title: Executive Vice President - Shared Solutions
Address: 222 West Washington Ave
Madison WI 53701

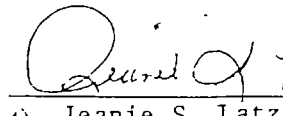
Agent Authorized to Accept Service on Behalf of Above-signed Party:

Name (print): Daniel L. Siegfried
Title: Assistant Corporate Secretary
Address: 200 First St. SE
Cedar Rapids, IA 52406

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. Interstate Power and Light Company, Kansas City Power & Light Company, and City of Mason City, Iowa, relating to the Mason City Coal Gasification Plant Superfund Site

FOR KANSAS CITY POWER & LIGHT COMPANY

1/25/02
Date

Signature: 
Name (print): Jeanie S. Latz
Title: Sr. Vice President Corporate Service
Address: 1201 Walnut
Kansas City MO 64106-2124

Agent Authorized to Accept Service on Behalf of Above-signed Party.

Name (print): Jeanie S. Latz
Title:
Address

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v Interstate Power and Light Company, Kansas City Power & Light Company, and City of Mason City, Iowa, relating to the Mason City Coal Gasification Plant Superfund Site

FOR CITY OF MASON CITY, IOWA

2-7-02
Date

Signature _____
Name(print) Lee L. Henry
Title Mayor Pro tem
Address City Hall, 10 1st St. N.W.
Mason City, IA 50401

Agent Authorized to Accept Service on Behalf of Above-signed Party

Name (print) Timothy A. Hoerman
Title City Administrator
Address City Hall
10 First Street N.W.
Mason City, IA. 50401

RECORD OF DECISION

MASON CITY COAL GASIFICATION SITE
MASON CITY, IOWA

Prepared by:

U.S. Environmental Protection Agency
Region VII
901 North 5th Street
Kansas City, Kansas 66101

September 2000

RECORD OF DECISION
DECLARATION

SITE NAME AND LOCATION

Mason City Coal Gasification Site
Mason City, Iowa
CERCLIS ID# IAD980969190

STATEMENT OF BASIS AND PURPOSE

The U.S. Environmental Protection Agency (EPA) has prepared this decision document to present the selected remedial action for the Mason City Coal Gasification site located in Mason City, Iowa. This decision was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and to the extent practicable, the National Contingency Plan (NCP). This decision is based on the Administrative Record for this site. The Administrative Record file is located in the following information repositories:

Mason City Public Library
225 2nd Street S.E.
Mason City, Iowa

U.S. Environmental Protection Agency
901 North 5th Street
Kansas City, Kansas

The EPA has coordinated selection of this remedial action with the Iowa Department of Natural Resources. The state of Iowa concurs with the selected remedy.

ASSESSMENT OF THE SITE

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

DESCRIPTION OF THE SELECTED REMEDY

The selected remedy prevents exposure to contaminated ground water, restores the ground water to drinking water quality, and implements institutional controls to prevent exposure

to contaminated soil. The selected remedy includes the following components:

- Monitored natural attenuation of ground water;
- Restrictions on the site prohibiting residential development, the construction of basements in any buildings, and the installation of any water supply wells for municipal, industrial, or domestic purposes, and
- Continued listing of the site on the Registry of Hazardous Waste or Hazardous Substance Disposal Sites pursuant to Iowa Administrative Code 455B.426

The preferred remedy also includes a contingency remedy in the event that the monitoring data indicate that the natural attenuation processes are no longer effective in remediating the ground water. The contingency remedy is ground water pumping and treatment with discharge to the sanitary sewer and institutional controls. The contingency remedy includes the following components:

- Pumping and treatment of ground water in an on site, multi-stage treatment system with discharge of the treated water to the sanitary sewer;
- Restrictions on the site prohibiting residential development, the construction of basements in any buildings, and the installation of any water supply wells for municipal, industrial, or domestic purposes; and
- Continued listing of the site on the Registry of Hazardous Waste or Hazardous Substance Disposal Sites pursuant to Iowa Administrative Code 455B.426.

In order to accelerate the clean up of the source area, a removal action was completed It included the excavation and thermal treatment of soil exceeding risk-based action levels and placement of the treated soil back into the area of excavation.

The selected remedy prevents exposure to residual contaminated soil through implementation of institutional controls. The selected remedy prevents exposure to contaminated ground water through natural attenuation continuing to decrease the concentrations of the contaminants and prohibiting the withdrawal of ground water at the site.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent possible. Treatment of the ground water was not found to be practical; therefore, this remedy does not satisfy the statutory preference for treatment as a principal element of the remedy.

Because this remedy will result in hazardous substances remaining on site above levels that allow for unlimited use and unrestricted exposure, a review will be conducted within five

years after initiation of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

ROD DATA CERTIFICATION CHECKLIST

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

- Chemicals of concern (COCs) and their respective concentrations
- Baseline risk represented by the COCs
- Clean up levels established for COCs and the basis for the levels
- How source materials constituting principal threats are addressed
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of ground water used in the baseline risk assessment and the ROD
- Potential land and ground water use that will be available at the site as a result of the selected remedy
- Estimated capital, operation and maintenance, and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected
- Key factors that led to selecting the remedy

Michael J. Sanderson
Director
Superfund Division
U.S. EPA, Region VII

9-19-00
Date

RECORD OF DECISION
DECISION SUMMARY

1.0 Site Name, Location, and Description

This Record of Decision (ROD) has been developed by the United States Environmental Protection Agency (EPA) to select a remedial alternative at the Mason City Coal Gasification site in Mason City, Iowa (herein, the "Site"). The Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) identification number for the site is IAD980969190. The EPA is the lead agency for enforcement of the activities taking place at the Mason City Coal Gasification site. Actions taken at the site up to this point have been paid for by the potentially responsible parties, including reimbursement for the EPA's oversight costs.

The Mason City Coal Gasification site is located near the center of Mason City, Iowa. The site is bounded on three sides by city streets: South Pennsylvania Avenue to the east, 5th Street Southeast (SE) to the south, and South Delaware Avenue to the west. The northern edge of the site is bounded by Willow Creek. Willow Creek flows east past the site and over a low-head dam at the downstream end of the site. A map of the Mason City Coal Gasification site, including the location of monitoring wells, is shown in Figure 1.

Beginning in the early 1900's, the site was occupied by a manufactured gas plant which generated "town gas" for lighting and heating purposes in the Mason City area. Following the availability of natural gas, the plant was decommissioned and subsequently demolished. Residues from the gas manufacturing processes, commonly referred to as coal tar, were left on site and resulted in soil and ground water contamination. In June 1984 the city began excavation on the site for the installation of a new sewer line. During this excavation, coal tar was discovered in the subsurface soil and structures. Approximately 1,000 to 1,500 gallons of coal tar was mixed with inert material, such as sand, and deposited in an above-ground waste pile on site.

2.0 Site History and Enforcement Activities

On June 3, 1986, Interstate Power Company (IPW), currently known as Alliant Energy Corporation, entered into an Administrative Order on Consent with the EPA. As a result of this Order, IPW conducted three phases of field investigation and preliminary assessment of the site.

On October 1, 1991, IPW entered into another Administrative Order on Consent with the EPA to conduct a Remedial Investigation and Feasibility Study (RI/FS) at the site. The goals of the RI/FS were to complete the investigation into the extent of soil and ground water contamination at the site and to determine an appropriate remedy or remedies.

The site was placed on the National Priorities List (NPL) in December 1994

The RI for the Mason City Coal Gasification site was conducted using a phased approach. Prior to the beginning of the RI, 3 phases of field investigation and preliminary assessment were conducted by IPW. The RI field investigation occurred in 1992. The results of this investigation were reported in the RI Report dated August 1993. It was determined that additional investigation would be necessary to fill data gaps. Additional field investigations were conducted beginning in November 1993 and concluding in August 1994. The results of these investigations were reported in the RI Addendum Report dated September 1994.

Following completion of the RI/FS, a decision was made by the EPA that a non-time critical removal should be performed to address the contaminated soil and waste pile, which were source materials. A Removal Action Decision Document (RADD) was signed by the EPA on March 20, 1995.

In order to accelerate the clean up of the source area, on July 20, 1995, IPW, Kansas City Power & Light Company (KCPL), the City of Mason City, Iowa, Bob McKiness Grading & Excavating, Inc., and the EPA entered into an Administrative Order on Consent to conduct a Removal Action

The removal actions implemented at the Mason City Coal Gasification site included the following:

- excavation of soil exceeding risk-based action levels;
- off site treatment by thermal desorption of soil and waste pile materials to below risk-based action levels;
- placement of treated soil back into the area of excavation; and
- ground water monitoring.

Excavation and treatment of contaminated soil and waste pile materials were completed in 1996. Over 21,000 tons of contaminated materials were thermally treated. During the soil removal action there were limited areas identified where the levels of contamination exceeded the action levels but the soil was inaccessible for excavation. These areas were near the power substation, beneath the sewer line that traverses the site, and beneath some subsurface concrete structures in the northwest corner of the site. The removal action is fully described in the Removal Action Report dated April 1997 and Technical Memorandum No 14.

The RI Report and other documents in the Administrative Record file may be reviewed for a more complete source of information regarding the history of the site.

3.0 Community Participation

Throughout the time that investigation and removal activities have taken place at the site, numerous community involvement activities have occurred. These include the distribution of fact sheets, meetings with the public, and media interviews. The Engineering Evaluation/Cost Analysis was made available for public comment in 1994, prior to the EPA making a final decision regarding the removal action.

The EPA issued a Proposed Plan for the Mason City Coal Gasification site on July 19, 2000. A 30-day public comment period occurred from July 24 to August 22, 2000. A public meeting was held on July 31, 2000, at the Mason City Public Library in Mason City, Iowa, to present the Proposed Plan and solicit comments from the public. The EPA's response to comments received during the comment period are included in the Responsiveness Summary, which is a part of this ROD. Additionally, the EPA established an Administrative Record which contains supportive documents for this decision. The Administrative Record is available for review during normal business hours at the following locations:

Mason City Public Library
225 2nd Street S.E.
Mason City, Iowa

U.S. Environmental Protection Agency
901 N. 5th Street
Kansas City, Kansas

4.0 Scope and Role of Response Action

A removal action was conducted to accelerate the clean up of the soil in the source area. All of the soil excavation and treatment work associated with the removal action was completed in 1996.

The remedy selected in this ROD is the only remedial action planned for this site. This remedial action includes components to ensure that steps taken during the removal action continue to be protective. Specifically, institutional controls will be implemented to ensure that there is no exposure to any residual soil contamination which might remain on site. The remedial action will also prevent exposure to contaminated ground water through the use of monitored natural attenuation.

5.0 Site Characteristics

As shown in Figure 1, the site is essentially vacant, with the exception of an electrical substation and a storage building. Prior to completion of the treatment of contaminated soil in 1996, a covered waste pile of materials excavated during the 1984 sewer construction project occupied the southeastern portion of the site. There is a gravel access driveway from the entrance gate on Delaware Avenue around the substation to the retaining wall along 5th Street SE. The remainder of the site is covered with grass.

Prior to initiation of the removal action, most of the site consisted of 9 to 14 feet of unconsolidated fill material. Silts and clays were the predominant soil types in the fill. The other fill material consisted of building demolition rubble, cinders, coal, concrete, wood and wood chips, steel, brick, and rock. Native soil, when encountered, was rarely thicker than one foot. Following completion of the removal action, the thermally treated soil was placed back into the areas that were excavated. The treated soil was then covered with approximately four inches of clean top soil obtained from another location.

The uppermost bedrock unit on the site is dolomite and dolomitic limestone of the Cedar Valley Formation in the Devonian aquifer system. At many locations, the uppermost bedrock is weathered into a granular consistency. Competency of the rock increases with depth as the frequency of fractures decreases. The thickness of the shallow bedrock on site ranges from 8 feet to 18 feet. The base of the shallow bedrock is marked by a zone of interbedded shale layers The individual shale layers are of thicknesses of up to eight inches and the shale zone extends to a maximum thickness of seven feet. Below the shale zone is a unit composed of fine-grained dolomite. This unit is referred to as the first transmissive zone of bedrock. The competency of the bedrock increases dramatically below the shale zone, with only one naturally occurring vertical fracture encountered in core samples that were taken.

Major surface water flow in the vicinity of the site is controlled by the presence of Willow Creek. All surface run-off is directed toward the creek. When raised, the low-head dam spanning Willow Creek at the eastern edge of the site raises the creek level adjacent to the site. Also, a large portion of south central and west central Mason City storm drainage is directed into Willow Creek, which contributes to its responsiveness at the site.

Ground water flow in the shallow aquifer in the vicinity of the site is partially controlled by water levels in Willow Creek. In turn, water levels in Willow Creek can be controlled by the variable-height, low-head dam at the east end of the site. When the dam is in the down position, shallow ground water flows onto the site from the southwest. The ground water flows generally to the northeast until it encounters the retaining wall. The flow then splits and flows around and under the retaining wall prior to resuming a northeasterly course.

When the dam is in the raised position, or the elevation of Willow Creek increases as the result of a high precipitation event, water from Willow Creek enters the ground water system upstream of the retaining walls and flows around the retaining walls and dam. This results in a reversal, or significant change, in the direction of ground water flow west of Delaware Avenue and in the northwestern portion of the site. Ground water entering the site from the south is diverted to the east around the retaining wall and dam.

Under both dam-up and dam-down conditions, shallow ground water flow on the eastern side of site flows northeasterly, toward Willow Creek. Across Willow Creek, to the north of the site, the shallow ground water flows to the south, and when combined with the northeasterly flow previously described, results in a ground water trough to the north of the northern retaining wall.

Ground water flow in the first transmissive zone below the shale zone is to the southwest

The contaminants usually associated with the production of manufactured gas include a group of semivolatile compounds referred to as polynuclear aromatic hydrocarbons (PAHs). There are 16 PAH compounds which were analyzed for throughout the course of the investigations at this site. Seven of these compounds are considered by the EPA to be probable human carcinogens, or cancer causing. While the individual concentrations of each of these compounds has been reported for each sample analyzed, generally, PAH concentrations for a given sampling location were reported as "total PAH concentration" or "total carcinogenic PAH concentration." The value reported for the total PAH concentration is the sum of the concentrations for each of the 16 PAHs. The value reported for the total carcinogenic PAH concentration is the sum of the concentrations for each of the seven carcinogenic PAHs.

Other contaminants usually found at manufactured gas plant site include benzene, ethylbenzene, xylene, and toluene (BETX). Some forms of cyanide, arsenic, acid-extractable organic compounds, such as phenolic compounds, and metals may also be found.

Potential on site source areas were identified during the investigations. One of the principal source areas was the northwest corner of the site where the gas plant and below ground basins were located. A large amount of contaminated material was removed from this area and mixed with other materials to make it easier to handle during construction of the sewer that crosses the site. This material was placed in the southeast corner of the site and became what was known as the "waste pile." Even though this material was moved, the northwest corner of the site was still found to have some of the highest levels of PAHs, benzene, acid-extractable organic compounds, and cyanide in soil and ground water at the site.

The highest concentrations of PAHs were found in the waste pile materials. Visual observations during test trenching of the waste pile revealed the pile to consist of a nonhomogeneous mix of sludge, heavily contaminated soil, rubble, and lightly contaminated soil. The waste pile was covered with an impermeable cover prior to its excavation and treatment during the removal action.

Another source area was identified near the middle of the site where a former oil storage tank and large gas holder were located during operation of the gas plant. There were also isolated pockets of material, such as wood chips used in gas production, in other areas of the site.

The highest concentration of total PAHs found in the waste pile was 25,860 milligrams per kilogram (mg/kg), while the highest concentration of total carcinogenic PAHs was 67 mg/kg. The highest concentration of benzene found in the waste pile was 240 mg/kg and the highest concentration of arsenic was 8.5 mg/kg.

Considerably lower concentrations of contamination were found in the subsurface soil at the site than were found in the waste pile. The highest concentration of total PAHs was 1906

mg/kg and was found in the middle of the site. The highest concentration of total carcinogenic PAHs was 1246 mg/kg and was also found in the middle of the site. The highest concentration of arsenic found was 82 mg/kg. The highest concentration of benzene found in subsurface soil was 1.7 mg/kg.

During the course of the investigations and the removal action that were conducted at the site a total of 38 ground water monitoring wells were installed. As shown in Figure 1, they are divided into three groups: shallow aquifer, intermediate zone, and first transmissive zone monitoring wells. The wells designated as shallow aquifer wells are constructed such that they are screened across the water table. The intermediate zone wells are screened below the water table, deeper in the shallow aquifer. The first transmissive zone wells are screened in the dolomite below the zone of interbedded shale.

In general, the levels of contamination found in the monitoring wells in the shallow aquifer have decreased from their pre-removal levels following excavation and treatment of the contaminated soil. In the shallow aquifer, monitoring well MW-2R, which is in the northwest corner of the site, continues to have high levels of both the BETX compounds and PAHs in ground water. MW-14, which is also in that area, has high levels of both BETX and PAHs. The concentrations of benzene found in MW-02R and MW-14 during the most recent sampling were 144 micrograms per liter (µg/l) and 7.3 µg/l, respectively. The concentrations of total PAHs found in MW-02R and MW-14 were 17.2 µg/l and 220 µg/l, respectively.

One shallow aquifer monitoring well north of Willow Creek, MW-17, has exhibited high levels of the BETX compounds and PAHs both before and after the excavation and treatment of the contaminated soil. As stated previously, there is a ground water trough in the vicinity of this monitoring well and it is believed that the contamination found in this well is at least primarily from a different source than this site.

Lead was detected at elevated levels at MW-13 and MW-14, which are shallow aquifer wells in the northwest area of the site. The source of this lead has not been clearly identified.

One intermediate zone well, MW-8, has elevated levels of benzene in the ground water. In the most recent sampling event benzene was found in this well at 263 µg/l. Low levels of some of the PAH compounds have intermittently been detected in two of the intermediate zone wells.

A new intermediate zone monitoring well, MW-38, was installed in 1999 during evaluation of potential ground water remedies for the site. This well was sampled one time and found to have very high concentrations of the BETX and PAH compounds, including a measurable amount of dense nonaqueous phase liquid (DNAPL). The DNAPL is a chemical that is a liquid in its pure form and is heavier than water, and which does not readily mix with water but does slowly dissolve in water. It is possible that ground water obtained from this well was contaminated through localized fractures in the bedrock, and that it is not representative of the

entire intermediate zone Removal of the impacted soil and below grade gas plant structures eliminated any additional source material that could migrate into the bedrock.

Much lower levels of the site-related contaminants have been found in the first transmissive zone and they have been detected only intermittently None of the BETX compounds have been detected in any of the monitoring wells in this zone since excavation and treatment of the contaminated soil. Relatively low levels of naphthalene and phenanthrene, which are PAHs, have been detected in some wells in this zone from time to time since excavation and treatment of the soil.

Surface water in Willow Creek was sampled upstream and adjacent to the site. Surface water in Willow Creek does not appear to be affected by the site. Adjacent to the site low levels of benzo(a)anthracene, a PAH, were detected but it is considered to be a background condition since it was also detected in the creek upstream of the site.

Sediment in Willow Creek was sampled upstream, downstream, and adjacent to the site. The PAH compounds were detected throughout the locations sampled, with the highest concentration found at the upstream end of the site and below the dam near the storm sewer outlet from the site. While the site may have contributed some of the PAH contamination found in the sediment, it appears that there are other continuous sources of the same contaminants, such as storm sewers, upstream of the site. The BETX compounds were detected in sediment upstream of the site and therefore do not appear to be present in the sediment due to the site.

During the course of the investigations at the site information was gathered to determine the extent to which natural attenuation of contaminants was occurring. Natural attenuation refers to naturally occurring processes in the environment that act to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in various media. These in situ processes include biodegradation, dispersion, dilution, adsorption, volatilization, and chemical or biological stabilization or destruction of contaminants.

At the Mason City Coal Gasification site, natural attenuation involves two main components: (1) physical attenuation processes consisting primarily of aquifer dilution, dispersion, and diffusion; and (2) intrinsic bioremediation. Intrinsic bioremediation is the process by which contaminants are transformed from toxic to nontoxic by-products through biologically mediated reactions that occur naturally in the ground water system. Whereas physical attenuation processes reduce the contaminant concentrations and their overall toxicity in ground water, intrinsic bioremediation includes biological and chemical processes that destroy contaminant mass in the aquifer. Loss of contaminant mass will reduce the volume of contaminants present and result in overall plume shrinkage.

Data from the Mason City Coal Gasification site indicates that intrinsic bioremediation is occurring in the former source area and areas downgradient in the shallow aquifer. Natural attenuation is sufficient to cause a stable or shrinking plume. The data indicate that ground water

conditions are sufficiently anaerobic for degradation to occur. Electron acceptors (dissolved oxygen, nitrate, iron, sulfate, and carbon dioxide [indicated by the presence of methane]) are being depleted in areas of active biodegradation. Data from the site indicates that much of the original PAH and BETX mass has been degraded along the ground water flow pathways. The evaluation of intrinsic bioremediation at the Mason City Coal Gasification site is discussed fully in Technical Memorandum No. 15, dated October 12, 1999, which is contained in the Administrative Record.

A conceptual model of the site was developed to depict how contamination in the source area has potentially led to the exposure of several receptor populations. This conceptual model is illustrated in Figure 3-1.

6.0 Current and Potential Future Site and Resource Uses

6.1 Land Uses

Currently the site is fenced and is accessible through a locked gate. Alliant Energy Corporation is currently working with the community to develop plans for landscaping the site, possibly including foot paths on the property. If this is done, it is possible that the public could have access to the site.

Immediately surrounding the site on three sides are city streets. Willow Creek runs along the north boundary of the site, with north and south banks that consist of concrete retaining walls. On the opposite side of Willow Creek, to the North of the site, is a city park. The properties beyond the streets and the park are retail businesses and residences. It is possible that there will be further commercial and residential development in areas outside of the site area.

6.2 Surface Water Uses

Surface water from the site flows into Willow Creek. The level of Willow Creek is controlled by a low-head dam at the downstream boundary of the site. The dam is typically in the down position. Willow Creek enters the Winnebago River approximately 2.25 miles downstream of the site. The Winnebago River is used for recreational fishing. It is not anticipated that this use will change.

6.3 Ground Water Uses

A number of domestic, industrial, and municipal wells were identified in an area approximately 1.3 miles upgradient to 0.75 miles downgradient of the site. None of these wells are within the plume of contamination or are immediately threatened by the plume.

It is the goal of the remedial action at this site to control exposure to, and prevent the spread of, contamination. Ground water monitoring will be used to ensure that the remedy is

effective in addressing the contamination in the ground water. The goal of the remedy is to restore the ground water to drinking water quality.

7.0 Summary of Site Risks

CERCLA requires the EPA to seek permanent solutions to protect human health and the environment from hazardous substances to the extent practicable. These solutions provide for removal, treatment, or containment of dangerous chemicals so that any remaining contamination does not pose an unacceptable health risk to those who might come into contact with the contaminants. Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present a current or potential threat to public health, welfare, or the environment.

7.1 Summary of Human Health Risk Assessment

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

The EPA prepared an Interim Baseline Risk Assessment using the data collected during the RI. However, after the RI Report was completed, additional field investigation was conducted at the site, the results of which were documented in the Remedial Investigation Addendum Report. The EPA then revised the risk assessment in the Addendum to the Interim Baseline Risk Assessment. Both of these risk assessment reports were completed before the removal action occurred. The Interim Baseline Risk Assessment and Addendum to the Interim Baseline Risk Assessment reports may be found in the Administrative Record file.

In general, the EPA requires or undertakes remedial actions for Superfund sites when the excess carcinogenic (cancer) risk exceeds 10^{-4}. A risk of 10^{-4} represents an increase of one in ten thousand, or 1/10,000, for a reasonable maximum exposure (RME). This risk represents the lifetime risk of developing cancer as a result of releases from the site

Remedial actions may also be conducted at Superfund sites when the hazard index (HI) equals or exceeds one for the RME scenario. The HI is a numeric expression of the noncarcinogenic risk to human health resulting from releases from the site.

7.1.1 Identification of Chemicals of Concern

Table 2-3, attached, is a list of the COCs detected in each of the media sampled at the site. Note that although bromodichloromethane is listed in this table as a chemical of potential concern for ground water in this table, it was later determined in the baseline risk assessment that that compound was likely a contaminant introduced at the analytical laboratory, and not site-

related. It was not carried forward as a COC in the ground water risk calculations. Tables 2-2(a), 2-2(aa), 2-2(b), 2-2(bb), and 2-2(c), which are attached, include the range of concentrations detected for each COC, as well as the frequency of detection. Tables 3-4(a), 3-4(b), and 3-4(c) present the point concentrations for each of the COCs detected in each of the media sampled at the site. The exposure point concentration is the 95% Upper Confidence Limit (UCL) on the arithmetic mean of the concentrations unless the 95% UCL exceeds the highest detect level for a compound for that grouping, the latter was used for calculation of intake. If the 95% UCL exceeded the highest sample quantitation limit (SQL), the 95% SQL was used.

As stated previously, a removal action was implemented after the baseline risk assessment was prepared. As a result of these actions, the only exposure pathways which are still considered viable by the EPA are those involving exposure to ground water and sediment and fish in Willow Creek. The only COCs which will be discussed further in the section are the COCs for ground water and sediment and fish in Willow Creek. The COCs in ground water include BETX, PAHs, and lead. The COCs in sediment are PAHs.

7.1.2 Exposure Assessment

The RME scenarios are developed using current exposure pathways given existing land uses and also exposures which might reasonably be predicted based upon expected or logical future land use assumptions. During preparation of the Interim Baseline Risk Assessment for the Mason City Coal Gasification site there were four RME scenarios which were determined to be appropriate prior to implementation of the removal action. The RME scenarios and the exposure media for each of these scenarios are as follows:

RME Scenario 1

Current land use for a child trespasser on the site who is also a recreational user of Willow Creek

- Ingestion of contaminants in surface soil, subsurface soil (trenches), the waste pile, and Willow Creek sediment
- Inhalation of contaminants in surface soil, subsurface soil (trenches), and the waste pile
- Dermal absorption of contaminants in surface soil, subsurface soil (trenches), and the waste pile

RME Scenario 2

Current land use for an on site worker (adult) who is also a recreational user of Willow Creek

- Ingestion of contaminants in surface soil and Willow Creek sediment
- Inhalation of contaminants from surface soil
- Dermal absorption of contaminants in surface soil
- Ingestion of fish from Willow Creek

RME Scenario 3
Future land use for a child trespasser on the site who is also an off site resident and recreational user of Willow Creek

- Ingestion of contaminants in surface soil, subsurface soil (trenches), the waste pile, Willow Creek sediment, and ground water
- Inhalation of contaminants in surface soil, subsurface soil (trenches), the waste pile, and ground water
- Dermal absorption of contaminants in surface soil, subsurface soil (trenches), the waste pile, and ground water

RME Scenario 4
Future on site construction worker (adult) who is also an off site resident and recreational user of Willow Creek

- Ingestion of contaminants in surface soil, subsurface soil, the waste pile, Willow Creek sediment, and ground water
- Inhalation of contaminants in surface soil, subsurface soil, the waste pile, and ground water
- Dermal absorption of contaminants in surface soil, subsurface soil, the waste pile, and ground water
- Ingestion of fish from Willow Creek

Due to the implementation of the removal actions, the only exposure pathways which are still considered viable by the EPA are those involving exposure to ground water and sediment and fish in Willow Creek.

7.1.3 Toxicity Assessment

The following is a discussion of the toxicity of each of the COCs for ground water since this is the media actively addressed by this ROD. Further information on the COCs for other affected media may be found in the Interim Baseline Risk Assessment.

The PAHs, formed during the incomplete combustion of organic substances, persist throughout the environment. The PAHs are generally found in the environment as a mixture of two or more compounds. The PAHs are essential components of coal tar and are commonly found at former manufactured gas plants (FMGPs). In general, PAHs are readily bioavailable following inhalation exposure. Absorption following ingestion or dermal exposure is available and may be subject to saturation. Toxic effects of PAH exposure include bone marrow depression, hepatotoxicity. and immunosuppression. The PAHs exhibit local dermal toxicity following dermal exposure. Both developmental and reproductive effects have been observed in animals following exposure to PAHs.

Inhalation, oral, and dermal exposure to PAHs have been associated with carcinogenic effects in animals. The site of tumor is influenced by the route of exposure: dermal exposure

induces skin tumors, respiratory tract tumors are observed following inhalation, and forestomach papillomas are observed following oral ingestion. The PAHs are variable with respect to genotoxicity. Benzo(a)pyrene has demonstrated genotoxic potential that requires metabolic activation while a number of other PAHs are negative for genotoxic effects Of the 16 PAH compounds which the EPA routinely analyzes samples for, seven are considered to be probable human carcinogens, or Group B2 carcinogens. Those compounds are benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, chrysene, and indeno(1,2,3-c,d)pyrene

Benzene, a contaminant of gasoline and a widely used solvent, is absorbed through the respiratory and gastrointestinal tracts, and skin. Benzene is commonly found at FMGPs Benzene is considered to be a human carcinogen. There is clear evidence of carcinogenic activity in rats and mice. In humans, a causal relationship between leukemia and exposure has been established by the observation of increased incidence of leukemia in exposed workers. The most predominant noncarcinogenic systemic effects associated with chronic exposure to benzene is hematotoxicity. This toxicity is manifested as a decrease in white blood cells (leukopenia) in animals. In humans, leukopenia may progress to pancytopenia, a decrease in all cellular elements of the blood. Human benzene toxicity is often described as aplastic or hypoplastic anemia, which is characterized by severe damage to the bone marrow. Direct life-threatening consequences of pancytopenia result from leukopenia and thrombocytopenia which will cause an increased susceptibility to infection or hemorrhagic conditions, respectively. Benzene is classified by the EPA as a Group A carcinogen, which is a known human carcinogen.

Ethylbenzene is widely found in the environment as a component of coal tar and petroleum. Ethylbenzene is commonly found at FMGPs. Ethylbenzene is absorbed following inhalation, ingestion, or direct dermal contact with the liquid. In animals, ethylbenzene exposure is associated with adverse hepatic histology without functional disturbance. Similar histologic and enzymatic changes have been observed in the kidneys. These observations may be representative of adaptive enzyme induction rather than a toxic effect. There is not adequate information on the possibility of carcinogenic effects of ethylbenzene in animals or humans.

Toluene is an industrial solvent. It is commonly found at FMGPs. Toluene is rapidly absorbed following inhalation; absorption following ingestion or dermal exposure is slower and more limited. The predominant toxic effect following chronic exposure is impairment of the central nervous system. Toluene is also considered a developmental toxicant following exposure of pregnant animals or humans. There is not adequate information on the possibility of carcinogenic effects of toluene in animals or humans.

Xylene is a man-made chemical used as an industrial solvent. Xylene is commonly found at FMGPs. Xylene is absorbed following ingestion and inhalation and to a much lesser extent following dermal exposure. Adaptive hepatologic changes and adverse renal effects have been observed following chronic xylene exposure. There is not adequate information on the possibility of carcinogenic effects of xylene in animals or humans.

Lead occurs naturally in the earth, plants, animals, air, and water in small amounts. Lead is also released into the environment from industrial sources, automobile exhaust, tobacco smoke, and lead water pipes. Lead is commonly found at FMGPs Absorption of lead is related to solubility. The primary route of absorption is gastrointestinal, particularly in children. Dermal absorption of lead is minimal Lead is primarily a compound of concern in children where its neurological effects are well documented. Lead encephalopathy in adults is considered an acute toxic response to high levels of lead exposure Lead has been classified as a probable human carcinogen on the basis of increased incidence of renal tumors in rats. This is referred to as a Group B2 carcinogen by the EPA

Tables 4.1 and 4.2 from the Interim Baseline Risk Assessment, which are attached, list the toxicity values and potential noncarcinogenic effects and toxicity values and carcinogenic effects, respectively, for the COCs.

7.1.4 Risk Characterization

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

Risk=CDI x SF

where: risk = a unitless probability (e.g., $2x10^{-5}$) of an individual's developing cancer
CDI = chronic daily intake averaged over 70 years (mg/kg-day)
SF = slope factor, expressed as $(mg/kg\text{-}day)^{-1}$.

These risks are probabilities that usually are expressed in scientific notation (e.g., $1x10^{-6}$). An excess cancer risk of $1x10^{-6}$ indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual's developing cancer from all other causes has been estimated to be as high as one in three. The EPA's generally acceptable risk range for site-related exposures is 10^{-4} to 10^{-6}.

In the Interim Baseline Risk Assessment excess cancer risks were calculated for each of the four RME scenarios described previously and are listed below as the pre-removal cancer risks. The post-removal cancer risks listed below include only the exposure pathways that include ground water or sediment and fish from Willow Creek.

Excess Cancer Risks for RME Scenarios

	Cancer Risk	
RME	Pre-Removal	Post-Removal
RME Scenario 1	7.2×10^{-3}	1.3×10^{-6}
RME Scenario 2	7.4×10^{-6}	1.1×10^{-7}
RME Scenario 3	8.9×10^{-3}	1.7×10^{-3}
RME Scenario 4	8.0×10^{-3}	8.0×10^{-3}

The post-removal RME Scenarios 3 and 4 present unacceptable levels of cancer risk This information is presented in greater detail in Tables 5.1 through 5.8 from the Interim Baseline Risk Assessment, which are attached.

These estimates of risk, like all estimates of risk, have some degree of uncertainty associated with them. Uncertainty in the estimates of cancer risk for this site are primarily associated with the fact that benzo(a)pyrene is the only PAH compound which has a slope factor The slope factors utilized by the EPA for the other six carcinogenic PAHs have been assigned base on their relative carcinogenic potency compared to benzo(a)pyrene. Also, the carcinogenic risk may have been underestimated because at the time the risk assessments were prepared for this site, there was no method to quantify the risks due to dermal exposure to PAHs.

The potential for noncarcinogenic 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 less than one indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. The Hazard Index (HI) is generated by adding the HQs for all COCs 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 less than one indicates that, based on the sum of all HQs from different contaminants and exposure routes, toxic noncarcinogenic effects from all contaminants are unlikely. An HI greater than one indicates that site-related exposures may present a risk to human health.

The HQ is calculated as follows:

Non-cancer HQ = CDI/RfD

where. CDI = chronic daily intake
RfD = reference dose.

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

In the Interim Baseline Risk Assessment noncarcinogenic risks were calculated for each of the four RME scenarios described previously and are listed below as the pre-removal health indices. The post-removal health indices listed below include only the exposure pathways that include ground water or sediment and fish from Willow Creek.

Noncarcinogenic Risks for RME Scenarios

	Health Index	
RME	Pre-Removal	Post-Removal
RME Scenario 1	0.10	<0.01
RME Scenario 2	<0.01	<0.01
RME Scenario 3	0.6	0.5
RME Scenario 4	0.3	0.3

None of the RME scenarios have a Health Index that indicates that site-related exposures may present an unacceptable level of risk to human health This information is presented in greater detail in Tables 5.1 through 5.8 from the Interim Baseline Risk Assessment, which are attached.

Uncertainty existed in the estimate of noncarcinogenic risk at this site because reference doses for PAHs and benzene were not available. This possibly resulted in an underestimation in the noncarcinogenic risk posed by the site.

7.2 Summary of Ecological Risk Assessment

The Interim Baseline Risk Assessment also includes an Ecological Risk Assessment (ERA). Although potential ecological risks were identified for organisms living in Willow Creek, the uncertainties of any such risks were high due to the limited amount of data collected from the creek and the number of other sources of the same contaminants that may be entering Willow Creek on a continuing basis.

7.3 Basis for Action

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

8.0 Remediation Objectives

Remedial Action Objectives (RAOs) provide a general description of what the clean up will accomplish. The RAOs are most often general objectives such as: prevention of exposure to contaminants; prevention of plume migration; restoration of the ground water to drinking water quality, etc. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs) of other environmental laws and risk-based levels established in the risk assessment. The two contaminated media present at this site include ground water and soil. RAOs are established for each.

The RAOs for this action are to prevent exposure to ground water containing contaminants that represent an unacceptable risk to human health or the environment, to limit or prevent the migration of the contaminated ground water plume, to restore the ground water to drinking water quality, and to maintain site conditions which prevent exposure to residual soil contaminants that could pose an unacceptable risk to human health or the environment.

The RAO for ground water, which is protective of human health and the environment, involves the prevention of ingestion or direct contact with ground water having an unacceptable level of carcinogenic risk. The EPA's Maximum Contaminant Levels (MCLs), pursuant to the Safe Drinking Water Act for public water supplies are identified as ARARs for this site. The MCLs represent levels which are considered safe for human consumption. There are MCLs for benzene and benzo(a)pyrene. The MCL for benzene is 5 µg/L and for benzo(a)pyrene is 0.2 µg/l. These MCLs are approximately equal to the 10^{-5} cancer risk. There are no MCLs for the other carcinogenic PAHs but it is possible to calculate the concentrations of the contaminants that would be associated with a given level of cancer risk. In the FS, the concentration of each of the carcinogenic PAHs at the 10^{-6} cancer risk was determined. However, it is not even possible to detect some of these compounds at those low concentrations. Therefore, the clean up goals listed in the table below for the contaminants other than benzene and benzo(a)pyrene, were presented in the FS. These contaminant concentrations can be detected in a ground water sample using available analytical methods and represent a range of $1x10^{-5}$ to $8x10^{-5}$ cancer risk.

Ground Water Clean Up Goals
in µg/L

Contaminant	MCL
Benzene	5
Benzo(a)pyrene	0.2
Benzo(k)fluoranthene	0.2
Benzo(a)anthracene	0.1
Chrysene	0.2
Benzo(b)fluoranthene	0.2
Indeno(1,2,3-c,d)pyrene	0.4
Dibenz(a,h)anthracene	0.3

The RAO for soil which is protective of human health and the environment involves the prevention or minimization of direct contact exposures (inhalation, dermal contact, ingestion, etc.) with soil having a carcinogenic risk in excess of 10^{-6} or a hazard index for noncarcinogens greater than 1.0. Specific soil clean up criteria were not established for this site because the removal action has eliminated exposure to soil which exceeds the threshold for carcinogenic or noncarcinogenic risk when the property is used for purposes other than residential use.

9.0 Description of Alternatives

A feasibility study was conducted to develop and evaluate remedial alternatives for the site. Remedial alternatives were assembled from applicable remedial process options and were initially evaluated for effectiveness, implementability, and cost. The alternatives meeting these criteria were further evaluated and compared to the nine criteria required by the NCP. In addition to the remedial alternatives, the NCP requires that a no action alternative be considered. The no action alternative serves primarily as a point of comparison for the other alternatives. Five alternatives in addition to the no action alternative are considered. Alternatives 4, 5, and 6 all involve ground water extraction and treatment. All of the alternatives, with the exception of the no action alternative, include institutional controls and monitoring. An explanation of the common elements of the remedial alternatives follows.

Institutional controls are non-engineering methods intended to affect human activities in such a way as to prevent or reduce exposure to hazardous substances. The institutional controls are expected to reduce the potential for contamination affecting future receptors. The institutional controls include the following:

- the placement of restrictions on the site, including no residential development; no basements in any buildings constructed on the site; and no water supply wells for municipal, industrial, or domestic purposes; and

- an environmental easement providing the EPA access to the site; and

- continued listing of the site on the Registry of Hazardous Waste or Hazardous Substance Disposal Sites pursuant to Iowa Administrative Code 455B 426. According to Iowa Administrative Code 148.6(5), written approval of the director of the Iowa Department of Natural Resources (IDNR) is required prior to any substantial change in the use of the listed site. In addition, written approval is also required to sell, convey, or transfer title of the listed site

Each of the alternatives, except the no further action alternative, includes ground water monitoring. The type and amount of monitoring may vary for each of the alternatives but at the very least would include periodic analysis of ground water samples collected from monitoring wells on the site for the compounds for which ground water clean up goals have been established.

For each of the alternatives that include ground water extraction and treatment, the process would involve piping the extracted water to an on site multistage treatment system The first stage of the treatment system would consist of a separation tank, where separate-phase liquids would be removed from the water stream. The aqueous stream would then be passed through an inorganics treatment process to filter out the suspended particulates, remove metals, and condition the mineralized water that is anticipated. The conditioned water would then be passed through an air stripper, where volatiles would be removed. This would be followed by a secondary particulate removal stage and organophilic clay and carbon adsorption polishing step to remove less volatile organic compounds, and possibly some inorganic compounds, prior to discharge of the water to the sanitary sewer.

Alternative 1: No Action

The NCP requires that the EPA consider a no further action alternative against which other remedial alternatives can be compared. Under this alternative, no further action would be taken to monitor, control, or remediate the soil or ground water contamination. It has been demonstrated that natural attenuation of the ground water contamination is occurring at the site. Under the no action alternative, no monitoring would take place to determine that these natural attenuation processes continue to be effective in the future or to determine where the concentration of contaminants has effectively been reduced below health-based levels. There are no capital or operating costs associated with this alternative.

The expected outcome of this alternative is that natural attenuation of the ground water may continue for some period of time but its effectiveness would be undetermined. There would be no measures in place that would prevent the installation of water supply wells within the contaminated plume, therefore it is possible that someone could be exposed to contaminated ground water that exceeds health-based levels. There would also be nothing in place to prevent the construction of residences or basements on the site, thus providing the opportunity for exposure to residual contamination in the soil above health-based levels.

Alternative 2: Institutional Controls with Ground Water Monitoring

On site monitoring of the ground water would be done periodically to gather information regarding where the contaminated plume of ground water is located. The ground water samples would be analyzed for the compounds which have clean up goals. The samples would not be analyzed for additional parameters that would indicate whether natural attenuation through intrinsic bioremediation is continuing to occur. The institutional controls, as described previously, would be implemented. The estimated capital costs are $25,000 which includes development of sampling plans and protocols and costs associated with the implementation of the institutional controls. The operation and maintenance costs are $29,400 per year and the present net worth is $476,900 assuming that sampling will be conducted annually for thirty years.

The expected outcome of this alternative is that natural attenuation of the ground water may continue for some period of time but its effectiveness would be undetermined. It would be possible to determine the extent of the contaminated plume within the boundaries of the site and it could be determined if the plume extended off site. The extent of off site contamination, if it were to occur, would not be determined. The implementation of the institutional controls would prevent exposure to contaminated ground water on site and exposure to unacceptable levels of residual contamination in the soil.

Alternative 3: Monitored Natural Attenuation of Ground Water with Institutional Controls

Natural attenuation refers to the naturally occurring processes in the environment that act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in the affected media. These processes include biodegradation, dispersion, dilution, sorption, volatilization, and/or chemical and biological stabilization or destruction of contaminants. This process has been enhanced through the removal of the source of contamination, which has already occurred.

Natural attenuation is sufficient to cause a stable or shrinking contaminant plume. Ground water conditions are sufficiently anaerobic for degradation to occur, electron acceptors are being depleted in areas of active bioremediation, as indicated by the presence of methane, and much of the original PAH and BETX mass has been degraded along the ground water flow pathway. Further data suggests intrinsic biodegradation will occur at the site at a predictable rate in the future and degrade PAHs and BETX by 50 percent every 0.48 to 0.95 years. The evaluation of natural attenuation at the Mason City Coal Gasification site is described in Technical Memorandum No. 15 which is included in the Administrative Record file.

Also included in this remedial option is the collection of ground water samples from appropriate monitoring wells and the analysis of these water samples for BETX and PAHs as well as other constituents which would be used to measure the extent that natural attenuation is occurring. A site model will be generated to better predict rates of contaminant degradation. The

institutional controls would be implemented The estimated capital costs for implementation of this alternative are $125,000 which includes the development of sampling plans and protocols, the implementation of the institutional controls and the development of the site model. The estimated annual operation and maintenance costs are $53,200 for the first five years and $26,600 for the next twenty-five years based on the assumption the sampling will be conducted semiannually for the first five years and annually for the next twenty-five years. The estimated present net worth is $649,100.

The expected outcome of this alternative is that the PAH and BETX contamination in the ground water will be degraded through natural attenuation. The site model that will be developed will provide a more accurate tool to determine the effectiveness and rate of intrinsic bioremediation of the ground water. There will be no exposure to contaminated ground water in the future There will be no exposure to unacceptable levels of residual contamination in the soil.

Alternative 4: Ground Water Pumping and Treatment with Discharge to the Sanitary Sewer and Institutional Controls

This alternative consists of extracting ground water with wells from the unconsolidated fill and weathered bedrock zone and the top 15 feet of the fractured bedrock zone beneath. The ground water would be piped to a multistage treatment plant, which was described previously, to be constructed on site, treated and then discharged into the on site sanitary sewer. It is assumed that thirty-six gallons per minute of ground water would be treated for this alternative. Ground water would be monitored to evaluate the effectiveness of the extraction system. The institutional controls would be implemented. The estimated capital costs for implementation of this alternative are $492,000 which includes the cost of constructing the treatment system. The estimated annual operation and maintenance costs are $407,700 and the estimated present net worth is $7,274,000.

The expected outcomes of this alternative are that the hydraulic gradient of the ground water will be controlled, preventing further movement of the plume and that the concentrations of BETX and PAHs will be reduced, eventually reaching the clean up goals. There will be no exposure to contaminated ground water in the future. There will be no exposure to unacceptable levels of residual contamination in the soil.

Alternative 5: Bedrock Grouting and Shallow Ground Water Pumping and Treatment with Discharge to the Sanitary Sewer and Institutional Controls

With this alternative, the upper 15 feet of fractured bedrock would be pressure grouted to contain ground water in this zone. Ground water would be pumped from a trench installed in the shallow unconsolidated fill zone. The trench would be excavated to the top of the fractured bedrock with a french drain installed in the base of the trench. The collected ground water would be treated in a multistage treatment plant constructed on site then discharged into the on site sanitary sewer. It is assumed that eight gallons per minute of ground water would be treated for

this alternative. Ground water would be monitored to ensure that the containment and pumping and treatment systems were operating properly. The institutional controls would be implemented. The estimated capital cost for implementation of this alternative is $3,623,100, which includes $2,227,500 for installation of the bedrock grouting and the ground water recovery trench in addition to the cost of constructing the treatment system. The estimated annual operation and maintenance costs are $153,300 and the estimated present net worth is $5,979,300

The expected outcomes of this alternative are that the movement of the ground water and site-related contaminants will be controlled, preventing further movement of the plume and that the concentrations of BETX and PAHs will be reduced, eventually reaching the clean up goals. There will be no exposure to contaminated ground water in the future. There will be no exposure to unacceptable levels of residual contamination in the soil.

Alternative 6: Bedrock Grouting, Vertical Barrier, and Ground Water Pumping and Treatment with Discharge to the Sanitary Sewer and Institutional Controls

With this alternative, contaminated ground water from within the unconsolidated fill and weathered bedrock zone and the top 15 feet of the fractured bedrock zone beneath would be contained by the implementation of vertical ground water flow barriers. In the unconsolidated fill and the upper one foot of weathered bedrock containment would consist of some type of vertical barrier to ground water flow, such as sheet piling or a slurry wall. In the upper 15 feet of fractured bedrock containment would be achieved by pressure grouting. Using these methods, the upper bedrock surface would be sealed and isolated from further ground water movement. Ground water would have to be pumped from the isolated area and treated to prevent breaching the vertical barrier. This would be achieved by placing a ground water withdrawal sump inside the isolated area. The collected ground water would be treated in a multistage treatment plant constructed on site then discharged into the on site sanitary sewer. It is assumed that two gallons per minute of ground water would be treated for this alternative. Ground water would be monitored to ensure that the containment system was operating properly. The institutional controls would be implemented. The estimated capital cost for implementation of this alternative is $3,985,000, which includes $2,500,500 for installation of the bedrock grouting, sheet piling, and the ground water recovery trench in addition to the cost of constructing the treatment system. The estimated annual operation and maintenance costs are $209,300 and the estimated present net worth is $6,040,000.

The expected outcomes of this alternative are that the movement of the ground water and site-related contaminants will be further controlled than Alternative 5, preventing further movement of the plume and that the concentrations of BETX and PAHs will be reduced, eventually reaching the clean up goals. There will be no exposure to contaminated ground water in the future. There will be no exposure to unacceptable levels of residual contamination in the soil.

10.0 Summary of Comparative Analysis of Alternatives

Nine criteria are used to evaluate the different remediation alternatives individually and against each other in order to select a remedy. The nine evaluation criteria are (1) overall protection of human health and the environment; (2) compliance with applicable, relevant and appropriate requirements (ARARs); (3) long-term effectiveness and permanence; (4) reduction of toxicity, mobility, or volume of contaminants through treatment, (5) short-term effectiveness; (6) implementability; (7) cost; (8) state/support agency acceptance; and (9) community acceptance. This section of the ROD profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other options under consideration. The nine evaluation criteria are discussed below. The "Detailed Analysis of Alternatives" can be found in the FS Report and Technical Memorandum No 16.

10.1 Overall Protection of Human Health and the Environment

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

All of the alternatives, except the no action alternative, would provide adequate protection of human health and the environment by eliminating, reducing or controlling risk by one or more of the following: through treatment, engineering controls, and institutional controls. Alternatives 4 through 6 would be likely to achieve a higher degree of protection in a shorter time, than Alternatives 2 and 3, by enhancing the natural attenuation processes with physical containment and removal of some of the impacted ground water. Alternative 6 would be the most protective of these three alternatives. However, since the removal action has eliminated the vast majority of the coal tar and contaminated soil, which was the source of contamination to the ground water, and monitoring date indicate that the plume of contaminated ground water is stable or shrinking, the advantages of Alternatives 4 through 6, as compared with Alternative 3, would likely diminish over time.

The ground water monitoring program that is to be implemented as a part of Alternatives 2 through 6 will detect where the ground water contamination has migrated but will not ensure that exposure to ground water contaminants from the site will not occur. Alternative 3 provides additional protection by generating a site model to predict rates of contaminant degradation, and instituting a ground water monitoring program, to verify the rate at which remediation is occurring as well as the extent of impacted ground water.

Alternatives 2 through 6 include the same institutional controls which would ensure that there is no exposure to residual soil contamination in the future. This would also ensure that contaminated ground water on the site would not be used for any purpose. These alternatives

also include the continued listing of the site on the Registry of Hazardous Waste or Hazardous Substance Disposal Sites pursuant to Iowa Administrative Code 455B.426.

Because the no action alternative is not protective of human health and the environment, it was eliminated from consideration under the remaining eight criteria.

10.2 Compliance with ARARs

Section 121(d) of CERCLA requires that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate federal and state requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA Section 121(d)(4).

Applicable requirements are those substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address hazardous substances, the remedial action to be implemented at the site, the location of the site, or other circumstances present at the site. Relevant and appropriate requirements are those substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law which, while not applicable to the hazardous materials found at the site, the remedial action itself, the site location, or other circumstances at the site, nevertheless address problems or situations sufficiently similar to those encountered at the site that their use is well suited to the site.

Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes or provides a basis for invoking a waiver.

Alternatives 2 and 3 would have the fewest ARARs since there is no construction required for either alternative and no active remediation involved.

All alternatives, except the no action alternative, would comply with the MCLs promulgated under the Safe Drinking Water Act for the contaminants of concern in areas found not to contain DNAPL. It may not be possible to achieve the MCLs in DNAPL zones. The DNAPL was found in MW-38 during one round of sampling. If such DNAPL zones are located, a technical impracticability waiver under CERCLA will be sought to waive MCLs as ARARs for the affected area(s).

Construction of the ground water extraction system for Alternatives 4 through 6 would potentially have to comply with requirements of the Clean Water Act. Operation of the ground water treatment system would require compliance with air emission standards. Discharge of treated ground water to the sanitary sewer for treatment at the Publicly Owned Treatment Works (POTW) would require compliance with certain Iowa Water Pollution Control Regulations.

Alternatives 2 through 6 include continued listing of the site on the Registry of Hazardous Waste or Hazardous Substance Disposal Sites pursuant to Iowa Administrative Code 455B.426, which is an ARAR for the site.

Alternatives 2 through 6 would meet their respective ARARs from federal and state laws. Tables 2-3, 2-4, 2-5, 2-6, 2-7, and 2-8 from the Feasibility Study Report, which are attached, provide a comprehensive listing of all ARARs.

10.3 Long-term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean up levels have been met This criterion includes the consideration of residual risk that will remain on site following remediation and the adequacy and reliability of controls

The ground water monitoring and institutional controls of Alternative 2 would provide long-term effectiveness by assessing the movement of the plume. Both Alternatives 2 and 3 would be simple to maintain. Alternatives 3 through 6 would be effective in the long-term by reducing contaminant concentrations in ground water. Attenuation processes will continue to decrease the concentrations of contaminants in the aquifers, eventually transforming them to non-toxic by-products through intrinsic bioremediation. Evidence suggests that natural attenuation processes have resulted in a steady-state contaminant plume at the Mason City Coal Gasification site and have reduced the contaminant mass loading to the aquifers by degrading the PAHs and BETX to non-toxic by-products. This has been documented in the Technical Memorandum No. 15, dated October 12, 1999. The monitoring program and modeling is needed to document the degree to which natural attenuation is occurring and identify whether ground water flow directions, gradients, or plume boundaries have changed.

Alternatives 4 through 6 include ground water extraction and treatment to further reduce contaminant residuals. Both the ground water extraction and treatment systems would require on-going maintenance to prevent operational problems and to continue their effectiveness. These alternatives would also provide long-term effectiveness by preventing movement of ground water off site. Alternative 4 would be the simplest of these three alternatives to maintain. Alternatives 5 and 6 would require more extensive maintenance and monitoring to ensure the integrity of the structural components of these alternatives.

Reviews at least every five years, as required, would be necessary to evaluate the effectiveness of all of these alternatives because hazardous substances would remain on site in concentrations above health-based levels.

10.4 Reduction of Toxicity, Mobility, or Volume of Contaminants Through Treatment

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy

Alternative 2 would not reduce the toxicity, mobility, or volume of contaminants through treatment. The intrinsic biodegradation of the contaminants that is occurring in Alternative 3 is reducing the toxicity of site contaminants by completely and irreversibly degrading the PAHs and BETX to non-toxic by-products. Alternatives 4 through 6 would reduce contaminant toxicity by destroying contaminants captured in their extraction systems by treatment.

Ground water monitoring would provide information on the movement of contaminants in ground water but would not directly affect the mobility of the contaminants. Ground water extraction associated with Alternative 4 through 6 would reduce contaminant mobility by creating a hydraulic barrier around various areas of contamination.

The mass of contaminants present in the aquifers would be reduced by Alternatives 3 through 6. Based on data collected at the site, it is predicted that PAHs and BTEX will be degraded by 50 percent every 0.48 to 0.95 years through natural attenuation processes.

The biodegradation process results in complete degradation of PAHs and BETX to non-toxic residuals. Ground water extraction would remove contaminants from ground water and they would be treated in the multi-stage treatment system.

10.5 Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the environment, and the community during construction and operation of the remedy until clean up goals are achieved.

In general, the alternatives with the fewest construction activities will pose the lowest risk to site workers and the community during the remedial action. Therefore, Alternatives 2 and 3 would pose the least risk since they do not involve any construction activities. Since no one is currently exposed to contaminated ground water, only workers collecting samples from monitoring wells could be exposed to contaminants and this could be minimized by proper use of personal protective equipment. Alternatives 4 through 6 also have the possibility of the risks associated with ground water sampling, but may have greater risks to workers posed by drilling, excavation, and construction. The time needed to complete these activities should be less than one construction season.

Air emissions from the ground water treatment processes in Alternatives 4 through 6 would be addressed by engineering controls to ensure that the emissions meet applicable federal or state air emissions standards, mitigating any adverse on or off site impacts.

10.6 Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Alternatives 2 through 6 are technically implementable. Ground water monitoring and sampling equipment and procedures are well developed and available. Monitoring data collected for Alternative 3 can be used to develop the lines of evidence for natural attenuation Predicted rates of contaminant degradation and the time required to reach the clean up goals will become more reliable as more data are collected and incorporated in the site model.

Ground water extraction and treatment, included in Alternatives 4 through 6, would be technically feasible to implement and a large number of vendors are available to provide this technology. The implementation of bedrock grouting and installation of the vertical barrier are more complex, with the possibility of more construction problems and a longer period for implementation. However, it should not be difficult to obtain vendors able to implement these technologies.

All of the alternatives have few associated administrative difficulties

10.7 Cost

Cost includes estimated capital and operation and maintenance costs as well as present worth costs. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

The estimated costs associated with Alternatives 1 through 6 are summarized in Table 1. The present net worth costs were calculated using an assumed life of 30 years and a five percent discount rate. Alternatives 4 through 6 are considerably more costly than Alternative 2 and 3 because of the significant capital and operation and maintenance costs associated with the installation and maintenance of a ground water pump and treat system. Alternatives 5 and 6 are in excess of $2,000,000 in capital costs associated with the implementation of bedrock grouting.

10.8 State/Support Agency Acceptance

The IDNR has participated in the oversight activities for the Mason City Coal Gasification site, including review of the RI and FS Reports. The IDNR has expressed its support for Alternative 3, with Alternative 4 as a contingency remedy.

10.9 Community Acceptance

During the public comment period, the community expressed its support for the EPA's preferred alternative A comment was received during the public meeting regarding the sampling schedule to be utilized for the evaluation of monitored natural attenuation. A written comment was received which recommended that rather than selecting one of the alternatives presented in the FS Report as a contingency in the event that monitored natural attenuation fails to be effective in the future, that a reevaluation of field data and the application of the best available technology would be more appropriate. Another written comment was received from the State Historical Society of Iowa which questions whether the EPA met its compliance obligations under section 106 of the National Historic Preservation Act of 1966 (NHPA). The EPA provides a response to all significant comments in the Responsiveness Summary section of this ROD.

11.0 Principal Threat Wastes

The NCP establishes an expectation that the EPA will use treatment to address the principal threats posed by a site wherever practicable (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.

There is a possibility that contaminants exist in the ground water as DNAPLs, which may also be considered principal threat wastes. The DNAPL was found in MW-38 during one round of sampling, which raises the possibility of its existence. However, additional sampling, which will be implemented as part of the remedy may prove that this was a one-time occurrence. None of the alternatives include actions specifically designed to address this possible contamination as the locations of areas of DNAPL have not been identified with any certainty.

12.0 Selected Remedy

The Preferred Alternative for cleaning up the Mason City Coal Gasification site is Alternative 3. Alternative 3 provides for monitored natural attenuation of ground water with institutional controls. In the event that the monitoring data indicate that the Preferred Alternative is no longer effective in remediating the ground water contaminants at the site, Alternative 4, ground water pumping and treatment with discharge to the sanitary sewer and institutional controls shall be implemented as a contingency.

12.1 Summary of the Rationale for the Selected Remedy

The Preferred Alternative was selected over other alternatives because it is expected to achieve substantial reduction of the risks posed by contaminated ground water and implements measures to prevent future exposure to currently contaminated ground water and residual soil contamination at a substantially lower cost than the other alternatives. Although Alternatives 4

through 6, which are more active remedies, may achieve a higher degree of protection in a shorter amount of time, since the source of the ground water contamination has been removed through the removal actions that were taken, this advantage is likely to diminish over time. Alternative 2 would be less protective than the Preferred Alternative as there would be no information developed through modeling of the sampling results to determine the mechanisms and rate of degradation of the contaminants Alternatives 4 through 6 do not have any significant advantage over the Preferred Alternative with respect to long-term effectiveness and permanence. The Preferred Alternative does not satisfy the preference for treatment, which Alternatives 4 through 6 do. However, the toxicity, mobility, and volume of contaminants will be reduced by the Preferred Alternative. The short-term effectiveness and implementability are better with the Preferred Alternative than with Alternatives 4 through 6.

The Contingency Remedy was selected because of the remaining alternatives it is also expected to reduce the risks at the site to acceptable at a lower cost than the other active remedies, Alternatives 5 and 6. Alternative 2 does not provide the level of protection that the other alternatives provide. Alternatives 5 and 6 do not provide substantially more protection for the additional costs, as compared with the Contingency Remedy.

12.2 Description of the Selected Remedy

The major components of the Preferred Remedy are the following:

- Implementation of an institutional control in the form of restrictions on the property that comprise the site which will prohibit future residential development; prohibit the construction of basements in any non-residential buildings which might be constructed on the site in the future; and prohibit the installation of any water supply wells on the site which might be used for municipal, industrial, or domestic purposes. This does exclude the installation of additional ground water monitoring wells on the site in the future. Implementation of these restrictions will be the responsibility of the property owners, Alliant Energy Corporation and the city of Mason City, Iowa, subject to the approval of the EPA. It will not be necessary to obtain an environmental easement for EPA access to the site since Section 104 of CERCLA provides authority for the EPA to acquire access if it is not voluntarily provided by agreement.

- Continued listing of the site on the Registry of Hazardous Waste or Hazardous Substance Disposal Sites pursuant to Iowa Administrative Code 455B.426. According to Iowa Administrative Code 148.6(5), written approval of the director of the IDNR is required prior to any substantial change in the use of the listed site. In addition, written approval is also required to sell, convey, or transfer title of the listed site.

- The development and implementation of a ground water monitoring and maintenance plan. This plan would include the details for ground water sampling, analysis, and the inspection of selected wells identified in the areas of contamination and downgradient

from contaminated zones. Additional monitoring wells may need to be installed in the future in the event that the network of monitoring wells which already exist for this site no longer provide the information necessary to determine whether the remedy continues to be protective. Ground water monitoring will be conducted at a minimum frequency of twice per year for the first five years and no less than annually until the clean up levels have been met

A detailed sampling and quality assurance plan to perform the ground water monitoring will be prepared and will include sample locations, frequency, procedures, analytical methods, and documentation procedures. Sampling modifications, including modifications to the sampling locations and frequency, may be made during implementation of the remedy.

The analytical results would be used with aquifer mathematical models to evaluate the rate of natural attenuation and the migration of contaminants. Ground water and surface water data previously generated from the site may be used for modeling purposes.

The EPA will consider natural attenuation to be occurring at this site in an acceptable manner and rate if:

1. An examination of the ground water chemistry identifies conditions that are favorable for the occurrence of biodegradation.

2. A reduction in the concentrations of PAHs and BETX along the flow path downgradient of the former source area occurs.

3. Monitoring and modeling results indicate that natural attenuation is occurring at a rate sufficient to prevent the spread of the contaminant plume.

If these conditions were not being met the Contingency Remedy would be implemented.

The major components of the Contingency Remedy are the following:

- The institutional controls, which are itemized in the first three bullets of the Preferred Remedy.

- A ground water extraction system sufficient to capture the contaminated ground water in the shallow aquifer would be designed and constructed. It has been estimated that six extraction wells would be required as well as the associated piping and pumps.

- A water treatment system would be designed and constructed on the site. At a minimum the treatment system would consist of a separation tank, where separate-phase liquids would be removed from the water stream. The aqueous stream would then be passed

through an inorganics treatment process to filter out the suspended particulates, remove metals, and condition the mineralized water that is anticipated. The conditioned water would then be passed through an air stripper, where volatiles would be removed This would be followed by a secondary particulate removal stage and organophilic clay and carbon adsorption polishing step to remove less volatile organic compounds, and possibly some inorganic compounds, prior to discharge of the water to the sanitary sewer

- The development and implementation of a ground water monitoring and maintenance plan. Ground water monitoring would be conducted at a minimum frequency of twice per year for the first five years and no less than annually until the clean up levels were met.

The EPA's MCLs, pursuant to the Safe Drinking Water Act for public water supplies are identified as ARARs for this site. The MCLs represent levels which are considered safe for human consumption. There are MCLs for benzene and benzo(a)pyrene. The MCL for benzene is 5 µg/L and for benzo(a)pyrene is 0.2 µg/l. These MCLs are approximately equal to the 10^{-5} cancer risk. There are no MCLs for the other carcinogenic PAHs but it is possible to calculate the concentrations of the contaminants that would be associated with a given level of cancer risk. In the FS, the concentration of each of the carcinogenic PAHs at the 10^{-6} cancer risk was determined However, it is not even possible to detect some of these compounds at those low concentrations. Therefore, the clean up levels listed in the table below for the contaminants other than benzene and benzo(a)pyrene, were presented in the FS Report. These contaminant concentrations can be detected in a ground water sample using available analytical methods and represent a range of $1x10^{-5}$ to $8x10^{-5}$ cancer risk.

Ground Water Clean UpLevels in µg/L

Contaminant	MCL
Benzene	5
Benzo(a)pyrene	0.2
Benzo(k)fluoranthene	0.2
Benzo(a)anthracene	0 1
Chrysene	0.2
Benzo(b)fluoranthene	0.2
Indeno(1,2,3-c,d)pyrene	0.4
Dibenz(a,h)anthracene	0.3

Additional ground water sampling will be done to determine whether the elevated levels of lead found in MW-13 and MW-14 continue to exist and are representative of site-related contaminants that pose an unacceptable level of risk to human health. A plan for the appropriate monitoring wells to be sampled will be included in the ground water monitoring plan. If it is determined by the EPA that there are concentrations of these analytes which pose an unacceptable level of risk to human health, it may be necessary to modify this remedial action in the future to address this risk.

12.3 Summary of the Estimated Remedy Costs

Table 1, attached, was taken from the FS Addendum and provides a detailed cost estimate for implementation of the Preferred Remedy. The capital expenditures planned for this remedy cover the costs of developing the monitoring plans and conducting the modeling.

Table 4-10, attached, was taken from the FS Report and provides a detailed cost estimate for implementation of the Contingency Remedy

The discount rate used in calculation of the present net worth costs is five percent. The information in these cost estimate summary tables are based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Major changes may be documented in the form of a memorandum in the Administrative Record file, an ESD, or a ROD amendment. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

12.4 Expected Outcomes of the Selected Remedy

The expected outcome of this alternative is that the concentration of contaminants in the ground water will be reduced below health-based clean up levels and there will be no consumption of contaminated ground water in the future. There will be no direct contact with residual contaminated soil that remains in the subsurface.

The site will be available for any use that is not inconsistent with the restrictions that are being placed on the property. Upon achieving the clean up levels for ground water there will be no limitations on its use.

13.0 Statutory Determinations

Under its legal authority, the EPA's primary responsibility at Superfund sites is to ensure that remedial actions achieve adequate protection of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that when complete, the selected remedial action for this site must comply with applicable or relevant and appropriate environmental standards established under federal and state environmental laws, unless a statutory waiver is justified. The selected remedy also must be cost effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, and mobility of hazardous wastes as their principal element. The following sections discuss how the selected remedy meets these statutory requirements.

13.1 Protection of Human Health and the Environment

The selected remedy will protect human health and the environment by achieving the remedial action objectives established for the site. Levels of contaminants in the ground water will be reduced to levels considered by the EPA to be safe for human consumption. In the short-term, protection is provided by ground water use restrictions which will prevent exposure to the contaminated ground water

13.2 Compliance With ARARs

The Preferred and Contingency Remedies are expected to comply with ARARs. The MCLs established under the Safe Drinking Water Act and Chapter 133 of the Iowa Administrative Code are considered relevant and appropriate for the monitored natural attenuation component of the Preferred Remedy and the treatment component of the Contingency Remedy for the chemicals of concern.

National Ambient Air Quality Standards and Iowa Air Pollution Control Regulations are action-specific ARARs for the air discharges from the ground water treatment component of the Contingency Remedy. The Pretreatment Standards and the Iowa Water Pollution Control Regulations are action-specific ARARs for the construction of and the discharges to the POTW from the ground water treatment component of the Contingency Remedy.

Listing on the Iowa site registry is a location-specific ARAR for the Preferred and Contingency Remedies. The site is on the Registry pursuant to Iowa Administrative Code 567-148(455B). The site cannot be sold, conveyed, or transferred without written approval of the IDNR.

Requirements of the Occupational Safety and Health Act (OSHA) will be complied with.

13.3 Cost Effectiveness

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

The estimated present net worth cost of the Preferred Remedy is $649,100. Although the cost of Alternative 2 is slightly less the EPA believes that the Preferred Remedy is more protective than Alternative 2, and thus is more cost-effective

The estimated present net worth cost of the Contingency Remedy is $3,709,300. Again, although Alternative 2 is significantly less expensive, the EPA believes that the Contingency Remedy is more protective, thus more cost-effective.

13.4 Utilization of Permanent Solutions and Alternative Treatment Technology to the Maximum Extent Practicable

The Preferred Remedy represents the maximum extent to which permanent solutions and treatment can be utilized in a cost-effective manner at this site. Of the alternatives that are protective of human health and the environment and comply with ARARs, the EPA has determined that the Preferred Remedy provides the best balance of trade-offs in terms of long-term effectiveness, reduction of toxicity, mobility, or volume achieved through treatment, short-term effectiveness, implementability, and cost. Additional considerations include the statutory preference for treatment as a principal element as well as state and community aceptance.

All of the alternatives which met the threshold criteria provided long-term effectiveness. Since the Preferred Remedy does not include treatment, long-term effectiveness is determined through monitoring of the ground water and ultimately achieved through natural attenuation processes. Treatment was found to be impracticable due to significantly higher costs because it did not provide significantly more protection. The Contingency Remedy does include treatment of contaminated ground water and therefore satisfies the preference for treatment. Short-term effectiveness was not a major concern with any of the alternatives considered. While all of the alternatives which included extraction and treatment of ground water were implementable, Alternatives 5 and 6 were more difficult to implement than Alternatives 3 and 4.

13.5 Preference for Treatment as a Principal Element

The Preferred Remedy at this site does not meet the preference for treatment as a principal element. Treatment was found to be impracticable as it did not provide significantly more protection for the significantly higher costs. A ground water monitoring program is included to monitor contaminant levels over time and confirm the adequacy of natural attenuation to reduce contaminant levels.

The Contingency Remedy does meet the preference for treatment as a principal element.

13.6 Five-Year Review Requirements

If there are hazardous substances, pollutants, or contaminants remaining at a site above levels that would allow for unlimited use and unrestricted exposure, pursuant to Section 121(c)

of CERCLA and NCP §300.430(f)(5)(iii)(C), the EPA shall conduct a review of such remedial action no less often than each five years after the initiation of the remedial action to assure that human health and the environment are being protected. The Mason City Coal Gasification site will require a statutory five-year review

14.0 Documentation of Significant Changes

The Proposed Plan for the Mason City Coal Gasification site was released for public comment in July 2000. The Proposed Plan identified Alternative 3, monitored natural attenuation of ground water with institutional controls, as the preferred alternative. Alternative 4, ground water pumping and treatment with discharge to the sanitary sewer and institutional controls was included as a contingency in the event that at some time in the future it was determined that monitored natural attenuation was no longer effective. The EPA reviewed the comments received during the public comment period. It was determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate

RESPONSIVENESS SUMMARY
Mason City Coal Gasification Site
Mason City, Iowa

Introduction

This Responsiveness Summary has been prepared in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and the National Contingency Plan (NCP) 40 CFR §300.430(f). This document provides the United States Environmental Protection Agency's (EPA's) response to all significant comments received on the Proposed Plan from the public during the 30-day public comment period.

On July 24, 2000, the EPA released the Proposed Plan and Administrative Record File which contains the pertinent documents for the site. The Proposed Plan discussed the EPA's proposed actions to address contaminated ground water and residual contaminated soil The public comment period began on July 24, 2000 and ended on August 22, 2000. The EPA held a public meeting on July 31, 2000 at the Mason City Public Library to present the Proposed Plan and provide the public an opportunity to comment. A copy of the transcript from the public meeting is included in the Administrative Record File.

Comments Received from the Public and Responses

The following comments were received in writing during the comment period or verbally during the public meeting.

A citizen who attended the public meeting recommended that the monitoring wells be sampled once a year, rather than twice a year, which was the sampling frequency utilized in the Feasibility Study Addendum for cost estimating purposes for Alternative 3. He stated that this would reduce the cost of the Preferred Remedy and minimize the threat of contaminating the well during sampling.

Particularly during the first five years of implementation of the Preferred Remedy, it is important to collect adequate ground water sampling information to be able to perform aquifer mathematical modeling to evaluate the rate of natural attenuation and the migration of contaminants. The EPA believes that monitoring must occur at a minimum of twice a year during the first five years to adequately evaluate the on-going effectiveness of this remedy. At the end of five years of monitoring, if it has been demonstrated that monitored natural attenuation continues to be effective and is occurring at the predicted rate, monitoring may be reduced to once a year.

A Quality Assurance Project Plan will be developed for the monitoring that will take place at the site to ensure that practices and procedures are utilized that minimize the possibility of introducing contamination into a monitoring well during sampling.

Kansas City Power & Light Company and Alliant Energy Corporation, two of the potentially responsible parties, have commented that if the Preferred Remedy is deemed ineffective, the contingency should be the reevaluation of the field data and the application of the best technologies available at that time, rather than the EPA's Contingency Remedy.

The EPA Office of Solid Waste and Emergency Response (OSWER) published a directive entitled "Use of Monitored Natural Attenuation at Superfund RCRA Corrective Action, and Underground Storage Tank Sites" (OSWER Directive Number 9200 4-17P) which states the EPA's policy regarding the use of monitored natural attenuation for the clean up of contaminated soil and ground water in the referenced programs. In that directive the "EPA recommends that remedies employing monitored natural attenuation be evaluated to determine the need for including one or more contingency measures that would be capable of achieving remediation objectives. EPA believes that contingency remedies should generally be included as part of a monitored natural attenuation remedy which has been selected based primarily on predictive analyses rather than documented trends of decreasing contaminant concentrations." Since this is the case for the Mason City Coal Gasification site, it is appropriate to include a contingency remedy in the ROD.

Selection of a contingency remedy involves the same decision making process as does the selection of the preferred remedy. It is not possible to adequately evaluate an unspecified technology that might be available at some time in the future. Therefore, the remedies that were considered and evaluated as possible contingency remedies for this site were the alternatives that were presented in the Feasibility Study Report. In the EPA guidance document entitled "A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents" (OSWER 9200.1-23P) it is stated that "generally, an explanation of significant difference (ESD) will be required to invoke a contingency." This provides an opportunity for the EPA to consider this significant change in the remedy for the site at the time the contingency is to be invoked. The guidance also states that "in some cases, an additional public comment period or public meeting may be held voluntarily on a planned ESD (NCP §300.825(b)). This may be useful where there is considerable public or potentially responsible party interest in the matter."

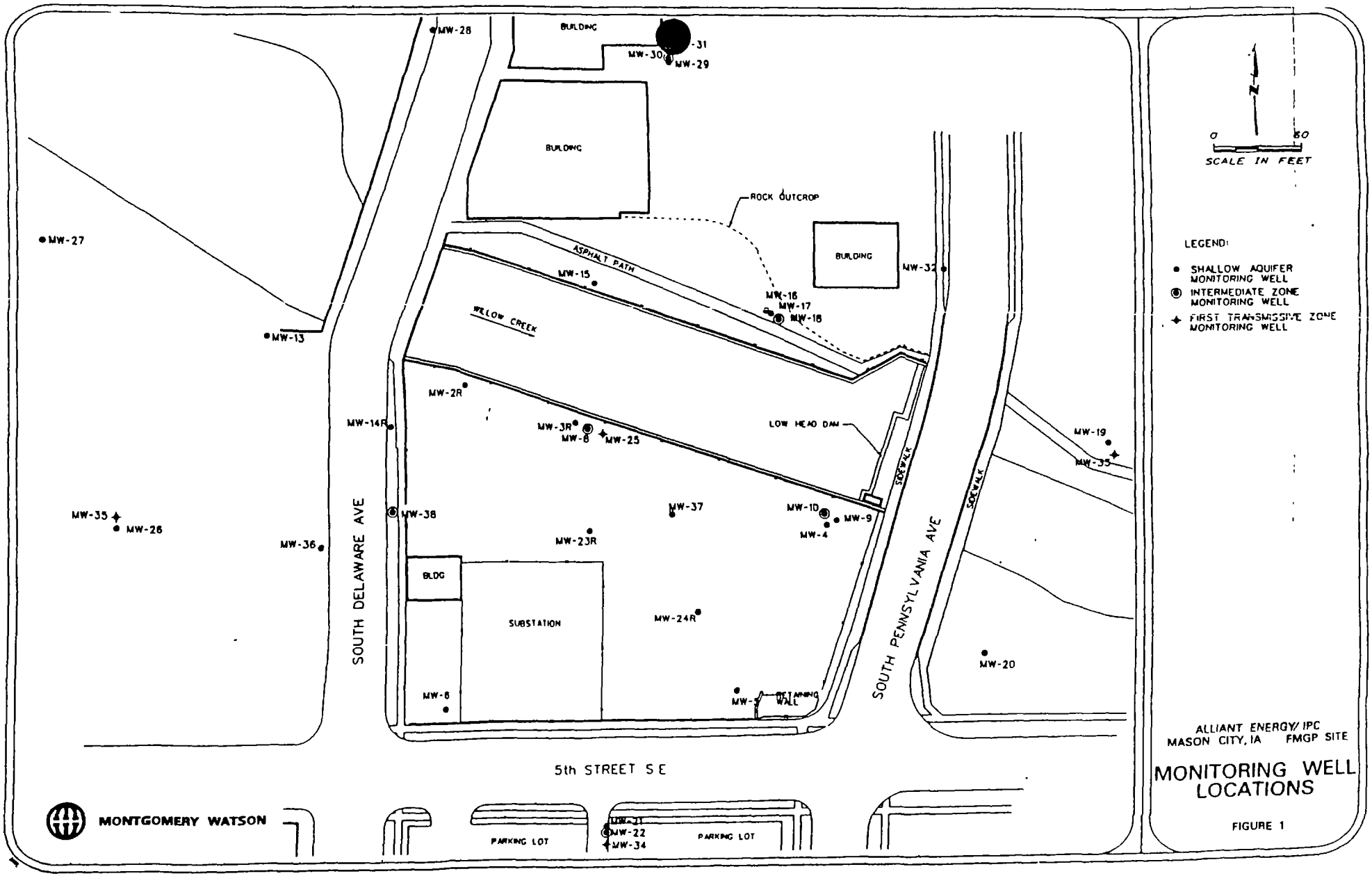
The State Historical Society of Iowa commented that EPA did not consult with the Iowa State Historic Preservation Office before conducting a removal at the Site, nor did EPA follow the National Historic Preservation Act.

The site was the location of a manufactured gas plant in the early 1900's, which was used to produce gas for lighting and heating purposes in the Mason City area. In 1957, once natural gas was available, the manufactured gas plant was decommissioned and demolished. Residues from the gas manufacturing process, known as coal tar, contaminated the site and were discovered in 1984, when the city began excavation on the site for a new sewer line. To address the soil contamination, the EPA conducted a removal action at the site in 1995 and 1996.

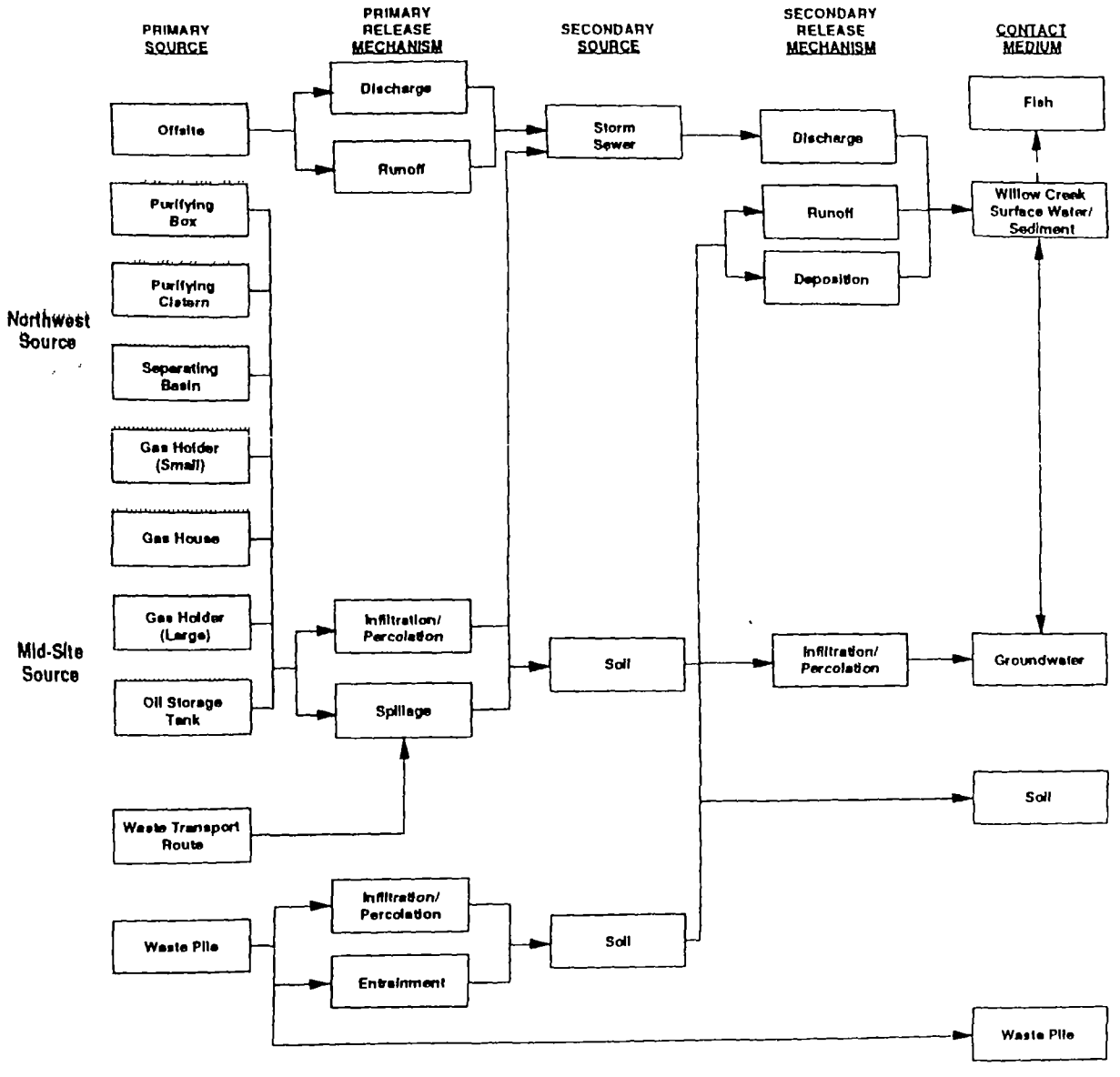
Before the EPA conducted the removal action, extensive investigations were done to determine the nature and extent of contamination, as well as to characterize the site. The site had

previously been disturbed in 1957 due to the decommissioning and demolition of the manufactured gas plant This resulted in 9 to 14 feet of fill material on the site, including building demolition rubble, cinders, coal, concrete, wood/wood chips, steel, brick, and rock. The only structures on the site were an electrical substation and a storage building. As a result, the EPA concluded that there was nothing of historical value present and proceeded to decrease the contamination at the site by conducting a removal action

Presently, the EPA has selected monitored natural attenuation as the remedy to clean up the contaminated groundwater at the site. In implementing this remedy, the EPA must comply with any Federal or State environmental laws that are legally applicable or are relevant and appropriate (ARARs). The selected remedy will not result in any intrusion to the site beyond sampling. The National Historic Preservation Act of 1966 is not an ARAR and since there will be no active remediation at the site, does not apply to this site.


MW-28
BUILDING
MW-31
MW-30
MW-29
BUILDING
ROCK OUTCROP
MW-27
ASPHALT PATH
BUILDING
MW-32
MW-15
MW-16
MW-17
MW-18
WILLOW CREEK
MW-13
MW-2R
MW-14R
MW-3R
MW-8
MW-25
LOW HEAD DAM
SIDEWALK
MW-19
MW-35
SIDEWALK
MW-35
MW-26
MW-38
MW-37
MW-10
MW-9
MW-4
MW-36
MW-23R
BLDG
SUBSTATION
MW-24R
SOUTH DELAWARE AVE
SOUTH PENNSYLVANIA AVE
MW-6
MW-5
RETAINING WALL
MW-20
5th STREET S E
PARKING LOT
MW-21
MW-22
MW-34
PARKING LOT
MONTGOMERY WATSON
N
0
60
SCALE IN FEET
LEGEND:
SHALLOW AQUIFER MONITORING WELL
INTERMEDIATE ZONE MONITORING WELL
FIRST TRANSMISSIVE ZONE MONITORING WELL
ALLIANT ENERGY/ IPC
MASON CITY, IA FMGP SITE
MONITORING WELL LOCATIONS
FIGURE 1

CONCEPTUAL SITE MODEL
MASON CITY FORMER MANUFACTURED GAS PLANT



POTENTIAL RECEPTO.

Exposure Route	Human: Offsite Resident	Human: Site Worker	Human: Onsite Trespasser	Human: Offsite Recreational Receptor	Biota: Aquatic	Biota: Terrestrial
Ingestion				●		
Inhalation						
Ingestion				●	●	●
Dermal Contact				●	●	●
Plant Uptake					●	
Inhalation	●					
Ingestion	●					
Dermal Contact	●					
Plant Uptake						
Inhalation		●	●			
Ingestion		●	●			
Dermal Contact		●	●			●
Plant Uptake						●
Inhalation			●			
Ingestion			●			
Dermal Contact			●			
Plant Uptake						

JACOBS ENGINEERING GROUP INC.	DRAWN BY: DK/MD DATE: 08/01/93	DESCRIPTION: CONCEPTUAL SITE MODEL	SITE NAME: MASON CITY FORMER MANUFACTURED GAS PLANT		JACOBS PROJECT NO: 121025700	ARCS	3-1
	CHECKED BY: JS/DA DATE: 08/01/93						

Table 2-3
Chemicals of Potential Concern by Media
Mason City FMGP

Groundwater[+]	Soils[o]	Willow Creek Sediment[o]	Willow Creek Surface Water[o]
VOCs			
Benzene	Benzene		
Bromodichloromethane	Vinyl Chloride		
Ethyl benzene			
Toluene			
Xylenes			
PAHs			
NONCARCINOGENIC			
Naphthalene	Naphthalene		
Acenaphthylene	Acenaphthylene		
Acenaphthene	Phenanthrene		
Fluorene	Fluorene		
Phenanthrene	Pyrene		
Anthracene	Benzo(g,h,i)perylene		
Fluoranthene			
Pyrene			
Benzo(g,h,i)perylene			
CARCINOGENIC			
Benzo(k)flouranthene	Benzo(k)flouranthene	Phenanthrene	Benzo(a)anthracene
Benzo(a)anthracene	Benzo(a)anthracene	Benzo(k)flouranthene	
Chrysene	Chrysene	Benzo(a)anthracene	
Benzo(b)fluoranthene	Benzo(b)flouranthene	Chrysene	
Benzo(a)pyrene	Benzo(a)pyrene	Benzo(b)flouranthene	
Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene	Benzo(a)pyrene	
Dibenz(a,h)anthracene	Dibenz(a,h)anthracene	Dibenz(a,h)anthracene	
		Indeno(1,2,3-cd)pyrene	
Metals			
Lead	Arsenic		
	Lead		

[+] Data from RI only all sampling rounds and locations combined
[o] Data from all investigations (1986-1992) all sampling rounds and locations combined

e 2-2(a)

Identification of Chemicals of Potential Concern -- Groundwater +
Mason City FMGP

(all units ug/L)

	Frequency of Detection # Hits	# Analyses	Range of Detection	SQL Range	Is Highest SQL > than PRG?	PRGs for Carcinogen Effects	PRGs for Non-Carcinogenic Effects	Upgradient SQL Range	Upgradient Range	Chemical of Potential Concern? (Yes/No)
VOCs										
Benzene	20	42	1 3 - 6730	1 00 - 50 00	Yes	0 62		1 00 U - 5 00 U		Yes (2)
Bromodichloromethane	1	42	1 4 - 1 4	1 00 - 50 00	Yes	0 67	730 00	1 00 U - 5 00 U		Yes (2)
cis-1 2 Dichloroethene	1	42	59 5 - 59 5	0 20 - 105 00	No		365 00	1 00 U 5 00 U		No (4)
Ethylbenzene	19	42	1 1 - 1050	1 00 - 25 00	No		1540 99	1 00 U 5 00 U		Yes (1)
Toluene	12	42	1 - 4670	1 00 - 50 00	No		933 72	1 00 U - 5 00 U		Yes (1)
Xylenes	20	42	5 8 - 1470	1 00 25 00	No		791 41	1 00 U - 5 00 U		Yes (1)
PAHs										
Naphthalene	9	43	11 4 - 4360	1 00 - 50 00	No		146 00			Yes (1)
Acenaphthylene	9	43	1 - 1300	0 50 - 25 00	*			0 50 U 1 00 U		Yes (1)
Acenaphthene	13	43	19 - 843	0 40 - 1800 00	N/A		2190 00	0 40 U 1 00 U		No (4)
Fluorene	10	43	6 53 - 460	0 10 - 11000 00	Yes		1460 00	0 10 U - 0 11 U		Yes (2)
Phenanthrene	12	43	16 - 2920	0 40 - 10 00	*			0 40 U 0 50 U		Yes (1)
Anthracene	9	43	1 6 - 170	0 20 - 33000 00	Yes		10950 00	0 20 U 0 50 U		Yes (2)
Fluoranthene	21	43	0 5 - 2450	0 20 - 105 00	No		1460 00	0 20 U 0 20 U		Yes (1)
Benzo(k)fluoranthene	3	43	0 129 - 21 5	0 02 - 900 00	Yes	0 15		0 02 U 0 09 U		Yes (2)
Pyrene	15	43	0 2 - 1000	0 20 - 135 00	No		1095 00	0 20 U 0 20 U		Yes (1)
Benzo(a)anthracene	7	43	0 6 - 243	0 02 - 700 00	Yes	0 15		0 02 U - 0 06 U		Yes (2)
Chrysene	7	43	0 314 - 487	0 10 - 7 50	Yes	1 47		0 10 U 0 10 U		Yes (2)
Benzo(b)fluoranthene	8	43	0 257 - 45 5	0 02 - 900 00	Yes	0 15		0 02 U 0 07 U		Yes (2)
Benzo(a)pyrene	8	43	0 112 - 83	0 13 - 1200 00	Yes	0 01		0 13 U 0 20 U		Yes (2)
Indeno(1 2,3 cd)pyrene	1	43	16 - 16	0 05 - 2200 00	Yes	0 15		0 05 U 0 09 U		Yes (2)
Dibenz(a h)anthracene	1	43	1 3 - 1 3	0 04 - 1500 00	Yes	0 01		0 04 U 0 16 U		Yes (2)
Benzo(g h,i)perylene	2	43	0 262 - 0 465	0 10 3800 00	*			0 10 U - 0 10 U		Yes (2)
ACID EXTRACTABLES										
2 4-Dimethylphenol	2	42	57 - 74 7	11 00 - 43 00	No		730 00			No (4)
METALS										
Arsenic	10	42	5 - 8	5 00 5 00	Yes	0 05	10 95	5 00 U - 5 00 U		No (5)
Chromium Total	11	43	2 - 4	2 00 - 2 00	No		182 50	2 00 U 2 00 U	2 00 2 00 b	No (4)
Copper	8	43	5 - 25	5 00 - 13 00	No		1460 00	5 00 U 5 00 U		No (4)
Iron	30	42	100 - 46000	100 00 - 2600 00	*			100 00 U 100 00 U	6400 00 6500 00 a	No (3)
Lead	9	42	5 - 51	5 00 15 00	N/A			5 00 U - 8 00 U	7 00 - 7 00 b	Yes (1)
Zinc	21	43	60 00 - 1000	50 00 - 150 00	No		7300 00			No (4)
CYANIDES										
Cyanide Total	31	42	10 00 - 710	10 00 - 10 00	No		803 00			No (4)

+ - Data from only the RI were combined across rounds of sampling

* -- Data inadequate for Quantitative Risk Assessment HEAST 1/92 calculation of PRG not possible

- Preliminary Remediation Goals based on residential exposures and acceptable risk of 1 x 10E 6 and acceptable HI of 1 0

1 Detected at levels above background or PRGs

2 Detected at levels above background or PRGs SQLs greater than PRGs

3 Not associated with adverse effects

4 Detected at levels below PRGs or Background

5 Not present above maximum contaminant level of 0 05 mg/L Drinking Water Regulations and Health Advisories USEPA 1992

6 Not detected SQLs greater than PRGs

U = Undetected at level shown

a = 2 out of 4 analyses

b = 1 out of 4 analyses

N/A = not available EPA uses UBK model to estimate hazard due to lead

Identification of Chemicals of Potential Concern - Waste Pile, Trench, Subsurface and Surface Soils + Mason City FMGP

Waste Pile, Trench, Subsurface and Surface Soils (all units mg/Kg)

	Frequency of Detection # Hits / # Analyses	Range of Detection	SQL Range	Is Highest SQL > than PRG?	PRGs # for Carcinogenic Effects	PRGs # for Non Carcinogenic Effects	Background Range		Chemical of Potential Concern? (Yes/No)
VOCs									
Benzene	6 / 32	0 60 - 240	0 50 - 0 50	No	22 1		Not Detected		Yes (1)
Ethylbenzene	7 / 32	0 60 - 260	0 50 - 0 50	No		27444	Not Detected		No (4)
Toluene	6 / 32	0 70 - 350	0 50 - 0 50	No		54887	Not Detected		No (4)
Trichloroethene	3 / 32	0 70 - 1 50	0 50 - 5 00	No	58 21		Not Detected		No (4)
Vinyl chloride	1 / 32	20 - 20	5 00 - 10 00	Yes	0 34		Not Detected		Yes (2)
Xylenes	5 / 30	1 30 - 410	0 50 - 0 50	No		548872	Not Detected		No (4)
PAHs									
Naphthalene	16 / 56	0 18 - 5500	0 04 400 00	No		1098	Not Detected		Yes (1)
Acenaphthylene	15 / 56	0 91 - 1100	0 02 - 200 00	*			Not Detected		Yes (3)
Acenaphthene	20 / 56	0 52 - 100	0 02 - 340 00	No		16466	Not Detected		No (4)
Fluorene	24 / 56	0 05 - 17800	0 004 - 5 00	No		10800	Not Detected		Yes (3)
Phenanthrene	36 / 56	0 13 - 2300	0 02 - 16 00	*			0 06 0 06	b	Yes (3)
Anthracene	28 / 56	0 18 - 650	0 01 - 80 00	No		82031	Not Detected		No (4)
Fluoranthene	46 / 56	0 23 - 1510	0 50 - 8 00	No		10977	0 20 - 0 20	b	No (4)
Benzo(k)fluoranthene	17 / 54	0 08 - 56	0 001 - 340 00	Yes	1 10		Not Detected		Yes (2)
Pyrene	39 / 56	0 24 - 1440	0 080 - 8 00	No		8233	Not Detected		Yes (4)
Benzo(a)anthracene	33 / 56	0 16 - 360	0 001 - 250 00	Yes	0 88		0 76 - 0 76	b	Yes (2)
Chrysene	32 / 56	0 08 - 340	0 004 - 250 00	Yes	8 77		0 03 - 0 03	b	Yes (2)
Benzo(b)fluoranthene	17 / 54	0 39 - 120	0 001 - 340 00	Yes	0 88		0 18 - 0 18	b	Yes (2)
Benzo(a)pyrene	29 / 56	0 18 - 540	0 01 - 340 00	Yes	0 09		Not Detected		Yes (2)
Indeno(1 2,3-cd)pyrene	17 / 56	0 05 - 15 00	0 02 - 340 00	Yes	0 88		Not Detected		Yes (2)
Dibenz(a,h)anthracene	10 / 56	0 23 - 100	0 002 - 340 00	Yes	0 09		Not Detected		Yes (2)
Benzo(g,h i)perylene	16 / 56	0 65 - 110	0 004 - 340 00	*			Not Detected		Yes (1)
METALS									
Arsenic	31 / 32	1 80 - 82	1 00 - 1 00	Yes	0 37	82	11 00 - 21 00	a	Yes (1)
Chromium Total	32 / 32	4 40 - 17	0 00 - 0 00	No		1372	8 80 - 11 00		No (4)
Copper	32 / 32	4 40 - 270	0 00 - 0 00	No		10977	21 00 - 28 00		No (4)
Iron	30 / 30	5200 - 260000	0 00 - 0 00	*			23000 00 - 98000 00	a	No (3)
Lead	30 / 30	13 - 1300	0 00 - 0 00	N/A			61 00 - 68 00	a	Yes (1)
Nickel	32 / 32	9 00 - 42	0 00 0 00	No		5489	27 00 - 98 00		No (4)
Zinc	30 / 32	41 - 3800	0 00 0 00	No		54887	94 00 - 160 00		No (4)
CYANIDES									
Cyanide Total	28 / 56	0 001 - 40 00	0 20 - 0 50	No		6037 59	Not Detected		No (4)

* -- Data inadequate for Quantitative Risk Assessment HEAST 1/92

@ - Preliminary Remediation Goals based on residential exposure and acceptable risk of 1 x 10E 6 and acceptable HI of 1 0

+ -- All data collected at site from all phases of investigation between 1986 1992 including RI Data were combined across all sampling rounds

1 - Detected at levels above background SQLs or PRGs

2 - Detected at levels above background and PRGs SQLs unusually high

3 -- Not associated with adverse effects

4 -- Detected at levels below PRGs or Background

U = Undetected at level shown

a = 2 out of 2 analyses

b = 1 out of 2 analyses

N/A = not available EPA uses IUBK model to estimate hazard due to lead

Identification of Chemicals of Potential Concern -- Willow Creek Sediment/Surface Water

Mason City FMGP

	Frequency of Detection # Hits	# Analyses	Range of Detection	SQL Range	Is Highest SQL > than PRG?	PRGs # for Carcinogenic Effects	PRGs # for Non-Carcinogenic Effects	Upgradient Frequency of Detection # Hits	# Analyses	Upgradient Range of Detection	Chemical of Potential Concern? (Yes/No)
Willow Creek Sediment (all units mg/kg)											
PAHs											
Naphthalene	2	7	2 - 22	0 09 - 0 5	No		1097 74	2	5	0 4 - 1 5	No (4)
Phenanthrene	7	7	0.57 - 25	0 00 - 0	*			4	5	0 025 - 1 8	Yes (1)
Fluoranthene	7	7	0 44 - 37	0 00 - 0	No		10977 44	3	5	1 4 - 3 5	No (4)
Benzo(k)fluoranthene	5	7	0 085 - 3 4	0 75 - 1	No	1 10		0	5	0 0008 UJ - 0 9 U	Yes (1)
Pyrene	7	7	0 35 - 22	0 00 - 0	No		8233 08	4	5	0 18 - 2 6	No (4)
Benzo(a)anthracene	6	7	0 21 - 7 8	0 01 - 0 008	No	1 10		4	5	0 046 - 1 3	Yes (1)
Chrysene	7	7	0 099 - 11	0 00 - 0	No	11 04		2	5	0 88 - 2 1	Yes (1)
Benzo(b)fluoranthene	6	7	0 55 - 8.4	0 01 - 0 008	No	1 10		2	5	0 01 - 1 7	Yes (1)
Benzo(a)pyrene	5	7	0 53 - 2 7	0 08 - 0 4	Yes	0 11		2	5	0 46 - 0 9	Yes (2)
Indeno(1,2,3-cd)pyrene	4	7	0 25 - 3 5	0 02 - 1	No	1 10		0	5	0 002 UJ - 0 9 U	Yes (1)
Dibenz(a,h)anthracene	0	7	0 - 0	0 02 - 1	Yes	0 11		1	5	0 028 - 0 028	Yes (6)
Benzo(g,h,i)perylene	0	7	0 - 0	0 04 - 1	*			0	5	0 004 UJ - 0 9 U	No (4)
METALS											
Arsenic	2	2	3 5 - 3 6	0 0 - 0	No	0 37	82 33	3	3	2 5 - 4 1	No (4)
Chromium, Total	2	2	2 7 - 6 8	0 0 - 0	No		1372 18	3	3	11 - 19	No (4)
Copper	2	2	2 9 - 12	0 0 - 0	No		10977 44	3	3	12 - 36	No (4)
Iron	2	2	4700 - 6700	0 0 - 0	*			0	3	4500 D - 12000 D	No (3)
Lead	2	2	10 - 19	0 0 - 0	N/A			3	3	49 - 74	No (4)
Nickel	2	2	6 6 - 15	0 0 - 0	No		5488 72	3	3	11 - 17	No (4)
Zinc	2	2	22 - 34	0 0 - 0	No		54887 22	3	3	69 - 100	No (4)
Willow Creek Surface Water (all units ug/L)											
Benzo(a)anthracene	2	8	1 1 - 1 1	2 0 - 2 0	Yes	0 10		0	2	2 U - 2 U	Yes (1)

* -- Data inadequate for Quantitative Risk Assessment, HEAST 1/92

\+ -- Data from sampling events combined

\# -- Preliminary Remediation Goals based on residential exposure and acceptable risk of 1 x 10E-6 and acceptable HI of 1 0

1 -- Detected at levels above background, SQLs or PRGs

2 -- Detected at levels above background and PRGs, SQLs unusually high

3 -- Not associated with adverse effects

4 -- Detected at levels below PRGs or Background

5 -- Not present above maximum contaminant level of 0 05 mg/L Drinking Water Regulations and Health Advisories, USEPA 1992

6 -- Not detected, SQLs greater than PRGs

N/A = not available EPA uses U/BK model to estimate hazard due to lead

U = Undetected at level shown

Table 4(a)

Exposure Point Concentrations (ug/L) -- Groundwater
Mason City FMGP

Chemical of Potential Concern	MW21 Shallow Upgradient Aquifer	MW22 Deep Upgradient Aquifer	MW-1, -2, -3, -4, -5, -6, -7, -9, -13, -14, -15, -16, -17, -19, -20, -23, -24 Shallow Aquifer		MW-23		MW-8 -10 -18 Deep Aquifer	
	SQL	SQL	Mean	95% UCL	Mean	95% UCL	Mean	95% UCL
VOCs								
Benzene	5 0	5 0	561	1109	65	193	5	13
Ethylbenzene	5 0	5 0	121	213	53	122	1 2	2 3
Toluene	5 0	5 0	210	503	15	34	1 2	2 3
Xylenes	5 0	5 0	142	260	67	133	1 2	2 3
PAHs								
Acenaphthylene	1 0	1 0	84	189	536	1366	0 4	0 5
Fluorene	0 1	0 1	26	55	114	355	0 1	0 1
Phenanthrene	0 5	0 5	122	306	770	2316	0 2	0 3
Anthracene	0 5	0 5	14	36	81	175	1.8E-01	0 3
Benzo(k)fluoranthene	0 1	0 1	1	3	5	17	2 8E-02	4 9E 02
Benzo(a)anthracene	0 1	0 1	8	22	50	184	0 4	1 0
Chrysene	0 1	0 1	20	51	125	387	5 0E-02	5 0E-02
Benzo(b)fluoranthene	0 1	0 1	2	5	10	35	2 3E-02	3 7E-02
Benzo(a)pyrene	0 2	0 2	5	11	19	64	8 3E-02	0 1
Indeno(1,2,3-cd)pyrene	0 1	0 1	0 8	1 6	1 03	3	3 5E-02	4 6E-02
Dibenz(a,h)anthracene	0 2	0 2	0 4	0 6	0 28	1.40	5 0E-02	8 4E-02
Benzo(g,h,I)perylene	0 1	0 1	0 3	0 4	0 20	0 85	5 0E-02	5 0E-02
METALS								
Lead	8 0	7 0	7	10	15	40	6 2	8 2

Not detected in these wells, exposure point concentration calculated using 1/2 SQL as the detect level

SQL -- Sample quantitation limit, these compounds were not detected in these wells

Tal 'b)

Exposure Point Con. ations (mg/kg) -- Soil

Mason City FMGP

Chemical of Potential Concern	SB-CC, SB-DD SS-1, -2, -3, -4, -5		SB-A, -B, -C, -D, -E, -F, -G, H, -J, -L, -M, -N, SB-AA,-BB, -CC, -EE MW14, -23, -24		MW13, -15, -17, -18, -19, -20		TR-01	Trenches 1, 2 and 3, WP01, WP02		MW-21	BG-01 BG-02
										Background Subsurface	Background Surface
	On-Site Surface		On-Site Subsurface		Off-Site Subsurface		On-Site Trench	Waste Pile			
	Mean	95% UCL	Mean	95% UCL	Mean	95% UCL	HDL	Mean	95% UCL	HDL	HDL
VOCs											
Benzene	0 25	0.25	0 61	0 83	0 25	0.25	1 U	128	299	0 5 U	0 5 U
Vinyl chloride	2 5	2.5	2.50	2 50	2.50	2 50	5 U	10	21	5 0 U	
PAHs											
Naphthalene	0 3	0.7	26	46	3 0	4 5	40 U	3140	6604	4 0 U	26 0 U
Acenaphthylene	0 1	0 2	5 8	9 2	1 5	2 3	20 U	498	1173	2 0 U	26 0 U
Fluorene	0 2	0 4	7 9	12 4	0 4	0 5	4 U	5070	18584	0 40 U	5 60 U
Phenanthrene	1 4	2 5	32	49	9 5	25 9	16 U	1133	2560	1 6	1 6
Benzo(k)fluoranthene	2 5	7 6	6 5	11 85	2 1	6 3	0 8 U	76	211	0 08 U	0 86
Benzo(a)anthracene	2 6	5 1	17 4	34	1 8	4 1	0 8 U	190	429	0 76 U	1 95
Chrysene	2 8	6 1	17 1	30	0 9	2 4	4 0 U	174	404	0 03	1 82
Benzo(b)fluoranthene	2 3	6.3	10 3	20	1 0	2 5	0 8 U	76	211	0 18	1 83
Benzo(a)pyrene	7 3	20	33	70	7 9	22 8	8 U	94	197	0 80 U	1 34
Indeno(1,2,3-cd)pyrene	0 2	0 4	3 8	6 1	2 3	6 3	2 U	79	208	0 20 U	2 12
Dibenz(a,h)anthracene	0 8	1 6	5 8	12	1 2	3 0	1 6 U	78	209	0 16 U	0 80 U
Benzo(g,h,i)perylene	1 6	3 7	10 0	19	3 9	9 0	4 U	84	204	0 40 U	2 23
METALS											
Arsenic	5	7 5	18	35	4 5	5 9	6	7	9	21	5 3
Lead	65	167	136	264	260 1	645 8	34	115	566	68	50

= Not detected in these wells, 1/2 SQL used as detect level

HDL -- Highest Detected Level mean and 95% UCL not calculated because of limited number of sampling points

U -- not detected, value represents highest sample quantitation limit

Ta 4(c)

Exposure Point Concentrations -- Willow Creek Sediment/Surface Water
Mason City FMGP

	Site #1, 2, 4, WCA, WCB		WCC, WCD WCE, Site #3		
	Sediment		Upstream Sediment		Estimated
	Mean	95% UCL	Mean	95% UCL	Fish Conc'n*
PAHs					
Naphthalene	0 8	1 6	0 5	1 2	15
Phenanthrene	5 8	13 9	0 8	1 8	193
Fluoranthene	8 8	20 5	1 4	3 2	285
Benzo(k)fluoranthene	1 4	2 6	0 3	0 9	26
Pyrene	5 2	12 2	0 8	2 1	169
Benzo(a)anthracene	1 9	4 4	0 5	1 1	60
Chrysene	2 7	6 2	0 6	1 7	85
Benzo(b)fluoranthene	3 3	6 5	0 5	1 4	65
Benzo(a)pyrene	1 0	1 8	0 3	0 8	21
Indeno(1,2,3-cd)pyrene	1 0	2 1	0 3	0 9	27
Dibenz(a,h)anthracene	0 2	0 4	0 3	0 9	
Benzo(g,h,i)perylene	0 2	0.4	0 3	0 9	

	Surface Water	
Benzo(a)anthracene	1 78	2 12

= not detected 1/2 SQL used as detect level

* - estimated according to Conner 1985, as modified by Huckins, 1987

Table 4-1
Noncarcinogenic Toxicity Values

Chemical CASN	Chronic RfD mg/kg-day (oral/dermal)	Species	Critical Effect	Confidence Level	RfD Source/Basis	Uncertainty/ Modifying Factors (I)
ORAL/DERMAL EXPOSURE						
acenaphthylene 208-96-8	NA					
anthracene 120-12-7	0.3/NC	mouse	none observed	low	IRIS/gavage	10(A); 10(H): 30(S/D)/1
arsenic 7440-38-2	0.0003/ 0.00027[a]	human	hyper pigmentation, keratosis, vascular complications	medium	IRIS/water	3 (D)
benzene 71-43-2	NA					
benzo(a)anthracene 56-55-3	NA					
benzo(a)pyrene 50-32-8	NA					
benzo(b)fluoranthene 205-99-2	NA					
benzo(g,h,i)perylene 191-24-2	NA					
benzo(k)fluoranthene 207-08-9	NA					
chrysene 218-01-9	NA					
dibenz(a,h)anthracene 53-70-3	NA					

Table 4-1 (Continued)

Chemical CASN	Chronic RfD mg/kg-day (oral/dermal)	Species	Critical Effect	Confidence Level	RfD Source/Basis	Uncertainty/ Modifying Factors (1)
ORAL/DERMAL EXPOSURE (Continued)						
ethyl benzene 100-41-4	0.1/0.1[b]	rat	liver and kidney toxicity	low	IRIS/gavage	10(H); 10(A); 10(S)
fluoranthene 206-44-0	0.04/NC[b]	mouse	nephropathy, increased liver weights, hematological alterations and clinical effects	low	IRIS/gavage	10(A); 10(H), 30(S/D)/1
fluorene 86-73-7	0.04/NC[b]	mouse	decreased erythrocyte counts	low IRIS/gavage	10(S); 10(H); 10(A); 3(D)/1	
indeno(1,2,3-cd)pyrene 193-39-5	NA					
lead 7439-92-1	ND		neurobehavorial effects; no level considered to be without effect			
napthalene 91-20-3	0.04/NC[a]	rat	decreased body weight		HEAST	
phenanthrene 85-01-8	NA					
pyrene 129-00-00	0.03/NC[b]	mouse	kidney effects	low	IRIS/gavage	10(H); 10(A), (S), 3(D)/1
toluene 108-88-3	0.2/0.2[b]	rat	increased liver & kidney weight	medium	IRIS/gavage	10(A); 10(H); 10(L); 10(D)/1
vinyl chloride 75-01-4	NA					
xylene 1330-20-7	2.0/2.0[c]	rat	hyperactivity, decreased body weight, increased mortality	medium	IRIS/gavage	10(A); 10(H)/1

Table 4-1 (Continued)

Chemical CASN	Inhalation RfC, mg/m^3 (RfDi; mg/kg-day)	Species	Critical Effect	Confidence Level	RfD Source/Basis	Uncertainty/ Modifying Factors (1)
INHALATION EXPOSURE						
acenaphthylene 208-96-8	NA					
anthracene 120-12-17	NA					
arsenic 7440-38-2	NA					
benzene 71-43-2	NA					
benzo(a)anthracene 56-55-3	NA					
benzo(a)pyrene 50-32-8	NA					
benzo(b)fluoranthene 205-99-2	NA					
benzo(h,i)perylene 191-24-2	NA					
benzo(k)fluoranthene 207-08-9	NA					
chrysene 218-01-9	NA					
dibenz(a,h)anthracene 53-70-3	NA					
ethyl benzene 100-41-4	1.0/(0.274)[a]	rat/rabbit	developmental toxicity	low	IRIS/air	10(H); 3(A), 10(D)/1

Table 4-1 (Continued)

Chemical CASN	Inhalation RfC, mg/m^3 (RfDi; mg/kg-day)	Species	Critical Effect	Confidence Level	RfD Source/Basis	Uncertainty/ Modifying Factors (1)
INHALATION EXPOSURE (Continued)						
fluoranthene 206-411-0	NA					
fluorene 26-73-7	NA					
lead 7439-92-1	NA					
napthalene	NA					
phenanthrene 85-01-8	NA					
pyrene 129-00-00	NA					
toluene 108-88-3	0.4 (0.1)[d]	humans	neurological effects	medium	IRIS/air	10(H); 10(L), 3(D)/1
vinyl chloride 75-01-4	NA					
xylene 1330-20-7	NA					

(1) Uncertainty in RfD value results from variations in human sensitivity (H), extrapolation from observation in animal species to humans (A), extrapolation from subchronic exposure to chronic exposure(s) (S), extrapolation from a LOAEL to a NOAEL (L), or data deficiencies (D).

NA not available; EPA has not performed quantitative risk assessment for noncarcinogenic effects following oral exposures

NC not calculated; dermal RfD cannot be calculated from oral RfD

ND not determined; EPA uses U/BK model to estimate hazard due to lead

[a] chronic values adopted as subchronic values (HEAST, 1992)

[b] subchronic values 10 x chronic values (HEAST, 1992)

[c] subchronic values 2 x chronic values (HEAST, 1992)

[d] subchronic value 5 x chronic value (HEAST, 1992)

Table 4-2
Carcinogenic Toxicity Values

Chemical CASN	Slope Factor $(mg/kg\text{-}day)^{-1}$ oral/dermal	Unit Risk $(\mu g/L)^{-1}$	Weight of Evidence Classification	Type of Cancer	Unit Risk Basis/Source
ORAL/DERMAL EXPOSURE					
acenaphthylene 208-196-8	NA	NA	D^+	inadequate data	NA/IRIS
arsenic 7440-38-2	1.75/1.75	5.0×10^{-5}	A	lung cancer in humans exposed via inhalation, skin cancer in humans exposed via ingestion	water/IRIS
benzene 71-43-2	0.029/0.029	8.3×10^{-7}	A	leukemia following occupational exposure	air/IRIS
benzo(a)anthracene 56-55-3	0.73[a]/NC	ND	$B2^+$	increased incidence of tumors following administration via numerous routes	NA/IRIS
benzo(a)pyrene 50-32-8	7.3/NC	1.7×10^{-4}	$B2^+$	numerous tumors following administration via numerous routes	diet/HEAST
benzo(b)fluoranthene 205-99-2	0.73[a]/NC	ND	$B2^+$	tumors in mice following administration via numerous routes	NA/IRIS
benzo(g,h,i)perylene 191-24-2	NA	NA	D^+	inadequate data	NA/IRIS
benzo(k)fluoranthene 207-08-9	0.73[a]/NC	ND	$B2^+$	lung and skin tumors in mice	NA/IRIS
chrysene 218-01-9	0.073[a]/NC	ND	$B2^+$	carcinomas and malignant lymphomas in mice often intraperitoneal injection and skin tumors following dermal application	NA/IRIS
dibenzo(a,h)anthracene 53-70-3	7.3[a]/NC	ND	$B2^+$		
ethyl benzene 100-41-4	NA		D		

Table 4-2 (Continued)

Chemical CASN	Slope Factor (mg/kg-day)$^{-1}$ oral/dermal	Unit Risk (µg/L)$^{-1}$	Weight of Evidence Classification	Type of Cancer	Unit Risk Basis/Source
ORAL/DERMAL EXPOSURE (Continued)					
fluoranthene 206-44-0	NA	ND	D[+]		
fluorene 86-73-7	NA	ND	D[+]		
indeno(1,2,3-cd)pyrene 193-39-5	0.73[a]/NC	ND	B2[+]		
lead 7439-92-1	CAG recommends no numerical estimate be used		B2	renal tumors in rodents	diet/IRIS
napthalene	NA	ND	D[+]		
phenanthrene 85-01-8	NA	NA	D[+]	inadequate data	NA/IRIS
toluene 108-88-3	NA		D		
vinyl chloride 75-01-4	1.9/0.13	5.4×10^{-4}	A	brain cancer in rats	diet/HEAST 1992
xylene 1330-20-7	NA		D		

Table 4-2 (Continued)

Chemical CASN	Slope Factor $(mg/kg\text{-}day)^{-1}$	Unit Risk $(\mu g/m^3)^{-1}$	Weight of Evidence Classification	Type of Cancer	Unit Risk Basis/Source
INHALATION EXPOSURE					
acenaphthylene 208-196-8	NA		D[+]		
arsenic 7440-38-2	50	4.3 x 10-3	A	lung cancer in humans exposed via inhalation; skin cancer in humans exposed via ingestion	air/IRIS
benzene 71-43-2	0.029	8.3 x 10-6	A	leukemia following occupational exposure	air/IRIS
benzo(a)anthracene 56-55-3	0.61[a]		B2[+]		
benzo(a)pyrene 50-32-8	6.1[a]	1.7 x 10-3	B2[+]	respiratory tract tumors in hamsters	air/HEAST
benzo(b)fluoranthene 205-99-2	0.61[a]		B2[+]		
benzo(g,h,i)perylene 191-24-2	NA	NA	D[+]		
benzo(k)fluoranthene 207-08-9	0.61[a]		B2[+]		
chrysene 218-01-9	0.061[a]		B2[+]		
dibenzo(a,h)anthracene	6.1[a]		B2[+]		
lead 7439-92-1	NA	NA			
phenanthrene 85-01-8	NA		D[+]		
ethyl benzene	NA		D		

Table 4-2 (Continued)

Chemical CASN	Slope Factor $(mg/kg\text{-}day)^{-1}$	Unit Risk $(\mu g/m^3)^{-1}$	Weight of Evidence Classification	Type of Cancer	Unit Risk Basis/Source
INHALATION EXPOSURE (Continued)					
fluoranthene	NA		D*		
fluorene	NA		D*		
napthalene	NA		D*		
toluene	NA		D		
vinyl chloride	0.294	8.4×10^{-5}	A	liver angiosarcomas; brain, skin and lung tumors and, tumors of the lymphatic and blood-forming systems following occupational exposure	air/HEAST
xylene	NA		D		

[a] Slope factors for other potentially carcinogenic PAHs are derived by applying the carcinogenic equivalency factors: benzo(a)anthracene, 0.1; benzo(b)fluoranthene, 0.1; benzo(k)fluoranthene, 0.1; chrysene, 0.01; dibenzo(a,h)anthracene, 1.0; indeno(1,2,3,cd)pyrene, 0.1.

* classifications verified by the Carcinogen Risk Assessment Verification Endeavor (CRAVE)

NA Not available. EPA has not performed quantitative risk assessment for carcinogenic effects.

NC Not calculated, dermal slope factor cannot be calculated from oral slope factor

ND Not determined

Table 5-1(a)

Intakes, Hazard Quotients and Risks Due to Groundwater Ingestion/Future Off-Site Residents (Adults)

Intakes and Hazard Quotients

Compound		Shallow Aquifer			MW-23			Deep Aquifer		
VOCs	RfD	CW (ug/L)	Intake	HQ	CW (ug/L)	Intake	HQ	CW (ug/L)	Intake	HQ
Benzene		1109			193			13		
Ethylbenzene	1 0E-01	213	5.8E-03	5 8E-02	122	3 3E-03	3 3E-02	2	6 2E-05	6.2E-04
Toluene	0 2	503	1 4E-02	6 9E-02	34	9 2E-04	4 6E-03	2	6 2E-05	3 1E-04
Xylenes	2	260	7.1E-03	3 6E-03	133	3.6E-03	1.8E-03	2	6 2E-05	3 1E-05
PAHs										
Acenaphthylene		189			1366			0 5		
Fluorene	4 00E-02	55	1.6E-03	3 8E-02	355	9 7E-03	0.2	0.1	1 4E-06	3 6E-05
Phenanthrene		306			2316			0 3		
Anthracene	3 00E-01	36	1.0E-03	3.3E-03	170	4 7E-03	1.6E-02	0 3	7 2E-06	2.4E-05
Benzo(k)fluoranthene		3			17			0 05		
Benzo(a)anthracene		22			184			0 97		
Chrysene		51			387			0 05		
Benzo(b)fluoranthene		5			35			0 04		
Benzo(a)pyrene		11			64			0 10		
Indeno(1,2,3-cd)pyrene		2			3			0 05		
Dibenz(a,h)anthracene		0 56			1 40			0 08		
Benzo(g,h,i)perylene		0.38			0 85			0 05		
Cyanide	2 00E-02	900 68	2 5E-02	1 2						
Total Hazard Index				0 2			0 3			0 001

Intakes and Risks

Compound		Shallow Aquifer			MW-23			Deep Aquifer		
VOCs	SF	CW (ug/L)	Intake	Risk	CW (ug/L)	Intake	Risk	CW (ug/L)	Intake	Risk
Benzene	2 92E-02	1109	1 3E-02	3 8E-04	193	2 3E-03	6 6E-05	13	1 5E-04	4 4E-06
Ethylbenzene		213			122			2		
Toluene		503			34			2		
Xylenes		260			133			2		
PAHs										
Acenaphthylene		189			1366			0 5		
Fluorene		55			355			0 1		
Phenanthrene		306			2316			0 3		
Anthracene		36			170			0 3		
Benzo(k)fluoranthene	0 73	3	3 1E-05	2 3E-05	17	1 9E-04	1 4E-04	0 05	5 6E-07	4 1E 07
Benzo(a)anthracene	0 73	22	2 6E-04	1 9E-04	184	2.2E-03	1.6E-03	0 97	1 1E-05	8 3E-06
Chrysene	0 073	51	6 0E 04	4 4E-05	387	4 5E-03	3 3E-04	0 05	5 9E-07	4 3E-08
Benzo(b)fluoranthene	0 73	5	5 9E-05	4 3E-05	35	4 1E-04	3 0E-04	0 04	4 3E-07	3 2E-07
Benzo(a)pyrene	7 3	11	1 3E-04	9 6E-04	64	7 5E-04	5 4E-03	0 10	1 2E-06	8 8E-06
Indeno(1,2,3-cd)pyrene	0 73	2	1 8E-05	1 3E-05	3	3 0E-05	2 2E-05	0 05	5 5E 07	4 0E 07
Dibenz(a,h)anthracene	7 3	0 56	6 5E-06	4 8E-05	1 40	1 6E-05	1 2E-04	0 08	9 9E-07	7 2E 06
Benzo(g,h,i)perylene		0 38			0 85			0 05		
Total Risk for Carcinogenic PAHs				1 3E-03			7 9E-03			2 6E-05
Total Risk				1 7E-03			8 0E-03			3 0E 05

Table 5-1(a-1)

Intakes, Hazard Quotients and Risks Due to Groundwater Ingestion/Future Off-Site Residents (Child)

Intakes and Hazard Quotients

Compound		Shallow Aquifer			MW-23			Deep Aquifer		
VOCs	RfD	CW (ug/L)	Intake	HQ	CW (ug/L)	Intake	HQ	CW (ug/L)	Intake	HQ
Benzene		1109			193			13		
Ethylbenzene	1.0E-01	213	7.2E-03	7 2E-02	122	4 1E-03	4 1E-02	2	7 6E-05	7 6E-04
Toluene	0 2	503	1 7E-02	8 5E-02	34	1 1E-03	5 7E-03	2	7 6E-05	3 8E-04
Xylenes	2	260	8.8E-03	4 4E-03	133	4 5E-03	2.2E-03	2	7 6E-05	3.8E-05
PAHs										
Acenaphthylene		189			1366			0 5		
Fluorene	4.00E-02	55	1.9E-03	4 6E-02	365	1 2E-02	0.3	0 1	1 8E-06	4 5E-05
Phenanthrene		306			2316			0 3		
Anthracene	3.00E-01	36	1.2E-03	4 1E-03	170	6 8E-03	1 9E-02	0.3	8 8E-06	2 9E-05
Benzo(k)fluoranthene		3			17			0 05		
Benzo(a)anthracene		22			184			0 97		
Chrysene		51			387			0 05		
Benzo(b)fluoranthene		6			35			0 04		
Benzo(a)pyrene		11			64			0 10		
Indeno(1,2,3-cd)pyrene		2			3			0 05		
Dibenz(a,h)anthracene		0 56			1 40			0 08		
Benzo(g,h,i)perylene		0 38			0 85			0 05		
Cyanide	2 00E-02	900.68	3.0E-02	1 5						
Total Hazard Index				0.2			0 4			0 001

Intakes and Risks

Compound		Shallow Aquifer			MW-23			Deep Aquifer		
VOCs	SF	CW (ug/L)	Intake	Risk	CW (ug/L)	Intake	Risk	CW (ug/L)	Intake	Risk
Benzene	2 92E-02	1109	2 7E-03	7 8E-05	193	4 7E-04	1 4E-05	13	3 1E-05	9 0E-07
Ethylbenzene		213			122			2		
Toluene		503			34			2		
Xylenes		260			133			2		
PAHs										
Acenaphthylene		189			1366			0 5		
Fluorene		55			355			0 1		
Phenanthrene		306			2316			0 3		
Anthracene		36			170			0 3		
Benzo(k)fluoranthene	0 73	3	6 4E-06	4 6E-06	17	4 0E-05	2 9E-05	0 05	1 2E 07	8 4E-08
Benzo(a)anthracene	0.73	22	5 4E-05	4 0E-05	184	4 4E-04	3 2E-04	0 97	2.4E-06	1 7E-06
Chrysene	0 073	51	1 2E-04	9 0E-06	387	9 4E-04	6 8E-05	0 05	1 2E-07	8 8E-09
Benzo(b)fluoranthene	0 73	5	1 2E-05	8 9E-06	35	8 4E-05	6 1E-05	0 04	8 9E-08	6 5E-08
Benzo(a)pyrene	7 3	11	2 7E 05	2 0E-04	64	1 5E-04	1 1E-03	0 10	2 5E-07	1 8E-06
Indeno(1,2,3-cd)pyrene	0.73	2	3 8E-06	2 7E-06	3	6 1E-06	4 4E-06	0 05	1.1E-07	8 2E-08
Dibenz(a,h)anthracene	7 3	0 56	1 3E-06	9 8E-06	1 40	3 4E-06	2 5E-05	0 08	2 0E-07	1 5E-06
Benzo(g,h,i)perylene		0 38			0 85			0 05		
Total Risk for Carcinogenic PAHs				2 7E-04			1 6E-03			5 3E-06
Total Risk				3 5E 04			1 6E-03			6 2E-06

Table

Intakes, Hazard Quotients and Risks Due to Inhalation of Contaminants Volatilizing from Groundwater/Future Off-Site Residents (Adults)

Intakes and Hazard Quotients

Compound		Shallow Aquifer			MW-23			Deep Aquifer		
VOCs	RfD(i)	CW (ug/L)	Intake	HQ	CW (ug/L)	Intake	HQ	CW (ug/L)	Intake	HQ
Benzene		1109			193			13		
Ethylbenzene	2.7E-01	213	4.6E-03	1.7E-02	122	2 7E-03	9.7E-03	2	4 9E-05	1.8E-04
Toluene	1 10E-01	503	1 1E-02	9 9E-02	34	7 3E-04	6 6E-03	2	4 9E-05	4 4E-04
Xylenes	8 22E-02	260	5.7E-03	6.9E-02	133	2.9E-03	3 6E-02	2	4 9E-05	6.0E-04
PAHs										
Acenaphthylene		189			1366			0 5		
Fluorene		55			355			0 1		
Phenanthrene		306			2316			0 3		
Anthracene		36			170			0 3		
Benzo(k)fluoranthene		3			17			0 05		
Benzo(a)anthracene		22			184			0 97		
Chrysene		51			387			0 05		
Benzo(b)fluoranthene		5			35			0 04		
Benzo(a)pyrene		11			64			0 10		
Indeno(1,2,3-cd)pyrene		2			3			0 05		
Dibenz(a h)anthracene		0 56			1 40			0 08		
Benzo(g,h,i)perylene		0.38			0 85			0.05		
Total Hazard Index				0 2			0 1			0 001

Intakes and Risks

Compound		Shallow Aquifer			MW-23			Deep Aquifer		
VOCs	SF	CW (ug/L)	Intake	Risk	CW (ug/L)	Intake	Risk	CW (ug/L)	Intake	Risk
Benzene	2 92E-02	1109	1 0E-02	3 0E-04	193	1 8E-03	5 3E-05	13	1 2E-04	3 5E-06
Ethylbenzene		213			122			2		
Toluene		503			34			2		
Xylenes		260			133			2		
PAHs										
Acenaphthylene		189			1366			0 5		
Fluorene		55			355			0 1		
Phenanthrene		306			2316			0 3		
Anthracene		36			170			0 3		
+ Benzo(k)fluoranthene	0 61	3	2 4E-05		17	1 5E-04		0 05	4 4E-07	
+ Benzo(a)anthracene	0 61	22	2 1E-04		184	1 7E-03		0 97	9 1E-06	
+ Chrysene	0 061	51	4 7E-04		387	3 6E-03		0 05	4 7E-07	
+ Benzo(b)fluoranthene	0 61	5	4.7E-05		35	3.2E-04		0.04	3 4E-07	
+ Benzo(a)pyrene	6 1	11	1 0E-04		64	5 9E-04		0 10	9 6E-07	
+ Indeno(1,2,3-cd)pyrene	0 61	2	1 4E-05		3	2 3E-05		0 05	4 3E-07	
+ Dibenz(a h)anthracene	6 1	0 56	5 2E-06		1 40	1 3E-05		0 08	7 9E-07	
Benzo(g h,i)perylene		0 38			0 85			0 05		
Total Risk				3 0E 04			5 3E-05			3 5E-06

+ -- Inhalation not calculated, volatilization not anticipated because molecular weight of these compounds is greater than 200 g/mole (US EPA 1991 Risk Assessment Guidance for Superfund Part B)

Intakes, Hazard Quotients and Risks Due to Inhalation of Contaminants Volatilizing from Groundwater/Future Off-Site Residents (Child)

Intakes and Hazard Quotients

Compound		Shallow Aquifer			MW-23			Deep Aquifer		
VOCs	RfD(i)	CW (ug/L)	Intake	HQ	CW (ug/L)	Intake	HQ	CW (ug/L)	Intake	HQ
Benzene		1109			193			13		
Ethylbenzene	2 7E-01	213	6 2E-03	2 3E-02	122	3 6E-03	1 3E-02	2	6 5E-06	2 4E-04
Toluene	1 10E-01	503	1 5E-02	1 3E-01	34	9 8E-04	8 9E-03	2	6 5E-05	6 0E-04
Xylenes	8 22E-02	260	7 6E-03	9 2E-02	133	3 9E-03	4 7E-02	2	6 5E-05	8 0E-04
PAHs										
Acenaphthylene		189			1366			0 5		
Fluorene		55			355			0 1		
Phenanthrene		306			2316			0 3		
Anthracene		36			170			0 3		
Benzo(k)fluoranthene		3			17			0 05		
Benzo(a)anthracene		22			184			0 97		
Chrysene		51			387			0 05		
Benzo(b)fluoranthene		5			35			0 04		
Benzo(a)pyrene		11			64			0 10		
Indeno(1 2 3-cd)pyrene		2			3			0 05		
Dibenz(a,h)anthracene		0 56			1 40			0 08		
Benzo(g,h,i)perylene		0 38			0 85			0 05		
Cyanide		900 68								
Total Hazard Index				0 2			0 1			0 002

Intakes and Risks

Compound		Shallow Aquifer			MW-23			Deep Aquifer		
VOCs	SF	CW (ug/L)	Intake	Risk	CW (ug/L)	Intake	Risk	CW (ug/L)	Intake	Risk
Benzene	2 92E-02	1109	2 3E-03	6 7E-05	193	4 0E-04	1 2E-05	13	2 7E-05	7 7E-07
Ethylbenzene		213			122			2		
Toluene		503			34			2		
Xylenes		260			133			2		
PAHs										
Acenaphthylene		189			1366			0 5		
Fluorene		55			355			0 1		
Phenanthrene		306			2316			0 3		
Anthracene		36			170			0 3		
+ Benzo(k)fluoranthene	0 61	3	5 5E-06		17	3 4E-05		0 05	9 9E-08	
+ Benzo(a)anthracene	0 61	22	4.7E-05		184	3 8E 04		0 97	2 0E-06	
+ Chrysene	0 061	51	1 1E-04		387	8 0E-04		0 05	1 0E-07	
+ Benzo(b)fluoranthene	0 61	5	1 1E-05		35	7 2E-05		0 04	7 7E-08	
+ Benzo(a)pyrene	6 1	11	2 3E 05		64	1 3E-04		0 10	2 1E-07	
+ Indeno(1 2 3-cd)pyrene	0 61	2	3 2E-06		3	5 2E-06		0 05	9 7E-08	
+ Dibenz(a,h)anthracene	6 1	0 56	1 2E-06		1 40	2 9E-06		0 08	1 8E-07	
Benzo(g,h i)perylene		0 38			0 85			0 05		
Total Risk				6 7E-05			1 2E-05			7 7E 07

+ – Inhalation not calculated volatilization not anticipated because molecular weight of these compounds is greater than 200 g/mole (US EPA 1991 *Risk Assessment* Guidance for Superfund *Part* B)

Intakes, Hazard Quotients and Risks Due to Dermal Contact with Groundwater/Future Off-Site Residents (Adults)

Intakes and Hazard Quotients

Compound		Shallow Aquifer			MW-23			Deep Aquifer		
VOCs	RfD(derm)	CW (ug/L)	Intake	HQ	CW (ug/L)	Intake	HQ	CW (ug/L)	Intake	HQ
Benzene		1109			193			13		
Ethylbenzene	1 0E-01	213	9.9E-03	9 9E-02	122	5.7E-03	6 7E-02	2	1 0E-04	1 0E-03
Toluene	0 2	503	2 3E-02	1 2E-01	34	1 6E-03	7 8E-03	2	1 0E-04	5 2E-04
Xylenes	2	260	9 7E-04	4 8E-04	133	4.9E-04	2.5E-04	2	8 4E-06	4 2E-06
PAHs										
Acenaphthylene		189			1366			0 5		
Fluorene		55	3.8E-06		355	2 5E-05		0 1	3 7E-09	
Phenanthrene		306			2316			0 3		
Anthracene		36	2 5E-06		170	1 2E-05		0 3	1.8E-08	
Benzo(k)fluoranthene		3			17			0 05		
Benzo(a)anthracene		22			184			0 97		
Chrysene		51			387			0 05		
Benzo(b)fluoranthene		5			35			0 04		
Benzo(a)pyrene		11			64			0 10		
Indeno(1,2,3-cd)pyrene		2			3			0 05		
Dibenz(a h)anthracene		0 56			1 40			0 08		
Benzo(g,h,i)perylene		0 38			0 85			0 05		
Total Hazard Index				0 2			0 1			0 002

Intakes and Risks

Compound		Shallow Aquifer			MW-23			Deep Aquifer		
VOCs	SF	CW (ug/L)	Intake	Risk	CW (ug/L)	Intake	Risk	CW (ug/L)	Intake	Risk
Benzene	2 92E-02	1109	2 4E-03	7 1E-05	193	4 2E-04	1 2E-05	13	2 8E-05	8 2E-07
Ethylbenzene		213			122			2		
Toluene		503			34			2		
Xylenes		260			133			2		
PAHs										
Acenaphthylene		189			1366			0 5		
Fluorene		55			355			0.1		
Phenanthrene		306			2316			0 3		
Anthracene		36			170			0 3		
+ Benzo(k)fluoranthene		3	6 3E-05		17	4 0E-04		0 05	1 1E-06	
+ Benzo(a)anthracene		22	3.6E-04		184	3 0E-03		0 97	1 6E-05	
+ Chrysene		51	8 2E-04		387	6 3E-03		0 05	8 1E-07	
+ Benzo(b)fluoranthene		5	1 2E-04		35	8 3E-04		0 04	8.8E-07	
+ Benzo(a)pyrene		11	2 7E-04		64	1 5E-03		0 10	2 5E 06	
+ Indeno(1,2,3-cd)pyrene		2	5.9E-05		3	9 6E-05		0 05	1 8E-06	
+ Dibenz(a h)anthracene		0 56	3 0E-05		1 40	7 5E-05		0 08	4 6E-06	
+ Benzo(g,h i)perylene		0 38			0 85			0 05		
Total Risk				7 1E-05			1 2E-05			8 2E-07

+ – Dermal risk not calculated extrapolation of oral SF for dermal contact not recommended (Memorandum from Joan S Dollarhide Superfund Health Support Center to Mary Williams Region VII Assessment of feasibility of oral to dermal extrapolation (for PAHs)" Nov 25 1992

Intakes, Hazard Quotients and Risks Due to Dermal Contact with Groundwater/Future Off-Site Residents (Child)

Intakes and Hazard Quotients

Compound		Shallow Aquifer			MW-23			Deep Aquifer		
VOCs	RfD(derm)	CW (ug/L)	Intake	HQ	CW (ug/L)	Intake	HQ	CW (ug/L)	Intake	HQ
Benzene		1109			193			13		
Ethylbenzene	1 0E-01	213	1 1E-02	1 1E-01	122	6 4E-03	6 4E-02	2	1.2E-04	1.2E-03
Toluene	0 2	503	2 6E-02	1 3E-01	34	1 8E-03	8 8E-03	2	1 2E-04	5 9E-04
Xylenes	2	260	1.1E-03	5 4E-04	133	5 5E-04	2 8E-04	2	9 4E-06	4 7E-06
PAHs										
Acenaphthylene		189			1366			0 5		
Fluorene		55	4 3E-06		355	2 8E-05		0 1	4.1E-09	
Phenanthrene		306			2316			0 3		
Anthracene		36	2 8E-06		170	1 3E-05		0 3	2 0E-08	
Benzo(k)fluoranthene		3			17			0 05		
Benzo(a)anthracene		22			184			0 97		
Chrysene		51			387			0 05		
Benzo(b)fluoranthene		5			35			0 04		
Benzo(a)pyrene		11			64			0 10		
Indeno(1,2,3-cd)pyrene		2			3			0 05		
Dibenz(a,h)anthracene		0 56			1 40			0 08		
Benzo(g,h,i)perylene		0 38			0.85			0 05		
Total Hazard Index				0 2			0 1			0 002

Intakes and Risks

Compound		Shallow Aquifer			MW-23			Deep Aquifer		
VOCs	SF	CW (ug/L)	Intake	Risk	CW (ug/L)	Intake	Risk	CW (ug/L)	Intake	Risk
Benzene	2 92E-02	1109	4 6E-04	1 3E-05	193	7 9E-05	2 3E-06	13	5 2E-06	1 5E-07
Ethylbenzene		213			122			2		
Toluene		503			34			2		
Xylenes		260			133			2		
PAHs										
Acenaphthylene		189			1366			0 5		
Fluorene		55			355			0 1		
Phenanthrene		306			2316			0 3		
Anthracene		36			170			0 3		
+ Benzo(k)fluoranthene		3	1 2E-05		17	7 4E-05		0 05	2 1E-07	
+ Benzo(a)anthracene		22	6.8E-05		184	5 6E-04		0 97	2 9E-06	
+ Chrysene		51	1 5E-04		387	1 2E-03		0 05	1 5E-07	
+ Benzo(b)fluoranthene		5	2 3E-05		35	1 6E-04		0 04	1.7E-07	
+ Benzo(a)pyrene		11	5 0E-05		64	2 8E-04		0 10	4 6E-07	
+ Indeno(1,2,3-cd)pyrene		2	1 1E-05		3	1 8E-05		0 05	3 3E-07	
+ Dibenz(a,h)anthracene		0 56	5 6E-06		1 40	1 4E 05		0 08	8 5E-07	
+ Benzo(g,h,i)perylene		0 38			0 85			0 05		
Total Risk				1 3E-05			2 3E-06			1 5E 07

+ – Dermal risk not calculated, extrapolation of oral SF for dermal contact not recommended (Memorandum from Joan S Dollarhide, Superfund Health Support Center to Mary Williams, Region VII "Assessment of feasibility of oral-to dermal extrapolation [for PAHs]" Nov 25 1992

Total Hazard Indices and Risks for Residential (Adult) Exposures to Groundwater

Total Non-carcinogenic Hazard Indices

	Shallow Aquifer	MW-23	Deep Aquifer
	Total	Total	Total
Ingestion	0 2	0 30	0 001
Inhalation	0 2	0 05	0 001
Dermal	0 2	0 06	0 002
TOTAL	0 6	0 4	0 004

Total Carcinogenic Risks

	Shallow Aquifer			MW-23			Deep Aquifer		
	PAHs	Benzene	Total	PAHs	Benzene	Total	PAHs	Benzene	Total
Ingestion	1 3E-03	3 8E-04	1 7E-03	7 9E-03	6 6E-05	8 0E-03	2 6E-05	4 4E-06	3 0E-05
Inhalation		3.0E-04	3.0E-04		5 3E-05	5 3E-05		3 5E-06	3 5E-06
Dermal		7 1E-05	7 1E-05		1 2E-05	1 2E-05		8 2E-07	8 2E-07
TOTAL	1 3E-03	7 5E-04	2 1E-03	7 9E-03	1 3E-04	8 1E-03	2 6E-05	8 7E-06	3 4E-05

Table 5-2(a)

Total Hazard Indices and Risks for Residential Exposures to Groundwater (Child)

Total Non-carcinogenic Hazard Indices

	Shallow Aquifer	MW 23	Deep Aquifer
	Total	Total	Total
Ingestion	0 2	0 4	1 3E-03
Inhalation	0 2	6 9E-02	1 6E-03
Dermal	0 2	7 3E-02	1 8E-03
TOTAL	0 7	0 5	0 005

Total Carcinogenic Risks

	Shallow Aquifer			MW-23			Deep Aquifer		
	PAHs	Benzene	Total	PAHs	Benzene	Total	PAHs	Benzene	Total
Ingestion	2 7E-04	7 8E-05	3 5E-04	1 6E-03	1 4E-05	1 6E-03	5 3E-06	9 0E-07	6 2E 06
Inhalation		6 7E-05	6.7E-05		1 2E-05	1 2E-05		7 7E-07	7 7E-07
Dermal		1 3E-05	1 3E-05		2 3E-06	2 3E-06		1 5E-07	1 5E-07
TOTAL	2 7E-04	1 6E-04	4 3E-04	1 6E-03	2 8E-05	1 7E-03	5 3E-06	1 8E-06	7 1E-06

Table 5-3(a)

Intakes, Hazard Quotients and Risks Due to Surface Soil Ingestion/Current On-Site Worker

Intakes and Hazard Quotients

Compound		On-Site Surface		
VOCs	RfD	CS (mg/kg)	Intake	HQ
Benzene		0 3		
Vinyl chloride		2 5		
PAHs				
Naphthalene	4 00E-02	0 7	6 9E-08	1 7E-06
Acenaphthylene		0 2		
Fluorene	4 00E-02	0 4	3 6E-08	8 9E-07
Phenanthrene		2 5		
Benzo(k)fluoranthene		7 6		
Benzo(a)anthracene		5 1		
Chrysene		6 1		
Benzo(b)fluoranthene		6 3		
Benzo(a)pyrene		20 0		
Indeno(1,2,3-cd)pyrene		0 4		
Dibenz(a,h)anthracene		1 6		
Benzo(g,h,i)perylene		3 7		
METALS				
Arsenic	3 00E-04	7 5	7 4E-07	2 5E-03
Total Hazard Index				2 5E-03

Intakes and Risks

Compound		On-Site Surface		
VOCs	SF	CS (mg/kg)	Intake	Risk
Benzene	2 92E-02	0 3	8 7E-09	2 6E-10
Vinyl chloride	1 9	2 5	8 7E-08	1 7E-07
PAHs				
Naphthalene		0 7		
Acenaphthylene		0 2		
Fluorene		0 4		
Phenanthrene		2 5		
Benzo(k)fluoranthene	0 73	7 6	2 7E-07	1 9E-07
Benzo(a)anthracene	0 73	5 1	1 8E-07	1 3E-07
Chrysene	0 073	6 1	2 1E-07	1 5E-08
Benzo(b)fluoranthene	0 73	6 3	2 2E-07	1 6E-07
Benzo(a)pyrene	7 3	20 0	7 0E-07	5 1E-06
Indeno(1,2,3-cd)pyrene	0 73	0 4	1 4E-08	1.1E-08
Dibenz(a,h)anthracene	7 3	1 6	5 6E-08	4 1E-07
Benzo(g,h,i)perylene		3 7		
Total PAH Carcinogenic Risk				6 0E-06
METALS				
Arsenic	1 75	7 5	2 6E-07	4 6E-07
Total Risk				6 6E-06

Table 5-3(b)

Intakes, Hazard Quotients and Risks Due to Inhalation of Contaminants in Surface Soil/Current On-Site Worker

Intakes and Hazard Quotients

Compound		On-Site Surface		
VOCs	RfD(i)	CS (mg/kg)	Intake	HQ
Benzene		0 3		
Vinyl chloride		2 5		
PAHs				
Naphthalene		0 7		
Acenaphthylene		0 2		
Fluorene		0 4		
Phenanthrene		2.5		
Benzo(k)fluoranthene		7 6		
Benzo(a)anthracene		5 1		
Chrysene		6 1		
Benzo(b)fluoranthene		6.3		
Benzo(a)pyrene		20 0		
Indeno(1,2,3-cd)pyrene		0 4		
Dibenz(a,h)anthracene		1 6		
Benzo(g,h,i)perylene		3 7		
METALS				
Arsenic		7 5		
Total Hazard Index				0 0E+00

Intakes and Risks

Compound		On-Site Surface		
VOCs	SF	CS (mg/kg)	Intake	Risk
Benzene	2 92E-02	0.3	1 7E-10	5 1E-12
Vinyl chloride	3 0E-01	2 5	1 7E-09	5 2E-10
PAHs				
Naphthalene		0 7		
Acenaphthylene		0 2		
Fluorene		0 4		
Phenanthrene		3		
Benzo(k)fluoranthene	0 61	8	5 3E-09	3 3E-09
Benzo(a)anthracene	0 61	5	3 6E-09	2 2E-09
Chrysene	0 061	6	4 2E-09	2 6E-10
Benzo(b)fluoranthene	0 61	6	4 4E-09	2 7E-09
Benzo(a)pyrene	6 1	20	1 4E-08	8 5E 08
Indeno(1,2,3-cd)pyrene	0 61	0 4	2 9E-10	1 8E-10
Dibenz(a,h)anthracene	6 1	1 60	1 1E-09	6 8E-09
Benzo(g,h,i)perylene		3 69		
Total PAH Carcinogenic Risk				1 0E-07
METALS				
Arsenic	50 00	7 5	5 3E-09	2 6E-07
Total Risk				3 6E-07

Table 5-3(c)

Intakes, Hazard Quotients and Risks Due to Dermal Contact with Surface Soil/Current On-Site Worker

Intakes and Hazard Quotients

Compound		On-Site Surface		
VOCs	RfD(derm)	CS (mg/kg)	Intake	HQ
Benzene		0 3		
Vinyl chloride		2 5		
PAHs				
Naphthalene		0 7		
Acenaphthylene		0 2		
Fluorene		0 4		
Phenanthrene		2 5		
Benzo(k)fluoranthene		7 6		
Benzo(a)anthracene		5 1		
Chrysene		6 1		
Benzo(b)fluoranthene		6 3		
Benzo(a)pyrene		20 0		
Indeno(1,2,3-cd)pyrene		0 4		
Dibenz(a,h)anthracene		1 6		
Benzo(g,h,i)perylene		3 7		
METALS				
Arsenic	2 70E-04	7 5	3 8E-11	1 4E-07
Total Hazard Index				1 4E-07

Intakes and Risks

Compound		On-Site Surface		
VOCs	SF	CS (mg/kg)	Intake	Risk
Benzene	2.92E-02	0 3	1 4E-08	4 2E-10
Vinyl chloride	1 9	2 5	1 4E-07	2 7E-07
PAHs				
Naphthalene		0 7		
Acenaphthylene		0 2		
Fluorene		0 4		
Phenanthrene		2 5		
Benzo(k)fluoranthene		7 6		
Benzo(a)anthracene		5 1		
Chrysene		6 1		
Benzo(b)fluoranthene		6 3		
Benzo(a)pyrene		20 0		
Indeno(1,2 3-cd)pyrene		0 4		
Dibenz(a,h)anthracene		1 6		
Benzo(g,h,i)perylene		3 7		
METALS				
Arsenic	1 75	7 5	1 4E-11	2 4E 11
Total Risk				2 7E-07

Table 5-4

Total Hazard Indices and Risks for On-Site Commercial/Industrial Exposure to Soil

Non-Carcinogenic Hazard Quotients

	On-Site Surface
Ingestion	2 5E-03
Inhalation	0
Dermal	1 4E-07
TOTAL	2 5E-03

Carcinogenic Risks

	On-Site Surface
Ingestion	6 6E-06
Inhalation	3 6E-07
Dermal	2 7E-07
TOTAL	7 3E-06

Table 5-5(a)

Intakes, Hazard Quotients and Risks due to Soil Ingestion/Future On-Site Construction Worker

Intakes and Hazard Quotients

Compound		On-Site Surface			On-Site Subsurface		
VOCs	RfD*	CS (mg/kg)	Intake	HQ	CS (mg/kg)	Intake	HQ
Benzene		0 3			0,8		
Vinyl chloride		2 5			2 5		
PAHs							
Naphthalene	4 0E-02	0 7	2 4E 06	5 9E-05	46	1 5E-04	3 9E-03
Acenaphthylene		0 2			9 2		
Fluorene	4 0E-01	0 4	1 2E-06	3 1E-06	12 4	4 2E 05	1 1E-04
Phenanthrene		2 5			49		
Benzo(k)fluoranthene		7 6			11 8		
Benzo(a)anthracene		5 1			34		
Chrysene		6 1			30		
Benzo(b)fluoranthene		6 3			19 5		
Benzo(a)pyrene		20 0			70		
Indeno(1 2 3-cd)pyrene		0 4			6 1		
Dibenz(a,h)anthracene		1 6			12 5		
Benzo(g,h,i)perylene		3 7			19,4		
METALS							
Arsenic	3 0E-04	7 5	2 6E-05	8 5E-02	35 4	1 2E-04	4 0E-01
Total Hazard Index				0 09			0 40

Intakes and Risks

Compound		On-Site Surface			On-Site Subsurface		
VOCs	SF*	CS (mg/kg)	Intake	Risk	CS (mg/kg)	Intake	Risk
Benzene	2 92E-02	0 3	1 2E-08	3.5E-10	0 8	4.0E-08	1.2E-09
Vinyl chloride	1 9	2 5	1 2E-07	2 3E-07	2 5	1 2E-07	2 3E-07
PAHs							
Naphthalene		0 7			46		
Acenaphthylene		0 2			9.2		
Fluorene		0 4			12 4		
Phenanthrene		2 5			49		
Benzo(k)fluoranthene	0 73	7 6	3 7E-07	2 7E-07	11 8	5 7E-07	4 2E-07
Benzo(a)anthracene	0.73	5 1	2 5E-07	1 8E-07	34	1 6E-06	1.2E-06
Chrysene	0 073	6 1	2 9E-07	2 1E-08	30	1 4E-06	1 0E-07
Benzo(b)fluoranthene	0 73	6 3	3 0E-07	2 2E-07	19 5	9 4E-07	6 9E-07
Benzo(a)pyrene	7 3	20 0	9 7E 07	7 0E-06	70	3 4E-06	2 5E-05
Indeno(1 2 3-cd)pyrene	0.73	0 4	2 0E-08	1 5E-08	6.1	2 9E-07	2 2E-07
Dibenz(a,h)anthracene	7 3	1 6	7 7E-08	5 6E-07	12 5	6 0E-07	4 4E-06
Benzo(g,h,i)perylene		3 7			19 4		
Total PAH Carcinogenic Risk				8 3E-06			3 2E-05
METALS							
Arsenic	1 75	7 5	3 6E-07	6 4E-07	35 4	1 7E 06	3 0E-06
Total Risk				9 2E 06			3 5E-05

* Subchronic references doses used because exposure duration is less than 7 years

Table 5-5(b)

Intakes, Hazard Quotients and Risks due to Inhalation of Contaminants in Soil/Future On-Site Construction Worker

Intakes and Hazard Quotients

Compound		On-Site Surface			On-Site Subsurface		
VOCs	RfD(i)	CS (mg/kg)	Intake	HQ	CS (mg/kg)	Intake	HQ
Benzene		0 3			0 8		
Vinyl chloride		2 5			2 5		
PAHs							
Naphthalene		0 7			46		
Acenaphthylene		0.2			9.2		
Fluorene		0 4			12 4		
Phenanthrene		2 5			49		
Benzo(k)fluoranthene		7 6			11 8		
Benzo(a)anthracene		5 1			34		
Chrysene		6 1			30		
Benzo(b)fluoranthene		6 3			19 5		
Benzo(a)pyrene		20 0			70		
Indeno(1,2,3-cd)pyrene		0 4			6 1		
Dibenz(a,h)anthracene		1 6			12 5		
Benzo(g,h,i)perylene		3 7			19 4		
METALS							
Arsenic		7 5			35 4		
Total Hazard Index				0 0E+00			0 0E+00

Intakes and Risks

Compound		On-Site Surface			On-Site Subsurface		
VOCs	SF	CS (mg/kg)	Intake	Risk	CS (mg/kg)	Intake	Risk
Benzene	2.92E-02	0 3	1.1E-10	3.3E-12	0 8	3.7E-10	1.1E-11
Vinyl chloride	2 9E-01	2 5	1 1E-09	3 3E-10	2 5	1 1E-09	3 3E-10
PAHs							
Naphthalene		0 7			46		
Acenaphthylene		0 2			9 2		
Fluorene		0 4			12 4		
Phenanthrene		3			49		
Benzo(k)fluoranthene	0 61	8	3 4E-09	2 1E 09	12	5 3E-09	3 3E-09
Benzo(a)anthracene	0 61	5	2 3E-09	1 4E-09	34	1 5E-08	9 4E-09
Chrysene	0 061	6	2 7E-09	1 7E-10	30	1 3E-08	8 2E-10
Benzo(b)fluoranthene	0.61	6	2 8E-09	1.7E-09	20	8 8E-09	5 4E-09
Benzo(a)pyrene	6 1	20	9 0E-09	5 5E-08	70	3 2E-08	1 9E-07
Indeno(1,2,3-cd)pyrene	0 61	0 4	1 9E-10	1 1E-10	6 1	2 8E-09	1 7E-09
Dibenz(a,h)anthracene	6 1	1 60	7 2E-10	4 4E-09	12 47	5 6E-09	3 4E-08
Benzo(g,h,i)perylene		3 69			19 39		
Total PAH Carcinogenic Risk				6 5E-08			2 5E-07
METALS							
Arsenic	50 00	7 5	3 4E-09	1 7E-07	35 4	1 6E-08	8 0E-07
Total Risk				2 4E-07			1 0E 06

Table 5-5(c)

Intakes, Hazard Quotients and Risks due to Dermal Contact with Soil/Future On-Site Construction Worker

Intakes and Hazard Quotients

Compound		On-Site Surface			On-Site Subsurface		
VOCs	RfD(derm)	CS (mg/kg)	Intake	HQ	CS (mg/kg)	Intake	HQ
Benzene		0 3			0 8		
Vinyl chloride		2 5			2 5		
PAHs							
Naphthalene		0 7			45 7		
Acenaphthylene		0 2			9 2		
Fluorene		0 4	1 1E-06		12 4	3 6E-05	
Phenanthrene		2 5			49 2		
Benzo(k)fluoranthene		7 6			11 8		
Benzo(a)anthracene		5 1			34 1		
Chrysene		6 1			29 7		
Benzo(b)fluoranthene		6 3			19 5		
Benzo(a)pyrene		20 0			70 3		
Indeno(1,2,3-cd)pyrene		0 4			6 1		
Dibenz(a,h)anthracene		1 o			12 5		
Benzo(g,h,i)perylene		3,7			19 4		
METALS							
Arsenic	2 70E-04	7 5	4 4E-07	1 6E-03	35 4	2 0E-06	7 6E-03
Total Hazard Index				1 6E-03			7 6E-03

Intakes and Risks

Compound		On-Site Surface			On-Site Subsurface		
VOCs	SF	CS (mg/kg)	Intake	Risk	CS (mg/kg)	Intake	Risk
Benzene	2 92E-02	0 3	2 1E-09	6 0E-11	0 8	6 8E-09	2 0E-10
Vinyl chloride	1 9	2 5	2 1E-08	3 9E-08	2 5	2 1E-08	3 9E-08
PAHs							
Naphthalene		0 7			45 7		
Acenaphthylene		0 2			9 2		
Fluorene		0 4			12 4		
Phenanthrene		2.5			49 2		
Benzo(k)fluoranthene		7 6	3 1E-07		11 8	4 9E 07	
Benzo(a)anthracene		5 1	2 1E-07		34 1	1 4E-06	
Chrysene		6 1	2 5E-07		29 7	1 2E-06	
Benzo(b)fluoranthene		6 3	2 6E-07		19 5	8 1E-07	
Benzo(a)pyrene		20 0	8 2E-07		70 3	2 9E 06	
Indeno(1,2,3-cd)pyrene		0 4	1 7E-08		6 1	2 5E-07	
Dibenz(a,h)anthracene		1 6	6 6E-08		12 5	5 1E-07	
Benzo(g,h,i)perylene		3 7			19 4		
METALS							
Arsenic	1 75	7 5	6 2E-09	1 1E-08	35 4	2 9E-08	5 1E-08
Total Risk				5 0E-08			9 1E-08

Table 5-6

Total Hazard Indices and Risks/Future On-Site Construction Worker Exposures to Soil

Non-Carcinogenic Hazard Quotients

	On-Site Surface	On-Site Subsurface
Ingestion	0 09	0 40
Inhalation	0 00	0 00
Dermal	0 002	0 01
TOTAL	0 09	0 41

Carcinogenic Risks

	On-Site Surface	On-Site Subsurface
Ingestion	9 2E-06	3 5E-05
Inhalation	2 4E-07	1.0E-06
Dermal	5 0E-08	9 1E-08
TOTAL	9 5E-06	3 6E-05

Table 5-7(d)

Intakes, Hazard Quotients and Risks Due to Inhalation of Volatilized Chemicals in Soil/Current On-site Trespasser

Intakes and Hazard Quotients

Compound		Waste Pile		
VOCs	RfD(i)	CS (mg/kg)	Intake	HQ
Benzene		299		
Vinyl chloride		21		
PAHs				
Naphthalene		6604		
Acenaphthylene		1173		
Fluorene		18584		
Phenanthrene		2560		
Benzo(k)fluoranthene		211		
Benzo(a)anthracene		429		
Chrysene		404		
Benzo(b)fluoranthene		211		
Benzo(a)pyrene		197		
Indeno(1,2,3-cd)pyrene		208		
Dibenz(a,h)anthracene		209		
Benzo(g,h,i)perylene		204		
METALS				
Arsenic		9		
Total Hazard Index				0 0E+00

Intakes and Risks

Compound		Waste Pile		
VOCs	SF	CS (mg/kg)	Intake	Risk
Benzene	2.92E-02	299	2 4E-04	7 1E-06
Vinyl chloride	2 94E-01	21	2 4E-02	7 1E-03
PAHs				
Naphthalene		6604		
Acenaphthylene		1173		
Fluorene		18584		
Phenanthrene		2560		
Benzo(k)fluoranthene		211		
Benzo(a)anthracene		429		
Chrysene		404		
Benzo(b)fluoranthene		211		
Benzo(a)pyrene		197		
Indeno(1,2,3-cd)pyrene		208		
Dibenz(a,h)anthracene		209		
Benzo(g,h,i)perylene		204		
METALS				
Arsenic		9		
Total Risk				7 1E-03

Table 5-7(a)

Intakes, Hazard Quotients and Risks Due to Soil Ingestion/Current On-site Trespasser

Intakes and Hazard Quotients

Compound		On-Site Surface			Trenches			Waste Pile		
VOCs	RfD	CS (mg/kg)	Intake	HQ	CS (mg/kg)	Intake	HQ	CS (mg/kg)	Intake	HQ
Benzene		0 3			1			299		
Vinyl chloride		2 5			5 0			21		
PAHs										
Naphthalene	4 0E-02	0 7	2 3E-07	5 7E-06	40	1 3E-05	3 2E-04	6604	2 1E-03	5 3E 02
Acenaphthylene		0 2			20			1173		
Fluorene	4 0E-01	0 4	1 2E-07	2 9E-07	4	1 3E-06	3 2E-06	18584	6 0E-03	1 5E-02
Phenanthrene		2 5			16			2560		
Benzo(k)fluoranthene		7 6			0 8			211		
Benzo(a)anthracene		5 1			0.8			429		
Chrysene		6 1			4			404		
Benzo(b)fluoranthene		6 3			0 8			211		
Benzo(a)pyrene		20			8 0			197		
Indeno(1 2 3-cd)pyrene		0 4			2 0			208		
Dibenz(a,h)anthracene		1 6			1 6			209		
Benzo(g,h,i)perylene		3 7			4 0			204		
METALS										
Arsenic	3 0E-04	7 5	2 4E-06	8 1E-03	6 2	2 0E-06	6 7E-03	9	2 8E-06	9 3E-03
Total Hazard Index				0 01			0 01			0 08

Intakes and Risks

Compound		On-Site Surface			Trenches			Waste Pile		
VOCs	SF	CS (mg/kg)	Intake	Risk	CS (mg/kg)	Intake	Risk	CS (mg/kg)	Intake	Risk
Benzene	2.92E-02	0 3	5 8E-09	1 7E-10	1	1 2E-08	3 4E-10	299	6 9E-06	2 0E-07
Vinyl chloride	1 9	2 5	5 8E-08	1 1E-07	5 0	1 2E-07	2 2E-07	21	4 9E-07	9 3E-07
PAHs										
Naphthalene		0 7			40			6604		
Acenaphthylene		0 2			20			1173		
Fluorene		0 4			4			18584		
Phenanthrene		2 5			16			2560		
Benzo(k)fluoranthene	0 73	7 6	1 8E-07	1 3E-07	0 8	1 8E-08	1 3E-08	211	4 9E-06	3 5E-06
Benzo(a)anthracene	0,73	5 1	1 2E-07	8 6E-08	0 8	1 8E-08	1 3E-08	429	9 9E-06	7 2E-06
Chrysene	0 073	6 1	1 4E-07	1 0E-08	4	9 2E-08	6 7E-09	404	9 3E-06	6 8E-07
Benzo(b)fluoranthene	0 73	6 3	1.4E-07	1 1E-07	0 8	1 8E-08	1 3E-08	211	4 9E-06	3 5E-06
Benzo(a)pyrene	7 3	20	4 6E-07	3 4E-06	8 0	1 8E-07	1 3E-06	197	4 5E-06	3 3E-05
Indeno(1,2,3-cd)pyrene	0,73	0 4	9 5E-09	6 9E-09	2 0	4 6E-08	3 4E-08	208	4 8E-06	3 5E-06
Dibenz(a,h)anthracene	7 3	1 6	3 7E-08	2 7E-07	1 6	3 7E-08	2 7E-07	209	4 8E-06	3 5E 05
Benzo(g,h,i)perylene		3 7			4 0			204		
Total PAH Carcinogenic Risk				4 0E-06			1 7E-06			8 7E-05
METALS										
Arsenic	1 75	7 5	1 7E-07	3 0E-07	6 2	1 4E-07	2 5E-07	9	2 0E-07	3 5E 07
Total Risk				4 4E-06			2 2E-06			8 8E-05

Table

Intakes, Hazard Quotients and Risks Due to Inhalation of Chemicals in Soil/Current On-site Trespasser

Intakes and Hazard Quotients

Compound		On-Site Surface			Trenches			Waste Pile		
VOCs	RfD(i)	CS (mg/kg)	Intake	HQ	CS (mg/kg)	Intake	HQ	CS (mg/kg)	Intake	HQ
Benzene		0 3			0 5			299		
Vinyl chloride		2 5			5 0			21		
PAHs										
Naphthalene		0 7			40			6604		
Acenaphthylene		0.2			20			1173		
Fluorene		0 4			4 0			18584		
Phenanthrene		2 5			16 0			2560		
Benzo(k)fluoranthene		7 6			0 8			211		
Benzo(a)anthracene		5 1			0 8			429		
Chrysene		6 1			4 0			404		
Benzo(b)fluoranthene		6 3			0 8			211		
Benzo(a)pyrene		20			8 0			197		
Indeno(1,2,3-cd)pyrene		0.4			2 0			208		
Dibenz(a,h)anthracene		1 6			1 6			209		
Benzo(g,h,i)perylene		3 7			4 0			204		
METALS										
Arsenic		7 5			6 2			9		
Total Hazard Index				0 00			0 00			0 00

Intakes and Risks

Compound		On-Site Surface			Trenches			Waste Pile		
VOCs	SF	CS (mg/kg)	Intake	Risk	CS (mg/kg)	Intake	Risk	CS (mg/kg)	Intake	Risk
Benzene	2.92E-02	0 3	7 2E-12	2.1E-13	0 5	1 4E-11	4 2E-13	299	8 6E-09	2 5E-10
Vinyl chloride	2 94E-01	2 5	7 2E-11	2 1E-11	5 0	1 4E-10	4 2E-11	21	6 1E-10	1 8E-10
PAHs										
Naphthalene		0 7			40 0			6604		
Acenaphthylene		0 2			20 0			1173		
Fluorene		0 4			4 0			18584		
Phenanthrene		3			16			2560		
Benzo(k)fluoranthene	0 61	8	2 2E-10	1 3E-10	0 8	2 3E-11	1 4E-11	211	6 1E-09	3 7E-09
Benzo(a)anthracene	0 61	5	1 5E-10	8 9E-11	1	2 3E-11	1 4E-11	429	1 2E-08	7 5E-09
Chrysene	0 061	6	1 7E-10	1 1E-11	4	1 2E-10	7 0E-12	404	1 2E-08	7 1E-10
Benzo(b)fluoranthene	0 61	6	1 8E-10	1 1E-10	0 8	2 3E-11	1 4E-11	211	6 1E-09	3 7E-09
Benzo(a)pyrene	6 1	20	5 8E-10	3 5E-09	8	2 3E 10	1 4E-09	197	5 7E-09	3 5E 08
Indeno(1,2,3-cd)pyrene	0 61	0 4	1 2E-11	7 3E-12	2 0	5 8E-11	3 5E-11	208	6 0E-09	3 7E-09
Dibenz(a,h)anthracene	6 1	1 6	4 6E-11	2 8E-10	1 6	4 6E-11	2 8E-10	209	6 0E 09	3 7E-08
Benzo(g,h,i)perylene		3 7			4 0			204		
Total PAH Carcinogenic Risk				4 1E-09			1 8E-09			9 1E-08
METALS										
Arsenic	50 00	7 5	2 2E-10	1 1E 08	6 2	1 8E-10	8 9E-09	9	2 5E-10	1 3E 08
Total Risk				1 5E-08			1 1E 08			1 0E 07

Table 5-7(c)

Intakes, Hazard Quotients and Risks Due to Dermal Contact with Chemicals in Soil/Current On-site Trespasser

Intakes and Hazard Quotients

Compound		On-Site Surface			Trenches			Waste Pile		
VOCs	RfD(derm)	CS (mg/kg)	Intake	HQ	CS (mg/kg)	Intake	HQ	CS (mg/kg)	Intake	HQ
Benzene		0.3			0.5			299		
Vinyl chloride		2.5			5.0			21		
PAHs										
Naphthalene		0.7			40			6604		
Acenaphthylene		0.2			20			1173		
Fluorene		0.4	5.4E-09		4.0	5.9E-08		18584	2.8E-04	
Phenanthrene		2.5			16.0			2560		
Benzo(k)fluoranthene		7.6			0.8			211		
Benzo(a)anthracene		5.1			0.8			429		
Chrysene		6.1			4.0			404		
Benzo(b)fluoranthene		6.3			0.8			211		
Benzo(a)pyrene		20.0			8.0			197		
Indeno(1,2,3-cd)pyrene		0.4			2.0			208		
Dibenz(a,h)anthracene		1.6			1.6			209		
Benzo(g,h,i)perylene		3.7			4.0			204		
METALS										
Arsenic	2.7E-04	7.5	1.8E-12	6.5E-09	6.2	4.6E-09	1.7E-05	9	6.4E-09	2.4E-05
Total Hazard Index				0.00000001			0.00002			0.00002

Intakes and Risks

Compound		On-Site Surface			Trenches			Waste Pile		
VOCs	SF	CS (mg/kg)	Intake	Risk	CS (mg/kg)	Intake	Risk	CS (mg/kg)	Intake	Risk
Benzene	2.92E-02	0.3	1.3E-10	3.9E-12	0.5	2.6E-10	7.7E-12	299	1.6E-07	4.6E-09
Vinyl chloride	1.9	2.5	1.3E-09	2.5E-09	5.0	2.6E-09	5.0E-09	21	1.1E-08	2.1E-08
PAHs										
Naphthalene		0.7			40			6604		
Acenaphthylene		0.2			20			1173		
Fluorene		0.4			4.0			18584		
Phenanthrene		2.5			16.0			2560		
Benzo(k)fluoranthene		7.6	8.1E-09		0.8	8.5E-10		211	2.2E-07	
Benzo(a)anthracene		5.1	5.4E-09		0.8	8.5E-10		429	4.5E-07	
Chrysene		6.1	6.4E-09		4.0	4.2E-09		404	4.3E-07	
Benzo(b)fluoranthene		6.3	6.6E-09		0.8	8.5E-10		211	2.2E-07	
Benzo(a)pyrene		20.0	2.1E-08		8.0	8.5E-09		197	2.1E-07	
Indeno(1,2,3-cd)pyrene		0.4	4.4E-10		2.0	2.1E-09		208	2.2E-07	
Dibenz(a,h)anthracene		1.6	1.7E-09		1.6	1.7E-09		209	2.2E-07	
Benzo(g,h,i)perylene		3.7			4.0			204		
METALS										
Arsenic	1.75	7.5	4.0E-10	7.0E-10	6.2	3.3E-10	5.7E-10	9	4.6E-10	8.1E-10
Total Risk				3.2E-09			5.6E-09			2.7E-08

Table 5-8

Total Hazard Indices and Risks/On-Site Trespasser Exposure to Soil

Non-Carcinogenic Hazard Quotients

	On-Site Surface			Trenches			Waste Pile		
	PAHs	Other	Total	PAHs	Other	Total	PAHs	Other	Total
Ingestion	6.0E-06	8 1E-03	8 1E-03	3 3E-04	6 7E-03	7 0E-03	6 8E-02	9 3E-03	7 8E-02
Inhalation	0	0	0	0	0	0	0	0	0
Dermal	0	6 5E-09	6 5E-09	0	1 7E-05	1 7E-05	0	2 4E-05	2 4E-05
Inhalation of Volatilized Chemicals									
TOTAL	0 00001	0.01	0 01	0 0003	0 01	0 01	0 07	0 01	0 08

Carcinogenic Risks

	On-Site Surface			Trenches			Waste Pile		
	PAHs	Other	Total	PAHs	Other	Total	PAHs	Other	Total
Ingestion	4 0E-06	4 1E-07	4 4E-06	1 7E-06	4 7E-07	2 2E-06	8 7E-05	1 5E-06	8 8E-05
Inhalation	4.1E-09	1 1E-08	1 5E-08	1 8E-09	9.0E-09	1 1E-08	9 1E-08	1 3E-08	1 0E-07
Dermal	0	3 2E-09	3 2E-09	0	5 6E-09	5 6E-09	0	2 7E-08	2 7E-08
Inhalation of Volatilized Chemicals							0	7.1E-03	7.1E-03
TOTAL	4 0E-06	4 3E-07	4 4E-06	1 7E-06	4 8E-07	2 2E-06	8 7E-05	7 1E-03	7 2E-03

TABLE 2-3
Federal and State
Potential Chemical-Specific ARARs and TBCs
for Groundwater Drinking Water Use
(All concentrations expressed in micrograms per liter)

Former Manufactured Gas Plant
Mason City, Iowa

Chemicals	ARARs[a]				TBCs[b]				
	MCL[c]	MCLG[c]	IMCL[c]	AWQC[e]	MCL[d]	MCLG[d]	HAL[f]	RSC[g]	RfC[h]
Benzene	5	–	5	0.67	–	–	235 (10 day/10kg)	1 2	–
Ethylbenzene	700	700	–	2,400	–	–	680 (lifetime/70 kg)	–	3,500
Toluene	1,000	1,000	2,420	15,000	–	–	2420 (lifetime/70 kg)	–	7,000
Xylenes (Total)	10,000	10,000	12,000	–	–	–	2200 (lifetime/70 kg)	–	70,000
Acenaphthylene	–	–	–	–	–	–	–	–	2,100
Anthracene	–	–	–	–	–	–	–	–	11,000
Benzo(a)anthracene	–	–	–	0.031	0.1	–	–	0 005	–
Benzo(a)pyrene	–	–	–	0.031	0 2	–	–	0 005	–
Benzo(b)fluoranthene	–	–	–	0 031	0 2	–	–	0 005	–
Benzo(ghl)perylene	–	–	–	0.031	–	–	–	– –	–
Benzo(k)fluoranthene	–	–	–	0 031	0 2	–	–	0 005	–
Chrysene	–	–	–	0.031	0.2	–	–	0 005	–
Dibenzo(ah)anthracene	–	–	–	0 031	0 3	–	–	0 005	–
Fluoranthene	–	–	–	188	–	–	–	–	1,400
Fluorene	–	–	–	–	–	–	–	–	
Indeno(1,2,3-cd)pyrene	–	–	–	0 031	0 4	–	–	0 005	–
Phenanthrene	–	–	–	–	–	–	–	–	–
Pyrene	–	–	–	–	–	–	–	–	1,100
Naphthalene	–	–	–	–	–	–	–	–	1,400

[a] ARARs – Applicable or relevant and appropriate requirements
[b] TBCs – To Be Considered; nonpromulgated criteria.
[c] MCL – Maximum Contaminant Level, MCLG – Maximum Contaminant Level Goal, IMCL – Iowa MCL.
[d] Indicates proposed.
[e] AWQC – Ambient Water Quality Criteria for Human Health – Adjusted to reflect drinking water use only. US EPA, 1986.
[f] HAL – Lifetime Health Advisory Level – US EPA Office of Water (Iowa Chap. 133 references Lifetime HALs. Not available for all COCs).
[g] RSC – Risk-specific concentration at 10^{-6} cancer risk level. Based on cancer slope factor, 2 liter/day water consumption, 70 kg body weight
[h] Rfc – reference concentration based on RfD, 2 liter/day water consumption, 70 kg body weight

TABLE 2-4
Federal and State
Potential Chemical-Specific ARARs and TBCs
For Surface Water
(All concentrations expressed in micrograms per liter)

Former Manufactured Gas Plant
Mason City, Iowa

Chemicals	ARARs[a]				TBCs[b]	
	AWQC[c] Human Health		AWQC[d] Freshwater		Lowest Reported Effects Level[e]	
	Water & Fish	Fish	Acute	Chronic	Acute	Chronic
Benzene	0.6	40	5,300	--	235[f]	--
Ethylbenzene	1,400	3,280	32,000	--	32,000[f]	3,400[g]
Toluene	14,300	424,000	17,500	--	20,000[f]	7,000[g]
Xylenes	--	--	--	--	40,000	60,000[g]
Acenaphthylene	0 0028	0 0311	--	--	--	--
Anthracene	0 0028	0 0311	--	--	--	--
Benzo(a)anthracene	0 0028	0.0311	--	--	--	--
Benzo(a)pyrene	0 0028	0 0311	--	--	--	--
Benzo(b)fluoranthene	0 0028	0 0311	--	--	--	--
Benzo(ghi)perylene	0.0028	0 0311	--	--	--	--
Benzo(k)fluoranthene	0.0028	0 0311	--	--	--	--
Chrysene	0.0028	0 0311	--	--	--	--
Dibenzo(ah)anthracene	0 0028	0 0311	--	--	--	--
Fluoranthene	42	54	3,980	--		--
Fluorene	0.0028	0 0311	--	--	--	--
Indeno(1,2,3-cd)pyrene	0 0028	0 0311	--	--	--	--
Phenanthrene	0.0028	0 0311	30	6 3	--	--
Pyrene	0.0028	0 0311	--	--	--	--
Naphthalene	--	--	2,300	620	500	100[g]

[a] Applicable or relevant and appropriate requirements
[b] To be considered
[c] AWQC – Ambient water quality criteria
[d] AWQC – Ambient water quality criteria for aquatic life protection.
[e] No criteria developed. Criteria documents reported lowest reported effects level
[f] Based on No Observed Adverse Effect Level (NOAEL)
[g] Drinking Water Equivalent Level (DWEL)

Note: If the State of Iowa has promulgated water quality standards (WQS) for specific pollutants and water body at the site, the state's WQSs will generally be the ARARs.

Note: NOAELs are No Observed Adverse Effect Levels, the greatest dose at which a test organism shows no deleterious response to a chemical or agent These are determined for each animal or epidemiological study of effects of a chemical. There can be different NOAELs listed for a chemical based on the animal used, the route of exposure, and the methods used in the study. A representative NOAEL is selected by EPA based on its evaluation of the studies conducted.

From a NOAEL (or if a NOAEL is not available, from the Lowest Observed Adverse Effect Level, or LOAEL), various uncertainty factors are used to determine a human reference dose (RfD). The RfD is the dose which is assumed to be without appreciable risk of deleterious effects over the course of a lifetime.

From the RfD, the Drinking Water Equivalency Level (DWEL) is determined by multiplying the RfD by a body weight of 70 kg, and dividing by a water consumption rate of 2 liters per day The DWEL is the concentration of chemical in water that would be without appreciable risk of deleterious effect, if all exposure to the chemical was only due to drinking water

Maximum Contaminant Level Goals (MCLGs) are determined by factoring the DWEL by the percentage of the total exposure which is assumed to come from drinking water. Commonly this is 20%.

The preceding only applies to non-carcinogenic compounds It is described in 40 CFR in the explanation of Parts 141, 142, and and 143. These sections are where the National Primary Drinking Water Standards are promulgated.

TABLE 2-4A
Federal
Potential Chemical-Specific ARARs and TBCs
for Air Quality

Former Manufactured Gas Plant
Mason City, Iowa

Particulate Matter	150 mg/m^3, 24-hour average concentrations[a]
	50 mg/m^3, annual arithmetic mean
Lead	1 5 mg/m^3, maximum arithmetic mean averaged over a calender quarter [b]

The levels of the national primary and secondary 24-hour ambient air quality standards

[a] – Part 50 6 National Primary and Secondary Ambient Air Quality Standard
[b] – Part 50.12 National Primary and Secondary Ambient Air Quality Standard

TABLE 2-5
Chemical-Specific State ARARs

Former Manufactured Gas Plant
Mason City, Iowa

Standard, Requirement, Criteria, or Limitation	Citation	Description	Applicable/ Relevant and Appropriate	Comment
National Secondary Drinking Water Standards (SMCLs)	40 CFR Part 143	Establishes welfare-based standards for public water systems (secondary maximum contaminant levels)	No/No	Secondary MCLs may be relevant and appropriate if the state has adopted them To date, Iowa has not
Iowa Environmental Quality Act Rules for Determining Cleanup Actions and Responsible Parties	Iowa Code Chapter 133 Effective 8/16/89	Establishes cleanup levels for contaminated groundwater and soil	Yes/—	These regulations are applicable to any soil or groundwater contaminated above Iowa action levels

TABLE 2-6
Potential Federal Action-Specific ARARs

Former Manufactured Gas Plant
Mason City, Iowa

Federal Regulations	Requirement	Potential ARAR Status	Analysis
CLEAN AIR ACT			
National Ambient Air Quality Standards/NESHAP/NSPL/BACT/ PSD/LAER 40 CFR 60 1–17, 60 50–54, 60 150–154, 60.480–489 40 CFR 53 1–33 40 CFR 61.01–18, 61.50–112, 61 240–247	Sets treatment technology standards for emissions to air from incinerators and fugitive emissions	Applicable	These requirements are applicable to any alternatives that involve emissions regulated by these standards
National Emission Standards for Hazardous Air Pollutants (NESHAP) Subpart C 40 CFR Part 61 30 beryllium Subpart E 40 CFR Part 61 50–56 Mercury Subpart F 40 CFR Part 61.6–71 Vinyl Chloride Subpart I 40 CFR Part 61.100–108 Radio Nuclides Subpart FF 40 CFR Part 61 340–358 Benzene Subpart J 40 CFR Part 61 110–112 Benzene Subpart N 40 CFR Part 61 160–165 Arsenic	The regulation includes emission standards for mercury, vinyl chloride, benzene, beryllium, inorganic arsenic, and radio nuclide from specific sources.	Not an ARAR	

TABLE 2-6
Potential Federal Action-Specific ARARs

Former Manufactured Gas Plant
Mason City, Iowa

Federal Regulations	Requirement	Potential ARAR Status	Analysis
CLEAN WATER ACT			
National Pollutant Discharge Elimination System (NPDES) 40 CFR 122 1–64	Regulate the point source discharge of water into surface water bodies. The State of Iowa has authority to administer NPDES in Iowa Refer to State ARARs (Table 2-7 and Section 2 2 2 3 3)	Applicable	The remedial action may include the discharge of treated or untreated groundwater to Willow Creek Substantive requirements will have to be met, although administrative requirements (a permit) may not be required if the discharge is on-site
DEPARTMENT OF TRANSPORTATION			
Hazardous Materials Transportation Act (HMTA) 49 USC Sect 1801–1813 Hazardous Materials Transportation Regulations 49 CFR Parts 107, 171–177	Regulates transportation of hazardous materials	Applicable	These requirements are applicable to all alternatives involving transport of contaminated materials from the site
Pretreatment Standards 40 CFR Part 403 1–18	Established pretreatment standards for the control of pollutants' discharge to POTWs The POTW should have either an EPA-approved program or sufficient mechanism to meet the requirements of the national program in accepting CERCLA waste.	Applicable	Discharge to POTW possible alternative It is considered an off-site action The substantive and administrative legally applicable requirements of the national pretreatment program must be met
Ocean Discharge 40 CFR 227.1–32	NPDES permit required to discharge to marine water	Not applicable	Not relevant to situation
Dredge and Fill Requirement 40 CFR 230 1–80	Regulates the discharge of dredged or fill material into the water of the US	Not applicable	No dredging or filling anticipated
SAFE DRINKING WATER ACT			
Underground Injection Control Program 40 CFR Part 144 1–70	Controls the underground injection of wastes and treated wastewater	Not applicable	Not relevant to situation because no underground injection anticipated

TABLE 2-6
Potential Federal Action-Specific ARARs

Former Manufactured Gas Plant
Mason City, Iowa

Federal Regulations	Requirement	Potential ARAR Status	Analysis
RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)			
Hazardous Waste Management	Management of generation, treatment, storage, disposal, and transport of hazardous waste	Coal tar wastes Not applicable May be relevant and appropriate Treatment residues May be applicable	Coal tar wastes are not listed wastes and do not appear to be RCRA characteristic, therefore, RCRA is not applicable to on-site or off-site actions constituting treatment or disposal
Definition and identification of hazardous waste 40 CFR Part 261 20–134	Identifies those wastes subject to regulation	Relevant and appropriate	RCRA requirements are applicable to treatment residues generated from remedial actions that are identified as RCRA hazardous wastes and that are stored, treated, disposed of, and/or transported RCRA requirements may be relevant and appropriate for on-site actions to waste that is similar to RCRA hazardous waste depending on site-specific circumstances
Standards for Generators 40 CFR 262 10–40	Establishes regulation covering activities of generators of hazardous wastes. Requirements include ID number, record keeping, and use of uniform national manifest	Applicable	Applicable to off-site actions if waste or treatment residues are RCRA hazardous Off-site actions must meet both substantive and administrative legally applicable requirements, but not relevant and appropriate requirements
Standards for Transport 40 CFR 263 10–31	The transport of hazardous waste is subject to requirements including DST regulations, manifesting, record keeping, and discharge cleanup	Applicable	Applicable to off-site actions if waste or treatment residues are RCRA hazardous Off-site actions must meet both substantive and administrative legally applicable requirements, but not relevant and appropriate requirements

TABLE 2-6
Potential Federal Action-Specific ARARs

Former Manufactured Gas Plant
Mason City, Iowa

Federal Regulations	Requirement	Potential ARAR Status	Analysis
REGULATIONS FOR OWNERS AND OPERATORS OF PERMITTED HAZARDOUS WASTE FACILITIES			
Subpart G – Closure/Post-Closure 40 CFR 264 111, 264 117C	Concerns site closure requirements, including operation and maintenance, site monitoring, record keeping, and site use	Not applicable, Relevant and appropriate	Substantive closure and post-closure requirements are applicable to RCRA hazardous wastes, and may be relevant and appropriate to wastes that are similar to RCRA hazardous wastes
Subpart I – Storage Container 40 CFR 264 171–178	Requirements concern permits on-site storage of hazardous wastes or temporary storage phases during cleanup actions Requirements for maintenance of storage containers, compatibility with waste, inspection, storage area, location, and closure	Not applicable, Relevant and appropriate	May be relevant and appropriate to storage of wastes prior to off-site shipment if RCRA is determined relevant and appropriate for wastes Substantive requirements are applicable to RCRA hazardous wastes stored in containers or piles after November 19, 1980 Waste piles closed in place are regulated under 40 CFR Part 64, Subpart N
Subpart J – Tank Storage 40 CFR 264.191–198	Requirements apply to tank storage of hazardous materials.	Not applicable	Tank storage is not anticipated
Subpart K – Surface Impoundments 40 CFR 264.220–231	Requirements for hazardous waste containment using new or existing surface impoundments	Not applicable	No surface impoundments are anticipated
Subpart L – Waste Piles 40 CFR 264 251–258	Requirements for hazardous waste kept in piles	Not applicable, Relevant and appropriate	Temporary waste piles not subject to RCRA, may be relevant and appropriate for long-term storage piles Substantive requirements are applicable to RCRA hazardous wastes stored in containers or piles after November 19, 1980 Waste piles closed in place are regulated under 40 CFR Part 64, Subpart N.

TABLE 2-6
Potential Federal Action-Specific ARARs

Former Manufactured Gas Plant
Mason City, Iowa

Federal Regulations	*Requirement*	*Potential ARAR Status*	Analysis
Subpart M – Land Treatment 40 CFR 264 271–283	Requirements pertain to land treatment of hazardous wastes	Not applicable	Land treatment is not an alternative
Subpart N – Landfills 40 CFR 264 301–314 (New landfills)	Requirement for design, operation, and maintenance of a new hazardous waste landfill, includes minimum technology requirements under HSWA	Applicable	Creation of a new landfill is an action considered Substantive requirements are applicable to the on-site disposal os RCRA hazardous wastes in a landfill and may be relevant and appropriate to the on-site disposal of wastes that are similar to RCRA hazardous wastes
Closure 40 CFR 264 310	Requirement for closure of landfill with waste in place, includes requirement for capping, monitoring	Not applicable Potentially relevant and appropriate	Wastes may be left in place If RCRA is deemed relevant and appropriate for the waste, closure requirements may be deemed relevant and appropriate
Subpart O – Incinerators 40 CFR 264 340–351	Requirements for hazardous waste incinerators	Not applicable	On-site incinerator is not considered for this site
Subpart S – Corrective Action for Solid Waste Management Units 40 CFR Part 264 552–553	Requirements for CAMUs and temporary treatment units at RCRA-permitted TSD facilities undergoing corrective action	Not an ARAR, Is a TBC	Substantive requirements may be relevant and appropriate to temporary on-site treatment
Subpart X – Miscellaneous Units 40 CFR Part 264 600-603	Standards for performance of miscellaneous treatment units Miscellaneous treatment units may include temporary waste holding units or effluent pretreatment units	Not applicable	Subpart X may apply to use of on-site physical, chemical, or biological treatment technologies if RCRA is determined to be relevant and appropriate overall Substantive requirements are applicable to RCRA hazardous wastes treated on-site in miscellaneous units, and may be relevant and appropriate to wastes (treated on site in miscellaneous units) that are similar to RCRA hazardous wastes

TABLE 2-6
Potential Federal Action-Specific ARARs

Former Manufactured Gas Plant
Mason City, Iowa

Federal Regulations	Requirement	Potential ARAR Status	Analysis
Land Disposal Restrictions 40 CFR, Part 268 30—40	The land disposal restrictions and treatment requirements for materials subject to restrictions on land disposal	Appropriate and relevant	On-site land disposal (i e , new placement) is anticipated, therefore, land ban may be triggered Substantive land disposal restrictions are applicable to the land disposal of RCRA hazardous wastes, and may be relevant and appropriate to wastes that are similar to RCRA hazardous wastes
TOXIC SUBSTANCES CONTROL ACT (TSCA) PCBs			
40 CFR Part 761.60—79	Requirement for disposal of PCBs	Not applicable	PCBs are not known to be present at the site

TABLE 2-7
Potential Federal Location-Specific ARARs

Former Manufactured Gas Plant
Mason City, Iowa

Location-Specific Concern	Requirement	Prerequisite	Citation	Potential ARAR Determination	Analysis
Within area where action may cause irreparable harm, loss, or destruction of significant artifacts	Action to recover and preserve artifacts	Alternation of terrain that threatens significant scientific, prehistorical, or archaeological data	National Historical Preservation Act (16 USC Section 469), 36 CFR Part 65	Not applicable or relevant and appropriate	There are no known archaeological or historical artifacts on the site
Historic project owned or controlled by Federal agency	Action to preserve historic properties, planning of action to minimize harm to National Historic Landmarks	Property included in, or eligible for, the National Register of Historic Places	National Historical Preservation Act, Section 106 (16 USC 470 *et seq.*), 36 CFR Part 800	Not applicable or relevant and appropriate	Site not on the National Register of Historic Places
Critical habitat upon which endangered species or threatened species depends	Action to conserve endangered species or threatened species, including consultation with the Department of Interior	Determination of presence of endangered or threatened species	Endangered Species Act of 1973 (16 USC 1531 *et seq.*), 50 CFR Part 222, 50 CFR Part 402 Fish and Wildlife Coordination Act (16 USC 661 *et seq.*) 33 CFR Parts 320–330	Not applicable or relevant and appropriate	No endangered species are known to exist at the site No evidence of unique habitat is present

TABLE 2-8
Potential State Action-Specific ARARs

Former Manufactured Gas Plant
Mason City, Iowa

Standard, Requirement, Criteria, or Limitation	Citation	Description	Applicable/ Relevant and Appropriate	Comment
Iowa Environmental Quality Act	Enacted 1972, as amended, chapter 455B of Iowa Administrative Code Annotated.			
	455B 430	The permission of IDNR's Director is required to change the use of a site on the Registry of abandoned or uncontrolled disposal sites.	Yes/--	The Mason City site is an uncontrolled waste site as defined by the Act. Therefore this section of the law is applicable.
	455B.465 Well Injection Prohibited	Makes it unlawful to inject hazardous or restricted waste into a well.	No/No	No proposed alternative uses on-site injection wells
Iowa Air Pollution Control Regulations	22.4 or 22.5	Establishes requirements for major stationary sources in attainment/unclassified areas (22 4) or nonattainment areas (22 5)	Yes/--	These regulations (either 22 4 or 22.5) are applicable to any remedial activities taken at the site, such as incineration or excavation.

TABLE 2-8
Potential State Action-Specific ARARs

Former Manufactured Gas Plant
Mason City, Iowa

Standard, Requirement, Criteria, or Limitation	Citation	Description	Applicable/ Relevant and Appropriate	Comment
Iowa Air Pollution Control Regulations (continued)	23.1 Emissions Standards	Establishes emission standards for new sources and for hazardous air pollutants	Yes/--	These regulations would be applicable to certain new sources such as incinerators and to emissions of hazardous air pollutants
	23.3 (455B) Specific Contaminants	Establishes standards for various contaminants.	Yes/--	These regulations would apply to remedial actions
	23.4 (12) Incinerators	Establishes standards for particulate matter and visible emissions	Yes/--	These standards would apply to any on-site incinerators used in remedial actions
Iowa Water Pollution Control Regulations	Iowa Water Quality Standards 61.3 (1) and 61.3 (3)	Establishes general water standards and class "B" water standards.	No/No	No alternative involves discharge to surface waters
	62.1 (6)	Prohibits discharges to POTWs without a pretreatment agreement	Yes/--	These prohibitions would apply to any off-site discharges to a POTW
	(3), and (4)	Adopts the following Federal regulations: 40 CFR Part 403 and 40 CFR Part 125, Subpart H	Yes/--	These regulations would be applicable to any discharge from the site to a POTW

TABLE 2-8
Potential State Action-Specific ARARs

Former Manufactured Gas Plant
Mason City, Iowa

Standard, Requirement, Criteria, or Limitation	Citation	Description	Applicable/ Relevant and Appropriate	Comment
Iowa Water Pollution Control Regulations (continued)	62 6	Establishes how IDNR will set effluent limitations or pretreatment requirements for pollutants for which there are no federal standards	Yes/--	These regulations would be applicable to discharge from the site to a POTW
	62 8 (3) and (4)	Establishes how IDNR may set pretreatment requirements which are more stringent than current standards if necessary	Yes/--	These requirements may be applied to any discharges from the site to a POTW, if IDNR deems it necessary.
	62.9	Prohibits disposal of any pollutant (other than heat) into wells in Iowa after Sept. 1, 1977.	No/No	No alternative considered involves the use of injection wells
	63 Monitoring, Analytical and Reporting Requirements	This chapter establishes requirements for these activities	Yes/Yes	Off-site disposal options must comply with all portions of this chapter On-site disposal options must comply with the substantive requirements (63 3 (1) through 63.3 (4))

TABLE 2-8
Potential State Action-Specific ARARs

Former Manufactured Gas Plant
Mason City, Iowa

Standard, Requirement, Criteria, or Limitation	Citation	Description	Applicable/ Relevant and Appropriate	Comment
Iowa Water Pollution Control Regulations (continued)	64.2 (3)	Establishes silting criteria that must be complied with when building a new wastewater disposal system.	Yes/--	These regulations would apply to any treatment system built to remediate the groundwater
	64.3 (5)	Requirements for industries that discharge to another disposal system	Yes/--	These regulations would apply to any remedial option that discharged treated water to a POTW.

TABLE 1

REMEDIAL ALTERNATIVE COST SUMMARY

Cost	No Action	Institutional Controls with Monitoring	MENA	Bedrock Grouting, Vertical Barrier, Groundwater Pump and Treat	Groundwater Pump and Treat, Discharge to Sanitary Sewer	Bedrock Grouting, Shallow Groundwater Pump and Treat
Capitol Cost	$ 0	$ 25,000	$125,000	$3,985,000	$ 492,000	$3,623,100
O&M	$ 0	$ 29,400	$ 53,200/26,600[a]	$ 133,700	$ 209,300	$ 153,300
Present Net Worth	$ 0	$476,900	$649,100	$6,040,000	$3,709,300	$5,979,300

[a] Estimated O&M for First 5 Years/Estimated O&M After 5 Years

TABLE 4-10
Cost Estimate
Groundwater Pumping/Treatment
Discharge to Sanitary Sewer

Former Manufactured Gas Plant
Mason City, Iowa

Description	Estimated Unit Cost/	Number of Units	Estimated Cost
Summary			
Capital Cost			
Facilities			
Groundwater Collection and Treatment (36 gpm)			
Shallow Extraction Wells (6)	75 00 / ft	180	$13,500
Groundwater Pumps	3,500 00 / ea	6	$21,000
Recovery Well Access Vaults	2,500 00 / ea	6	$15,000
Yard Piping from Pumps	8,200 00 / LS	1	$8,200
Yard Electrical to Pumps	7,500 00 / LS	1	$7,500
Equipment Bldg & Fndt (20'x30')	36,000 00 / LS	1	$36,000
Electrical Service and Installation	15,000 00 / LS	1	$15,000
Instrumentation	8,000 00 / LS	1	$8,000
Control Panel	10,000 00 / LS	1	$10,000
Principal Process Equipment			
O/W Separator with Pump	10,000 00 / LS	1	$10,000
Transfer Tank with Pump	3,200 00 / LS	1	$3,200
pH Control System	22,500 00 / LS	1	$22,500
Air Stripper	35,000 00 / LS	1	$35,000
Transfer Tank with Mixer	3,200 00 / LS	1	$3,200
Parallel Plate Separator	12,000 00 / LS	1	$12,000
Overflow Tank with Pump	3,200 00 / LS	1	$3,200
Particulate Filter	5,000.00 / LS	1	$5,000
Activated Carbon	7,000 00 / ea	2	$14,000
Organophilic Clay Filter	7,500 00 / ea	2	$15,000
Solids Dewatering System	16,000.00 / LS	1	$16,000
Subcontracotr System Installation	40,000 00 / LS	1	$40,000
Discharge Line to Sanitary Sewer	4,000 00 / LS	1	$4,000
Pre-treatment Permit (Sanitary Sewer)	5,500 00 / LS	1	$5,500
Air Permit	5,500 00 / LS	1	$5,500
Subtotal Groundwater			$328,300
Subtotal Capital Cost			$328,300
Miscellaneous	10% of Subtotal		38,800
Contingency	25% of Subtotal		82,100
Engineering	15% of Subtotal		49,200
Total Capital Cost			$492,400

TABLE 4-10 — *Continued*

Description	Estimated Unit Cost/	Number of Units	Estimated Cost
Annual Operation Cost			
Groundwater Sampling/Monitoring/Reporting	21,000 00 / YR	1	$21,000
Treatment System, Performance and Compliance Sampling/Monitoring	10,000 / YR	1	$10,000
Labor and Report Preparation	14,000 00 / YR	1	$14,000
Electricity (Treatment System)	18,000 00 / YR	1	$18,000
Groundwater Treatment O&M	6% of Groundwater Subtotal	1	$25,600
Treatment Sampling/Analytical	12,000 00 / YR	1	$12,000
Labor and Report Preparation	30,000 00 / YR	1	$30,000
Sewer Use Fee ($1/1,000 gallons)	18,900 00 / YR	1	$18,900
Subtotal Annual Operation Cost (O&M)			$149,500
Miscellaneous	20% of Subtotal		$29,900
Contingency	20% of Subtotal		$29,900
Total Annual Operation Cost			$209,300
Total Present Worth for 30 Years @ 5%			$3,709,300

APPENDIX B

STATEMENT OF WORK

FOR

THE REMEDIAL DESIGN/REMEDIAL ACTION
CONSENT DECREE

AT THE
MASON CITY COAL GASIFICATION SITE
MASON CITY, CERRO GORDO COUNTY, IOWA

JANUARY 2002

STATEMENT OF WORK FOR THE REMEDIAL DESIGN AND REMEDIAL ACTION AT THE MASON CITY COAL GASIFICATION SITE MASON CITY, CERRO GORDO COUNTY, IOWA

I. INTRODUCTION AND PURPOSE

The purpose of this Statement of Work ("SOW") is to describe the implementation of the Remedial Design, the Remedial Action, and Operation and Maintenance for the remedy set forth in the Record of Decision, signed by the Superfund Division Director for the U.S. Environmental Protection Agency ("EPA") Region VII on September 19, 2000, for the Mason City Coal Gasification Site. This SOW is incorporated into and made a part of the Consent Decree entered into by the Settling Defendants and the United States of America for the Remedial Design and Remedial Action for the Site. The Settling Defendants shall follow the Record of Decision, the Consent Decree, the approved Remedial Design, and pertinent reference documents listed in Section VII of the SOW and subsequent revisions thereto, upon notification by the EPA to Settling Defendants of such revision, in submitting deliverables for and implementing the Remedial Action for the Site.

II. SELECTED REMEDY

The EPA selected the following actions in the Record of Decision to address the Mason City Coal Gasification Site:

- Monitored natural attenuation of groundwater,
- Restrictions on the site prohibiting residential development, the construction of basements in any buildings, and the installation of any water supply wells for municipal, industrial, or domestic purposes; and
- Continued listing of the site on the Registry of Hazardous Waste or Hazardous Substance Disposal Sites pursuant to Iowa Code §455B.426.

The selected remedy also includes a contingency remedy in the event that the monitoring data indicate that the natural attenuation processes are no longer effective in remediating the groundwater. The contingency remedy is groundwater pumping and treatment with discharge to the sanitary sewer and institutional controls The contingency remedy includes the following components

- Pumping and treatment of groundwater in an on site, multi-stage treatment system with discharge of the treated water to the sanitary sewer;
- Restrictions on the site prohibiting residential development, the construction of basements in any buildings, and the installation of any water supply wells for municipal, industrial, or domestic purposes; and

- Continued listing of the site on the Registry of Hazardous Waste or Hazardous Substance Disposal Sites pursuant to Iowa Code §455B.426.

III. DESCRIPTION OF THE REMEDIAL ACTION /PERFORMANCE STANDARDS

A. Performance Standards

Performance Standards, as defined in Section IV of the Consent Decree, are set forth below.

The EPA's Maximum Contaminant Levels ("MCLs"), pursuant to the Safe Drinking Water Act for public water supplies are identified as Applicable or Relevant and Appropriate Requirements ("ARARs") for this site. The MCLs represent levels which are considered safe for human consumption. There are MCLs for benzene and benzo(a)pyrene. The MCL for benzene is 5 µg/L and for benzo(a)pyrene is 0.2 µg/l. These MCLs are approximately equal to the 10^{-5} cancer risk. There are no MCLs for the other carcinogenic PAHs but it is possible to calculate the concentrations of the contaminants that would be associated with a given level of cancer risk. The Performance Standards listed in Table 1 for the contaminants other than benzene and benzo(a)pyrene, were presented in the Feasibility Study Report These contaminant concentrations can be detected in a groundwater sample using available analytical methods and represent a range of $1x10^{-5}$ to $8x10^{-5}$ cancer risk The EPA will review the performance of the response action to determine the progress of the action to meet these criteria during each 5-year review.

TABLE 1
PERFORMANCE STANDARDS
FOR THE MASON CITY COAL GASIFICATION SITE
MASON CITY, IOWA

Contaminant	Concentration in µg/l*
Benzene	5
Benzo(a)pyrene	0 2
Benzo(k)fluoranthene	0.2
Benzo(a)anthracene	0.1
Chrysene	0.2
Benzo(b)fluoranthene	0 2
Indeno(1,2,3-c,d)pyrene	0 4
Dibenz(a,h)anthracene	0 3

* Concentrations are presented in units of micrograms per liter (µg/l).

B. Installation and Operation of Monitoring Program for Performance Monitoring of Natural Attenuation

The Settling Defendants shall design and implement a groundwater monitoring program to document the restoration of the aquifer through natural attenuation and to evaluate remedial progress over time The groundwater monitoring program shall include monitoring to demonstrate that the Remedial Action remains protective of human health and the environment and achieves the Performance Standards, and to confirm that the Performance Standards are maintained over the long-term. The groundwater monitoring program shall include monitoring to track the movement of groundwater contaminants and to monitor changes in chemical constituents and chemical concentrations in the groundwater over time The groundwater monitoring program shall be designed to document whether natural attenuation, including intrinsic biodegradation is occurring, and shall provide data to be utilized with aquifer mathematical models to evaluate the rate of natural attenuation and the migration of contaminants. The monitoring program will also be utilized to determine whether natural attenuation continues to be an effective remedy, and if not, if implementation of the Contingency Plan and/or the Contingency Remedy are necessary.

The groundwater monitoring program shall include monitoring of existing wells and any new wells installed during the Remedial Design and/or the Remedial Action in accordance with the Groundwater Monitoring Plan approved by the EPA. The exact number of new wells, if any, to be installed during the Remedial Design/Remedial Action shall be determined and detailed in the Remedial Design, subject to the EPA's review and approval. Additional monitoring wells may also be required during the Remedial Design/Remedial Action as part of the Contingency Plan (see Section III C of this SOW)

The Settling Defendants shall continue to implement the monitoring program until it has been demonstrated that the Performance Standards listed in Table 1 of this SOW are achieved at all points throughout the contaminated groundwater plume for a minimum period of three years of sampling events with a minimum of three sampling events no less than one year apart, and shall continue until the Settling Defendants demonstrate, subject to the EPA's approval, that chemical concentrations in the groundwater are stable and will remain below Performance Standards on a permanent basis. As used herein, unless as otherwise approved by the EPA, contamination is the detection of a substance listed in Table 1 for which Performance Standards have not been consecutively achieved for a minimum period of three years of sampling events with a minimum of three events no less than one year apart at all locations in the groundwater impacted by the Site, and for which Settling Defendants have not demonstrated, subject to the EPA's approval, that the chemical concentrations in the groundwater are stable and will remain below Performance Standards on a permanent basis. As used herein, contamination also includes the detection of chemicals which may not be listed in Table 1, but which are potential degradation products or may have increased mobility as a result of natural attenuation processes.

The analytical results of each groundwater sampling event, as outlined in the Groundwater Monitoring Plan (see Task 2) shall be provided to the EPA and the Iowa Department of Natural Resources ("IDNR") within 90 days of each sampling event. Included shall be the raw analytical data, the data validation package, and a synopsis of the validated data, including summary tables. Copies of the raw analytical data and the data validation packages are not required to be submitted to the IDNR. If the contaminated groundwater plume expands beyond the plume boundary which shall be delineated in the Groundwater Monitoring Plan based upon data collected during previous investigations, or if contaminant concentrations increase above concentrations to be stipulated in the Groundwater Monitoring Plan, the Settling Defendants shall notify the EPA and the IDNR immediately and, within 21 days, shall propose to the EPA, for approval, Contingency Plan provisions that will be implemented to address the expansion of the plume and/or the detection of a chemical above stipulated concentrations (see Task 2). The Contingency Plan provisions shall include a schedule for implementation and reporting.

An Annual Progress Report summarizing the tasks performed during the previous year and the results of the previous year's sampling and monitoring events, including tables and figures, shall be submitted to the EPA and the IDNR on an annual basis. The Annual Progress Report shall include an opinion regarding the protectiveness of the Remedial Action pursuant to the monitoring program, and shall include a map showing the estimated extent of the plume boundary, based upon the definition of plume boundary in the Remedial Design and approved by the EPA, and the location of existing and new wells located in and around the Site. The Annual Progress Report shall also contain a qualitative evaluation of the protectiveness of the remedy based on the results of the previous year's monitoring data and trends from any prior years, and include an updated qualitative assessment of potential risks to users of any new and existing wells and ecological receptors. In addition, the Annual Progress Report shall contain a description of Contingency Plan provisions that were implemented during the previous year, the basis for implementing the provisions and a summary of the outcome, a detailed quantitative analysis, and documentation of the overall progress and protectiveness of the Remedial Action, including the estimated time until Performance Standards are achieved.

The specific details of the monitoring program shall be submitted to the EPA for approval as part of the Groundwater Monitoring Plan during the Remedial Design (see Task 2). The groundwater monitoring program shall include, at a minimum, monitoring of all chemicals listed in Table 1 of this SOW for which Performance Standards have not been consecutively achieved for a minimum period of three years of sampling events with a minimum of three events no less than one year apart at all points throughout the contaminated groundwater plume, except for those chemicals which the Settling Defendants have demonstrated, subject to the EPA's approval, that the concentrations in the groundwater are stable and will remain below Performance Standards on a permanent basis. In addition, the groundwater monitoring program shall include monitoring of any chemicals which are potential degradation products and chemicals which may have increased mobility as a result of natural attenuation processes

The Groundwater Monitoring Plan shall also delineate specifically the tests, measurements, and sampling that will be performed to satisfactorily demonstrate that natural attenuation, including biodegradation, is occurring This includes the methods and procedures that will be used to quantify the observed rates of chemical degradation including the methods of aquifer mathematical modeling that will be utilized, as well as the methods and procedures that will be used to monitor potential risks to human health and the environment and to document the protectiveness of the Remedial Action

The Groundwater Monitoring Plan shall contain a detailed schedule specifying the sampling frequencies, the tasks to be performed, and a schedule for implementation At a minimum, sampling shall occur quarterly for five years after the start of the Remedial Action. At the conclusion of this period of quarterly monitoring the Settling Defendants shall submit the Interim Remedial Action Report for EPA approval Following approval of this report an Operation and Maintenance Plan shall be submitted to the EPA for approval. During the period of Operation and Maintenance groundwater sampling shall occur at least annually until the Performance Standards listed in Table 1 of this SOW are achieved at all points throughout the contaminated groundwater plume for a minimum period of three years of sampling events with a minimum of three sampling events no less than one year apart, and shall continue until the Settling Defendants demonstrate, subject to the EPA's approval, that chemical concentrations in the groundwater are stable and will remain below Performance Standards on a permanent basis If the data collected from the sampling indicates that the groundwater monitoring program is inadequate in providing information on the levels, movement, or degradation of groundwater contaminants, or to assess the protectiveness and the effectiveness of the Remedial Action, the EPA may require the installation of additional groundwater monitoring wells and laboratory analysis of samples from such wells, and/or laboratory analysis of additional sampling parameters If any of the monitoring wells designated for sampling in the Groundwater Monitoring Plan or subsequent revisions are destroyed or in any way become unusable, the Settling Defendants shall submit a plan to repair or replace each well to the EPA for approval within 30 days of discovery of damage or destruction, unless deemed unnecessary by the EPA Within 30 days of the EPA's approval of the well repair/replacement plan, Settling Defendants shall repair or replace each well in accordance with the approved well repair/replacement plan

Based upon the results of monitoring in accordance with the Groundwater Monitoring Plan, the Settling Defendants may petition the EPA to reduce the sampling frequency and/or the number of sampling locations, or to delete individual chemicals from the sampling program (e g., for chemicals that have consecutively achieved Performance Standards for a minimum period of three years of sampling events with a minimum of three events no less than one year apart at all points throughout the Site groundwater plume, and for which Settling Defendants have demonstrated, subject to the EPA's approval, that the chemical concentrations in the groundwater are stable and will remain below Performance Standards on a permanent basis). Petitions shall include a discussion of the rationale and the basis for the proposed modifications, and may be submitted in the Annual Report. Petitions are subject to review and approval by the

EPA. Any modifications to the approved Groundwater Monitoring Plan shall be incorporated into a revised Groundwater Monitoring Plan, subject to the EPA's approval.

C. Contingency Plan

The Settling Defendants shall develop a Contingency Plan to respond to any differences in the actual performance of the remedy and actual site conditions, as compared to the expected performance of the remedy and expected site conditions. Implementation of the Contingency Plan shall be based on the data and information collected during the groundwater monitoring program. The final determination of the need for the implementation of any Contingency Plan provision, including implementation of the Contingency Remedy, shall be made by the EPA.

The Contingency Plan shall include, but may not be limited to, provisions for modifications to institutional controls; modifications to the groundwater monitoring program; confirmation sampling, additional groundwater modeling efforts; additional evaluation of the potential for groundwater contaminants to impact existing and new well supplies, including the potential cancer and noncancer risks associated with any impacts, and implementation of the Contingency Remedy, if necessary (see Task 2). Modifications to institutional controls may include provisions for changes in the type(s) of institutional controls implemented, and the implementation and/or execution of institutional controls over additional areas. Modifications to the monitoring program may include provisions for additional monitoring elements, increased sampling frequency, the installation of additional groundwater monitoring wells, if necessary, and modifications to groundwater sampling locations and analytical parameters

D. Contingency Remedy

If the information and the data collected during groundwater monitoring indicate that any of the following conditions are not being met (1) an examination of the groundwater chemistry identifies conditions that are favorable for the occurrence of biodegradation, (2) a reduction in the concentration of PAHs and BETX along the flow path downgradient of the former source area occurs, or (3) monitoring and modeling results indicate that natural attenuation is occurring at a rate sufficient to prevent the spread of the contaminant plume; then the Contingency Remedy, as described in the Record of Decision, or an alternative remedy proposed by the Settling Defendants and selected by EPA for implementation shall be implemented as provided in Paragraph 15 of the Consent Decree

IV. SCOPE OF REMEDIAL DESIGN AND REMEDIAL ACTION

The Remedial Design and Remedial Action shall consist of the following six major tasks. All plans are subject to EPA approval.

Task 1: Institutional Controls

Task 2: Remedial Design

Task 3: Remedial Action
1. Pre-final Inspection
2. Final Inspection
3. Interim Remedial Action Report

Task 4: Operation and Maintenance

Task 5 : Remedial Action Report

Task 6: Progress Reports

A. Task 1: Institutional Controls

Within 90 days of receipt of notice from the EPA of lodging of this Consent Decree, Owner Settling Defendants shall prepare for EPA review and approval a Declaration of Restrictive Covenants to be filed with the county as detailed in Section IX of the Consent Decree. Owner Settling Defendants shall record and certify the recording as set forth in Section IX of the Consent Decree.

In accordance with Section IX of the Consent Decree, Settling Defendants shall provide the EPA and its representatives with access to property to which access is required as necessary to effectuate the Consent Decree and this SOW, including, but not limited to, areas where the installation, monitoring, and sampling of groundwater monitoring wells will be performed If the Settling Defendants do not own the property where access is needed, the Settling Defendants shall use best efforts to attain access for the purpose of performing the Remedial Action, as detailed in Section IX of the Consent Decree

B. Task 2: Remedial Design

The Settling Defendants shall prepare plans and design specifications to implement the Remedial Action at the Site as described in the Record of Decision and this SOW. Plans and specifications as required by this SOW shall be submitted in accordance with the schedule set forth in Section VI below. All plans and specifications shall be developed in accordance with the EPA Superfund Remedial Design and Remedial Action Guidance (OSWER Directive No- 9355.0-4A) and shall demonstrate that the Remedial Action meets all objectives of the Record of Decision, the Consent Decree, and this SOW, including all Performance Standards The Settling Defendants shall communicate with the EPA as necessary to discuss design issues.

The Remedial Design submittal shall include, at a minimum, the following:

1. The overall management strategy for performing the design, construction,

operation and maintenance of the Remedial Action The Remedial Design objectives, assumptions, limitations, and approaches shall also be defined. Included shall be a description of the responsibility and authority of all organizations and key personnel involved with the implementation with a description of qualifications of key personnel directing the Remedial Design, including contractor personnel.

2. Monitoring Well Location and Installation Plan which shall identify existing monitoring wells that would be utilized and the rationale for their selection, as well as the identification of additional wells to be installed, with plans and specifications for their installation;

3. Groundwater Monitoring Plan, including:
   a. Field Sampling and Monitoring Plan;
   b Aquifer Modeling Plans which shall include plans, drawings, and figures, including design and modeling methods and/or calculations, to support the proposed methods for determining the occurrence and estimated rate of intrinsic biodegradation/natural attenuation and estimates of the time to achieve Performance Standards Also considered shall be the design assumptions and parameters for monitored natural attenuation, including design restrictions, performance criteria, and expected degradation and attenuation efficiencies (concentration and volume),
   c Reporting and Performance Standards Verification Plan,

4. Quality Assurance Project Plan (see Section V A),

5 Construction Quality Assurance Plan (see Section V.C.);

6 Health and Safety Plan (see Section V B.),

7 Contingency Plan/Contingency Remedy Plan (see Sections III.C and III.D). The Contingency Plan shall include plans for responding to differences in the actual performance of the remedy and actual site conditions as compared to the expected performance of the remedy and expected site conditions General plans of the steps to be taken and a schedule outline for implementation of the Contingency Remedy must be included in the Contingency Plan;

8 Capital and Operation and Maintenance Cost Estimate. This cost estimate shall refine the cost estimate made in the Feasibility Study and Feasibility Study Addendum to reflect the detail presented in the Remedial Design; and

9 Project Schedule for the installation and implementation of the Remedial Action which identifies timing for initiation and completion of all critical path tasks. The final project schedule shall include specific dates for completion of the project and major milestones.

The Remedial Design shall include reproducible drawings and specifications suitable for bid solicitation.

C. Task 3: Remedial Action

The Settling Defendants shall implement the Remedial Action as detailed and in accordance with the schedule provided in the Remedial Design. The following activities shall be completed and/or performed to implement the Remedial Action

1. Pre-final Inspection

Upon preliminary completion of the construction phase of the Remedial Action or the initiation of the Remedial Action, Settling Defendants shall notify the EPA and the IDNR for the purpose of conducting a pre-final inspection. The pre-final inspection shall consist of a walk-through inspection of the Site. The inspection is to determine whether the implementation/construction portion of the project is complete and consistent with the contract documents and the EPA approved Remedial Design Any outstanding implementation or construction items discovered during the inspection shall be identified and noted jointly by the Parties. The Pre-final Inspection Report shall outline the outstanding implementation or construction items, if any, actions required to resolve outstanding items, completion date for these items and a proposed date for final inspection, if determined to be needed

2. Final Inspection

Upon completion of any outstanding implementation or construction item. Settling Defendants shall notify the EPA and the IDNR for the purpose of conducting a final inspection. The final inspection shall consist of a walk-through inspection of the Site by the EPA, the IDNR (if the state desires to attend), and the Settling Defendants. The Pre-final Inspection Report shall be used as a checklist with the final inspection focusing on the outstanding implementation or construction items identified in the pre-final inspection Confirmation shall be made by the EPA in writing that outstanding items have been resolved Final inspections shall be repeated as necessary

3. Interim Remedial Action Report

Within 90 days of the final round of quarterly groundwater monitoring per the schedule in the Remedial Design approved by the EPA, the Settling Defendants shall submit an Interim Remedial Action Report. This report shall be prepared consistent with the EPA

guidance entitled Close Out Procedures for National Priority List Sites, OSWER 9320 2-09A-P, January 2000 or as superseded by subsequent guidance. In the Report, the Settling Defendants' Project Coordinator shall state that all construction activities have been completed in full satisfaction of the requirements of the Consent Decree and the Remedial Design The Interim RA Report shall fully summarize the results of the groundwater monitoring program including the effectiveness of the natural attenuation remedy. The Interim RA Report shall also include the following certification, signed by a responsible corporate official of a Settling Defendant or the Settling Defendants' Project Coordinator:

> "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 there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations "

D. Task 4: Operation and Maintenance

Operation and Maintenance (O&M) shall be designed to confirm over the O&M monitoring period that the Remedial Action remains effective The Settling Defendants shall prepare an O&M Plan to cover long term maintenance of the Remedial Action The O&M Plan shall be submitted to the EPA for review and approval within 30 days of approval of the Interim Remedial Action Report by the EPA. The O&M Plan shall include the following elements

1 Description of normal operation and maintenance,
   a. Description of tasks for operation;
   b Description of tasks for maintenance
   c. Description of prescribed treatment or operation conditions, and
   d Schedule showing frequency of each O&M task

2. Description of potential operating problems;
   a Description and analysis of potential operation problems,
   b. Sources of information regarding problems, and
   c Common and/or anticipated remedies

3 Description of any routine monitoring and laboratory testing in addition to that described in the Groundwater Monitoring Plan,
   a. Description of monitoring tasks;
   b. Description of required data collection, laboratory tests, and their interpretation;
   c Required quality assurance and quality control;
   d. Schedule of monitoring frequency and procedures for a petition to the EPA to reduce the frequency of or discontinue monitoring,
   e Description of verification sampling procedures to be used if Performance Standards are exceeded during routine monitoring

4 Description of alternate O&M;
   a. Should systems fail, alternate procedures to prevent release or threatened releases of hazardous substances, pollutants, or contaminants which may endanger public health and the environment or exceed Performance Standards; and
   b Analysis of vulnerability and additional resource requirements should a failure occur.

5. Corrective action,
   a Description of corrective action to be implemented in the event that Performance Standards are exceeded; and
   b. Schedule for implementing these corrective actions

6. Description of equipment,
   a. Equipment identification;
   b Installation of monitoring components;
   c Maintenance of site equipment; and
   d Replacement schedule for equipment and installed components

7 Records and reporting mechanisms required;
   a. Operating logs;
   b Laboratory records,
   c Records for operating costs;
   d Mechanism for reporting emergencies;
   e Personnel and maintenance records, and
   f. Annual reports to State agencies.

E. Task 5: Remedial Action Report

Within 30 days after the Settling Defendants conclude that the Remedial Action has been fully performed and that the Performance Standards have been consecutively achieved at all points throughout the aquifer that have been or will be contaminated by the site for a minimum period of three years of sampling events with a minimum of three sampling events no less than one year apart, and it has been demonstrated that the contaminant concentrations in the groundwater are stable and will remain below Performance Standards on a permanent basis, the Settling Defendants shall submit a Remedial Action Report. This report shall be prepared consistent with the EPA guidance entitled Close Out Procedures for National Priority List Sites, OSWER 9320.2-09A-P, January 2000 or as superseded by subsequent guidance In the report, a Licensed Professional Engineer and the Settling Defendants' Project Coordinator shall state that the Remedial Action has been completed in full satisfaction of the requirements of this Consent Decree. The written report shall contain the following statement, signed by a responsible corporate official of the Settling Defendants or the Settling Defendants' Project Coordinator

"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 there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

The Settling Defendants shall address the EPA's comments on the Remedial Action Report in accordance with the schedule identified in Section VI of this SOW.

F. Task 6: Annual Progress Reports

Settling Defendants shall submit Annual Progress Reports to the EPA throughout implementation and operation of the Remedial Action and Operation and Maintenance (O&M). Annual Progress Reports shall be submitted annually beginning 90 days after completion of the fourth round of quarterly groundwater sampling and continue to be submitted annually until Settling Defendants submit the Remedial Action Report. Annual Progress Reports shall be due within 90 days of the end of the reporting period. Annual Progress Reports shall include, but need not be limited to the following

Description of activities performed during the reporting period,

Summary of sampling results and tests obtained during the reporting period,

Summary of deliverables submitted to EPA during the reporting period,

Description of activities performed in support of the Community Relations Plan,

Description of anticipated work to be performed during the next reporting period,

Percent completion, delays (if any), and efforts to mitigate delays (if required), and

Modifications to work plans or schedules

The Annual Progress Reports shall include an opinion as to whether all of the following conditions are being met: 1) groundwater chemistry conditions that are favorable for the occurrence of biodegradation, 2) a reduction in the concentration of PAHs and BETX along the flow path downgradient of the former source area; and 3) natural attenuation occurring at a rate sufficient to prevent the spread of the contaminant plume. In addition, the Annual Progress Reports shall include an opinion as to whether the remedy continues to be protective

V. CONTENT OF SUPPORTING PLANS

The documents listed in this section must be prepared and submitted as outlined in

previous sections of this SOW. Following are descriptions of the required contents of each of these supporting plans

A. Quality Assurance Project Plan

Settling Defendants shall develop a site-specific Quality Assurance Project Plan (QAPP), which shall address sample analysis and data handling for samples collected in all phases of future Site Work, based upon the Consent Decree and guidance identified by the EPA The QAPP shall be consistent with the requirements of standard EPA methodology for laboratories The QAPP shall at a minimum include

1. Project Description
   - Past Data Collection Activity
   - Project Scope
   - Sample Network Design
   - Parameters to be Tested and Frequency
   - Project Schedule

2. Project Organization and Responsibility

3. Quality Assurance Objective for Measurement Data
   - Level of Quality Control Effort
   - Accuracy, Precision and Sensitivity of Analysis
   - Completeness, Representativeness
   - Comparability

4. Sampling Procedures

5. Sample Custody
   - Field-Specific Custody Procedures
   - Laboratory Chain-of-Custody Procedures

6. Calibration Procedures and Frequency
   - Field Instruments/Equipment
   - Laboratory Instruments

7. Analytical Procedures
   - Analytical Methods
   - Field Screening and Analytical Protocol
   - Laboratory Procedures

8. Internal Quality Control Checks
   - Field Measurements

Laboratory Analysis

9. Data Reduction, Validation and Reporting
   Data Reduction
   Data Validation
   Data Reporting

10. Performance and System Audits
    Internal Audits of Field Activity
    Internal Laboratory Audit
    External Field Audit
    External Laboratory Audit

11. Preventive Maintenance
    Routine Preventative Maintenance Procedures and Schedules
    Field Instruments/Equipment
    Laboratory Instruments

12. *Performance Standard Verification*
    Performance Standard verification shall be described and implemented to ensure that both short-term and long-term Performance Standards for the Remedial Action are met

13. Specific Routine Procedures to Assess Data Precision, Accuracy, and Completeness
    Field Measurement Data
    Laboratory Data

14. Corrective Action
    Sample Collection/Field Measurement
    Laboratory Analysis

15 Quality Assurance Reports to Management

Settling Defendants shall submit a QAPP to EPA for review and approval as part of the Remedial Design/Remedial Action process.

B. Health and Safety Plan

Settling Defendants shall develop a Health and Safety Plan (HASP) designed to protect on-site personnel and area residents from physical, chemical and all other hazards posed by implementation of this Remedial Design/Remedial Action. The safety plan shall develop the performance levels and criteria necessary to address the following areas:

Personnel
Levels of protection
Safe work practices and safety guards
Medical surveillance
Personal and environmental air monitoring
Personal protective equipment
Personal hygiene
Decontamination - personal and equipment
Site work zones
Contaminant control
Contingency and emergency planning
Logs, reports, and record keeping

The HASP shall follow U.S. EPA guidance and all OSHA requirements as outlined in 29 C.F R. Sections 1910 and 1926, as well as the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F R. Section 300.150.

As part of the HASP, Settling Defendants shall include a Contingency Plan describing procedures to be used in the event of an accident or emergency The Contingency Plan 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), if necessary, 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)

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 associated with implementation of the remedial action.

C. **Construction Quality Assurance Plan**

Settling Defendants shall submit a Construction Quality Assurance Plan

("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 Remedial Action elements.

2. Qualifications of the Quality Assurance Official to demonstrate they possess the training and experience necessary to fulfill their 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 Consent Decree shall be included.

5 Reporting requirements for construction quality assurance activities shall be described in detail in the CQAP This shall include, as appropriate, such items as daily summary reports, inspection data sheets, problem identification and corrective measures reports, design acceptance reports and final documentation

VI. SCHEDULE OF MAJOR DELIVERABLES

A summary of the project schedule and reporting requirements contained in this SOW is presented as follows

Submission or Activity	Due Date
Groundwater Sampling Results	90 days after sampling event
Expansion of Contaminant Plume	Immediate notification, Contingency Plan implementation plans within 21 days
Progress Reports	90 days after end of reporting period
Plan to Replace or Repair Damaged Monitoring Well	30 days after discovery of damage or destruction

Replacement or Repair of Damaged Monitoring Well	30 days after EPA's approval of plans to repair or replace well
Remedial Design	60 days after EPA's authorization to proceed
Pre-final Inspection	30 days after completion of construction
Final Inspection	30 days after completion of action items identified during Pre-final Inspection
Interim Remedial Action Report	90 days after final round of quarterly groundwater sampling
O&M Plan	30 days after EPA's approval of Interim RA Report
Remedial Action Report	30 days after completion of Remedial Action

VII. REFERENCE DOCUMENTS

The National Oil and Hazardous Substances Pollution Contingency Plan, 40 C F.R Part 300

"Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA," US EPA, Office of Emergency and Remedial Response, OSWER Directive No. 9355.3-01, EPA/540/G-89/004, October 1988

"EPA Superfund Remedial Design and Remedial Action Guidance," Interim Final, US EPA, Office of Solid Waste and Emergency Response, OSWER Directive 9355 0-4A, June 1986

"Guidance for the Data Quality Objectives Process, EPA QA/G-4," US EPA, Office of Environmental Information, EPA/600/R-96/055, August 2000.

"Guidance for Quality Assurance Project Plans, EPA QA/G-5," US EPA, Office of Research and Development, EPA/600/R-98/018, February 1998.

"EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5," Interim Final, US EPA, Quality Assurance Division, November 1999

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

"Test Methods for Evaluating Solid Wastes," US EPA, Office of Solid Waste and Emergency Response, SW-846, Third Edition, Volumes IA, IB, IC and II, November 1986 (including Final Update I, July 1992; Final Update II, September 1994).

National Primary Drinking Water Regulations, Final Rule, Part II, 40 CFR Parts 141, 142, and 143.

"User's Guide to the Contract Laboratory Program," US EPA, Office of Emergency and Remedial Response, EPA/540/P-91/002, 1991.

"Sampler's Guide to the Contract Laboratory Program," US EPA, Office of Emergency and Remedial Response, EPA/540/P-90/006, 1991

"CERCLA Compliance with Other Laws Manual," Draft Guidance, US EPA, Office of Emergency and Remedial Response, OSWER Directive No. 9234.1-01, EPA/540/G-89/006, August 1988.

"CERCLA Compliance with Other Laws Manual, Part II," Interim Final, US EPA, Office of Emergency and Remedial Response, OSWER Directive No. 9234 1-02, EPA/540/G-89/009, August 1989.

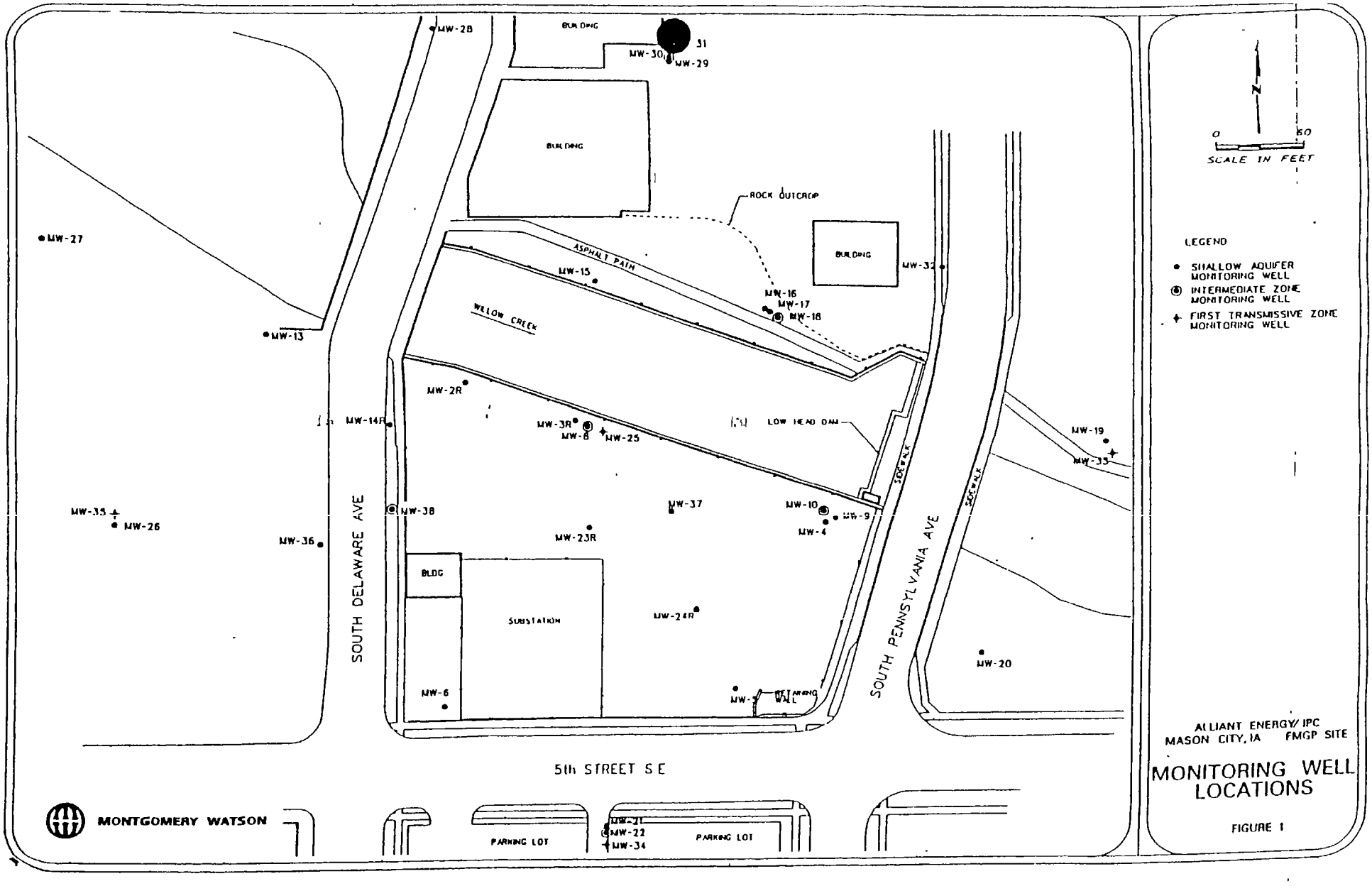
"Overview of the Off-Site Rule for OSCs and RPMs," US EPA, Office of Solid Waste and Emergency Response, EPA Publication No 9834 11FS, September 1993.

"Health and Safety Roles and Responsibilities at Remedial Sites," US EPA, Office of Solid Waste and Emergency Response, EPA Publication No. 9285.1-02, July 1991.

OSHA Regulations in 29 C.F.R Sections 1910 120 (Federal Register 45654, December 19, 1986)

"Contract Laboratory Program (CLP) Users Guide," EPA, 1988.

"Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action and Underground Storage Tank Sites," OSWER Directive 9200 4-17P, April 1999.


MW-28
BUILDING
31
MW-30
MW-29
BUILDING
ROCK OUTCROP
MW-27
ASPHALT PATH
BUILDING
MW-32
MW-15
MW-16
MW-17
MW-18
WILLOW CREEK
MW-13
MW-2R
MW-14R
MW-3R
MW-8
MW-25
LOW HEAD DAM
SOCENE
MW-19
MW-33
MW-35
MW-26
MW-38
MW-37
MW-10
MW-9
MW-4
MW-36
MW-23R
BLDG
SUBSTATION
MW-24R
MW-6
MW-20
SOUTH DELAWARE AVE
SOUTH PENNSYLVANIA AVE
5th STREET S E
PARKING LOT
MW-21
MW-22
MW-34
PARKING LOT
MONTGOMERY WATSON
N
0
60
SCALE IN FEET
LEGEND
SHALLOW AQUIFER MONITORING WELL
INTERMEDIATE ZONE MONITORING WELL
FIRST TRANSMISSIVE ZONE MONITORING WELL
ALLIANT ENERGY/ IPC
MASON CITY, IA FMGP SITE
MONITORING WELL LOCATIONS
FIGURE 1

DECLARATION OF RESTRICTIVE COVENANTS

1. This Declaration of Restrictive Covenants is made this ____ day of _____, 200___, by and between Interstate Power and Light Company, ("Grantor"), having an address of 222 West Washington Avenue, Madison, Wisconsin 53701-0192, the City of Mason City, Iowa ("Grantor") having an address of 10 1st Street NW, Mason City, IA 50401, the United States of America ("Grantee"), having an address of c/o the United States Environmental Protection Agency, Region VII, 901 N. Fifth Street, Kansas City, Kansas 66101; and the State of Iowa ("Grantee"), having an address of c/o the Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319

WITNESSETH:

2. WHEREAS, Grantor is the owner of a parcel of land located in the county of Cerro Gordo, State of Iowa, more particularly described on **Exhibit A** attached hereto and made a part hereof (the "Property"); and

3. WHEREAS, the Property is part of the Mason City Coal Gasification Superfund Site ("Site"), which the U.S. Environmental Protection Agency ("EPA"), pursuant to Section 105 of the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9605, placed on the National Priorities List, set forth at 40 C F R Part 300, Appendix B, by publication in the Federal Register on December 16, 1994, and

4. WHEREAS, in May 1990, the Site was listed on the State of Iowa's *Registry of Confirmed Hazardous Waste or Hazardous Substance Disposal Sites pursuant to* Iowa Code § 455B.426 *et al.*, which provides in pertinent part.

> A A person shall not substantially change the manner in which a hazardous waste or hazardous substance disposal site on the registry...is used without the written approval of the director.
>
> B. A person shall not sell, convey, or transfer title to a hazardous waste or hazardous substance disposal site which is on the registry. without the written approval of the director. Iowa Code § 455B.430; and

5. WHEREAS, in a Record of Decision dated September 19, 2000 (the "ROD"), the EPA Region VII Regional Administrator selected a "remedial action" for the Site, which provides, in part, for the following actions:

Restrictive covenants/deed restrictions, remediation of ground water through the use of monitored natural attenuation.

and

6 WHEREAS, the parties hereto have agreed to impose on the Property use restrictions as covenants that will run with the land for the purpose of protecting human health and the environment;

NOW, THEREFORE.

7. Grant: Grantor, on behalf of itself, its successors and assigns, in consideration of the terms of the Consent Decree in the case of *United States of America v. Interstate Power and Light Company, Kansas City Power and Light Company, and the City of Mason City, Iowa*, does hereby covenant and declare that the Property shall be subject to the restrictions on use set forth below, and does give, grant and convey to the Grantee, and its assigns, with general warranties of title, the perpetual right to enforce said use restrictions with respect to the Property.

8. Purpose: It is the purpose of this instrument to convey to the Grantee real property rights, which will run with the land, to facilitate the remediation of past environmental contamination and to protect human health and the environment by reducing the risk of exposure to contaminants

9. Restrictions on use: The following covenants, conditions, and restrictions apply to the use of the Property, run with the land and are binding on the Grantor:

a) Unless approved in writing by EPA, ground water underlying the Property shall not be utilized for municipal, domestic, or industrial purposes. This excludes the installation of additional or replacement monitoring wells, or wells constructed for the purposes of pumping and treating the ground water, if determined necessary by EPA

b) Unless approved in writing by EPA, the Property shall not be used for residential purposes

c) Unless approved in writing by EPA, buildings utilized for the purpose of industrial or commercial uses on the Property shall not contain a basement.

10 Modification of restrictions The above restrictions may be modified, or terminated in whole or in part, in writing, by the Grantee If requested by the Grantor, such writing will be executed by Grantee in recordable form

11. Reserved rights of Grantor: Grantor hereby reserves unto itself, its successors, and assigns, all rights and privileges in and to the use of the Property which are not incompatible with the restrictions and rights granted herein.

12. Notice requirement: Grantor agrees to include in any instrument conveying any interest in any portion of the Property, including but not limited to deeds, leases and mortgages, a notice which is in substantially the following form:

NOTICE: THE INTEREST CONVEYED HEREBY IS SUBJECT TO A DECLARATION OF RESTRICTIVE COVENANTS, DATED _____, 200__, RECORDED IN *THE PUBLIC LAND RECORDS ON* _____, *200*___, IN BOOK _____, PAGE ____, IN FAVOR OF, AND ENFORCEABLE BY, THE UNITED STATES OF AMERICA.

NOTICE FURTHER: HAZARDOUS WASTES AND/OR HAZARDOUS SUBSTANCES WERE DISPOSED OF ON THIS PROPERTY. IN MAY 1990, THE PROPERTY WAS LISTED ON THE STATE OF IOWA'S REGISTRY OF CONFIRMED HAZARDOUS WASTE OR HAZARDOUS SUBSTANCE DISPOSAL SITES PURSUANT TO *IOWA CODE § 455B.426 ET AL.*, WHICH PROVIDES IN PERTINENT PART:

1. A PERSON SHALL NOT SUBSTANTIALLY CHANGE THE MANNER IN WHICH A HAZARDOUS WASTE OR HAZARDOUS SUBSTANCE DISPOSAL ON THE REGISTRY...IS USED WITHOUT THE WRITTEN APPROVAL OF THE DIRECTOR.

2. A PERSON SHALL NOT SELL, CONVEY, OR TRANSFER TITLE TO A HAZARDOUS WASTE OR HAZARDOUS SUBSTANCE DISPOSAL SITE WHICH IS ON THE REGISTRY...WITHOUT THE WRITTEN APPROVAL OF THE DIRECTOR.

THE CURRENT USE OF THIS SITE IS NON-RESIDENTIAL AND SUBJECT TO THE RESTRICTIONS ON THE USE SET FORTH HEREIN.

Within thirty (30) days of the date any such instrument of conveyance is executed, Grantor must provide Grantee with a certified true copy of said instrument and, if it has been recorded in the public land records, its recording reference

13 Administrative jurisdiction. The federal agency having administrative jurisdiction over the interests acquired by the United States by this instrument is the EPA.

14. Enforcement: The Grantee shall be entitled to enforce the terms of this instrument by resort to specific performance or legal process. All remedies available hereunder shall be in addition to any and all other remedies at law or in equity, including CERCLA. Enforcement of the terms of this instrument shall be at the discretion of the Grantee, and any forbearance, delay or omission to exercise its rights under this instrument in the event of a breach of any term of this instrument shall not be deemed to be a waiver by the Grantee of such term or of any subsequent breach of the same or any other term, or of any of the rights of the Grantee under this instrument.

15. Damages: Grantee shall be entitled to recover damages for violations of the terms of this instrument, or for any injury to the remedial action, to the public or to the environment protected by this instrument

16. Waiver of certain defenses. Grantor hereby waives any defense of laches, estoppel, or prescription.

17 Covenants: Grantor hereby covenants to and with the United States and its assigns, that the Grantor is lawfully seized in fee simple of the Property, that the Grantor has a good and lawful right and power to sell and convey it or any interest therein, that the Property is free and clear of encumbrances, except those noted on **Exhibit B** attached hereto, and that the Grantor will forever warrant and defend the title thereto and the quiet possession thereof.

18 Notices: Any notice, demand, request, consent, approval, or communication that either party desires or is required to give to the other shall be in writing and shall either be served personally or sent by first class mail, postage prepaid, addressed as follows:

To Grantor Interstate Power and Light Company:

_____

_____

_____

To Grantor city of Mason City, Iowa:

_____

_____

_____

To Grantee United States of America:

_____

_____

_____

To Grantee State of Iowa:

_____

_____

_____

19. Term of Covenants: The covenants contained herein shall be deemed covenants running with the land, and shall remain in full force and effect until twenty-one (21) years after the date these covenants are recorded in the Office of the County Recorder of the county where the Property is located. These covenants may be extended for successive twenty-one (21) year periods by the filing of a verified claim in accordance with Iowa Code § 614.24.

20. General provisions:

a) Controlling law: The interpretation and performance of this instrument

shall be governed by the laws of the United States or, if there are no applicable federal laws, by the law of the state where the Property is located

b) Liberal construction: Any general rule of construction to the contrary notwithstanding, this instrument shall be liberally construed in favor of the grant to effect the purpose of this instrument and the policy and purpose of CERCLA. If any provision of this instrument is found to be ambiguous, an interpretation consistent with the purpose of this instrument that would render the provision valid shall be favored over any interpretation that would render it invalid.

c) Severability. If any provision of this instrument, or the application of it to any person or circumstance, is found to be invalid, the remainder of the provisions of this instrument, or the application of such provisions to persons or circumstances other than those to which it is found to be invalid, as the case may be, shall not be affected thereby

d) Entire Agreement: This instrument sets forth the entire agreement of the parties with respect to rights and restrictions created hereby, and supersedes all prior discussions, negotiations, understandings, or agreements relating thereto, all of which are merged herein.

e) No Forfeiture: Nothing contained herein will result in a forfeiture or reversion of Grantors' title in any respect.

f) Joint Obligation: If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

g) Successors: The covenants, terms, conditions, and restrictions of this instrument shall be binding upon, and inure to the benefit of, the parties hereto and their respective personal representatives, heirs, successors, and assigns and shall continue as a servitude running in perpetuity with the Property. The term "Grantor", wherever used herein, and any pronouns used in place thereof, shall include the persons and/or entities named at the beginning of this document, identified as "Grantor" and their personal representatives, heirs, successors, and assigns. The term "Grantee", wherever used herein, and any pronouns used in place thereof, shall include the persons and/or entities named at the beginning of this document, identified as "Grantee" and their personal representatives, heirs, successors, and assigns. The rights of the Grantee and Grantor under this instrument are freely assignable, subject to the notice provisions hereof

h) Termination of Rights and Obligations: A party's rights and obligations under this instrument terminate upon transfer of the party's interest in the Property, except that liability for acts or omissions occurring prior to transfer shall survive transfer.

i) Captions. The captions in this instrument have been inserted solely for convenience of reference and are not a part of this instrument and shall have no effect upon construction or interpretation

j) Counterparts The parties may execute this instrument in two or more counterparts, which shall, in the aggregate, be signed by both parties; each counterpart shall be deemed an original instrument as against any party who has signed it. In the event of any disparity between the counterparts produced, the recorded counterpart shall be controlling.

TO HAVE AND TO HOLD unto the United States and its assigns forever

IN WITNESS WHEREOF, Grantor has caused this Agreement to be signed in its name.

Executed this _____ day of _____, 200__

INTERSTATE POWER AND LIGHT COMPANY:

_____

By: _____

Its. _____

STATE OF _____)
) ss
COUNTY OF _____)

On this __ day of _____, 200__, before me, the undersigned, a Notary Public in and for the State of Iowa, duly commissioned and sworn, personally appeared _____, known to be the _____ of _____, the corporation that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that they are authorized to execute said instrument

Witness my hand and official seal hereto affixed the day and year written above

_____
Notary Public in and for the
State of Iowa

My Commission Expires: _____.

Executed this _____ day of _____, 200__.

CITY OF MASON CITY, IOWA:

_____

By: _____

Its: _____

STATE OF _____)
) ss
COUNTY OF _____)

On this __ day of _____, 200__, before me, the undersigned, a Notary Public in and for the State of Iowa, duly commissioned and sworn, personally appeared _____, known to be the _____ of _____, the corporation that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that they are authorized to execute said instrument.

Witness my hand and official seal hereto affixed the day and year written above

_____
Notary Public in and for the
State of Iowa

My Commission Expires. _____.

This declaration is accepted this ____ day of _____ , 200__.

UNITED STATES OF AMERICA
U S ENVIRONMENTAL PROTECTION AGENCY

By: _____

_____

This declaration is accepted this ____ day of _____ , 200__.

STATE OF IOWA

By _____

_____

Attachments

Exhibit A - legal description of the Property

Exhibit B - list of permitted title encumbrances