SUPERFUND PROGRAM
PROPOSED PLAN

PEOPLES NATURAL GAS SITE
IAD980852578
DUBUQUE, IOWA

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 7

JUNE 2013

THE EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan identifies the Preferred Alternative for a Record of Decision (ROD) amendment addressing contamination at the Peoples Natural Gas site (the Site) and provides the rationale for the Preferred Alternative. In addition, this Proposed Plan includes summaries of other alternatives evaluated for use at this site. This Proposed Plan is issued by the U.S. Environmental Protection Agency (EPA), the lead agency for the Site. The Iowa Department of Natural Resources (IDNR) is the support agency. The EPA, in consultation with IDNR, will select a remedy to address contamination at the Site after reviewing and considering all information submitted during the 30-day public comment period. The EPA, in consultation with IDNR, may modify the Preferred Alternative or select another alternative presented in this Proposed Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives presented in this Proposed Plan.

The EPA is issuing this Proposed Plan as part of its public participation responsibilities under section 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and section 117(a) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). This Proposed Plan summarizes information that can be found in greater detail in documents contained in the Administrative Record (AR) file for the Site. The EPA and IDNR encourage the public to review these documents to gain a more comprehensive understanding of the Site and the Superfund program activities that have been conducted at the Site.

PUBLIC-COMMENT PERIOD:
June 26 – July 25, 2013
The EPA will accept comments on the Proposed Plan during the public-comment period. Comments should be submitted to Ben Washburn, Community Involvement Coordinator at 11201 Renner Boulevard, Lenexa, Kansas 66219, by telephone at (800) 223-0425 or by email at washburn.ben@epa.gov.

PUBLIC MEETING:
July 8, 2013
The EPA will hold a public meeting to provide information and answer questions on this Proposed Plan. Oral and written comments will also be accepted at the meeting. The meeting will be held at the Carnegie-Stout Public Library, 360 West 11th Street in Dubuque, Iowa, at 7:00 p.m.

For more information, see the AR file at one of the following locations:

U.S. EPA Region 7
Records Center
11201 Renner Boulevard
Lenexa, Kansas 66219

Carnegie-Stout Public Library
360 West 11th Street
Dubuque, Iowa 52001

SITE BACKGROUND

The Site occupies approximately five acres and is located near the intersection of East 11th Street and Kerper Boulevard in the eastern part of Dubuque, Iowa (Figure 1). The Site is approximately 300 feet west of the Mississippi River and is protected by a 500-year flood protection levee. The eastern portion of the Site is owned by the city of Dubuque. The city previously operated a public works garage on the property and is currently leasing a part of the property to a tenant for storage of building materials. The western portion of the Site is owned by the Iowa Department of Transportation. A section of U.S. Highway 61 was constructed on this part of the Site following completion of a removal action to address contaminated soil.

The Site is the location of a former manufactured gas plant (MGP) that operated from approximately the 1930s to 1954. Aboveground structures were dismantled in 1957. During operation of the plant, coal tar and cyanide-bearing wood chips were produced as by-products of gas production and stored on-site. Coal tar is a mixture of compounds including polynuclear aromatic compounds (PAHs) and volatile organic compounds (VOCs), particularly benzene, toluene, ethylbenzene and xylenes (collectively referred to as BTEX). Coal tar was stored in one underground tank and one aboveground tank on the Site. The wood chips were buried on the eastern portion of the Site.

Contamination at the Site was first identified during a geotechnical investigation conducted by the Iowa Department of Transportation in preparation for construction of a new section of U.S. Highway 61 across the western portion of the Site. Subsequent investigations performed by the EPA and Midwest Gas (currently MidAmerican Energy Company), a responsible party for the Site, determined the nature and extent of contamination at the Site.

A removal action was initiated in 1989 to address soil contamination in the area where the highway construction was to take place. During the removal action, 6,850 cubic yards of contaminated soil and wastes were excavated and destroyed by blending with coal and burning in a utility boiler.

On August 30, 1990, the Site was listed on the National Priorities List (NPL). The NPL is the list of national priorities among the known releases or threatened releases of hazardous substances, pollutants or contaminants throughout the U.S. and its territories.

In May 1991, MidAmerican Energy Company (MidAmerican) completed a Remedial Investigation/Feasibility Study (RI/FS). This RI/FS described the nature and extent of contamination associated with the Site, the risks that were posed and alternatives for remediation of the contamination. Two groundwater units were identified and investigated at the Site. The shallowest, a thin, silty sand unit referred to in Site documents as the silty sand aquifer, lies between two clay-confining units referred to as the upper confining unit (UCU) and the lower confining unit (LCU). The UCU directly underlies the clay fill and clean granular fill at the surface of the Site. The alluvial aquifer of the Mississippi River underlies the LCU. The silty sand unit is present in a limited area in the vicinity of the Site and is actually part of the alluvial aquifer. The silty sand unit is referred to as the "silty sand aquifer" in Site documents and throughout this Proposed Plan for consistency, even though it is not a separate aquifer. The alluvial aquifer is used as a source of drinking water in the Dubuque area. Figure 2 depicts a model cross-section of the Site.

The EPA presented the preferred alternative for remediation of the Site to the public in a Proposed Plan and selected the remedy for the Site in a ROD dated September 16, 1991. The remedy selected in the ROD included the following actions:

- Excavation and incineration of contaminated soil from the surface to six feet below grade that exceeded 100 milligrams per kilogram (mg/kg) of carcinogenic PAHs and 500 mg/kg total PAHs;
- Excavation and incineration of contaminated source soils that have visible coal tar contamination from six feet below grade to the surface of the upper confining unit;
- Enhanced in situ bioremediation to treat the contaminated groundwater and contaminated source soils in the silty sand aquifer;

- Groundwater extraction of both the silty sand and alluvial aquifers to reduce contaminant concentrations to levels established by the state of Iowa Administrative Code Chapter 133; and
- Groundwater monitoring of both the silty sand and alluvial aquifers to ensure successful implementation of the groundwater treatment systems.

On October 10, 1991, MidAmerican's predecessor, Midwest Gas; the Iowa Department of Transportation; the city of Dubuque, Iowa; and Enron Corporation entered into a Consent Decree to perform the remedial design and remedial action as well as pay past costs and response costs associated with the cleanup of the Site. MidAmerican has conducted the work at the Site including preparation of a remedial design and implementation of the remedial action.

It was determined during the remedial design that the contaminant concentrations in the alluvial aquifer did not warrant installation of a groundwater extraction system in that aquifer. Further, because there is communication between the more heavily contaminated silty sand aquifer and the alluvial aquifer, pumping of the alluvial aquifer may have resulted in the movement of contaminants from the shallower silty sand to the deeper alluvial aquifer. This change in the remedy was documented in an Explanation of Significant Differences (ESD) dated March 1, 2000.

In March 2004, MidAmerican submitted a request to IDNR for support to modify the remediation levels for benzene from the negligible risk level of 1 microgram per liter (µg/l) to the Maximum Contaminant Level (MCL) of 5 µg/l pursuant to the Safe Drinking Water Act for public water supplies, and the health advisory level (HAL) for naphthalene at the time of the ROD of 20 µg/l to the revised HAL of 100 µg/l. The EPA received a letter from IDNR in April 2004 supporting these changes. It was determined at that time that the requested modifications were protective and consistent with federal applicable or relevant and appropriate requirements (ARARs), and the modifications were incorporated into a second ESD dated December 28, 2004.

As described previously, contaminated soil from the western portion of the Site was excavated during a removal action prior to initiation of the remedial action. A portion of the contaminated soil and wastes from the eastern portion of the Site were excavated during the removal action and co-burned with coal in a utility boiler during the remedial action. An additional 10,400 cubic yards of contaminated soil and wastes that were accessible were excavated during the remedial action. The areas excavated were backfilled with clean fill, thus eliminating direct contact with contaminated soil. All planned soil remediation was completed in 1998. Soil was not excavated from beneath the building and sewer main on-site since it was not readily accessible and did not pose a direct-contact threat. If at some time in the future these structures are removed and contaminated soil is found in these locations, additional soil remediation may be required consistent with the 1991 ROD.

The groundwater extraction system in the silty sand aquifer consisted of one extraction well and one interception trench, more commonly referred to as the "drain sump." Water was piped from the extraction well and the drain sump to an on-site water treatment facility which included an air stripper. The treated water was disposed of into the city of Dubuque sanitary sewer system for treatment at the municipal wastewater treatment facility. Installation of the groundwater extraction and treatment systems was completed in January 1996. Groundwater monitoring has been conducted regularly since that time.

From 1994 through 1999, several investigations and pilot studies were conducted to evaluate the appropriate method of in situ bioremediation to treat the contaminated groundwater and contaminated source soil in the silty sand aquifer. Ultimately, it was determined that ozone sparging in conjunction with soil vapor extraction (SVE) could effectively reduce contaminant concentrations in the groundwater. The SVE system removed vapors liberated from the silty sand aquifer into the vadose zone. These vapors were treated prior to discharge to the atmosphere. Construction of the ozone-sparging/SVE system was completed in September 2000. The system was operated until October 12, 2002. At that time, it was determined that the potential reductions in contaminant levels in the silty sand aquifer that would result from continued operation of the system were limited, while the cost of operation would remain quite high. Approximately 500 pounds of VOC contamination was removed during operation of the ozone-sparging/SVE system.

Throughout the period of operation of the groundwater extraction and treatment system, high levels of dissolved solids and iron that naturally exist in the aquifer created fouling problems. Specifically, the rate of groundwater extraction would become significantly diminished when the well screens and the area surrounding the well screen became fouled. As the efficiency of the extraction system decreased, the ability of the system to capture the contaminated groundwater in the silty sand aquifer decreased. The dissolved solids and iron in the extracted groundwater also caused fouling of the air stripping equipment, which reduced that system's performance.

To address the persistent fouling, the extraction well and drain sump were cleaned repeatedly using both chemical and mechanical methods. Modifications to the groundwater treatment system were also made to optimize its performance. Eventually it was determined that fouling and scaling in the extraction well, lines and treatment system rendered them inoperable. The groundwater extraction and treatment system was shut down on March 17, 2003, and has not operated since that time. During the time the system operated, approximately 30 million gallons of groundwater was extracted and treated, removing 380 pounds of BTEX and 210 pounds of PAHs.

From June 2001 through March 2002, dense nonaqueous phase liquid (DNAPL), which had previously been identified in only two monitoring wells, flowed into the drain sump in significant quantities. During late 2004, an investigation was conducted using the Tar-Specific Green Optical Screening Tool (TarGOST™)/cone penetrometer to assess the location and estimate the volume of DNAPL present in the subsurface throughout the Site. Figure 3 shows the locations where DNAPL was detected. The majority of DNAPL has been identified in the silty sand unit between the UCU and the LCU, and downward movement appears to be limited by the LCU. The LCU is upward-sloping along the eastern edge of the site, limiting movement toward the Mississippi River. A detailed description of the location of DNAPL is included in section 5.5.2 of the Technical Impracticability (TI) Evaluation Report which is included in the AR file. As a result of this investigation, the total mass of PAHs and BTEX at the Site was estimated to be 608,380 and 5,910 pounds, respectively. The majority of this contaminant mass is DNAPL.

Numerous additional studies and investigations have been conducted from 2004 to the present. They include assessment of the relief holder beneath the maintenance garage where it was determined there was no significant accumulation of DNAPL, installation of new monitoring wells and borings to monitor the downgradient plume and delineate the extent of the LCU, assessment of potential remedial alternatives and abandonment and/or replacement of monitoring wells that were damaged or no longer needed.

SITE CHARACTERISTICS

Site Geology and Hydrogeology: The Site is located on the floodplain of the Mississippi River. The MGP facility was built on imported clay fill material of a thickness of 6 to 20 feet placed onto over-bank river sediments. Much of the clay fill has been replaced by clean granular fill during the soil remediation activities that have occurred at the Site. Two groundwater units have been investigated at the Site. A silty sand unit lies between two clay-confining units, referred to as the UCU and the LCU. The UCU directly underlies the clay fill and clean granular fill. The alluvial aquifer of the Mississippi River underlies the LCU. The alluvial aquifer is used as a source of drinking water in the Dubuque area.

While the LCU appears to exist in all of the contaminated areas of the Site, it appears to be absent in areas north of the Site, in areas near monitoring wells W-13 and W-113 south of the Site and in some portions of the Highway 61 corridor. In the areas where the LCU is absent, the alluvial aquifer occurs directly beneath the UCU. Figure 4 shows the elevation of the base of the LCU.

The silty sand aquifer ranges in thickness from 2.5 feet to over 13 feet. The silty sand aquifer is comprised of silty sand, poorly graded sand with silt and poorly graded sand. This aquifer is generally thicker and exhibits a deeper base in the eastern and northern portions of the Site.

The alluvial aquifer consists of poorly graded sand and is approximately 150 feet thick in the vicinity of the Site, with coarse gravels predominating the lower 50 feet. The alluvial aquifer occurs between 19 and 29 feet below ground surface (bgs) in the northern portion of the Site, an average of 33 feet bgs in the central portion of the Site, and approximately 41 feet bgs in the easternmost portion of the Site.

The groundwater flow direction in the silty sand aquifer and alluvial aquifer has varied significantly over the course of site work primarily due to pumping of groundwater in the vicinity of the Site and variations in surface water levels in the Mississippi River. Groundwater flow directions in both aquifers have ranged from north-northeast to south-southeast when the on-site extraction well and drain sump pump were not operating. Historical water-well surveys identified several wells in the area pumping large volumes of water from the alluvial aquifer that had a significant effect on the direction of groundwater flow at the Site. There are currently no wells in proximity of the Site that are known to be influencing groundwater flow at the Site. Currently, groundwater flow in the silty sand aquifer is generally to the east-southeast, with occasional westerly components. The flow is bifurcated at times, which is likely the effect of flow in the river being diverted westerly by higher hydraulic head in the Mississippi River. The average horizontal gradient in the silty sand aquifer is 0.0014 foot per foot. Since shutdown of the extraction system and the off-site wells, the Mississippi River and Dove Harbor typically have a lower elevation than the groundwater in the silty sand wells nearest the levee, indicating it is a gaining stream in this area. During times of high river levels, groundwater flow is reversed over a portion of the Site. Groundwater flow in the alluvial aquifer is generally to the east-southeast. The average horizontal gradient in the alluvial aquifer is 0.0007 foot per foot. Slight downward gradients were observed between the silty sand and alluvial aquifers in the main portion of the Site and slightly upward gradients were observed near Dove Harbor during low river stage.

Dove Harbor is the closest portion of the Mississippi River to the Site. The base of Dove Harbor is maintained at an elevation of 581 to 583 feet above sea level. A survey of channel depths by the U.S. Army Corps of Engineers from 1998 shows the maximum depth of the Mississippi River in the vicinity of the Site to be approximately 31 feet below the normal pool elevation of 592 feet above sea level, or 561 feet above sea level. Therefore, it appears that the silty sand aquifer lies below the bottom of Dove Harbor, separated vertically from the bottom sediments and water of the harbor by approximately 4.5 feet or more of UCU materials, based upon the elevation of the silty sand aquifer around monitoring well P-112 (refer to Figure 2). The top of the LCU slopes upward near the river. It appears that groundwater in the fill material at the water table may discharge into Dove Harbor during periods of low and normal river levels.

Groundwater Contamination: The groundwater contamination at the Site has been routinely monitored for BTEX and PAHs since implementation of the remedial action. The most recent sampling results reported are from September 2012 and are as follows:

- For wells screened at the water table, benzene ranged from 557 µg/L to below detection limits; and naphthalene, the most mobile of the PAHs, from 7.29 µg/L to nondetect.

- For wells screened in the silty sand aquifer, benzene ranged from 2,080 µg/L to nondetect, and naphthalene from 2,540 µg/L to nondetect.

- In the alluvial aquifer benzene was only detected in one well, MW-21R, most recently at 57.3 µg/L.

In 2005, MW-21 was replaced when it was determined that the original well casing was cracked, allowing groundwater from the more heavily contaminated silty sand aquifer to move into the alluvial aquifer at that location. Low levels of naphthalene were found in three alluvial aquifer wells in September 2012. Figures 5 and 6 show the extent of benzene and naphthalene contamination in the silty sand and alluvial aquifers.

Land Use: As described previously, the eastern portion of the Site is owned by the city, where a public works garage was operated on the property until early 2006. The former public works garage remains on the property. The city continues to store equipment on part of the property and lease a portion of the property to a tenant for storage of building materials. Future use of the property is anticipated to be similar. Consideration is being given to using the property for storage and light maintenance of city buses. The western portion of the Site is where a section of U.S. Highway 61 lies, and it is owned by the Iowa Department of Transportation. This is not anticipated to change. The area surrounding the Site is used for industrial purposes and that is not anticipated to change.

Conclusions Reached Since the 1991 RI/FS and ROD: Through implementation of the remedy and additional investigations that have been conducted at the Site, some new conclusions have been reached:

- The mass of DNAPL remaining at the Site is substantially larger than the amount estimated in the RI. The screening technology used to quantify the DNAPL mass did not exist in 1991.

- Iron and fouling significantly impact the ability to extract and treat the groundwater.

- The groundwater flow direction in the affected aquifers during the RI and design of the remedy was significantly affected by pumping of off-site wells that are no longer in operation.

- The extent of the LCU has been more completely defined and appears to limit the movement of DNAPL from the silty sand aquifer to the Mississippi River.

- The contaminated groundwater is not considered to be a principal threat for the Site as defined below. DNAPLs found in the groundwater may be considered source material, and, therefore, a principal threat at this Site.

WHAT IS A PRINCIPAL THREAT?

The NCP establishes an expectation that the EPA will use treatment to address the principal threats posed by a site wherever practicable [NCP Section 300.430(a)(1)(iii)(A)]. The principal threat concept is applied to the characterization of source materials at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater, surface water or air, or acts as a source for direct exposure. Contaminated groundwater generally is not considered to be a source material; however, nonaqueous phase liquids (NAPLs) in groundwater may be viewed as source material.

SCOPE AND ROLE OF THE ACTION

This action will amend the 1991 ROD for the Site, which has previously been modified by ESDs in 2000 and 2004. The scope of the actions to be undertaken when this amendment is implemented will more effectively prevent unacceptable exposures to contaminated groundwater, limit migration of contaminated groundwater and mitigate potential vapor intrusion from groundwater at the Site. The removal and remedial actions already completed at the Site have addressed the soil contamination that is currently accessible.

SUMMARY OF SITE RISKS

As part of the RI, a baseline risk assessment was conducted to determine the current and future effects of site contaminants on human health and the environment. The May 1991 baseline risk assessment was referred to as an endangerment assessment and included a human health baseline risk assessment and an ecological risk assessment. Since that time, changes in risk assessment methodology, assumptions and toxicity and their effect on the protectiveness of the remedy have been evaluated during five-year reviews of the remedy, documented most recently in the Third Five-Year Review Report dated July 22, 2010.

Based upon the results of the endangerment assessment and the updated information in the most recent five-year review, it is the EPA's current judgment that the Preferred Alternative identified in this Proposed Plan or one of the other measures considered is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund human health risk assessment estimates the baseline risk. This is an estimate of the likelihood of health problems occurring if no cleanup action were taken at a site. To estimate the risk, the process undertakes four steps:

Step 1: Analyze Contamination
Step 2: Estimate Exposure
Step 3: Assess Potential Health Dangers
Step 4: Characterize Site Risks

In Step 1, comparisons are made between site-specific concentrations and health-based standards to determine which contaminants are most likely to pose the greatest threat to human health.

In Step 2, different ways people might be exposed to contaminants are identified. Concentrations, frequency and duration of exposure are used to calculate the reasonable maximum exposure (RME) which portrays the highest level of exposure that could reasonably be expected to occur.

In Step 3, information from Step 2 is combined with toxicity information for each chemical to assess potential health risks. The EPA considers two types of risk: cancer and noncancer. The likelihood of any kind of cancer resulting from a site is generally expressed as an upper bound probability. For example, a 1-in-10,000 chance means for every 10,000 people exposed, one extra cancer may occur as a result of exposure from the site. For noncancer effects, a hazard index is calculated. The key concept here is that a hazard index less than 1 predicts no noncancer effects.

In Step 4, the results of the three previous steps are combined, evaluated and summarized into a total site risk. The EPA then determines if the site risk requires action to prevent exposures to the contaminants.

Human Health Risks

In the 1991 baseline risk assessment, the following contaminants were identified as the contaminants of potential concern (COPCs) in groundwater: benzene; benzo(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; benzo(k)fluoranthene; dibenz(a,h)anthracene; indeno(1,2,3-cd)pyrene; chrysene; fluorine; fluoranthene; pyrene; acenaphthene; anthracene; and cyanide. All of these COPCs, except benzene and cyanide, are among a group of compounds referred to as PAHs. In the 1991 ROD, in addition to the COPCs identified during the baseline risk assessment, naphthalene, ethylbenzene, toluene and xylenes were added as contaminants of concern (COCs) for groundwater because they were present at concentrations that exceeded state regulatory levels. Naphthalene is a PAH. Benzene, toluene, ethylbenzene and xylenes are commonly referred to as BTEX.

PAHs: There are 16 PAH compounds that are routinely analyzed at MGP sites. Seven of these compounds, benzo(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; benzo(k)fluoranthene; dibenz(a,h)anthracene; and indeno(1,2,3-cd)pyrene are classified by the EPA as probable human carcinogens. Naphthalene is classified by the EPA as a possible human carcinogen. Naphthalene was considered noncarcinogenic at the time of the 1991 ROD. Benzo(a)pyrene and dibenz(a,h)anthracene are considered to have the highest level of carcinogenicity of the PAHs. The only PAH to have an MCL is benzo(a)pyrene at 0.2 µg/L. In addition to being carcinogenic, naphthalene also poses a relatively high level of noncancer risk to humans through inhalation of the vapors. The noncancer risks posed by naphthalene are currently considered to be much higher than they were at the time of the 1991 ROD.

BTEX: These four compounds are VOCs commonly found at MGP and petroleum sites. Benzene and ethylbenzene are considered carcinogenic, while toluene and xylenes are not. The EPA considers benzene to be a known human carcinogen. The MCL for benzene is 5 µg/L. MCLs for the other three compounds are 1,000 µg/L (toluene); 700 µg/L (ethylbenzene); and 10,000 µg/L (xylenes).

As described in the most recent five-year review report, cyanide was identified as a COPC in the baseline risk assessment, but it was not a COC in the 1991 ROD. While not explained in the ROD, further evaluation of the noncancer risk associated with this compound in groundwater at the Site indicated the HI was 1.86×10^{-3} for an adult resident, and 1.91×10^{-3} for a child resident. These levels are so low that cyanide was properly eliminated as a COC.

The potential human receptors that were evaluated for exposure to groundwater in the baseline risk assessment were future off-site adults and children using the groundwater as a primary drinking water source. Only ingestion of groundwater was considered and the concentrations of the COCs that were used were those found in a well that is now abandoned and upgradient of the Site due to the change in groundwater flow direction that has occurred since pumping has ceased at several wells in the area. Current risk assessment methodology would also include evaluation of dermal contact with groundwater and inhalation of VOCs in groundwater due to household water uses (that is, showering and cooking).

At the time the original baseline risk assessment was conducted, there were no current exposures to the groundwater contaminants since no one was using water from the plume. That is still the case. Potential vapor intrusion from contamination in subsurface soil and groundwater into buildings was not assessed during the baseline risk assessment. The threat of vapor intrusion is not an exposure pathway that needs to be considered for the current use of the former public works garage, but must be considered should the use of that building change in the future, or if a new building was to be built over the plume.

In an effort to evaluate the current human health risks associated with exposure to groundwater at the Site, a screening-level risk evaluation was conducted using recent monitoring data from the Site and current risk methodologies. The results of the screening-level evaluation are summarized in Table 1. The estimated excess individual lifetime cancer risks for benzene, ethylbenzene, benzo(a)pyrene and naphthalene are significantly greater than 1×10^{-4}, or 1 in 10,000, in the event of domestic use of a well in the contaminated groundwater plume at some time in the future. In addition, the noncancer hazard quotient (HQ) is greater than 1 for benzene, ethylbenzene and naphthalene in the event of domestic use of a well in the contaminated groundwater plume at some time in the future. Specifically, naphthalene presents the highest excess individual lifetime cancer risk of 2×10^{-2}, or 2 in 100, and noncancer HQ of 497.

Table 1
Groundwater Exposure
Estimated Cancer Risks and Hazard Quotients

Contaminant	EPC (µg/L)[1]	Cancer Risk	Hazard Quotient
Benzene	1,426	4×10^{-3}	49
Ethylbenzene	984	8×10^{-4}	1.5
Benzo(a)pyrene	10.1	4×10^{-3}	---
Naphthalene	3,033	2×10^{-2}	497

[1]Exposure point concentrations (EPCs) are based on 95 percent upper confidence limits (UCLs) of the arithmetic mean. If insufficient data were available to calculate 95 percent UCLs, then arithmetic means were calculated. In general, the only data used in the calculation of EPCs was from wells in which concentrations exceeded MCLs.

These estimated risk values exceed the EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} and noncancer HQ of 1. Therefore, a significant human health threat exists if groundwater in the plume at the Site is used for domestic purposes. Since this was a screening-level risk evaluation, the excess individual cancer risks for each compound were not added together to evaluate overall cancer risk, but clearly that value would be greater than any of the individual cancer risk values. Likewise, the individual noncancer HQs were not added together to determine the noncancer HI, but given the individual HQs that exceeded 1, it is certain that adding together multiple compounds would result in an HI greater than one.

A screening-level evaluation of future human health risks associated with vapor-intrusion exposure was conducted using monitoring data from the Site and current risk methodologies. The results of the screening-level evaluation are summarized in Table 2. The estimated excess individual lifetime cancer risks for benzene, ethylbenzene and naphthalene are greater than 1×10^{-4}, or 1 in 10,000. In addition, the noncancer HQ is greater than 1 for benzene and naphthalene. Specifically, benzene presents the highest excess individual lifetime cancer risk of 5×10^{-4}, or 5 in 10,000, and naphthalene presents the highest noncancer HQ of 5.5. These estimated risk values exceed the EPA's target cancer risk range of 1×10^{-6} to 1×10^{-4} and noncancer HQ of 1. Based on this evaluation, contaminants in groundwater at the Site are at concentrations that may pose a significant health risk through vapor intrusion. The total excess individual lifetime cancer risk and noncancer HQs may be higher than presented in this screening-level risk assessment because risk was only determined for individual contaminants.

Table 2
Indoor Air Exposure Due to Vapor Intrusion
Estimated Cancer Risks and Hazard Quotients[1]

Contaminant	Groundwater EPC[2] (µg/L)	Calculated Indoor Air Concentration (µg/m³)	Carcinogenic Risk	Hazard Quotient
Benzene	1426	156	5.0E-04	5.0
Ethylbenzene	984	128	1.3E-04	0.1
Naphthalene	3033	17.2	2.4E-04	5.5

[1]Indoor air concentrations, carcinogenic risk, and noncarcinogenic hazards were calculated using the Vapor Intrusion Screening-level Calculator (USEPA, 2012a).
[2]Exposure point concentrations are based on 95 percent UCLs of the arithmetic mean. If insufficient data are available to calculate 95 percent UCLs, then arithmetic means were calculated. In general, the only data used in the calculation of EPCs was from wells in which concentrations exceeded MCLs.

Ecological Risks

In the endangerment assessment, ecological risk was evaluated for freshwater aquatic life in the Mississippi River and Dove Harbor. Since the limited number of surface water and sediment samples collected did not contain detectable levels of site contaminants, contaminant transport modeling was used to estimate the concentrations of four contaminants (benzene, benzo[a]anthracene, benzo[a]pyrene and naphthalene) that could be expected in surface water in both the harbor and the river in the future if no action was taken. These concentrations were used to assess the ecological risk and the conclusion reached was that there would not be any adverse impacts to aquatic life. However, the chronic and acute contaminant levels in freshwater used in the 1991 endangerment assessment for comparison are not consistent with the levels that would now be used to assess risk in freshwater. Of the four contaminants considered, the only contaminant in surface water that might pose an unacceptable level of risk using current methodology would be naphthalene in surface water in Dove Harbor, but it was determined that the risk would be minimal.

In the ecological risk assessment, there was no consideration given to sediment contamination that might be expected to occur from the contaminants entering the harbor or river from the Site. During the most recent five-year review, it was noted that it would be desirable to sample the harbor sediment since PAHs have a preference to adhere to sediment. Since Dove Harbor is dredged periodically to maintain the depth of the harbor for navigation, it might be possible to sample sediment in conjunction with dredging of the harbor. Due to the barge traffic in the harbor and the proximity of the coal pile at a nearby power plant, both potential sources of PAH contamination, it may be very difficult to determine whether the source of PAH contamination is the Site or these other sources. Sampling of sediment and comparison to appropriate ecological benchmarks will occur if it becomes possible to target the discharge point for contaminated groundwater originating from the Site.

In conclusion, if groundwater from the Site is allowed to discharge to Dove Harbor, it may be possible for aquatic life to be exposed to an unacceptable level of naphthalene in surface water. The effect of this groundwater discharge to the sediment of Dove Harbor has not been quantified, but would be difficult to attribute to the Site since multiple sources of the same contaminants are present in and around the harbor.

REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) provide a general description of what the actions taken at a site are expected to accomplish. RAOs are most often general objectives such as prevention of exposure to contaminants, prevention of contaminant migration or restoration of groundwater to drinking water quality. The RAOs for this site in the 1991 ROD were as follows:

- Minimize direct contact with soil;
- Minimize the potential exposure to users of the alluvial aquifer to groundwater with contaminants that exceed MCLs, have a total excess lifetime cancer risk of greater than $1x10^{-6}$ or have a HI that exceeds 1;
- Provide remedies that allow eventual achievement of other groundwater standards that are applicable or relevant and appropriate in the alluvial aquifer; and
- Minimize migration of contaminants from other media to the extent necessary to protect the alluvial aquifer.

In addition to the existing RAOs, two RAOs are being added:

- Prevent and/or reduce future human exposure to indoor air containing COCs that exceed health-based levels, and
- Prevent migration of contaminated groundwater from the Site to the Mississippi River.

Cleanup levels are the concentrations of the COCs in the affected media that must not be exceeded to ensure that the RAOs will be met. Soil cleanup levels were established in the 1991 ROD. Visibly contaminated soil from the surface to 6 feet below grade and more heavily contaminated soil from 6 feet to the upper confining unit, or the maximum depth that could be reached by the excavator, was excavated, treated off-site and replaced with clean fill.

Groundwater cleanup levels were established in the 1991 ROD, and the levels for benzene and naphthalene were modified in the 2004 ESD. However, as has been noted in the most recent five-year review, there have been numerous changes to toxicity values and risk assessment methodology which affect the levels of some of the COCs that would be protective. The cleanup levels for groundwater at the Site are listed in Table 3. The revised cleanup levels for groundwater were determined based upon the following hierarchy:

- The MCL is the cleanup level for COCs with MCLs.
- For COCs without an MCL, a risk-based cleanup level was determined based on an excess lifetime cancer risk of 1×10^{-6} and/or a target HQ of 1.
- When the risk-based level is below the laboratory practical quantitation limit (PQL), the PQL is the cleanup level provided it falls within the acceptable risk range.

Table 3
Groundwater Cleanup Levels
in micrograms per liter (μ/L)

Contaminant of Concern	Current Cleanup Level (1991 ROD or ESDs)	Chemical-Specific ARAR (MCLs)	Risk-Based Level[1]	Practical Quantitation Limit[2]	Revised Cleanup Level
Benzene	5	5	-	-	5
Ethylbenzene	700	700	-	-	700
Toluene	2000	1000	-	-	1000
Xylenes	10,000	10,000	-	-	10,000
Naphthalene	100	-	0.14	0.1	0.14
Benzo(a)pyrene	0.2	0.2	-	-	0.2
Benzo(a)anthracene	0.1	-	0.029	0.1	0.1
Benzo(b)fluoranthene	0.2	-	0.029	0.1	0.1
Benzo(k)fluoranthene	0.2	-	0.29	0.1	0.29
Chrysene	0.2	-	2.9	0.1	2.9
Dibenz(a,h)anthracene	0.2	-	0.0029	0.013	0.013
Indeno(1,2,3-cd)pyrene	0.4	-	0.029	0.1	0.1

[1]Risk-based cleanup level was determined based on an excess lifetime cancer risk of 1×10^{-6} and/or a target HQ of 1.
[2]Practical Quantitation Limits listed are laboratory Reporting Limits except for dibenzo(a,h)anthracene where the Method Detect Limit is used.

SUMMARY OF REMEDIAL ALTERNATIVES

Alternative 1: No Action
Estimated Present Worth Cost: $0
Estimated Time to Achieve RAOs: Never

The NCP requires that the EPA consider a no-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 Site.

Alternative 2: Institutional Controls with Additional Excavation
Estimated Present Worth Cost: $2,394,000
Estimated Time to Achieve RAOs: More than 1,000 years

Alternative 2 includes both institutional controls and additional excavation of contaminated soil to prevent exposure to contaminated groundwater. In 2005, the Iowa state legislature passed the Uniform Environmental Covenants Act (UECA), which has been certified under Iowa Code Title XI, Chapter 455I, providing a legally enforceable means to restrict land use or access under a real estate instrument called an environmental covenant. Implementation of environmental covenants to restrict access to residual contamination is proposed for the Site. In addition to environmental covenants, the IDNR Water Supply Section, the city Water Department and the Dubuque County Health Department would be notified in writing of the area of contamination for consideration when reviewing new water well permit applications. These notifications are informational institutional controls. The city of Dubuque has notified the EPA of plans to introduce a city ordinance placing limitations on installation of water wells in the vicinity of the Site as well as other areas within the city. Once implemented, this ordinance will prevent contaminated groundwater from the Site from being moved to previously uncontaminated areas through pumping of groundwater. An ordinance is a governmental institutional control.

The second component of this alternative is additional excavation. To achieve the cleanup levels specified in Table 3, the source areas for groundwater contamination must be addressed. As discussed in section 3.1 of the 2006 Technical Impracticability (TI) Evaluation Report, soil excavation was a component of the original remedy to address contamination at the Site. Approximately 45 percent of the original source contamination was removed from the Site through excavation. As discussed in Section 5.3 of the TI Report, the source material remaining at the Site includes DNAPL located in the area northeast of the former maintenance building and below the base of the excavations. The estimated 614,290 pounds of residual source material have the potential to be a source of further releases to groundwater or surface water, with the quantity of contaminants either staying the same or decreasing over time due to physical, chemical and biological natural attenuation processes. Natural attenuation reduces contaminant concentrations in groundwater and limits migration via natural processes such as biodegradation, chemical transformation, sorption, dispersion, diffusion and volatilization. Much of the remaining material is not readily accessible because it is beneath the building or sewer line on the Site, or its removal would risk compromising the LCU. Following further excavation proposed in this alternative, an estimated 206,230 pounds or 34 percent of source material would remain at the Site. Excavation of contaminated soil in the UCU and silty sand aquifer would also include removal of DNAPL. It would also require removal of clean soil in areas previously remediated, would require extensive dewatering and would risk compromise of the LCU unless pressure equal to or greater than the hydraulic head of the underlying alluvial aquifer is maintained on the LCU to prevent upheaval. Due to the large mass of source material that would remain untreated, it is estimated that it would take more than 1,000 years to achieve cleanup levels in the silty sand aquifer.

Alternative 3: Institutional Controls and In Situ Solidification
Estimated Present Worth Cost: $3,711,000
Estimated Time to Achieve RAOs: More than 1,000 years

Alternative 3 combines institutional controls, as described previously, with in situ solidification. In situ solidification is accomplished by mixing a combination of Portland cement, cement kiln dust, lime, fly ash or other binding agents into the subsurface soil. A heavy-duty, large-diameter auger is used to mix the soil while injecting the binding agent, effectively distributing the binding agent throughout the soil. The binding agent subsequently solidifies upon reaction with water or hydration. Contaminated groundwater within the treatment zone participates in the hydration reaction, and is, therefore, bound within the resulting structure. This technology reduces contaminant mobility by binding the contaminant into a solid mass with low permeability that resists leaching, and/or by chemically binding contaminants to the solidification reagents. Solidification neither reduces contaminant mass nor completely prevents leaching or volatilization, and may become less effective over time as the binding agents degrade. This technology is effective to 55 feet bgs. The auger can be positioned adjacent to the exterior wall of a building, and mixing of subsurface soil can extend up to approximately four feet beneath a building foundation; however, at this site, this will be limited by the way the former maintenance garage is constructed which includes pilings for subsurface support. Similarly, this technology would be very limited with respect to the extent that contamination beneath Highway 61 could be addressed. The technology is limited by subsurface debris greater than 3 feet in diameter. To implement this technology at the Site, the uncontaminated areas would be excavated and stockpiled prior to the start of the project.

Approximately 30,500 square feet of the contaminated area would be accessible to the treatment auger. The source material extends to a depth of up to 35 feet bgs with an approximate treatment volume of 22,600 cubic yards. Approximately 65 percent of the total mass remaining at the Site is accessible for treatment. Of the total mass, 35 percent would remain untreated after solidification. After solidification, the zone that was treated would be much less permeable than the surrounding soils and would likely result in a change in the groundwater flow direction at the Site. The proximity of the stage changes of the Mississippi River, which is hydraulically connected to the silty and alluvial aquifers, may result in multiple flow directions at the Site, causing additional contaminant migration from untreated areas. Due to the large mass of source material that would remain untreated, it is estimated that it would take more than 1,000 years to achieve cleanup levels in the silty sand aquifer.

Alternative 4: Institutional Controls with In Situ Thermal Treatment
Estimated Present Worth Cost: $3,416,000
Estimated Time to Achieve RAOs: More than 1,000 years

Alternative 4 combines institutional controls with in situ thermal treatment. In situ thermal treatment is possible east of the city maintenance garage and could extend beneath the building. However, the presence of U.S. Highway 61 would limit treatment in the Highway Corridor area. In situ thermal treatment uses heat to volatilize contaminants, decrease the viscosity of DNAPL and desorb and then thermally destruct contaminants adsorbed to soil. The technology can use heater wells or electrodes to generate heat in the subsurface. Volatilized contaminants are extracted in the vapor phase, and recovery wells can be used to capture mobile product. In situ thermal treatment is most effective in unsaturated soils, where the higher temperatures required for contaminant desorption and destruction can be achieved. In saturated soils, the operating temperature is limited to 212 degrees Fahrenheit (°F), the boiling point of water. In situ heating technologies have been used to successfully remediate chlorinated solvent DNAPL sites, but the success of this technology to treat MGP contaminants, or in restoring groundwater to drinking water standards, is not certain.

TarGOST™ data indicates that DNAPL remains in both the unsaturated fill material above the UCU and in the silty sand aquifer. Dewatering the silty sand aquifer would be required to achieve temperatures greater than 212°F. Dewatering is not practical and risks damage to the LCU due to upward force from the underlying alluvial aquifer. Therefore, the highest temperature that could be achieved in the silty sand aquifer is 212°F. At this temperature, volatile contaminants would be removed, and free-phase DNAPL would be mobilized for collection. However, residual DNAPL and adsorbed contaminants would remain. It is estimated that thermal treatment would remove approximately 361,670 pounds or 59 percent of the total remaining mass. The contaminant mass beneath U.S. Highway 61 could not be treated. Due to the significant mass of source materials that would remain in the subsurface, it is estimated that it would take more than 1,000 years to achieve groundwater cleanup levels in the silty sand aquifer.

Alternative 5: Institutional Controls and Monitored Natural Attenuation (MNA)
Estimated Present Worth Cost: $523,000
Estimated Time to Achieve RAOs: More than 100,000 years

Alternative 5 combines institutional controls with MNA. The plume would be monitored through groundwater sampling and analysis to detect changes in groundwater concentrations or plume migration. Of all the natural attenuation processes described in Alternative 2, biodegradation is the primary mechanism that reduces contaminant mass. Biodegradation is generally capable of addressing dissolved contaminants and does not appreciably remediate DNAPL. Low permeability and adsorptive clayey soil can be the primary physical attenuation mechanisms, which limit migration rates and greatly increase the time available for on-site biodegradation.

Current data indicates the dissolved plume is generally stable and supports the ability of natural attenuation processes to contain the contaminated groundwater plume to prevent further migration of the groundwater plume to potential receptors except in the area of silty sand aquifer well P-112. Concentrations of contaminants in P-112 are increasing, apparently as a result of the change in flow direction due to shutdown of the off-site upgradient wells, which extracted large volumes of water, and the on-site extraction system. The current direction of groundwater flow is not expected to change now that none of these wells are operating.

As discussed in Section 5.6 of the 2006 TI Report, groundwater conditions at the Site appear conducive to microbial activity, and initial geochemical data suggest various microbial processes are occurring. Continued groundwater monitoring would be required to confirm contaminant migration is not occurring and that concentrations are stable and will eventually decrease. The majority of contamination remains in the upper fill layer and the silty sand aquifer, with the underlying low permeability UCU and LCU providing a mechanism to limit source migration at the Site. DNAPL retention as residual material will also limit the degree of both vertical and horizontal migration.

Approximately 99 percent of the remaining contaminant mass is comprised of PAHs. PAHs have a higher propensity to remain bound to the soil matrix than to dissolve into groundwater. Natural attenuation of PAHs is limited because microbial degradation predominantly occurs in the dissolved phase. As a result, it is estimated that it would take more than 100,000 years to achieve groundwater cleanup levels in the silty sand aquifer.

Alternative 6: Institutional Controls with Hydraulic Containment and MNA
Estimated Present Worth Cost: $1,706,000
Estimated Time to Achieve RAOs: More than 100,000 years

Alternative 6 combines institutional controls with a hydraulic containment system consisting of extraction wells located between Kerper Boulevard and the levee to prevent migration of the downgradient plume. Pilot testing of this system occurred and confirmed the viability of this option to capture the downgradient plume in the silty sand aquifer while operating at a very low flow rate through several extraction wells in an effort to minimize the likelihood of the biological and iron fouling that plagued the original groundwater extraction system. Small amounts of compounds called sequestering agents may be added at the extraction wells to further prevent fouling of the wells. Pilot test sampling indicated that the extracted water could be discharged to the sanitary sewer system but a treatment system may be added if the contaminant levels in the extracted water exceed levels that may be discharged to the sanitary sewer system. The pumping rates that would be used for this alternative should not mobilize DNAPL. While contamination will be removed from the silty sand aquifer, the impact on the levels of contamination remaining at the Site will be very minimal since the objective is to control the downgradient plume, not to remove all of the contamination from the silty sand aquifer.

As described in Alternative 5, natural attenuation would continue to reduce contaminant concentrations in the dissolved plume supporting plume stability. Monitoring would verify that this was occurring. It is estimated that it would take more than 100,000 years to achieve groundwater cleanup levels in the silty sand aquifer.

EVALUATION OF ALTERNATIVES

Nine criteria are used to evaluate the different remediation alternatives individually and against each other in order to select a remedy. This section of the Proposed Plan 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.

1. Overall Protection of Human Health and the Environment determines whether an alternative eliminates, reduces or controls threats to public health and the environment through institutional controls, engineering controls or treatment.

All of the alternatives except the no-action alternative, Alternative 1, would provide adequate protection of human health and the environment by using layered institutional controls to prohibit future well placement in the vicinity of the Site and controlling future vapor intrusion. While existing proprietary property restrictions, city and county ordinances and state rules provide some degree of protection, they do not address potential future exposures to contaminated soil, groundwater and air in all areas of the contaminated groundwater plume without implementation of environmental covenants and a city ordinance placing restrictions on installation of water wells in the vicinity of the Site.

During the design and implementation of Alternatives 2 through 4, steps might have to be taken to prevent mobilization of DNAPL. For each of the Alternatives 2 through 6, a large volume of contaminant mass would remain following implementation. Excavation (Alternative 2) is likely to disturb the steady-state DNAPL distribution and result in increased risk to human health and the environment by promoting migration and increasing the risk of contaminant dissolution if the LCU is compromised. In situ solidification (Alternative 3) is likely to create low permeability areas and change the groundwater flow paths at the Site. In situ thermal treatment (Alternative 4) is limited in effectiveness due to water in the surrounding aquifer. Dewatering the aquifer would compromise the LCU and promote migration and contaminant dissolution. While MNA (Alternatives 5 and 6) would reduce concentrations of the more mobile contaminants (BTEX and naphthalene), it would have a very limited impact on the other contaminants, and have almost no impact on DNAPL. The presence of DNAPL in inaccessible areas suggests that none of the alternatives are likely to achieve the cleanup levels in groundwater at the Site in a reasonable amount of time. The hydraulic containment system (Alternative 6) would prevent expansion of the plume toward the Mississippi River and remove a limited amount of contamination from the silty sand aquifer.

The no-action alternative does not protect human health and the environment because it would not prevent installation of new wells into the plume and surrounding areas where the plume may be affected, does not monitor the plume's future migration and does not address potential future exposures to contaminated soil, groundwater and air without implementation of environmental covenants. As a result, Alternative 1 was eliminated from consideration under the remaining eight criteria.

2. Compliance with ARARs evaluates whether the alternative meets federal and state environmental statutes, regulations and other requirements that pertain to the Site, or whether a waiver is justified.

The ARARs identified for all of the alternatives are listed in Table 4 (attached). None of the alternatives are likely to comply with chemical-specific ARARs for all compounds due to the nature and distribution of the contaminants at the Site. Due to the presence of a large volume of DNAPL, it is unlikely that the MCL would ever be met for benzo(a)pyrene. It has been demonstrated through past experience at similar sites that long-term treatment of high levels of dissolved concentrations of PAHs cannot be remediated in a reasonable time frame. At this time, there is no known reliable method for removing and remediating the DNAPL or treating it in place.

When there are site-specific conditions that may inhibit groundwater restoration as is the case at this Site, the EPA has established guidance and a mechanism to evaluate the technical impracticability (TI) of restoring groundwater to meet ARARs. Therefore, it has been determined that a TI ARAR waiver is appropriate for the groundwater contaminants at the Site. The EPA refers to the portion of the aquifer where groundwater cannot be restored to drinking water standards within a reasonable time frame as the "TI zone." The TI zone for this Site applies to the silty sand aquifer in the area shown in Figure 7.

All ARARs listed for each of the alternatives would be achieved outside the TI zone.

3. Long-term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.

The institutional controls portion of Alternatives 2 through 6 adequately protects human health because the proposed institutional controls would effectively prevent any future exposure to contaminated groundwater and vapor intrusion. The institutional controls include existing IDNR rules; new environmental covenants, which prohibit future well installation on-site and prevent potential vapor intrusion; and a new city ordinance to place limitations on well installation in the vicinity of the Site. The city water department, the Dubuque County Health Department and the IDNR Water Supply Section would be notified of the contamination present at the Site. The institutional controls are layered to increase their reliability. The existing IDNR rules are expected to provide long-term effectiveness and permanence. Because an environmental covenant is a legally binding document, a high level of long-term effectiveness and reliability is expected. The city ordinance would provide additional long-term effectiveness and reliability, ensuring that contaminants from the Site will not be moved to previously uncontaminated groundwater. All alternatives will require statutory five-year reviews of the remedy.

Alternatives 2, 3 and 4 may mobilize DNAPL, exacerbating current conditions and requiring long-term monitoring and management. Additional excavation and in situ thermal treatment activities may damage the LCU and allow DNAPL to migrate downward into the alluvial aquifer. Alternative 3 will create a low permeability zone that may encourage the development of new vertical and lateral groundwater pathways. Mobilization of DNAPL is likely to increase the total volume of contaminated groundwater. Disturbing the steady-state conditions will likely cause greater dissolution into groundwater, thus increasing contaminant concentrations. All alternatives leave a large volume of contaminated mass in the subsurface that will continue to exist as a long-term source of dissolved PAHs and BTEX that will affect a large aquifer volume.

Alternative 5 may not prevent contaminated groundwater from reaching the Mississippi River if the movement of the dissolved plume is faster than the natural attenuation processes are able to reduce the contaminants to nonhazardous compounds.

The hydraulic control component of Alternative 6 decreases the likelihood that the groundwater plume in the silty sand aquifer will expand toward the Mississippi River and will remain effective as long as the system is in operation.

4. Reduction of Toxicity, Mobility or Volume of Contaminants Through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment and the amount of contamination present.

Alternatives 2, 3 and 4 will remove or immobilize over half of the total contaminant mass, but contaminant mass remaining as DNAPL or adsorbed to the soil matrix is inaccessible to these alternatives because of the presence of U.S. Highway 61, the city maintenance garage and the 30-inch sanitary sewer force main. Alternative 2 would not involve treatment of principal threat wastes if the excavated soil was disposed of in a landfill. If the excavated soil was thermally treated following excavation, then treatment of principal threat wastes would occur. Alternatives 3 and 4 involve treatment of principal threat wastes. Alternatives 2, 3 and 4 may potentially increase contaminant mobility by mobilizing DNAPL into new lateral and vertical migration paths. Alternative 5 does not involve active treatment and provides only limited reductions in toxicity, mobility or volume. Alternative 6 would result in a small decrease in contaminant volume since dissolved contaminants in extracted groundwater would be treated at the waste water treatment plant. The groundwater to be treated would not be a principal threat waste. A significant quantity of contaminant mass containing PAHs and VOCs will remain at the Site with each alternative.

5. Short-Term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents and the environment during implementation.

Alternative 5 poses minimal risk to the community or environment from monitoring; however, a slight risk of field and laboratory worker exposure to contaminants while sampling and analyzing the groundwater is present. The proper use of personal protective equipment and appropriate laboratory procedures should eliminate nearly all risk to workers. Alternatives 2, 3 and 4 potentially expose site workers to soil and groundwater contamination during implementation, but risk to the community is minimal and can be mediated through air monitoring, use of proper health and safety plans and standard operating procedures. The risk to workers from alternatives 2, 3 and 4 is increased during equipment installation, equipment repair, cleaning and material handling. Risks to workers would be minimized by adherence to a proper health and safety plan. The opportunity is present for contaminants to be transferred to the vapor phase during implementation of Alternatives 2 and 4. Therefore, some additional community exposure is likely with these alternatives. Plans for air monitoring during intrusive soil work and suppression of vapors, should they occur, would mitigate this risk. Alternative 4 includes DNAPL recovery resulting in potential exposure to site workers, the community and the environment in the event of an accidental release during recovery or storage. These risks can be minimized with proper personal protective equipment, standard operating procedures and secure storage prior to transport. Alternative 6 poses minor risks to the public while wells are being installed outside of the fenced area of the Site. This is manageable with proper construction site controls. There is also a potential that the LCU could be damaged during well installation, allowing DNAPL to move deeper. This is also avoidable with knowledge of the geology of that area and proper care taken while installing the wells.

6. Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

Each of the alternatives includes institutional controls, including those provided by the city code, county ordinance and IDNR rules which are already in place. Environmental covenants should not be difficult to place on the Site properties with the cooperation of the property owners. The city has expressed an interest in implementing an ordinance to place limitations on well installation in the vicinity of the Site as well as other areas in the city.

Alternative 4, in situ thermal treatment, is the most difficult to implement because of the complexity of the equipment, borehole installation and the limited amount of historical use of the technology on MGP contaminants. Alternative 2, excavation, is the next most difficult to implement due to the amount of clean soil that would need to be excavated and the volume of contaminated soil and groundwater that would either need to be treated or disposed of. Alternative 3 would not remove mass from the Site and would not require an extensive site preparation period. Alternative 6 would require the installation of wells and an extraction system but the technology is readily available and well developed. Particular attention would need to be taken to monitor water quality during operation of the extraction system to avoid system fouling problems experienced in the past. Coordination with the city waste water treatment plant would have to be ongoing. Alternative 5 includes ongoing monitoring, which is already being done. Alternatives 2, 3 and 5 have been implemented at other MGP sites and a familiarity with the processes would increase their implementability.

7. Cost includes estimated capital and annual operations and maintenance costs as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. The present worth costs were calculated at a discount rate of 7 percent. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

The least costly option is Alternative 5 with a present worth cost estimated at $523,000. The most costly option is Alternative 3 with a present worth cost estimated at $3,711,000. The remaining alternatives are estimated at $3,416,000 for Alternative 4; $2,394,000 for Alternative 2; and $1,706,000 for Alternative 6. A detailed itemization of costs and assumptions for each alternative was included as Appendix I of the TI Evaluation Report.

It is significant to note that the cost estimates for all of the alternatives are based upon 30 years of operation for purposes of comparison, though in all cases, the remedies will need to operate well beyond 30 years to ensure protectiveness. Costs will be significantly higher if the periods of operation extend well beyond 30 years.

8. State/Support Agency Acceptance considers whether the state agrees with the EPA's analyses and recommendations as described in the RI/FS and Proposed Plan.

The state of Iowa supports the Preferred Alternative.

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

Community acceptance of the Preferred Alternative will be evaluated after the public comment period ends and will be described in the Record of Decision Amendment.

SUMMARY OF THE PREFERRED ALTERNATIVE

The Preferred Alternative for the Site is Alternative 6, which addresses the groundwater contamination using institutional controls in conjunction with a hydraulic containment system consisting of extraction wells located between Kerper Boulevard and the levee to prevent migration of the downgradient plume. The Preferred Alternative will prevent groundwater in the silty sand aquifer from moving into Dove Harbor or the river while minimizing the risk of mobilizing DNAPL. The addition of small amounts of sequestering agents into the aquifer should minimize the possibility that the extractions wells or the areas surrounding the wells will become fouled. A small amount of dissolved contamination will be removed with the extracted groundwater and treated, but it will not satisfy the preference for treatment of principal threat waste. There is minimal risk to on-site workers, the community and the environment during implementation of this remedy and it is relatively easy to implement. The cost of implementation is moderate compared to the other alternatives with the potential for removing contaminant mass from the groundwater. An important element of the remedy for this site is the TI ARAR waiver for groundwater in the silty sand aquifer within the area designated as the TI zone. Institutional controls will protect anyone from being exposed to groundwater within the TI zone and monitoring will ensure the groundwater outside of the TI zone will meet all ARARs and health-based cleanup levels. The potential for future indoor air contamination through vapor intrusion is addressed through implementation of environmental covenants on the properties over the contaminated plume.

The EPA will periodically review the remedy to evaluate its ongoing effectiveness. These reviews will occur at least every five years and are required for this Preferred Alternative.

Based on the information available at this time, the EPA and the state of Iowa believe the Preferred Alternative would be protective of human health and the environment, would comply with ARARs outside of the TI ARAR waiver zone, would be cost effective and would use permanent solutions and alternative treatment technologies to the maximum extent practicable.

The Preferred Alternative can change in response to public comment received or new information.

COMMUNITY PARTICIPATION

The EPA and IDNR provide information regarding the cleanup of the Site through public meetings, the AR file for the Site and announcements published in the *Telegraph Herald*. The EPA and IDNR encourage the public to gain a more comprehensive understanding of the Site and the Superfund activities that have been conducted at the Site.

The dates for the public comment period; the date, location, and time of the public meeting; and the locations of the AR file are provided on the front page of this Proposed Plan.

GLOSSARY OF TERMS

Administrative Record (AR): The body of documents that forms the basis for selection of a particular response at a site. An AR is available at or near the site to permit interested individuals to review the documents and to allow meaningful public participation in the remedy selection process.

Aquifer: An underground layer of rock, sand or gravel capable of storing water within cracks and pore spaces or between grains. When water contained within an aquifer is of sufficient quantity and quality, it can be used for drinking or other purposes. The water contained in the aquifer is called groundwater.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA): The law enacted by Congress in 1980 to evaluate and cleanup abandoned hazardous waste sites. The EPA is charged with the mission to implement and enforce CERCLA.

Consent Decree: A legal document, approved by a judge, that formalizes an agreement between the EPA and one or more potentially responsible parties outlining the terms by which a response action will take place. A Consent Decree is subject to a public comment period prior to its approval by a judge, and is enforceable as a final judgment by a court.

Contaminant Plume: A body of contaminated groundwater flowing from a specific source with both horizontal and vertical dimensions.

Dense Nonaqueous Phase Liquid (DNAPL): Liquid that is denser than water and only slightly soluble in water.

Explanation of Significant Difference (ESD): Documents a significant change to a remedy selected in a ROD that does not fundamentally alter the overall cleanup approach.

Groundwater: Underground water that fills pores in soils or openings in rocks to the point of saturation. Groundwater is often used as a drinking water source via municipal or domestic wells.

Institutional Controls: Nonengineered instruments such as administrative and legal controls that help minimize the potential for human exposure to contamination and/or protect the integrity of the remedy.

Maximum Contaminant Levels (MCLs): The maximum permissible level of a contaminant in water that is delivered to any user of a public water system pursuant to the Safe Drinking Water Act.

Monitoring: An ongoing collection of information about the environment that helps gauge the effectiveness of a cleanup action. Monitoring wells drilled at different depths and locations at a site are used to detect any migration of the contaminant plume.

Manufactured Gas Plant (MGP): A facility that used heat to convert coal or oil into methane for purposes of heating and lighting. They operated from the mid-1800s until the arrival of natural gas pipelines in the mid-1900s.

Present Worth Analysis: A method of evaluation of expenditures that occur over different time periods. By discounting all costs to a common base year, the costs for different remedial actions can be compared on the basis of a single figure for each alternative.

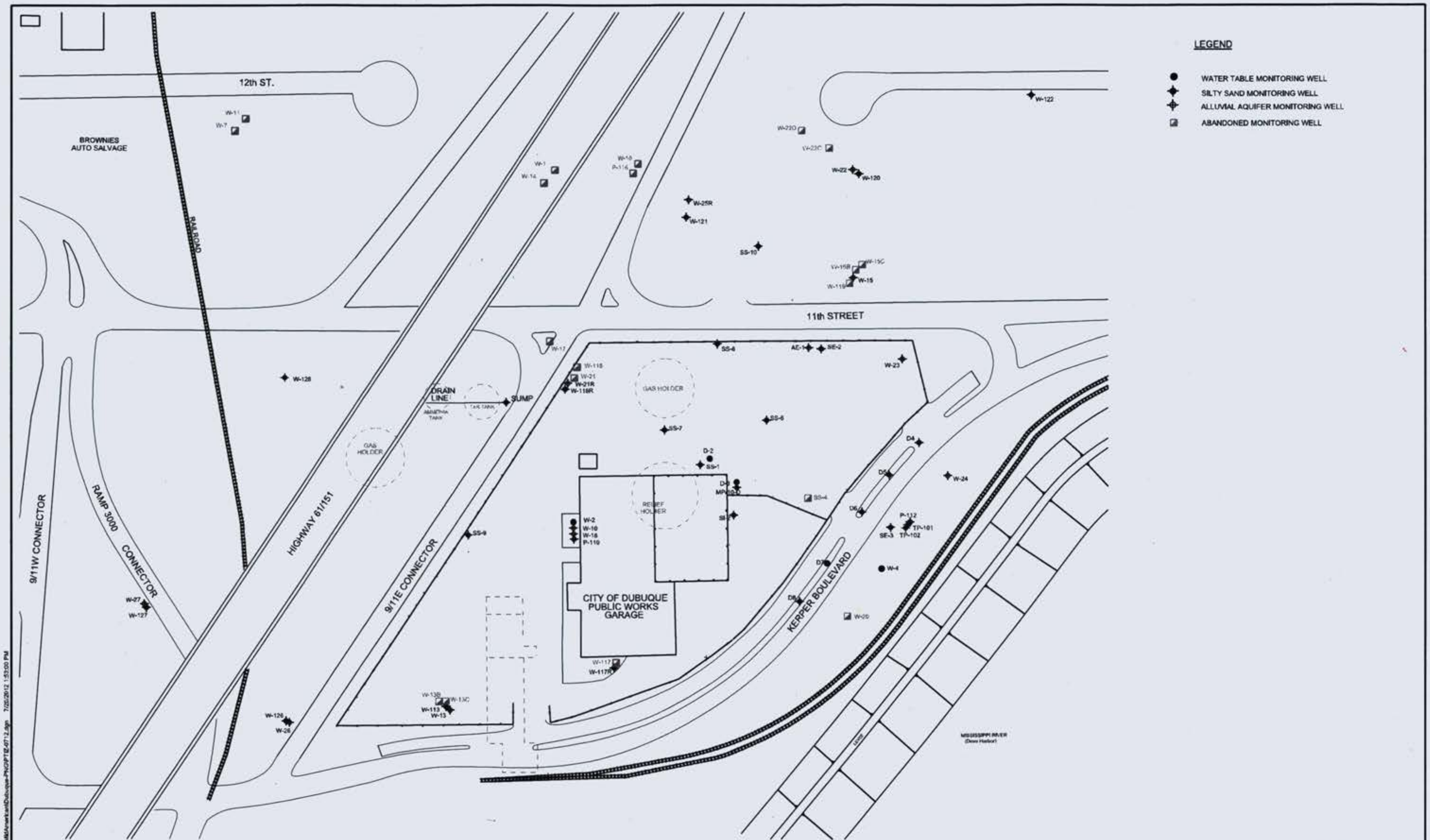
Record of Decision (ROD): The decision document in which the EPA selects the remedy for a Superfund site.

Removal Action: A response action, typically short-term, that may be taken to address releases or threatened releases requiring prompt response.

Soil Vapor Extraction (SVE): An in situ process for soil remediation where contamination is removed from soil by carrying it out through a medium such as air or steam. The extracted soil vapors are separated into liquids and vapors, and each stream is treated as necessary.

Superfund: The nickname for CERCLA.

Vadose Zone: The earth that extends from the top of the ground surface to the water table.



DESIGNED BY	KEVIN ARMSTRONG	
DRAWN BY	NORA DAY	
CHECKED BY	M. GERINGER	
APPROVED BY	KEVIN ARMSTRONG	
PROJECT MANAGER	KEVIN ARMSTRONG	

0 120
SCALE IN FEET

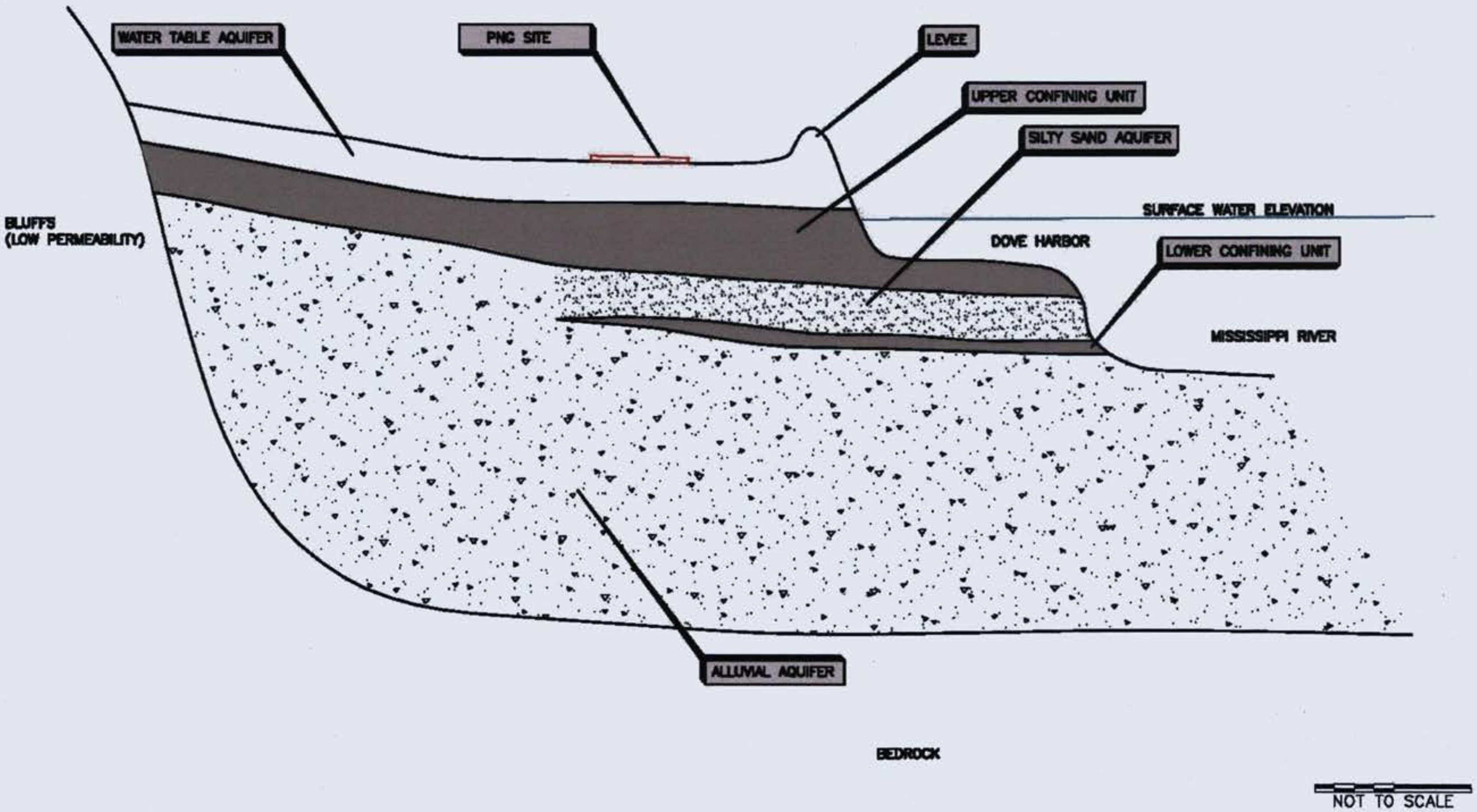
MANAGING OFFICE: DES MOINES, IOWA

PROJECT: MIDAMERICAN ENERGY COMPANY PEOPLES NATURAL GAS SITE DUBUQUE, IOWA

TITLE: SITE MAP

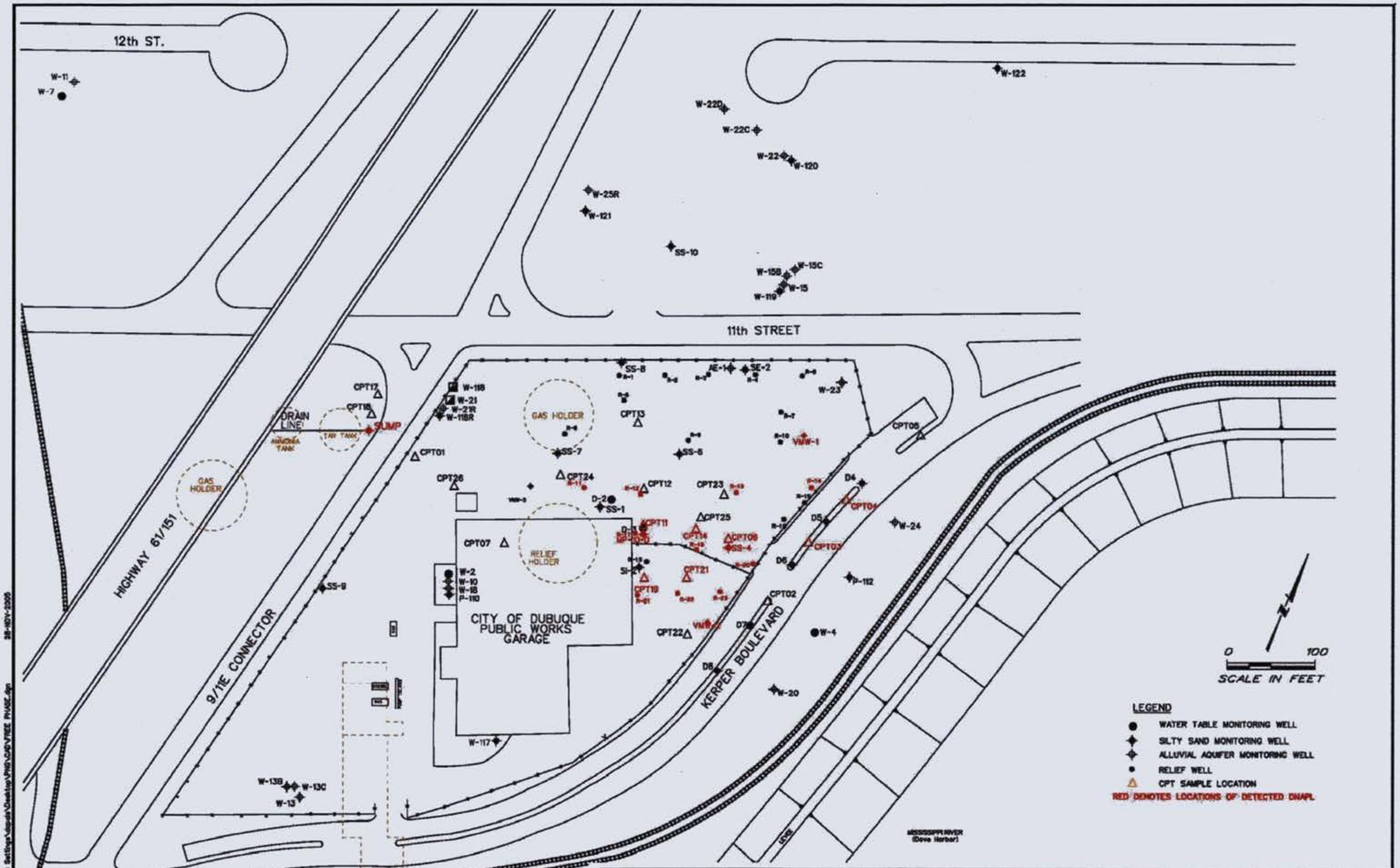
FIGURE: 1

MWH



DESIGNED BY	TIM WINELAND		MANAGING OFFICE	DES MOINES, IOWA
DRAWN BY	NORA DAY		PROJECT	MIDAMERICAN ENERGY COMPANY PEOPLES NATURAL GAS SITE DUBUQUE, IOWA
CHECKED BY	TIM WINELAND			
APPROVED BY	KEVIN ARMSTRONG		TITLE	CONCEPTUAL MODEL CROSS SECTION
PROJECT MANAGER	KEVIN ARMSTRONG		FIGURE	2

MWH

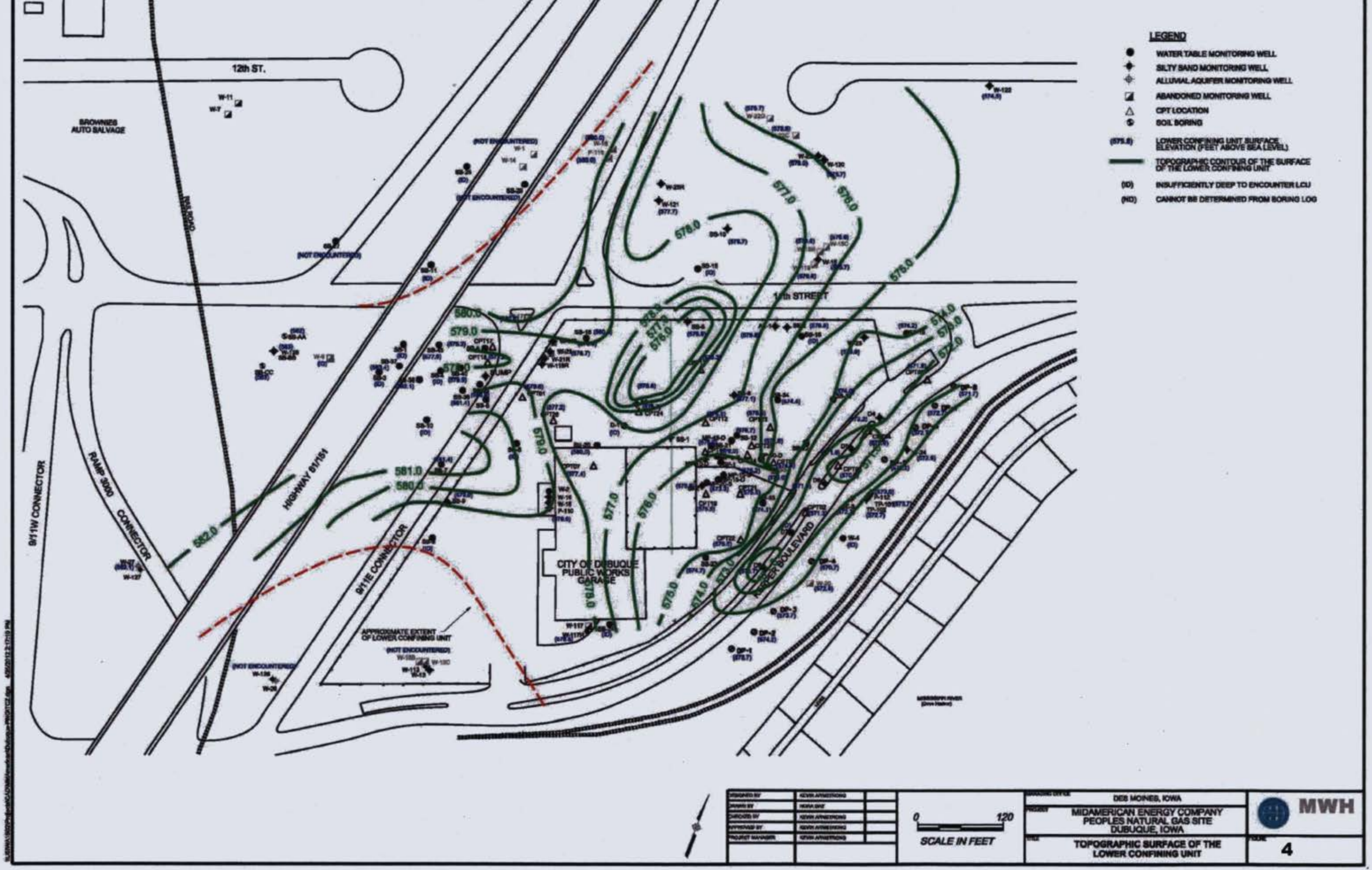


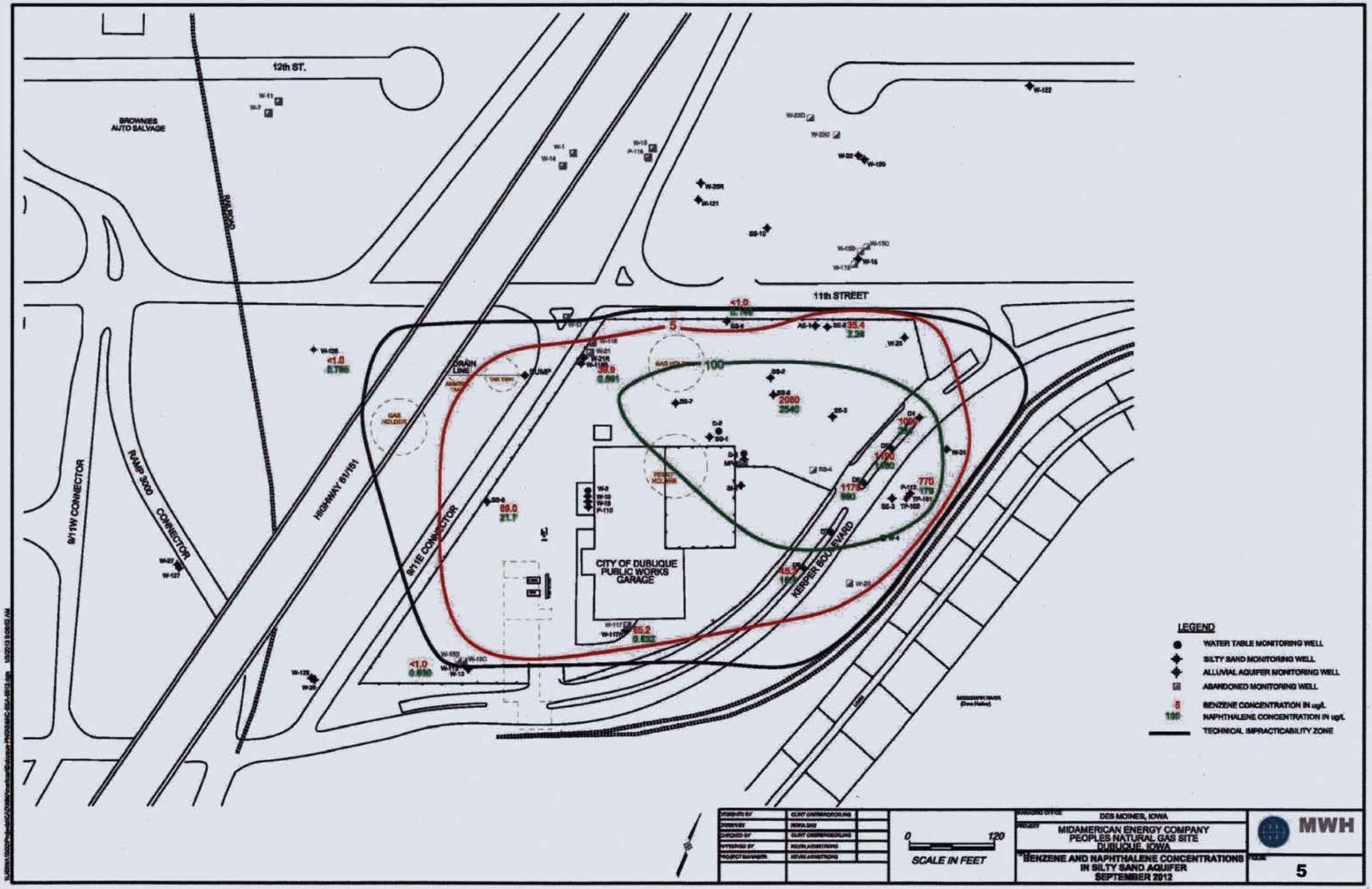
MWH Des Moines Iowa

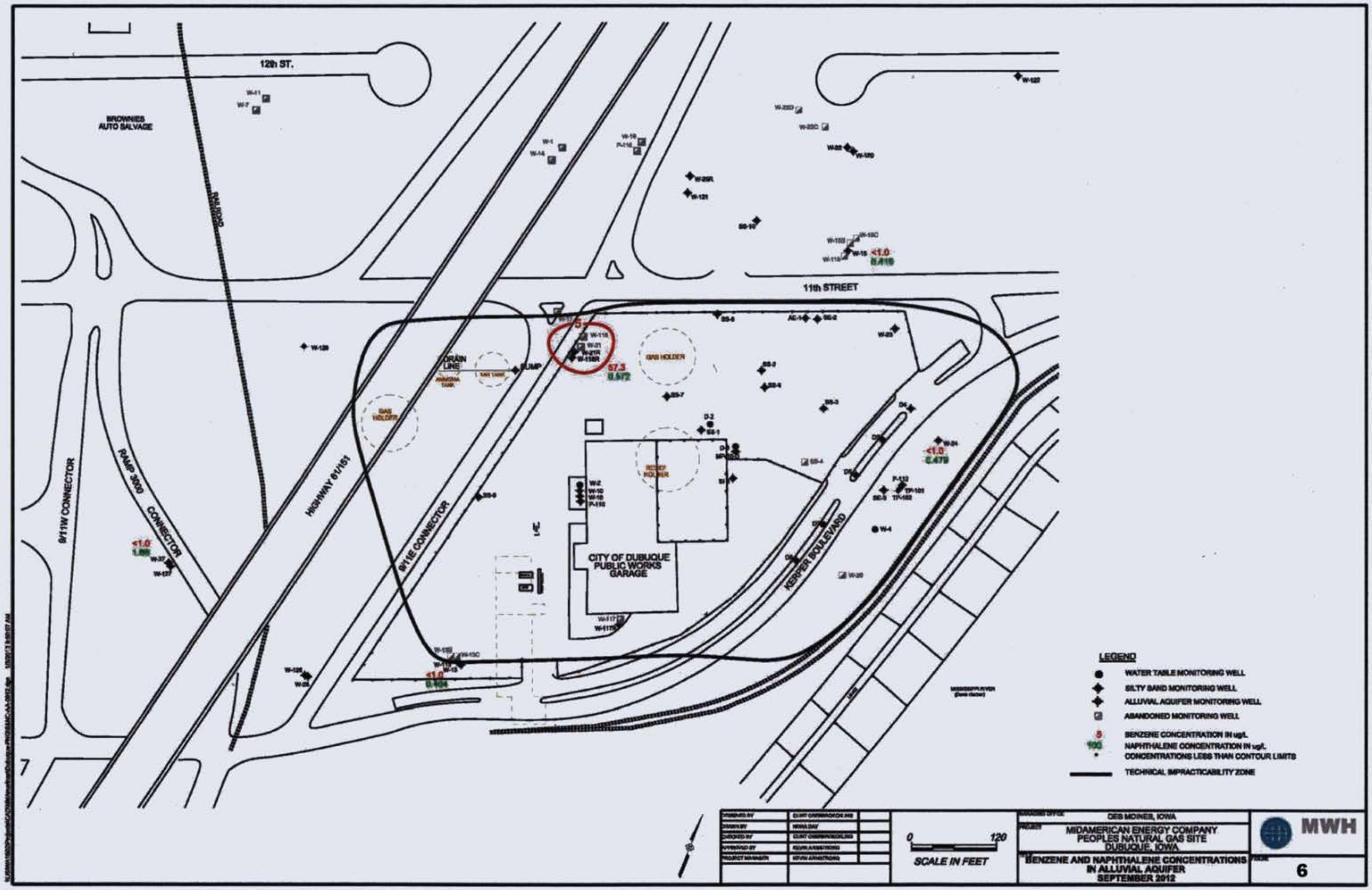
MIDAMERICAN ENERGY COMPANY
PEOPLE'S NATURAL GAS SITE
DUBUQUE, IOWA

EXTENT OF DNAPL MEASURED IN WELLS AND INDICATED IN CPT BORINGS

FIGURE 3


12th ST.
BROWNIES AUTO SALVAGE
(NOT ENCOUNTERED)
11th STREET
HIGHWAY 61/151
9/11E CONNECTOR
9/11W CONNECTOR
RAMP 3000 CONNECTOR
CITY OF DUBUQUE PUBLIC WORKS GARAGE
APPROXIMATE EXTENT OF LOWER CONFINING UNIT
RIVER BOULEVARD
582.0
581.0
580.0
579.0
578.0
577.0
576.0
575.0
574.0
573.0
LEGEND
WATER TABLE MONITORING WELL
SILTY SAND MONITORING WELL
ALLUVIAL AQUIFER MONITORING WELL
ABANDONED MONITORING WELL
CPT LOCATION
SOIL BORING
LOWER CONFINING UNIT SURFACE ELEVATION (FEET ABOVE SEA LEVEL)
TOPOGRAPHIC CONTOUR OF THE SURFACE OF THE LOWER CONFINING UNIT
(ID) INSUFFICIENTLY DEEP TO ENCOUNTER LCU
(ND) CANNOT BE DETERMINED FROM BORING LOG
0 120
SCALE IN FEET
DES MOINES, IOWA
MIDAMERICAN ENERGY COMPANY
PEOPLES NATURAL GAS SITE
DUBUQUE, IOWA
TOPOGRAPHIC SURFACE OF THE LOWER CONFINING UNIT
MWH
4


12th ST.
BROWNIES AUTO SALVAGE
11th STREET
HIGHWAY 61/151
9/11E CONNECTOR
9/11W CONNECTOR
RAMP 3000 CONNECTOR
KERPER BOULEVARD
CITY OF DUBUQUE PUBLIC WORKS GARAGE
DRAIN LINE
SUMP
GAS HOLDER
<1.0
0.796
5
100
35.4
2.38
39.9
0.891
2080
2540
1090
1100
1170
770
170
89.0
21.7
45.2
35.2
0.632
<1.0
0.830
LEGEND
WATER TABLE MONITORING WELL
SILTY SAND MONITORING WELL
ALLUVIAL AQUIFER MONITORING WELL
ABANDONED MONITORING WELL
5 BENZENE CONCENTRATION IN ug/L
100 NAPHTHALENE CONCENTRATION IN ug/L
TECHNICAL IMPRACTICABILITY ZONE
0 120
SCALE IN FEET
DES MOINES, IOWA
MIDAMERICAN ENERGY COMPANY
PEOPLES NATURAL GAS SITE
DUBUQUE, IOWA
BENZENE AND NAPHTHALENE CONCENTRATIONS
IN SILTY SAND AQUIFER
SEPTEMBER 2012
MWH
5


12th ST.
BROWNIES AUTO SALVAGE
11th STREET
HIGHWAY 61/151
9/11E CONNECTOR
9/11W CONNECTOR
RAMP 3000 CONNECTOR
KERPER BOULEVARD
CITY OF DUBUQUE PUBLIC WORKS GARAGE
GAS HOLDER
RELIEF HOLDER
DRAIN LINE
SUMP
W-118
W-31
W-21R
W-119R
57.3
0.572
<1.0
0.416
<1.0
0.479
<1.0
1.66
<1.0
0.404
W-2
W-10
W-16
P-110
W-4
W-20
W-24
W-23
W-122
W-120
W-121
W-26R
LEGEND
WATER TABLE MONITORING WELL
SILTY SAND MONITORING WELL
ALLUVIAL AQUIFER MONITORING WELL
ABANDONED MONITORING WELL
5 BENZENE CONCENTRATION IN ug/L
100 NAPHTHALENE CONCENTRATION IN ug/L
* CONCENTRATIONS LESS THAN CONTOUR LIMITS
TECHNICAL IMPRACTICABILITY ZONE
0
120
SCALE IN FEET
DES MOINES, IOWA
MIDAMERICAN ENERGY COMPANY
PEOPLES NATURAL GAS SITE
DUBUQUE, IOWA
BENZENE AND NAPHTHALENE CONCENTRATIONS
IN ALLUVIAL AQUIFER
SEPTEMBER 2012
MWH
6

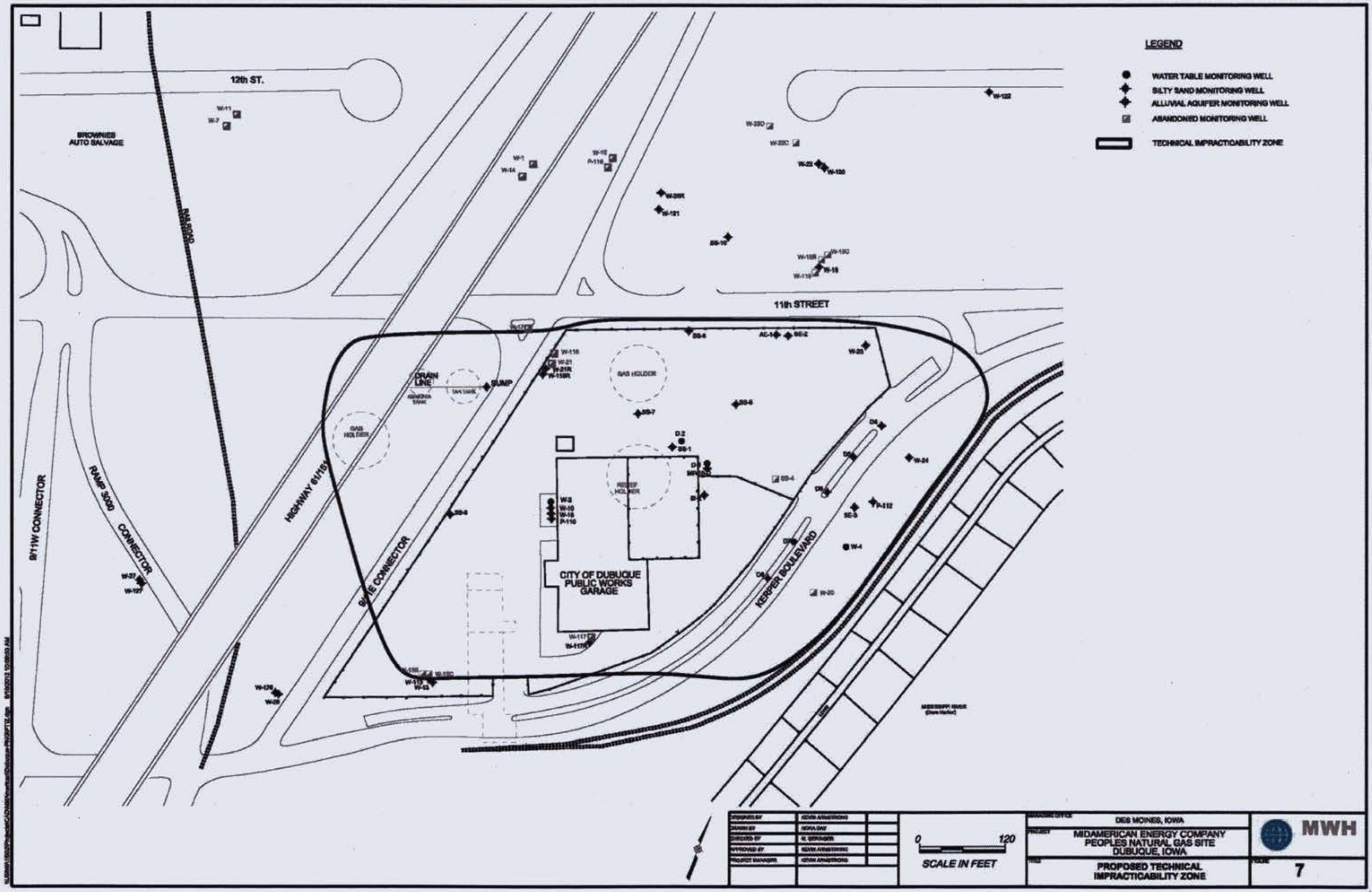

LEGEND
WATER TABLE MONITORING WELL
SILTY SAND MONITORING WELL
ALLUVIAL AQUIFER MONITORING WELL
ABANDONED MONITORING WELL
TECHNICAL IMPRACTICABILITY ZONE
12th ST.
11th STREET
BROWNIES AUTO SALVAGE
HIGHWAY 61/151
9/11E CONNECTOR
9/11W CONNECTOR
RAMP 3030 CONNECTOR
KERPER BOULEVARD
CITY OF DUBUQUE PUBLIC WORKS GARAGE
GAS HOLDER
DRAIN LINE
SUMP
W-122
W-22
W-120
W-20R
W-121
SS-10
W-18
SS-6
AL-1
SS-2
W-23
SS-5
SS-7
D-2
SS-1
SS-4
W-24
P-112
SS-3
W-4
W-20
W-3
W-10
W-16
P-110
SS-8
W-21
W-21R
W-118R
W-116
W-117
W-12
W-119
W-26
W-126
W-27
W-127
W-1
W-14
W-15
W-11
W-7
0
120
SCALE IN FEET
DES MOINES, IOWA
MIDAMERICAN ENERGY COMPANY
PEOPLES NATURAL GAS SITE
DUBUQUE, IOWA
PROPOSED TECHNICAL
IMPRACTICABILITY ZONE
MWH
7

TABLE 4

CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
PEOPLES NATURAL GAS SITE - DUBUQUE, IOWA

Standard, Requirement, Criteria, or Limitation	Citation	Description	Comment
Federal			
Safe Drinking Water Act	40 USC Section 300		
National Primary Drinking Water Regulations	40 CFR Part 141	Establishes MCLs which are health-based standards for public water systems.	MCLs are relevant and appropriate to groundwater contaminants.
National Secondary Drinking Water Regulations	40 CFR Part 143	Establishes SMCLs which are non-enforceable guidelines for public water systems to ensure the aesthetic quality of the water.	SMCLs may be "TBC" values if treated groundwater is used as a source of water.
Maximum Contaminant Level Goals	PL No. 99-339 100 Statute 642 (1986)	Establishes drinking water quality goals set at levels of no known or anticipated adverse health effects with an adequate margin of safety.	MCLGs for organic and inorganic contaminants may be relevant and appropriate if a more stringent standard is required to protect human health or the environment.
Clean Water Act	33 USC Section 1251-2762		
National Pretreatment Standards	40 CFR Part 403	Sets standards to control pollutants which pass through or interfere with treatment processes in POTWs or which may contaminate sewage sludge.	Applicable to discharge of water from the hydraulic containment system, as referenced by 567 IAC 62.4(3).
Clean Air Act	42 USC Section 7401-7671		
National Primary and Secondary Ambient Air Quality Standards	40 CFR Part 50	Establishes standards for ambient air quality to protect public health and welfare.	Applicable to portland cement concrete batching plant equipment, as referenced by 567 IAC 28.1, for the ISS remedial option.

TABLE 4

CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
PEOPLES NATURAL GAS SITE - DUBUQUE, IOWA

Standard, Requirement, Criteria, or Limitation	Citation	Description	Comment
State			
Iowa Environmental Quality Act	Iowa Code Chapter 455B	Defines the jurisdiction of the IDNR, powers and duties of the commission and the director, and civil or criminal proceedings to be undertaken by the State Attorney General.	None.
Iowa Water Pollution Control Regulations			
Scope Of Title--Definitions--Forms--Rules Of Practice	IAC 567—Chapter 40	Water supply definitions. Defines MCLs to which IAC Chapter 133 refers.	None.
Water Supplies	IAC 567—Chapter 41	Contains the drinking water standards and specific monitoring requirements for the public water supply program.	May be relevant and appropriate to groundwater contaminants.
Water Quality Standards	IAC 567—Chapter 61	Contains the water quality standards of the State, including classification of surface waters.	Applicable to discharge of water generated during dewatering activities or from the hydraulic containment system.
Effluent And Pretreatment Standards: Other Effluent Limitations Or Prohibitions	IAC 567—Chapter 62	Contains the standards or methods for establishing standards relevant to the discharge of pollutants to waters of the state.	Applicable to discharge of water generated during dewatering activities or from the hydraulic containment system.
Rules for Determining Cleanup Actions and Responsible Parties	IAC 567—Chapter 133	These rules establish the procedures and criteria the IDNR will use to determine the parties responsible and cleanup actions necessary to meet the goals of the State pertaining to the protection of groundwater. These rules pertain to the cleanup of groundwater, soil, and surface water where groundwater may be impacted.	Applicable to soil or groundwater contaminated above State of Iowa Action Levels.

TABLE 4

CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
PEOPLES NATURAL GAS SITE - DUBUQUE, IOWA

Standard, Requirement, Criteria, or Limitation	Citation	Description	Comment
State (continued)			
Iowa Land Recycling Program and Response Action Standards	IAC 567—Chapter 137	These rules establish the policies and procedures for the voluntary enrollment of contaminated property in the "land recycling program" established under IAC Chapter 137. These rules also establish the response action standards that participants must meet in order to qualify for an NFA certificate; the statutory protections and immunities that follow are associated with the NFA.	Not an ARAR, but a TBC guidance standard for the State of Iowa.
Iowa Air Pollution Control Regulations			
Ambient Air Quality Standards	IAC 567—Chapter 28	Identifies the state ambient air quality standards (adopts the National Primary and Secondary Ambient Air Quality Standards as published in 40 CFR Part 50)	Applicable to portland cement concrete batching plant equipment.

Notes:
ARAR = Applicable or relevent and appropriate requirements.
CFR = Code of Federal Regulations.
IAC = Iowa Administrative Code.
IDNR = Iowa Department of Natural Resources.
ISS = In-situ solidification.
MCLGs = Maximum Contaminant Level Goals.
MCLs = Maximum Contaminant Levels.
NFA - No further action.
POTW = Publically-Owned Treatment Works.
SMCLs = Secondary Maximum Contaminant Levels
TBC = To Be Considered.
USC = United States Code.

TABLE 4

LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
PEOPLES NATURAL GAS SITE - DUBUQUE, IOWA

Standard, Requirement, Criteria, or Limitation	Citation	Description	Comment
Federal			
Solid Waste Disposal Act	42 USC Section 6901-6987		
Contents Of Part B: General Requirements	40 CFR 270.14(b)(11) (iii) and (iv)	Provides requirements for owners and operators of hazardous waste management facilities located in the 100-year floodplain.	Applicable if remedial activities result in the site becoming a TSD facility.
Clean Water Act	33 USC Section 1251-2762		
Section 404(b)(1) Guidelines For Specification Of Disposal Sites For Dredged Or Fill Material	40 CFR Part 230	Establishes a permit program administered by the U.S. Army Corps of Engineers to regulate discharge of dredged or fill material into waters of the U.S.	Applicable if excavated material is discharged into waters of the U.S.
State			
Iowa Environmental Quality Act	Iowa Code Chapter 455B	Defines the jurisdiction of the IDNR, powers and duties of the commission and the director, and civil or criminal proceedings to be undertaken by the State Attorney General.	None.
Floodplain Development	IAC 567—Chapters 70-72 and 75	Regulates construction on floodplains and floodways in the state.	Applicable to excavation or construction activities.

Notes:
CFR = Code of Federal Regulations.
IAC = Iowa Administrative Code.
IDNR = Iowa Department of Natural Resources.
TSD = Treatment, storage, and disposal.
U.S. = United States.
USC = United States Code.

TABLE 4

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
PEOPLES NATURAL GAS SITE - DUBUQUE, IOWA

Standard, Requirement, Criteria, or Limitation	Citation	Description	Comment
Federal			
Solid Waste Disposal Act	42 USC Section 6901-6987		
Hazardous Waste Management Systems: General	40 CFR Part 260	Establishes procedures and criteria for modification or revocation of any provision in 40 CFR Parts 260-265, and 268.	May be applicable if a substance at the site were to be excluded from the list of hazardous wastes.
Identification and Listing of Hazardous Waste	40 CFR Part 261	Defines those solid wastes that are subject to regulation as hazardous wastes under 40 CFR Parts 263-265 and Parts 124, 270 and 271.	Applicable.
Standards Applicable To Generators Of Hazardous Waste	40 CFR Part 262	Establishes standards for generators of hazardous waste.	Applicable.
Standards Applicable to Transporters of Hazardous Waste	40 CFR Part 263	Establishes standards that apply to persons transporting hazardous waste within the U.S. if the transportation requires a manifest under 40 CFR Part 262.	Applicable if off-site transportation of hazardous waste is required.
Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities	40 CFR Part 264	Establishes minimum national standards that define the acceptable management of hazardous waste for owners and operators of facilities that treat, store or dispose hazardous waste.	Subparts B through X would be applicable if any off-site facility accepted hazardous waste for treatment, storage, or disposal.
Land Disposal Restrictions	40 CFR Part 268	Identifies hazardous wastes that are restricted or prohibited from land disposal.	Applicable to land disposal of hazardous waste generated during the remedial action. Not applicable to environmental media left or treated in situ.
Hazardous Waste Permit Program	40 CFR Part 270	Establishes provisions covering basic EPA hazardous waste permitting requirements.	A permit is not required for on-site CERCLA response actions, per 40 CFR 300.400(e)(1). However, compliance with substantive permit requirements is required.

TABLE 4

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
PEOPLES NATURAL GAS SITE - DUBUQUE, IOWA

Standard, Requirement, Criteria, or Limitation	Citation	Description	Comment
Federal (continued)			
Off-Site Rule	40 CFR 300.440	Establishes criteria and procedures for determining whether facilities are acceptable for receipt of CERCLA wastes from response actions authorized or funded under CERCLA.	Applicable.
Clear Air Act	42 USC Section 7401-7642		
National Ambient Air Quality Standards	40 CFR Part 50	Treatment technology standards for emissions to air.	If an alternative developed would involve emissions governed by these standards, then the requirements are applicable.
Clean Water Act	33 USC Section 1251-2762		
Oil Pollution Prevention	40 CFR Part 112	Establishes procedures, methods, equipment, and other requirements to prevent discharge of oil from non-transportation-related on-shore and off-shore facilities into or upon navigable waters of the U.S.	Applicable if more that 1,320 gallons of oil is stored at the site.
Designation Of Hazardous Substances/Determination Of Reportable Quantities For Hazardous Substances	40 CFR Parts 116 and 117	This regulation designates hazardous substances and associated reportable quantities.	Applicable if hazardous substances are used and released on site.
EPA Administered Permit Programs: The National Pollutant Discharge Elimination System	40 CFR 122.26	Provides requirements for stormwater discharges.	Applicable if one or more acres are disturbed during remedial activities, as referenced by 567 IAC 64.13(1).

TABLE 4

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
PEOPLES NATURAL GAS SITE - DUBUQUE, IOWA

Standard, Requirement, Criteria, or Limitation	Citation	Description	Comment
Federal (continued)			
Criteria And Standards For The National Pollutant Discharge Elimination System	40 CFR Part 125	Establishes criteria and standards for the imposition of technology-based treatment requirements in permits under section 301(b) of the Clean Water Act.	Applicable if dewatered groundwater is discharge to navigable waters.
Underground Injection Control Program	40 CFR Parts 144 and 146	Establishes criteria and standards and the permiting process for the underground injection of liquids.	Applicable to the underground injection of remediation agents or chemical sequestrants into wells.
Emergency Planning and Community Right to Know	42 USC Section 11001-11050		
Emergency Planning And Notification	40 CFR Part 355	Establishes requirements for a facility to provide information necessary for developing and implementing State and local chemical emergency response plans, and requirements for emergency notification of chemical releases.	Applicable if extremely hazardous substances are present at the site in quantities exceeding threshold levels.
Hazardous Chemical Reporting: Community Right-To-Know	40 CFR Part 370	Establishes reporting requirements for providing the public with important information on the hazardous chemicals in their communities.	Applicable if hazardous chemicals are present at the site in quantities exceeding threshold levels.
Transportation			
Hazardous Materials Regulations	49 CFR Parts 171-173, and 177	Establishes requirements for transportation of hazardous materials.	Applicable to off-site transportation of hazardous materials.
Occupational Safety and Health Act	29 USC Section 651-678	Regulates worker health and safety.	Applicable to personnel involved in implementation of remedial action.
State			
Iowa Environmental Quality Act	Iowa Code Chapter 455B	Defines the jurisdiction of the IDNR, powers and duties of the commission and the director, and civil or criminal proceedings to be undertaken by the State Attorney General.	None.
Solid Waste Management And Disposal			

TABLE 4
ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
PEOPLES NATURAL GAS SITE - DUBUQUE, IOWA

Standard, Requirement, Criteria, or Limitation	Citation	Description	Comment
State (continued)			
Scope Of Title--Definitions--Forms--Rules Of Practice	IAC 567—Chapter 100	Provides general requirements relating to solid waste management and disposal.	Applicable.
Special Waste Authorizations	IAC 567—Chapter 109	Provides rules for disposal of special waste.	Applicable to disposal of excavated material.
Iowa Air Pollution Control Regulation			
Controlling Pollution	IAC 567—Chapter 22	Provides standards and procedures for permitting of emission sources and the special requirements for nonattainment areas.	Applicable to batch plant required to process soil binding agent used for ISS.
Emission Standards For Contaminants	IAC 567—Chapter 23	Provides air emission standards for contaminants.	Applicable to fugitive dust from remediation activities. Requires reasonable precautions to be taken to prevent nuisance levels of particulate matter. Applicable to particulate emissions from portland cement concrete batching plants used for ISS.
Excess Emission	IAC 567—Chapter 24	Details excess emissions reporting requirements, and equipment maintenance and repair requirements.	Applicable to portland cement concrete batching plant equipment used for ISS.
Measurement Of Emissions	IAC 567—Chapter 25	Provides testing and sampling requirements for new and existing sources.	Applicable to portland cement concrete batching plant equipment used for ISS.
Iowa Water Pollution Control Regulations			
Private Water Well Construction Permits	IAC 567—Chapter 38	Defines requirements for private water well construction permits.	Applicable if additional wells are installed.
Requirements For Properly Plugging Abandoned Wells	IAC 567—Chapter 39	Provides requirements for well abandonment.	Applicable if wells are abandoned.

TABLE 4

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
PEOPLES NATURAL GAS SITE - DUBUQUE, IOWA

Standard, Requirement, Criteria, or Limitation	Citation	Description	Comment
State (continued)			
Scope Of Title--Definitions--Forms--Rules Of Practice	IAC 567—Chapter 40	Water supply definitions. Defines MCLs to which Chapter 133 refers.	None.
Nonpublic Water Wells	IAC 567—Chapter 49	Establishes uniform minimum standards and methods for well construction and reconstruction for nonpublic water supply wells.	Applicable to extraction wells.
Water Withdrawals	IAC 567—Chapters 50-54	Provides requirements for water withdrawal permits. Permits are required for withdrawals greater than 25,000 gallons per day.	Applicable if the withdrawal rate is greater than 25,000 gallons per day.
Scope Of Title IV (Wastewater Treatment And Disposal)--Definitions--Forms--Rules Of Practice	IAC 567—Chapter 60	Provides general definitions and rules of practice, including forms, applicable to the public in the department's administration of this title.	Applicable if groundwater is discharged to navigable waters, or if one or more acres are disturbed during remedial activities. Provides instructions and form requirement for NPDES permit applications.
Wastewater Construction And Operation Permits	IAC 567—Chapter 64	Contains the standards and procedures for obtaining construction, operation, and NPDES permits for wastewater disposal systems.	Applicable if groundwater is discharged to navigable waters, or if one or more acres are disturbed during remedial activities.
Well Contractor Certification	IAC 567—Chapter 82	Establishes certification and requirements for well contractors.	Applicable to well installation activities.
Laboratory Certification	IAC 567—Chapter 83	Provides procedures for laboratory certification.	Applicable to all laboratories conducting analyses of contaminated site parameters pursuant to IAC 567 - Chapter 133.
Solid Waste Management And Disposal			
Scope Of Title--Definitions--Forms--Rules Of Practice	IAC 567—Chapter 100	Provides general requirements relating to solid waste management and disposal.	Applicable.

TABLE 4

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
PEOPLES NATURAL GAS SITE - DUBUQUE, IOWA

Standard, Requirement, Criteria, or Limitation	Citation	Description	Comment
State (continued)			
Spills And Hazardous Conditions			
Notification Of Hazardous Conditions	IAC 567—Chapter 131	Provides requirements for reporting a hazardous condition.	Applicable if hazardous substances are used and released during remedial activities.
Rules For Determining Cleanup Actions And Responsible Parties	IAC 567—Chapter 133	Establish procedures and criteria to determine the parties responsible and cleanup actions necessary to meet the goals of the state pertaining to the protection of groundwater. These rules pertain to the cleanup of groundwater itself and soils and surface water where groundwater may be impacted.	Applicable.

Notes:

CERCLA = Comprehensive, Environmental Response, Compensation, and Liability Act.
CFR = Code of Federal Regulations.
EPA = Environmental Protection Agency.
IAC = Iowa Administrative Code.
IDNR = Iowa Department of Natural Resources.
ISS = In-situ solidification.
MCL = Maximum Contaminant Levels.
NPDES = National Pollutant Discharge Elimination System.
U.S. = United States.
USC = United States Code.