



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 W. JACKSON BLVD
CHICAGO, IL 60604

US EPA RECORDS CENTER REGION 5



475607

MEMORANDUM

SUBJECT: ENFORCEMENT ACTION MEMORANDUM —Determination of Threat to Public Health and/or the Environment at the Wisconsin Public Service, Two Rivers Former Manufactured Gas Plant Site, Two Rivers, Manitowoc County, Wisconsin (Site ID: B5BU).

FROM: Brad Benning, On-Scene Coordinator *BBS*
Removal Response Section 3

THRU: Samuel Borries, Chief *MUR for*
Emergency Response Branch 2

TO: Richard C. Karl, Director
Superfund Division

I. PURPOSE

The purpose of this Action Memorandum is to document the determination of an imminent and substantial threat to public health and the environment posed by the existence of uncontrolled hazardous substances in soils and groundwater at the former Wisconsin Public Service (WPSC) Two Rivers Manufactured Gas Plant (MGP) site (“WPSC Two Rivers MGP Site” or “the Site”) located in Two Rivers, Manitowoc County, Wisconsin and to document the proposed time-critical removal action described herein.

The proposed actions will mitigate Site conditions by in-situ stabilization (ISS) and/or by removal and off-site disposal of the coal tar contaminated soils from areas A, B and C as shown in Figure A-3.

The high levels of hazardous substances in surface and sub-surface soil at concentrations that exceed U.S. Environmental Protection Agency Removal Management Levels (RMLs) and the Wisconsin Department of Natural Resources (WDNR) Removal Action Levels (RALs), the Site’s plans for future construction, the potential of exposure to children trespassers and the industrial/commercial use of nearby property requires that this action be classified as a time-critical removal. A potential responsible party (PRP) is prepared to conduct the time-critical removal action described in this Action Memorandum pursuant to an Administrative Order on Consent (AOC).

There are no nationally significant or precedent setting issues associated with the proposed response at this Superfund Alternative (SA)/non-NPL site.

II. SITE CONDITIONS AND BACKGROUND

CERCLIS ID: WIN000509953
RCRA ID: none
State ID: BRRTS #02-36-000255
Category: Time-Critical

A. Site Description

The WPSC Two Rivers MGP Site located at 200 21st Street, encompasses approximately 4-acres. Features include historic concrete building foundations. A chain link fence secures the Site perimeter. A wetland exists in the center and western portion of the property (approximately 2 acres). Large portions of the Site east of the wetland are covered in crushed stone and asphalt. The vegetation in the wetland consists of a fringe scrub-shrub on the eastern edge of the wetland dominated by aspen and dogwood. Emergent and wet meadow species such as green bulrush and horsetail are located closer to the bank of the West Twin River.

The Site has elevations ranging from approximately 579 feet (MSL) to 584 feet MSL. Surface water drainage flows overland to the West Twin River. The majority of the Site is within the 100-year flood zone as mapped by Federal Emergency Management Agency.

1. **Removal Site Evaluation**

WPSC has conducted a number of Site investigations over the years. Below are summaries of assessment activities taken from the WDNR 2006 Preliminary Assessment Report and from the removal action work plan.

Phase I Investigation performed by EDI in 1986

Site Investigation, Former Coal Gas Manufacturing Plant, School Street, Two Rivers, Wisconsin; EDI Engineering & Science, Inc., 1986.

The EDI investigation consisted of collecting soil, groundwater, and air samples; advancing soil borings; and installing monitoring wells. The Phase I investigation indicated the Site is covered by wetland soils, muck, and fill. Beneath the top layer of soil is up to approximately 20 feet of inter-bedded peat, marl, sand, silt, and clay; which is underlain by a thick layer of clay. Groundwater flow is west toward the West Twin River and depth to groundwater across the Site was reported at 0 to 0.3 feet below ground surface (bgs).

During the Phase I investigation, soil, air, and groundwater samples were collected and analyzed for volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), cyanides, and metals. The results are summarized below:

- Total cyanide and benzo(a)pyrene were detected in soils at the surface and cyanide and PAHs were detected in the subsurface.
- Several parameters were detected in an up gradient monitoring wells, but none above either the Wisconsin Administrative Code (WAC) NR140 Enforcement Standard (ES) for groundwater.
- Benzene, benzo(a)pyrene, and naphthalene were detected in down gradient monitoring wells above the WAC NR 140 ES for groundwater.
- Low level PAHs and VOCs were detected in down gradient monitoring wells.
- Cyanide and sulfate were detected in southern, down gradient monitoring wells.
- Low level zinc and phenol were detected in all monitoring wells.
- Nickel was detected in all down gradient monitoring wells.

Phase II Investigation performed by NRT in 1994

Phase II Environmental Investigation Report, Former Manufactured Gas Plant Site, Two Rivers, Wisconsin; NRT 1995.

NRT conducted a Phase II investigation in November 1994 which included test pits and soil borings and the installation and sampling of groundwater monitoring wells. The results of the investigation are summarized below:

- Soils beneath the Site include fine and silty sands, clay, and occasional, discontinuous peat layers. The surface soils are dominated by fine sands, silts and fill material comprised of glass, wood, brick, concrete, wire, and ash/cinder. A clay layer is present between 4 and 7 feet bgs and extends to 30 feet bgs in most locations. The clay is gray to red-gray, soft, wet, and plastic, and contains varying amounts of sands and silts.
- Groundwater occurs between 0.58 and 3.20 feet bgs at the Site. Groundwater flow in both the shallow and deep wells is southwest, toward the West Twin River. The calculated horizontal hydraulic gradient is low, and moderate to strong upward gradients were calculated in all well nests. The horizontal groundwater flow is estimated to be approximately 1 to 16.5 feet per year.
- The areas of benzene and PAH impacted soil are approximately 20,000 and 24,500 square feet (or 0.47 and 0.56 acres), respectively. The depth of impacts lies below the water table. Therefore, it is likely that some of the soil impacts may be due to the shallow depth of groundwater and migration of highly impacted groundwater just beneath the surface of the Site.
- Cyanide impacts were noted at well nest MW-603 and test pit TP-605 (refer to Figure A-3). Cyanide impacted soils lie outside the area of BTEX and PAH impacted soils.

- Evidence of MGP tar or oil wetted material was noted between 7 and 14 feet bgs at well nests MW-605 and MW-608. At well nest MW-605 the clay layer separating the upper and lower portion of the aquifer may be mitigating tar impacts in the lower portion of the aquifer.
- BTEX, PAHs, and cyanide impacts in groundwater are widespread across the Site. BTEX and PAH results suggest that impacts on the northern portion of the property may be partially due to an off-site, up gradient source.
- The report concluded that based on the concentrations measured in the nested wells (shallow wells screened 2-12 feet bgs, and deeper wells screened 25 to 30 feet bgs), contamination is present in shallow and deeper portions of the groundwater regime at the Site.
- Results from the piezometers suggest that deeper groundwater impacts increase with distance from source areas. Well nests MW-607 and MW-608, farther down gradient from source areas, indicate groundwater impacts are present in both the shallow and deep portion of the aquifer, but concentrations decreased by an order of magnitude with depth.
- Possible MGP residuals were noted in the boring and wells on the north side of the Site (i.e. well nest MW-605).

1995 EPA Sampling of Downstream Sediments at PCI Tank Farm

Sediment sampling was also conducted in 1995 along the banks of the West Twin River during an EPA site assessment of the PCI tank farm located approximately 350 feet south and downstream of the WPSO Two Rivers MGP Site. Results shows that sediments contaminated with PAHs were present in samples upgradient of the PCI site and downstream of the Site.

1995-1996 Sediment Investigation

In July 1995, WPSO conducted an initial sediment investigation to screen for the absence or presence of BTEX and PAH in sediment in the West Twin River. A manually driven Ogeechee sand corer and a Ponar grab dredge sampler were used. Samples were submitted for analyses for BTEX, PAH, total organic carbon (TOC), total cyanide, phenol, oil and grease. In June 1996, further field work to characterize sediment chemistry was conducted by WPSO with the use of a Vibracore sampling device. Total PAH concentrations from Vibracore samples ranged from <1 to 2,004 mg/kg.

Both sediment investigation efforts resulted in a preliminary delineation of the contamination of sediments in the West Twin River (see Figure 4). Odor, sheen, and tar were observed and measured to a distance of approximately 720 feet along the shore and 160 feet out from the shore of the WPSO Two Rivers MGP site. Coal tar was observed for a distance of approximately 500 feet along the shore and within 125 feet of the shoreline. The thickness of soft sediments in this area ranged from 2.0 to 11.3 feet, averaging about 7.2 feet. Tar was sometimes evident only in the lower portion of the soft sediment. Tar was observed in 5 samples to a depth of 100 inches (8.3 feet).

Phase II Addendum Investigation Results, Former Two Rivers Manufactured Gas Plant (MGP) Site, Two Rivers, Wisconsin. WDNR Transmittal; NRT, Nov. 13, 1996,

During the Phase II Addendum Investigation, NRT installed additional soil borings and monitoring wells to gather additional information on the Site. The sampling events for this Addendum occurred in March and September of 1996. A summary of the investigation is provided below:

- Soil samples around and west of the MGP facilities, surface and subsurface, had BTEX detected above the WAC NR 720 residual contaminant level (RCL) values.
- Total PAHs around and west of the Site, surface and subsurface, had PAHs ranging from 0 to 616 ppm.
- Groundwater samples around and down gradient of the Site indicated BTEX, cyanide, cadmium, and lead were detected and in some instances were above WAC NR140 ES or preventive action limits (PAL) for groundwater quality.

2003 Sediment Poling and Survey

In July 2003, WPSC completed a sediment poling and grab sample survey in the near shore environment of the West Twin River near the WPSC Two Rivers MGP site. Poling locations were spread about 150 feet apart. Insufficient data was collected to evaluate the vertical distribution of MGP residuals in sediments. However, the survey did confirm that sediment types and presence or absence of MGP residuals were consistent with the previous sediment work effort. MGP residuals were identified in surficial soft sediments near the site. Sheen was noted on the water surface after sediments were disturbed. Free phase tar consisting of tiny globules of tar intermixed with sediment matrix was noted at several locations. Traces of tar were noted 500 feet downstream of the WPSC Two Rivers MGP Site.

Pre-Remedial Design Investigation and Remedial Action Options Report; Former Manufactured Gas Plant Site, Two Rivers, Wisconsin; NRT, December 2003 (RAOR)

NRT conducted a pre-remedial design investigation during development of a Remedial Action Options Report in 2003. Soil samples collected in August 2003 from test pits in the vicinity of the former MGP structures were generally unsaturated to moist and contained large amounts of fill material (ash/cinders, wood, brick, etc.). Soil samples collected from test pits and soil borings west of the former MGP structures were generally saturated and represent the intervals exhibiting potential MGP impacts based on visual and/or olfactory observations or elevated PID measurements. Emulsified coal tar was observed in soil borings and test pits generally located within and to the west of the wetland area. Beneath a majority of the Site, a clay layer was present between 4 and 7 feet bgs and extends to the bottom of the piezometer borings (25 to 30 feet bgs).

Analytical results of soil sampling indicated the following contaminant distribution trends:

- Off-property soils to the north were not impacted by benzene and naphthalene.

- Analytical results of off-property soils to the south indicated benzene and naphthalene concentrations above the generic groundwater pathway NR720 RCLs, in effect at the time.
- Site soils are generally above the NR720 standards for benzene and naphthalene at low levels across the Site. Concentrations are significantly higher at select locations where coal tar was observed to occur within the soil matrix.

Based on the investigation, the Site was split up based upon contaminants of concern associated with emulsified coal tar and other MGP process residuals. The three areas of concern identified include:

- **Upland Area:** approximately 32,600 square feet and approximately 5,000 cubic yards, generally unsaturated fill materials extending 4 to 5 feet bgs in the vicinity of historic MGP structures.
- **Source Area:** approximately 35,800 square feet and approximately 15,000 cubic yards, generally saturated soil containing emulsified coal tar within the soil matrix in the vicinity of the wetlands, considered to be the primary source of dissolved MGP groundwater impacts. Emulsified tar is observed from ground surface to 17 feet bgs.
- **Downgradient Area:** approximately 18,600 square feet and approximately 2,600 cubic yards, (including saturated soil west of the Source Area and shallow groundwater), extends from the wetland to the West Twin River and contains emulsified coal tar in thinner layers than the Source Area within the soil matrix at depths ranging from 9 to 14 feet bgs.

Preliminary Assessment for the WPSO TWO RIVERS MGP Site, 2000 21st Street, Two Rivers, Wisconsin, September 26, 2006

The WDNR was tasked to conduct a Preliminary Assessment (PA) at the WPSO Two Rivers MGP Site through a cooperative agreement with EPA under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA). The PAs documented Site conditions based on existing WPSO and WDNR information. The PA includes a review of extensive state file information, a comprehensive target survey, and a presentation of existing analytical data. A summary of the PA findings is provided below.

The PA documented numerous releases to groundwater. The table below lists the highest level of select contaminants measured in monitoring wells at the WPSO Two Rivers MGP Site.

Contaminant	Groundwater in monitoring well (ug/L)	Tapwater RML (ug/L)
Naphthalene	310,000 ©MW-605AR 610,000 (D) @ MW-605AR	140
Benzo(a)pyrene	42 @ MW-608A 92 @ MW-605A	0.29

Contaminant	Groundwater in monitoring well (ug/L)	Tapwater RML (ug/L)
	14,000(Q) @ MW-605AR 33,000 (E) @ MW-605AR	
Fluoranthene	460 @ MW-605A	1,900
Fluorene	460 @ MW-605A	6,500
Total PAHs	2,066 @ MW-605AR 2,988 @ MW-606 2,174 @ MW-605b	
Total BTEX	23,800 @ MW-605AR	
Total Cyanide	24,000 @ MW-603A	
Diss Cyanide	640 @ MW-603A	

The PA further highlighted impacts to sediment from the Site. Sediment contaminated with coal tar, PAH and BTEX has been measured at the Site as early as 1995. The table below lists the highest level of select contaminants measured in sediments at various depths nearshore and downstream of the WPSC Two Rivers MGP Site. MGP impacted groundwater is also discharging to an on-site wetland and the West Twin River. The degree and extent of sediment contamination in the West Twin River has not been fully defined. Odor, sheen, and tar extends approximately 720 feet along the shore and 160 feet out from the shore of the Two Rivers MGP property. Coal tar was observed about 500 feet along the shore and within 125 feet of the shoreline to a depth of 8 feet. The highest concentration of select contaminants measured in sediments is provided below and compared to site specific removal management levels (RMLs) for soil:

Contaminant (Known)	Concentration (mg/kg), depth in inches	Removal Management Level (mg/kg)
COAL TAR, or Emulsified Coal Tar	SD-601-V, SD-603-BV, SD-603-CV, SD-605-AV, SD-605-BV, SD-606-V, SD-607-AV, SD-607-BV	Not Available (NA)
Naphthalene	416 @ 26-30" SD603-CV 63 @ 0-42" SD-603-BV	10,100
Benzo(a) Pyrene	26 @ 0-18"SD-601 39 @ 26-30" SD-603-CV	7.44
Fluoranthene	304 @ 0-1 8" SD-601 93 @ 26-30" SD-603-CV	33,800
Total PAHs	820 @ 0-1 8" SD-601 2,003.9 @ 26-30" SD-603-CV	NA
Benzene	3.3 @ 0-18"SD-603-B 0.37 @ 32-48' SD-606-V(A)	3,360
Total BTEX	126.2 @ 0-18"SD-603-B 105 @ 26-30" SD-603-CV(I)	NA
Total Cyanide	0.850 @ 0-18"SD-603-B	NA

The PA also documented high levels of contamination within the upper two feet of soil at the Site. The following table lists the highest concentration of select soil contaminants measured in the upper two feet of soil at the WPSC Two Rivers MGP Site. These concentrations are then compared to Site specific RMLs for soil:

Contaminant	Concentration (mg/kg)	Location	Removal Management Level (mg/kg)
Benzene	3.1	MW-603	3,360
Benzo(a)anthracene	29.0 0.250	MW-603 MW-601	74.4
Naphthalene	125	MW-603	10,100
Benzo(a)pyrene	3.6 1.6	TP-605 SS-602	7.44
Total cyanide	210	MW-603	NA
Phenanthrene	71,000	MW-603	NA

Numerous other releases to soil from 3 to 20 feet have been documented at the WPSC Two Rivers MGP Site. As groundwater at the site is found at depths averaging less than 5 feet, a large percentage of the soil samples are representative of groundwater contamination as opposed to soil contamination. The following table lists the highest concentration of select soil contaminants measured at various depths.

Contaminant	Concentration (mg/kg), sample location, depth in feet	Removal Management Level (mg/kg)
Coal Tar, or emulsified coal tar product	SB-609, SB-617, SB-618, SB-625, SB-626, SB-634, MW-605, MW-608	NA
Naphthalene	100 @ TP-6163-4' 1,100 @ SB-626 12-1 5'	10,100
Benzo(a) Pyrene	26 @ TP-6163-4' 78 @ SB-626 12- 15'	7.44
Fluoranthene	68 @ TP-6122-3'	33,800
Fluorene	131 @ TP-6122-31 200 @ SB-626 12-1 5'	33,800
Total PAHs	894 @ TP-6122-3' 4,246 @ SB-626 12-1 5'	NA
Benzene	130 @ TP-6162-3'	3,360
Total BTEX	2,456 @ TP-61 6 3-4'	NA
Total Cyanide	45 @ 1 -2' TP-605	NA
Dissolved Cyanide	31 @ 1-2' TP-605	NA

Numerous investigations since 1986 have revealed high concentrations of BTEX, PAH, and cyanide in on-site soil, sediment, and groundwater. Concentrations of benzo(a)pyrene in surface and subsurface soil and sediment exceed the site specific RML.

Groundwater Quality Data Transmittal; Former Two Rivers Manufactured Gas Plant, Two Rivers, Wisconsin; NRT, 2005-2013

Beginning in 2005, groundwater samples and elevation measurements were collected annually to monitor conditions in Site monitoring wells. Samples were analyzed for petroleum volatile organic compounds (PVOCs), PAHs, and field parameters measured during previous activities. A summary of the results is provided below;

- As in previous sampling events, the BTEX analytical results indicate a wider distribution of elevated concentrations compared to the PAHs. Benzene, the other BTEX parameters, and 1,2,4-trimethylbenzene exceeded WAC NR 140 at most of the down gradient wells and piezometers. Although benzene concentrations at some locations fluctuated above and below the groundwater quality standards, no strong correlation with the groundwater elevation was identified. The highest benzene (and other PVOC) concentrations occur in shallow groundwater near the source areas.
- 1-methylnaphthalene is the PAH most often observed above the WAC NR140 ES. In addition, numerous other PAHs (including benzo(a)pyrene, benzo(b)fluoranthene, chrysene, and naphthalene) have been detected above the ES, and these impacts are primarily confined to the wells located within the former MGP property boundary.

2. Physical Location

The approximately 4-acre Site is located on vacant land between 22nd Street and School Street in Two Rivers, Manitowoc County, Wisconsin. The geographical coordinates for the Site are Latitude 44°9'09" and Longitude 87°34'29". Specific Site features, sampling locations, and adjacent properties are shown on Figure A-3. The Site is bounded by:

- 2022 School Street to the south, owned by Manitowoc County
- School Street right-of-way and residential properties to the east:
- 1926 22nd Street to the north, owned by the US Oil Company, Inc.
- The West Twin River to the west

The headwaters of the West Twin River are comprised of the Neshota River, Black Creek, and Devils River which originate in Brown and Manitowoc Counties. The West Twin River flows south and east before joining with the East Twin River where the combined flow discharges into Lake Michigan via the Two Rivers harbor.

An Environmental Justice (EJ) analysis for the Site was conducted. Screening of the surrounding area used Region 5's EJ Screen Tool (which applies the interim version of the national EJ Strategic Enforcement Assessment Tool (EJSEAT)). Region 5 has reviewed environmental and demographic data for the area surrounding the site at 200 21st Street, Two Rivers, Wisconsin, and determined there is a low potential for EJ concerns at this location.

3. Site Characteristics

The Site was formerly a MGP and produced gas using a carbureted water gas method from 1925 to 1946. The locations of former MGP structures, based on historic Site drawings provided by WPSC, are shown on Figure A-3 and include the following:

- Boiler and meter building
- Pipe Shed
- Three gas holders: 10,000 cubic feet (ft³), 80,000 ft³, and 90,000 ft³ capacity
- Two oil tanks
- Three warehouses and garages

After 1946, the facility was used for propane storage and distribution prior to the availability of natural gas in the area. WPSC maintains ownership of the Site.

Current Site features included historic concrete building foundations. A chain link fence secures the Site perimeter. A wetland exists in the center and western portion of the property. Large portions of the Site east of the wetland are covered in crushed stone and asphalt. The vegetation in the wetland consists of a fringe scrub/shrub on the eastern edge of the wetland dominated by aspen and dogwood. Emergent and wet meadow species such as green bulrush and horsetail, are located closer to the bank of the West Twin River.

The Site has elevations ranging from approximately 579 feet above mean sea level (MSL) to 584 feet MSL. Surface water drainage flows overland to the West Twin River. The majority of the Site is within the 100-year flood zone as mapped by the Federal Emergency Management Agency. Existing Site contours, wetland information, and the 100-year flood zone are shown on Figure A-2.

4. Release or Threatened Release into the Environment of a Hazardous Substance, or Pollutant, or Contaminant

Analytical results from historical samples in the proposed removal areas indicate the presence of elevated concentrations of PAHs and VOCs in soil, sediment and groundwater. In particular, this past data indicates the presence of benzo(a) pyrene in soil above the site specific RML of 7.4 mg/kg. The defined source area contains emulsified coal tar from the ground surface to a depth of 17 feet bgs. Coal tar has been observed in near shore sediments of the West Twin River. Depth to groundwater in the area varies from 0.5 to 7.2 feet bgs. Groundwater flows to the southwest towards the West Twin River, and organics contained in the coal tar may leach into the groundwater and migrate to the river, which ultimately discharges to Lake Michigan. The total volume of impacted materials in areas A, B and C is estimated to be 41,300 cubic yards including 34,200 cubic yards of ISS and 7,100 cubic yards of excavation and off-site disposal.

5. NPL Status

The Site is not on the National Priorities List (NPL). The Site is being addressed as a Superfund Alternative Site under an (AOC), between EPA and WPSC that was signed in 2006.

6. Maps, Pictures, and Other Graphic Representations

The following Figures are included as attachments: Figure A-1-Site Location and Boundaries; Figure A-2-Site Contours and Wetland Delineation; Figure A-3- Map of Proposed Removal Action Area Extent; and Figure A-4 - Extent of Observed Impacts to Sediment; Table B-1-ISS Performance Goals.

B. Other Actions to Date

1. Previous Actions

Previous actions at the Site include a 1986 Phase I Investigation performed by EDI Engineering and Science, Inc. and the 1994 Phase II Investigation performed by NRT. NRT performed the Phase II Addendum Investigation in 1996, a Pre-Remedial Design Site Investigation in 2003, and annual Groundwater Quality Data Transmittals from 2005 through 2013.

2. Current Actions

EPA and WPSC entered into an Administrative Settlement Agreement and Order on Consent in 2006 that requires WPSC to conduct a RI/FS for the Site to address PAH impacts to soil, groundwater, and sediment. Currently, the RI/FS process is scheduled to commence in 2015.

In preparation of the upcoming removal activities, NTR performed geotechnical borings, test pits, and other activities on behalf of WPSC. NRT has also conducted an ISS treatability study on the source material present on Site, which includes a dense non-aqueous phase liquid (NAPL), and delineated areas for ISS and excavation.

C. State and Local Authorities' Roles

1. State and Local Actions to Date

The WDNR is partnering with EPA to oversee the remediation of this Site and six other former MGP sites owned by WPSC. All have been in the Superfund Alternative Program since 2006.

2. Potential for Continued State/Local Response

Since July 2006, EPA has taken the lead on CERCLA response activities at the Site. EPA will continue working in consultation with WDNR during the proposed removal and potential remedial activities associated with the Site.

III. THREATS TO PUBLIC HEALTH AND/OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

Conditions at the Site may pose an imminent and substantial endangerment to public health or welfare, and the environment based upon factors set forth in the National Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Section 300.415 (b)(2). These conditions include:

Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants.

A potential exposure risk is present due to exposed MGP residual materials, including weathered tar at ground surface and tar-like NAPL in soil and the West Twin River. Analysis of soil samples taken during previous investigations indicated the presence of elevated levels of PAHs, including benzo(a) pyrene above the site specific RML. Under current land use conditions, trespassers, particularly children trespassers, have had access to the open areas of the former MGP footprint up to the East Twin River. Children and teenagers have been observed playing on the property and in the East Twin River despite the Warning and No Trespassing signs. There is no beach and the river in the vicinity of the site does not have boat access.

Subsurface migration also presents a potential exposure to groundwater and the West Twin River. PAHs are present in groundwater at high concentrations greatly exceeding EPA Tapwater RMLs. Ground water discharges to the West Twin River which ultimately flows to Lake Michigan. MGP residuals including free phase tar were observed in sediment within the West Twin River adjacent to the Site and as seen on the river. There are potential human health risks from exposure to PAH-contaminated soil by recreational users.

Acute inhalation exposure to PAHs such as benzo(a)pyrene may cause eye, skin, and respiratory tract irritation. Repeated exposures to benzo(a)pyrene may result in an allergic skin reaction, ingestion may result in irritation of the digestive tract. Long-term chronic exposure to these compounds may cause reproductive or fetal effects. These compounds are categorized as possible human carcinogens (Group 2A or 2B), with all shown to be mutagenic in laboratory experiments by EPA. Benzene is a known human carcinogen. Long-term exposure to high levels of this compound in the air can lead to leukemia and cancers of the blood-forming organs.

Actual or potential contamination of drinking water supplies or sensitive ecosystems.

Depth to groundwater at the Site is very shallow and flow towards the West Twin River which is adjacent to the Site. Hazardous substances at or near the surface and in groundwater discharging to the Twin River which is a tributary to Lake Michigan have the potential to adversely impact sensitive ecosystems.

High levels of hazardous substances or pollutants or contaminants in soils at or near the surface that may migrate.

Analytical results from previous reports and activities documented the presence of high levels of hazardous substances in soil and within 10 feet of the shoreline. Exposed coal tar and the presence of elevated levels of PAHs, including benzo(a) pyrene above the site specific RML, in the upper two feet of soil were detected in multiple samples. Trespassers may be exposed to contaminated soil in the surface through either dermal contact or inhalation. Typical security measures, including fencing, are currently employed to limit potential exposure.

Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released.

Migration could occur as a result of wind action during dry periods, which could pose a breathing hazard. Such wind action could also lead to deposition of materials in uncontaminated areas. Migration of contaminants in surface soil could also occur through surface water flow or groundwater flow during wet periods, due to the high levels of PAHs found in some of the samples.

IV. ENDANGERMENT DETERMINATION

Given the Site conditions, the nature of the known and suspected hazardous substances on Site, and the potential exposure pathways to nearby populations described in Sections II, and III above, actual or threatened release of hazardous substances and pollutants or contaminants from the Site, if not addressed by implementing the response actions selected in this Memorandum, may present an imminent and substantial endangerment to public health, welfare, or the environment.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Actions

1. Proposed action description

Area A is in the eastern portion of the WPSC property where the former MGP operations took place and where source material impacts are generally considered to be at or near the ground surface and extend to a depth of approximately 6 feet bgs. For Area A, it is estimated that 7,100 cubic yards of material will be excavated and disposed. Area B includes the central portion of the WPSC property and the delineated wetland areas. Source material impacts are considered to be at or near ground surface and extend to a depth of approximately 20 feet bgs. Approximate volume to be addressed by a mixture of excavation and on-site ISS is 22,600 cubic yards. Area C includes the western portion of the WPSC property and delineated wetlands area along the West Twin River. Source material impacts are generally considered to be at or near ground surface and extend up to a depth of 20 feet bgs. Preliminary estimates indicated the approximate removal action volume for this area is 11,600 cubic yards and will be addressed through on-site ISS.

The PRP shall implement the EPA approved Removal Action Work Plan for WPSC Site, dated February 24, 2014. The main components of the work plan include the following provisions which require compliance:

- a) Preliminary activities such as site security and controls.
- b) Site preparation, including clearing and grubbing.
- c) Targeted excavation within defined removal areas A, B and C.
- d) Transportation and off-site disposal of excavated material from areas A, B and C.
- e) In-Situ Solidification/Stabilization construction and operations in area B and C. ISS solidified material will remain on-site until future land use requires removal and disposal.
- f) Backfilling with excess swell material and/or clean fill.
- g) Compliance with State and Local requirements.
- h) Construction Quality Assurance Measures such as
 - Air Monitoring
 - Fugitive Emission Management Plan
 - Health and Safety Plan
 - Sampling and Analysis Plan
 - ISS Construction Quality Assurance Plan
- i) Schedule for Completion.
- j) Submission of Weekly and Final Reports.
- k) Take any other response actions to address any release or threatened release of a hazardous substance, pollutant or contaminant that the EPA OSC determines may pose an imminent and substantial endangerment to public health or the environment.

The removal action will be conducted in a manner not inconsistent with the NCP. The PRP will also initiate planning for provisions of post-removal Site control consistent with the provisions of Section 300.415(1) of the NCP.

The threats posed by uncontrolled substances considered hazardous meet the criteria listed in the NCP Section 300.415(b)(2), and the response actions proposed herein are consistent with any long-term remedial actions which may be required. The proposed removal of hazardous substances, pollutants and contaminants that pose a substantial threat of release is expected to minimize substantial requirements for post-removal Site controls.

All hazardous substances, pollutants, or contaminants removed off-site pursuant to this removal action for treatment, storage and disposal shall be treated, stored, or disposed of at a facility in compliance, as determined by EPA, with the EPA Off-Site Rule, 40 C.F.R Section 300.440.

2. Contribution to remedial performance

The proposed action will not impede future actions plan under the Remedial Program.

3. Engineering Evaluation/Cost Analysis (EE/CA)

This section is not applicable.

4. Applicable or relevant and appropriate requirements (ARARs)

All applicable, relevant and appropriate requirements (ARARs) of Federal and State law will be complied with to the extent practicable considering the exigencies of the circumstances.

5. Project Schedule

This project is expected to be completed in 20 weeks.

B. Estimated Costs

This information is not available because this is an Enforcement Action Memorandum.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Given the Site conditions, the nature of the hazardous substances and pollutants or contaminants documented on Site, and the potential exposure pathways to nearby populations described in Sections II, III, and IV above, actual or threatened release of hazardous substances and pollutants or contaminants from the Site, failing to take or delaying action may present an imminent and substantial endangerment to public health, welfare or the environment, increasing the potential that hazardous substances will be released, thereby threatening the adjacent population and the environment.

VII. OUTSTANDING POLICY ISSUES

There are no outstanding policy issues.

VIII. ENFORCEMENT

For administrative purposes, information concerning the enforcement strategy for this Site is contained in the Enforcement Confidential Addendum.

IX. RECOMMENDATION

This decision document represents the selected removal action for the former WPSC Two Rivers MGP Site, Two Rivers, Manitowoc County, Wisconsin, developed in accordance with CERCLA as amended, and is not inconsistent with the NCP. This decision is based on the administrative record for the Site (Attachment 1). Conditions at the Site meet the NCP Section 300.415(b)(2) criteria for a removal action and I recommend your approval of the removal action proposed in this Action Memorandum. You may indicate your decision by signing below.

APPROVE:  DATE: 7-28-14
Director, Superfund Division

DISAPPROVE: _____ DATE: _____
Director, Superfund Division

Enforcement Addendum

Figures:

- A-1 Site Location Map and Former MGP Property Layout and Site Boundaries
- A-2 Site Contours and Wetland Delineation
- A-3 Removal Action Area Extent
- A-4 Extent of Observed Impacts to Sediment

Tables:

- B-1 ISS Performance Goals

Attachments:

1. Administrative Record Index

cc: S. Fielding, EPA 5202 G (email: Fielding.Sherry/DC/USEPA/US)
V. Darby, U.S. DOI, **w/o Enf. Addendum**
(email: Valencia_Darby@ios.doi.gov)
L. Nelson, U.S. DOI, **w/o Enf. Addendum**
(email: lindy_nelson@ios.doi.gov)
S. Ridenour, U.S. EPA HQ
A. Weissbach, WDNR, **w/o Enf. Addendum**
C. Bougie, WDNR, **w/o Enf. Addendum**
J. Killian, WDNR, **w/o Enf. Addendum**

BCC PAGE HAS BEEN REDACTED

**NOT RELEVANT TO SELECTION
OF REMOVAL ACTION**

**ENFORCEMENT ADDENDUM
HAS BEEN REDACTED – ONE PAGE**

**ENFORCEMENT CONFIDENTIAL
NOT SUBJECT TO DISCOVERY
FOIA EXEMPT**

**NOT RELEVANT TO SELECTION
OF REMOVAL ACTION**

FIGURE A-1

SITE LOCATION MAP
WPSC TWO RIVERS MGP SITE



Service Layer Credits: Copyright © 2013
National Geographic Society, I-cubed

DRAWN BY/DATE:
TDC 1/29/14
REVIEWED BY/DATE:
KRM 1/30/14
APPROVED BY/DATE:
KRM 2/4/14

SITE LOCATION

REMEDIAL ACTION WORK PLAN
FORMER TWO RIVERS MANUFACTURED GAS PLANT
WISCONSIN PUBLIC SERVICE CORPORATION
TWO RIVERS, WISCONSIN

PROJECT NO: 1568

FIGURE NO: 1



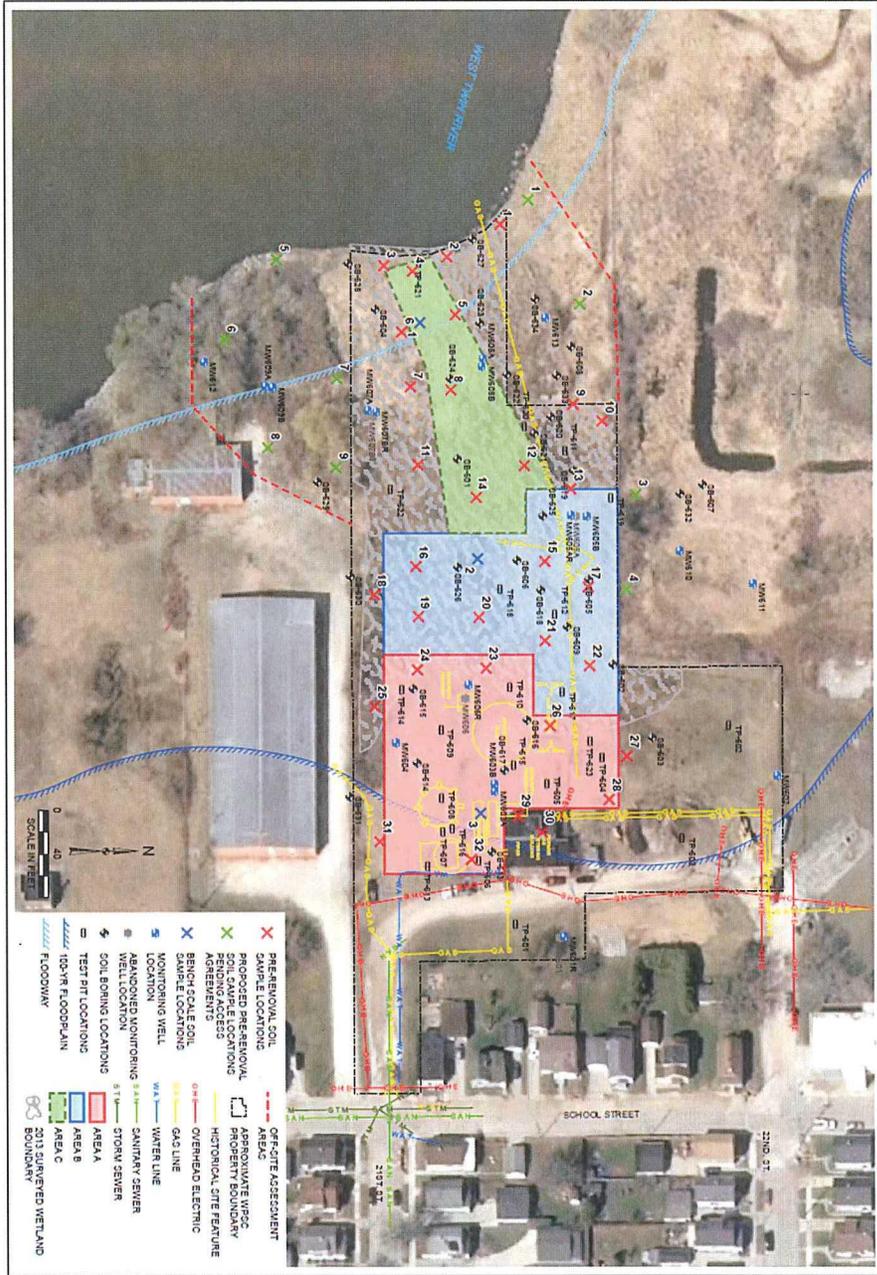
FIGURE A-2

**SITE CONTOURS AND WETLAND DELINEATION
WPSC TWO RIVERS MGP SITE**



FIGURE A-3

**REMOVAL ACTION AREA
WPSC TWO RIVERS MGP SITE**



PROJECT NO: 1560
 FIGURE NO: 5

REMOVAL ACTION AREA EXTENTS
 REMEDIAL ACTION WORK PLAN
 FORMER TWO RIVERS MANUFACTURED GAS PLANT
 WISCONSIN PUBLIC SERVICE CORPORATION
 TWO RIVERS, WISCONSIN

DRAWN BY/DATE:
 TOC 2/11/14
 REVIEWED BY/DATE:
 KRM 2/11/14
 APPROVED BY/DATE:
 KRM 2/21/14

FIGURE A-4

EXTENT OF OBSERVED IMPACTS TO SEDIMENT

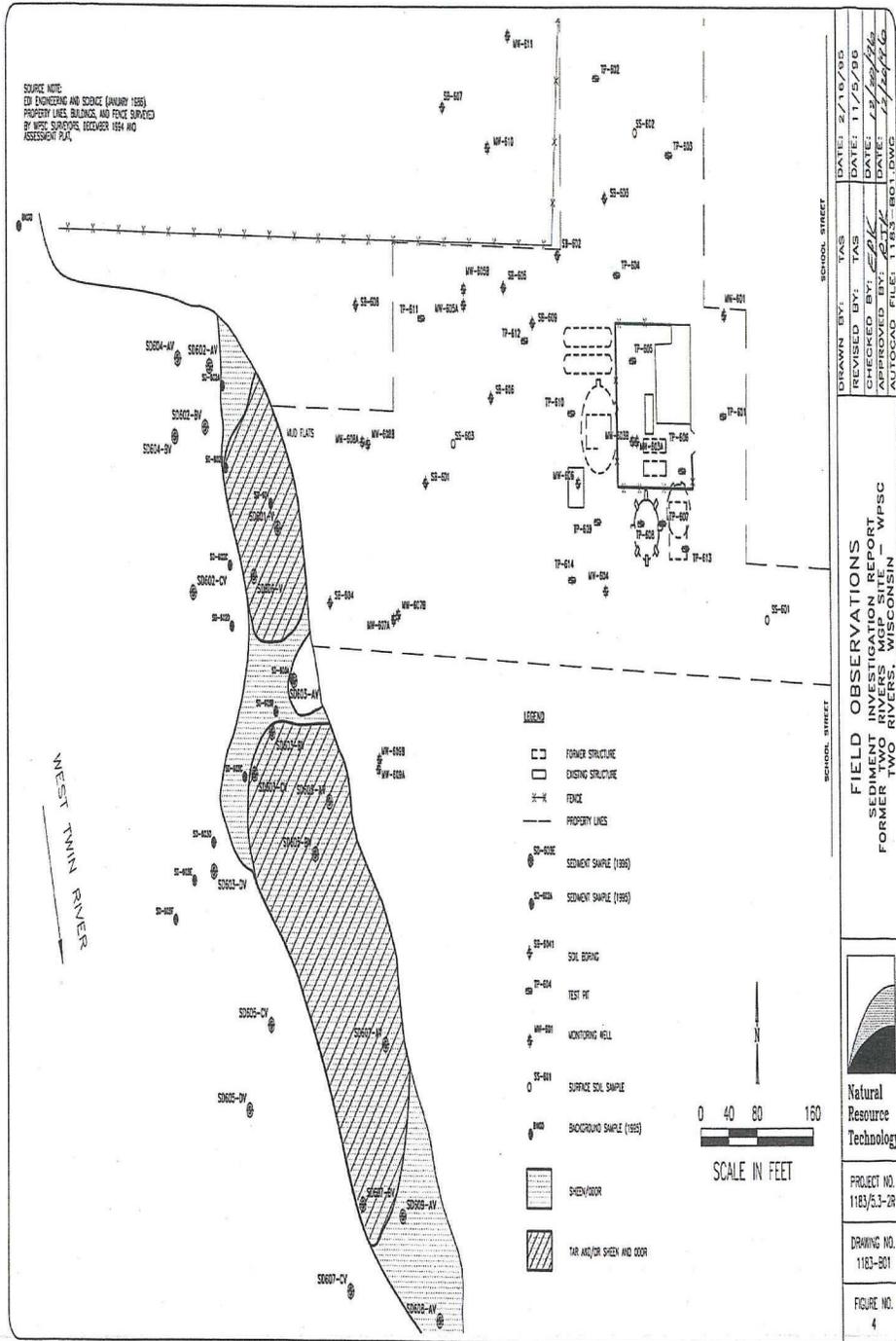


TABLE B-1

**ISS PERFORMANCE GOALS
WPSC TWO RIVERS MGP SITE**

Parameter	Performance Goal	Methodology
Hydraulic Conductivity	$\leq 1 \times 10^{-6} \text{ cm/s}^1$	ASTM D5084
Unconfined Compressive Strength	$\geq 50 \text{ psi}$	ASTM D1633
Durability (freeze and thaw)	Weight loss $\leq 15\%$	ASTM D4842
Durability (wetting and drying)	Weight loss $\leq 15\%$	ASTM D4843
Slake (Submergence Testing)	Minimal deterioration of specimen and discoloration of water, and no phase-separated tar or soil	Empirical Observations
Volumetric Expansion	$< 30\%$ if possible	Empirical Measurement
Leachability	<u>BTEX \leq WAC ES</u> <u>PAHs \leq WAC ES</u> Total Cyanide \leq ES (for free cyanide)	ANS-16.1 leaching 8260B analysis for BTEX 8270 for PAHs and Total Cyanide
pH	TBD	Any acceptable methodology

ATTACHMENT I

ADMINISTRATIVE RECORD INDEX
Wpsc TWO RIVERS MGP SITE

05-13-2005		NATURAL RESOURCE TECHNOLOGY - TWO RIVERS FORMER MGP UPLAND SITE DATA SUMMARY		
05	267969		09-29-2006	EPA SITE ASSESSMENT DECISION FORM - PRELIMINARY ASSESSMENT  19
05	267971		09-29-2006	WI DNR - REVISED PRELIMINARY ASSESSMENT  187
05	441369		02-13-2012	GROUNDWATER QUALITY DATA TRANSMITTAL, SEPTEMBER 2011 GROUNDWATER MONITORING EVENT  62
05	441370		02-13-2013	GROUNDWATER QUALITY DATA TRANSMITTAL, SEPTEMBER 2012 GROUNDWATER MONITORING EVENT  61
05	453889		07-27-2010	JULY 27 2010 Wpsc MANUFACTURED GAS PLANT UPDATE MEETING DOCUMENTS - USEPA/INTEGRYS  104

1. 2014 (Pending) Natural Resource Technology USEPA Removal Work Plan Wpsc Two s Rivers MGP Site (DRAFT)
2. 2014 (Pending) Benning, B USEPA Karl, R USEPA Enforcement Action Memorandum: Wpsc Two Rivers MGP Site