



# **EXPLANATION OF SIGNIFICANT DIFFERENCE**

**Tar Lake Superfund Site  
Mancelona, Michigan**

**September 2009**

## **INTRODUCTION TO THE SITE AND STATEMENT OF PURPOSE**

This Explanation of Significant Difference (ESD) documents a change in the institutional control (IC) component of the groundwater remedy the United States Environmental Protection Agency (EPA) selected for the Tar Lake Superfund site (site) in Mancelona, Michigan. The cleanup remedy is documented in EPA's Record of Decision (ROD) for the site dated February, 25, 2002, and in an ESD EPA issued on September 27, 2004. EPA is the lead agency for the site and the Michigan Department of Environmental Quality (MDEQ) is the support agency.

EPA is issuing this ESD pursuant to Section 117(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. Section 9617(c), as amended by the Superfund Amendments and Reauthorization Act, and Section 300.435(c)(2)(i) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). These regulations require EPA to publish an ESD when a difference in the remedial action for a site significantly changes, but does not fundamentally alter, the remedy EPA selected in the ROD for the site. More fundamental changes would require EPA to issue a proposed ROD Amendment to the public, and hold a public comment period of at least 30 days.

EPA developed this ESD to clarify the IC requirements restricting groundwater use at the site in the 2002 ROD. The 2002 ROD called for no groundwater use until four consecutive groundwater sampling events indicate contaminant concentrations are below Maximum Contaminant Levels (MCLs) and MDEQ drinking water criteria. Since the "no groundwater use" is a broad standard and could be interpreted to mean both potable and non-potable uses, EPA is clarifying in this document that certain groundwater uses at the site are acceptable.

This ESD will become part of the administrative record file for the site, as noted in the NCP at 40 C.F.R. Section 300.825(a)(2). The administrative record file and information repositories for the site are available at EPA's offices in Chicago, Illinois, and locally in Mancelona, Michigan at the following locations:

EPA Region 5 Superfund Records Center  
77 West Jackson Blvd.  
7<sup>th</sup> Floor, Room 711  
Chicago, IL 60604  
312-353-5821

Hours: Monday to Friday 8:00 am to 4:00 pm

Mancelona Township Library  
202 West State Street  
Mancelona, MI 49659  
231-587-9451

Hours: Tuesday, Wednesday, Friday: 10:00 am to 5:00 pm  
Thursday: 12:00 pm to 10:00 pm  
Saturday-Monday: Closed

## **SITE HISTORY, CONTAMINATION AND SELECTED REMEDY**

The Tar Lake site is a former iron manufacturing facility (Antrim Iron Works) that operated from about 1882 to 1945. The site is in a rural area about one mile south of Mancelona, Michigan. The site currently includes about 189 acres and covers 13 properties (Figure 1). The site does not include the 45 acre east tailings area (ETA) which EPA determined was acceptable for unrestricted use/unlimited exposure (UU/UE) and deleted from the site in 2005. About 12 acres of the site are fenced and include a groundwater treatment and monitoring system. Parts of the site are used by two businesses and Mancelona Township. About 159 acres of the site have been vacant since 1945.

Antrim Iron Works' manufacturing operations created a tar-like waste residue (tar) which was discharged to a low-lying area of the site called Tar Lake. From 1957 to 1967, a metal products company also disposed waste in the Tar Lake area of the site. Other major operations areas of the site include the iron production area, creosote area, and the retort and chemical production area. Peckham Lake and Nelson Lake were also used for cooling water withdrawal and discharge.

In 1998-1999, EPA conducted a fund-lead removal action and removed 47,043 tons of tar and tar debris from the Tar Lake area (operable unit 1 or OU1). EPA also began a fund-lead remedial investigation/feasibility study (RI/FS) to address the soil below the excavated tar, groundwater and other site areas (OU2).

In 1998, MDEQ installed an on-site in-situ biosparge groundwater treatment system downgradient of the tar removal area. MDEQ also provided residents with bottled water until 2002 when MDEQ connected residents to the Mancelona water supply through a state-funded water supply expansion.

EPA signed the OU2 ROD in 2002. The 2002 ROD included the following major remedy components:

- Continue to operate MDEQ's biosparge groundwater treatment system to prevent groundwater contaminants from moving off-site and return on-site groundwater to drinking water levels.
- Install groundwater circulation and soil bioventing systems in the Tar Lake excavation to increase air flow through soil and groundwater and the aerobic degradation of soil and groundwater contaminants. Restore soil to MDEQ drinking water protection criteria (DWPC) and site-specific values calculated for chemicals for which MDEQ DWPC are not available. Restore groundwater in the Tar Lake excavation to Maximum Contaminant Levels (MCLs) and MDEQ residential drinking water criteria (RDWC).
- Excavate tar in the creosote area and transport to an off-site energy recovery facility.
- Conduct long-term groundwater monitoring to verify the effectiveness of the remedial action and monitor groundwater conditions over time.
- Implement ICs such as restrictive covenants to reduce the potential for exposure to on-site groundwater and restrict residential use at the site. The restrictions on groundwater use will apply until the groundwater is demonstrated to be below MCLs and MDEQ RDWC. The restrictions on residential use will apply until risks associated with residential use are properly assessed and determined to be acceptable.
- Restrictions are not required for off-site groundwater because contaminants detected in off-site groundwater did not exceed health-based drinking water criteria. Further impacts to off-site groundwater will be prevented by the biosparge system.

In 2004, EPA determined it was more cost effective to remove the contaminated soil from the Tar Lake area instead of constructing the groundwater circulation and soil bioventing systems in the excavation. EPA issued an ESD in 2004 changing the remedy from groundwater circulation and soil bioventing to soil excavation and off-site disposal. EPA completed the remedial action soil removal and creosote area tar removal in 2004. EPA estimated the cleanup time for groundwater would be one to three years. In 2005, EPA deleted the 45-acre East Tailings Area (ETA) of the site for unrestricted use/unlimited exposure (UU/UE).

MDEQ continues to operate the biosparge system at the site and conduct routine groundwater monitoring. EPA conducted a Five-Year Review (FYR) for the site in June 2009. The FYR indicates the biosparge system is operating and functioning as designed, and that the soil removal was effective in the south part of the Tar Lake area.

However, groundwater contamination in the north part of the Tar Lake area upgradient of the biosparge system has not decreased to cleanup levels as expected, and is increasing. The increased groundwater contamination is treated by the biosparge system and is not spreading downgradient. However, EPA plans to reassess the cleanup time frame for groundwater in the north part of the Tar Lake area and evaluate whether the biosparge system should be expanded.

Additional information about the Tar Lake site is available in the 2002 ROD, the 2004 ESD, the 2009 FYR and other reports and documents in the administrative record file for the site. The 2002 ROD and 2004 ESD are available on the internet at [www.epa.gov/superfund/sites/rods](http://www.epa.gov/superfund/sites/rods), and the 2009 FYR is available on the internet at [www.epa.gov/region5superfund/fiveyear/reviews](http://www.epa.gov/region5superfund/fiveyear/reviews).

### **BASIS FOR THE ESD**

In 2009, property owners redeveloping a portion of the site requested clarification of the groundwater institutional controls. Specifically, the ROD states (page 25):

*Institutional controls would consist of recording legal notices on the property of current owners of the site to reduce the potential for exposure to on-site groundwater and restrict residential land use. EPA would ensure that the current property owners place language in their property deed to explain that no groundwater wells should be installed until on-site groundwater in the shallow drinking water aquifer is below the MCL for benzene (5 ppb) and below the state drinking water standard for 2,4 dimethylphenol (370 ppb). When groundwater monitoring indicates that on-site groundwater is below MCLs and state drinking water standards during four consecutive sampling events, there would no longer be restrictions on groundwater use. Restrictions on off-site groundwater would not be necessary because results of groundwater investigations indicate that although off-site groundwater concentrations are above State of Michigan [aesthetic] drinking water standards for iron and manganese, these concentrations are not above health-based risk levels. Language explaining that only industrial, commercial and recreational land use would be allowed until risks associated with residential land use have been properly assessed [would also be included]. Currently, there are no zoning ordinance (sic) in Antrim County to refer to that would assist with restricting groundwater or land use.*

The 2002 ROD did not clarify whether groundwater use was prohibited on the entire site until the groundwater contamination is cleaned up, even if groundwater sampling at a specific property indicates chemical concentrations are below MCLs and MDEQ criteria at that property. Also, the requirements for

groundwater use referenced in the 2002 ROD are drinking water standards (potable use).

EPA's 2002 ROD and 1999 Human Health Risk Assessment did not specifically address non-potable groundwater use at the site (e.g., groundwater used for industrial processes or cooling water). However, MDEQ health-based groundwater criteria for industrial/commercial groundwater volatilization to indoor air inhalation criteria and groundwater contact criteria are significantly greater than the highest levels of groundwater contaminants detected on-site. Therefore, non-potable groundwater use is not expected to pose any unacceptable health risks at the site (Table 1).

<b>Table 1 Maximum Groundwater Concentration Detected On-Site 2004-2008 and MDEQ Non-Potable Groundwater Use Criteria</b>			
Chemical	Maximum Concentration Detected On-Site (ug/L)	MDEQ Groundwater Contact Criteria and Risk-Based Screening Levels (ug/L)	MDEQ Industrial/Commercial Groundwater Volatilization to Indoor Air Inhalation Criteria and Risk-Based Screening Levels (ug/L)
Benzene	110	11,000	35,000
2,4-Dimethylphenol	3,500	520,000	NLV
Methylphenols (total)	13,100	810,000	NLV
Arsenic	120	4,300	NLV
Iron	3,000	58,000,000	NLV

NLV - No or Limited Volatilization Potential

The RI indicates the aquifer at the site is a continuous unconfined sand aquifer reported to be up to 400 feet deep, which may contain minor lenses of silt and clay. A 52-hour groundwater pump test conducted at the site in 1995 estimated the transmissivity of the aquifer to be 9,749 ft<sup>2</sup>/day.

EPA has determined that it is acceptable for groundwater wells to be drilled and used at the Tar Lake site for certain purposes. Therefore, this ESD clarifies that certain groundwater uses at the Tar Lake site would be acceptable.

The current boundary of the Tar Lake site for ICs is shown in Figure 1 (blue and white dashed line). All site areas within the blue and white dashed line - except for the deleted UU/UE ETA shown in red - do not support UU/UE or require additional data and evaluation to support UU/UE.

Restrictions are not required for off-site groundwater because contaminants detected in off-site groundwater did not exceed health-based drinking water criteria. Further impacts to off-site groundwater are prevented by the biosparge system, which has been operating since 1998.

Additional documentation recognizing the need for this ESD may be found in the 2002 ROD and the 2009 FYR, which are in the administrative record file for the site.

## **DESCRIPTION OF SIGNIFICANT DIFFERENCES/ROD CLARIFICATION**

### ***Current Groundwater Use Restrictions in 2002 ROD***

The 2002 ROD currently requires EPA to:

*... ensure that the current property owners place language in their property deed to explain that no groundwater wells should be installed until on-site groundwater in the shallow drinking water aquifer is below the MCL for benzene (5 ppb) and below the state drinking water standard for 2,4 dimethylphenol (370 ppb). When groundwater monitoring indicates that on-site groundwater is below MCLs and state drinking water standards during four consecutive sampling events, there would no longer be restrictions on groundwater use.*

### ***Description of Significant Differences/ROD Clarification***

Non-Potable Groundwater Use: Groundwater at the Tar Lake site may be used for non-potable purposes<sup>1</sup> before the biosparge groundwater treatment cleanup is complete<sup>2</sup>, provided the non-potable use of groundwater does not negatively impact EPA's selected remedy for the site, including, but not limited to, the biosparge system and groundwater monitoring wells; or pose an unacceptable risk to human health.

The restrictive covenants or other institutional controls to be implemented at the site will state that groundwater at the site may be used for non-potable purposes provided the property owner submits a proposal to EPA and MDEQ, showing the proposed depth, location and pumping rate of each proposed non-potable well, including an evaluation demonstrating that the expected use of the proposed

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<sup>1</sup>Non-drinking human consumption purposes, excluding agricultural or livestock purposes.

<sup>2</sup>Groundwater samples from four consecutive sampling events in the Tar Lake area of the site are below MCLs and MDEQ drinking water criteria, and biosparge treatment is discontinued.

well(s) should not negatively impact EPA's remedy. The proposal must also certify the non-potable wells will not be used for potable use.

EPA, in consultation with MDEQ, may also require the property owner to implement a monitoring plan to confirm the wells are not negatively impacting EPA's remedy in the long-term, and provide appropriate assurances that the property owner will conduct EPA-approved corrective action(s) in consultation with MDEQ, if EPA's remedy is negatively affected and/or is no longer protective due to the property owner's non-potable groundwater use at the site. The property owner must submit final well logs to EPA and MDEQ, and may be required to test the water from the non-potable well(s) or allow EPA, or MDEQ on its behalf, to test the water from the non-potable well(s).

These requirements do not apply to the existing non-potable well at property identification number (PIN) 05-11-130-003-00 (property owned by Moeke Lumber). This well is south of and sidegradient to the biosparge system. This well was in use before EPA's 2002 ROD and before MDEQ constructed the biosparge system at the site. Groundwater monitoring data collected since 1998 indicates this well is not having any negative effect on the biosparge treatment system (e.g., groundwater contaminants are not flowing south toward this well). However, EPA may incorporate this well into the long-term groundwater monitoring program.

Potable Groundwater Use: Groundwater at the Tar Lake site may be used for potable purposes<sup>3</sup> before the biosparge groundwater treatment cleanup is complete, provided the potable use of groundwater does not negatively impact EPA's selected remedy for the site, including, but not limited to, the biosparge system and groundwater monitoring wells; or pose an unacceptable risk to human health as specified below.

The restrictive covenants or other institutional controls to be implemented at the site will state that the groundwater at the Tar Lake site may be used for potable purposes provided the property owner submits a proposal to EPA and MDEQ showing the proposed depth, location and pumping rate of each proposed potable well, including an evaluation demonstrating that the expected use of the proposed well(s) should not negatively impact EPA's remedy. In addition, the property owner must also submit groundwater data from four consecutive sampling events from a groundwater monitoring well installed at each proposed well location demonstrating that contaminant concentrations at each proposed

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<sup>3</sup>Groundwater used for human drinking water, and for agricultural and livestock purposes.



well location do not exceed applicable MCLs, MDEQ drinking water criteria, and other applicable or relevant and appropriate criteria.

EPA, in consultation with MDEQ, may also require the property owner to implement a monitoring plan once the potable groundwater well is installed to confirm the well is not negatively impacting EPA's remedy. EPA, in consultation with MDEQ, may also require the property owner to provide appropriate assurances that the property owner will conduct EPA-approved corrective action(s), in consultation with MDEQ, if EPA's remedy is negatively affected and/or is no longer protective due to the property owner's potable groundwater use at the site. The property owner must submit final well logs to EPA and MDEQ, and must allow EPA, or MDEQ on its behalf, to test the water from the potable well(s).

These requirements do not apply to the existing potable well at property identification number (PIN) 05-11-130-003-00. This property is owned by Moeke Lumber and this potable well is south of and sidegradient to the biosparge system. EPA tested this well for phenols and metals during the RI, and the well did not contain any contaminants above MCLs or MDEQ's health-based industrial/commercial drinking water criteria.

The potable well on PIN 05-11-130-003-00 was in use before EPA's 2002 ROD and before MDEQ constructed the biosparge system at the site. Biosparge groundwater monitoring data collected since 1998 indicates the potable well is not having any negative effect on the biosparge treatment system. However, based on EPA's 2009 FYR, EPA is planning to incorporate this potable well into the long-term groundwater monitoring program at the site.

### ***Changes in Expected Outcomes***

The 2002 ROD and 2004 ESD stated that the cleanup time frame for groundwater at the site would be one to three years. Groundwater data collected 2004-2009, however, indicates groundwater contamination in the north part of the Tar Lake area has not decreased to cleanup levels as expected, and is increasing.

Based on the FYR, EPA is planning to reassess the cleanup time frame for groundwater and evaluate whether the biosparge system should be expanded. However, this ESD makes it clear that property owners may use on-site groundwater for restricted potable and restricted non-potable purposes, provided the groundwater use does not negatively impact EPA's selected remedy for the site, including, but not limited to, the biosparge system and groundwater monitoring wells; and does not pose an unacceptable risk to human health, subject to the conditions specified in this ESD.

## **SUPPORT AGENCY COMMENTS**

MDEQ concurs with this ESD. MDEQ's letter of concurrence is in Attachment 1.

## **STATUTORY DETERMINATIONS**

EPA has determined that the remedy clarifications in this ESD for potable and non-potable groundwater use at the Tar Lake site satisfy the statutory requirements of CERCLA Section 121. This statute requires EPA to select cleanup remedies that protect human health and the environment; comply with applicable or relevant and appropriate requirements; are cost effective; utilize permanent solutions and alternate treatment technologies to the maximum extent practicable; and satisfy the preference for treatment as a principal element of the remedy.

Because EPA's remedy for the Tar Lake site allows hazardous substances, pollutants or contaminants to remain in on-site soils and groundwater above levels that allow for UU/UE, EPA must conduct a statutory review of the site every five years to ensure the remedy continues to be protective. EPA will complete the next FYR of the Tar Lake site by June 12, 2014.

## **PUBLIC PARTICIPATION COMPLIANCE**

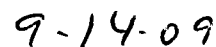
This ESD will be made available to the public by placing it in the administrative record file and the information repositories for the site located at EPA Region 5 and in Mancelona, Michigan. A public notice of this ESD will be published in the Antrim Review. These activities will satisfy the public participation requirements of Section 300.435(c)(2)(i) of the NCP.

Approved by:

Date:



Richard C. Karl, Director  
Superfund Division





# FIGURE 1



## Tar Lake Figure 1

Antrim County, MI

Date: October 20, 2008  
 Projection: NAD 83 State Plane Michigan Central  
 FIPS 2112 Feet

References:  
 Fenced Areas and Biosparge System -  
 Provided by US EPA, Region 5,  
 via TechLaw, Inc.  
 Parcels - Parcel data was provided by  
 TLI Solutions, Inc.  
 Roads and Lakes - US EPA (Unknown year)  
 Railroad - HSP (2007)  
 Imagery - DigitalGlobe, 1-meter, Color  
 (©2002007)  
 East Tailings Area Data - Gourdie-Fraser (2007)

Notes:  
 The fenced area boundary and acreage calculations  
 are estimated based on MDEQ drawing and GPS  
 points dated 7/2/2008.  
 The East Tailings Area boundary and acreage values  
 are from a survey conducted by Gourdie Fraser on  
 7/24/2007.  
 \*Note: Please check with the local County  
 Recorder's office to determine whether  
 there are any other restrictive covenants  
 on site properties.  
 See Figure 2 for close up of Fenced  
 Area and East Tailings Area.

Legend:  
 Fenced Boundary (12,184.9 Acres)  
 Fence Boundary Points  
 East Tailings Area (45,418 Acres)  
 East Tailings Area Points  
 Tar Lake Boundary (234,203 Acres)  
 Biosparge System  
 Parcels  
 Roads  
 Michigan Northern Railroad

Scale:  
 0 125 250 500 Feet  
 0 25 50 100 Meters



**ATTACHMENT 1**

**STATE LETTER OF CONCURRENCE**



JENNIFER M. GRANHOLM  
GOVERNOR

STATE OF MICHIGAN  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
LANSING



STEVEN E. CHESTER  
DIRECTOR

August 24, 2009

VIA E-MAIL and U.S. MAIL

Ms. Karen Cibulskis  
United States Environmental Protection Agency  
77 West Jackson Boulevard (SR-6J)  
Chicago, Illinois 60604

Dear Ms. Cibulskis:

SUBJECT: Tar Lake Superfund Site (Tar Lake), Explanation of Significant Difference (ESD)

Thanks for the opportunity to review the Tar Lake ESD. The ESD documents a change in the institutional control component of the groundwater remedy the United States Environmental Protection Agency (USEPA) selected for Tar Lake. As the support agency, the Michigan Department of Environmental Quality (MDEQ) reviewed the ESD. The MDEQ's comments were relayed to you via a conference call on August 10, 2009.

Based on the revised draft ESD submitted later that day (August 10, 2009) by the USEPA, it appears that the revised version of the ESD addresses the MDEQ's comments; therefore, please consider this letter as our concurrence with the revised draft Tar Lake ESD.

Sincerely,

Keith Krawczyk  
Senior Project Manager  
Specialized Sampling Unit  
Superfund Section  
Remediation and Redevelopment Division  
517-335-4103

cc: Mr. Thomas Short, USEPA  
Mr. David Kline, MDEQ