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September 18, 2006

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RE: Feasibility Study – Revised per Comments  
Former Republic Creosoting Site  
University of Minnesota East Bank Campus  
Wenck Project Number 0179-16-03

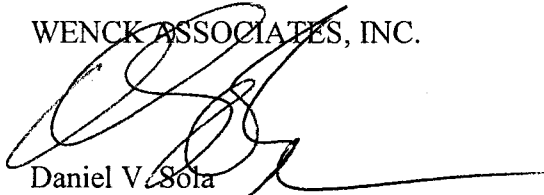
Dear Mr. Sarappo and Ms. Grigor:

Enclosed are two copies of the revised Feasibility Study (“FS”) for the former Republic Creosoting Site. This version replaces the original version submitted on August 28, 2006, and incorporates the comments you communicated to us during our meeting of September 11, 2006.

If you have any questions concerning this revised report, please contact me at (651) 294-4591.

Sincerely,

WENCK ASSOCIATES, INC.



Daniel V. Sola  
Sr. Hydrogeologist

Enclosure

cc: Mr. Rick Kubler, Gray Plant Mooty (1 copy)  
Mr. Brian Swanson, University of Minnesota (2 copy)  
Mr. David Spillman, Hines (1 copy)

UMR - 6010

# Feasibility Study

Former Republic  
Creosoting Facility  
Near 23<sup>rd</sup> Avenue and  
6<sup>th</sup> Street SE  
Minneapolis, Minnesota



Wenck

Prepared for

University of Minnesota

Revised  
September 2006

UMR - 6011

# Feasibility Study

Former Republic Creosoting  
Facility  
Near 23<sup>rd</sup> Avenue and  
6<sup>th</sup> Street SE  
Minneapolis, Minnesota

**Wenck File #0179-16-03**

Submitted by:

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**Revised September 2006**



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## Executive Summary

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Wenck Associates, Inc. (“Wenck”) has prepared this Feasibility Study (“FS”) at the request of the University of Minnesota (“University”) to identify and assess response action alternatives for remaining creosote-contaminated soils associated with the former Republic Creosoting facility (“Republic Site”). The Republic Site is located on a portion of the future site of the TCF Bank Stadium™, an outdoor college football stadium located on the University’s East Bank Campus (the “Property”). As is documented in a letter dated August 22, 2006 the Minnesota Pollution Control Agency (“MPCA”) has directed the University to conduct this Feasibility Study, regarding the creosote-contaminated soils at the Republic Site. MPCA has also directed the University to develop and submit, for agency approval, a Response Action Plan (“RAP”) to be implemented in association with the redevelopment of the Property.

The Republic Creosoting facility operated from approximately 1903 to 1913. The facility occupied approximately 2.75 acres and included a creosote wood treating plant, a lumber processing plant, coal bins, storage buildings and railroad loading areas. The facility also had a settling basin where wood was treated with the creosote oil.

The University purchased a 23.8-acre parcel of property in 1990, which included the Republic Site. The University purchased the property from the Chicago and Northwestern Transportation Company (“C&NW”), now Union Pacific Railroad.

A series of investigations were completed at the Republic Site during the 1990s. The highest concentrations of compounds related to the past use of the Property as a creosoting facility were present in the soils in and near the former settling basin and in the groundwater downgradient from the former settling basin. In general, the wood treating compounds identified in the soil included numerous polyaromatic hydrocarbons (“PAHs”).

A partial response action was implemented by C&NW on the Property starting in 1994, which consisted of the on-site thermal treatment of approximately 7,700 tons of creosote-impacted soil excavated from the former settling basin. These soil treatment activities were completed in cooperation with the MPCA VIC Program.

In 1995, after completion of this partial response action, the MPCA issued a “no further action” letter to C&NW, which was limited to soils in the area of excavation within the former settling basin. The MPCA also determined at that time that creosote-impacted soil and groundwater remaining at the conclusion of the partial response action would require further investigation.

Subsequent investigation activities conducted by the University at the Property concluded that creosote-impacted soils remained at the Republic Site near the former creosote settling basin at levels which exceed the applicable Soil Reference Values. In addition, groundwater impacted with substances including naphthalene and other semi-volatile organic was still present at the Property.

In December 2005, the MPCA approved the Wenck Investigation Report (and the historical investigation results included within it) as sufficient to define the nature and extent of the remaining soil and groundwater contamination at the Property, including the Republic Site. MPCA strongly recommended that a RAP be developed to address the remaining creosote-contaminated soils at the Republic Site.

In May 2006, Wenck submitted to MPCA, on behalf of the University, a proposed actions letter relative to the Property and a Site Redevelopment Construction Contingency Plan (“Contingency Plan”) describing procedures for addressing any hazardous substances encountered during construction of the Stadium and related infrastructure. In approving the Contingency Plan, MPCA required the University to develop a set of contingency procedures as an “interim measure” to address any creosote-contaminated soils encountered during infrastructure work. At the time the Contingency Plan was approved in July 2006, MPCA advised the University that it

would be required to conduct this FS and develop and implement a RAP to address the remaining creosote-contaminated soil at the Republic Site.

The MPCA identified potential pathways of exposure during redevelopment of the Republic Site as including a much higher likelihood of dermal contact with impacted media, incidental ingestion of impacted particulate, and inhalation of particulate or organic vapors. Specifically, soil excavation and possible dewatering and storm water control activities would create an exposure pathway to workers at the Site and potentially draw creosote-contamination to previously uncontaminated groundwater.

Based on current plans for the Stadium and other anticipated development of the Republic Site, construction of buildings and other improvements on the Property would create a potential indoor air exposure pathway due to vapor migration within the soil and groundwater. Other aspects of the planned Stadium include construction of bio-swales for storm water control. MPCA has indicated that leaving creosote-contaminated soils in place beneath bio-swales is inappropriate as it would create a potential leaching pathway to the groundwater.

Wenck developed the response action alternatives for the Republic Site using the U.S. Environmental Protection Agency (“USEPA”) entitled:

“Presumptive remedies for Soils, Sediments, and Sludges at Wood Treater Sites,” Directive 9200.5-162, EPA/540/R-95/128, PB 95-963410, December 1995 (“Presumptive Guidance”).

Using the Presumptive Guidance as a framework, the FS was then prepared according to the USEPA guidance entitled:

“Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA,” OSWER DIRECTIVE 9355-3-01 (“RI/FS Guidance”).

The MPCA has identified the cleanup goal for the Republic Site as excavation and treatment or disposal of creosote-contaminated soils at or above the water table that exceed industrial SRVs.



Based on the Presumptive Guidance, four alternatives were assembled from the general response actions and technology screening.

Under **Alternative 1** (No Action) the contaminated soil would be left in place and the construction of the Stadium would proceed. Institutional controls (deed restrictions) that would be placed on the Property if the creosote-contaminated soil remains in place would limit or prevent future redevelopment at and in the vicinity of the Republic Site. The cost of implementing Alternative 1 is minimal.

**Alternative 2** (On-Site Thermal Treatment) would consist of excavating approximately 19,300 yards of soils down to industrial SRVs or the water table in the Republic Site area. The soils previously treated in 1994-95 as part of the partial response action (approximately 5,000 yards) would be segregated and stockpiled on Property for backfilling. Excavated soil would be tested based on the requirements of the treatment facility permit. Contaminated soil in excess of the cleanup goal would be stockpiled for treatment with standard earthmoving equipment near an on-site mobile thermal treatment unit. The soil would then be treated according to the permit requirements of the mobile treatment unit. The cost of Alternative 2 is estimated at between \$4,317,000 and \$5,156,000.

**Alternative 3** (Off-Site Thermal Treatment) would consist of excavating approximately 19,300 yards of soils down to the industrial SRVs or the water table in the Republic Site area. The soils previously treated in 1994-95 as part of the partial response action (approximately 5,000 yards) would be segregated and stockpiled on Property for backfilling. Excavated soil would be tested based on the requirements of the treatment facility permit. Contaminated soil in excess of the cleanup goal would be transported via truck to the thermal treatment facility in Belle Plain, Minnesota (approximately 45 miles). The treatment facility would handle final disposition of the treated soil. The excavation would be backfilled with common, uncontrolled fill. The cost for Alternative 3 is estimated at between \$3,212,000 and \$4,006,000.

**Alternative 4** (Off-Site Secure Disposal) would consist of excavating approximately 19,300 yards of soils down to the industrial SRVs or the water table in the Republic Site area. The soils

previously treated in 1994-95 as part of the partial response action (approximately 5,000 yards) would be segregated and stockpiled on Property for backfilling. The limits of the excavation would be verified by visual confirmation and supporting analytical samples. Contaminated soil in excess of the cleanup goal would be transported via rail to the landfill facility (e.g., the EQ Landfill in Bellville, Michigan) approximately 650 miles from the Site. The disposal facility would handle any required stabilization and final disposition of the soil. The excavation would be backfilled with clean fill.

The cost for Alternative 4 is estimated at between \$7,532,500 and \$9,406,000. The facility cost (\$250/ton) was obtained in a conversation with the EQ Landfill and includes the cost for stabilization of the soil as per the facility's permit requirements. The hauling cost is based on an estimated \$40-\$50 per ton obtained in a conversation with CP Rail. Shipping the soil by rail would require at least six weeks of lead-time to arrange gondola cars and an access agreement to use the nearest rail spur (likely the nearby ADM property).

Each of the foregoing four response action alternatives was evaluated against the nine criteria established by the USEPA for evaluating response action alternatives:

1. Overall Protection of Human Health and the Environment
2. Compliance with Applicable Relevant and Appropriate Requirements ("ARARs")
3. Long-Term Effectiveness and Permanence
4. Reduction of Toxicity, Mobility, or Volume ("TMV") Through Treatment
5. Short-Term Effectiveness
6. Implementability
7. Cost
8. State Acceptance
9. Community Acceptance

Alternative 1 would not reduce the potential exposures under the planned development for the site. In addition, based upon MPCA's prior comments as reflected in the agency's correspondence to the University dated August 22, 2006, Alternative 1 does not appear to meet

the criterion for State Acceptance. Alternatives 2 and 3 would best achieve the technical criteria (protection of human health and the environment, compliance with ARARs, long term effectiveness, reduction of TMV, short term effectiveness and implementability). The cost of Alternatives 2 and 3 are similar, with off-site treatment likely costing less than on-site treatment. The State would likely accept either Alternative 2 or Alternative 3. The community is likely to prefer off-site treatment (Alternative 3) due to the convenience and aesthetic concerns associated with operation of a soil treatment unit on the Property in a populated area. However, on-site treatment has been used in the past with limited adverse effects. Alternative 4 is the most expensive response action and does not result in the permanent destruction of the contaminants through treatment.

Therefore, Alternative 3, excavation with off-site thermal treatment, is the preferred alternative.

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# 1.0 Introduction

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## 1.1 PURPOSE AND ORGANIZATION REPORT

Wenck has prepared this FS at the request of the University to address response action alternatives for a portion of the future site of the TCF Bank Stadium™, an outdoor college football stadium located on the University's East Bank Campus (see Figure 1). This report presents the findings of the FS of response action alternatives for the soil contamination at the Republic Site. Figure 2 shows the Republic Site location within the Property. The FS was prepared according to the guidance titled: "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA," OSWER DIRECTIVE 9355-3-01. The Property has been enrolled by the University in the MPCA's Voluntary Investigation and Cleanup ("VIC") Program.

In a letter dated August 22, 2006 the MPCA directed the University to conduct a feasibility study addressing the creosote-contaminated soils at the Republic Site. This FS is to be used in the development of a Response Action Plan ("RAP") for the creosote release associated with the Republic Site.

## 1.2 BACKGROUND INFORMATION (SUMMARIZED FROM RI REPORT)

The results of the Wenck 2005 Site Investigation comprise a remedial investigation ("RI") of the Property and are presented in the investigation report titled:

"Investigation Report, Proposed TCF Bank Stadium Site, University of Minnesota, Minneapolis, Minnesota," prepared by Wenck Associates, Inc., October 2005 ("RI").

The RI did not involve conducting additional investigation of the soils at the Republic Site. As determined by the MPCA, previous testing had sufficiently characterized the soils at the Republic Site to allow development of response action alternatives. The MPCA determined the Wenck RI (and the historical investigation results included within it) to be sufficient to define the nature and extent of soil and groundwater contamination at the Property, including the Republic Site.

In May 2006, Wenck submitted to MPCA, on behalf of the University, a proposed actions letter and a Site Redevelopment Construction Contingency Plan ("Contingency Plan") describing procedures for addressing any hazardous substances encountered during construction of the Stadium and related infrastructure. In approving the Contingency Plan, MPCA required the University to develop a set of contingency procedures as an "interim measure" to address any creosote-contaminated soils encountered during infrastructure work. At the time the Contingency Plan was approved in July 2006, MPCA advised the University that it would be required to conduct this FS and develop and implement a RAP to address the remaining creosote-contaminated soil at the Republic Site.

The MPCA identified potential pathways of exposure during redevelopment of the Republic Site as including a much higher likelihood of dermal contact with impacted media, incidental ingestion of impacted particulate, and inhalation of particulate or organic vapors. Specifically, soil excavation and possible dewatering activity would create an exposure pathway to workers at the Site and potentially draw creosote-contamination to previously uncontaminated groundwater.

Based on current plans for the Stadium and other anticipated development of the Republic Site, future construction of buildings and other improvements would create a potential indoor air exposure pathway due to vapor migration within the soil and groundwater. Other aspects of the planned Stadium construction are bio-swales for storm water control. MPCA has indicated that leaving creosote-contaminated soils in place beneath bio-swales is inappropriate as it would create a potential leaching pathway to the groundwater.

The following summary of previous investigation work is included in the RI.

### 1.2.1 Republic Site Description and History

According to available information, the former Republic facility operated from approximately 1903 to 1913. The facility occupied approximately 2.75 acres and included a creosote wood treating plant, a lumber processing plant, coal bins, storage buildings and railroad loading areas. Also associated with the property were several large ASTs. The ASTs ranged in size from approximately 25,000-gallons to 100,000-gallons and were used to store creosote oil. The facility also had a settling basin where wood was treated with the creosote oil. According to the Peer Phase I, the settling basin may have been filled at times with sludge generated from cleaning the creosote oil ASTs. After treatment, the wood was moved to the storage areas. The Republic facility was decommissioned in 1913 and the buildings razed in 1916. As reported in the Peer Phase I, the majority of the building demolition debris was hauled off-site but some of the debris was buried in place.

The University purchased a 23.8-acre parcel of property in 1990, which included the former Republic site. The University purchased the property from C&NW, now Union Pacific Railroad. Development of the property has included:

- several bituminous parking lots (Parking Lot C60, the Buckeye, Hawkeye, Badger, Gopher, and Hawkeye Lots),
- the bus transit way that separates the Hawkeye and Badger parking lots from the Gopher and Wolverine Parking Lots, 6<sup>th</sup> Street SE,
- a bituminous bicycle path just north of 6<sup>th</sup> Street SE,
- the Lions Research Building,
- the Center for Magnetic Resonance Imaging, and
- the University's Integrated Waste Management Facility.

### 1.2.2 Nature and Extent of Contamination

Several subsurface investigations have been performed at or near the former Republic Site. The most comprehensive investigative work performed at the former Republic Site was by Dahl & Associates, Inc. ("Dahl") in the mid-1990s and Peer Engineering, Inc. ("Peer") in the late 1990s. Other environmental consultants including Barr Engineering Company and Twin City Testing Corporation performed relatively limited subsurface investigations on the Property. Only the investigation activities performed by Dahl and Peer are discussed herein.

In 1990, on behalf of C&NW, Dahl conducted subsurface investigation activities at the former Republic Site including soil and groundwater assessment. Dahl concluded that the highest concentrations of compounds related to the past use of the Property as a creosoting facility were present in the soils in and near the former settling basin and in the groundwater under and downgradient from the former settling basin. In general, the compounds identified in the soil included numerous polyaromatic hydrocarbons ("PAHs"), and arsenic.

Based on Dahl's findings, a limited response action was implemented on the Property starting in 1994, which consisted of the on-site thermal treatment of approximately 7,700 tons of creosote-impacted soil excavated from the former settling basin. The soil treatment activities were completed in cooperation with the MPCA VIC Program. The MPCA VIC Program initially established a site-specific cleanup standard of 10 milligrams per kilogram ("mg/kg") total PAHs. Upon completing the first phase of the treatment activities, and assessing the post-thermal treatment sampling results, it was determined that the initial cleanup standard was not achievable. Based on this finding, MPCA VIC staff revised the cleanup standard on a pile-by-pile basis using a health risk evaluation spreadsheet for PAHs. According to Dahl's Remedial Action Implementation Report, dated March 30, 1995, lenses of impacted soil (typically less than 3 inches) were observed in the sidewalls (upper 2 to 4 feet) of the final limits of the excavation.

The MPCA concluded impacted soil and groundwater remaining at the conclusion of the Dahl response action required further investigation and provided a "no further action" assurance only with respect to the soils that were excavated, treated and replaced within the limits of the former

settling basin. The MPCA also requested that C&NW complete further investigation of releases of hazardous substances to the soil and groundwater of the Republic Site.

In 1997, Peer was contracted by the University to perform additional investigation activities associated with the Republic Site. The investigation consisted of collecting soil and groundwater samples through trenching, probing and soil boring methods. Seventeen (17) test trenches were advanced in a radial pattern around the edge of the excavated creosote settling basin. See *"Subsurface Investigation Report, Former Republic Creosote Facility Site"* (Peer, 1997). The trenches allowed Peer to visually identify the limits of the creosote contamination. Figure 1.3 to this FS depicts the area of soil contamination delineated in these investigations, and shows the area of previous excavation and treatment by Dahl.

Peer's subsurface investigation activities identified several areas exhibiting gross creosote impacts. The creosote-impacted soil was typically identified within five (5) feet of the ground surface. The contaminated soil was described as having a tar-like consistency, generally stained gray or black, and having a strong creosote odor. In general the investigation identified both carcinogenic (namely benzo(a)pyrene) and non-carcinogenic (namely naphthalene) PAHs in the soil. Total carcinogenic PAHs were identified at concentrations ranging from non-detect to 9,970 mg/kg. Total non-carcinogenic PAHs were detected at concentrations ranging from non-detect to 66,790. In addition, diesel range organic compounds ("DRO"), polychlorinated biphenyl ("PCB"), organochlorine pesticides, volatile organic compounds ("VOCs"), and Resource Conservation Recovery Act Metals ("RCRA") samples were also collected. DRO was revealed at concentrations ranging from non-detect to 120,000 mg/kg. The only VOCs identified in soil above applicable regulatory screening criteria were naphthalene, 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene. Naphthalene concentrations ranged from non-detect to 7,000 mg/kg. PCBs results were all non-detect. Several pesticides were identified in the soil samples collected during the investigation activities, but none were identified above their applicable regulatory screening criteria. The only metal revealed above its regulatory limit was mercury. Mercury was identified in one sample at a concentration of 3.8 mg/kg.



Peer concluded that creosote-impacted soils remained at the Republic Site near the former creosote settling basin. Peer also concluded that shallow groundwater impacted with naphthalene, other PAHs, organochlorine pesticides, VOCs, DRO, and GRO exists at the Republic Site. Peer estimated that the groundwater contaminant plume extended from the former creosote settling basin downgradient (south-southwest) approximately 300 feet.

Wenck's 2005 RI detected DRO and GRO in several wells. VOCs and PAHs were not above the HRLs. Silver and lead were detected in groundwater at levels slightly above the applicable Minnesota Health Risk Levels ("HRLs"), but may be naturally occurring and are not likely associated with the Republic Site.

### **1.2.3 Contaminant Fate and Transport**

Past evidence of groundwater contamination indicates that the soil contaminants are somewhat mobile in the sub-surface. The Peer investigation in 1997 discovered high concentrations of creosote-related compounds in groundwater.

Samples collected during the Wenck RI in 2005 suggested that the levels of contamination in groundwater identified by Peer had decreased over time. The only compounds detected above the HRLs or the USEPA Health Based Values ("HBVs") at the Property, including the monitoring wells at, and downgradient of, the Republic Site, were silver and lead. These metals may be naturally occurring and do not appear to be related to the Republic Site. DRO and GRO were detected at several monitoring wells. No VOCs or PAHs were detected above the HRLs. The existence of a paved surface likely reduced infiltration through the impacted media, and natural biological processes diminished the magnitude of constituents amenable to attenuation. The continued presence of creosote compounds in the soil above industrial SRVs represents an ongoing risk of contaminant migration to groundwater.

#### **1.2.4 Baseline Risk Assessment**

An exposure pathway is a route by which a receptor may come in contact with an affected media. Potential Site-specific human exposure pathways, of the identified contaminants of concern (“COCs” *see* Section 1.2.4.4, below), primarily carcinogenic and non-carcinogenic PAHs, include:

- Soil exposure (inhalation, dermal contact, and ingestion)
- Surface water (dermal contact and ingestion)
- Outdoor air (inhalation of particulate matter or organic vapors)
- Indoor air (inhalation of organic vapors)
- Migration of dissolved phase contaminants through groundwater

Ecological pathways of exposure for the Site involve migration of dissolved phase contaminants through groundwater to surface water receptors. No other significant pathways of ecological exposure are considered relevant based on the highly urbanized Site setting.

A Site-specific risk assessment was not conducted for the Site. The MPCA determined that generic clean-up criteria, namely, Soil Reference Values (“SRVs”) for industrial site soils are appropriate for the future land use, and are sufficiently protective of human health and the environment.

##### **1.2.4.1 Current Site Exposure Pathways**

In its current configuration, potential pathways of exposure to human receptors are not complete and direct contact with impacted soil is currently prevented by the surface parking lot pavements and landscaped areas planted in grass and small trees. However, planned future development will expose Republic Site contaminated soil, and complete a pathway of exposure.

With respect to the groundwater pathway, which would be the only potentially complete pathway for human ingestion of impacted groundwater exposure, there are no known drinking water wells on the Republic Site, the Property, or between the Property and the Mississippi River.

Groundwater discharge to the Mississippi River appears to be the only ecological pathway of potential exposure. The apparent decrease in creosote-related compounds in groundwater from 1997 to 2006 suggests that this pathway is likely currently incomplete. However, the continued potential for contaminants to leach to groundwater exists and represents a potential pathway for ecological exposure.

Vapor accumulation in structures in the current, undeveloped condition of the Republic Site is not presently an exposure concern. Vapor inhalation of outdoor air appears to be an incomplete pathway based primarily on the limited amount of readily permeable surface on the Republic Site. However, vapor accumulation in structures or excavations and vapor inhalation are potential pathways for exposure.

#### **1.2.4.2 Exposure Pathways During Development Activities**

Potential pathways of exposure during redevelopment of the Republic Site include a much higher likelihood of dermal contact with impacted media, incidental ingestion of impacted particulate, and inhalation of particulate or organic vapors. Specifically, soil excavation, infiltration and leaching after removal of the current surface parking, and possible dewatering activity would create an exposure pathway to workers and the surrounding community.

#### **1.2.4.3 Exposure Pathways after Completion of Stadium Construction**

Based on current schematics of the proposed stadium construction, pathways of exposure post-construction will be essentially similar to existing conditions. However, construction of buildings at the Property would increase the potential to create an indoor air exposure pathway due to vapor migration within the soil. Other aspects of the planned construction include bio-swales for storm water control. MPCA has indicated that leaving creosote-contaminated soils in

place beneath bio-swales would be inappropriate as that may create a leaching pathway to the groundwater

#### **1.2.4.4 Contaminants of Concern – Soil**

Based on the data collected during the investigations at the Republic Site the contaminants of concern for soils are:

- PAHs
- GRO
- DRO
- VOCs

The primary concern is gross contamination from creosote contamination in the form of PAHs. PAHs are therefore the most appropriate primary indicator compound for characterizing soils for the response action.

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## **2.0 Identification and Screening of Technologies**

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### **2.1 INTRODUCTION**

The response action technologies and alternatives for the Site were developed using the USEPA guidance entitled:

“Presumptive remedies for Soils, Sediments, and Sludges at Wood Treater Sites,” Directive 9200.5-162, EPA/540/R-95/128, PB 95-963410, December 1995 (“Presumptive Guidance”).

The Presumptive Guidance is designed to streamline the feasibility study process by drawing on the historical patterns of response action selection and the USEPA’s evaluation of performance data on technology implementation.

### **2.2 RESPONSE ACTION OBJECTIVES**

The cleanup goals for the Republic Site are based on the planned future use of the Property as part of the stadium complex and anticipated future redevelopment of the area by the University. A significant concern is worker exposure during construction activities and potential exposure created by future construction. Other significant concerns include potential threats to human health and the environment posed by leaving uncontained creosote contamination present in the upper soil strata at the Property at levels that exceed the applicable industrial SLVs. Post-construction exposure pathways include groundwater (through bio-swales or dewatering associated with future construction), dermal or ingestion (through excavation associated with future construction), and vapor inhalation (during future construction).

The following apply to the cleanup goal development:

- COCs are creosote-related compounds (PAHs, DRO, GRO, and VOCs),
- The Applicable Relevant and Appropriate Requirements (“ARARs”) for soil cleanup are the Minnesota Industrial SRVs for soil,
- Resource Conservation and Recovery Act (“RCRA”) is not an ARAR for thermal treatment option (i.e., the soils can be removed for treatment without being classified as a RCRA F-listed waste.),
- The ARARs for thermal treatment are the permit requirements of the selected thermal treatment contractor; and
- RCRA is an ARAR for off-site secure landfill disposal (i.e., the soils would be classified as a RCRA Type F-listed waste).

The cleanup goal for the Republic site is to excavate and treat creosote-contaminated soils at or above the water table that exceed industrial SRVs.

### **2.3 GENERAL RESPONSE ACTIONS**

The area of contaminated soil remaining in-place at the Republic Site covers approximately an acre. It extends to the water table at a depth of approximately 12 feet. The total volume of contaminated soil is, therefore, approximately 19,300 cubic yards. At a typical density of 1.5 tons per yard, there is approximately 29,000 tons of contaminated soil. During the previous soil excavation activity 7,700 tons of soil were removed and treated. This material is visually identifiable and can likely be at least partially segregated during excavation. Verification sampling will result in an estimated 4,000 tons of material not needing additional treatment, leaving approximately 25,000 tons of contaminated soil.

The general response actions for this soil are containment, excavation, secure landfill disposal, and treatment. Excavation of this volume of soil is feasible with standard earth moving equipment and methods. Treatment technologies are available as discussed in the following section.

## **2.4 IDENTIFICATION AND SCREENING OF TECHNOLOGY TYPES AND PROCESS OPTIONS**

### **2.4.1 Identification and Screening of Technologies**

Comprehensive screening of technologies is not required to be completed in an FS based on the USEPA document:

“Presumptive Remedies: Policy and Procedures” Dir. 9355.0-47FS, EPA 540-F-93-047.

This Guidance allows the elimination of the technology identification and screening step since the presumptive remedy guidance identifies the applicable technologies.

The Presumptive Guidance technologies potentially applicable to the Site soils are containment (capping), ex-situ thermal treatment, secure landfill disposal, and biological treatment (in-situ or ex-situ).

### **2.4.2 Evaluation of Technologies and Selection of Representative Technologies**

Biological treatment technologies can be eliminated from consideration based on the presence of seams of free- phase product in the Site soils. Biological technologies are not applicable in this instance because the free-phase product present in the soil is toxic to microorganisms.

Containment (e.g., vaulting the contaminated soils) is not applicable at the Site because it would not result in removal or destruction of the contaminants. In terms of the response action objectives, containment is not appropriate since future uses for the Property include construction of new facilities. Potential exposure of workers and releases to the environment would occur during construction activities. The MPCA has determined that containment of the creosote contamination in-place is not acceptable an acceptable response action.

Secure disposal of the soil in a hazardous waste landfill (Subtitle C) is applicable for the Republic Site. The soils would be considered a RCRA Type-F waste for transport and disposal. A Subtitle C landfill is not available in Minnesota, so the soils would need to be transported to an out of state disposal facility.

Thermal treatment has been demonstrated to be effective at the Republic Site during the previous partial response action. Thermal treatment is, therefore, the only applicable treatment technology to be forwarded for alternative analysis.



