EPA Region 5 Records Ctr.
201737

FIVE-YEAR REVIEW REPORT

First Review

St. Louis River Superfund Site
Duluth
St. Louis County, Minnesota

U.S. Steel Site - EPA OU 02
St. Louis River/Interlake/Duluth Tar Site, Tar Seep OU – EPA OU 01
St. Louis River/Interlake/Duluth Tar Site, Soil OU – EPA OU 03

Prepared for
U.S. Environmental Protection Agency
Region 5
by
U.S. Army Corps of Engineers
Omaha District

Date
September 2003

Approved by:

Wm. E. Muno

William E. Muno, Director
Superfund Division
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9/24/03
Date

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LIST OF ACRONYMS

amsl	Above Mean Sea Level
AOI	Area of Interest
Barr	Barr Engineering Company
BOD	Biological Oxygen Demand
BTU	British Thermal Unit
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COC	Chemical of Concern
cPAH	Carcinogenic Polynuclear Aromatic Hydrocarbon
ESD	Explanation of Significant Differences
FAV	Final Acute Value
FS	Feasibility Study
FIT	Field Investigation Team
HRS	Hazard Ranking System
IAG	Interagency Agreement
MDH	Minnesota Department of Health
mg/kg	Milligrams per Kilogram
msl	Mean Sea Levels
MPCA	Minnesota Pollution Control Agency
MPI	Malcom Pirnie Inc.
MS	Maximum Standards
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PAH	Polynuclear Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyls
PLP	Permanent List of Priorities
ppm	Parts per Million
PRP	Potentially Responsible Party
QA/QC	Quality Assurance/Quality Control
RA	Remedial Action
RAO	Remedial Action Objective
RAP	Response Action Plan
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RFRA	Request for Response Action
RI	Remedial Investigation
ROD	Record of Decision
RP	Responsible Party
RPM	Remedial Project Manager
SARA	Superfund Amendments and Reauthorization Act of 1986
SedOU	Sediment Operable Unit (USEPA OU04)

SLRIDT	St. Louis River/Interlake/Duluth Tar Site
SOU	Soil Operable Unit (USEPA OU03)
SPM	State Project Manager
TCL	Target Cleanup Levels
TCLP	Toxic Characteristic Leaching Procedure
TPT	Twin Ports Testing, Inc.
TSOU	Tar Seeps Operable Unit (USEPA OU01)
URS	URS Corporation
USACE	United States Army Corp of Engineers
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
USS or USX	U.S. Steel Site/ Duluth Works Site (USEPA OU02)
VOC	Volatile Organic Compound
WLSSD	Western Lake Superior Summary District
WQC	Water Quality Criteria

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: **St. Louis River Superfund Site**		
EPA ID *(from WasteLAN)*: **MND039045430**		
Region: 5	**State: MN**	**City/County: Duluth, St. Louis County**

SITE STATUS	
NPL status: X Final Deleted Other (specify)	
Remediation status (choose all that apply): Under Construction **X Operating** Complete	
Multiple OUs?* X YES NO	**Construction completion date:** Construction is not complete.
Has site been put into reuse? X YES SLRIDT Site X NO USS Site	

REVIEW STATUS	
Lead agency: EPA X State Tribe Other Federal Agency _____	
Author name: Janie Carrig/Don Moses/Kevin Siemann/Kim Witt	
Author title: Chemist/Engineer/Industrial Hygienist-Risk Assessor/Chemical Engineer	**Author affiliation: U.S. Army Corps of Engineers**
Review period:** September 1992 to June 2003	
Date(s) of site inspection: June 23 – 27, 2003	
Type of review: Post-SARA Pre-SARA NPL-Removal only Non-NPL Remedial Action Site **X NPL State/Tribe-lead** Regional Discretion	
Review number: X 1 (first) 2 (second) 3 (third) Other (specify) _____	
Triggering action: Actual RA Onsite Construction at OU #____ **X Actual RA Start at EPA OU01 (TSOU)** Construction Completion Previous Five-Year Review Report Other (specify)	
Triggering action date *(from WasteLAN)*: September 1992	
Due date *(five years after triggering action date)*: September 1997	

* ["OU" refers to operable unit.]
** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form, cont'd.

The St. Louis Superfund Site is comprised of two state Superfund (MERLA – Minnesota Environmental Response and Liability Act) listed sites: US Steel (USS) and St. Louis River/Interlake/Duluth Tar (SLRIDT). Although the two sites are listed as one on the National Priorities List (NPL), they are listed separately on the state's Permanent List of Priorities (PLP) and are presented in this report in two separate volumes.

Issues For USS:

Reuse
Trespassing
Slope stability concerns for a cover
Oil Sheens
ATV trails, erosion runnels and trees on a soil cover
Disrepair of warning signs
Visible tar and tar-contaminated soil
Lack of surveyed locations and boundaries of OUs and Remedial Actions
The need for Deed Restrictions/Institutional Controls
Need to supplement the monitoring plan
One Remedial Action could not be documented
Lack of TCLs for soil in the ROD
Uncovered dredge spoils
Several uninvestigated features on site not covered in ROD

Recommendations and Follow-up Actions For USS:

Soil sampling/risk analysis prior to reuse
Repair warning signs at access points
Repair erosion/remove trees on soil cover
Test water quality and sediment at sheen locations
Install slope movement markers at slope stability area of concern
Conduct Ecological and Human Health Risk-based Screening for Soils Clean-up
Ensure restrictive covenants are in place
Supplement the monitoring plan
Evaluate MPCA SRVs and EPA PRGs as to status as TBCs
Test exposed spoils
Verify location and existence of unknown features

Five-Year Review Summary Form, cont'd.

Issues For SLRIDT:

Trespassing and minimal site access control
Visible tar and tar-contaminated soil
Active erosion
Lack of monitoring well maintenance
Incomplete or missing Restrictive Covenants/Institutional Controls
Lack of ground water monitoring plan
Significant disparity between SRVs/PRGs and ROD cleanup goals

Recommendations and Follow-up Actions For SLRIDT:

Develop a site security control plan
Remove visible tar
Periodic monitoring of new exposures to tar
Repair erosion
Remove fill from around monitoring wells or retrofit wells to current site conditions
Annual inspections/institutional controls to protect wells
Ensure restrictive covenants are in place
Ground water monitoring
Evaluate MPCA SRVs and EPA PRGs as to status as TBCs
Update risk assessment for the site

The issues and recommendations that must be addressed are detailed in Chapter VIII of each volume of this report.

Protectiveness Statement(s):

A comprehensive site-wide protectiveness statement cannot be made at this time pending implementation of the recommendations contained within this five-year report. In addition, remedies have not been selected and/or constructed for OU-N and R at USS and the Sediment OU at SLRIDT. The comprehensive site-wide protectiveness statement will be reevaluated in two years.

Other Comments:
None.

EXECUTIVE SUMMARY

The USEPA St. Louis River Superfund Site, located in the West Duluth neighborhood of Duluth, St. Louis County, Minnesota is comprised of two state Superfund (MERLA – Minnesota Environmental Response and Liability Act) listed sites: US Steel (USS) and St. Louis River/Interlake/Duluth Tar (SLRIDT). Although the two sites are listed as one on the National Priorities List (NPL), they are listed separately on the state's Permanent List of Priorities (PLP). Both sites are part of the U.S. EPA Deferral Pilot Project and were placed under Minnesota Pollution Control Agency (MPCA) jurisdiction in 1995. The sites have separate project teams, are in different phases of construction, have different Responsible Parties, and different community group interests. A distance of four river miles separates the two sites. This is the first five-year review performed for this site.

The first post-ROD remedies at both sites were completed in 1992 with source removals. This was followed by additional remedial actions during the 1990s to further reduce the risk due to direct exposure to contaminated soil, sediments and reduce contaminant migration to ground water. The remedial actions performed to date, in response to the decision documents, are generally protective in the short-term. However, in order to ensure long-term protectiveness, follow-up actions will be required for most of the remedies. The issues and recommendations that must be addressed in response to the completed remedies are detailed in Chapter VIII of each volume of this report and summarized individually below. Protectiveness statements were developed for each OU at both sites as detailed in Chapter IX of each volume.

U.S. Steel Site

The USS site has 18 Operable Units (OUs) and two areas identified within the ROD for remedial actions. Remedial actions have been completed, as required in the ROD with the exception of the "Tar and Tar Contaminated Soil in the Coke Plant Settling Basin Located between (but not included in) OU-J and I". OU-N and OU-R were designated in the ROD as a no action remedy. Both are currently being evaluated as a component of the on-going sediment investigation. Documentation of the remediation of the "Tar and Tar Contaminated Soil in the Coke Plant Settling Basin Located between (but not included in) OU-J and I" could not be verified.

The result of this five-year review indicates that most of the remedial activities appear to be protective of human health and the environment in the short term because ~~that~~ the actions have decreased the migration of contaminants from the operable units to the St. Louis River. A protectiveness statement was developed for each OU and the two other response actions that were identified in the ROD with the exception of OU-N and OU-R. Protectiveness determinations were not developed for OU-N and R during this 5-year review because these areas are being evaluated as a component of an on-going sediment investigation.

Several areas are not considered protective in the short term for the following reasons:

- It was not possible to verify that the area identified in the ROD as the "Tar and Tar Contaminated Soil in the Coke Plant Settling Basin Located between (but not included in) OU-J and I" was remediated.
- There is an oil sheen located beyond the toe of the cap at OU-J.
- Non-native materials are exposed at the ground surface at OU-Q.
- A seep with an oil sheen was found discharging from the south spoil pile into the bank of the Wire Mill Pond.

Trespassers are encroaching into the site and could be exposed to these areas.

In order to assure the long term protectiveness of the site, most of the remedial areas require follow-up activities. The ROD did not establish Target Clean-up Levels for soils. Therefore, the remedial actions that included removal of contaminated soil require an ecological and human health risk-based screening in order to assure long term protectiveness. The operable units that had soil excavation as a component include OUs A, D, E, H and the Soil Contaminated by Above and Below Ground Petroleum Storage Tanks.

To assure the long term protectiveness of the operable units where non-native materials were left in-place, formal institutional controls such as deed restrictions should be implemented. These operable units are OUs I, J, K, L, M, O, P and Q.

It is being recommended to expand the monitoring program by adding nested wells and collecting sediment and plant tissue samples in the Unnamed Creek. Nested wells would monitor the ground water gradient, contaminant movement and attenuation. Obtaining sediments samples from the Unnamed Creek would monitor a potential contaminant source and conveyance mechanism. Collecting plant tissue samples would determine if the vegetation is bioaccumulating contaminants or if toxic by-products are being formed.

Sampling and testing is being recommended at several sheen locations; OU-Q; suspected Seep #2; the Unnamed Pond; and near Well 7 at the Former Gatewell Structure and non-native material.

Several features, not documented in the ROD, were observed during the site inspection. These include demolition landfills, both used and unused, a demolition stockpile and a former flue dust disposal area (also known as demolition landfill No. 3). Location verification and literature searchs are recommended for these areas.

A comprehensive USS site-wide protectiveness statement cannot be developed until the issues of this five-year review are addressed and the OU-N and OU-R remedy is selected, implemented and completed.

St. Louis River/Interlake/Duluth Tar Site
This site has three Operable Units (OUs): the Tar Seep OU (TSOU); the Soil OU (SOU); and the Sediment OU (SedOU). Remedial actions have been completed at the TSOU and the SOU. A remedy has not yet been selected for the SedOU.

The result of this five-year review indicates the TSOU remedy is protective of human health and the environment. The tar seeps identified in the TSOU ROD were location specific and have been removed.

The SOU remedy is protective of human health and the environment in the short term because soil above the direct exposure clean-up levels identified in the ROD for industrial land use and construction worker's has been removed. In order to assure the long term protectiveness, contaminant migration to ground water, additional assessment of risk, and enforcement of institutional controls must be addressed. The evaluation of soil contaminant transport to ground water has not been determined and ground water monitoring over time has not been performed as specified in the SOU ROD and ESD. Ground water sampling results in support of the SedOU investigation indicate the presence of low-level contamination but there is insufficient data to establish trends. Also preventing a long term protectiveness determination are incomplete or missing restrictive covenants, evidence of recreational trespassing, and the placement of fill in violation of the water well code.

A comprehensive SLRIDT site-wide protectiveness statement cannot be developed until the issues of this five-year review are addressed and the SedOU remedy is selected, implemented and completed.

USS and SLRIDT Overall Protectiveness Statement
A comprehensive site-wide protectiveness statement cannot be made at this time pending implementation of the recommendations contained within this five-year report. In addition, remedies have not been selected and/or constructed for the Sediment OUs at SLRIDT and OU-N and R at USS. The comprehensive site-wide protectiveness statement will be reevaluated in two years.

INTRODUCTION

The purpose of this five-year review is to determine whether the remedy at the St. Louis River Superfund Site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, the Five-Year Review report identifies issues found during the review and recommendations to address them.

The St. Louis River Superfund Site is divided into two different sites: the St. Louis River/Interlake/Duluth Tar Site (SLRIDT) and the US Steel Site (USS). In 1983, the U.S. Environmental Protection Agency (USEPA) consolidated the SLRIDT and the USS sites and added them to the National List of Priorities (NPL), the federal Superfund list, as one site: the St. Louis River Superfund Site with a Hazard Ranking Score (HRS) of 32. In 1984, the Minnesota Pollution Control Agency (MPCA) added the Site to the state's Permanents List of Priorities (PLP). Although the two sites are listed as one on the NPL, they are listed separately on the state's PLP and are being investigated and cleaned up separately. This is because a distance of four river miles separates them and there are different Responsible Parties (RPs) for each. U.S. Steel is conducting the cleanup at the USS Site while Interlake Corporation (Interlake), Allied Signal Inc. (Allied), Domtar Inc. (Domtar), and Beazer East Inc. (Beazer) are conducting the clean up at the SLRIDT Site. Therefore, in this five-year review both the SLRIDT site and the USS site will be discussed; however, they will be divided into two different volumes.

The SLRIDT Site has been split into three Operable Units (OU): the Tar Seeps Operable Unit (TSOU, USEPA OU01); the Soil Operable Unit (SOU, USEPA OU03); and the Sediment Operable Unit (SedOU, USEPA OU04). For the USS Site (USEPA OU02), MPCA has designated the site into eighteen Operable Units (OUA through OUR). This review addresses remedial actions associated with USEPA OU01, USEPA OU02, and USEPA OU03. Remedial action has not been started at USEPA OU04. The status of the remedy selection is presented for this OU. This report will utilize the MPCA designation to distinguish between operable units.

The USACE, as delegated by the USEPA, is preparing this five-year review pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The agency interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

U. S. Army Corps of Engineers (USACE), in coordination with MPCA and USEPA Region 5, have conducted a five-year review of the remedial actions implemented at SLRIDT and USS both located in Duluth, MN. This review was conducted from April, 2003 through September, 2003. This report documents the results of the review and the inspection conducted by the USACE staff. The USEPA delegated and funded the work through an Interagency Agreement with USACE.

This is the first five-year review for the SLRIDT and USS sites. The triggering action for both sites in this review is the initiation of the first remedial action that left contaminants on site, in both cases this would be September of 1992. The five-year review is required because hazardous substances, pollutants, or contaminants remain at both sites above levels that allow for unlimited use and unrestricted exposure.

VOLUME I

U.S. Steel Site - EPA OU 02

Five-Year Review

First Review

September 2003

Volume I

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Attachment 2: Comment and Information Surveys
Attachment 3: List of documents reviewed.
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I. SITE CHRONOLOGY

Table 1: Chronology of Site Events

Event	Date
Beginning of US Steel operations	1915
Contaminants were found while a survey was conducted by MN State Board of Health, the MN Commission of Game and Fish, and WI State Board of Health	1929
Coke plant basin was constructed	1954
Survey conducted by MPCA found exceeding measurements of BOD and pH and high concentration of phenols, cyanide, and ammonia in the coke plant basin	1973
Steel making activities stopped	1975
Minnesota Pollution Control Agency (MPCA) requested hydrogeological study of the site	1979
Coke plant operations stopped	1979
Old basement full of oily waste found and excavated out-of-state shortly after	1981
Site was inspected by the USEPA	1982
Site was placed on the National Priorities List under CERCLA	1983
A request for response action was issued	1983
State superfund listing	1984
Order between US Steel and the State of MN was approved by MPCA	1985
Final phase of Remedial Investigation began	1985
The wire mill discontinued operations	1986
The Record of Decision was signed	1989
Remedial construction began on the coke plant	1989
Clean up and demolition of the coke plant and appurtenant facilities was completed	1992
A free liquid mercury spill that was under a meter storage shed was reported and cleaned up	1992
Response Action Plan for implementing the remedy at OU J was submitted to the MPCA	1996
Response Action Plan for implementing the remedy at the wire mill pond was prepared and submitted	1996
Solidification of OU J was started and completed	1997
Field activities as required in the Response Action Plan on the wire mill pond were completed	1997
The wire mill was removed	1999
Underground coke oven gas lines were removed	1999
Work on the slumps that developed in the perimeter berm near the creek on OU J was complete	2001

II. BACKGROUND

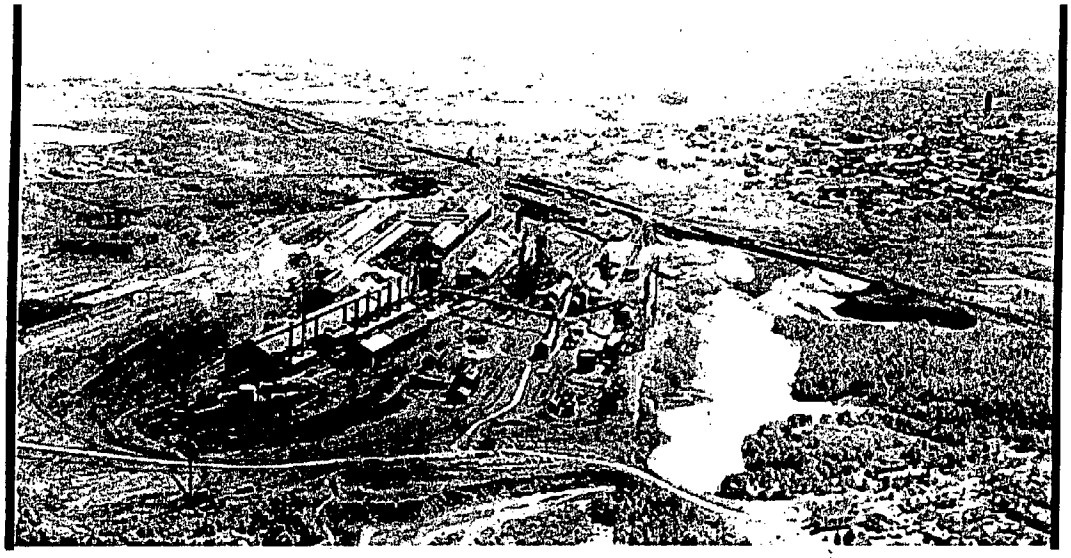
PHYSICAL CHARACTERISTICS

The USS Duluth Works Site was an integrated steel mill consisting of coke production, iron and steel making, casting, primary rolling and roughing, hot and cold finishing and galvanizing. The site is located in Sections 34 and 35, T49N, R15W, and Sections 2 and 3, T48N, R15W near the Morgan Park neighborhood of the City of Duluth in St. Louis County, Minnesota (see Figure 1 at the back of this section – extracted from the ROD). The Site is bounded by the Morgan Park neighborhood to the north, the St. Louis River (also called Spirit Lake) to the east, and Duluth Missabe and Iron Range (DM&IR) Railroad property to the west and south.

The Site is underlain by two distinct Quaternary hydrogeologic units (Barr 1981). The majority of the Site, located on the bluff, rests on thick lacustrine silt and clay deposits associated with Glacial Lake Duluth (USGS 1979, MGS 1982). A subsequent period of lower lake levels in the ancestral Lake Superior resulted in deep incising of these lake deposits by both the Unnamed Creek and St. Louis River. As lake levels rose to current surface evaluations, approximately 200 feet of reworked glacial sediments were deposited under these surface water bodies.

A U.S. Geological Survey (USGS) topographic map (USGS – West Duluth, 1954 – Photo revised 1969) indicates the site elevation ranges from 600 to 670 (National Geodetic Vertical Datum of 1929) feet above mean sea level (msl). The majority of the Site is fairly flat, and sits on a bluff above the St. Louis River (Spirit Lake) and the Unnamed Creek. Surface storm water at the Site drains to the Unnamed Creek and to the St. Louis River. The Unnamed Creek flows in a northeasterly direction.

The bedrock geology of the Site consists of the Duluth Complex; a complex of early Precambrian rocks that include multiple intrusions of gabbroic anorthosite, troctolite, gabbro, anorthosite and felsic rocks (Sims 1970).

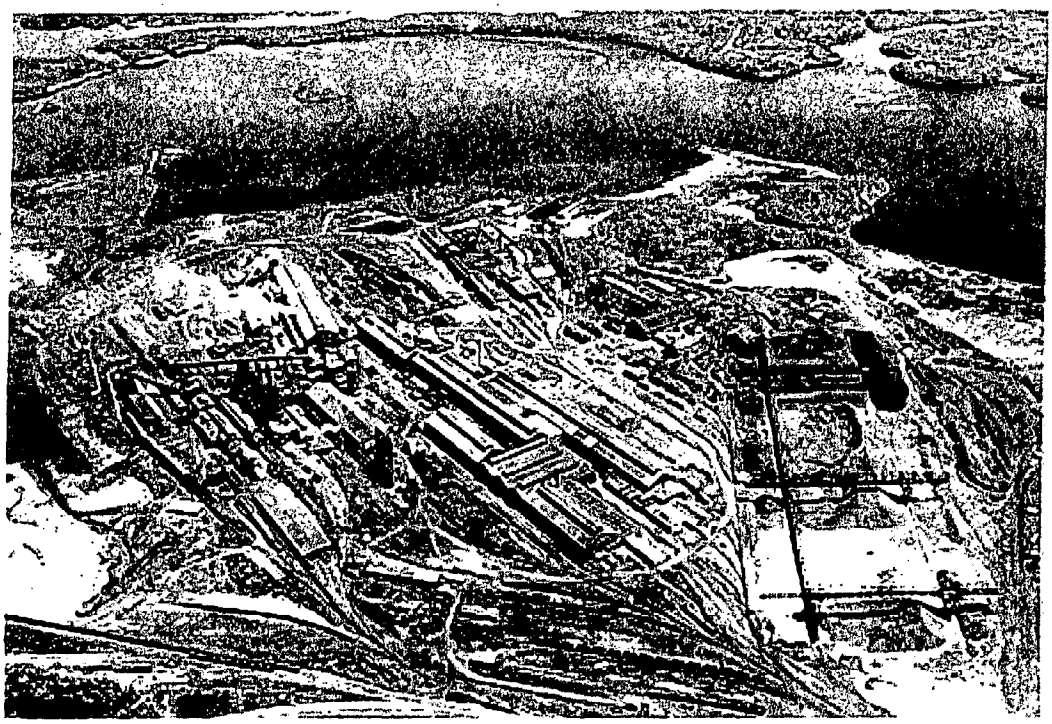


Fill material encountered during subsurface investigation at the Site consists of sand, clay, gravel, cinders, fragments, and other materials. The characteristics and depth of the fill material vary throughout the Site. While fill depths are restricted to a few feet over most of the Site, portions of the bluff area south of Unnamed Creek have been historically extended with 30 to 40 foot layers of fill. This fill can be viewed in the 1960 aerial photograph shown above. The native soils present beneath the fill material generally consist of deposits of sandy and clayey soil layers.

Groundwater monitoring wells installed from previous investigation in the main upland area are screened above river level, which is very nearly the same as the level of Lake Superior, normally 601 feet msl. These wells show the water table at elevations of 620 to 625 feet within 1000 feet of the riverbank, with the water table sloping steeply toward the river (Geraghty and Miller 1995). An upward vertical hydraulic gradient exists at most areas of the site. The upward vertical hydraulic gradient coupled with site-specific geological conditions causes seeps and artesian flow at several locations along the lower portion of the site near the river. The upward vertical hydraulic gradient also creates the potential for groundwater to discharge into the Unnamed Creek. Refer to Figure 2 at the back of this section (extracted from the ROD) for a Groundwater Contour Elevations Map.

LAND AND RESOURCES USE

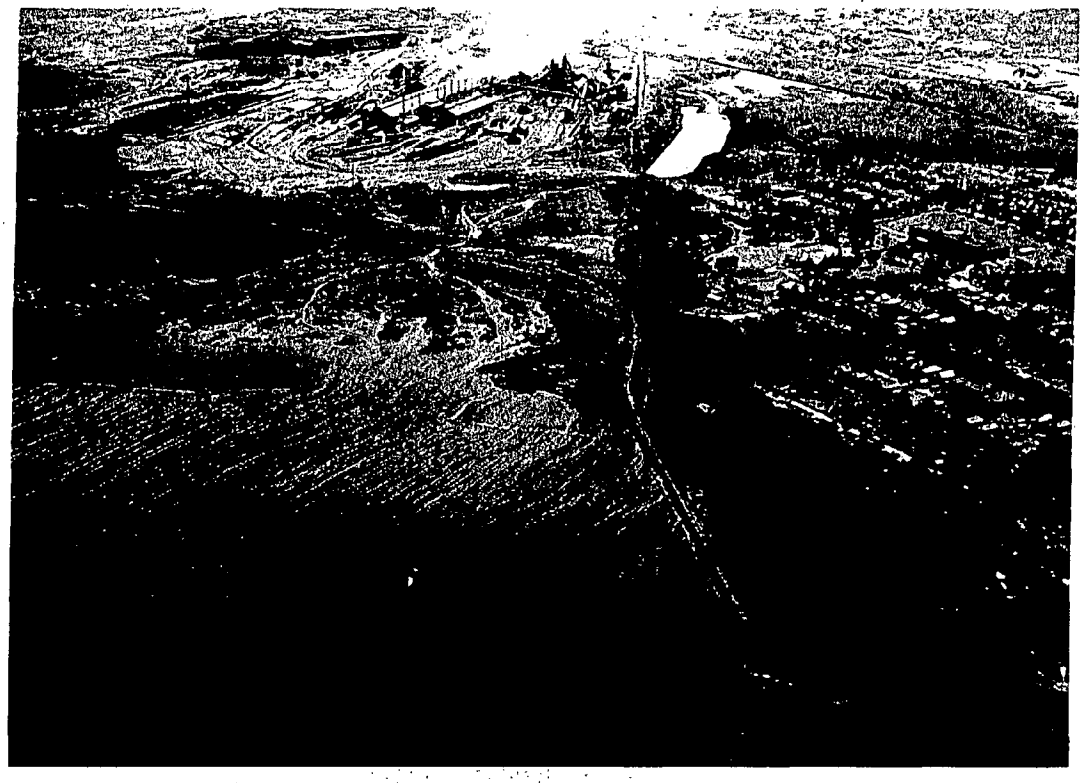
From 1915 until May of 1979, U.S. Steel (USS) operated an integrated steel mill, or parts thereof, at the Duluth Works site. Operations at the mill included coke production, iron and steel making, casting, primary rolling and roughing, hot and cold finishing, and galvanizing. All of the facilities described above, pictured below in the historic aerial photograph, have been removed and demolished.



The Site is owned and managed by USS Realty. The Site is currently unused and has restricted access. The Site is bounded on the west by the DM&IR Railroad. A former USS cement plant was located to the west of the Site. The area to the northwest is primarily industrial land use, which includes a gravel mining operation. Areas further northwest are primarily undeveloped due to steep grades. The area to the north is residential. Areas west and southwest of the Site are residential or undeveloped (Risk Assessment Work Plan 2000).

HISTORY OF CONTAMINATION

The Site is adjacent to the St. Louis River. The St. Louis River discharges into Lake Superior approximately 8 miles downstream of the Site. In its 64 years of operation, the mill produced a variety of solid, semi-solid and liquid wastes, which were discharged to portions of the surrounding land surface and into waterways. The Unnamed Creek flows through the northern portion of the Site and discharges to the St. Louis River. During operations at the Site, much of the waste from the coke plant and the "hot side" of the steel plant were discharged to the settling basin formed by a control structure in the creek. Contaminated water was routed from the settling basin on the Unnamed Creek into the St. Louis River as shown below in a 1967 historic aerial photograph.



Wastes from the "cold side" of the steel plant were discharged directly to the river through a small basin (referred to as the Wire Mill Settling Basin) located adjacent to the river. After the publication of the ROD, US Steel obtained a general permit authorization from MPCA to discharge storm water associated with industrial activity under the National Pollutant Discharge Elimination System/State Disposal System Permit Program.

INITIAL RESPONSE

In 1979, the Minnesota Pollution Control Agency (MPCA) requested a hydrogeological study of the Duluth Works Site. In response to this request, U.S. Steel submitted two reports - one titled "Soil and Ground Water Investigation," in 1981 and one titled "River Water Quality Impact Investigation", in 1983. In 1982, the United States Environmental Protection Agency (USEPA) Field Investigation Team (FIT) inspected the Site. Based on the studies and inspection it was revealed that poly-nuclear aromatic hydrocarbons (PAH) compounds were moving toward and being discharged to the St. Louis River by the routes of both surface water drainage and ground water flowing beneath the Site.

The site was placed on the National Priorities List under CERCLA in 1983.
On October 3, 1983, U.S. Steel Corporation received a Request for Response Action from the MPCA with regard to the Corporation's Duluth Works Site. The site was placed on the State of Minnesota's Superfund listing in 1984. The MPCA executed a Response Order By Consent (Order) with U.S. Steel Corporation, a division of USS Corporation, (USS) on March 26, 1985. During the summer of 1985, the final phase of the Remedial Investigation (RI) began. The RI included more that 150 soil borings and test holes,

chemical analysis of more than 50 soil and sediment samples, installation and monitoring of thirteen piezometers and monitoring wells and monitoring of two seeps and four surface water stations. The MPCA Commissioner signed a Record of Decision (ROD) in February 1989 that set forth the clean-up actions USS needed to take.

BASIS FOR TAKING ACTION

The remedial investigation characterized the contaminants and contaminated areas of the Site as identified in the 1985 Consent Order. The remedial investigation identified 18 areas that required remediation. The ROD delineated eighteen Operable Units (OU's A-R) for remediation as well several other components that were not identified with those Operable Units.

The primary potential impact of the on-site contamination (PAH compounds) was on the St. Louis River. The most significant contaminant pathways were surface flow to the St. Louis River by the creek flowing through the coke plant settling basin in the northern portion of the site and/or flow from the wire mill settling basin in the southern portion of the Site.

Figure 1

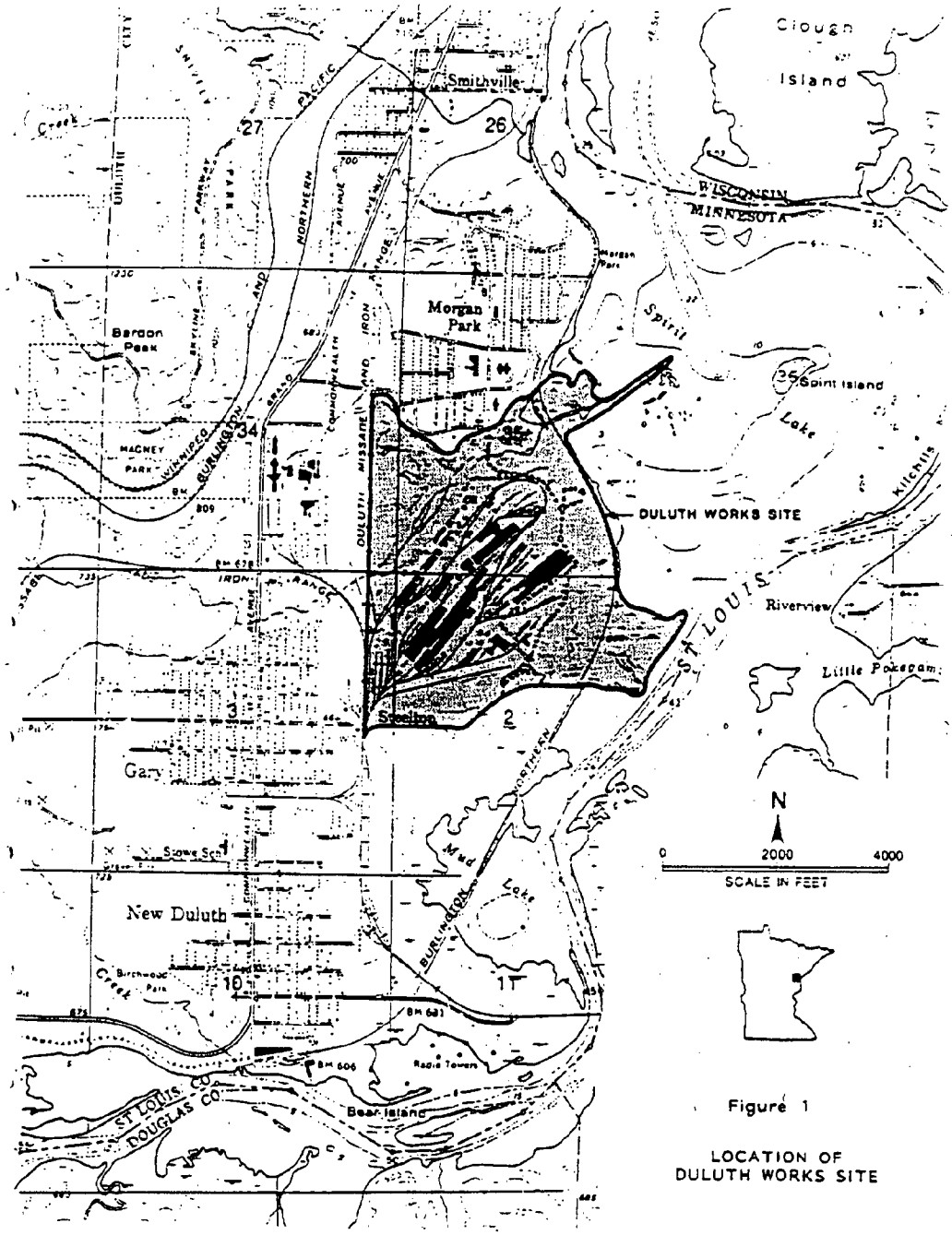
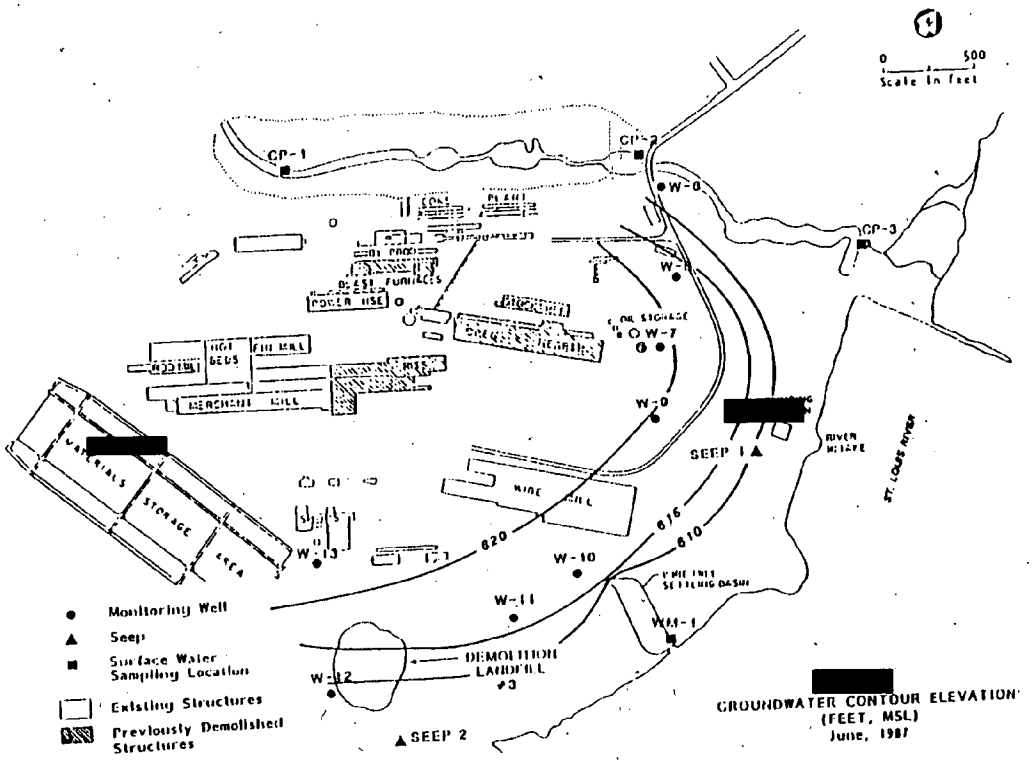


Figure 1

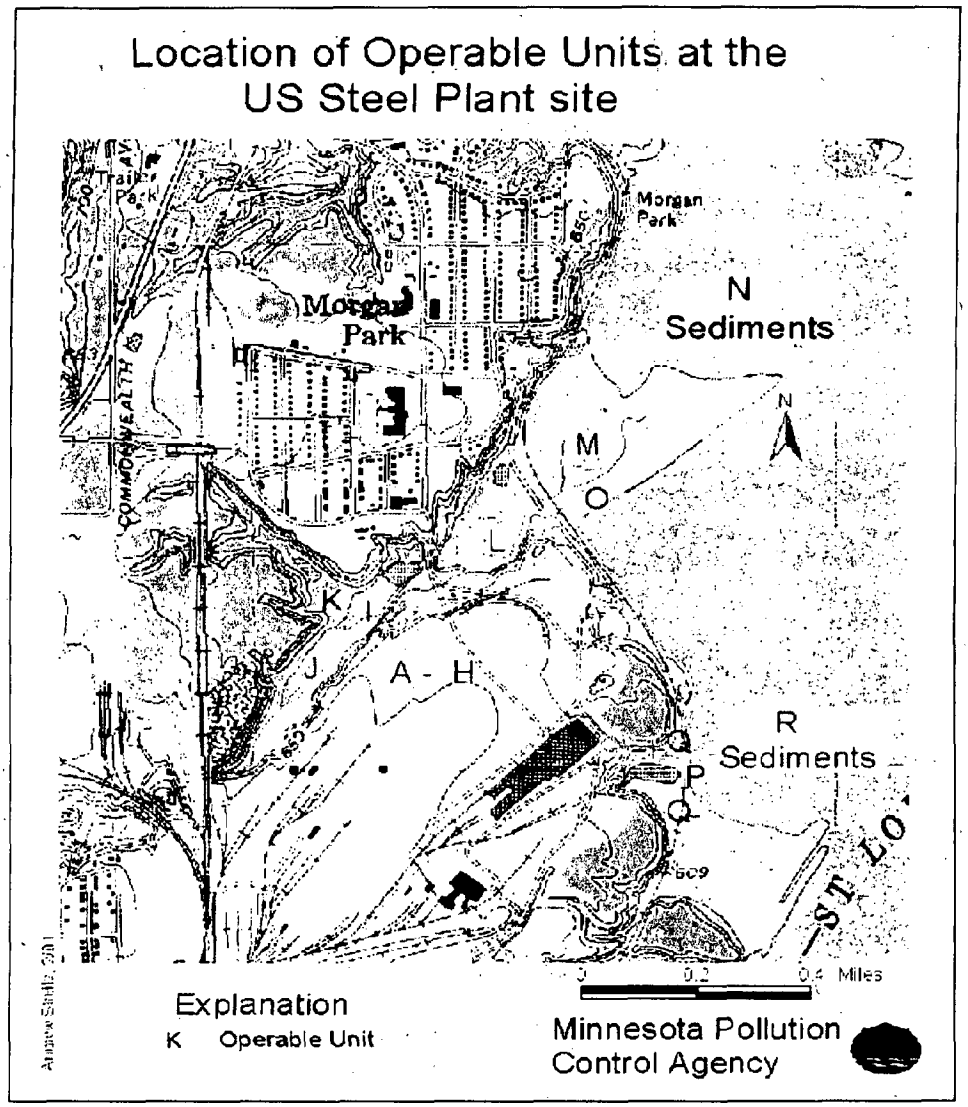
LOCATION OF
DULUTH WORKS SITE

Figure 2


0
500
Scale in feet
CP-1
CP-2
CP-3
W-8
W-7
W-9
W-10
W-11
W-12
W-13
SEEP 1
SEEP 2
620
616
610
ST. LOUIS RIVER
Monitoring Well
Seep
Surface Water Sampling Location
Existing Structures
Previously Demolished Structures
DEMOLITION LANDFILL #3
GROUNDWATER CONTOUR ELEVATION
(FEET, MSL)
June, 1987

III. REMEDIAL ACTIONS

Pursuant to the 1985 Response Order, USS conducted remedial investigations, prepared feasibility and detailed analysis studies, and commenced performance of selected response actions. The "Detailed Analysis Report, USS Duluth Works Site, April 1988" described and evaluated three management areas involving 18 Operable Units (designated A through R). The Detailed Analysis Report summarized the recommended response actions for those Operable Units involving remedial work to implement the response action. The locations of the operable units are shown below:



REMEDIAL ACTION OBJECTIVES

The February 22, 1989 ROD (page 11) specified remedies limited to eighteen (18) Operable Units identified in the feasibility study and those items identified in the 1985 Consent Order and two additional response actions identified in the ROD. Those three response actions in the ROD were as follows:

- Eliminate or minimize contaminant releases to the St. Louis River and the Unnamed Creek flowing into the St. Louis River;
- Control and prevent contact with exposed tar, tar contaminated soils and non-native material; and
- Eliminate contact with contaminants in drums, transformers and buildings.

The ROD presented a wide variety and a large number of alternatives to deal with the various releases or potential releases. The alternatives were divided in the following categories:

- Coke Plant Management Area;
- Coke Plant Settling Basin Management Area; and
- Wire Mill Settling Basin Management Area.

The management areas will be presented in this report in a similar format.

COKE PLANT MANAGEMENT AREA (OU-A, -B, -C, -D, -E, -F, -G, -H)

The response actions for the Operable Units located within the Coke Plant Management Area are the subjects of the following Response Action Reports:

- "Response Action Report, Removal and Recycle/ Disposal of Tank Contents, U.S. Steel Duluth Works Site, May 1986" prepared for U.S. Steel Corporation by Barr Engineering Co.
- "Response Action Final Report, 1988 Drum and Tank Work, Duluth Works Site," prepared for USS Corporation by Barr Engineering Co. dated 1991
- " Response Action Report, Coke Plant Cleanup and Demolition, U.S Steel Duluth Works Site" dated June 1993
- "Final Response Action Report, 1992 Coke Plant Clean-up: Materials Management, Demolition and Restoration Duluth Works Site" dated February 1994
- "Documentation Report for Removal of Underground Coke Oven Gas Lines" dated January 2000.

OU-A (Tar and Tar Contaminated Soil)

Remedy Selection

The response action in the ROD for OU-A (same remedy as for OU-D and OU-E) specified the excavation/removal of the tar, tar contaminated soil and coking by-products for use as fuel.

Remedy Implementation

The remediation of OU-A was completed as required by the ROD. The following report summarizes the remedial activities for this site: "Response Action Report, Coke Plant Cleanup and Demolition, U.S. Steel Duluth Works Site" dated June 1993. In September 1994, USS placed a contract with 7 & 7, Inc. to remove OU-A tars. Recyclable material was shipped to 7 & 7's facility in Ohio for recycling. Nonrecyclable tar and debris were disposed off-site. As of March 1995, all the tar spills were excavated and removed from the Site. Confirmation samples were collected from the materials handling yard spill area, the wire mill pond spill area, the southwest tar spill area, the fuel oil storage tank spill area, and the ravine embankment spill area. Approximately 8,780 tons of materials were shipped off-site to the BFI Landfill near Madison, Wisconsin. Approximately 338 tons were recycled at the 7 & 7 recovery facility in Wooster, Ohio. Final site restoration was completed in October 1995.

System Operations/O&M

There is no O&M associated with the any of the Operable Units within the Coke Plant Management Area because the response actions were all removals.

OU-B (Contaminated Water in Tanks and Pipelines)

Remedy Selection ROD

The response action in the ROD for OU-B specified contaminated water would be discharged to the Western Lake Superior Sanitary District sewer system for treatment at the District's wastewater treatment plant.

Remedy Implementation

The remediation of OU-B was completed as required by the ROD. The "Final Response Action Report 1992 Coke Plant Clean-up: Materials Management, Demolition & Restoration Duluth Works Sites" dated February 1994 summarizes most of the Response Action that was implemented for OU-B. Over 2 million gallons of contaminated water was pumped from tanks, pipelines and basements as part of remedial work performed during 1985, 1988, 1989, 1992 and later in 1999. During these years, water was passed through a baffled clarifier on-site before being discharged to the sanitary sewer for treatment at the WLSSD plant.

System Operations/O&M

There is no O&M associated with the any of the operable units within the Coke Plant Management Area because the response actions were all removals.

OU-C (Solids in Large and Small Gas Holders)

Remedy Selection

The response action in the ROD for OU-C specified that solids be removed from the gas holders and placed in either an off-site landfill or be incinerated at a facility acceptable to the MPCA.

Remedy Implementation

The remediation of OU-C was completed as required by the ROD. The "Final Response Action Report 1992 Coke Plant Clean-up: Materials Management, Demolition & Restoration Duluth Works Sites" Dated February 1994 summarizes most of the Response Action that was implemented for OU-C. The solids in the large and small gas holders were sampled and analyzed. During the period of October through December of 1993, a total of 1,148 tons of large gas holder solids were removed and shipped to a hazardous waste landfill in Belleville, Michigan. A total of 66 tons of small gas holder solids were shipped to a special waste landfill in Clinton, Illinois.

System Operations/O&M

There is no O&M associated with the any of the operable units within the Coke Plant Management Area because the response actions were all removals.

OU-D (Tar and Coking By-Products in Tanks)

Remedy Selection

The response action in the ROD for OU-D (same remedy as for OU-A and OU-E) specified the excavation/removal of the tar, tar contaminated soil and coking by-products for use as fuel.

Remedy Implementation

Twenty-two tanks were emptied and cleaned during remedial work performed in 1985. The residual contents from these tanks were recycled as fuel. This remedial activity is described in the following report: "Response Action Report, Removal and Recycle/ Disposal of Tank Contents, U.S. Steel Duluth Works Site, May 1986" prepared for U.S. Steel Corporation by Barr Engineering Co.

Twenty underground tanks and two aboveground tanks were emptied and cleaned during remedial work performed in 1988. The residual materials from these tanks were used as fuel or disposed by 7 & 7, Inc. This work also included removal of contaminated soil encountered in tank excavations and site restoration. Soil samples were collected from each excavation below the tank and a headspace test was performed on each sample to determine if the soils were contaminated. Tar and tar-contaminated soils encountered in the tank excavations were excavated, transported to and placed in a stockpile on the prepared surface in the sulfate storage room staging area. The soils that were lightly contaminated with petroleum based fuel oil and gasoline was decontaminated by thin-spreading on-site. The location of the thin spreading operation can be found on Figure 2 of the "Response Action Final Report 1988 Drum and Tank Work document date April

1991." Subsequent sampling and headspace testing of the soils in the thin-spread areas showed these soils were no longer contaminated. The excavated underground tanks and the aboveground tanks were transported to a temporary staging area for cleaning. The cleaned tanks were to be cut up and sold as scrap metal. This remedial activity is described in the following report: "Response Action Final Report, 1988 Drum and Tank Work, Duluth Works Site," prepared for USS Corporation by Barr Engineering Co. dated 1991.

System Operations/O&M

There is no O&M associated with the any of the operable units within the Coke Plant Management Area because the response actions were all removals.

OU-E (Tar and Coking By-Products in Pipelines)

Remedy Selection

The response action in the ROD for OU-E (same remedy as for OU-A and OU-D) specified the excavation/removal of the tar, tar-contaminated soil and coking by-products for use as fuel.

Remedy Implementation

The remediation of OU-E was completed as required by the ROD. The "Final Response Action Report 1992 Coke Plant Clean-up: Materials Management, Demolition & Restoration Duluth Works Sites" Dated February 1994 summarizes most of the Response Action that was implemented for OU-E. Pipelines were dismantled and cleaned as part of the remedial work performed in conjunction with the 1989 demolition of the coke plant facility. The clean pipes were transported from the site as scrap metal. The tars and coking by-products removed from the pipes were placed with other fuel materials in the temporary staging areas on-site. A portion of the underground pipes were excavated and cleaned in 1992 and 1993, with tar stored at the site and cleaned pipe being disposed as scrap metal. The remaining materials were used as fuel or disposed as described with OU-A.

USS submitted a response action plan in March 1999 that addressed the removal, cleaning and disposal of the remaining 7,800 feet of buried coke oven gas lines. The response action plan was approved by the MPCA in April 1999. Removal operations were completed in August 1999 and described in the "Documentation Report for Removal of Underground Coke Oven Gas Lines" dated January 2000. The Documentation Report summarized the following remedial items:

- Liquids were removed from the gas lines and then pumped through an oil/water separator, air sparging system then a carbon filter. The treated liquid was stored in a holding tank and later disposed (approximately 97,650 gallons) into the Western Lake Superior Sanitary District sewer system.
- The buried pipe was excavated and cleaned on impermeable concrete pads.
    - The pipe was recycled at Simko Superior Ltd. In Superior, Wisconsin

- The lead joints were stockpiled at Earth Burners, Inc. to wait for more favorable recycling conditions.
- The solids removed by the cleaning were shipped to Chemical Waste Management, Inc. in Sauget, Illinois by Peoria Disposal Co. (Peoria, Illinois) for disposal.

- Soils suspected of being impacted were field screened. Residual soils (1,700 tons) exceeding 10 ppm VOC were excavated and disposed of at the Timberline Trail Recycling and Disposal Facility in Bruce, Wisconsin.
- The excavated trenches were restored to preexisting conditions. Material derived from the original trench excavation (VOC levels were less than the 10 ppm) was used to backfill the trench. Additional backfill was obtained from an on-site location.

System Operations/O&M

There is no O&M associated with the any of the operable units within the Coke Plant Management Area because the response actions were all removals.

OU-F (PCB Liquids)

Remedy Selection

The response action in the ROD for OU-F specified the removal of the PCB liquids, rinsing of the PCB transformer carcasses, and incineration of the PCB liquids at a commercial incinerator.

Remedy Implementation

The remediation of OU-F was completed as required by the ROD. The following report summarizes the remedial activities for this site: "Response Action Report, Coke Plant Cleanup and Demolition, U.S. Steel Duluth Works Site" dated June 1993.

PCB liquids were removed from three PCB transformers in 1989. The drained transformer carcasses were transported from the site with the PCB liquids in the fall of 1989. The PCB liquids and transformer carcasses were transported to General Electric Company's facility in Chicago, Illinois and incinerated.

System Operations/O&M

There is no O&M associated with the any of the operable units within the Coke Plant Management Area because the response actions were all removals.

OU-G (Ammonium Sulfate)

Remedy Selection

The response action in the ROD for OU-G specified that the ammonium sulfate would be landspread and used as a nitrogen fertilizer either on-site or off-site.

Remedy Implementation

The remediation of OU-G was completed as required by the ROD. The following report summarizes the remedial activities for this site: "Response Action Report, Coke Plant Cleanup and Demolition, U.S. Steel Duluth Works Site" dated June 1993.

The sulfate storage room contained a couple of small stockpiles of solid ammonium sulfate. This material was removed and recycled in two batches. The first batch of ammonium sulfate was delivered to the Holiday Greenhouse in Superior, Wisconsin for use as fertilizer on greenhouse stock. The second batch was delivered to an individual for use in agricultural applications.

System Operations/O&M

There is no O&M associated with the any of the operable units within the Coke Plant Management Area because the response actions were all removals.

OU-H (Lubricants, Paints, Solvents, Fuel Oils)

Remedy Selection

The response action in the ROD for OU-H specified the collection, inventory, and identification of the drums and their contents and disposal of the drum contents, as appropriate, by recycling, use as fuel, incineration or placement in an on-site containment vault.

Remedy Implementation

The remediation of OU-H was completed as required by the ROD. The "Final Response Action Report 1992 Coke Plant Clean-up: Materials Management, Demolition & Restoration Duluth Works Sites" Dated February 1994 summarizes most of the Response Action that was implemented for OU-H. This remedial activity is partially documented in the following reports: "Response Action Final Report, 1988 Drum and Tank Work, Duluth Works Site," prepared for USS Corporation by Barr Engineering Co. dated 1991 and in the "Response Action Report, Coke Plant Cleanup and Demolition, U.S. Steel Duluth Works Site" dated June 1993.

A total of 2,977 drums and containers were collected prior to 1992 from within buildings and structures and from scattered locations around the surface of the site. This work was part of the work conducted during 1988, 1989, and 1990. A small portion of these drums and containers were collected from the former cement plant site adjacent to the steel plant site. The contents of these drums and the containers were treated as follows:

- 1,537 drums were considered empty;
- 212 drums contained used oil which was recycled;
- 184.5 drums contained common refuse and were disposed at a sanitary landfill;
- 365.5 drums contained coking by-products which were added to the stage OU-A material;
- 8 drums contained personal protective equipment which was incinerated at a hazardous waste incinerator;

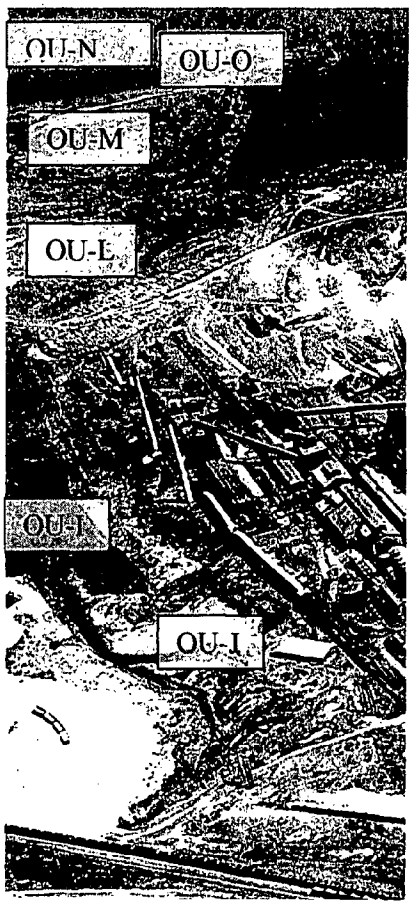
- 7 drums contained PCB contaminated oil which was incinerated; and
- 663 drums were bulked based on the results of compatibility testing for disposal
  - 20 drums were disposed at a hazardous waste landfill
  - 13,125 pounds of material was incinerated at a hazardous waste incinerator

Partially buried drums in ten areas of the site were investigated in 1992 using geophysical methods. A total of 449 drums or containers were encountered within all of the areas excavated to locate drums. The drums were excavated; contents identified, and then were shipped off-site in 1993 for use as fuel, incineration (PCBs), or for treatment to neutralize the alkalinity. Contaminated soil and debris excavated during removal of the drums were disposed at a hazardous waste landfill.

System Operations/O&M

There is no O&M associated with the any of the operable units within the Coke Plant Management Area because the response actions were all removals.

COKE PLANT SETTLING BASIN MANAGEMENT AREA (OU-I, -J, -K -L, -M, -N, -O)



The contaminated areas that were located within the watershed of the Unnamed Creek were evaluated together as the Coke Plant Settling Basin Management Area.

OU-I (Non-Native Material in Settling Basin)

The Coke Plant Settling Basin was constructed directly in the channel area of the Unnamed Creek. In the Remedial Investigation Report (RI) dated December 1986, it was estimated that there was approximately 140,000 cubic yards of non-native material in the coke plant-settling basin. The primary contaminant was PAH/heterocyclic compounds with reported concentrations as high as 35,000 mg/kg. The thickness of the non-native material varied but average approximately 10 feet in thickness. The native soils below the coke consisted of red-brown clay.

Remedy Selection

The response action in the ROD for OU-I (same remedy as for OU-L, OU-M, OU-N and OU-O) specified no-action subject to the completion of a PAH-treatability study to examine implementation of alternative and innovative treatment technologies. No action includes routine inspections

and water quality monitoring to verify that significant erosion has not occurred and to verify the long-term effectiveness of the response actions for these and other operable units. Appropriate institutional controls shall be implemented to minimize future disturbance of these units.

Remedy Implementation

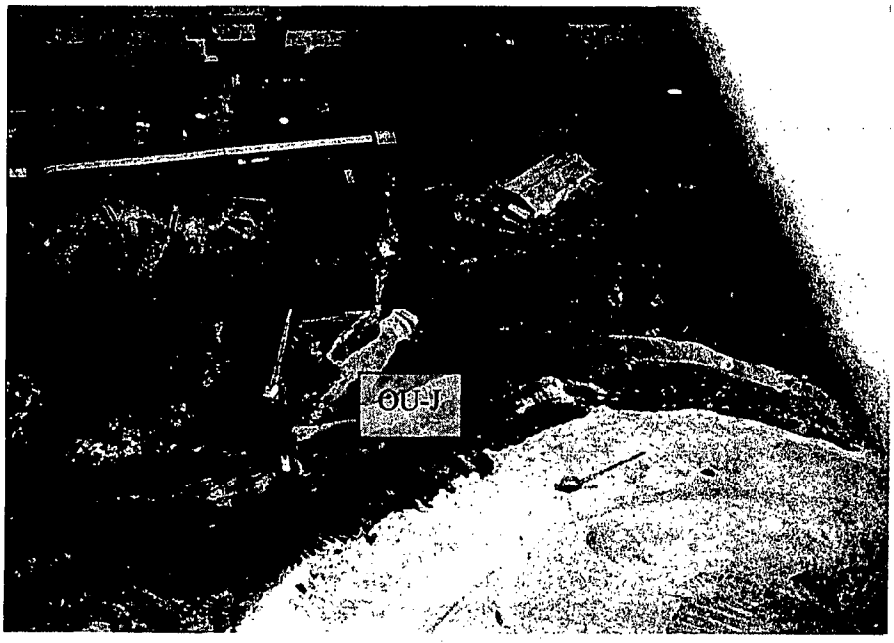
The remediation of OU-I was completed as required by the ROD. The ROD designates the no action alternative which includes routine inspections to verify that significant erosion has not occurred and water quality monitoring to verify the long-term effectiveness of the no action response action for this and other operable units. This no action response was subject to the completion of the PAH treatability study (completed and approved June 1990) examining implementation of alternative and innovative treatment technologies. The no action alternative also requires implementation of appropriate institutional controls to minimize future disturbance of the operable unit.

System Operations/O&M

The long-term monitoring requirements are delineated in the Phase II Response Action Plan - USS Duluth Works Site dated June 1993. OU-I is identified in the Response Action Plan as an area of the site to be included in an annual visual inspection.

OU-J (Tar and Tar Contaminated Soil)

OU-J has been estimated to contain about 10,000 cubic yards of nonnative material (tar and tar-contaminated soil containing coke fines, flue dust, and mill scales). The tar was found to contain polynuclear aromatic hydrocarbon (PAH) levels as high as 11,000 mg/kg carcinogenic PAHs (cPAHs) and 50,000 mg/kg non-carcinogenic PAHs (nPAHs) during the RI (Barr Engineering Company, 1986). OU-J can be viewed in the previous and following photograph.



Remedy Selection

USS retained Geraghty & Miller, Inc. to re-evaluate four alternatives for OU-J, including a slurry wall containment system, a slurry wall system with in-situ treatment, in-situ cement stabilization, or a funnel and gate system. In a Recommendation Report for OU-J dated August 1995, Geraghty & Miller recommended the remedial alternative of stabilization/solidification.

Remedy Implementation

The remediation of OU-J was completed as required by the ROD. A Response Action Plan (RAP) for OU-J was submitted to MPCA in March of 1996 and proposed in-situ cement stabilization as the preferred remedy. The MPCA approved the RAP in November 1996. Field work commenced in June 1997 and was completed in December 1997. A Response Action Implementation Certification Report and accompanying set of Record Drawings for OU-J was submitted in February on 1998. The report summarized the events leading to the completion of the RA field activities, presented the "as-built" conditions, and provided certification that the remedy was executed as prescribed in the RAP and specific MPCA approval correspondence.

The remedial alternative consisted of three major components including protection of the Unnamed Creek, stabilization/solidification, and construction of a final cover system.

- The unnamed Creek was stabilized and protected. The surface water diversion structure was designed to withstand the 100-year, 24-hour recurrence storm event. A perimeter berm was built in two phases. The berm was partially constructed (up to elevation 626) prior to the field phase to protect the site during construction. After the stabilization/solidification was completed, the berm was raised to elevation 631 to protect the unit from the 100-year flood event. The berm was constructed on 2H:1V sideslopes. A gabion basket structure was installed to provide stability of the berm and for erosion control along the creek.
- Approximately 10,000 cubic yards of coal tar and tar-contaminated soil were solidified in-place.
- And a seven foot engineered cap was placed over the unit (designed to reject 90% of precipitation) On-site borrow was used for all layers but topsoil.
    - 6" topsoil layer
    - 30" protective vegetation rooting layer (5% minimum slope)
    - Geotextile filter
    - 12" sand drainage layer
    - Geotextile filter
    - 24" low-permeability (1×10^{-7} cm/sec) clay barrier layer
    - 12" minimum grade-adjusting layer

Aerial view of Operable Unit J during full-scale implementation activities.

System Operations/O&M)

It should be noted that instrumentation such as lysimeters or soil moisture probes was not installed to monitor the infiltration rate through the engineered cap. The effectiveness of the engineered cap is monitored by inspecting the surface features of the cap and by sampling water quality in adjacent and downgradient Unnamed Creek.. The monitoring schedule and requirements for OU-J are presented in the Response Action Contingency Plan dated June 1997. The monitoring requirements were updated in an April 2000 "Monitoring Plan" and approved with modifications by the MPCA on May 26, 2000. Current requirements call for semi annual surface water sampling and annual groundwater sampling. Visual inspections are made of the berm and cap integrity, and for sheens at CP-3 and 4, the OU-J shoreline and the Coke Settling Basin area. Water quality is sampled at CP-3 and 4. Monitoring to date has shown few exceedences of water quality performance criteria.

OU-J Berm Repair and Improvement Project

Beginning in the fall of 2000, slumps developed in the perimeter berm near the Unnamed Creek. The repair and improvement project consisted of repairing the slumps, stabilizing the perimeter berm by extending the existing gabion baskets, and repairing the affected areas of the cover. Repair activities were completed in August of 2001. The berm repair consisted of the following elements:

- Installation of siltation and erosion controls
- Removal and temporary stockpiling of topsoil from the perimeter berm

- Excavation of the side and base of the perimeter berm to accept the new gabion baskets
- Compaction of the soil in the excavated area
- Lining the excavation with 7.5-ounce, non-woven geotextile liner
- Installation of the new gabion baskets
- Repair of the damaged slump areas with compacted material from the new gabion basket excavation
- Replacement of topsoil in all disturbed areas
- Reseeding the disturbed areas

OU-K (Dredge Spoil Material)

The coke plant settling basin was dredged at various times during coke plant operations and the dredge spoil material was placed in an area northwest of the coke plant settling basin. The non-native material identified in the dredge spoil material area consists of fine to coarse coke. The volume of dredge spoil material in Cells A, B and C is estimated to be 62,000, 23,000 and 4,000 cubic yards, respectively.

The sum of PAH compound concentration in samples collected from Cell A in 1986 range from 250 to 1,800 mg/kg. Two composite samples collected in 1986 from Cell B indicate a total PAH compound concentrations of 475 to 780 mg/kg. One composite sample collected in 1986 from Cell C indicates a total PAH compound concentration of 79 mg/kg. (RI Final Report, Tables 15, 16 and 17).

Remedy Selection

The response action in the ROD for OU-K specified the top dressing of the dredge spoil in Cells A, B, and C subject to the completion of a PAH-treatability study to examine implementation of alternative and innovative treatment technologies. In addition, the culvert beneath Cell A was to be rehabilitated as a preventative maintenance measure.

Remedy Implementation

The remediation of OU-K was completed as required by the ROD. The Phase I Response Action Plan dated October 1992 describes the Response Action that was planned for OU-K. The "Final Response Action Report 1992 Coke Plant Clean-up: Materials Management, Demolition & Restoration Duluth Works Sites" Dated February 1994 summarizes most of the Response Action that was implemented for OU-K.

Soil topdressing was placed over the dredge spoil area (Cells A, B and C). The 36-inch corrugated metal pipe culvert beneath Cell A was to be rehabilitated using a patented pipe lining process known as Insituform. The culvert was originally installed to provide drainage of a pond and its watershed which lie northwest of the dredge spoil area under to the Unnamed Creek.

Topdressing Cells A, B and C included the following specific activities:

- Clearing the existing vegetation from the dredge spoil areas,
- Grading the berms located around the cells to provide adequate drainage off the cells, minimizing the ponding of water on the cells and reducing the potential for erosion in other areas,
- Placement of a minimum one foot of clean fill material over the dredge spoil material, and (note that the borrow material was to be clean fill acquired from on-site – south of Wire Mill Pond)
- Seeding, fertilizing, and mulching the area to establish vegetation.

System Operations/O&M

The long-term monitoring requirements are delineated in the Phase II Response Action Plan - USS Duluth Works Site dated June 1993. OU-K is identified in the Response Action Plan as an area of the site to be included in an annual visual inspection.

OU-L (Creek Channel)

OU-L is the creek channel located between the Coke Plant Settling Basin control structure near the access road and the railroad tracks that parallel the St. Louis River. The streambed and former open water area as delineated in 1907 indicates approximately 10 acres has been impacted by non-native materials. The RI soil borings indicate 5-9 feet on non-native material is present in the area. It was estimated that 82,000 to 148,000 cubic yards of non-native material are present in the streambed and former open water area.

Remedy Selection

The response action in the ROD for OU-L (same remedy as for OU-I, OU-M, OU-N and OU-O) specified no-action subject to the completion of a PAH-treatability study to examine implementation of alternative and innovative treatment technologies. No action includes routine inspections and water quality monitoring to verify that significant erosion has not occurred and to verify the long-term effectiveness of the response actions for these and other operable units. Appropriate institutional controls shall be implemented to minimize future disturbance of these units.

Remedy Implementation

The remediation of OU-L was completed as required by the ROD. The ROD designates the no action alternative which includes routine inspections to verify that significant erosion has not occurred and water quality monitoring to verify the long-term effectiveness of the no action response action for this and other operable units. This no action response was subject to the completion of the PAH treatability study (completed and approved June 1990) examining implementation of alternative and innovative

treatment technologies. The no action alternative also requires implementation of appropriate institutional controls to minimize future disturbance of the operable unit.

System Operations/O&M

The long-term monitoring requirements are delineated in the Phase II Response Action Plan - USS Duluth Works Site dated June 1993. OU-L is identified in the Response Action Plan as an area of the site to be included in an annual visual inspection.

OU-M (Delta and Creek Channel Area)

OU-M is the creek channel and delta area that is located riverward of the railroad tracks. This delta was created by flows carrying sediment from the Coke Plant Settling Basin into the St. Louis River estuary. A 1940 aerial photo shows that the St. Louis River estuary extends to the former Burlington Northern railroad tracks, while the 1983 aerial photo shows a 28-acre land area between the railroad tracks and the estuary. Soil borings conducted as part of the Remedial Investigation showed approximately 10 feet of coke/flue dusts in most areas of the delta. It was estimated in the RI and stated in the ROD that the delta (OU-M) and estuary (OU-N) adjacent to the delta contains 600,000 to 900,000 cubic yards (total for both OU-M and N) of non-native material and contaminated soil.

Remedy Selection

The response action in the ROD for OU-M (same remedy as for OU-I, OU-L, OU-N and OU-O) specified no-action subject to the completion of a PAH-treatability study to examine implementation of alternative and innovative treatment technologies. No action includes routine inspections and water quality monitoring to verify that significant erosion has not occurred and to verify the long-term effectiveness of the response actions for these and other operable units. Appropriate institutional controls shall be implemented to minimize future disturbance of these units.

Remedy Implementation

The remediation of OU-M was completed as required by the ROD. The ROD designates the no action alternative which includes routine inspections to verify that significant erosion has not occurred and water quality monitoring to verify the long-term effectiveness of the no action response action for this and other operable units. This no action response was subject to the completion of the PAH treatability study (completed and approved June 1990) examining implementation of alternative and innovative treatment technologies. The no action alternative also requires implementation of appropriate institutional controls to minimize future disturbance of the operable unit.

System Operations/O&M

The long-term monitoring requirements are delineated in the Phase II Response Action Plan - USS Duluth Works Site dated June 1993. OU-M is identified in the Response Action Plan as an area of the site to be included in an annual visual inspection.

examine implementation of alternative and innovative treatment technologies. No action includes routine inspections and water quality monitoring to verify that significant erosion has not occurred and to verify the long-term effectiveness of the response actions for these and other operable units. Appropriate institutional controls shall be implemented to minimize future disturbance of these units.

Remedy Implementation

The remediation of OU-O was completed as required by the ROD. The ROD designates the no action alternative which includes routine inspections to verify that significant erosion has not occurred and water quality monitoring to verify the long-term effectiveness of the no action response action for this and other operable units. This no action response was subject to the completion of the PAH treatability study (completed and approved June 1990) examining implementation of alternative and innovative treatment technologies. The no action alternative also requires implementation of appropriate institutional controls to minimize future disturbance of the operable unit.

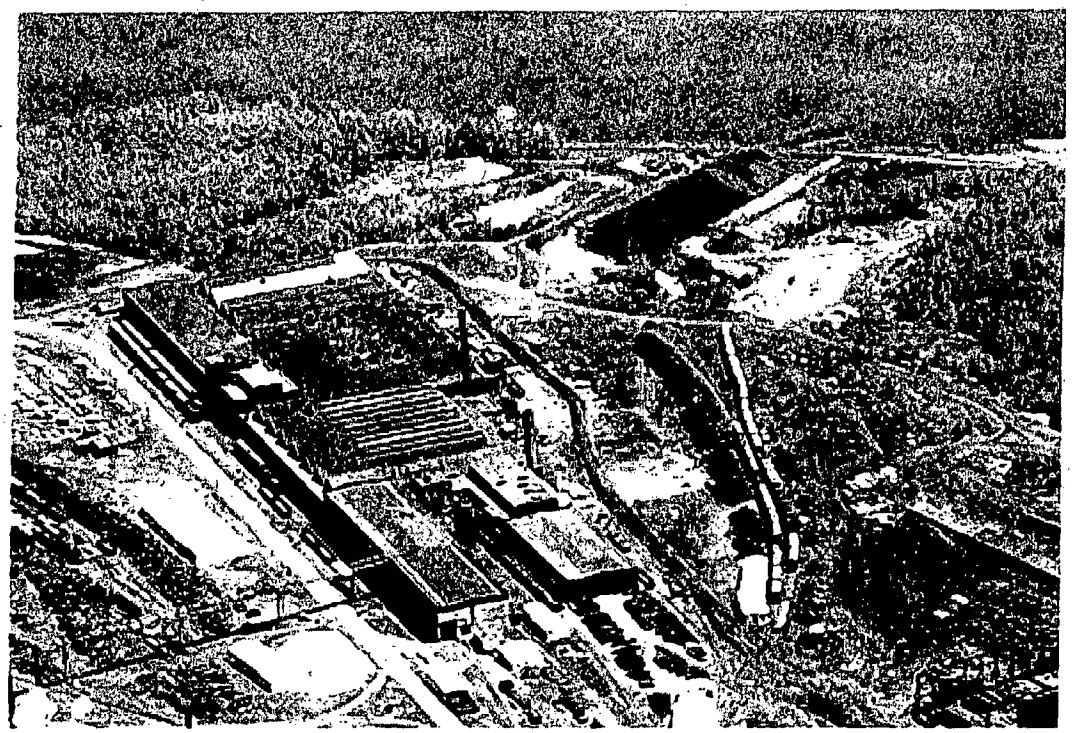
System Operations/O&M

The long-term monitoring requirements are delineated in the Phase II Response Action Plan - USS Duluth Works Site dated June 1993. OU-O is identified in the Response Action Plan as an area of the site to be included in an annual visual inspection.

WIRE MILL SETTLING BASIN MANAGEMENT AREA (OU-P, -Q, -R)

OU-P (Wire Mill Pond)

The Wire Mill Pond served as receiving pond for stormwater and wastewater from the "cold" side of the integrated steel mill; including the wire mill, and the merchant mill. Operations performed in these mills included hot and cold rolling, pickling, and galvanizing. The cold side of the Duluth Works ceased operation in 1973, except for the wire mill that continued to operate under a lease agreement. Tenants used the wire mill and discharged noncontact cooling water to the pond from 1973 until approximately 1986, when the operation of the wire mill was discontinued. During operations, the Wire Mill Pond was used as a treatment basin, holding wastewater to allow oil and greases to be removed prior to discharge to the St. Louis River. Heavy materials in the influent waste streams settled in the pond and lighter materials were captured with an active skimming process prior to discharge to Spirit Lake and the St. Louis River. The photo below was taken sometime after 1967 when the Wire Mill Pond was constructed. The floating skimmers can be seen on the pond.



Sediments in the Wire Mill Pond were probed in 1984 and samples were collected in 1985 for chemical analysis. The sediment data indicated low concentrations of PAHs. Saturated hydrocarbons, primarily oil and grease, were also detected in the sediment samples. The pond was estimated to contain 10,000 cubic yards of nonnative sediments.

Due to continued concern about the potential impact on water quality, additional sediment samples were collected. In 1994, USS and MPCA each collected two additional sediment samples from the Wire Mill Pond for analysis of semivolatile organics, phenolic compounds, pesticides, PCBs, cyanide, mercury, and total oil and grease. In 1995, USS and MPCA collected ten additional sediment samples from the Wire Mill Pond for analysis of semivolatile organics, metal, cyanide, and total organic carbon.

Sediment samples were also collected in December 1995 for waste characterization analysis using TCLP. These results indicated that the sediments did not exhibit any hazardous characteristics.

Remedy Selection

The response action in the ROD for OU-P (same remedy as for OU-Q and OU-R) was originally specified to be no-action. Concern regarding the discharge of contaminated water to the river lead to subsequent investigations in 1994 and 1995 (as described above). A Response Action Plan dated February 1996 was submitted to the MPCA and was approved in November 1996.

Remedy Implementation

The remediation of OU-P is complete. Response actions commenced in June 1997 and were completed in December 1997. A Response Action Plan (RAP) for the Wire Mill Pond was completed in February 1996. Fieldwork commenced in June 1997 and with the exceptions of the wetlands was completed in December 1997. A Response Action Implementation Certification Report and accompanying set of Record Drawings for the Wire Mill Pond was completed in February on 1998. The report summarized the events leading to the completion of the RA field activities, presented the "as-built" conditions, and provided certification that the remedy was executed as prescribed in the RAP and specific MPCA approval correspondence.

The remedial alternative consisted of the following components:

- Modification of watershed drainage patterns
- Cleaning and plugging the 84-inch storm sewer
- Temporary diversion of stormwater flows
- Temporary barrier at the Wire Mill Pond outlet
- Gross pond dewatering and temporary water treatment
- Excavation of 6487 tons of non-native material from the Wire Mill Pond
- Dewatering of excavated material
- Drying of excavated material
- Transportation and disposal of the excavated material at the Timberline Trail Recycling and Disposal Facility at Weyerhaeuser, WI
- Placement of Geotextile filter
- Backfilling Wire Mill Pond and
- Site restoration via wetlands construction

System Operations/O&M

The components and frequency of inspections are detailed in correspondence from the MPCA, dated November 6, 1996 and the RA Contingency Plan, dated May 1997. Contingency actions are also detailed in the RA Contingency Plan.

OU-P is identified in the Response Action Plan as an area of the site to be included in an annual visual inspection.

The outfall is monitored on a semi-annual basis. No significant exceedences of performance criteria have been detected to date.

OU-Q (Dredge Spoil Area)

As stated in the RI, a comparison of current aerial photographs and the 1907 topographic map of the site suggest that the Wire Mill settling basin has changed shape since 1907. The basin appears to have been formed by construction of the Burlington Northern Railroad track across a natural inlet in the estuary shoreline. The shape of the basin is essentially the same on the 1907 topographic map and in a 1953 aerial photo. The figure 31 as shown below was extracted from the RI delineates the 1907 boundary relative to

the present basin. The basin was apparently dredged and reshaped between 1953 and 1969.

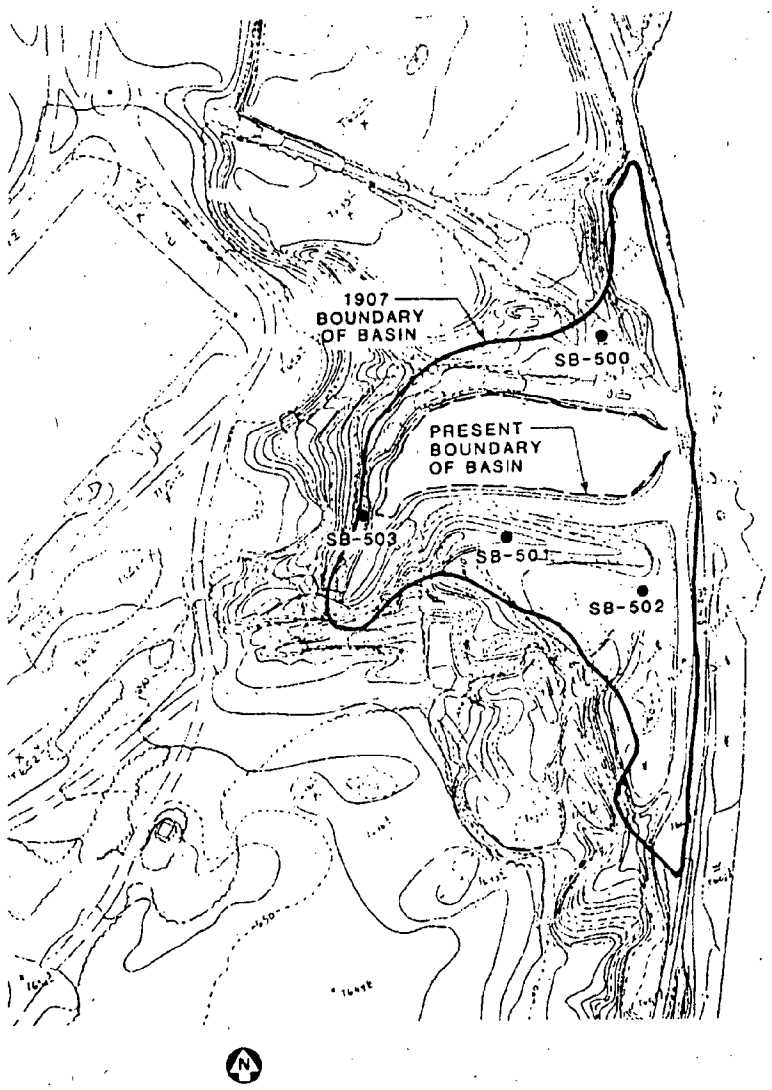


Figure 31
LIMITS OF WIRE MILL SETTLING BASIN AND SOIL BORING LOCATIONS

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The aerial photo above was taken in 1967, when the Wire Mill Pond was under construction. The 1967 plans of the Wire Mill settling basin indicated that dredged material was primarily placed to the south of the present basin limit and that some dredge material may also have been placed north of the basin. This aerial photo indicates that dredge fill on the north side appears to be more recent than the vegetated dredge fill that is located on the south side. Based upon borings done during the RI, it was estimated there could be 40,000 cubic yards on non-native material in the north pile and 19,000 cubic yards in the south pile.

Remedy Selection

The response action in the ROD for OU-Q (same remedy as for OU-P and OU-R) specified no-action subject to the completion of a PAH-treatability study to examine implementation of alternative and innovative treatment technologies. No action includes periodic inspections to verify that no significant changes have occurred and routine water quality monitoring to verify the long-term effectiveness of the response actions for these and other operable units. Appropriate institutional controls shall be implemented to minimize future disturbance of these units.

Remedy Implementation

The remediation of OU-Q was completed as required by the ROD. The ROD designates the no action alternative which includes routine inspections to verify that significant erosion has not occurred and water quality monitoring to verify the long-term effectiveness of the no action response action for this and other operable units. This no

action response was subject to the completion of the PAH treatability study (completed and approved June 1990) examining implementation of alternative and innovative treatment technologies. The no action alternative also requires implementation of appropriate institutional controls to minimize future disturbance of the operable unit.

System Operations/O&M

The long-term monitoring requirements are delineated in the Phase II Response Action Plan - USS Duluth Works Site dated June 1993. OU-Q is identified in the Response Action Plan as an area of the site to be included in an annual visual inspection.

OU-R (Wire Mill Pond Delta)

The sediment in the St. Louis River estuary adjacent to the outlet of the Wire Mill, Settling basin was investigated during the RI. Non-native material was found in the sediments consisting of mill scale and PAH's. The non-native materials were found to be up to seven feet in thickness. The contaminant plume can be viewed in the 1967 aerial photos on the Wire Mill Pond shown above and below.

As with OU-N, OU-R is currently being evaluated as a component of a sediment investigation. Protectiveness determinations will not be developed for OU-N and R during this 5-year review.

Remedy Selection

The response action in the ROD for OU-R (same remedy as for OU-P and OU-Q) was originally specified to be no-action. However, post-ROD sampling of estuary sediments showed that sediments were being re-worked by wave and storm events, resulting in a continuing source on contaminants to the St. Louis River.

Remedy Implementation

USS agreed to address the non-native sediments in both the Unnamed Creek and Wire Mill Pond estuaries. A Focused Feasibility Study (FFS) was submitted to the MPCA in July 1998. It was found that more information was required to determine extent and magnitude of contaminated sediments. In March 2002, a laser- induced florescence tool was used to survey sediments for coal tar. Additional chemical verification will follow with development of the Risk Assessment Work Plan.

System Operations/O&M

The long-term monitoring requirements are delineated in the Phase II Response Action Plan - USS Duluth Works Site dated June 1993. OU-R is identified in the Response Action Plan as an area of the site to be included in an annual visual inspection.

ADDITIONAL COMPONENTS NOT IDENTIFIED BY AN OPERABLE UNIT

Tar and Tar Contaminated Soil in the Coke Plant Settling Basin Located between (but not included in) Operable Units I and J

Remedy Selection

The response action in the ROD stated that this contaminated material was to be excavated and used as fuel.

Remedy Implementation

No specific reference could be found in the literature review that defined the actual location of this area. Nor is there a specific reference in any of the Response Action Reports that documents the remediation of this area. However, the RI (see page 18) presented investigation results for "areas not covered by water" in the vicinity of the Coke Plant Settling basin. The RI states that there was tar encountered in locations TW-101 and TW-106 of the Coke Plant Settling Basin. The description of the Thin Wall samples can be found on pages 91 and 92 of the RI. The locations of TW-101 and TW-106 are highlighted on Figure 17 that was extracted from the RI as shown on the top of following page. TW-101 and TW-106 appear to be in the same vicinity as Area 2 were five drums containing soil and debris were removed and disposed at a hazardous waste landfill as a component of OU-H. The drum removal activities are discussed in the Final Response Action Report 1992 Coke Plant Clean-up: Materials and Management, Demolition and Restoration (Barr 1994) as part of OU-H. The location of Area 2 is highlighted on Figure 2 that was extracted from the 1994 Final Response Action Report as shown on the bottom of following page. The work activities associated with the drum removal included removal of contaminated soil. However, it could not be determined from the 1994 Final Response Action Report if any contaminated soils were removed in association with the Area 2 drum removal activity. Therefore, it was not possible to verify if the tar and tar-contaminated soils in the Coke Plant Settling Basin Located Between (but not including) OUs I and J were remediated.

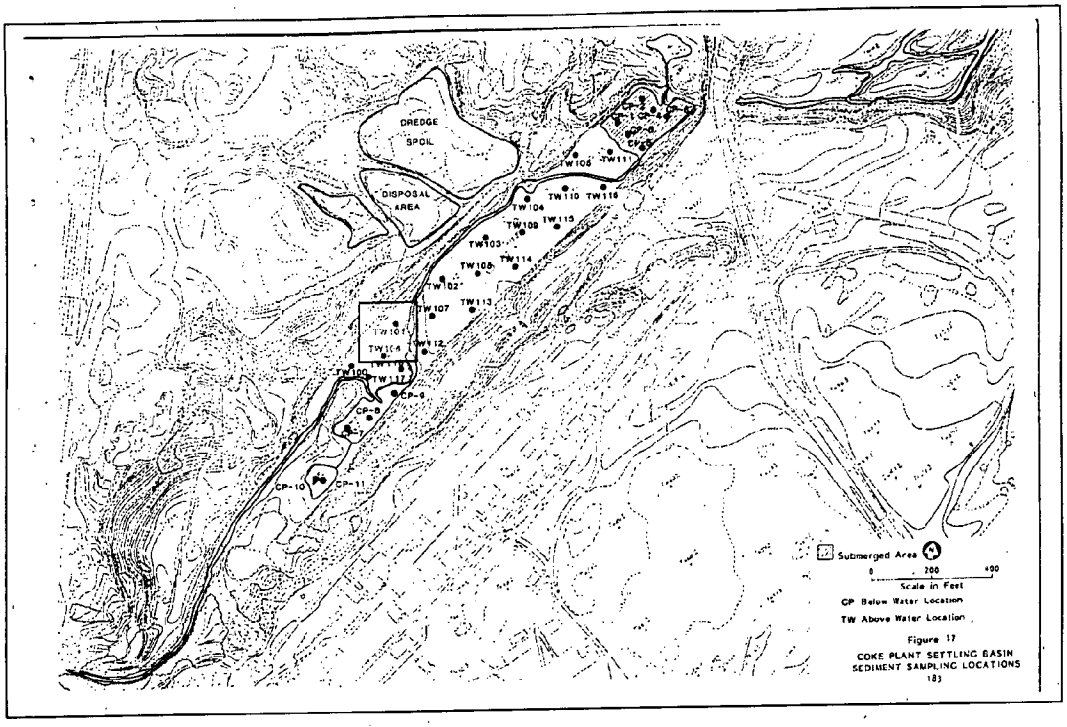

Figure 17
COKE PLANT SETTLING BASIN
SEDIMENT SAMPLING LOCATIONS
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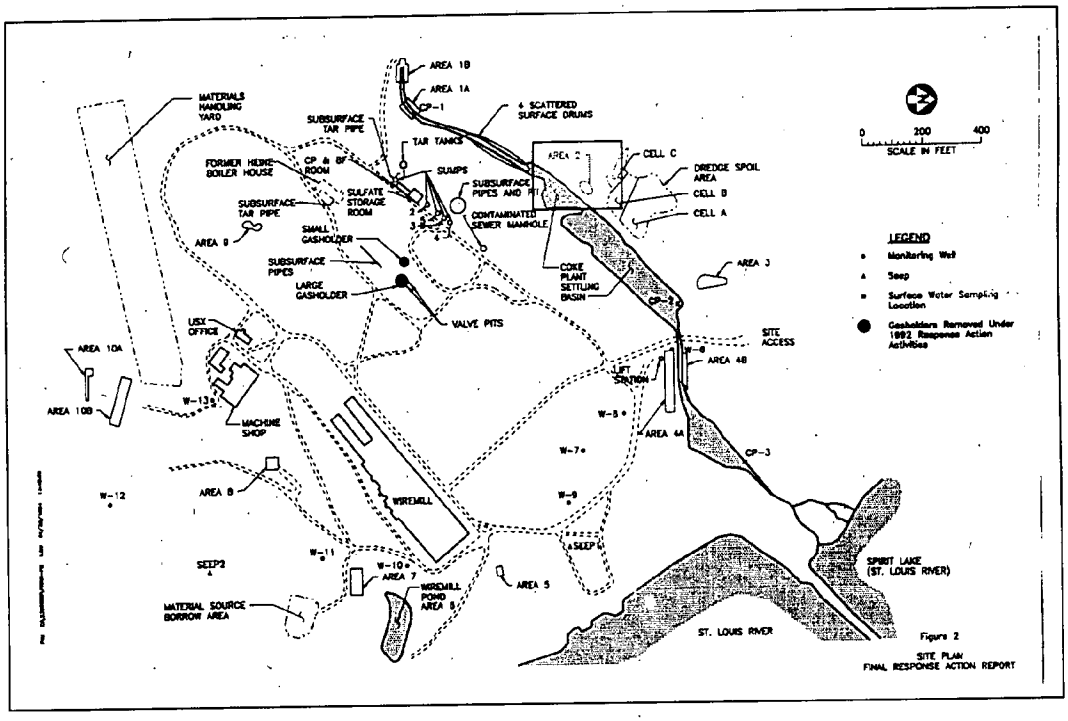


Figure 2
SITE PLAN
FINAL RESPONSE ACTION REPORT

System Operations/O&M

No specific reference could be found in the literature review that defined the actual location of this area including evidence of past operations and maintenance activities.

Soils Contaminated by Above and Below Ground Petroleum Storage Tanks

Remedy Selection

The response action for this contaminated material is excavation and thin-spreading and/or land-farming on-site.

Remedy Implementation

This remedial activity is described in the following report: "Response Action Final Report, 1988 Drum and Tank Work, Duluth Works Site," prepared for USS Corporation by Barr Engineering Co. dated 1991.

Soil samples were collected from each excavation below the tank and a headspace test was performed on each sample to determine if the soils were contaminated. The lightly contaminated petroleum based fuel oil and gasolines were decontaminated by thin-spreading on-site. Subsequent sampling and headspace testing of the soils in the thin-spread areas showed these soils were no longer contaminated.

System Operations/O&M

There is no O&M associated with this activity because the subsequent sampling and headspace testing of the soils in the thin-spread areas showed these soils were no longer contaminated.

Mercury Cleanup

Free liquid mercury was discovered on the ground below old planking at the former location of a meter storage shed located between the Coke Gas Holder and the North Boiler House. The meter shed had previously been torn down. The Mercury was detected during demolition of the North Boiler House. Twin Ports Testing, Inc. (TPT) reported the mercury spill to Mr. Steve Lee of the Minnesota Pollution Control Agency (MPCA) on May 19, 1992.

Remedy Selection

The mercury cleanup was not a component of the ROD. The goal was to remove liquid and field detectable mercury at the spill site. The MPCA asked USS to investigate and remediate after the ROD-mandated demolition of the shed revealed the mercury release. The USS agreed and hired contractors to do the work.

Remedy Implementation

The remediation of the mercury spill is complete. Approximately 40 fluid ounces of free mercury were recovered during cleanup. Cleanup was conducted in two phases. Phase I cleanup operations began on July 20, 1992. Visible liquid mercury was cleaned up with

pipettes and vacuums to the extent possible to prevent spreading of the mercury. A portable mercury vapor analyzer (Jerome 431X) was used as a tool to help detect free mercury in soil where it may not have been visible. Soil samples from the cleanup zone were field tested for mercury vapors. Soil samples were then tested in the laboratory. On the basis of laboratory analysis and field screening results, further cleanup of the soil and the concrete slab was determined to be necessary to reduce mercury vapors and remove additional soil.

Phase II Consisted of additional soil excavation. Phase II was conducted September 17, 22 and 23, 1992. A small backhoe was used to excavate soil around the north and west edges of the concrete pad. Soil was placed directly in to drums lined with polyethylene bags. Drums were sealed when filled. Approximately 15-17 cubic yards of soil was removed from the site and placed in 61 lined steel drums. Six drums of wood, tar paper, and concrete chips were also been removed. Seven additional drums of waste were generated which contain disposable personal protective equipment, polyethylene sheeting, tools, sampling and cleaning equipment. The soil and mercury waste was disposed of off-site with mercury recovery as an option.

System Operations/O&M

There is no O&M associated with the Mercury Cleanup. The cleanup was a removal action.

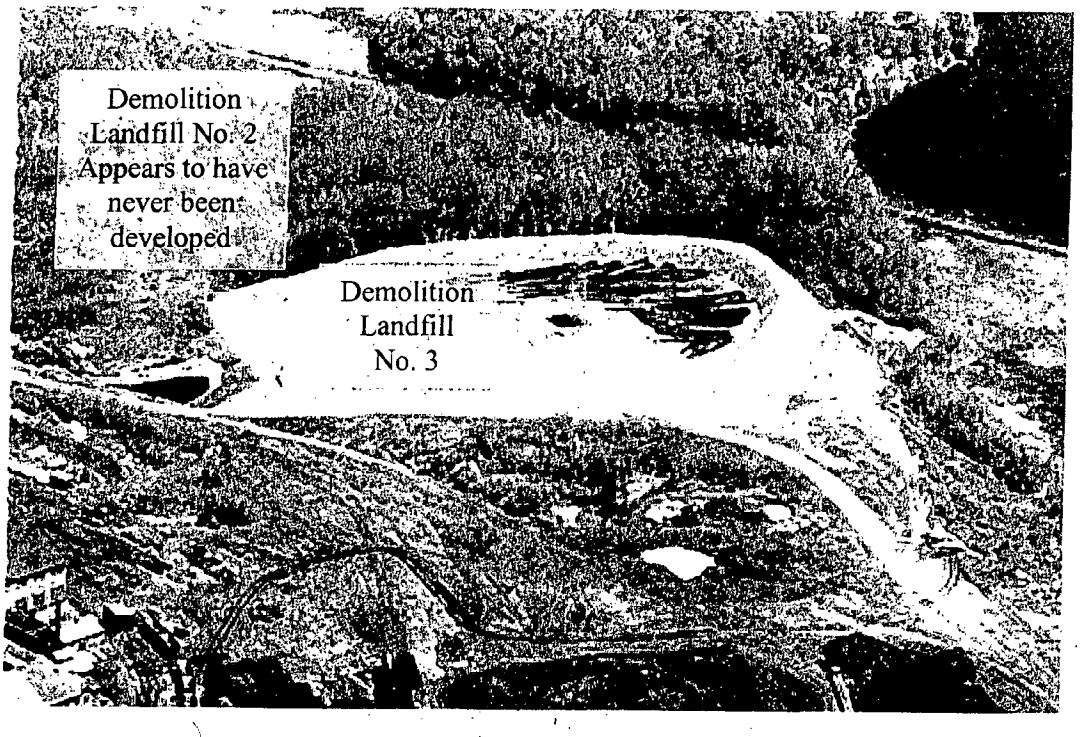
On-Site Demolition Landfills

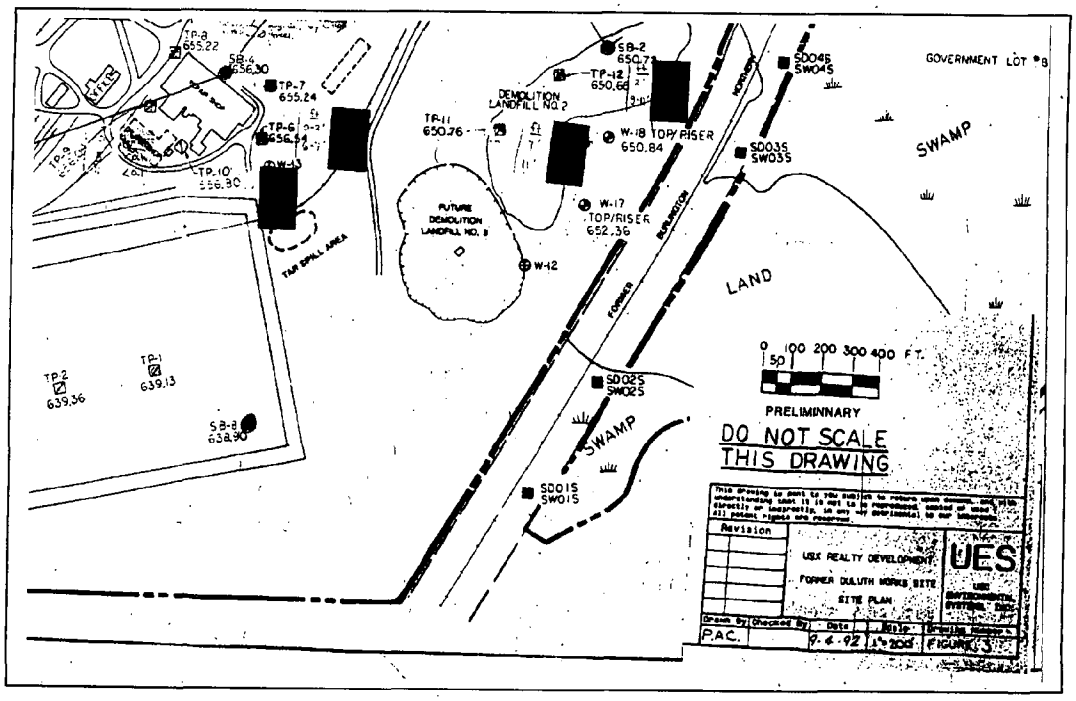
MPCA issued Permit No. SW-201 on March 27, 1979 for the construction and operation of Demolition Landfills No. 1 and No. 2 at the Duluth Works site. Demolition Landfill No. 1 was permitted to accept building masonry from the demolition of the Atlas Cement Plant. No map showing the permitted location of Demolition Landfill No. 1 could be found in the literature search.

Plant Demolition Landfill No. 2 was permitted to accept building masonry from the demolition of the steel facility (Plans Submitted Pursuant to Part IV and Part V Task A to Exhibit A Response Order by Consent). As later discussed in Section V, no evidence of landfilled materials could be seen in the area identified as Demolition Landfill No. 2. Demolition Landfills No. 2 and 3 are shown on a USS Realty Development Site Plan dated 9-4-92 (refer to the following page – partial scan of drawing). Demolition Landfill No. 3 is also shown on Figure 5 of the ROD where the area was presented as an alternative disposal location for the gas holder solids, ammonium sulfate and other items. Demolition Landfill No. 2 is shown to be located immediately northeast of the proposed Demolition Landfill No. 3. Demolition Landfills Nos. 2 and 3 can be also seen in the aerial photograph of the following page. Uncertainty regarding the location or existence of the demolition landfills remains such that a literature search is being recommended.

In August 1982, U.S. Steel submitted a permit application to the MPCA for the construction and operation of Demolition Landfill No. 3 at the Duluth Works site. In response to the application, the MPCA replied, in a letter dated October 11, 1982, that the permit could not be issued until a few concerning issues were clarified. These concerns

were due, in part, to a buried basement that contained oily waste. The material was eventually disposed of in an out-of-state facility.





IV. PROGRESS SINCE LAST REVIEW

This is the initial five-year review.

V. FIVE YEAR REVIEW PROCESS

ADMINISTRATIVE COMPONENTS

The USEPA had the lead role in executing the five year review. The USEPA contracted the Corps of Engineers – Omaha District to conduct the five year review. Potentially interested parties including MPCA, USEPA management and staff counterparts as well as USS and their consultants were notified of the start of five year review. The members of the review team included:

- USEPA RPM: Jon Peterson
- USACE PM: Teresa Reinig
- USACE Geotechnical Engineer: Don Moses (USS Lead)
- USACE Chemist: Janie Carrig
- USACE Industrial Hygienist: Kevin Siemann
- USACE Chemical Engineering Student: Kimberly Witt

Others as noted below participated in the process by either attending the inspection, providing technical support or by reviewing components of the Draft 5 Year Review Document:

- USACE 5-year Review Coordinator: Greg Mellema
- USACE Center of Expertise Risk Assessor: Anita Meyer
- USACE Center of Expertise Environmental Regulation Specialist: Sandy Frye
- MPCA SPM: Susan Johnson
- MPCA Hydrogeologist: Andrew Streitz
- MPCA Human Health Risk Assessor: Laura Solem PhD
- MPCA: Ecological Risk Assessor: Steven Hennes PhD
- MPCA Public Information officer: Anne Moore
- MDH: Toxicologist Carl Herbrandson PhD
- MDH: Hydrogeologist Virginia Yingling
- USS: Tony Nuzzo
- USS: Margaret Zak
- USS: Ron Benson
- USS Consultant: URS - Dean Stockwell

COMMUNITY NOTIFICATION AND INVOLVEMENT

Two start notifications were issued for the five year review process. MPCA issued a public notice on December 31, 2002 announcing the start of a five year review of the St. Louis River Superfund Site. The USEPA also made notice of the five year review during an informational meeting for the public that was held on May 15, 2003. This notice and meeting minutes can be found in Attachment 1.

Surveys were provided to selected members of MPCA and the public. See Attachment 2 for the survey and results.

DOCUMENT REVIEW

Documents reviewed for this five-year review are referenced in Attachment 3.

DATA REVIEW

Refer to the Technical Assessment Portion of this five-year review for more detailed information and to Attachment 3 for a list of documents reviewed.

Site Target Cleanup Levels

No Site Target Cleanup Levels (TCLs) for soil were listed in the 1989 ROD. The Site TCLs for surface water was delineated in the 1989 ROD and are shown in Table V-1 below. The TCL is the lower of WQC for fish consumption and WQC for the protection of aquatic life. The TCLs are represented as follows:

Table V-1: From Table 14 – ROD USS Duluth Works Site Target Cleanup Levels

Media	Contaminant	Target Cleanup Level (ug/L)
Surface Water	ΣcPAH	0.069
	ΣnPAH	17
	Acenaphthene	20
	Naphthalene	20.4
	Phenanthrene	1

The ROD also stated that other monitoring requirements would be developed as part of the Response Action Plan. The long-term monitoring requirements were originally delineated in the Phase II Response Action Plan - USS Duluth Works Site dated June 1993.

Since then, evaluation criteria (EC) were developed and listed in a December 6, 1996 MPCA approval letter, as amended in a February 5, 1997 MPCA letter. The criteria are based on 1) MPCA Derived Performance Limits, and 2) Federal Ambient Water Quality Criteria for protection of human health @ 1 X 10-6 cancer risk (40 CFR 181.36(b)(1) for

Class 2B waters (St. Louis River classification in this area). Long-term monitoring requirements are also presented in Response Action Contingency Plans that were developed in February 1996 for the Wire Mill Pond and in June 1997 for Operable Unit J. The contingency plans do not have procedures defined when samples are continually elevated over the evaluation criteria. The purpose of the long-term monitoring of the site is to verify that the response actions implemented at the site, including no action for selected operable units, will continue to provide adequate protection human health and the environment. Long-term monitoring consists of visually inspecting the site and by monitoring the quality of the groundwater that passes under the site, the surface water that flows across or through the site, and the St. Louis River in the vicinity of the site. The locations of the monitoring points are shown below.

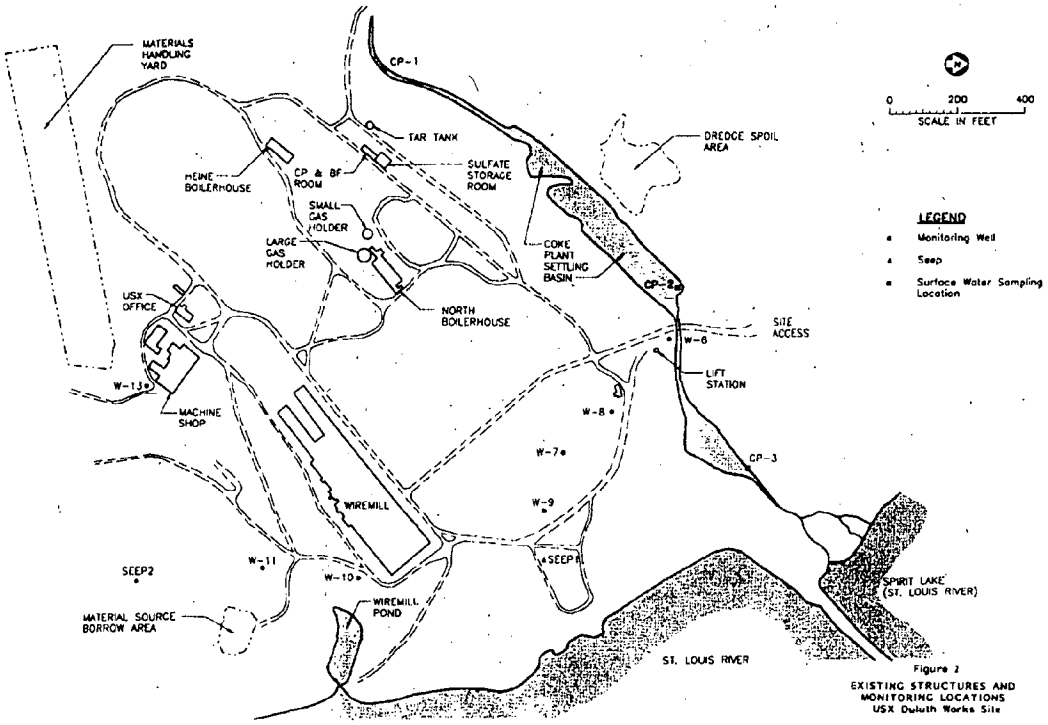


Figure 2
EXISTING STRUCTURES AND MONITORING LOCATIONS
USX Duluth Works Site

Visual Inspections

A visual inspection of the site is conducted annually. A summary of the visual inspection is included in the annual report. The intent of the visual inspections is to verify that human activity or other natural processes have not disturbed operable units, which remain at the site. The following areas of the site are included in the annual visual inspection:

- OU-I (Non-Native Material in Settling Basin)
- OU-J (Tar and Tar Contaminated Soil)
- OU-K (Dredge Spoil Material)
- OU-L (Unnamed Creek Channel)
- OU-M (Delta and Unnamed Creek Channel Area)
- OU-N (Unnamed Creek Estuary)
- OU-O (Spit of Land)
- OU-P (Wire Mill Pond)
- OU-Q (Dredge Spoil Area)
- OU-R (Wire Mill Pond Delta)

All of the past inspection reports were reviewed. The only past issue noted was the slope failure at OU-J.

Groundwater Monitoring

Groundwater at the site is monitored annually during the spring quarter at Monitoring Wells W6, W7, W8, W9, W10, W11 and W13. The annual monitoring parameters as well as the Evaluation Criteria (EC) and exceedences that have occurred since 1993 are shown in Table V-2. During 2001 and 2002, the only parameters exceeding the Evaluation Criteria were zinc and lead in wells W8 and W10. Zinc has historically been above the EC of 86 ug/L averaging approximately 100 ug/L.in W10. Cyanide has historically been found in W6 and W13. The last cyanide exceedence was in 1999. There has been essentially no PAH compounds that exceeded the Evaluation Criteria.

Wire Mill Pond and the Unnamed Creek

Surface water is sampled from the Wire Mill Pond at WM1 and along the Unnamed Creek at Creek Points CP1, CP2, CP3 and CP4. In 1999, the frequency of the surface water sampling was downsized from quarterly to twice a year. Surface water samples from locations CP1, CP2, CP3, CP 4 and WM1 are analyzed for the parameters shown in Table V-3. This table also identifies the evaluation criteria for each analyte as well as any exceedences that have occurred since 1993. OU-J was completed in 1997. OU-J is located in the Unnamed Creek valley. There were exceedences of the evaluation criteria most notably in the PAH compounds at the CP monitoring points during the years preceding and including 1998. There have been no exceedences of the evaluation criteria at any of the Unnamed Creek surface water points during the two last years.

TABLE V-2
Groundwater Analytical Exceedences
Wells 6, 7, 8, 9, 10, 11, 13

Analyte	Units	Evaluation Criteria	Year							
			1993	1994	1995	1996	1999	2000	2001	2002
Arsenic	ug/L	360								
Arsenic, Dissolved	ug/L	360								
Cadmium	ug/L	22								
Cadmiun, Dissolved	ug/L	22								
Chromium	ug/L	1297								
Chromium, Dissolved	ug/L	1297								
Lead	ug/L	51							W8 74.4	W10 72.2
Lead, Dissolved	ug/L	51								
Nickel	ug/L	1036								
Nickel, Dissolved	ug/L	1036								
Zinc	ug/L	86		W10 98	W10 91	W10 96.4	W10 101		W10 106	W10 100
Zinc, Dissolved	ug/L	86							W10 97.6	W10 189
Acenapthene	ug/L	41								
Anthracene	ug/L	0.78								
Benzo(a)anthracene	ug/L	0.31						W6 0.56		
Benzo(a)pyrene	ug/L	0.31						W6 0.75		
Benzo(b)fluoranthene	ug/L	0.31						W6 0.47		
Benzo(k)fluoranthene	ug/L	0.31						W6 0.48		
Chrysene	ug/L	0.31						W6 0.32		
Dibenzo(a,h)anthracene	ug/L	0.31								
Fluoranthene	ug/L	199								
Fluorene	ug/L	14000								
Ideno(1,2,3-cd)pyrene	ug/L	0.31						W6 0.64		
Naphthalene	ug/L	409								
Phenanthrene	ug/L	29								
Pyrene	ug/L	11000								
Cyanide, Weak & Dissociable	ug/L	22	W6 40	W6 130	W6 56 W13 93		W6 50			
PH	S.U.	NE								
Specific Conductance	Umho/cm	NE								
Dissolved Oxygen	ppm	NE								
Temperature	°C	NE								

TABLE V-3 Unnamed Creek Surface Water Analytical Exceedences
Wire Mill Pond WM1 and Creek Points CP 1-4

Analyte	Units	Eval. Criteria	Year									
			93	94	95	96	97	98	99	00	01	02
Arsenic	ug/L	360										
Cadmium	ug/L	22										
Chromium	ug/L	1297										
Chromium, hex	ug/L	16										
Copper	ug/L	12.5										
Lead	ug/L	51										
Mercury	ug/L	0.2										
Nickel	ug/L	1036										
Zinc	ug/L	86	WM1 91	CP3 120		CP1 124						
Acenapthene	ug/L	41										
Anthracene	ug/L	0.78		CP2 0.80		CP2 1.8	CP1 4.6	CP2 3.2				
Benzo(a)anthracene	ug/L	0.31			CP2 0.41	CP2 0.68 CP3 0.35	CP1 2.9	CP2 11		CP2 0.33		
Benzo(a)pyrene	ug/L	0.31				CP2 0.51	CP1 2.7	CP2 20				
Benzo(b)fluoranthene	ug/L	0.31				CP2 0.33	CP1 3.6	CP2 43				
Benzo(k)fluoranthene	ug/L	0.31				CP2 0.34	CP1 1.1	CP2 47				
Chrysene	ug/L	0.31			CP2 0.42	CP2 0.64	CP1 2.7	CP2 18				
Dibenzo(a,h)anthracene	ug/L	0.31					CP1 0.47	CP2 0.58				
Fluoranthene	ug/L	199										
Fluorene	ug/L	14000										
Ideno(1,2,3-cd)pyrene	ug/L	0.31					CP1 1.8					
Naphthalene	ug/L	409										
Phenanthrene	ug/L	29					CP1 52					
Pyrene	ug/L	11000										
Cyanide, Weak & Dissociable	ug/L	22	CP3 80	CP1 40 CP3 50	CP2 110	CP2 30 CP3 37	CP1 60 CP3 50	CP3 30	CP1 60 CP2 30 CP3 40			
Hardness	Mg/l	NE										
PH	S.U.	NE										
Specific Conductance	umho/cm	NE										
Dissolved Oxygen	ppm	NE										
Temperature	°C	NE										
Visible Sheen	V.E.	NE										
Flow Rate	V.E.	NE										

Seep 1

The water discharging from Seep 1 is currently sampled twice a year. The monitoring parameters and the corresponding Evaluation Criteria for Seep 1 is shown in Table V-4. Exceedences that have occurred since 1993 at Seep 1are also shown in the table. There were few historic exceedences at Seep 1 and none since 1999. Zinc and cyanide have been the only historic exceedences of the evaluation criteria.

TABLE V-4
Water Analytical Exceedences
Seep 1

Analyte	Units	Evaluation Criteria	Year									
			93	94	95	96	97	98	99	00	01	02
Arsenic	ug/L	360										
Cadmium	ug/L	22										
Chromium	ug/L	1297										
Chromium, hex	ug/L	16										
Copper	ug/L	12.5										
Lead	ug/L	51										
Mercury	ug/L	0.2										
Nickel	ug/L	1036										
Zinc	ug/L	86		160	130	104						
Acenapthene	ug/L	41										
Anthracene	ug/L	0.78										
Benzo(a)anthracene	ug/L	0.31										
Benzo(a)pyrene	ug/L	0.31										
Benzo(b)fluoranthene	ug/L	0.31										
Benzo(k)fluoranthene	ug/L	0.31										
Chrysene	ug/L	0.31										
Dibenzo(a,h)anthracene	ug/L	0.31										
Fluorant	ug/L	199										
Fluorene	ug/L	14000										
Ideno(1,2,3-cd)pyrene	ug/L	0.31										
Naphthalene	ug/L	409										
Phenanthrene	ug/L	29										
Pyrene	ug/L	11000										
Cyanide, Weak & Dissociable	ug/L	22		40			50		40			
Hardness	Mg/l	NE										
PH	S.U.	NE										
Specific Conductance	umho/cm	NE										
Dissolved Oxygen	ppm	NE										
Temperature	°C	NE										
Visible Sheen	V.E.	NE										
Flow Rate	V.E.	NE										

St. Louis River Sampling

In accordance with the ROD, USS monitors the water quality of the St. Louis River in the vicinity of the site. Two monitoring points are used. The upstream monitoring site, SLR1, is at the center of the St. Louis River immediately beneath the Highway 39 Bridge. The downstream location, SLR2, is located southwest of Clough Island in the center of the stream channel. These locations are sampled once annually during the spring monitoring event. The monitoring parameters and the corresponding Evaluation Criteria for the St. Louis River is shown in Table V-5. Exceedences that have occurred since 1994 in the St. Louis River are also shown in the table. There has been one historic exceedence in the St. Louis River and since 1994. Zinc measured 203 ug/l in 1999 and exceeded the evaluation criteria of 86 ug/l.

TABLE V-5
St. Louis River Water Analytical Exceedences
SLR 1&2

Analyte	Units	Evaluation Criteria	Year						
			1994	1995	1996	1999	2000	2001	2002
Arsenic	ug/L	360							
Cadmium	ug/L	22							
Chromium	ug/L	1297							
Lead	ug/L	51							
Nickel	ug/L	1036							
Zinc	ug/L	86				SLR2 203			
Acenapthene	ug/L	41							
Anthracene	ug/L	0.78							
Benzo(a)anthracene	ug/L	0.31							
Benzo(a)pyrene	ug/L	0.31							
Benzo(b)fluoranthene	ug/L	0.31							
Benzo(k)fluoranthene	ug/L	0.31							
Chrysene	ug/L	0.31							
Dibenzo(a,h)anthracene	ug/L	0.31							
Fluoranthene	ug/L	199							
Fluorene	ug/L	14000							
Ideno(1,2,3-cd)pyrene	ug/L	0.31							
Naphthalene	ug/L	409							
Phenanthrene	ug/L	29							
Pyrene	ug/L	11000							
Cyanide, Weak & Dissociable	ug/L	22							
Hardness	Mg/l	NE							
pH	S.U.	NE							
Specific Conductance	umho/cm	NE							
Dissolved Oxygen	ppm	NE							
Temperature	°C	NE							
Visible Sheen	V.E.	NE							
Flow Rate	V.E.	NE							

SITE INSPECTION

The site inspection of the U.S. Steel site took place primarily on Tuesday June 24, 2003. Some of the inspection members returned on Wednesday June 25, 2003 to survey site features using GPS technology. Several members returned on Friday to inspect a pipe of unknown origin that discharges into the railroad ditch near the southeast corner of the property. The following is a list of the participants of the site inspection (also see Attachment 4 for SI Sign in Sheets):

Jon Peterson	USEPA	(Tuesday, Wednesday, Friday)
Susan Johnson	MPCA	(Tuesday, Friday)
Andrew Streitz	MPCA	(Tuesday, Wednesday)
Ron Benson	USS	(Tuesday, Wednesday, Friday)
Dean Stockwell	URS	(Tuesday, Wednesday)
Teresa Reinig	USACE	(Tuesday, Wednesday)
Kevin Sieman	USACE	(Tuesday)
Don Moses	USACE	(Tuesday, Wednesday, Friday)
Kim Witt	USACE	(Tuesday)
Janie Carrig	USACE	(Tuesday)
Ginger Jager	USEPA	(Tuesday, Wednesday)
Steven Thrall	USEPA	(Tuesday, Wednesday)
Vilma Rivera	USEPA	(Tuesday, Wednesday)
Jeff Myers	USEPA	(Tuesday, Wednesday)
John Bing-Carr	USEPA	(Tuesday, Wednesday)
Kyle Maunu	Local Historian	(Friday)

COKE PLANT MANAGEMENT AREA

Operable Units A-H were all removal actions and thus were neither inspected nor surveyed with GPS. Furthermore, the removal actions could not be physically located with any certainty due to lack of as-built surveys.

COKE PLANT SETTLING MANAGEMENT AREA

OU-I (Non-Native Material in Settling Basin)

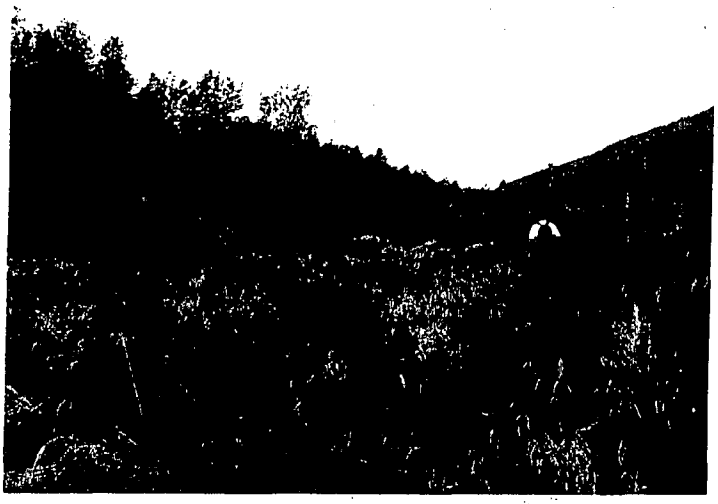
The former settling basin, which is also the Unnamed Creek, was inspected on June 24, 2003 from three different vantage points. Several inspection team members walked the Unnamed Creek for a distance of approximately 600 feet along the toe the exposed face of the former containment berm located between OU-K Cells A and B and the creek.

Several beaver dams were observed within this reach. There were no oil sheens or other visual evidence of PAHs in the creek. The former settling basin is covered with sediment and is well vegetated with wetland and terrestrial plants as viewed in the photo to the left. The vantage point of this photo is viewed looking in a northerly direction from OU-J.

The downstream end of the former settling basin at the pond was also inspected. There were no oil sheens or other visual evidence of PAHs in the pond. The vantage point of this photo is viewed looking in a westerly direction from the access road near the control structure.

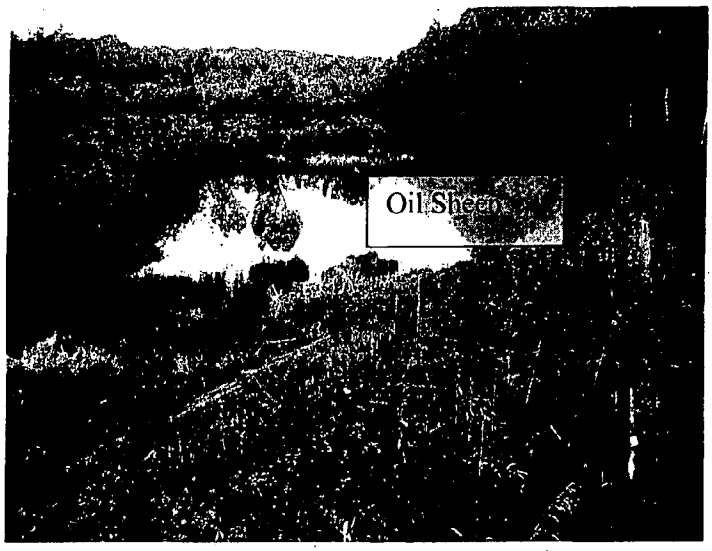
OU-J (Tar and Tar Contaminated Soil)

OU-J was inspected and delineated with GPS on June 24, 2003. The major components of OU-J include protection of the Unnamed Creek, in-situ stabilization on contaminated soil and a final cover.



The entire surface of the cover was inspected. The vegetation was found to be in excellent condition. No trees were found on the cover. There were no obvious settlement areas. The cover surface appeared to have adequate slope for to facilitate surface drainage. The vantage point of this photo is viewed looking in a northerly direction along the Unnamed Creek.

Recent movement of the steep sideslope near the near vertical gabion structure was noted. The toe drain of the cover system discharges onto the steep slope above the vertical gabion structure. Saturating the steep sideslope would contribute to the stability problem at this location. The vantage point of this photo is viewed looking in a northerly direction along the Unnamed Creek. The flow in the Unnamed Creek was unobstructed. There were no oil sheens or other visual evidence of PAHs in the creek.



An oil sheen was observed in the pond pictured on the left. The sheen was located adjacent to the toe of the cover. Floating tar balls were also noted during the inspection and continued intermittently eight weeks later. ATV tracks were observed on the northern slope of the cover. The vantage point of this photo is viewed looking in a northerly direction along the Unnamed Creek.

Pictured on the left is a close-up of the oil sheen and tar balls described above. The vantage point of this photo is viewed looking in a northeasterly direction.

OU-K (Dredge Spoil Area)

Cells A, B and C were inspected on June 24, 2003. The vegetative cover was found to be in generally good condition, and there was no non-native material observed. The vegetative cover consisted primarily of clover and grasses. Small trees were noted in several areas.

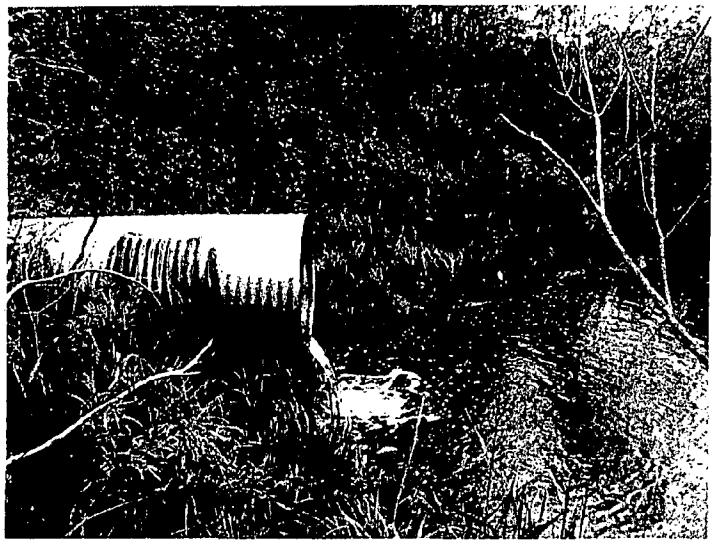
Trespassers had worn an ATV trail across the site that ran in the north - south direction. The photo on the left is viewed looking east. Note the ATV trail at the left of the picture. The tire ruts have penetrated into the cover nearly eight inches. The GPS unit is being used to define the trail. The perimeter of OU-K was defined using a GPS unit. ATV trails were also noted adjacent to the OU being to the north and west of Cell C.

The photo on the left is viewed looking north at the berm separating Cell A and the up-gradient pond. Note the erosion runnel in the center of the photo. These erosion runnels were nearly a foot deep.

A 36" corrugated metal pipe drains the up-gradient pond through Cell A into the Unnamed Creek (former Coke Plant Settling Basin). This pipe was rehabilitated with an in-situ liner in order to prevent water from leaking from the pipe into the contaminated dredge fill.

The inlet as shown in the photo on the left was found to be in good condition and free flowing. There were no oil sheens observed in the pond or water entering the culvert.

The photo is viewed looking south at the inlet of the conduit.



The outlet as shown in the photo on the left was also found to be in good condition and free flowing. There were no oil sheens observed in the discharge water or in the plunge pool.

The photo is viewed looking east or downstream along the unnamed street.

The exposed face of the former containment berm located between Cells A and B and the Unnamed Creek (former Coke Plant Settling Basin) was inspected.

The sideslope of the former berm was heavily vegetated with grasses and woody tree growth. There was no evidence of seepage, PAH's, or recent erosion or sloughing.

The photo on the left is viewed looking northeast at the berm located between Cell B and the Unnamed Creek.

OU-L (Unnamed Creek Channel)

OU-L was inspected at several locations on June 24, 2003. OU-L is the creek channel located between the control structure and the access road and the railroad tracks that parallel the St. Louis River. The response action for OU-L was no-action that included routine inspections and water quality monitoring. The overbank areas of the Unnamed Creek are heavily vegetated and hard to access in most reaches.

Pictured on the left is the downstream terminus of OU-L. The Water Monitoring Point CP-3 is located at this location. Members of the inspection team observed a small sheen near the bridge abutment. The photo on the left is viewed looking northerly or downstream relative to the parallel St. Louis River.

An oil sheen was observed west of the railroad tracks in the delta of the Unnamed Creek. The oil sheen was located adjacent to a culvert that was recently installed under the railroad tracks. New replacement ties were found in the immediate area of the oil sheens. The source of the sheens is unknown. The photo on the left is viewed looking south or upstream relative to the parallel St. Louis River. The railroad bridge shown in the previous photo can be seen in the upper left hand corner of this photo.

Close up view of the oil sheen that is described above. A second sheen was located in the delta to the north of this location. Both sheens were surveyed with GPS.

OU- M (Delta and Unnamed Creek Channel Area)

OU-M was inspected at several locations on June 24, 2003. OU-M is the creek channel and delta area that is located riverward of the railroad tracks. The response action for OU-M was no-action that included routine inspections and water quality monitoring.

The photo on the left is viewed looking north or downstream along the shoreline of the St. Louis River. At this location, there was no obvious erosion and no oil sheens or other evidence of PAH's.

OU-N (Unnamed Creek Estuary)

OU-N was inspected at several locations on June 24, 2003. OU-N is the estuary at the confluence of the Unnamed Creek with the St. Louis River. The response action for OU-N was no-action that included routine inspections and water quality monitoring. OU-N is currently under investigation as a component of the sediment evaluation.

The photo on the left is viewed looking easterly towards the St. Louis River. At this location, there was no obvious erosion and no oil sheens or other evidence of PAH's.

OU-O (Spit of Land)

OU-O was inspected at several locations on June 24, 2003. OU-0 is a narrow man made peninsula of land that extends out into the St. Louis River. The Spit of Land contains primarily coke deposits underlain by boulders and slag. The response action for OU-O was no-action that included routine inspections and water quality monitoring.

The Spit of Land was found to be in good condition. There was no shoreline erosion, oil sheens or visual evidence of PAHs. The south face (as viewed in this photo) was open to the St. Louis River. It appeared that trespassing (fishing, camping, hiking etc.) appears frequently on the Spit of Land. The path that extends from the railroad tracks to the tip of the peninsula was surveyed with GPS.

Wire Mill Settling Basin Management Area

OU-P (Wire Mill Pond)

OU-P was inspected on June 24, 2003. The Wire Mill Pond functioned as a receiving basin for storm and wastewater prior to discharge into the St. Louis River. Major components of the remedial alternative consisted of excavating contaminated material from the pond and restoring the site as a constructed wetland.

The photo on the left is view of the Wire Mill Pond looking easterly towards the St. Louis River. The wetland vegetation was well established. There was an oil sheen observed on the pond surface near the hydraulic control structure on June 27, 2003. There was no shoreline erosion or sloughing noted. The perimeter of the pond was surveyed with GPS.

OU-Q (Dredge Spoil Area)

OU-Q was inspected on June 24, 2003. The Wire Mill Settling basin dredge spoil area contains alternating layers of non-native material and native soil on the north and south sides of the basin. The response action for OU-Q was no-action that included routine inspections and water quality monitoring.

The spoil areas on both the north and south sides of the basin were inspected. Non-native materials were found exposed at the ground surface on the south side as pictured in the photo to the left. There was no exposed non-native materials found on the north pile. The north pile was well vegetated with tree and covered with soil. This south spoil pile was surveyed using GPS.

Trespassers access the site at the Wire Mill Pond area by using the city owned railroad tracks. During the short duration of the inspection, several ATVs and hikers passed by on the railroad tracks.

The drainage ditches located between the Wire Mill Pond and the north and south spoil piles were inspected. No sheens were observed in either ditch.

The west bank of the Wire Mill Pond was inspected. There was a large area of non-native material located south of the pond. The non-native material did not support vegetation. This area was surveyed using GPS. A seep was discharging from the south spoil pile into the bank of the Wire Mill Pond about three feet above the water surface.

Close up view of the seep described above. The seep had an oil sheen on it. The seep was surveyed using GPS.

OU-R (Wire Mill Pond Delta)

OU-R was inspected at several locations on Jun- 24, 2003. OU-R shallow water delta area that is located riverward of the railroad tracks where the Wire Mill Pond discharges into the St. Louis River. The response action for OU-R was originally no-action that included routine inspections and water quality monitoring. OU-R is currently under investigation as a component of the sediment evaluation.

The shoreline of the St. Louis River was inspected adjacent to the Wire Mill Pond. The photo on the right is viewed looking towards the St. Louis River from the Wire Mill Pond. The original contaminant warning sign was damaged. The replacement sign can be seen in the background of the photo.

Non-native materials were observed along the shoreline of the St. Louis River near the Wire Mill Pond. The photo on the left is a close-up view of the non-native material.

Other Clean-Up Areas

Soil in the Coke Plant Settling Basin Located Between (but not included in) Operable Units I and J

This site was a removal action and thus was neither inspected nor surveyed with GPS.

Soil Contaminated by Above and Below Ground Petroleum Storage Tanks

This site was a removal action and thus was neither inspected nor surveyed with GPS.

Mercury Clean-up

The U.S. Steel employee and consultant helped to locate the former Mercury Shed. GPS was used to define the approximate location.

Other Areas

On-site Demolition Landfills

Three different demolition landfills are referenced in the literature. The U.S. Steel employee and consultant assisted the team in the effort to locate these landfills.

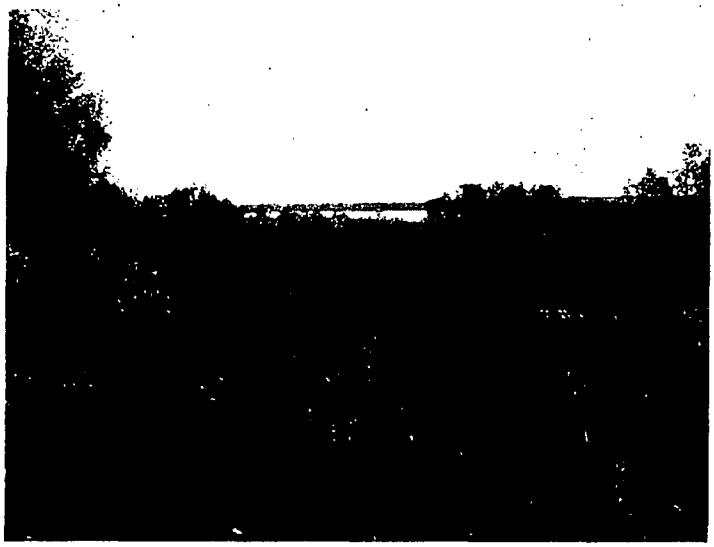
The first demolition landfill is located between the former Coke Plant and the main entrance road near the former employee parking lot. The landfill was capped with a soil cover and vegetated. There was erosion occurring on the soil cover exposing debris. This is thought to be Demolition Landfill No. 1. The footprint of the demolition debris landfill was surveyed with GPS.

A demolition stockpile of bricks was located near the northeast corner of the former Materials Storage Area. The area was not surveyed. This demolition stockpile is not Demolition Landfill Nos. 1, 2 or 3 that were previously discussed in this report. No information could be found in the literature search that indicates this demolition stockpile was ever permitted.

The third landfill was never used for the disposal of demolition materials. Demolition Landfill No. 3 is also referred to as the flue dust disposal area and as a clay-lined pond. This area also had an old buried basement in it that contained oily waste. Burning also took place at the buried basement. This landfill is located between the former Materials Storage Area and the St. Louis River being west of the railroad tracks. During the inspection, the vegetation was found to be in good condition. Wetland plants were located in east side of the site. The Demolition Landfill No. 3 was surveyed with GPS.

On-site Borrow Areas

The U.S. Steel employee and consultant helped to locate the former borrow areas. The photo on the left is the sand or random borrow area. The clay borrow area can be viewed in the upper right hand corner of this photo and is pictured below. This borrow pit is located to the south and west of the Wire Mill Pond. Both borrow areas were surveyed with GPS.



The clay borrow pit is pictured on the left. The clay borrow pit is located immediately adjacent (southwest) to the sand borrow pit. Both borrow pits had ATV tracks traversing across the areas.

Unknown Steel Pipe Outlet and Red Stained Ditch

A steel pipe of unknown origin was found in the west railroad ditch between the unused Demolition Landfill No. 3 and the St. Louis River. Post inspection research indicates this pipe may be there repaired monitoring location of Seep #2. Approximately 200 feet of ditch was stained red.

Unnamed Pond

This pond was inspected on June 27, 2003. The pond is located south of Seep 1. A citizen stated his dog fell through the ice at this pond and was coated with an oily material.

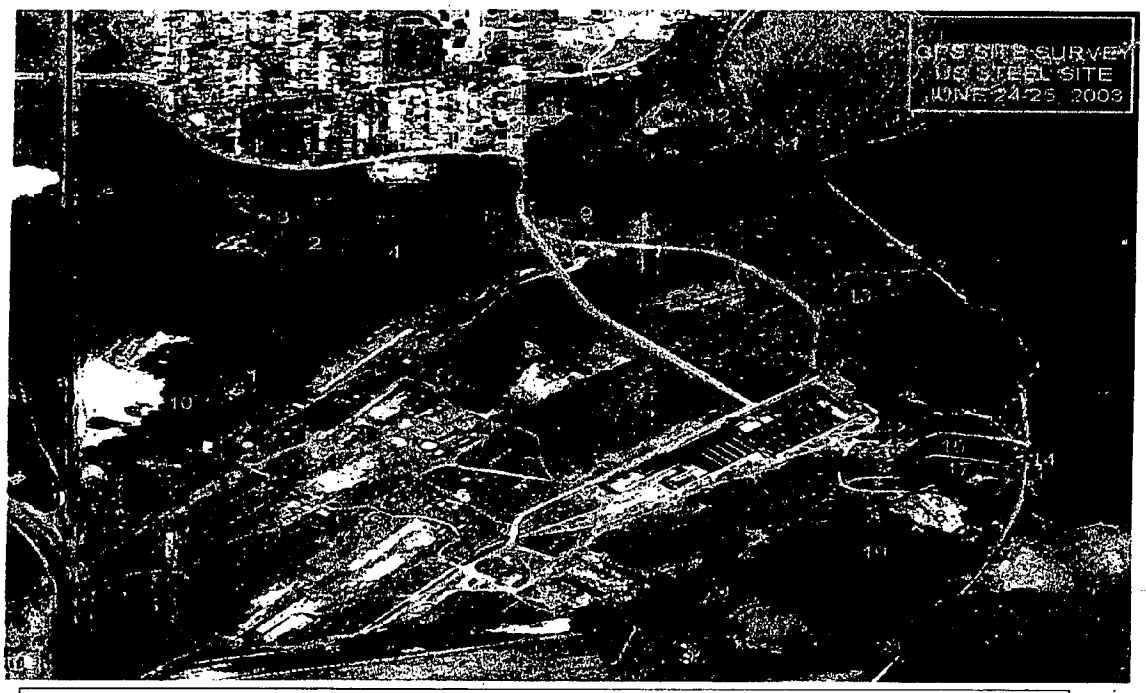
Former Gatewell Structure and Non-native Material Near Well 7

This gatewell was inspected on June 27, 2003. The gatewell is located near Well 7. There was floating product in the gatewell. The orange protective fence around the structure needs repair.

This non-native material was observed on June 27, 2003. The soil is located near Well 7.

GPS Survey Results

Certain features were surveyed using GPS technology on June 24 and 25 at the U.S. Steel Site. The results are delineated on the aerial photo shown below:



LEGEND

1. OU-J
2. OU-K
3. Inlet 36" CMP
4. Outlet 36" CMP
5. Demolition Debris Landfill
6. Foundation of Small Gas holder
7. Approximate Location Mercury Shed
8. CP-2
9. CP-4
10. CP-1
11. CP-3
12. Oil Sheens
13. Seep 1
14. WM-1
15. Wire Mill Pond
16. Exposed Non-native Materials and Oil sheen seep
17. OU-Q
18. Sand borrow Pit
19. Clay Borrow Pit
20. Unused Demolition Landfill No. 3 (Flue Ash Landfill)
21. Steel Pipe Outlet – Red Stained Ditch

INTERVIEWS

Mr. Ron Benson, of USS was present on June 24 and June 27 of the inspection. Mr. Benson was extremely helpful during the inspection. He helped with the following items:

- He located Demolition Landfill No. 1
- He located the approximate location of the Mercury Shed
- He located the approximate location of the former oil filled basement foundation at the unused Demolition Landfill No. 3. He stated that there were several residences in that area for foremen back when the only way to commute to town was by railroad.
- He located the former borrow areas for random and clay soils
- He located the brick oven demolition debris pile

Mr. Dean Stockwell with URS helped located the creek monitoring locations and other project features for the survey crew to locate.

Mr. Kyle Maunu, a local historian was interviewed. He allowed the team to scan several historic aerial photos that have been included in this report.

VI. TECHNICAL ASSESSMENT

QUESTION A: IS THE REMEDY FUNCTIONING AS INTENDED BY THE DECISION DOCUMENTS?

With one exception, the remedies identified in the ROD are functioning as intended. It was not possible to verify if the "Tar and Tar-contaminated Soils in the Coke Plant Settling Basin located between (but not including) OUs "I and J" was remediated as required by the ROD. OU-N and OU-R are currently being evaluated as a component of a sediment investigation. Protectiveness determinations are thus deferred for OU-N and R during this 5-year review.

Over the last ten years, the surface and groundwater monitoring program indicate that there were limited instances of exceedences with several of the monitoring parameters and that none of the exceedences were deemed significant in any of the annual monitoring reports. Surface and groundwater are appropriate media to monitor the effectiveness of the remedies. As discussed below, added nested monitoring wells and sediment sampling from the Unnamed Creek will be recommended to supplement the current monitoring program. The post closure accumulations of sediments that now overlie the non-native materials in the Unnamed Creek have a beneficial impact on the effectiveness of the remedies. The wetland and terrestrial vegetation that is located along the Unnamed Creek and at the Wire Mill Pond also aids in the effectiveness of the remedies. There are several maintenance issues at specific OU's that need to be addressed.

QUESTION B: ARE THE EXPOSURE ASSUMPTIONS, TOXICITY DATA, CLEANUP LEVELS, AND REMEDIAL ACTION OBJECTIVES USED AT THE TIME OF THE REMEDY SELECTION STILL VALID?

The exposure pathways of greatest concern described in the 1989 ROD are ingestion of contaminated fish and dermal contact with or ingestion of contaminated soils. These exposure pathways are still of concern, although the risk of dermal contact or ingestion of contaminated soil has been reduced through removal or covering of the most contaminated soils. Ingestion of contaminated fish remains an exposure pathway of primary concern. The ROD addresses this exposure pathway through establishment of Target Cleanup Levels (TCLs) based on Minnesota Water Quality Criteria (WQC). These TCLs are discussed further below.

The ROD established Target Cleanup Levels based on the lower of MN Class 2B Water Quality Criteria (WQC) for fish consumption or protection of aquatic life. Surface water on the site is sampled twice a year and St. Louis River sampling is conducted on an annual basis. Recent sampling results indicate that WQC are not being exceeded. Although WQC criteria have changed since the 1989 ROD, they have become less stringent. The TCLs established in the ROD remain protective of water quality.

No TCLs were established in the ROD for soils at the site. Potential To Be Considered (TBCs) have been established for soils by the MPCA since the ROD was signed. In 1999, the state of Minnesota established Soil Reference Values (SRVs) for residential, recreational and industrial land uses. These SRVs are risk based guidance values used by the MPCA in their Superfund and Voluntary Investigation and Cleanup Program. Additionally, Minnesota established generic Soil Leaching Values (SLVs) in order to be protective of ground water. A chart showing Minnesota SRVs for the above uses for the Contaminants of Concern at the U.S. Steel Site and the Tier 1 (generic) SLVs is included in Table VI-1 below:

Table VI-1
State of Minnesota Soil Reference and Soil Leaching Values

Contaminant	Residential MPCA SRV*	Recreational MPCA SRV**	Industrial MPCA SRV***	Tier 1 SLVs
ΣcPAHs	2 mg/kg B(a)P	2 mg/kg B(a)P	4 mg/kg B(a)P	1 mg/kg B(a)P
ΣnPAHs	N/A	N/A	N/A	N/A
Acenaphthalene	1200 mg/kg	1860 mg/kg	5260 mg/kg	50 mg/kg
Naphthalene	10 mg/kg	24 mg/kg	28 mg/kg	7.5 mg/kg
Phenanthrene	N/A	N/A	N/A	N/A
Anthracene	7880 mg/kg	10000 mg/kg	45400 mg/kg	942 mg/kg

* - Tier 2 Residential SRV
** - Tier 2 Recreational SRV
*** - Tier 2 Industrial SRV

The site is currently undeveloped. To date, no ecological or human health risk-based screening has been completed and approved to evaluate the protectiveness of the soil cleanup at the site. At a minimum, post remediation sampling should be conducted and compared to the MPCA SRVs listed in Table VI-1 above. Sampling results should be compared to residential, recreational, and industrial SRVs to account for current use and potential future uses of the site. This first tier (Tier 1) screening process would indicate the need, or lack thereof, for a residual risk assessment to be completed.

An ERA was conducted in May, 1996 for the sediments of the St. Louis Estuary in the vicinity of the former U.S. Steel Duluth Works. The sediments and subsequent remediation are to be addressed in the future under a separate Record of Decision. Evaluation of the 1996 Sediment ERA will not be addressed in this 5 year review.

No ARARs were identified in the ROD that require addressing in this report.

QUESTION C: HAS ANY OTHER INFORMATION COME TO LIGHT THAT COULD CALL INTO QUESTION THE PROTECTIVENESS OF THE REMEDY?

There has been no natural disaster or other development that would call into question the protectiveness of the remedy. The potential for future redevelopment at the site is a subject of current interest. As stated previously, OU-N and OU-R are currently being evaluated as a component of a sediment investigation. USS retained URS to investigate the nature and extent of non-native sediments in the St. Louis River associated with potential discharges from the Wire Mill Pond and the Unnamed Creek and to evaluate the human and ecological risks associated with the non-native sediments. This sediment investigation and risk evaluation is in progress.

SUMMARY OF TECHNICAL ASSESSMENT

Conclusions stated above were made based upon the following technical assessment. All available and relevant information was obtained and reviewed. The ROD was reviewed and compared with subsequent Response Action Plans and Reports. All of the annual monitoring reports were reviewed. The adequacy of the existing monitoring plan was also assessed. The site inspection was completed over three separate days. Participants in the inspection included the following technical specialists: Geologist, Industrial Hygienist, Chemist, Civil Engineer, Geotechnical Engineer, Surveyors, and Project and Site Managers. Site interviews were conducted. A public meeting was held in advance of the inspection. The inspection was held during the week of June 24, 2003. A draft 5-year review document was submitted for review. Reviewers of the draft 5-year review document identified the following issues that impacted the development of the Technical Assessment:

1. **Appropriateness and Adequacy of the ROD Requirement of a PAH-Treatability Study:**

The February 1989 ROD was signed with recommended Response Actions for OU-K (top dressing) and OU's – I, L-R (no-action) being conditionally approved subject to USS conducting a treatability study to examine alternative or innovative treatment technologies. On behalf of US Steel, Barr Engineering prepared a report dated June 1990 titled "A review of Alternative and Innovative Treatment Technologies for Polynuclear Aromatic Hydrocarbon (PAH) Contaminated Soil". The subject document was reviewed to determine if any changes or recommendations to the selected remedies were established. The document was a literature search of alternative and innovative technologies for the remediation of PAHs. There was no site specific PAH treatability study conducted. The report concluded that the top-dressing at OU-K and no-action at the other OUs were the best alternatives. This conclusion was based upon the lack of demonstrated treatment technologies, adverse site conditions, high cost, lack of site characterization and because of the potential for the adverse environmental impacts associated with a remedial action. The report described the suspected hydrogeology of the Unnamed Creek valley. It stated that, "Groundwater flow beneath the site discharges to the coke plant settling basin located in the northern portion of the site, the stream

channel downstream of the coke plant settling basin or the estuary, all of which create groundwater flow boundaries of three sides of the site. An upward groundwater gradient exists from the lower geologic units under the site." In hindsight, the report did little to address the natural attenuation mechanisms that have occurred to date under the no-action scenario. There have been no exceedences of the Evaluation Criteria in the surface water of the Unnamed Creek during the last several years. The water quality data as well as visual inspections indicate that there are natural attenuation mechanisms that are contributing to the success of the no-action remedies. The following features may be aiding the natural attenuation process in the operable units located in the Unnamed Creek valley:

- The non-native material was naturally capped with clean sediments (thickness and aerial extent is unknown).
- Soil flushing could be occurring as the suspected upward groundwater gradient pushes through the non-native material into the sediments and then into the Unnamed Creek.
- The sediments are probably functioning as a treatment filter based upon the following scenario:
    - Extensive wetland and terrestrial vegetation has developed in the valley. The vegetation stabilized the sediment from erosion. The plants could also be phytoremediating the PAHs. Phytoremediation is the use of plants to uptake and degrade contaminants.
    - Indigenous bacteria located in the sediments are probably degrading (biodegradation) the PAHs.
- Dilution, volatilization and photolysis are probably occurring when the PAHs enter the surface waters.

It is important to note that natural attenuation processes described above are based upon visual observation and have not been verified by analytical methods. The majority of the contaminant mass probably remains in place. Most of theses processes decrease human and environmental exposures. Some of these processes may contribute to environmental exposure pathways. The wetland and terrestrial vegetation may bioaccumulate contaminants or the biodegrade contaminants into toxic breakdown by-products. Additional monitoring is required to better define the natural attenuation processes.

2. Appropriateness and Adequacy of the Monitoring Requirements:

The following additional monitoring requirements are recommended:

- Nested wells should be co-located with the surface water sampling points in the Unnamed Creek with screens located below the non-native material, in the non-native material, and in the overlying sediment. Nested wells would monitor the upward groundwater gradient as well as contaminant movement and attenuation.

- Sediment samples should be taken from the Unnamed Creek actually in the incised creek section. Samples should be taken from the channel bed, and at a depth of 1.5 and 3 feet.
- Tissue samples should be taken vegetation that overlies the non-native materials to assure that contaminant uptake is not resulting in toxic by-products.

3. Lack of Target Clean-up Levels for Soil in the ROD:

The ROD does not identify TCLs for soils. The lack of any risk based human or ecological health screening is a data gap and this screening should be conducted in order to fully determine the long-term protectiveness of the site. At a minimum, post-remedial sampling should be conducted and the results should be compared to the SRVs and SLVs contained in Table VI-1. This comparison will determine the need, or lack thereof, for a residual risk assessment to be conducted.

VII. ISSUES

Table VII-1 Issues		
Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
1. Reuse - Reuse of the site was an issue discussed during the inspection. USEPA had their reuse contractor visit the site.	N	Y
2. Trespassing - The site appears to be in a constant state of trespass. Access to the site is occurring along the public corridor (railroad tracks) along the shoreline of the St. Louis River. Obvious uses of the site include ATV, hiking, dog walking, fishing in the St. Louis River and parties.	Y	Y
3. OU-J –		
a. New Oil Sheen – An oil sheen was noted in the pond located adjacent to the toe of the cover.	Y	Y
b. Slope Stability – Recent movement of the steep sideslope adjacent to the near vertical gabion structure was observed. The toe drain of the cover system discharges onto the steep slope above the gabion structure. Saturating the steep sideslope would contributed to the stability problem at this location.	N	Y
4. OU-K –		
a. ATV Trail - Trespassers have worn an ATV trail across the soil cover.	N	Y
b. Erosion Runnels – Erosion runnels are located on the berm separating Cell A and the up-gradient pond.	N	Y
c. Small trees were noted on the soil cover that could cause future maintenance problems and impede future inspections.	N	Y
5. OU-L Oil Sheen – Several oil sheens were observed west of the railroad tracks in the delta of the Unnamed Stream.	N	Y

6. OU-Q		
a. Uncovered Dredge Spoils – Non-native materials are exposed at the ground surface on the south and west sides of the Wire Mill Pond.	Y	Y
b. Oil Sheen – A seep with a sheen was discharging from the south spoil pile into the bank of the Wire Mill Pond about three feet above the water surface.	Y	Y
7. OU-O and R Warning Signs – The warning sign on the south side of the spit of land was damaged. The old sign in front of the Wire Mill Pond was damaged, however the replacement sign further out in the river was adequate.	N	Y
8. Demolition Landfills		
a. Demolition Landfill No. 1 – Need to confirm the location of this landfill as being located near the former Coke Plant and the main entrance road near the former employee parking lot.	N	Y
b. Demolition Landfill No. 2 – Demolition Landfill No. 2 is shown on an USS realty Development Site Plan dated 9-4-92 as being located immediately northeast of the proposed Demolition Landfill No. 3. This area walked during the site inspection and no evidence of a landfill was noted.	N	Y
c. Unused Demolition Landfill No. 3 – The diked area that was to be used as Demolition Landfill No. 3 was not thoroughly investigated during the RI or at any other time. Documented activity at this site includes an oil filled basement, flue dust disposal, buried drums and a burn area.	N	Y
9. Steel Pipe Outfall – A steel pipe of unknown origin suspected to be Seep #2 was found in the west railroad ditch between the unused Demolition Landfill No. 3 and the St. Louis River. Approximately 200 feet of the ditch was stained red.	N	Y

10. Unnamed Pond – An unnamed pond located south of Seep 1 may have non-native materials in it. A citizen stated his dog fell through the ice at this pond and was coated with and oily material.	N	Y
11. Former Gatewell Structure and Non-native Material Near Well 7 – There is floating product in the gatewell structure near Well 7. Non-native material was also observed on the ground in this area.	N	Y
12. The brick pile found located near the material handling area appears to be improperly disposed.	N	Y
13. The effectiveness of many of operable units and other clean-up areas may be impacted by future development. Institutional controls are required for these areas.	N	Y
14. The location and documentation of the remediation of the "Tar and Tar Contaminated Soil in the Coke Plant Settling Basin Located between (but not included in) Operable Units I and J" could not be verified.	Y	Y
15. No TCLs were established in the ROD for soils	N	Y
16. Appropriateness and adequacy of the current monitoring program	N	Y
17. Locations and boundaries of Operable Units and other Remedial Actions are poorly or not defined	N	Y

VIII. RECOMMENDATIONS

Table VIII-1 Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Action	Party Responsible	Oversight Agency	Milestone	Affects Protectiveness (Y/N)	
					Current	Future
1. Reuse	Soil sampling and risk based analysis required before specific reuse is allowed	Developer or USS	MPCA	N/A	N	Y
2. Trespassing	Erect warning signs at obvious access points	USS	MPCA	July 04	Y	Y
3. OU-J						
a. New Oil Sheen	Test water quality and sediment at sheen location	USS	MPCA	July 04	Y	Y
b. Slope Stability	Install slope movement markers. If movement continues, conduct slope stability analyses and prepare mitigation measures such as toe buttress or tensile support. Specifically inspect toe of drain for slope saturation during snowmelt or periods of heavy rainfall.	USS	MPCA	July 04	N	Y
4. OU-K						
a. ATV Trail	Fill in with topsoil, seed and prevent ATV access	USS	MPCA	July 04	N	Y
b. Erosion Runnels	Fill in with topsoil and seed	USS	MPCA	July 04	N	Y
c. Trees	Remove trees on cover	USS	MPCA	July 04	N	Y
5. OU-L Oil Sheen	Test water quality and sediment near surface at sheen location	USS	MPCA	July 04	N	Y
6. OU-Q						
a. Uncovered Dredge Spoils	Test exposed soils in south and west spoil piles	USS	MPCA	July 04	Y	Y
b.Oil Sheen	Test water quality and sediment at sheen location	USS	MPCA	July 04	Y	Y
7. OU-O and R Warning Signs	Repair sign on the south side of spit of land	USS	MPCA	July 04	N	Y
8. Demolition Landfills						
a. Demolition Landfill No. 1	Conduct a literature search on historic use of area, verify location and permitting	USS	MPCA	July 04	N	Y
b. Demolition Landfill No. 2	Conduct a literature search on historic use of area, verify location and permitting	USS	MPCA	July 04	N	Y

Issue	Recommendations and Follow-up Action	Party Responsible	Oversight Agency	Milestone	Affects Protectiveness (Y/N)	
					Current	Future
c. Unused Demolition Landfill No. 3	Conduct a literature search on historic use of area and sampling recommendations	USS	MPCA	July 04	N	Y
9. Steel Pipe Outfall	Verify if pipe is Seep# 2 Test water quality and sediment at sheen location	USS	MPCA	July 04	N	Y
10. Unnamed Pond	Test water quality and sediment in pond	USS	MPCA	July 04	N	Y
11. Former Gatewell Structure and Non-native Material Near Well 7	Test water quality and repair security fence at gatewell, test exposed non-native material	USS	MPCA	July 04	N	Y
12. Brick Pile Located Near Materials Handling Area	Conduct a literature search on historic use of area, verify location and document permitting	USS	MPCA	July 04	N	Y
13. Institutional Controls	Place institutional controls on site such as deed restrictions	USS	MPCA	July 05	N	Y
14. Tar and Tar Contaminated Soil in the Coke Plant Settling Basin Located between (but Not included in) Operable Units I and J	Conduct a literature search for documentation of the remedial activity. Resample as component of recommended risk assessment discussed below in item 15.	USS	MPCA	July 04	Y	Y
15. Lack of TCLs for soil in the ROD	Conduct Ecological and Human Health Risk-based Screening for Soils Clean-up	USS	MPCA	July 04	N	Y
16. Monitoring Program	Prepare a supplemental monitoring proposal that addresses nested wells, collecting plant and sediment samples in the Unnamed Creek	USS	MPCA	July 04	N	Y
17. Locations and Boundaries of Operable Units and other Remedial Actions	As a component of the Ecological and Human Health Risk-based Screening for Soils Clean-up, the locations and boundaries of the OUs and other Remedial Action should be defined. This information is required to implement institutional controls.	USS	MPCA	July 05	N	Y

IX. PROTECTIVENESS STATEMENTS

COKE PLANT MANAGEMENT AREA

OU-A (Tar and Tar Contaminated Soil)

The remedial action taken at OU-A protects human health and the environment in the short term because the removal action was completed in accordance to the ROD. However, the ROD did not establish Target Clean-up Levels for soils. In order for the remedy to be protective in the long term an ecological and human health risk-based screening should be conducted.

OU-B (Contaminated Water in Tanks and Pipelines)

The remedial action taken at OU-B was completed as required by the ROD and is protective of human health and the environment.

OU-C (Solids in Large and Small Gas Holders)

The remedial action taken at OU-C was completed as required by the ROD and is protective of human health and the environment.

OU-D (Tar and Coking by-Products in Tanks)

The remedial action taken at OU-D protects human health and the environment in the short term because the removal action was completed in accordance to the ROD. However, the ROD did not establish Target Clean-up Levels for soils. A component of this remedial action included removal of contaminated soil encountered in tank excavations. In order for the remedy to be protective in the long term an ecological and human health risk-based screening should be conducted.

OU-E (Tar and Coking By-Products in Pipelines)

The remedial action taken at OU-E protects human health and the environment in the short term because the removal action was completed in accordance to the ROD. However, the ROD did not establish Target Clean-up Levels for soils. A component of this remedial action included removal of contaminated soil encountered in the pipe excavations. In order for the remedy to be protective in the long term an ecological and human health risk-based screening should be conducted.

OU-F (PCB Liquids)

The remedial action taken at OU-F was completed as required by the ROD and is protective of human health and the environment.

OU-G (Ammonium Sulfate)

The remedial action taken at OU-G was completed as required by the ROD and is protective of human health and the environment.

OU-H (Lubricants, Paints, Solvents and Fuel Oils)

The remedial action taken at OU-H protects human health and the environment in the short term because the removal action was completed in accordance to the ROD. However, the ROD did not establish Target Clean-up Levels for soils. A component of this remedial action included excavation of contaminated soil encountered during the drum removals. In order for the remedy to be protective in the long term an ecological and human health risk-based screening should be conducted.

COKE PLANT SETTLING MANAGEMENT AREA

OU-I (Non-Native Material in Settling Basin)

OU-I is protective of human health and the environment in the short-term based upon the current restricted land use. Disruption of the existing sediment blanket and vegetation could affect long-term protectiveness. Institutional controls should be formally established in order for the remedy to be protective in the long term.

OU-J (Tar and Tar Contaminated Soil)

The remedial action taken at OU-J was completed as required by the ROD and is protective of human health and the environment in the short term. Institutional controls should be formally established in order for the remedy to be protective in the long term. The oil sheen that recently developed beyond the toe of the cap is not protective of human health and the environment in the short term and should be investigated.

OU-K (Dredge Spoil Material)

The remedial action taken at OU-K was completed as required by the ROD and is protective of human health and the environment in the short term based upon current restricted land use. Damage to the soil cover from ATV encroachment as well as the erosion runnels should be repaired to assure future long-term protectiveness. Institutional controls should be formally established in order for the remedy to be protective in the long term.

OU-L (Stream Channel)

OU-L is protective of human health and the environment in the short term based upon current restricted land use. Disrupting the existing sediment blanket and vegetation could affect long-term protectiveness. The oil sheen that recently developed should be investigated to assure future long-term protectiveness. Institutional controls should be formally established in order for the remedy to be protective in the long term.

OU-M (Delta and Stream Channel Area)

OU-M is protective of human health and the environment in the short term based upon current restricted land use. Disrupting the existing sediment blanket and vegetation could affect long-term protectiveness. Institutional controls should be formally established in order for the remedy to be protective in the long term.

OU-N (Unnamed Creek Estuary)

OU-N and OU-R are currently being evaluated as a component of a sediment investigation. Protectiveness determinations will not be developed for OU-N and R during this 5-year review.

OU-O (Spit of Land)

OU-O is protective of human health and the environment in the short term based upon existing restricted land use. Physical disruption of the spit of land would expose non-native material in the delta area. Institutional controls should be formally established in order for the remedy to be protective in the long term.

WIRE MILL SETTLING BASIN MANAGEMENT AREA

OU-P (Wire Mill Pond)

The remedial action taken at OU-P was completed as required and is protective of human health and the environment in the short term based upon existing restricted land use. Institutional controls should be formally established in order for the remedy to be protective in the long term.

OU-Q (Dredge Spoil Area)

OU-Q is not protective of human health and the environment in the short-term based upon non-native materials being exposed at the ground surface in the west and south piles. In addition, a seep with an oil sheen daylights from the west pile into the Wire Mill Pond. This seep and oil sheen should be investigated. The surface of the west and south spoil piles should be sampled and evaluated to current exposure parameters. Institutional controls should be formally established in order for the remedy to be protective in the long term.

OU-R (Wire Mill Pond Delta)

OU-N and OU-R are currently being evaluated as a component of a sediment investigation. Protectiveness determinations will not be developed for OU-N and R during this 5-year review.

OTHER CLEAN-UP AREAS

Tar and Tar Contaminated Soil in the Coke Plant Settling Basin Located between (but not included in) Operable Units I and J

The remedy at the "Tar and Tar Contaminated Soil in the Coke Plant Settling Basin Located between (but not included in) OU-J and I" is not protective. It was not possible to verify if this area was remediated as required by the ROD. Further information shall be obtained by conducting a literature search for documentation of the remedial activity and by resampling as component of recommended risk assessment. Institutional controls should be formally established in order for the remedy to be protective in the long term.

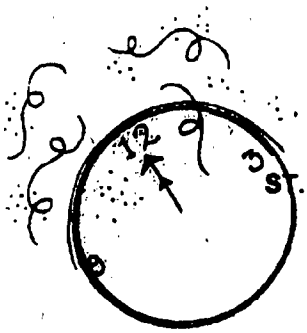
Soil Contaminated by Above and Below Ground Petroleum Storage Tanks

This remedial action protects human health and the environment in the short term because the removal action was completed in accordance to the ROD. However, the ROD did not establish Target Clean-up Levels for soils. This remedial action included excavation of contaminated soil encountered when removing the petroleum storage tanks. In order for the remedy to be protective in the long term an ecological and human health risk-based screening should be conducted.

X. NEXT REVIEW

The next review five-year review is scheduled for September 30, 2008.

Attachment 1



U.S. EPA AND MPCA

TO REVIEW

ST. LOUIS RIVER SUPERFUND SITE
DULUTH, MN

U.S. Environmental Protection Agency Region 5, and Minnesota Pollution Control Agency are starting a five-year review of the St. Louis River Superfund Site, Duluth, MN.

EPA and MPCA will hold an informational meeting at the beginning of the review process for interested members of the public to comment on the USS and Interlake facilities of the St. Louis River Superfund Site.

The informational meeting will be
6:30 to 8:30 pm, Thursday, May 15
Morgan Park Good Fellowship Community Center
1302 88th Avenue West
Duluth, MN

The objective of this five-year review is to confirm whether or not the remedies were constructed in accordance with the requirements of the record of decision and if they continue to be protective of human health and the environment.

- A Record of Decision (ROD) for the U.S. Steel Duluth Works portion of the site was signed Feb. 22, 1989, that addressed 16 operable units at the USS facility. Contaminated soil was either removed to a landfill or contained in place and monitored at the facility.
- A second ROD was signed on Sept. 28, 1990, that called for tar seeps at the Interlake portion of the site to be excavated and removed to an off-site landfill.
- A ROD was signed on Sept. 26, 1995, calling for contaminated soils at the Interlake facility to be excavated and removed.

All site documents are retained at the Duluth Public Library, West Duluth Branch, 5830 Grand Ave, Duluth, MN.

For further Information, special needs or accommodations, please contact:

Anne Moore, Public Information Officer II
Minnesota Pollution Control Agency
525 Lake Ave, Suite 400,
Duluth, MN 55802-2300
(218) 723-2356
or toll free
voice and TTY (800) 657-3864
fax: (218) 723-4727

Attachment 1

U.S. Environmental Protection Agency
St. Louis River Superfund Site
Five-Year Review Informational Meeting
Goodfellowship Club, Morgan Park
May 15, 2003

Attendees
Residents and interested others: Ron Benson, Marsha Patelke, John Smith, Angela Smith, Steven Chepelnik, Dr. Joe Balach, Tim Leland, Nancy Leland, Nancy Thompson, Jackie Morris-Rep. Oberstar's office, Dean Stockwell, Annette Trowbridge-USFWS, Marilyn Danks-MN DNR / Natural Resource Damage Assessment Trustees, Allan Beaulier, Bill Majewski, Kyle Maunu, Herb Widell, Guy Partch, Hans Wronka, J. Howard McCormick, Bill McGiffert, Debbie Isabell. Craig Lincoln, Dan Simonson, Marlene Simonson
Participating governmental agencies: Jon Peterson- USEPA; Cheryl Allen- USEPA, Greg Mellema-US Army Corps of Engineers, Teresa Reinig-US Army Corps of Engineers, Chet Wilander-MPCA Citizens' Board, Sid Mason-MPCA Citizens' Board, Dr. Daniel Foley-MPCA Citizen's Board, Susan Johnson-MPCA, Jane Mosel-MPCA, Mike Bares-MPCA, Anne Moore-MPCA

Introductions
Anne Moore-MPCA welcomed the group and asked them to introduce themselves. She introduced Cheryl Allen-USEPA, who facilitated the meeting. Jon Peterson-USEPA briefly explained that the combined US Steel / St. Louis River / Interlake / Duluth Tar Superfund site (St Louis River) was due for a five-year protectiveness review of its completed operable units' remedies.

US Steel Site Overview
Susan Johnson-MPCA explained the USEPA-labeled St Louis River Site is considered two sites by the MPCA. Each has a project manager, hydrologist, its own Responsible Party(ies) and is in a different phase of the Superfund process.

Johnson described US Steel's use of the 644 acres over its 64-year history. The site was added to the Superfund list in 1983. She noted two of the site's 16 land-based operable units, J and P, triggered this review. OUJ still contains about 20,000 yards coal tar stabilized with cement and isolated within a clay lined containment disposal area. The Wire Mill Pond, OUP, was a direct discharge outlet from the Wire Mill and site sewers. The remediated pond still contains an allowable amount of coal tar, heavy metals and mercury buried under a synthetic liner, backfilled and planted as a wetland.

Johnson explained ground water samples are taken twice annually at eight locations on land and five from surface water resources to monitor these two units. The site is now considered cleaned up to industrial-based standards as specified by the 1989 Record of Decision.

St Louis River / Interlake / Duluth Tar Overview

Jane Mosel-MPCA discussed the site's many uses over the past 100 years: iron and coking plants; water and gas plant; a horse rendering plant; and, tar and chemical plants. By products of the last-named company types were identified as responsible for the resulting contamination. The MPCA became involved in the late 1970s and placed the site on the Superfund list in 1983; responsible companies (Interlake Corporation (now XIK), AlliedSignal (now Honeywell), Domtar and Beazer East) were identified in 1991 and 1993. Contaminants of concern found at the site included tar, PAHs, VOCs, cyanide, naphthalene and heavy metals. Two land-based operable units containing tar seeps and tar-impacted soil were excavated and removed for offsite incineration in 1994 and 1997. The remaining surface is now considered "clean" to industrial-based standards.

Five-Year Review Process
Greg Mellema-US Army Corps of Engineers explained USEPA requires five-year reviews on remediated Superfund sites with remaining contamination above unrestricted use to verify the protectiveness and effectiveness of the selected remedy(ies). The US Army Corps of Engineers was hired by USEPA to help conduct this site's review.

Specifically, public input is important because they are more familiar with the site and are likely to notice any changes: vegetation discoloration, odors, broken fences protecting the public from certain areas, unusual activities at the site, and/or new uses at the site.

In addition to taking comments at the informational meeting and conducting a site visit, Corps and USEPA staff review the related MPCA and USEPA files, visit with community officials, arrange for new samples, if required, to be taken from the remediated operable units, and publishes its findings. Mellema requested meeting attendees to fill out a survey about the site and return them by June 20.

Site Redevelopment
Jon Peterson-USEPA described his meeting with City of Duluth Planning Director, Mike Conlan, and his interest in a new pilot project Jon and other USEPA managers are developing. It would offer short-term technical and marketing assistance to four USEPA Region V Superfund sites which are prime for redevelopment. He felt the St. Louis River site would be a strong candidate for inclusion; he will know more in June.

Q&A
Q: If the Record of Decision (ROD) cleans up property to a 'lack of hazard' condition for uses fitting that description, how can you increase the use / get beyond that level of cleanup?
A: The Five-Year plan offers reuse options and recommendations. Further cleanup that would be required if rezoned to a more restrictive level would be the responsibility of the developer.

Q: Who pays for the redevelopment pilot project?
A: Tools are available for redeveloping brownfields and contaminated sites from grants and city, state and federal levels.

Q: What's the cleanup level for US Steel? Could it be upgraded for a golf course?
A: It's zoned industrial, and would be cleaned up to that use standard (which is recreational).

Q: What about the material that went to Missouri from the SLRIDT site? How was it transported?
A: It had hazardous waste status and was sent via covered trucks to a licensed facility to be burned. The closest facility to Minnesota was in Missouri.

Q: What was being burned at the end of Hallett's docks?
A: Soil / dirt was burned on site in a thermal desorber at low temperatures. The ROD was changed to accommodate the 'not quite clean' dirt. It was then buried in two places (south end of 59th Avenue West and the 54th peninsula) on site with eight foot covers.

Q: Why does Hallett have a 30-foot berm?
A: It isolates industrial from residential areas. The 1988 Neighborhood plan recommended we provide something aesthetic to block the (industrial) view.

Q: Do the underground springs pose any connection to the area's risk from land-based remedies?
A: Land-based contamination can move and this will be addressed in the water portion of this review process. Land with a cap or cover over contamination does change the configuration of a site and we're not sure if it / they affect ground water.

Q: What will the ROD syllabus data say when it is finished?
A: The USS land is for sale; the city is very interested in a portion of it (it also has a brownfield grant which could be used for redevelopment). It could be a couple of years before the land is actually redeveloped.

Q: The sludge was capped at the Wire Mill Pond. Is it similar to Stryker Bay? And have you checked the mercury? You can't hide the problem.
A: Sampling mercury, as related to the land-based remedies we are discussing today, is one of the parameters analyzed when surface water samples are taken. These samples are taken on an annual basis. Several sampling locations are near the Wire Mill pond. Mercury levels have been reduced dramatically since the remedy was implemented; levels are within performance standards.

Q: What about OUP?
A: We can't do any sampling because the Five-Year review will be finished by September. The Five-Year review will determine whether there is a need to sample; if yes, the Five Year review will be amended to add sampling results.

Q: Can you check to see if the mercury moves through the cap?
A: Please put your suggestions in the survey.

Q: From Gary Glass's aerials photos we saw the Wire Mill pond was two times larger before the cleanup than the size it is now; the dredged material went into the pond. What is this dredged material? Is OUQ dredge spoils for the pond?
A: The 1989 ROD specified "no action" for this operable unit. OUJ and OUP triggered the Five-Year review but all units will be reviewed.

Attachment 1

Q: What are we doing here tonight? The (USS) site boundaries should be secure; should any observation be from outside the boundary?
A: If the ROD says so, yes. We'll accept all written comments – please put them in the survey.

Q: Can we have a meeting on site?
A: If you're interested, let us try and set one up. Put that into your survey comments.

Q: There has been controlled access in the past and photos were prohibited.
A: Both sites are private property and visitors need permission from the landowners to enter.

Q: The signs warning of wading in the water have fallen down into the water.
A: (Hallett response) Only authorized people are allowed to enter our property.
(USEPA response) Put your request in writing in the survey.

Q: If you open up the site, can you also go in other people's houses? Can you clean up the property to what land use we want?
A: Both sites will be cleaned up to industrial standards because the land is zoned industrial.

Q: Who tests (samples) and determines what to do?
A; The Responsible Party(ies) hire consultants who test samples against a standard list of parameters for metals, PAHs, low-level mercury, zinc, and cadmium. They also do ground water monitoring and send the samples to a Minnesota Department of Health-certified lab. The MPCA reviews the lab's report.

Q: Why didn't the MPCA do the Five-Year review?
A: The MPCA didn't have time to do it at the same time as doing work on the contaminated sediments. The MPCA manager wants the staff to move forward on the sediment units and not look back on the past.

Q: When will the sediments be completed?
A: At Stryker Bay, the sediments are being assessed with the Responsible Parties and a remedy should be selected by Spring 2004.

Attachment 2

Email

All:

A Five-Year Review is being conducted for the completed portions of St. Louis River Superfund Site, located in Duluth, MN., by the Corps of Engineers for EPA Region 5. It should be noted that this review is not for the sediments units at either the US Steel Site, or the St. Louis River/ Interlake/ Duluth Tar Site. Because of your current or past involvement with the site, your input is valuable to the completion of the review.

It would be greatly appreciated if you could complete the survey which is attached below. Not all questions may apply to your particular involvement, or current understanding of the site. If this is the case, a "no comment" response for those questions is completely understood. If there are others in your office who may be able to provide comments, feel free to forward the survey to those individuals as well.

Completed forms can be returned either by e-mail to me, at gregory.j.mellema@usace.army.mil or sent directly to me at the address given below. If possible, we would like to have the surveys returned by June 20, 2003.

If you have any questions, contact me anytime.

Thanks,

Greg Mellema, P.E.
US Army Corps of Engineers
CENWO-HX-G
12565 W. Center Road
Omaha, NE 68144
402-697-2658
gregory.j.mellema@usace.army.mil

Attachment 2

St. Louis River Superfund Site Five-Year Review
Comment and Information Survey

Name: Susan Johnson	Organization: MPCA
Telephone No: 218-725-7762 Fax No: 218-723-4727 E-Mail Address: susan.johnson@pca.state.mn.us	Street Address: 525 S. Lake Ave., Suite 400 City: Duluth State, Zip: MN, 55802

Comments for the:
(please check the name of the site for which these comments apply. Use a separate form for each site.)

_X US Steel Site **____ St. Louis River / Interlake / Duluth Tar Site**

1. What is your overall impression of the cleaned-up portions of this Superfund Site? (general sentiment)
My impression is that the two action units, OUJ and OUP are appropriate and adequately achieving protectiveness. OUK's remedy was not the intended remedy but may be protective for very limited uses.

Other Non-action operable units were identified early in the process and don't address all the potential problems at the site.

2. Are you aware of any community concerns regarding the site administration related to completed clean-up activities? If so, please give details.

The community is an important part of the site clean-up, particularly into the future. At one time the community wanted the EPA to take over site administration that has not been considered. The MPCA is making site decisions and informing the EPA regularly regarding progress. The EPA has been satisfied with MPCA's decisions to date.

3. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give dates, details, and outcome(s) if known.

There is regular daily trespassing on the site, I believe the community is not fully aware of the potential risk from trespassing. Fencing will not keep them out. The site is not cleaned to recreational use and that information should be more widely dispersed.

4. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?

Get the web page going!

(Form continued on next page)

St. Louis River Superfund Site Five-Year Review

Comment and Information Survey - Con't

Name: Susan Johnson

5. Are you aware of any issues that may require changes to the completed remedial actions or the decision documents?

The ROD may need to be amended since changes in the remedies at OUJ and OUP were not updated in the ROD. The MPCA will seek the EPA advice in this matter.

6. Have any problems or difficulties been encountered regarding institutional controls or deed restrictions?

There are none. This will become a priority in the next year within the MPCA.

7. Do you feel the completed remedies are functioning as expected? Why or why not?

OUJ is functioning however the drainage may need to be addressed to ensure stability.
OUP is functioning fairly well, occasional sheens have been sampled with no risk found.
OUK is functioning to a degree, the use will need to be very limited.

OUQ is the most questioned remedy with what remains of the dredge spoils.

8. Are you aware of any issues, which may call into question the site's short-term or long-term protectiveness?

We discussed those during the inspection.

9. Are you aware if there are any trends that indicate contaminant levels are increasing or decreasing?

The oil bloom on the pond next to OUJ and the sheen on OUP are a concern. Possibly the sheen on OUL.

Discovery of other areas not addressed in the ROD across the site are the biggest unknown. Testing will be required for any redevelopment.

(Form continued on next page)

St. Louis River Superfund Site Five-Year Review

Comment and Information Survey - Con't

Name: Susan Johnson

10. Is there a continuous O&M presence? Please describe staff and frequency of site inspections and activities.

Yes, USS is required to inspect the remedies at OUJ and OUP twice a year. They look for changes, integrity and overall function of the remedies. They also conduct surface water sampling and groundwater sampling a couple times a year.

11. Have there been any significant changes in O&M requirements, maintenance schedules, or sampling routines? If so, do they affect the protectiveness or effectiveness of the remedy?

Reduction in sampling from quarterly to semi-annual or annual. With the new oil bloom near OUJ, a weekly inspection will be required throughout the summer. Results will be reported to the agency.

12. Have there been unexpected O&M difficulties or costs at the site? If so, please give details.

Repair of OUJ slump. Ongoing beaver activities may jeopardize OUJ.

13. Do you have any other comments, concerns or recommendations regarding the project?

The area is not ready for reuse. An across the site gridded sampling effort has not been done at the site, therefore areas not of concern in 1983 when the site was listed could be a large concern now. The surface water criteria have also changed as well as the soil standards (though not applicable through the ROD). Any development will have to meet current soil, groundwater surface water risk based standards.

Attachment 2

St. Louis River Superfund Site Five-Year Review
Comment and Information Survey

Name: John Moeger	**Organization: Minnesota Pollution Control Agency**
Telephone No: 651-282-2383 **Fax No: 651-296-9707** **E-Mail Address: john.moeger@pca.state.mn.us**	**Street Address: 520 Lafayette Road** **City: St. Paul** **State, Zip: Minn. 55155**

Comments for the:
(please check the name of the site for which these comments apply. Use a separate form for each site.)

__X__ US Steel Site **____ St. Louis River / Interlake / Duluth Tar Site**

1. What is your overall impression of the cleaned-up portions of this Superfund Site? (general sentiment)

Satisfactory, at this time. Human health risks associated with residual contamination have been addressed. Long term environmental effects upon benthic organisms need to be assessed.

2. Are you aware of any community concerns regarding the site administration related to completed clean-up activities? If so, please give details.

Yes. The MPCA formed a community work group (CWG) in the early 90's as part of the public involvement requirements of CERCLA. This work group did not agree with the MPCA's cleanup decisions, particularly for Operable Unit J (OUJ) and the wire mill pond.

3. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give dates, details, and outcome(s) if known.

Yes. The site suffers from regular trespassing due to a public corridor along the shoreline of the St. Louis River, and adjacent to the former steel plant. This public corridor serves as a railroad for a tourist train. In addition, perimeter fencing is sometimes breached by ATV enthusiasts.

4. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?

US Steel should work with the City of Duluth and neighboring communities to turn over portions of the 640 acre site for public use/development. US Steel should pursue de-listing those portions of the site from the NPL.

(Form continued on next page)

St. Louis River Superfund Site Five-Year Review

Comment and Information Survey - Con't

Name: John Moeger

5. Are you aware of any issues that may require changes to the completed remedial actions or the decision documents?

no

6. Have any problems or difficulties been encountered regarding institutional controls or deed restrictions?

I am not sure, but there should be institutional controls (e.g. deed restrictions) on most if not all of the operable units. Contact the current MPCA project manager for more information.

7. Do you feel the completed remedies are functioning as expected? Why or why not?

Yes. When I was involved with the project, compliance monitoring rarely exceeded established surface water quality standards for the St. Louis River.

8. Are you aware of any issues, which may call into question the site's short-term or long-term protectiveness?

Yes. Sediment response actions should be seen as the ultimate indicator of the site's impacts and long term protectiveness of the river. Land-based response actions that were taken appear to be adequate; that said, the residual contamination can and should be managed appropriately through controlled land use and institutional controls.

9. Are you aware if there are any trends that indicate contaminant levels are increasing or decreasing? No

(Form continued on next page)

St. Louis River Superfund Site Five-Year Review

Comment nd Information Survey - Con't

Name: John Moeger

10. Is there a continuous O&M presence? Please describe staff and frequency of site inspections and activities.

As I have not been on the project since 2000, I can not comment.

11. Have there been any significant changes in O&M requirements, maintenance schedules, or sampling routines? If so, do they affect the protectiveness or effectiveness of the remedy? No comment

12. Have there been unexpected O&M difficulties or costs at the site? If so, please give details.

No comment

13. Do you have any other comments, concerns or recommendations regarding the project? Require US Steel to establish a substantial trust account for long term monitoring and maintenance devoted to sediment response actions.

Attachment 2

St. Louis River Superfund Site Five-Year Review
Comment and Information Survey

Name: Anne Moore	Organization: MPCA
Telephone No: (218) 723-2356 Fax No: (218) 723-4727 E-Mail Address: anne.moore@pca.state.mn.us	Street Address: 525 Lake Avenue South, Suite 400 City: Duluth State, Zip: MN 55802

Comments for the:
(please check the name of the site for which these comments apply. Use a separate form for each site.)

_x_ US Steel Site **____ St. Louis River / Interlake / Duluth Tar Site**

1. What is your overall impression of the cleaned-up portions of this Superfund Site? (general sentiment)

From the few times I've been on site, I've noticed surficial examples of contamination: "hot spots" where the snow had melted during winter (west side of units A-H); gooey material (alongside OUJ). MPCA staff are aware of these conditions. As a citizen, it's hard to understand why obvious signs of contamination remain. As an MPCA employee, I trust these conditions are not hazardous. And because the general public does not have access to any part of the site, I trust future land use will accommodate these use conditions with safety standards and reliable protection.

2. Are you aware of any community concerns regarding the site administration related to completed clean-up activities? If so, please give details.

I believe the community representatives attending our regular workgroup meetings are candid and have presented their concerns over the years. We created a list of outstanding concerns and have addressed them all. To my knowledge, the only concern remaining is the length of time it's taking to resolve the sediment remedy selection issue.

3. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give dates, details, and outcome(s) if known.

No.

4. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?

I think the team is doing the best they can.

(Form continued on next page)

St. Louis River Superfund Site Five-Year Review

Comment and Information Survey - Con't

Name: Anne Moore

5. Are you aware of any issues that may require changes to the completed remedial actions or the decision documents?

No; it's my understanding that all monitoring results have been in the acceptable ranges.

6. Have any problems or difficulties been encountered regarding institutional controls or deed restrictions?

Not that I'm aware of.

7. Do you feel the completed remedies are functioning as expected? Why or why not?

As mentioned above, if the obvious signs of contamination are acceptable within industrial standards, then I would answer "yes." It is important for future buyers / users to have adequate information about the soil / water conditions before accessing or acquiring the site.

8. Are you aware of any issues, which may call into question the site's short-term or long-term protectiveness?

No.

9. Are you aware if there are any trends that indicate contaminant levels are increasing or decreasing?

It's my understanding they are fairly constant.

(Form continued on next page)

St. Louis River Superfund Site Five-Year Review

Comment and Information Survey - Con't

Name: Anne Moore

10. Is there a continuous O&M presence? Please describe staff and frequency of site inspections and activities.

Yes. Project staff visit the site regularly (several times per year) for site visits, sampling, and verification of US Steel presence.

11. Have there been any significant changes in O&M requirements, maintenance schedules, or sampling routines? If so, do they affect the protectiveness or effectiveness of the remedy?

Not that I'm aware of.

12. Have there been unexpected O&M difficulties or costs at the site? If so, please give details.

13. Do you have any other comments, concerns or recommendations regarding the project?

I hope the Five-Year review report will help the community better understand the remedies in place and what they can expect from them in the future.

Attachment 2

St. Louis River Superfund Site Five-Year Review
Comment and Information Survey

Name: Andrew Streitz	**Organization: MN Pollution Control Agency**
Telephone No: 218.723.4929 **Fax No: 218.723.4727** **E-Mail Address: andrew.streitz@pca.state.mn.us**	**Street Address: 525 Lake Ave. South; Suite 400** **City: Duluth** **State, Zip: Minnesota 55802**

Comments for the:
(please check the name of the site for which these comments apply. Use a separate form for each site.)

___X_ US Steel Site **____ St. Louis River / Interlake / Duluth Tar Site**

1. What is your overall impression of the cleaned-up portions of this Superfund Site? (general sentiment)

The clean-up to date has been pretty well done. The RP has methodically (if slowly) taken care of most of the big problems in a responsible fashion.

2. Are you aware of any community concerns regarding the site administration related to completed clean-up activities? If so, please give details.

None

3. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give dates, details, and outcome(s) if known.

The site is in a constant state of trespass. The community considers the property to be a local green space, and uses it frequently for dog walking, dirt biking, and drinking parties. Obwells that were constructed in 1/2001 were vandalized repeatedly over the following few months before new locking caps were installed by the RP.

4. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?

No. The trespass referred to in Answer #3 has no easy solution.

(Form continued on next page)

St. Louis River Superfund Site Five-Year Review

Comment and Information Survey - Con't

Name: Andrew Streitz

5. Are you aware of any issues that may require changes to the completed remedial actions or the decision documents?

Yes. I do not believe that the remedies selected for Operable Units (OU) Q and K are protective in the long term. OUK is subject to erosion from ATV use, and to natural causes along the Steel creek banks. OUQ was labeled No Action in the ROD, which leaves piles of uninvestigated dredge spoils along the St. Louis River.

6. Have any problems or difficulties been encountered regarding institutional controls or deed restrictions?

No Comment.

7. Do you feel the completed remedies are functioning as expected? Why or why not?

Yes, with the exceptions listed under #5. Most of the OUs involved removals: buildings, mercury contaminated soils, barrels, coal tar waste in pipes and tanks, etc. Product and soils were carried offsite to landfills. OUJ and OUP were the last two big OUs to be remediated and they have met all performance criteria.

8. Are you aware of any issues, which may call into question the site's short-term or long-term protectiveness?

ROD remedies for OUL, M & O consist of natural sedimentary cover of coal tar waste. They OUs seem stable, and the growth of trees and shrubs add to their isolation, but it is possible that there are long term threats posed by these remedies.

9. Are you aware if there are any trends that indicate contaminant levels are increasing or decreasing?

PAH levels have been dropping downstream of OUJ in Steel creek in the five years following treatment of that OU. I haven't seen coal tar blooms in Steel creek in three years. There have been no exceedances in the Wire Mill Pond outfall in the last several years.

(Form continued on next page)

St. Louis River Superfund Site Five-Year Review

Comment and Information Survey - Con't

Name: Andrew Streitz

10. Is there a continuous O&M presence? Please describe staff and frequency of site inspections and activities.

The site is visited at least twice a year by the RP's consultant, to both make an inspection tour and to collect WQ samples. As Site Technical Analyst I generally visit at least 10 times a year, mostly involved with the selection of a sediment remedy. Some time from each visit is spent in a general inspection of the site.

11. Have there been any significant changes in O&M requirements, maintenance schedules, or sampling routines? If so, do they affect the protectiveness or effectiveness of the remedy?

The RP has cut back on surface water sampling events in keeping with instructions from the Agency. As WQ samples have continued to show that performance criteria are being met, the need for more frequent sampling has declined.

12. Have there been unexpected O&M difficulties or costs at the site? If so, please give details.

Two problems: OUK is suffering erosion from ATV use, and the cap may suffer physical breakthrough as a result. OUJ has suffered from its proximity to Steel creek. Beaver dams have raised the creek water level, saturating the dike and causing physical failure of the dike due to slumping. The RP has fixed the immediate problem, but the beavers will return.....

13. Do you have any other comments, concerns or recommendations regarding the project?

No.

Attachment 3

U.S. Steel Documents Reviewed

April 1981	Soul and Ground Water Investigation
February 1983	River Water Quality Impact Investigation
March 1985	Response Order by Consent
May 1985	Plans Submitted Pursuant to Part IV and Part V Task A to Exhibit A March 26, 1985 Response Order by Consent
December 1986	Remedial Investigation Final Report, US Duluth Works Site
February 1989	Record of Decision, USX Duluth Works Site
May 1989	Remedial Investigation/Response Action Implementation Final Report (Wire Mill)
June 1990	PAH Treatability Study
April 1991	Response Action Final Report 1988 Drum and Tank Work, Duluth Works Site
October 1992	Phase I Response Action Plan, Operable Units B, C, E, H & K
November 1992	Mercury Cleanup - Former Shed Location
June 1993	Phase II Response Action Plan, USX Duluth Works Site
June 1993	Response Action Report Coke Plant Cleanup and Demolition, U.S. Steel Duluth Works Site
February 1994	Final Response Action Report 1992 Coke Plant Clean-up: Materials Management, Demolition and Restoration Duluth Works Site
July 1995	Public Health Consultation Contaminated Sediments
August 1995	Recommendation Report, OU-J
November 1995	Response Action Final Report Excavation and Management of Tar Materials

February 1996	Response Action Plan, Wire Mill Pond
March 1996	Response Action Plan OU J Volume 1
March 1996	Response Action Plan OU J Volume 2
March 1996	A Superfund Fact Sheet on USX Duluth Site (March 1996)
May 1996	Human Health and Ecological Risk Assessment for the Sediments of the St. Louis Estuary in the Vicinity of the Former WSX Duluth
April 1997	Solidification/Stabilization OU J
May 1997	Monitoring, Maintenance and Contingency Plan Wire Mill Pond Response Action
June 1997	RA Contingency Plan (OU-J)
November 1997	Field Demonstration of Accelerated In Situ Biodegradation of Contaminated Sediments in Lake Superior
February 1998	Response Action Implementation Certification Report, Wire Mile Pond
February 1998	Response Action Implementation Certification Report, OU-J
January 2000	Documentation Report for Removal of Underground Coke Oven Gas Lines
September 2000	Comments on the Former Duluth Works Risk Assessment Work Plan
September 2000	Former Duluth Works Risk Assessment Work Plan
October 2000	2000 Semi-Annual Inspection, Visual Inspection: US Steel Former Duluth Works Site
May 2001	Annual Inspection Report 2000 Follow-Up, Former Duluth Works Site
December 2001	OU-J Repair Certification Report
February 2002	2001 Annual Monitoring Inspection Report
June 2002	Annual Monitoring Reports (1985-1996)

Health Assessment for U.S. Steel Duluth Works site

Miscellaneous Letters, Memos, and Articles

Quarterly & Annually Progress Reports (1997-1999)

Five-Year Review
For
US Steel Site and St. Louis River/ Interlake/ Duluth Tar Site
Task: Site Inspection

Date	Name (Please Print)	Signature	Organization	Phone Number
6-24	Jon Peterson	Jon Peterson	USEPA	312-353-6204
	Susan Johnson	Susan Johnson	MPCA	218-725-7769
	Andrew Streitz	[illegible]	MPCA	218-723-4927
	Ron Benson	Ronald A Benson	USX	218-626-1245
	Dean Stockwell	Dean Stockwell	URS	612-373-6881
	Teresa Reinig	Teresa Reinig	USACE	402-221-7461
	John Bing Cao	[illegible]	USEPA	312.886.6182
	Steven Thorsell	[illegible]	USEPA	312.886 6182
	Vilma Rivera	Vilma P. Rivera Carvajal	USEPA	312-886-7795
	Ginger Jager	Ginger Jager	USEPA	312 886 0767
	Jeff Myers	[illegible]	USEPA	[illegible]
	Keith Siemann	[illegible]	COE	402-221-7682
	Don Mayg	Don Mayg	COE	" " 3077
	Kim Witt	Kim J Witt	USACE	312-322-1587
	Janie Carrig	Janie Carrig	USACE	402-221-7754

Attachment 4

Five-Year Review
For
US Steel Site and St. Louis River/ Interlake/ Duluth Tar Site
Task: Site Inspection

Date	Name (Please Print)	Signature	Organization	Phone Number
6-25-03	Teresa Rechig	Teresa Rechig	USACE	402-221-7661
	Dean Stockwell	Dean Stockwell	URS	612-373-6881
	Ron Benson	Ronald D Benson	USX	612-626-1245
	Jon Rilleson	Jon Rilleson	USEPA	312-353-1264
	Don Mazy	Don Mazy	COE	402-221-3077
	Ginger Jager	Ginger Jager	USEPA	312 886 0767
	Steven Thrall	Steven Thrall	USEPA	312 886 0767
	Vilma Rivera	Vilma J. Rivera Cancel	USEPA	312-886-7785
	Jeff Myers	[illegible]	"	312-353-4027
	Kevin Sumann	[illegible]	COE	402-221-7682
	Greg Mellema	[illegible]	COE	402-697-2658
	John Bing Cano	John Bing Cano	USEPA	312.886.6182

VOLUME II

St. Louis River/Interlake/Duluth Tar Site
Tar Seep OU – EPA OU 01
Soil OU – EPA OU 03

Five-Year Review
First Review

September 2003

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I. SITE CHRONOLOGY

Table 1: Site Chronology	
Event	**Date**
Site Discovery when PAH contamination was detected in Stryker Embayment sediments and later surface water by MPCA.	1979
Local resident reported oil rising to the surface of Stryker Embayment.	1981
Preliminary Assessment by USEPA	1983
Site Inspection USEPA	1983
Listing on USEPA National Priorities List in combination with US Steel Site	1983
Listing on MPCA Permanent List or Priorities	1984
Remedial Investigation Completed	1990
ROD selecting Tar Seep OU (TSOU) remedy and deferring remediation of all other contamination to the Soil OU ROD is signed on October 19th.	1990
RFRA issued to three PRPs for implementation of the TSOU remedy and investigation and remediation of the Soil OU (SOU).	1991
MPCA approves RD/RAP with modifications	1992
TSOU ESD to address changes in RCRA regulations was signed.	1993
TSOU remedial action completed.	1994
On March 22 a RFRA issued to Interlake for the RI/FS and RD/RA of the SedOU.	1994
On June 20th EPA and MCPA enter into MPCA Enforcement Deferral Pilot Project.	1995
ROD selecting the remedy for soil and deferring the sediment and ground water remedy is signed.	1995
RFRA for issued to Allied, Beazer, and Domtar for the RI/RF and RD/RA of the SedOU on March 26th.	1996
Air Sparge Pilot Test for Area C-naphthalene deposit of Soil OU determined air sparging was not a viable option.	1996
Remedial Action for the SOU began	1996
SOU ESD is signed that modifies the area C-naphthalene deposit remedy from air sparging to leaving the contamination in place.	1997
SOU excavation portion of response action is completed.	1997
SOU bioventing remedial action at Maurices' parking lot is completed.	2001

II. BACKGROUND

PHYSICAL CHARACTERISTICS

General

The St. Louis River/ Interlake/ Duluth Tar Site (Site) is within the West Duluth neighborhood of the city of Duluth, on the north bank of the St. Louis River, approximately four river miles upstream of Lake Superior. The location of the Site is shown in Figure 1. The Site includes approximately 255 acres of land and river embayments, wetlands, and boat slips.

The land includes the 59th Avenue Peninsula (Hallett Peninsula), the 54th Avenue Peninsula, and is bounded on the north by the Burlington Northern right-of-way
The two peninsulas consist largely of fill material. The topography of the Site is uneven, and slopes slightly toward the St. Louis River. Portions of the Site are located within the 100-year floodplain. The Site is zoned for industrial land use.

Hallett Dock Company (Hallett) currently owns the majority of the Site and runs a bulk shipping business. Earth Burners Inc., purchased Duluth Auto, formerly an automobile salvage yard, and ran a contaminated soil thermal treatment operation. Kemp Fisheries, Moline Brothers (currently under the name of Cedar Bay Partners LLC.), and Maurices, Inc. own smaller parcels.

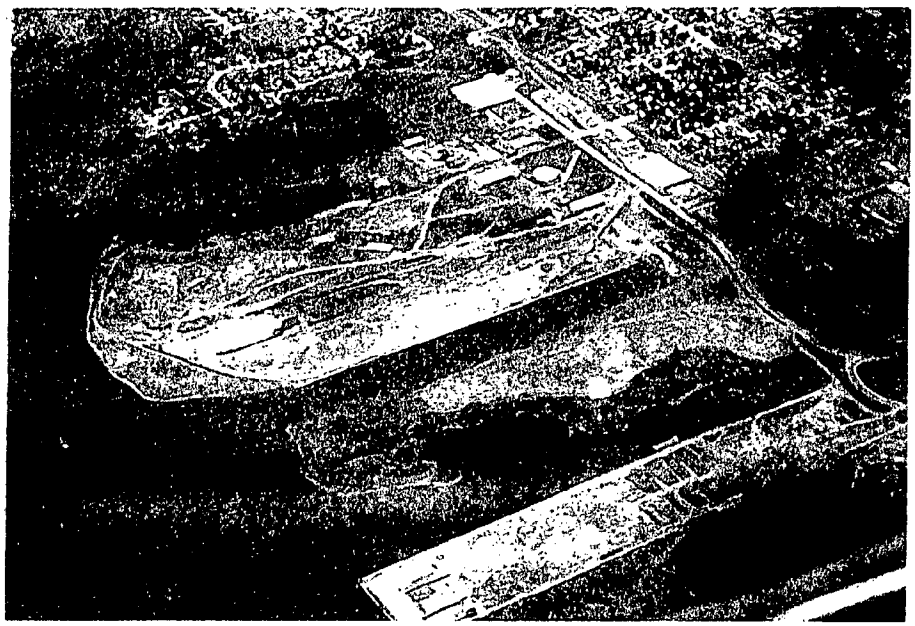
The aquatic portion of the Site includes Stryker Embayment (approximately 35 acres and defines the western boundary), Hallett Dock Boat Slip 6 (about 23 acres located in the middle of the Site), the 48 Inch Outfall Area, Keene Creek Bay/Hallett Dock Boat Slip 7 (about 27 acres and defines the eastern boundary), and St. Louis River to the south (Figure 2).

The St. Louis River and estuary is the largest tributary on the U.S. side of Lake Superior, the largest freshwater lake by area in the world, providing a wealth of natural resources. Resource management goals for the estuary are to protect, preserve, restore, and enhance natural resources, and to provide opportunities for public use for this and future generations. More specifically, natural resources managers have identified priority needs of conserving and enhancing near-shore shallow water fishery habitat, nesting and rearing habitat for shorebirds, and wetlands.

There are three geographically separated areas of concern in the river, within the Site. Stryker Embayment is a shallow water embayment with emergent wetlands at the north end. Boat Slip 6 is a shallow water and deep water environment. The 48 Inch Outfall Area and Keene Creek Bay/Boat Slip 7 are emergent wetlands and shallow water environments grading into deepwater environment. Both Slip 6 and Slip 7 are currently used for ship loading and unloading.

Site Geology

In general, the Site consists of two types of geologic areas. A portion of the Site consists of native (natural) materials which includes interbedded clay, silty clay, silty sand and sand. The area of native materials is located on the northern approximately one third of the Site north of the original St. Louis River shoreline. Areas A, B, E, and Maurices' parking lot are, for the most part, composed of native material. In general, the stratigraphy in these areas consists of an upper clay layer of varying thickness (average ten feet) that overlies a silty sand layer (approximately 15 feet thick) and a lower red clay layer that is over 150 feet thick. Both the upper and lower clay layers have a relatively low permeability, which tends to inhibit the migration of water and chemical compounds. The upper clay layer has been penetrated by building foundations and other structures, and contains fractures and silt stringers which can increase the permeability. The lower clay is a confining layer. Varying thicknesses of fill material have also been deposited upon areas of native materials north of the original shoreline. The other areas of the Site, including most of the 54th and 59th Avenue Peninsulas south of the original shoreline, consist primarily of industrial and other fill material. Slag from pig iron operations, dredge spoils, solid by-products, and wastes were used to fill. The historical progression of these filling activities is displayed in Figure 3. The current layout of the site is shown below in a June 27, 2003 photograph.

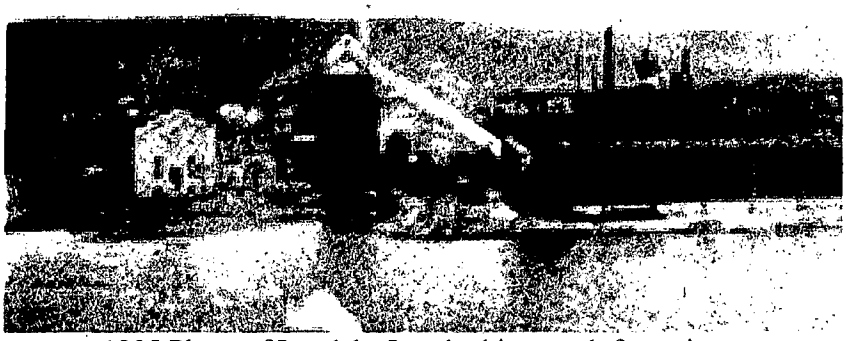


The most permeable materials present at the Site consist of the silty sand and sand layers found in the native materials. Some of the granular fill materials are also permeable. Ground water flows, under water table conditions, from the upland portions of the Site towards the embayments and the St. Louis River. Flow is generally to the south from the natural upland areas and from the center of the peninsulas radially outward where the ground water discharges to surface water of the St. Louis River. The depth to ground water varies at the Site as does the surface topography. In general, the depth to ground

water is greater in the northern portion of the Site (approximately 15 feet) and is closer to the surface in the lower areas which are near the St Louis River. Ground water occurs within the gabbroic bedrock at depths greater than 200 feet. The potentiometric surface of the bedrock ground water is estimated to be higher than the ground surface at the Site. The bedrock aquifer is isolated from the shallow unconfined ground water by the thick regional red clay present. In addition, an upward potentiometric gradient exists from the bedrock into the red clay interval.

LAND AND RESOURCE USE

The Site has been used for industrial purposes since the late 1800s. From the 1880s to the early 1960s the operations included coal tar refining, tar product manufacturing, coking and by-product recovery, iron making, and gas making.

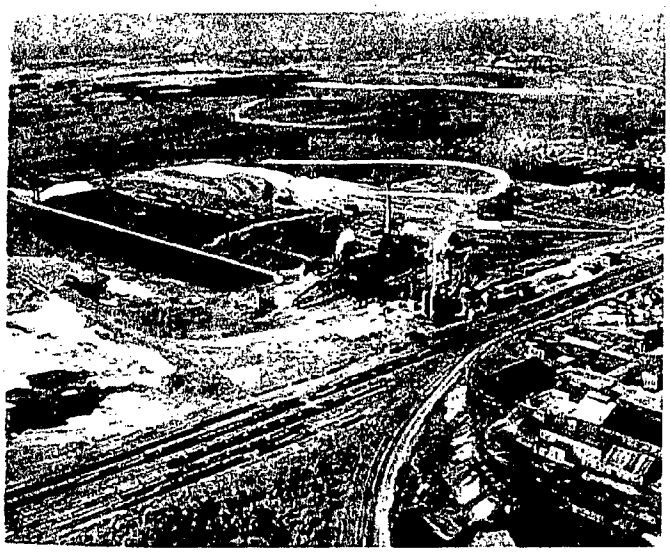


1905 Photo of Interlake Iron looking north from river.

Iron manufacturing operations were conducted from the 1880s to the early 1960s. The Zenith Furnace Company built the first coke plant and a water gas manufacturing plant in approximately 1905. This coke plant operated until approximately 1929 when the Zenith facilities were dismantled and partially removed. The Interlake Iron Company was built about this time, including a second coke plant. The Interlake Iron Co. continued to operate the coke plant and the water gas manufacturing plant until 1961. During the years of operation, filling of the river was conducted to create the land on the 59th Avenue Peninsula. Fill was also used to form the 54th Avenue Peninsula. Discharges from the coking and pig iron operations evolved the outfall pond/ditch of the Keene Creek Bay to a southerly ditch and finally to a 48-inch pipe at the southern end of the 54th Avenue peninsula. The filling activities that have since been conducted on the 54th Avenue Peninsula have covered the former pond/ditch.

Between 1961 and 1966, the site was not in use. In 1966, Hallett purchased the former Interlake portion of the Site. Since that time, the Hallett property has been used primarily for bulk storage and handling of bentonite, coal, coke and other industrial materials. Hallett currently owns most of the Site and leases certain buildings and property on the

Site to others. In the late 1970s Hallett sold a portion of the northern most part of the Site to Maurices', Inc. and in 1999 sold a portion of the Site south of Fremont St. and west of 59th Avenue to Cedar Bay Partners, LLC.



1947 photo of Interlake Iron Co.

The Duluth Tar and Chemical Company, who used the by-products of the iron companies coking operations to manufacture products such as shingles and tarpaper, operated from approximately 1920 to 1927. The company was located on the eastern portion of the site along, what was, the 1905 shoreline. During the 1930s another company, American Tar and Chemical Company, began operating a plant immediately north of the Duluth Tar and Chemical Plant. An underground pipeline directly supplied the tar plant with dehydrated coal tar from the neighboring coke plant. This area later became an automobile salvage yard that operated from 1963 until approximately 1998, when Earth Burner Inc (EBI) purchased it. EBI operated a contaminated soil thermal treatment facility until approximately 2001, when it discontinued the soil treatment operations.

A horsemeat packing plant operated from 1929 through 1975 on the western edge of the site, south of the tar company operations. The buildings on the property were destroyed by fire on February 20, 1975 and the area remains vacant.

HISTORY OF CONTAMINATION

The coking and pig iron industrial operations produced waste products. These products include coke, pig iron, coal tar, slag, sodium nitrate, and coal gas. The tar waste products included coal tar, pitch, and oils. In 1979 the Minnesota Pollution Control Agency (MPCA) staff detected the presence of polycyclic aromatic hydrocarbons (PAHs) in samples collected from Stryker Embayment sediments. Subsequent analysis of embayment surface water samples, by MPCA staff in 1980, showed the presence of PAH compounds. In 1981 a local resident reported oil rising to the surface of Stryker Embayment, apparently from the slow release of oil from the sediments.

Based on the industrial operations and waste products, distinct areas of contamination were identified. These area designations, used throughout the Site documentation, are shown in Figure2.

- Areas A and E were the location of former tar distillation operations.
- Area B includes the waste liquor settling basin, naphthalene sump, discharge sewer line structures, and surrounding soil that is associated with the iron manufacturing and waste handling.
- Area C includes the ditches, pipes, lift station, and settling pond contaminated from Interlake's waste handling. These areas contain tarry wastes and naphthalene deposits.
- Area D includes soil impacted by tarry wastes from the water gas plant and coking ovens.
- Area F contains several areas of soil contamination as a result of discharges to a crescent shaped pond and disposal of contaminated dredge spoils located near the western edge of the 59th Avenue peninsula.
- Maurices' Parking Lot is the area of visually stained soil observed during the original remedial investigation. The source of this VOC and naphthalene contamination is unknown.

INITIAL RESPONSE PRE-RECORD OF DECISION

No clean-up activities were performed prior to issuing the first ROD (for the Tar Seep OU). As part of the initial investigations, the MPCA staff identified four Responsible Parties (RPs), three of which agreed to undertake remedial actions for various portions of the Site. These include the Interlake Corporation (Interlake), Allied Signal Inc. (Allied) and Domtar Inc. (Domtar). The fourth, Beazer East Inc. (Beazer), had not cooperated. The MPCA requested the RPs to conduct remedial actions in accordance with the following Request for Response Actions (RFRAs) for the TSOU and SOU.

The March 26, 1991, RFRA was issued to Interlake, Domtar and Allied for Remedial Design/Response Action (RD/RA) of the TSOU and the Remedial Investigation/Feasibility Study (RI/FS) and RD/RA of the SOU.

The May 25, 1993, RFRA was issued to Interlake for the RI/FS and RD/RA of additional areas of the SOU and to Beazer for the RI/FS and RD/RA of the TSOU and SOU.

The 1991 and 1993, RFRAs allocate responsibility to TSOU and SOU by area. Domtar and Beazer are responsible for Area E and tar seeps on the border of Areas A and E. Allied is responsible for Area A and tar seeps on the border of Areas A and E. Interlake is responsible for Areas and sub-Areas of B, C, D, F, and Maurices' Parking Lot and the 48-Inch Outfall.

BASIS FOR TAKING ACTION

The contaminated environmental media at the site includes soil, ground water, sediment and surface water.

- Polynuclear Aromatic Hydrocarbons (PAHs) were detected in surface and subsurface soils during investigation of the peninsulas and in sediments from the embayment, boat slip, and outfall areas.
- Waste discharged from the outfall spread and hardened resulting in a tar blanket extending across a considerable area into the open waters of the St. Louis River.
- Large tar seeps were present on the 59th Avenue Peninsula in Area A, Area B near the north end of the Hallett Boat Slip, and Northern Area D.
- Black contaminated native sand and clay were present north of the peninsulas (Maurices' parking lot).
- Elevated concentrations of inorganics were identified in ground water, sediment and soil samples collected at the Site.
- Ground water contamination appeared to be localized and correlated to the contamination seen in soils in the vicinity of the monitoring wells.
- Volatile organic contaminants were detected in ground water, in outfall sediments and in the boat slip sediments.
- Floating wastes were periodically present in the open waters as a hydrocarbon sheen or solid material composed of compounds associated with coal tar wastes.

The Human Health Risk Assessment, developed in 1993 by MPCA, identified the following Contaminants of Concern (COCs): the carcinogenic polycyclic aromatic hydrocarbons (PAHs); benz[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene, chrysene, dibenzo[a,h]anthracene, and indeno[1,2,3]pyrene the noncarcinogenic PAHs; acenaphthene, anthracene, fluoranthene, fluorine, napththalene, pryrene, 2,4dimethylphenol, 2-methylphenol, 4-methylphenol, phenol, the VOCs; acetone, benzene, ethylbenzene, styrene, toluene, and xylenes, and the inorganics; cyanide and lead. Potential pathways for human exposure to site contaminants include inhalation, ingestion, and skin contact.

The Remedial Investigations indicated that PAHs were found in every sample taken at the Site (Retec 1993). Of the 278 samples collected and analyzed for Total cPAHs and EnSys field screening, 237 (85 percent), were higher that the MPCA preliminary cleanup goal of 0.8 parts per million Total cPAHs. Non-cPAH compounds were always detected in association with cPAHs. In all areas, if the preliminary cleanup goal was exceeded for any compound, it is also exceeded for Total cPAHs. VOCs were found only in association with high concentrations of PAHs.

Samples have been collected from areas of the site that have fill but no specific history of tar disposal or process operations. The fill consists of slag, silt with debris, general fill material, and maintenance debris from the current owner's operations. The cPAH concentrations of these samples ranging from detection levels to 86 parts per million are lower than areas impacted by tarry material. These concentrations may be representative of levels found throughout the industrial fill not directly associated with tar contamination.

III. REMEDIAL ACTIONS

TAR SEEPS OPERABLE UNIT (OU)

Remedial Action Objectives

The Remedial Action Objectives (RAOs), as summarized in the September 28, 1990 ROD (1990 ROD) for the TOU are:

1. Prevention of human exposure to tars via inhalation, ingestion, or direct contact routes.
2. Prevention of contaminant migration to surface water and ground water.
3. Prevention of wildlife exposure to tars.

Selected Remedy

The remedy selected to address the RAOs, as described in the 1990 ROD, was excavation of the four large tar seeps to be used as a recyclable/burnable fuel until no further tar contamination was visible. The location of the tar seeps that were to be addressed are shown on Figure 4 and described below.

- The central portion of the Hallett Peninsula immediately south of the Hallett Dock Company Office, within designated Area D;
- On the Hallett Peninsula near the northwest corner of the Hallett boat slip within designated Area B;
- On the Hallett Peninsula at the southeastern edge of Duluth Auto Wrecking, within the area designated Area A, and extending into the northern portion of A. Kemp Fisheries, within designated Area E;
- At the south end of the 54th Avenue Peninsula, at the 48-inch outfall pipe.

The excavated tar was to be transported and burned as a recyclable waste fuel (at least 10,000 BTUs per pound and containing less than 30% solids) at a coal-fired power plant, steel blast furnace, cement kiln, or similar facility. Any tar mixed with soil that was not a suitable fuel would be incinerated. It was estimated that 10% of the material could require the incineration contingency.

Remedy Implementation

The selected remedy was implemented by the responsible parties in September 1992 and completed in March 1994 (Service 1994).

- Approximately 192 tons of fuel-grade tar were removed from Areas B, D, and the 48-inch outfall pipe and burned by Missouri Fuel Recycler/Continental Cement Company of Hannibal, Missouri.
- Non-fuel grade material was separated into "clean fill" and "tar/soil mixtures". "Clean fill" for the purpose of this remedy was any material containing less than 1% tar by microscopy.
- Tanks # 1 and #2 in Area D were excavated of tar and contaminated material, scraped clean, and then backfilled with clean material brought from off-site.
- The material within the concrete tank in Area B was excavated. The tank was then cleaned and backfilled with soil treated by an off-site rotary kiln.

- None of the material excavated from Areas A and E was of sufficient quality to be used as a recyclable/burnable fuel.
- A twenty cubic yard pile of clean fill (<1% tar as defined above) was placed on the ground beside the excavation in Area D. This pile remained at this location until the summer of 1993 when it was moved during the SOU investigation. Although Area D was excavated as part of the SOU remedy, specific documentation of the removal of this pile was not located.
- The tar/soil mixtures were placed in 14 roll-off boxes. Approximately 250 tons of non-fuel grade tar/soil mixture was left on site for treatment with the Soil OU.
- Microscopy of samples from the perimeter of the 48-inch outfall pipe excavation indicated less than 1% or no detected observable tar. The non-fuel grade tarry sediments/contaminated material remaining in the vicinity of the 48-inch outfall pipe were left to be addressed as part of the Sediment Operable Unit.

System Operations/O&M

The remedy consisted of excavation and removal with off-site incineration and there is no operation or maintenance component to the remedy. The remedy has been completed as specified by the ROD.

SOIL OPERABLE UNIT (SOU)

Remedial Action Objectives (RAO)

The RAOs, as summarized in the September 27, 1995 ROD for the SOU, are to prevent current or future exposure to the contaminated soils and reduce the contaminant migration to ground water. To achieve this objective, the ROD established soil clean-up levels based on contaminant leachability to ground water and direct exposure to contaminant residue in the soil. These clean-up levels are presented in Table 2 below.

Selected Remedy

The ROD specified the following remedial actions for the SOU:

1. Excavation of tarry soils and tar impacted soils to a maximum depth of 12 feet below the ground surface or to the water table to satisfy the soil clean-up levels established in the ROD (Table 2). The excavated material will be treated by on-site thermal treatment of the tarry soils in combination with off-site landfill disposal that includes the tar-impacted soils excavated during the TSOU remediation. As an added precaution, any area where contamination is left in place below ground water and the water table is less than 8 feet below ground surface, clean fill will be added to a depth of 8 feet above the water table.
2. Structure decontamination. Structures above the water table that will be decontaminated by scraping contaminated material from the surface include but are not limited to: piping, sumps, tanks, footings, building foundations, settling basins, and lift stations.
3. Air Sparging for Area C naphthalene to remediate the entire thickness to the soil clean-up levels presented in Table 1 of the ROD (Table 2 below).

4. Bioventing for Maurices Parking Lot to achieve the soil clean-up levels in Table 2.
5. Ground water monitoring. Two rounds of monitoring will be performed prior to implementation of the soil remedy to establish a baseline to evaluate the remedy performance. The monitoring network existing at the time of the ROD and the ten new wells proposed as part of the SedOU work will be monitored in accordance with an MPCA staff approved plan on a quarterly basis.
6. Institutional Controls.
   - Zoning designation. This Site will be used for industrial development only.
   - Excavation will not occur below twelve feet or ground water which ever is most shallow. In addition, any soil removed below a depth of 3.5 feet must be placed back below 3.5 feet or disposed of in accordance with a MPCA staff approved plan.
   - Wells will not be constructed within the uppermost aquifer at the Site.

Table 2
Soil Clean-up Levels

Contaminant	Industrial Land Use [a]	Construction Worker Scenario[b]	Ground Water Protection Level
Semi-Volatile Organic Compounds (mg/kg)[c]			
Total cPAHs [d]	9 (73)	92 (270)	
Acenaphthene	7920	25030	
Anthracene	39600	125150	
Fluoranthene	5280	16690	
Fluorene	5280	16690	
Naphthalene	5280	1655	940
Pyrene	3960	12515	
2,4-Dimethylphenol [e]			
2-Methylphenol [e]			
4-Methylphenol [e]			
Phenol [e]			
Volatile Organic Compounds (mg/kg)			
Acetone [e]			
Benzene [e]			0.03
Ethylbenzene			0.06
Styrene			19
Toluene			566
Xylenes (total m,p, and o)			1103
Inorganics			
Cyanide [e]			
Lead [e]			

[a] Industrial Land Use values applied to the top 3.5 feet of soil.
[b] The Construction Worker Scenario values applied to the soil that was below 3.5 feet down to ground water or 12 feet below ground surface, whichever was shallower. The cleanup levels for the volatile contaminants were based on the protection of ground water. These values applied to the entire soil column.
[c] mg/kg = milligrams per kilogram
[d] Total carcinogenic polycyclic aromatic hydrocarbons (cPAHs) includes: Benz(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Chrysene, Dibenzo(a,h)anthracene, and Indeno(1,2,3,-cd)pyrene. The cleanup level outside of parentheses represented a 50th percentile and the value in parentheses represented a 95th percentile value. Both of these values were used to verify when remediation was complete.
[e] The MPCA Risk Assessment indicated that this contaminant did not pose a health risk at the soil concentration used in the baseline assessment. If during the course of remediation it was discovered that the soil concentrations used in the baseline assessment were not representative of the levels at the site, particularly if the levels discovered are significantly higher, a cleanup level may need to be derived.

Explanation of Significant Differences

In 1996 the Area C pilot study demonstrated that air sparging would not effectively remediate the Area C naphthalene deposit that is present below the water table. Based on this information the MPCA staff recommended that the contamination be left in place. This recommendation is consistent with the SOU ROD that allows contamination to remain in place below the water table. An Explanation of Significant Differences (ESD), dated February 10, 1997, documents this significant change from the September 1995 ROD. The ESD specified:

1. Additional ground water monitoring wells will be installed and ground water monitoring will be conducted to determine ground water and surface water impacts.
2. The contaminated area will be covered with a minimum of eight feet of clean soil above the water table to allow for future industrial development.
3. Institutional controls will be used to minimize risk to human health and the environment.

Remedy Implementation

Interlake, Domtar, and Allied excavated soil from their respective areas to meet the soil clean-up levels presented in the SOU ROD. Verification of soil excavation completeness was determined using an iterative sampling procedure from a Michigan Department of Natural Resources guidance document modified to reflect the two-layered Cleanup Levels and heterogeneous nature of the deposits. Samples were collected and analyzed from the bottom and sidewalls of the excavation. The data set for each excavation was compared to the ROD clean-up levels with final approval by the on-site MPCA inspector prior to backfilling. In Areas A and E it was also noted that the native red clay soil underlying the contaminated soil provided a visual reference to contrast the contaminated soil

Excavation of contaminated material could not be completed under existing operational structures with out damaging the structures. Therefore soil contamination above the subsurface clean-up levels remains under these structures. Contaminated material that exceeded the cleanup levels specified in the ROD, but which is either beneath the water table or deeper than 12 feet also remains in place at the Site. This information is provided in a Technical Memorandum on Residuum in Appendix A to the "Documentation of Operable Unit Completion, Soil Operable Unit, St. Louis River/Interlake/Duluth Tar Site, Duluth, MN, October 1997".

The remedial action also included the decontamination of structures that were uncovered during excavation. All structures encountered were scraped clean and when possible removed. The specifics for each area are presented below.

MPCA concurred with the remedy completions in the document, "Documentation of Operable Unit Completion, Soil Operable Unit, St. Louis River/Interlake/Duluth Tar Site, Duluth, MN, October 1997 and the addendum "Addendum to the Documentation of OU

Completion Report, Soil Operable Unit, St. Louis River/Interlake/Duluth Tar Site, Duluth, MN, December 2002.

Areas A and E

Domtar and Allied implemented the soil excavation for Areas A and E in August 1996 and completed it in January 1997. As shown in Figure 5 approximately 14,711 cubic yards of contaminated soil were excavated from a series of sixteen areas. The excavated soil was transported to the Minnesota Industrial Containment Facility in Rosemount, Minnesota for disposal.

The steel tank base from the former 860,000 gallon tank in the southeast corner of Area E and the steel in-ground vessel from the central portion of Area E were removed, scraped clean and transported to a scrap yard. The foundations and footings left in place were scraped clean. In general, piping was excavated for off-site disposal.

MPCA inspected the site on August 7, 1997 and noted three areas requiring additional work. A small gully that had formed near the toe of the re-vegetated bank of excavation area 16 was filled and stabilized. A sump in the northwest corner of the concrete pad in Area A was determined to be a safety hazard and was filled to grade with sand and gravel. A small amount, approximately one quart, of black tarry material was observed near this sump and was removed.

Areas, B, C, D, F and Maurices' Parking Lot

The Interlake Corporation implemented the selected remedies, summarized below, for Areas B, C, D, and F in May 1996 and for Maurices' Parking lot in September 1996. The soil excavation portion of the remedy was completed in August 1997 and the bioventing system remediation at Maurices' Parking Lot was completed in December 2001

Areas B, C, D, and F

Approximately 30,441 cubic yards of soil and debris were excavated and remediated from Areas B, C, D, and F.

Simultaneous to the soil remediation an Interim Response Action was implemented to remove and treat approximately 4,400 yards of contaminated sediments dredged from the north end of Slip 6. Figure 6 shows the location of the excavations and removals.

Buried drums discovered in Area C2, determined to be nonhazardous, were disposed off-site at Lake Area Landfill.

Maurices' Parking Lot

The one-half acre area of volatile organic compound soil contamination including benzene, toluene, ethylbenzene, xylene, and styrene was treated with a six-vent bioventing system. The system operated during the non-winter months until the blower failed in September 1997. The soil was sampled at this time to determine if clean-up levels had been met. The sampling demonstrated that the soil still exceeded the clean-up levels, so a new blower was installed and the system restarted in October 1997. The system continued to operate until December 2001. Soil samples collected in 2000 detected only one VOC, ethyl benzene at 1.6 mg/kg, at concentrations exceeding clean-up levels (0.06 mg/kg for ethyl benzene).

Ground water was sampled several times between August 2000 and June 2001 at two water table wells located down gradient from Maurices' Parking Lot to monitor water quality between the site and the river. None of the site contaminants have been detected in the ground water samples.

MPCA concurred that the remedial action was complete based on the decrease of all contaminants except ethyl benzene to below clean-up levels, that the low levels of contamination remaining are at depth, and ground water analysis shows no contamination was detected.

System Operations/O&M

The remedy consisted of a combination of excavation with on site thermal desorption/off-site disposal, bioventing of one area, and ground water monitoring. Currently, there are no active treatment systems or processes that require ongoing operation and maintenance at the site. However, contamination remains in place and ground water monitoring should continue to ensure the remedy is functioning as intended.

SEDIMENT OPERABLE UNIT

In accordance with the RFRAs, a Remedial Investigation (RI) and a Feasibility Study (FS) for the SedOU were completed. On November 19, 1998, the MPCA staff presented its proposed plan to the public for the cleanup of the SedOU. The plan recommended dredging the contaminated sediments and containing them in a confined disposal facility in Hallett Boat Slip 6. This remedial action was not accepted. The RPs proposed a new alternative to the MPCA, called the Wetland Cap (Cap). However, this alternative had not gone through the Superfund evaluation and public review process. Therefore, the MPCA, Companies, Trustees and interested parties have been working together to evaluate the data and to develop a remedial alternative option for the cleanup of contaminated sediments at the Site. Based on their work together the following schedule has been developed:

Date	Document/Action
October 1, 2003	Feasibility Study
November 1, 2003	Proposed Plan
	Public Comment Period
January 15, 2003	Record of Decision
April 1, 2004	Remedial Action Work Plan
May 1, 2004	Remedy Implementation

IV. PROGRESS SINCE LAST REVIEW

This is the first Five-Year Review for the site.

V. FIVE-YEAR REVIEW PROCESS

ADMINISTRATIVE COMPONENTS

The USEPA had the lead role in executing the five-year review. The USEPA contracted the Corps of Engineers – Omaha District to conduct the five-year review. Potentially interested parties including MPCA, USEPA management and staff counterparts as well as the RPs, the PRP consultants, and the current landowners were notified of the start of five-year review. The members of the review team included:

- USEPA RPM: Mr. Jon Peterson
- USACE PM: Teresa Reinig
- USACE Chemist: Janie Carrig (SLRIDT Lead)
- USACE Geotechnical Engineer: Don Moses
- USACE Industrial Hygienist/Risk Assessor: Kevin Siemann
- USACE Student: Kimberly Witt

Other site visit participants, reviewers, or technical support included:

- USACE Five-Year Review Coordinator: Greg Mellema
- MPCA SPM: Ms. Jane Mosel
- MPCA Hydrogeologist: Mr. Mike Bares
- MPCA Public Information officer: Ms Anne Moore
- MPCA Student: Crystal Gilbertson
- MPCA Student: Alex Hokenson
- Brenda Winkler: Former MPCA SPM for SLRIDT
- Consultant: Service Environmental Consulting - Mr. Michael Costello
- Consultant: ENSR - Peter Moore
- MPCA Human Health Risk Assessor: Laura Solem
- MDH Hydrogeologist: Virginia Yingling
- MDH Toxicologist: Carl Herbrandson PhD
- MPCA Ecological Risk Assessor: Mr. Steven Hennes

A review schedule, which addressed the following components of the five-year review, was developed for April through October 2003:

Community Involvement,
Document Review,
Data Review,
Interviews,
Site Inspection,
Five-Year Review Report Development and
Five-Year Review Report Reviews.

COMMUNITY NOTIFICATION AND INVOLVEMENT

MPCA issued a public notice announcing the start of a five-year review of the St. Louis River Superfund Site. The notice also announced an informational meeting for the public that was held on May 15, 2003. This notice and meeting minutes can be found in Attachment 1.

Surveys were provided to selected members of MPCA and the public; see Attachment 2 for email and survey results.

DOCUMENT REVIEW

Documents reviewed for this five-year review are referenced in Attachment 3.

DATA REVIEW

The summarized data and laboratory reports, as available, were reviewed from the *TSOU Final Remedial Action Report, Documentation of OU Completion*, Service, February 1994, the *Final Implementation and Completion Report Interlake Portion of the Soil OU Response Action*, Service, 1997 and the *Remedial Action Implementation Report Soil Operable Unit, Areas A and E*, ENSR, 1997.

Ground water data from the *Draft Data Gap Report, St. Louis River/Interlake/Duluth Tar Site,* Service, November 2002 was reviewed to establish approximate ground water contaminant concentrations. Refer to Attachment 3 for a complete list of all documents reviewed.

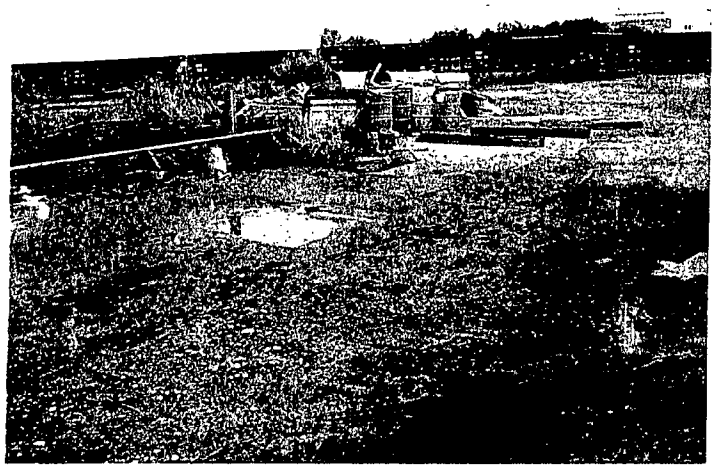
SITE INSPECTION

The site inspection for the SLRIDT site was performed on June 26, 2003. The purpose of the inspection was to visually assess the protectiveness of the Tar Seep OU and Soil OU remedial actions. It did not include an inspection of the Sediment OU from a remedial perspective because the remedy has not been selected or implemented. The inspection began with a short meeting on site to introduce all personnel and give an overview of the inspection process and goals. See attachment 4 for a complete list of attendees. The two environmental consultants who performed the remedial actions were present and were interviewed during the course of the on-site inspection. They are Michael Costello, with Service Engineering Group, who performed the remediation of Areas B, C, D, F and Maurices' Parking Lot for Interlake; and Peter Moore, with ENSR, who performed the remediation of Areas A and E for Domtar Inc. & Allied Signal Inc.

The details of the site inspection observations are presented below by area. There was no visual evidence of contamination with the exception of tar observed at the north end of Slip 6 and at the end of the 59th Avenue peninsula. Overall, the monitoring wells encountered were securely locked and the land use appeared to be maintained as industrial. There are no physical barriers, procedures, or controls in place to monitor site access. If trespassers are encountered they are asked to leave. Evidence of recreational trespassing was noted throughout the site, particularly near the water.

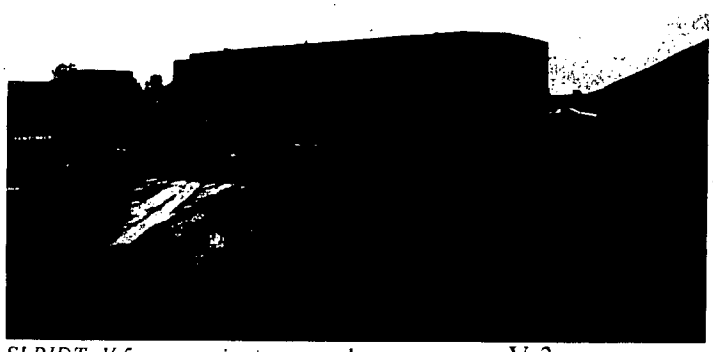
Area B

Area B, located on the north end of Slip 6, was inspected to verify the removal of visual tar from Tar Seep B and to assess the protectiveness of the Soil OU remedy. No tar or visual evidence of contamination was observed at the location designated as the Area B Tar Seep. However, hardened tar was observed near the water line at the northeast end of



Slip 6. The location of the tar appears to be just to the east of the Area B excavations, but directly adjacent to the Slip 6 sediment dredging area.
The location of former above ground tanks looking to the southwest in Area B is shown in the picture to the left. This location is also shown on Figure 7 as Area B AST.

This photo looking east shows the approximate location of a former Tar Seep in Area B. This location was marked by GPS and is shown on Figure 7 as Area B Tar Seep.



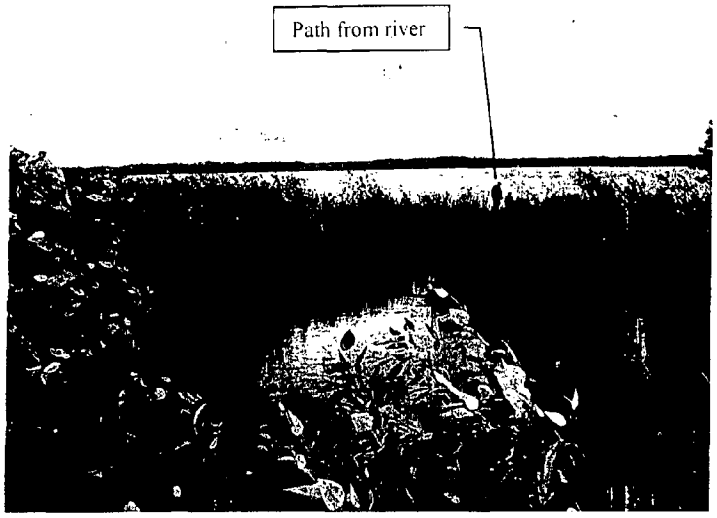
Several of the original buildings remain and are currently used by a paint shop. This photo is taken from the north of Area B looking to the southeast.

Hardened tar was observed at several locations along the water's edge on the north bank of Slip 6. These seeps appeared to be fairly fresh. The locations were marked by GPS and are shown on Figure 7.

Tar located at the water's edge at the north end of Slip 6. The locations are shown on Figure 7 as Tar at Slip 6.

Area C

The inspection began at the 48" outfall located on the southern end of the 54th Avenue peninsula. This is one of the Tar Seep OU locations where removal of visual tar had been completed. The cover and the west shoreline of the peninsula were also inspected. Due to accessibility issues, the eastern shoreline was inspected from the other side of Keene Creek Embayment on April 24, 2003.



The inspection showed no visual evidence of tar or the presence of sheens on the water's surface. No stressed vegetation was noted. A worn path connecting the river's edge and the wetland area was observed. This area is shown on Figure 7 as 48" outfall.

The original surface elevation that was present following the Soil OU remedial activities has been amended with several feet of additional fill placed by Hallett Dock. See Figure 7 for a cross section view of the original site elevation and this fill. The source of this loose fill is reportedly from city street projects.

A few areas of erosion were observed in the fill placed by Hallett post remedial action. These do not appear to be impacting the original remedy based on the elevation of the original cover as compared to the fill.

The erosion in this photo is the deepest observed at approximately 3 feet. The location was marked using GPS and is shown on

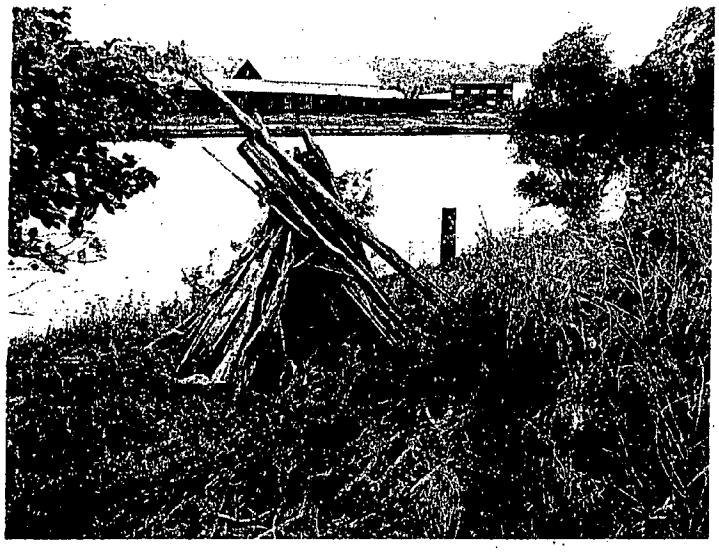


Figure 7.
Evidence of trespassing, like that shown here, was observed along the shoreline of the peninsula. Trash, debris, and small fire rings were common across the site.

Area D

Area D, located midway down the 59th Avenue peninsula, was inspected to verify that no visible tar remained at the site and to assess the protectiveness of the soil remedy. No evidence of tar or contamination was observed. Residual soil contamination above the clean-up levels is present under the old pump house and another building on the east side of the area. Excavation could not be completed without damage to the structures. The area is currently used for industrial purposes

Looking north to the former location of two tanks removed during the Tar Seep remedial action is viewed to the left. This area of excavation was approximated using GPS and is shown on Figure 7 as Area D-1.

This former location of two tanks removed during the Soil OU remedial action is the location originally identified as the Area D Tar Seep. The location was marked by GPS and is shown on Figure 7 as Area D-2.

Residual Contamination is present under this pump house in Area D.

AREA F

The inspection of Area F, which encompasses the southern half of the 59th Avenue peninsula, began on the west side of the peninsula, at the Area A boundary and followed the shoreline to the south and then east. The berm that follows the contour of the west side of the peninsula was then inspected, followed by the fill in the center of the peninsula. The Tar Seep OU ROD had not identified any locations within Area F that required removal so the inspection concentrated on the Soil OU only.

A few areas of oily material were observed along the west shoreline. Oil blooms were noted during the site inspection and it is speculated that the contaminated sediments present in Stryker Embayment may be the cause of the cause of the oil that gathers along the water's edge.

The berm located in the southwest portion of the 59th Avenue peninsula began as slag fill from industrial operations. In 1997, under a permit from the city, Hallet began construction of the existing visible barrier to the residences on the east side of Stryker Embayment. Dock scrapings consisting primarily of bentonite, with some coke and coal, were excavated from the 54th Avenue peninsula and placed in the center of the berm. The berm was completed with glacial lake clay and silt from off-site. See Figure 8 for a cross section view of the 59th Avenue peninsula. During the April 2003 site visit there were large amounts of soil and debris stockpiled in the area where the concrete recycler operates. The source of the material is unknown. In the June 2003 site inspection much of the soil and debris were gone and primarily concrete was observed.

Some erosion and small areas of hardened tar were observed at the south end of the 59th Avenue peninsula where the peninsula meets the St. Louis River. Two of the protective bollards for monitoring well MW-02 (identification based on maps reviewed subsequent to the site visit) were on the ground. Due to the proximity to a frequently used road, it is

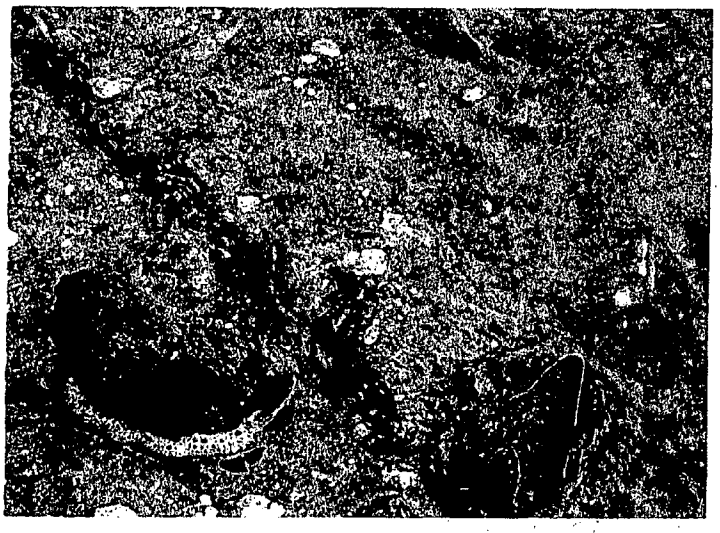
likely these were hit by truck traffic. Also noted in Area F was the placement of new fill around monitoring well MW-28 to an elevation of approximately 2 feet above the original well completion pad. A distance of 3 to 4 feet in diameter surrounding the well has been left as clearance, however there is nothing to prevent sloughing and eventual burial of the well. The only other item of note is a circular area, roughly 60 feet in diameter, with berms about 8 feet high, that appears to be used for water retention.

Except for recreational trespassers (fire rings, debris), the land use for Area F appears to be entirely industrial.

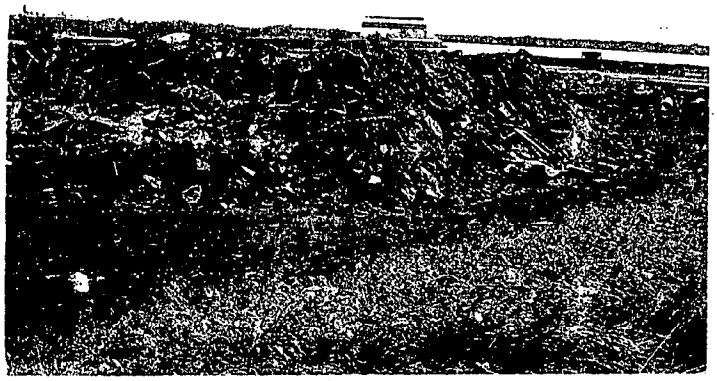
Erosion was observed along the west shore of the 59th Avenue peninsula. The location was marked using GPS and is shown as Area F 1 on Figure 7

Erosion along the west shore of the 59th Avenue peninsula was observed. The location was marked using GPS and is shown as Area F 2 on Figure 7

An example of the oily material was observed along 59th Avenue peninsula west shoreline.

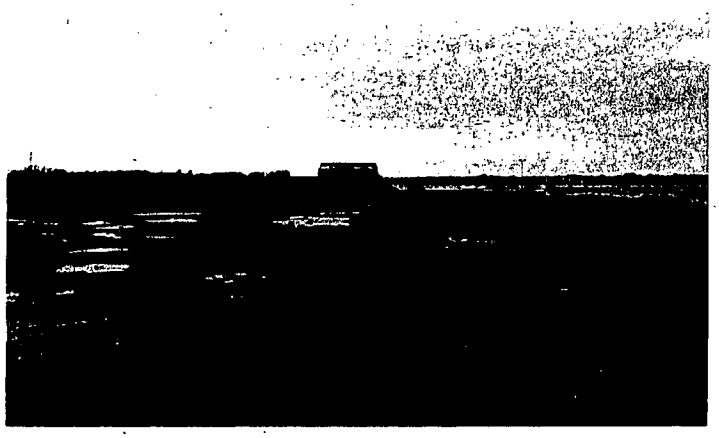


This is an example of the oil sheens observed on Stryker Embayment Surface.

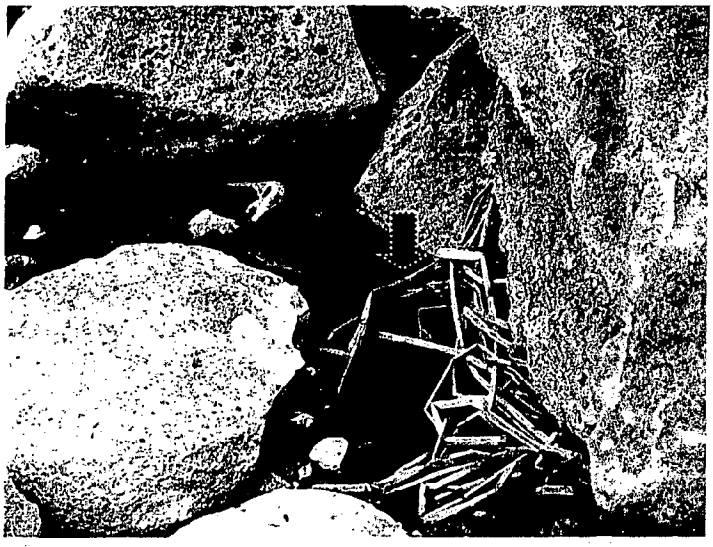


This photo is the concrete recycling operation as seen on April 24, 2003 from top of berm looking east.

Photographed to the left is the concrete recycling operation as seen on June 25, 2003 from top of berm looking east.



Viewed here is erosion observed at the southern tip of the 59th Avenue peninsula.

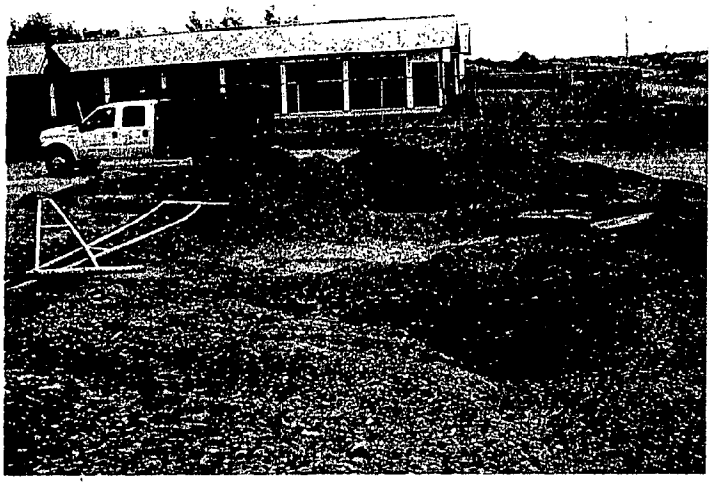


This tar was observed in the same general location that the erosion was noted. The tar and erosion location are approximated on Figure 7 as Area F 3.

Looking northeast at a circular bermed area that is located at the southern end of the 59th Ave. peninsula.

MAURICES' PARKING LOT

The area known as Maurices' Parking lot continues to be used for industrial purposes. Nothing of significance was noted during the June 2003 visit. A shallow excavation, to a depth of two feet or less, was observed on July 25, 2003. This activity is not in conflict with land use required by the ROD.



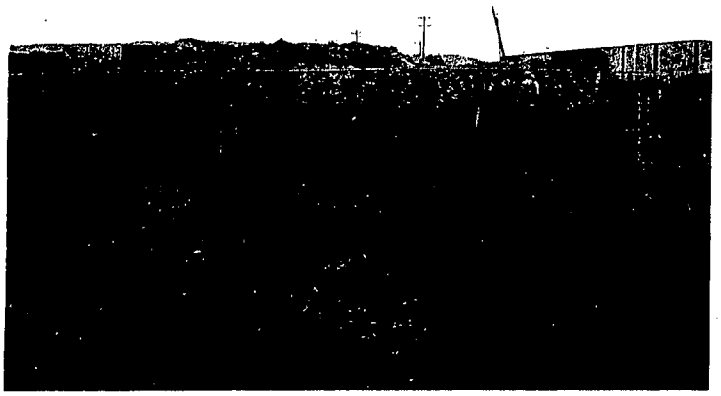
To the left is the backside of Maurices' Parking lot, looking east.

AREAS A and E

The inspection of these areas began at the location of the tar seep identified in the Tar Seep OU ROD and progressed to the west, then north along the railroad tracks, east along former Fremont Street, and south along 59th Avenue. Access to the fenced area now owned by EBI Inc. was not permitted, so observations of that portion of the site were through the fence only.

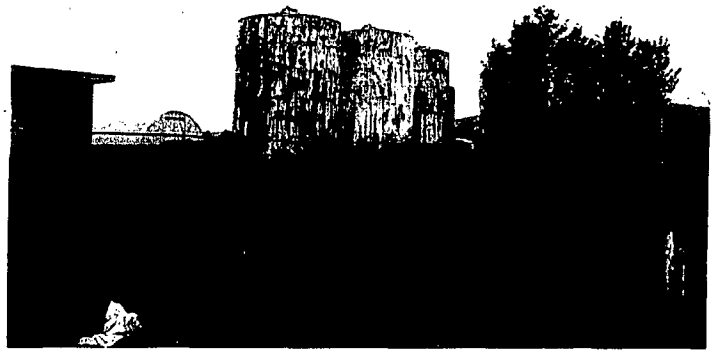
During the investigations and remedial actions, no testing or excavation was performed under existing buildings. It is known that residual contamination remains under the foundation of one of the former Duluth Auto wrecking buildings because concentrations above clean-up levels were detected. However, excavation could not be completed with damage to the structure.

There was no evidence of trespassing during the site inspection and the two areas appear to be used for industrial purposes only.

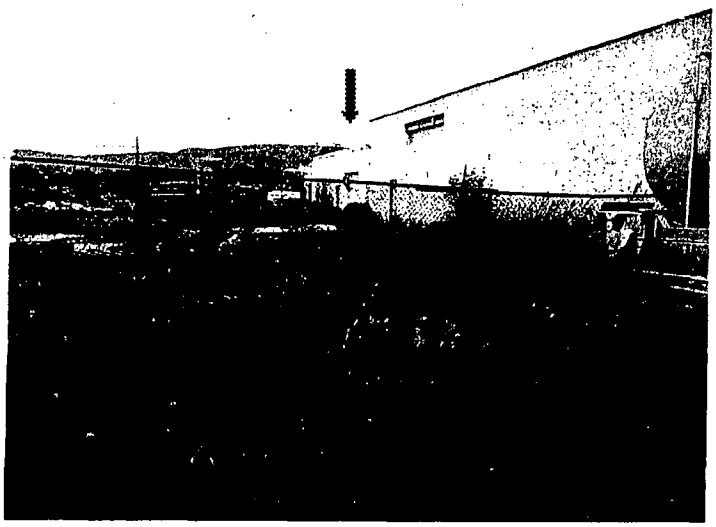


The tar seep was originally located at the fence line, approximately where the ground is standing. This point was marked using GPS and is shown as Area A/E tar seep on Figure 7

This photo is the west side of Area E, looking east, northeast. A low point with poor drainage is noted in foreground.



Shown to the left is the north side of Area E looking to the southwest.



Represented by the arrow is the south side of former Duluth Auto Wrecking Inc. where residual contamination remains.

Looking west from the east side of Area E, this pile, excavated during gas line installation, reportedly contains coal tar.

INTERVIEWS

Interviews were conducted with several individuals during the course of the five-year review. Jane Mosel, MPCA Project Lead for the SLRIDT Site and Mike Bares, MPCA Hydrogeologist for the SLRIDT Site, were interviewed April 24 (Jane Mosel only) and June 25, 2003 for historical information and MPCA information. Michael Costello, Service Engineering Group (performed the remediation of Areas B, C, D, F and Maurices' Parking Lot for Interlake) was interviewed on June 25, 2003 and July 22, 2003 and Peter Moore, ENSR (performed the remediation of Areas A and E for Domtar Inc. & Allied Signal Inc) was interviewed on June 25, 2003 for remedial action details and site history. Mike McCoshen, Hallett Dock Corp., was interviewed on June 25, 2003 and July 28, 2003 about current site operations. Terry Anderson, owner of EBI, was interviewed on July 25, 2003. Mr. Anderson expressed concern about soil, reportedly contaminated, that was encountered on his property during a recent gas line installation. Brenda Winkler, the former MPCA Project Lead for SLRIDT was interviewed on 8 September 2003.

VI. TECHNICAL ASSESSMENT

QUESTION A: IS THE REMEDY FUNCTIONING AS INTENDED BY THE DECISION DOCUMENTS?

Tar Seeps Operable Unit

The review of documents, the personal interviews, and results of the site inspection indicate the remedy for the TSOU is complete and functioning as intended by the ROD. The ROD specified the excavation and off-site disposal, as a recyclable/burnable fuel, of tar from four specific source areas to reduce the immediate risk to humans and wildlife associated with exposure to the tar materials. These four specific source areas were identified as the primary process locations that generated large volumes of tar material. The remedy as specified in the ROD was completed in 1994.

No flowing tar, or tar that would be suitable as a recyclable/burnable fuel, was noted during the site inspection. Small localized pockets of hardened tar were observed on the embankment and at the water's edge on the north end of Slip 6 and also at the southern most point of the 59th Avenue peninsula along the St. Louis River. No odors or seeps were noted and no sheens associated with the tar that was in contact with the surface water were observed. The process by which these pockets of tar have been deposited is not clear, but may be due to the past filling operations that created the peninsulas.

To continue being protective, inspections and monitoring for the purpose of removing surface tar is recommended. Site characterization to search for potential pockets of subsurface tar within the site soils is not recommended at this time given the current land use, the presence of a tar layer underlying much of the site, and that known contamination remains within the site soils.

Soil OU

Soil Removal and Treatment

The remedial action components of the selected remedy were; excavation, treatment, and removal of contaminated soils and tar-impacted soils to clean-up levels, air sparging for the Area C naphthalene deposit, and bioventing for Maurices' Parking Lot. A pilot study later demonstrated that air sparging would not be effective. Therefore, the MPCA recommended, in an ESD to the Soil ROD, that the Area C pond naphthalene deposit be left in place and covered with a minimum of 8 feet of clean fill. See Figure 9 for a cross section view of the contamination left in place at the Area C pond.

Based on interviews with the remedial action contractors, the MPCA staff, and review of the available documentation, the excavation of soil as specified by the ROD has been completed. All known soil contamination above action levels, that was within 12 feet of the ground surface was removed or treated with the exception of the inaccessible soil underlying two existing buildings in Area D and the Duluth Auto Wrecking Garage in

Area E. This soil could not be removed without damage to the structures. If these structures were demolished, remediation of the soil to the clean-up levels stated in the ROD would be necessary. A current property owner expressed concern that contaminated soil was encountered during a gas line installation. This soil was reportedly excavated and stockpiled without an approved work plan. Without more information, this claim cannot be verified. However, with removal actions that were based on Site characterization data generated with a finite number of soil borings, it is possible that residual pockets of soil, contaminated above the ROD clean-up levels, could remain on the Site.

Some erosion was noted on the west side of the 54th Avenue Peninsula and the embankment of the west shore of the 59th Avenue peninsula in Area F. The areas noted are not within the 8 feet of clean cover on the 54th Avenue Peninsula or impacting the excavated locations within Area F. Although there is not a current impact to the protectiveness of the remedy due to erosion, repairs are needed to prevent further erosion within the 54th Avenue Peninsula and for esthetic purposes as well as reducing potential sediment into the bay at the 59th Avenue Peninsula location.

During the April 2003 site visit large quantities of soil and debris stockpiles were observed in Area F, at the concrete recycling location. During the June 2003 site inspection the quantities were less, but stockpiles of material other than concrete was still evident. Additional information suggests the recycler may be operating without the required permits and accepting waste other than concrete.

Groundwater Monitoring

The selection of a remedy for ground water has been deferred to the Sediment OU. In the interim, monitoring specifically to evaluate the effectiveness of the SOU remedy in reducing contaminant levels has not been performed. Review of the documentation and interviews with the remedial action contractors and the MPCA staff indicate that ground water monitoring was performed for approximately five quarters in conjunction with the 2000-2001 SedOU studies. Review of this data indicates that several rounds of PAH data were discarded because of sample filtering problems. This reduced the sample set from five to two, and in a few instances three rounds of data over the course of one year. Upon completion of the Sediment OU investigation, no additional ground water sampling has been performed. Existing results, shown in Figure 10 indicate that the average contaminant concentration for VOCs is generally less than 2 mg/L, total PAHs are less than 4 mg/L and mercury is less than 0.3 ug/L except for one location (MW26S) that averaged 1.96 ug/L. However, there is insufficient data over time to observe trends in contaminant levels. Additional monitoring of a subset of wells, representative of site ground water conditions, is necessary to evaluate the concentrations over time. This evaluation of contaminant migration from soil to ground water likely would be complicated by the presence of contaminated sediments and soils (at depths below those treated or excavated) and may not provide the data necessary to evaluate the leaching

potential of the residual soil contamination. However, there is currently insufficient data to make a decision on how to best proceed with the evaluation of a ground water remedy.

Institutional Controls

Review of the documentation indicates that the institutional controls specified by the ROD have not been completely implemented. Although the site is currently being used only for industrial purposes, some property owners do not have environmental restrictive covenants in place, or the declarations of restriction are incomplete. The status of the restrictive covenants is presented below.

Complete restrictive covenants are in place for:
Hallett Dock Company, Maurices Incorporated, and A. Kemp Fisheries Company.

The restrictive covenant does not specify that water wells will not be constructed within the uppermost aquifer at the Site for:
Cedar Bay Partners LLC..

No environmental restrictive covenants are on record for:
EBI, Inc.

The results of the on-site inspection indicate that although the site use is restricted to industrial land use only, evidence of recreational trespassing is present along the shores of both 54th Avenue and 59th Avenue peninsulas. There is no monitoring of access and no access controls are in place to prevent exposure to the site media. Debris, campsites, and fire rings are common. One contaminated sediment warning sign was present at the mouth of Stryker Embayment on the southwest shore of the 59th Avenue peninsula. There were no other posted warnings.

It was noted in Area F that soil has been placed around monitoring well MW-28 (well ID number has not been confirmed) to an elevation of approximately 2 feet above the original well completion pad. A distance of 3 to 4 feet in diameter surrounding the well has been left as clearance, however there is nothing to prevent sloughing, funneling of precipitation, or eventual burial of the well. This well should be rehabilitated and all other wells should be checked to ensure they comply with the Minnesota Department of Health Water Well Code.

QUESTION B: ARE THE EXPOSURE ASSUMPTIONS, TOXICITY DATA, CLEANUP LEVELS, AND REMEDIAL ACTION OBJECTIVES USED AT THE TIME OF THE REMEDY SELECTION STILL VALID?

The exposure pathways of greatest concern described in the 1995 ROD for the soil Polycyclic Aromatic Hydrocarbons (PAHs) are incidental ingestion of soil/dust, dermal contact with soil/dust, and inhalation of vapors or particulate. These exposure pathways

are still valid, although the risk has been reduced through removal or covering of the most contaminated soils. No additional pathways of concern were identified in the five year review process.

Human health based cleanup goals were calculated for the soil PAHs based on the multiple direct contact exposure pathways described above, although inhalation of vapors and particulate were not addressed in the 1993 Baseline Risk Assessment discussed below. Clean-up goals were also developed for the protection of ground water. The latter clean-up goals resulted in lower soil concentrations for VOCs than direct contact human health based goals. Ground water at the Site was not considered as potential drinking water, but was evaluated as a source of contamination for surface water. Although the 1995 ROD discussed this potential exposure pathway, ground water remediation was not required at the time. Remediation of the soils at the Site was expected to lead to an improvement in ground water quality. The ROD required monitoring to occur to determine the effects of soil remediation on improving Site ground water quality. As discussed previously, this monitoring has not been effectively conducted to date. If groundwater remediation were required in the future, it would be addressed under the SedOU ROD.

Subsequent to the signature of the 1995 ROD, the state of Minnesota established Soil Reference Values (SRVs) for residential, recreational and industrial land uses. Additionally, Soil Leaching Values (SLVs) were established to assist in the estimation of risk to groundwater from sources and contaminants of potential concern. These SRVs and SLVs are risk based guidance values used by the MPCA in their Superfund and Voluntary Investigation and Cleanup Program. Tier 2 SRVs and SLVs use contaminant and generic soil-specific properties to evaluate human health risk and risk to groundwater. Although Tier 2 SRVs and SLVs can be used as cleanup criteria, they primarily serve as a screening tool and are To Be Considered Criteria (TBCs) as defined in the National Contingency Plan (NCP). Table 3 showing Tier 2 Minnesota SRVs for the above land uses and Tier 1 SLVs for the Contaminants of Concern and the cleanup levels established in the ROD is included below.

Table 3

Contaminant	Clean-up Level (a)						
	Site Specific			Generic			
	Industrial Land Use (mg/kg[b])	Construction Worker Scenario (mg/kg)	Ground Water Protection Level (mg/kg)	MPCA Residential (Tier 2 SRV) (mg/kg)	MPCA Recreational (Tier 2 SRV) (mg/kg)	MPCA Industrial (Tier 2 SRV) (mg/kg)	MPCA (Tier 1 SLV) (mg/kg)
Semi-Volatile Organic Compounds							
Total cPAHs (c)(d)	9 (73)	92 (270)		2 B(a)P	2 B(a)P	4 B(a)P	1
Acenaphthene	7920	25030		1200	1860	5260	50
Anthracene	39600	125150		7880	10000	45400	942
Fluoranthene	5280	16690		1080	1290	6800	295
Fluorene	5280	16690		1140	1200	4120	47
Naphthalene	5280	1655	940	10	24	28	7.5

Pyrene	3960	12515		890	1060	5800	272
Volatile Organic Compounds (mg/kg)							
Benzene (c)			0.03	1.5	3	4	0.03
Ethylbenzene			[illegible]6	200	200	200	4.7
Styrene			19	210	500	600	1.9
Toluene			566	107	260	305	6.4
Xylenes (total m,p, and o)			1103	110	248	248	45

(a) The Industrial Land Use values apply to the top 3.5 feet of soil. The Construction Worker Scenario values apply to soil below 3.5 feet to ground water of 12 feet, whichever is shallower. The cleanup levels for the volatile contaminants are based on the protection of ground water. These values apply to the entire soil column.
(b) mg/kg = milligrams per kilogram
(c) potential carcinogen
(d) Total carcinogenic polycyclic aromatic hydrocarbons (cPAHs) includes: Benzo(a)anthracene, Benzo(b)flouranthene, Benzo(k)flouranthene, Benzo(a)pyrene, Chrysene, Dibenzo(a,h)anthracene, and Indeno(1,2,3,-cd)pyrene. The cleanup level outside of parentheses represents a 50th percentile and the value in parentheses represents a 95yh percentile value. Both of these values will be used to verify when remediation is complete.

The U.S. EPA has recently developed guidance to assess the potential impact of vapor intrusion from contaminated soil and ground water on the indoor air quality of structures that are located over areas of contamination (Evaluating the Vapor Intrusion into Indoor Air, USEPA, Nov 2002). As contamination exists under structures on the site, but at unknown concentrations, sampling of soil vapor under the structures should be conducted and evaluated using the recent EPA guidance.

The Site is currently used for varied industrial operations. In May 1993, the Minnesota Pollution Control Agency developed the Human Health Baseline Risk Assessment for the Soil Operable Unit of the St. Louis River/Interlake/Duluth Tar Site. The Baseline Risk Assessment evaluated the current limited industrial land use, and limited (recreational) and unrestricted (residential) potential future land uses. The Baseline Risk Assessment did not address the inhalation of vapors or particulate. The estimated total excess cancer risk exceeded the acceptable target risk level (1E-5) in all areas of the Site for all the evaluated land use scenarios. The carcinogenic PAHs accounted for greater than 99% of the cancer risk. The carcinogenic PAHs were addressed in the 1995 ROD through surface/near surface and subsurface cleanup levels. Only one area of the Site (Area E) demonstrated a Hazard Index greater than 1 in the Baseline Risk assessment. The noncarcinogenic PAHs (acenapthene, anthracene, fluoranthene, fluorine, naphthalene, and pyrene) were overwhelmingly responsible for the unacceptably high noncarcinogenic risk. Napthalene alone contributed 82% of the total noncarcinogenic risk.

In conducting the 1993 Baseline Risk Assessment, the cancer slope factor for Benzo(a)pyrene was utilized as a surrogate slope factor for all carcinogenic PAHs. This methodology remains appropriate as queries on the EPA Integrated Risk Information System (IRIS) web site indicate that slope factors are still not available for the other carcinogenic PAHs (benzo(a)anthracene, benzo(b-k)fluoranthenes, chrysene, dibenz(a,h)anthracene, and indeo(1,2,3-cd)pyrene) addressed in the Baseline Risk Assessment. Draft guidance has been issued for assessing the dermal pathway since 1993 (Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual

(Part E, Supplemental Guidance for Dermal Risk Assessment), EPA, 2001). However, the changes do not affect the conclusions of the Baseline Risk Assessment. The absorption fraction used in the 1993 Baseline Risk Assessment for PAHs is consistent with updated guidance, and the skin adherence factor used in the 1993 calculations is actually more conservative than the current recommendation.

Only the oral reference dose (RfD oral) for naphthalene has changed since the 1993 risk estimation was conducted. The RfD oral for naphthalene became less conservative (4.00E-2 mg/kg-day in 1993 to 2.00E-2 mg/kg-day today). However, the MPCA Tier 2 SRV for naphthalene is orders of magnitude lower than the ROD cleanup goal. This is primarily due to the inclusion of the significant inhalation pathway for naphthalene in risk based numbers since the 1993 Baseline Risk Assessment was developed. The MPCA levels are also lower than EPA Region 9 Preliminary Remediation Goals (PRGs), which are conservative multi-pathway screenings levels and should be evaluated prior to the next five year review to determine their status as a TBC.

The 1993 Baseline Risk Assessment did not evaluate Areas C and F due to inadequate sampling data. During subsequent remediation, Area C was overlain with at least eight feet of clean fill, and Area F was excavated according to the same requirements for other areas of excavation on the site. Inhalation of vapors and particulate were not addressed as a pathway in the 1993 Baseline Risk Assessment. Vapor intrusion in buildings on-site has not been evaluated and could potentially pose a risk to workers in the buildings. Since the remediation was completed, additional compounds associated with coke production and iron and steel making have been documented which were not addressed in the initial assessment. Trespassing continues to occur on the site. Risks to trespassers were not adequately characterized in the 1993 Baseline Risk Assessment. For these reasons, additional sampling should be conducted and an updated risk assessment for the site should be completed.

Ecological risk discussion in the 1995 ROD focus on potential effects to the St. Louis River surface water and sediments. The Chemicals of Concern at the Site pose potential risks to aquatic life because of the known toxicity of PAHs and metals in sediments to aquatic organisms. There are indications that benthic invertebrate populations and diversity are low in areas of the highest sediment contamination at the Site. The sediments and subsequent remediation are to be addressed in the future under a separate ROD. Although new methods have been established for ecological risk assessment since the ROD was signed in 1995, the Site is used for industrial purposes only and there are no critical habitats for threatened and endangered species identified at the Site. Additionally, the Site soils are not currently managed for ecological purposes, nor are expected to be in the future.

No ARARs were identified in the ROD that require addressing in this report.

QUESTION C: HAS ANY OTHER INFORMATION COME TO LIGHT THAT COULD CALL INTO QUESTION THE PROTECTIVENESS OF THE REMEDY?

No new ecological risks have been identified and there are no impacts from natural disasters.

Reviewers of the this report provided additional information and documentation about industrial activities with the potential to create contamination that have been, or are currently, operating within the Site boundaries. Before ceasing operation in 2001 the contaminated soil thermal treatment facility was observed to expel smoke and soot to the extent that it would visibly coat the surface of Stryker Embayment and the residential properties on the west side of the embayment. Also in question is the type of material accepted for recycling by the concrete recycler and whether the recycler is permitted for this operation. Any activity that generates contamination that could subsequently be deposited on the site surface potentially changes the risk to individuals exposed to the surface soil.

TECHNICAL ASSESSMENT SUMMARY

The TSOU remedy as specified by the ROD is complete. The tar seeps identified by the ROD were location specific and have been removed. Periodic site inspections to identify and remove the pockets of surface tar observed during the site inspection are recommended to ensure future protectiveness of the remedy.

The site is currently used for industrial purposes. Provided that the land use remains industrial, the SOU remedy is preventing direct contact with contaminated soil above the industrial/construction worker/leachability clean-up levels established by the ROD. However, based on several factors, an updated risk assessment is needed to determine the long term protectiveness of the remedy. Since the remediation was completed, additional analytes associated with coke production and iron and steel making have been documented which were not sampled for, or addressed, in the initial assessment. Also noted was the lack of sampling data within Areas C and F to adequately characterize risk to the on site worker or to the trespasser. The inhalation pathway due to exposure to contaminated soil vapor within indoor air has been identified as a potential exposure that has not been addressed. Review of the cleanup goals, established in the ROD, indicates the goal for Naphthalene is approximately two orders of magnitude greater than MN Tier 2 Industrial SRVs and EPA Region 9 PRGs. They should be evaluated to determine their status as TBC Criteria.

The ground water sampling performed as part of the SedOU investigation indicates the presence of ground water contamination. However, there is insufficient ground water data over time to establish trends to determine if removal of the contaminated soils above clean-up levels has minimized the migration of contaminants to ground water as required by the SOU ROD. Deferment of this evaluation to the SedOU remedial action to coincide with the existing deferment of the ground water remediation to the SedOU could be done. However, monitoring must be performed in the interim to ensure the data

needed to make the evaluation is collected. Ground water is not used as a drinking water source, and the ground water migrates to surface water that is in contact with the contaminated sediment.

Several land use/restrictive covenant issues were identified. One property does not have a restrictive covenant in place, and another does not include a water well installation restriction. Based on site inspection observations, the State Water Well code is not being adhered to when fill is placed around monitoring wells. Also observed was evidence of recreational trespassing and industrial uses potentially not protective of the remedy. These observations demonstrate the need for stricter enforcement of institution controls including; no excavation without an MPCA approved work plan, tighter Site access control, and possible restriction on the types of industrial activities operating on Site.

VII. ISSUES

Table 4: Issues		
Issue	**Currently Affects Protectiveness (Y/N)**	**Affects Future Protectiveness (Y/N)**
1. Minimal Site access control and evidence of recreational trespassing.	Y	Y
2. Industrial use potentially not protective of the remedy.	N	Y
3. Small amounts of tar present at the north end of Slip 6 and the south end of 59th Avenue. Contaminated soil was reportedly encountered by one of the property owners on site	N	Y
4. Erosion runnels are present in the fill on the 54th Avenue peninsula and some erosion of the embankment on the west shore of the 59th Avenue peninsula is present in Area F.	N	N
5. New fill has been placed around monitoring wells in Area F to an elevation of approximately 2 feet above the original well completion pad. This is in violation of the Minnesota Department of Health Water Well Code and may impact the well integrity.	N	Y
6. Restrictive covenants for some property owners are incomplete or missing.	N	Y
7. Neither monitoring, nor a monitoring plan, to evaluate migration of contamination from soil to ground water is in place.	N	Y
8. Inadequate assessment of risk due to exposure to soil vapor intruding to indoor air and insufficient sample data to characterize risk to the trespasser and onsite worker.	N	Y
9. MPCA Tier 2 SRV and the EPA PRG for Naphthalene should be evaluated to determine their status as TBCs.	N	Y

VIII. RECOMMENDATIONS

Table 5: Recommendations and follow-up actions

Recommendations and follow-up actions						
Issue	**Recommendations and Follow-up Action**	**Party Responsible**	**Oversight Agency**	**Milestone**	**Affects Protectiveness (Y/N)**	
					Current	**Future**
1) Minimal Site access control and evidence of recreational trespassing.	A site security control plan should be established. At a minimum some warning signs should be posted to inform site visitors and trespassers about the site hazards.	Responsible Party	MPCA	July 2004	Y	Y
2) Industrial use potentially not protective of the remedy.	Restriction on the types of industrial activities operating on Site should be considered.	Responsible Party	MPCA	July 2004	N	Y
3) Small amounts of tar are present at the north end of Slip 6 and the south end of 59th Avenue. Contaminated soil was reportedly encountered by one of the property owners on site.	Periodic removal of visible tar with continued monitoring until the Sediment OU remedy is selected to ensure the noted problems do not increase and that no unacceptable exposures are occurring..	Responsible Party	MPCA	Seasonally	N	Y
4) Erosion runnels are present in the fill on the 54th Avenue peninsula and some erosion of the embankment on the west shore of the 59th Avenue peninsula is present in Area F.	Repairs for esthetic purposes could include filling runnels with topsoil, cutting back the slopes to a reduced grade and revegetating. Hard armoring the slope with riprap or soft armoring with fabric and revegetation could also be considered.	Property Owner.	MPCA	As needed.	N	N
5) New fill has been placed around monitoring wells in Area F to an elevation of approximately 2 feet above the original well	Annual inspections and institutional control revisions are needed to ensure monitoring well construction/rehabilit	Responsible Party	MPCA	March 2004	N	Y

completion pad. This is in violation of the Minnesota Department of Health Water Well Code and may impact the well integrity.	ation/abandonment and placement of fill meet the state wellhead requirements.					
6) The restrictive covenants for some property owners are incomplete or missing.	Ensure restrictive covenants are in place for all property owners within the footprint of the SLRIDT Site.	Responsible Party	USEPA	July 2004 or immediately in the case of a property transfer.	N	Y
7) Neither monitoring, nor a monitoring plan, to evaluate migration of contamination from soil to ground water is in place	Recommend that a monitoring plan to evaluate soil impact to ground water be developed and implemented..	Responsible Party	MPCA	Concurrent with the Sediment OU Remedy Selection.	N	Y
8 Inadequate assessment of risk due to exposure to soil vapor intruding to indoor air and insufficient sample data to characterize risk to the trespasser and onsite worker	Complete an updated risk assessment.	Responsible Party	MPCA	July 2005	N	Y
9) MPCA Tier 2 SRV for naphthalene is significantly lower than the ROD cleanup goal.	Evaluate MPCA Tier 2 SRV and EPA Region 9 PRG for Napthalene to determine their status as TBCs.	MPCA	USEPA	July 2004	N	Y

IX. PROTECTIVENESS STATEMENTS

The TSOU remedial action is complete and is protective of human health and the environment as intended by the ROD.

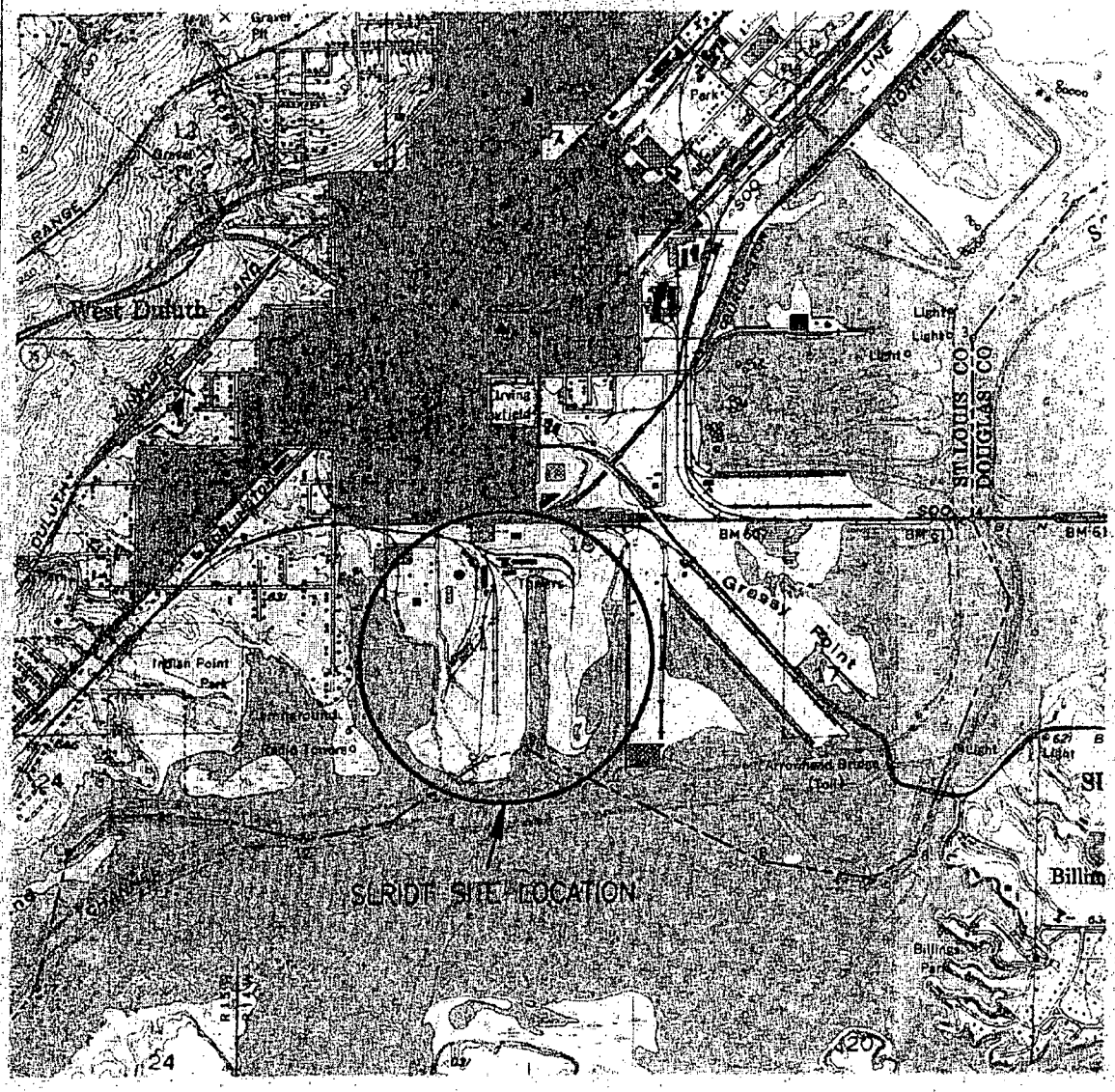
The SOU remedy is protective of human health and the environment in the short term because soil above the direct exposure clean-up levels identified in the ROD for industrial land use and construction worker's has been removed. However the remedy is not protective in the long term unless the issues identified are addressed. In order for the remedy to be protective in the long term, contaminant migration to ground water, additional assessment of risk and enforcement of institutional controls must be addressed.

X. NEXT REVIEW

The next review five-year review is scheduled for September 30, 2008.

Figures

RETEC



MAP SOURCE: USGS
WEST DULUTH QUADRANGLE
7.5 MINUTE SERIES

QUADRANGLE LOCATION

0 2000 40000
SCALE IN FEET

3-1293-000
1293SITE.DWG

SITE LOCATION MAP
SLRIDT SITE
DULUTH, MINNESOTA

FIGURE
1

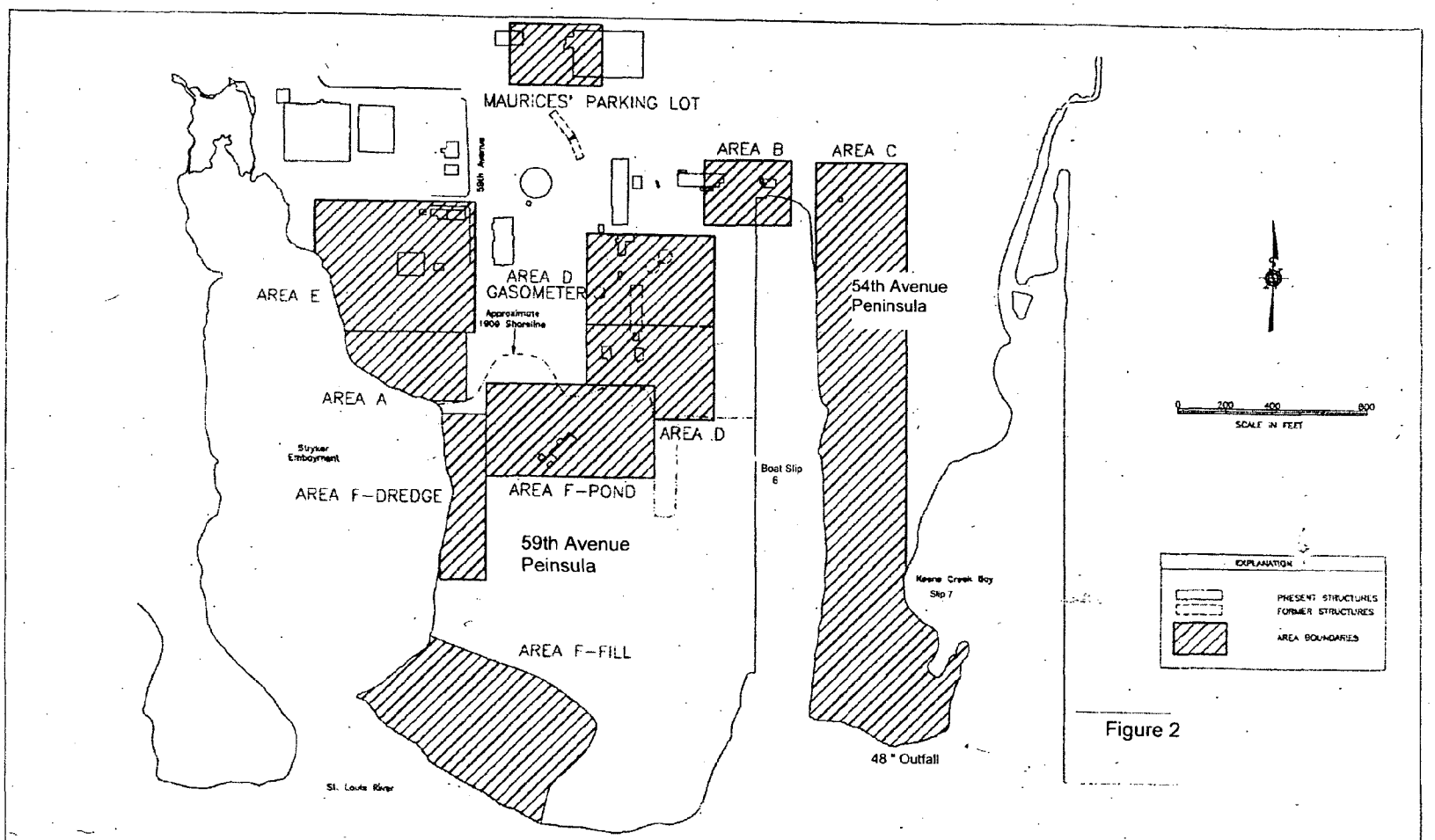
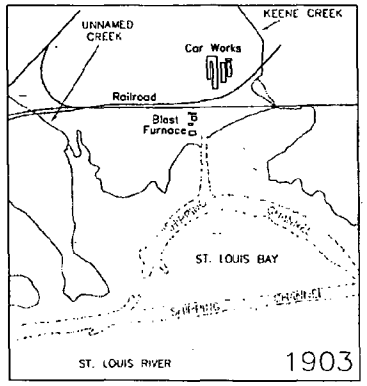


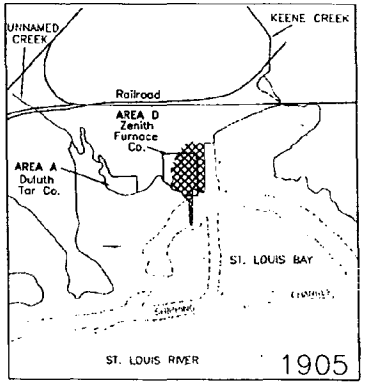
Figure 2

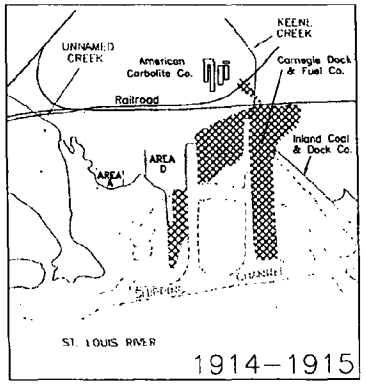
SLRIDT SITE
DULUTH, MINNESOTA
3-1293-202

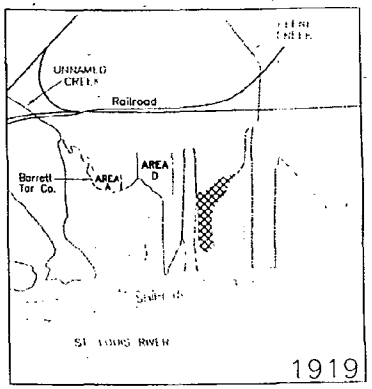
SLRIDT SITE MAP

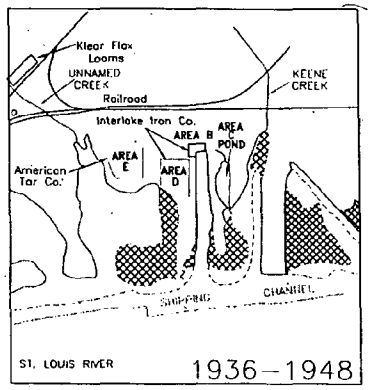
RETEC
FIGURE 2

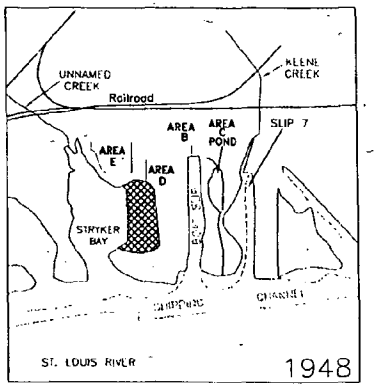


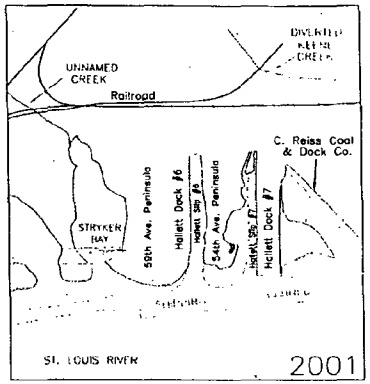












0 1200
APPROXIMATE SCALE IN FEET

EXPLANATION

- SANITARY SEWER DISCHARGE LINES
- SHORELINE
- SHIPPING CHANNELS
- NEW LAND SINCE PREVIOUS MAP

REFERENCE:

US ARMY CORPS OF ENGINEERS
HARBOR MAPS 1903, 1905,
1914–15, 1919, 1936, 1948.
AERIAL PHOTO 1948.
TELECON WITH CITY OF DULUTH
SEWER DEPARTMENT.

REFERENCES IT CORP 'FIGURE 1-3 HISTORICAL DEVELOPMENT OF 59TH AND 54TH AVENUE PENINSULAS' FILE NAME RFI_2-1.

SERVICE ENGINEERING GROUP

FIGURE 3.
HISTORICAL DEVELOPMENT OF 59TH AND 54TH AVENUE PENINSULAS
SLRIDT SITE
DULUTH, MINNESOTA

FILE	DATE	REVISION DATE	DRAWN BY
FIGBHIST	4/28/97	10/8/01	PJCADD/HH

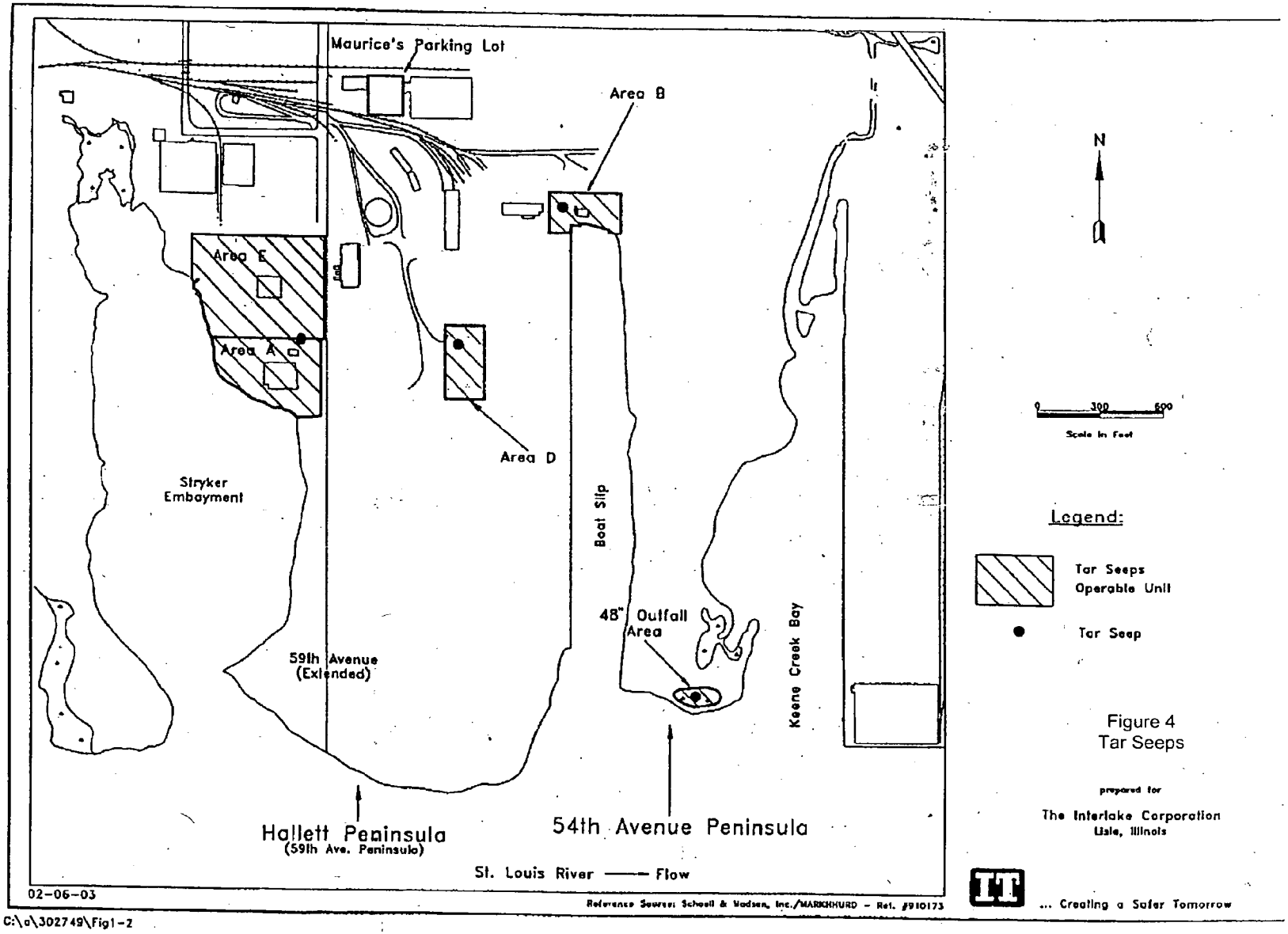
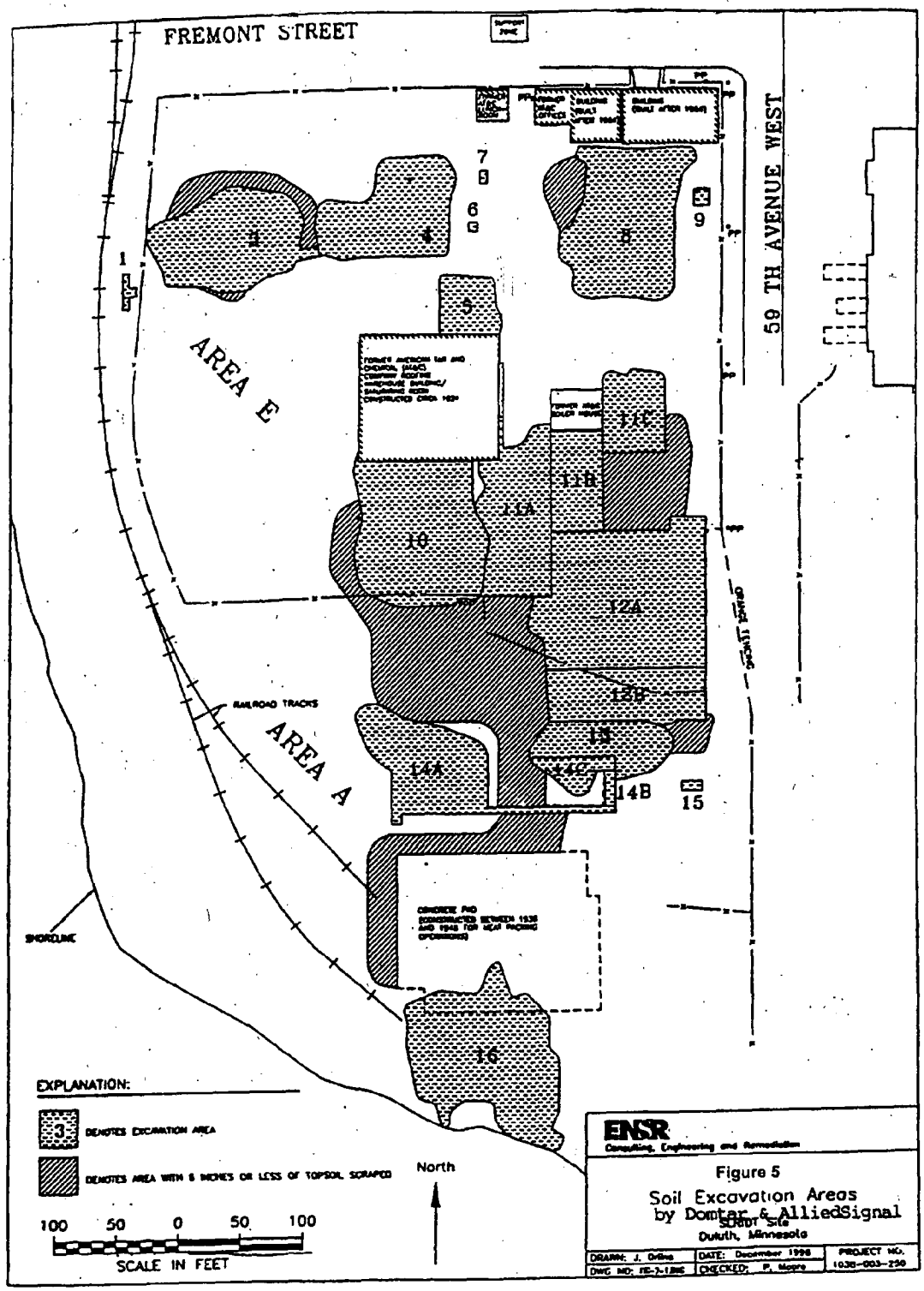


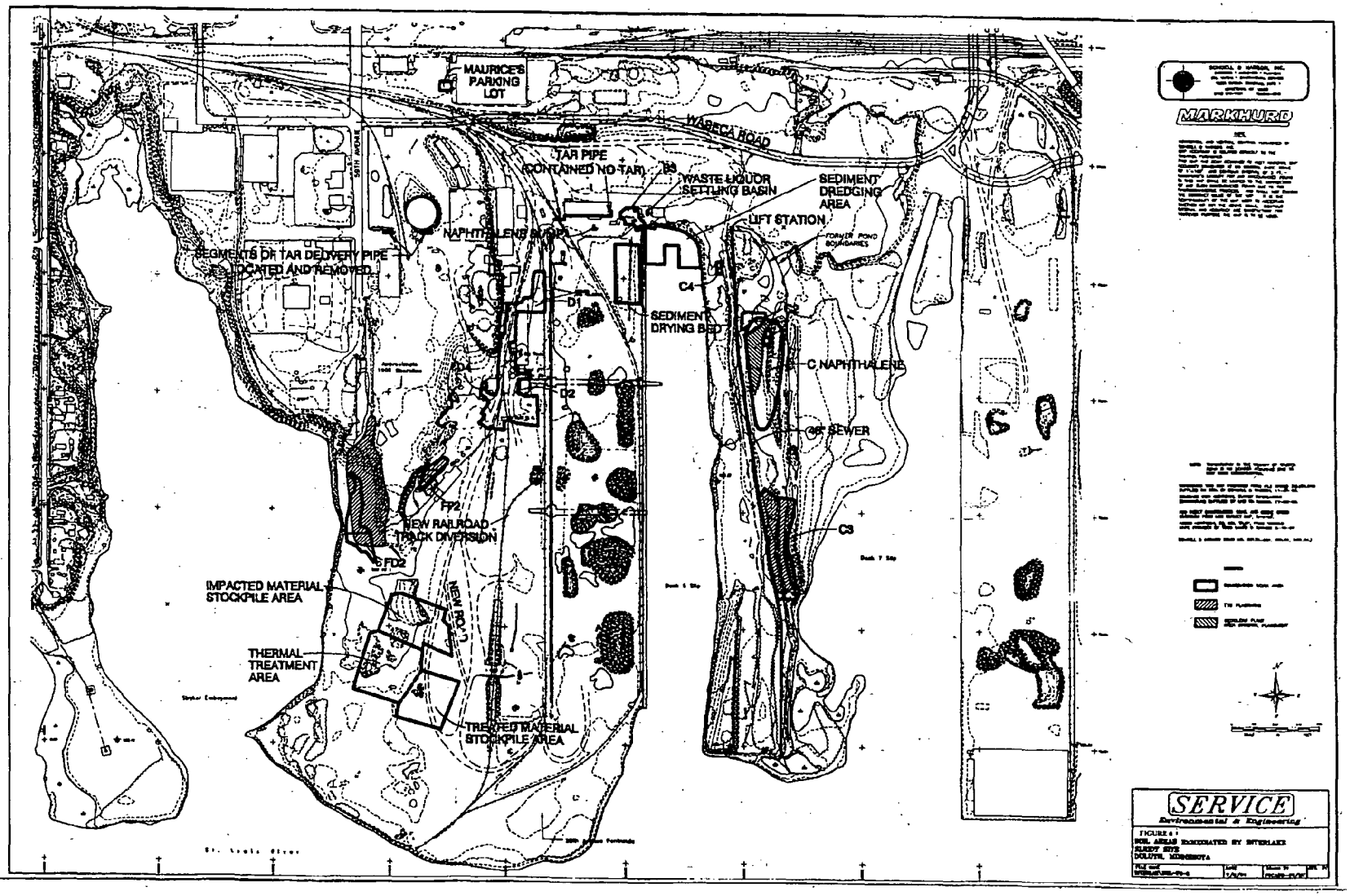
Figure 4
Tar Seeps

prepared for

The Interlake Corporation
Lisle, Illinois

C:\a\302749\Fig1-2


FREMONT STREET
59 TH AVENUE WEST
AREA E
AREA A
RAILROAD TRACKS
SHORELINE
1
2
3
4
5
6
7
8
9
10
11A
11B
11C
12A
12B
13
14A
14B
14C
15
16
EXPLANATION:
DENOTES EXCAVATION AREA
DENOTES AREA WITH 6 INCHES OR LESS OF TOPSOIL SCRAPED
100 50 0 50 100
SCALE IN FEET
North
ENSR
Consulting, Engineering and Remediation
Figure 5
Soil Excavation Areas
by Domtar & AlliedSignal
Duluth, Minnesota
DRAWN: J. Dilling
DATE: December 1996
PROJECT NO. 1030-003-230
DWG NO: FE-7-1.DWG
CHECKED: P. Moore


MAURICE'S PARKING LOT
WABECA ROAD
TAR PIPE (CONTAINED NO TAR)
B3
WASTE LIQUOR SETTLING BASIN
SEDIMENT DREDGING AREA
LIFT STATION
FORMER POND BOUNDARIES
NAPHTHALENE SHOOT
SEGMENTS OF TAR DELIVERY PIPE RELOCATED AND REMOVED
C4
D1
SEDIMENT DRYING BED
C2
C NAPHTHALENE
D2
SEWER
FP2
NEW RAILROAD TRACK DIVERSION
C3
FD2
IMPACTED MATERIAL STOCKPILE AREA
NEW ROAD
THERMAL TREATMENT AREA
TREATED MATERIAL STOCKPILE AREA
MARKHURD
SERVICE
Environmental & Engineering

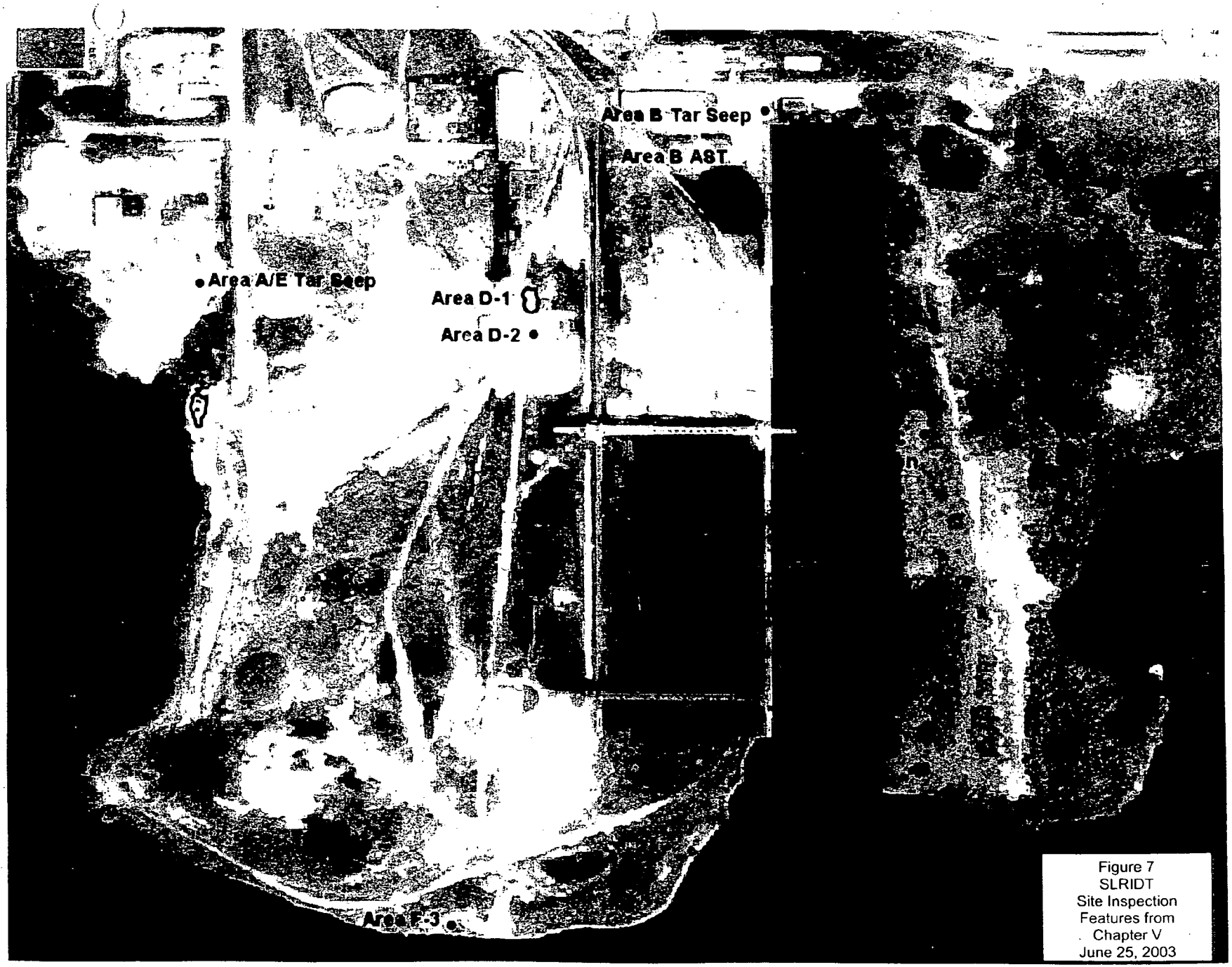
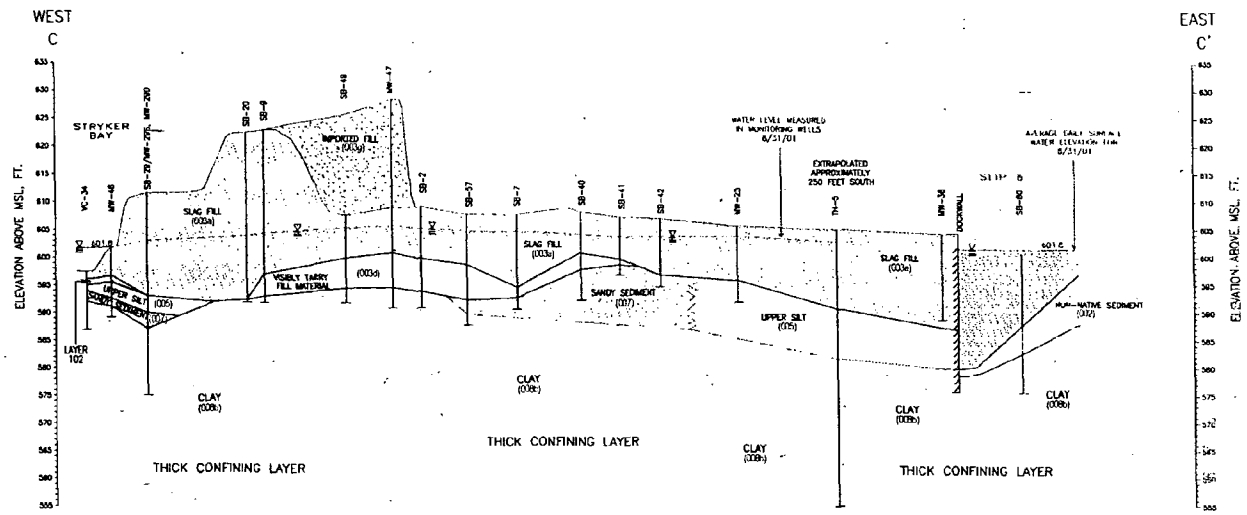
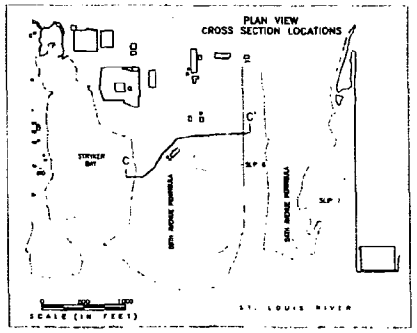


Figure 7
SLRIDT
Site Inspection
Features from
Chapter V
June 25, 2003





10x VERTICAL EXAGGERATION

20 FEET

200 FEET

LEGEND:

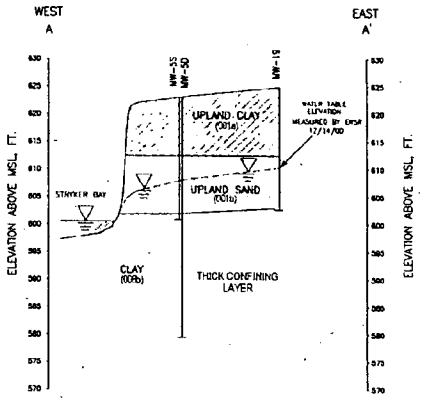
- INDUSTRIAL MATERIAL
- UPPER SILT
- PEAT
- SANDY SEDIMENT
- NON-NATIVE SEDIMENT
- THICK CONFINING LAYER: SILT, CLAY, LOWER SILT
- IMPORTED FILL LAYER
- WATER
- VISIBLY TARRY FILL MATERIAL
- LAYER 102
- TOP OF WATER
- SB-2 MONITORING WELL LOCATION

FIGURE TITLE

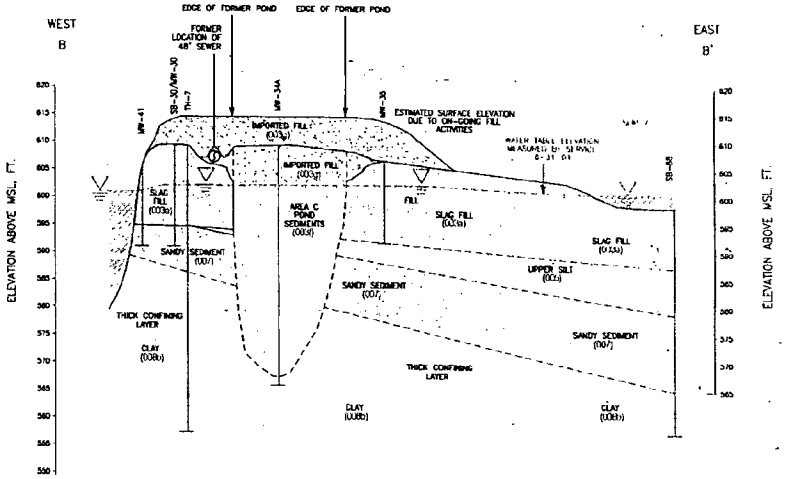
FIGURE 8
GEOLOGIC CROSS SECTION OF 59th AVENUE PENINSULA
SLRIDT SITE
DULUTH, MINNESOTA

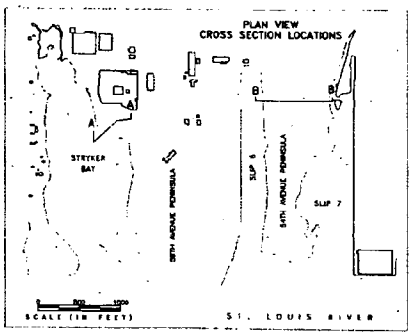
FILE NAME	DATE	REVISION DATE	DRAWN BY	REVIEWED BY
006xsC.DWG	7/24/01		LS	EPH

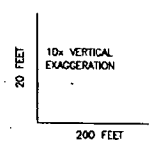
SERVICE ENGINEERING GROUP



CROSS SECTION C-C'
STRATIGRAPHY OF AREAS A & E SHOWING NATIVE SILTY SAND AQUIFER DAYLIGHTING ABOVE STRYKER BAY WATER LEVEL



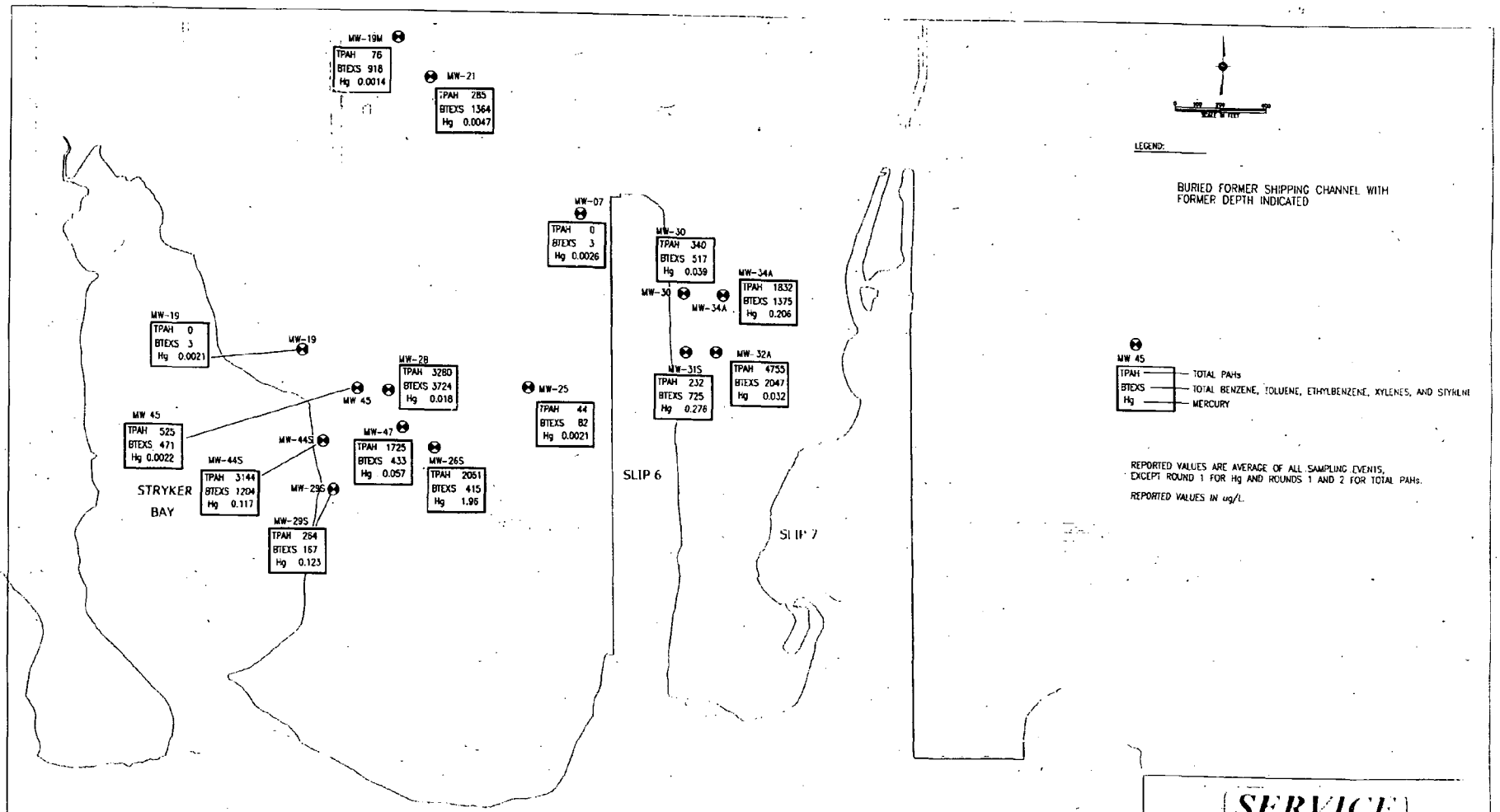




LEGEND:

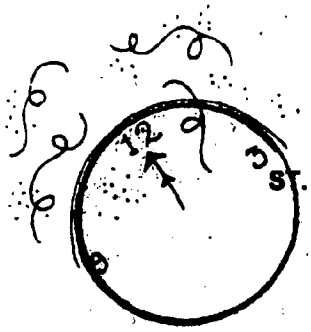
- INDUSTRIAL MATERIAL
- UPPER SILT
- PEAT
- SANDY SEDIMENT
- NON-NATIVE SEDIMENT
- THICK CONFINING LAYER: SILT, CLAY, LOWER SILT, UPLAND SAND, UPLAND CLAY
- IMPORTED FILL
- WATER
- TOP OF WATER
- MW-5 MONITORING WELL LOCATION

FIGURE TITLE	FIGURE 9 GEOLOGIC CROSS SECTIONS OF AREAS A & E AND 54th AVENUE PENINSULA SLRIDT SITE DULUTH, MINNESOTA				
FILE NAME 99006/PHII/HYDROA 006xsAB.dwg	DATE 10/10/01	REVISION DATE	DRAWN BY LS	REVIEWED BY EPH	SERVICE ENGINEERING GROUP


MW-19M
TPAH 76
BTEXS 918
Hg 0.0014
MW-21
TPAH 285
BTEXS 1364
Hg 0.0047
MW-07
TPAH 0
BTEXS 3
Hg 0.0026
MW-30
TPAH 340
BTEXS 517
Hg 0.039
MW-34A
TPAH 1832
BTEXS 1375
Hg 0.206
MW-31S
TPAH 232
BTEXS 725
Hg 0.278
MW-32A
TPAH 4755
BTEXS 2047
Hg 0.032
MW-19
TPAH 0
BTEXS 3
Hg 0.0021
MW-28
TPAH 3280
BTEXS 3724
Hg 0.018
MW-25
TPAH 44
BTEXS 82
Hg 0.0021
MW-45
TPAH 525
BTEXS 471
Hg 0.0022
MW-44S
TPAH 3144
BTEXS 1204
Hg 0.117
MW-47
TPAH 1725
BTEXS 433
Hg 0.057
MW-26S
TPAH 2051
BTEXS 415
Hg 1.95
MW-29S
TPAH 264
BTEXS 167
Hg 0.123
STRYKER BAY
SLIP 6
SLIP 7
LEGEND:
BURIED FORMER SHIPPING CHANNEL WITH FORMER DEPTH INDICATED
MW 45
TPAH — TOTAL PAHs
BTEXS — TOTAL BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND STYRENE
Hg — MERCURY
REPORTED VALUES ARE AVERAGE OF ALL SAMPLING EVENTS, EXCEPT ROUND 1 FOR Hg AND ROUNDS 1 AND 2 FOR TOTAL PAHs.
REPORTED VALUES IN ug/L.
REFERENCE:
SCHOELL & MADSON, INC. / MARKHURD BASE MAP.
MAP SHOWING PROPOSED CHANGES IN HARBOR LINES IN ST. LOUIS BAY..., WAR DEPARTMENT DEC. 5, 1894.
SERVICE ENGINEERING GROUP
FIGURE 10
AVERAGE ANALYTICAL MEASUREMENT IN CHARACTERIZATION WELLS
SLRIDT SITE
DULUTH, MINNESOTA
F/N 99006/PH111/ HYDR/NON.DWG
DATE 10/9/02
DRAWN BY LJ
REVIEWED BY EPH

Attachments

Attachment 1



U.S. EPA AND MPCA

TO REVIEW

ST. LOUIS RIVER SUPERFUND SITE
DULUTH, MN

U.S. Environmental Protection Agency Region 5, and Minnesota Pollution Control Agency are starting a five-year review of the St. Louis River Superfund Site, Duluth, MN.

EPA and MPCA will hold an informational meeting at the beginning of the review process for interested members of the public to comment on the USS and Interlake facilities of the St. Louis River Superfund Site.

The informational meeting will be
6:30 to 8:30 pm, Thursday, May 15
Morgan Park Good Fellowship Community Center
1302 88th Avenue West
Duluth, MN

The objective of this five-year review is to confirm whether or not the remedies were constructed in accordance with the requirements of the record of decision and if they continue to be protective of human health and the environment.

- A Record of Decision (ROD) for the U.S. Steel Duluth Works portion of the site was signed Feb. 22, 1989, that addressed 16 operable units at the USS facility. Contaminated soil was either removed to a landfill or contained in place and monitored at the facility.
- A second ROD was signed on Sept. 28, 1990, that called for tar seeps at the Interlake portion of the site to be excavated and removed to an off-site landfill.
- A ROD was signed on Sept. 26, 1995, calling for contaminated soils at the Interlake facility to be excavated and removed.

All site documents are retained at the Duluth Public Library, West Duluth Branch, 5830 Grand Ave, Duluth, MN.

For further Information, special needs or accommodations, please contact:

Anne Moore, Public Information Officer II
Minnesota Pollution Control Agency
525 Lake Ave, Suite 400,
Duluth, MN 55802-2300
(218) 723-2356
or toll free
voice and TTY (800) 657-3864
fax: (218) 723-4727

Attachment 1

U.S. Environmental Protection Agency
St. Louis River Superfund Site
Five-Year Review Informational Meeting
Goodfellowship Club, Morgan Park
May 15, 2003

Attendees
Residents and interested others: Ron Benson, Marsha Patelke, John Smith, Angela Smith, Steven Chepelnik, Dr. Joe Balach, Tim Leland, Nancy Leland, Nancy Thompson, Jackie Morris-Rep. Oberstar's office, Dean Stockwell, Annette Trowbridge-USFWS, Marilyn Danks-MN DNR / Natural Resource Damage Assessment Trustees, Allan Beaulier, Bill Majewski, Kyle Maunu, Herb Widell, Guy Partch, Hans Wronka, J. Howard McCormick, Bill McGiffert, Debbie Isabell, Craig Lincoln, Dan Simonson, Marlene Simonson
Participating governmental agencies: Jon Peterson- USEPA; Cheryl Allen- USEPA, Greg Mellema-US Army Corps of Engineers, Teresa Reinig-US Army Corps of Engineers, Chet Wilander-MPCA Citizens' Board, Sid Mason-MPCA Citizens' Board, Dr. Daniel Foley-MPCA Citizen's Board, Susan Johnson-MPCA, Jane Mosel-MPCA, Mike Bares-MPCA, Anne Moore-MPCA

Introductions
Anne Moore-MPCA welcomed the group and asked them to introduce themselves. She introduced Cheryl Allen-USEPA, who facilitated the meeting. Jon Peterson-USEPA briefly explained that the combined US Steel / St. Louis River / Interlake / Duluth Tar Superfund site (St Louis River) was due for a five-year protectiveness review of its completed operable units' remedies.

US Steel Site Overview
Susan Johnson-MPCA explained the USEPA-labeled St Louis River Site is considered two sites by the MPCA. Each has a project manager, hydrologist, its own Responsible Party(ies) and is in a different phase of the Superfund process.

Johnson described US Steel's use of the 644 acres over its 64-year history. The site was added to the Superfund list in 1983. She noted two of the site's 16 land-based operable units, J and P, triggered this review. OUJ still contains about 20,000 yards coal tar stabilized with cement and isolated within a clay lined containment disposal area. The Wire Mill Pond, OUP, was a direct discharge outlet from the Wire Mill and site sewers. The remediated pond still contains an allowable amount of coal tar, heavy metals and mercury buried under a synthetic liner, backfilled and planted as a wetland.

Johnson explained ground water samples are taken twice annually at eight locations on land and five from surface water resources to monitor these two units. The site is now considered cleaned up to industrial-based standards as specified by the 1989 Record of Decision.

St Louis River / Interlake / Duluth Tar Overview

Jane Mosel-MPCA discussed the site's many uses over the past 100 years: iron and coking plants; water and gas plant; a horse rendering plant; and, tar and chemical plants. By products of the last-named company types were identified as responsible for the resulting contamination. The MPCA became involved in the late 1970s and placed the site on the Superfund list in 1983; responsible companies (Interlake Corporation (now XIK), AlliedSignal (now Honeywell), Domtar and Beazer East) were identified in 1991 and 1993. Contaminants of concern found at the site included tar, PAHs, VOCs, cyanide, naphthalene and heavy metals. Two land-based operable units containing tar seeps and tar-impacted soil were excavated and removed for offsite incineration in 1994 and 1997. The remaining surface is now considered "clean" to industrial-based standards.

Five-Year Review Process
Greg Mellema-US Army Corps of Engineers explained USEPA requires five-year reviews on remediated Superfund sites with remaining contamination above unrestricted use to verify the protectiveness and effectiveness of the selected remedy(ies). The US Army Corps of Engineers was hired by USEPA to help conduct this site's review.

Specifically, public input is important because they are more familiar with the site and are likely to notice any changes: vegetation discoloration, odors, broken fences protecting the public from certain areas, unusual activities at the site, and/or new uses at the site.

In addition to taking comments at the informational meeting and conducting a site visit, Corps and USEPA staff review the related MPCA and USEPA files, visit with community officials, arrange for new samples, if required, to be taken from the remediated operable units, and publishes its findings. Mellema requested meeting attendees to fill out a survey about the site and return them by June 20.

Site Redevelopment
Jon Peterson-USEPA described his meeting with City of Duluth Planning Director, Mike Conlan, and his interest in a new pilot project Jon and other USEPA managers are developing. It would offer short-term technical and marketing assistance to four USEPA Region V Superfund sites which are prime for redevelopment. He felt the St. Louis River site would be a strong candidate for inclusion; he will know more in June.

Q&A
Q: If the Record of Decision (ROD) cleans up property to a 'lack of hazard' condition for uses fitting that description, how can you increase the use / get beyond that level of cleanup?
A: The Five-Year plan offers reuse options and recommendations. Further cleanup that would be required if rezoned to a more restrictive level would be the responsibility of the developer.

Q: Who pays for the redevelopment pilot project?
A: Tools are available for redeveloping brownfields and contaminated sites from grants and city, state and federal levels.

Q: What's the cleanup level for US Steel? Could it be upgraded for a golf course?
A: It's zoned industrial, and would be cleaned up to that use standard (which is recreational).

Q: What about the material that went to Missouri from the SLRIDT site? How was it transported?
A: It had hazardous waste status and was sent via covered trucks to a licensed facility to be burned. The closest facility to Minnesota was in Missouri.

Q: What was being burned at the end of Hallett's docks?
A: Soil / dirt was burned on site in a thermal desorber at low temperatures. The ROD was changed to accommodate the 'not quite clean' dirt. It was then buried in two places (south end of 59th Avenue West and the 54th peninsula) on site with eight foot covers.

Q: Why does Hallett have a 30-foot berm?
A: It isolates industrial from residential areas. The 1988 Neighborhood plan recommended we provide something aesthetic to block the (industrial) view.

Q: Do the underground springs pose any connection to the area's risk from land-based remedies?
A: Land-based contamination can move and this will be addressed in the water portion of this review process. Land with a cap or cover over contamination does change the configuration of a site and we're not sure if it / they affect ground water.

Q: What will the ROD syllabus data say when it is finished?
A: The USS land is for sale; the city is very interested in a portion of it (it also has a brownfield grant which could be used for redevelopment). It could be a couple of years before the land is actually redeveloped.

Q: The sludge was capped at the Wire Mill Pond. Is it similar to Stryker Bay? And have you checked the mercury? You can't hide the problem.
A: Sampling mercury, as related to the land-based remedies we are discussing today, is one of the parameters analyzed when surface water samples are taken. These samples are taken on an annual basis. Several sampling locations are near the Wire Mill pond. Mercury levels have been reduced dramatically since the remedy was implemented; levels are within performance standards.

Q: What about OUP?
A: We can't do any sampling because the Five-Year review will be finished by September. The Five-Year review will determine whether there is a need to sample; if yes, the Five Year review will be amended to add sampling results.

Q: Can you check to see if the mercury moves through the cap?
A: Please put your suggestions in the survey.

Q: From Gary Glass's aerials photos we saw the Wire Mill pond was two times larger before the cleanup than the size it is now; the dredged material went into the pond. What is this dredged material? Is OUQ dredge spoils for the pond?
A: The 1989 ROD specified "no action" for this operable unit. OUJ and OUP triggered the Five-Year review but all units will be reviewed.

Attachment 1

Q: What are we doing here tonight? The (USS) site boundaries should be secure; should any observation be from outside the boundary?
A: If the ROD says so, yes. We'll accept all written comments – please put them in the survey.

Q: Can we have a meeting on site?
A: If you're interested, let us try and set one up. Put that into your survey comments.

Q: There has been controlled access in the past and photos were prohibited.
A: Both sites are private property and visitors need permission from the landowners to enter.

Q: The signs warning of wading in the water have fallen down into the water.
A: (Hallett response) Only authorized people are allowed to enter our property.
(USEPA response) Put your request in writing in the survey.

Q: If you open up the site, can you also go in other people's houses? Can you clean up the property to what land use we want?
A: Both sites will be cleaned up to industrial standards because the land is zoned industrial.

Q: Who tests (samples) and determines what to do?
A; The Responsible Party(ies) hire consultants who test samples against a standard list of parameters for metals, PAHs, low-level mercury, zinc, and cadmium. They also do ground water monitoring and send the samples to a Minnesota Department of Health-certified lab. The MPCA reviews the lab's report.

Q: Why didn't the MPCA do the Five-Year review?
A: The MPCA didn't have time to do it at the same time as doing work on the contaminated sediments. The MPCA manager wants the staff to move forward on the sediment units and not look back on the past.

Q: When will the sediments be completed?
A: At Stryker Bay, the sediments are being assessed with the Responsible Parties and a remedy should be selected by Spring 2004.

Attachment 2

Email

All:

A Five-Year Review is being conducted for the completed portions of St. Louis River Superfund Site, located in Duluth, MN., by the Corps of Engineers for EPA Region 5. It should be noted that this review is not for the sediments units at either the US Steel Site, or the St. Louis River/ Interlake/ Duluth Tar Site. Because of your current or past involvement with the site, your input is valuable to the completion of the review.

It would be greatly appreciated if you could complete the survey which is attached below. Not all questions may apply to your particular involvement, or current understanding of the site. If this is the case, a "no comment" response for those questions is completely understood. If there are others in your office who may be able to provide comments, feel free to forward the survey to those individuals as well.

Completed forms can be returned either by e-mail to me, at gregory.j.mellema@usace.army.mil or sent directly to me at the address given below. If possible, we would like to have the surveys returned by June 20, 2003.

If you have any questions, contact me anytime.

Thanks,

Greg Mellema, P.E.
US Army Corps of Engineers
CENWO-HX-G
12565 W. Center Road
Omaha, NE 68144
402-697-2658
gregory.j.mellema@usace.army.mil

Attachment 2

St. Louis River Superfund Site Five-Year Review
Comment and Information Survey

Name: John Betcher	**Organization:** MPCA
Telephone No: 651-296-7821 **Fax No:** **E-Mail Address:** john.betcher@pca.state.mn.us	**Street Address:** 520 Lafayette Road North **City:** St. Paul **State, Zip:** MN 55155-4194

Comments for the:
(please check the name of the site for which these comments apply. Use a separate form for each site.)

____ US Steel Site **__X_ St. Louis River / Interlake / Duluth Tar Site**

1. What is your overall impression of the cleaned-up portions of this Superfund Site? (general sentiment)

The cleanup was carried out according to risk criteria to be protective for an industrial risk scenario. The cleanup was done based on the best historical information available at the time and the data collected during the RI and the excavation phase of remedy implementation. Citizen input was solicited during the development of cleanup plans and during remedy implementation.

2. Are you aware of any community concerns regarding the site administration related to completed clean-up activities? If so, please give details.

No

3. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give dates, details, and outcome(s) if known.

No

4. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?

It should be kept in mind that the site cleanup was based on an industrial land use scenario. If an alternative land use is proposed additional cleanup may be required to bring the site to acceptable risk criteria for alternative land uses.

(Form continued on next page)

St. Louis River Superfund Site Five-Year Review

Comment and Information Survey - Con't

Name: John Betcher

5. Are you aware of any issues that may require changes to the completed remedial actions or the decision documents?

Some residential land uses have been investigated for the site that might require additional remedial actions to bring the site to an acceptable level of risk. I am not aware how realistic it might be that these proposals will become reality. Any future development would most likely be done under MPCA oversight in the Voluntary Investigation & Cleanup program.

6. Have any problems or difficulties been encountered regarding institutional controls or deed restrictions?

Not aware of any

7. Do you feel the completed remedies are functioning as expected? Why or why not?

I expect that they are as long as the institutional controls are being follwed.

8. Are you aware of any issues, which may call into question the site's short-term or long-term protectiveness?

No

9. Are you aware if there are any trends that indicate contaminant levels are increasing or decreasing?

No

(Form continued on next page)

St. Louis River Superfund Site Five-Year Review

Comment and Information Survey - Con't

Name: John Betcher

10. Is there a continuous O&M presence? Please describe staff and frequency of site inspections and activities.

Don't know

11. Have there been any significant changes in O&M requirements, maintenance schedules, or sampling routines? If so, do they affect the protectiveness or effectiveness of the remedy?

Don't know

12. Have there been unexpected O&M difficulties or costs at the site? If so, please give details.

Don't know

13. Do you have any other comments, concerns or recommendations regarding the project?

No

Attachment 2

St. Louis River Superfund Site Five-Year Review
Comment and Information Survey

Name: Anne Moore	Organization: MPCA
Telephone No: (218) 723-2356 Fax No: (218) 723-4727 E-Mail Address: anne.moore@pca.state.mn.us	Street Address: 525 Lake Avenue South, Suite 400 City: Duluth State, Zip: MN 55802

Comments for the:
(please check the name of the site for which these comments apply. Use a separate form for each site.)

____ US Steel Site ___x_ St. Louis River / Interlake / Duluth Tar Site

1. *What is your overall impression of the cleaned-up portions of this Superfund Site? (general sentiment)*

The site looks appropriate for its many current uses.

2. Are you aware of any community concerns regarding the site administration related to completed clean-up activities? If so, please give details.

No.

3. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give dates, details, and outcome(s) if known.

No.

4. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?

I think the team is doing the best they can.

(Form continued on next page)

St. Louis River Superfund Site Five-Year Review

Comment and Information Survey - Con't

Name: Anne Moore

5. Are you aware of any issues that may require changes to the completed remedial actions or the decision documents?

No; it's my understanding that all monitoring results have been in the acceptable ranges.

6. Have any problems or difficulties been encountered regarding institutional controls or deed restrictions?

Not that I'm aware of.

7. Do you feel the completed remedies are functioning as expected? Why or why not?

Yes.

8. Are you aware of any issues, which may call into question the site's short-term or long-term protectiveness?

No.

9. Are you aware if there are any trends that indicate contaminant levels are increasing or decreasing?

No.

(Form continued on next page)

St. Louis River Superfund Site Five-Year Review

Comment and Information Survey - Con't

Name: Anne Moore

10. Is there a continuous O&M presence? Please describe staff and frequency of site inspections and activities.

Yes. Site team visit Stryker Bay several times per year for reasons unrelated to the cleaned up soil operable units.

11. Have there been any significant changes in O&M requirements, maintenance schedules, or sampling routines? If so, do they affect the protectiveness or effectiveness of the remedy?

Not that I'm aware of.

12. Have there been unexpected O&M difficulties or costs at the site? If so, please give details.

13. Do you have any other comments, concerns or recommendations regarding the project?

I hope the Five-Year review report will help the community better understand the remedies in place and what they can expect from them in the future.

St. Louis River Superfund Site Five-Year Review
Public Comment and Survey Form

[redacted]

Name: [redacted]	**Organization:** IRVING COMM CLUB
Telephone No:	**Street Address:** [redacted]
Fax No:	**City:** DULUTH
E-Mail Address:	**State, Zip:** MINN 55807

Questions and Comments for the:
(please check the name of the site for which these comments apply. Use a separate form for each site.)

____ US Steel Site ✓ St. Louis River / Interlake / Duluth Tar Site

1. What is your overall impression of the cleaned-up portions of this Superfund Site? (general sentiment)

AS FAR AS I KNOW IT HAS BEEN CLEANED UP TO INDUSTRIAL STANDARDS.

2. What effects have completed site clean-up operations had on the surrounding community?

NONE - CERTAINLY NO CLEANER AIR.

3. Are you aware of any community concerns regarding the site administration related to completed clean-up activities? If so, please give details.

1- SINCE THE CLEAN UP. THE AREA HAS PERMITTED EARTH BURNERS TO POLLUTE & TO HAVE A BURN THAT WAS INCOMPLETE - I WONDER WHERE THIS SO CALLED CLEAN SOIL WAS DUMPED?

2. WOOD WASTE ENERGY WAS PERMITTED TO GRIND CREOSOTE TIES, RESULTING IN AIR POLLUTION. MY HOUSE HAS TO BE POWER WASHED AND I LIVE SEVERAL BLOCKS AWAY. MY HOUSE WAS NEWLY SIDED IN THE LAST TWO YRS. MY PORCHES ARE FILTHY.

IN MY OPINION, THESE DIRTY BULK INDUSTRIES SHOULD NOT BE PERMITTED

(Form continued on next page)

St. Louis River Superfund Site Five-Year Review

Public Comment and Survey Form - Con't

Questions and Comments:

Name: [redacted]

4. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give dates, details, and outcome(s) if known.

NO

5. Do you feel well informed about the site's completed clean-up activities and progress? Also, what is your preferred method of communication (web-page updates, public notices, public meetings, etc.)?

BY PUBLIC MEETINGS

6. Do you have any other comments, suggestions, or recommendations regarding the site's management or operation?

THIS AREA WOULD BE BETTER SUITED FOR HOUSING & MARINA ACTIVITIES

Comments should be mailed or faxed to:
Mr. Greg Mellema, U.S. Army Corps of Engineers,
12565 W. Center Road, Omaha, NE 68144
fax: 402-697-2613
Comments must be received no later than June 20, 2003.

St. Louis River Superfund Site Five-Year Review
Public Comment and Survey Form

Name: [redacted]	**Organization:** Irving Community Club
Telephone No: [redacted]	**Street Address:** [redacted]
Fax No: No	**City:** Duluth
E-Mail Address: No	**State, Zip:** MN 55807

Questions and Comments for the:
(please check the name of the site for which these comments apply. Use a separate form for each site.)

___ US Steel Site _✓_ St. Louis River / Interlake / Duluth Tar Site

1. What is your overall impression of the cleaned-up portions of this Superfund Site? (general sentiment)

No Comment

2. What effects have completed site clean-up operations had on the surrounding community?

No Comment

3. Are you aware of any community concerns regarding the site administration related to completed clean-up activities? If so, please give details.

No Comment

(Form continued on next page)

St. Louis River Superfund Site Five-Year Review

Public Comment and Survey Form - Con't

Questions and Comments:

Name:

4. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give dates, details, and outcome(s) if known.

No Comment

5. Do you feel well informed about the site's completed clean-up activities and progress? Also, what is your preferred method of communication (web-page updates, public notices, public meetings, etc.)?

I prefer public meetings in West Duluth.

6. Do you have any other comments, suggestions, or recommendations regarding the site's management or operation?

No Comment

I am unable to attend most of the meetings concerning St. Louis River problems but thank you for giving me the opportunity to voice my opinion.

Comments should be mailed or faxed to:
Mr. Greg Mellema, U.S. Army Corps of Engineers,
12565 W. Center Road, Omaha, NE 68144
fax: 402-697-2613
Comments must be received no later than June 20, 2003.

St. Louis River Superfund Site Five-Year Review
Public Comment and Survey Form

Name: [redacted]	**Organization:** Fam Leasing Earth Burners Inc
Telephone No: 218- [redacted]	**Street Address:** 5910 Fremont Street
Fax No: 218- [redacted]	**City:** Duluth
E-Mail Address: earthbrn@cpinternet.com	**State, Zip:** Mn 55807

Questions and Comments:

1. What is your overall impression of the project? (general sentiment)

2. What effects have site operations had on the surrounding community?

3. Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.

(Form continued on next page)

Comments should be mailed or faxed to:
Mr. Greg Mellema, U.S. Army Corps of Engineers,
12565 W. Center Road, Omaha, NE 68144
fax: 402-697-2613
Comments must be received no later than June 20, 2003.

Attachment 2

St. Louis River Superfund Site Five-Year Review

Public Comment and Survey Form - Con't

Questions and Comments:

4. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details. yes. a monitoring well was placed on our property without authorization from the owners. It was brought up to both the Engineer + the MPCA + it was asked to have the proper paper work completed or remove the well. They both just Laughed. today, an illegal well still remains on our property.

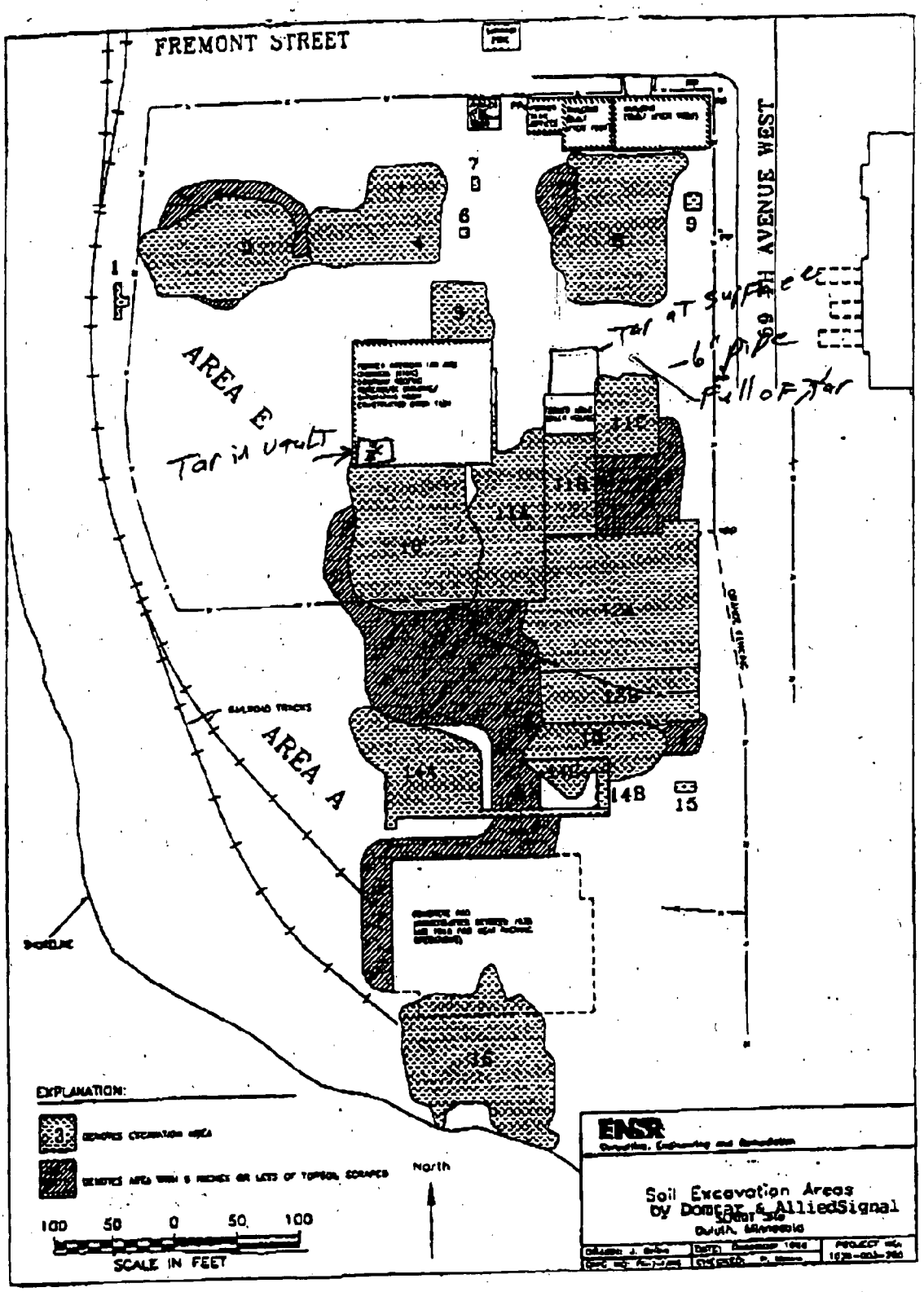
5. Do you feel well informed about the site's activities and progress?

6. Do you have any other comments, suggestions, or recommendations regarding the site's management or operation?

the R.O.D. on this site is not complete as the ROD was intended. this has been brought up with the Engineer, Dom Tar + the MPCA. they all just laughed.

1. Tar remains on site to this day well above the ROD Limitations
2. this remaining tar has been corrisponded to all parties involved with no response.
3. Restrictive Convenance on the Title of my property has not been filed according to the ROD.

all + all, the ROD is not complete on this property. the world needs to know if they won't complete the ROD, they sure won't conduct the next portion in the bay right or complete it either.


FREMONT STREET
69TH AVENUE WEST
AREA E
AREA A
Tar at surface
6" pipe
Full of Tar
Tar in vault
RAILROAD TRACKS
SHORELINE
EXPLANATION:
North
100 50 0 50 100
SCALE IN FEET
ENSR
Soil Excavation Areas
by Domtar & AlliedSignal
Duluth, Minnesota

Attachment 3

St. Louis River/Interlake/Duluth Tar Documents Reviewed

January 1990	Final Report Remedial Action Vol. 1
January 1990	Final Report Remedial Investigation Vol. 2
July 1990	Final Report Feasibility Study
October 1990	ROD for the Tar Seeps
May 1992	Draft-Supplemental Remedial Investigation Report
July 1992	Final Field Design Investigation Report
October 1992	Draft-Baseline Risk Assessment Human Health Evaluation
May 1993	Site Response Section and RFRA
September 1993	Explanation of Significant Differences (Tar Seeps OU)
December 1993	Additional Supplemental Remedial Investigation
December 1993	Alternatives Screening Report Soil OU
December 1993	Final Remedial Investigation Report for the Soil OU
January 1994	Draft-Alternatives Array Document for Areas A & E
February 1994	Final Remedial Action Report for the Tar Seeps
March 1995	Draft-Feasibility Study
September 1995	ROD for the Soil OU
December 1995	Remedial Design/Remedial Action Plan for Areas A and E
December 1995	Remedial Design/Response Action Plan for the Soil OU
September 1996	Explanation of Significant Differences (Soil OU)
December 1996	Air Sparge Plot Test Report
August 1997	Implementation and Completion Report Interlake Portion of the Soil OU

August 1997	Remedial Action Implementation Report Soil OU Areas A & E
October 1997	Technical Memorandum on Remedial Action Implementation Report (Soil OU)
November 1997	Technical Memorandum on Remedial Action Implementation Report (Soil OU)
November 1998	Proposed Plane for the Sediment OU
August 1999	Environmental Restrictive Covenant Declaration of Restrictions and Covenants
October 1999	ROD, Decision Summary for the Sediment OU
December 1999	Declaration of Restrictions and Covenants (Cedar Bay Partners)
December 1999	ROD for the Sediment OU
October 26, 2000	Memo from Carl Herbrandson, PhD Toxicologist, Minnesota Department of Health, about Earth Burner Emissions.
January 2001	Declaration of Restrictions and Covenants (Maurices, Incorporated)
March 2001	Declaration of Restrictions and Covenants and Affidavit Concerning Real Property Contaminated with Hazardous Substances (Kemp Fisheries Company)
June 2002	Maurices' Parking Lot Draft Completion and Closure Request (Soil OU)
November 2002	Draft-Date Gap Report
December 2002	Addendum to the Documentation of OU Completion Report (SoilOU)
	Miscellaneous Letters, Memos, Articles, and Contracts

Attachment 4

Five-Year Review
For
US Steel Site and St. Louis River/ Interlake/ Duluth Tar Site
Task: Site Inspection

Date	Name (Please Print)	Signature	Organization	Phone Number
6-26-03	T Reinig	[illegible]	USACE	402 221 7661
	K Witt	[illegible]	USACE	712-322-1581
	J Carrig	[illegible]	USACE	402-221-7754
	G. Mellema	[illegible]	USACE	402-697-2658
	K. Siemann	[illegible]	USACE	402-221-7682
	Jon Peterson	[illegible]	USEPA	312-353-1264
	Mike Costello	[illegible]	SERVICE ENG	651 644 6680
	Vilma Rivera	Vilma Rivera Carrero	USEPA	312-886-7795
	Ginger Jager	Ginger Jager	USEPA	312 886 0767
	Steven Thrall	[illegible]	USEPA	312 886 0767
	Jeff Myers	[illegible]	USEPA	312 353 1027
	Michael Hancox	[illegible]	E^2	434-~~995~~-6700
	Jen Trompeter	[illegible]	E^2	434 979 6700
	Mike McPoshen	[illegible]	Hallett Dock	218 628-2281
	Crystal Gilbertson	[illegible]	MPCA	218-529-6255
	Jane Mosel	Jane Mosel	MPCA	218-529-6250
	Peter Moore	[illegible]	ENSR	952-924-0117

Attachment 4

Five-Year Review
For
US Steel Site and St. Louis River/ Interlake/ Duluth Tar Site
Task: Site Inspection

Date	Name (Please Print)	Signature	Organization	Phone Number
6-25-03	Mike Bares	[illegible]	MPCA	651-297-8599
6-25-03	Crystal Gilberson	[illegible]	MPCA	218-529-6255
6-25-03	Laura Solano	[illegible]	MPCA	218-529-6254