

GENERAL SITE INFORMATION, CHARACTERISTICS, AND STATUS

Project Name	<u>LTV STEEL</u>	ProjectID: 05-09
Last Updated:	11/06/98	
City:	East Chicago	
County:	Lake	
State:	IN	
Country:	USA	
Bodies of Water:	Intake Flume; Indiana Harbor Canal; Lake Michigan	
US EPA Region:	V	
Status (Active, Complete, or Monitoring Only):	Complete	
Date On NPL:	N/A	
ROD/ESD Date:	N/A	
Operable Unit:	N/A	
Areas of Concern (length or acres):	3500 feet of Intake Flume, supplying avg. daily process water flow of 147 million gallons; width ranges from 96-467 feet.	
Other Characteristics of Water Body:	Avg. width of the flume is 186 feet ranging from 96-467 feet, terminating in a 450 foot wide basin upstream of the service intake pump station. Flume water depth ranges from 8-23 feet. Impacted sediment thickness ranged from 3-12 feet. The width of impacted sediments averaged 73 feet, and was restricted by reposed fill material forming the sides of the flume. Average daily flow was 147 million gallons, representing 58% of LTV Steel's Indiana Harbor Works fresh water requirements. Average flow velocity, 0.07-0.12 fps.	
Contaminants of Concern:	PAHs (oils)	
Source of Contamination:	As alleged in the Clean Water Act complaint, a spill of 300-400 gallons of oil from an oil retention pond adjacent to the No. 2 Intake Flume.	
Contaminated Area Physical Characteristics:	Oil-contaminated sediments in a 3,500 foot intake channel (flume).	
Type of Regulatory Action:	Clean Water Act Consent Decree (1992).	
Overall Status Summary:	LTV is on a peninsula abutting the Indiana Harbor Ship Canal and Lake Michigan. Sediment remediation was initiated in 1994 to remove, treat, and dispose of oil-contaminated sediments located in a 3,500' intake channel between the site and the Indiana Harbor Canal. The intake channel provided process water (147 million gallons per day) and was kept operational during the entire remediation. Targeted "removal of sediment down to original lake bottom." Winter and mechanical difficulties caused delays. Completed 10 - 15% of project in 1994 using diver-assisted vacuum dredging teams. Too slow and inefficient. Completed remaining 85 - 90% in 1995 - 1996 using a hydraulic dredge. Solids dewatered and transported to a State special waste landfill; oils recovered and recycled to blast furnace. Completed late 1996. Removed 109,000 cy.	
Remedial Action Planned:	<input checked="" type="checkbox"/>	
Risk Assessment:	<input type="checkbox"/>	
Remedial Action Implemented:	<input checked="" type="checkbox"/>	
Status of Dredging	<input type="checkbox"/>	
PRPs:	<input checked="" type="checkbox"/>	

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<i>Contacts:</i>	<input checked="" type="checkbox"/>
<i>References:</i>	<input checked="" type="checkbox"/>
<i>Modeling:</i>	<input type="checkbox"/>
<i>Fishing Advisory:</i>	<input type="checkbox"/>
<i>Key Conditions:</i>	commercial landfill, dredging, floating oil

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Target Sediment Cleanup Standards (TSCS): None

How TSCS Established: N/A

Target Bank and Floodplain Cleanup Levels (if applicable): N/A

Other Target: None

Environmental Sample Data References:

- **Sediment:** Reference A-167
- **Water:** Reference A-167
- **Fish:** None

Estimated Target Volume: 96,000 - 115,000 cy

Planned Disposal Method:

Estimated Calendar Time to Implement Remedy: 18 months

Estimated Time to Implement Remedy: 18 months

Estimated Cost to Implement Remedy: Not available

Stated Remedial Action Objectives (and Source): Source: Reference A-167

"Based on the environmental appraisal of the current conditions in the FLUME, it is concluded that the conditions do not pose substantial risks to human health or to ecological receptors. As a result, the remedial objective inferred in the Consent Decree, to remove sediment to the natural FLUME bottom elevation is appropriate as a response to the petroleum impacted sediments. That is, risk-based remedial objectives are not appropriate."

"LTV is required via the Consent Decree to remove oil-impacted sediment from the FLUME... Section V, paragraph 14 of the Consent Decree defines the scope as the removal of "...all settled material (including all loose, solid and slurry material, whether oil-contaminated or not) between the slag fill walls of the FLUME, down to the slag fill at the bottom of the FLUME or the "hard pan" of the original lake-bottom, whichever is shallower." This removal effort will extend from the breakwall northeast to the air curtain on the southwestern edge of the FLUME."

"Based on the above language, this SRDP establishes an elevational standard for verification of sediment removal.... The elevational standard is appropriate in that a risk-based clean-up standard is not necessary for protection of human health or the environment."

"The overall project objectives are to comply with the Consent Decree. These project objectives are:

- Remove the sediment from the FLUME down to the elevation of the slag fill or lake

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bottom;

- Evaluate the possibility of recycling for beneficial use or disposal of the sediments into the steel-making process; and
- Dispose of the sediment in accordance with all relevant and applicable Federal State and local regulations."

"Sediment will be removed from the FLUME bottom by divers using vacuum hoses, the only option considered suitable for minimizing resuspension and protecting service water quality. The sediment will be piped to primary settling/staging tanks for solids, flocculation and settling. The overflow from the primary settling/staging tanks will be piped to the Plant's MSD Filtration Plant for treatment (settling, oil removal) prior to discharge to Plant Outfall 011. The underflow slurry will be piped to slurry conditioning tanks where the slurry will be mixed with a filtration aid. From the slurry conditioning tanks, the conditioned slurry will be piped to pressure filters for dewatering. The filtrate from the dewatering operations will be piped to the Plant's MSD Filtration Plant for treatment prior to discharge through Plant Outfall 011. The dewatered sediment will be transferred from the pressure filters directly into lugger boxes which will be shipped via truck to CID Landfill in Calumet City, Illinois for disposal."

"All floatable/recoverable oils will be collected and transported to the Plant's on-site oil reclamation plant for recovery as fuel and/or blast furnace injectant oil."

"With respect to environmental control, the salient features of the above activities are as follows:

- Removal of sediment by divers will minimize resuspension of sediment in the water column. This removal method is selected because Plant operational constraints (i.e., protection of Plant intake pumps and Plant service water quality) are as stringent as, or more stringent than, environmental constraints.
- Sediment and sediment constituents will not be placed in or on the land during removal and dewatering activities.
- Wastewater generated during sediment dewatering activities will not be discharged to surface water until treated in the Plant's MSD Filtration Plant.
- Because of the use of enclosed tanks, site workers will have little or no direct exposure to sediment and sediment constituents."

Measures of Success to be Used:

Source: Reference A-167

"In accordance with the Consent Decree requirement, the sediment in the FLUME will be removed to the elevation standard. Because current conditions are believed to pose de minimis risks to human and ecological receptors, a risk-based clean-up objective is neither necessary nor appropriate. As with any sediment removal operation, it will not be possible to remove all of the oil-impacted sediment in the FLUME. This practical fact was recognized by the signatories to the Consent Decree when the elevation standard was selected as the clean-up objective. Although removal of all oil-impacted sediment is not practically possible, the selected removal method (divers using vacuum hoses) will ensure that all sediment that can be practically removed will be removed. A sonar profiling survey will be conducted to verify that the elevation standard has been achieved. Sonar verification of sediment removal will be documented and reported in a clean-up verification report. At the conclusion of the clean-up program, it is

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expected that only small residual "pockets" of oil impacted sediment will be left in the FLUME."

Planned Monitoring and Restoration:

Source: Reference A-167

"Upon completion of the sediment removal operations, LTV and its consultant will conduct a post-removal instrumental profiling survey using the methods employed to conduct the pre-removal profiling survey. The results of the pre- and post-removal surveys will be compared to estimate the total amount of sediment removed from the FLUME and to verify sediment removal operations. If comparison varies significantly, divers will be redeployed to the FLUME to conduct a visual inspection of FLUME bottom conditions. If the results of these inspections demonstrate the need for additional removal operations in certain sections of the FLUME, such operations will be conducted until visual compliance with the qualitative standard has been achieved."

Agency Position on Sediment Removal (and Source):

Source: Reference A-167

"The Consent Decree requires the removal of FLUME sediment. Removal verification will be based on an elevational standard. In addition to meeting the elevational standard, LTV and its consultant has established design criteria for sediment removal operations. In general, these criteria focus on maintenance of a continuous service water intake supply to the Plant and protection of intake water quality during removal operations. These criteria place constraints on the removal operations relative to minimizing sediment resuspension and mitigation of the sediment from the locations of removal activities to the Plant service water intake."

"Throughout the removal process, a continuous intake water supply to LTV must be maintained. Sediment resuspension must be minimized to protect intake water quality. The release of dredged materials to the FLUME must be prevented to maintain water quality. The removal process should maximize solids concentrations in the removed material while minimizing the amount of virgin bottom material removed. The removal process should show demonstrated success in similar applications, be capable of meeting the elevation removal verification standard, and maintain compatibility with subsequent processes (e.g., staging, dewatering)."

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Project Name:	<u>LTV STEEL</u>	ProjectID: 05-09
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Physical Target:	3,500 foot intake channel (flume) between the Indiana Harbor Ship Canal and the LTV Steel plant, providing 147 million gallons per day of process water; width 96 to 467 feet.	
Goals:	Contaminants were PAHs and oils. Target was removal of all settled sediment down to either the underlying slag fill or the natural "hard pan" at the bottom of the channel. Removal was required to be accomplished without interrupting the supply of process water.	
Primary Contractor:	Lindahl Marine Contractors	
Other Contractors:	Ohio River Dredge and Dock; FBA Environmental (was Floyd Browne, Associates); Waste Management; Clean Harbors.	
Generic Remediation Method:	Hydraulic dredging; diver-assisted	
Equipment:	<p>Performed 10 - 15% of project using diver-assisted vacuum dredging teams; poor production; removed only 12,000 cy in first year, with a peak daily removal rate of 200 cy. Switched to 10-12-inch cutterhead dredge with 8-inch discharge pipe for years 2 and 3; deployed silt curtains and floating booms. The 8-inch discharge pipe allowed for higher velocity to pump up a 50-foot lift and reduced the volume of flow to a manageable level for the land-based wastewater treatment facilities.</p> <p>Hydraulic dredging was started using an open suction to minimize sediment resuspension. Due to numerous suction plugs, resulting from plastic products, cables, rock, boulders, and slag, it was decided to install the dredge cutter. A basket-style seven-blade cutter was modified to allow for no larger than two inch particles to pass through the cutter. A steel shroud was fabricated for the cutter, but it was never needed. With the addition of the cutter operating at a low RPM, no increase was noticed in turbidity levels as compared to the use of the open suction type operation. The dredge swing was operated at less than 50% of dredge capability. With the cutter installed, down time due to suction and pump stops were almost completely eliminated. Production was dramatically improved. The average combined weekly removal rate for the divers and dredge was 2,100 cubic yards. This weekly average accounted for all project delays such as equipment repair and replacement, weather delays, holidays, and any routine maintenance which suspended operations. During 1995 and 1996, a peak weekly removal rate of 3,295 cubic yards and a peak daily removal rate of 1,040 cubic yards were reached. In 1995, approximately 52,000 cubic yards of sediment were removed and approximately 45,000 cubic yards of sediments were removed in 1996: more than four times the volume removed by the dive teams in 1994. Hydraulic dredging averaged 3 - 5% solids, with 12% the maximum attained.</p>	
Material Handling:	<p>Sediments removed by the divers and subsequently the dredge were screened to remove debris, rocks, and large sediment fragments (greater than 10 mesh). (Dredged material was pumped to one of three shakers. The 10 mesh requirement was set to protect the belt presses). After screening, the sediments were pumped almost a mile for processing. Coagulant aids were added and the removed sediments were thickened using existing clarifiers followed by belt presses for dewatering, and transported off-site to a solid waste landfill. Prior to transportation, the average solids concentration of the dewatered sediment was approximately 60 percent. Once hydraulic dredging was implemented, downstream solids handling capability had to be increased. The major downstream constraint was the solids handling capability of the thickener. To minimize this downstream constraint, LTV Steel Company agreed to using two thickeners. The maximum solids handling capacity was increased to 85,210 pounds per hour or the equivalent 880 cubic yards per day of in-situ material. To minimize overloading the thickeners, the target removal rate was set at approximately 75% of the maximum solids handling capacity of the thickeners or 660 cubic yards per day of in-situ material.</p>	

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Project Name:	<u>LTV STEEL</u>	ProjectID: 05-09
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Volume Removed:	109,000 cy	
Calendar Time:	June 1994 to October 1996.	
Time To Implement:	Three years (5 months per year; 6 days per week first year; 5 days per week second year; 10 hours per day).	
Total Cost:	\$12 million; \$110 per cy	
Dredging Cost:	Not available.	
Disposal of Sediment:	Involved 4,180 truckloads, for a total of 79,925 tons of dewatered solids (avg. solids concentration of 58%). Dewatered solids disposed at Chemical Waste Management's CID Landfill in Calumet City, IL. Also, 26,320 gallons of oil were recovered from the sediments.	
Volume of Water:	Not available (treatment was in an existing onsite industrial wastewater treatment facility)	
Method of Water Treatment:	Water from dewatering and from thickener overflow sent through existing LTV clarifiers and sand-filters and discharged.	
Water Discharge Limit:	Treated water sent to LTV's MSD Filtration Plant and mixed with other flows and discharged through Plant Outfall 011.	
Air Monitoring During Remediation:	Apparently none.	
Water Monitoring During Remediation:	Due to concerns about water quality during hydraulic dredging, turbidity was continuously monitored at the intake, and a limit of 10 NTUs above background was set (requiring shutdown of dredging if exceeded). The water quality was also monitored daily 200 feet downstream of the dredge. During the 1995 and 1996 seasons, the average turbidity recorded directly downstream of the dredge was 4.2 NTUs and ranged from 2 to 10 NTUs. The average background turbidity was 3.8 NTUs. No significant change in turbidity was recorded at the fixed 24-hour continuous monitoring station during the removal operations.	
Outcome:	A depth standard was targeted and achieved which in turn resulted in oil-contaminated, as well as some clean sediments, being removed and disposed.	
Restoration and Post-Monitoring:	See "Outcome" above. Long-term goal or benefit, or means of measuring same, is not clear.	
Site-Specific Difficulties:	<p>Low dive team production, compounded by the presence of debris, rocks, and plastic refuse. Operational constraints imposed by need to minimize turbidity and not interfere with continuous supply of process water through the channel. Torque limitation on thickener arm was a limitation on % solids that could be delivered from dredge; thickener arm broke once during the 1994 operating season causing 1-2-month project shutdown. Difficulties imposed by winter weather also caused delays.</p> <p>Following the 1994 removal operations, it was apparent that the major downstream constraint was the solids handling capability of the thickener. To minimize this downstream constraint, two available thickeners were used. This effectively doubled the solids handling capacity. To minimize overloading the thickeners, the target removal rate was set at approximately 75% of the maximum solids handling capacity of the thickeners or 660 cubic yards per day of in-situ material. LTV also developed an inventory of spare parts for the thickeners to minimize downtime for any needed repairs.</p>	

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Monitoring Data None

References:

- **Sediment**
- **Water:**
- **Fish:**

POTENTIALLY RESPONSIBLE PARTIES

Project Name **LTV STEEL**

ProjectID: 05-09

PRP Name: PRP INFORMATION NOT RELEASED

PRPID:

Street Address:

City:

State:

KEY CONTACTS

Project Name **LTV STEEL**

ProjectID: 05-09

Last Name: KEY CONTACT INFORMATION NOT RELEASED

Contact ID:

First Name:

Title:

Company:

Address:

City:

State:

Postal Code:

Work Phone # :

Other Phone #:

Fax # :

Email Address:

REFERENCES

Project Name **LTV STEEL**

ProjectID: 05-09

Reference Type: A

ReferenceID: 167

Title: ***Sediment Removal Disposal Plan - LTV Steel Company, Indiana Harbor Works, East Chicago, Indiana***

Location: AEM

Category: Site Update

Prepared by/Author: Floyd Browne Associates, Inc.

Preparer/Author Address: Marion, OH

Prepared For: LTV Steel Company

Date Published: August 1993

Key Words and Phrases:

Reference Type: A

ReferenceID: 365

Title: ***Certification Report (Final): No. 2 Intake Flume: Sediment Removal and Disposal Project: LTV Steel Company***

Location: AEM

Category: Site Update

Prepared by/Author: FBA Environmental, Inc.

Preparer/Author Address:

Prepared For: LTV Steel Company

Date Published: August 1997

Key Words and Phrases:

Reference Type: B

ReferenceID: 762

Title: ***Realizing Remediation I - Great Lakes Contaminated Sediments LTV Steel Site - Indiana Harbor (see Reference A-905)***

Location: AEM

Category: Dredging: Remedial (Contaminated Sediments)

Prepared by/Author: US EPA Great Lakes National Program Office (GLNPO)

Preparer/Author Address: 77 West Jackson Boulevard (G-17J)
Chicago, IL 60604

Prepared For: General Public

Date Published: August 1, 2002

Key Words and Phrases:

REFERENCES

Project Name LTV STEEL

ProjectID: 05-09

Reference Type: B

ReferenceID: 814

Title: *Realizing Remediation II - Updated Summary:
Indiana Harbor - LTV Steel Site
(see Reference A-907)*

Location: AEM

Category: Dredging: Remedial (Contaminated Sediments)

Prepared by/Author: US EPA Great Lakes National Program Office (GLNPO)

**Preparer/Author
Address:** 77 West Jackson Boulevard (G-17J)
Chicago, IL 60604

Prepared For: General Public

Date Published: July 2000

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 1035

Title: *None: Two Pages from FBA Environmental, Inc. Report re
Method of Relating In-Situ Cubic Yards to Out-the-Gate Tons*

Location: AEM

Category: Mass Balance

Prepared by/Author: FBA Environmental, Inc.

**Preparer/Author
Address:**

Prepared For: LTV Steel

Date Published: 1996 circa

**Key Words and
Phrases:**

Reference Type: C

ReferenceID: 162

Title: *Ohio River Dredge & Dock Removes Contaminated Sediment
from Indiana Industrial Site*

Location: AEM

Category: Site Update

Prepared by/Author:

**Preparer/Author
Address:**

Prepared For: International Dredging Review (IDR), 1996, Vol. 15, No. 5

Date Published: September/October 1996

**Key Words and
Phrases:**

REFERENCES

Project Name **LTV STEEL**

ProjectID: 05-09

Reference Type: C

ReferenceID: 344

Title: ***Corps Proposes \$136 Million Plan to Dredge Indiana Harbor Sediment***

Location: AEM

Category: Site Update

Prepared by/Author:

Preparer/Author Address:

Prepared For: Superfund Week

Date Published: November 6, 1998

Key Words and Phrases:

Reference Type: E

ReferenceID: 247

Title: ***Remediation of Sediments by Dredging: Methods and Case Histories***

Location: AEM

Category: Dredging: Remedial (Contaminated Sediments)

Prepared by/Author: Bradford S. Cushing

Preparer/Author Address: AEM, Inc.

Prepared For: WODCON XV Conference, Las Vegas, NV

Date Published: June 28 - July 2, 1998

Key Words and Phrases:

Reference Type: R

ReferenceID: 1

Title: ***Letter to PRP re: Case Histories: Contaminated Sediment Sites (with response from LTV Steel)***

Location: AEM

Category: Site Update

Prepared by/Author: AEM, Inc. with response from LTV Steel

Preparer/Author Address: Malvern, PA 19355

Prepared For: LTV Steel Company, submitted to

Date Published: August 17, 1998

Key Words and Phrases:
