

GENERAL SITE INFORMATION, CHARACTERISTICS, AND STATUS

<i>Project Name</i>	<u>FORMOSA PLASTICS</u>	<i>ProjectID:</i> 06-04
<i>Last Updated:</i>	08/11/98	
<i>City:</i>	Point Comfort	
<i>County:</i>	Calhoun	
<i>State:</i>	TX	
<i>Country:</i>	USA	
<i>Bodies of Water:</i>	Turning basin in Lavaca Bay	
<i>US EPA Region:</i>	VI	
<i>Status (Active, Complete, or Monitoring Only):</i>	Complete	
<i>Date On NPL:</i>	N/A	
<i>ROD/ESD Date:</i>	N/A	
<i>Operable Unit:</i>	N/A	
<i>Areas of Concern (length or acres):</i>	Area impacted by a spill --- about 150 by 350 feet (1.1 acres) in corner of an active turning basin.	
<i>Other Characteristics of Water Body:</i>	Water depth of 25 - 35 feet	
<i>Contaminants of Concern:</i>	ethylene dichloride	
<i>Source of Contamination:</i>	On shore pipeline leak which flowed to a drainage ditch then into the bay.	
<i>Contaminated Area Physical Characteristics:</i>	Six to 12 feet of soft silty bay floor underlain by thick, high plasticity clay.	
<i>Type of Regulatory Action:</i>	Emergency response action with the Texas Water Commission and the Calhoun County Navigation District.	
<i>Overall Status Summary:</i>	A spill of ethylene dichloride (EDC) contaminated a 1.1 acre area in a harbor in Lavaca Bay, TX. Hydraulic dredging only removed 500 cy due to severe water capacity limitations on land. Subsequently, in 1992, 7000 cy was removed to 500 ppb EDC in 4 weeks using a barge-mounted crane and 4 cy environmental bucket. Material dewatered, stabilized with cement, and transported to two commercial hazardous waste landfills.	
<i>Remedial Action Planned:</i>	<input checked="" type="checkbox"/>	
<i>Risk Assessment:</i>	<input type="checkbox"/>	
<i>Remedial Action Implemented:</i>	<input checked="" type="checkbox"/>	
<i>Status of Dredging</i>	<input type="checkbox"/>	
<i>PRPs:</i>	<input checked="" type="checkbox"/>	
<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, water handling limitations, solidification / stabilization	

REMEDIAL ACTION PLANNED

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Target Sediment Cleanup Standards (TSCS):	500 ppb ethylene dichloride (EDC).	
How TSCS Established:	Unknown	
Target Bank and Floodplain Cleanup Levels (if applicable):	N/A	
Other Target:	N/A	
Environmental Sample Data References:	Not available	
	<ul style="list-style-type: none">• Sediment:• Water:• Fish:	
Estimated Target Volume:	3,300 cy	
Planned Disposal Method:		
Estimated Calendar Time to Implement Remedy:	Unknown	
Estimated Time to Implement Remedy:	Unknown	
Estimated Cost to Implement Remedy:	Unknown	
Stated Remedial Action Objectives (and Source):	Remove the contaminated material from the ship loading area, and prevent any impact to the Greater Lavaca Bay system which is used as a shrimp, oyster, and commercial fishing area.	
Measures of Success to be Used:	Attainment of 500 ppb cleanup level for ethylene dichloride.	
Planned Monitoring and Restoration:	None identified	
Agency Position on Sediment Removal (and Source):	<p>After a failed attempt using a hydraulic dredge (unable to manage the large volume of water generated), Formosa offered four alternatives to the Texas Water Commission, including:</p> <ol style="list-style-type: none">1) in-situ bioremediation:2) in-situ destruction and stabilization3) cofferdamming of the area and a dry excavation and backfill technique to remove the solid, and4) sediment agitation <p>Three of the processes were proprietary in nature. The Texas Water Commission selected the cofferdam and dry excavation technique for the removal (Formosa subsequently had this overturned in favor of using an environmental clamshell bucket.) Two concerns were expressed</p>	

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by the Calhoun County Navigation District in considering remedial actions. First, the port would need to stay in operation during the execution of the clean-up. This dock area was designed to handle ship and barge traffic. The spill occurred in the area adjacent to the ship dock and extended almost the entire distance to the barge dock. The need to keep both of these dock facilities operational significantly restricted remedial designs. Second was the condition of the retaining wall and shoreline around the southeast corner of the warehouse that stood adjacent to the ship dock. Natural erosion had undermined the bulkhead that held the shoreline in place, leaving the bulkhead leaning out into the water, and the shoreline beneath the corner of the warehouse was collapsing. A remediation technique, which included a mass dredging methodology, would accelerate the erosion process. Although the warehouse was stable at the start of the job, there was concern about the stability of the shoreline and the warehouse in the event of hurricane.

REMEDIAL ACTION IMPLEMENTED

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Physical Target:	1.1 acre bottom area in a turning basin, contaminated with ethylene dichloride.	
Goals:	Achieve 500 ppb cleanup level.	
Primary Contractor:	AWD Technologies, Inc. (wholly-owned subsidiary of Dow Chemical)	
Other Contractors:		
Generic Remediation Method:	Hydraulic and mechanical dredging	
Equipment:	Barge-mounted crane using a specialized 4 cy clamshell bucket with similar (but not the same) features as the Cable Arm, Inc. environmental bucket. Full surface-to-bottom impermeable silt curtain, with anchors on the bottom of the curtain and anchor barges to hold the top of the curtain in place.	
Material Handling:	<p>A cutterhead hydraulic suction dredge was initially used to remove sediment from the corner of the turning basin. Additionally, a belt press dewatering system was used to stabilize dredged material for landfill (468 tons) and the resulting water (6.6 million gallons) was delivered to Formosa. It was the slow processing of the saltwater, conducted by Formosa, that contributed to the length of the initial project. An air stripper was even brought in at one point to provide onsite treatment of press water, but this system failed and the water was again delivered to Formosa for treatment. This method failed after only removing 500 cy of sediments due to the extremely limited capacity to handle such volume of water.</p> <p>Subsequently, during clamshell dredging, removed sediments were partially dewatered in barges by pumping off water, then stabilizing the material with 10 % Portland cement, and off-loading into dump trailers for transport to two commercial landfills.</p>	
Volume Removed:	7,500 cy	
Calendar Time:	Six months of hydraulic dredging in 1991 which removed only 500 cy due to severe water handling restrictions was followed by 4 weeks of clamshell dredging in April 1992.	
Time To Implement:	Four weeks (clamshell dredging)	
Total Cost:	Approximately \$1.4 million for the 7,000 cy removed by clamshell; approximately \$200 per cy.	
Dredging Cost:	Not available	
Disposal of Sediment:	Disposal at two hazardous waste landfills, Chemical Waste Mgt. in Lake Charles, LA and Texas Ecologists at Robstown, TX. Two were used to expedite landfilling before the May 8, 1992 land disposal treatment standard took effect.	
Volume of Water:	6.6 million gallons during hydraulic dredging; 800,000 gallons during clamshell dredging.	
Method of Water Treatment:	Decanted water from clamshell dredging, in temporary storage tanks, was sent to the Formosa Plastics steam stripper for treatment and discharged according to the plant operating permit specifications.	
Water Discharge Limit:	Decanted water from clamshell dredging, in temporary storage tanks, was sent to the Formosa Plastics steam stripper for treatment and discharged according to the plant operating permit specifications.	
Air Monitoring During Remediation:	Unknown	

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Water Monitoring During Remediation:	Water samples were taken twice per shift, just above the bottom of the bay and one foot below the surface on each side of a full depth impermeable curtain. "Stop dredging" limits were 500 ppb EDC inside and 250 ppb EDC outside. Only one failure outside the curtain.	
Outcome:	Project cleanup level of 500 ppb or less EDC was achieved based on an unidentified number of post-dredging verification samples (analyzed during dredging in a mobile onsite lab). Four dredge passes (each of 2-4 feet) were required in 10% of the area, one pass in 50% of the area.	
Restoration and Post-Monitoring:	None identified	
Site-Specific Difficulties:	<ul style="list-style-type: none">• Failure of hydraulic dredging due to inadequate land-based water management facilities (only 500 cy of sediments were removed over 9 months of intermittent operation).• Soft silty sediments kept "running into" the hot spot from the surrounding area.• Active dredging had to be periodically halted due to ship traffic, since the target area was in an active turning basin.	
Monitoring Data	Not available	
References:	<ul style="list-style-type: none">• <i>Sediment</i>• <i>Water:</i>• <i>Fish:</i>	

POTENTIALLY RESPONSIBLE PARTIES

Project Name **FORMOSA PLASTICS**

ProjectID: 06-04

PRP Name: PRP INFORMATION NOT RELEASED

PRPID:

Street Address:

City:

State:

KEY CONTACTS

Project Name **FORMOSA PLASTICS**

ProjectID: 06-04

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 FORMOSA PLASTICS

ProjectID: 06-04

Reference Type: M

ReferenceID: 67

Title: *Clean Up of the Contaminated Bay Floor (with Summary Notes as Reviewed by Cable Arm Inc.)*

Location: AEM

Category: Dredging: Equipment

Prepared by/Author: R. Martinek

Preparer/Author Address: Environmental Options, Inc.

Prepared For:

Date Published: September 30, 1992

Key Words and Phrases:

Reference Type: M

ReferenceID: 70

Title: *Case Histories: When Innovation Proves More Effective Than Traditional Techniques*

Location: AEM

Category: Dredging: Equipment

Prepared by/Author:

Preparer/Author Address: AWD Technologies, Inc. Rockville, MD

Prepared For: The National Environmental Journal

Date Published: March/April 1993

Key Words and Phrases:

Reference Type: M

ReferenceID: 71

Title: *Report prepared by Dr. John Herbich, including Case Histories*

Location: AEM

Category: Dredging: Equipment

Prepared by/Author: Dr. John Herbich

Preparer/Author Address: Consulting Research Services, Inc. Bryan, TX

Prepared For: Distribution

Date Published: October 1994

Key Words and Phrases:
