HAZARD RANKING SYSTEM (HRS)
DOCUMENTATION RECORD - REVIEW COVER SHEET

Name of Site: Delta Shipyard

EPA ID No.: LAD058475419

Contact Persons

Site Investigation:	Brenda Nixon Cook, NPL Coordinator, EPA Reg.6 (Name)	(214) 665-7436 (Telephone)
Documentation Record:	Brenda Nixon Cook, NPL Coordinator, EPA Reg.6 (Name)	(214) 665-7436 (Telephone)

Pathways, Components, or Threats Not Scored

1) Ground Water Pathway: The ground water migration pathway has not been scored because although there is analytical data to support a release, there is not a sufficient number of targets to impact the overall site score. Based on information at this time, evaluation of the ground water migration pathway would not affect the listing decision (Ref. 1, Sec. 2.2.3).

2) Soil Exposure Pathway: The soil exposure pathway has not been scored. Based on information available at this time, evaluation of the soil exposure pathway would not affect the listing decision (Ref. 1, Sec. 2.2.3).

3) Air Pathway: Based on information available at this time, evaluation of the air migration pathway would not affect the listing decision (Ref. 1, Sec. 2.2.3).

4) Surface Water Pathway: The Surface Water Pathway has been scored for the Human Food Chain Threat and Environmental Threat. The drinking water threat has not been scored. Based on information available at this time, evaluation of the drinking water threat would not affect the listing decision (Ref. 1, Sec. 2.2.3).

HRS DOCUMENTATION RECORD

Name of Site:	Delta Shipyard
Site Spill Identifier No.:	06GC
EPA ID No.:	LAD058475419
EPA Region:	6
Date Prepared:	May 2014
Street Address of Site:	200 Dean Court*
City, County, and State:	Houma, Terrebonne Parish, Louisiana 70363*
General Location within the State:	The site is located in the City of Houma, Terrebonne Parish, Louisiana. Houma is located in southern Louisiana (Ref. 3, p. 1).
Topographic Map(s):	The following U.S. Geological Survey (USGS) 7.5-minute topographic series map was used in locating the site: Houma, Louisiana (1998) (Ref. 3, p. 1).
Latitude/Longitude *:	29° 33’ 56.9448” N, 90° 42’ 18.507” W

Latitude and Longitude coordinates were measured from the center of Pit 2 surface impoundment and were determined using a scaled topographic map and Geographic Information System (GIS) software (Ref. 4, pp. 1-2).

	Scores
Air Pathway	Not Scored
Ground Water Pathway	Not Scored
Soil Exposure Pathway	Not Scored
Surface Water Pathway	96.106
HRS SITE SCORE	**48.05**

*The street address, coordinates, and contaminant locations presented in this HRS documentation record identify the general area the site is located. They represent one or more locations EPA considers to be part of the site based on the screening information EPA used to evaluate the site for NPL listing. EPA lists national priorities among the known "releases or threatened releases" of hazardous substances; thus, the focus is on the release, not precisely delineated boundaries. A site is defined as where a hazardous substance has been "deposited, stored, disposed, or placed, or has otherwise come to be located." Generally, HRS scoring and the subsequent listing of a release merely represent the initial determination that a certain area may need to be addressed under CERCLA. Accordingly, EPA contemplates that the preliminary description of facility boundaries at the time of scoring will be refined as more information is developed as to where the contamination has come to be located.

NOTES TO THE READER

1. The following rule applies when citing references in this documentation record:

   Tracking numbers are assigned by the region to every page of every reference. The tracking number consists of the reference number followed by the page number within that reference. A tracking number has a two-digit number followed by the sequential number (e.g., Reference 4, page 1 is expressed as 040001in Reference 4).

2. Hazardous substances are listed by the names used in the Superfund Chemical Data Matrix (SCDM) (Ref. 2).

3. Attachment A of this documentation record consists of the following figures:

   - A-1 Site Location Map
   - A-2 Property Layout Map
   - A-3 Surface Water Pathway Map
   - A-4 15-Mile Target Distance Limit Map
   - A-5 Sample Location Map

REFERENCES CITED

1. 40 Code of Federal Regulations (CFR) Part 300, Hazard Ranking System; Final Rule. 14 December 1990. Volume 55, No. 241. Pages: 1. [A complete copy of the Hazard Ranking System can be obtained from the Regional Docket upon request or found online at http://www.epa.gov/superfund/sites/npl/hrsres/index.htm#HRS Rule].

2. U.S. Environmental Protection Agency (EPA). 2014. Superfund Chemical Data Matrix (SCDM) (excerpts). January 30, 2014. Pages: 21. [A complete copy of SCDM is available at http://www.epa.gov/superfund/sites/npl/hrsres/tools/scdm.htm].

3. U.S. Geological Survey (USGS) Topographic Maps. 1998. Houma, Louisiana; 1994, Dulac, Louisiana; 1998, Lake Quitman, Louisiana (7.5-minute topographic series maps). Pages: 3.

4. Weston Solutions, Inc. (WESTON®). 2013. Project Note to File. Measurement of the Latitude and Longitude coordinates at Delta Shipyard. 19 March 2013. Pages: 2.

5. EPA. 1981. Potential Hazardous Waste Site Identification and Preliminary Assessment. Delta Shipyard. Houma, Terrebonne Parish, Louisiana. LAO1317. April 1992. Pages: 7.

6. WESTON. 1996. Field Logbook. WO# 04603-026-031. Field Logbook Notes for Delta Shipyard Expanded Site Inspection. 07 March 1996 to 08 August 1996. Pages: 32.

7. WESTON. 2012. Site Visit Photographs. Delta Shipyard, Houma, Louisiana. 10 January 2012. Pages: 12.

8. Louisiana Department of Natural Resources (LDNR). 1983. Notice of Violation Letter. Delta Shipyard. 20 May 1983. Pages: 2.

9. Wink Engineering. 1985. Letters to Louisiana State Department of Environmental Quality, Regarding Delta Shipyards' Waste Sites at Houma and Duson, LA. 6 September 1985 and 5 July 1985. Pages: 37.

10. Louisiana Department of Environmental Quality (LDEQ). 1986. General Inspection, Delta Shipyards, Houma, Terrebonne Parish. 16 April 1986. Pages: 3.

11. EPA. 1994. Site Inspection Prioritization Report. Delta Shipyard, Phase III. Houma, Louisiana. December 1994. Pages: 57.

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16. WESTON. 2012. Quality Assurance Sampling Plan. Delta Shipyard, Houma, Terrebonne Parish, Louisiana. July 2012. Pages: 223.

17. EPA. 1996. Fact Sheet. Using Qualified Data to Document an Observed Release and Observed Contamination. EPA

18. Federal Emergency Management Agency (FEMA). Flood Insurance Rate Map (FIRM). Community Panel Number 225206 0265C. Terrebonne Parish, Louisiana. Map Revised 1 May 1985. Pages: 1.

19. WESTON. 2013. Project Note to File. Pit Area Measurements. Delta Shipyard, Houma, Terrebonne Parish, Louisiana. 31 July 2013. Pages: 2.

20. WESTON. 2012. Photolog. Delta Shipyard, Houma, Louisiana. 7 June and 6-10 August 2012. Pages: 39.

21. USGS. 2008. Influence of the Houma Navigation Canal on Salinity Patterns and Landscape Configuration in Coastal Louisiana. 2008. Pages: 16.

22. EPA. 2013. Envirofacts Warehouse. http://oaspub.epa.gov/enviro/enviroFACTS (updated http://www.epa.gov/enviro/index.html). With links to EPA Facility Registry System http://oaspub.epa.gov/enviro/ (updated http://www.epa.gov/enviro/html/fii/fii_query_java.html). Accessed 3 April 2013. Pages: 11.

23. Toxics Release Inventory Program. www.epa.gov/TRI/. TRI Explorer search conducted for zip code 70360. Data Source: 2011 Data Updated as of March 2013. Pages: 2.

24. WESTON. 2013. Project Note to File. Level II Wetland Perimeter Distance Measurement. Delta Shipyard, Houma, Terrebonne Parish, Louisiana. 1 August 2013. Pages: 3.

25. WESTON. 2013. Project Note to File. Wetland Frontage Distance along TDL. Delta Shipyard, Houma, Terrebonne Parish, Louisiana. 5 April 2013. Pages: 2.

26. USGS. 2013. Surface-Water Annual Statistics for Louisiana. USGS 07381328 Houma Navigation Canal at Dulac, Louisiana. http://waterdata.usgs.gov/la/nwis/annual/?search_site_no=07381328&agency_cd=USGS&referred_module=sw&format=sites_selection_links. Accessed 5 April 2013. Pages: 2.

27. WESTON. 1996. Phone Conversation Record with Louisiana Department of Wildlife and Fisheries. Fisheries in Houma Navigation Canal and Bayou LaCarpe. 14 March 1996. Pages: 1.

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31. U.S. Department of Agriculture (USDA). 1960. Louisiana Online Soil Survey Manuscripts. Terrebonne Parish Detailed Soil Maps. 1960. http://soils.usda.gov/survey/online_surveys/louisiana/. Accessed 31 July 2013. Pages: 2.

SITE SUMMARY

The site being evaluated includes the release of hazardous substances from the waste filled open pits and an adjacent drainage ditch that resulted from the Delta Shipyard facility operations. The former Delta Shipyard (Site) is located at 200 Dean Court in southeastern Houma, Terrebonne Parish, Louisiana (Ref. 3, p. 1, Ref. 5, p. 1; Ref. 6, p. 10; Ref. 11, pp. 1, 2). The facility is located in a mixed industrial/residential area south of the city of Houma, Louisiana and is depicted on Figure A-1 of Attachment A (Ref. 3, p. 1). The facility property once consisted of 165 acres and was home to 7 divisions of Delta Ironworks, including Delta Shipyard (Ref. 5, p. 3). In 1973, Delta Ironworks merged with Chromalloy American Corporation of St. Louis, Missouri. Chromalloy maintained all 7 of the divisions until November 1980, when 5 of the divisions were sold to Delta Services Industries of Houma, Louisiana, including Delta Shipyard (Ref. 5, p. 3). Mr. Lynn Dean (of Dean Boats, Inc.) purchased 110 acres of the industrial park from Delta Services in 1986 including the property owned by Delta Shipyard (Ref. 6, p. 3).

Delta Shipyard consisted of a cleaning and repair facility for small cargo boats, fishing boats, and oil barges. Before repair work could begin, the boats had to be certified vapor free by the U.S. Coast Guard. To accomplish this, the boats were first steam cleaned to remove oily wastes. Recovered oil that was still deemed usable was recovered and sold. The remaining oily waste from the cleaning process was stored in several unlined earthen pits used as evaporation ponds (Ref. 5, p. 3). These pits were reportedly also used to dispose of oil-field drilling material (Ref. 9, p. 4).

Currently, there are three open evaporation pits and a backfilled pit area located on-site. The three open pits are uncovered and lack containment features, which allow the contents to be exposed to the elements. The pits have no vegetation growing on them and have a crusty layer on the surface. Their surrounding berms are not maintained, contain heavy vegetation, and appear to be insufficient to contain the contents of the pits during a rain event. The crusty layer on the pits is black and appears to be a dried oil/petroleum-type waste (Ref. 7, pp. 1, 3, 5, 6). The backfilled pit area contains vegetation and trash and is differentiated from the surrounding land as mounds within a relatively flat topographic area. The closest residential property is located approximately 400 feet west of the open pits (Ref. 7, p. 7). A Property Layout Map is provided as Figure A-2.

For the purpose of this HRS evaluation, the Delta Shipyard site includes the three open pits (Sources 1 through 3) and an adjacent drainage ditch (Source 4). Sources 1 through 4 contain hazardous substances that are surrounded by HRS eligible wetlands. Hazardous substances associated with the sources could potentially be released into an adjacent waterway, Company Canal. Level II contamination, as a result of releases of hazardous substances via flooding and overland flow migration, has been documented in sediment within the surrounding wetland and Company Canal. This contamination threatens a nearby sensitive environment and fishery.

History

Multiple phases of investigations have occurred at the Delta Shipyard Site since the early 1980s. Investigations that have been conducted in the vicinity of the open pits encompassing the current Site are described in the following paragraphs:

- **1981** – EPA contractors performed a primary assessment of the Site and found that contamination of surface water could occur if the pits overflowed, and they found some staining of soil from oily wastes in the pits (Ref. 5, p. 2).

- **1983** - The Louisiana Department of Natural Resources (LDNR) performed an inspection of the Site and subsequently issued a Notice of Violation (NOV). Eight violations were cited; among these violations were "that there was no indication that the facility was having their waste treated, stored, or disposed of at a permitted hazardous waste facility, and the facility has not developed and adhered to a ground water sampling and analysis plan" (Ref. 8, pp. 1,2).

- **1985** - Wink Engineering collected one composite sludge sample from each of the three pits. A report prepared by Wink Engineering indicated that the contents of the pits were exposed. The samples were analyzed for volatiles, cyanide, total phenol, flash point, pH, toxicity, and oil and grease (Ref. 9, p. 5). Concentrations of chlorobenzene, ethylbenzene, toluene, and total xylenes were detected in the samples collected from the open pits (Ref. 9, p. 36). Wink Engineering concluded in the report that the Site did not pose a threat to human health or the environment since the constituents did not exceed limits specified in the Wink Engineering report (Ref. 9, p. 5). The nature of the specific limits were not defined in the Wink report (i.e., calculated background values, health-based screening levels, etc.).

- **1986** - The Louisiana Department of Environmental Quality (LDEQ), formerly LDNR, received a complaint about pits containing hazardous waste. A composite sample was collected from the three open pits and analyzed for volatiles, metals, and polychlorinated bi-phenyls (Ref. 10, pp. 1-4). Laboratory analytical information could not be found in the file information.

- **1994** – EPA contractors conducted sampling at the pits in support of a Site Inspection Prioritization (SIP) Report. A limited number of pit sludge and drainage ditch sediment samples were collected in and around the pits (Ref. 11, pp. 6, 15). During field activities, water was observed flowing from an overflow pipe from Pit 2 into the nearby drainage ditch (Ref. 11, p. 7). The sludge samples collected from the exposed pits indicated the presence of volatiles, semivolatile organics, pesticides, and metals. Sediment analytical results meeting HRS observed release criteria of three times background included benzene, ethylbenzene, xylenes, 2-methylnaphthalene, polycyclic aromatic hydrocarbons (PAHs), arsenic, chromium, lead, and mercury (Ref. 11, pp. 5, 16-51).

- **1996** – EPA contractors conducted an Expanded Site Inspection (ESI) of Delta Shipyard. As part of the ESI, 7 pit sludge samples, 6 surface and subsurface soil samples, 2 ground water samples, 4 surface water samples, 37 stream sediment samples, and 6 field Quality Control samples were collected (Ref. 12, pp. 24, 32-37). The pit sludge sample results indicated elevated concentrations of 2-methylnaphthalene, naphthalene, phenanthrene, ethylbenzene, toluene, xylenes, chromium, lead, and zinc. Of these, the highest concentrations were the PAHs (Ref. 12, p. 40). In addition, samples collected from ground water, surface water, and soil indicated an elevated presence of PAHs, indicating migration of these contaminants from the pits to the surrounding media (Ref. 12, p. 57).

WORKSHEET FOR COMPUTING HRS SITE SCORE

		S	S^2
1.	Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	NS	NS
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	96.106	9,236.363
2b.	Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	NS	NS
2c.	Surface Water Migration Pathway Score (S_{sw}) (Enter the larger of lines 2a and 2b as the pathway score)	NS	NS
3.	Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	NS	NS
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	NS	NS
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$	----	9,236.363
6.	HRS Site Score: Divide the value on line 5 by 4 and take the square root.		**48.05**

Notes:

S Score
S^2 Score squared
NS Not scored

Tables 3-1, 4-1, 4-25, 5-1, and 6-1 refer to score sheets presented in the HRS (Ref. 1). Table 4-1 is reproduced in the following pages of this HRS Documentation Record for the convenience of the reader.

DRINKING WATER THREAT - Not Scored (NS)

Factor Categories and Factors		Maximum Value	Value Assigned
	Likelihood of Release		
1.	Observed Release	550	550
2.	Potential to Release by Overland Flow:		
	2a. Containment	10	NS
	2b. Runoff	25	NS
	2c. Distance to Surface Water	25	NS
	2d. Potential to Release by Overland Flow (lines 2a[2b + 2c])	500	NS
3.	Potential to Release by Flood:		
	3a. Containment (Flood)	10	NS
	3b. Flood Frequency	50	NS
	3c. Potential to Release Flood (lines 3a x 3b)	500	NS
4.	Potential to Release (lines 2d + 3c, subject to a maximum of 500)	500	NS
5.	Likelihood of Release (higher of lines 1 and 4)	550	550
	Waste Characteristics		
6.	Toxicity/Persistence	a	NS
7.	Hazardous Waste Quantity	a	NS
8.	Waste Characteristics (Toxicity/Persistence x Hazardous Waste Quantity, then assign a value from Table 2-7)	100	NS
	Targets		
9.	Nearest Intake	50	NS
10.	Population		
	10a. Level I Concentrations	b	NS
	10b. Level II Concentrations	b	NS
	10c. Potential Contamination	b	NS
	10d. Population (lines 10a + 10b + 10c)	b	NS
11.	Resources	5	NS
12.	Targets (lines 9 + 10d +11)	b	NS
	Drinking Water Threat Score		
13.	Drinking Water Threat Score [(lines 5 x 8 x 12)/82,500 subject to a maximum of 100]	100	NS

HUMAN FOOD CHAIN THREAT

Factor Categories and Factors		Maximum Value	Value Assigned
	Likelihood of Release		
14.	Likelihood of Release (Same value of line 5)	550	550
	Waste Characteristics		
15.	Toxicity/Persistence/ Bioaccumulation	a	$5x10^8$
16.	Hazardous Waste Quantity	a	100
17.	Waste Characteristics (Toxicity/Persistence/Bioaccumulation x Hazardous Waste Quantity, then assign a value from Table 2-7)	1,000	320
	Targets		
18.	Food Chain Individual	50	20
19.	Population		
	19a. Level I Concentrations	b	0
	19b. Level II Concentrations	b	0
	19c. Potential Human Food Chain Contamination	b	0.000003
	19d. Population (lines 19a + 19b + 19c)	b	0.000003
20.	Targets (lines 18 + 19d)	b	20.000003
	Human Food Chain Threat Score		
21.	Human Food Chain Threat Score [(lines 14 x 17 x 20)/82,500 subject to a maximum of 100]	100	42.666

ENVIRONMENTAL THREAT

Factor Categories and Factors		Maximum Value	Value Assigned
	Likelihood of Release		
22.	Likelihood of Release (Same value of line 5)	550	550
	Waste Characteristics		
23.	Ecosystem Toxicity/Persistence Bioaccumulation	a	$5x10^8$
24.	Hazardous Waste Quantity	a	100
25.	Waste Characteristics (Ecosystem Tox./Persistence x Bioaccumulation x Hazardous Waste Quantity, then assign a value from Table 2-7)	1,000	320
	Targets		
26.	Sensitive Environments		
	26a. Level I Concentrations	b	0
	26b. Level II Concentrations	b	25
26c.	Potential Contamination		
	26c. Potential Contamination	b	0.05
26d.	Sensitive Environments (lines 26a + 26b + 26c)	b	25.05
27.	Targets (value from line 26d)	b	25.05
	Environmental Threat Score		
28.	Environmental Threat Score [(lines 22 x 25 x 27)/82,500 subject to a maximum of 60]	60	53.44

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE FOR A WATERSHED

29.	Watershed Score [(Lines 13 + 21+ 28), subject to a maximum of 100]	100	96.106

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE

30.	Component Score (Highest score from Line 29 for all watersheds evaluated, subject to a maximum of 100)	100	96.106

SOURCE DESCRIPTION

2.2 Source Characterization

Source Description: Source 1 – Open Pit 1

Source Type: Surface Impoundment

Source 1 consists of the northern most open pit (referred to as Pit 1) of three open pits located on the property and contains a total area of approximately 23,750 square feet (Attachment A, Figure A-2; Ref. 13, p. 114; Ref. 19). Source 1 is classified as the HRS source type "Surface Impoundment" (Ref. 1, Table 2-5). Oily waste from the cleaning process was stored in the unlined earthen pit used as an evaporation pond (Ref. 5, p. 3). The pit was reportedly also used to dispose of oil-field drilling material (Ref. 9, p. 4). Currently, the open pit is uncovered and lacks engineered containment features; this allows the contents to be exposed to the elements. The pits have no vegetation growing on them and have a crusty layer on the surface. The crusty layer on the pit is black and appears to be a dried oil/petroleum-type waste (Ref. 7, pp. 1, 3, 5, 6; Ref. 12, pp. 16, 17). Although Pit 1 is separated from the other pits by a berm, the photo logs from the Site show that its surrounding berms are not maintained, contain heavy vegetation, and appear to be insufficient to contain the contents of the pit during a rain event (Ref. 7, pp. 1, 3, 5, 6; Ref. 20, pp. 16-18).

Source Location

The open Pit 1 (Source 1) is the northern most open pit and is located on the south end of the property to the east of Dean Court (formerly referred to as Plant Shell Road) and west of Company Canal in a wetland area (Ref. 11, p. 3; Ref. 12, p. 23; Ref 14, p. 1). The location of the pit is depicted on Attachment A, Figure A-2.

Source Containment

Release To Surface Water

The open earthen Pit 1 is unlined and was originally surrounded by an earthen berm, but the berm is not maintained and as the photo logs from the Site show, over time the surrounding wetlands have encroached into Source 1 (Ref. 5, p. 3; Ref. 12, pp. 16, 17; Ref. 20, pp. 1-3, 6, 10-13, 17, 18).

The berm is absent in a low lying area in the northern section of Pit 1 (Source 1) at the apparent location of the beginning of the on-site drainage ditch (Ref. 12, p. 54). The berms are not maintained and contain heavy vegetation (Ref. 7, pp. 1, 3, 4, 6, 9, 11; Ref. 12, pp. 96-99; Ref. 20, pp. 1-6, 10-13). In addition, Source 1 is located in a special flood hazard area subject to inundation by the 1% annual chance of flood (Ref. 18, p. 1).

Source 1	Overland Flow Containment Value	Flood Containment Value
Source 1 is surrounded by HRS eligible surface water and source has unsound diking that is not regularly inspected or maintained (Ref. 7, pp. 1, 3, 4, 6, 9, 11; Ref. 12, pp. 96-99; Ref. 20, pp. 1-6, 10-13).	10	-
Source 1 has not been designed, constructed, operated, and maintained to prevent washout of hazardous substances by flooding (Ref. 7, pp. 1, 3, 4, 6, 9, 11; Ref. 12, pp. 96-99; Ref. 18, p. 1; Ref. 20, pp. 1-6, 10-13).	-	10

2.4.1 Hazardous Substances

As part of the ESI sampling conducted by EPA contractors in July 1996, two waste samples were collected from Pit 1 (P01 and P02) (Attachment A, Figure A-5, Ref. 6, p. 15; Ref. 12, p. 36). The samples were analyzed for volatile organic analytes (VOAs), base-neutral, acids (BNA), and polychlorinated biphenyls (PCBs)/pesticides by Contract Laboratory Program (CLP) OLM01.9 and for target analyte list (TAL) metals and cyanide by CLP ILM04.0 by the CLP laboratories assigned by the EPA (Ref. 12, pp. 25, 131, 187).

As part of reassessment sampling of the Delta Shipyard Site from 06 through 10 August 2012, EPA contractors collected six waste samples from various depths from Pit 1 (Attachment A, Figure A-5, Ref. 13, p. 126). The samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), TCL semivolatile organic compounds (SVOCs), pesticides, and PCBs by the CLP Statement of Work (SOW) for Multi-Media, Multi-Concentration Organic Analysis, SOM01.2, and TAL metals with mercury by CLP SOW Multi-Media, Multi-Concentration Inorganics Analysis, ISM01.3 (Ref. 13, p. 5). The samples were submitted to the EPA Region 6 Environmental Services Branch Laboratory, located in Houston, Texas (Ref. 13, p. 5).

Analytical evidence of the contamination in waste source samples associated with Source 1 located on the Delta Shipyard Site is summarized below.

Hazardous Substance	Evidence			References
	Sample ID	Concentration (mg/kg)	Quantitation Limit[1] (mg/kg)	
ESI Sampling Activities – July 1996				
Ethylbenzene	P01-71-1/ G42512	8.7	2.3[2]	Ref. 6, p. 15; Ref.12, pp. 42, 227
Xylenes		27.0	2.3[2]	Ref. 6, p. 15; Ref.12, pp. 42, 227
2-Methylnaphalene		390	120[2]	Ref. 6, p. 15; Ref.12, pp. 42, 272
Naphthalene		130	120[2]	Ref. 6, p. 15; Ref.12, pp. 42, 272

Hazardous Substance	Evidence			References
	Sample ID	Concentration (mg/kg)	Quantitation Limit[1] (mg/kg)	
Endosulfan II	P02-71-1/ G42513	0.066	0.03[2]	Ref. 6, p. 15; Ref.12, pp. 42, 300
Heptachlor epoxide		0.110	0.03[2]	Ref. 6, p. 15; Ref.12, pp. 42, 300
Arsenic		26.1	1.19[3]	Ref. 6, p. 15; Ref.12, pp. 42, 126, 406
Cadmium		5.6	0.55[3]	Ref. 6, p. 15; Ref.12, pp. 42, 126
Chromium		709	1.09[3]	Ref. 6, p. 15; Ref.12, pp. 42, 126
Lead		861	0.055[3]	Ref. 6, p. 15; Ref.12, pp. 42, 126
Mercury		1.8	0.055[3]	Ref. 6, p. 15; Ref.12, pp. 42, 126
Zinc		1,010	2.19[3]	Ref. 6, p. 15; Ref.12, pp. 42, 126
Ethylbenzene		3.5	2.1[2]	Ref. 6, p. 14; Ref.12, pp. 42, 229
Xylenes		23	2.1[2]	Ref. 6, p. 14; Ref.12, pp. 42, 229
2-Methylnaphalene		460	110[2]	Ref. 6, p. 14; Ref.12, pp. 42, 275
Naphthalene		160	110[2]	Ref. 6, p. 14; Ref.12, pp. 42, 275
Endosulfan II		0.088	0.027[2]	Ref. 6, p. 14; Ref.12, pp. 42, 301
Heptachlor epoxide		0.049	0.027[2]	Ref. 6, p. 14; Ref.12, pp. 42, 301
Arsenic		32.7	1.19[3]	Ref. 6, p. 14; Ref.12, pp. 42, 127
Cadmium		6.5	0.59[3]	Ref. 6, p. 14; Ref.12, pp. 42, 127
Chromium		576	1.19[3]	Ref. 6, p. 14; Ref.12, pp. 42, 127
Lead		952	0.59[3]	Ref. 6, p. 14; Ref.12, pp. 42, 127
Mercury		1.6	0.059[3]	Ref. 6, p. 14; Ref.12, pp. 42, 127
Zinc		1,140	2.38[3]	Ref. 6, p. 14; Ref.12, pp. 42, 127
Reassessment Sampling Activities – August 2012				
Ethylbenzene	DSE-01-24-413	0.858	0.0999[4]	Ref. 13, pp. 91, 126, 132-135, 207, 374
Isopropylbenzene		0.456	0.0999[4]	Ref. 13, pp. 91, 126, 132-135, 207, 374
meta-/para-Xylene		3.9	0.20[4]	Ref. 13, pp. 91, 126, 132-135, 207, 374
ortho-Xylene		2.1	0.0999[4]	Ref. 13, pp. 91, 126, 132-135, 207, 374
Toluene		0.641	0.0999[4]	Ref. 13, pp. 91, 126, 132-135, 207, 374
Anthracene		1.8	1.14[4]	Ref. 13, pp. 91, 126, 132-135, 208, 374
Fluorene		8.55 J	1.14[4]	Ref. 13, pp. 91, 126, 132-135, 209, 374
2-Methylnaphthalene		50.7 J	1.14[4]	Ref. 13, pp. 91, 126, 132-135, 209, 374
Naphthalene		18.3	1.14[4]	Ref. 13, pp. 91, 126, 132-135, 209, 374
Phenanthrene		11.9	1.14[4]	Ref. 13, pp. 91, 126, 132-135, 210, 374
Pyrene		1.66	1.14[4]	Ref. 13, pp. 91, 126, 132-135, 210, 374
Antimony		4.8J	1.3[4]	Ref. 13, pp. 90, 126, 132-135, 212, 374
Arsenic		28.6	1.3[4]	Ref. 13, pp. 90, 126, 132-135, 212, 374
Cadmium		5.8	0.7[4]	Ref. 13, pp. 90, 126, 132-135, 212, 374
Chromium		327	1.3[4]	Ref. 13, pp. 90, 126, 132-135, 212, 374
Lead		803	1.3[4]	Ref. 13, pp. 90, 126, 132-135, 212, 374

Hazardous Substance	Evidence			References
	Sample ID	Concentration (mg/kg)	Quantitation Limit[1] (mg/kg)	
Manganese		569	0.7[4]	Ref. 13, pp. 90, 126, 132-135, 212, 374
Mercury		1.8	0.077[4]	Ref. 13, pp. 90, 126, 132-135, 213, 374
Benzene	DSE-01-48-413	0.86	0.099[4]	Ref. 13, pp. 91, 126, 132-135, 214, 374
Ethylbenzene		6.04	0.0999[4]	Ref. 13, pp. 91, 126, 132-135, 215, 374
Isopropylbenzene		2.36	0.0999[4]	Ref. 13, pp. 91, 126, 132-135, 215, 374
meta-/para-Xylene		20.3	0.40[4]	Ref. 13, pp. 91, 126, 132-135, 215, 374
ortho-Xylene		9.94	0.20[4]	Ref. 13, pp. 91, 126, 132-135, 215, 374
Toluene		5.94	0.0999[4]	Ref. 13, pp. 91, 126, 132-135, 215, 374
Fluorene		38.3	13.1[4]	Ref. 13, pp. 91, 126, 132-135, 217, 374
2-Methylnaphthalene		593	13.1[4]	Ref. 13, pp. 91, 126, 132-135, 217, 374
Naphthalene		184	13.1[4]	Ref. 13, pp. 91, 126, 132-135, 217, 374
Phenanthrene		89.2	13.1[4]	Ref. 13, pp. 91, 126, 132-135, 218, 374
Pyrene		3.41	1.31[4]	Ref. 13, pp. 91, 126, 132-135, 218, 374
Antimony		6.5	1.3[4]	Ref. 13, pp. 90, 126, 132-135, 220, 374
Arsenic		26.9	1.3[4]	Ref. 13, pp. 90, 126, 132-135, 220, 374
Cadmium		6	0.7[4]	Ref. 13, pp. 90, 126, 132-135, 220, 374
Chromium		296	1.3[4]	Ref. 13, pp. 90, 126, 132-135, 220, 374
Lead		733	1.3[4]	Ref. 13, pp. 90, 126, 132-135, 220, 374
Manganese		501	0.7[4]	Ref. 13, pp. 90, 126, 132-135, 220, 374
Mercury		2.07	0.156[4]	Ref. 13, pp. 90, 126, 132-135, 221, 374
Benzene	DSE-01-72-413	0.584	0.10[4]	Ref. 13, pp. 93, 126, 132-135, 222, 374
Ethylbenzene		3.97	0.10[4]	Ref. 13, pp. 93, 126, 132-135, 223, 374
Isopropylbenzene		1.55	0.10[4]	Ref. 13, pp. 93, 126, 132-135, 223, 374
meta-/para-Xylene		16.5	0.10[4]	Ref. 13, pp. 93, 126, 132-135, 223, 374
ortho-Xylene		8.2	0.10[4]	Ref. 13, pp. 93, 126, 132-135, 223, 374
Toluene		3.85	0.10[4]	Ref. 13, pp. 93, 126, 132-135, 223, 374
Dibenzofuran		17.5	13.5[4]	Ref. 13, pp. 93, 126, 132-135, 225, 374
2-Methylnaphthalene		523	13.5[4]	Ref. 13, pp. 93, 126, 132-135, 225, 374
Fluorene		30.3	13.5[4]	Ref. 13, pp. 93, 126, 132-135, 225, 374
Naphthalene		164	13.5[4]	Ref. 13, pp. 93, 126, 132-135, 225, 374
Phenanthrene		77.7	13.5[4]	Ref. 13, pp. 93, 126, 132-135, 226, 374
Pyrene		3.21	1.35[4]	Ref. 13, pp. 93, 126, 132-135, 226, 374
Antimony		3.1	1.3[4]	Ref. 13, pp. 92, 126, 132-135, 228, 374
Arsenic		40.9	1.3[4]	Ref. 13, pp. 92, 126, 132-135, 228, 374
Cadmium		2.4	0.7[4]	Ref. 13, pp. 92, 126, 132-135, 228, 374
Chromium		137	1.3[4]	Ref. 13, pp. 92, 126, 132-135, 228, 374
Lead		405	1.3[4]	Ref. 13, pp. 92, 126, 132-135, 228, 374

Hazardous Substance	Evidence			References
	Sample ID	Concentration (mg/kg)	Quantitation Limit[1] (mg/kg)	
Manganese		355	0.7[4]	Ref. 13, pp. 92, 126, 132-135, 228, 374
Mercury		1.82	0.078[4]	Ref. 13, pp. 92, 126, 132-135, 229, 374
Benzene	DSE-01-96-413	0.146	0.10[4]	Ref.13, pp. 93, 126, 132-135, 230, 373
Ethylbenzene		1.48	0.10[4]	Ref.13, pp. 93, 126, 132-135, 231, 373
Isopropylbenzene		0.78	0.10[4]	Ref.13, pp. 93, 126, 132-135, 231, 373
meta-/para-Xylene		6.24	0.10[4]	Ref.13, pp. 93, 126, 132-135, 231, 373
ortho-Xylene		2.59	0.10[4]	Ref.13, pp. 93, 126, 132-135, 231, 373
Toluene		0.828	0.10[4]	Ref.13, pp. 93, 126, 132-135, 231, 373
2-Methylnaphthalene		310	13.1[4]	Ref.13, pp. 93, 126, 132-135, 233, 373
Naphthalene		86.1	13.1[4]	Ref.13, pp. 93, 126, 132-135, 233, 373
Phenanthrene		43.7	13.1[4]	Ref.13, pp. 93, 126, 132-135, 234, 373
Antimony		5.8	1.3[4]	Ref. 13, pp. 92, 126, 132-135, 236, 373
Arsenic		63.5	1.3[4]	Ref. 13, pp. 92, 126, 132-135, 236, 373
Cadmium		3.8	0.7[4]	Ref. 13, pp. 92, 126, 132-135, 236, 373
Chromium		73.2	1.3[4]	Ref. 13, pp. 92, 126, 132-135, 236, 373
Lead		541	1.3[4]	Ref. 13, pp. 92, 126, 132-135, 236, 373
Manganese		489	0.7[4]	Ref. 13, pp. 92, 126, 132-135, 236, 373
Mercury		1.75	0.082[4]	Ref. 13, pp. 92, 126, 132-135, 237, 373
Ethylbenzene	DSE-01-120-413	0.492	0.10[4]	Ref. 13, pp. 91, 126, 132-135, 191, 373
Isopropylbenzene		0.324	0.10[4]	Ref. 13, pp. 91, 126, 132-135, 191, 373
meta-/para-Xylene		2.1	0.20[4]	Ref. 13, pp. 91, 126, 132-135, 191, 373
ortho-Xylene		0.977	0.10[4]	Ref. 13, pp. 91, 126, 132-135, 191, 373
Toluene		0.349	0.10[4]	Ref. 13, pp. 91, 126, 132-135, 191, 373
2-Methylnaphthalene		213	14.4[4]	Ref. 13, pp. 91, 126, 132-135, 193, 373
Fluorene		14.9	14.4[4]	Ref. 13, pp. 91, 126, 132-135, 193, 373
Naphthalene		44.2	1.44[4]	Ref. 13, pp. 91, 126, 132-135, 193, 373
Phenanthrene		33.4	33.4[4]	Ref. 13, pp. 91, 126, 132-135, 194, 373
Pyrene		1.55	1.44[4]	Ref. 13, pp. 91, 126, 132-135, 194, 373
Antimony		1.9	1.4[4]	Ref. 13, pp. 90, 126, 132-135, 196, 373
Arsenic		26.3	1.4[4]	Ref. 13, pp. 90, 126, 132-135, 196, 373
Cadmium		1.5	0.7[4]	Ref. 13, pp. 90, 126, 132-135, 196, 373
Chromium		96.2	1.4[4]	Ref. 13, pp. 90, 126, 132-135, 196, 373
Lead		310	1.4[4]	Ref. 13, pp. 90, 126, 132-135, 196, 373
Manganese		465	0.7[4]	Ref. 13, pp. 90, 126, 132-135, 196, 373
Mercury		0.609	0.081[4]	Ref. 13, pp. 90, 126, 132-135, 197, 373
Phenanthrene	DSE-01-144-413	1.97	0.330[4]	Ref. 13, pp. 91, 126, 132-135, 202, 373
Antimony		1.8	1.5[4]	Ref. 13, pp. 90, 126, 132-135, 204, 373

Hazardous Substance	Evidence			References
	Sample ID	Concentration (mg/kg)	Quantitation Limit[1] (mg/kg)	
Arsenic		37.3	1.5[4]	Ref. 13, pp. 90, 126, 132-135, 204, 373
Chromium		17.3	0.8[4]	Ref. 13, pp. 90, 126, 132-135, 204, 373
Lead		131	1.2[4]	Ref. 13, pp. 90, 126, 132-135, 204, 373
Manganese		358	0.8[4]	Ref. 13, pp. 90, 126, 132-135, 204, 373
Mercury		0.142	0.104[4]	Ref. 13, pp. 90, 126, 132-135, 205, 373

Notes:
mg/kg = milligrams per kilogram = 1,000 micrograms per kilogram (ug/kg)
J The identification of the analyte is acceptable; the reported value is an estimate (Ref. 12, p. 193; Ref. 13, p. 380). There is an unknown bias associated with these concentrations.
[1] The Reporting Limit (RL) terminology used by the EPA Region 6 Laboratory and the Adjusted Contract Required Quantitation Limit (CRQL) and Contract Required Detection Limit (CRDL) terminology used by the CLP Laboratory are based on detection limits that have been adjusted for sample aliquot, sample volume, and dilutions for the analysis Ref. 1, Section 1.1, Table 2-3; Ref. 13, pp. 134-135; Ref. 29).
[2] Quantitation limit provided is an adjusted CRQL (Ref. 12, pp. 400-405; Ref. 29).
[3] Quantitation limit provided is an adjusted CRDL (Ref. 12, p. 406; Ref. 29).
[4] Quantitation limit provided is an RL (Ref. 13, p. 135; Ref. 29).

2.4.2 Hazardous Waste Quantity

2.4.2.1 Source Hazardous Waste Quantity

2.4.2.1.1 Tier A: Hazardous Constituent Quantity- Not Evaluated (NE)

The hazardous constituent quantity for Source 1 could not be adequately determined according to HRS requirements; that is, the total mass of all Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) hazardous substances in the source is not known and cannot be estimated with reasonable confidence (Ref. 1, Section 2.4.2.1.1). There are insufficient historical and current data (manifests, potentially responsible party (PRP) records, State records, permits, waste concentration data, etc.) available to adequately calculate the total mass of all CERCLA hazardous substances in the source and the associated releases from the source. Therefore, there is insufficient information to evaluate the associated releases from the source to calculate the hazardous constituent quantity for Source 1 with reasonable confidence.

2.4.2.1.2 Tier B: Hazardous Wastestream Quantity- Not Evaluated (NE)

The hazardous wastestream quantity for Source 1 could not be adequately determined according to HRS requirements; that is, the mass of the wastestream plus the mass of any additional CERCLA pollutants and contaminants that are allocated to the source is not known and cannot be estimated with reasonable confidence (Ref. 1, Section 2.4.2.1.2). There are insufficient historical and current data (manifests, PRP records, State records, permits, waste concentration data, etc.) available to adequately calculate the mass of the wastestream plus the mass of any additional CERCLA pollutants and contaminants in the source and the associated releases from the source. Therefore, there is insufficient information to evaluate the associated releases from the source to calculate the hazardous wastestream quantity for Source 1 with reasonable confidence. Scoring proceeds to the evaluation of Tier C, volume (Ref. 1, Section 2.4.2.1.3).

2.4.2.1.3 Tier C: Volume

The information available is not sufficient to adequately determine a volume with reasonable confidence for Source 1. There are insufficient historical and current data available to adequately calculate the depth of the pits and, therefore, determine the volume of Source 1. Source 1 has been assigned a value of 0 for the volume measure (Ref. 1, Section 2.4.2.1.3). Scoring proceeds to the evaluation of Tier D, area (Ref. 1, Section 2.4.2.1.4).

Volume Assigned Value: 0

2.4.2.1.4 Tier D: Area

The area of Pit 1 (Source 1) was determined by measurements obtained by using Geographic Information System (GIS) software (Ref. 19). GIS software contains recent aerial photography of the Site, which allows the user to trace an area and determine length and width measurements of the pits (Ref. 19). The area of Source 1 was calculated to total 23,750 square feet (Attachment A, Figure A-2; Ref. 19). The Tier C equation for assigning a value for area of a source type "Surface Impoundment" is A/13 (Ref. 1, Table 2-5). Calculations for Pit 1 are as follows:

Pit 1: 190 feet x125 feet = 23,750 square feet
Area of Source 1 (square feet): 23,750
Area Assigned Value = 23,750/13
Area Assigned Value = 1,826.923

2.4.2.1.5 Source Hazardous Waste Quantity Value

Per the HRS, the highest of the values assigned to the source for hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), Volume (Tier C), and Area (Tier D) should be assigned as the source hazardous waste quantity value (Ref. 1, Section 2.4.2.1.5).

Tier Evaluated	Source 1 Values
A	Not Evaluated
B	Not Evaluated
C	0
D	1,826.923

Source Hazardous Waste Quantity Value: 1,826.923

SOURCE DESCRIPTION

2.2 Source Characterization

Source Description: Source 2 – Open Pit 2

Source Type: Surface Impoundment

Source 2 consists of the middle open pit (referred to as Pit 2) of three open pits located on the property and contains a total area of approximately 26,875 square feet (Attachment A, Figure A-2; Ref. 13, p. 112; Ref. 19). Source 2 is classified as the HRS source type "Surface Impoundment" (Ref. 1, Table 2-5). Oily waste from the cleaning process was stored in the unlined earthen pit used as an evaporation pond (Ref. 5, p. 3). Currently, the open pit is uncovered and lacks engineered containment features; this allows the contents to be exposed to the elements. The pit has no vegetation growing on it and has a crusty layer on the surface. The crusty layer on the pit is black and appears to be a dried oil/petroleum-type waste (Ref. 7, pp. 1, 3, 5, 6; Ref. 12, pp. 16, 17). Although Pit 2 is separated from the other pits by a berm, the photo logs from the Site show that its surrounding berms are not maintained, contain heavy vegetation, and appear to be insufficient to contain the contents of the pit during a rain event (Ref. 7, pp. 1, 3, 5, 6; Ref. 20, pp. 16-18).

Source Location

The open Pit 2 (Source 2) is the middle open pit and is located on the south end of the property to the east of Dean Court (formerly referred to as Plant Shell Road) and west of Company Canal in a wetland area (Ref. 11, p. 3; Ref. 12, p. 23; Ref 14, p. 1). The location of the pit is depicted on Attachment A, Figure A-2.

Source Containment

Release To Surface Water

The open earthen Pit 2 is unlined and was originally surrounded by an earthen berm, but the berm is not maintained and as photo logs from the Site show, over time the surrounding wetlands have encroached into Source 2 (Ref. 5, p. 3; Ref. 12, pp. 16, 17; Ref. 20, pp. 1-3, 6, 10-13, 17, 18).

The berms are not maintained and contain heavy vegetation (Ref. 7, pp. 1, 3, 4, 6, 9, 11; Ref. 12, pp. 96-99; Ref. 20, pp. 1-6, 10-13). In addition, Source 2 is located in a special flood hazard area subject to inundation by the 1% annual chance of flood (Ref. 18, p. 1).

Source 2	Overland Flow Containment Value	Flood Containment Value
Source 2 is surrounded by HRS eligible surface water and source has unsound diking that is not regularly inspected or maintained (Ref. 7, pp. 1, 3, 4, 6, 9, 11; Ref. 12, pp. 96-99; Ref. 20, pp. 1-6, 10-13).	10	-
Source 2 has not been designed, constructed, operated, and maintained to prevent washout of hazardous substances by flooding (Ref. 7, pp. 1, 3, 4, 6, 9, 11; Ref. 12, pp. 96-99; Ref. 18, p. 1; Ref. 20, pp. 1-6, 10-13).	-	10

2.4.1 Hazardous Substances

As part of the ESI sampling conducted by EPA contractors in July 1996, two waste samples were collected from the Pit 2 (P03 and P04) (Attachment A, Figure A-5, Ref. 6, p. 14; Ref. 12, p. 36). The samples were analyzed for volatile organic analytes (VOAs), base-neutral, acids (BNA), and polychlorinated biphenyls (PCBs)/pesticides by Contract Laboratory Program (CLP) OLM01.9 and for target analyte list (TAL) metals and cyanide by CLP ILM04.0 by the CLP laboratories assigned by the EPA (Ref. 12, pp. 25, 131, 187).

As part of reassessment sampling of the Delta Shipyard Site from 06 through 10 August 2012, EPA contractors collected six waste samples from various depths from Pit 2 (Attachment A, Figure A-5, Ref. 13, p. 125). The samples were analyzed for TCL VOCs, TCL SVOCs, pesticides, and PCBs by the CLP SOW for Multi-Media, Multi-Concentration Organic Analysis, SOM01.2, and TAL metals with mercury by CLP SOW Multi-Media, Multi-Concentration Inorganics Analysis, ISM01.3 (Ref. 13, p. 5). The samples were submitted to the EPA Region 6 Environmental Services Branch Laboratory, located in Houston, Texas (Ref. 13, p. 5).

Analytical evidence of the contamination in waste source samples associated with Source 2 located on the Delta Shipyard Site is summarized below.

Hazardous Substance	Evidence			References
	Sample ID	Concentration (mg/kg)	Quantitation Limit[1] (mg/kg)	
ESI Sampling Activities – July 1996				
Ethylbenzene	P03-71-1/ G42511	4.5	2.1[2]	Ref. 6, p. 14; Ref.12, pp. 42, 225
Toluene		3.8	2.1[2]	Ref. 6, p. 14; Ref.12, pp. 42, 225
Xylenes		28.0	2.1[2]	Ref. 6, p. 14; Ref.12, pp. 42, 225
2-Methylnaphalene		470	110[2]	Ref. 6, p. 14; Ref.12, pp. 42, 269
Naphthalene		160	110[2]	Ref. 6, p. 14; Ref.12, pp. 42, 269
Phenanthrene		110 J	110[2]	Ref. 6, p. 14; Ref.12, pp. 42, 269

Hazardous Substance	Evidence			References
	Sample ID	Concentration (mg/kg)	Quantitation Limit[1] (mg/kg)	
Endosulfan II	P04-71-1 / G42510	0.089	0.028[2]	Ref. 6, p. 14; Ref.12, pp. 42, 299
Heptachlor epoxide		0.089	0.028[2]	Ref. 6, p. 14; Ref.12, pp. 42, 299
Arsenic		27.6	1.16[3]	Ref. 6, p. 14; Ref.12, pp. 42, 125
Cadmium		5.1	0.58[3]	Ref. 6, p. 14; Ref.12, pp. 42, 125
Chromium		520	1.16[3]	Ref. 6, p. 14; Ref.12, pp. 42, 125
Lead		771	0.58[3]	Ref. 6, p. 14; Ref.12, pp. 42, 125
Mercury		1.2	0.053[2]	Ref. 6, p. 14; Ref.12, pp. 42, 125
Zinc		1,020	2.33[3]	Ref. 6, p. 14; Ref.12, pp. 42, 125
Xylenes	P04-71-1 / G42510	2.0	1.7[2]	Ref. 6, p. 14; Ref.12, pp. 42, 223
2-Methylnaphthalene		130	90[2]	Ref. 6, p. 14; Ref.12, pp. 42, 267
Naphthalene		48.0 J	90[2]	Ref. 6, p. 14; Ref.12, pp. 42, 267
Arsenic		48.2	1.48[3]	Ref. 6, p. 14; Ref.12, pp. 42, 124
Cadmium		3.5	0.74[3]	Ref. 6, p. 14; Ref.12, pp. 42, 124
Chromium		104	1.48[3]	Ref. 6, p. 14; Ref.12, pp. 42, 124
Lead		520	0.74[3]	Ref. 6, p. 14; Ref.12, pp. 42, 124
Mercury		0.98	0.074[3]	Ref. 6, p. 14; Ref.12, pp. 42, 124
Zinc		808	2.96[3]	Ref. 6, p. 14; Ref.12, pp. 42, 124
Reassessment Sampling Activities – August 2012				
2-Methylnaphthalene	DSE-02-24-413	480	12.2[4]	Ref. 13, pp. 95, 125, 132-135, 158, 371
Dibenzofuran		16.3	12.2[4]	Ref. 13, pp. 95, 125, 132-135, 158, 371
Fluorene		28.1	12.2[4]	Ref. 13, pp. 95, 125, 132-135, 158, 371
Naphthalene		142	12.2[4]	Ref. 13, pp. 95, 125, 132-135, 158, 371
Phenanthrene		72.6	12.2[4]	Ref. 13, pp. 95, 125, 132-135, 159, 371
Antimony		6.3	1.3[4]	Ref. 13, pp. 94, 125, 132-135, 161, 371
Arsenic		26.7	1.3[4]	Ref. 13, pp. 94, 125, 132-135, 161, 371
Cadmium		6.9	0.6[4]	Ref. 13, pp. 94, 125, 132-135, 161, 371
Chromium		179	1.3[4]	Ref. 13, pp. 94, 125, 132-135, 161, 371
Lead		669	1.3[4]	Ref. 13, pp. 94, 125, 132-135, 161, 371
Manganese		502	0.6[4]	Ref. 13, pp. 94, 125, 132-135, 161, 371
Mercury		2.24	0.171[4]	Ref. 13, pp. 94, 125, 132-135, 162, 371
Benzene	DSE-02-48-413	0.762	0.0999[4]	Ref. 13, pp. 95, 125, 132-135, 163, 372
Ethylbenzene		4.62	0.0999[4]	Ref. 13, pp. 95, 125, 132-135, 164, 372
Isopropylbenzene		1.82	0.0999[4]	Ref. 13, pp. 95, 125, 132-135, 164, 372
meta-/para-Xylene		23.3	0.399[4]	Ref. 13, pp. 95, 125, 132-135, 164, 372
ortho-Xylene		11.3	0.200[4]	Ref. 13, pp. 95, 125, 132-135, 164, 372
Toluene		5.09	0.0999[4]	Ref. 13, pp. 95, 125, 132-135, 164, 372

Hazardous Substance	Evidence			References
	Sample ID	Concentration (mg/kg)	Quantitation Limit[1] (mg/kg)	
2-Methylnaphthalene		612	26.6[4]	Ref. 13, pp. 95, 125, 132-135, 166, 372
Anthracene		6.93	1.33[4]	Ref. 13, pp. 95, 125, 132-135, 165, 372
Dibenzofuran		26	3.33[4]	Ref. 13, pp. 95, 125, 132-135, 166, 372
Fluoranthene		3.44	1.33[4]	Ref. 13, pp. 95, 125, 132-135, 166, 372
Fluorene		44.1	1.33[4]	Ref. 13, pp. 95, 125, 132-135, 166, 372
Naphthalene		188	26.6[4]	Ref. 13, pp. 95, 125, 132-135, 166, 372
Phenanthrene		103	26.6[4]	Ref. 13, pp. 95, 125, 132-135, 167, 372
Pyrene		2.09	1.33[4]	Ref. 13, pp. 95, 125, 132-135, 167, 372
Antimony		8.7	1.4[4]	Ref. 13, pp. 94, 125, 132-135, 169, 372
Arsenic		41.9	1.4[4]	Ref. 13, pp. 94, 125, 132-135, 169, 372
Cadmium		10.2	0.7[4]	Ref. 13, pp. 94, 125, 132-135, 169, 372
Chromium		191	1.4[4]	Ref. 13, pp. 94, 125, 132-135, 169, 372
Lead		1,170	1.4[4]	Ref. 13, pp. 94, 125, 132-135, 169, 372
Manganese		726	0.7[4]	Ref. 13, pp. 94, 125, 132-135, 169, 372
Mercury		2.67	0.176[4]	Ref. 13, pp. 94, 125, 132-135, 169, 372
Benzene		1.01	0.0999[4]	Ref. 13, pp. 95, 125, 132-135, 171, 372
Ethylbenzene		3.52	0.0999[4]	Ref. 13, pp. 95, 125, 132-135, 172, 372
Isopropylbenzene		1.36	0.0999[4]	Ref. 13, pp. 95, 125, 132-135, 172, 372
meta-/para-Xylene		15.8	0.200[4]	Ref. 13, pp. 95, 125, 132-135, 172, 372
ortho-Xylene		7.97	0.0999[4]	Ref. 13, pp. 95, 125, 132-135, 172, 372
Toluene		4.48	0.0999[4]	Ref. 13, pp. 95, 125, 132-135, 172, 372
2-Methylnaphthalene		517	13.0[4]	Ref. 13, pp. 95, 125, 132-135, 174, 372
Anthracene		13	13.0[4]	Ref. 13, pp. 95, 125, 132-135, 173, 372
Fluorene		61.7	13.0[4]	Ref. 13, pp. 95, 125, 132-135, 174, 372
Naphthalene	DSE-02-72-413	79.9	13.0[4]	Ref. 13, pp. 95, 125, 132-135, 174, 372
Phenanthrene		100	13.0[4]	Ref. 13, pp. 95, 125, 132-135, 175, 372
Pyrene		13.5	13.0[4]	Ref. 13, pp. 95, 125, 132-135, 175, 372
Antimony		4.7	1.3[4]	Ref. 13, pp. 94, 125, 132-135, 177, 372
Arsenic		25.1	1.3[4]	Ref. 13, pp. 94, 125, 132-135, 177, 372
Cadmium		5.6	0.6[4]	Ref. 13, pp. 94, 125, 132-135, 177, 372
Chromium		218	1.3[4]	Ref. 13, pp. 94, 125, 132-135, 177, 372
Lead		590	1.3[4]	Ref. 13, pp. 94, 125, 132-135, 177, 372
Manganese		432	0.6[4]	Ref. 13, pp. 94, 125, 132-135, 177, 372
Mercury		1.1	0.072[4]	Ref. 13, pp. 94, 125, 132-135, 178, 372
Benzene		0.732	0.10[4]	Ref. 13, pp. 95, 125, 132-135, 180, 372
Ethylbenzene	DSE-02-96-413	6.48	0.10[4]	Ref. 13, pp. 95, 125, 132-135, 180, 372
Isopropylbenzene		2.65	0.10[4]	Ref. 13, pp. 95, 125, 132-135, 180, 372

Hazardous Substance	Evidence			References
	Sample ID	Concentration (mg/kg)	Quantitation Limit[1] (mg/kg)	
meta-/para-Xylene		23.9	0.40[4]	Ref. 13, pp. 95, 125, 132-135, 180, 372
ortho-Xylene		11.8	0.20[4]	Ref. 13, pp. 95, 125, 132-135, 180, 372
Toluene		7.45	0.10[4]	Ref. 13, pp. 95, 125, 132-135, 180, 372
2-Methylnaphthalene		182	10.6[4]	Ref. 13, pp. 95, 125, 132-135, 182, 372
Fluorene		12.8	10.6[4]	Ref. 13, pp. 95, 125, 132-135, 182, 372
Naphthalene		50.6	10.6[4]	Ref. 13, pp. 95, 125, 132-135, 182, 372
Phenanthrene		31.3	10.6[4]	Ref. 13, pp. 95, 125, 132-135, 183, 372
Pyrene		1.27	0.53[4]	Ref. 13, pp. 95, 125, 132-135, 183, 372
Antimony		4.5	1.3[4]	Ref. 13, pp. 94, 125, 132-135, 185, 372
Arsenic		43.9	1.3[4]	Ref. 13, pp. 94, 125, 132-135, 185, 372
Cadmium		5.8	0.7[4]	Ref. 13, pp. 94, 125, 132-135, 185, 372
Chromium		114	1.3[4]	Ref. 13, pp. 94, 125, 132-135, 185, 372
Lead		572	1.3[4]	Ref. 13, pp. 94, 125, 132-135, 185, 372
Manganese		511	0.7[4]	Ref. 13, pp. 94, 125, 132-135, 185, 372
Mercury		0.260	0.089[4]	Ref. 13, pp. 94, 125, 132-135, 186, 372
Ethylbenzene	DSE-02-120-413	0.677	0.0999[4]	Ref. 13, pp. 93, 125, 132-135, 140, 371
Isopropylbenzene		0.354	0.0999[4]	Ref. 13, pp. 93, 125, 132-135, 140, 371
meta-/para-Xylene		2.92 J	0.2[4]	Ref. 13, pp. 93, 125, 132-135, 140, 371
ortho-Xylene		1.47	0.0999[4]	Ref. 13, pp. 93, 125, 132-135, 140, 371
Toluene		0.445	0.0999[4]	Ref. 13, pp. 93, 125, 132-135, 140, 371
2-Methylnaphthalene		165 J	1.78[4]	Ref. 13, pp. 93, 125, 132-135, 142, 371
Fluorene		17.2	0.714[4]	Ref. 13, pp. 93, 125, 132-135, 142, 371
Fluoranthene		0.964 J	0.714[4]	Ref. 13, pp. 93, 125, 132-135, 142, 371
Dibenzofuran		10.2	1.78[4]	Ref. 13, pp. 93, 125, 132-135, 142, 371
Naphthalene		46.8 J	7.14[4]	Ref. 13, pp. 93, 125, 132-135, 142, 371
Phenanthrene		26.9 J	0.714[4]	Ref. 13, pp. 93, 125, 132-135, 143, 371
Pyrene		0.909	0.714[4]	Ref. 13, pp. 93, 125, 132-135, 143, 371
Arsenic		43.1	1.8[4]	Ref. 13, pp. 92, 125, 132-135, 145, 371
Cadmium		1.7	0.9[4]	Ref. 13, pp. 92, 125, 132-135, 145, 371
Chromium		27.1	1.8[4]	Ref. 13, pp. 92, 125, 132-135, 145, 371
Lead		222	1.8[4]	Ref. 13, pp. 92, 125, 132-135, 145, 371
Manganese		379	0.9[4]	Ref. 13, pp. 92, 125, 132-135, 145, 371
Mercury		0.655	0.121[4]	Ref. 13, pp. 92, 125, 132-135, 146, 371
2-Methylnaphthalene	DSE-02-144-413	1.39	0.344[4]	Ref. 13, pp. 93, 125, 132-135, 150, 371
Phenanthrene		0.642	0.344[4]	Ref. 13, pp. 93, 125, 132-135, 151, 371
Arsenic		6.9	1.6[4]	Ref. 13, pp. 92, 125, 132-135, 153, 371
Chromium		12.7	1.6[4]	Ref. 13, pp. 92, 125, 132-135, 153, 371

Hazardous Substance	Evidence			References
	Sample ID	Concentration (mg/kg)	Quantitation Limit[1] (mg/kg)	
Lead		30.4	1.6[4]	Ref. 13, pp. 92, 125, 132-135, 153, 371
Manganese		210	0.8[4]	Ref. 13, pp. 92, 125, 132-135, 153, 371

Notes:
mg/kg = milligrams per kilogram = 1,000 micrograms per kilogram (ug/kg)
J The identification of the analyte is acceptable; the reported value is an estimate (Ref. 12, p. 193; Ref. 13, p. 380). There is an unknown bias associated with these concentrations.
[1] The Reporting Limit (RL) terminology used by the EPA Region 6 Laboratory and the Adjusted Contract Required Quantitation Limit (CRQL) and Contract Required Detection Limit (CRDL) terminology used by the CLP Laboratory are based on detection limits that have been adjusted for sample aliquot, sample volume, and dilutions for the analysis (Ref. 1, Section 1.1, Table 2-3; Ref. 13, pp. 134-135; Ref. 29).
[2] Quantitation limit provided is an adjusted CRQL (Ref. 12, pp. 400-405; Ref. 29).
[3] Quantitation limit provided is an adjusted CRDL (Ref. 12, p. 406; Ref. 29).
[4] Quantitation limit provided is an RL (Ref. 13, p. 135; Ref. 29).

2.4.2 Hazardous Waste Quantity

2.4.2.1 Source Hazardous Waste Quantity

2.4.2.1.1 Tier A: Hazardous Constituent Quantity- Not Evaluated (NE)

The hazardous constituent quantity for Source 2 could not be adequately determined according to HRS requirements; that is, the total mass of all CERCLA hazardous substances in the source is not known and cannot be estimated with reasonable confidence (Ref. 1, Section 2.4.2.1.1). There are insufficient historical and current data (manifests, PRP records, State records, permits, waste concentration data, etc.) available to adequately calculate the total mass of all CERCLA hazardous substances in the source and the associated releases from the source. Therefore, there is insufficient information to evaluate the associated releases from the source to calculate the hazardous constituent quantity for Source 1 with reasonable confidence.

2.4.2.1.2 Tier B: Hazardous Wastestream Quantity- Not Evaluated (NE)

The hazardous wastestream quantity for Source 2 could not be adequately determined according to HRS requirements; that is, the mass of the wastestream plus the mass of any additional CERCLA pollutants and contaminants that are allocated to the source is not known and cannot be estimated with reasonable confidence (Ref. 1, Section 2.4.2.1.2). There are insufficient historical and current data (manifests, PRP records, State records, permits, waste concentration data, etc.) available to adequately calculate the mass of the wastestream plus the mass of any additional CERCLA pollutants and contaminants in the source and the associated releases from the source. Therefore, there is insufficient information to evaluate the associated releases from the source to calculate the hazardous wastestream quantity for Source 2 with reasonable confidence. Scoring proceeds to the evaluation of Tier C, volume (Ref. 1, Section 2.4.2.1.3).

2.4.2.1.3 Tier C: Volume

The information available is not sufficient to adequately determine a volume with reasonable confidence for Source 2. There are insufficient historical and current data available to adequately calculate the depth of the pits and, therefore, determine the volume of Source 2. Source 2 has been assigned a value of 0 for the volume measure (Ref. 1, Section 2.4.2.1.3). Scoring proceeds to the evaluation of Tier D, area (Ref. 1, Section 2.4.2.1.4).

Volume Assigned Value: 0

2.4.2.1.4 Tier D: Area

The area of Pit 2 (Source 2) was determined by measurements obtained by using Geographic Information System (GIS) software (Ref. 19). GIS software contains recent aerial photography of the Site, which allows the user to trace an area and determine length and width measurements of the pits (Ref. 19). The area of Source 2 was calculated to total 26,875 square feet (Attachment A, Figure A-2; Ref. 19). The Tier C equation for assigning a value for area of a source type "Surface Impoundment" is A/13 (Ref. 1, Table 2-5). Calculations for Pit 2 are as follows:

Pit 2: 215 feet x 125 feet = 26,875 square feet
Area of Source 2 (square feet): 26,875
Area Assigned Value = 26,875/13
Area Assigned Value = 2,067.307

2.4.2.1.5 Source Hazardous Waste Quantity Value

Per the HRS, the highest of the values assigned to the source for hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), Volume (Tier C), and Area (Tier D) should be assigned as the source hazardous waste quantity value (Ref. 1, Section 2.4.2.1.5).

Tier Evaluated	Source 2 Values
A	Not Evaluated
B	Not Evaluated
C	0
D	2,067.307

Source Hazardous Waste Quantity Value: 2,067.307

SOURCE DESCRIPTION

2.2 Source Characterization

Source Description: Source 3 – Open Pit 3

Source Type: Surface Impoundment

Source 3 consists of the southernmost open pit (referred to as Pit 3) of three open pits located on the property and contains a total area of approximately 35,250 square feet (Attachment A, Figure A-2; Ref. 13, p. 112; Ref. 19). Source 3 is classified as the HRS source type "Surface Impoundment" (Ref. 1, Table 2-5). Oily waste from the cleaning process was stored in the unlined earthen pit used as an evaporation pond (Ref. 5, p. 3). Currently, the open pit is uncovered and lacks engineered containment features; this allows the contents to be exposed to the elements. The pit has no vegetation growing on it and has a crusty layer on the surface. The crusty layer on the pit is black and appears to be a dried oil/petroleum-type waste (Ref. 7, pp. 1, 3, 5, 6; Ref. 12, pp. 16, 17). Although Pit 3 is separated from the other pits by a berm, photo logs from the Site show that its surrounding berms are not maintained, contain heavy vegetation, and appear to be insufficient to contain the contents of the pit during a rain event (Ref. 7, pp. 1, 3, 5, 6; Ref. 20, pp. 16-18).

Source Location

The open Pit 3 (Source 3) is the southernmost pit and is located on the south end of the property to the east of Dean Court (formerly referred to as Plant Shell Road) and west of Company Canal in a wetland area (Ref. 11, p. 3; Ref. 12, p. 23; Ref 14, p. 1). The location of the pit is depicted on Attachment A, Figure A-2.

Source Containment

Release To Surface Water

The open earthen Pit 3 is unlined and was originally surrounded by an earthen berm, but the berm is not maintained and as the photo logs from the Site show, over time the surrounding wetlands have encroached into Source 3 (Ref. 5, p. 3; Ref. 12, pp. 16, 17; Ref. 20, pp. 1-3, 6, 10-13, 17, 18).

The berms are not maintained and contain heavy vegetation (Ref. 7, pp. 1, 3, 4, 6, 9, 11; Ref. 12, pp. 96-99; Ref. 20, pp. 1-6, 10-13). In addition, Source 3 is located in a special flood hazard area subject to inundation by the 1% annual chance of flood (Ref. 18, p. 1).

Source 3	Overland Flow Containment Value	Flood Containment Value
Source 3 is surrounded by HRS eligible surface water and source has unsound diking that is not regularly inspected or maintained (Ref. 7, pp. 1, 3, 4, 6, 9, 11; Ref. 12, pp. 96-99; Ref. 20, pp. 1-6, 10-13).	10	-
Source 3 has not been designed, constructed, operated, and maintained to prevent washout of hazardous substances by flooding (Ref. 7, pp. 1, 3, 4, 6, 9, 11; Ref. 12, pp. 96-99; Ref. 18, p. 1; Ref. 20, pp. 1-6, 10-13).	-	10

2.4.1 Hazardous Substances

As part of the ESI sampling conducted by EPA contractors in July 1996, two waste samples and a duplicate were collected from the Pit 3 (P05 and P06) (Attachment A, Figure A-5, Ref. 6, p. 14; Ref. 12, p. 36). The samples were analyzed for VOAs, BNA, and PCBs/pesticides by CLP OLM01.9 and for TAL metals and cyanide by CLP ILM04.0 by the CLP laboratories assigned by the EPA (Ref. 12, pp. 25, 131, 187).

As part of reassessment sampling of the Delta Shipyard Site from 06 through 10 August 2012, EPA contractors collected two waste samples from two depths from Pit 3 (Attachment A, Figure A-5, Ref. 13, p. 126). The samples were analyzed for TCL VOCs, TCL SVOCs, pesticides, and PCBs by the CLP SOW for Multi-Media, Multi-Concentration Organic Analysis, SOM01.2, and TAL metals with mercury by CLP SOW Multi-Media, Multi-Concentration Inorganics Analysis, ISM01.3 (Ref. 13, p. 5). The samples were submitted to the EPA Region 6 Environmental Services Branch Laboratory, located in Houston, Texas (Ref. 13, p. 5).

Analytical evidence of the contamination in waste source samples associated with Source 3 located on the Delta Shipyard Site is summarized below.

Hazardous Substance	Evidence			References
	Sample ID	Concentration (mg/kg)	Quantitation Limit[1] (mg/kg)	
ESI Sampling Activities – July 1996				
Ethylbenzene	P05-71-1/ G42508	8.6	2.3[2]	Ref. 6, p. 14; Ref.12, pp. 42, 219
Toluene		6.4	2.3[2]	Ref. 6, p. 14; Ref.12, pp. 42, 219
Xylenes		56.0	2.3[2]	Ref. 6, p. 14; Ref.12, pp. 42, 219
2-Methylnaphthalene		410	120[2]	Ref. 6, p. 14; Ref.12, pp. 42, 260
Naphthalene		130	120[2]	Ref. 6, p. 14; Ref.12, pp. 42, 260
Arsenic		61.2	1.06[3]	Ref. 6, p. 14; Ref.12, pp. 42, 122
Cadmium		12.2	0.53[3]	Ref. 6, p. 14; Ref.12, pp. 42, 122

Hazardous Substance	Evidence			References
	Sample ID	Concentration (mg/kg)	Quantitation Limit[1] (mg/kg)	
Chromium	P05-72-1/ G42509	371	1.06[3]	Ref. 6, p. 14; Ref.12, pp. 42, 122
Lead		561	0.53[3]	Ref. 6, p. 14; Ref.12, pp. 42, 122
Mercury		0.81	0.053[3]	Ref. 6, p. 14; Ref.12, pp. 42, 122
Zinc		2,160	2.13[3]	Ref. 6, p. 14; Ref.12, pp. 42, 122
Ethylbenzene		9.0	2.1[2]	Ref. 6, p. 14; Ref.12, pp. 43, 221
Toluene		7.4	2.1[2]	Ref. 6, p. 14; Ref.12, pp. 43, 221
Xylenes		59.0	2.1[2]	Ref. 6, p. 14; Ref.12, pp. 43, 221
2-Methylnaphthalene		470	110[2]	Ref. 6, p. 14; Ref.12, pp. 43, 263
Naphthalene		160	110[2]	Ref. 6, p. 14; Ref.12, pp. 43, 263
Arsenic		48.9	1.17[3]	Ref. 6, p. 14; Ref.12, pp. 43, 123
Cadmium		15.2	0.58[3]	Ref. 6, p. 14; Ref.12, pp. 43, 123
Chromium		384	1.17[3]	Ref. 6, p. 14; Ref.12, pp. 43, 123
Lead		525	0.58[3]	Ref. 6, p. 14; Ref.12, pp. 43, 123
Mercury		0.76	0.058[3]	Ref. 6, p. 14; Ref.12, pp. 43, 123
Zinc		2,500	3.42[3]	Ref. 6, p. 14; Ref.12, pp. 43, 123
Xylenes	P06-71-1/ G42507	13.0	2.4[2]	Ref. 6, p. 14; Ref.12, pp. 43, 217
Heptachlor epoxide		0.078	0.033[2]	Ref. 6, p. 14; Ref.12, pp. 43, 295
Cadmium		6.2	0.051[3]	Ref. 6, p. 14; Ref.12, pp. 43, 121
Chromium		451	1.02[3]	Ref. 6, p. 14; Ref.12, pp. 43, 121
Mercury		0.85	0.051[3]	Ref. 6, p. 14; Ref.12, pp. 43, 121
Zinc		1,190	3.49[3]	Ref. 6, p. 14; Ref.12, pp. 43, 121
Reassessment Sampling Activities – August 2012				
Ethylbenzene	DSE-03-24-413	0.163	0.10[4]	Ref. 13, pp. 97, 126, 132-135, 261, 377
Isopropylbenzene		0.286	0.10[4]	Ref. 13, pp. 97, 126, 132-135, 261, 377
meta-/para-Xylene		0.812	0.20[4]	Ref. 13, pp. 97, 126, 132-135, 261, 377
ortho-Xylene		0.501	0.10[4]	Ref. 13, pp. 97, 126, 132-135, 261, 377
Toluene		0.103	0.10[4]	Ref. 13, pp. 97, 126, 132-135, 261, 377
2-Methylnaphthalene		98.4	15.0[4]	Ref. 13, pp. 97, 126, 132-135, 262, 377
Anthracene		2.55	1.5[4]	Ref. 13, pp. 97, 126, 132-135, 262, 377
Fluorene		11.6	1.5[4]	Ref. 13, pp. 97, 126, 132-135, 262, 377
Naphthalene		10.6	1.5[4]	Ref. 13, pp. 97, 126, 132-135, 263, 377
Phenanthrene		23.5	1.5[4]	Ref. 13, pp. 97, 126, 132-135, 264, 377
Pyrene		2.2	1.5[4]	Ref. 13, pp. 97, 126, 132-135, 264, 377
Arsenic		18.1	1.5[4]	Ref. 13, pp. 96, 126, 132-135, 266, 377
Cadmium		1.7	0.8[4]	Ref. 13, pp. 96, 126, 132-135, 266, 377
Lead		194	1.5[4]	Ref. 13, pp. 96, 126, 132-135, 266, 377

Hazardous Substance	Evidence			References
	Sample ID	Concentration (mg/kg)	Quantitation Limit[1] (mg/kg)	
Manganese		304	0.8[4]	Ref. 13, pp. 96, 126, 132-135, 266, 377
Mercury		0.478	0.084[4]	Ref. 13, pp. 96, 126, 132-135, 267, 377
Ethylbenzene	DSE-03-48-413	0.223	0.0999[4]	Ref. 13, pp. 97, 126, 132-135, 271, 377
Isopropylbenzene		0.109	0.0999[4]	Ref. 13, pp. 97, 126, 132-135, 271, 377
meta-/para-Xylene		0.891	0.20[4]	Ref. 13, pp. 97, 126, 132-135, 271, 377
ortho-Xylene		0.463	0.0999[4]	Ref. 13, pp. 97, 126, 132-135, 271, 377
Toluene		0.153	0.0999[4]	Ref. 13, pp. 97, 126, 132-135, 271, 377
2-Methylnaphthalene		21.8	3.15[4]	Ref. 13, pp. 97, 126, 132-135, 273, 377
Anthracene		0.455	0.315[4]	Ref. 13, pp. 97, 126, 132-135, 272, 377
Dibenzofuran		0.913	0.788[4]	Ref. 13, pp. 97, 126, 132-135, 273, 377
Fluoranthene		0.520	0.315[4]	Ref. 13, pp. 97, 126, 132-135, 273, 377
Fluorene		2.63	0.315[4]	Ref. 13, pp. 97, 126, 132-135, 273, 377
Naphthalene		5.19	3.15[4]	Ref. 13, pp. 97, 126, 132-135, 273, 377
Phenanthrene		4.93	0.315[4]	Ref. 13, pp. 97, 126, 132-135, 274, 377
Pyrene		0.701	0.315[4]	Ref. 13, pp. 97, 126, 132-135, 274, 377
Arsenic		26.6	1.4[4]	Ref. 13, pp. 95, 126, 132-135, 276, 377
Cadmium		0.7	0.7[4]	Ref. 13, pp. 95, 126, 132-135, 276, 377
Lead		25.9	1.4[4]	Ref. 13, pp. 95, 126, 132-135, 276, 377
Manganese		541	0.7[4]	Ref. 13, pp. 95, 126, 132-135, 276, 377
Mercury		0.207	0.081[4]	Ref. 13, pp. 95, 126, 132-135, 277, 377

Notes:
mg/kg = milligrams per kilogram = 1,000 micrograms per kilogram (ug/kg)

[1] The Reporting Limit (RL) terminology used by the EPA Region 6 Laboratory and the Adjusted Contract Required Quantitation Limit (CRQL) and Contract Required Detection Limit (CRDL) terminology used by the CLP Laboratory are based on detection limits that have been adjusted for sample aliquot, sample volume, and dilutions for the analysis (Ref. 1, Section 1.1, Table 2-3; Ref. 13, pp. 134-135; Ref. 29).

[2] Quantitation limit provided is an adjusted CRQL (Ref. 12, pp. 400-405; Ref. 29).

[3] Quantitation limit provided is an adjusted CRDL (Ref. 12, p. 406; Ref. 29).

[4] Quantitation limit provided is an RL (Ref. 13, p. 135; Ref. 29).

2.4.2 Hazardous Waste Quantity

2.4.2.1 Source Hazardous Waste Quantity

2.4.2.1.1 Tier A: Hazardous Constituent Quantity- Not Evaluated (NE)

The hazardous constituent quantity for Source 3 could not be adequately determined according to HRS requirements; that is, the total mass of all CERCLA hazardous substances in the source is not known and cannot be estimated with reasonable confidence (Ref. 1, Section 2.4.2.1.1). There are insufficient historical and current data (manifests, PRP records, State records, permits, waste concentration data, etc.) available to adequately calculate the total mass of all CERCLA hazardous substances in the

source and the associated releases from the source. Therefore, there is insufficient information to evaluate the associated releases from the source to calculate the hazardous constituent quantity for Source 3 with reasonable confidence.

2.4.2.1.2 Tier B: Hazardous Wastestream Quantity- Not Evaluated (NE)

The hazardous wastestream quantity for Source 3 could not be adequately determined according to HRS requirements; that is, the mass of the wastestream plus the mass of any additional CERCLA pollutants and contaminants that are allocated to the source is not known and cannot be estimated with reasonable confidence (Ref. 1, Section 2.4.2.1.2). There are insufficient historical and current data (manifests, PRP records, State records, permits, waste concentration data, etc.) available to adequately calculate the mass of the wastestream plus the mass of any additional CERCLA pollutants and contaminants in the source and the associated releases from the source. Therefore, there is insufficient information to evaluate the associated releases from the source to calculate the hazardous wastestream quantity for Source 3 with reasonable confidence. Scoring proceeds to the evaluation of Tier C, volume (Ref. 1, Section 2.4.2.1.3).

2.4.2.1.3 Tier C: Volume

The information available is not sufficient to adequately determine a volume with reasonable confidence for Source 3. There are insufficient historical and current data available to adequately calculate the depth of the pits and, therefore, determine the volume of Source 3. Source 3 has been assigned a value of 0 for the volume measure (Ref. 1, Section 2.4.2.1.3). Scoring proceeds to the evaluation of Tier D, area (Ref. 1, Section 2.4.2.1.4).

Volume Assigned Value: 0

2.4.2.1.4 Tier D: Area

The area of Pit 3 (Source 3) was determined by measurements obtained by using GIS software (Ref. 19). GIS software contains recent aerial photography of the Site, which allows the user to trace an area and determine length and width measurements of the pits (Ref. 19). The area of Source 3 was calculated to total 35,250 square feet (Attachment A, Figure A-2; Ref. 19). The Tier C equation for assigning a value for area of a source type "Surface Impoundment" is A/13 (Ref. 1, Table 2-5). Calculations for Pit 3 are as follows:

Pit 3: 235 feet x 150 feet = 35,250 square feet
Area of Source 3 (square feet): 35,250
Area Assigned Value = 35250/13
Area Assigned Value = 2,711.538

2.4.2.1.5 Source Hazardous Waste Quantity Value

Per the HRS, the highest of the values assigned to the source for hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), Volume (Tier C), and Area (Tier D) should be assigned as the source hazardous waste quantity value (Ref. 1, Section 2.4.2.1.5).

Tier Evaluated	Source 3 Values
A	Not Evaluated
B	Not Evaluated
C	0
D	2,711.538

Source Hazardous Waste Quantity Value: 2,711.538

SOURCE DESCRIPTION

2.2 Source Characterization

Source Description: Source 4 –Drainage Ditch

Source Type: Other

Source 4 consists of the manmade drainage ditch that was designed to be part of the waste management system, which incorporates the pits in Sources 1 through 3. Source 4 is west of and runs parallel to Pits 1 through 3. It then turns east, south of Pit 3, and drains to Company Canal (Ref. 12, p. 52). Pit 2 (Source 2) contains an overflow pipe which is known to have discharged to the drainage ditch (Source 4) (Ref. 12, pp. 52, 54, 94; Ref. 13, p. 8). Source 4 was used for overflow of Sources 1 through 3 and was developed around the same time as the pits, around the mid-1970s (Ref. 30, pp. 1-4). There is a series of un-maintained weirs located within the ditch, south of Source 3 (Ref. 7, pp. 10-12).

Source 4 is classified as the HRS source type "Other" (Ref. 1, Table 2-5).

Source Location

The drainage ditch (Source 4) is located to the west and south of Source 1 through 3 and to the east of Dean Court (formerly referred to as Plant Shell Road) and west of Company Canal in a wetland area (Ref. 11, p. 3; Ref. 12, p. 23; Ref 14, p. 1). The location of the drainage ditch is depicted on Attachment A, Figure A-2.

Source Containment

Release To Surface Water

Source 4, the drainage ditch, is unlined, and it is located within a wetland (Ref. 5, p. 3; Ref. 12, pp. 16, 17; Ref. 20, pp. 1-3, 6, 10-13, 17, 18).

In addition, Source 4 is located in a special flood hazard area subject to inundation by the 1% annual chance of flood (Ref. 18, p. 1).

Source 4	Overland Flow Containment Value	Flood Containment Value
Source 4 is located within wetlands, HRS eligible surface water (Ref. 7, pp. 1, 3, 4, 6, 9, 11; Ref. 12, pp. 96-99; Ref. 20, pp. 1-6, 10-13).	10	-
Source 4 has not been designed, constructed, operated, and maintained to prevent washout of hazardous substances by flooding (Ref. 7, pp. 1, 3, 4, 6, 9, 11; Ref. 12, pp. 96-99; Ref. 18, p. 1; Ref. 20, pp. 1-6, 10-13).	-	10

2.4.1 Hazardous Substances

As part of the ESI sampling conducted by EPA contractors in July 1996, four waste samples and two duplicates were collected from the drainage ditch (D01, D02, D03 and D04) (Attachment A, Figure A-5, Ref. 6, p. 16; Ref. 12, p. 30). The samples were analyzed for VOAs, BNA, and PCBs/pesticides by CLP OLM01.9 and for TAL metals and cyanide by CLP ILM04.0 by the CLP laboratories assigned by the EPA (Ref. 12, pp. 25, 131, 187).

As part of reassessment sampling of the Delta Shipyard Site from 06 through 10 August 2012, EPA contractors collected waste samples from four locations at various depths from the drainage ditch (Attachment A, Figure A-5, Ref. 13, p. 125). The samples were analyzed for TCL VOCs, TCL SVOCs, pesticides, and PCBs by the CLP SOW for Multi-Media, Multi-Concentration Organic Analysis, SOM01.2, and TAL metals with mercury by CLP SOW Multi-Media, Multi-Concentration Inorganics Analysis, ISM01.3 (Ref. 13, p. 5). The samples were submitted to the EPA Region 6 Environmental Services Branch Laboratory, located in Houston, Texas (Ref. 13, p. 5).

Analytical evidence of the contamination in waste source samples associated with Source 4 located on the Delta Shipyard Site is summarized below.

Hazardous Substance	Evidence			References
	Sample ID	Concentration (mg/kg)	Quantitation Limit[1] (mg/kg)	
ESI Sampling Activities – July 1996				
Chromium	D01-51-1/ MFGY33	75.2	2[3]	Ref. 6, p. 16; Ref.12, pp. 61, 445
Zinc		2350	4[3]	Ref. 6, p. 16; Ref.12, pp. 62, 445
2-Methylnaphthalene	D02-51-1/ FFE74/ MFGY34	1.5 J	0.80[2]	Ref. 6, p. 16; Ref.12, pp. 61, 435
Naphthalene		0.860 J	0.80[2]	Ref. 6, p. 16; Ref.12, pp. 61, 437
Phenanthrene		0.880 J	0.80[2]	Ref. 6, p. 16; Ref.12, pp. 61, 221
Chromium		123	2[3]	Ref. 6, p. 16; Ref.12, pp. 61, 123
Benzo(b)fluoranthene	D02-52-1/ FFE75/ MFGY35	1.1 J^	0.73[2]	Ref. 6, p. 16; Ref.12, pp. 61, 436
Benzo(k)fluoranthene		1.1 J^	0.73[2]	Ref. 6, p. 16; Ref.12, pp. 61, 436
Chromium		92.1	2[3]	Ref. 6, p. 16; Ref.12, pp. 61, 445
Chromium	D03-52-1/ MFGY37	68.4	2[3]	Ref. 6, p. 16; Ref.12, pp. 61, 445
Chromium	D04-51-1/ MFGY38	232	1[3]	Ref. 6, p. 16; Ref. 12, pp. 61, 446
Reassessment Sampling Activities – August 2012				
Arsenic	DSE-07/ 24" (MF6AA6)	54.7	0.92[4]	Ref. 13, pp. 30, 125, 386-388, 400, 416, 423
Mercury		0.32	0.13[4]	Ref. 13, pp. 30, 125, 386-388, 400, 416, 423

Hazardous Substance	Evidence			References
	Sample ID	Concentration (mg/kg)	Quantitation Limit[1] (mg/kg)	
Cadmium	DSE-10/ 12" (MF6AB0)	3.8	0.46[4]	Ref. 13, pp. 16, 125, 386-388, 404, 417, 424
Mercury		0.85	0.12[4]	Ref. 13, pp. 16, 125, 386-388, 404, 417, 424
Fluorene	DSE-10/ 24" (F6AB1)	1.6	1.0[4]	Ref. 13, pp. 33, 125, 428-430, 435, 470, 500
Phenanthrene		3.5	1.0[4]	Ref. 13, pp. 33, 125, 428-430, 435, 470, 500
Arsenic	DSE-10/ 24" (MF6AB1)	62.5	0.92[4]	Ref. 13, pp. 32, 125, 385-388, 405, 418, 424
Cadmium		18.3	0.46[4]	Ref. 13, pp. 32, 125, 385-388, 405, 418, 424
Chromium		52.6	0.92[4]	Ref. 13, pp. 32, 125, 385-388, 405, 418, 424
Lead		2,170 J	0.92[4]	Ref. 13, pp. 32, 125, 385-388, 405, 418, 424
Manganese		671	1.4[4]	Ref. 13, pp. 32, 125, 385-388, 405, 418, 424
Mercury		1.8	0.12[4]	Ref. 13, pp. 32, 125, 385-388, 405, 418, 424
Arsenic	DSE-13/ 24" (MF6AB8)	27.7	1.0[4]	Ref. 13, pp. 32, 125, 385-388, 411, 419, 425
Manganese		531	1.5[4]	Ref. 13, pp. 32, 125, 385-388, 411, 419, 425
Arsenic	DSE-16/ 24" (MF6AC9)	36.1 J	1.0[4]	Ref. 13, pp. 32, 125, 711-714, 722, 741, 750
Cadmium		1.0	0.5[4]	Ref. 13, pp. 32, 125, 711-714, 722, 741, 750
Lead		189	1.0[4]	Ref. 13, pp. 32, 125, 711-714, 722, 741, 750

Notes:
mg/kg = milligrams per kilogram = 1,000 micrograms per kilogram (ug/kg)
J The identification of the analyte is acceptable; the reported value is an estimate (Ref. 12, p. 193; Ref. 13, p. 380). There is an unknown bias associated with these concentrations.
^ High bias (Ref. 12, p. 134).
[1] The Reporting Limit (RL) terminology used by the EPA Region 6 Laboratory and the Adjusted Contract Required Quantitation Limit (CRQL) and Contract Required Detection Limit (CRDL) terminology used by the CLP Laboratory are based on detection limits that have been adjusted for sample aliquot, sample volume, and dilutions for the analysis (Ref. 1, Section 1.1, Table 2-3; Ref. 13, pp. 134-135; Ref. 29).
[2] Quantitation limit provided is an adjusted CRQL (Ref. 12, pp. 400-405; Ref. 29).
[3] Quantitation limit provided is an adjusted CRDL (Ref. 12, p. 406; Ref. 29).
[4] Quantitation limit provided is an RL (Ref. 13, p. 135; Ref. 29).

2.4.2 Hazardous Waste Quantity

2.4.2.1 Source Hazardous Waste Quantity

2.4.2.1.1 Tier A: Hazardous Constituent Quantity- Not Evaluated (NE)

The hazardous constituent quantity for Source 4 could not be adequately determined according to HRS requirements; that is, the total mass of all CERCLA hazardous substances in the source is not known

and cannot be estimated with reasonable confidence (Ref. 1, Section 2.4.2.1.1). There are insufficient historical and current data (manifests, PRP records, State records, permits, waste concentration data, etc.) available to adequately calculate the total mass of all CERCLA hazardous substances in the source and the associated releases from the source. Therefore, there is insufficient information to evaluate the associated releases from the source to calculate the hazardous constituent quantity for Source 4 with reasonable confidence.

2.4.2.1.2 Tier B: Hazardous Wastestream Quantity- Not Evaluated (NE)

The hazardous wastestream quantity for Source 4 could not be adequately determined according to HRS requirements; that is, the mass of the wastestream plus the mass of any additional CERCLA pollutants and contaminants that are allocated to the source is not known and cannot be estimated with reasonable confidence (Ref. 1, Section 2.4.2.1.2). There are insufficient historical and current data (manifests, PRP records, State records, permits, waste concentration data, etc.) available to adequately calculate the mass of the wastestream plus the mass of any additional CERCLA pollutants and contaminants in the source and the associated releases from the source. Therefore, there is insufficient information to evaluate the associated releases from the source to calculate the hazardous wastestream quantity for Source 4 with reasonable confidence. Scoring proceeds to the evaluation of Tier C, volume (Ref. 1, Section 2.4.2.1.3).

2.4.2.1.3 Tier C: Volume

There are insufficient historical and current data available to adequately calculate the depth of the drainage ditch, however, it is documented that the waste in the source contains hazardous substances (see Section 2.4.1 for Source 4 of this report). Therefore, Source 4 has been assigned a value of unknown but >0 for the volume measure (Ref. 1, Section 2.4.2.1.3).

Volume Assigned Value: >0, but unknown

2.4.2.1.4 Tier D: Area

Per the HRS, as a value of unknown but >0 has been assigned to the volume measure, the area measure is not evaluated (Ref. 1, Section 2.4.2.1.3).

Area Assigned Value = 0

2.4.2.1.5 Source Hazardous Waste Quantity Value

Per the HRS, the highest of the values assigned to the source for hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), Volume (Tier C), and Area (Tier D) should be assigned as the source hazardous waste quantity value (Ref. 1, Section 2.4.2.1.5).

Tier Evaluated	Source 4 Values
A	Not Evaluated
B	Not Evaluated
C	>0, but unknown
D	0

Source Hazardous Waste Quantity Value: >0, but unknown

Other Sources Not Scored

The backfilled pit area, referred to as Pit 4, covers approximately 23,800 square feet (ft^2), contains vegetation and trash, and is differentiated from the surrounding land as mounds within a relatively flat topographic area (Ref. 7, p. 7; Ref. 19). Pit 4 is located approximately 160 feet west of Source 1 (Pits 1 through 3) and west of Dean Court (formerly referred to as Plant Shell Road), within a grassy area of wetland (Ref. 11, p. 15; Ref. 12, p. 23; Ref. 14, p. 1). This area was observed in 1985 to have a thin crust of fill and an overgrowth of vegetation. At one time this pit was actually three surface impoundments; however, the individual pits are no longer discernible (Ref. 9, p. 4; Ref. 11, p. 6; Ref. 12, pp. 17, 20). These impoundments were used for storage of disposed oil-field drilling material (Ref. 9, p. 4). As part of reassessment sampling of the Delta Shipyard Site from 06 through 10 August 2012, two waste samples collected by EPA contractors from Pit 4 indicated the presence of benzo(g,h,i)perylene, 2-butanone, cadmium, and antimony (Ref. 13, p. 2, 10, 20, 28, 130). The backfilled pit area is not used in scoring.

SITE SUMMARY OF SOURCE DESCRIPTIONS

Source No.	Source Hazardous Waste Quantity Value	Containment Factor Value			
		Ground Water	Surface Water	Gas	Air Particulate
1	1,826.923	NE	10	NE	NE
2	2,067.307	NE	10	NE	NE
3	2,711.538	NE	10	NE	NE
4	>0, but unknown	NE	10	NE	NE
TOTAL	>6,605.768	NE	10	NE	NE

NE = Not Evaluated

3.0 GROUND WATER MIGRATION PATHWAY SCORE - NOT SCORED

The ground water migration pathway is not scored because it is not expected to contribute significantly to the site score. The site score already exceeds 28.50 based only on the evaluation of the surface water pathway.

Although there is evidence of contamination through sampling of two monitoring wells, there is a lack of ground water drinking water targets (Ref. 12, pp. 46, 47). There are no drinking water wells located within 4 miles of the Site, and ground water is not known to be used as a resource in the area (Ref. 12, p. 47). Two monitoring wells were completed at depths of 16 feet bgs and 24 feet bgs, respectively in an approximately 100-foot-wide strip of land between the pits and Company Canal during the EPA ESI sampling event in 1996 (Ref. 12, p. 46). Elevated ground water concentrations of 2-methylnaphthalene (65 micrograms per liter (µg/L)), naphthalene (23 µg/L), phenanthrene (9 µg/L), barium (29,400 µg/L), chromium (507 µg/L), lead (482 µg/L), and zinc (3,290 µg/L) were detected. All of these constituents were also detected in samples collected from the three open pits (Source 1) (Ref. 12, p. 46).

4.0 SURFACE WATER MIGRATION PATHWAY

4.1 OVERLAND/FLOOD MIGRATION COMPONENT

4.1.1 General Considerations

4.1.1.1 Definition of Hazardous Substance Migration Path for Overland/Flood Component

The hazardous substance migration path includes both the overland and the in-water segment that hazardous substances would take as they migrate away from sources at the Site (Ref. 1, Section 4.1.1.1). There is one watershed for the hazardous substance migration path that begins on-facility at the wetland; therefore, there is no overland segment. The wetland is the beginning of the in-water segment for Source 1, which is described in the following text. The surface water pathway is presented on Figures A-3 and A-4.

In-Water Segments

The target distance limit (TDL) for the surface water pathway, which defines the maximum distance over which targets are considered, is 15 miles. Although the eligible surface water bodies within the TDL are considered tidally influenced, the Site is located approximately 50 stream miles from the Gulf Coast, and the water in the area is freshwater. Therefore, the tidal carry within the TDL is not considered influential and was not evaluated (Ref. 21, pp. 8, 12). The TDL of the surface water flow path is presented in Attachment A, Figure A-4 and is described in the following paragraphs.

The in-water segment begins at the probable point of entry (PPE) to an eligible surface water body as defined in the HRS (Ref. 1, Sec. 4.1.1). The eligible surface water bodies that have been determined to be part of the in-water segment for the Delta Shipyard Site are the Palustrine System, Scrub-Shrub, Broad-Leaved Deciduous, Temporary-Tidal (PSS1S) wetland, which is contiguous to a perennially flowing river, the Company Canal (Attachment A, Figure A-4; Ref. 1, Sec. 4.0.2; Ref. 14, pp. 1-2). The PSS1S wetland meets the 40 CFR 230.3 definition of a wetland and, therefore, is eligible for evaluation under the HRS as a surface water body (Ref. 1, Sec. 4.0.2). For HRS purposes, the term wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas (Ref. 15, pp. 3-4). The pits themselves are considered Palustrine, unconsolidated bottom, non-tidal permanent water regime, excavated (PUBHx) wetlands and are man-made excavated ponds that were created to hold waste. This type of wetland may not always meet the HRS (40 CFR 230.3) definition of a wetland (Ref. 14, pp. 1, 9). The vegetated areas along the former boundaries of the pits, which consist of PSS1S wetlands, are encroaching into the pits. Additionally, the drainage ditch is located within the PSS1S wetlands (Ref. 14, pp. 1, 9; Ref. 20, pp. 3-6, 10-13, 32-36, 38-39). The areas of the sources were historically wetland areas until their development between 1974 and 1978 (Ref. 30, pp. 1-4; Ref. 31, pp. 1-2).

There are multiple PPEs to the surface water pathway, and the entire boundary of each source could be considered to be PPEs, although only one PPE is illustrated for each source at the point at which entry of the hazardous substances to surface water is considered most likely. For Sources 1 through 3, there is at least one point each (PPE1 through PPE3), located along the eastern edges of the pits which are in direct contact with the HRS eligible wetland. The topography of the Delta Shipyard Site is relatively

flat and discharge from the pits would continue through sheet flow through the wetland and into Company Canal to the east. The PPE for Source 4 (PPE4) is located where the drainage ditch enters Company Canal. While there is an open pipe that allows discharges from Source 4 to enter Company Canal located immediately east of the site, wastes can also enter from around the pipe (Ref. 11, p. 7; Ref. 12, p. 52; Ref. 20, p. 30). From PPE4, Company Canal flows south for approximately 1,000 feet until reaching Bayou LaCarpe. Bayou LaCarpe flows south approximately 3,500 feet to its confluence with the Houma Navigation Canal. The Houma Navigation Canal, which is a part of the Company Canal, completes the 15-mile TDL (Attachment A, Figure A-3; Ref. 3, pp. 1-3; Ref. 12, p. 53).

4.1.2.1 LIKELIHOOD OF RELEASE

4.1.2.1.1 Observed Release

Direct Observation

An observed release is established by direct observation. Wastes containing hazardous substances generated from historical operations at the facility are in direct contact with wetlands (Ref. 20, pp. 3-6, 10-13, 32-36, 38-39). The pits and drainage ditch were used as evaporation ponds and part of a waste management system for the storage of oily wastes from boat cleaning operations and oil field drilling (Ref. 9, p. 4; Ref. 12, p. 16). These wastes contain hazardous substances based on samples collected from the pits in 1996 and 2012 (see Section 2.2 for Source 1, 2, 3 and 4 of this report). The wetlands are encroaching into the pits, and the drainage ditch is within the wetland (Ref 14, pp. 1, 9). Wetlands have historically covered the area where the sources are located and were present before the pits and drainage ditch were developed sometime between 1974 and 1978 (Ref. 14, pp. 1, 9; Ref. 30, pp. 1-4). The Terrebonne Parish Soil Survey from 1960 shows the soils in the area of the sources were categorized as Swamp, clays and murky clays (Ref. 31, pp. 1-2). The wetlands are currently re-emerging into the sources (Ref. 20, pp. 3-6, 10-13, 32-36, 38-39). Therefore, material containing hazardous substances is in direct contact with an HRS-defined surface water body, the PSS1S wetlands that surround the sources and are contiguous to Company Canal (Ref. 1, Sec. 4.0.2; Ref. 14, pp. 1-3).

The sources at the Site are uncontained and located within a wetland. Due to historical operations at the Site (operations that have demonstrated to cause releases of arsenic, antimony, anthracene, benzene, cadmium, chromium, ethylbenzene, fluorene, lead, manganese, mercury, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, o-xylene, and m,p-xylene contamination as shown through sampling results of the source) combined with the overall lack of containment of the source at the Site (see Section 2.2 for Source 1, 2, 3 and 4 of this report), the HRS criteria for observed release by direct observation have been met (Ref. 1, Sec. 4.1.2.1.1).

In addition, there is an observed release by chemical analysis established from the Site. During the August 2012 sampling activities, samples collected from within the wetland show elevated concentrations of hazardous substances as described below.

Chemical Analysis

Surface water and sediment samples were collected during the August 2012 EPA Reassessment sampling activities (Ref. 13, p. 4). For the purpose of this HRS evaluation, only the sediment samples are being discussed. Seventeen sediment samples (including one duplicate) were collected from the wetlands surrounding Sources 1-3 and one for the Company Canal at the mouth of the drainage ditch (Source 4) (Attachment A, Figure A-5; Ref. 13, p. 4; Ref. 14, pp. 1, 9). Sample locations are depicted in Figure A-5 of Attachment A.

Background Concentrations:

Two background sediment samples were collected from the wetland (DSE-21/12" and 24") immediately east and slightly upgradient of Pit 1, of Source 1 (Attachment A, Figure A-5; Ref. 13, p. 120). The background sediment samples contaminant concentrations collected from the wetland are

compared to site-related wetland sediment samples concentrations collected from the same wetland area to investigate whether a release from the Site to the surrounding wetlands can be established (Ref. 13, pp. 3, 4).

A background sediment sample was also collected from Company Canal upstream of the facility, and the sample contamination levels are compared to the canal release sample contamination levels (Attachment A, Figure A-3, Ref. 13, p. 4; Ref. 16, p. 22).

The background sediment samples from the wetlands and the Company Canal were collected on 09 August 2012 by EPA contractors (Ref. 13, pp. 107, 120). The wetland sediment samples were collected using a direct push technology subsurface coring device. The direct push cores were advanced to a depth of 8 feet bgs with samples collected at 0 to 12 inches, 1 to 2 feet, 2 to 4 feet, 4 to 6 feet, and 6 to 8 feet, although only samples collected from 12 and 24 inches were used. The Company Canal sediment sample was collected from 0 to 12 inches using a plastic disposable scoop. Once collected, the sediment sample bottles were placed on ice until shipping (Ref. 13, pp. 4, 5). The background samples and the samples collected to demonstrate the presence of contamination, the potential migration path, and to demonstrate observed releases were all collected during the same time frame during the same sampling event (Ref. 13, p. 4). The samples were collected by the same field team during the same sampling event, following the same sample collection protocols and methodologies. The background samples were collected from a similar location (within the same wetland or surface water body), were from similar media, same depth, used the same sampling methods, preservation, and handling, and were all collected under the same weather conditions as the release samples (Ref. 13, pp. 4, 5, 103-107, 110-122).

Sediment samples for organic analysis were shipped to the CLP contracted laboratory, Mitkem Laboratories, located in Warnick, Rhode Island for analysis of VOCs, SVOCs, pesticides, and PCBs. Sediment samples for inorganic analysis for all samples but CC-01were shipped to the CLP contracted laboratory, Chem Tech, located in Mountainside, New Jersey, for metals analysis (Ref. 13, pp. 125-130). CC-01 was submitted to the EPA Region 6 Environmental Services Branch Laboratory, located in Houston, Texas for inorganic analysis (Ref. 13, p. 5). The samples were analyzed for VOCs, SVOCs, Pesticides, and PCBs by CLP SOM01.2 and for TAL metals and mercury by CLP ISM01.3 (Ref. 13, p. 5).

EPA Reassessment Sampling Event - Background Sample Description
August 2012

Station Location (Sample ID)	Sample Location	Sample Date (Military Time)	Reference
Sediment			
DSE-21/12" and 24" (DSE-21-12-515/MF6AM2/F6AM2, DSE-21-24-515/MF6AM3/F6AM3)	Upgradient (northeast) of open Pit 1 location within the wetland	08/09/2012 (1305)	Ref. 13, pp. 128, 642, 1025
CC-01 (CC-01-03-611/ F6AL0)	Upstream of the Site within Company Canal	08/09/2012 (1115)	Ref. 13, pp. 107, 379, 1112

EPA Reassessment Sampling Event - Background Sample Concentrations
August 2012

Summary of Delta Shipyard Designated Background Concentrations				
Hazardous Substance	**Evidence**			**Reference**
Sediment - Wetland	**Station Location/ Sample ID**	**Concentration mg/kg**	**Quantitation Limit[1] mg/kg**	
2-Methylnaphthalene	DSE-21/ 12" F6AM2	0.22 U	0.22[2]	Ref. 13, pp. 20, 929-935, 941-942, 996, 1025
Chromium	DSE-21/ 12" MF6AM2	92.6	1.0[2]	Ref. 13, pp.20, 899-903, 910, 915
Lead		211	1.0[2]	Ref. 13, pp.20, 899-903, 910, 915
Mercury		0.27	0.12[2]	Ref. 13, pp.20, 899-903, 910, 915
Ethylbenzene	DSE-21/ 24" F6AM3	0.0081 U	0.0081[2]	Ref. 13, pp. 35, 929-935, 943-944, 970, 1026
o-Xylene		0.0081 U	0.0081[2]	Ref. 13, pp. 35, 929-935, 943-944, 970, 1026
m,p-Xylene		0.0081 U	0.0081[2]	Ref. 13, pp. 35, 929-935, 943-944, 970, 1026
Isopropylbenzene		0.0081 U	0.0081[2]	Ref. 13, pp. 35, 929-935, 943-944, 970, 1026
Benzo(g,h,i)perylene		0.270 U	0.270[2]	Ref. 13, pp. 35, 929-935, 946, 998, 1026
Naphthalene		0.270 U	0.270[2]	Ref. 13, pp. 35, 929-935, 945-946, 997, 1025
2-Methylnaphthalene		0.270 U	0.270[2]	Ref. 13, pp. 34, 929-935, 945-946, 997, 1025
Fluorene		0.270 U	0.270[2]	Ref. 13, pp. 35, 929-935, 945-946, 997, 1025
Fluoranthene		0.270 U	0.270[2]	Ref. 13, pp. 35, 929-935, 945-946, 998, 1025
Phenanthrene		0.270 U	0.270[2]	Ref. 13, pp. 35, 929-935, 945-946, 997, 1025
Pyrene		0.270 U	0.270[2]	Ref. 13, pp. 35, 929-935, 945-946, 998, 1025
Anthracene		0.270 U	0.270[2]	Ref. 13, pp. 34, 929-935, 945-946, 998, 1025
Arsenic	DSE-21/ 24" MF6AM3	5.6	1.1[2]	Ref. 13, pp. 34, 899-903, 911, 915
Chromium		16.3	1.1[2]	Ref. 13, pp. 34, 899-903, 911, 915
Cadmium		0.31 LJ	0.56[2]	Ref. 13, pp. 34, 899-903, 911, 915
Lead		35.6	1.1[2]	Ref. 13, pp. 34, 899-903, 911, 915
Manganese		135 (167.4) J*	1.7[2]	Ref. 13, pp. 34, 899-906, 911, 915
Mercury		0.086 LJ	0.15[2]	Ref. 13, pp. 34, 899-903, 911, 915

Sediment – Company Canal	Station Location/ Sample ID	Concentration mg/kg	Quantitation Limit[1] mg/kg	
Arsenic	CC-01-03-611/ MF6AL0	24.0	1.8[3]	Ref. 13, pp. 132-135, 299, 379
Lead		20.9	1.8[3]	Ref. 13, pp. 132-135, 299, 379
Chromium		9.8	1.8[3]	Ref. 13, pp. 132-135, 298, 379
Zinc		80.9	3.6[3]	Ref. 13, pp. 132-135, 298, 379
Fluoranthene	CC-01-03-611/ F6AL0	0.33 U	0.33[2]	Ref. 13, pp. 1048-1052, 1055, 1095, 1112
Pyrene		0.33 U	0.33[2]	Ref. 13, pp. 1048-1052, 1055, 1095, 1112

Notes:
mg/kg = milligrams per kilogram = 1,000 micrograms per kilogram (ug/kg)
U Not detected at reported quantitation limit (Ref. 13, pp. 938, 1055).
J Result is estimated because of outlying quality control parameters such as matrix spike, serial dilution, etc., or the result is below the Contract Required Quantitation Limit (CRQL) (Ref. 13, pp. 904, 906).
* Result has been adjusted according to the EPA Fact Sheet (Ref. 17) and is shown in parentheses. There is an unknown bias associated with this concentration.
L Reported concentration is between the MDL and the CRQL (Ref. 13, p .906). There is no bias associated with these concentrations.
1 The Reporting Limit (RL) terminology used by the EPA Region 6 Laboratory and the Adjusted Contract Required Quantitation Limit (CRQL) and Contract Required Detection Limit (CRDL) terminology used by the CLP Laboratory are based on detection limits that have been adjusted for sample aliquot, sample volume, and dilutions for the analysis (Ref. 1, Section 1.1, Table 2-3; Ref. 13, pp. 134-135; Ref. 29).
2 Quantitation limit provided is an adjusted CRQL (Ref. 13, pp. 905, 937; Ref. 29).
3 Quantitation limit provided is an RL (Ref. 13, p. 135; Ref. 29).

Samples collected from the wetland will be compared to the highest designated background level as shown below:

Surface Water Body	Matrix	Hazardous Substance	Highest Background Concentration (mg/kg)	Background Comparison Concentration = 3 x Background or CRQL (mg/kg)
Wetland at 12 inches bgs	Sediment	2-Methylnaphthalene	0.22 U	0.22[1]
		Chromium	92.6	277.8
		Lead	211	633
		Mercury	0.27	0.81
Wetland at 24 inches bgs	Sediment	Ethylbenzene	0.0081 U	0.0081
		o-Xylene	0.0081 U	0.0081
		m,p-Xylene	0.0081 U	0.0081
		Isopropylbenzene	0.0081 U	0.0081
		Benzo(g,h,i)perylene	0.270 U	0.270
		Naphthalene	0.270 U	0.270
		2-Methylnaphthalene	0.270 U	0.270
		Fluorene	0.270 U	0.270
		Fluoranthene	0.270 U	0.270
		Phenanthrene	0.270 U	0.270
		Pyrene	0.270 U	0.270
		Anthracene	0.270 U	0.270
		Arsenic	5.6	16.8
		Cadmium	0.31 LJ	0.93
		Chromium	16.3	48.9
		Lead	35.6	106.8
		Manganese	167.4	502.2
		Mercury	0.086 LJ	0.258

Surface Water Body	Matrix	Hazardous Substance	Highest Background Concentration (mg/kg)	Background Comparison Concentration = 3 x Background or CRQL (mg/kg)
Company Canal	Sediment	Arsenic	24.0	72
		Lead	20.9	62.7
		Chromium	9.8	29.4
		Zinc	80.9	242.7
		Fluoranthene	0.33 U	0.33
		Pyrene	0.33 U	0.33

Notes:
U Not detected at reported quantitation limit (Ref. 13, pp. 938, 1055).
CRQL = Contract Required Quantitation Limit
J Result is estimated because of outlying quality control parameters such as matrix spike, serial dilution, etc., or the result is below the CRQL (Ref. 13, pp. 904, 906). There is an unknown bias associated with these concentrations.
L Reported concentration between the MDL and the CRQL (Ref. 13, p. 906). There is no bias associated with these concentrations.
[1] Since the concentration of the substance is below the CRQL, the CRQL is the background comparison concentration. (Ref. 1, Section 1.1, Table 2-3).

Release Samples:

Samples identified as "contaminated" are those that meet observed release criteria as defined by the HRS (Ref. 1, Table 2-3). Observed release criteria is met when a hazardous substance attributable to a release from the Site has a concentration exceeding the SQL (including the background SQL) and is at least three times greater than the background concentration when the background concentration equals or exceeds its SQL (Ref. 1, Table 2-3). Sampling locations with hazardous substances meeting observed release criteria are presented below.

EPA Reassessment Sampling Event – August 2012

Station Location (Sample ID)	Sample Location	Sample Date (Military Time)	Reference
Wetland			
DSE-04 24" (MF6AA1/F6AA1)	Northwest of Pit 1, within wetland	08/06/2012 (0955)	Ref. 13, pp. 111, 125, 423, 496, 499; Ref. 16, p. 24
DSE-05 12" (MF6AG2/F6AG2) 24" (MF6AG3/F6AG3)	North of Pit 1, within wetland	08/08/2012 (0940)	Ref. 13, pp. 116, 126, 590, 752, 871, 1016, 1018; Ref. 16, p. 24
DSE-05-Duplicate 24" (MF6AG7/F6AG7)	North of Pit 1, within wetland	08/08/2012 (0940)	Ref. 13, pp. 116, 126, 796, 929-938, 1017, 1019; Ref. 16, p. 24
DSE-06 12" (MF6AD3/F6AD3) 24" (MF6AD4/F6AD4)	Northeast of Pit 1, within wetland	08/07/2012 (1040)	Ref. 13, pp. 113,125, 586-587,748, 750; Ref. 16, p. 24
DSE-08 24" (MF6AD9/F6AD9)	East of Pit 1, within wetland	08/07/2012 (1128)	Ref. 13, pp. 114, 125, 749, 751; Ref. 16, p. 24
DSE-11 12" (F6AK6) 24" (MF6AK7)	East of Pit 2, within wetland	08/09/2012 (1030)	Ref. 13, pp. 119, 120, 686, 913, 915, 1020, 1023; Ref. 16, p. 24
DSE-14 24" (MF6AL8)	East of Pit 3, within wetland	08/09/2012 (1145)	Ref. 13, pp. 119, 120, 686, 689, 916, 1022; Ref. 16, p. 25
Company Canal			
CC-02 (CC-02-03-612/F6AK9/MF6AK9)	Within Company Canal at PPE4	08/09/2012 (1100)	Ref. 13, pp. 106, 107, 379, 1021; Ref. 16, p. 22

The release sediment samples were collected on 06 through 09 August 2012 by EPA contractors using the same procedures as were used to collect the background samples (Ref. 13, p. 120). Wetland release sediment samples were collected using a direct push technology subsurface coring device. The direct push cores were advanced to a depth of 8 feet bgs with samples collected at 0 to 12 inches, 1 to 2 feet, 2 to 4 feet, 4 to 6 feet, and 6 to 8 feet. The Company Canal release sediment sample was collected from 0 to 12 inches using a plastic disposable scoop. Once collected, sediment sample bottles were placed on ice until shipping (Ref. 13, pp. 4, 5).

Sediment samples for organic analysis were shipped to the CLP contracted laboratory, Mitkem Laboratories, located in Warnick, Rhode Island for analysis of VOCs, SVOCs, Pesticides, and PCBs. Sediment samples for inorganic analysis were shipped to the CLP contracted laboratory, Chem Tech, located in Mountainside, New Jersey, for metals analysis (Ref. 13, pp. 125-130). The samples were analyzed for VOCs, SVOCs, Pesticides, and PCBs by CLP SOM01.2 and for TAL metals and mercury by CLP ISM01.3 (Ref. 13, p. 5)

EPA Reassessment Sampling Event – August 2012
Sediment Samples – Wetland

Station Location (Sample ID)	Hazardous Substance	Concentration mg/kg	Adjusted CRQL[1] mg/kg	Reference
DSE-04/ 24" (MF6AA1)	Arsenic	27.6	1.0	Ref. 13, pp. 30, 386-388, 395, 414, 423
DSE-05/ 12" (MF6AG2)	Chromium	431	0.99	Ref. 13, pp. 14, 764-768, 779, 790, 795
	Lead	791	0.99	Ref. 13, pp. 14, 764-768, 779, 790, 795
	Mercury	1.2	0.13	Ref. 13, pp. 14, 764-768, 779, 790, 795
DSE-05/ 24" (F6AG3)	Naphthalene	2.0	1.2	Ref. 13, pp. 31, 929-935, 939, 975, 1016
	2-Methylnaphthalene	6.2	1.2	Ref. 13, pp. 30, 929-935, 939, 975, 1016
	Fluorene	1.5	1.2	Ref. 13, pp. 31, 929-935, 940, 975, 1016
DSE-05/ 24" (MF6AG3)	Arsenic	23.6	1.0	Ref. 13, pp. 30, 764-768, 780, 790, 795
	Cadmium	5.1 J+ (3.62)[2]	0.51	Ref. 13, pp. 30, 764-768, 780, 791, 795, 798, 801-802
	Chromium	584	1.0	Ref. 13, pp. 30, 764-768, 780, 791, 795
	Lead	761	1.0	Ref. 13, pp. 30, 764-768, 780, 791, 795
	Manganese	569	1.5	Ref. 13, pp. 30, 764-768, 780, 791, 795
	Mercury	2.0	0.12	Ref. 13, pp. 30, 764-768, 780, 791, 795
DSE-05/ 24" Duplicate (F6AG7)	Ethylbenzene	1.8	0.45	Ref. 13 pp. 43, 929-935, 952, 959, 1019
	o-Xylene	3.9	0.45	Ref. 13 pp. 43, 929-935, 952, 959, 1019
	m,p-Xylene	9.7	0.45	Ref. 13 pp. 43, 929-935, 952, 959, 1019
	Isopropylbenzene	0.8	0.45	Ref. 13 pp. 43, 929-935, 952, 959, 1019
	Naphthalene	130 J[1]	59.0	Ref. 13 pp. 43, 929-935, 950, 983, 1017
	2-Methylnaphthalene	400 J[1]	59.0	Ref. 13 pp. 42, 929-935, 950, 983, 1017
	Fluorene	45.0 J[1]	5.9	Ref. 13 pp. 43, 929-935, 951, 982, 1017
	Phenanthrene	58.0 J[1]	5.9	Ref. 13 pp. 43, 929-935, 951, 983, 1017
	Anthracene	7.2 J[1]	5.9	Ref. 13 pp. 42, 929-935, 951, 983, 1017
DSE-05/ 24" Duplicate (MF6AG7)	Arsenic	37.4	1.0	Ref. 13, pp. 42, 764-768, 784, 792, 796
	Cadmium	8.5 J+ (6.03)[2]	0.50	Ref. 13, pp. 42, 764-768, 784, 792, 796, 798, 801-802
	Chromium	337	1.0	Ref. 13, pp. 42, 764-768, 784, 792, 796
	Lead	1,030	1.0	Ref. 13, pp. 42, 764-768, 784, 792, 796
	Manganese	866	1.5	Ref. 13, pp. 42, 764-768, 784, 792, 796
DSE-06/ 12" (MF6AD3)	Mercury	0.84	0.11	Ref. 13, pp. 14, 710-717, 726, 742, 750
DSE-06/ 24" (F6AD4)	Benzo(g,h,i)perylene	0.32	0.21	Ref. 13, pp. 31, 506-510, 515, 548, 587
	Fluoranthene	0.37	0.21	Ref. 13, pp. 31, 506-510, 515, 548, 587
	Phenanthrene	0.28	0.21	Ref. 13, pp. 31, 506-510, 515, 548, 587
	Pyrene	0.38	0.21	Ref. 13, pp. 31, 506-510, 515, 548, 587
DSE-06/ 24" (MF6AD4)	Cadmium	1.6	0.45	Ref. 13, pp. 30, 710-717, 727, 742, 750
	Lead	258	0.91	Ref. 13, pp. 30, 710-717, 727, 742, 750
DSE-08/ 24" (MF6AD9)	Arsenic	19.3 J	0.92	Ref. 13, pp. 30, 710-717, 732, 744, 751
	Lead	162	0.92	Ref. 13, pp. 30, 710-717, 732, 744, 751
DSE-11/ 12" (F6AK6)	2-Methylnaphthalene	0.39	0.23	Ref. 13, pp. 16, 930-938, 947, 985, 1020
DSE-11/ 24" (MF6AK7)	Arsenic	17.5	1.0	Ref. 13, pp. 32, 899-906, 907, 915
	Manganese	1,910 J	1.5	Ref. 13, pp. 32, 899-906, 907, 915

Station Location (Sample ID)	Hazardous Substance	Concentration mg/kg	Adjusted CRQL[1] mg/kg	Reference
DSE-14/ 24" (MF6AL8)	Manganese	578 J	1.7	Ref. 13, pp. 32, 900-906, 909, 916

Notes:
[1] The Adjusted Contract Required Quantitation Limit (CRQL) terminology used by the CLP Laboratory are quantitation limits that have been adjusted for sample aliquot, sample volume, and dilutions for the analysis (Ref. 1, Section 1.1, Table 2-3; Ref. 29).
[2] Values that have been adjusted according to the EPA Fact Sheet (Reference 17) are listed in parentheses.
J Result is estimated because of outlying quality control parameters (Ref. 13, pp. 717, 906). There is no bias associated with these concentrations.
J[1] Estimated value (Ref. 13, p. 938). Low biased based on analysis outside holding time (Ref. 13, pp. 929-935).
J+ Result is estimated because of outlying quality control parameters. High biased (Ref. 13, p. 771).

EPA Reassessment Sampling Event – August 2012
Sediment Samples – Company Canal

Station Location (Sample ID)	Hazardous Substance	Concentration mg/kg	Quantitation Limit[1] mg/kg	Reference
CC-02-03-612 (MF6AK9/F6AK9)	Lead	89.6	2.4[3]	Ref. 13, pp. 132-135, 297, 379
	Chromium	105	2.4[3]	Ref. 13, pp. 132-135, 297, 379
	Zinc	567	4.7[3]	Ref. 13, pp. 132-135, 297, 379
	Fluoranthene	0.480	0.410[2]	Ref. 13, pp. 1048-1052, 1059, 1094, 1112
	Pyrene	0.420	0.410[2]	Ref. 13, pp. 1048-1052, 1059, 1094, 1112

Notes:
mg/kg = milligrams per kilogram = 1,000 micrograms per kilogram (ug/kg)
[1] The Reporting Limit (RL) terminology used by the EPA Region 6 Laboratory and the Adjusted Contract Required Quantitation Limit (CRQL) terminology used by the CLP Laboratory are quantitation limits that have been adjusted for sample aliquot, sample volume, and dilutions for the analysis (Ref. 1, Section 1.1, Table 2-3; Ref. 13, pp. 134-135; Ref. 29).
[2] Quantitation limit provided is an adjusted CRQL (Ref. 13, p. 1054; Ref. 29).
[3] Quantitation limit provided is an RL (Ref. 13, p. 135; Ref. 29).

Attribution:

Since there is analytical evidence that some of the sediment samples collected from the Site contain hazardous substance concentrations above their background levels, the sampling conducted at the Site in 2012 further supports observed release by chemical analysis and attribution to the site.

The background samples collected at the Site are deemed appropriate background samples for the purposes of evaluating the Site under the HRS because the analytical results from the background samples are indicative of the highly industrialized area in which the Site is located because the samples were collected in the general vicinity of the Site (Appendix A, Figure A-5). Samples having concentrations that are three times greater than the highest background concentration of a particular analyte were collected from within the surface water pathway. Further, analytical results from samples collected from the sources at the Site displayed the presence of the same contaminants as the samples from the surface water pathway meeting observed release criteria (Sections 2.4.1 and 4.1.2.1.1).

Downgradient sites were not evaluated as contributing to background contamination levels. Although the surface water pathway includes water bodies that are seasonally tidally influenced, there is no documentation to indicate that there is tidal carry from other possible downgradient sources.

The Site is located approximately 50 stream miles from the Gulf Coast and is along a freshwater river; therefore only minimal elevation changes due to tidal influence are expected to occur (Ref. 3, pp. 1-3; Ref. 21 pp. 8, 13).

A search of the Toxic Release Inventory (TRI) and EPA EnviroMapper and Envirofacts databases was performed within the zip code of the Site location. The facilities identified upgradient along Company Canal, Houma Navigation Canal, and Bayou LaCarpe included: Apache Louisiana Minerals a crude oil petroleum facility; Elevating Boats LLC, a boat building and repair facility that uses volatile organic compounds; Performance Energy Services LLC, a metal coating and allied facility that uses zinc; Preferred Sandblasting LLC, a metal coating and allied facility that uses volatile organic compounds; and D&S Chemical Company (Ref. 22, pp. 1-11). No nearby facilities along the surface water pathway are reported to have had a release of arsenic, antimony, anthracene, benzene, cadmium, chromium, ethylbenzene, fluorene, lead, manganese, mercury, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, o-xylene, and m,p-xylene according to the TRI database (Ref. 23, p. 1).

Likelihood of Release Factor:

Observed releases have been established through direct observation and chemical analysis. Based on the analytical data and attribution components listed above, arsenic, antimony, anthracene, benzene, cadmium, chromium, ethylbenzene, fluorene, lead, manganese, mercury, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, o-xylene, and m,p-xylene have been documented as the hazardous substances in the observed release to the contiguous wetland. Therefore, the observed release factor value of 550 was assigned for the surface water pathway (Ref. 1, Section 4.1.2.1.1).

Likelihood of Release Factor Value: 550

4.1.2.1.2 POTENTIAL TO RELEASE

4.1.2.1.2.1 Potential to Release by Overland Flow

Potential to release was not evaluated because observed releases to surface water have been established by direct observation and chemical analysis (see Section 4.1.2.1.1 of this HRS documentation record).

4.1.3 HUMAN FOOD CHAIN THREAT

4.1.3.2 WASTE CHARACTERISTICS

Evidence of contamination associated with Source 1-4 is established based on direct observation and chemical analyses of samples collected from the source (refer to the Attribution section and Section 2.2 for Source 1, 2, 3 and 4). Arsenic, anthracene, cadmium, chromium, ethylbenzene, fluorene, lead, manganese, mercury, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, o-xylene, and m,p-xylene were detected in sediment samples collected in the surface water pathway, thus establishing an observed release (see Section 4.1.2.1.1).

4.1.3.2.1 Toxicity/Persistence/Bioaccumulation

The substances with the highest combined values are cadmium and mercury as shown below.

Hazardous Substance	Source Number	Toxicity Factor Value	Persistence Factor Value[1]	Bioaccumulation Factor Value Fresh Water[2]	Toxicity/ Persistence/ Bioaccumulation Factor Value	Reference
Anthracene	1,2,3,OR	10	0.4	50,000	2×10^5	Ref. 2, p. 9
Antimony	1,2,OR	10,000	1	5	5×10^4	Ref. 2, p. 9
Arsenic	1,2,3,4,OR	10,000	1	5	5×10^4	Ref. 2, p. 9
Benzene	1,2,OR	1,000	0.4	5,000	2×10^6	Ref. 2, p. 10
Cadmium	1,2,3,4,OR	10,000	1	50,000	5×10^8	Ref. 2, p. 10
Chromium	1,2,3,4,OR	10,000	1	5	5×10^4	Ref. 2, p. 11
Ethylbenzene	1,2,3,OR	10	0.4	50	2×10^2	Ref. 2, p. 13
Fluorene	1,2,3,4,OR	100	0.4	500	2×10^4	Ref. 2, p. 13
Lead	1,2,3,4,OR	10,000	1	5,000	5×10^7	Ref. 2, p. 15
Manganese	1,2,3,4,OR	10,000	1	500	5×10^6	Ref. 2, p. 15
Mercury	1,2,3,4,OR	10,000	1	50,000	5×10^8	Ref. 2, p. 15
2-Methyl-naphthalene	1,2,3,4,OR	1,000	0.4	50,000	2×10^7	Ref. 2, p. 15
Naphthalene	1,2,3,4,OR	1,000	0.4	50,000	2×10^7	Ref. 2, p. 15
Phenanthrene	1,2,3,4,OR	1	0.4	5,000	2×10^3	Ref. 2, p. 16
Pyrene	1,2,3,OR	100	1	50,000	5×10^6	Ref. 2, p. 16
o-Xylene	1,2,3,OR	100	0.4	50	2×10^3	Ref. 2, p. 18
m-Xylene	1,2,3,OR	100	0.4	500	2×10^4	Ref. 2, p. 18
p-Xylene	1,2,3,OR	100	0.4	50	2×10^3	Ref. 2, p. 18
Zinc	1,2,3,4,OR	10	1	500	5×10^3	Ref. 2, p. 18

Notes:
OR – Observed Release

[1] The surface water category that includes rivers, oceans, coastal tidal waters, and great lakes was utilized to assign the hazardous substances persistence factor value (Ref. 1, Sect. 4.1.2.2.1.2). The persistence values were assigned for a river according to HRS Section 4.1.3.2.1.2.

[2] Bioaccumulation factor values are assigned from the SCDM (Ref. 2), for water body type "Fresh Water" in which the fisheries are located (Ref. 1, Sect. 4.1.3.2.1.3).

Toxicity/Persistence/Bioaccumulation Factor Value: 5×10^8

4.1.3.2.2 Hazardous Waste Quantity

Source No.	Source Hazardous Waste Quantity Value	Containment Factor Value			
		Ground Water	Surface Water	Gas	Air Particulate
1	1,826.923	NE	10	NE	NE
2	2,067.307	NE	10	NE	NE
3	2,711.538	NE	10	NE	NE
4	>0, but unknown	NE	10	NE	NE
TOTAL	>6,605.768	NE	10	NE	NE

NE = Not Evaluated

A hazardous waste quantity of 6,605.781 is estimated for the sources at the Delta Shipyard Site, which when applied in HRS Table 2-6, yields a pathway hazardous waste quantity of 100.

Hazardous Waste Quantity Factor Value = 100

4.1.3.2.3 Waste Characteristics Factor Category Value

Toxicity/Persistence Factor Value: 10,000 Hazardous Waste Quantity Factor Value: 100
Bioaccumulation Potential Factor Value: 50,000

10,000 (Toxicity/Persistence Factor Value) x 100 (Hazardous Waste Quantity Factor Value) = 1 x 10^6(maximum of 1 x 10^8 according to HRS Section 4.1.3.2.3)

1 x 10^6(Toxicity/Persistence Factor Value x Hazardous Waste Quantity Factor Value) x 50,000 (Bioaccumulation Potential Factor Value) = 5 x 10^{10} (maximum of 1 x 10^{12} according to HRS Section 4.1.3.2.3)

A hazardous waste quantity factor of 100 is assigned according to HRS Section 2.4.2.2. From Reference 2 and Table 4-12 of the HRS (i.e., Reference 1), cadmium and mercury have a toxicity/persistence value of 10,000 and a bioaccumulation potential factor of 50,000. The waste characteristics factor category value from Reference 1, Table 2-7 for a waste characteristics product of 5 x 10^{10} is 320.

Hazardous Waste Quantity Assigned Value: 100

Waste Characteristics Factor Category Value: 320

4.1.3.3 TARGETS

4.1.3.3.1 Food Chain Individual

Fishing is documented within the TDL (Ref. 27, p. 1; Ref. 28, p. 1). The area of the confluence of Bayou LaCarpe and the Houma Navigation Canal, on the south end of Houma, is fished for freshwater fish including catfish and carpe. These fish are used for personal consumption (Ref. 27, p. 1; Ref. 28, p. 1).

Fishery	Type of Surface Water Body	Reference(s)
Company Canal (Houma Navigation Canal)	Large Stream to River	Ref. 26; Ref. 28

Observed releases by chemical analysis and an observed release by direct observation are established to the surface water migration pathway (See Section 4.1.2.1.1 of this HRS documentation record). This information documents an observed release of several hazardous substances having a bioaccumulation factor of 500 or greater to surface water (the wetland and the Company Canal) in the watershed (See Section 4.1.3.2.1 of this HRS documentation record). There is also a fishery present within the TDL; therefore a food chain individual value of 20 was assigned (Ref. 1, Section 4.1.3.3.1).

Food Chain Individual Factor Value: 20

4.1.3.3.2 Population

4.1.3.3.1.1 Level I Concentrations

Level I concentrations have not been established; therefore, the Level I concentrations factor value receives an assigned value of 0.

Level I Concentration Factor Value: 0

4.1.3.3.1.2 Level II Concentrations

Level II concentrations have not been established; therefore, the Level II concentrations factor value receives an assigned value of 0.

Level I Concentration Factor Value: 0

4.1.3.3.2.3 Potential Human Food Chain Contamination

Identity of Fishery	Annual Production (pounds)	Type of Surface Water Body	Average Annual Flow	Reference	Population Value (P_i)	Dilution Weight (D_i)	$P_i \times D_i$
Company Canal (Houma Navigation Canal)	>0, but unknown	Large Stream to River	3,525 cfs	Ref. 1, Tables 4-13, 4-18; Ref. 26, p. 1	0.03	0.001	0.00003

Notes:
cfs = cubic feet per second.

Bayou LaCarpe and the Houma Navigation Canal are fished for catfish and carpe according to the Louisiana Department of Wildlife and Fisheries; these fish are caught for human consumption (Ref. 27; Ref. 28). Data to estimate pounds of fish caught annually from Bayou LaCarpe and the Houma Navigation Canal are not available; however, because these water bodies are fished, the annual production is known to be greater than zero. As such, a human food chain population value of 0.03 is assigned from Table 4-18 of the HRS (Ref. 1, Table 4-18). For Houma Navigation Canal, which encompasses the majority of the TDL, the dilution weight was based on the average annual flow data collected by the USGS at a gauging station located at Dulac, Louisiana (Ref. 26, p. 1). Based on the stream flow, Houma Navigation Canal, according to Table 4-13 of the HRS, is classified as a large stream to river and receives an assigned dilution weight of 0.001 (Ref. 1, Table 4-13).

Houma Navigation Canal - Product of $P_i \times D_i = 0.03 \times 0.001$

Product of $P_i \times D_i$: 0.00003

(Sum of Products of $P_i \times D_i$)/10: 0.000003

4.1.4 ENVIRONMENTAL THREAT

4.1.4.2 WASTE CHARACTERISTICS

Evidence of contamination associated with Source 1, 2, 3 and 4 have been established based on direct observation and chemical analyses of samples collected from this source (refer to the Attribution section and Sections 2.2 for Source 1, 2, 3 and 4 of this HRS documentation record).

4.1.4.2.1 Ecosystem Toxicity/Persistence/Bioaccumulation

The substances with the highest combined values are mercury, cadmium and pyrene as shown below.

Hazardous Substance	Source Number	Ecotoxicity Factor Value Fresh[2]	Persistence[1] Factor Value	Ecosystem Bioaccumulation Potential Factor Value Fresh Water[2]	Ecotoxicity/ Persistence/ Bioaccumulation Factor Value	Reference
Anthracene	1,2,3,OR	10,000	0.4	50,000	2×10^8	Ref. 2, p. 9
Antimony	1,2,OR	1	1	5	5	Ref. 2, p. 9
Arsenic	1,2,3,4,OR	10	1	50,000	5×10^5	Ref. 2, p. 9
Benzene	1,2,OR	1,000	0.4	5,000	2×10^6	Ref. 2, p. 10
Cadmium	1,2,3,4,OR	10,000	1	50,000	5×10^8	Ref. 2, p. 10
Chromium	1,2,3,4,OR	10,000	1	500	5×10^6	Ref. 2, p. 11
Ethylbenzene	1,2,3,OR	100	0.4	50	2×10^3	Ref. 2, p. 13
Fluorene	1,2,3,4,OR	1,000	0.4	5,000	2×10^6	Ref. 2, p. 13
Lead	1,2,3,4,OR	1,000	1	50,000	5×10^7	Ref. 2, p. 15
Manganese	1,2,3,4,OR	100	1	50,000	5×10^6	Ref. 2, p. 15
Mercury	1,2,3,4,OR	10,000	1	50,000	5×10^8	Ref. 2, p. 15
2-Methyl-naphthalene	1,2,3,4,OR	100	0.4	50,000	2×10^6	Ref. 2, p. 15
Naphthalene	1,2,3,4,OR	1,000	0.4	50,000	2×10^7	Ref. 2, p. 15
Phenanthrene	1,2,3,4,OR	10,000	0.4	50,000	2×10^8	Ref. 2, p. 16
Pyrene	1,2,3,OR	10,000	1	50,000	5×10^8	Ref. 2, p. 16
o-Xylene	1,2,3,OR	100	0.4	50	2×10^3	Ref. 2, p. 18
m-Xylene	1,2,3,OR	100	0.4	500	2×10^4	Ref. 2, p. 18
p-Xylene	1,2,3,OR	100	0.4	50	2×10^3	Ref. 2, p. 18
Zinc	1,2,3,4,OR	10	1	50,000	5×10^5	Ref. 2, p. 18

Notes:
OR – Observed Release

[1] The surface water category that includes rivers, oceans, coastal tidal waters, and great lakes was utilized to assign the hazardous substances persistence factor value (Ref. 1, Sec. 4.1.2.2.1.2). The persistence values were assigned for a river according to the HRS (Ref. 1, Sect. 4.1.2.2.1.2).

[2] Bioaccumulation factor values are assigned from the SCDM (Ref. 2), for "Fresh Water" in which the wetlands are located (Ref. 14, p. 1, Ref. 21, p. 13). The data that yielded the higher factor value was assigned to the Bioaccumulation Factor Value of the hazardous substance (Ref. 1, Sect. 4.1.3.2.1.3).

Toxicity/Persistence/Bioaccumulation Factor Value: 5×10^8

4.1.4.2.2 Hazardous Waste Quantity

Source No.	Source Hazardous Waste Quantity Value	Containment Factor Value			
		Ground Water	Surface Water	Gas	Air Particulate
1	1,826.923	NE	10	NE	NE
2	2,067.307	NE	10	NE	NE
3	2,711.538	NE	10	NE	NE
4	>0, but unknown	NE	10	NE	NE
TOTAL	6,605.768	NE	10	NE	NE

NE = Not Evaluated

A hazardous waste quantity of 6,605.768 is estimated for sources at the Delta Shipyard Site which when applied in HRS Table 2-6, yields a pathway hazardous waste quantity of 100.

Hazardous Waste Quantity Factor Value = 100

4.1.4.2.3 Waste Characteristics Factor Category Value

Ecotoxicity/Persistence Factor Value: 10,000
Hazardous Waste Quantity Factor Value: 100
Ecosystem Bioaccumulation Potential Factor Value: 50,000

10,000 (Ecotoxicity/Persistence Factor Value) x 100 (Hazardous Waste Quantity Factor Value) = 1 x 10^6 (maximum of 1 x 10^8 according to HRS Section 4.1.4.2.3)

1 x 10^6 (Ecotoxicity/Persistence Factor Value x Hazardous Waste Quantity Factor Value) x 50,000 (Bioaccumulation Potential Factor Value) = 5 x 10^{10} (maximum of 1 x 10^{12} according to HRS Section 4.1.4.2.3)

A hazardous waste quantity factor of 100 is assigned according to HRS Section 2.4.2.2. From Reference 2 and Table 4-20 of the HRS, mercury, cadmium and pyrene have an ecotoxicity/persistence value of 10,000 and an ecosystem bioaccumulation potential factor of 50,000. The waste characteristics factor category value from Reference 1, Table 2-7 for a waste characteristics product of 5 x 10^{10} is 320.

Hazardous Waste Quantity Assigned Value: 100

Waste Characteristics Factor Category Value: 320

4.1.4.3.1 SENSITIVE ENVIRONMENTS

4.1.4.3.1.1 Level I Concentrations

No Level I concentrations have been documented; therefore, Level I concentrations were not evaluated. Level I concentrations factor value receives an assigned value of 0.

Level I Concentration Factor Value: 0

4.1.4.3.1.2 Level II Concentrations

Wetlands

The area of Level II contamination includes the perimeter of the wetlands where observed release concentrations of contaminants were detected (Ref. 1, Section 4.1.2.1.1). The perimeter of the wetland determined to be affected by Level II concentrations was measured two different ways for direct observation and for chemical analysis. The highest calculated perimeter is 3,500 linear feet (Ref. 14, pp. 1, 9; Ref. 24, pp. 1-3). The total length of wetlands was determined in accordance with Sections 4.1.4.3.1.1 and 4.1.4.3.1.2 of the HRS (Ref. 1) and was calculated by measuring the perimeter of the wetland subject to Level II concentrations as the length **(**Ref. 1, Sections 4.1.4.3.1.1 and 4.1.4.3.1.2; Ref. 24, pp. 1-2).

According to information presented in a National Wetlands Inventory (NWI) Map of the area, updated in September 2012, the wetland with Level II contamination is classified as PSS1S (Ref. 14, pp. 1-3, 9). These wetlands meet the HRS definition of a wetland.

Total Level II Wetland Perimeter = 3,500 feet
5,280 feet = 1 mile
3,500 feet/5,280 feet = 0.662 miles

Wetland Value (Ref. 1, Table 4-24): 25

Level II Concentrations Factor Value: 25

4.1.4.3.1.3 Potential Contamination

Wetlands

Palustrine forested wetlands are located along a large portion of the surface water pathway's 15-mile TDL that are susceptible to potential contamination (Ref. 14, pp. 4, 9). The total length of wetlands was determined in accordance with Sections 4.1.4.3.1.3 of the HRS (Ref. 1) and was calculated by measuring the frontage of the wetland along each bank of the surface water pathway subject to potential contamination within the TDL **(**Ref. 1, Sections 4.1.4.3.1.3; Ref. 25, pp. 1-2).

According to the NWI Map of the area, updated in September 2012, the wetlands with potential contamination is classified as Palustrine System, Forested (Ref. 14, pp. 1-3, 9). These wetlands meet the HRS definition of a wetland.

Total Potential Wetland Frontage = 21.7 miles
Wetland Value (Ref. 1, Table 4-24): 500

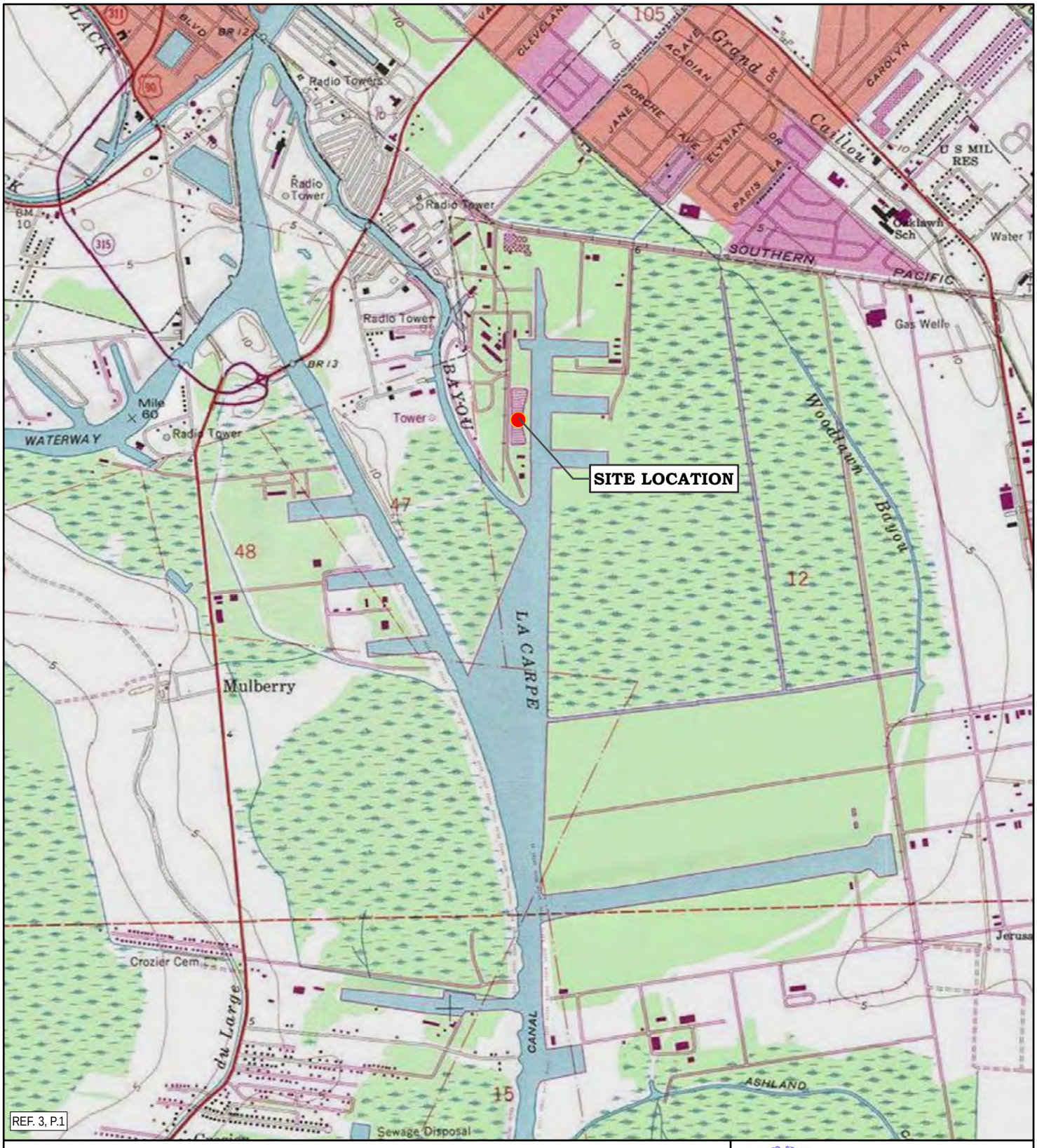
The potential wetlands are located along the Houma Navigation Canal. The Houma Navigation Canal has an average flow of 3,525 cubic feet per second according to the USGS (Ref. 26. p. 1). This would categorize the canal as a large stream to river according to HRS (Ref. 1, Table 4-13). Potential contamination was calculated according to HRS, Section 4.1.4.3.1.3.

Houma Navigation Canal Dilution Weight = 0.001

Product of Wetland Value x Dilutions Weight = 500 x 0.001 = 0.5
0.5/10=0.05

Potential Contamination Factor Value: 0.05

Attachment A



0 2,000 4,000

SCALE IN FEET

LEGEND

● SITE LOCATION

N

SOURCE: 2011 National Geographic Society, i-cubed
(USGS 7.5 minute Houma Topographic Quadrangle)
TDD NO: TO-0019-11-10-01
EPA ID NO: LAD058475419

US EPA REGION 6

FIGURE A-1
SITE LOCATION MAP
DELTA SHIPYARD
200 DEAN COURT, HOUMA
TERREBONNE PARISH, LOUISIANA

DATE	PROJECT NO	SCALE
MAY, 2014	20406.012.019.0680.01	AS SHOWN

FILE: L:\20406_START3_R6\DeltaShipyard\GIS\Maps\Figure A-1 Site Location Map.mxd 10:29:46 AM 5/13/2014 bondp

LEGEND

- Probable Point of Entry
- Drainage Ditch
- Surface Water Flow Direction
- Pits
- Facility Boundary

N

0 87.5 175

Feet

TDD NO: TO-0019-11-10-01
EPA ID NO: LAD058475419

Image Source:
ESRI World Imagery

US EPA REGION 6

FIGURE A-2
PROPERTY LAYOUT MAP
DELTA SHIPYARD
200 DEAN COURT, HOUMA,
TERREBONNE PARISH, LOUISIANA

DATE	PROJECT NO	SCALE
APRIL, 2014	20406.012.019.0680.01	AS SHOWN

10:25:48 AM 4/3/2014

FILE: L:\20406_START3_R6\DeltaShipyard\GIS\Maps\Figure A-2 Property Layout Map.mxd 10:25:48 AM 4/3/2014 hemmm

REF. 13, PP. 11,REF. 14, PP. 1,9; REF. 19, PP. 1-2; REF. 27; REF. 28

LEGEND

- Background Sample Location
- Probable Point of Entry
- Perennial Drainage Ditch
- Surface Water Flow Direction
- Pits
- Level II Wetlands

Wetlands

- Riverine
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Freshwater Emergent Wetland

N

0 425 850

Feet

TDD NO: TO-0019-11-10-01
EPA ID NO: LAD058475419

Image Source:
ESRI World Imagery
Wetland Source:
US Fish and Wildlife Service (National Wetlands Inventory)

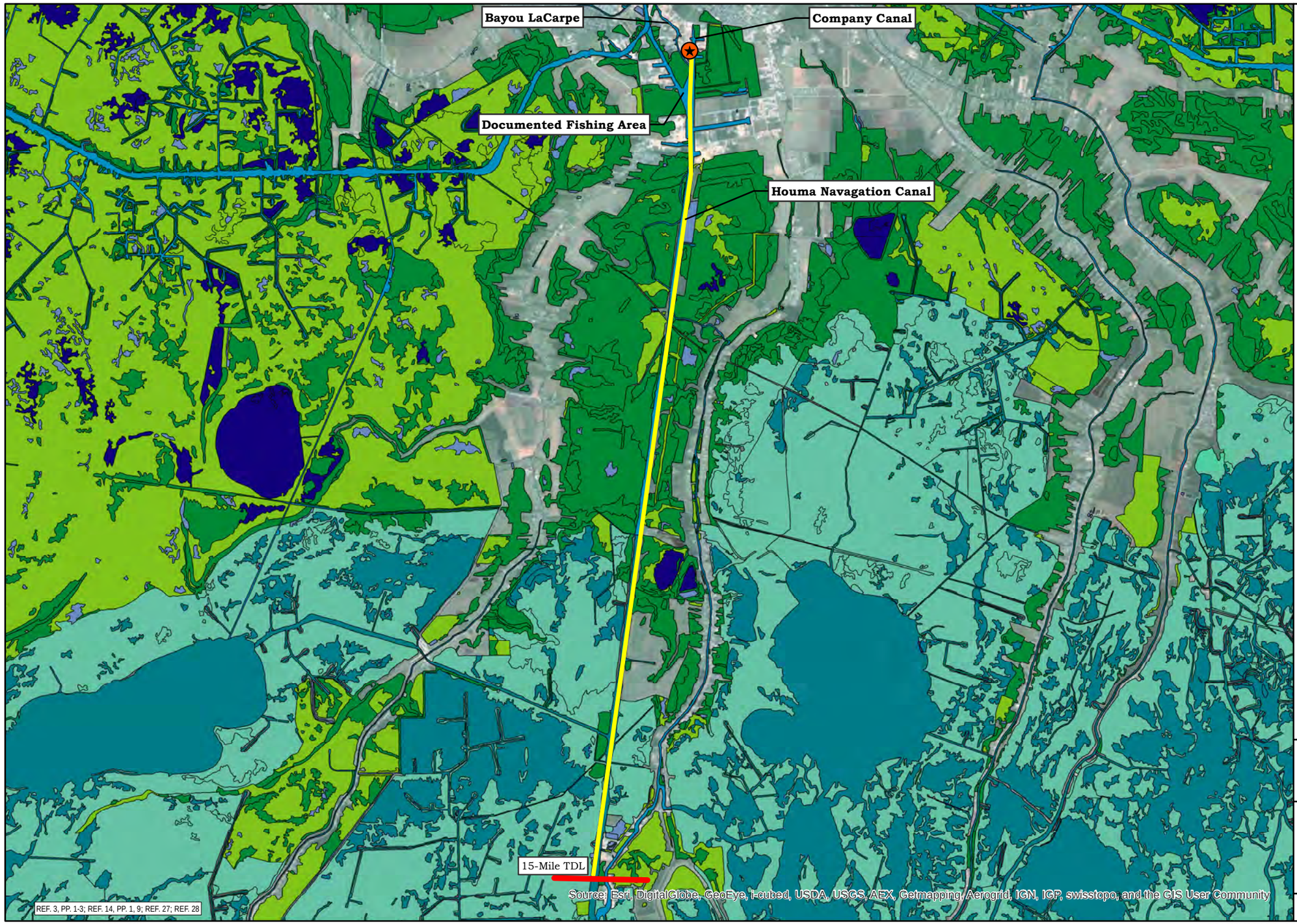
US EPA REGION 6

FIGURE A-3
SURFACE WATER PATHWAY MAP
DELTA SHIPYARD
200 DEAN COURT, HOUMA,
TERREBONNE PARISH, LOUISIANA

DATE	PROJECT NO	SCALE
MAY, 2014	20406.012.019.0680.01	AS SHOWN

2:58:16 PM 5/13/2014

FILE: L:\20406_START3_R6\DeltaShipyard\GIS\Maps\Figure A-3 Surface Water Pathway Map.mxd 2:58:16 PM 5/13/2014 bondp



LEGEND

15 Mile TDL

Site Location

Wetlands

- Riverine
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Freshwater Emergent Wetland
- Lake
- Estuarine and Marine Wetland

N

0 1 2

Miles

TDD NO: TO-0019-11-10-01
EPA ID NO: LAD058475419

Image Source:
(c) 2009 Microsoft Corporation and its data suppliers, 2011
Wetland Source:
US Fish and Wildlife Service (National Wetlands Inventory)

US EPA REGION 6

REF. 3, PP. 1-3; REF. 14, PP. 1, 9; REF. 27; REF. 28

FIGURE A-4
15-MILE TARGET DISTANCE LIMIT MAP
DELTA SHIPYARD
200 DEAN COURT, HOUMA,
TERREBONNE PARISH, LOUISIANA

DATE	PROJECT NO	SCALE
FEBRUARY, 2014	20406.012.019.0680.01	AS SHOWN

4:18:45 PM 4/2/2014

FILE: L:\20406_START3_R6\DeltaShipyard\GIS\Maps\Figure A-4 Target Distance Limit Map.mxd 4:18:45 PM 4/2/2014 herrinm

LEGEND

- Probable Point of Entry
- Background Sediment Sample
- Characterization Sample
- Level II Sediment Sample
- Source Characterization Sample
- Drainage Ditch
- Surface Water Flow Direction
- Pits
- Level II Wetlands

Wetlands

- Riverine
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

Note: Locations of samples collected in 1996 are approximations only. The locations shown in Reference 12 are not to scale.

N

0 87.5 175

Feet

TDD NO: TO-0019-11-10-01
EPA ID NO: LAD058475419

Image Source:
ESRI World Imagery

US EPA REGION 6

FIGURE A-5
SAMPLE LOCATION MAP
DELTA SHIPYARD
200 DEAN COURT, HOUMA, TERREBONNE PARISH, LOUISIANA

DATE	PROJECT NO	SCALE
APRIL, 2014	20406.012.019.0680.01	AS SHOWN

4:24:52 PM 4/2/2014

FILE: L:\20406_START3_R6\DeltaShipyard\GIS\Maps\Figure A-5 Sample Location Map.mxd 4:24:52 PM 4/2/2014 herinm