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HRS DOCUMENTATION RECORD

for

Aluminum Finishing Co.
Houston, Texas

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September 1997

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Protecting Texas
by Reducing and
Preventing Pollution

HRS DOCUMENTATION RECORD

VOLUME I OF II

for

Aluminum Finishing Company
Harris County, Texas
SWR # 38879
TXD# 988 020 228

Prepared by:

Texas Natural Resource
Conservation Commission
Austin, Texas

September 1997

HRS DOCUMENTATION RECORD

ALUMINUM FINISHING COMPANY
HOUSTON, TEXAS

SWR# 38879
TXD# 988 020 228

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Stennie Meadours — Date
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TNRCC

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September 1997

Hazard Ranking System
Documentation Record

Aluminum Finishing Company
Houston, Harris County, Texas
SWR # 38879
EPA # 988 020 228

Prepared by

Texas Natural Resource Conservation Commission
Assessment Section
Site Discovery and Assessment Program Staff
Austin, Texas

September 1997

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HRS DOCUMENTATION RECORD - REVIEW COVER SHEET

NAME OF SITE: Aluminum Finishing Company

A.K.A.: ~~None~~ Riverside Kitchen and Bath Company

CONTACT PERSON & PHONE NUMBER: Leo Montgomery (713)741-1775

CURRENT SITE OWNER/OPERATOR: Leo Montgomery, Owner/Operator of Riverside Kitchen, Bath and Entertainment.

SITE ADDRESS

STREET: 6006 Ardmore
CITY: Houston
COUNTY: Harris
STATE: Texas

LATITUDE: . . . . . N29°42'31" **LONGITUDE:** . . . . . W95°22'30"

EPA ID#: TXD 988020228

TNRCC ID#: 38879
TNRCC REGION: 12

SITE SUMMARY

GENERAL DESCRIPTION OF THE SITE:

The Aluminum Finishing Company site is located in a mainly residential area on a corner lot at 6006 Ardmore, in Houston, Texas in Harris County. The site is located at Latitude N29°42'31" and Longitude W95°22'30". See Figure 1. Site Location Map. There are two buildings on-site, one being a single story small office building, and the other a large corrugated metal storage building. The site is bound on all sides by either a chain link fence or newly built privacy wooden fence (Ref 4. p. 1). The lot is approximately 70ft x 135ft (Ref. 5). Sample locations for the TNRCC sampling investigations are depicted in Figure 2. Site Sample Locations.

NOTES TO READER

1. The State predecessor agencies, Texas Water Quality Board, Texas Department of Water Resources, Texas Water Commission, and the Texas Air Control Board, referred to throughout this report are to be known as the Texas Natural Resource Conservation Commission (TNRCC). The new agency, TNRCC became effective September 1, 1993, as mandated under State Senate Bill 2 of the 73rd Regular Legislative Session.

2. If the reference cited had an original page number, that page number is cited.

BACKGROUND/OPERATING HISTORY:

The property was owned by Mr. Stilwell during the time when Aluminum Finishing Company began operating at the site. Mr. Stilwell leased the property to Aluminum Finishing Company, owned and operated by Mohammed Hussain, in March, 1981. Ms. Lola Elizabeth Stilwell inherited the property after Mr. Stilwell's death. Ms. Stilwell remarried and her new name became Ms. Hinojosa. She continued to lease the property to Mohammed Hussain until Aluminum Finishing Company ceased operations. (Ref. 6). Mohammed Hussain reportedly ceased operations in January, 1993 (Ref. 7).

After the property was abandoned by Mohammed Hussain, Ms. Hinojosa leased it to Mr. John Pitre of New Dimension Designs, a construction company, in July, 1993 (Ref. 8, p. 1). Mr. and Ms. Hinojosa both passed away in 1996 leaving the estate to be sold by the trustee of their will to Mr. Leo Montgomery, owner and operator of Riverside Kitchen, Bath and Entertainment. Leo Montgomery was a former employee of New Dimension Designs (Ref. 9).

Figure 1
Site Location Map
Aluminum Finishing Company

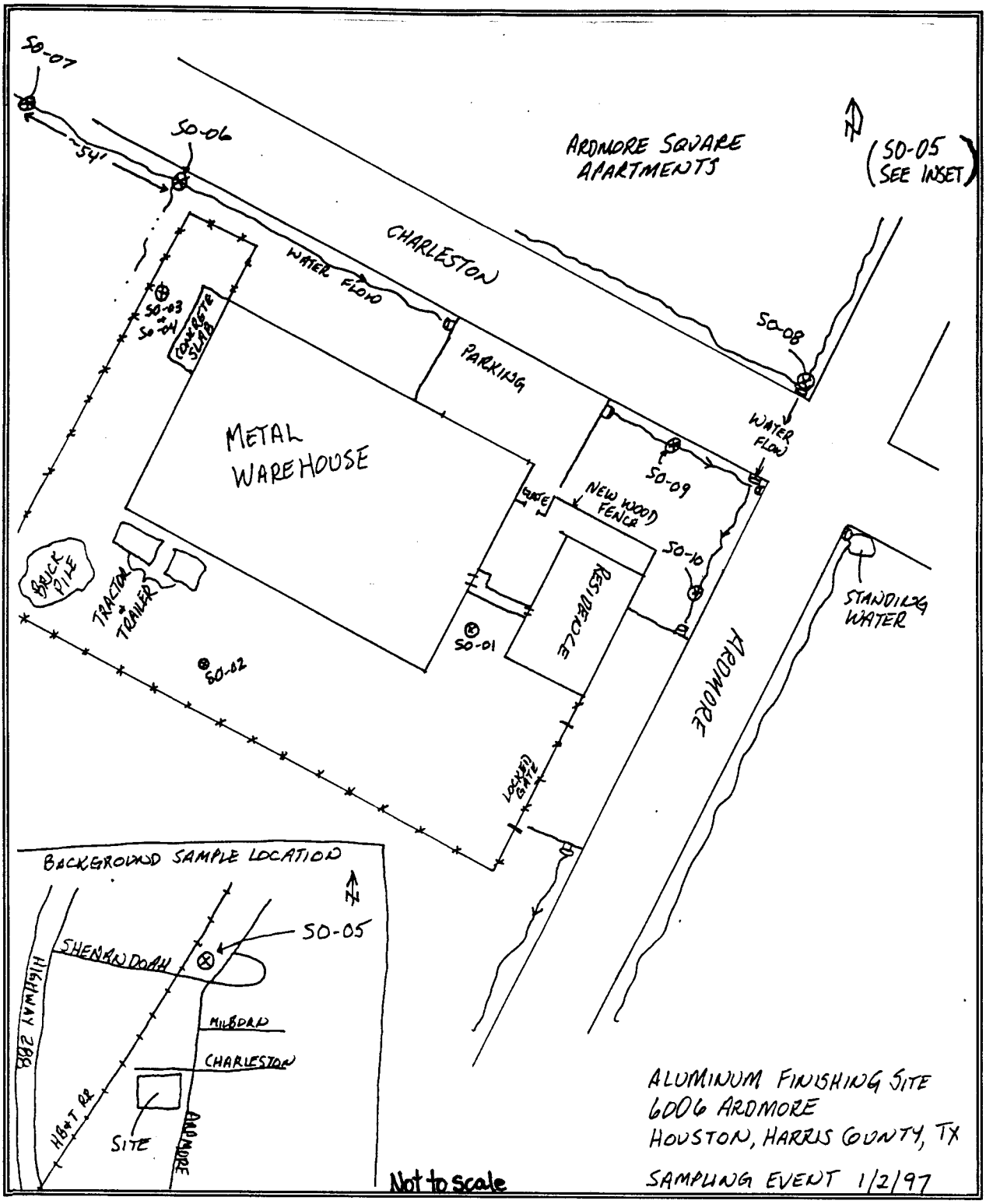

Figure 2
Site Sample Locations Map
Aluminum Finishing Company

The site currently consists of a storage building and an occupied residence. Leo Montgomery operates his construction company on-site. His company mainly conducts remodeling operations. A corrugated metal storage building houses lumber and partially finished cabinets, and other woodworking operations. Wastes generated through this operation include wood scraps, bricks, and empty paint buckets. An office building on the site is being renovated for his homestead. Mr. Montgomery, his wife and three children live on-site in the renovated office building at 6006 Ardmore. The address for the construction company is 6006 ½ Ardmore (Ref. 5).

The site first came to the attention of the Texas Water Commission (Texas Water Commission) when a request for assistance dated February 21, 1989 from Clyde Smith, Assistant Supervisor for Industrial Wastewater Quality Control Branch, City of Houston was received by Eberto Amador of the Texas Water Commission District 07 Office-Houston, regarding the existence of the Aluminum Finishing Company facility, a non-notifier. It was reported that Mukaram (Mohammed) Hussain was the owner of the facility. Mr. Amador spoke to Mr. Hussain and requested that he obtain a hazardous waste determination and apply to the Texas Water Commission and EPA for the solid waste registrations (Ref. 10, p. 2).

Clyde Smith subsequently reported to Marsha Hill, of the Texas Water Commission District 7 Office -Houston during a phone conversation on February 23, 1989, that Aluminum Finishing Company was previously found discharging wastewater from an electroplating operation into the City's sanitary sewer system in August of 1988. In response to the complaint, Marsha Hill conducted a solid waste inspection of the site on March 2, 1989. It was documented during the investigation that Aluminum Finishing Company is an electroplating operation where nuts of different sizes are electroplated with cadmium and coated with chromium. The nut cleaning solution made up of caustic sodium cyanide solution was neutralized with sulfuric acid and subsequently was discharged into the City's sanitary sewer system. The wastewater from the electroplating process was collected in tanks and left to evaporate. A small amount of cadmium/chromium sludge was documented as being stored in the tanks (Ref. 10, p.3).

As a result of the noncompliances documented during the inspection, a Notice of Violation letter was mailed to Mohammed Hussain on March 29, 1989, citing Title 31 Texas Administrative Code violations for failure to notify the Texas Water Commission of generating waste during his process and for the failure to determine if that waste is hazardous (Ref. 10, pp.6-7). In response, Mr. Hussain requested a solid waste registration number from the Texas Water Commission and provided his initial notification of his electroplating processes on April 13, 1989 (Ref. 11).

The Texas Water Commission District 7 Office (Houston) received another request for assistance dated June 7, 1990 from Clyde Smith, Assistant Supervisor for Industrial Wastewater Quality Control Branch, City of Houston. Mr. Smith reported improper handling of hazardous waste sludge generated from the treatment of cadmium plating wastewater at the Aluminum Finishing Company facility. (Ref. 10, p. 2). Marsha Hill, of the Texas Water Commission District 7 Office - Houston investigated the complaint on August 29, 1990 and found one unlabeled drum

containing less than 55 gallons of hazardous waste sludge stored at the site. Ms. Hill provided Mohammed Hussain with a handbook for small generators of hazardous waste and informed him of labeling requirements for drums of hazardous waste (Ref. 10, p. 1).

A request for assistance was received by Stacey McCoy, Texas Water Commission Investigator District 7 Office- Houston, on January 23, 1992 from Dave Fetterman, City of Houston. Mr. Fetterman inspected Aluminum Finishing Company for the City of Houston and documented that the facility had violated City of Houston industrial wastewater disposal ordinance; therefore, the City may shut off water to the site. Mr. Fetterman observed during his investigation four drums of sodium cyanide stored next to a vat of acid, which would be highly reactive if the two should come in contact. As a result of the inspection by the City of Houston, on January 24, 1992, the sewer at the site was plugged by the City of Houston Utilities to prevent any unauthorized noncompliant discharges from entering the municipal sewer system from Aluminum Finishing Company. Water was still being provided (Ref. 12, p.1).

On February 19, 1992, Stacy McCoy, Field Inspector, Texas Water Commission District 7 Office-Houston, conducted an inspection of the Aluminum Finishing Company site. She documented six rectangular metal tanks on-site storing plating sludge. One tank was found on its side allowing the discharge of its contents to the northwest property fence line. Also noted were numerous open top drums and several spills (Ref. 13, p.35).

On February 28, 1992, a sample investigation of the Aluminum Finishing Company site was conducted by Stacy McCoy. Samples were collected at the northwest corner of the property at the plating area. Chain of custody (COC) numbers were SW014319-21. Hazardous substances barium, cadmium, chromium, and arsenic were detected in the soils. A sample collected adjacent to the site in the drainage area in front of the metal corrugated plating building (COC tag SW014320) contained toxicity characteristic leachating procedure (TCLP) cadmium at 25,500 μg/L (Ref 13, pp. 18-20). According to the 40 Code of Federal Regulations §261.24, the regulatory maximum level for TCLP cadmium (D006 waste) is 1000 μg/L.

A Notice of Violation (NOV) letter dated June 15, 1992, was mailed to Mohammed Hussain, Owner/Manager of Aluminum Finishing Company describing 31 Texas Administrative Code (TAC), Federal Code of Federal Regulations (CFR), and Texas Water Code violations documented during the February 19 and 28, 1992 inspections of the facility. These violations include 31 TAC §335.6 © - Notification Requirements; 31 TAC §335.63 (a)/40 CFR §262.12 (a) - EPA Identification Numbers; 31 TAC § 335.4 - General Prohibitions/Texas Water Code §26.121 - Unauthorized Discharges Prohibited. This letter also provided several reasonable actions to be conducted by Mr. Hussain to bring his facility into compliance with the Texas Water Commission rules (Ref. 13, pp. 28-33).

In response to the NOV letter dated June 15, 1992, M. Hussain sent a letter to Susan Bredehoeft, Texas Water Commission Program Manager, District 7 Office-Houston, on July 14, 1992.

Mohammed Hussain stated in his letter that his business had ceased since March, 1991. He also stated he had a buyer for his plating equipment and he was negotiating disposal of his waste with a disposal group (Ref. 14, p. 5).

On September 8, 1992 the Texas Water Commission inspectors, Stacy McCoy and Brain Lynch met with Aluminum Finishing Company representatives, Mohammed Hussain and Uddin Mussir. The inspectors informed Mr. Hussain and Mr. Mussir that the response letter did not adequately address the violations and did not document actions needed to be taken to clean up the contaminated soil on-site. Mr. Hussain explained during the meeting that the sludge had been removed and disposed of through the Malone Service Company. Also, he promised that the contaminated soils would be excavated, containerized, and properly disposed of within two weeks (Ref. 14, pp. 8-11).

The TNRCC inspectors, Stacy McCoy and Brian Lynch, conducted a follow up inspection of the Aluminum Finishing Company site on October 5, 1992. Changes on-site were documented, such as the metal roof over the plating area had been removed and was being used as a privacy fence attached to the cyclone fence. A trench under the metal privacy fence had been dug to promote drainage from this part of the site. Two samples were collected in this area. The sample of the discharge from under the fence contained TCLP cadmium at 200 μg/L. Chain of custody numbers were SW014479-80 (Ref. 14).

Due to the lack of proper response to the TNRCC District 7 Office efforts to encourage cleanup of the site, on March 23, 1993, a TNRCC enforcement referral packet was prepared by Stacy McCoy and Brian Lynch, Field Investigators of the District 07 Office-Houston and was provided to the Enforcement Screening Committee of the Industrial and Hazardous Waste Division for evaluation (Ref. 14). On April 15, 1993, the TNRCC Enforcement Screening Committee met to discuss the alleged violations presented in the March 23, 1993 enforcement referral packet for Aluminum Finishing Company. It was decided that a NOV letter would be mailed to the owner of the facility requesting a facts meeting to discuss clean up of the property. If response to the letter was inadequate, then the Industrial and Hazardous Waste Division would refer the site to State Superfund (Pollution Cleanup Division) (Ref. 15).

On April 29, 1993, the NOV letter signed by Sonia Ralls, Supervisor, TNRCC Industrial and Hazardous Waste Enforcement Section was mailed to Mohammed Hussain, President of Aluminum Finishing Company, describing violations of the Title 31 Texas Administrative Code violations documented during the March 23, 1993 TNRCC investigation of the facility. Violations included 31 TAC §335.4/Texas Water Code §26.121 -General Prohibitions (Ref. 16). On May 25, 1993, Mr. Hussain mailed a written response to DeAnna Epperson, Enforcement Coordinator, Industrial and Hazardous Waste Division. He stated in his letter that his business had not been operating since January, 1992. He stated that he has made every effort to comply with TNRCC rules and the wastes have been disposed of. He stated that his equipment was taken over by

another plating company. Also, he stated that his investigations show very little contamination left on-site (Ref. 7).

Since the owner of the property inherited the property, and the owner of the facility refused to further clean up the site, on September 02, 1993, the site was referred by the Industrial and Hazardous Waste Division to Stennie Meadours, Manager, Emergency Response and Assessment Section, Pollution Cleanup Division, for appropriate Superfund action and cleanup (Ref 17).

On March 8, 1994, Aluminum Finishing Company was verified as a eligible site for the State Superfund Program by DeAnna Epperson, TNRCC Site Investigation Manager, Pollution Cleanup Division. The site was being leased at this time to New Dimensions Designs, a construction company (Ref. 18).

In a phone conversation on March 15, 1994, John Pitre of New Dimensions Designs stated that he had been doing business at the site since July, 1993. He had originally planned to purchase the property from Lola Hinojosa and had a lease for two years which could be extended to five years. Mr. Pitre had requested Busby Environmental Services to sample the property to determine if any contamination from the former plating operation still existed (Ref. 8).

On March 16, 1994, the TNRCC received a copy of the sample results from Busby Environmental Services which was provided by John Pitre, New Dimensions Designs. The samples were collected September 16, 1993. A four point composite soil sample collected from the southwest side (behind) the metal corrugated building contained hazardous substances cadmium at 2,579 mg/Kg; chromium at 171 mg/Kg; lead at 98.99 mg/Kg; and zinc at 3,425 mg/Kg. A soil sample taken from the drainage ditch near the fence line contained hazardous substances cadmium at 1,465 mg/Kg; chromium at 121 mg/Kg; lead at 263 mg/Kg; and zinc at 1,992 mg/Kg (Ref. 19).

In order to provide sampling information during the preliminary hazard ranking process, on November 4, 1994, Johnny Kennedy and Steve Hamm, Regional Inspectors of the TNRCC Region 12-Houston Office conducted a sample inspection of the Aluminum Finishing Company site. Soil samples were collected adjacent to the plating area and around the plating building in the drainage pathways. Sample S0-1, collected north of the metal corrugated building contained hazardous substances including antimony at 25.8 mg/Kg; cadmium at 2420 mg/Kg; chromium at 520 mg/Kg; lead at 517 mg/Kg; selenium at 5.14 mg/Kg; and silver at 173 mg/Kg. Sample S0-2, collected south of the metal corrugated building contained hazardous substances including antimony at 6.26 mg/Kg; arsenic at 13.7 mg/Kg; cadmium at 1860 mg/Kg; chromium at 247 mg/Kg; lead at 124 mg/Kg; and barium at 162 mg/Kg. Sample S0-3, collected west of the metal corrugated building in the drainage pathway contained hazardous substances including arsenic at 22 mg/Kg; cadmium at 1710 mg/Kg; chromium at 90.2 mg/Kg; lead at 64.2 mg/Kg; and barium at 252 mg/Kg. Values which meet release criteria are tabulated in the "contaminated samples" portion of the Soil Exposure Pathway of this report. Chain of custody numbers were SW183142-43, SW183150, and SW182953 (Ref. 4).

On October 5, 1995, the TNRCC Preliminary Screening was completed by DeAnna Epperson, of the Pollution Cleanup Division. This screening assessed the pathways potentially impacted by sources identified on-site through prior site investigations; thereby, determined a score for prioritization (Ref. 20).

The Aluminum Finishing Company site was assigned for completion of a Hazard Ranking System (HRS) package determination on September 11, 1996. On October 3, 1996, information request letters were mailed to persons identified in the file as associated with the site, including Leo Montgomery and John Pitre (Attachment E). On October 28, 1996, Leo Montgomery was verbally contacted to verify ownership of the property. It was documented during this phone conversation that Mr. Montgomery, his wife and three children live on the property that once was occupied by the plating facility (Ref. 5).

On October 11, 1996, a facsimile was sent from DeAnna Epperson, TNRCC Pollution Cleanup Division, to John Villanacci, Ph.D. Texas Department of Health, requesting that soil samples collected on the Aluminum Finishing Company property dated November 4, 1994, be evaluated for health threats for residents occupying the property (Ref. 21). On October 25, 1996, a facsimile from Nancy Ingram, Texas Department of Health, Health Risk Assessment and Toxicology Program was received describing the adverse health effects of cadmium which exceeded the health comparison values of 40-50 ppm for children exposed to soil and 500-700 ppm for adults. Also, the letter stated that elevated levels of lead in the blood of children could result after their exposure to the contaminated soil at the site (Ref. 22). This facsimile attached to a letter from the TNRCC was mailed to Leo Montgomery on November 1, 1996 describing some precautions for he and his family to take to limit exposure to the contaminated soils (Ref. 23).

The TNRCC collected soil samples at Aluminum Finishing Company site on January 2, 1997. The samples were collected on-site, in the play area near the residence, and in the drainage pathways surrounding the site. Five soil samples, SO-6, SO-7, SO-9, and SO-10 are located in the drainage pathways leading from the areas where plating wastes were allowed to discharge off the site. SO-8 is located in an adjacent street-side ditch on the corner of Ardmore and Charleston Street. Samples SO-3/SO-4 (duplicates) are located on-site in the area where plating wastes were stored. SO-1 is located in the residential play yard near where the family resides. Sample SO-02 is located at the back of the property behind the metal warehouse. Samples S0-9 and S0-10 collected in the front yard ditch just north (S0-9) and east (S0-10) of the residence contained hazardous metals at levels as high as: cadmium at 1430 mg/Kg (S0-9); chromium at 220 mg/Kg (S0-10); lead at 231 mg/Kg (S0-10); arsenic at 140 mg/Kg (S0-10), and also contained cyanide at 150 mg/Kg (S0-9). Samples S0-6 and S0-7 collected in the ditch along Ardmore west of the site contained hazardous metals at levels as high as: cadmium at 891 mg/Kg (S0-6); chromium at 102 mg/Kg (S0-6); lead at 88 mg/Kg (S0-7); barium at 434 mg/Kg (S0-7), and also contained cyanide at 140 mg/Kg (S0-6). Sample S0-8 contained low levels of metals and no cyanide to report. Results which meet release criteria from the soil samples collected on-site are tabulated under "contaminated samples"

in the Soil Exposure Pathway portion of this report. Chain of custody numbers are SW01991-02000 (Ref. 24).

SITE SCORING SUMMARY

PATHWAYS, COMPONENTS, OR THREATS NOT EVALUATED:

1) Surface Water - Overland Flow/Flood Migration Pathway: An observed release to the current surface water pathway has not been documented at this time due to the lack of perennial flowing surface water between the site and coastal waters. Based on available information, evaluation of this pathway would not significantly effect the site score.

2) Surface Water-Ground Water to Surface Water Migration Pathway: An observed release to the current surface water pathway has not been documented at this time due to the lack of perennial flowing surface water between the site and coastal waters. Also, no drinking water targets are located in this pathway. Based on available information, evaluation of this pathway would not significantly effect the site score.

3) Air Migration Pathway: Samples were not collected to characterize the air migration pathway; therefore, an observed release to the air pathway was not documented and the targets would have to be evaluated as potential targets, resulting in a minimal score. Based on available information, evaluation of this pathway would not significantly effect the site score.

SCORES

GROUND WATER PATHWAY: 2.07
SURFACE WATER PATHWAY: N/A
SOIL EXPOSURE PATHWAY: 12.6
AIR PATHWAY: N/A

HRS SITE SCORE: 6.38

NOTES TO READER

1. The State predecessor agencies, Texas Water Quality Board, Texas Department of Water Resources, Texas Water Commission, and the Texas Air Control Board, referred to throughout this report are to be known as the Texas Natural Resource Conservation Commission (TNRCC). The new agency, TNRCC became effective September 1, 1993, as mandated under State Senate Bill 2 of the 73rd Regular Legislative Session.

2. If the reference cited had an original page number, that page number is cited.

WORKSHEET FOR COMPUTING HRS SITE SCORE

		S	S^2
1.	Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	2.07	4.28
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	N/A	
2b.	Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	N/A	
2c.	Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	N/A	
3.	Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	12.6	158.76
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	N/A	
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$		163.04
6.	**HRS Site Score** Divide the value on line 5 by 4 and take the square root	6.38	

TABLE 3-1
GROUND WATER MIGRATION PATHWAY SCORESHEET

Factor Categories and Factors	Maximum Value	Value Assigned	
Likelihood of Release to an Aquifer			
1. Observed Release	550	0	
2. Potential to Release			
2a. Containment	10	10	
2b. Net Precipitation	10	3	
2c. Depth to Aquifer	5	1	
2d. Travel Time	35	1	
2e. Potential to Release			
(Lines 2a(2b + 2c + 2d))	500	50	
3. Likelihood of Release			
(Higher of Line 1 and 2e)	500		50
Waste Characteristics			
4. Toxicity/Mobility	*	100	
5. Hazardous Waste Quantity	*	10,000	
6. Waste Characteristics	100		6
Targets			
7. Nearest Well	50	9	
8. Population:			
8a. Level I Concentrations	**	0	
8b. Level II Concentrations	**	0	
8c. Potential Contamination	**	564	
8d. Population (Lines 8a + 8b + 8c)	**	564	
9. Resources	5	5	
10. Wellhead Protection Area	20	5	
11. Targets (Lines 7 + 8d + 9 + 10)	**		569
Ground Water Migration Score for an Aquifer			
12. Aquifer Score			
((Lines 3 x 6 x 11)/82,500)***	100		2.07
Ground Water Migration Pathway Score			
Pathway Score (S_{gw}), (Highest value from Line 12 for all 13. aquifers evaluated)***	100		2.07

TABLE 5-1
SOIL EXPOSURE PATHWAY SCORESHEET

Factor Categories and Factors	Maximum Value	Value Assigned	
RESIDENT POPULATION THREAT			
Likelihood of Release to an Aquifer			
1. Likelihood of Exposure	550		550
Waste Characteristics			
2. Toxicity	*	1E+04	
3. Hazardous Waste Quantity	*	10	
4. Waste Characteristics	100		18
Targets			
5. Resident Individual	50	50	
6. Resident Population:			
6a. Level I Concentrations	**	50	
6b. Level II Concentrations	**	0	
6c. Resident Population (Lines 6a + 6b)	**	50	
7. Workers	15	5	
8. Resources	5	0	
9. Terrestrial Sensitive Environments	***	0	
10. Targets (Lines 5 + 6c + 7 + 8 + 9)	**		105
Resident Population Threat Score			
11. Resident Population Threat (Lines 1 x 4 x 10)	**		1,039,500
NEARBY POPULATION THREAT			
Likelihood of Exposure			
12. Attractiveness/Accessibility	100	10	
13. Area of Contamination	100	5	
14. Likelihood of Exposure	500		5

* Maximum value applies to waste characteristics category
** Maximum value not applicable
*** No specific maximum value applies to factor. However, pathway score based solely on terrestrial sensitive environments is limited maximum of 60
**** Do not round to the nearest integer

TABLE 5-1
SOIL EXPOSURE PATHWAY SCORESHEET

Factor Categories and Factors		Maximum Value	Value Assigned	
NEARBY POPULATION THREAT (Concluded)				
Waste Characteristics				
15.	Toxicity	*	1E+04	
16.	Hazardous Waste Quantity	*	10	
17.	Waste Characteristics	100		18
Targets				
18.	Nearby Individual	1	0	
19.	Population Within 1-Mile	**	6.6	
20.	Targets (Lines 18 + 19)	**		6.6
Nearby Population Threat Score				
21.	Nearby Population Threat (Lines 14 x 17 x 20)	**		594
SOIL EXPOSURE PATHWAY SCORE				
22.	Soil Exposure Pathway Score *** (S_3)(Lines 11 + 21)/82,500, subject to a maximum of 100)	100		12.6

* Maximum value applies to waste characteristics category
** Maximum value not applicable
*** No specific maximum value applies to factor. However, pathway score based solely on terrestrial sensitive environments is limited maximum of 60
**** Do not round to the nearest integer

SOURCE DESCRIPTION

2.2 Source Characterization

2.2.1 Source Identification

Number of the source: 1

Name and description of the source: Soil Contamination

On November 8, 1994, Johnny Kennedy and Steve Hamm, Regional Inspectors of the TNRCC Region 12-Houston Office conducted a sample inspection of the Aluminum Finishing Company site. Soil samples were collected adjacent to the plating area and around the plating building in the drainage pathways. Soil samples collected near the metal building in the drainage pathways contained hazardous substances antimony, cadmium, chromium, lead, selenium, and silver which met release criteria. Chain of custody numbers were SW183142-43, SW183150 and SW182953 (Ref. 4).

The TNRCC collected on-site soil samples in drainage pathways at the former Aluminum Finishing Company site on January 2, 1997. Soil samples were collected in areas in and downgradient from where plating waste reportedly had been stored, spilled or allowed to discharge off the site. Five soil samples, SO-6, SO-7, SO-9, and SO-10 are located in the drainage pathways leading from the areas where plating wastes had been allowed to discharge off the site. SO-8 is located off-site in the adjacent street-side ditch on the corner of Ardmore and Charleston Street. These samples contained release levels of metals cadmium, chromium, silver, mercury, selenium, arsenic and lead, and also contain cyanide. Samples SO-3/SO-4 (duplicates) are located on-site in the area where plating wastes had been stored. SO-1 is located in the residential play yard near where the family resides. Sample SO-02 is located at the back of the property behind the metal warehouse. The on-site soil samples contained release levels of metals including cadmium and chromium, and also contained cyanide. Chain of custody numbers are SW01991-02000 (Ref. 24).

Location of the source, with Ref. to a map of the site: The area of contaminated soil covers on-site areas within, adjacent to and downgradient from the plating waste storage area. See Figure 1. for the Site Location Map and Figure 2. for the Site Sketch Map. Also, a USGS topographic map is included as Attachment B.

Source type for HRS evaluation purposes:

This source consists of an area of surface soils contaminated with metals and cyanide and is classified and evaluated as the HRS source type contaminated soil.

Containment

Gas release to air: The source does not have aromatic properties; therefore, gas containment has not been evaluated (Ref. 2).

Particulate release to air: There are no formal containment structures present that prevent particle migration of contaminants from the entire property. However, much of the property has grass or natural plant life growing on the soil; therefore, air containment has not been evaluated (Ref. 24 - 1/3/97 investigation).

Release to ground water: No liner or containment system is present at the source. The plating tubs and drums storing the process waste had been stored directly on the ground surface northwest of the metal corrugated building. The soils in that area were not covered nor contained in any manner; therefore, groundwater containment has been evaluated (Ref. 14, pp. 15 and 33).

Release via overland migration and/or flood: No liner or containment system is present at the source. The plating tubs and drums storing the process waste had been stored directly on the ground surface northwest of the metal corrugated building. The soils in that area were not covered nor contained in any manner (Ref. 14, pp. 15 and 33).

2.2.2 Hazardous Substances Associated with a Source

On November 8, 1994, Johnny Kennedy and Steve Hamm, Regional Inspectors of the TNRCC Region 12-Houston Office conducted a sample inspection of the Aluminum Finishing Company site. Soil samples were collected adjacent to the plating area and around the plating building in the drainage pathways. Soil samples contained hazardous substances antimony, cadmium, chromium, lead, selenium, and silver which met release criteria. Chain of custody numbers were SW SW183142-43, SW183150, and SW182953 (Ref. 4).

The TNRCC collected on-site soil samples in drainage pathways at the former Aluminum Finishing Company site on January 2, 1997. Soil samples were collected in areas in and downgradient from where plating waste reportedly had been stored, spilled or allowed to discharge off the site. These soil samples contained release levels of metals cadmium and chromium, and also contained cyanide. Chain of custody numbers are SW01991-02000 (Ref. 24).

SOURCE DESCRIPTION

Station/COC # Location	Evidence		References
	Hazardous Substance	Concentration (mg/Kg)	
TNRCC Sampling Event November 8, 1994			
SO-1/SW183150 north side of the metal corrugated building	Antimony	25.8	Ref. 4, Attachment A
	Cadmium	2420	
	Chromium	520	
	Lead	517	
	Selenium	5.14	
	Silver	173	
SO-2/SW183143 south side of metal corrugated building	Cadmium	1860	Ref. 4, Attachment A
	Chromium	247	
	Lead	124	
	Antimony	6.26	
SO-3/SW183142 west side of metal corrugated building	Cadmium	1710	Ref. 4, Attachment A

Station/COC # Location	Evidence		References
	Hazardous Substance	Concentration (mg/Kg)	
TNRCC Sampling Event January 2, 1997			
SO-1/SW01991 between the former plating building and the residence, within the fenced play area	Cadmium	113	Ref. 24, Attachment A
	Chromium	111	
	Cyanide	9.5[1]	
SO-2/SW01992 southwest and directly behind the former metal plating building approximately 6 ft from the back fence.	Cadmium	201	Ref. 24, Attachment A
SO-3/SW01993 northwest side of metal corrugated building in the area where plating waste had once been stored	Cadmium	1370	Ref. 24, Attachment A
	Chromium	107	
	Cyanide	480[1]	
SO-4/SW01994 (duplicate of SO-3) northwest side of metal corrugated building in the area where plating waste had once been stored	Cadmium	3310	Ref. 24, Attachment A
	Chromium	141	
	Cyanide	420[1]	

Note:
[1] - See Data Usability Table (Attachment D)

Background metal levels for this source are summarized in the table below.

Hazardous Substance	Evidence		References
	Station Location No./COC #	Concentration (mg/Kg)	
TNRCC Sampling Event November 4, 1994			
Antimony	SO-4/SW182953	<3.0	Ref. 4, Attachment A
Cadmium	SO-4/SW182953	<0.34	Ref. 4, Attachment A
Chromium	SO-4/SW182953	30.7	Ref. 4, Attachment A
Lead	SO-4/SW182953	41.2	Ref. 4, Attachment A
Selenium	SO-4/SW183953	<3.0	Ref. 4, Attachment A
Silver	SO-4/SW182953	0.542	Ref. 4, Attachment A
TNRCC Sampling Event January 2, 1997			
Cadmium	SO-5/SW01995	<0.33	Ref. 24, Attachment A
Chromium	SO-5/SW01995	25.2	Ref. 24, Attachment A
Cyanide	SO-5/SW01995	<1.1[1]	Ref. 24, Attachment A

Note:

[1]- See Data Usability Table (Attachment D)

2.2.3 Identify Hazardous Substances Available to a Pathway

The area of Source 1 contamination was based on analytical evidence of hazardous substances present in concentration three times greater than the designated background and in concentrations greater than the corresponding SQLs. All surface soil samples were collected at a depth of 6 inches or less at the source. Hazardous substances associated with Source 1 that meet the criteria for observed contamination are shown in the following table.

2.3 LIKELIHOOD OF RELEASE

Refer to Sections 3.1.2.1 and 6.1.1 of this document record for specific information related to the Likelihood of Release to the Groundwater and Soil Exposure Pathways.

2.4.1 Selection of Substance Potentially Posing Greatest Threat

Chromium was selected as the hazardous substance potentially posing the greatest hazard for the groundwater migration pathway and the soil exposure pathway because of its presence in Source 1 because of its toxicity/mobility value of 100, and its toxicity value of 10,000 (Ref. 2).

2.4.2. Hazardous Waste Quantity

2.4.2.1.1. Source Hazardous Constituent Quantity

The information available is not sufficient to evaluate Tier A; therefore, it is not possible to adequately determine a hazardous constituent quantity for Source 1, Contaminated Soils. As a result, the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier B, hazardous wastestream quantity (Ref. 1, Section 2.4.2.1.2).

2.4.2.1.2. Hazardous Wastestream Quantity

The information available is not sufficient to evaluate Tier B; therefore it is not possible to adequately determine a hazardous wastestream quantity for Source 1, Contaminated Soils. As a result, the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier C, volume (Ref. 1, Section 2.4.2.1.3).

2.4.2.1.3. Volume

The information available is not sufficient to evaluate Tier C; therefore it is not possible to adequately determine a source volume in cubic yards for Source 1, Contaminated Soils. As a result, the evaluation of source volume proceeds to the evaluation of Tier D, source area (Ref. 1, Section 2.4.2.1.4).

2.4.2.1.4. Area

Samples from Source 1, Contaminated Soils, show hazardous substances to be present (See Ref. 24, Attachment A - data results). The area of contaminated soils lying between sampling locations that meet the criteria for observed contamination was not determined. This area covers the downgradient portions of the site, and in the drainage pathways leading off-site. The area of observed soil contamination will be assigned an area hazardous quantity value of greater than (>) 0. The value of >0 reflects that the area value is known to be greater than 0, but the exact amount is unknown.

The Equation for assigning Source Area Hazardous Waste Quantity Value for Migration Pathway is A/34,000 (Ref. 1, Table 2-5).

Area of source (ft^2): A > 0

Ref.(s): Ref. 1, Table 2-5; Ref. 28, p.3
Area Assigned Value: >0, but unknown

2.4.2.1.5. Source Hazardous Waste Quantity Value

Tier Evaluated	Source 1Values
A	NE
B	NE
C	NE
D	>0

The assigned source hazardous waste quantity value is greater than 0, but unknown.

SITE SUMMARY OF SOURCE DESCRIPTIONS

Source No.	Source Hazardous Waste Quantity Value	Containment			
		Ground Water	Surface Water	Gas	Air Particulate
1	>0, but unknown	Non-zero	NE	NE	Non-zero

NE = Not evaluated.

Hazardous Waste Quantity Factor Value: 10

According to the HRS, if none of the targets are subject to Level 1 or Level II for a migration pathway when assigning a Hazardous Waste Quantity Factor Value, the value from Table 2-6 or a value of 10, whichever is greater, is assigned. Additionally, for the soil exposure pathway, if the hazardous constituent quantity is not adequately determined for one or more areas of observed contamination, assign either the value from Table 2-6, or a value of 10, whichever is greater, as the hazardous waste quantity factor value (Ref. 1, Section 2.4.2.2).

Therefore, because potential contamination was identified for the Groundwater Migration Pathway, and because the hazardous constituent quantity is not adequately determined, a Hazardous Waste Quantity Factor Value of 10 is assigned.

Also, for the soil exposure pathway, because the hazardous constituent quantity is not adequately determined for the area of observed contamination, a value of 10 as the hazardous waste quantity factor value is assigned.

SOURCES NOT EVALUATED

No other sources have been identified as being located on this property.

3.0 GROUND WATER MIGRATION PATHWAY

3.0.1 GENERAL CONSIDERATIONS

Harris County and the Aluminum Finishing Company site are located in the Gulf Coast Plain of Southeast Texas (Ref. 25). Surface outcrops along the Texas coast generally parallel the coastline. Regionally, these stratigraphic units dip toward the Gulf of Mexico at an angle greater than that of the land surface, and they tend to thicken and occur progressively deeper basinward. The stratigraphic units which contain fresh to slightly saline water in Harris County range in age from Miocene to Holocene. These units, from oldest to youngest, are the Fleming Formation of Miocene age, Goliad Sand of Pliocene age, the Willis Sand, Bentley Formation, Montgomery Formation, and the Beaumont Clay of Pleistocene age, and the alluvium of Holocene age. Collectively, these units are estimated to attain a thickness of about 2400 feet (ft.) in northern Harris County to approximately 4800 ft. in the southeast part of the county (Ref. 26). Lithologically, these units primarily consist of inerceded sand and clay with subordinate beds of silt and gravel. Post-Miocene age units are lithologically similar making delineation of the stratigraphic and hydrologic sections difficult (Refs. 26 and 27).

Aquifer/Stratum 1

Aquifer/Stratum Name: Chicot Aquifer

Description:

The Chicot aquifer outcrops in the site area. It consists of sand and clay beds. The thickness below the site is approximately 280 feet. The major source of groundwater in Chicot aquifer is obtained from the basal Alta Loma Sand, with the exception of the Texas City area, where the chloride concentrations exceed 500 mg/L. At Texas City, sand and gravel lenses in the middle part of the Chicot are the principal sources of water.

Ref.s: Ref. 27, p. 41 and Ref. 26, Attachment (TWDB Report 295, Table 1 and p.23)

Aquifer/Stratum 2

Aquifer/Stratum Name: Evangeline Aquifer

Description:

The Evangeline aquifer is composed of the Goliad Sand and the uppermost part of the Fleming Formation. The top of the Evangeline aquifer ranges from about 550 ft. deep in northern Harris County to about 750 ft. and thickens down dip from about 650 ft. to 2400 ft. The Evangeline aquifer is the major source of ground water in the Houston District.

Ref.s: 27, p. 40 and Ref. 26, Attachment (TWDB Report 295, Table 1 and p.23)

Aquifer/Stratum 3

Aquifer/Stratum Name: Jasper Aquifer

Description:

The Jasper aquifer ranges in thickness from about 930 ft. in northern Harris County to about 1160 ft. in far southern Harris County. The base of this aquifer coincides with the base of the lower stratigraphic boundary of the Fleming Formation and is contained within about the lower third of this formation. Ground water withdrawal from the Jasper aquifer is not significant in Harris County.

Ref.s: Ref. 26, Attachment (TWDB Report 295, Table 1 and p.19)

3.1.2 POTENTIAL TO RELEASE

3.1.2.1 Containment

On February 19, 1992, Stacy McCoy, Field Inspector, TWC District 7 Office-Houston, conducted an inspection of the Aluminum Finishing Company site. She documented six rectangular metal tanks on-site storing plating sludge. One tank was found on its side allowing the discharge of its contents to the northwest property fence line. Also noted were numerous open top drums and several spills (Ref. 13, p.35).

The TNRCC inspectors, Stacy McCoy and Brian Lynch, conducted a follow up inspection of the Aluminum Finishing Company site on October 5, 1992. A trench under a metal privacy fence had been dug to promote drainage off of the site from the plating area. Two samples were collected in this area. The sample of the discharge from under the fence contained TCLP cadmium at 200 μg/L. Chain of custody numbers were SW014479-80 (Ref. 14).

On November 8, 1994, Johnny Kennedy and Steve Hamm, Regional Inspectors of the TNRCC Region 12-Houston Office conducted a sample inspection of the Aluminum Finishing Company site. Soil samples were collected adjacent to the plating area and around the plating building in the drainage pathways. Soil samples collected near the metal building in the drainage pathways contained hazardous substances antimony, cadmium, chromium, lead, selenium, and silver which met release criteria. Chain of custody numbers were SW SW183142-43, SW183150, and SW182953 (Ref. 4).

The TNRCC collected on-site soil samples in drainage pathways at the former Aluminum Finishing Company site on January 2, 1997. Soil samples were collected in areas in and downgradient from where plating waste reportedly had been stored, spilled or allowed to discharge off the site. These soil samples contained release levels of metals cadmium and chromium, and also contained cyanide. Chain of custody numbers are SW01991-02000 (Ref. 24).

Source	Descriptor	Value
1. Contaminated Soil	contaminated soil	10

Containment Factor Value: 10

3.1.2.2 Net Precipitation

Precipitation (in inches): N/A
Ref.: Ref. 1, Table 3-4; and Ref. 29 (TNRIS rainfall and evaporation data)
Factor Value: 3

From 1970 through 1990, average precipitation is 50.1, and average net evaporation is 23.5; therefore the precipitation for the twenty year period is 26.6 inches (Ref. 29). Transpiration data was not provided; therefore, a more conservative factor value of 3 is assigned (Ref. 1, Table 3-4).

3.1.2.3 Depth to Aquifer

The lowest point of known contamination on-site is within one foot. The samples collected by TNRCC were collected to a depth within one foot (Ref. 4, p. 2 and Ref. 24, p. 2).

Location	Stratum	Depth (in feet)	Cumulative Depth	References
Site Area	Chicot	280	280	Ref. 7, p.40-41; Ref. 26, pp.19 and 23; and Ref. 28
	Evangeline	488	488	
	Jasper	2300	2300	

Net Precipitation Factor Value: 3
Depth to Aquifer Factor Value: 1

3.1.2.4 Travel Time

Layer	Composition	Thickness (feet)	Conductivity (cm/sec)	References
Chicot	sand and clay	280	1E-08	Ref. 1, Table 3-6
Evangeline	sand and clay	426	1E-08	
Jasper	sandstone and sand	291	1E-08	

Lowest Hydraulic Conductivity: 1E-08

Travel Time Factor Value: 1

3.2 WASTE CHARACTERISTICS

3.2.1 Toxicity/Mobility

Hazardous Substance	Source No.	Toxicity Factor Value	Mobility Factor Value	Toxicity/ Mobility	References
Lead	1	10,000	2E-05	2E-01	Ref. 2
Chromium	1	10,000	1E-02	100	Ref. 2
Cadmium	1	10,000	2E-03	20	Ref. 2
Selenium	1	100	1E-02	1	Ref. 2
Antimony	1	10,000	1E-02	100	Ref. 2
Cyanide	1	100	1	100	Ref. 2
Silver	1	100	2E-05	2E-03	Ref. 2

Toxicity/Mobility Factor Value: 100

GW-Hazardous Waste Quantity

3.2.2 Hazardous Waste Quantity

Source Number	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is source hazardous constituent quantity data complete?
1	>0, but unknown	No

Sum of Values: > 0, but unknown

According to the HRS, if none of the targets are subject to Level 1 or Level II for a migration pathway when assigning a hazardous Waste Quantity Factor Value, the value from Table 2-6 or a value of 10, whichever is greater, is assigned. Therefore, because potential contamination was identified for the Groundwater Migration Pathway, and because the hazardous constituent quantity is not adequately determined, a Hazardous Waste Quantity Factor Value of 10 is assigned (Ref. 1, Section 2.4.2.2).

3.2.3 Waste Characteristics Factor Category Value

(Toxicity/Mobility Factor Value = 100) X (Hazardous Waste Quantity Factor Value= 10) = 1E+03

Based on this product, a value of 6 is assigned from Ref. 1, Table 2-7, Section 2.4.3.1.

Hazardous Waste Quantity Factor Value: 10
Waste Characteristics Factor Category Value: 6

3.3 TARGETS

Well	Distance from Source (Miles)	Aquifer	Level I Contam. (Y/N)	Level II Contam. (Y/N)	Potential Contam. (Y/N)	References
65-21-302	0.57	Evangeline	N	N	Y	Ref. 20, Attachment E (well logs); Ref. 30; and Attachment B (USGS Topo maps)
65-21-304	1.1	Evangeline	N	N	Y	Ref. 20, Attachment E (well logs); Ref. 30; and Attachment B (USGS Topo maps)
65-21-306	1.1	Evangeline	N	N	Y	Ref. 20, Attachment E (well logs); Ref. 30; and Attachment B (USGS Topo maps)
65-13-944	3.2	Evangeline	N	N	Y	Ref. 20, Attachment E (well logs); Ref. 30 and Attachment B (USGS Topo maps)

3.3.1 Nearest Well

Well: 65-21-302 Public Supply Well, Houston, Texas
Level of Contamination (I, II, or potential): Potential
If potential contamination, distance from source in miles: 0.57

Ref.(s): Ref. 20, Attachment E (well logs); and Attachment B (USGS Topo maps)

Nearest Well Factor Value: 9

3.3.2.1 Level of Contamination

3.3.2.4 Potential Contamination

The City of Houston has approximately 140 wells installed, with about 84 of those in service at any one time. The wells serve less than 40% of the population each (Ref 30). The number of persons per household is 2.4 persons/household (Ref. 31, p. 240). However, the number of households served by individual wells are not documented due to the complexity of the system. Ref.32. The city is supplied with 54% surface water and 46% groundwater as a blended system. The total population is 1.58 million served by the entire system (Ref. 33).

With 84 wells operating at any one time, each well could serve up to 8,652 persons within the blended system. [(1.58 million x 0.46)/(84 wells) = 8,652]

There are three wells operating within the ½ to 1 mile distance category; therefore, 3 x 8,652 = 25,956 population is assigned for that distance. One well is operating in the 3-4 mile distance category; therefore, 8,652 is assigned to that distance category.

Distance Category (Miles)	Population	Ref.	Distance-Weighted Population Value
½ to 1	25,956	Ref. 30, and 33	5,224
3 to 4	8,652	Ref. 30, and 33	417

Sum of Distance-Weighted Population Values: 5,641

Potential Contamination Factor Value: 564

3.3.3 RESOURCES

Well	Aquifer	Resource Use	References
½ to 1 Mile from Site			
65-21-302	Evangeline	PWS	Ref. 20, Attachment E (well logs); and Attachment B (USGS Topo maps)
65-21-306	Evangeline	PWS	Ref. 20, Attachment E (well logs); and Attachment B (USGS Topo maps)
65-21-306	Evangeline	PWS	Ref. 20, Attachment E (well logs); and Attachment B (USGS Topo maps)
3 to 4 Miles from Site			
65-13-944	Evangeline	PWS	Ref. 20, Attachment E (well logs); and Attachment B (USGS Topo maps)

Resources Factor Value: 5

3.3.4 WELLHEAD PROTECTION AREA

Well	Aquifer	Distance from Site (Miles)	Resource Use	References
65-21-302	Evangeline	0.28	PWS	Ref. 20, Attachment E (well logs); and Ref. 35

The City has a Well Head Protection area which extends 1/4 mile from the well (Ref. 34 - well head map). The site is located within ½ mile of the protection area for Well No. 65-21-302 (Attachment B - USGS Topo maps).

Wellhead Protection Area Factor Value: 5

3.5 Calculation of Groundwater Migration Pathway Score

Pathway Score = (Likelihood to Release) x (Waste Characteristics) x (Targets)

$$= (50) \times (6) \times (569)$$

$$= \frac{170,700}{82,500}$$

$$= 2.069$$

5.0 SOIL EXPOSURE PATHWAY

5.0.1 GENERAL CONSIDERATIONS

According to the HRS, the soil exposure pathway is based on areas of observed contamination (Ref.1, Sect. 5.0.1). The area of observed soil contamination at the site was based on analytical evidence of hazardous substances present in concentrations three times greater than the designated background levels and in concentrations greater than the corresponding SQL's. The area of observed soil contamination at the Aluminum Finishing Company site consists of the sampling locations and the area lying between these locations.

- Letter (A, B, ect.) by which this area is to be identified: A
- Name and description of the area: Contaminated Soils

On February 19, 1992, Stacy McCoy, Field Inspector, TWC District 7 Office-Houston, conducted an inspection of the Aluminum Finishing Company site. She documented six rectangular metal tanks on-site storing plating sludge. One tank was found on its side allowing the discharge of its contents to the northwest property fence line. Also noted were numerous open top drums and several spills (Ref. 13, p.35).

On February 28, 1992, a sample investigation of the Aluminum Finishing Company site was conducted by Stacy McCoy. Samples were collected at the northwest corner of the property at the plating area. Chain of custody (COC) numbers were SW014319-21. Hazardous substances barium, cadmium, chromium, and arsenic were detected in the soils. A sample collected adjacent to the site in the drainage area in front of the metal corrugated plating building (COC tag SW014320) contained toxicity characteristic leaching procedure (TCLP) cadmium at 25,500 μg/L (Ref 13, pp. 18-20). According to the 40 Code of Federal Regulations §261.24, the regulatory maximum level for TCLP cadmium (D006 waste) is 1000 μg/L.

The TNRCC inspectors, Stacy McCoy and Brian Lynch, conducted a follow up inspection of the Aluminum Finishing Company site on October 5, 1992. Changes on-site were documented, such as the metal roof over the plating area had been removed and was being used as a privacy fence attached to the cyclone fence. A trench under the metal privacy fence had been dug to promote drainage from this part of the site. Two samples were collected in this area. The sample of the discharge from under the fence contained TCLP cadmium at 200 μg/L. Chain of custody numbers were SW014479-80 (Ref. 14).

In order to provide sampling information during the preliminary hazard ranking process, on November 8, 1994, Johnny Kennedy and Steve Hamm, Regional inspectors of the TNRCC Region 12-Houston Office conducted a sample inspection of the Aluminum Finishing Company site. Soil samples were collected adjacent to the plating area and around the plating building in the drainage pathways. Soil samples collected near the metal building in the drainage pathways contained hazardous substances antimony, cadmium, chromium, lead, selenium, and silver which met release criteria. Chain of custody numbers were SW SW183142-43, SW183150, and SW182953 (Ref. 4).

On March 16, 1994, the TNRCC received a copy of the sample results from Busby Environmental Services which was provided by John Pitre, New Dimensions Designs. The samples were collected September 16, 1993. A four point composite soil sample collected from the southwest side (behind) the metal corrugated building contained hazardous substances cadmium at 2,579 mg/Kg; chromium at 171 mg/Kg; lead at 98.99 mg/Kg; and zinc at 3,425 mg/Kg. A soil sample taken from the drainage ditch near the fence line contained hazardous substances cadmium at 1,465 mg/Kg; chromium at 121 mg/Kg; lead at 263 mg/Kg; and zinc at 1,992 mg/Kg (Ref. 19).

The TNRCC collected on-site soil samples and samples in the drainage pathways at the former Aluminum Finishing Company site on January 2, 1997. Soil samples were collected in areas in and downgradient from where plating waste reportedly had been stored, spilled or allowed to discharge off the site. Five soil samples, SO-6, SO-7, SO-9, and SO-10 are located in the drainage pathways leading from the areas where plating wastes were allowed to discharge off the site. SO-8 is located in an adjacent street-side ditch on the corner of Ardmore and Charleston Street. These soil samples contained release levels of metals including cadmium, chromium, lead, silver, mercury, and arsenic, and also contained cyanide Samples SO-3/SO-4 (duplicates) are located on-site in the area where plating wastes were stored. SO-1 is located in the residential play yard near where the family resides. Sample SO-02 is located at the back of the property behind the metal warehouse. The on-site soil samples contained release levels of metals cadmium and chromium, and also contained cyanide. Chain of custody numbers are SW01991-02000 (Ref. 24).

Location of the area, with reference to a map of the site:

The area of contaminated soil covers on-site areas and areas downgradient from the site. See Figure 1. for the Site Location Map. Also, a USGS topographic map is included as Attachment B.

- Background Concentration

Development of background levels for soils at the site were based on background sampling results from the TNRCC November 4, 1994 Inspection and the TNRCC January 2, 1997 sampling investigation. Designated background soil levels in the vicinity of the site for each sampling event were determined by selecting the background value for each hazardous substance of concern. Sample locations for the TNRCC sampling investigations are depicted in Figure 2.

Analyte	Station Location No./COC #	Concentration (SQL) (mg/Kg)	3xHighest Background Concentration	References
TNRCC Sampling Event November 4, 1994				
Cadmium	SO-4/SW182953	ND (0.34)	>0.34	Ref. 4, Attachment A
Chromium	SO-4/SW182953	30.7	92.1	Ref. 4, Attachment A
Lead	SO-4/SW182953	41.2	123.6	Ref. 4, Attachment A
Selenium	SO-4/SW183953	ND (3.0)	> 3.0	Ref. 4, Attachment A
Silver	SO-4/SW182953	0.542	1.626	Ref. 4, Attachment A
TNRCC Sampling Event January 2, 1997				
Cyanide	SO-5/SW01995	ND (1.1)[1]	>1.1	Ref. 24, Attachment A
Cadmium	SO-5/SW01995	ND (0.33)	>0.33	Ref. 24, Attachment A
Chromium	SO-5/SW01995	25.2	75.6	Ref. 24, Attachment A

Notes:
[1] - See Data Usability Table (Attachment D)
(1) J = Estimated concentration
(2) ND = Not Detected. These analytes were not detected at the reported quantitation limit; therefore, the release must be greater than its SQL and the background sample SQL reported in the above table.
(3) SQL = Sample Quantitation Limit

- Contaminated Samples

Contaminated surface soil samples from the TNRCC November 4, 1994 inspection and the TNRCC January 2, 1997 inspection are presented in the table below. For samples location refer to Figure 2.

Station/COC # Location	Evidence		References
	Hazardous Substance	Concentration (mg/Kg) [SQL]	
TNRCC Sampling Event November 4, 1994			
SO-1/SW183150 north side of the metal corrugated building	Cadmium	2420 [1]	Ref. 4, Attachment A
	Chromium	520 [2]	
	Lead	517 [0.6]	
	Selenium	5.14 [1]	
	Silver	173 [2]	
SO-2/SW183143 south side of metal corrugated building	Cadmium	1860 [1]	Ref. 4, Attachment A
	Chromium	247 [2]	
	Lead	124 [0.6]	
SO-3/SW183142 west side of metal corrugated building	Cadmium	1710 [1]	Ref. 4, Attachment A
TNRCC Sampling Event January 2, 1997			

Station/COC # Location	Evidence		References
	Hazardous Substance	Concentration (mg/Kg) [SQL]	
SO-1/SW01991 between the former plating building and the residence, within the fenced play area	Cadmium	113 [0.66]	Ref. 24, Attachment A
	Chromium	111 [1.3]	
	Cyanide	9.5[1] [0.64]	
SO-2/SW01992 southwest and directly behind the former metal plating building approximately 6 ft from the back fence.	Cadmium	201 [0.33]	Ref. 24, Attachment A
SO-3/SW01993 northwest side of metal corrugated building in the area where plating waste had once been stored	Cadmium	1370 [0.33]	Ref. 24, Attachment A
	Chromium	107 [0.66]	
	Cyanide	480[1] [33]	
SO-4/SW01994 (duplicate of SO-3) northwest side of metal corrugated building in the area where plating waste had once been stored	Cadmium	3310 [0.32]	Ref. 24, Attachment A
	Chromium	141 [0.64]	
	Cyanide	420[1] [32]	

Notes:
[1] - See Data Usability Table (Attachment D)
(1) Observed contamination samples were collected from a depth of 0 to 6 inches.
(2) SQL = Sample Quantitation Limit
(3) All concentrations reported are greater than 3 times the background concentrations and meet the criteria for observed contamination.

Attribution:

Aluminum Finishing Company was an electroplating operation where nuts and bolts of different sizes were electroplated with cadmium and coated with chromium. The nut cleaning solution was made up of a caustic sodium cyanide solution (Ref. 10). Drums of sodium cyanide were stored on-site in the plating area (Ref. 12). Tanks of electroplating waste sludge were allowed to spill and electroplating wastewater was allowed to discharge onto the surrounding soils (Ref. 13).

Also, several sampling events have been conducted on-site in and around the former plating tank storage area. Soil samples collected by the TNRCC on February 28, 1992 in the plating area revealed hazardous substances barium, cadmium, chromium, and arsenic (Ref. 13). John Pitre of New Dimension Designs had samples collected on September 16, 1993 where Aluminum Finishing Company once operated the plating operation. A four point composite soil sample collected from the southwest side of the metal corrugated building contained hazardous substances cadmium, chromium, lead and zinc (Ref. 19). In addition, Leo Montgomery had a sample collected in the residential area of the property and one in the former plating area on-site. The samples were collected on March 29, 1996. Both of the soil samples contained hazardous substances arsenic, cadmium, chromium, lead, silver, selenium, and zinc (Ref. 24, Attachment B).

Analytes detected in the on-site soil at levels which meet release criteria specifically associated with the process of electroplating the nuts and bolts are cyanide, cadmium and chromium. Additional analytes detected in the soil on-site associated with the wastewater and sludge resulting from the electroplating process which meet release criteria are silver, selenium, and lead.

Area Hazardous Waste Quantity

Hazardous Constituent Quantity

The information available is not sufficient to evaluate Tier A; therefore, it is not possible to adequately determine a hazardous constituent quantity for Source 1, Contaminated Soils. As a result, the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier B, hazardous wastestream quantity (Ref.1, Sect. 2.4.2.1.2).

Hazardous Wastestream Quantity

The information available is not sufficient to evaluate Tier B; therefore it is not possible to adequately determine a hazardous wastestream quantity for Source 1, Contaminated Soils. As a result, the evaluation of Hazardous Wastestream Quantity proceeds to the evaluation of Tier C, volume (Ref.1, Sect. 2.4.2.1.3).

Volume

The information available is not sufficient to evaluate Tier C; therefore it is not possible to adequately determine a source volume in cubic yards for Source 1, Contaminated Soils. As a result, the evaluation of source volume proceeds to the evaluation of Tier D, source area (Ref.1, Sect. 2.4.2.1.4).

Area

Samples from Source 1, Contaminated Soils, show hazardous substances to be present (See Ref. 4 and Ref. 24). The area of contaminated soils lying between sampling locations that meet the criteria for observed contamination was not determined. This area covers the downgradient portions of the site, and in the drainage pathways leading off-site. The area of observed soil contamination will be assigned an area hazardous quantity value of greater than (>) 0. The value of >0 reflects that the area value is known to be greater than 0, but the exact amount is unknown.

Area of source (ft^2): $A > 0$

Area of area of observed contamination (ft^2): >0
Reference(s): Ref.1, Table 2-5
Area Assigned Value: >0, but unknown

For the soil exposure pathway, if the hazardous constituent quantity is not adequately determined for one or more areas of observed contamination, assign either the value from Table 2-6, or a value of 10, whichever is greater, as the hazardous waste quantity factor value Ref. 2, Section 2.4.2.2.

Therefore, for the soil exposure pathway, because the hazardous constituent quantity is not adequately determined for the area of observed contamination, a value of 10 as the hazardous waste quantity factor value is assigned.

Area of Observed Contamination Hazardous Waste Quantity Value: 10

Summary of Site Contamination

Level I Samples

Listed below are on-site soil samples which have cadmium and chromium levels that meet or exceed the health-based benchmark for cancer risk and are at least three times above the designated background levels. Refer to Reference 2 (SCDM) for benchmarks. For sample locations refer to Figure 2.

Sample No.	Evidence			References
	Hazardous Substance	Concentration (mg/Kg)	Benchmark (mg/Kg)	
SW183143	Cadmium	1860	39	Ref 2, SCDM; and Ref.4
SW183142	Cadmium	1710	39	Ref 2, SCDM; and Ref.4
SW183150	Cadmium	2420	39	Ref 2, SCDM; and Ref.4
	Chromium	520	390	
SW01991	Cadmium	113	39	Ref 2, SCDM; and Ref.24
SW01992	Cadmium	201	39	Ref 2, SCDM; and Ref.24
SW01993	Cadmium	1370	39	Ref 2, SCDM; and Ref.24
SW01994	Cadmium	358	39	Ref 2, SCDM; and Ref.24

Level II Sample

Each of the samples collected on-site contained Level I concentrations of analytes. Samples that had Level I concentrations of analytes with Level II concentrations of other constituents are not being considered in this report.

5.1 RESIDENT POPULATION THREAT

Sample Location ID	Location of Population Relative to Observed Contamination	Level of Contamination
SO-1/SW183150	north side of the metal corrugated building.	Level I
SO-2/SW183143	south side of the metal corrugated building.	Level I
SO-3/SW183142	west side of the metal corrugated building.	Level 1
SO-1/SW01991	between the former plating building and the residence, within the fenced play area	Level I
SO-2/SW01992	southwest and directly behind the former metal plating building approximately 6 ft from the back fence.	Level I
SO-3/SW0199	northwest side of metal corrugated building in the area where plating waste had once been stored	Level I
SO-4/SW0199	(duplicate of SO-3) northwest side of metal corrugated building in the area where plating waste had once been stored	Level I

5.1.1 Likelihood of Exposure

Chemical analysis of surface soil samples collected from the property where Aluminum Finishing Company once operated detected cadmium, chromium, lead, cyanide, selenium, and silver in concentrations meeting observed contamination criteria and in concentrations greater than the corresponding sample quantitation limits. All samples were collected within six inches of the surface, on the property of the resident or worker and were within 200 feet of the house or workplace.

Observed contamination has been detected within 200 feet of a residence; therefore, a Resident Population Threat-Likelihood of Exposure Factor Value of 550 will be assigned (Ref.1, Sec. 5.1.1).

Resident Population Threat Likelihood of
Exposure Factor Category Value: 550

5.1.2 Waste Characteristics

5.1.2.1 Toxicity

Hazardous Substance	Toxicity Factor Value	References
Lead	10,000	Ref. 2
Chromium	10,000	Ref. 2
Cadmium	10,000	Ref. 2
Selenium	100	Ref. 2
Cyanide	100	Ref. 2
Silver	100	Ref. 2

Toxicity Factor Value: 10,000

5.1.2.2 Hazardous Waste Quantity

Area Letter	Area Hazardous Waste Quantity Value	Constituent Quantity Data Complete?
1	>0, but unknown	No

Sum of Values: > 0, but unknown

A value of ten (10) has been assigned as the site hazardous waste quantity factor value. According to the HRS, this value is to be used to reflect that there is a known area of observed soil contamination, but that area is not completely and adequately determined (Ref.1, Sect. 2.4.2.2).

5.1.2.3 Calculation of Waste Characteristics Factor Category Value

(Toxicity Factor Value = 10,000 x Hazardous Waste Quantity Factor Value=10) = 100,000 or 1E+05

Based on this product, a value of 18 is assigned from Reference 1, Table 2-7, Section 2.4.3.1.

Hazardous Waste Quantity Factor Value: 10
Waste Characteristics Factor Category Value: 18

5.1.3 TARGETS

5.1.3.1 Resident Individual

Area Letter: A
Level of Contamination: Level 1

According to the HRS, hazardous constituents that meet the criteria for an observed release and exceed media-specific benchmark values meet the criteria for Level 1 contamination (Ref. 1, Sect. 2.5). Based on results from the TNRCC sampling inspections, Level 1 concentrations of cadmium and chromium have been established on the property and within 200 feet of a residential home and a workplace (refer to Section 5.1 Residential Population Threat).

A value of 50 is assigned to resident individual because there is at least one resident individual subject to Level 1 concentrations (Ref.1, Sect 5.1.3.1).

Resident Individual Factor Value: 50

5.1.3.2 Resident Population

5.1.3.2.1 Level I Concentrations

Area Letter	Resident Address	Resident Individuals	Total
A	6006 Ardmore	5	5

Based on results from the TNRCC sampling investigations, Level 1 concentrations of cadmium and chromium have been established on the property of 6006 Ardmore where Leo Montgomery's business, Riverside Kitchen, Bath and Entertainment, and his family now reside (Ref. 5).

Sum of individuals subject to Level I concentrations: 5

Level 1 concentration factor value = 5 x 10 = 50
(Ref.1, Sect. 5.1.3.2.1).

5.1.3.2.2 Level II Concentrations

The area of contaminated soil has been used to determine resident individuals subject to Level 1 concentrations; that is, resident individuals are already subject to Level 1 concentrations and are excluded from designations as Level II concentrations.

Sum of individuals subject to Level II concentrations: 0

5.1.3.2.3. Calculation of Resident Population Factor Value

The sum of the factor values for Level I concentration (50) and Level II concentration (0) is 50.

Level I Concentrations Factor Value: 50
Level II Concentrations Factor Value: 0

5.1.3.3 Workers

Area Letter	Number of Workers/Business	Reference
A	1/Riverside Kitchen, Bath and Entertainment	Ref. 5

Per Table 5-4 of the HRS, a value of 5 will be assigned as the factor value for workers because the total number of workers does not exceed 100, and is at least 1 (Ref. 1, Sect. 5.1.3.3).

Total workers: 1

5.1.3.4 Resources

Resources as described in Section 5.1.3.4 of the HRS were not identified associated with this site (Ref.1, Sect. 5.1.3.4).

Workers Factor Value: 5
Resources Factor Value: 0

5.1.3.5 Terrestrial Sensitive Environments

Terrestrial sensitive environments, as identified in Table 5-5 of the HRS, were not identified as associated with this site (Ref.1, Table 5-5; and Ref. 35).

Likelihood of exposure factor category value (LE): 550
Waste characteristics factor category value (WC): 18
Terrestrial sensitive environments value (ES): 0
Product (LE x WC x ES): 0
(LE x WC x ES)/82,500: 0

Value of EC: 0

5.1.3.6 Calculation of Resident Population Targets

The sum of values for resident individual (50), resident population (50), workers factor value (5), resources factor value (0), and terrestrial sensitive environmental factor (0), is 105. This sum is the targets factor category value for the resident population threat.

Terrestrial Sensitive Environments Factor Value 0
Resident Population Target Factor Category Value 105

5.2 NEARBY POPULATION THREAT

5.2.1 Likelihood of Exposure

5.2.1.1 Attractiveness/Accessibility

Area Letter	Descriptor(s) for Area	Value
A	accessible, with no public recreation use	10

As per Section 5.2 of the HRS, the nearby population threat component was evaluated excluding any land used for residences (Ref. 1, Sect. 5.2).

Attractiveness/Accessibility Factor Value: 10

5.2.1.2 Area of Contamination

Area Letter	Size of Area of Observed Contamination (sq ft)
A	>0, but unknown

Total Area of Observed Contamination: >0, but unknown

5.2.1.3 Likelihood of Exposure Factor Category

According to Table 5-8 of the HRS, the Nearby Population Threat Likelihood of Exposure Factor Category Value assigned to the area of contamination and attractiveness/accessibility factor is a 5.

Area of Contamination Factor Value: 5
Nearby Population Threat Likelihood of Exposure Factor Category Value: 5

5.2.2 WASTE CHARACTERISTICS

5.2.2.1 Toxicity

Hazardous Substance	Toxicity Factor Value	References
Lead	10,000	Ref. 2
Chromium	10,000	Ref. 2
Cadmium	10,000	Ref. 2
Selenium	100	Ref. 2
Cyanide	100	Ref. 2
Silver	100	Ref. 2

Toxicity Factor Value: 10,000

5.2.2.2 Hazardous Waste Quantity

Area Letter	Area Hazardous Waste Quantity Value	Constituent Quantity Data Complete?
1	>0, but unknown	No

Sum of Values: > 0, but unknown

A value of ten (10) has been assigned as the site hazardous waste quantity factor value. According to the HRS, this value is to be used to reflect that there is a known area of observed soil contamination, but that area is not completely and adequately determined (Ref.1, Sect. 2.3.2.2).

5.2.2.3 Calculation of Waste Characteristics Factor Category Value

(Toxicity Factor Value = 10,000 x Hazardous Waste Quantity Factor Value=10) = 100,000 or 1E+05

Based on this product, a value of 18 is assigned from Reference 1, Table 2-7, Section 2.4.3.1.

Hazardous Waste Quantity Factor Value: 10
Waste Characteristics Factor Category Value: 18

5.2.3 TARGETS

5.2.3.1 Nearby Individual

According to the HRS, if one or more person meets the Section 5.1.3 criteria for a resident individual, assign the nearby individual factor a value of 0 (Ref. 1, 5.2.3.1).

Nearby Individual Factor Value: 0

5.2.3.2 Population Within 1 Mile

Travel Distance Category (miles)	Number of People	Reference	Distance-Weighted Value (Table 5-10)
>0 to 1/4	760	Ref. 36	1.3
>1/4 to ½	1781	Ref. 36	2.0
>½ to 1	7518	Ref. 36	3.3

Sum of Distance-weighted Values: 6.6

Population Within 1 Mile Factor Value: 6.6

5.3 Calculation of Soil Exposure Pathway Score

Resident Population Threat = (Likelihood of Exposure) x (Waste Characteristics) x (Targets)
= (550) x (18) x (105)
= 1,039,500

Nearby Population Threat = (Likelihood of Exposure) x (Waste Characteristics) x (Targets)
= (5) x (18) x (6.6)
= 594

$$\text{Soil Exposure Pathway Score} = \frac{(\text{Resident Population Threat} + \text{Nearby Population Threat})}{82{,}500}$$

$$= \frac{1{,}039{,}500 + 594}{82{,}500}$$

$$= 12.6$$