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HRS DOCUMENTATION RECORD

for

San Angelo Electric Service Company (SESCO)

San Angelo, Texas

No graphics illustrations or copies of documents cited as references in the determination of the HRS score are included with this electronic version, but graphics are available with the print versions as part of the SESCO repository records

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Tom Green County Public Library, Main Branch
113 West Beauregard Avenue,
San Angelo, Texas

and/or

TCEQ Records Management Center
Austin, Texas

December 2005

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Hazard Ranking System Documentation Record

for

San Angelo Electric Service Company (SESCO)
926 Pulliam Street
San Angelo, Tom Green County, Texas
Solid Waste Registration # 30188
EPA Identifier # TXD091271924

Prepared by:

Texas Commission on Environmental Quality
Superfund Site Discovery and Assessment Program
Austin, Texas

April 2004

HRS
Documentation Record

San Angelo Electric Service Company (SESCO)
San Angelo, Tom Green County, Texas
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Site Investigations and Community Relations Section
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Austin, Texas

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HRS DOCUMENTATION RECORD

San Angelo Electric Service Company (SESCO)

San Angelo, Tom Green County, Texas

SIGNATURE PAGE

Melissa Cordell

Melissa Cordell, Project Manager
Texas Commission on Environmental Quality
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4/20/04
Date

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Texas Commission on Environmental Quality
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4/20/04
Date

David L. Davis

David Davis, Assistant Director
Texas Commission on Environmental Quality
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4/29/04
Date

HRS DOCUMENTATION RECORD

Name of Site: San Angelo Electric Service Company

EPA Region: 6 Date Prepared: 4/21/2004

Street Address of Site: 926 Pulliam Street

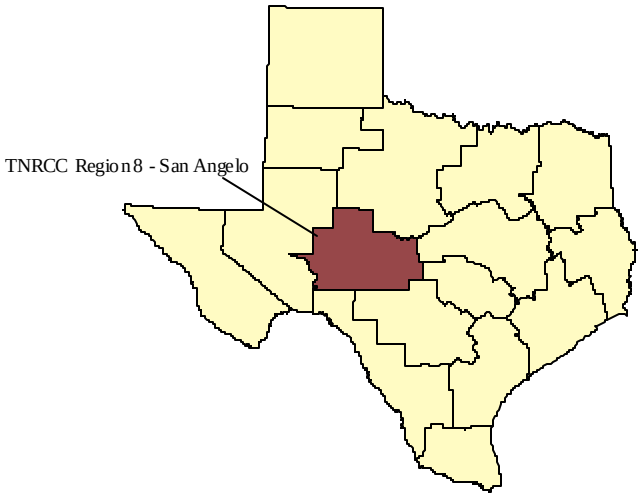
City, County, State: San Angelo, Tom Green, TX

Topographic Map: U.S. Geological Survey 7.5 Minute Topographic Map, San Angelo South Quadrangle, 1957

(Photorevised 1971 and 1978) (Ref. 4)

Latitude: (North)	Longitude: (West)
31º28'15.2"	100º25'19.4

TCEQ Region: 8



Scores	
Air Pathway	0.00
Ground Water Pathway	0.60
Soil Exposure Pathway	25.27
Surface Water Pathway	0.41
HRS SITE SCORE	**12.64**

WORKSHEET FOR COMPUTING HRS SITE SCORE

		S	S^2
1.	Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	0.60	0.36
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	0.07	
2b.	Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	0.00	
2c.	Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	0.41	0.17
3.	Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	25.27	638.57
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	0.00	0.00
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$		639.10
6.	**HRS Site Score** Divide the value on line 5 by 4 and take the square root	12.64	

SITE DESCRIPTION

The San Angelo Electric Service Company (SESCO) was founded in 1932 as a motor magneto and starter repair company. The current operation, located on a three acre facility in northeastern San Angelo, Texas, has been building, repairing and servicing electrical transformers. Polychlorinated biphenyls (PCBs), a hazardous man-made fluid once added to the oil used in transformers, was discovered in the soil and groundwater both on and off the SESCO property. Land use around facility is residential. The San Jacinto Elementary School is across the street (Ref. 5; Ref. 8).

Site History:

In 1986 at the direction of the Texas Water Commission (TWC), a predecessor agency of the TCEQ, SESCO sampled a former plant water supply well located within the facility and determined that the groundwater in the well was contaminated with PCBs. The water well had no surface protection and appeared as a round hole in the concrete floor in the corner of the Untanking and Disassembly building. Wash water and oils washed from the floor were disposed of in this open water well, which was later converted to into monitoring well (MW) MW5 (Ref. 21).

In April 1994, SESCO entered into an Agreed Order with the Texas Natural Resource Conservation Commission (TNRCC), a predecessor agency of the TCEQ, which required SESCO to conduct an investigation and remediation of any contamination originating from their property. The 1994 Order has been the subject of litigation between SESCO and the Office of the Attorney General, on behalf of the TCEQ (Ref. 10).

On September 6, 2002, the 126th Travis County District Court granted the TCEQ a Temporary Injunction that required SESCO to undertake further soil and groundwater investigation at the facility, effective on September 4, 2002. Prior to this litigation, SESCO had conducted some soil and groundwater investigation and remediation activities (Ref. 10).

SESCO filed for Chapter 11 bankruptcy in January 2003 (Ref. 34).

On March 3, 2003 as documented in a March 6, 2003 TCEQ Region 8 Industrial and Hazardous Waste Sampling report, SESCO discharged approximately 400 gallons of transformer oil across their property, along Baze Street, and into the Texas Department of Transportation (TxDOT) storm water collection system which flows into the Concho River. The oil contained PCBs (Ref. 10; Ref. 19).

On March 4, 2003, TCEQ staff provided SESCO with an oral directive to take immediate action to mitigate a recent release of oil from the facility. The oral directive was followed by a written directive on March 5, 2003. Both the oral and written directives instructed SESCO to take immediate action to mitigate the above referenced off-site soil contamination because the conditions at the facility constituted an imminent and substantial endangerment to human health and the environment (Ref. 10).

On March 5, 2003, SESCO discharged 5500 gallons of wastewater and transformer oil into the City of San Angelo Wastewater Treatment Plant causing an upset. The City of San Angelo Wastewater Treatment Plant Superintendent contacted the TCEQ concerning the undetermined amount of oil the wastewater treatment plant (WWTP) received. The Superintendent reported that a thick scum had developed and was continuing to develop on the surface of the aeration basins, a citrus smell and oil smell was noted by the plant personnel, and an oily sheen was on the surface of the treatment units. Mr. Thenappan, former owner of SESCO, and SESCO personnel stated that the wastewater from the oil/water separator tank was discharged directly to the sanitary sewer system and not directed to a second oil/water separator. Samples of the transformer oil which was released to the WWTP were collected at the wastewater tank outlet and the sampling manhole. Analysis indicated a PCB level of 5.10 mg/kg in the oil from the tank. The sample from the manhole indicated below detectable levels of PCBs in the sewage (Ref. 34).

On TCEQ Region 8 staff met with Mr. Thenappan and verbally demanded SESCO to immediately cease and desist all activities associated with all off-site soil contamination originating from the discharge. Mr. Thenappan was informed that the TCEQ would contact their emergency response contractor to respond and address the contamination (Ref. 34).

From March 4-6, 2003, the TCEQ's Emergency Response (ER) Team was called in to begin cleaning up the PCB-contaminated oil from the street and storm sewer. While cleaning up the PCB oils, the TCEQ emergency response contractor also dealt with the contaminated soil along the public areas outside the SESCO fence line. Sampling began off-site for residents, the San Jacinto Elementary School, TxDOT right-of-way on Pulliam Street, the Pope and Tarver Street outfall, and the City right-of-way on Baze Street (Ref. 14).

On March 6, 2003, samples of the ravine were collected to determine extent of contamination from the unauthorized discharge at SESCO. Nine soil samples were collected at various locations in the ravine. Sample analysis indicated PCBs in all soil samples along the ravine (i.e., 0.249 mg/kg, 0.180 mg/kg, 0.130 mg/kg, 0.134 mg/kg, 0.194 mg/kg, 0.242 mg/kg, 0.132 mg/kg, 0.164 mg/kg, and 0.303 mg/kg). One water sample was collected at the junction of the ravine and the Concho River. Analyses indicated PCBs were below the detection limit in the water sample (Ref. 14).

On March 7, 2003, SESCO personnel conveyed to TCEQ that the amount of transformer oil discharged to Baze Street was around 400 gallons versus the original 100-200 gallons originally reported. SESCO personnel noted that MW1 recovered approximately 5-10 gallons of oil since operations began (Ref. 35). There was an unauthorized discharge of transformer oils through cracks in secondary containment. The TCEQ ER Strike Team members mobilized to the facility (Ref. 19).

On March 8, 2003, the TCEQ continued excavation activities along Upton and Baze Streets. An abandoned 18 inch clay pipe storm drain was located on Baze Street approximately 25 feet north of SESCO's north entrance on Baze Street. One end of the pipe ended in the City of San Angelo right-of-way on Baze Street, where bricks had been piled in front of the open end. The pipe runs west from the right-of-way to an unknown point on SESCO property. The emergency response contractor removed the pipe flush with SESCO's east fence and covered the end of the pipe with plastic. The decision based on sample results was made to excavate the soils at the point where the pipe had ended in the Baze Street right-of-way to a depth of five feet (Ref. 45).

On March 10, 2003, the TCEQ ER Strike Team arrived and conducted sampling at the school and the SESCO east yard runoff. At each sample location two samples were collected (i.e., a surface sample and a six inch deep sample) at the soccer field and the east yard. Soil samples were obtained from thirteen different locations on and near the soccer field. Therefore, a total twenty-six samples were collected on or near the soccer field. The SESCO east yard fence line and drainage was sampled. A total of twelve different sample locations were collected at the fence, in the TxDOT railroad culvert, and adjacent to the rail line on the east side in the drainage. A total of twenty-four samples were collected on or near the SESCO east yard fence line. The PCB concentrations detected in the surface samples ranged from 3.24 to 318.0 mg/kg. The PCB concentrations detected in the samples collected at six inches deep ranged from 5.07 to 246.0 mg/kg (Ref. 14).

From March 11-13, 2003, the TCEQ conducted a walking water well survey and a distribution line sampling event a quarter mile outside of the SESCO facility. A total of 145 residents were surveyed. If the resident was not home, a flyer was placed on the door by TCEQ staff. Fifteen wells were found during the survey. Three additional wells were located after residents notified the TCEQ Region 8 office. Of the fifteen wells, six were sampled for benzene, toluene, ethyl benzene, and toluene (BTEX) and PCBs. The remaining nine were dry or had equipment located in the well and therefore not sampled. The City of San Angelo water distribution system was also sampled in order to determine if any PCB contamination has infiltrated the distribution system. A total of six sample locations were sampled throughout the quarter mile area. The wells were geographically located to get a wide distribution throughout the survey area. The sample locations were analyzed for total chlorine, PCBs, and BTEX. The water well and distribution line sample results were below detectable limits for PCBs and BTEX (Ref. 14).

During March 17-18, 2003, the TCEQ identified and confirmed that SESCO had an unauthorized discharge from leaking Batch Tanks 1-8 (Ref. 19; Ref. 29).

On March 18, 2003, the Office of the Attorney General and SESCO entered into an Agreed Temporary Injunction which superceded the September 4, 2002 Temporary Injunction. Due to previous inadequate response actions on the part of SESCO that compounded the contamination problems in the area, the Agreed Temporary Injunction in State Court ordered SESCO to immediately cease all soil investigation and remediation activities. The Agreed Temporary Injunction required SESCO to allow the State access to the facility to identify potential sources of the groundwater

contamination and to allow temporary storage of contaminated materials from the State's response actions at the facility. The Temporary Injunction required SESCO to post signs in Spanish and English to provide public notice in instances where potential exposure to contamination in areas accessible to the public may occur, and required SESCO to notify adjacent land owners of the availability of sample results and of actual or probable exposure to contamination, in accordance with the requirements of the Texas Risk Reduction Program rule. The Temporary Injunction also required SESCO to allow the State to remove and dispose of wastes and oils at the facility to allow leak-testing of tanks, lines, sumps, and other parts of SESCO's systems at the facility, and required SESCO to allow the State to operate, modify, or improve the groundwater recovery system. The April 12, 1994 Agreed Order remained in effect (Ref. 46).

On March 20, 2003, the TCEQ notified SESCO to move all transformers along the east yard fence line so a containment berm could be constructed. All leaking transformers were not to be moved (Ref. 20).

On March 24, 2003, a TCEQ investigator observed an open leaking transformer on the SESCO property. The surrounding soils were stained and had killed the vegetation growth. The transformer was labeled as junk yet contained transformer oil. A stick in the container was used to verify the presence of transformer oil (Ref. 20).

On March 27, 2003, TCEQ noticed that the leaking transformer, identified on March 24, 2003, had been moved. The new location of the leaking transformer had stained soil. In the process of moving the transformer, oils were spilled on the ground and stained the soil (Ref. 20). Two separate holes were detected during the removal of sludges from the oil plant sump (Ref. 19).

On March 28, 2003, a previously unidentified landfill was located in the east yard, and well MW8 tank was discovered to have had an overflow of transformer oil (Ref. 19).

On April 1, 2003, state contractors began removing sludges from the oil plant tanks and continued the evacuation of line for the preparation of tightness tests. The horizontal tanks, H1 and H2, appeared to be leaking (Ref. 19).

On April 2, 2003, SESCO had an unauthorized discharge of sand blasting waste to the environment during normal operation (Ref. 18).

On April 3, 2003, TCEQ began discharge of approximately 7000 gallons of wastewater to city sewer with prior approval. All piping was turned off to the horizontal due to dropping of fluid levels (Ref. 19).

On April 4, 2003, TCEQ commenced the excavation of 2000 cubic yards of on-site soil. These soils required removal to abate human exposure and migration. The TCEQ completed discharging wastewater to the city, evacuated the horizontal tanks, and filled a tote for SESCO with the transformer oil from H1 (Ref. 19).

On April 7, 2003, the removal was completed for the excavated soils, sludges, and drill cuttings from the facility. The excavated areas were backfilled with clean soil. The removal of the waste transformer oil from the onsite TCEQ dual compartment tank was initiated. The tops were placed on BT1-8. Sludges were removed from V5 and V6 and the oil and sludges were evacuated from V1-V4. The lines associated with H1 and H2 were evacuated (Ref. 19).

On April 8, 2003, the remaining waste transformer oils from the TCEQ dual compartment tanks were evacuated and cleaned. Attempts were made to evacuate all waste liquids associated with the sump holes. Tightness tests were applied to oil lines which failed to hold. The TCEQ completed the containment berm to prevent surface runoff at SESCO's property east of Baze Street (Ref. 19).

During the week of April 14-19, 2003, the TCEQ performed air monitoring activities at the facility to evaluate possible wind blown hazardous substances (Ref. 19).

From April 21 - 26, 2003, a fence was constructed around the alley between SESCO and Browning Street and warning signs were placed on the TxDOT railroad right-of-way on the east side of the facility. The oils and sludges from the frac tank were removed (Ref. 19). The TCEQ removed accumulated rainwater from the secondary containment systems.

During April 28 - May 3, 2003, the TCEQ performed the following activities: (1) installed wells MW26-MW30, (2) plugged wells MW2, MW3, MW6, and MW9, (3) reviewed operating records for the facility with EPA, (4) gauged wells with the interface probe, and (5) sampled phase separated hydrocarbons (PSH) in wells MW28, MW29, and MW30 (Ref. 36).

During the week of May 5 - 10, 2003, the TCEQ installed monitoring wells MW31, MW32, and MW33 and plugged the 150 foot well identified as MW5 (Ref. 36).

During May - August 2003, the EPA conducted additional soil sampling on and off site, sampling and inventory of transformers on-site, and dye testing of facility pipelines (Ref. 5).

On June 3, 2003, a Rule 11 Agreement was signed stating that the Assistant Attorney General agreed that SESCO may pump rainwater to tank V-4 where the material may phase separate; the wastewater may be disposed of consistent with the permit SESCO has with the City of San Angelo (Ref. 45).

On June 13, 2003, the TCEQ via a letter requested SESCO to conduct remediation of off-site affected properties located adjacent to SESCO (Ref. 46). SESCO did not respond.

On August 29, 2003, SESCO voluntarily filed for Chapter 7 bankruptcy.

On October 6-8, 2003, Superfund Site Discovery and Assessment Program (SSDAP) personnel and their contractors conducted the pre-inspections, alley trimming, and assessment sampling prior to soil removal actions. Assessment samples were collected at 418 N. Browning Street, 421 N. Browning, San Angelo Independent School District (SAISD) soccer field at 800 Spaulding, along the City of San Angelo right-of-ways (1) on the south side of Upton Street between N. Browning and Baze; (2) on the north side of Upton Street between the Texas Pacifico Railroad and N. Baze; (3) between Texas Pacifico Railroad and Pulliam Draw; and (4) east and west sides of Baze between the southern grids sampled at the soccer field and Pulliam Street (Ref. 6). The contractors also videotaped the residences and performed a 6-point elevation survey at the residences (Ref. 7).

From October - November, 2003, over 1300 letters were sent out to companies and individuals as the initial stage of the Potentially Responsible Party (PRP) search. In these letters, the TCEQ requested information on any involvement between the receiver of the letter and SESCO and notified these parties of needed clean-up activities.

In November 2003, SSDAP mobilized to conduct the off-site soil removals at the residences, alley, and the soccer field (Ref. 9). Under the 40 CFR 761.61, the cleanup level for bulk PCB remediation waste in high occupancy areas is <=1.0 mg/kg (Ref. 49).

On November 11, 2003, the excavation of contaminated soil of the alley and 418 N. Browning property began. The excavation at 416 N. Browning backyard was completed on November 14, 2003. Restoration at the residences was completed on November 19, 2003. Alley restoration completed on November 20, 2003 (Ref. 9).

On December 2, 2003, excavation at the soccer field began. Removal of contaminated soil concluded on December 10, 2003. On December 18, 2003, backfilling and restoration of the soccer field and right of ways was completed (Ref. 9).

On January 5, 2004, the state contractor conducted the post-inspections at the residences, researched deed information for the alley, and surveyed in the alley (Ref. 7).

On January 6-7, 2004, SAISD and City of San Angelo Parks Department signed the soccer field post-inspection checklist to finalize the removal activity (Ref. 9).

On January 16, 2004, over 700 boxes of SESCO records were transported off-site under the supervision of the Office of Attorney General.

On February 1, 2004, TCEQ SSDAP officially began operation of the SESCO ground water recovery system (Ref. 21).

LEGEND

- SITE LOCATION
- MAJOR ROADS
- RAILROAD

N

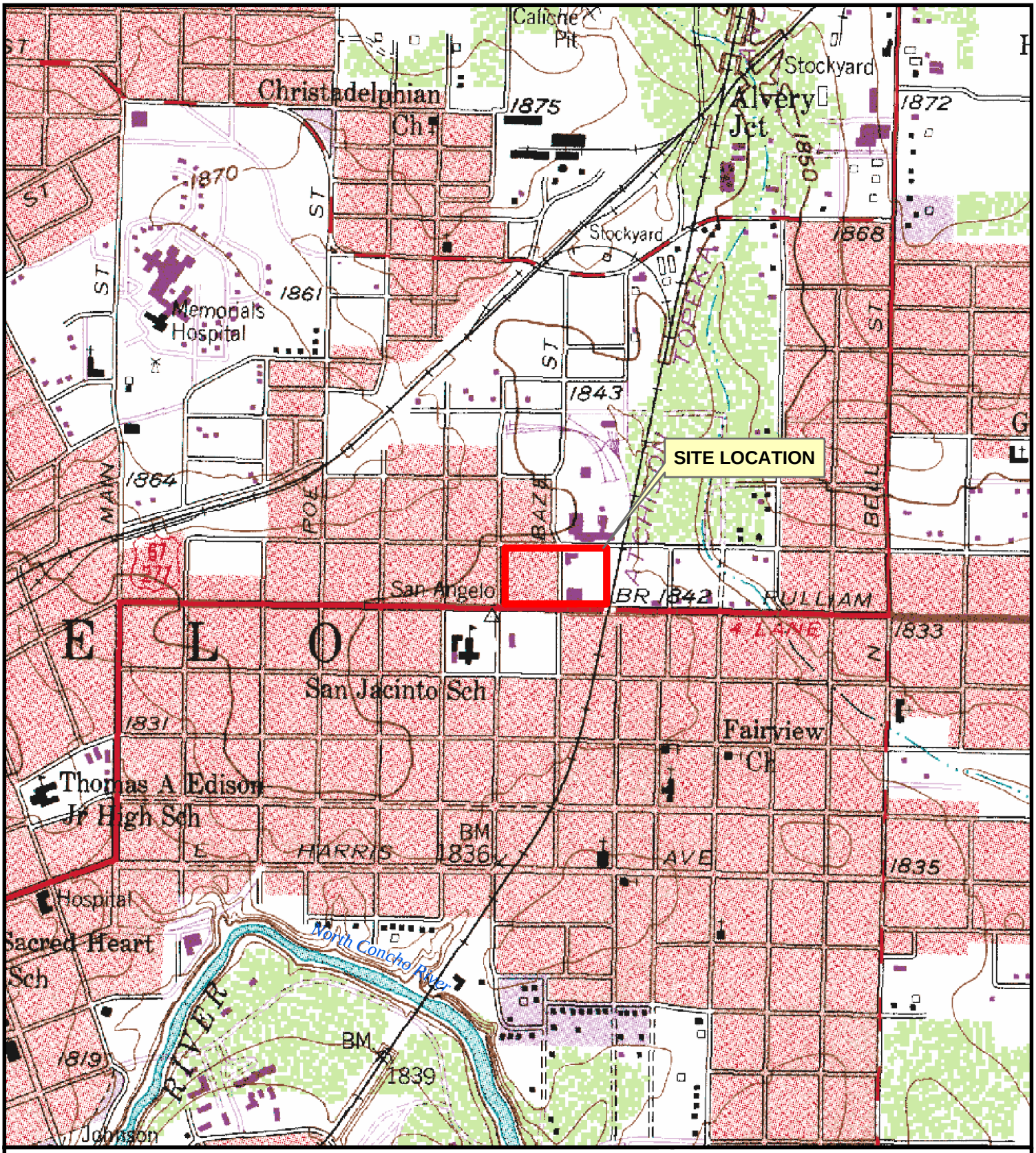
FIGURE 1
SITE LOCATION MAP
SAN ANGELO ELECTRIC
SERVICE COMPANY
(SESCO)
SAN ANGELO,
TOM GREEN COUNTY, TEXAS

DATE	PROJECT NO	SCALE
AUG 2003	12632.001.040.0373.01	1" = 0.8 MI

TDD: 06-03-04-0006
NRC: 640057

SOURCE: BASEMAP PROVIDED BY MICROSOFT
MAPPOINT 2002 AND GEOGRAPHIC DATA TECHNOLOGY, INC

Prepared by Weston Solutions, Inc. File: \\shou02\DATA\12632_Start2_R6\SESCO\GIS\SITE_LOCATION_MAP.mxd, 28-Aug-03 11:09, chapmanb



0 500 1,000 2,000 Feet

LEGEND

SITE LOCATION

N

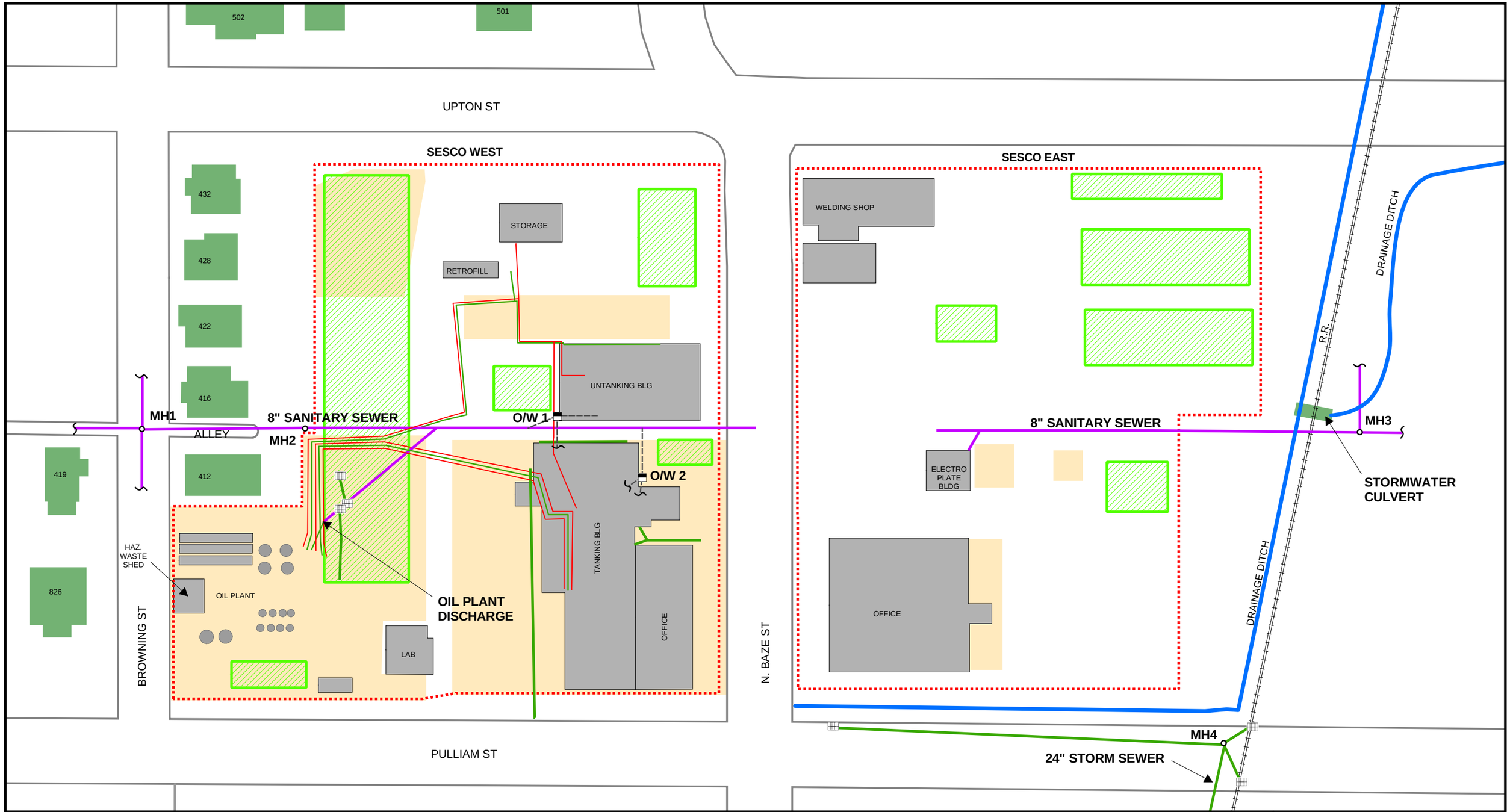
FIGURE 2a
SITE AREA MAP
SAN ANGELO ELECTRIC
SERVICE COMPANY
(SESCO)
SAN ANGELO,
TOM GREEN COUNTY, TEXAS

DATE	PROJECT NO	SCALE
AUG 2003	12632.001.040.0373.01	AS SHOWN

TDD: 06-03-04-0006
NRC: 640057

SOURCE: USGS 7.5 MIN TOPOGRAPHIC QUADRANGLE SAN ANGELO SOUTH, TEXAS - 1992

Prepared by Weston Solutions, Inc. File: \\fshou02\DATA\12632_Start2_R6\SESCO\GIS\SITE_AREA_MAP.mxd, 28-Aug-03 11:10, chapmanb



LEGEND

- SITE BOUNDARY
- ROADS
- CONCRETE COVERED
- 416 RESIDENCES WITH STREET NUMBER
- ABOVE-GROUND STORAGE UNITS
- SESCO BUILDINGS
- TRANSFORMER STORAGE
- STORM DRAIN
- O/W SEPARATOR
- MANHOLE
- >1 PPM OIL
- < 1PPM OIL
- O/W INFLUENT/DISCHARGE
- SANITARY SEWER
- STORMWATER SEWER

0 35 70 140 Feet

N

NOTE:
UTILITIES ARE SHOWN IN APPROPIATE LOCATIONS AND ARE NOT DRAWN TO SCALE.
DOMESTIC SANITARY FACILITIES WERE NOT LOCATED AND ARE NOT SHOWN.

SOURCE: BASE DATA WAS DERIVED FROM 1996 AERIAL IMAGERY PROVIDED BY TOM GREEN COUNTY CENTRAL APPRIASAL DISTRICT.

TDD: 06-03-04-0006
NRC: 640057

FIGURE 2b
SITE UTILITY MAP
SAN ANGELO ELECTRIC SERVICE COMPANY (SESCO)
SAN ANGELO,
TOM GREEN COUNTY, TEXAS

DATE	PROJECT NO	SCALE
AUG 2003	12632.001.040.0373.01	AS SHOWN

Prepared by Weston Solutions, Inc. File: \\fshou02\DATA\12632_Start2_R6\SESCO\GIS\SITE_UTILITY_MAP.mxd, 28-Aug-03 12:38, chapmanb

REFERENCES

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TABLE 3-1 --GROUND WATER MIGRATION PATHWAY SCORESHEET

Factor categories and factors	Maximum Value	Value Assigned	
Aquifer Evaluated: Leona Formation			
Likelihood of Release to an Aquifer:			
1. Observed Release	550	550.00	
2. Potential to Release:			
2a. Containment	10	0.00	
2b. Net Precipitation	10	0.00	
2c. Depth to Aquifer	5	0.00	
2d. Travel Time	35	0.00	
2e. Potential to Release [lines 2a(2b + 2c + 2d)]	500	0.00	
3. Likelihood of Release (higher of lines 1 and 2e)	550		550.00
Waste Characteristics:			
4. Toxicity/Mobility	(a)	10,000.00	
5. Hazardous Waste Quantity	(a)	10.00	
6. Waste Characteristics	100		18.00
Targets:			
7. Nearest Well	(b)	0.00	
8. Population:			
8a. Level I Concentrations	(b)	0.00	
8b. Level II Concentrations	(b)	0.00	
8c. Potential Conamination	(b)	0.00	
8d. Population (lines 8a + 8b + 8c)	(b)	0.00	
9. Resources	5	5.00	
10. Wellhead Protection Area	20	0.00	
11. Targets (lines 7 + 8d + 9 + 10)	(b)		5.00
Ground Water Migration Score for an Aquifer:			
12. Aquifer Score [(lines 3 x 6 x 11)/82,5000][c]	100		0.60
Ground Water Migration Pathway Score:			
13. Pathway Score (S_{gw}), (highest value from line 12 for all aquifers evaluated)[c]	100		0.60

[a] Maximum value applies to waste characteristics category
[b] Maximum value not applicable
[c] Do not round to nearest integer

TABLE 3-1 --GROUND WATER MIGRATION PATHWAY SCORESHEET

Factor categories and factors	Maximum Value	Value Assigned	
Aquifer Evaluated: Choza Formation			
Likelihood of Release to an Aquifer:			
1. Observed Release	550	550.00	
2. Potential to Release:			
2a. Containment	10	0.00	
2b. Net Precipitation	10	0.00	
2c. Depth to Aquifer	5	0.00	
2d. Travel Time	35	0.00	
2e. Potential to Release [lines 2a(2b + 2c + 2d)]	500	0.00	
3. Likelihood of Release (higher of lines 1 and 2e)	550		550.00
Waste Characteristics:			
4. Toxicity/Mobility	(a)	10,000.00	
5. Hazardous Waste Quantity	(a)	10.00	
6. Waste Characteristics	100		18.00
Targets:			
7. Nearest Well	(b)	0.00	
8. Population:			
8a. Level I Concentrations	(b)	0.00	
8b. Level II Concentrations	(b)	0.00	
8c. Potential Conamination	(b)	0.00	
8d. Population (lines 8a + 8b + 8c)	(b)	0.00	
9. Resources	5	5.00	
10. Wellhead Protection Area	20	0.00	
11. Targets (lines 7 + 8d + 9 + 10)	(b)		5.00
Ground Water Migration Score for an Aquifer:			
12. Aquifer Score [(lines 3 x 6 x 11)/82,5000][c]	100		0.60
Ground Water Migration Pathway Score:			
13. Pathway Score (S_{gw}), (highest value from line 12 for all aquifers evaluated)[c]	100		0.60

[a] Maximum value applies to waste characteristics category
[b] Maximum value not applicable
[c] Do not round to nearest integer

TABLE 4-1 --SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET

Factor categories and factors	Maximum Value	Value Assigned	
Watershed Evaluated: Baze to North Concho River			
Drinking Water Threat			
Likelihood of Release:			
1. Observed Release	550	0.00	
2. Potential to Release by Overland Flow:			
2a. Containment	10	10.00	
2b. Runoff	25	25.00	
2c. Distance to Surface Water	25	6.00	
2d. Potential to Release by Overland Flow [lines 2a(2b + 2c)]	500	310.00	
3.Potential to Release by Flood:			
3a. Containment (Flood)	10	0.00	
3b. Flood Frequency	50	0.00	
3c. Potential to Release by Flood (lines 3a x 3b)	500	0.00	
4. Potential to Release (lines 2d + 3c, subject to a maximum of 500)	500	310.00	
5. Likelihood of Release (higher of lines 1 and 4)	550		310.00
Waste Characteristics:			
6. Toxicity/Persistence	(a)	10,000.00	
7. Hazardous Waste Quantity	(a)	10.00	
8. Waste Characteristics	100		18.00
Targets:			
9. Nearest Intake	50	0.00	
10. Population:			
10a. Level I Concentrations	(b)	0.00	
10b. Level II Concentrations	(b)	0.00	
10c. Potential Contamination	(b)	0.00	
10d. Population (lines 10a + 10b + 10c)	(b)	0.00	
11. Resources	5	5.00	
12. Targets (lines 9 + 10d + 11)	(b)		5.00
Drinking Water Threat Score:			
13. Drinking Water Threat Score [(lines 5x8x12)/82,500, subject to a max of 100]	100		0.34
Human Food Chain Threat			
Likelihood of Release:			
14. Likelihood of Release (same value as line 5)	550		310.00
Waste Characteristics:			
15. Toxicity/Persistence/Bioaccumulation	(a)	5.00E+8	
16. Hazardous Waste Quantity	(a)	10.00	
17. Waste Characteristics	1000		180.00
Targets:			
18. Food Chain Individual	50	0.00	
19. Population			
19a. Level I Concentration	(b)	0.00	
19b. Level II Concentration	(b)	0.00	
19c. Potential Human Food Chain Contamination	(b)	6.00E-5	
19d. Population (lines 19a + 19b + 19c)	(b)	6.00E-5	
20. Targets (lines 18 + 19d)	(b)		6.00E-5
Human Food Chain Threat Score:			
21. Human Food Chain Threat Score [(lines 14x17x20)/82500, subject to max of 100]	100		3.64E-5

Environmental Threat			
Likelihood of Release:			
22. Likelihood of Release (same value as line 5)	550		310.00
Waste Characteristics:			
23. Ecosystem Toxicity/Persistence/Bioaccumulation	(a)	5.00E+8	
24. Hazardous Waste Quantity	(a)	10.00	
25. Waste Characteristics	1000		180.00
Targets:			
26. Sensitive Environments			
26a. Level I Concentrations	(b)	0.00	
26b. Level II Concentrations	(b)	0.00	
26c. Potential Contamination	(b)	0.10	
26d. Sensitive Environments (lines 26a + 26b + 26c)	(b)	0.10	
27. Targets (value from line 26d)	(b)		0.10
Environmental Threat Score:			
28. Environmental Threat Score [(lines 22x25x27)/82,500 subject to a max of 60]	60		0.07
Surface Water Overland/Flood Migration Component Score for a Watershed			
29. Watershed Score[c] (lines 13+21+28, subject to a max of 100}	100		0.41
Surface Water Overland/Flood Migration Component Score			
30. Component Score (S_{sw})[c] (highest score from line 29 for all watersheds evaluated)	100		0.41

[a] Maximum value applies to waste characteristics category
[b] Maximum value not applicable
[c] Do not round to nearest integer

TABLE 5-1 --SOIL EXPOSURE PATHWAY SCORESHEET

Factor categories and factors	Maximum Value	Value Assigned	
Likelihood of Exposure:			
1. Likelihood of Exposure	550		550.00
Waste Characteristics:			
2. Toxicity	(a)	10,000.00	
3. Hazardous Waste Quantity	(a)	10.00	
4. Waste Characteristics	100		18.00
Targets:			
5. Resident Individual	50	50.00	
6. Resident Population:			
6a. Level I Concentrations	(b)	155.60	
6b. Level II Concentrations	(b)	0.00	
6c. Population (lines 6a + 6b)	(b)	155.60	
7. Workers	15	5.00	
8. Resources	5	0.00	
9. Terrestrial Sensitive Environments	(c)	0.00	
10. Targets (lines 5 + 6c + 7 + 8 + 9)	(b)		210.60
Resident Population Threat Score			
11. Resident Population Threat Score (lines 1 x 4 x 10)	(b)		2,084,940.00
Nearby Population Threat			
Likelihood of Exposure:			
12. Attractiveness/Accessibility	100	75.00	
13. Area of Contamination	100	0.00	
14. Likelihood of Exposure	500		0.00
Waste Characteristics:			
15. Toxicity	(a)	10,000.00	
16. Hazardous Waste Quantity	(a)	10.00	
17. Waste Characteristics	100		18.00
Targets:			
18. Nearby Individual	1	0.00	
19. Population Within 1 Mile	(b)	0.00	
20. Targets (lines 18 + 19)	(b)		0.00
Nearby Population Threat Score			
21. Nearby Population Threat (lines 14 x 17 x 20)	(b)		0.00
Soil Exposure Pathway Score:			
22. Pathway Score[d] (S_s), [lines (11+21)/82,500, subject to max of 100]	100		25.27

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

2.2 SOURCE CHARACTERIZATION

2.2.1 SOURCE IDENTIFICATION

Name of source: Contaminated Soil (Residential) Number of source: 1

Source Type: Contaminated Soil

Description and Location of Source (with reference to a map of the site):
From March 11-13, 2003, the TCEQ ER collected soil samples at off-site residential properties along N. Browning Street. The soil samples at 416, 418, 422, 428, and 432 N. Browning residences showed detections of PCBs. The surface samples at 422 N. Browning ranged from 0.256 and 0.760 mg/kg PCBs. Two soil samples collected at six inches deep had 0.220 and 0.430 mg/kg PCBs (Ref. 8; Ref. 14). The PCBs concentration in the surface soil samples at 428 N. Browning was 0.219 mg/kg and 0.529 mg/kg at a six inch depth (Ref. 8). The surface samples at 432 N. Browning ranged from 0.279 to 0.528 mg/kg PCBs. One soil sample collected at six inches deep had 0.609 mg/kg PCBs. Another soil sample collected in a different location at six inches deep did not have detections of PCBs (Ref. 8; Ref. 14).

The alley, a 20' by 100' strip of land, lies to the west of the SESCO property. This land extends from the SESCO west gate to Browning Street (Ref. 7) (Figure 3a). PCB concentrations detected in surface soil samples collected from the alley were 3.25 to 167 mg/kg. At six inches deep the concentrations were 5.76 and 9.15 mg/kg. The PCB detection in the soil sample collected at 18 inches deep was 5.00 mg/kg (Ref. 8).

In April 2003, a fence was constructed around the alley between SESCO and N. Browning Street and between 416 and 418 N. Browning and warning signs were placed on the gate (Ref. 19).

During May - August 2003, the EPA has conducted additional soil sampling in the residential and alley area. Screening samples at locations 1036, 1035 and 1038 further indicated the presence of PCBs (Ref. 5).

This source is located on the east side of Browning street adjacent to the SESCO western fence line and bounded by Upton Street to the north and the alley to the south and consists of 418, 422, 428, and 432 N. Browning residences (Figure 3a).

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- TCEQ Assessment Sampling Locations
- TCEQ Emergency Response Sampling Locations
- EPA Sampling Locations

Source: Base data was derived from 1996 aerial imagery provided by the Tom Green County Central Appraisal District.

EPA and TCEQ sample location information can be found in References 5, 6, and 8 of the State Superfund Hazard Ranking System Documentation.

7 0 7 14 Feet

N

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Figure 3a. Source 1: Contaminated Soil/AOC A

2.2.2 HAZARDOUS SUBSTANCES ASSOCIATED WITH THE SOURCE

- Background Concentrations [*if necessary*]:

Sample ID	Sample Type	Date	Hazardous Substance	Hazardous Substance Concentration	Sample Quantitation Limit	Reference
Background (421 N. Browning)	Sample	10/8/2003	PCBs	U ug/kg	100.00	Ref. 6

- Source Samples:

Sample ID	Sample Type	Date	Hazardous Substance	Hazardous Substance Concentration	Sample Quantitation Limit	Reference
Release (416 N. Browning)	Sample	3/4/2003	PCBs	4,930.00 ug/kg	2,200.00	Ref. 8
Release (418 N. Browning)	Sample	10/8/2003	Polychlorinated biphenyls (PCBs)	500.00 ug/kg	150.00	Ref. 6
Release (Alley)	Sample	3/13/2003	Polychlorinated biphenyls (PCBs)	167,000.00 ug/kg	38,000.00	Ref. 8

2.2.3 HAZARDOUS SUBSTANCES AVAILABLE TO A PATHWAY

Containment Description	Containment Factor Value	Ref.
Gas release to air: -	-	
Particulate release to air: -	-	
Release to ground water: Evidence of hazardous substance migration from source area (i.e., source area includes source and any associated containment structures).	10	Ref. 8
Release via overland migration and/or flood: Evidence of hazardous substance migration from source area (i.e., source area includes source and any associated containment structures).	10	Ref. 8

Notes: NS Not Scored

2.2.4 HAZARDOUS WASTE QUANTITY

2.2.4.1.1. Hazardous Constituent Quantity

Hazardous Substance	Constituent Quantity	(Units)	References
None			

Sum (pounds): 0.00

Hazardous Constituent Quantity Assigned Value: 0.00

2.2.4.1.2. Hazardous Wastestream Quantity

Hazardous Wastestream	Wastestream Quantity	(Units)	References
None			

Sum (pounds): 0.00
Sum of Wastestream Quantity/5,000 (Table 2-5): 0.00

Hazardous Wastestream Quantity Assigned Value: 0.00

2.2.4.1.3. Volume

Source Type	Volume	Units	References
None			

Sum (yd^3/gal): 0.00
Equation for Assigning Value (Table 2-5): V/2,500

Volume Assigned Value: 0.00

2.2.4.1.4. Area

Description

The total area lying between sampling locations that meet the criteria for observed contamination was determined to be 7,124.43 square feet (Figure 3a). The base map was derived from 1996 aerial imagery provided by the Tom Green County Central Appraisal District. Outermost soil sample locations from Reference 5, 6, 8, 14, and 50 meeting the criteria for observed contamination were connected by lines, and the outlined area was calculated by using ESRI ArcView GIS 3.2a software.

Areas covered by buildings and/or maintained, impenetrable materials (such as paved areas), normally deducted from the calculation of total area, were not excluded from the area calculations because they could not be adequately delineated and/or identified. Therefore, the area of observed soil contamination will be assigned an area hazardous waste 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.

Source Type	Area	Units	References
None	>0		Ref. 5; Ref. 6; Ref. 8

Sum (ft^2): 0.00
Equation for Assigning Value (Table 2-5): A/34,000

Area Assigned Value: 0>, but unknown

2.2.4.1.5. Source Hazardous Waste Quantity Value

Highest assigned value assigned from Table 2-5: 0.00

2.2.1 SOURCE IDENTIFICATION

Name of source: Contaminated Soil Number of source: 2

Source Type: Contaminated Soil

Description and Location of Source (with reference to a map of the site):
On March 10, 2003, the TCEQ ER Strike Team arrived and conducted sampling at the San Angelo Independent School District activity field is located at 800 Spaulding, San Angelo, Texas (Figure 3c). At each sample location two samples were collected (i.e., a surface sample and a six inch deep sample) at the soccer field. Soil samples were obtained from thirteen different locations on and near the soccer field. Therefore, a total twenty-six samples were collected on or near the soccer field (Ref. 14).

Additional sample locations were collected by the TCEQ on March 31, 2003. Samples collected were from locations of barren of grass and in areas frequented by children. Fifteen sample locations were identified. At each location two samples were collected (i.e., surface and six inches deep) (Ref. 50).

Soil samples collected during the TCEQ October 2003 Assessment at the Pulliam Right of Way (ROW) (north of SAISD soccer field) and the Baze Street ROW (east of Baze, south of Pulliam) (Ref. 6). Surface soil samples 2018, 2019, 2020, 2021, and 2022 in the Pulliam ROW had detection of PCBs ranging from 0.32 mg/kg to 2.1 mg/kg. In the 12-inch deep soil samples, PCBs were detected from 0.25 to 1.1mg/kg. Surface soil sample 2027 was collected in the Baze ROW. PCBs were detected at 1.3 mg/kg (Ref. 6).

2.2.2 HAZARDOUS SUBSTANCES ASSOCIATED WITH THE SOURCE

- Background Concentrations [*if necessary*]:

Sample ID	Sample Type	Date	Hazardous Substance	Hazardous Substance Concentration	Sample Quantitation Limit	Reference
Background (Baze ROW)	Sample	10/7/2003	Polychlorinated biphenyls (PCBs)	U ug/kg	88.00	Ref. 6
Background (Soccer field)	Sample	3/31/2003	Polychlorinated biphenyls (PCBs)	U mg/kg	0.20	Ref. 50

- Source Samples:

Sample ID	Sample Type	Date	Hazardous Substance	Hazardous Substance Concentration	Sample Quantitation Limit	Reference
Release (Baze ROW)	Sample	10/7/2003	Polychlorinated biphenyls (PCBs)	4,000.00 ug/kg	92.00	Ref. 6
Release (Soccer field)	Sample	3/10/2003	Polychlorinated biphenyls (PCBs)	1,510.00 ug/kg	710.00	Ref. 14

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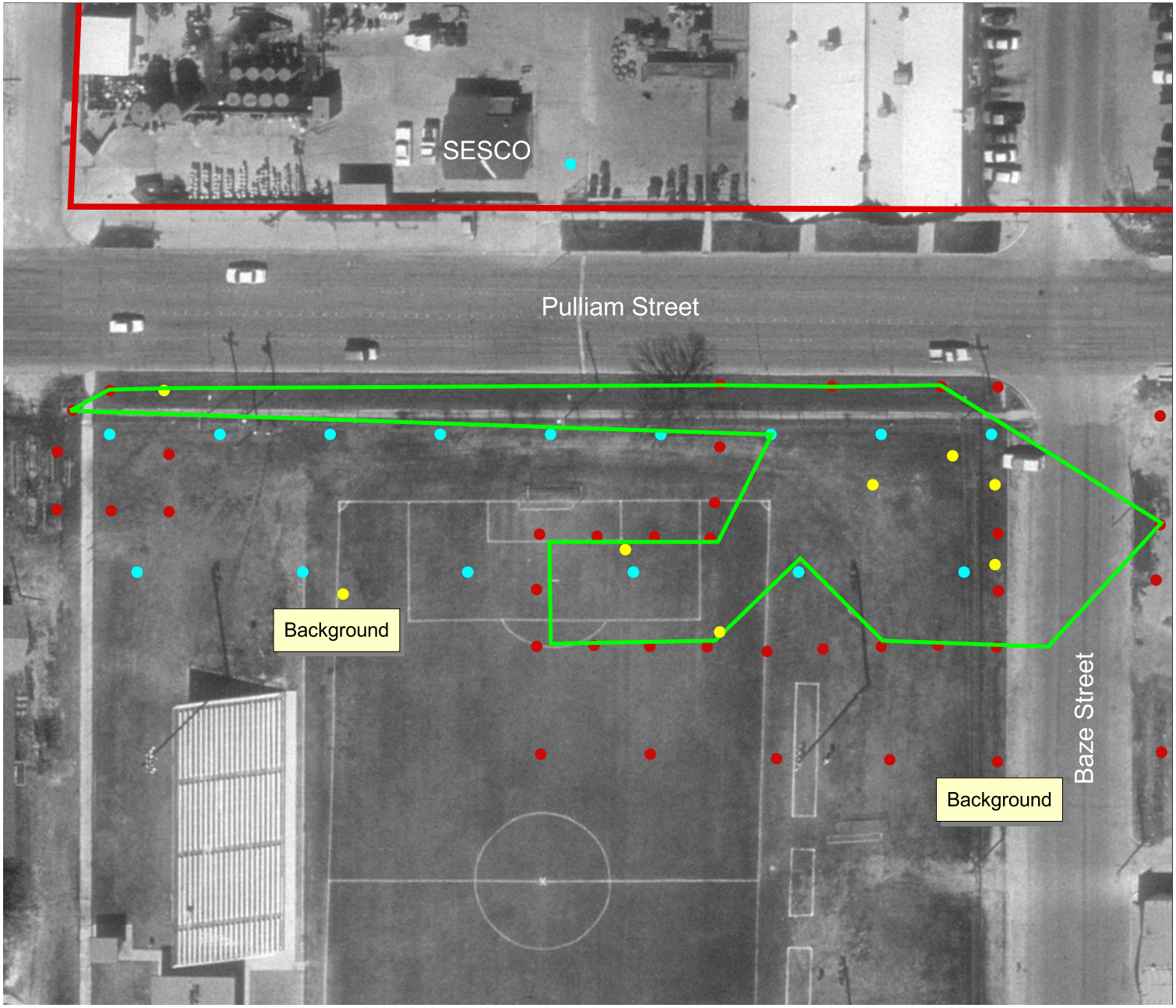

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- TCEQ Assessment Sampling Locations
- TCEQ Emergency Response Sampling Locations
- EPA Sampling Locations

Source: Base data was derived from 1996 aerial imagery provided by the Tom Green County Central Appraisal District.

EPA and TCEQ sample location information can be found in References 5, 6, and 8 of the State Superfund Hazard Ranking System Documentation.

7 0 7 14 Feet

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Figure 3b. Source 2: Contaminated Soil/AOC B

2.2.3 HAZARDOUS SUBSTANCES AVAILABLE TO A PATHWAY

Containment Description	Containment Factor Value	Ref.
Gas release to air: -	-	
Particulate release to air: -	-	
Release to ground water: Evidence of hazardous substance migration from source area (i.e., source area includes source and any associated containment structures).	10	Ref. 5; Ref. 6; Ref. 14
Release via overland migration and/or flood: Evidence of hazardous substance migration from source area (i.e., source area includes source and any associated containment structures).	10	Ref. 5; Ref. 6; Ref. 14

Notes: NS Not Scored

2.2.4 HAZARDOUS WASTE QUANTITY

2.2.4.1.1. Hazardous Constituent Quantity

Hazardous Substance	Constituent Quantity	(Units)	References
None			

Sum (pounds): 0.00

Hazardous Constituent Quantity Assigned Value: 0.00

2.2.4.1.2. Hazardous Wastestream Quantity

Hazardous Wastestream	Wastestream Quantity	(Units)	References
None			

Sum (pounds): 0.00
Sum of Wastestream Quantity/5,000 (Table 2-5): 0.00

Hazardous Wastestream Quantity Assigned Value: 0.00

2.2.4.1.3. Volume

Source Type	Volume	Units	References
None			

Sum (yd^3/gal): 0.00
Equation for Assigning Value (Table 2-5): V/2,500

Volume Assigned Value: 0.00

2.2.4.1.4. Area

Description

The total area lying between sampling locations that meet the criteria for observed contamination was determined to be 24,794.11 square feet (Figure 3b). The base map was derived from 1996 aerial imagery provided by the Tom Green County Central Appraisal District. Outermost soil sample locations from Reference 5, 6, 10, 14, and 50 meeting the criteria for observed contamination were connected by lines, and the outlined area was calculated by using ESRI ArcView GIS 3.2a software.

Areas covered by buildings and/or maintained, impenetrable materials (such as paved areas), normally deducted from the calculation of total area, were not excluded from the area calculations because they could not be adequately delineated and/or identified. Therefore, the area of observed soil contamination will be assigned an area hazardous waste 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.

Source Type	Area	Units	References
None	> 0		Ref. 5; Ref. 6; Ref. 14

Sum (ft^2): 0.00
Equation for Assigning Value (Table 2-5): A/34,000

Area Assigned Value: > 0; but unknown

2.2.4.1.5. Source Hazardous Waste Quantity Value

Highest assigned value assigned from Table 2-5: 0.00

2.2.1 SOURCE IDENTIFICATION

Name of source: Contaminated Soil (Site) Number of source: 3

Source Type: Contaminated Soil

Description and Location of Source (with reference to a map of the site):
This source is characterized by contaminated soils located across the SESCO facility and extending along Upton Street. The boundaries of this source are defined by soil samples collected during TCEQ and EPA investigations (Figure 3c).

On March 3, 2003 and documented in a March 6, 2003 TCEQ Region 8 Industrial and Hazardous Waste Sampling report, SESCO discharged approximately 400 gallons of transformer oil across their property, along Baze Street, and into the Texas Department of Transportation (TxDOT) storm water collection system which flows into the Concho River. The oil contained PCBs (Ref. 10).

On March 4, 2003, TCEQ staff observed SESCO personnel cleaning stained soils near the sandblast building. It was conveyed to the TCEQ investigator that transformer oil containing 5-50 parts per million (ppm) PCB had been discharged off the property on March 3, 2003 (Ref. 10).

As specified by SESCO personnel, the release was caused by several factors. First, the rain occurring on March 3, 2003 had partially filled the concrete secondary containment at the location identified by Containment Area B (Figure 3). Second, the yellow pump which is used to transfer 5-50 ppm PCB's in the containment area froze and subsequently broke during the recent cold weather. Third, the pumping activities occurring in the untanking/painting building and subsequent pumping of the oil from the recovery well MW8 oil/water separator were pumping oil directly into the containment area which had already been partially filled with rain water. The current pipe system routes the oil recovered from MW8 as well as the oil generated in the untanking/painting building toward the oil plant. Finally, due to only 8 employees and no personnel working in the Containment Area B in excess of six months, the release was not observed for approximately three hours. (Ref. 10).

Upon arrival at the facility on March 4, 2003, the TCEQ investigators observed recent staining of off-site soils between SESCO and Baze Street as well as portions of Baze Street which had been stained. Puddles of oil as well as water contaminated with oil were observed in several locations along Baze Street. Observations also indicated a significant amount of sand had been placed on a portion of the stained pavement. It was also noted that the material staining the pavement had entered the TxDOT storm drain on Pulliam. The TxDOT storm drain discharges to an approximately a half mile long unnamed tributary prior to entering the Concho River (Ref. 4) (Figure 3e). It was determined that the material which stained the soil and street had originated from SESCO property. The material ran off SESCO property through the north entrance on the east fence. The TCEQ investigators sampled the soils located on the northeast corner of the intersection of Pulliam and Baze Streets. Visual observations of pooled transformer oil were noted in these soils. An environmental impact was documented through photographic documentation as well as three different soil sample locations. Analyses indicated PCB levels of 2.95 and 2.2. mg/kg (Ref. 10).

Mr. Thenappan agreed that some transformer oil ran into the storm drain. Through photographic documentation as well as sample analyses the TCEQ investigator documented soils within the facility as well as soils off-site as being impacted by the unauthorized discharge (Ref. 10).

On March 5, 2003, SESCO discharged 5500 gallons of wastewater and transformer oil into the City of San Angelo Wastewater Treatment Plant causing an upset. The City of San Angelo Wastewater Treatment Plant Superintendent contacted the TCEQ concerning the undetermined amount of oil the WWTP received. The Superintendent reported that a thick scum had developed as was continuing to develop on the surface of the aeration basins, a citrus smell and oil smell was noted by the plant personnel, and an oily sheen was on the surface of the treatment units. Mr. Thenappan and SESCO personnel stated that the wastewater from the oil/water separator tank was discharged directly to the sanitary sewer system and not directed to a second oil/water separator. Samples of the transformer oil which was released tot he WWTP were collected at the wastewater tank outlet and the sampling manhole. Analysis indicated a PCB level of 5.10 parts per million (ppm) in the oil from the tank. The sample from the manhole indicated below detectable levels of PCBs in the sewage (Ref. 34).

On March 10, 2003, the TCEQ ER Strike Team conducted sampling at the SESCO east yard runoff (Ref. 14). A railroad borders the east side of the facility, and the ditch bordering the railroad tracks serves as primary surface water drainage for the SESCO facility. PCB contamination was reported in the drainage ditch. SAISD representatives reported that this ditch serves as

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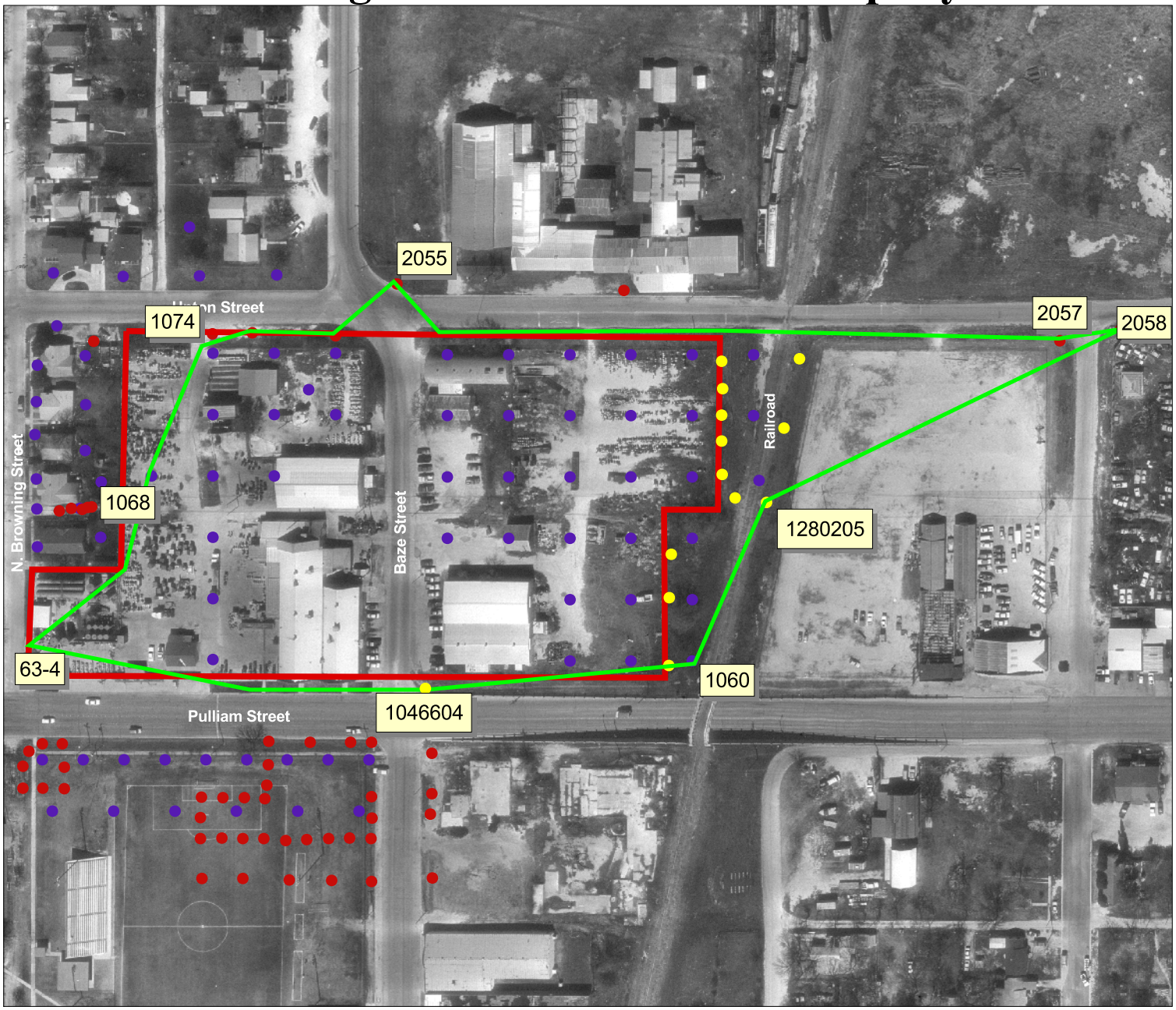

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Legend

- TCEQ Assessment Sampling Locations
- TCEQ Emergency Response Sampling Locations
- EPA Sampling Locations

Source: Base data was derived from 1996 aerial imagery provided by the Tom Green County Central Appraisal District.

EPA and TCEQ sample location information can be found in References 5, 6, 10, 14, and 51 of the State Superfund Hazard Ranking System Documentation.

50 0 50 100 Feet

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Figure 3c. Source 3: Contaminated Soil

a walking path for many students who attend San Jacinto Elementary School (Ref. 5). At each sample location two samples were collected (i.e., a surface sample and a six inch deep sample) at the east yard. The SESCO east yard fence line and drainage was sampled. A total of twelve different sample locations were collected at the fence, in the TxDOT railroad culvert, and adjacent to the rail line on the east side in the drainage. A total of twenty-four samples were collected on or near the SESCO east yard fence line. The PCB concentrations detected in the surface samples ranged from 3.24 to 318.0 mg/kg. The PCB concentrations detected in the samples collected at six inches deep ranged from 5.07 to 246.0 mg/kg (Ref. 14).

On March 13, 2003, two surface soil samples and one water/transformer oil mixture samples were collected at the TxDOT storm water outfall. The soil samples at the TxDOT outfall indicated PCBs at 0.988 mg/kg and 0.873 mg/kg. The water/transformer oil sample at the TxDOT outfall indicate PCBs at 0.238 mg/L (Ref. 8).

TCEQ ER excavated the PCB contaminated soil in the right of ways adjacent to the western portion of the SESCO facility. This area is bordered by N. Browning, Upton, Pulliam, and N. Baze Streets (Ref. 51).

During the EPA 2003 activities, the analytical data from the grid screening data and sampling were evaluated to determine an estimated volume of affected soil for PCBs. A total of approximately 252,672 cubic feet of soil contain PCBs, specifically Arochlor 1260. Of this total 234,666 cubic feet of on-site soils exceed 10 mg/kg and 18,006 cubic feet of off-site soils exceeded 1.0 mg/kg (Ref. 5).

On October 6-8, 2003, TCEQ SSDAP collected assessment samples along the City of San Angelo right-of-ways (1) on the south side of Upton Street between N. Browning and Baze; (2) on the north side of Upton Street between the Texas Pacifico Railroad and N. Baze; and (3) between Texas Pacifico Railroad and Pulliam Draw. PCBs were detected in soil samples were collected along Upton Street. Samples 2055 at the surface and 2055 at six inches. Surface sample 2057 consisted of 2.6 mg/kg (mg/kg). Sample 2055, collected at six inches depth, consisted of 2.2 mg/kg (Ref. 6).

2.2.2 HAZARDOUS SUBSTANCES ASSOCIATED WITH THE SOURCE

- Background Concentrations [*if necessary*]:

Sample ID	Sample Type	Date	Hazardous Substance	Hazardous Substance Concentration	Sample Quantitation Limit	Reference
Background (421 N. Browning - 0")	Sample	10/8/2003	Polychlorinated biphenyls (PCBs)	U ug/kg	100.00	
Background (421 N. Browning - 6")	Sample	10/8/2003	Polychlorinated biphenyls (PCBs)	U ug/kg	97.00	Ref. 6

- Source Samples:

Sample ID	Sample Type	Date	Hazardous Substance	Hazardous Substance Concentration	Sample Quantitation Limit	Reference
Release (March 2003 Spill)	Sample	3/4/2003	Polychlorinated biphenyls (PCBs)	2,950.00 ug/kg	2,200.00	Ref. 10
Release (NE Baze & Upton)	Sample		Polychlorinated biphenyls (PCBs)	2,600.00 ug/kg	98.00	Ref. 6
Release (Railroad)	Sample	3/10/2003	Polychlorinated biphenyls (PCBs)	318.00 mg/kg	79.00	Ref. 14
Release (SESCO-Browning)	Sample	3/7/2003	Polychlorinated biphenyls (PCBs)	72.20 ug/kg	16.60	Ref. 51
Release (Upton ROW)	Sample	10/8/2003	Polychlorinated biphenyls (PCBs)	760.00 ug/kg	93.00	Ref. 6

2.2.3 HAZARDOUS SUBSTANCES AVAILABLE TO A PATHWAY

Containment Description	Containment Factor Value	Ref.
Gas release to air: -	-	
Particulate release to air: -	-	
Release to ground water: Evidence of hazardous substance migration from source area (i.e., source area includes source and any associated containment structures).	10	Ref. 5; Ref. 6; Ref. 10; Ref. 14; Ref. 51
Release via overland migration and/or flood: Evidence of hazardous substance migration from source area (i.e., source area includes source and any associated containment structures).	10	Ref. 5; Ref. 6; Ref. 10; Ref. 14; Ref. 51

Notes: NS Not Scored

2.2.4 HAZARDOUS WASTE QUANTITY

2.2.4.1.1. Hazardous Constituent Quantity

Hazardous Substance	Constituent Quantity	(Units)	References
None			

Sum (pounds): 0.00

Hazardous Constituent Quantity Assigned Value: 0.00

2.2.4.1.2. Hazardous Wastestream Quantity

Hazardous Wastestream	Wastestream Quantity	(Units)	References
None			

Sum (pounds): 0.00
Sum of Wastestream Quantity/5,000 (Table 2-5): 0.00

Hazardous Wastestream Quantity Assigned Value: 0.00

2.2.4.1.3. Volume

Source Type	Volume	Units	References
None			

Sum (yd^3/gal): 0.00
Equation for Assigning Value (Table 2-5): V/2,500

Volume Assigned Value: 0.00

2.2.4.1.4. Area

Description

The total area lying between sampling locations that meet the criteria for observed contamination was determined to be 364,073.17 square feet (Figure 3c). The base map was derived from 1996 aerial imagery provided by the Tom Green County Central Appraisal District. Outermost soil sample locations from Reference 5, 6, 10, 14, and 51 meeting the criteria for observed contamination were connected by lines, and the outlined area was calculated by using ESRI ArcView GIS 3.2a software.

Areas covered by buildings and/or maintained, impenetrable materials (such as paved areas), normally deducted from the calculation of total area, were not excluded from the area calculations because they could not be adequately delineated and/or identified. Therefore, the area of observed soil contamination will be assigned an area hazardous waste 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.

Source Type	Area	Units	References
Contaminated Soil	>0		

Sum (ft^2): 0.00
Equation for Assigning Value (Table 2-5): A/34,000

Area Assigned Value: > 0; but unknown

2.2.4.1.5. Source Hazardous Waste Quantity Value

Highest assigned value assigned from Table 2-5: 0.00

2.2.1 SOURCE IDENTIFICATION

Drum samples that did not contain oily liquids were analyzed in the field using HAZCAT technology. A total of 10 samples, which contained oily liquids, were submitted for laboratory analysis, utilizing EPA method SW-846 8082B, for PCBs. The PCB concentrations in two of the 10 samples submitted exceeded 50 mg/kg (Ref. 5).

Name of source: Drums Number of source: 4

Source Type: Drums

Description and Location of Source (with reference to a map of the site):
During the EPA removal action, drum sampling and HAZCAT activities occurred on June 6, 2003 and June 12, 2003. Samples were collected from 30 on-site drums utilizing dedicated transfer pipettes or "drum thief" samplers. Drum samples containing oily liquid were submitted for laboratory analysis for PCBs, and all other samples were screened in the field using HAZCAT technology. Labels, indicating the contents of the drums, were placed on each drum after samples were screened with the HAZCAT kit (Ref. 5).

A total of 52 drums were located in storage buildings throughout the facility (Ref. 5) (Figure 3d).

Thirty of the 52 drums were opened, sampled, and gauged. The 22 remaining drums were not sampled and gauged due to the contents of the drums (i.e., water, sand, or paint). A dedicated transfer pipette or "drum thief" was used to collect samples from each drum. A total of 10 samples, which contained oily liquids, were submitted for laboratory analysis, utilizing EPA method SW-846 8082B, for PCBs. The PCB concentration in two of the 10 samples exceeded 50 mg/kg. The collected samples were field screened utilizing the HAZCAT field screening kit to determine general chemical and physical properties of each sample. Drums that contained oil were sampled and submitted for laboratory analysis for PCBs using EPA SW-846 8082B (Ref. 5).

Based on field observations and building inventories conducted during the sampling activities, other potential sources of hazardous waste were located (Ref. 5).

The electro-plating building contained 12 drums containing a sulfuric acid/water mixture and two drums containing blasting sand and glass beads. A conservatively estimated total of 150 gallons of waste is contained in the 13 drums (Ref. 5).

The hazardous waste shed, located on the west side of the oil plant, contained 12 drums of solid paint waste and 3 drums containing a red lubricating oil. A conservatively estimated total of 755 gallons of waste is contained in the 15 drums (Ref. 5).

The welding shop contained two drums of lubricating oil, one drum of paint thinner, one drum of paint, and one drum of water. A conservatively estimated total of 100 gallons of waste is contained in the four drums, not including the drum of water (Ref. 5).

The tanking building contained seven drums of various oils, three drums of paint, one drum of soap solution, and one drum of recycled thinner. A conservatively estimated total of 275 gallons of waste is contained in the 12 drums (Ref. 5).

The untanking building contained four drums of oil/water mixture and two drums of water. A conservatively estimated total of 110 gallons of waste is contained in the six drums (Ref. 5).

The total estimated volume of waste listed above is 1,390 gallons. A spreadsheet containing a complete description of each building contents and quantities is located in Table 6-1 (Ref. 5).

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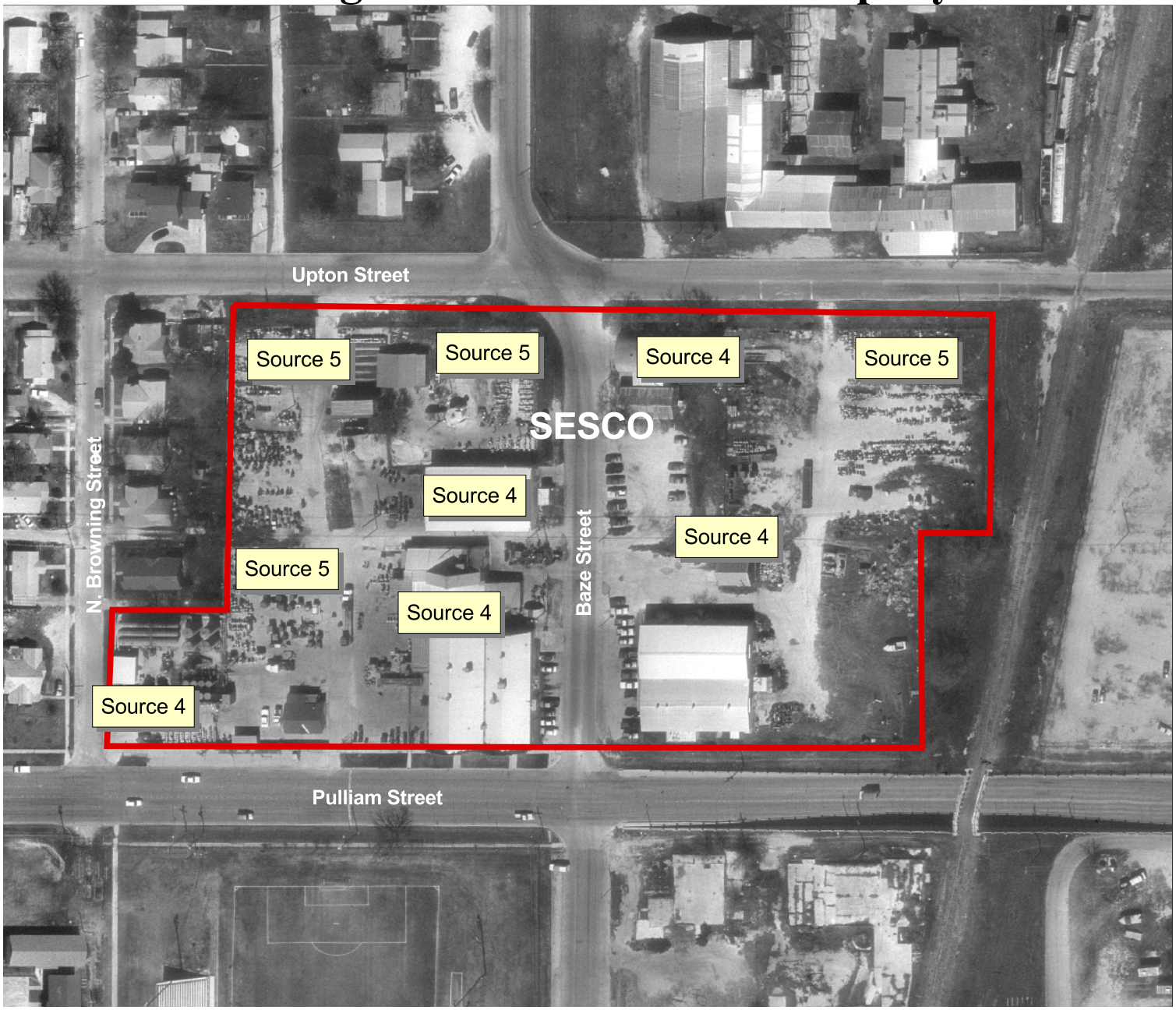

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TCEQ

926 Pulliam Street
San Angelo
Tom Green County, TX
SWR 30188
EPA TXD 091271924

Source: Base data was derived from 1996 aerial imagery provided by the Tom Green County Central Appraisal District.

50 0 50 100 Feet

N

Figure 3d. Sources 4: Drums and 5: Transformers

2.2.2 HAZARDOUS SUBSTANCES ASSOCIATED WITH THE SOURCE

- Background Concentrations [*if necessary*]:

Sample ID	Sample Type	Date	Hazardous Substance	Hazardous Substance Concentration	Sample Quantitation Limit	Reference
421 N. Browning	Sample	10/8/2003	PCBs	U		Ref. 6

- Source Samples:

Sample ID	Sample Type	Date	Hazardous Substance	Hazardous Substance Concentration	Sample Quantitation Limit	Reference
Drum 8013	Sample	6/12/2003	PCBs	77.00 mg/kg		Ref. 5

2.2.3 HAZARDOUS SUBSTANCES AVAILABLE TO A PATHWAY

Containment Description	Containment Factor Value	Ref.
Gas release to air: -	-	
Particulate release to air: -	-	
Release to ground water: Any one of the following three items present: (1) maintained engineered cover, or (2) functioning and maintained run-on control system and runoff management system, or (3) functioning leachate collection and removal system immediately above liner.	9	Ref. 5; Ref. 19
Release via overland migration and/or flood: No evidence of hazardous substance migration from source area and: Any two of the following items present: (1) maintained engineered cover, or (2) functioning and maintained run-on control system and runoff management system, or (3) liner with functioning leachate collection and removal system immediately above liner.	7	Ref. 5; Ref. 19

Notes: NS Not Scored

2.2.4 HAZARDOUS WASTE QUANTITY

2.2.4.1.1. Hazardous Constituent Quantity

Hazardous Substance	Constituent Quantity	(Units)	References
None			

Sum (pounds): 0.00

Hazardous Constituent Quantity Assigned Value: 0.00

2.2.4.1.2. Hazardous Wastestream Quantity

Hazardous Wastestream	Wastestream Quantity	(Units)	References
None			

Sum (pounds): 0.00
Sum of Wastestream Quantity/5,000 (Table 2-5): 0.00

Hazardous Wastestream Quantity Assigned Value: 0.00

2.2.4.1.3. Volume

Source Type	Volume	Units	References
Drums	5.00	Gal	Ref. 5

Sum (yd^3/gal): 5.00
Equation for Assigning Value (Table 2-5): V/500

Volume Assigned Value: 0.01

2.2.4.1.4. Area

Source Type	Area	Units	References
None			

Sum (ft^2): 0.00
Equation for Assigning Value (Table 2-5): -

Area Assigned Value: 0.00

2.2.4.1.5. Source Hazardous Waste Quantity Value

Highest assigned value assigned from Table 2-5: 0.01

2.2.1 SOURCE IDENTIFICATION

Name of source: Transformers Number of source: 5

Source Type: Containers other than drums

Description and Location of Source (with reference to a map of the site):
On March 7, 2003, a TCEQ investigator met with Mr. Thenappan. It was brought to the investigators attention that some transformers located in the main yard still contained oil. Mr. Thenappan stated that there is not a specific location where these transformers were kept. The way SESCO identified these transformers is by kicking them (Ref. 35).

On March 24, 2003, a TCEQ investigator observed an open leaking transformer on the SESCO property. The surrounding soils were stained and had killed the vegetation growth. The transformer was labeled as junk yet contained transformer oil in the container. A stick was brought out of the container and verified the transformer oil in the container (Ref. 20).

The TCEQ notified SESCO to move all transformers along the east yard fence line so a containment berm could be constructed. All leaking transformers were not to be moved (Ref. 20).

On March 27, 2003, TCEQ noticed that the leaking transformer, identified on March 24, 2003, had been moved. The new location of the leaking transformer had stained soil. In the process of moving the transformer, oils were spilled on the ground and stained the soil (Ref. 20).

During the 2003 EPA investigation, transformer sampling was performed to characterize and gauge the liquids contained in each transformer. A total of 2,030 samples were collected from 2,749 transformers on-site. A dedicated transfer pipette or “drum thief” sampler was utilized to sample each transformer. The sampling team visually estimated the quantity of oil contained in each transformer. The collected samples were submitted to an EPA-approved laboratory for PCB analysis using method EPA SW-846 8082B (Ref. 5).

A total of 2,030 oil samples were collected from 2,749 transformers. Transformer oil samples were submitted for laboratory analysis, utilizing EPA method SW-846 8082B for PCBs. Twenty-six transformers contained oil with PCB concentrations exceeding 50 mg/kg of PCBs in oil. Approximately 200 to 300 gallons of PCB-contaminated transformer oil in 26 transformers exists on the SESCO facility (Ref. 5).

The transformers are located on both the east and west sections of the SESCO property. Some but not all areas where the transformers are stored are capped by concrete (Ref. 5) (Figure 2b; Figure 3d).

2.2.2 HAZARDOUS SUBSTANCES ASSOCIATED WITH THE SOURCE

- Background Concentrations [*if necessary*]:

Sample ID	Sample Type	Date	Hazardous Substance	Hazardous Substance Concentration	Sample Quantitation Limit	Reference
421 N. Browning	Sample	10/8/2003	Polychlorinated biphenyls (PCBs)	U mg/kg	100.00	Ref. 6

- Source Samples:

Sample ID	Sample Type	Date	Hazardous Substance	Hazardous Substance Concentration	Sample Quantitation Limit	Reference
Transformer Oil	Sample	6/8/2003	Polychlorinated biphenyls (PCBs)	720.00 mg/kg	1.00	Ref. 5

2.2.3 HAZARDOUS SUBSTANCES AVAILABLE TO A PATHWAY

Containment Description	Containment Factor Value	Ref.
Gas release to air: -	-	
Particulate release to air: -	-	
Release to ground water: Any one of the following three items present: (1) maintained engineered cover, or (2) functioning and maintained run-on control system and runoff management system, or (3) functioning leachate collection and removal system immediately above liner.	9	Ref. 5; Ref. 19
Release via overland migration and/or flood: Evidence of hazardous substance migration from container area (i.e., container area includes containers and any associated containment structures).	10	Ref. 5; Ref. 19

Notes: NS Not Scored

2.2.4 HAZARDOUS WASTE QUANTITY

2.2.4.1.1. Hazardous Constituent Quantity

Hazardous Substance	Constituent Quantity	(Units)	References
None			

Sum (pounds): 0.00

Hazardous Constituent Quantity Assigned Value: 0.00

2.2.4.1.2. Hazardous Wastestream Quantity

Hazardous Wastestream	Wastestream Quantity	(Units)	References
None			

Sum (pounds): 0.00
Sum of Wastestream Quantity/5,000 (Table 2-5): 0.00

Hazardous Wastestream Quantity Assigned Value: 0.00

2.2.4.1.3. Volume

Source Type	Volume	Units	References
Containers other than drums	200.00	Gal	Ref. 5

Sum (yd^3/gal): 200.00
Equation for Assigning Value (Table 2-5): V/2.5

Volume Assigned Value: 0.40

2.2.4.1.4. Area

Source Type	Area	Units	References
None			

Sum (ft^2): 0.00
Equation for Assigning Value (Table 2-5): -

Area Assigned Value: 0.00

2.2.4.1.5. Source Hazardous Waste Quantity Value

Highest assigned value assigned from Table 2-5: 0.40

2.2.1 SOURCE IDENTIFICATION

Name of source: Contaminated Soil Number of source: 6

Source Type: Contaminated Soil

Description and Location of Source (with reference to a map of the site):
The underground storm sewer extends from the Pullman Street railroad underpass to the outfall at Pope and Tarver (Ref. 13; Ref. 38) (Figure 3e).

In 2002 TxDOT planned to remove sediment/soil from an underground storm sewer line that extends from the Pullman Street railroad underpass to the outfall at Pope and Tarver. On behalf of TxDOT, PBS&J collected sediment/soil samples to determine if PCBs were present in the underground storm sewer. Three manhole locations and the storm sewer outfall were sampled. Arochlor 1260 was detected in the manhole and outfall grab samples at concentrations ranging from 0.256 mg/kg to 0.818 mg/kg (Ref. 38).

On March 6, 2003, samples of the ravine were collected to determine extent of contamination from the unauthorized discharge at SESCO. Nine soil samples were collected at various locations in the ravine. Sample analysis indicated PCBs in all soil samples along the ravine (i.e., 0.249 mg/kg, 0.180 mg/kg, 0.130 mg/kg, 0.134 mg/kg, 0.194 mg/kg, 0.242 mg/kg, 0.132 mg/kg, 0.164 mg/kg, and 0.303 mg/kg). One water sample was collected at the junction of the ravine and the Concho River. Analyses indicated PCBs were below the detection limit in the water sample (Ref. 16).

2.2.2 HAZARDOUS SUBSTANCES ASSOCIATED WITH THE SOURCE

- Background Concentrations [*if necessary*]:

Sample ID	Sample Type	Date	Hazardous Substance	Hazardous Substance Concentration	Sample Quantitation Limit	Reference
None						

- Source Samples:

Sample ID	Sample Type	Date	Hazardous Substance	Hazardous Substance Concentration	Sample Quantitation Limit	Reference
Release (Ravine)	Sample	3/13/2003	Polychlorinated biphenyls (PCBs)	988.00 ug/kg	460.00	Ref. 16

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TCEQ

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SWR 30188
EPA TXD 091271924

Source: Source is the San Angelo South NE Digital Orthoquarter Quadrangle (DOQ), which is a rectified aerial photograph.

TCEQ sample location and the National Wetland Inventory information can be found in Reference 16 and 30, respectively of the State Superfund Hazard Ranking System Documentation.

0.08 0 0.080.16 Miles

N

Tom Green County, Texas

Figure 3e. Source 7: Contaminated Soil/Surface Water Pathway

2.2.3 HAZARDOUS SUBSTANCES AVAILABLE TO A PATHWAY

Containment Description	Containment Factor Value	Ref.
Gas release to air: -	-	
Particulate release to air: -	-	
Release to ground water: Evidence of hazardous substance migration from source area (i.e., source area includes source and any associated containment structures).	10	Ref. 16
Release via overland migration and/or flood: Evidence of hazardous substance migration from source area (i.e., source area includes source and any associated containment structures).	10	Ref. 16; Ref. 38

Notes: NS Not Scored

2.2.4 HAZARDOUS WASTE QUANTITY

2.2.4.1.1. Hazardous Constituent Quantity

Hazardous Substance	Constituent Quantity	(Units)	References
None			

Sum (pounds): 0.00

Hazardous Constituent Quantity Assigned Value: 0.00

2.2.4.1.2. Hazardous Wastestream Quantity

Hazardous Wastestream	Wastestream Quantity	(Units)	References
None			

Sum (pounds): 0.00
Sum of Wastestream Quantity/5,000 (Table 2-5): 0.00

Hazardous Wastestream Quantity Assigned Value: 0.00

2.2.4.1.3. Volume

Source Type	Volume	Units	References
None			

Sum (yd^3/gal): 0.00
Equation for Assigning Value (Table 2-5): V/2,500

Volume Assigned Value: 0.00

2.2.4.1.4. Area

Description
The total area lying between sampling locations from Reference 38 that meet the criteria for observed contamination could not be determined based on available data (Figure 3a). Therefore, the area of observed soil contamination will be assigned an area hazardous waste 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.

Source Type	Area	Units	References
Contaminated Soil	>0		Ref. 16; Ref. 38

Sum (ft^2): 0.00
Equation for Assigning Value (Table 2-5): A/34,000

Area Assigned Value: > 0; but unknown

2.2.4.1.5. Source Hazardous Waste Quantity Value

Highest assigned value assigned from Table 2-5: 0.00

SUMMARY OF SOURCE DESCRIPTIONS

Description of Other Possible Sources

The following sources were not evaluated in this Documentation Record:

a. Unidentified Landfill

On March 28, 2003, A TCEQ investigator observed a landfill not previously identified to the TCEQ by SESCO. The landfill is located in the east yard near the "L" in the fence. Ash, stained soils, glass, and scrap metal were a few items identified at the soil surface (Ref. 33). The EPA further assessed this area by using the Hybrizyme field screening. Screening samples collected at location 1056 indicated levels of PCBs well of 878.09 mg/kg at the surface, 18586.26 mg/kg at six inches, 5329.86 mg/kg at 12 inches, 489.12 mg/kg at 18 inches, and 3.96 mg/kg at 24 inches (Ref. 5).

b. Underground Storage Tank (UST)

During the 1998 investigation by SESCO, three underground fuel storage tanks at the facility were identified. The location of these tanks is at the northeast corner of Browning and Pulliam. There was a gas station from 1928 to 1963 at that location identified in a city directory. In 1963 the location was designated as Lee's Radiator Service. SESCO purchased that property on April 11, 1972 (Ref. 38).

Tank 1 was reportedly installed in 1951 and later removed from the ground. Tank 2 was a gasoline tank that was reportedly installed in 1928 and abandoned-in-place in December 1973. Tank 3 was a gasoline tank that was reportedly installed in 1928 and abandoned-in-place in December 1973. SESCO stated that the building was demolished in 1979 to setup and expand the oil plant and fence (Ref. 37).

According to a TxDOT contractor, two 1,000-gallon fuel USTs were permanently removed from the ground on February 26, 2001. The concentrations of total petroleum hydrocarbons (TPH) and BTEX in the soil samples were reported below the detection level for each constituent (Ref. 38).

The analytical results from SESCO sampling events between May 5, 1997 through February 23, 1999, indicated that BTEX constituents were present in the groundwater in both the Leona and Choza aquifers. BTEX constituents were detected in MW1,MW3, MW5, MW6, and MW7 (Ref. 21).

During a September 4, 2002 sampling investigation, the following constituents were detected in a water sample collected from MW9: 1,1-Dichloroethane, cis-1,2-Dichloroethylene, vinyl chloride, TPH, benzene, toluene, ethyl benzene, xylene. The following constituents were detected in a water sample collected from MW6: PCBs, 1,1-Dichloroethane, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene, vinyl chloride, TPH, benzene, toluene, ethyl benzene, and xylene. The following constituents were detected in a water sample collected from MW2 included cis-1,2-Dichloroethylene and toluene. The following constituents were detected in a water sample collected from MW8: PCBs, 1,1-Dichloroethane, cis-1,2-Dichloroethylene, TPH, ethyl benzene, xylene, antimony, barium, selenium, and tin. The following constituents were detected in a water sample collected from MW10: TPH, benzene, toluene, ethyl benzene, and xylene, bis(2-ethylhexyl)phthalate, naphthalene, arsenic, lead, vanadium, and barium (Ref. 23).

During the installation of 12 monitoring wells in October 2002, hydrocarbon odors were detected in wells MW15, MW16, MW17, MW21, and MW22 and soil borings #1 and #2 (Ref. 41).

c. Sand blasting unit

On April 2, 2003, the TCEQ noted SESCO operating the on-site sand blasting operation. The TCEQ investigator noted the door was open and the air pollution control device was missing. The unauthorized discharge of industrial solid waste was observed as well as photographed blowing out of the door and onto the ground. This unauthorized discharge was also noted in a previous April 2002 investigation (Ref. 18).

d. Metals in Ground Water

The analytical results from SESCO sampling events conducted from May 5, 1997 through February 23, 1998 indicate the presence of metals. Arsenic and mercury concentrations were detected above detection limits. Barium was detected in the on-site wells and in an up gradient well (Ref. 21).

Source No.	Source Hazardous Waste Quantity Value	Source Hazardous Constituent Quantity Complete? (Y/N)	Containment Factor Value by Pathway				
			Ground Water (GW) (Table 3-2)	Surface Water (SW)		Air	
				Overland/ flood (Table 4-2)	GW to SW (Table 3-2)	Gas (Table 6-3)	Particulate (Table 6-9)
1	>0	No	10	10			
2	>0	No	10	10			
3	>0	No	10	10			
4	0.01	No	9	7			
5	0.40	No	9	10			
6	>0	No	10	10			

3.0 GROUND WATER MIGRATION PATHWAY

3.0.1 GENERAL CONSIDERATIONS

In 1986 at the direction of the Texas Water Commission (TWC), a predecessor agency of the TCEQ, SESCO sampled a former plant water supply well located within the facility and determined that the groundwater in the well was contaminated with PCBs. The water well had no surface protection and appeared as a round hole in the concrete floor in the corner of the Untanking and Disassembly building. Wash water and oils washed from the floor were disposed of in this open water well (Ref. 21). This well was later converted into monitoring well (MW) MW5 (Ref. 21; Figure 4).

In April 1994, SESCO entered into an Agreed Order with the Texas Natural Resource Conservation Commission (TNRCC), a predecessor agency of the TCEQ, which required SESCO to conduct an investigation and remediation of any contamination originating from their property (Ref. 11).

On September 6, 2002, the 126th Travis County District Court granted the TCEQ a Temporary Injunction that required SESCO to undertake further soil and groundwater investigation at the facility, effective on September 4, 2002. Prior to this litigation, SESCO had conducted some soil and groundwater investigation and remediation activities. The facility had been recovering PCB oil and gasoline-contaminated groundwater through a groundwater recovery system.

On September 4, 2002, SESCO conducted sampling activities for monitoring wells MW2, MW6, MW8, MW9, and MW10. Wells MW8 and MW10 were to have both phase separated hydrocarbon (PSH) and water sampled (Ref. 22).

On October 10, 2002, SESCO's contractor installed 12 monitoring wells to investigate the ground water. The TCEQ investigator noted areas of concern. MW2 , MW3, MW5, MW6, and MW5 identified two water bearing zones, the Leona Formation and the Choza Formation. Based on the data collected, the ground water gradient appeared to be to the southeast and not to the south-southwest as identified by SESCO. Transformer oil was detected in MW13, MW14, MW15, MW16, and MW19 and in soil borings #1 and #2 (Ref. 41).

On March 3, 2003 and per a March 6, 2003 TCEQ Region 8 Industrial and Hazardous Waste Sampling report, SESCO discharged approximately 400 gallons of transformer oil across their property, along Baze Street, and into the Texas Department of Transportation (TxDOT) storm water collection system which flows into the Concho River. The oil contained PCBs (Ref. 10; Ref. 19).

From March 4-6, 2003, the TCEQ's Emergency Response (ER) Team was called in to begin cleaning up the PCB-contaminated oil from the street and storm sewer (Ref. 14).

On March 7, 2003, there was an unauthorized discharge of transformer oils through cracks in secondary containment (Ref. 19).

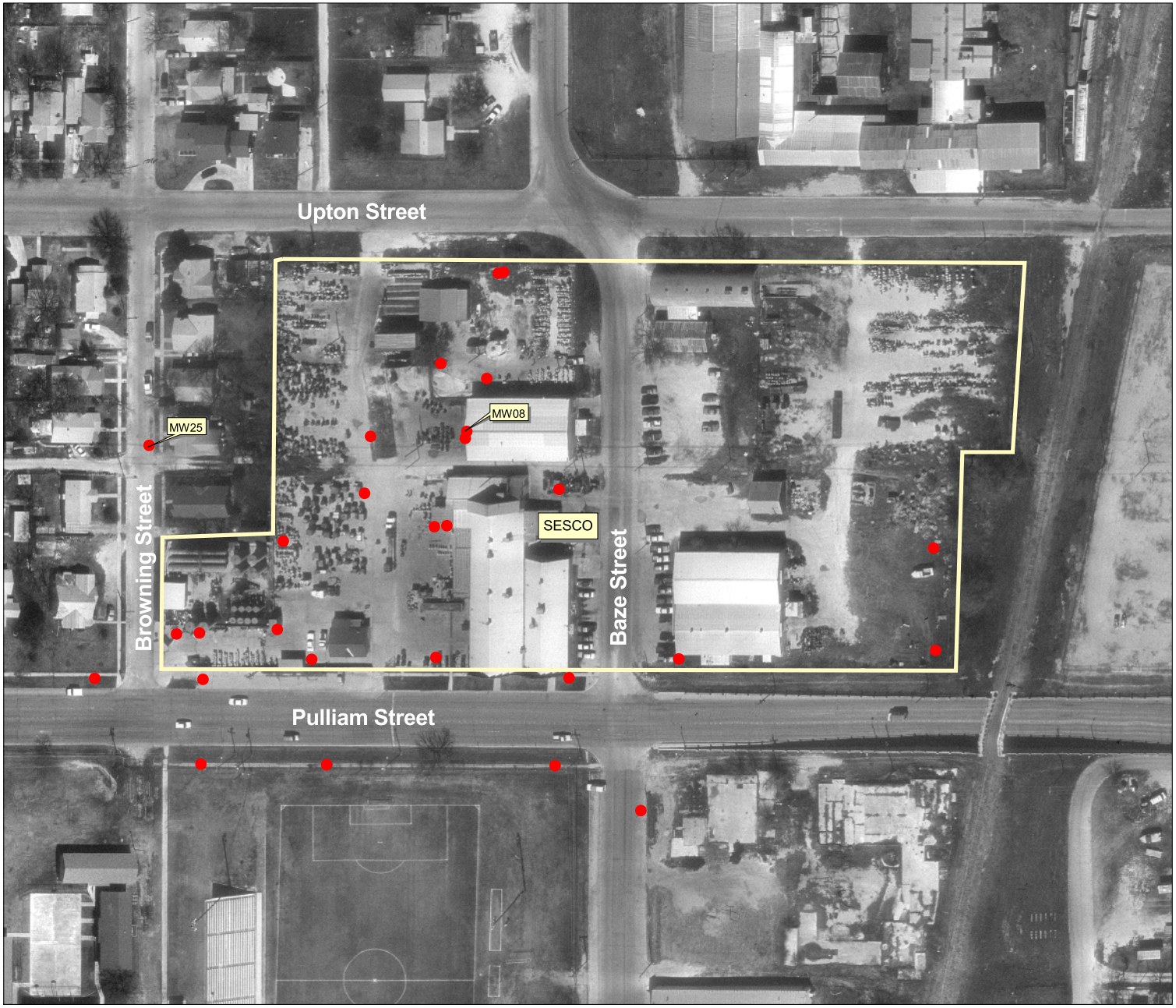
On March 14, 2003, a TCEQ investigator observed the steam cleaning of the oil plant to remove collected transformer oils from the cracked concrete secondary containment. During March 17-18, 2003, the TCEQ identified and confirmed that transformer oil was draining out from leaking Batch Tanks 1-8 (Ref. 19; Ref. 29).

On March 18, 2003, the Office of the Attorney General and SESCO entered into an Agreed Temporary Injunction which superceded the September 4, 2002 Temporary Injunction. Due to previous inadequate response actions on the part of SESCO that compounded the contamination problems in the area, the Agreed Temporary Injunction in State Court ordered SESCO to immediately cease all soil investigation and remediation activities. The Agreed Temporary Injunction required SESCO to allow the State access to the facility to allow identification of potential sources of the groundwater contamination at the facility. The Temporary Injunction also required SESCO to allow the State to remove and dispose of wastes and oils at the facility to allow leak-testing of tanks, lines, sumps, and other parts of SESCO's systems, and required SESCO to allow the State to operate, modify, or improve SESCO's groundwater recovery system.

On March 24, 2003, a TCEQ investigator observed an open leaking transformer on the SESCO property. The surrounding soils were stained and had killed the vegetation growth. The transformer was labeled as junk yet contained transformer oil in the container. A stick was brought out of the container and verified the transformer oil in the container (Ref. 20).

On March 20, 2003, the TCEQ notified SESCO to move all transformers along the east yard fence line so a containment berm could be constructed. All leaking transformers were not to be moved (Ref. 20).

San Angelo Electric Service Company



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SWR 30188
EPA TXD 091271924

Legend

● Monitoring Wells

Source: Base data was derived from 1996 aerial imagery provided by the Tom Green County Central Appraisal District.

50 0 50 100 Feet

N

Tom Green County, Texas

Figure 4. SESCO Monitoring Wells.

On March 27, 2003, TCEQ noticed that the leaking transformer, identified on March 24, 2003, had been moved. The new location of the leaking transformer had stained soil. In the process of moving the transformer, oils were spilled on the ground and stained the soil (Ref. 20).

On March 27, 2003, two separate holes were detected during the removal of sludges from the oil plant sump (Ref. 19).

Because of the severity of the contamination at the site, the TCEQ ER determined a re-designed ground water recovery and treatment system was needed to protect the private wells in the area by, containing and remediating the ground water contamination (Ref. 22; Ref. 36).

From April - May, 2003, the TCEQ performed the following activities: (1) installed wells MW26-MW30, (2) plugged and abandoned five improperly installed wells MW2, MW3, MW6, and MW9, (3) gauged wells with an interface probe, and (4) sampled phase separated hydrocarbons (PSH) in wells MW28, MW29, and MW30. Eight new ground water recovery wells were drilled and completed. Pneumatic pumps were installed in six new wells and in three existing wells. These nine wells were plumbed into a central collection system located in the above ground storage tank containment area. The collection system was connected to a three phase water treatment system. These three treatment phases consisted of; two stages of physical filters, an oil/water separator and an activated charcoal polishing filter. Recovered oils were stored in an above ground storage tank until proper disposal could be arranged. Treated ground water was discharged, with City of San Angelo approval, to the City sanitary sewer (Ref. 22; Ref. 36).

On February 1, 2004, TCEQ SSDAP officially began operation of the SESCO ground water recovery system (Ref. 22).

As of March 30, 2004, 519,992 gallons of ground water had been pumped and treated and 4,052 gallons of mineral oil had been recovered by the treatment system (Ref. 24).

Ground Water Migration Pathway Description

The Texas Water Development Board has designated the Lipan Aquifer as a minor aquifer. In Texas, a minor aquifer is defined as one that supplies large quantities of water in small areas or small quantities of water in large areas (Ref. 43). The SESCO facility is located above this minor aquifer (Ref. 25).

- Aquifer/Stratum 1 (uppermost): Leona Formation

Description
This stratum is an aquifer. It is the top aquifer of the interconnected aquifers below.

Based on previous site characterizations, the upper zone is an apparent discontinuous, perched zone found in unconsolidated sand/clay/gravel alluvium of Quaternary age. The Pleistocene-age Leona Formation is a consolidated limestone conglomerate, which is an apparent lower aquitard for this perched zone. (Ref. 5).

The facility lies in the outcrop of the Leona Formation (Ref. 25). According to the Ground-water Resources of Tom Green County, Texas, the conglomerate along the Concho River and its tributaries is classified as Pleistocene. The Pleistocene alluvium in Tom Green County consists of rock materials derived principally form the Cretaceous rocks of the Edwards Plateau. The alluvium was deposited on the eroded surfaces of the Permian rocks over about 400 square miles in the plains area of the county. The thickness of the alluvium ranges from a few feet to about 125 feet. The alluvium is composed of discontinuous beds of poorly sorted, rounded to subangular gravel, conglomerate, sand, silty clay, and caliche (Ref. 25).

According to Mr. Kyle Combest, a geologist working in the San Angelo area, stated that some areas that have a lot of silty clay and not much gravel will not yield much ground water (like SESCO). The Quaternary alluvium is pinkish orange or tan to light brown silty clay (Ref. 42).

A review of the monitoring well installation reports and well logs were reviewed to determine the depth of the transition from Leona Formation to the Choza Formation. The range of depths at which a showing red, blue, gray, or green shale (Choza Formation) beneath the Quaternary alluvium (Leona Formation) are from 29 to 44 feet (Ref. 40; Ref. 42). The average depth is approximately 34 feet based on the available reports (Ref. 40).

- Aquifer/Stratum 2 (deepest): Choza Formation

Description
This stratum is an aquifer. It is interconnected with the aquifer above.

The underlying clays of the Permian-age Chozo Formation are an apparent aquitard with thin dolomitic limestone layers deeper than 50 bgs within the Chozo Formation (Ref. 5).

According to the Ground-water Resources of Tom Green County, Texas, the Choza Formation is described as about 625 feet thick and composed of red, green, blue, and yellow shale and silty clay and beds of gray dolomitic limestone (Ref. 25).

SUMMARY OF AQUIFER(S) BEING EVALUATED

Aquifer No.	Aquifer Name	Is Aquifer Interconnected with Upper Aquifer within 2 miles? (Y/N/NA)	Is Aquifer Continuous within 4-mile TDL? (Y/N)	Is Aquifer Karst? (Y/N)
1	Leona Formation	No	Yes	No
2	Choza Formation	Yes	Yes	No

3.1 LIKELIHOOD OF RELEASE

3.1.1 OBSERVED RELEASE

Aquifer Being Evaluated: 1

Chemical Analysis

- Background Concentrations:

Sample ID	Screened Interval (feet bgs or msl)	Date	Reference
MW25*	- Ft bgs	02/11/2004	Ref. 24

Sample ID	Hazardous Substance	Concentration	Sample Quantitation Limit	Reference
MW25	Polychlorinated biphenyls (PCBs)	U ug/L	0.10 ug/L	Ref. 24

*No well log available.

Contaminated Samples: According to a 1999 SESCO report, the historical analytical results for detections of PCBs in groundwater are (Ref. 21):

- May 5, 1997: Wells MW1 and MW4 had detectable concentrations. The PCB concentrations were 0.95 ug/L and 23 ug/L, respectively.
- August 22, 1997: The PCB concentrations for MW7 was 1.23 ug/L.
- October 17, 1997: The PCB concentrations for MW7 was 1.23 ug/L.
- March 27, 1998: Wells MW1, MW2, MW6, and MW7 had detectable concentrations.
- October 28, 1998 - Wells MW1, MW5, and MW6 were impacted. The detectable PCB concentrations ranged from 0.77 ug/L to 49 ug/L (Ref. 21).

A table detailing product thickness in accessible monitoring wells and additional and February 2004 samples results are in Reference 24.

Sample ID	Screened Interval (feet bgs or msl)	Date	Reference
1047803	16.00 - 26.00 Ft bgs	9/4/2002	Ref. 23

Sample ID	Hazardous Substance	Concentration	Sample Quantitation Limit	Background Sample Used	Reference
1047803	Polychlorinated biphenyls (PCBs)	819.00 ug/L	500.00	MW25	Ref. 23

Notes: µg/L micrograms per liter

Level I Samples

Sample ID	Hazardous Substance	Hazardous Substance Concentration	Benchmark Concentration	Benchmark	Reference for Benchmark
1047803	Polychlorinated biphenyls (PCBs)	819.00 ug/L	4.26E-5	Cancer Risk	Ref. 3

Notes:

Hazardous Substances Released

Polychlorinated biphenyls (PCBs)

Ground Water Observed Release Factor Value: 550.00

3.2 WASTE CHARACTERISTICS

3.2.1 TOXICITY/MOBILITY

Hazardous Substance	Source No.	Toxicity Factor Value	Mobility Factor Value	Does Haz. Substance Meet Observed Release? (Y/N)	Toxicity/ Mobility (Table 3-9)	Reference
Polychlorinated biphenyls (PCBs)	1	10,000.00	1	Y	1E4	Ref.1; Ref. 3
Polychlorinated biphenyls (PCBs)	2	10,000.00	1	Y	1E4	Ref.1; Ref. 3
Polychlorinated biphenyls (PCBs)	3	10,000.00	1	Y	1E4	Ref.1; Ref. 3
Polychlorinated biphenyls (PCBs)	5	10,000.00	1	Y	1E4	Ref.1; Ref. 3
Polychlorinated biphenyls (PCBs)	6	10,000.00	1	Y	1E4	Ref.1; Ref. 3

Toxicity/Mobility Factor Value: 10,000.00
(Table 3-9)

3.2.2 HAZARDOUS WASTE QUANTITY

Source No.	Source Type	Source Hazardous Waste Quantity
1	Contaminated Soil	>0, but unknown
2	Contaminated Soil	>0, but unknown
3	Contaminated Soil	>0, but unknown
4	Drums	0.01
5	Containers other than drums	0.40
6	Contaminated Soil	>0, but unknown

Sum of Values: >0.41

Hazardous Waste Quantity Factor Value: 10.00
(Table 2-6)

3.2.3 WASTE CHARACTERISTICS FACTOR CATEGORY VALUE

Toxicity/Mobility Factor Value: 10,000.00
Hazardous Waste Quantity Factor Value: 10.00

Toxicity/Mobility Factor Value X
Hazardous Waste Quantity Factor Value: 100,000.00

Waste Characteristics Factor Category Value: 18.00
(Table 2-7)

3.3 TARGETS

In September 2002, one residential well was sampled by the TCEQ. This well is located at 925 Spaulding and was completed at 140 feet deep (Ref. 5; Ref. 44). The screen type was designated as none. The static water level was at 115 feet deep and into the shale of the Choza Formation (Ref. 5). At the time of the 2002 report, the water well was used for watering the yard, garden, and trees. Periodically the water was consumed while inhabitants were outside. The well was sampled for VOCs, SVOCs, TPH, PCBs, and RCRA metals. Sample analyses did not detect PCBs in the water. Barium which was detected in on-site monitoring wells was detected at 0.025 mg/l (Ref. 23; Ref. 44).

From March 11-13, 2003, the TCEQ conducted a walking water well survey and a distribution line sampling event was conducted. The quarter mile door-to-door water well survey was conducted from March 11th to noon on March 12th. A total of 145 residents were surveyed. If the resident was not home, a flyer was placed on the door by TCEQ staff. Fifteen wells were found during the survey. Three additional wells were located after residents notified the TCEQ Region 8 office. Of the fifteen wells, six were sampled for BTEX and PCBs. The remaining nine were dry or had equipment located in the well and therefore not sampled. The City of San Angelo water distribution system was sampled in order to determine if any PCB contamination has infiltrated the distribution system. A total of six sample locations were sampled throughout the quarter mile area. These wells were geographically located to get a wide distribution throughout the survey area. The sample locations were sampled for total chlorine, PCBs, and BTEX. The water well and distribution line sample results were below detectable limits for PCBs and BTEX (Ref. 14).

A water well search using the records of the Texas Water Development Board (TWDB) and the TCEQ was conducted in June 2003. Three located, 13 plotted and nine partially numbered water wells were determined to be within a half mile of the SESCO facility based on the driller's report (Ref. 5).

A water supply source for the City of San Angelo is surface water. Public Water Supply 2260001 is supplied by the Concho River (within the 1-2 mile Target Distance Limit, TDL) and the O.C. Fisher Lake (within the 3-4 mile TDL). The location of these supplies are in Segment 1421 and 1425, respectively and upstream of the PPE (Ref. 47).

People in the vicinity of the SESCO facility do not use well water as a primary source for drinking water, but probably use the well water for drinking while outside (Ref. 17).

A review of the TWDB Water information, Integration & Dissemination Database showed the following wells (Ref. 48):

a. From 0.25 to 0.50 miles - one domestic well
b. From 0.50 to 1 mile - 11 wells: five domestic; two irrigation; four unused
c. From 1 to 2 miles - 15 wells: nine domestic; three irrigation; one unused; two did not have a designated water use
d. From 2 to 3 miles - nine wells: five domestic; two irrigation; two unused
e. From 3 to 4 miles - 26 wells: nine domestic; five irrigation; four stock; seven unused; and one did not have a designated water use.

3.3.1 NEAREST WELL

Well ID: 0.00
Level of Contamination (I, II, or potential): 0.00
If potential contamination, distance from source in miles: 0.00

Nearest Well Factor Value: 0.00
(Table 3-11)

3.3.2 POPULATION

3.3.2.1 Level of Contamination

3.3.2.2 Level I Concentrations

Level I Well	Aquifer No.	Population	Reference
MW8	1	None	Ref. 23

Sum of Population Served by Level I Wells: 0.00
Sum of Population Served by Level I Wells x 10: 0.00

Level I Concentrations Factor Value: 0.00

3.3.2.3 Level II Concentrations

Level II Well	Aquifer No.	Population	Reference
None			

Sum of Population Served by Level II Wells:

Level II Concentrations Factor Value: 0.00

3.3.2.4 Potential Contamination

Distance Category	Population	Reference	Distance-Weighted Population Value (Table 3-12)
None			

Calculations:
Sum of Distance-Weighted Population Values: 0.00
Sum of Distance-Weighted Population Values/10: 0.00

Potential Contamination Factor Value: 0.00

3.3.3 RESOURCES

Well ID	Aquifer No.	Resource Use	Reference
	1	Ground water Usable for Drinking Purposes	Ref. 2; Ref. 25

Resources Factor Value: 5.00

3.3.4 WELLHEAD PROTECTION AREA

Area	Use	Reference	Value
None			

Wellhead Protection Area Factor Value: 0.00

4.0 SURFACE WATER MIGRATION PATHWAY

4.1 OVERLAND/FLOOD MIGRATION COMPONENT - Baze to North Concho River

There are two possible routes to this pathway. One pathway is through the storm water drainage system that leads to the Concho River. An October 14, 2002 investigation revealed that rainfall runoff discharging from the facilities storm water drainage system into Pulliam Street and eastward toward the Pulliam Street railroad underpass. The TxDOT storm water outfall at the intersections of Pope and Tarver Streets begins at the Pulliam Street railroad underpass. This storm water drainage which begins at Pulliam Street parallels the railroad tracks until it discharges at the outfall located at the intersection of Pope and Tarver Streets (Ref. 37). The storm water then flows approximately a half mile through a ravine and subsequently into the Concho River, Texas Stream Segment 1421 of the Colorado River Basin. This stream segment supports a public water supply and fish consumption (Ref. 26).

On March 6, 2003, samples of the ravine were collected to determine extent of contamination from the unauthorized discharge at SESCO. Nine soil samples were collected at various locations in the ravine. Sample analysis indicated PCBs in all soil samples along the ravine (i.e., 0.249 mg/kg, 0.180 mg/kg, 0.130 mg/kg, 0.134 mg/kg, 0.194 mg/kg, 0.242 mg/kg, 0.132 mg/kg, 0.164 mg/kg, and 0.303 mg/kg). One water sample was collected at the junction of the ravine and the Concho River. Analyses indicated PCBs were below the detection limit in the water sample (Ref. 16).

On March 13, 2003, two surface soil samples and one water/transformer oil mixture samples were collected at the TxDOT storm water outfall. The unauthorized discharge of transformer oil from the SESCO facility on March 3, 2002 flowed into the storm water system. The TxDOT outfall soil samples results indicated PCBs at 0.988 mg/kg and 0.873 mg/kg. The water/transformer oil sample at the TxDOT outfall indicate PCB's at 0.238 mg/L (Ref. 8).

One sediment sample was collected at the confluence of the North Concho River and the South Concho River. The results of PCB analysis on the sediment sample were below 1.0 mg/kg (Ref. 5).

The second route is through the SESCO east yard to a culvert on the Texas Department of Transportation/ Texas Pacifico railroad right-of-way. (The shortest distance from a known or potential source of hazardous substances at the site to a perennial-flowing water body is approximately 0.75 mile.) This culvert leads to a drainage pathway along Upton Street to the Pulliam Draw. This Draw drains into the Concho River (Ref. 4). The surface water then, flows 0.75 mile to the North Concho River that converges with the South Concho River approximately 1.2 miles southeast of the facility. The Concho River flows northeast for approximately 45 miles where it empties into the Colorado River. The Colorado River eventually empties into the Gulf of Mexico (Ref. 5).

The elevation of the site slopes toward the Pulliam Draw (Ref. 4). To prevent rainwater from running off the facility, TCEQ Emergency Response constructed a three-foot high soil berm on the inside of the facility perimeter fence. The total length of this berm is 700 feet. Uncontrolled runoff of PCB contaminated water is thought to be the cause of extensive soil contamination (Ref. 19).

During the TCEQ October 2003 sampling event, soil samples were collected along the overland flow segment on Upton Street. PCBs were detected in samples 2057 and 2058. Sample 2057, collected at the surface, consisted of 0.760 mg/kg. Sample 2058, collected at six inches depth, consisted of 0.230 mg/kg (Ref. 6).

The distance from Sample 2058 to Pulliam Draw and to the Concho River is 1.97 miles (Figure 3d). The Pulliam Draw is designated on the U.S.G.S. topographic map as an intermittent stream (Ref. 4). According to the Climatic Atlas of Texas, the average annual precipitation is approximately 20 inches (Ref. 39). No samples were collected in the Pulliam Draw or in the Concho River downstream of the confluence of Pulliam Draw and the Concho River.

Surface water bodies in the area support high amounts of recreational activity such as swimming, boating, and fishing (Ref. 5). There are surface water intakes along the Concho River.

Note: Most recharge to the aquifer is from local precipitation and return flow from applied irrigation water. Ground water is discharged by seepage to the Concho River and its major tributaries and by springflow, evapotranspiration, and withdrawals from wells (Ref. 43).

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

4.1.2.1 Likelihood of Release

4.1.2.1.2 Potential to Release

4.1.2.1.2.1 Potential to Release by Overland Flow

4.1.2.1.2.1.1 Containment

Source No.	Source Haz. Waste Quantity Value ≥0.5? (Y/N)	Containment Factor Value (Table 4-2)	Refs.
4	N	No evidence of hazardous substance migration from source area and: Any two of the following items present: (1) maintained engineered cover, or (2) functioning and maintained run-on control system and runoff management system, or (3) liner with functioning leachate collection and removal system immediately above liner.	7
5	N	Evidence of hazardous substance migration from container area (i.e., container area includes containers and any associated containment structures).	10

Containment Factor Value: 10.00

4.1.2.1.2.1.2 Runoff

Rainfall
2-year, 24-hour Rainfall (inches): 3.50
Reference: Ref. 11

Drainage Area
Drainage area for the watershed (acres): 4,411.00

Drainage Area value: 4.00
(Table 4-3)

Soil Group

Surface Soil Description	Reference	Soil Group Designation (Table 4-4)
Fine-textured soils with very low infiltration rate or Impermeable surfaces	Ref. 12	D

Drainage Area Value (Table 4-3): 4.00
2-year, 24-hour Rainfall: 3.50
Soil Group Designation (Table 4-4): D
Rainfall/Runoff Value (Table 4-5): 6.00

Runoff Factor Value: 25.00
(Table 4-6)

4.1.2.1.2.1.3 Distance to Surface Water

Source No.	Distance to Surface Water	Reference
3	0.67	Ref. 8; Ref. 16; Figure 3d

Shortest distance to surface water: 0.67

Distance to Surface Water Factor Value: 6.00
(Table 4-7)

4.1.2.1.2.1.4 Calculation of Factor Value for Potential to Release by Overland Flow

Runoff Factor Value: 25.00
Distance to Surface Water Factor Value: 6.00

Sum of Values:
Sum of Values x Containment Factor Value:

Potential to Release by Overland Flow Factor Value: 310.00

4.1.2.1.2.2 Potential to Release by Flood

Source No.	Source Haz. Waste Quantity Value ≥0.5? (Y/N)	Flood Containment Factor Value (Table 4-8)	Floodplain Category	Flood Frequency Factor Value (Table 4-9)	Potential to Release by Flood Factor Value*
None					

Notes: * Flood Containment Factor Value x Flood Frequency Factor Value

Potential to Release by Flood Factor Value: 0.00

4.1.2.2 Drinking Water Threat Waste Characteristics

4.1.2.2.1 Toxicity/Persistence

Hazardous Substance	Source No.	Toxicity Factor Value	Persistence Factor Value	Toxicity/ Persistence Factor Value (Table 4-12)	Reference
Polychlorinated biphenyls (PCBs)	3	10,000.00	1.00	10,000.00	

Toxicity/Persistence Factor Value: 10,000.00

4.1.2.2.2 Hazardous Waste Quantity

Source No.	Source Type	Source Hazardous Waste Quantity
1	Contaminated Soil	>0, but unknown
2	Contaminated Soil	>0, but unknown
3	Contaminated Soil	>0, but unknown
4	Drums	0.01
5	Containers other than drums	0.40
6	Contaminated Soil	>0, but unknown

Sum of Values: >0.41

Hazardous Waste Quantity Factor Value: 10.00
(Table 2-6)

4.1.2.2.3 Waste Characteristics Factor Category Value

Toxicity/Persistence Factor Value: 10,000.00
Hazardous Waste Quantity Factor Value: 10.00

Toxicity/Persistence Factor Value x
Hazardous Waste Quantity Factor Value: 100,000.00

Waste Characteristics Factor Category Value: 18.00
(Table 2-7)

4.1.2.3 Drinking Water Threat Targets

A water supply source for the City of San Angelo is surface water. Public Water Supply 2260001 is supplied by the Concho River (within the 1-2 mile TDL) and the O.C. Fisher Lake (within the 3-4 mile TDL). The location of these supplies are in Segment 1421 and 1425, respectively and upstream of the PPE (Ref. 47).

Level I Concentrations

Sample ID	Hazardous Substance	Hazardous Substance Concentration	Benchmark Concentration	Benchmark	Refs.
None					

4.1.2.3.2 Population

4.1.2.3.2.2 Level I Concentrations

Intake	Distance Along the In-water Segment from PPE	Population	References
None			

Sum of Populations Served by Level I Intakes: 0.00
Sum of Populations Served by Level I Intakes x 10: 0.00

Level I Population Factor Value: 0.00

4.1.2.3.2.3 Level II Concentrations

Intake	Distance Along the In-water Segment from PPE	Population	References
None			

Sum of Populations Served by Level II Intakes: 0.00

Level II Population Factor Value: 0.00

4.1.2.3.2.4 Potential Contamination

Intake	Type of Surface Water Body	Average Annual Flow (cfs)	Population Served	References
None				

Sum of Populations Served by Potential Intakes: 0.00

Potential Contamination Factor Value: 0.00

4.1.2.3.3 Resources

Surface Water Body	Resource Use	Reference
Baze to North Concho River	Major/Designated Recreation Area	Ref. 26; Ref. 32

Resources Factor Value: 5.00

4.1.3.2 Human Food Chain Threat Waste Characteristics

4.1.3.2.1 Toxicity/Persistence/Bioaccumulation

Hazardous Substance	Source No.	Toxicity Factor Value	Persistence Factor Value*	Bioaccu-mulation Value**	Toxicity/ Persistence/ Bioaccumulation Factor Value (Table 4-16)	Ref.
Polychlorinated biphenyls (PCBs)	3	10,000.00	1.00	50,000.00	500,000,000.00	Ref. 1; Ref. 3

Notes: * Persistence value for (Lakes or Rivers)
** Bioaccumulation factor value for (Salt or Freshwater)

Toxicity/Persistence/Bioaccumulation Factor Value: 500,000,000.00

4.1.3.2.2 Hazardous Waste Quantity

Source No.	Source Type	Source Hazardous Waste Quantity
1	Contaminated Soil	>0, but unknown
2	Contaminated Soil	>0, but unknown
3	Contaminated Soil	>0, but unknown
4	Drums	0.01
5	Containers other than drums	0.40
6	Contaminated Soil	>0, but unknown

Sum of Values: >0.41, but unknown

Hazardous Waste Quantity Factor Value: 10.00
(Table 2-6)

4.1.3.2.3 Waste Characteristics Factor Category Value

Toxicity/Persistence Factor Value: 10,000.00
Hazardous Waste Quantity Factor Value: 10.00

Toxicity/Persistence Factor Value x
Hazardous Waste Quantity Factor Value: 100,000.00

Toxicity/Persistence Factor Value x
Hazardous Waste Quantity Factor Value x Bioaccumulation Factor Value: 5,000,000,000.00

Waste Characteristics Factor Category Value: 180.00
(Table 2-7)

4.1.3.3 Human Food Chain Threat Targets

Actual Human Food Chain Contamination

Sample ID	Sample Medium	Distance from PPE	Hazardous Substance	Bioaccumulation Factor Value	Refs.
None					

- Closed Fisheries:

Identity of Fishery	Sample ID	Distance from PPE	Hazardous Substance	Refs.
None				

- Benthic Tissue:

Identity of Fishery	Sample ID	Distance from PPE	Hazardous Substance	Organism	Refs.
None					

Level I Concentrations

Sample ID	Sample Medium	Hazardous Substance	Hazardous Substance Concentration	Benchmark Concen-tration	Benchmark	Refs.
None						

Level I Fisheries

Identity of Fishery	Extent of Level I Fishery (Relative to PPE)	Refs.
None		

Level II Fisheries

Identity of Fishery	Extent of Level II Fishery (Relative to PPE or Level I Fishery)	Refs.
None		

4.1.3.3.1 Food Chain Individual

Identity of Fishery	Type of Surface Water Body	Dilution Weight (Table 4-13)	Refs.
North Concho River	Moderate to Large Stream (>100-1,000 cfs)	0.01	Ref. 26; Ref. 32
Concho River	Moderate to Large Stream (>100-1,000 cfs)	0.01	Ref. 26; Ref. 32

Food Chain Individual Factor Value: 0.00

4.1.3.3.2 Population

4.1.3.3.2.1 Level I Concentrations

Identity of Fishery	Annual Production (pounds)	References	Human Food Chain Population Value (Table 4-18)
None			

Sum of Level I Human Food Chain Population Values: 0.00

Sum of Level I Human Food Chain Population Values x 10: 0.00

Level I Concentrations Factor Value: 0.00

4.1.3.3.2.2 Level II Concentrations

Identity of Fishery	Annual Production (pounds)	References	Human Food Chain Population Value (Table 4-18)
None			

Sum of Level II Human Food Chain Population Values: 0.00

Level II Concentrations Factor Value: 0.00

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 (cfs)	Refs.	Population Value (P_i) (Table 4-18)	Dilution Weight (D_i) (Table 4-13)	P_i x D_i
Concho River	1	Moderate to Large Stream (>100-1,000 cfs)	180	Ref. 26; Ref. 27; Ref. 32	0.03	0.01	0.0003
North Concho River	1	Moderate to Large Stream (>100-1,000 cfs)	180	Ref. 26; Ref. 27; Ref. 32	0.03	0.01	0.0003

Sum of P_i x D_i: 6.00E-4

(Sum of P_i x D_i)/10: 6.00E-5

Potential Human Food Chain Contamination Factor Value: 6E-5

4.1.4.2 Environmental Threat Waste Characteristics

4.1.4.2.1 Ecosystem Toxicity/Persistence/Bioaccumulation

Hazardous Substance	Source No.	Ecosystem Toxicity Factor Value	Persistence Factor Value*	Bioaccu-mulation Value**	Ecosystem Toxicity/ Persistence/ Bioaccumulation Factor Value (Table 4-21)	Ref.
Polychlorinated biphenyls (PCBs)	3	10,000.00	1.00	50,000.00	500,000,000.00	Ref. 1; Ref. 3

Notes: * Persistence value for (Lakes or Rivers)
** Bioaccumulation factor value for (Salt or Freshwater)

Ecosystem Toxicity/Persistence/Bioaccumulation Factor Value: 500,000,000.00

4.1.4.2.2. Hazardous Waste Quantity

Source No.	Source Type	Source Hazardous Waste Quantity
1	Contaminated Soil	>0, but unknown
2	Contaminated Soil	>0, but unknown
3	Contaminated Soil	>0, but unknown
4	Drums	0.01
5	Containers other than drums	0.40
6	Contaminated Soil	>0, but unknown

Sum of Values: >0.41, but unknown

Hazardous Waste Quantity Factor Value: 10.00
(Table 2-6)

4.1.4.2.3. Waste Characteristics Factor Category Value

Ecosystem Toxicity/Persistence Factor Value: 10,000.00
Hazardous Waste Quantity Factor Value: 10.00

Ecosystem Toxicity/Persistence Factor Value x
Hazardous Waste Quantity Factor Value: 100,000.00

Toxicity/Persistence Factor Value x
Hazardous Waste Quantity Factor Value x Bioaccumulation Factor Value: 5,000,000,000.00

Waste Characteristics Factor Category Value: 180.00
(Table 2-7)

4.1.4.3 Environmental Threat Targets

Level I Concentrations

Sample ID	Sample Medium	Hazardous Substance	Hazardous Substance Concentration	Benchmark Concen-tration	Benchmark	Refs.
None						

4.1.4.3.1 Sensitive Environments

4.1.4.3.1.1. Level I Concentrations

Sensitive Environments

Sensitive Environment	Distance from PPE to Nearest Sensitive Environment	References	Sensitive Environment Value (Table 4-23)
None			

Sum of Level I Sensitive Environments Value: 0.00

Wetlands

Wetland	Wetland Frontage (miles)	References
None		

Sum of Level I Wetland Frontages: 0.00
Wetlands Value (Table 4-24): 0.00
Sum of Level I Sensitive Environments Value + Wetlands Value: 0.00
(Sum of Level Sensitive Environments Value + Wetlands Value) x 10: 0.00

Level I Concentrations Factor Value: 0.00

4.1.4.3.1.2. Level II Concentrations

Sensitive Environments

Sensitive Environment	Distance from PPE to Nearest Sensitive Environment	References	Sensitive Environment Value (Table 4-23)
None			

Sum of Level II Sensitive Environments Value: 0.00

Wetlands

Wetland	Wetland Frontage (miles)	References
None		

Sum of Level II Wetland Frontages: 0.00
Wetlands Value (Table 4-24): 0.00

Sum of Level II Sensitive Environments Value + Wetlands Value: 0.00

Level II Concentrations Factor Value: 0.00

4.1.4.3.1.3 Potential Contamination

Sensitive Environments

Type of Surface Water Body	Sensitive Environment	References	Sensitive Environment Value (Table 4-23)
Moderate to Large Stream (>100-1,000 cfs)	Concho Water Snake	Ref. 31	75.00

Wetlands

Type of Surface Water Body	Wetland Frontage (miles)	References	Wetlands Value (Table 4-24)
Moderate to Large Stream (>100-1,000 cfs)	0.13	Ref. 1; Ref. 30	25

Type of Surface Water Body	Sum of Sensitive Environments Values (S_j)	Wetland Frontage Value (W_j)	Dilution Weight (D_j) (Table 4-13)	$D_j(W_j + S_j)$
Moderate to Large Stream (>100-1,000 cfs)	75.00	25	0.01	1.00

Sum of $D_j(W_j + S_j)$: 1.00
(Sum of $D_j(W_j + S_j)$)/10: 0.10

Potential Contamination Factor Value: 0.10

5.0 SOIL EXPOSURE PATHWAY

5.0.1 GENERAL CONSIDERATIONS

The primary pathway of concern is the Soil Exposure Pathway. The facility is located on the Mereta soil series. This soil consists of well drained, slowly permeable indurated caliche covered by a thin layer of clay loam (Ref. 12). Based on analytical results from previous investigations, PCB contamination occurs in residential areas bordering the SESCO facility and a soccer field (Ref. 5).

The 416 N. Browning residential property, where PCB contamination in the soil has been identified, is inhabited by a family of five including children (Ref. 17). Three people live at the 418 N. Browning residence in which there was a soil sample collected with a detection above background for PCBs (Ref. 6; Ref. 17).

Soil samples collected identified elevated levels of PCBs in the alley which lies between the residences. Soils samples at the surface contained up to 167.0 mg/kg of PCBs. Soils samples down to 18 inches indicated 5.0 mg/kg (Ref. 10).

Soil samples were collected from the San Angelo Independent School District (SAISD) - San Jacinto Elementary School soccer field at 800 Spaulding Street showed PCBs. Two samples were collected from below the surface and one sample at the surface on the soccer field showed detections of PCBs (Ref. 10; Ref. 24). Two hundred forty students used the facility for soccer and football games. There are two on-site workers at the field (Ref. 28).

Letter by which this area is to be identified: A

Name of area: Off-site Residential Area

Location and description of area (with reference to a map of the site):
Figure 3a -
Off-site Residential Area

Observed Contamination Evidence:

- Background Samples for Area: A

Sample ID	Sample Matrix	Depth	Date	Reference
2049100	N/A	0.00	10/8/2003	Ref. 6

Sample ID	Hazardous Substance	Concentration (µg/L)	Sample Quantitation Limit (µg/L)	Reference
2049100	PCBs	U ug/kg	100.00	Ref. 6

- Contaminated Samples for Area A

Sample ID	Sample Matrix	Depth	Date	Reference
1046703	N/A	0.00	3/4/2003	Ref. 10
1280803	N/A	1.50	3/13/2003	Ref. 8
2054100	N/A	0.00	10/8/2003	Ref. 6
1280509	N/A	0	3/11/2003	Ref. 8

- Observed Contamination Concentrations for Area: A

Sample ID	Hazardous Substance	Concentration (µg/L)		Sample Quantitation Limit (µg/L)	Back-ground Sample Used	Reference
1046703	Polychlorinated biphenyls (PCBs)	4,930.00	ug/kg	2,200.00	2049100	Ref. 6
2054100	Polychlorinated biphenyls (PCBs)	500.00	ug/kg	150.00	2049100	Ref. 6
1280803	Polychlorinated biphenyls (PCBs)	167,000.00	ug/kg	38,000.00	2049100	Ref. 8
1280509	Polychlorinated biphenyls (PCBs)	528	ug/kg	400.00	2049100	Ref. 8; Ref. 14

Letter by which this area is to be identified: B

Name of area: SAISD Activity Field

Location and description of area (with reference to a map of the site):
SAISD activity field is located at 800 Spaulding (Figure 3c)

Observed Contamination Evidence:

- Background Samples for Area: B

Sample ID	Sample Matrix	Depth	Date	Reference
2004100	N/A	0.00	10/7/2003	Ref. 6
5703214	N/A	0.50	3/31/2003	Ref. 50

Sample ID	Hazardous Substance	Concentration (µg/L)	Sample Quantitation Limit (µg/L)	Reference
2004100	Polychlorinated biphenyls (PCBs)	U ug/kg	88.00	Ref. 6
5703214	Polychlorinated biphenyls (PCBs)	U mg/kg	0.20	Ref. 50

- Contaminated Samples for Area B

Sample ID	Sample Matrix	Depth	Date	Reference
1045208	N/A	0.50	3/10/2003	Ref. 14
2002100	N/A	0.00	10/7/2003	Ref. 6

- Observed Contamination Concentrations for Area: B

Sample ID	Hazardous Substance	Concentration (µg/L)	Sample Quantitation Limit (µg/L)	Back-ground Sample Used	Reference
1045208	Polychlorinated biphenyls (PCBs)	1,510.00 ug/kg	710.00	5703214	Ref. 14
2002100	Polychlorinated biphenyls (PCBs)	4,000.00 ug/kg	92.00	2004100	Ref. 6

5.1 RESIDENT POPULATION THREAT

5.1.1 LIKELIHOOD OF EXPOSURE

Sample ID	Distance of Population/Resource from Area of Observed Contamination	Reference
1046703	0.00	Figure 3a
2054100	0.00	Figure 3a
1280509	0.00	Figure 3a
1045208	0.00	Figure 3b

Resident Population Threat Likelihood of Exposure Factor Category Value: 550.00

5.1.2 WASTE CHARACTERISTICS

5.1.2.1 Toxicity

Hazardous Substance	Toxicity Factor Value	Reference
Polychlorinated biphenyls (PCBs)	10,000.00	Ref. 14
Polychlorinated biphenyls (PCBs)	10,000.00	Ref. 6
Polychlorinated biphenyls (PCBs)	10,000.00	Ref. 6
Polychlorinated biphenyls (PCBs)	10,000.00	Ref. 6
Polychlorinated biphenyls (PCBs)	10,000.00	Ref. 8

Toxicity Factor Value: 10,000.00

5.1.2.2 Hazardous Waste Quantity

- Hazardous Constituent Quantity:

Hazardous Substance	Constituent Quantity (pounds)	References
None		

Sum (pounds): 0.00

Hazardous Constituent Quantity Assigned Value: 0.00

- Hazardous Wastestream Quantity:

Hazardous Wastestream	Wastestream Quantity (pounds)	References
None		

Sum (pounds): 0.00
Wastestream Quantity/5,000 (Table 5-2): 0.00

Hazardous Wastestream Quantity Assigned Value: 0.00

- Volume:

Source Type	Description (# drums or dimensions)	Quantity (yd^3/gal)	References
None			

Sum (yd^3/gal): 0.00
Equation for Assigning Value (Table 5-2):

Volume Assigned Value: 0.00

- Area:

Source Type	Description	Quantity (ft^2)	References
Contaminated Soil	Off-Site Residential Area	>0	Ref. 5; Ref. 6; Ref. 8; Ref. 14
Contaminated Soil	SAISD Activity Field	>0	Ref. 5; Ref. 6; Ref. 8; Ref. 10

Sum (ft^2): 0.00
Equation for Assigning Value (Table 5-2): A/34,000

Area Assigned Value: 0.00

S Calculation of Hazardous Waste Quantity Factor Value (2.4.2.2):

Area Letter	Source Type	Hazardous Waste Quantity
A	Contaminated Soil	>0
B	Contaminated Soil	>0

Sum of Values: >0

Hazardous Waste Quantity Factor Value: 10.00
(Table 2-6)

5.1.2.3 Calculation of Waste Characteristics Factor Category Value

Toxicity Factor Value: 10,000.00
Hazardous Waste Quantity Factor Value: 10.00

Toxicity Factor Value x Hazardous Waste Quantity Factor Value: 1.00E+5

Waste Characteristics Factor Category Value: 18.00
(Table 2-7)

5.1.3 TARGETS

5.1.3.1 Resident Individual

Area Letter: A
Level of Contamination (Level I/Level II): I
The 416 N. Browning residential property, where PCB contamination in the soil has been identified, is inhabited by a family of five including children (Ref. 17). Three people live at the 418 N. Browning residence in which there was a soil sample collected with a detection above background for PCBs (Ref. 6; Ref. 17).

Resident Individual Factor Value: 50.00

5.1.3.2 Resident Population

5.1.3.2.1 Level I Concentrations

Area Letter	Sample ID	Number of Residences	County Multiplier	Total No. of Residents	References
A	1046703	1 - 416 N. Browning		5.00	Ref. 17
A	2054100	1 - 418 N. Browning		3.00	Ref. 17
A	1280509	3 - 422, 428, 432 N. Browning	2.52	7.56	Ref. 8; Ref. 14; Ref. 52

Sum of individuals subject to Level I concentrations: 15.56
Sum of individuals subject to Level I concentrations x 10: 155.60

Level I Concentrations Factor Value: 155.60

5.1.3.2.2 Level II Concentrations

Area Letter	Sample ID	Number of Residences	County Multiplier	Total No. of Residents	References
None					

Sum of individuals subject to Level II concentrations: 0.00

Level II Concentrations Factor Value: 0.00

5.1.3.3 Workers

Area Letter	Number of Workers	References
B	2.00	Ref. 17

Total workers: 2.00

Workers Factor Value: 5.00
(Table 5-4)