REDACTED VERSION

Name: Kurt Soutendijk Location: Ingleside, Texas

Site Name: Falcon Refinery

Date: January 12, 1990

REVISED HRS SCORESHEET

INSTRUCTIONS

The recommended overall data collection strategy during the SSI is to refine/verify/augment desktop data collected during the PA, obtain all non-sampling field data, and focus sampling efforts on verifying or limiting "critical" revised HRS factors values. Therefore, during PreScore at the SSI stage, you should be able to refine the preliminary and projected HRS scores for a site based on more accurate and comprehensive site specific information. The preliminary and projected scores for a site should begin to converge toward the "representative" site score. It is important to keep in mind that, as with PreScore at the PA stage, it is the projected HRS score that will be the principle mechanism which determines if a site will go on to an LSI or be recommended for "No Further Remedial Action Planned" under the Federal CERCLA program.

The attached scoresheets are part of the deliverable package for each site involved in the SSI stage of Phase II. During PRESCORE, you should document the preliminary and projected assigned value for each revised HRS factor and subfactor. For each projected HRS value, check one of the three boxes in the "Data Type" column to categorize the type of data used to document that value. Table Values should not be used during PRESCORE at the SSI stage.

H: Hard Data - Data that would satisfy formal HRS quality assurance requirements. This type of data is usually obtained from independent, defensible sources and requires little or no interpretation. A check in this column indicates that data collection for the factor is complete and will require no further investigation.

E: Estimated Data - Reasonable approximation based on the judgment of the SSI investigator. A check in this column indicates that the factor requires further investigation for LSI candidate sites.

D: Database - Data obtained from online database sources (e.g., GEMS).

Provide a reference for each value in the "Raw Data/Reference" column. Also, at a minimum, please complete the calculation tables following each pathway. Waste quantity worksheets provided by MITRE during the June 14th Project Orientation program are included to aid waste quantity calculations. Use the blank sheets to document calculations that were performed or assumptions that were made. For factors which do not require extensive calculations, enter the actual data in the "Raw Data/Reference" column.

953975

SSI PRESCORE SCORESHEETS
SUMMARY SCORESHEET FOR COMPUTING S_m

PRELIMINARY HRS SCORE
DRAFT

	S pathway	S^2 pathway
Air Migration Pathway Score (S_a)	6.49	42.12
Ground Water Migration Pathway Score (S_{gw})	18.82	354.19
Surface Water Migration Pathway Score (S_{sw})	0	0
Onsite Exposure Pathway Score (S_{os})	1.90	3.61
$S^2_a + S^2_{gw} + S^2_{sw} + S^2_{os}$		399.92
$(S^2_a + S^2_{gw} + S^2_{sw} + S^2_{os})/4$		99.98
$\sqrt{(S^2_a + S^2_{gw} + S^2_{sw} + S^2_{os})/4}$		10.00

PROJECTED HRS SCORE
DRAFT

	S pathway	S^2 pathway
Air Migration Pathway Score (S_a)	18.29	334.52
Ground Water Migration Pathway Score (S_{gw})	29.07	845.06
Surface Water Migration Pathway Score (S_{sw})	3.62	13.10
Onsite Exposure Pathway Score (S_{os})	1.90	3.61
$S^2_a + S^2_{gw} + S^2_{sw} + S^2_{os}$		1,196.29
$(S^2_a + S^2_{gw} + S^2_{sw} + S^2_{os})/4$		299.07
$\sqrt{(S^2_a + S^2_{gw} + S^2_{sw} + S^2_{os})/4}$		17.29

PHASE II FIELD TESTING AIR MIGRATION PATHWAY SCORESHEET

Factor Categories and Factors	Max Value	Preliminary HRS Value Assigned	Projected HRS Value Assigned	Data Type				References / Comments
				H	E	D	T	
LIKELIHOOD OF RELEASE								
1. OBSERVED RELEASE	450	0	0					No observed release
2. POTENTIAL TO RELEASE	390	390	390					
Source Containment	3	3	3	x			x	Ref. 1, p. 14; Ref. 13, Table 2-4 and 2-5
Gas	3	3	3	x			x	Ref. 1, p. 14, Ref. 13, Table 2-4 and 2-5
Particulate	3	3	3	x			x	Ref. 1, p. 14, Ref. 13, Table 2-4 and 2-5
Source Type	80	80	80	x			x	Ref. 1, p. 14, Ref. 13, Rable 2-6
Source Mobility	50	50	50	x			x	Ref. 13, Table 2-10
Gas	3	3	3	x			x	Com #2, Ref. 13, Table 2-7 and 2-8, Ref. 1, 4
Particulate	3	2	2	x			x	Com #3, Ref. 13, Figure 2-3, Ref. 1, 4, Table 2-4
3. LIKELIHOOD OF RELEASE (Higher of lines 1 or 2)	450	390	390	x			x	
WASTE CHARACTERISTICS								
4. TOXICITY/MOBILITY	100	60	60		x			Ref. 13, Table 2-12
Toxicity	5	1	1		x			Ref. 4, p. 10/Com 4
Mobility	3	3	3		x			same as above *gas mobility
5. HAZARDOUS WASTE QUANTITY	100	100	100		x			Page 9
6. WASTE CHARACTERISTICS (Lines 4+5)	200	160	160		x			
TARGETS								
7. MEI	50	13	50		x			Ref. 3, Com 5, Ref. 13, Table 2-15
8. POPULATION	235	1	1		x			Ref. 3; Com 6, Ref. 13, Table 2-16
9. LAND USE	10	8	10		x			Ref. 3; Com #7, Ref. 13, Table 2-17
10. SENSITIVE ENVIRONMENTS	100	0	1.0		x			Ref. 3, Ref. 13, Table 2-18, Com 8
11. TARGETS (Lines 7+8+9+10)	235	22	62		x			
12. PATHWAY SCORES(S_a) [Lines 3x6x11)/2.115 x 10^5]	100	6.49	18.29		x			

BF042 (Revised 8/19/88)

Comments (Air)

Calculations: In the space below, document all assumptions, estimates and calculations involved in assigning a projected HRS value.

1. The evaporation pond described in Reference 1 is enclosed, but uncovered. According to Table 2-4, this containment has an assigned value of three.

2. The vapor pressure, Henry's constant and dry relative soil volatility for ortho xylene and butanol are respectively 6.62, 0.0043, 2.73 and 7.06, 0.0000093 and 2.42. Assigned values are found in Table 2-7 and 2-8.

3. Particulate mobility is calculated using the Thornthwaite P-E Index. Where:

$$P\text{-}E = \sum_{i=1}^{12} 115 \times [Pi/(ti-10)]^{10/9}$$

Values of P-E are given in Figure 2-3.

4. The toxicity scores for ortho xyolene and butanol are both as indicated by Reference 4.

5. There is no public water in this area. The nearest home to the site is considered the MEI. This home was found on the topographical map in Reference 3. The preliminary value assumes a distane of greater than one-eighth, and the projected value assumes a distane of less than one eighth.

6. Refer to Comment #6 on Ground Water

7. Single family residents are present and multi family residents are possibly present as manifest by the topograhical map of the area (Ref. 3). The preliminary value assigns a score of eight for single family residences, and the projected assigns a ten for multi family residence.

8. No sensitive environments have been unequivicably identified within a four mile radius of the site, but the gulf coast is within 0.8 miles of the site and could be assigned a value of 100 if used for a purpose that warrants such a score. The preliminary score is 0, but the projected score is calculated as described in Section 2.3.4.

$$ES = (1/10) \prod_{i=1}^{n} Di\ Si$$

$Di = .0517$

$Si = 100$

$ES = .517 = 1.0$

Calculation of Population for Air Migration Pathway

Calculations: In the space below, document all assumptions, estimates and calculations involved in assigning a projected HRS value.

Calculation for Source Mobility Factor for:

p-Xylene
vp - 8.76, HC - .0043
Assigned value = 2 Assign 2

Dry Relative Soil Volitility
= $Pvp/mw^{1/4}$
= $8.76/106^{1/4}$ = 2.73

,C8H10 = 106

Value = 3
Total value = 7
Assigned value = 3

Butanol

Vp = 7.06 HC = .0000093
Value = 2 Value = 1

DRSV
= $Vp/MW^{1/2}$ - 1/4

MW = $CH_2CH_2CH_2CH_2OH$ = C_4H90 = 73

$7.06/73^{1/4}$ = 2.42
Value = 3
Total value = 7
Assigned value = 3

Calculation of Population for Air Migration Pathway

Calculations: In the space below, document all assumptions, estimates and calculations involved in assigning a projected HRS value.

$$PI = 1/100 \sum_{i=1}^{8} Di\ Pi$$

Area (i)	Weighing Factor (Di)	Population (Pi)
0	5.265	0
0 - 1/4	1.0	17.44
1/4 - 1/2	.1751	52.42
1/2 - 1	.0517	204.7
1 - 2	.0171	552.69
2 - 3	.0083	779.64
3 - 4	.0054	854.4
4	0	---

(Di)(Pi)
0
17.44
9.18
10.58
8.93
6.47
4.61
57.21

PI = 57.21/100 = .5721

PHASE II FIELD TESTING GROUND WATER MIGRATION PATHWAY SCORESHEET

Shallow aquifer 4 feet Factor Categories and Factors	Max Value	Preliminary HRS Value Assigned	Projected HRS Value Assigned	Data Type				References Comments
				H	E	D	T	
LIKELIHOOD OF RELEASE								
1. OBSERVED RELEASE	500	0	0					
2. POTENTIAL TO RELEASE								
a. Containment	10	9	10		x			Ref. 1, p. 14; Table 1-2; Comment 1
b. Net Precipitation	10	1	1		x			Ref. 8; Comment 2; Ref. 13 Table 3-3
c. Depth to Aquifer/Hydraulic Conductivity	35	35	35		x			Table 3-8, 3-4 Ref. 1, 9; Comment 3
Depth to Aquifer	7							
Hydraulic Conductivity	3							
d. Sorptive Capacity	5	5	5		x			Ref. 13, Table 3-6, 3-7, Ref. 1, Ref. 9, Comment 3
e. Potential to Release [Lines ax(b+c+d)]	500	369	410		x			
3. LIKELIHOOD OF RELEASE (Higher of lines 1 or 2e)	500	369	410		x			
WASTE CHARACTERISTICS								
4. TOXICITY/MOBILITY	100	60	60	x			x	
Toxicity	5	1	1	x			x	Ref. 4, p. 10 Comment #4 of air migration
Mobility	3	3	3	x				Ref. 4, Comment 4
5. HAZARDOUS WASTE QUANTITY	100	100	100					Page 9
6. WASTE CHARACTERISTICS (Lines 4+5)	200	160	160					
TARGETS								
7. MEI	50	0	0					See comment air migration
8. POPULATION								
a. Level I Concentrations	200	0	0					
b. Level II Concentrations	200	0	0					
c. Level III Concentrations	200	0	0					

PHASE II FIELD TESTING GROUND WATER MIGRATION PATHWAY SCORESHEET

Factor Categories and Factors	Max Value	Preliminary HRS Value Assigned	Projected HRS Value Assigned	Data Type				References / Comments
				H	E	D	T	
d. Potential Contamination	200	0	0		x			Aquifer is 4.5 feet deep and within a mile or less of salt water. This aquifer is unconfined (Ref. 9) and unusable.
e. Population (Lines a+b+c+d, maximum of 200)	200	0	0		x			
9. GROUND WATER USE								
a. Drinking Water Use	50	0	0		x			
b. Other Water Use	20	0	0		x			
c. Ground Water Use (Lines a+b, maximum of 50)	50	0	0		x			
10. SOLE SOURCE AQUIFER	50	0	0		x			
11. TARGETS (Lines 7+8e+9c+10, maximum of 200)	200	0	0		x			
GROUND WATER MIGRATION PATHWAY SCORE								
12. AQUIFER SCORE [(Lines 3x6x11)/2x10^5]	100	0	0		x			
13. PATHWAY SCORE (S_{gw}) (Highest value from Line 12 for all aquifers evaluated)	100				x			

PHASE II FIELD TESTING GROUND WATER MIGRATION PATHWAY SCORESHEET

Deep Aquifer 80 to 130 feet Factor Categories and Factors	Max Value	Preliminary HRS Value Assigned	Projected HRS Value Assigned	Data Type				References Comments
				H	E	D	T	
LIKELIHOOD OF RELEASE								
1. OBSERVED RELEASE	500	0	0		x			No evidence
2. POTENTIAL TO RELEASE								
a. Containment	10	9	10		x			Ref. 1, D; 14; Table I-2; Comment 1
b. Net Precipitation	10	1	1		x			
c. Depth to Aquifer/Hydraulic Conductivity	35	29	29		x			Ref. 9, 10, 11, 12, 13 Com #5; Table 3-8, 3-4
Depth to Aquifer	7							
Hydraulic Conductivity	3							
d. Sorptive Capacity	5	5	5		x			Table 3-6, 3-7 Ref. 9, 10, 11, 12, 13
e. Potential to Release [Lines ax(b+c+d)]	500	315	350		x			
3. LIKELIHOOD OF RELEASE (Higher of lines 1 or 2e)	500	315	350		x			
WASTE CHARACTERISTICS								
4. TOXICITY/MOBILITY	100	60	60	x			x	Same as shallow aquifer
Toxicity	5	1	1	x			x	Same as shallow aquifer
Mobility	3	3	3	x			x	Same as shallow aquifer
5. HAZARDOUS WASTE QUANTITY	100	100	100					Same as shallow aquifer
6. WASTE CHARACTERISTICS (Lines 4+5)	200	160	160	x			x	
TARGETS								
7. MEI	50	22	50					Ref. 3, 10, 11, 12, Table 3-11 See comment 5-A migration
8. POPULATION								
a. Level I Concentrations	200	0	0					No observed release
b. Level II Concentrations	200	0	0					No observed release
c. Level III Concentrations	200	0	0					No observed release

BF042 (Revised 8/19/88)

PHASE II FIELD TESTING GROUND WATER MIGRATION PATHWAY SCORESHEET

Factor Categories and Factors	Max Value	Preliminary HRS Value Assigned	Projected HRS Value Assigned	Data Type				References / Comments
				H	E	D	T	
d. Potential Contamination	200	2.69	3.85		x			Comment 6 Ref. 3, 5, 10, 11, 12, Table 3.14
e. Population (Lines a+b+c+d, maximum of 200)	200	2.69	3.85		x			
9. GROUND WATER USE								
a. Drinking Water Use	50	40	50		x			Comment 7, Table 3-17 Ref. 3, 5, 10, 11, 12, 13
b. Other Water Use	20	10	15		x			Comment 8, Table 3-16 Ref. 3, 5, 10, 11, 12, 13
c. Ground Water Use (Lines a+b, maximum of 50)	50	50	50		x			
10. SOLE SOURCE AQUIFER	50	0	0					Comment 9
11. TARGETS (Lines 7+8e+9c+10, maximum of 200)	200	74.69	103.85		x			
GROUND WATER MIGRATION PATHWAY SCORE								
12. AQUIFER SCORE [(Lines 3x6x11)/$2x10^5$]	100	18.82	29.07		x			
13. PATHWAY SCORE (S_{gw}) (Highest value from Line 12, for all aquifers evaluated)	100	18.82	29.07		x			

Comments and Calculations for Ground Water Migration Pathway

Calculations: In the space below, document all assumptions, estimates and calculations involved in assigning a projected HRS value.

1. The preliminary score assumes a sound diking system and the projected score assumes an unsound diking system. Both values are given in Table 1-2, p. 220 in the HRS manual.

2. The net precipitation is equal to the difference between net evaporation and gross precipitation. These values were calculated for the site by extrapolation of data given on Reference 8.
   The distance between the precipitation contour lines encompassing the site, 32 inches to 28 inches, is 1/2 inch, and the change in precipitation is four inches. The distance to the site from the 32"-contour line is 1/8".

   x/.125 = 32/4, x = 1"

   32" + 1" = 33"

   33 inches is the gross precipitation.

   Net evaporation was calculated by the same method
   x/1.375 = 20/2.125, x = 12.94

   20 + 12.94 = 32.94

   Net precipitation = 33-32.94 = .06"/year

3. Reference 1 notes the shallow aquifer as being four feet deep and reference nine shows that to this depth a sand-silt soil is abundant. A conductivity value of 10-4 cm/sec was assigned from Table 3-8 and a depth to aquifer/hydrolic conductivity value of 35 was assigned from Table 3-4. A sorptive capacity value was assigned Table 3-6 and 3-7.

4. Butanol has a solubility of 7400 mg/l. This is greater than ortho xylene.

5. Reference 10 shows that well depths can be as shallow as 80 feet, and Reference 9 shows that sand-silt soil is most prevalent to this depth.

6. The preliminary value for potential contamination assumes that 70% of the possible water users use well water drawn from this aquifer. The projected value assumes 100% of the possible users use this aquifer.

7. The preliminary score for drinking water use is based on the assumption that water from this aquifer is used by single family residences with no alternate supply. The projected score encompasses the possibility that there could be use of this aquifer for public water supply.

8. The surficial soil found in this area is of poor quality for agriculture and grazing. There is most likely no other water use other than industrial.
   However, there are possibly restaurants using well water.

PHASE II FIELD TESTING SURFACE WATER MIGRATION PATHWAY SCORESHEET

Factor Categories and Factors	Max Value	Preliminary HRS Value Assigned	Projected HRS Value Assigned	Data Type H	Data Type E	Data Type D	Data Type T	References / Comments
DRINKING WATER THREAT								
LIKELIHOOD OF RELEASE								
1. OBSERVED RELEASE	120	0	0		x			No observed release
2. POTENTIAL TO RELEASE BY OVERLAND FLOW								
a. Containment	10	10	10		x			Ref. 1, Com. 1
b. Runoff	6	4	5		x			Com 12, Ref. 6, 7
Rainfall	10	2	2		x			Ref. 13, Table 2, 4.4; Ref. 2, Com 12
Runoff Curve Number	100	40	50		x			Ref. 13, Table 2.4; Ref. 6, 7, Com 12
Drainage Area	3	1	2		x			Ref. 3, Com 2, Ref. 13, Table 4.3
c. Distance to Surface Water	6	2	6		x			Ref. 3, Com 3, Ref. 13, Table 4.6
d. Potential to Release by Overland Flow (Lines ax(b+c))	120	60	110		x			
3. POTENTIAL TO RELEASE BY FLOOD								
a. Containment (Flood)	10	10	10		x			Com 4, Ref. 13, Table 4-7
b. Flood Frequency	12	5	5		x			Ref. 1, p. 9, Ref. 13, Table 4-8
c. Potential to Release by Flood (Lines axb)	120	50	50		x			
4. POTENTIAL TO RELEASE (Lines 2d+3c, maximum of 120)	120	110	120		x			
5. LIKELIHOOD OF RELEASE (Higher of lines 1 or 4)	120	110	120		x			
WASTE CHARACTERISTICS								
6. TOXICITY/PERSISTENCE	100	43	43	x			x	
Toxicity	5	1	1	x			x	Ref. 4
Persistence	3	2	2	x			x	Ref. 4
7. hazardous waste quantity	100	100	100		x			

BF042 (Revised 8/19/88)

PHASE II FIELD TESTING SURFACE WATER MIGRATION PATHWAY SCORESHEET

Factor Categories and Factors	Max Value	Preliminary HRS Value Assigned	Projected HRS Value Assigned	Data Type				References / Comments
				H	E	D	T	
8. WASTE CHARACTERISTICS (Lines 6+7)	200	143	143		x			
TARGETS								
9. MEI	50	0	0					Ref. 3 Ref: (HRS Man., pp. 153-155) Com 5
10. POPULATION					x			
a. Level I Concentrations	200	0	0		x			No hard evidence to
b. Level II Concentrations	200	0	0		x			verify contamination
c. Level III Concentrations	200	0	0		x			
d. Potential Contamination	200	0	0		x			Ref. 3, Com 6
e. Population (Lines a+b+c+d, maximum of 200)	200	0	0		x			
11. SURFACE WATER USE								
a. Drinking Water Use	50	0	0		x			Ref. 3, Com 7
b. Other Water Use	20	0	10		x			Com 14, Ref. 3
c. Surface Water Use (Lines a+b)	50	0	10		x			
12. TARGETS (Lines 9+10e+11c, maximum of 200)	200	0	0		x			
DRINKING WATER THREAT SCORE								
13. DRINKING WATER THREAT (Lines 5x8x12)	4.8×10^6	0	171,600		x			
HUMAN FOOD CHAIN THREAT								
LIKELIHOOD OF RELEASE								
14. LIKELIHOOD OF RELEASE (Same value as Line 5)	120	110	120		x			Same as line 5
WASTE CHARACTERISTICS					x			

BF042 (Revised 8/19/88)

PHASE II FIELD TESTING SURFACE WATER MIGRATION PATHWAY SCORESHEET

Factor Categories and Factors	Max Value	Preliminary HRS Value Assigned	Projected HRS Value Assigned	Data Type				References / Comments
				H	E	D	T	
15. TOXICITY/PERSISTENCE	100	43	43		x			Same as drinking water
Toxicity	5	1	1		x			Same as drinking water
Persistence	3	2	2		x			Same as drinking water
16. HAZARDOUS WASTE QUANTITY	100	100	100		x			Same as drinking water
17. WASTE CHARACTERISTICS (Lines 15+16)	200	143	143		x			
TARGETS					x			
18. POPULATION					x			
a. Potential Contamination	200	0	0		x			
Bioaccumulation Value	6	4	4		x			Ref. 4, Table 4-14
Production Value	8	1	1		x			Ref. Table 4-15, I-5, Com 8
b. Actual Contamination	200	0	0		x			No evidence to meet criteria of 4.2.3.1
c. Population (Lines a+b, maximum of 200)	200	0	0		x			" " " "
19. Fishery Use	50	0	0		x			" " " "
20. Targets (Lines 18c+19, maximum of 200)	200	0	0		x			" " " "
HUMAN FOOD CHAIN THREAT SCORE								
21. HUMAN FOOD CHAIN THREAT (Lines 14x17x20)	4.8×10^6	0	0		x			
HUMAN RECREATION THREAT								
LIKELIHOOD OF RELEASE								
22. LIKELIHOOD OF RELEASE (Same Value as line 5)	120				x			
WASTE CHARACTERISTICS								

BF042 (Revised 8/19/88)

PHASE II FIELD TESTING SURFACE WATER MIGRATION PATHWAY SCORESHEET

Factor Categories and Factors	Max Value	Preliminary HRS Value Assigned	Projected HRS Value Assigned	Data Type				References / Comments
				H	E	D	T	
23. TOXICITY/PERSISTENCE	100							
Toxicity	5							
Persistence	3							
24. HAZARDOUS WASTE QUANTITY	100							
25. WASTE CHARACTERISTICS (Lines 23+24)	200							
TARGETS								
26. POPULATION								
a. Actual Contamination (Highest value assigned to any recreation area, maximum of 200)	200							
Recreation Use	7							
Dose Adjusting Factor	6							
b. Potential Contamination (Highest value assigned to any recreation area, maximum of 200)	200							
c. Population (Higher of values on Lines a or b)	200							
27. TARGETS (Value from Line 26c)	200							
HUMAN RECREATION THREAT SCORE								
28. HUMAN RECREATION THREAT (Lines 22x25x27)	4.8×10^6							
ENVIRONMENTAL THREAT								
LIKELIHOOD OF RELEASE								
29. LIKELIHOOD OF RELEASE (Same value as Line 5)	120	110	120		x			Same as line 5

BF042 (Revised 8/19/88)

PHASE II FIELD TESTING SURFACE WATER MIGRATION PATHWAY SCORESHEET

Factor Categories and Factors	Max Value	Preliminary HRS Value Assigned	Projected HRS Value Assigned	Data Type				References / Comments
				H	E	D	T	
WASTE CHARACTERISTICS								
30. ECOSYSTEM TOXICITY/PERSISTENCE	100	63	63					
Ecosystem Toxicity	5	3	3	x			x	Ref. 4
Persistence	3	2	2	x			x	Same as drinking water
31. HAZARDOUS WASTE QUANTITY	100	100	100		x			
32. WASTE CHARACTERISTICS (Lines 30+31)	200	163	163		x			
TARGETS								
33. SENSITIVE ENVIRONMENTS								
a. Level I Concentrations	120							
b. Level II Concentrations	120							
c. Potential Contamination	120	0	0.1		x			
d. Sensitive Environments (Lines a+b+c, maximum of 120)	120	0	0.1		x			Com 13
34. TARGETS (Value from Line 33d)	120	0	0.1		x			
ENVIRONMENTAL THREAT SCORE								
35. ENVIRONMENTAL THREAT (Lines 29x32x34)	2.88×10^6	0	1,956.00		x			
SURFACE WATER MIGRATION PATHWAY SCORE FOR A WATERSHED								
36. WATERSHED SCORE [(Lines 13+21+28+35)/48,000, maximum of 100)	100	0	3.62		x			
SURFACE WATER MIGRATION PATHWAY SCORE								

BF042 (Revised 8/19/88)

PHASE II FIELD TESTING SURFACE WATER MIGRATION PATHWAY SCORESHEET

Factor Categories and Factors	Max Value	Preliminary HRS Value Assigned	Projected HRS Value Assigned	Data Type				References / Comments
				H	E	D	T	
37. PATHWAY SCORE (S_{sw}) (Sum of scores from Line 36 for all watersheds evaluated, maximum of 100)	100	0	3.62		x		

Ref. 7926

Comment #2 Calculations

1 mile = 5.25 inches

1.5 inches = radius of arc

x miles/1.5 inches = 1 mile/5.25 inches

x miles = 1.5 miles/5.25 miles

x miles = .2857 miles

45°/360° $\Pi r2$ = area of semi circle, where 45° is the angle of the arc

r = .2857 miles

45°/360° = .125 = 1/8

Π = 3.14

Area = $(.125)(3.14)(.29)^2 = 3.3 \times 10^{-2}$ miles^2

1 km^2 = .3861 miles^2

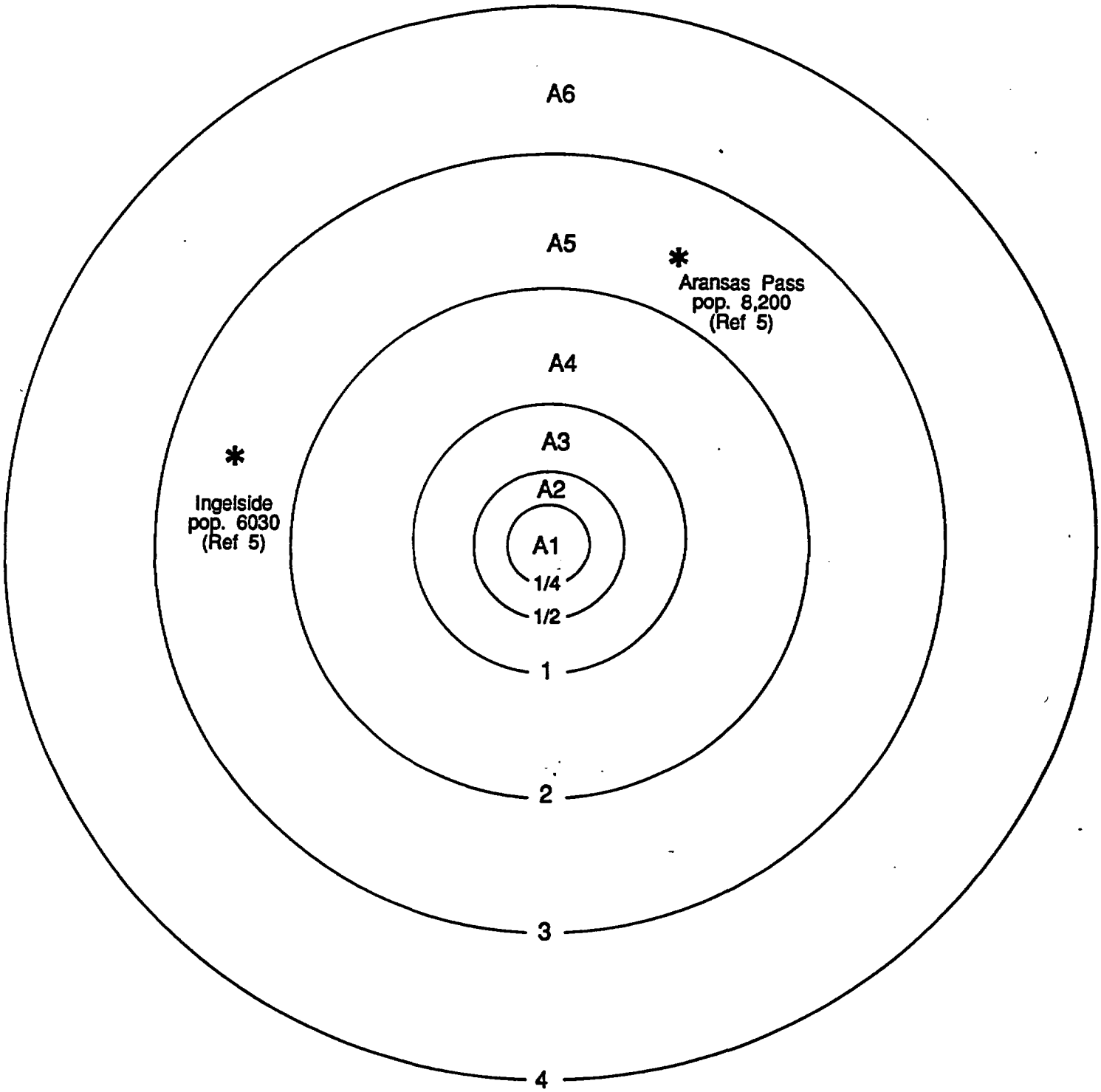
.01 km^2 = 2.47 acres

100 = .3861 miles^2/2.47 acres

1 mile^2 = (2.47 acres)(100)/.3861 miles^2 = 639.7 acres

$$x \text{ acres}/3.3 \times 10^{-2} = \frac{639.7 \text{ acres}}{1 \text{ mile}^2}$$

$x = 3.3 \times 10^{-2}$ (639.7 acres) = 21.1 acres



* Ingelside and Aransas Pass use surface water from Lake Corpus Christi.

F0037.CDR

Area #	Formula	Area r (Miles)	Area Value (mile^2)	% Ocean	Net (miles^2) Area
A_1	Πr^2	1/4	.196	0	.196
A_2	$\Pi r_2^2 - A_1$	1/2	.589	0	.589
A_3	$\Pi r_2^2 - A2$	1	2.55	10	2.30
A_4	$\Pi r_2^2 - A3$	2	10.01	38	6.20
A_5	$\Pi r^2 - A4$	3	18.226	52	8.76
A_6	$\Pi r_2 - A5$	4	32.00	70	9.6

Area #	(Miles^2) Net Area	(Ref. 5) Population/Miles^2	City Population	Total Population
A_1	.196	89	--	17.44
A_2	.589	89	--	52.42
A_3	2.30	89	--	204.7
A_4	6.21	89	14,500*	552.69
A_5	8.76	89	--	779.64
A_6	9.6	89	--	854.4

Area #	Total Population	Dilution Factor	(Total Population) x (Dilution Factor)
A_1	17.44	1.00	17.44
A_2	52.422	.62	32.50
A_3	204.7	.32	65.504
A_4	552.69	.18	99.48
A_5	779.64	.13	101.27
A_6	854.4	.08	68.32

Potential Contamination Score 384.514/100 = 3.85

* Not added to Total Population because using city water (Ref. 10).

Comments and Calculations for Surface Water Migration Pathway

Calculations: In the space below, document all assumptions, estimates and calculations involved in assigning a projected HRS value.

1. Reference 1 states there is an uncovered waste pond on-site. I-4 assigns a score of 10.

2. The appropriate drainage area was calculated by making several assumptions; they are: all upgradient land, including only half of the most elevated ara, encompassed in a 45° semicircle radiating from the site, contribute to the site drainage area. In this case, the radius of the semicircle is 1.5" and map scale is 1 mile = 5.25". Thus 1.5" = .29 miles. The area of the semicircle is equal to 1/8th the total area of the circle, which is equal to πr^2. Using these parameters, the drainage area is calculated to be 21.1 acres.

3. The site is located 1/2 mile or 2,640 feet from the gulf, but it is possible there intermitten are other bodies of water nearer to the site due to inundation.

4. No attestation exist that the evaporation pond is secure against flood; therefore a score of 10 was assigned.

5. The nearest body of water is the gulf. A dillution factor of .001 was assigned and an MEI value of 50 times the dillution factor is .05.

6. The ocean water is not used for drinking water; therefore the population is zero.

7. (Same as #6)

8. The preliminary score is based on the assumption that 57 lb/year x acre of fish are produced and that only 1 acre of water is applicable.

* Comments 9, 10 and 11 were not necessary because the recreation pathway has been expunged.

12. The runoff value is for soil type A, as according to Reference 6 and Reference 7. The preliminary score assumes the land is open grass covered area with good cover, and the projected score assumes the cover is poor.

13. A projected sensitive environment value of 100 is assigned and a preliminary value of 0. The dilution weighing factor is .001.

14. The topographical map shows industrial land use in this area. However, there exact water supply is unknown.

PHASE II FIELD TESTING ONSITE EXPOSURE PATHWAY SCORESHEET

Factor Categories and Factors	Max Value	Preliminary HRS Value Assigned	Projected HRS Value Assigned	Data Type				References / Comments
				H	E	D	T	
RESIDENT POPULATION THREAT								
1. LIKELIHOOD OF RELEASE	100	0	0		x			No observed release due to
2. WASTE CHARACTERISTICS	5	0	0					lack of evidence to substantiate
Toxicity	5	0	0					a release
3. TARGETS								
a. High Risk Population	100	0	0					
b. Total Resident Population	100							
c. Terrestrial Sensitive Environments	25	0	0					
d. Targets (Lines a+b+c, maximum of 100)	100	0	0					
4. RESIDENT POPULATION THREAT (Lines 1x2x3d)	$5x10^4$	0	0		x			
NEARBY POPULATION THREAT								
5. LIKELIHOOD OF EXPOSURE								
a. Waste Quantity	100	100	100		x			Ref. 1, Com 1
b. Accessibility/Frequency of Use	100	75	75		x			Com 2
c. Likelihood of Exposure (Value from Table 5-5)	100	100	100		x			Ref. 1, Com 2 and 1
6. WASTE CHARACTERISTICS	5							
Toxicity	5	1	1	x			x	Ref. 4
7. TARGETS								
a. Nearby Population	100	9.478	9.478		x			Comment 3
8. NEARBY POPULATION THREAT (Lines 5cx6x7a)	$5x10^4$	947.8	947.8		x			
9. PATHWAY SCORE (S_{os}) (Lines [4+8]/500, maximum of 100)	100	1.90	1.90		x			

BF042 (Revised 8/19/88)

Comments for the On-Site Migration Pathway

Calculations: In the space below, document all assumptions, estimates and calculations involved in assigning a projected HRS value.

1. The area of the site is 91.12 acres (Ref. 1). 1 acre = 43,560 square feet; therefore, 91.12 acres = 3,969,187.2 square feet. A value of 100 was assigned.

2. The contamination of on-site areas is unequivicable, as manifest by Reference 1. There is no evidence of fencing. A value of 75 is therefore assigned to the site.

3. Population values were taken for Comment #6 for Ground Water Migration.

Area #	Population	Dilution Factor	PHi
A1	17.44	.1	1.74
A2	52.42	.05	2.62
A3	204.7	.025	5.118
		PH =	9.478

REFERENCES

Reference Number	Description of the Reference
01	U.S. EPA Potential Hazardous Waste Site Inspection Report. Prepared by Bradley Morris and Brenda Cook, Ecology and Environment, Inc. June 12, 1987.
02	Herschfield, D.M., 1961, Rainfall Frequency Atlas of the United States. U.S. Weather Bureau Technical Paper No. 40.
03	U.S.G.S. Topographical Map. Quadrangles - Aransas Pass and Port Ingleside. 1968. Photorevised 1975. 7.5 Minute Series.
04	MITRE Raw Chemical Data values for HRS Scoring. April, 1988.
05	County and City Data Book, 1988, U.S. Department of Commerce Bureau of the Census.
06	Soil Survey of San Palricio and Arkansas Counties, Texas. U.S. Department of Agriculture, Soil Conservation Service. 1979.
07	U.S. Department ot Agriculture, Soil Conservation Service, Technical Release No. 55, Urban Hydrology for Small Watersheds. 1976.
08	Summary Appraisal of the Nations Ground Water Resources, Texas, Gulf Region, Geological Survey Professional Paper 813-F. 1976.
09	Stratigraphic and Hydrogeologic Framework of Part of the Coastal Plains of Texas, Texas Department of Water Resources. 1979.
10	Record of Communication. To: Jimmy Durham, Arkansas Water Department. From: Kurt Soutendijk, FIT Chemist. EPA Region VI. Re: Falcon Refinery. November 16, 1989.
11	Record of Communication. To: Wilfred Hansen, Sinton County Health Office. From: Kurt Soutendijk, FIT Chemist. EPA Region VI. Re: Falcon Refinery. November 16, 1989.
12	Record of Communication. To: George Kneuper, Ingleside Water Department. From: Kurt Soutendijk, FIT Chemist. EPA Region VI. Re: Falcon Refinery. November 16, 1989.
13	U.S. EPA Hazard Ranking System (HRS) for Uncontrolled Hazardous Substance Releases, Appendix A of the National Oil and Hazardous Substances Contingency Plan; Proposed Rule. 40 CFR Part 300, December 23, 1988.

1

F06-8708-16

REFERENCE 1

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

VI	TXD086278058

GENERAL INSTRUCTIONS: Complete Sections I and III through XV of this form as completely as possible. Then use the information on this form to develop a Tentative Disposition (Section II). File this form in its entirety in the regional Hazardous Waste Log File. Be sure to include all appropriate Supplemental Reports in the file. Submit a copy of the forms to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force (EN-335); 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME: Falcon Refinery (AKA UNI, Midgulf & FRC)

B. STREET (or other identifier): Farm Rd. 2725 & Bishop Road

C. CITY: Ingleside

D. STATE: TX

E. ZIP CODE: 78362

F. COUNTY NAME: San Patricio

G. SITE OPERATOR INFORMATION

1. NAME: Falcon Refining Company

2. TELEPHONE NUMBER: (713)270-1300

3. STREET: 7322 Southwest Freeway Suite 850

4. CITY: Houston

5. STATE: TX

6. ZIP CODE: 77074

H. REALTY OWNER INFORMATION (if different from operator of site)

1. NAME: American Energy Leasing C/O Corporation Trust Co., N. 100th and W 10th

2. TELEPHONE NUMBER: (302)658-7581

3. CITY: Wilmington

4. STATE: Delaware

5. ZIP CODE: 19801

I. SITE DESCRIPTION: Abandoned Petroleum Refinery Complex.

J. TYPE OF OWNERSHIP

- [ ] 1. FEDERAL
- [ ] 2. STATE
- [ ] 3. COUNTY
- [ ] 4. MUNICIPAL
- [X] 5. PRIVATE

II. TENTATIVE DISPOSITION (complete this section last)

A. ESTIMATE DATE OF TENTATIVE DISPOSITION (mo., day, & yr.):

B. APPARENT SERIOUSNESS OF PROBLEM

- [ ] 1. HIGH
- [X] 2. MEDIUM
- [ ] 3. LOW
- [ ] 4. NONE

C. PREPARER INFORMATION

1. NAME: James Stacks

2. TELEPHONE NUMBER: (214)742-6601

3. DATE (mo., day, & yr.): 12-14-87

III. INSPECTION INFORMATION

A. PRINCIPAL INSPECTOR INFORMATION

1. NAME: James Stacks

2. TITLE: FIT Chemist

3. ORGANIZATION: Ecology and Environment, Inc., 1509 Main, Dallas, TX 75201

4. TELEPHONE NO. (area code & no.): (214)742-6601

B. INSPECTION PARTICIPANTS

1. NAME	2. ORGANIZATION	3. TELEPHONE NO.
Brenda Cook	Ecology and Environment, Inc.	(214)742-6601

C. SITE REPRESENTATIVES INTERVIEWED (corporate officials, workers, residents)

1. NAME	2. TITLE & TELEPHONE NO.	3. ADDRESS
Claude Richey	Plant Manager (713)270-1300	7322 Southwest Fry. #850, Houston, 77074

Continued From Front

III. INSPECTION INFORMATION *(continued)*

D. GENERATOR INFORMATION *(sources of waste)*

1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE GENERATED
Tenneco	(713)757-2131	1010 Milam, Houston, TX	Unknown solvents

E. TRANSPORTER/HAULER INFORMATION

1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE TRANSPORTED
Unknown			

F. IF WASTE IS PROCESSED ON SITE AND ALSO SHIPPED TO OTHER SITES, IDENTIFY OFF-SITE FACILITIES USED FOR DISPOSAL.

1. NAME	2. TELEPHONE NO.	3. ADDRESS
Chemical Waste Management Inc.	512-852-8284	6901 Greenwood, Corpus Christi, TX

G. DATE OF INSPECTION (mo., day, & yr.)	H. TIME OF INSPECTION	I. ACCESS GAINED BY: *(credentials must be shown in all cases)*
9-14-87	1300 hr.	☒ 1. PERMISSION ☐ 2. WARRANT

J. WEATHER *(describe)*

90°F, sunny, partly cloudy.

IV. SAMPLING INFORMATION

A. Mark 'X' for the types of samples taken and indicate where they have been sent e.g., regional lab, other EPA lab, contractor, etc. and estimate when the results will be available.

1. SAMPLE TYPE	2. SAMPLE TAKEN (mark 'X')	3. SAMPLE SENT TO:	4. DATE RESULTS AVAILABLE
a. GROUNDWATER			
b. SURFACE WATER			
c. WASTE			
d. AIR			
e. RUNOFF			
f. SPILL			
g. SOIL			
h. VEGETATION			
i. OTHER *(specify)*	X	No samples taken during inspection.	

B. FIELD MEASUREMENTS TAKEN *(e.g., radioactivity, explosivity, PH, etc.)*

1. TYPE	2. LOCATION OF MEASUREMENTS	3. RESULTS
RAD 4 mini	Main facility	No readings above background
HNU	Main facility	No readings above background

recycled paper
ecology and environment

Continued From Page 2

IV. SAMPLING INFORMATION (continued)

C. PHOTOS

1. TYPE OF PHOTOS: [X] a. GROUND [ ] b. AERIAL
2. PHOTOS IN CUSTODY OF: U.S. EPA (See Attachments)

D. SITE MAPPED?

[X] YES. SPECIFY LOCATION OF MAPS: U.S EPA (See Attachments)

E. COORDINATES

1. LATITUDE (deg.-min.-sec.): 27° 51' 38" N
2. LONGITUDE (deg.-min.-sec.): 97° 10' 44" W

V. SITE INFORMATION

A. SITE STATUS

[ ] 1. ACTIVE (Those industrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if infrequently.)

[ ] 2. INACTIVE (Those sites which no longer receive wastes.)

[X] 3. OTHER (specify): Facility may have received waste material (Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)

B. IS GENERATOR ON SITE?

[ ] 1. NO [X] 2. YES (specify generator's four-digit SIC Code): 2911

C. AREA OF SITE (in acres): 91.12

D. ARE THERE BUILDINGS ON THE SITE?

[ ] 1. NO [X] 2. YES (specify): Refinery control rooms, portable office and lab, guardhouses.

VI. CHARACTERIZATION OF SITE ACTIVITY

Indicate the major site activity(ies) and details relating to each activity by marking 'X' in the appropriate boxes.

X	A. TRANSPORTER	X	B. STORER	X	C. TREATER	X	D. DISPOSER
	1. RAIL		1. PILE		1. FILTRATION		1. LANDFILL
	2. SHIP	X	2. SURFACE IMPOUNDMENT		2. INCINERATION		2. LANDFARM
X	3. BARGE	X	3. DRUMS		3. VOLUME REDUCTION		3. OPEN DUMP
X	4. TRUCK	X	4. TANK (ABOVE GROUND)		4. RECYCLING/RECOVERY	X	4. SURFACE IMPOUNDMENT
	5. PIPELINE		5. TANK (BELOW GROUND)	X	5. CHEM./PHYS./TREATMENT		5. MIDNIGHT DUMPING
	6. OTHER (specify):		6. OTHER (specify):		6. BIOLOGICAL TREATMENT		6. INCINERATION
					7. WASTE OIL REPROCESSING		7. UNDERGROUND INJECTION
					8. SOLVENT RECOVERY		8. OTHER (specify):
					9. OTHER (specify):		

E. SUPPLEMENTAL REPORTS: If the site falls within any of the categories listed below, Supplemental Reports must be completed. Indicate which Supplemental Reports you have filled out and attached to this form.

[X] 1. STORAGE [ ] 2. INCINERATION [ ] 3. LANDFILL [X] 4. SURFACE IMPOUNDMENT [ ] 5. DEEP WELL

[ ] 6. CHEM/BIO/PHYS TREATMENT [ ] 7. LANDFARM [ ] 8. OPEN DUMP [ ] 9. TRANSPORTER [ ] 10. RECYCLOR/RECLAIMER

VII. WASTE RELATED INFORMATION

A. WASTE TYPE

[X] 1. LIQUID [ ] 2. SOLID [X] 3. SLUDGE [ ] 4. GAS

B. WASTE CHARACTERISTICS

[ ] 1. CORROSIVE [ ] 2. IGNITABLE [ ] 3. RADIOACTIVE [X] 4. HIGHLY VOLATILE

[ ] 5. TOXIC [ ] 6. REACTIVE [ ] 7. INERT [ ] 8. FLAMMABLE

[X] 9. OTHER (specify): Toxicity is not established, but the vapor is noxious.

C. WASTE CATEGORIES

1. Are records of wastes available? Specify items such as manifests, inventories, etc. below.

There are a number of log books and other documents located in the control rooms and offices on-site which may contain information about materials received and processed.

ecology and environment

recycled paper

Continued From Front

VII. WASTE RELATED INFORMATION *(continued)*

2. Estimate the amount *(specify unit of measure)* of waste by category: mark 'X' to indicate which wastes are present.

a. SLUDGE	b. OIL	c. SOLVENTS	d. CHEMICALS	e. SOLIDS	f. OTHER
AMOUNT: Unknown	AMOUNT: 75000	AMOUNT: Unknown	AMOUNT: None	AMOUNT: None	AMOUNT: None
UNIT OF MEASURE:	UNIT OF MEASURE: gallons	UNIT OF MEASURE:	UNIT OF MEASURE:	UNIT OF MEASURE:	UNIT OF MEASURE:
'X' (1) PAINT. PIGMENTS	'X' X (1) OILY WASTES	'X' (1) HALOGENATED SOLVENTS	'X' (1) ACIDS	'X' (1) FLYASH	'X' (1) LABORATORY. PHARMACEUT.
(2) METALS SLUDGES	(2) OTHER(specify):	X (2) NON-HALOGNTD. SOLVENTS	(2) PICKLING LIQUORS	(2) ASBESTOS	(2) HOSPITAL
(3) POTW		(3) OTHER(specify):	(3) CAUSTICS	(3) MILLING/MINE TAILINGS	(3) RADIOACTIVE
(4) ALUMINUM SLUDGE			(4) PESTICIDES	(4) FERROUS SMELTING WASTES	(4) MUNICIPAL
X (5) OTHER(specify): Oil sludge and API separator residue.			(5) DYES/INKS	(5) NON-FERROUS SMLTG. WASTES	(5) OTHER(specify):
			(6) CYANIDE	(6) OTHER(specify):	
			(7) PHENOLS		
			(8) HALOGENS		
			(9) PCB		
			(10) METALS		
			(11) OTHER(specify):		

Types of waste repeated from P.A. but some new waste types added

D. LIST SUBSTANCES OF GREATEST CONCERN WHICH ARE ON THE SITE *(place in descending order of hazard)*

1. SUBSTANCE	2. FORM (mark 'X') a. SOLID	b. LIQ.	c. VAPOR	3. TOXICITY (mark 'X') a. HIGH	b. MED.	c. LOW	d. NONE	4. CAS NUMBER	5. AMOUNT	6. UNIT
1-phenylethanol		X						98-85-1	Unknown	
Xylene		X						1330-20-7	Unknown	
Cyclohexanediol		X						931-17-9	Unknown	
Butanol		X						71-36-3	Unknown	

Specific waste on site

VIII. HAZARD DESCRIPTION

FIELD EVALUATION HAZARD DESCRIPTION: Place an 'X' in the box to indicate that the listed hazard exists. Describe the hazard in the space provided.

X A. HUMAN HEALTH HAZARDS

Local residents have attributed headaches, rashes, and nausea to volatiles relesed from the site.

recycled paper
recycled paper
recycled paper
recycled paper

ecology and environment
ecology and environment
ecology and environment
ecology and environment

Continued From Page 4

VIII. HAZARD DESCRIPTION (continued)

[X] B. NON-WORKER INJURY/EXPOSURE

Local resident (b) (6) [redacted] who lives on (b) (6) [redacted], reported that her son fell into a "sinkhole" associated with a Falcon Pipeline on her property and was covered with an oily sludge.

[ ] C. WORKER INJURY/EXPOSURE

[ ] D. CONTAMINATION OF WATER SUPPLY

[ ] E. CONTAMINATION OF FOOD CHAIN

[X] F. CONTAMINATION OF GROUND WATER

Due to the very shallow alluvial aquifer (15 ft.), release of substances to groundwater is highly probable.

aquifer is shallow alluvial aquifer

[X] G. CONTAMINATION OF SURFACE WATER

There is evidence of runoff from the site into Redfish Bay, and the spill reported by TACB (Attachment B) involved the marshy zone directly connected to the bay.

evidence of

recycled paper
ecology and environment

Continued From Front

VIII. HAZARD DESCRIPTION (continued)

☐ H. DAMAGE TO FLORA/FAUNA

☐ I. FISH KILL

☒ J. CONTAMINATION OF AIR

The TACB report (Attachment 8) describes the release of volatiles to surrounding areas.

Potential release of volatiles to air

☒ K. NOTICEABLE ODORS

Local residents have complained to the Ingleside Police Dept., TACB, and EPA about odors from the site.

☐ L. CONTAMINATION OF SOIL

☐ M. PROPERTY DAMAGE

recycled paper
recycled paper
recycled paper
recycled paper
ecology and environment
ecology and environment
ecology and environment
ecology and environment

Continued From Page 6

VIII. HAZARD DESCRIPTION (continued)

☐ N. FIRE OR EXPLOSION

☒ O. SPILLS/LEAKING CONTAINERS/RUNOFF/STANDING LIQUID

One leaking container was noted during the FIT inspection on 9-14-87. The TACB report of 4-9-87 describes a pipeline leak at the facility which was the source of a 30' by 60 zone of contaminated soil (Attachment B).

Documentation of leaking storage tank

☐ P. SEWER, STORM DRAIN PROBLEMS

☐ Q. EROSION PROBLEMS

☐ R. INADEQUATE SECURITY

☐ S. INCOMPATIBLE WASTES

ecology and environment
recycled paper

VIII. HAZARD DESCRIPTION (continued)

☐ T. MIDNIGHT DUMPING

☒ U. OTHER (specify): On 8-10-87, FIT was tasked to perform a recon inspection of the Falcon Refinery site, to develop a plan for sampling of the site, and to determine the potential for migration into the intercoastal waterway. The sampling plan is included herein.

An inspection was performed by James Stacks and Brenda Cook on 9-14-87. The team observed a large petroleum refinery complex covering approximately 90 acres. Objects of interest included a main processing area, 22 large storage tanks, an elaborate network of pipelines leading to a dock facility in Redfish Bay (Gulf of Mexico), a waste pond, an API separator and clarifier, a truck terminal, offices, control rooms complete with records, a small laboratory, and approximately 48 drums containing some type of material. A marshy area of Redfish bay is located SE of the facility, vacant land is to the SW, a small fabricating business is to the NW, and a small residential area lies to the NE. A site sketch and photographs are attached showing the locations of the above areas.

The team noted a strong organic odor (not a typical petroleum odor) throughout the facility. Because of this, the team was limited in the extent to which contents of tanks and waste volume could be estimated because of risk of exposure and safety factors. Appropriate levels of personal protection should be used in any future operations.

Interviews with various officials and residents and a file search has indicated that the facility was built in 1977 by UNI Oil, Inc. In 1980, title to the facility was transferred to Mid Gulf Energy. In 1985, title was transferred to Falcon Refining (See Attachment A).

IX. POPULATION DIRECTLY AFFECTED BY SITE

A. LOCATION OF POPULATION	B. APPROX. NO. OF PEOPLE AFFECTED	C. APPROX. NO. OF PEOPLE AFFECTED WITHIN UNIT AREA	D. APPROX. NO. OF BUILDINGS AFFECTED	E. DISTANCE TO SITE (specify units)
1. IN RESIDENTIAL AREAS	5000	150	1000	3 MI
2. IN COMMERCIAL OR INDUSTRIAL AREAS	2500	100	300	3 MI
3. IN PUBLICLY TRAVELLED AREAS	5000	1000	300	3MI
4. PUBLIC USE AREAS (parks, schools, etc.)	2000	10	20	3MI

X. WATER AND HYDROLOGICAL DATA

A. DEPTH TO GROUNDWATER (specify units)	B. DIRECTION OF FLOW	C. GROUNDWATER USE IN VICINITY
4.5 FT.	SOUTH	INDUSTRIAL (NO DRINKING)
D. POTENTIAL YIELD OF AQUIFER	**E. DISTANCE TO DRINKING WATER SUPPLY (specify unit of measure)**	**F. DIRECTION TO DRINKING WATER SUPPLY**
>1000 GAL/MIN	10 MI	NW

G. TYPE OF DRINKING WATER SUPPLY

☐ 1. NON-COMMUNITY < 15 CONNECTIONS ☒ 2. COMMUNITY (specify town): > 15 CONNECTIONS INGLESIDE (CORPUS CHRISTI)

☒ 3. SURFACE WATER ☐ 4. WELL

Continue On Page 9
ecology and environment
recycled paper

Continued From Page 8

X. WATER AND HYDROLOGICAL DATA (continued)

H. LIST ALL DRINKING WATER WELLS WITHIN A 1/4 MILE RADIUS OF SITE

1. WELL	2. DEPTH (specify unit)	3. LOCATION (proximity to population/buildings)	4. NON-COMMUNITY (mark 'X')	5. COMMUNITY (mark 'X')
		No drinking water wells within 1/4 mile.		

I. RECEIVING WATER

1. NAME Redfish Bay (Gulf of Mexico)

☐ 2. SEWERS ☐ 3. STREAMS/RIVERS ☐ 4. LAKES/RESERVOIRS ☒ 5. OTHER (specify):

6. SPECIFY USE AND CLASSIFICATION OF RECEIVING WATERS

Shellfish waters, contact recreation, exceptional quality aquatic habitat-state (TWC) Water Quality Standards include:Minimum 5mg/l dissolved O_2, pH 6.5-9.0, fecal coliform < 14 100/ml.

XI. SOIL AND VEGETATION DATA

LOCATION OF SITE IS IN:

☐ A. KNOWN FAULT ZONE ☐ B. KARST ZONE ☒ C. 100 YEAR FLOOD PLAIN ☒ D. WETLAND

☐ E. A REGULATED FLOODWAY ☐ F. CRITICAL HABITAT ☐ G. RECHARGE ZONE OR SOLE SOURCE AQUIFER

XII. TYPE OF GEOLOGICAL MATERIAL OBSERVED

Mark 'X' to indicate the type(s) of geological material observed and specify where necessary, the component parts.

'X'	A. OVERBURDEN	'X'	B. BEDROCK (specify below)	'X'	C. OTHER (specify below)
	1. SAND			X	Quaternary sands, silts, and clays.
	2. CLAY				
	3. GRAVEL				

XIII. SOIL PERMEABILITY

☐ A. UNKNOWN ☐ B. VERY HIGH (100,000 to 1000 cm/sec.) ☐ C. HIGH (1000 to 10 cm/sec.)

☒ D. MODERATE (10 to .1 cm/sec.) ☐ E. LOW (.1 to .001 cm/sec.) ☐ F. VERY LOW (.001 to .00001 cm/sec.)

G. RECHARGE AREA

☒ 1. YES ☐ 2. NO 3. COMMENTS

H. DISCHARGE AREA

☐ 1. YES ☒ 2. NO 3. COMMENTS

I. SLOPE

1. ESTIMATE % OF SLOPE: 0.5%

2. SPECIFY DIRECTION OF SLOPE, CONDITION OF SLOPE, ETC.: Southeast from 5 ft. elevation to coast line.

J. OTHER GEOLOGICAL DATA

Located on Quaternary Beaumont Formation barrier island and beach desposits which form part of the Chicot Aquifer. Local groundwater reported to be unusable due to salt water and industrial contamination.

ecology and environment
recycled paper

Continued From Front

XIV. PERMIT INFORMATION

List all applicable permits held by the site and provide the related information.

A. PERMIT TYPE (e.g., RCRA, State, NPDES, etc.)	B. ISSUING AGENCY	C. PERMIT NUMBER	D. DATE ISSUED (mo., day, & yr.)	E. EXPIRATION DATE (mo., day, & yr.)	F. IN COMPLIANCE (mark "X") 1. YES	2. NO	3. UNKNOWN
Solid Waste Registration	TWC	31288	9-21-78	Inactive on 6-1-87			X
Wastewater Disposal	TWC	02142	3-30-83	30-30-88			X
Texas Clean Air Act	TACB	C-5027 C-6625	9-29-78 5-21-82	9-20-93 5-21-97		X	
NPDES	EPA	TX0076635	12-17-86	12-16-86		X	
PSD (Clean air Act)	EPA	PSD-TX-229	3-12-82	9-12-83			X

XV. PAST REGULATORY OR ENFORCEMENT ACTIONS

☐ NONE ☒ YES (summarize in this space)

4-16-80 TDWR Inspection

11-7-80 TDWR sent letter requesting delinquent annual reports.

2-25-82 TDWR Inspection notes violations for incorrect hazardous waste registration. No determination on spent caustic, inadequate security, inadequate training records and inadequate operating records. Letter indicating noncompliance was issued.

3-28-84-TDWR Industrial Solid Waste Disposal Inspection-Found non-compliant because of improper registration of name change to mid Gulf Energy.

11-15-85-Letter from TWC indicates loss of interim status-Requests closure plan.

1-27-86-Letter from TWC requesting delinquent 1985 on-site and disposal reports.

8-26-86-RCRA/L015 Inspection.

1-8-86-TACB notice of violation for nuisance odor and permit violation.

11-10-86-3007 letter sent from EPA.(See Attachment A)

NOTE: Based on the information in Sections III through XV, fill out the Tentative Disposition *(Section II)* information on the first page of this form.

recycled paper
recycled paper
recycled paper
recycled paper
ecology and environment
ecology and environment
ecology and environment
ecology and environment

Instruction - This sheet is provided to give additional information in explanation of a question on the form T2070-3.

Corresponding number on form	Additional Remark and/or Explanation
VIII. U.	(AKA FRC Energy). In 1987, the property was forclosed on by American Energy Leasing, a Delaware Corporation. Tracing ownership of the facility is confusing, but it appears that at least some of the principals are the same in these different corportations. American Energy Leasing's address is the same as Falcon's Houston address according to local tax officials. American Energy Leasing listed Falcon's attorney as trustee during foreclosure. Claude Richy of Falcon indicated to TACB officials that a Thomas Hajecate was owner of both UNI and Falcon. Records indicate that a substantial amount of waste from a 104,000 bbl of a material received from Tenneco in January 1986 remains in the pipelines and tanks. TACB officials have noted that noxious odor complaints from surrounding residents began when Falcon started processing this material and have continued ever since. Mr. Tom Palmer of TACB has concluded that the Tenneco material was not virgin petroleum, but a mixture of organic solvents and is probably waste. TACB analytical results from a sample of material taken from a tank on site support this assumption. The TACB results and reports are attached. (Attachment B). A telephone interview with (b) (6) [redacted] to the site, indicates that the odor problem still exists and that residents suspect that the vapors are causing health problems. Ms. shedd said that the 9 households located next to the site have been complaining to regulatory agencies about the problem for some time. Also included are US Coast Guard files on the Falcon dock facility which are not currently in the EPA file (Attachment C). The Coast Guard issued a letter permitting operation of the dock. Inspection reports are included. The intercoastal waterway is part of Redfish Bay at this location, and potential for migration into Redfish Bay is great since the facility is located on the coastand site history indicates that release have occurred. FIT recommends the site be sampled as per the proposed plan outlined below. This plan is designed to yield information concerning the nature of the contaminants on-site and the extent to which contaminants have been released to surrounding properties. The plan does not include direct sampling of any concentrated waste material stored on site, but any future inspections should include plans to accurately determine the amount of material in the tanks and lines.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT SUPPLEMENT SHEET

Instruction - This sheet is provided to give additional information in explanation of a question on the form T2070-3.

Corresponding number on form	Additional Remark and/or Explanation

The proposed sampling plan calls for the collection of 9 low concentrations soil and 5 low concentrations water samples. Extensive background sampling is needed in this area because of the difficulty in isolating the site from numerous surrounding industries likely to produce similar contaminants. For this reason, two background soils have been included to determine if contamination in the marsh area SE of the site is attributable to Falcon or possibly the other industries bordering that area to the SE. Two background soils NW of FM 2725 are included to screen out any downgradient migration from industries which are located NW of the site at higher elevations. A backgound water sample of Redfish Bay at an inlet to the area of concern has also been included. No air sampling has been included because it is assumed the source of the odors can be detected in the VOC analysis of other matrices. The analyses should include a full inorganic and organic TCL scan of all samples.

PROPOSED SAMPLE LOCATIONS ARE LISTED BELOW:

STA #	STATION LOCATION	MATRIX	CONCENTRATION
1	BACKROUND SE OF MARSH AT DRAINAGE PATH OF ADJACENT INDUSTRY.	SOIL	LOW
2	BACKGROUND SE OF MARSH AT A SECOND DRAINAGE PATH.	SOIL	LOW
3	SOIL FROM AREA OF PIPELINE LEAK IN 1987.(LOCATED BY CLAMP)	SOIL	LOW
4	RUNOFF PATH SE OF TANKS #26 & #27.	SOIL	LOW
5	TANK IMPOUND AREA TANKS #26 & #27.	SOIL	LOW
6	SOIL FROM MAIN PROCESS AREA.	SOIL	LOW
7	BACKGROUND FROM NE OF FM2725	SOIL	LOW
8	BACKGROUND AT SECOND LOCATION NE OF FM2725	SOIL	LOW
9	SOIL FROM SINKHOLE AT SHEDD RESIDENCE.	SOIL	LOW
10	WATER FROM LINED LAGOON	WATER	LOW

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT SUPPLEMENT SHEET

Instruction - This sheet is provided to give additional information in explanation of a question on the form T2070-3.

Corresponding number on form	Additional Remark and/or Explanation PROPOSED SAMPLE LOCATIONS ARE LIISTED NELOW:			
CONT. FROM ATTACH-MENT	STA #	STATION LOCATION	MATRIX	CONCENTRATIONS
	11	PROCESS FROM LISTED LAGOON.	WATER	LOW
	12	WATER FROM SE OF SITE	WATER	LOW
	13	BACKGROUND, REDFISH BAY	WATER	LOW
	14	DUPLICATE-APPROPRIATE LOCATION TO BE DETERMINED AT TIME OF SAMPLING.	WATER	LOW
XV.	1-16-86-TACB notice of violation for nuisance odor. 4-9-87-TACB notice of violation for nuisance odor.			

SURFACE IMPOUNDMENTS SITE INSPECTION REPORT
(Supplemental Report)

INSTRUCTION
Answer and Explain as Necessary.

1. TYPE OF IMPOUNDMENT
Waste pond

2. STABILITY/CONDITION OF EMBANKMENTS
Good

3. EVIDENCE OF SITE INSTABILITY (Erosion, Settling, Sink Holes, etc.)
[X] YES [ ] NO Coastal with flooding and evidence of dike erosion.

4. EVIDENCE OF DISPOSAL OF IGNITABLE OR REACTIVE WASTE
[X] YES [ ] NO TACB analysis indicates presence of ignitable compounds onsite.

5. ONLY COMPATIBLE WASTES ARE STORED OR DISPOSED OF IN THE IMPOUNDMENT
[ ] YES [ ] NO Unknown

6. RECORDS CHECKED FOR CONTENTS AND LOCATION OF EACH SURFACE IMPOUNDMENT
[ ] YES [X] NO

7. IMPOUNDMENT HAS LINER SYSTEM
[X] YES [ ] NO Polymer liner

7a. INTEGRITY OF LINER SYSTEM CHECKED
[ ] YES [X] NO

7b. FINDINGS

8. SOIL STRUCTURE AND SUBSTRUCTURE
The area is overlain by several hundred feet of alternating layers of sands, silts, and clays.

9. MONITORING WELLS
[ ] YES [X] NO

10. LENGTH, WIDTH, AND DEPTH
LENGTH 150' WIDTH 30' DEPTH 3'

11. CALCULATED VOLUMETRIC CAPACITY
100,987 gal.

12. PERCENT OF CAPACITY REMAINING
25%

13. ESTIMATE FREEBOARD
1 ft.

14. SOLIDS DEPOSITION
[X] YES [ ] NO

15. DREDGING DISPOSAL METHOD
No

16. OTHER EQUIPMENT

A clarifier is present adjacent to the pond. Pumps are present for discharge into Redfish Bay under NPDES permits.

STORAGE FACILITIES SITE INSPECTION REPORT
(Supplemental Report)

INSTRUCTION
Answer and Explain as Necessary.

15

1. STORAGE AREA HAS CONTINUOUS IMPERVIOUS BASE
[ ] YES [X] NO

2. STORAGE AREA HAS A CONFINEMENT STRUCTURE
[X] YES [ ] NO

3. EVIDENCE OF LEAKAGE/OVERFLOW *(If "Yes", document where and how much runoff or overflowing or leaking from containment)*
[X] YES [ ] NO

There is evidence of runoff and breaks in the integrity of the dikes surrounding the tanks.

Back on site
Water
might be
Ground Surface
Contamination

4. ESTIMATE TYPE AND NUMBER OF BARRELS/CONTAINERS
There are approximately 48 partially full drums, most of which are 50 gal. capacity.

5. GLASS OR PLASTIC STORAGE CONTAINERS USED
[ ] YES [X] NO

6. ESTIMATE NUMBER AND CAPACITY OF STORAGE TANKS
There are 22 tanks, approximate total volume 600,000 gal, which TACB reports contain some residual materials.

7. NOTE LABELING ON CONTAINERS
Tank numbers only.

Volume and Number of tank
& No Labels on tanks

8. EVIDENCE OF LEAKAGE CORROSION OR BULGING OF BARRELS/CONTAINERS/STORAGE TANKS *(If "Yes", document evidence. Describe location and extent of damage. Take PHOTOGRAPHS)*
[X] YES [ ] NO

Attached communication from TACB indicates a leak incident and attached photograph # 10B shows a tank in the refinery area that was leaking during the FIT inspection.

9. DIRECT VENTING OF STORAGE TANKS
[X] YES [ ] NO

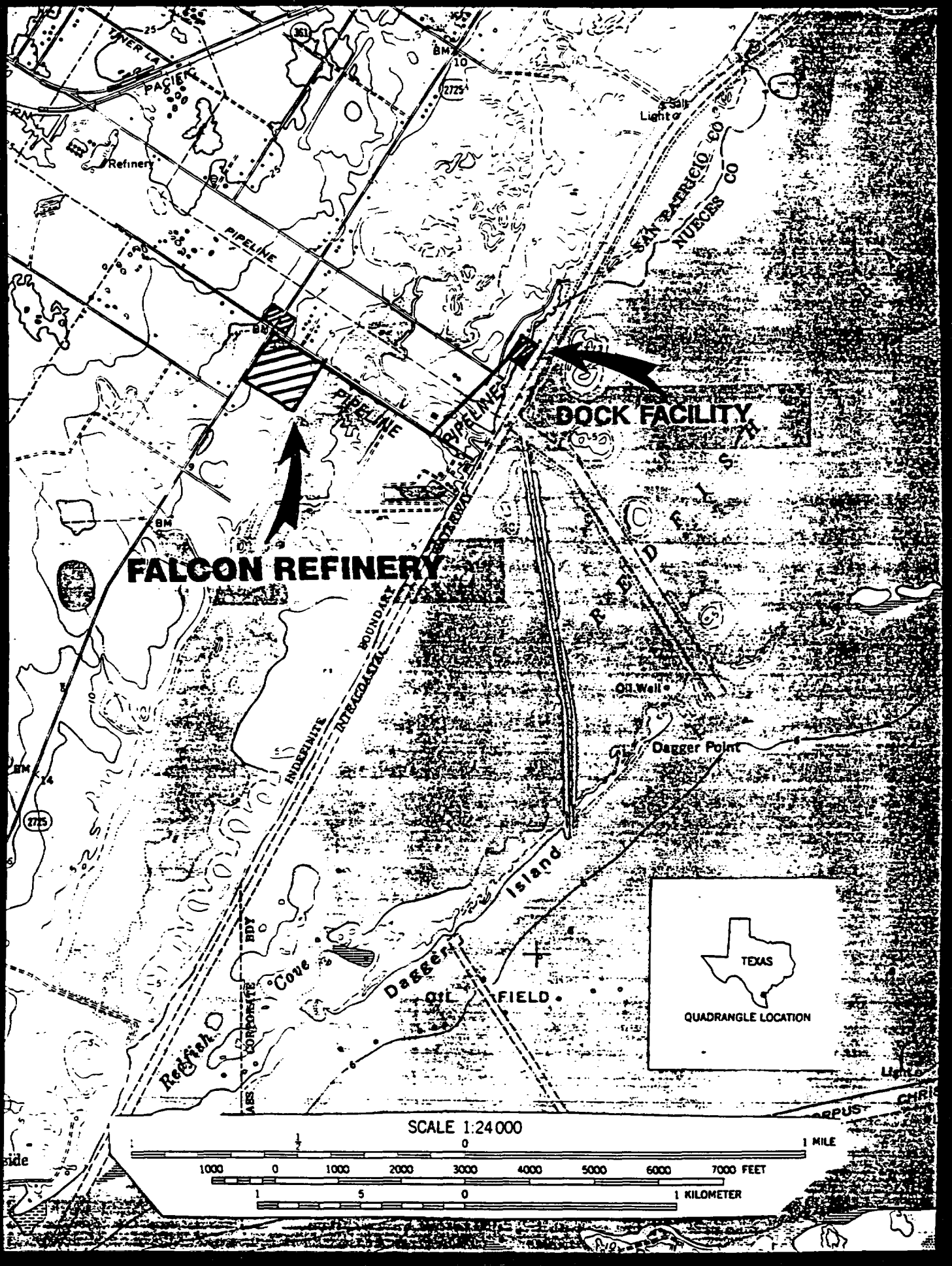
10. CONTAINERS HOLDING INCOMPATIBLE SUBSTANCES *(If "Yes", document evidence. Describe location and identity of hazardous waste. Take PHOTOGRAPHS.)*
[ ] YES [X] NO

11. INCOMPATIBLE SUBSTANCES STORED IN CLOSE PROXIMITY *(If "Yes", document evidence. Describe location and identity of hazardous waste. Take PHOTOGRAPHS.)*
[ ] YES [X] NO

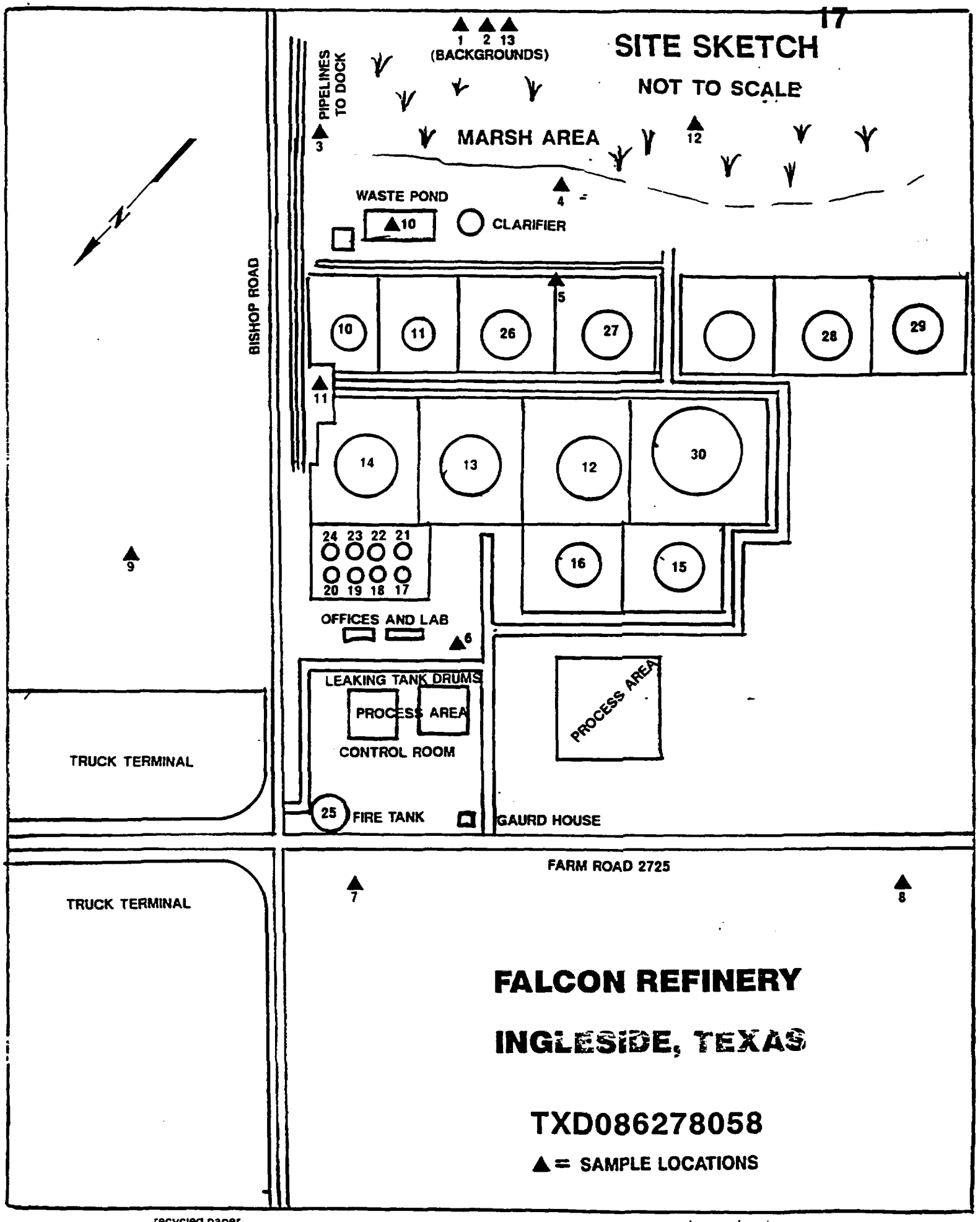
12. ADEQUATE CONTAINER WASHING AND REUSE PRACTICES
[ ] YES [X] NO

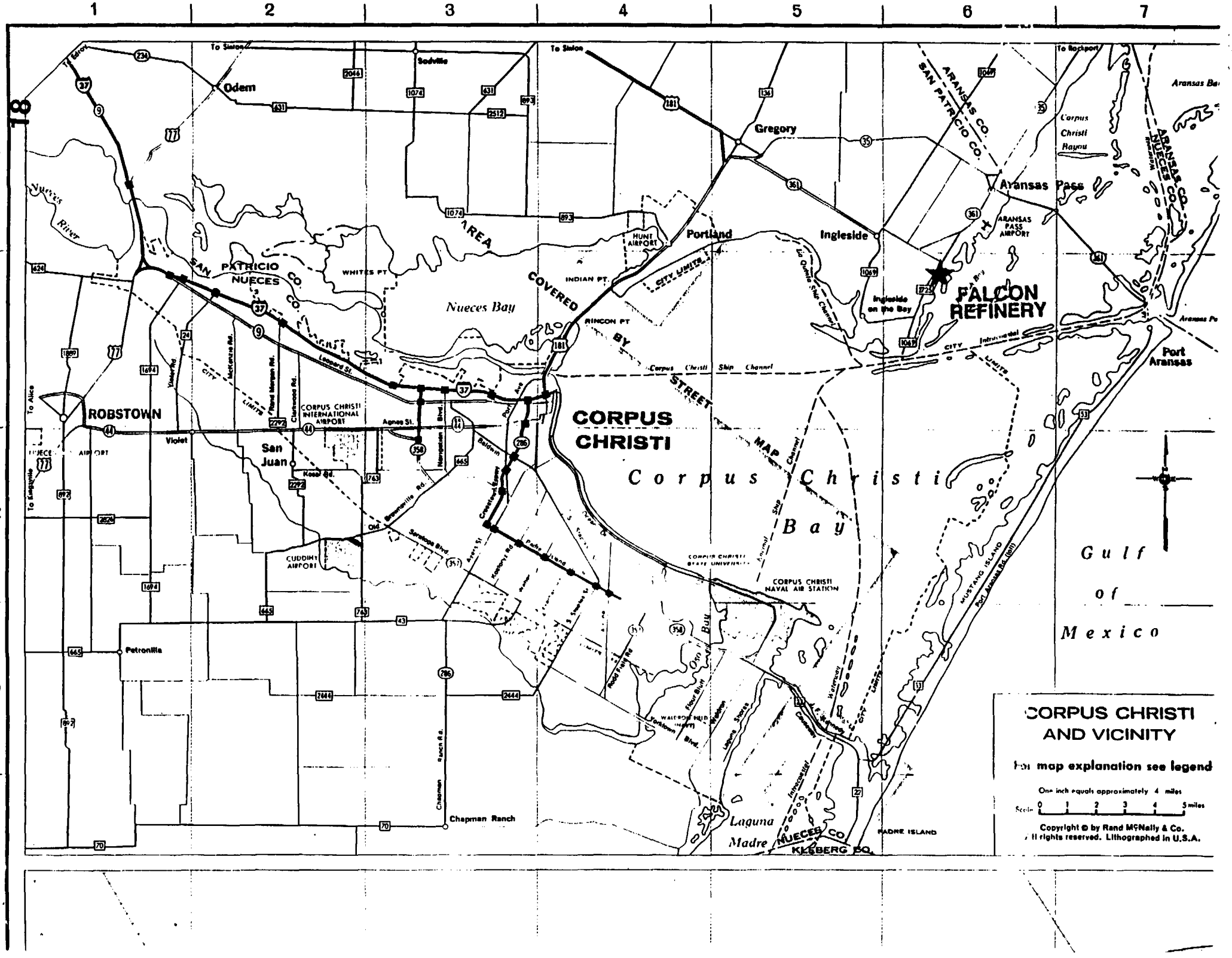
TACB inspection notes that is noxious material in t lines from the last run.

13. ADEQUATE PRACTICES FOR DISPOSAL OF EMPTY STORAGE CONTAINERS
[ ] YES [ ] NO N/A



DOCK FACILITY
FALCON REFINERY
PIPELINE
Refinery
Salt Light
SAN PATRICIO CO
NUECES CO
INDEFINITE BOUNDARY
INTRACOASTAL WATERWAY
Oil Well
Dagger Point
Dagger Island
Redfish Cove
OIL FIELD
CORPORATE BDY
TEXAS
QUADRANGLE LOCATION
SCALE 1:24 000
1 MILE
7000 FEET
1 KILOMETER

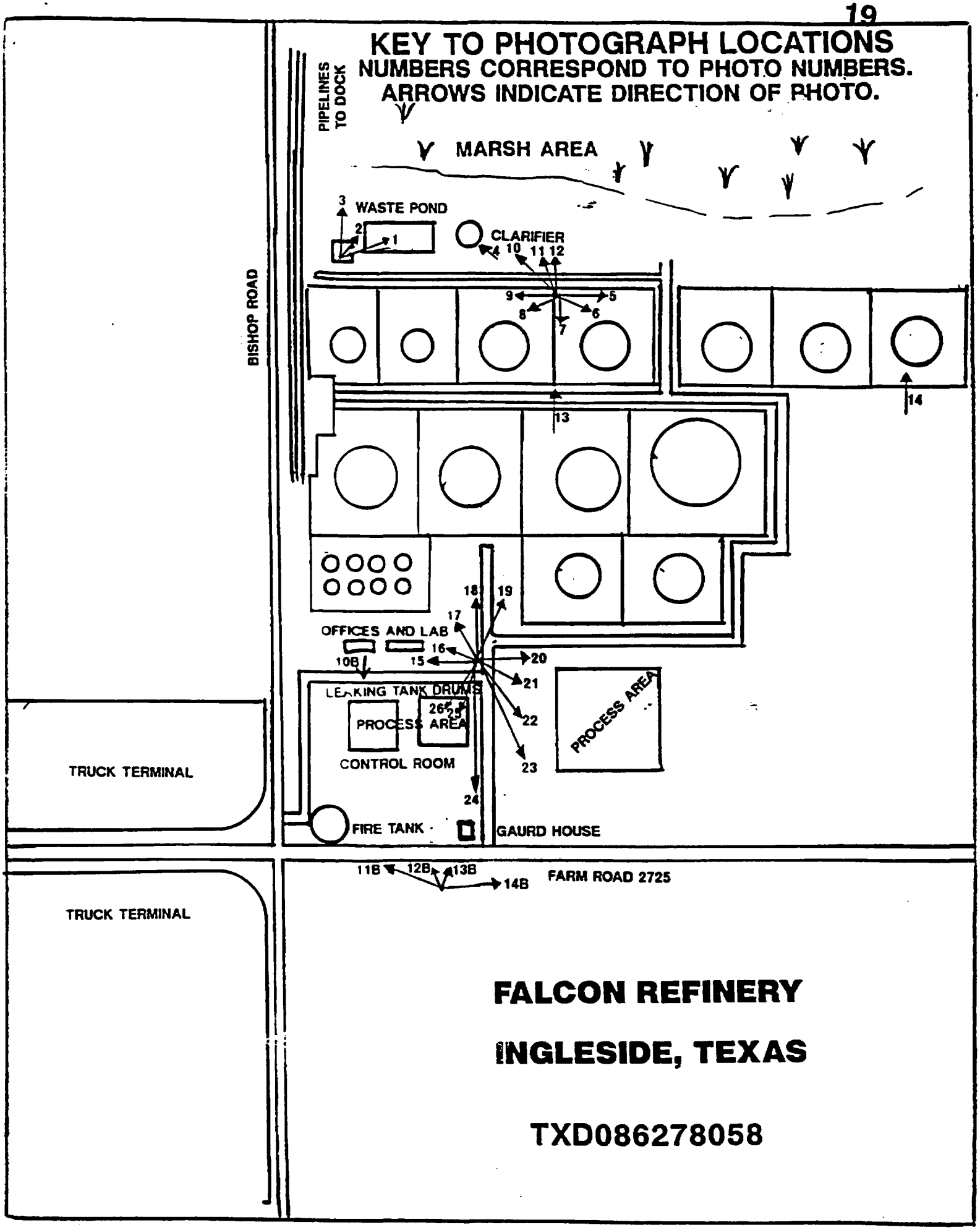

SITE SKETCH
NOT TO SCALE
1 2 13
(BACKGROUNDS)
PIPELINES TO DOCK
3
MARSH AREA
12
4
WASTE POND
10
CLARIFIER
BISHOP ROAD
5
10
11
26
27
28
29
11
14
13
12
30
24 23 22 21
20 19 18 17
16
15
9
OFFICES AND LAB
6
LEAKING TANK DRUMS
PROCESS AREA
CONTROL ROOM
PROCESS AREA
TRUCK TERMINAL
25
FIRE TANK
GAURD HOUSE
FARM ROAD 2725
7
8
TRUCK TERMINAL
FALCON REFINERY
INGLESIDE, TEXAS
TXD086278058
▲= SAMPLE LOCATIONS



CORPUS CHRISTI AND VICINITY
For map explanation see legend
One inch equals approximately 4 miles
Scale 0 1 2 3 4 5 miles
Copyright © by Rand McNally & Co.
All rights reserved. Lithographed in U.S.A.
CORPUS CHRISTI
Corpus Christi Bay
Gulf of Mexico
Nueces Bay
AREA COVERED BY STREET MAP
FALCON REFINERY
Ingleside
Ingleside on the Bay
Aransas Pass
Port Aransas
Gregory
Portland
Odem
Sodville
ROBSTOWN
San Juan
Petronilla
Chapman Ranch
Laguna Madre
PADRE ISLAND
MUSTANG ISLAND
Corpus Christi Bayou
Nueces River
SAN PATRICIO CO.
NUECES CO.
ARANSAS CO.
KLEBERG CO.
CORPUS CHRISTI INTERNATIONAL AIRPORT
CUDDIHY AIRPORT
CORPUS CHRISTI NAVAL AIR STATION
CORPUS CHRISTI STATE UNIVERSITY
HUNT AIRPORT
ARANSAS PASS AIRPORT
WHITES PT
INDIAN PT
RINCON PT
Corpus Christi Ship Channel
Laguna Shores
Flour Bluff
Yorktown Blvd.
Padre Island
Old Brownsville Rd.
Saratoga Blvd.
Agnes St.
Violet
Leopard St.
Port Ave
Baldwin
Crosstown Expwy
Kostoryz Rd.
Ayers St.
Chapman Ranch Rd.
Rand Morgan Rd.
Clarkwood Rd.
McKenzie Rd.
Yoakum Rd.
Kosar Rd.
Nueces River
To Sinton
To Rockport
To Alice
To Kingsville
To Edroy

KEY TO PHOTOGRAPH LOCATIONS

NUMBERS CORRESPOND TO PHOTO NUMBERS.
ARROWS INDICATE DIRECTION OF PHOTO.



FALCON REFINERY

INGLESIDE, TEXAS

TXD086278058

PG___OF___

NO. 1

PHOTOGRAPHER/WITNESS

STACKS / COOK

DATE / TIME / DIRECTION

9-14-87 / 1300hrs / SOUTH

COMMENTS

WASTE POND AT BACK OF FACILITY

PHOTOGRAPHER/WITNESS

STACKS / COOK

DATE / TIME / DIRECTION

9-14-87 / 1300hrs / SOUTH EAST

COMMENTS

WASTE POND AND MARSHY AREA AT BACK OF FACILITY

NO. 2

PG___OF___

NO. 3

PHOTOGRAPHER/WITNESS

STACKS / COOK

DATE / TIME / DIRECTION

9-14-87 / 1349 hrs / SE

COMMENTS

PIPELINE LEADING FROM FALCON REFINERY TO DOCK.

PHOTOGRAPHER/WITNESS

STACKS / COOK

DATE / TIME / DIRECTION

9-14-87 / 1404 hrs / E

COMMENTS

CLARIFIER TANK AT REAR OF FACILITY

NO. 4

PG___OF___

NO. 5

PHOTOGRAPHER/WITNESS

STACKS / COOK

DATE / TIME / DIRECTION

9-14-87 / 1410 hrs / SW

COMMENTS

BACK ROW OF STORAGE TANKS AND DIKES.

PHOTOGRAPHER/WITNESS

STACKS / COOK

DATE / TIME / DIRECTION

9-14-87 / 1410 hrs / SW

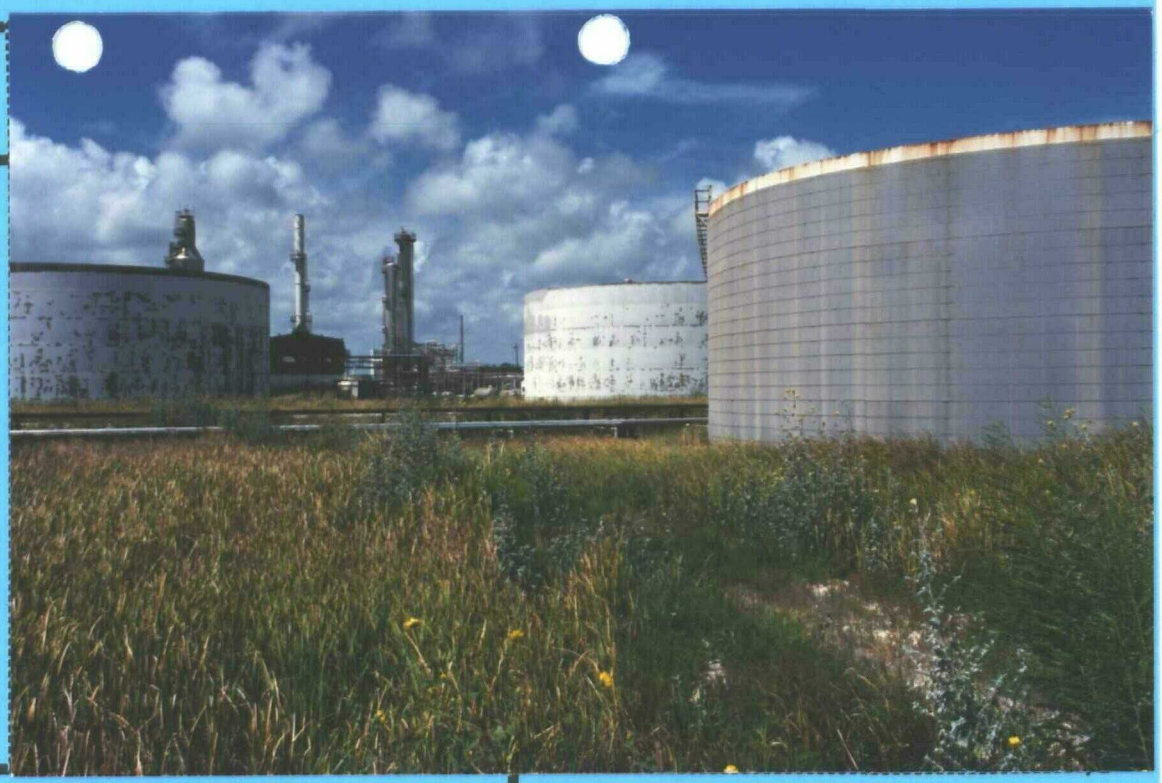
COMMENTS

BACK ROW OF STORAGE TANKS

NO. 6

PG___OF___

NO. 7



PHOTOGRAPHER/WITNESS

STACKS/COOK

DATE / TIME / DIRECTION

9-14-87/1410 hrs/ NW

COMMENTS

VIEW OF PROCESSING AREA FROM REAR OF FACILITY

PHOTOGRAPHER/WITNESS

STACKS/COOK

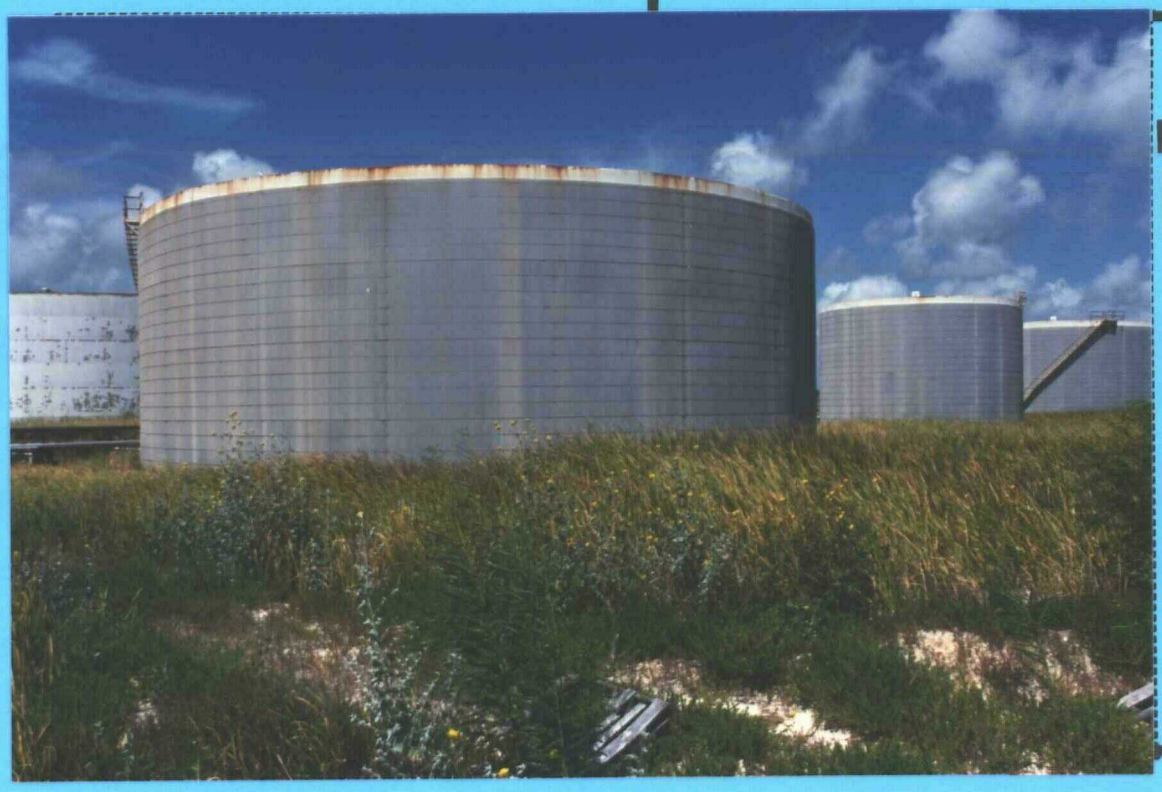
DATE / TIME / DIRECTION

9-14-87/1410 hrs/ N

COMMENTS

BACK ROW OF STORAGE TANKS

NO. 8



PG___OF___

NO. 9

PHOTOGRAPHER/WITNESS

STACKS/COOK

DATE / TIME / DIRECTION

9-14-87/1417 hrs/ NE

COMMENTS

POSSIBLE RUNOFF PATH FROM STORAGE TANKS.

PHOTOGRAPHER/WITNESS

STACKS/COOK

DATE / TIME / DIRECTION

9-14-87/1417 hrs/ E

COMMENTS

POSSIBLE RUNOFF PATH FROM TANKS – BREACH IN DIKE INTEGRITY.

NO. 10

PG___OF___

NO. 11

PHOTOGRAPHER/WITNESS

STACKS / COOK

DATE / TIME / DIRECTION

9-14-87 / 1417 hrs / SE

COMMENTS

POSSIBLE RUNOFF PATH INTO MARSHY AREA AT REAR OF FACILITY

PHOTOGRAPHER/WITNESS

STACKS / COOK

DATE / TIME / DIRECTION

9-14-87 / 1417 hrs / SE

COMMENTS

POSSIBLE RUNOFF PATH INTO MARSHY AREA AT REAR OF FACILITY.

NO. 12

PG___OF___

NO 13

PHOTOGRAPHER/WITNESS

STACKS / COOK

DATE / TIME / DIRECTION

9-14-87 / 1428 hrs / SE

COMMENTS

BREECH IN DYRE INTEGRITY AT BACK ROW OF TANKS.

PHOTOGRAPHER/WITNESS

COOK / STACKS

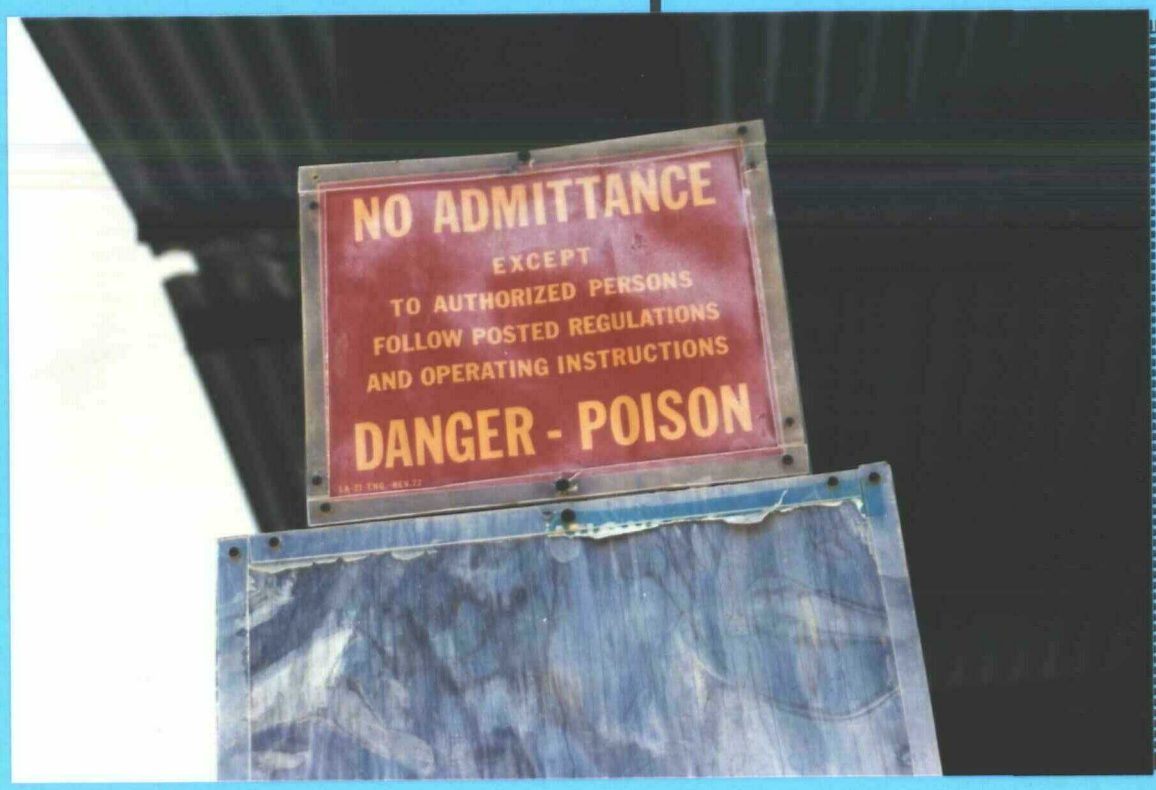
DATE / TIME / DIRECTION

9-14-87 / 1435 hrs / SE

COMMENTS

DANGER SIGN ON SOUTHERNMOST TANK.

NO. 14



PG___OF___

NO. 15

PHOTOGRAPHER/WITNESS

STACKS/COOK

DATE / TIME / DIRECTION

9-14-87/1500hrs/ NE

COMMENTS

MAIN PROCESSING FACILITY

PHOTOGRAPHER/WITNESS

STACKS/COOK

DATE / TIME / DIRECTION

9-14-87/1500hrs/ NE

COMMENTS

MAIN PROCESSING FACILITY

NO. 16

PG___OF___

NO. 17

PHOTOGRAPHER/WITNESS

STACKS/COOK

DATE / TIME / DIRECTION

9-14-87/1500hrs/E

COMMENTS

MAIN PROCESSING FACILITY, STORAGE TANKS.

PHOTOGRAPHER/WITNESS

STACKS/COOK

DATE / TIME / DIRECTION

9-14-87/1500hrs/SE

COMMENTS

MAIN PROCESSING FACILITY

NO. 18

PG___OF___

NO 19

PHOTOGRAPHER/WITNESS

STACKS/COOK

DATE / TIME / DIRECTION

9-14-87/1500hrs/ S

COMMENTS

MAIN PROCESSING FACILITY

PHOTOGRAPHER/WITNESS

STACKS /COOK

DATE / TIME / DIRECTION

9-14-87 /1500hrs/ SW

COMMENTS

MAIN PROCESSING FACILITY

NO. 20

PG___OF___

NO 21

PHOTOGRAPHER/WITNESS

STACKS/COOK

DATE / TIME / DIRECTION

9-14-87/1500hrs/ W

COMMENTS

MAIN PROCESSING AREA

PHOTOGRAPHER/WITNESS

STACKS/COOKS

DATE / TIME / DIRECTION

9-14-87/1500hrs/ W

COMMENTS

MAIN PROCESSING AREA

NO. 22

PG___OF___

NO. 23

PHOTOGRAPHER/WITNESS

STACKS / COOK

DATE / TIME / DIRECTION

9-14-87 / 1500 hrs / NW

COMMENTS

MAIN PROCESSING AREA

PHOTOGRAPHER/WITNESS

STACKS / COOK

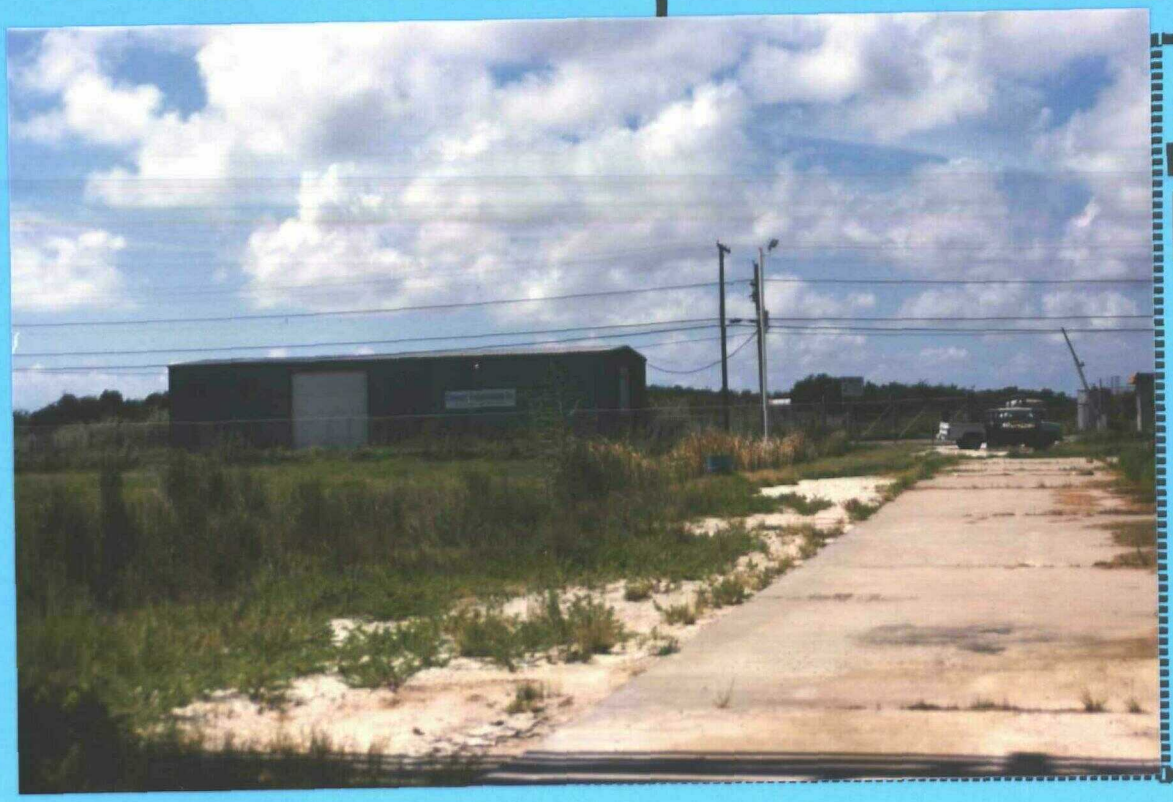
DATE / TIME / DIRECTION

9-14-87 / 1500 hrs / NW

COMMENTS

MAIN PROCESSING AREA WITH FRONT GATE IN BACKGROUND.

NO. 24



PG___OF___

NO. 25

PHOTOGRAPHER/WITNESS

STACKS/COOK

DATE / TIME / DIRECTION

9-14-87/1500hrs/ N

COMMENTS

MAIN PROCESSING FACILITY WITH DRUMS IN FOREGROUND.

PHOTOGRAPHER/WITNESS

STACKS/COOK

DATE / TIME / DIRECTION

9-14-87/1500hrs/ N

COMMENTS

MAIN PROCESSING AREA

NO. 26

PG___OF___

NO. 10 B

PHOTOGRAPHER/WITNESS

STACKS / COOK

DATE / TIME / DIRECTION

9-14-87 / 1515 hrs / NW

COMMENTS

LEAKING TANK IN PROCESSING AREA

PHOTOGRAPHER/WITNESS

STACKS / COOK

DATE / TIME / DIRECTION

9-14-87 / 1530 hrs / E

COMMENTS

FRONT OF FACILITY FROM FM 2725.

NO. 11 B

PG___OF___

NO. 12 B

PHOTOGRAPHER/WITNESS

STACKS / COOK

DATE / TIME / DIRECTION

9-14-87 / 1530 hrs / ESE

COMMENTS

FRONT OF FACILITY

PHOTOGRAPHER/WITNESS

STACKS / COOK

DATE / TIME / DIRECTION

9-14-87 / 1530 hrs / SE

COMMENTS

FRONT OF FACILITY-
GATE & GAURDHOUSE.

NO. 13 B

PG___OF___

NO. 14 B

PHOTOGRAPHER/WITNESS

STACKS / COOK

DATE / TIME / DIRECTION

9-14-87 / 1530 hrs / SW

COMMENTS

FRONT OF FACILITY, FM2725

PHOTOGRAPHER/WITNESS

DATE / TIME / DIRECTION

COMMENTS

NO.

PART A	SOURCE WASTE QUANTITY FACTOR WORKSHEET	PAGE: WQ 1 of 12
SOURCE: Waste Pond*	PATHWAYS: [ ] AIR [ ] GROUNDWATER [x] SURFACE WATER [x] ON-SITE	

1. WASTESTREAM QUANTITY SUMMARY TABLE

Complete the following table using all available data for identified wastestreams in the source. All wastestreams which cannot be attributed to a specific source are to be combined into a separate source called "Source Unknown". If you answer YES to (d), skip (e) and (f), but complete (g) and (h). If you have information that a wastestream was deposited into a source, but no waste quantity data are available, check box next to "Unquantifiable Wastestream" entry, write in identifying name and circle NO in columns (d) and (h).

(a) Wastestream Name	(b) Wastestream Hazardous Substance Quantity (lbs.)	(c) WHSQ Value (b)+10	(d) Are Data Complete ?	(e) Wastestream Waste Quantity As Deposited (lbs.)	(f) WWQD Value (e)+50,000	(g) Wastestream Waste Quantity Factor enter LARGER of (c) or (f)	(h) Are Data Complete ?
1 Phenylethanol			YES / NO				YES / NO
Xylene			YES / NO				YES / NO
Cyclohereceneclial			YES / NO				YES / NO
Butanol			YES / NO				YES / NO
Unquantifiable Wastestream(s) [x]			NO				NO
SOURCE TOTAL (sum of wastestreams)			YES* / NO			(sum of (g))	YES* / NO

* Circle YES only if ALL of the answers in the column above are YES (and there are no unquantifiable wastestreams).

*Ref. 1, pp. 4, 14

recycled paper

ecology and environment

PART A	SOURCE WASTE QUANTITY FACTOR WORKSHEET	PAGE: WQ 2 of 12
SOURCE: Drums and Tanks	PATHWAYS: [X] AIR [X] GROUNDWATER [X] SURFACE WATER [X] ON-SITE	

1. WASTESTREAM QUANTITY SUMMARY TABLE

Complete the following table using all available data for identified wastestreams in the source. All wastestreams which cannot be attributed to a specific source are to be combined into a separate source called "Source Unknown". If you answer YES to (d), skip (e) and (f), but complete (g) and (h). If you have information that a wastestream was deposited into a source, but no waste quantity data are available, check box next to "Unquantifiable Wastestream" entry, write in identifying name and circle NO in columns (d) and (h).

(a) Wastestream Name	(b) Wastestream Hazardous Substance Quantity (lbs.)	(c) WHSQ Value (b)+10	(d) Are Data Complete ?	(e) Wastestream Waste Quantity As Deposited (lbs.)	(f) WWQD Value (e)+50,000	(g) Wastestream Waste Quantity Factor enter LARGER of (c) or (f)	(h) Are Data Complete ?
1-phenylethanol			YES / NO				YES / NO
Xylene			YES / NO				YES / NO
Cyclohexeanediol			YES / NO				YES / NO
Butanol			YES / NO				YES / NO
Unquantifiable Wastestream(s) [x]			NO				NO
SOURCE TOTAL (sum of wastestreams)			YES* / NO			(sum of (g))	YES* / NO

* Circle YES only if ALL of the answers in the column above are YES (and there are no unquantifiable wastestreams).

Ref. 1, pp. 4, 15

recycled paper
energy and environment

PART A	SOURCE WASTE QUANTITY FACTOR WORKSHEET	PAGE: WQ 3 of 12
SOURCE: Waste Pond	PATHWAYS: [X] AIR [X] GROUNDWATER [X] SURFACE WATER [ ] ON-SITE	

2. SOURCE VOLUME/AREA FACTOR TABLE

If all of your wastestream waste quantity data are complete (Source Total, column (h) above is YES), skip to Table 3.

If any of your wastestream waste quantity data are not complete (any entry in column (h) is NO), then complete the following table.

(a) Source Volume (yds^3) or Source Area* (ft^3)	(b) Source Type	(c) Volume/Area Divisor (see Table 2-14)	(d) Volume/Area Factor Value (a) + (c)
502 yd^3	Surface Impoundment	25	20.08

* Use source area ONLY if source volume is not available.

Ref. 1, pp. 14, 20

Source volume is 100,987 gal
Conversion factor is 201 gal = 1 yd^3

100,987/201 gal/yd^3 = 502.423

recycled paper

ecology and environment

PART A	SOURCE WASTE QUANTITY FACTOR WORKSHEET	PAGE: WQ 4 of 12
SOURCE: Drums	PATHWAYS: [] AIR [] GROUNDWATER [] SURFACE WATER [] ON-SITE	

2. SOURCE VOLUME/AREA FACTOR TABLE

If all of your wastestream waste quantity data are complete (Source Total, column (h) above is YES), skip to Table 3.

If any of your wastestream waste quantity data are not complete (any entry in column (h) is NO), then complete the following table.

(a) Source Volume (yds^3) or Source Area* (ft^3)	(b) Source Type	(c) Volume/Area Divisor (see Table 2-14)	(d) Volume/Area Factor Value (a) + (c)
11.94 yd^3 or 2,400 gal	Drums	5,000	.48

* Use source area ONLY if source volume is not available.

Ref. 1, pp. 15, 32

48 - 50 gallon drums = 2,400 gal

2400gal/201 gal/yd^3 = 11.94 yd^3

recycled paper

ecology and environment

PART A	SOURCE WASTE QUANTITY FACTOR WORKSHEET	PAGE: WQ 5 of 12
SOURCE: Tanks (nondrummed containers)	PATHWAYS: [] AIR [] GROUNDWATER [] SURFACE WATER [] ON-SITE	

2. SOURCE VOLUME/AREA FACTOR TABLE

If all of your wastestream waste quantity data are complete (Source Total, column (h) above is YES), skip to Table 3.

If any of your wastestream waste quantity data are not complete (any entry in column (h) is NO), then complete the following table.

(a) Source Volume (yds^3) or Source Area* (ft^3)	(b) Source Type	(c) Volume/Area Divisor (see Table 2-14)	(d) Volume/Area Factor Value (a) ÷ (c)
2,985 yd^3	Nondrummed containers	25	119

* Use source area ONLY if source volume is not available.

Ref. 1, pp. 14, 12

22 tanks with total volume of 800,000 gal

800,000 gal/201 gal/yd^3 =

recycled paper

ecology and environment

PART A	SOURCE WASTE QUANTITY FACTOR WORKSHEET	PAGE: WQ 6 of 12
SOURCE: Waste Pond	PATHWAYS: [] AIR [] GROUNDWATER [] SURFACE WATER [] ON-SITE	

3. **SOURCE DISPOSAL CAPACITY FACTOR VALUE TABLE**
Complete the following table using the data compiled in the tables above.

(a) Source Name	(b) Source Hazardous Substance Quantity Factor Value enter Source Total value from 1(b)	(c) Are Data Complete ?	(d) Source Waste Quantity Factor Value enter Source Total value from 1(g)	(e) Are Data Complete ?	(f) Volume/Area Factor Value enter value from 2(d)	(g) Source Disposal Capacity Factor Value enter LARGER of (b), (d), or (f)
Waste Pond		YES				
		NO		YES		
				NO	20.08	20.08

recycled paper

ecology and environment

PART A	SOURCE WASTE QUANTITY FACTOR WORKSHEET	PAGE: WQ 7 of 12
SOURCE: Drums	PATHWAYS: [] AIR [] GROUNDWATER [] SURFACE WATER [] ON-SITE	

3. **SOURCE DISPOSAL CAPACITY FACTOR VALUE TABLE**

Complete the following table using the data compiled in the tables above.

(a) Source Name	(b) Source Hazardous Substance Quantity Factor Value enter Source Total value from 1(b)	(c) Are Data Complete ?	(d) Source Waste Quantity Factor Value enter Source Total value from 1(g)	(e) Are Data Complete ?	(f) Volume/Area Factor Value enter value from 2(d)	(g) Source Disposal Capacity Factor Value enter LARGER of (b), (d), or (f)
Drums		YES				
		NO		YES		
				NO	.48	.48

recycled paper

ecology and environment

PART A	SOURCE WASTE QUANTITY FACTOR WORKSHEET	PAGE: WQ 8 of 12
SOURCE: Tanks	PATHWAYS: [] AIR [] GROUNDWATER [] SURFACE WATER [] ON-SITE	

3. **SOURCE DISPOSAL CAPACITY FACTOR VALUE TABLE**

Complete the following table using the data compiled in the tables above.

(a) Source Name	(b) Source Hazardous Substance Quantity Factor Value enter Source Total value from 1(b)	(c) Are Data Complete ?	(d) Source Waste Quantity Factor Value enter Source Total value from 1(g)	(e) Are Data Complete ?	(f) Volume/Area Factor Value enter value from 2(d)	(g) Source Disposal Capacity Factor Value enter LARGER of (b), (d), or (f)
Tanks		YES				
		NO		YES		
				NO	119	119

recycled paper

ecology and environment

PART B	SITE WASTE QUANTITY FACTOR WORKSHEET	PAGE: WQ 9 of 12
SITE: Falcon Refinery	PATHWAYS: [] AIR [] GROUNDWATER [] SURFACE WATER	

1. SITE WASTE QUANTITY SUMMARY TABLE

Complete the following table using the data compiled in Table 3 of the PART A worksheet for each of the sources at the site.

(a) Source Name	(b) Source Hazardous Substance Quantity Factor Value enter value from 3(b), Part A for each source	(c) Are Data Complete ?	(d) Source Waste Quantity Factor Value enter value from 3(d), Part A for each source	(e) Are Data Complete ?	(f) Source Disposal Capacity Factor Value enter value from 3(g), Part A for each source
Waste Pond		YES		YES	
		NO		NO	20.8
Drums		YES		YES	
		NO		NO	.48
Tanks		YES		YES	
		NO		NO	119.0
		YES		YES	
		NO		NO	
SOURCE UNKNOWN		YES			
		NO			
SITE TOTAL (sum of sources)	(0)*	YES			
		NO	(10)	YES	
				NO	(10) 139.56

* Values in parentheses are the minimum assigned values for the factor.

recycled paper
ecology and environment

PART B	SITE WASTE QUANTITY FACTOR WORKSHEET	PAGE: WQ 10 of 12
SITE: Falcon Refinery	PATHWAYS: [] AIR [] GROUNDWATER [] SURFACE WATER	

2. WASTE QUANTITY FACTOR VALUE

From Table 1 above, select the LARGEST factor value sum from the SITE TOTAL row, columns b, d, and f, as applicable, subject to a maximum of 100 and the minimums indicated. Enter this number below.

Waste Quantity Factor Value
100

recycled paper

ecology and environment

PART C	ON-SITE WASTE QUANTITY FACTOR WORKSHEET	PAGE: WQ 11 of 12
SITE: Falcon Refinery	PATHWAY: ON-SITE	

1. CONTAMINATED SOURCE AREA SUMMARY TABLE

Complete the following table using contaminated area data for each source. If contaminated area data are not available, attach any information that might be useful in deriving a factor value that would serve as a surrogate for contaminated area.

(a) Source Name	(b) Contaminated Area (ft^2)	(c) Contaminated Area Factor Value (b)÷5000	(d) Are Data Complete ?
Waste Pond	4500 ft^2	.9	YES / NO
Drums and Tanks	N/A	N/A	YES / NO
			YES / NO
			YES / NO
			YES / NO
SITE TOTAL (sum of sources)		.9	YES / NO

recycled paper

ecology and environment

PART C	ON-SITE WASTE QUANTITY FACTOR WORKSHEET	PAGE: WQ 12 of 12
SITE: Falcon Refinery	PATHWAY: ON-SITE	

2. WASTE QUANTITY FACTOR VALUE

Enter the SITE TOTAL CONTAMINATED AREA FACTOR VALUE (bottom row, column (c)) from the table above.

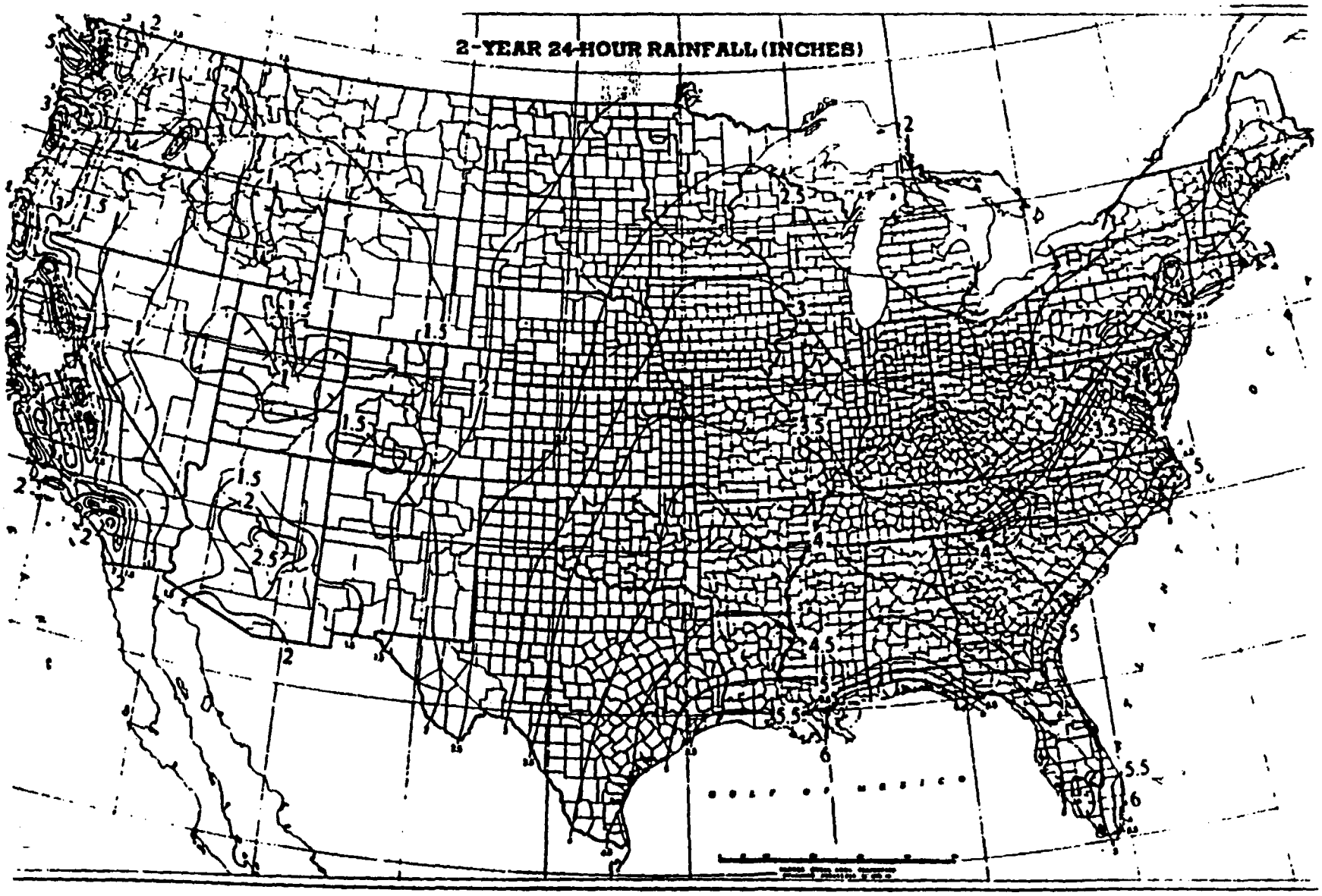
Contaminated Area Factor Value
.9

recycled paper

ecology and environment

REFERENCE: 2

Herschfield, D.M., 1961, Rainfall Frequency Atlas of the United States. U.S. Weather Bureau Technical Paper No. 40.


2-YEAR 24-HOUR RAINFALL (INCHES)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

KURT SOUTENDIJK

ARANSAS PASS QUADRANGLE
TEXAS
7.5 MINUTE SERIES (TOPOGRAPHIC)
NW/4 ARANSAS PASS 15' QUADRANGLE

REFERENCE: 3

Mapped, edited, and published by the Geological Survey

Control by USGS, NOS/NOAA, and USCE

Topography by photogrammetric methods from aerial photographs taken 1967. Field checked 1968

Supersedes Port Ingleside map dated 1954

Selected hydrographic data compiled from USC&GS Chart 523 (1969)
This information is not intended for navigational purposes

Polyconic projection. 1927 North American datum
10,000-foot grid based on Texas coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks, zone 14, shown in blue

Fine red dashed lines indicate selected fence lines

Water stages in this area vary with meteorological conditions
Approximate limits of occasional inundation shown by dashed blue lines where mean high water is undetermined for lack of visual evidence
Dotted blue lines indicate the approximate limits of low water

Revisions shown in purple compiled from aerial photographs taken 1975. This information not field checked

UTM GRID AND 1975 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 5 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS MEAN LOW WATER
SHORELINE SHOWN REPRESENTS APPROXIMATE LINE OF MEAN HIGH WATER
THE MEAN RANGE OF TIDE IS NEGLIGIBLE

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

ROAD CLASSIFICATION

Primary highway, hard surface — Light-duty road, hard or improved surface
Secondary highway, hard surface — Unimproved road
Interstate Route — U. S. Route — State Route

PORT INGLESIDE, TEX.

SW/4 ARANSAS PASS 15' QUADRANGLE
N2745—W9707.5/7.5

1968
PHOTOREVISED 1975
AMS 6539 I SW—SERIES V812

REFERENCE 4 DRAFT

TABLE 1. RAW CHEMICAL DATA VALUES FOR HRS SCORING

April, 1988

CHEMICAL NAME	COMMON SYNONYM	CAS NUMBER	LD50(a) (ORAL) (mg/kg) (Ref 1)	LD50 (DERMAL) (mg/kg) (Ref 1)	LC50 (INHAL) (ppm) (Ref 1)	RfD(b) (MG/KG/D) (Ref 16)	q1*(c) (mg/kg/d)-1 (Ref 2)	WEIGHT OF EVIDENCE (Ref 2)	ED10 (MG/KG/D) (Ref 1)	VAPOR PRESSURE (torr-25o)	HENRY'S LAW CONSTANT (atm-m3/mole) (REF.4)
1,1,2-TRICHLOROETHYLENE(TCE)	TRICHLOROETHYLENE	79-1-6	4920	—(d)	—	—	0.011	B2	—	58(26)	0.0091
TOLUENE	METHYLBENZENE	108-88-3	5000	—	LClo-4000/4H(f,g)	0.3	—	—	—	28.4(7)	0.0068
BENZENE	BENZOL	71-42-2	3800	—	10000/7H	—	.029(h)	A	3.7	95(10)	0.0055
CHLOROFORM	TRICHLOROMETHANE	67-66-3	800	—	8000/4H	0.01	0.081	B2	0.51	200(10)	0.0039
PCBs	AROCLOR	1336-36-3	1010	—	—	—	7.7	B2	0.02	0.375(10)	0.157
1,1,1-TRICHLOROETHANE	METHYLCHLOROFORM	71-55-6	10300	—	LClo-1000	0.09	—	—	—	125(41)	0.0014
TETRACHLOROETHENE	PERCHLOROETHYLENE	127-18-4	8100	—	4000/4H	0.02	0.051	B2	3.45	14.6(18)	.027
PHENOL	CARBOLIC ACID	108-95-2	414	669	—	0.04	—	—	—	0.33(41)	0.00000044
m-XYLENE	1,3-DIMETHYLBENZENE	108-38-3	4300		5000/4H	2				8.301(17)	0.0079
o-XYLENE	1,2-DIMETHYLBENZENE	95-47-6	4300		5000/4H	2				6.62(17)	0.0043
p-XYLENE	1,4-DIMETHYLBENZENE	106-42-3	4300		5000/4H	2				8.76(17)	0.0066
ETHYLBENZENE	PHENYLETHANE	100-41-4	3500	—	—	0.1	—	—	—	9.57(20)	0.0087
1,2-TRANS-DICHLOROETHYLENE	ACETYLENE DICHLORIDE	156-60-5	—	—	LClo-75000/2H	—	—	—	—	328(41)	
METHYLENE CHLORIDE	DICHLOROMETHANE	75-09-2	167	—	—	0.06	0.014	B2	—	409(22)	0.0033
1,1-DICHLOROETHANE	ETHYLIDENE CHLORIDE	75-34-3	725	—	—	—	—	—	—	228(41)	0.0054
1,1-DICHLOROETHENE	VINYLIDENE CHLORIDE	75-35-4	200	—	96/22H	0.009	1.16(i)	C	—	487(41)	0.019
VINYL CHLORIDE	CHLOROETHYLENE	75-01-4	500	—	LClo-20/30M	—	2.3	A	6.67	2660(24)	56.8
CHLOROBENZENE	MONOCHLOROBENZENE	108-90-7	2910	—	—	—	—	—	—	11.5(41)	0.0036
CARBON TETRACHLORIDE	TETRACHLOROMETHANE	56-23-5	2800	—	—	0.0007	0.13	B2	0.017	115(26)	.029
1,2-DICHLOROETHANE	ETHYLENE CHLORIDE	107-06-2	670	—	LClo-1000/4H	—	0.091	B2	—	82(28)	0.0012
PENTACHLOROPHENOL	PCP	87-86-5	50	105	11.7	0.03	—	—	—	0.00011(31)	0.00000028
NAPHTHALENE	NAPHTHENE	91-20-3	1780	—	—	—	—	—	—	0.102(41)	0.00055
METHYL ETHYL KETONE	2-BUTANONE	78-93-3	—	—	—	—	—	—	—	90.59(35)	0.000032
ACETONE	2-PROPANONE	67-64-1	—	—	—	—	—	—	—	231.5(37)	0.0000077
PHENANTHRENE		85-01-8	700	—	—	—	—	—	—	1.9e-6(41)	0.00000035
BENZO(a)PYRENE	3,4-BENZPYRENE	50-32-8	—	—	—	—	11.5	B2	0.0063	5.6e-9(41)	0.00000004
1-1,2-TRICHLOROETHANE	VINYL TRICHLORIDE	79-00-5	1140	—	LClo-500	0.2	0.0573	C	—	22.4(41)	0.00087
DDT	4,4-DDT	50-29-3	113			0.0005	0.34	B2	0.769	0.0000001(94)	0.00000848
ANTHRACENE		120-12-7								0.00031(24)	0.00161
LINDANE	gamma-HEXACHLOROCYCLOHEXANE	58-89-9	76	500		0.0003	1.1	B2		0.0000034(41)	0.00000004
BIS(2-ETHYLHEXYL)PHTHALATE	BEHP	117-81-7								0.00000011(41)	0.00000014
STYRENE	VINYL BENZENE	100-42-5	316	—	LClo-5000/8H	0.2				6.49(41)	0.0028
1,1,2,2-TETRACHLOROETHANE	TETRACHLOROETHANE	79-34-5	300	—	LClo-1000/4H		0.2	C	0.602	6.22(41)	0.000474
PYRENE	BENZO(def)PHENANTHRENE	129-00-0								0.0000000084(41)	0.000000017
BENZO(j,k)FLUORENE	FLUORANTHENE	206-44-0	2000	3180						0.000003(96)	0.000013
FLUORENE		86-73-7								0.000091(41)	0.00001
SULFURIC ACID		7664-93-9									
TRICHLOROFLUOROMETHANE	FREON 11	75-69-4								797(41)	0.131
ASBESTOS		1332-21-4									
ACENAPTHENE		83-32-9								0.00053(41)	0.000029
CIS-1,2-DICHLOROETHYLENE	CIS-DICHLOROETHYLENE	156-59-2								200(24)	0.032
ETHYL CHLORIDE	CHLOROETHANE	75-00-3			LClo-4000/45M					1200(41)	0.011
DI-N-BUTYL PHTHALATE	DIBUTYL PHTHALATE	84-74-2	12000			0.1				1.4E-4(55)	0.0000039
CHLORDANE		57-74-9	100	700		0.00005	1.3	B2	0.066	1.0E-5(58)	0.000014
TRINITROTOLUENE	TNT	118-96-7								0.0000023(24)	0.0000000065
HEXACHLOROBENZENE	HCB	118-74-1					1.67	B2		1.68E-5(62)	0.00075
AMMONIA		7664-41-7	350							7600(93)	0.000321(93)

DRAFT

TABLE 1. RAW CHEMICAL DATA VALUES FOR HRS SCORING

April, 1988

CHEMICAL NAME	COMMON SYNONYM	CAS NUMBER	LD50(a) (ORAL) (mg/kg) (Ref 1)	LD50 (DERMAL) (mg/kg) (Ref 1)	LC50 (INHAL) (ppm) (Ref 1)	RFD(b) (MG/KG/D) (Ref 16)	q1*(c) (mg/kg/d)-1 (Ref 2)	WEIGHT OF EVIDENCE (Ref 2)	ED10 (MG/KG/D) (Ref 1)	VAPOR PRESSURE (torr-25c)	HENRY'S LAW CONSTANT (atm-m3/mole) (REF. 4)
TETRAHYDROFURAN	BUTYLENE OXIDE	109-99-9								164(4)	0.000014
CHRYSENE	1,2-BENZOPHENANTHRENE	218-01-9								4e-11(4)	0.000000035
CHLOROMETHANE	METHYL CHLORIDE	74-87-3			3146/7H					4270(4)	0.0078
METHYL ISOBUTYL KETONE	MEKONE	108-10-1								7.88(4)	0.000061
DIOXIN	TCDD	1746-01-6	0.114				156000	B2	0.0000015	0.00000084(4)	0.05
DDE		72-55-9	113			0.0005			0.769	0.00000011(4)	0.0000011
HEXACHLOROCYCLOPENTADIENE	HCCPD	77-47-4								0.08(7)	0.014
2,4-DINITROTOLUENE	1-METHYL-2,4-DINITROBENZENE	121-14-2	268				0.31	B2		0.00005(4)	0.000000044
1,4-DICHLOROBENZENE	p-DICHLOROBENZENE	106-46-7	500							1.0(6)	0.0024
DIELDRIN		60-57-1	39			0.00003	20	B2	0.0042	7.78E-7(94)	0.000002
DIBROMOCHLOROMETHANE	CHLORODIBROMOMETHANE	124-48-1				0.002				17.3(4)	0.0014
ETHYL ETHER	ETHER	60-29-7								533(4)	0.0008
2,6-DINITROTOLUENE	2-METHYL-1,3-DINITROBENZENE	606-20-2	177							0.00055(4)	0.00000073
DIETHYL PHTHALATE	ETHYL PHTHALATE	84-77-5	1	LD1o-1000		0.8				0.00055(4)	0.00000018
1,2-DICHLOROBENZENE	o-DICHLOROBENZENE	95-50-1	500							1.5(6)	0.0019
BROMOMETHANE	METHYL BROMIDE	74-83-9								1400(7)	0.0062
RDX	CYCLOTRIMETHYLENETRINITRAMINE	121-82-4	200(167)	LD1o-465(162)						4.1E-9(163)	3.00000(E-11
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	FREON 113	76-13-1								332(4)	0.77
TRIBROMOMETHANE	BROMOFORM	75-25-2	1400			0.002				5.6(2)	0.00058
HEXACHLOROBUTADIENE	1,3-HEXACHLOROBUTADIENE	87-68-3					0.0775	C		0.269(4)	0.069
1,2-DICHLOROPROPANE	PROPYLENE CHLORIDE	78-87-5	1900		LC1o-1500/4H					52(2)	0.0029
HEPTACHLOR		76-44-8	40	119		0.000013	4.5	B2	0.0085	0.0003(96)	0.00082
ENDRIN		72-20-8								0.0000002(2)	0.0000004
ALDRIN		309-00-2	39			0.00003	16	B2	0.0042	6E-6(3)	0.000016
DDD		72-54-8	113			0.0005			0.769	0.00000015(98)	0.00000039
3,4-BENZOFLUORANTHENE	BENZO(b)FLUORANTHENE	205-99-2						B2		0.00000085(4)	0.00002
2,3,5-TRICHLOROPHENOL		933-78-8	820							0.0024(4)	0.00017
2,3,6-TRICHLOROPHENOL		933-75-5	820							0.0046(116)	0.000033
2,4,5-TRICHLOROPHENOL		95-95-4	820							0.0013(4)	0.00000028
2,4,6-TRICHLOROPHENOL		88-06-2	820				0.0199	B2		0.03(3)	0.0098
3,4,5-TRICHLOROPHENOL		609-19-8	820							0.000068(4)	0.000008
DIBENZOFURAN		132-64-9								0.00031(4)	0.000017
1,2,3-TRICHLOROPROPANE		96-18-4								2.67(4)	0.000099
BENZ(a)ANTHRACENE	BENZANTHRACENE	56-55-3							0.049	0.000000036(4)	0.0000019
2,4-D	2,4-DICHLOROPHENOXYACETIC ACID	94-75-7								0.000159(98)	0.000000075
2,4,5-T	2,4,5-TRICHLOROPHENOXYACETIC ACID	93-76-5								0.000034(26)	0.00000041
TOXAPHENE	CHLORINATED CAMPHENE	8001-35-2					1.13	B2		0.3196)	0.326
1,2,4-TRICHLOROBENZENE		120-82-1	756			0.02				0.42(103)	0.0058
HEXACHLOROCYCLOHEXANE-alpha	BENZENE HEXACHLORIDE(BHC)	608-73-1	76	500		0.0003	2.7	B2		0.02(4)	0.0075
HEXACHLOROCYCLOHEXANE-beta		319-85-7	76	500		0.0003	1.5	C		0.06(4)	4.78
ACENAPHTHYLENE		208-96-8								0.029(2)	0.00148
LEAD		7439-92-1	LD1o-160			0.0000001			0.193		
CHROMIUM(VI)		18540-29-9				0.005	41	A			
CHROMIUM(III)		16065-83-1				0.005					
ARSENIC		7440-38-2	8				15	A	0.00703		
CADMIUM		7440-43-9	225				6.1	B1			
ZINC		7440-66-6	350								

DRAFT

TABLE 1. RAW CHEMICAL DATA VALUES FOR HRS SCORING

April, 1988

CHEMICAL NAME	COMMON SYNONYM	CAS NUMBER	LD50(a) (ORAL) (mg/kg) (Ref 1)	LD50 (DERMAL) (mg/kg) (Ref 1)	LC50 (INHAL) (ppm) (Ref 1)	RFD(b) (MG/KG/D) (Ref 161)	q1*(c) (mg/kg/d)-1 (Ref 2)	WEIGHT OF EVIDENCE (Ref 2)	ED10 (MG/KG/D) (Ref 1)	VAPOR PRESSURE (torr-25o)	HENRY'S LAW CONSTANT (atm-m3/mole) (REF. 41)
COPPER		7440-50-8	300								
MERCURY		7439-97-6			LClo-3.5/30H	0.0003				0.002(97)	
CYANIDE		57-12-5	5			0.02					
NICKEL		7440-02-0	LDlo-5			0.02	0.84	A	0.125		
IRON		15438-31-0									
BARIUM		7440-39-3									
MANGANESE		7439-96-5									
SELENIUM		7782-49-2			LDlo-10/8H	0.003					
ALUMINUM		7429-90-5									
RADIUM		7440-14-4									
URANIUM		7440-61-1									
ANTIMONY		7440-36-0									
RADON		10043-92-2									
THORIUM		7440-29-1									
COBALT		7440-48-4									
BORON		7440-42-8									
BERYLLIUM		7440-41-7	82			0.005	8.4	B2	0.0125		
ANILINE	PHENYL AMINE	62-53-3								0.67(97)	0.0000013
2,4-DIMETHYL PHENOL	2,4-XYLENOL	105-67-9	3200							0.0914(41)	0.00000187
HEXANE	n-HEXANE	110-54-3								152(183)	1.39
DIPHENYL METHANE DIISOCYANATE	4,4-METHYLENEDIPHENYL DIISOCYANATE	101-68-8								0.00001(64)	0.00000016
PHENYL SULFIDE	DIPHENYL SULFIDE	139-66-2								0.0028(41)	0.000254
ACETOPHENONE	1-PHENYL ETHANONE	98-86-2	900(172)			30				0.37(20)	0.0000534
2-BENZOTHIOZONE			950(172)							0.0071(41)	0.000000141
BENZYL CHLORIDE	CHLOROMETHYLBENZENE	100-44-7	1231(172)		80(172)	0.403				1.17(41)	0.00039
BUTANOL	n-BUTANOL	71-36-3	790(172)	4200(172)	8000(172)					7.06(41)	0.0000093
DIETHYLENE GLYCOL	2,2-OXYBISETHANOL	111-46-6	1000(172)	11890(172)	30(172)					0.0145(41)	2.000000E-12
DI-n-OCTYL PHTHALATE		117-84-0	6513(172)		0.31(172)					0.00014(96)	0.00000056
1,4-DIOXANE	p-DIOXANE	123-91-1	2000(172)	7600(172)	12800(172)		0.0104	B2	29.4	37(24)	0.00000113
ENDOSULFAN		115-29-7	2(172)	74(172)		0.28				0.000011(91)	0.0000134
ETHYLENE GLYCOL MONOETHYL ETHER	2-ETHOXYETHANOL	110-80-5	890(172)	1280(172)	1480(172)					9.5(41)	0.00000006
ISOBUTANOL	ISOBUTYL ALCOHOL	78-83-1	2460(172)	4240(172)	LCLo8000(172)					12.6(186)	0.0000129
N-NITROSODIPHENYLAMINE	DIPHENYLNITROSAMINE	86-30-6	1650				0.00492	B2		0.00018(41)	0.0000013
THALLIUM		7440-28-0	15.8			0.0004					
THIOUREA		62-56-6	TDlo1660(172)							0.0145(41)	0.000000016
TRIETHANOLAMINE		102-71-6	8680(172)							0.0000036(193)	2.000000E-15

DRAFT

April, 1988

TABLE 1. RAW CHEMICAL DATA VALUES FOR HRS SCORING

CHEMICAL NAME	DRY RELATIVE SOIL VOLATILITY(e) (calculated)	WATER SOLUBILITY (mg/l)	COEFFICIENT OF AQUEOUS MIGRATION(h)	MCL(i) (ug/l) (Ref 3)	MCLGs(j) (ug/l) (Ref 3)	SURFACE WATER BENCHMARK(k) LCR (10-6) (mg/l)	HYDROLYSIS HALFLIFE (days)	Ref.	BIODEGRADATION HALFLIFE(l) (days) (Ref.173)	FREE RADICAL OXIDATION HALFLIFE (days) (Ref.41)	PHOTOLYSIS HALFLIFE (days)	Ref.	VOLITILIZATION HALFLIFE (days) (Ref. 41)	TOTAL HALFLIFE(m) (days) (calculated)
1,1,2-TRICHLOROETHYLENE(TCE)	1.71E+01	1100(26)	NA	5	---	3.20E-01	320	173	29000	2.4	210	173	0.13	0.1410
TOLUENE	5.17E+00	506.7(171)	NA	---	2000		10000000	173	29	2	0.28	8	0.12	0.0804
BENZENE	3.20E+01	1787(11)	NA	5	---	1.20E-01	10000000	173	6	5	0.000196	45	0.11	0.0002
CHLOROFORM	6.06E+01	8216(13)	NA	100	---	4.30E-02	1280000	27	7	54	161	15	0.14	0.1368
PCBs	8.80E-02	0.7(17)	NA	---	0	4.50E-04	10000000	173	960		---		0.18	0.1800
1,1,1-TRICHLOROETHANE	3.68E+01	1554(13)	NA	200	---		180	14	18	104	182	15	0.14	0.1385
TETRACHLOROETHENE	5.18E+00	149(13)	NA	---	0	6.90E-02	264	14	29000	3	84	15	0.16	0.1515
PHENOL	1.06E-01	93000(19)	NA	---	---		10000000	173	9	0.59	8	173	80.8	0.5146
m-XYLENE	2.59E+00	146(7)	NA		440		10000000	173	29	1			0.13	0.1146
o-XYLENE	2.06E+00	2131(18)	NA		440		10000000	173	29	1			0.13	0.1146
p-XYLENE	2.73E+00	185(18)	NA		440		10000000	173	29	1			0.13	0.1146
ETHYLBENZENE	2.98E+00	153(11)	NA	---	680		---		---	1.8	0.21	21	0.13	0.0769
1,2-TRANS-DICHLOROETHYLENE	1.05E+02	39000(41)	NA	---	70		---		---	1.9	---		---	1.9000
METHYLENE CHLORIDE	1.35E+02	13702(13)	NA	---	---	2.50E-01	704	27	3.5	96	---		0.12	0.1159
1,1-DICHLOROETHANE	7.23E+01	5500(92)	NA	---	---		---		---	18.2	---		0.13	0.1291
1,1-DICHLOROETHENE	1.55E+02	3200(94)	NA	7	---	3.00E-03	10000000	173	8	1.9	---		0.12	0.1113
VINYL CHLORIDE	9.46E+02	1.1(24)	NA	2	---	1.50E-03	---		---	1.4	77	15	0.17	0.1513
CHLOROBENZENE	3.53E+00	472(42)	NA	---	60		10000000	173	150	16.7	0.049	25	0.14	0.0362
CARBON TETRACHLORIDE	3.26E+01	800(43)	NA	5	---	2.70E-02	2600000	27	29000		70	15	0.15	0.1497
1,2-DICHLOROETHANE	2.60E+01	8690(40)	NA	5	---	3.80E-02	18000000	29	29000	20.6	15000	30	0.15	0.1489
PENTACHLOROPHENOL	2.72E-04	14(31)	NA	---	220		10000000	173	960	23	2	32	213	1.8208
NAPHTHALENE	3.03E-02	31(33)	NA	---	---		---		---	0.2	3	34	0.21	0.0991
METHYL ETHYL KETONE	3.11E+01	268000(36)	NA	---	---		---		1.3	12	0.64	173	1.1	0.3008
ACETONE	8.39E+01	2300000(41)	NA	---	---		---		---	48	0.57	38	5.67	0.5124
PHENANTHRENE	5.20E-07	1.29(39)	NA	---	---		---		---	1.67	---		3350	1.6692
BENZO(a)PYRENE	1.41E-09	0.049(41)	NA	---	---	3.00E-04	10000000	173	850	1	0.046	173	34900	0.0440
1,1,2-TRICHLOROETHANE	6.60E+00	4500(40)	NA	---	---	6.10E-02	---		---	14.7	---		0.19	0.1876
DDT	2.30E-08	0.0055(92)	NA			0.01				1.84			8.4	1.5094
ANTHRACENE	0.00E+00	0.045(92)	NA							0.00012			0.19	0.0001
LINDANE	8.23E-07	31.4(41)	NA	4	0.2	0.0032				1.63			1510	1.6282
BIS(2-ETHYLHEXYL)PHTHALATE	2.48E-08	0.4(92)	NA							0.354			512	0.3538
STYRENE	2.03E+00	320(7)	NA	---	140					0.104			0.14	0.0597
1,1,2,2-TETRACHLOROETHANE	1.73E+00	2900(92)	NA			0.018	240000	173	960000	11.46			0.26	0.2542
PYRENE	0.00E+00	0.135(102)	NA							0.02			3060	0.0200
BENZO(j,k)FLUORENE	0.00E+00	0.00003(41)	NA				10000000	173	29000	0.18	1.9	173	4.1	0.1581
FLUORENE	0.00E+00	1.98(103)	NA							0.083			4.8	0.0816
SULFURIC ACID	0.00E+00	0.000001(169)	NA											
TRICHLOROFLUOROMETHANE	2.33E+02	1100(52)	NA							0			0.14	0.1400
ASBESTOS	0.00E+00	0	NA	---	7.1(mf/l)									
ACENAPTHENE	0.00E+00	3.7(41)	NA							0.46			1.7	0.3620
CIS-1,2-DICHLOROETHYLENE	0.00E+00	800(24)	NA	---	70					2			0.12	0.1132
ETHYL CHLORIDE	0.00E+00	5740(92)	NA							28			0.18	0.1789
DI-N-BUTYL PHTHALATE	3.43E-04	13(56)	NA				3650	56		0.46			16	0.4471
CHLORDANE	2.22E-06	1.85(59)	NA			0.0027	1400	173	960000	0.054			5.5	0.0535
TRINITROTOLUENE	0.00E+00	100(163)	NA				10000000	173	16	0.33	0.48	173	8030	0.1932
HEXACHLOROBENZENE	4.09E-06	0.005(13)	NA			0.0021	10000000	173	960000	6935			0.26	0.2600
AMMONIA	0.00E+00	0.000001(169)	NA											

DRAFT

April, 1988

TABLE 1. RAW CHEMICAL DATA VALUES FOR HRS SCORING

CHEMICAL NAME	DRY RELATIVE SOIL VOLATILITY(e) (calculated)	WATER SOLUBILITY (mg/l)	COEFFICIENT OF AQUEOUS MIGRATION(h)	MCL(i) (ug/l) (Ref 3)	MCLGs(j) (ug/l) (Ref 3)	SURFACE WATER BENCHMARK(k) LCR (10-6) (mg/l)	HYDROLYSIS HALFLIFE (days)	Ref.	BIODEGRADATION HALFLIFE(l) (days) (Ref. 173)	FREE RADICAL OXIDATION HALFLIFE (days) (Ref. 41)	PHOTOLYSIS HALFLIFE (days)	Ref.	VOLITILIZATION HALFLIFE (days) (Ref. 41)	TOTAL HALFLIFE(m) (days) (calculated)
TETRAHYDROFURAN	5.63E+01	1000000(67)	NA							0.5			2.3	0.4107
CHRYSENE	0.00E+00	0.006(24)	NA				10000000	173	29000	0.125	0.28	173	1590	0.0864
CHLOROETHANE	2.47E+00	6450(92)	NA							240			0.16	0.1599
METHYL ISOBUTYL KETONE	2.49E+00	17000(24)	NA							3			0.72	0.5806
DIOXIN	0.00E+00	0.0000072(41)	NA			0.000000022				3			0.22	0.2050
DDE	0.00E+00	0.04(68)	NA							0.192			57	0.1914
HEXACHLOROCYCLOPENTADIENE	1.97E-02	2.1(72)	NA				14	19	29000	0.026	0.0026	74	0.21	0.0023
2,4-DINITROTOLUENE	1.36E-05	270(70)	NA			0.011	10000000	173	290000	0.33	1.8	173	1110	0.2788
1,4-DICHLOROBENZENE	2.87E-01	79(40)	NA	75	—		10000000	173	29000	60			0.17	0.1695
DIELDRIN	1.76E-07	0.186(75)	NA			0.00018				0.05			34	0.0499
DIBROMOCHLOROMETHANE	0.00E+00	3300(41)	NA	100	—					255			0.21	0.2098
ETHYL ETHER	1.82E+02	6500(194)	NA							0.542			0.14	0.1113
2,6-DINITROTOLUENE	1.50E-04	180(92)	NA							0.33			68	0.3284
DIETHYL PHTHALATE	1.42E-04	896(56)	NA							0.525			304	0.5241
1,2-DICHLOROBENZENE	4.31E-01	154(11)	NA	---	620		10000000	173	29000	56			0.17	0.1695
BROMOMETHANE	4.48E+02	15223(13)	NA				20	27		529			0.12	0.1193
RDX	0.00E+00	44.7(163)	NA							6			1820000	6.0000
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	0.00E+00	110(41)	NA							0			0.17	0.1700
TRIBROMOMETHANE	1.40E+00	3190(24)	NA	100	—					548			0.29	0.2898
HEXACHLOROBUTADIENE	0.00E+00	1.3(41)	NA			0.045	10000000	173	29000	0			0.2	0.2000
1,2-DICHLOROPROPANE	1.55E+01	2700(13)	NA				40	173	29000	7			0.14	0.1368
HEPTACHLOR	9.58E-05	0.18(92)	NA			0.00078	1.67	173		0.025			0.32	0.0229
ENDRIN	4.53E-08	0.23(75)	NA	0.2	—					0.083			179	0.0830
ALDRIN	1.37E-06	0.017(31)	NA			0.00022				0.042			4.6	0.0416
DDD	3.55E-08	0.16(24)	NA							1.7			166	1.6828
3,4-BENZOFLUORANTHENE	2.13E-07	0.014(96)	NA				10000000	173	960000	0.125	0.36	173	3.1	0.0901
2,3,5-TRICHLOROPHENOL	0.00E+00	3.6(41)	NA							22			0.47	0.4602
2,3,6-TRICHLOROPHENOL	1.36E-03	71(41)	NA							22			1.7	1.5781
2,4,5-TRICHLOROPHENOL	3.47E-04	1190(96)	NA							22			182	19.6273
2,4,6-TRICHLOROPHENOL	8.11E+00	800(24)	NA			0.18	10000000	173	960	22			0.18	0.1785
3,4,5-TRICHLOROPHENOL	0.00E+00	2.8(41)	NA							22			6.6	5.0769
DIBENZOFURAN	0.00E+00	4(41)	NA							0.292			2.9	0.2653
1,2,3-TRICHLOROPROPANE	7.67E-01	5200(41)	NA							7			0.59	0.5441
BENZ(a)ANTHRACENE	9.20E-09	0.0057(92)	NA				10000000	173	7200	0.142	0.14	173	29	0.0703
2,4-D	4.14E-05	890(68)	NA	100	70					1			730	0.9386
2,4,5-T	0.00E+00	278(24)	NA							1.12			1430	1.1191
TOXAPHENE	6.56E-02	0.5(92)	NA	5	---	0.0031	10000000	173	960000	0.292			0.25	0.1347
1,2,4-TRICHLOROBENZENE	1.25E-01	49(11)	NA							180			0.17	0.1698
HEXACHLOROCYCLOHEXANE-alpha	4.85E-03	.1(41)	NA			0.0013				1.6			0.22	0.1934
HEXACHLOROCYCLOHEXANE-beta	1.45E-02	0.0048(41)	NA			0.0023				1.6			0.21	0.1856
ACENAPHTHYLENE	0.00E+00	3.93(24)	NA				10000000	173	960	0.042	0.9	173	0.18	0.0328
LEAD			0.1-1	50	20									
CHROMIUM(VI)			(0.1	50	120	0.000085								
CHROMIUM(III)			(0.1	50	120									
ARSENIC		130(96)	1	50	50	0.00023								
CADMIUM			1	10	5									
ZINC			1											

DRAFT

April, 1988

TABLE 1. RAW CHEMICAL DATA VALUES FOR HRS SCORING

CHEMICAL NAME	DRY RELATIVE SOIL VOLATILITY(e) (calculated)	WATER SOLUBILITY (mg/l)	COEFFICIENT OF AQUEOUS MIGRATION(h)	MCL(a) (ug/l) (Ref 3)	MCLGs(j) (ug/l) (Ref 3)	SURFACE WATER BENCHMARK(k) UCR (10-4) (mg/l)	HYDROLYSIS HALFLIFE (days)	Ref.	BIODEGRADATION HALFLIFE(l) (days) (Ref.173)	FREE RADICAL OXIDATION HALFLIFE (days) (Ref.41)	PHOTOLYSIS HALFLIFE (days)	Ref.	VOLITILIZATION HALFLIFE (days) (Ref. 41)	TOTAL HALFLIFE(m) (days) (calculated)
COPPER		0.03(98)	0.1-1	---	1300									
MERCURY		0.08(19)	)1	2	3									
CYANIDE											0.11	173		0.1100
NICKEL			0.1-1			0.0042								
IRON														
BARIUM			0.1-1	1000	1500									
MANGANESE			0.1-1											
SELENIUM			)1	10	45									
ALUMINUM			(0.1											
RADIUM			)1	5	---									
CHROMIUM			)1											
ANTIMONY			)1											
RADON			)1											
THORIUM			(0.1											
COBALT			0.1-1											
BORON			)1											
BERYLLIUM			0.1-1			0.00042								
ANILINE	1.35E-01	38800(180)	NA							0.58	63	194	27	0.5600
2,4-DIMETHYL PHENOL	2.75E-02	7870(182)	NA										22	22
HEXANE	4.99E+01	12.4(184)	NA							4			0.11	
DIPHENYL METHANE DIISOCYANATE	2.59E-06	22(41)	NA							0.18			341	
PHENYL SULFIDE	7.58E-04	2.7(41)	NA							2.5			4.36	
ACETOPHENONE	1.12E-01	5440(187)	NA							2			0.88	0.61
2-BENZOTHIOZONE	2.03E-03	10000(41)	NA							0.58			319	0.58
BENZYL CHLORIDE	3.49E-01	493(188)	NA							2	0.63	27	0.24	0.3
BUTANOL	2.41E+00	74000(189)	NA							2.3	0.27	21	3.5	0.23
DIETHYLENE GLYCOL	4.5.E-03	0.000000001(41)	NA							0.42			20000000	0.42
DI-n-OCTYL PHTHALATE	3.15E-05	3(19)	NA							0.4			129	0.4
1,4-DIOXANE	1.27E+01	3800000(41)	NA							0.28			31	0.28
ENDOSULFAN	2.23E-06	0.4(41)	NA							0.05			5.8	0.05
ETHYLENE GLYCOL MONOMETHYL ETHER	3.22E+00	16000000(41)	NA							0.73			538	0.73
ISOBUTANOL	6.30E+00	95000(64)	NA							1.7	0.15	21	2.5	0.13
N-NITROSODIPHENYLAMINE	4.80E-05	35.1(182)	NA							0.29			40	0.29
THALLIUM	ERR		NA											
THIOUREA	4.91E-03	51800(64)	NA							548			1990	430
TRIETHANOLAMINE	1.03E-06	310000000(41)	NA							0.96			22000000000	0.96

6

DRAFT

TABLE 1. RAW CHEMICAL DATA VALUES FOR HRS SCORING

April, 1988

CHEMICAL NAME	BCF(a)	LOG P(o)	LC50 (ug/l)(p) Fresh	LC50 (ug/l)(p) Salt	BIOMAGNA-FICATION(q)	FDA ACTION LEVEL (PPM IN FISH) (Ref.170)	DOSE ADJUSTING FACTOR(r)	EPA WATER CRITERIA(ug/l)(s) FRESHWATER CRITERIA ACUTE	FRESHWATER CRITERIA CHRONIC	SALTWATER CRITERIA ACUTE	SALTWATER CRITERIA CHRONIC	ECOLOGICAL-BASED BENCHMARKS(ug/l)(t) FRESHWATER BENCHMARKS ACUTE (Ref 100)	FRESHWATER BENCHMARKS CHRONIC (Ref 100)	SALTWATER BENCHMARKS ACUTE (Ref 100)	SALTWATER BENCHMARKS CHRONIC (Ref 100)
1,1,2-TRICHLOROETHYLENE (TCE)	88(159)	2.29(26)	40700(24)		N(159)		0.0068	18000L(78)	2200L(78)	2000L(134)	190E(80)	45000	21900	2000	---
TOLUENE	269(114)	2.73(6)	22800(24)	8090(24)	N(159)		0.0063	13000L(81)	650E(80)	3700L(133)	3200L(133)	17500	---	6300	5000
BENZENE	30.9(114)	2.13(9)	5800(24)		N(159)		0.45	5300L(136)	265E(80)	5100L(136)	255E(80)	5300	---	5100	700
CHLOROFORM	7.1(113)	1.97(9)	100000(46)		N(159)		0.0042	28900L(46)	1240L(46)	81500L(46)	4075E(80)	28900	1240	---	---
PCBs	40000(159)	3.9(16)	2(47)		Y(159)		0.0029	2L(137)	0.014C(137)	10L(137)	0.03C(137)	2	---	10	---
1,1,1-TRICHLOROETHANE	8.9(108)	2.49(9)	52800(24)		N(159)		0.0022	40000L(82)	2000E(80)	31200L(23)	1560E(80)	18000(u)	9400(u)	31200(u)	---
TETRACHLOROETHENE	49(108)	2.6(9)	18400(24)	29400(48)	N(19)		0.037	5280L(48)	840L(48)	10200L(48)	450L(48)	5280	840	10200	450
PHENOL	16000(112)	1.46(9)	5020(24)	5000(24)	N(159)		0.015	8500L(83)	750L(83)	5800L(138)	290E(80)	10200	2560	5800	---
o-XYLENE	159(87)	3.2(9)	16000(a)(24)	9200(24)	N(159)		0.0061	9200L(24)	920E(80)	3700L(82)	370E(80)				
m-XYLENE	138(87)	3.12(9)	13500(24)	11000(24)	N(159)		0.004	11000L(24)	110E(80)	1300L(82)	130E(80)				
p-XYLENE	146(87)	3.15(9)	20900(24)	2000(24)	N(159)		0.0054	2000L(24)	200E(80)	2000L(82)	200E(80)				
ETHYLBENZENE	4.7(111)	3.15(6)	32000(24)	29000(24)	N(159)		0.00004	12100L(84)	6800L(78)	430L(139)	21.5E(80)	32000	---	430	---
1,2-TRANS-DICHLOROETHYLENE	1.6(93)	0.48(93)	135000(49)		N(19)		0.002	135000L(49)	110000L(78)			11600	---	224000	---
METHYLENE CHLORIDE	3.0(93)	1.25(9)	193000(24)		N(159)		0.014	19300L(46)	965E(80)	256000L(46)	12800E(80)	11000	---	12000	6400
1,1-DICHLOROETHANE		1.79(93)	550000(24)	480000(24)	N(19)		0.0048	55000L(24)	2750E(80)		---	118000(u)	20000(u)	113000(u)	---
1,1-DICHLOROETHENE	5.61(49)	1.84(93)	220000(24)	250000(24)	N(159)		0.017	30300L(49)	2400L(78)	224000L(49)	11200E(80)	11600	---	224000	---
VINYL CHLORIDE	1.2(159)	0.61(9)			N(159)		1.3	356000L(82)	17800E(80)			---	---	---	---
CHLOROBENZENE	447(110)	2.84(6)	15900(44)	10500(44)	N(159)		0.000018	16000L(81)	10000L(78)	10500L(44)	525E(80)	250	50	160	129
CARBON TETRACHLORIDE	30.2(109)	2.83(9)	125000(24)	150000(24)	N(159)		0.01	35200L(140)	1760E(80)	50000L(140)	2500E(80)	35200	---	50000	---
1,2-DICHLOROETHANE	2(108)	1.48(9)	500000(24)	185000(24)	N(159)		0.0021	118000L(23)	20000L(23)	113000L(23)	5650E(80)	118000(u)	20000(u)	113000(u)	---
PENTACHLOROPHENOL	6170(107)	5.86(9)	190(24)	223(24)	N(159)		0.000021	20C(141)	13C(141)	13C(141)	7.9C(141)	53	3.2	53	34
NAPHTHALENE	575(106)	3.3(9)	2300(5)	2500(s)(5)	Y(159)		0.0000017	2300L(5)	620L(5)	380L(82)	3.8E(80)	2300	620	2350	---
METHYL ETHYL KETONE		0.29(6)	1690000(24)		N(19)		0.003	520000L(78)	70000L(78)	1950000L(82)	975000E(80)				
ACETONE	0.4(87)	-0.24(6)	8300000(24)		N(19)		0.0000016	10000L(24)	500E(80)						
PHENANTHRENE	10000(159)	4.46(9)		600(24)	N(159)		0.0013	3980E(85)	40E(80)	40E(85)	16E(85)	---	---	300	---
BENZO(a)PYRENE	2177(159)	6.06(93)			Y(159)		0.0013					---	---	300	---
1,1,2-TRICHLOROETHANE	4.3(159)	2.47(93)	81700(23)		N(19)		0.0018	18000L(78)	1000L(78)			18000(u)	9400(u)	31200(u)	---
DDT	54000(93)	6.19(93)	0.25(24)	0.4(24)	Y(159)	5	0.0013	1.1C(142)	0.001C(142)	0.13C(142)	0.001C(142)	---	---	---	---
ANTHRACENE	1300(95)	4.45(93)	3980(85)	40(85)	N(159)		0.0013	3980E(85)	40E(80)	40E(85)	16E(85)	---	---	300	---
LINDANE	130(143)	3.9(93)	2.0(24)	9.0(24)	N(159)		0.0017	2C(143)	0.08C(143)	0.16C(143)	0.0016E(80)	---	---	---	---
BIS(2-ETHYLHEXYL)PHTHALATE	130(128)	9.6(92)	3770000(128)	---	N(159)		0.0013	11100L(128)	3L(128)	300000L(82)	3000E(80)	940	3	2944	---
STYRENE	13(101)	2.95(9)	25100(24)	---			0.0035	23000L(78)	6800L(78)	52000L(82)	520E(80)				
1,1,2,2-TETRACHLOROETHANE	42(93)	2.39(93)	37000-7d(24)	---	N(159)		0.0016	9320L(23)	1700L(78)	9020L(23)	451E(80)	9320(u)	2400(u)	9020(u)	---
PYRENE	10000(159)	5.09(102)	2.6(24)	---	N(159)		0.0013					---	---	300	---
BENZO(J,K)FLUORENE	10000(159)	5.2(76)	3980(160)	---	N(159)		0.0013	3980L(85)	40E(80)	40L(85)	16L(85)	---	---	300	---
FLUORENE	1480(50)	4.18(6)	1000(24)	970(85)	N(159)		0.0013	1700E(85)	170E(80)	970E(85)	710E(85)	---	---	300	---
SULFURIC ACID			---	---			0.0013								
TRICHLOROFLUOROMETHANE		2.53(6)	---	---			0.027					11000	---	12000	6400
ASBESTOS			---	---			0.0013					---	---	---	---
ACENAPTHENE	387(154)	4(93)	608(119)	---	N(159)		0.0022	608L(119)	6.1E(80)	970L(154)	710L(154)	1700	520	970	710
CIS-1,2-DICHLOROETHYLENE		1.86(76)	135000(49)				0.016					11600	---	224000	---
ETHYL CHLORIDE		1.43(9)	---	---			0.0085								
DI-N-BUTYL PHTHALATE	6760(57)	4.57(54)	940(128)	---	N(159)		0.0013	940L(128)	47E(80)	1700L(82)	85E(80)	940	3	2944	---
CHLORDANE	38000(60)	3.32(6)	22(24)	6.4(24)	N(159)	0.3	0.0013	2.4C(144)	0.0043C(144)	0.09C(144)	0.004C(144)	---	---	---	---
TRINITROTOLUENE	14100(144)	1.60(76)	2580(24)	---			0.0013								
HEXACHLOROBENZENE	16000(163)	5.20(61)	12000(86)	---	Y(159)	0.3	0.0017	1200L(86)	120E(80)			250	50	160	129
AMMONIA	0(93)		160(133)	140(s)(133)			0.0013	8467C(133)	1151C(133)			0.083	0.0017	---	---

DRAFT

April, 1988

TABLE 1. RAW CHEMICAL DATA VALUES FOR HRS SCORING

CHEMICAL NAME	BCF(n)	LOG P(o)	LC50 (ug/l)(p) Fresh	LC50 (ug/l)(p) Salt	BIOMAGNIFICATION(q)	FDA ACTION LEVEL (PPM IN FISH) (Ref. 170)	DOSE ADJUSTING FACTOR(r)	EPA WATER CRITERIA(ug/l)(s) FRESHWATER CRITERIA ACUTE	FRESHWATER CRITERIA CHRONIC	SALTWATER CRITERIA ACUTE	SALTWATER CRITERIA CHRONIC	ECOLOGICAL-BASED BENCHMARKS(ug/l)(t) FRESHWATER BENCHMARKS ACUTE (Ref 100)	FRESHWATER BENCHMARKS CHRONIC (Ref 100)	SALTWATER BENCHMARKS ACUTE (Ref 100)	SALTWATER BENCHMARKS CHRONIC (Ref 100)
TETRAHYDROFURAN	1.3(87)	0.46(9)	---	---			0.0013	2160000L(87)	108000P(80)						
CHRYSENE	19500(95)	5.61(93)	---	---			0.0013			1000L(82)	10P(80)				
CHLOROMETHANE		0.95(93)	550000(24)	270000(24)			0.0074	550000L(46)	27500P(80)	270000L(46)	13500P(80)	11000	---	12000	6400
METHYL ISOBUTYL KETONE	4.7(87)	1.19(87)	460000(u)(24)	---			0.0013	303600L(24)	13180P(80)	1230000L(82)	61500P(80)				
DIOXIN	13000(132)	6.72(93)	0.0056(132)	0.0056(132)	N(159)		0.013	1L(132)	0.001L(132)			1	0.001	---	---
DDE	510000(93)	5.69(68)	---	---	Y(159)	5	0.0013	1.1C(142)	0.001C(142)	0.13C(142)	0.001C(142)	1050	---	14	---
HEXACHLOROCYCLOPENTADIENE	1100(73)	5.04(71)	7.0(24)	---	N(159)		0.0068	7L(145)	5.2L(145)	7L(145)	0.35P(80)	7	5.2	7	---
2,4-DINITROTOLUENE	3.8(146)	1.56(9)	24300(84)	---	N(159)		0.0013	24300L(84)	1550P(80)			330	230	590	---
1,4-DICHLOROBENZENE	2000(63)	3.39(6)	33700(24)	---	N(159)		0.0027	1120L(147)	763L(147)	1990L(147)	99.5P(80)	1120	763	1970	---
DIELDRIN	4760(93)	4.32(95)	1.5(24)	---	Y(159)	0.3	0.0016	2.5C(148)	0.0019C(148)	0.71C(148)	0.0019C(148)	---	---	---	---
DIBROMOCHLOROMETHANE		2.23(41)	---	---			0.002					11000	---	12000	6400
ETHYL ETHER	2.8(87)	0.83(6)	2138000-14d(24)	---			0.0019	2560000L(84)	128000P(80)	10000000L(82)	5000000P(80)				
2,6-DINITROTOLUENE	3.8(93)	2.05(19)	19600(88)	---	N(159)		0.0013	19600L(88)	990P(80)			330	230	590	---
DIETHYL PHTHALATE	117(93)	2.47(6)	962000(128)	296000(128)	N(159)		0.0013	52100L(128)	10000L(78)	7590L(128)	73.5P(80)	940	3	2944	---
1,2-DICHLOROBENZENE	562(63)	3.38(6)	27000(24)	7300(24)	N(159)		0.0024	1580L(147)	360L(78)	1970L(147)	98.5P(80)	1120	763	1970	---
BROMOMETHANE		1.19(9)	11000(24)	12000(24)			0.0053	11000L(46)	550P(80)	12000L(46)	600P(80)	11000	---	12000	6400
RDX	4.2(164)		36001(165)	---			0.0013						300L(166)		
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE		3.16(159)	---	---			0.032								
TRIBROMOMETHANE		2.4(93)	29300(46)	17900(46)			0.0016	29300L(46)	1465P(80)	12000L(82)	6400L(46)	11000	---	12000	6400
HEXACHLOROBUTADIENE	2.8(149)	4.78(93)	90(24)	---	N(159)		0.017	90L(149)	9.3L(149)	32L(149)	1.6P(80)	90	9.3	32	---
1,2-DICHLOROPROPANE	4.1(150)	2(9)	320000(24)	240000(24)			0.0031	52500L(150)	8100L(150)	240000L(150)	12000P(80)	23000	5700	10300	3040
HEPTACHLOR	15700(93)	4.4(93)	17(24)	0.8(24)	N(159)	0.3	0.0017	0.52C(151)	0.0038C(151)	0.053C(151)	0.0036C(151)	---	---	---	---
ENDRIN	3970(152)	3.5(92)	0.12(24)	0.05(24)	Y(159)	0.3	0.0013	0.18C(152)	0.0023C(152)	0.037C(152)	0.0023C(152)	---	---	---	---
ALDRIN	28(148)	5.3(93)	2.03(24)	4.0(24)	N(159)	0.3	0.0017	3C(148)	0.22L(148)	1.3C(148)	0.73L(148)	---	---	---	---
DDD	53600(142)	6.2(93)	---	---	Y(159)		0.0013	1.1C(142)	0.001C(142)	0.13C(142)	0.001C(142)	---	---	---	---
3,4-BENZOFLUORANTHENE	1000000(95)	6.06(93)	---	---			0.0013					---	---	300	---
2,3,5-TRICHLOROPHENOL	2341(**95)	4.36(76)	1600(u)(24)	---	N(159)		0.39					---	970(x)	---	---
2,3,6-TRICHLOROPHENOL	141(95)	3.46(116)	5100(u)(24)	---	N(159)		0.39	3400L(24)	340P(80)		---	---	970(x)	---	---
2,4,5-TRICHLOROPHENOL	110(93)	3.72(93)	450(81)	---	N(159)		0.39	430L(81)	4.5P(80)		---	---	970(x)	---	---
2,4,6-TRICHLOROPHENOL	234(95)	3.87(93)	320(81)	---	N(159)		0.39	320L(81)	3.2P(80)	970E(82)	270P(80)	---	970	---	---
3,4,5-TRICHLOROPHENOL	234(**95)	4.01(159)	1100(u)(24)	---	N(159)		0.39					---	970(x)	---	---
DIBENZOFURAN		4.12(76)	---	---			0.0013								
1,2,3-TRICHLOROPROPANE	18.8(87)	1.98(41)	42000-7d(24)	---			0.0014	45L(89)	2.3P(80)						
BENZ(a)ANTHRACENE	29000(95)	5.6(93)	---	---			0.0013	1L(90)	0.1P(80)			---	---	300	---
2,4-D	53(95)	2.81(68)	70700(24)	26700(24)	N(159)		0.0016	14000L(91)	700P(80)	259000L(82)	12950P(80)				
2,4,5-T	65(95)	0.6(94)	980(24)	14600(24)	N(159)		0.0013	150L(24)	7.5P(80)						
TOXAPHENE	13100(93)	3.3(93)	4.8-10d(24)	0.53(24)	Y(159)	5	0.02	0.73C(153)	0.0002C(153)	0.21C(153)	0.0002C(153)				
1,2,4-TRICHLOROBENZENE	3236(115)	4.12(6)	2400-14d(24)	---	N(159)		0.0043	1500L(44)	286L(44)	450L(44)	222L(44)	250	50	160	129
HEXACHLOROCYCLOHEXANE-alpha	130(143)	3.89(94)	1310(24)	---	N(159)		0.049	9L(86)	0.09P(80)						
HEXACHLOROCYCLOHEXANE-beta	130(143)	3.89(94)	---	---	N(159)		0.028	9L(86)	0.09P(80)						
ACENAPHTHYLENE	370(95)	3.7(93)	1700(85)	970(85)			0.0022	1700E(85)	17P(85)	970E(85)	710E(85)	---	---	300	---
LEAD	200(19)		2448(79)	315(79)	N(159)		0.0013	83C(79)	3.2C(79)	140C(79)	5.6C(79)	142.5	12.26	315	37
CHROMIUM(VI)	4000(19)		17600(127)	12400(127)	N(159)		0.0013	16C(127)	11C(127)	1100C(127)	50C(127)	21.07	2.5	2000	13
CHROMIUM(III)	4000(19)		3330(127)	---	N(159)		0.0013	1700C(127)	210C(127)	10300L(127)	315P(80)	2221	66	10300	---
ARSENIC	10000(159)		13340(121)	12700(121)	N(159)		0.0013	360C(121)	190C(121)	69C(121)	36C(121)	40	---	19	---
CADMIUM	2500(**19)		1.64(120)	780(120)	Y(159)		0.0013	3.9C(120)	1.1C(120)	43C(120)	9.3C(120)	1	0.15	577	7.1
ZINC	1000(**19)		550(122)	---	Y(159)		0.0013	120C(122)	110C(122)	95C(122)	86C(122)				

DRAFT

April, 1988

TABLE 1. RAW CHEMICAL DATA VALUES FOR HRS SCORING

CHEMICAL NAME	BCF(n)	LOG P(o)	LC50 (ug/l)(p) Fresh	LC50 (ug/l)(p) Salt	BIOMAGNA-FICATION(q)	FDA ACTION LEVEL (PPM IN FISH) (Ref.170)	DOSE ADJUSTING FACTOR(r)	EPA WATER CRITERIA(ug/l)(s) FRESHWATER CRITERIA ACUTE	FRESHWATER CRITERIA CHRONIC	SALTWATER CRITERIA ACUTE	SALTWATER CRITERIA CHRONIC	ECOLOGICAL-BASED BENCHMARKS(ug/l)(t) FRESHWATER BENCHMARKS ACUTE (Ref 100)	FRESHWATER BENCHMARKS CHRONIC (Ref 100)	SALTWATER BENCHMARKS ACUTE (Ref 100)	SALTWATER BENCHMARKS CHRONIC (Ref 100)
COPPER	30000(19)		16.7(123)	13.93(123)	N(159)		0.0013	18C(123)	12C(123)	2.9C(123)	2.9C(123)	16.74	3.873	5.8	5
MERCURY	100000(19)		30(124)	67.4(124)	Y(159)	1	0.0013	2.4C(124)	0.012C(124)	2.1C(124)	0.025C(124)	2.2	0.26	3.5	1.6
CYANIDE	2.3(159)		44.7(125)	59(125)	N(159)		0.0013	22C(125)	5.2C(125)	30L(125)	1C(125)	44.73	13.57	4.893	1(y)
NICKEL	40000(19)		2920(126)	7960(126)	N(159)		0.0013	1400C(126)	160C(126)	75C(126)	8.3C(126)	---	---	---	---
IRON	100000(159)		---	---	N(159)		0.0013	---	1000C(156)	---	---	---	---	---	---
BARIUM	5.2(159)		---	---	N(159)		0.0013	410000L(78)	2813L(157)	---	---	---	---	---	---
MANGANESE	660(159)		---	---	N(159)		0.0013	---	388L(157)	---	---	---	---	---	---
SELENIUM	800(19)		620(129)	599(129)	Y(159)		0.0013	260C(129)	35C(129)	410C(129)	54C(129)	---	---	---	---
ALUMINUM	15000(159)		3600(130)	---	Y(159)		0.0013	950C(130)	150C(130)	---	---	---	---	---	---
RADIUM	900(159)		---	---	N(159)		0.0013	---	---	---	---	---	---	---	---
URANIUM	10(159)		---	---	N(159)		0.0013	---	---	---	---	---	---	---	---
ANTIMONY	16000(19)		21900(131)	---	N(159)		0.0013	9000L(131)	1600L(131)	---	---	9000	1600	---	---
RADON	---		---	---			0.0013	---	---	---	---	---	---	---	---
THORIUM	---		---	---			0.0013	---	---	---	---	---	---	---	---
COBALT	---		---	---	Y(159)		0.0013	1620L(158)	38.2L(157)	---	---	---	---	---	---
BORON	0.22(159)		---	---	N(159)		0.0013	---	31.6L(157)	---	---	3100(v)	---	---	---
BERYLLIUM	100(19)		130(155)	---	N(159)		0.0013	130L(155)	5.3L(155)	---	---	130	5.3	---	---
ANILINE	10(181)	0.9(9)					0.0013	20000L(174)	1000@(80)						
2,4-DIMETHYL PHENOL	150(195)	2.3(6)	16750(				0.36	2120L(195)	1000L(78)			2120	---	---	---
METHANE			4000(u)(24)				0.0013								
DIPHENYL METHANE DIISOCYANATE		3.1(41)					0.0015								
PHENYL SULFIDE	592(8)	4.45(41)					0.003								
ACETOPHENONE	11(8)	1.59(185)	155000(24)				0.0013	155000L(24)	7750@(80)						
2-BENZOTHIOZONE		1.77(41)					0.0013								
BENZYL CHLORIDE	33(87)	2.3(6)	6000(24)				0.0013	4000L(175)	200@(80)						
BUTANOL	2.7(87)	0.88(6)	1910000(24)				0.0013	1730000L(87)	86500@(80)	2100000L(82)	105000@(80)				
DIETHYLENE GLYCOL		-1.98(190)	61072000-7d(24)				0.0032								
DI-n-OCTYL PHTHALATE	100000(8)	9.2(19)					0.003	69L(176)	3L(177)						
1,4-DIOXANE	0.03(95)	-0.27(9)	>10000000(24)	6700000(24)			0.0013	6700000L(178)	335000@(80)	6700000L(82)	335000@(80)				
ENDOSULFAN	2455(192)	1.7(192)	0.17(196)	0.09(196)	N(159)		0.0013	0.22C(196)	0.056C(196)	0.034C(196)	0.0087C(196)				
ETHYLENE GLYCOL MONOMETHYL ETHER	0.3(8)	-0.32(194)	15520000(24)	>10000000(24)			0.0013	10000000L(24)	500000@(80)	10000000L(24)	500000@(80)				
ISOBUTANOL	2.2(87)	0.65(6)					0.0013	524600(179)	2623@(80)	600000L(82)	30000@(80)				
[illegible]PHENYLAMINE	219(108)	3.13(182)	5850(197)	3300000(197)			0.0145	5850L(197)	1000L(78)	3300000L(197)	3300@(80)	5850	---	3300000	---
THALLIUM	119(198)		1800(198)	20900(198)			0.0475	1400L(198)	40L(198)	2130L(198)	21.3@(80)	1400	40	2130	---
THIOUREA	0.005(55)	-1.02(6)	>100000(24)				0.0013	1800L(24)	9@(80)						
TRIETHANOLAMINE		-1.5(6)	75000000(u)(924)				0.0014								

DRAFT

April, 1988

TABLE 2. ASSIGNED FACTOR VALUES FOR HRS SCORING

CHEMICAL NAME	CAS Number	GAS MOBILITY: Vapor pressure subscore	Henry's constant subscore	Dry relative soil volatility subscore	OVERALL GAS MOBILITY SCORE	TOXICITY: Acute toxicity subscore	Chronic non-carcinogenic toxicity subscore	Carcino-genicity subscore	OVERALL TOXICITY SCORE	AQUATIC MOBILITY: SOLUBILITY SCORE	AQUEOUS MIGRATION SCORE(a)
1,1,2-TRICHLOROETHYLENE(TCE)	79-1-6	3	3	3	3	1	0	3	3	3	
TOLUENE	108-88-3	3	3	3	3	1	2	0	2	2	
BENZENE	71-42-2	3	3	3	3	1	0	4	4	3	
CHLOROFORM	67-66-3	3	3	3	3	1	3	3	3	3	
PCBs	1336-36-3	2	3	2	3	1	0	5	5	0	
1,1,1-TRICHLOROETHANE	71-55-6	3	3	3	3	2	2	0	2	3	
TETRACHLOROETHENE	127-18-4	3	3	3	3	1	2	3	3	2	
PHENOL	108-95-2	2	1	2	2	2	2	0	2	3	
m-XYLENE	108-38-3	2	3	3	3	1	1	0	1	2	
o-XYLENE	95-47-6	2	3	3	3	1	1	0	1	2	
p-XYLENE	106-42-3	2	3	3	3	1	1	0	1	2	
ETHYLBENZENE	100-41-4	2	3	3	3	1	2	0	2	2	
1,2-TRANS-DICHLOROETHYLENE	156-60-5	3	3	3	3	1	0	0	1	3	
METHYLENE CHLORIDE	75-09-2	3	3	3	3	2	2	3	3	3	
1,1-DICHLOROETHANE	75-34-3	3	3	2	3	1	0	0	1	3	
1,1-DICHLOROETHENE	75-35-4	3	3	3	3	3	3	4	4	3	
VINYL CHLORIDE	75-01-4	3	3	3	3	3	0	5	5	0	
CHLOROBENZENE	108-90-7	3	3	3	3	1	0	0	1	2	
CARBON TETRACHLORIDE	56-23-5	3	3	3	3	1	4	4	4	2	
1,2-DICHLOROETHANE	107-06-2	3	3	3	3	2	0	3	3	3	
PENTACHLOROPHENOL	87-86-5	1	1	1	0	4	3	0	4	1	
NAPHTHALENE	91-20-3	2	2	2	2	1	0	0	1	1	
METHYL ETHYL KETONE	78-93-3	3	2	3	3	0	0	0	0	3	
ACETONE	67-64-1	3	1	3	3	0	0	0	0	3	
PHENANTHRENE	85-01-8	0	1	0	0	1	0	0	1	0	
BENZO(a)PYRENE	50-32-8	0	0	0	0	0	0	5	5	0	
1,1,2-TRICHLOROETHANE	79-00-5	3	2	3	3	2	2	2	2	3	
DDT	50-29-3	0	1	0	0	2	4	4	4	0	
ANTHRACENE	120-12-7	1	3	0	1	0	0	0	0	0	
LINDANE	58-89-9	0	0	0	0	2	5	5	5	1	
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	0	0	0	0	0	0	0	0	0	
STYRENE	100-42-5	2	3	3	3	2	2	0	2	2	
1,1,2,2-TETRACHLOROETHANE	79-34-5	2	2	3	3	2	0	3	3	3	
PYRENE	129-00-0	0	0	0	0	0	0	0	0	0	
BENZO(J,K)FLUORENE	206-44-0	1	2	0	1	1	0	0	1	0	
FLUORENE	86-73-7	1	2	0	1	0	0	0	0	0	
SULFURIC ACID	7664-93-9	0	0	0	0	0	0	0	0	3	
TRICHLOROFLUOROMETHANE	75-69-4	3	3	3	3	0	0	0	0	3	
ASBESTOS	1332-21-4	0	0	0	0	0	0	0	0	0	
ACENAPTHENE	83-32-9	1	2	0	1	0	0	0	0	0	
CIS-1,2-DICHLOROETHYLENE	156-59-2	3	3	0	2	0	0	0	0	2	
ETHYL CHLORIDE	75-00-3	3	3	0	2	1	0	0	1	3	
DI-N-BUTYL PATHALATE	84-74-2	1	1	1	1	1	2	0	2	1	
CHLORDANE	57-74-9	1	2	1	1	2	5	5	5	0	
TRINITROTOLUENE	118-96-7	0	0	0	0	0	0	0	0	1	
HEXACHLOROBENZENE	118-74-1	1	2	1	1	0	0	5	5	0	

DRAFT

April, 1988

TABLE 2. ASSIGNED FACTOR VALUES FOR HRS SCORING

CHEMICAL NAME	CAS Number	GAS MOBILITY: Vapor pressure subscore	GAS MOBILITY: Henry's constant subscore	GAS MOBILITY: Dry relative soil volatility subscore	GAS MOBILITY: OVERALL GAS MOBILITY SCORE	TOXICITY: Acute toxicity subscore	TOXICITY: Chronic non-carcinogenic toxicity subscore	TOXICITY: Carcino-genicity subscore	TOXICITY: OVERALL TOXICITY SCORE	AQUATIC MOBILITY: SOLUBILITY SCORE	AQUATIC MOBILITY: AQUEOUS MIGRATION SCORE (a)
AMMONIA	7664-41-7	3	2	0	2	2	0	0	2	3	
[illegible]	109-99-9	3	2	3	3	0	0	0	0	3	
CHRYSENE	218-01-9	0	0	0	0	0	0	0	0	0	
CHLOROMETHANE	74-87-3	3	3	3	3	1	0	0	1	3	
METHYL ISOBUTYL KETONE	108-10-1	2	2	3	3	0	0	0	0	3	
DIOXIN	1746-01-6	0	3	0	1	4	0	5	5	0	
DDE	72-55-9	0	1	0	0	2	4	0	4	0	
HEXACHLOROCYCLOPENTADIENE	77-47-4	2	3	2	3	0	0	0	0	0	
2,4-DINITROTOLUENE	121-14-2	1	0	1	0	2	0	4	4	2	
1,4-DICHLOROBENZENE	106-46-7	2	3	2	3	1	0	0	1	1	
DIELDRIN	60-57-1	0	1	0	0	3	5	5	5	0	
DIBROMOCHLOROMETHANE	124-48-1	3	3	0	2	0	4	0	4	3	
ETHYL ETHER	60-29-7	3	2	3	3	0	0	0	0	3	
2,6-DINITROTOLUENE	606-20-2	1	1	1	1	2	0	0	2	2	
DIETHYL PHTHALATE	84-77-5	1	1	1	1	5	1	0	5	2	
1,2-DICHLOROBENZENE	95-50-1	2	3	2	3	1	0	0	1	2	
BROMOMETHANE	74-83-9	3	3	3	3	0	0	0	0	3	
RDX	121-82-4	0	0	0	0	2	0	0	2	1	
1,1,2-TRICHLORO-1,2,2-TRIFLUOR	76-13-1	3	3	0	2	0	0	0	0	2	
TRIBROMOMETHANE	75-25-2	2	2	3	3	1	3	0	3	3	
HEXACHLOROBUTADIENE	87-68-3	2	3	0	2	0	0	2	2	0	
1,2-DICHLOROPROPANE	78-87-5	3	3	3	3	2	0	0	2	3	
HEPTACHLOR	76-44-8	1	2	1	1	3	5	5	5	0	
ENDRIN	72-20-8	0	1	0	0	0	0	0	0	0	
ALDRIN	309-00-2	0	1	1	0	3	5	5	5	0	
DDD	72-54-8	0	1	0	0	2	4	0	4	0	
3,4-BENZOFLUORANTHENE	205-99-2	0	1	0	0	0	0	0	0	0	
2,3,5-TRICHLOROPHENOL	933-78-8	2	2	0	1	1	0	0	1	0	
2,3,6-TRICHLOROPHENOL	933-75-5	2	2	2	2	1	0	0	1	1	
2,4,5-TRICHLOROPHENOL	95-95-4	2	1	1	1	1	0	0	1	3	
2,4,6-TRICHLOROPHENOL	88-06-2	2	3	3	3	1	0	3	3	2	
3,4,5-TRICHLOROPHENOL	609-19-8	1	1	0	0	1	0	0	1	0	
DIBENZOFURAN	132-64-9	1	2	0	1	0	0	0	0	0	
1,2,3-TRICHLOROPROPANE	96-18-4	2	2	2	2	0	0	0	0	3	
BENZ(a)ANTHRACENE	56-55-3	0	1	0	0	0	0	0	0	0	
2,4-D	94-75-7	1	0	1	0	0	0	0	0	2	
2,4,5-T	93-76-5	1	0	0	0	0	0	0	0	2	
TOXAPHENE	8001-35-2	2	3	2	3	0	0	5	5	0	
1,2,4-TRICHLOROBENZENE	120-82-1	2	3	2	3	1	3	0	3	1	
HEXACHLOROCYCLOHEXANE-alpha	608-73-1	2	3	2	3	2	5	5	5	0	
HEXACHLOROCYCLOHEXANE-beta	319-85-7	2	3	2	3	2	5	4	5	0	
ACENAPHTHYLENE	208-96-8	2	3	0	2	0	0	0	0	0	
LEAD	7439-92-1	0	0	0	0	2	5	0	5		2
CHROMIUM(VI)	18540-29-9	0	0	0	0	0	3	5	5		1
CHROMIUM(III)	16065-83-1	0	0	0	0	0	3	0	3		1
ARSENIC	7440-38-2	0	0	0	0	3	0	5	5		3

April, 1988

TABLE 2. ASSIGNED FACTOR VALUES FOR HRS SCORING

CHEMICAL NAME	CAS Number	GAS MOBILITY: Vapor pressure subscore	Henry's constant subscore	Dry relative soil volatility subscore	OVERALL GAS MOBILITY SCORE	TOXICITY: Acute toxicity subscore	Chronic non-carcinogenic toxicity subscore	Carcino-genicity subscore	OVERALL TOXICITY SCORE	AQUATIC MOBILITY: SOLUBILITY SCORE	AQUEOUS MIGRATION SCORE (a)
CADMIUM	7440-43-9	0	0	0	0	2	0	3	3		3
ZINC	7440-66-6	0	0	0	0	2	0	0	2		3
COPPER	7440-50-8	0	0	0	0	2	0	0	2		2
MERCURY	7439-97-6	0	0	0	0	4	3	0	3		3
CYANIDE	57-12-5	0	0	0	0	3	3	0	3		
NICKEL	7440-02-0	0	0	0	0	3	3	3	3		2
IRON	15438-31-0	0	0	0	0	0	0	0	0		
BARIUM	7440-39-3	0	0	0	0	0	0	0	0		2
MANGANESE	7439-96-5	0	0	0	0	0	0	0	0		2
SELENIUM	7782-49-2	0	0	0	0	4	4	0	4		3
ALUMINUM	7429-90-5	0	0	0	0	0	0	0	0		1
RADIUM	7440-14-4	0	0	0	0	0	0	0	0		3
URANIUM	7440-61-1	0	0	0	0	0	0	0	0		3
ANTIMONY	7440-36-0	0	0	0	0	0	0	0	0		3
RADON	10043-92-2	0	0	0	0	0	0	0	0		3
THORIUM	7440-29-1	0	0	0	0	0	0	0	0		1
COBALT	7440-48-4	0	0	0	0	0	0	0	0		2
BORON	7440-42-8	0	0	0	0	0	0	0	0		3
BERYLLIUM	7440-41-7	0	0	0	0	2	3	3	3		2
ANILINE	62-53-3	2	1	2	2	0	0	0	0	3	
2,4-DIMETHYL PHENOL	105-67-9	2	1	2	2	1	0	0	1	3	
HEXANE	110-54-3	3	3	3	3	0	0	0	0	1	
DIPHENYL METHANE DIISOCYANATE	101-68-8	1	1	1	1	0	0	0	0	1	
PHENYL SULFIDE	139-66-2	2	2	1	2	0	0	0	0	0	
ACETOPHENONE	98-86-2	2	2	2	2	1	1	0	1	3	
2-BENZOTHIOZONE		2	1	2	2	1	0	0	1	3	
BENZYL CHLORIDE	100-44-7	2	2	2	2	3	2	0	3	2	
BUTANOL	71-36-3	2	1	3	2	1	0	0	1	3	
DIETHYLENE GLYCOL	111-46-6	2	0	2	1	3	0	0	3	0	
DI-n-OCTYL PHTHALATE	117-84-0	1	1	1	1	4	0	0	4	0	
1,4-DIOXANE	123-91-1	3	1	3	3	1	0	3	3	3	
ENDOSULFAN	115-29-7	1	2	1	1	4	2	0	4	0	
ETHYLENE GLYCOL MONOMETHYL ETH	110-80-5	2	0	3	2	2	0	0	2	3	
ISOBUTANOL	78-83-1	3	2	3	3	1	0	0	1	3	
N-NITROSODIPHENYLAMINE	86-30-6	1	1	1	1	1	0	2	2	1	
THALLIUM	7440-28-0				0	3	5	0	5		1
THIOUREA	62-56-6	2	0	2	1	1	0	0	1	3	
TRIETHANOLAMINE	102-71-6	0	0	1	0	1	0	0	1	3	

4/27/88 **DRAFT** TABLE 2. ASSIGNED FACTOR VALUES FOR HRS SCORING April, 1986

CHEMICAL NAME	POPULATION(b) NCL subscore	NCLB subscore	Population at 10-4 risk subscore	OVERALL HEALTH-BASED BENCHMARK SCORE	OVERALL PERSISTENCE SCORE(c) RIVERS/ STREAMS	LAKES	FOOD CHAIN BCF subscore	Log P subscore	Water solubility subscore	Biomagnification potential(d)	FDA action level subscore	OVERALL FOOD CHAIN SCORE
1,1,2-TRICHLOROETHYLENE(TCE)					2	1	3			N		3
TOLUENE					1	1	4			N		4
BENZENE					0	1	3			N		3
CHLOROFORM					2	1	2			N		2
PCBs					2	1	6			Y		6
1,1,1-TRICHLOROETHANE					2	1	2			N		2
TETRACHLOROETHENE					2	1	3			N		3
PHENOL					3	1	6			N		6
m-XYLENE					2	1	4			N		4
o-XYLENE					2	1	4			N		4
p-XYLENE					2	1	4			N		4
ETHYLBENZENE					1	1	2			N		2
1,2-TRANS-DICHLOROETHYLENE					3	1	2			N		2
METHYLENE CHLORIDE					2	1	2			N		2
1,1-DICHLOROETHANE					2	1		2		N		2
1,1-DICHLOROETHENE					2	1	2			N		2
VINYL CHLORIDE					2	1	2			N		2
CHLOROBENZENE					1	1	4			Y		5
CARBON TETRACHLORIDE					2	1	3			N		3
1,2-DICHLOROETHANE					2	1	2			N		2
PENTACHLOROPHENOL					3	1	5			N		5
NAPHTHALENE					1	1	4			N		4
METHYL ETHYL KETONE					2	1		1		Y		2
ACETONE					3	1	1			N		1
PHENANTHRENE					3	1	6			N		6
BENZO(a)PYRENE					1	1	5			Y		6
1,1,2-TRICHLOROETHANE					2	1	2			N		2
DDT					3	1	6			Y		6
ANTHRACENE					0	1	5			N		5
LINDANE					3	1	4			N		4
BIS(2-ETHYLHEXYL)PHTHALATE					2	1	4			N		4
STYRENE					1	1	3					3
1,1,2,2-TETRACHLOROETHANE					2	1	3			N		3
PYRENE					1	1	6			N		6
BENZO(j,k)FLUORENE					2	1	6			N		6
FLUORENE					1	1	5			N		5
SULFURIC ACID					2	1			1			1
TRICHLOROFLUOROMETHANE					2	1		3				3
ASBESTOS					2	1						
ACENAPTHENE					2	1	4			N		4
CIS-1,2-DICHLOROETHYLENE					2	1		2				2
ETHYL CHLORIDE					2	1		2				2
DI-N-BUTYL PHTHALATE					2	1	5			N		5
CHLORDANE					1	1	6			N		6
TRINITROTOLUENE					2	1	6					6
HEXACHLOROBENZENE					2	1	6			Y		6

TABLE 2. ASSIGNED FACTOR VALUES FOR HRS SCORING

April, 1988

CHEMICAL NAME	POPULATION(b) NCL subscore	NCLG subscore	Population at 10-4 risk subscore	OVERALL HEALTH-BASED BENCHMARK SCORE	OVERALL PERSISTENCE SCORE(c) RIVERS/ STREAMS	LAKES	FOOD CHAIN BCF subscore	Log P subscore	Water solubility subscore	Biomagnification potential(d)	FDA action level subscore	OVERALL FOOD CHAIN SCORE
AMMONIA					2	1	1					1
TETRAHYDROFURAN					2	1	2					2
CHRYSENE					1	1	6					6
CHLOROETHANE					2	1		2				2
METHYL ISOBUTYL KETONE					3	1	2					2
DIOXIN					2	1	6			N		6
DDE					2	1	6			Y		6
HEXACHLOROCYCLOPENTADIENE					0	1	3			N		3
2,4-DINITROTOLUENE					2	1	2			N		2
1,4-DICHLOROBENZENE					2	1	3			N		3
DIELDRIN					1	1	3			Y		6
DIBROMOCHLOROMETHANE					2	1		3				3
ETHYL ETHER					2	1	2					2
2,6-DINITROTOLUENE					2	1	2			N		2
DIETHYL PHTHALATE					3	1	4			N		4
1,2-DICHLOROBENZENE					3	1	4			N		4
BROMOETHANE					2	1		2				2
RDX					3	1	2					2
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE					2	1		3				3
TRIBROMOMETHANE					2	1		3				3
HEXACHLOROBUTADIENE					2	1	2			N		2
1,2-DICHLOROPROPANE					2	1	2					2
HEPTACHLOR					1	1	6			N		6
ENDRIN					1	1	3			Y		6
ALDRIN					1	1	3			N		3
DDD					3	1	6			Y		6
3,4-BENZOFLUORANTHENE					1	1	6					6
2,3,5-TRICHLOROPHENOL					2	1	4			N		4
2,3,6-TRICHLOROPHENOL					3	1	4			N		4
2,4,5-TRICHLOROPHENOL					3	1	4			N		4
2,4,6-TRICHLOROPHENOL					2	1	4			N		4
3,4,5-TRICHLOROPHENOL					3	1	4			N		4
DIBENZOFURAN					2	1		4				4
1,2,3-TRICHLOROPROPANE					3	1	3					3
BENZ(a)ANTHRACENE					1	1	6					6
2,4-D					3	1	3			N		3
2,4,5-T					3	1	3			N		3
TOXAPHENE					2	1	6			Y		6
1,2,4-TRICHLOROBENZENE					2	1	3			N		3
HEXACHLOROCYCLOHEXANE-alpha					2	1	4			N		4
HEXACHLOROCYCLOHEXANE-beta					2	1	4			N		4
ACENAPHTHYLENE					1	1	4					4
LEAD					3	3	4			N		4
CHROMIUM(VI)					3	3	3			N		3
CHROMIUM(III)					3	3	3			N		3
ARSENIC					3	3	3			N		3

rpr. 1, 1988

TABLE 2. ASSIGNED FACTOR VALUES FOR HRS SCORING

CHEMICAL NAME	POPULATION(b) MCL subscore	MCLG subscore	Population at 10-4 risk subscore	OVERALL HEALTH-BASED BENCHMARK SCORE	OVERALL PERSISTENCE SCORE(c) RIVERS/STREAMS	LAKES		FOOD CHAIN BCF subscore	Log P subscore	Water solubility subscore	Biomagnification potential(d)	FDA action level subscore	OVERALL FOOD CHAIN SCORE
CHROMIUM					3	3		6			Y		6
ZINC					3	3		6			Y		6
COPPER					3	3		6			N		6
MERCURY					3	3		6			Y		6
CYANIDE					3	3		2			N		2
NICKEL					3	3		6			N		6
IRON					3	3		6			N		6
BARIUM					3	3		2			N		2
MANGANESE					3	3		4			N		4
SELENIUM					3	3		4			Y		5
ALUMINUM					3	3		6			Y		6
RADIUM					3	3	3	4			N		4
URANIUM					3	3		3			N		3
ANTIMONY					3	3		6			N		6
RADON					3	3	3						
THORIUM					3	3	3						
COBALT					3	3	3				Y		1
BORON					3	3		1			N		1
BERYLLIUM					3	3		4			N		4
ANILINE					3	1		3				3	
2,4-DIMETHYL PHENOL					3	1		4				4	
HEXANE					2	1				6		6	
DIPHENYL METHANE DIISOCYANATE					2	1			3			3	
PHENYL SULFIDE					2	1		4				4	
ACETOPHENONE					3	1		3				3	
2-BENZOTHIOZONE					3	1			2			2	
BENZYL CHLORIDE					2	1		3				3	
BUTANOL					2	1		2				2	
DIETHYLENE GLYCOL					2	1			1			1	
DI-n-OCTYL PHTHALATE					2	1		6				6	
1,4-DIOXANE					2	1		1				1	
ENDOSULFAN					1	1		5			N	5	
ETHYLENE GLYCOL MONOETHYL ETHER					3	1		1				1	
ISOBUTANOL					2	1		2				2	
N-NITROSODIPHENYLAMINE					2	1		4				4	
THALLIUM					3	3		4				4	
THIOUREA					3	1		1				1	
TRIETHANOLAMINE					3	1			1			1	

April, 1988

4/27/88 **DRAFT**

TABLE 2. ASSIGNED FACTOR VALUES FOR HRS SCORING

CHEMICAL NAME	RECREATIONAL THREAT: ~~Dose adjusting factor score~~	ENVIRONMENTAL THREAT: ECOSYSTEM TOXICITY SCORE: Fresh	ENVIRONMENTAL THREAT: ECOSYSTEM TOXICITY SCORE: Salt	SENSITIVE ENVIRONMENTS: Ecological based benchmark score
1,1,2-TRICHLOROETHYLENE (TCE)	4	1	3	
TOLUENE	4	2	1	
BENZENE	6	0	2	
CHLOROFORM	4	1	1	
PCBs	4	5	5	
1,1,1-TRICHLOROETHANE	4	1	1	
TETRACHLOROETHENE	5	2	2	
PHENOL	5	2	2	
o-XYLENE	4	3	3	
o-XYLENE	4	2	3	
p-XYLENE	4	3	3	
ETHYLBENZENE	2	1	3	
1,2-TRANS-DICHLOROETHYLENE	4	0	0	
METHYLENE CHLORIDE	5	1	0	
1,1-DICHLOROETHANE	4	1	1	
1,1-DICHLOROETHENE	5	1	0	
VINYL CHLORIDE	6	0	0	
CHLOROBENZENE	2	0	2	
CARBON TETRACHLORIDE	5	1	1	
1,2-DICHLOROETHANE	4	0	1	
PENTACHLOROPHENOL	2	3	4	
NAPHTHALENE	1	2	4	
METHYL ETHYL KETONE	4	0	0	
ACETONE	1	2	2	
PHENANTHRENE	4	3	3	
BENZO(a)PYRENE	4			
1,1,2-TRICHLOROETHANE	4	2	2	
DDT	4	5	5	
ANTHRACENE	4	3	3	
LINDANE	4	5	5	
BIS(2-ETHYLHEXYL)PHTHALATE	4	4	1	
STYRENE	4	1	2	
1,1,2,2-TETRACHLOROETHANE	4	1	2	
PYRENE	4	5	5	
BENZO(j,k)FLUORENE	4	3	3	
FLUORENE	4	3	2	
SULFURIC ACID	4			
TRICHLOROFLUOROMETHANE	5			
ASBESTOS	4			
ACENAPTHENE	4	4	2	
CIS-1,2-DICHLOROETHYLENE	5	1	1	
ETHYL CHLORIDE	4			
DI-N-BUTYL PHTHALATE	4	3	3	
CHLORDANE	4	5	5	
TRINITROTOLUENE	4	3	3	
HEXACHLOROBENZENE	4	2	2	

4/27/88 DRAFT

TABLE 2. ASSIGNED FACTOR VALUES FOR HRS SCORING

CHEMICAL NAME	RECREATIONAL THREAT: Dose adjusting factor score	ENVIRONMENTAL THREAT: ECOSYSTEM TOXICITY SCORE: Fresh	Salt	SENSITIVE ENVIRONMENTS: Ecological based benchmark score
AMMONIA	4	1	1	
TETRAHYDROFURAN	4	0	0	
CHRYSENE	4		4	
DICHLOROMETHANE	4	0	0	
METHYL ISOBUTYL KETONE	4	0	0	
DIOXIN	4	5	5	
DDE	4	5	5	
HEXACHLOROCYCLOPENTADIENE	4	4	5	
2,4-DINITROTOLUENE	4	1	1	
1,4-DICHLOROBENZENE	4	2	3	
DIELDRIN	4	5	5	
DIBROMOCHLOROMETHANE	4			
ETHYL ETHER	4	0	0	
2,6-DINITROTOLUENE	4	2	2	
DIETHYL PHTHALATE	4	1	2	
1,2-DICHLOROBENZENE	4	2	3	
BROMOMETHANE	4	2	2	
DDT	4	3	3	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	5			
TRIBROMOMETHANE	4	1	1	
HEXACHLOROBUTADIENE	5	4	4	
1,2-DICHLOROPROPANE	4	1	0	
HEPTACHLOR	4	5	5	
ENDRIN	4	5	5	
ALDRIN	4	5	5	
DDD	4	5	5	
3,4-BENZOFLUORANTHENE	4			
2,3,5-TRICHLOROPHENOL	6	3	3	
2,3,6-TRICHLOROPHENOL	6	3	3	
2,4,5-TRICHLOROPHENOL	6	4	4	
2,4,6-TRICHLOROPHENOL	6	4	3	
3,4,5-TRICHLOROPHENOL	6	3	3	
DIBENZOFURAN	4			
1,2,3-TRICHLOROPROPANE	4	4	4	
BENZ(a)ANTHRACENE	4	5	5	
2,4-D	4	2	0	
2,4,5-T	4	4	4	
TOXAPHENE	5	5	5	
1,2,4-TRICHLOROBENZENE	4	2	2	
HEXACHLOROCYCLOHEXANE-alpha	4	5	5	
HEXACHLOROCYCLOHEXANE-beta	5	5	5	
ACENAPHTHYLENE	4	3	2	
LEAD	4	4	4	
CHROMIUM(VI)	4	3	3	
CHROMIUM(III)	4	2	2	
ARSENIC	4	2	3	

TABLE 2. ASSIGNED FACTOR VALUES FOR HRS SCORING

CHEMICAL NAME	RECREATIONAL THREAT: Base adjusting factor score	ENVIRONMENTAL THREAT: ECOSYSTEM TOXICITY SCORE: Fresh	ENVIRONMENTAL THREAT: ECOSYSTEM TOXICITY SCORE: Salt	SENSITIVE ENVIRONMENTS: Ecological based benchmark score
CHROMIUM	4	4	4	
ZINC	4	2	3	
COPPER	4	3	4	
MERCURY	4	5	5	
CYANIDE	4	4	4	
NICKEL	4	2	4	
IRON	4	2	2	
BARIUM	4	1	1	
MANGANESE	4	2	2	
SELENIUM	4	3	3	
ALUMINUM	4	2	2	
RADIUM	4			
URANIUM	4			
ANTIMONY	4	1	1	
RADON	4			
THORIUM	4			
COBALT	4	3	3	
BORON	4	3	3	
BERYLLIUM	4	4	4	
ANILINE	4	2	2	
2,4-DIMETHYL PHENOL	6	2	2	
HEXANE	4	3	3	
DIPHENYL METHANE DIISOCYANATE	4			
PHENYL SULFIDE	4			
ACETOPHENONE	4	1	1	
2-BENZOTHIOZONE	4			
BENZYL CHLORIDE	4	2	2	
BUTANOL	4	0	0	
DIETHYLENE GLYCOL	4	0	0	
DI-n-OCTYL PHTHALATE	4	4	4	
1,4-DIOXANE	4	0	0	
ENDOSULFAN	4	5	5	
ETHYLENE GLYCOL MONOMETHYL ETH	4	0	0	
ISOBUTANOL	4	0	0	
N-NITROSODIPHENYLAMINE	5	2	0	
THALLIUM	5	3	3	
THIOUREA	4	3	3	
TRIETHANOLAMINE	4	0	0	

A Statistical Abstract Supplement **REFERENCE: 5**

County and City Data Book

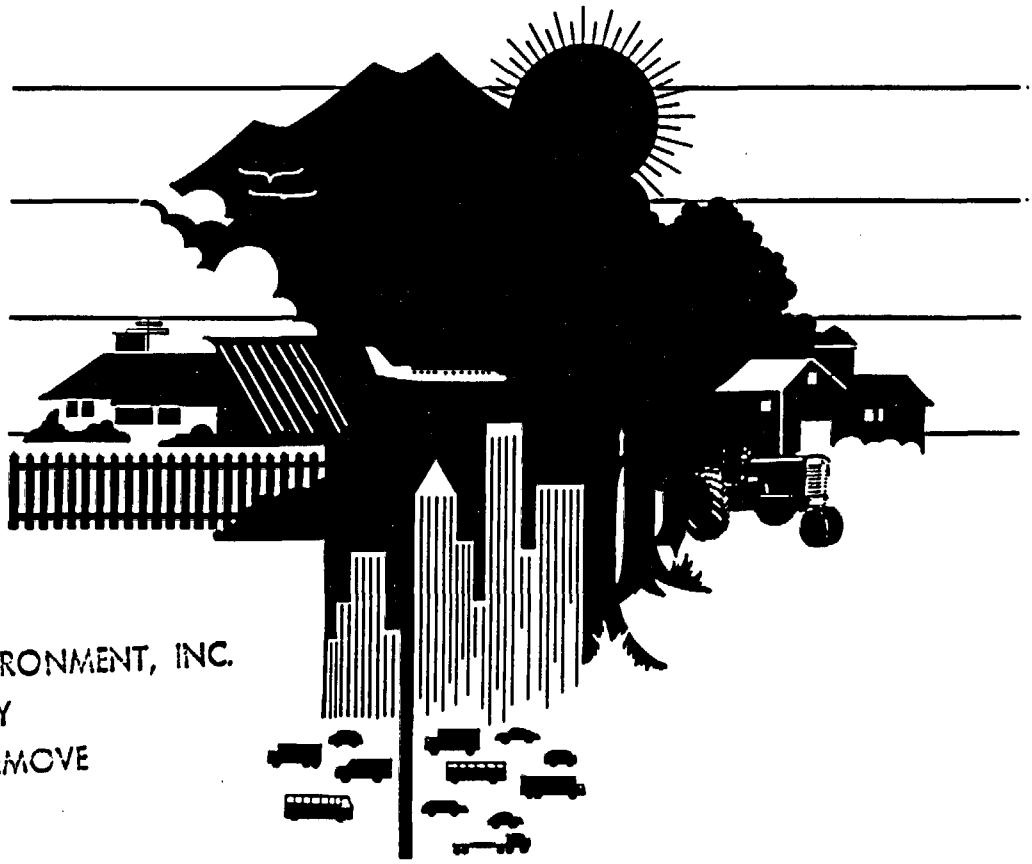
1988

States

Counties

Cities of 25,000 or More

Places of 2,500 or More



U.S. Department of Commerce

C. William Verity, Secretary
Donna C. Tuttle, Deputy Secretary
Robert Ortner, Under Secretary for Economic Affairs

BUREAU OF THE CENSUS
John G. Keane, Director

ECOLOGY AND ENVIRONMENT, INC.
LIBRARY
DO NOT REMOVE

MSA/ CMSA/ NECMA code[1]	State and county code	County	Land area,[2] 1990 (Sq. mi.)	Population: 1986 Total persons	1986 Rank[3]	1986 Per square mile	1980	Components of change, 1980-1986: Net change Number	Net change Percent	Natural increase Births	Natural increase Deaths	Net migration[4]	Population characteristics 1984 Percent— White	Black and other	Males per 100 females
			1	2	3	4	5	6	7	8	9	10	11	12	13
		TEXAS—Con.													
...	48 289	Leon	1 079	12 800	2 174	11.9	9 594	3 200	33.2	1 100	1 100	3 100	S	S	S
3362	48 291	Liberty	1 174	54 700	764	46.6	47 068	7 600	16.2	5 900	3 100	4 900	86.19	13.81	101.1
...	48 293	Limestone	930	21 200	1 626	22.8	20 224	1 000	5.0	1 900	1 800	1 000	77.20	22.80	95.4
...	48 295	Lipscomb	933	3 600	2 961	3.9	3 766	-100	-3.4	500	200	-400	S	S	S
...	48 297	Live Oak	1 057	9 500	2 445	9.0	9 606	-100	-1.1	900	500	-600	S	S	S
...	48 299	Llano	939	12 500	2 200	13.3	10 144	2 400	23.5	600	1 200	3 000	S	S	S
...	48 301	Loving	670	100	3 137	.1	91	-	-42.9	-	-	-	S	S	S
4600	48 303	Lubbock	900	224 800	208	249.8	211 651	13 200	6.2	26 200	8 800	-4 200	91.34	8.66	94.8
...	48 305	Lynn	888	7 600	2 623	8.6	8 605	-1 000	-11.5	900	400	-1 400	S	S	S
...	48 307	McCulloch	1 071	9 000	2 462	8.4	8 735	200	2.8	800	900	300	S	S	S
8600	48 309	McLennan	1 031	187 600	246	182.0	170 755	16 800	9.9	18 600	10 700	8 900	83.13	16.87	94.8
...	48 311	McMullen	1 183	900	3 119	.8	789	100	18.0	100	-	100	S	S	S
...	48 313	Madison	472	12 100	2 233	25.6	10 649	1 400	13.4	800	700	1 400	S	S	S
...	48 315	Marion	385	10 000	2 410	26.0	10 360	-300	-3.3	900	800	-400	S	S	S
...	48 317	Martin	914	5 300	2 832	5.8	4 684	600	12.1	700	300	200	S	S	S
...	48 319	Mason	934	3 600	2 961	3.9	3 663	-100	-1.6	300	300	-	S	S	S
...	48 321	Matagorda	1 127	41 000	975	36.4	37 828	3 100	8.3	5 000	2 100	200	84.56	15.44	105.3
...	48 323	Maverick	1 287	37 400	1 063	29.1	31 398	6 000	19.1	4 900	1 000	2 100	96.31	3.69	91.9
...	48 325	Medina	1 331	26 100	1 419	19.6	23 164	3 000	12.8	2 600	1 300	1 700	99.29	.71	96.3
...	48 327	Menard	902	2 300	3 051	2.5	2 348	-	-.6	200	200	-	S	S	S
5040	48 329	Midland	902	111 300	404	123.4	82 636	28 600	34.7	14 200	3 700	18 100	92.56	7.44	98.2
...	48 331	Milam	1 019	23 700	1 512	23.3	22 792	1 000	4.3	2 300	1 800	500	87.15	12.85	94.6
...	48 333	Mills	748	4 500	2 901	6.0	4 477	-	.8	300	500	200	S	S	S
...	48 335	Mitchell	912	9 100	2 474	10.0	9 088	-	-.1	1 000	800	-200	S	S	S
...	48 337	Montague	928	18 500	1 784	19.9	17 410	1 100	6.4	1 600	1 600	1 200	S	S	S
3362	48 339	Montgomery	1 047	159 500	291	152.3	127 222	32 300	25.4	16 800	5 700	21 200	94.87	5.13	101.2
...	48 341	Moore	905	17 600	1 835	19.4	16 575	1 000	6.1	2 400	700	-700	S	S	S
...	48 343	Morris	256	14 400	2 049	56.3	14 629	-200	-1.4	1 500	1 000	-700	S	S	S
...	48 345	Motley	959	1 700	3 087	1.8	1 950	-200	-11.4	100	200	-200	S	S	S
...	48 347	Nacogdoches	939	50 600	617	53.9	46 786	3 800	8.0	4 500	2 700	1 900	81.80	18.20	96.4
...	48 349	Navarro	1 068	39 600	1 006	37.1	35 323	4 200	12.0	3 700	2 900	3 400	79.19	20.81	93.5
...	48 351	Newton	935	13 300	2 132	14.2	13 254	100	.8	1 300	800	-400	S	S	S
...	48 353	Nolan	915	17 600	1 835	19.2	17 359	300	1.6	1 900	1 200	-400	S	S	S
1880	48 355	Nueces	847	301 600	157	356.1	268 215	33 400	12.4	36 200	12 100	9 300	94.52	5.48	95.3
...	48 357	Ochiltree	919	10 600	2 351	11.5	9 588	1 000	10.4	1 600	500	-100	S	S	S
...	48 359	Oldham	1 465	2 500	3 034	1.7	2 283	200	8.4	200	100	100	S	S	S
0640	48 361	Orange	362	83 400	534	230.4	83 938	-500	-.6	9 000	3 800	-5 700	91.24	8.76	99.0
...	48 363	Palo Pinto	949	26 600	1 393	28.0	24 062	2 500	10.5	2 500	1 900	1 900	95.25	4.75	89.7
...	48 365	Panola	812	22 200	1 573	27.3	20 724	1 500	7.3	1 900	1 400	1 000	81.09	18.91	95.1
1922	48 367	Parker	902	60 200	710	66.7	44 609	15 600	35.0	4 300	2 500	13 900	98.65	1.35	99.5
...	48 369	Parmer	885	10 900	2 323	12.3	11 038	-200	-1.5	1 300	500	-1 000	S	S	S
...	48 371	Pecos	4 777	17 200	1 859	3.6	14 618	2 600	17.5	2 400	600	700	S	S	S
...	48 373	Polk	1 061	30 300	1 268	28.6	24 407	5 900	24.2	2 500	2 000	5 400	84.08	15.92	98.1
0320	48 375	Potter	902	108 600	417	118.2	98 637	8 000	8.1	13 300	6 100	700	88.59	11.41	92.9
...	48 377	Presidio	3 857	5 700	2 797	1.5	5 188	500	10.0	500	300	300	S	S	S
...	48 379	Rains	243	6 100	2 768	25.1	4 839	1 200	25.6	400	400	1 200	S	S	S
0320	48 381	Randall	917	86 700	496	94.7	75 062	13 600	18.1	8 100	2 700	8 300	97.72	2.28	93.7
...	48 383	Reagan	1 173	5 100	2 844	4.3	4 135	1 000	23.9	800	100	300	S	S	S
...	48 385	Real	697	2 800	3 014	4.0	2 469	400	14.9	200	200	400	S	S	S
...	48 387	Red River	1 054	15 400	1 980	14.6	16 101	-700	-4.1	1 200	1 400	-500	S	S	S
...	48 389	Reeves	2 628	15 900	1 942	6.1	15 801	100	.7	2 400	700	-1 600	S	S	S
...	48 391	Refugio	771	8 600	2 527	11.2	9 289	-700	-7.6	900	600	-1 000	S	S	S
...	48 393	Roberts	915	1 100	3 111	1.2	1 187	-100	-11.5	100	100	-200	S	S	S
...	48 395	Robertson	864	15 900	1 942	18.4	14 653	1 300	8.8	1 800	1 300	800	S	S	S
1922	48 397	Rockwall	128	23 200	1 537	181.3	14 528	8 700	59.7	1 700	700	7 700	S	S	S
...	48 399	Runnels	1 056	12 400	2 205	11.7	11 872	500	4.4	1 300	1 000	300	S	S	S
...	48 401	Rusk	932	42 800	938	45.9	41 382	1 400	3.3	4 100	3 100	400	79.10	20.90	94.5
...	48 403	Sabine	486	10 100	2 396	20.8	8 702	1 400	15.5	700	800	1 400	S	S	S
...	48 405	San Augustine	524	8 800	2 508	16.8	8 785	-	.1	700	700	-	S	S	S
...	48 407	San Jacinto	572	14 100	2 081	24.7	11 434	2 700	23.6	1 100	800	2 400	S	S	S
1880	48 409	San Patricio	693	61 700	695	89.0	58 013	3 700	6.4	7 600	2 700	-1 200	98.32	1.68	97.0
...	48 411	San Saba	1 138	5 500	2 814	4.8	5 841	-400	-6.5	500	500	-300	S	S	S
...	48 413	Schleicher	1 309	3 000	3 009	2.3	2 820	200	7.8	400	200	-	S	S	S
...	48 415	Scurry	900	19 800	1 697	22.0	18 192	1 600	8.8	2 500	1 000	100	S	S	S
...	48 417	Shackelford	915	3 900	2 941	4.3	3 915	-	-.1	500	300	-100	S	S	S
...	48 419	Shelby	791	23 800	1 510	30.1	23 084	700	3.0	1 900	1 800	700	77.64	22.36	90.4
...	48 421	Sherman	923	3 100	3 002	3.4	3 174	-100	-1.7	300	200	-200	S	S	S
9640	48 423	Smith	932	152 100	302	163.2	128 366	23 700	18.5	15 000	7 700	16 500	79.01	20.99	94.5
...	48 425	Somervell	188	4 900	2 864	26.1	4 154	700	17.0	500	300	500	S	S	S
...	48 427	Starr	1 228	36 100	1 103	29.4	27 266	8 800	32.4	4 500	1 000	5 400	99.85	.15	94.5
...	48 429	Stephens	894	10 500	2 364	11.7	9 926	600	6.2	1 200	800	200	S	S	S
...	48 431	Sterling	923	1 700	3 087	1.8	1 206	500	38.4	200	100	300	S	S	S

[1]MSA = Metropolitan statistical area. CMSA = Consolidated MSA. NECMA = New England county metropolitan area. All areas defined as of October 18, 1986. [2]Dry land and land temporarily or partially covered by water. [3]When counties share the same rank, the next lower rank is omitted. [4]Comprises net immigration from abroad, net interstate migration, and movement of persons in the Armed Forces.

Table B. Counties — Population Characteristics and Households

County	Population characteristics—Con.												Households					
	1984—Con.									1980			1985			1980		
	Percent—									Percent—							Percent—	
	Under 5 years	5 to 14 years	15 to 24 years	25 to 34 years	35 to 44 years	45 to 54 years	55 to 64 years	65 to 74 years	75 years and over	American Indian, Eskimo, and Aleut	Asian and Pacific Islander	Hispanic[1]	Number	Percent change, 1980-1985	Persons per household	Number	Female family householder[2]	One-person[3]
	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
TEXAS—Con.																		
Leon	S	S	S	S	S	S	S	S	S	.07	.06	1.81	4 900	29.2	2.52	3 826	7.2	28.2
Liberty	8.3	16.9	16.2	15.6	13.9	9.5	9.3	6.5	3.9	.24	.12	2.24	18 600	14.9	2.88	16 227	7.6	18.8
Limestone	8.6	13.4	13.1	14.4	10.1	9.1	10.9	11.4	9.0	.14	.18	3.44	7 800	5.6	2.50	7 421	10.8	29.6
Lipscomb	S	S	S	S	S	S	S	S	S	.64	.24	7.30	1 400	-1.6	2.77	1 402	3.9	21.1
Live Oak	S	S	S	S	S	S	S	S	S	.21	.12	32.03	3 200	-4.6	2.98	3 308	5.4	18.1
Llano	S	S	S	S	S	S	S	S	S	.37	.16	2.61	5 300	21.1	2.21	4 402	4.8	22.1
Loving	S	S	S	S	S	S	S	S	S	-	-	17.58	-	-6.6	2.74	34	2.9	14.7
Lubbock	8.4	14.6	23.8	17.6	11.7	8.5	7.1	5.0	3.3	.26	.78	19.57	79 100	8.9	2.69	72 627	8.2	21.5
Lynn	S	S	S	S	S	S	S	S	S	.23	.05	37.93	2 600	-6.7	2.96	2 829	6.6	18.5
McCulloch	S	S	S	S	S	S	S	S	S	.18	.19	19.07	3 600	6.7	2.47	3 400	6.5	27.0
McLennan	7.7	14.0	20.4	15.1	11.0	9.2	9.6	7.5	5.5	.18	.32	8.78	67 700	10.0	2.62	61 554	10.1	23.5
McMullen	S	S	S	S	S	S	S	S	S	-	-	34.47	400	18.5	2.74	297	6.4	22.6
Madison	S	S	S	S	S	S	S	S	S	.28	.25	7.53	3 500	12.2	2.66	3 107	9.3	24.8
Marion	S	S	S	S	S	S	S	S	S	.27	.09	.96	3 700	-3.9	2.67	3 874	10.0	24.5
Martin	S	S	S	S	S	S	S	S	S	.13	.02	34.59	1 700	9.8	3.08	1 547	4.7	17.8
Mason	S	S	S	S	S	S	S	S	S	.05	.06	16.24	1 400	-3.3	2.48	1 461	5.1	25.3
Matagorda	10.1	16.7	15.9	18.7	11.7	8.5	8.0	6.3	4.2	.17	1.23	21.06	13 800	5.3	2.90	13 110	8.1	21.8
Maverick	12.3	23.0	17.0	13.6	12.1	8.7	6.8	4.3	2.2	2.35	.11	90.34	8 800	15.6	4.06	7 593	12.8	12.1
Medina	9.2	18.3	13.8	13.6	12.5	9.4	10.0	7.4	5.9	.26	.14	43.35	8 000	7.8	3.08	7 457	7.2	17.5
Menard	S	S	S	S	S	S	S	S	S	.30	.04	28.64	900	-6.3	2.60	917	7.2	27.3
Midland	10.6	14.9	16.9	20.9	12.1	9.7	8.3	4.2	2.4	.26	.33	14.91	39 300	32.8	2.75	29 650	7.4	20.6
Milam	9.5	15.8	12.4	13.0	10.9	9.6	10.8	9.9	8.2	.12	.11	10.51	8 400	1.7	2.78	8 299	8.5	24.3
Mills	S	S	S	S	S	S	S	S	S	.20	.40	7.28	1 800	2.9	2.40	1 772	5.4	23.8
Mitchell	S	S	S	S	S	S	S	S	S	.17	.09	25.14	3 300	-1.0	2.71	3 304	6.8	24.4
Montague	S	S	S	S	S	S	S	S	S	.39	.06	1.37	7 300	6.9	2.45	6 837	5.9	25.0
Montgomery	9.3	18.3	13.9	17.6	17.1	9.3	7.4	4.6	2.5	.20	.28	3.34	51 500	24.1	3.05	41 487	6.6	13.7
Moore	S	S	S	S	S	S	S	S	S	.52	1.10	19.63	5 900	4.8	2.93	5 590	4.9	15.3
Morris	S	S	S	S	S	S	S	S	S	.37	.12	1.69	5 200	.1	2.75	5 167	8.1	19.9
Motley	S	S	S	S	S	S	S	S	S	.15	.05	7.90	700	-9.1	2.34	812	4.1	29.7
Nacogdoches	6.8	12.2	29.1	15.4	9.9	7.2	7.3	7.0	5.1	.18	.40	2.82	18 000	9.8	2.51	16 457	9.2	24.1
Navarro	7.9	15.2	14.5	14.6	10.7	9.0	9.9	9.8	8.2	.18	.18	4.14	14 700	10.5	2.59	13 331	9.9	25.1
Newton	S	S	S	S	S	S	S	S	S	.05	.06	.82	4 500	1.1	2.92	4 470	9.4	19.2
Nolan	S	S	S	S	S	S	S	S	S	.13	.13	19.55	6 500	.8	2.71	6 446	7.7	22.6
Nueces	9.3	16.9	17.7	18.7	12.3	8.7	8.1	5.1	3.1	.27	.49	48.93	100 100	15.1	2.94	88 989	10.4	19.3
Ochiltree	S	S	S	S	S	S	S	S	S	1.06	.16	9.36	4 000	14.8	2.73	3 486	3.9	19.9
Oldham	S	S	S	S	S	S	S	S	S	.57	.53	5.12	800	14.4	2.60	674	4.6	17.2
Orange	9.3	16.5	15.6	16.6	13.9	10.5	8.9	5.7	3.0	.23	.53	2.10	28 600	2.5	2.90	27 918	7.8	15.8
Palo Pinto	7.3	14.9	14.7	15.3	12.0	10.6	9.8	9.1	6.2	.28	.46	5.66	9 600	8.8	2.67	8 977	7.4	22.7
Panola	8.3	16.0	14.1	15.5	12.2	9.5	8.7	9.1	6.6	.11	.09	1.66	7 800	4.5	2.80	7 434	8.3	21.2
Parker	8.3	15.1	14.6	16.0	14.5	10.8	9.8	6.5	4.6	.35	.25	3.04	19 900	27.4	2.80	15 640	5.6	17.1
Parmer	S	S	S	S	S	S	S	S	S	.15	.04	32.67	3 400	-1.5	3.14	3 489	5.2	15.6
Pecos	S	S	S	S	S	S	S	S	S	.17	.24	48.56	5 600	23.0	3.05	4 587	6.8	16.5
Polk	8.3	15.1	13.0	12.5	12.0	9.2	12.7	11.4	5.8	2.47	.04	3.70	10 800	21.2	2.69	8 909	7.5	21.1
Potter	8.9	13.3	19.8	16.9	11.0	8.7	9.5	7.1	4.8	.55	1.28	11.70	41 800	10.7	2.52	37 769	9.7	28.6
Presidio	S	S	S	S	S	S	S	S	S	.15	.02	76.89	1 800	8.5	3.08	1 680	9.9	23.3
Rains	S	S	S	S	S	S	S	S	S	.39	.02	1.20	2 200	15.1	2.61	1 911	5.2	21.5
Randall	8.2	16.2	16.9	18.4	15.2	9.8	8.4	4.3	2.8	.28	.44	4.47	31 200	16.9	2.72	26 709	6.6	18.1
Reagan	S	S	S	S	S	S	S	S	S	.44	.05	31.46	1 500	16.5	3.25	1 305	3.7	13.8
Real	S	S	S	S	S	S	S	S	S	.53	.04	22.36	1 000	10.4	2.75	900	8.6	22.4
Red River	S	S	S	S	S	S	S	S	S	.45	.11	1.74	5 700	-5.7	2.70	6 042	8.9	25.2
Reeves	S	S	S	S	S	S	S	S	S	.15	.21	61.96	5 100	6.1	3.10	4 789	8.4	17.4
Refugio	S	S	S	S	S	S	S	S	S	.08	.08	38.28	3 000	-4.2	2.81	3 168	8.9	21.5
Roberts	S	S	S	S	S	S	S	S	S	.25	.17	2.19	400	-16.2	2.88	426	4.2	19.5
Robertson	S	S	S	S	S	S	S	S	S	.08	.09	9.36	5 900	6.5	2.69	5 518	11.9	30.2
Rockwall	S	S	S	S	S	S	S	S	S	.14	.32	3.38	7 000	44.2	2.99	4 866	6.1	15.0
Runnels	S	S	S	S	S	S	S	S	S	.13	.19	19.38	4 600	1.8	2.69	4 496	5.8	25.6
Rusk	8.3	15.9	13.0	15.2	11.7	8.6	10.0	9.8	7.6	.19	.12	2.01	15 300	1.9	2.77	15 011	8.5	21.5
Sabine	S	S	S	S	S	S	S	S	S	.22	.02	1.28	3 900	16.3	2.51	3 336	7.3	23.0
San Augustine	S	S	S	S	S	S	S	S	S	.19	.05	.91	3 300	6.6	2.58	3 133	10.9	22.2
San Jacinto	S	S	S	S	S	S	S	S	S	.36	.04	.97	4 800	17.8	2.88	4 088	7.6	20.5
San Patricio	9.3	20.2	14.5	16.3	13.6	9.4	8.0	5.3	3.4	.23	.21	46.23	18 700	6.7	3.26	17 551	8.8	14.7
San Saba	S	S	S	S	S	S	S	S	S	.21	.16	15.60	2 200	-6.6	2.48	2 385	5.9	25.5
Schleicher	S	S	S	S	S	S	S	S	S	.21	.14	25.99	1 100	10.9	2.78	988	5.1	19.0
Scurry	S	S	S	S	S	S	S	S	S	.18	.07	18.68	7 000	9.1	2.81	6 376	6.2	19.5
Shackelford	S	S	S	S	S	S	S	S	S	.15	.10	5.39	1 400	-3.0	2.66	1 493	5.0	23.7
Shelby	7.4	14.5	14.3	13.0	11.2	9.1	12.0	10.7	7.8	.32	.08	1.13	9 000	5.6	2.62	8 555	9.5	23.8
Sherman	S	S	S	S	S	S	S	S	S	.03	-	11.47	1 200	4.7	2.66	1 117	3.2	18.9
Smith	8.0	14.8	16.3	17.3	12.8	9.3	9.3	7.3	5.0	.18	.27	3.14	55 300	20.0	2.67	46 042	9.3	21.3
Somervell	S	S	S	S	S	S	S	S	S	.63	.24	6.91	1 600	4.9	2.77	1 531	5.8	21.5
Starr	8.9	24.5	17.9	13.8	10.6	9.1	7.4	4.5	3.3	.10	.05	96.93	8 900	29.9	3.84	6 858	12.1	13.1
Stephens	S	S	S	S	S	S	S	S	S	.12	.16	5.66	4 200	6.6	2.49	3 928	7.5	27.0
Sterling	S	S	S	S	S	S	S	S	S	.25	-	23.13	600	36.4	2.81	413	4.6	18.2

[1]Hispanic persons may be of any race. [2]No spouse present. [3]Householder living alone.

Table D. Places — Population and Money Income

[Codes shown are 2-digit FIPS state codes for states; 4-digit census place codes for incorporated places; and 3-digit FIPS county codes followed by 3-digit census MCD codes for minor civil divisions (MCDs). The name of the county or counties in which the place/MCD is located is shown in parentheses following the place/MCD name.]

State/place/MCD code	Place (County)	Population 1986	Population Percent change, 1980-1986	Per capita money income 1985	Per capita money income Percent change, 1979-1985
		1	2	3	4
	TEXAS—Con.				
1845	Hearne (Robertson)	5 420	8.6	7 322	41.4
1860	Hedwig Village (Harris)	2 900	15.7	21 058	37.5
1870	Hempstead (Waller)	3 730	7.9	7 762	39.5
1875	Henderson (Rusk)	11 960	4.2	11 765	74.4
1880	Henrietta (Clay)	3 100	-1.5	8 392	24.9
1885	Hereford (Deaf Smith)	14 830	-8.4	7 843	38.7
1888	Hewitt (McLennan)	8 750	66.8	10 682	42.8
1905	Highland Park (Dallas)	9 430	5.8	35 713	48.9
1915	Highland Village (Denton)	4 280	31.9	16 578	52.9
1925	Hillsboro (Hill)	7 210	-2.4	7 930	38.4
1935	Hitchcock (Galveston)	6 250	2.4	8 826	29.5
1950	Hollywood Park (Bexar)	4 660	44.2	19 331	50.0
1955	Hondo (Medina)	6 280	3.7	6 187	44.5
1970	Hooks (Bowie)	2 540	1.3	9 384	46.4
1975	Houston (Harris, Fort Bend, Montgomery)	1 728 910	7.3	12 115	37.4
1995	Humble (Harris)	12 220	61.0	11 678	38.1
2000	Hunters Creek Village (Harris)	4 570	8.4	44 908	38.7
2010	Huntsville (Walker)	33 430	24.7	7 057	34.5
2015	Hurst (Tarrant)	35 150	11.9	13 778	47.7
2020	Hutchins (Dallas)	3 840	35.4	8 237	38.5
2035	Ingleside (San Patricio)	6 030	10.9	8 212	28.6
2045	Iowa Park (Wichita)	6 560	6.1	10 182	49.0
2060	Irving (Dallas)	128 530	16.9	13 175	55.0
2075	Jacinto City (Harris)	11 130	24.3	9 540	39.2
2080	Jacksboro (Jack)	3 850	-3.8	11 301	54.4
2085	Jacksonville (Cherokee)	12 890	5.1	8 494	38.9
2090	Jasper (Jasper)	7 280	4.6	7 427	29.3
2100	Jefferson (Marion)	2 280	-13.6	7 513	35.2
2105	Jersey Village (Harris)	5 230	28.1	15 882	37.0
2125	Jones Creek (Brazoria)	2 390	-9.2	10 940	33.8
2140	Jourdanton (Atascosa)	3 650	33.1	7 645	46.4
2145	Junction (Kimble)	2 730	5.3	7 171	45.5
2155	Karnes City (Karnes)	3 130	-4.9	7 445	45.8
2160	Katy (Harris, Waller, Fort Bend)	10 610	87.5	12 083	37.7
2165	Kaufman (Kaufman)	5 580	19.8	9 002	38.7
2170	Keene (Johnson)	3 180	5.5	8 446	49.4
2175	Keller (Tarrant)	7 510	80.7	11 681	42.0
2195	Kenedy (Karnes)	4 410	1.2	7 249	41.8
2200	Kennedale (Tarrant)	2 870	10.6	9 212	48.1
2210	Kermit (Winkler)	8 030	.2	8 031	30.3
2215	Kerrville (Kerr)	19 890	21.6	10 643	48.7
2220	Kilgore (Gregg, Rusk)	12 200	7.7	12 129	51.8
2230	Killeen (Bell)	59 560	28.7	7 981	50.8
2235	Kingsville (Kleberg)	28 600	-.6	7 619	37.9
2240	Kirby (Bexar)	8 100	25.9	9 401	50.7
2270	Kountze (Hardin)	2 770	2.0	6 507	22.5
2290	Lacy-Lakeview (McLennan)	2 960	7.8	7 927	45.9
2300	La Feria (Cameron)	4 470	27.9	5 420	35.4
2306	La Grange (Fayette)	4 420	17.3	8 852	44.8
2332	Lake Dallas (Denton)	3 690	16.1	10 266	42.8
2340	Lake Jackson (Brazoria)	20 740	8.6	14 502	39.4
2365	Lake Worth (Tarrant)	5 430	23.8	10 796	48.4
2370	La Marque (Galveston)	15 600	1.5	10 143	30.7
2375	Lamesa (Dawson)	11 790	5.0	8 144	36.1
2380	Lampasas (Lampasas)	6 830	10.8	8 170	50.5
2385	Lancaster (Dallas)	20 430	38.0	10 273	44.6
2390	La Porte (Harris)	25 030	30.2	11 136	37.3
2400	Laredo (Webb)	117 060	21.4	5 275	34.9
2414	League City (Galveston)	25 090	51.3	12 711	44.6
2440	Leon Valley (Bexar)	11 910	31.1	12 659	50.2
2445	Levelland (Hockley)	14 770	7.0	9 084	46.3
2450	Lewisville (Denton, Dallas)	27 630	13.8	12 349	53.3
2460	Liberty (Liberty)	8 410	5.9	10 360	31.2
2485	Littlefield (Lamb)	6 700	-9.5	8 526	46.2
2487	Live Oak (Bexar)	9 680	18.3	9 560	50.7
2490	Livingston (Polk)	6 720	36.4	8 030	34.6
2495	Llano (Llano)	3 420	11.4	8 023	41.0
2500	Lockhart (Caldwell)	10 100	27.0	7 372	47.0
2530	Longview (Gregg, Harrison)	73 870	10.9	10 452	41.6
2565	Lubbock (Lubbock)	186 400	5.0	10 087	44.4
2575	Lufkin (Angelina)	32 080	9.1	9 575	41.7
2580	Luling (Caldwell)	5 340	6.0	6 718	30.1
2595	McAllen (Hidalgo)	83 300	24.4	7 941	41.6
2605	McGregor (McLennan)	4 810	6.6	8 004	46.0
2610	McKinney (Collin)	20 570	26.5	9 506	61.3
2630	Madisonville (Madison)	3 980	8.7	8 123	36.2
2650	Mansfield (Tarrant, Johnson, Ellis)	12 650	52.8	11 451	48.1
2652	Manvel (Brazoria)	4 230	19.2	11 382	36.2
2660	Marble Falls (Burnet)	4 870	49.8	7 129	52.5
2680	Marlin (Falls)	6 230	-12.1	7 313	42.3
2690	Marshall (Harrison)	24 210	-2.8	8 398	37.6
2720	Mathis (San Patricio)	5 850	-3.2	4 273	34.6
2737	Meadows (Fort Bend)	6 170	42.8	14 140	37.5
2755	Memphis (Hall)	2 790	-16.7	5 906	10.8
2765	Mercedes (Hidalgo)	13 910	17.4	4 945	42.7
2795	Mesquite (Dallas)	88 700	32.3	11 616	58.5
2800	Mexia (Limestone)	6 980	-1.5	6 912	37.1
2810	Midland (Midland)	96 060	36.0	14 404	41.8
2815	Midlothian (Ellis)	5 870	82.4	10 157	50.3
2830	Mineola (Wood)	5 320	22.4	9 736	41.1
2835	Mineral Wells (Palo Pinto, Parker)	15 500	7.1	8 297	34.6
2850	Mission (Hidalgo)	31 230	37.9	5 819	41.8
2855	Missouri City (Fort Bend, Harris)	32 020	31.1	16 123	34.1
2860	Monahans (Ward, Winkler)	9 130	8.7	8 695	35.6
2870	Morton (Cochran)	2 500	-6.4	7 370	51.8
2910	Mount Pleasant (Titus)	11 820	7.4	9 214	40.2
2925	Muleshoe (Bailey)	4 940	2.0	7 687	40.2
2945	Nacogdoches (Nacogdoches)	28 350	4.4	8 457	43.3
2956	Nassau Bay (Harris)	4 730	4.5	19 972	37.5
2965	Navasota (Grimes)	7 460	24.9	7 212	35.8
2970	Nederland (Jefferson)	16 730	-.6	11 374	33.8
2985	New Boston (Bowie)	4 980	7.6	8 922	44.6
2990	New Braunfels (Comal, Guadalupe)	27 960	24.8	10 166	49.7
3025	Nocona (Montague)	3 140	4.9	8 445	37.2
3050	North Richland Hills (Tarrant)	43 960	43.7	12 939	47.3
3067	Oak Ridge North (Montgomery)	2 450	-2.1	14 669	32.7
3090	Odessa (Ector, Midland)	101 210	12.4	10 606	33.1
3115	Olney (Young)	3 640	-10.2	10 032	33.8
3130	Orange (Orange)	24 200	2.4	9 201	32.7
3160	Palacios (Matagorda)	5 210	11.8	9 104	50.8
3165	Palestine (Anderson)	19 440	15.9	9 110	35.4
3175	Pampa (Gray)	21 560	.8	10 664	35.8
3195	Paris (Lamar)	26 210	2.8	8 438	47.2
3200	Pasadena (Harris)	118 050	4.9	10 818	32.1
3215	Pearland (Brazoria, Harris)	17 020	21.9	13 919	39.4
3225	Pearsall (Frio)	7 890	6.9	5 563	41.2
3235	Pecos (Reeves)	13 220	2.8	7 016	37.8
3245	Perryton (Ochiltree)	8 790	10.0	11 040	29.7
3260	Pharr (Hidalgo)	25 920	21.2	4 857	45.3
3280	Pinehurst (Orange)	2 890	-1.2	9 653	28.3
3290	Piney Point Village (Harris)	3 290	11.2	43 736	36.6
3295	Pittsburg (Camp)	4 540	6.9	9 249	41.1
3305	Plainview (Hale)	22 540	1.6	8 034	35.1
3310	Plano (Collin, Denton)	111 030	53.5	14 980	63.7
3312	Pleasanton (Atascosa)	7 420	16.9	7 474	42.2
3335	Port Arthur (Jefferson)	62 360	-1.0	8 519	27.1
3340	Port Isabel (Cameron)	4 440	17.8	5 334	37.3
3345	Portland (San Patricio, Nueces)	12 450	3.8	11 997	38.2
3350	Port Lavaca (Calhoun)	11 960	8.5	8 838	31.4
3355	Port Neches (Jefferson)	13 990	.3	12 246	33.8
3365	Post (Garza)	3 980	.5	7 482	39.3
3370	Poteet (Atascosa)	3 650	18.3	5 068	41.2
3385	Prairie View (Waller)	3 670	-8.0	4 847	40.9
3390	Premont (Jim Wells)	3 160	5.9	7 811	50.1
3410	Princeton (Collin)	4 920	44.4	10 738	63.8
3435	Quanah (Hardeman)	3 730	-4.0	9 776	43.0
3465	Ranger (Eastland)	3 380	7.8	8 637	31.9
3480	Raymondville (Willacy)	10 130	8.7	5 238	32.4
3500	Refugio (Refugio)	3 380	-13.2	8 240	27.0
3520	Richardson (Dallas, Collin)	78 040	7.6	16 625	55.5
3530	Richland Hills (Tarrant)	9 990	25.2	13 708	51.0
3540	Richmond (Fort Bend)	16 770	58.9	8 936	48.4
3545	Richwood (Brazoria)	3 260	25.8	11 873	35.0
3575	River Oaks (Tarrant)	8 480	23.1	11 179	48.7
3590	Robinson (McLennan)	6 490	6.8	9 878	45.0
3600	Robstown (Nueces)	13 220	9.3	5 417	26.5
3615	Rockdale (Milam)	5 940	5.9	8 866	44.1
3620	Rockport (Aransas)	5 120	38.9	9 069	40.7
3630	Rockwall (Rockwall)	10 630	74.0	15 112	50.0
3645	Roma-Los Saenz (Starr)	4 500	33.0	2 953	27.2
3665	Rosenberg (Fort Bend)	22 290	24.9	8 226	23.7
3675	Round Rock (Williamson, Travis)	21 940	67.7	11 449	51.9

Table D. Places — Population and Money Income

[Codes shown are 2-digit FIPS state codes for states; 4-digit census place codes for incorporated places; and 3-digit FIPS county codes followed by 3-digit census MCD codes for minor civil divisions (MCDs). The name of the county or counties in which the place/MCD is located is shown in parentheses following the place/MCD name.]

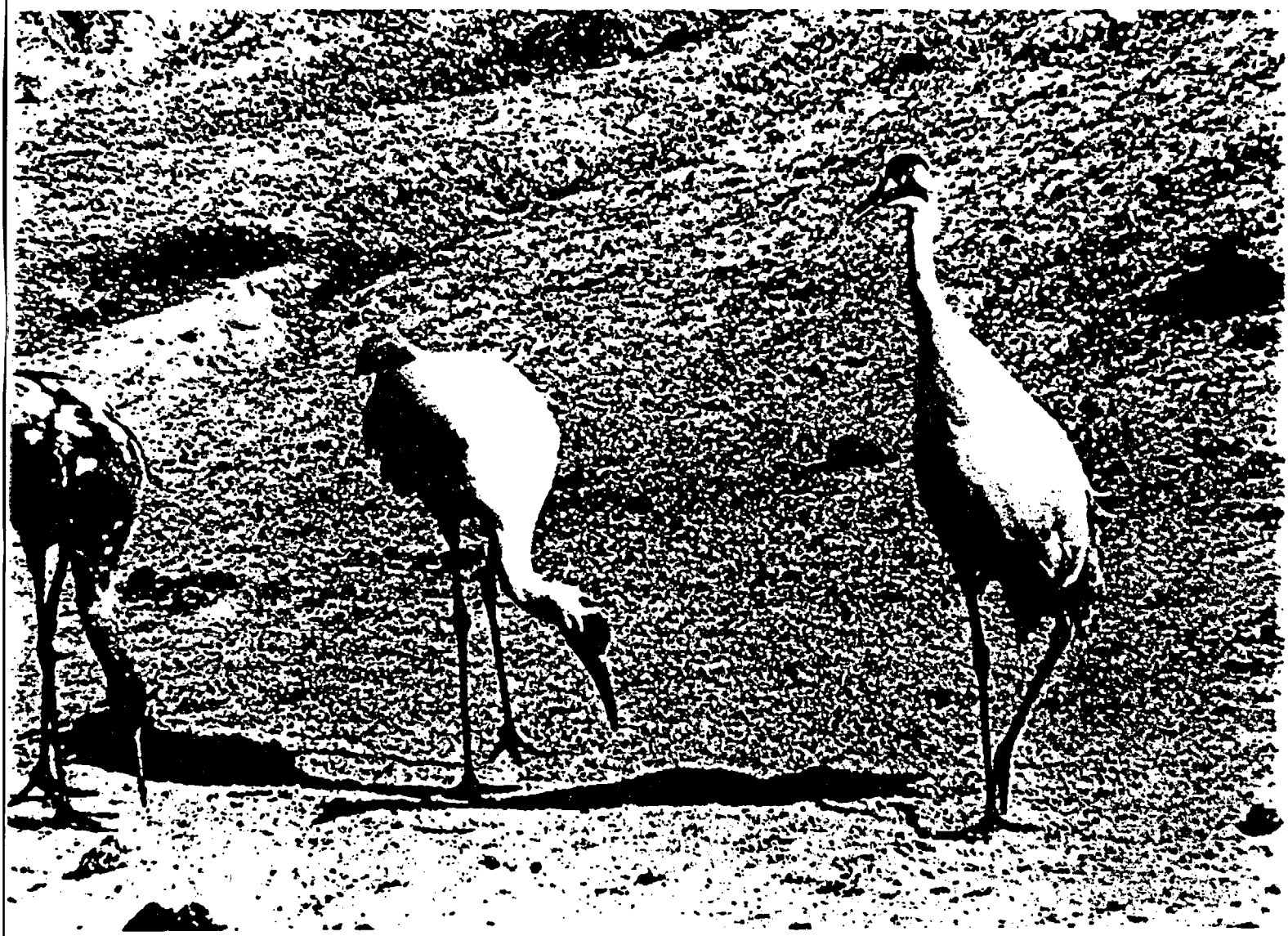
State/place/MCD code	Place (County)	Population 1986	Population Percent change, 1980-1986	Per capita money income 1985	Per capita money income Percent change, 1979-1985
		1	2	3	4
	SOUTH DAKOTA—Con.				
1225	Sioux Falls (Minnehaha, Lincoln)	97 550	13.0	11 508	54.3
1230	Sisseton (Roberts)	2 690	-3.4	8 202	63.3
1240	Spearfish (Lawrence)	5 990	14.1	8 509	54.8
1275	Sturgis (Meade)	5 320	2.6	8 389	41.7
1360	Vermillion (Clay)	9 270	-8.4	7 564	41.8
1425	Watertown (Codington)	18 670	6.5	9 205	44.3
1500	Winner (Tripp)	3 460	-.2	8 004	41.7
1525	Yankton (Yankton)	11 580	-3.5	9 477	42.9
47	TENNESSEE	4 803 000	4.6	9 290	49.5
0015	Alamo (Crockett)	2 580	-1.2	7 665	45.2
0020	Alcoa (Blount)	6 660	-3.0	9 188	49.0
0055	Athens (McMinn)	12 140	.5	8 624	45.7
0065	Bartlett (Shelby)	22 910	22.6	12 303	52.9
0105	Belle Meade (Davidson)	3 410	7.2	38 365	54.6
0150	Bolivar (Hardeman)	6 360	-3.5	6 920	44.5
0157	Brentwood (Williamson)	12 610	33.7	18 286	64.3
0170	Bristol (Sullivan)	23 460	-2.1	10 499	55.5
0175	Brownsville (Haywood)	10 230	9.9	7 139	43.0
0200	Camden (Benton)	3 170	-3.2	9 931	41.7
0205	Carthage (Smith)	2 400	-10.1	9 118	44.5
0225	Centerville (Hickman)	2 910	3.0	8 765	50.8
0245	Chattanooga (Hamilton)	162 170	-4.2	9 340	47.5
0247	Church Hill (Hawkins)	4 320	5.1	9 264	52.7
0250	Clarksville (Montgomery)	60 730	10.9	8 612	50.7
0255	Cleveland (Bradley)	26 140	-.9	10 555	61.1
0265	Clinton (Anderson)	8 420	8.1	10 296	48.1
0273	Collegedale (Hamilton)	4 240	-7.9	9 127	63.0
0275	Collierville (Shelby)	9 940	26.8	10 784	70.3
0290	Columbia (Maury)	28 170	6.0	9 579	48.4
0295	Cookeville (Putnam)	23 920	10.7	8 855	49.5
0315	Covington (Tipton)	6 660	9.8	7 675	38.5
0325	Crossville (Cumberland)	7 200	12.6	7 415	45.7
0350	Dayton (Rhea)	5 420	-2.8	7 678	48.2
0375	Dickson (Dickson)	7 370	4.7	9 130	53.3
0405	Dunlap (Sequatchie)	3 900	5.9	6 857	41.1
0420	Dyersburg (Dyer)	15 670	-1.1	8 566	46.8
0440	East Ridge (Hamilton)	20 810	-1.9	12 208	48.0
0445	Elizabethton (Carter)	12 300	-1.0	8 487	53.7
0480	Erwin (Unicoi)	4 660	-1.6	9 589	54.9
0490	Etowah (McMinn)	3 530	-6.0	9 751	56.8
0495	Fairview (Williamson)	4 620	26.6	8 858	49.8
0499	Farragut (Knox)	7 820	24.5	14 326	44.9
0500	Fayetteville (Lincoln)	7 700	.6	8 482	53.4
0513	Forest Hills (Davidson)	4 800	6.3	30 723	55.0
0515	Franklin (Williamson)	18 500	37.8	11 071	54.5
0540	Gallatin (Sumner)	19 350	12.6	9 429	48.5
0555	Gatlinburg (Sevier)	3 470	8.1	12 363	64.8
0560	Germantown (Shelby)	29 240	29.2	19 978	65.5
0575	Goodlettsville (Davidson, Sumner)	9 540	14.6	11 334	55.9
0600	Greenbrier (Robertson)	3 270	2.8	8 445	46.3
0605	Greeneville (Greene)	14 860	5.4	10 350	61.9
0625	Harriman (Roane)	6 360	.7	7 164	45.6
0630	Hartsville (Trousdale)	2 350	-12.0	8 918	40.3
0635	Henderson (Chester)	4 410	-.8	6 398	53.8
0637	Hendersonville (Sumner)	30 170	13.6	12 492	55.4
0665	Hohenwald (Lewis)	3 930	.2	6 878	43.9
0685	Humboldt (Gibson)	9 870	-3.2	7 272	44.4
0690	Huntingdon (Carroll)	3 680	-7.0	9 728	50.0
0705	Jackson (Madison)	52 810	7.2	9 097	49.0
0715	Jasper (Marion)	2 560	-2.7	8 944	43.9
0720	Jefferson City (Jefferson)	5 770	2.3	6 853	48.1
0725	Jellico (Campbell)	2 690	-3.8	6 521	50.4
0730	Johnson City (Washington, Carter)	44 700	2.3	10 121	51.0
0740	Jonesborough (Washington)	2 810	-.6	8 457	44.9
0750	Kingsport (Sullivan, Hawkins)	31 470	-1.6	11 528	55.4
0755	Kingston (Roane)	4 660	4.9	10 142	42.7
0760	Knoxville (Knox)	173 210	-.9	9 438	48.0
0765	Lafayette (Macon)	3 800	-.1	7 375	37.3
0770	La Follette (Campbell)	8 140	-.6	7 039	41.5
0784	La Vergne (Rutherford)	6 850	18.2	9 398	56.1
0785	Lawrenceburg (Lawrence)	10 950	7.5	8 794	50.2
0790	Lebanon (Wilson)	13 950	7.3	8 715	45.8
0795	Lenoir City (Loudon)	5 830	5.9	7 189	33.3
0800	Lewisburg (Marshall)	9 290	6.1	9 313	51.6
	TENNESSEE—Con.				
0805	Lexington (Henderson)	6 270	5.7	8 335	42.8
0820	Livingston (Overton)	3 090	-8.3	7 418	42.6
0845	Loudon (Loudon)	4 000	1.4	7 633	44.8
0870	McKenzie (Carroll, Weakley, Henry)	5 330	-1.3	8 888	50.1
0880	McMinnville (Warren)	10 790	-3.8	7 840	44.2
0890	Madisonville (Monroe)	3 240	12.3	9 687	55.4
0895	Manchester (Coffee)	7 630	5.2	10 376	55.2
0900	Martin (Weakley)	9 390	5.5	6 625	47.8
0905	Maryville (Blount)	18 060	3.3	10 666	55.5
0940	Memphis (Shelby)	652 640	1.0	9 362	44.8
0950	Milan (Gibson)	7 950	-1.5	8 887	58.8
0955	Millington (Shelby)	18 200	-10.0	7 231	52.1
0965	Monterey (Putnam)	2 710	3.8	6 985	50.0
0985	Morristown (Hamblen)	19 650	-8.2	8 844	55.6
0996	Mount Carmel (Hawkins)	5 470	45.3	8 458	49.9
0998	Mount Juliet (Wilson)	3 580	24.3	11 568	55.7
1000	Mount Pleasant (Maury)	3 190	-5.4	8 297	41.4
1010	Murfreesboro (Rutherford)	40 960	24.7	10 354	57.6
1016	Nashville-Davidson (Davidson)	473 670	4.0	11 253	54.7
1020	Newbern (Dyer)	2 750	-1.5	7 839	44.5
1030	Newport (Cocke)	7 480	-1.2	6 919	47.1
1070	Oak Hill (Davidson)	4 790	3.9	22 837	56.4
1080	Oak Ridge (Anderson, Roane)	26 920	-2.6	13 565	46.8
1090	Oliver Springs (Anderson, Roane, Morgan)	3 910	6.9	8 671	46.0
1091	Oneida (Scott)	3 870	4.8	9 033	42.5
1110	Paris (Henry)	10 470	-2.3	8 687	45.4
1145	Portland (Sumner)	4 420	9.7	9 696	53.1
1150	Pulaski (Giles)	7 530	4.8	8 317	51.1
1160	Red Bank (Hamilton)	12 910	-1.6	11 063	48.5
1195	Ripley (Lauderdale)	6 330	-.5	7 243	49.1
1210	Rockwood (Roane)	5 670	-.3	7 170	38.7
1215	Rogersville (Hawkins)	4 180	-4.2	9 209	61.4
1265	Savannah (Hardin)	6 900	-1.2	8 265	43.3
1275	Selmer (McNairy)	4 090	2.8	8 445	38.8
1280	Sevierville (Sevier)	5 370	17.9	8 890	44.5
1295	Shelbyville (Bedford)	13 630	.7	8 528	42.2
1300	Signal Mountain (Hamilton)	6 490	11.6	19 327	62.2
1315	Smithville (De Kalb)	4 050	5.5	7 601	53.9
1320	Smyrna (Rutherford)	13 610	44.2	9 665	53.6
1331	Soddy-Daisy (Hamilton)	8 440	.6	8 998	46.0
1350	South Fulton (Obion)	3 160	15.5	6 411	60.8
1360	South Pittsburg (Marion)	3 480	-4.2	8 197	39.4
1365	Sparta (White)	5 010	3.0	7 995	50.1
1380	Springfield (Robertson)	10 790	-.1	8 220	50.7
1405	Sweetwater (Monroe)	4 760	.7	8 910	52.5
1445	Trenton (Gibson)	4 610	.2	8 446	47.8
1465	Tullahoma (Coffee, Franklin)	16 780	6.2	9 810	46.6
1475	Union City (Obion)	10 460	.2	9 800	52.6
1500	Waverly (Humphreys)	4 170	-5.2	8 585	36.9
1545	Winchester (Franklin)	6 180	1.3	7 439	43.4
48	TEXAS	16 682 000	17.3	10 373	44.0
0010	Abernathy (Hale, Lubbock)	2 710	-6.6	7 360	28.7
0015	Abilene (Taylor, Jones)	112 430	12.6	9 685	44.5
0020	Addison (Dallas)	7 340	32.2	16 752	50.6
0035	Alamo (Hidalgo)	9 700	45.9	4 468	45.4
0040	Alamo Heights (Bexar)	7 250	18.0	20 380	49.3
0055	Alice (Jim Wells)	22 480	7.2	7 778	32.6
0065	Allen (Collin)	15 340	84.5	12 729	60.1
0070	Alpine (Brewster)	6 030	10.3	6 950	51.7
0083	Alton (Hidalgo)	4 190	53.4	2 639	40.1
0085	Alvarado (Johnson)	6 020	122.9	7 834	37.8
0090	Alvin (Brazoria)	19 400	8.5	10 669	36.0
0100	Amarillo (Potter, Randall)	165 850	11.1	10 975	41.1
0115	Andrews (Andrews)	13 700	23.9	9 914	39.2
0120	Angleton (Brazoria)	15 700	12.7	11 441	34.2
0140	Anson (Jones)	2 920	3.1	7 362	31.1
0145	Anthony (El Paso)	3 310	25.4	5 441	41.6
0155	Aransas Pass (San Patricio, Aransas, Nueces)	8 200	14.3	6 957	24.3
0175	Arlington (Tarrant)	249 770	54.3	12 796	46.6
0195	Athens (Henderson)	11 200	9.8	8 884	45.9
0200	Atlanta (Cass)	6 490	3.5	8 642	32.9
0210	Austin (Travis, Williamson)	466 550	25.2	11 633	57.9
0230	Azle (Tarrant, Parker)	9 000	47.6	10 206	45.0
0250	Balch Springs (Dallas)	19 440	41.4	8 563	48.5

'38!
5p

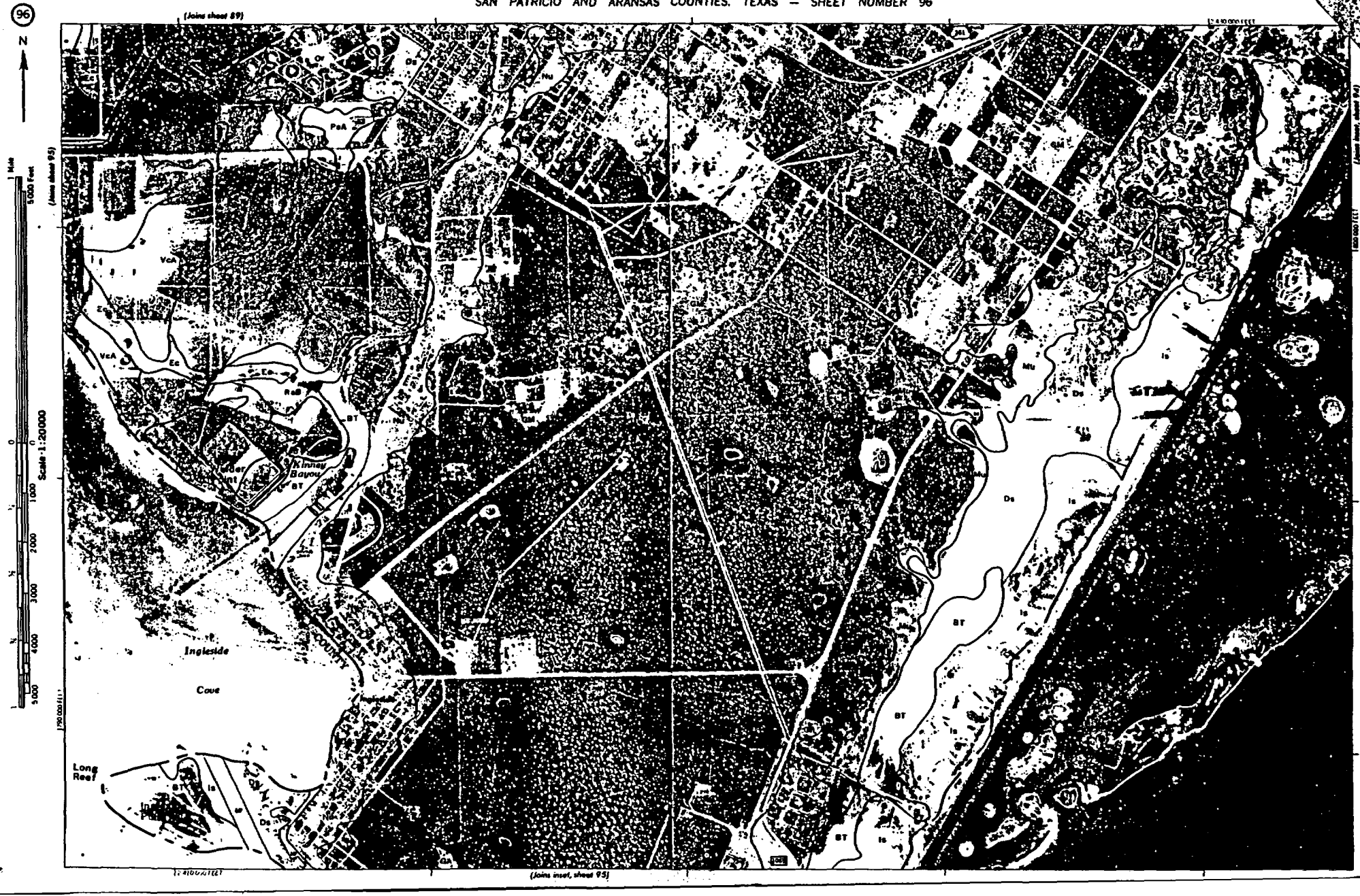
REFERENCE 6

SOIL SURVEY OF SAN PATRICIO AND ARANSAS COUNTIES, TEXAS

DEPOSITORY
AUG
DALLAS PUBLIC LIBRARY



United States Department of Agriculture
Soil Conservation Service
In cooperation with
Texas Agricultural Experiment Station


96
N
(Joins sheet 89)
(Joins sheet 95)
(Joins inset, sheet 94)
(Joins inset, sheet 95)
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
Kinney Bayou
Ingleside
Cove
Long Reef
PeA
VcA
Ec
RaB
BT
Ds
Is
Mu
Nu
GM

SOIL LEGEND

The first letter of the symbol is the first letter of the soil name and is a capital. The second letter, if it is lowercase, indicates that the map unit is narrowly defined, whereas, a capital letter indicates the unit is broadly defined. The third letter designates slope and is also a capital. Symbols without a third letter indicate the soils are nearly level or gently undulating.

Consecutive capital letters in a map symbol indicate the delineations are large and the composition is apt to be more variable than the other units in the survey area, but has been controlled well enough to be interpreted for the expected land use of the soils.

SYMBOL	NAME
Ac	Aransas clay
Af	Aransas clay, frequently flooded
As	Aransas clay, saline
BT	Barrada Tatton association
By	Beaches
Cs	Comitas loamy fine sand
Dn	Delfina loamy fine sand
Ds	Dianola soils
Dt	Dietrich fine sand
Ec	Edroy clay
Ed	Edroy clay, depressional
FA	
FA	Falfurrias association
GA	Galveston association
GM	Galveston Mustang association
Is	Ijam soils
La	Leming loamy fine sand
MoC	Monteola clay, 3 to 5 percent slopes
MoD	Monteola clay, 5 to 8 percent slopes
Mu	Mustang fine sand
Na	Narta fine sandy loam
Nu	Nueces fine sand
Od	Odem fine sandy loam
On	Oil-waste land
Or	Orelia fine sandy loam
Os	Orelia sandy clay loam
PaA	Papalote fine sandy loam, 0 to 1 percent slopes
PaB	Papalote fine sandy loam, 1 to 3 percent slopes
PaC	Papalote fine sandy loam, 3 to 5 percent slopes
PeB	Petrus loam, 0 to 3 percent slopes
PfC	Pharr fine sandy loam, 1 to 5 percent slopes
Pt	Plaimmont
RaA	Raymondville clay loam, 0 to 1 percent slopes
RaB	Raymondville clay loam, 1 to 3 percent slopes
Sa	Sarita-Nueces complex
Sn	Sinton loam
Tn	Tatton complex
Va	Victoria clay
VcA	Victoria clay, 0 to 1 percent slopes
VcB	Victoria clay, 1 to 3 percent slopes
Vd	Victoria clay, depressional
WfA	Willacy fine sandy loam, 0 to 1 percent slopes
WfB	Willacy fine sandy loam, 1 to 3 percent slopes
WfC	Willacy fine sandy loam, 3 to 5 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state, [illegible]
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool — Davis Airstrip

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEMS & DESIGNATIONS

- Interstate
- Federal
- State
- County, farm or ranch

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small

PITS

- Gravel pit — GRAVEL PIT
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — GAS
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial
- Intermittent

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot
- Caliche pit — CALICHE PIT

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — Cut, Fill

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown)

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot

REFERENCE 7

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

TECHNICAL RELEASE NO. 55

URBAN HYDROLOGY FOR SMALL WATERSHEDS

CONTENTS

Page

Chapter 1. Effects of urbanization on runoff volume and peak rates of discharge

Introduction..... 1-1
Effects of urban development..... 1-1
Volume parameters..... 1-2
  Soil type..... 1-2
  Cover type..... 1-2
Time parameters..... 1-3
  Slope..... 1-3
  Flow length..... 1-3
  Surface roughness..... 1-3
Methodology..... 1-3

Chapter 2. Estimating runoff from urban areas

Introduction..... 2-1
Runoff equation..... 2-1
Effect of urbanization on runoff..... 2-4
Urban runoff curve numbers..... 2-4
  Example 2-1..... 2-6
  Example 2-2..... 2-7
  Example 2-3..... 2-7
  Example 2-4..... 2-8

Chapter 3. Time of concentration, travel time, and lag

Introduction..... 3-1
Computation of travel time..... 3-1
  Overland flow..... 3-1
  Storm sewer or road gutter flow..... 3-2
  Channel flow..... 3-3
  Example 3-1..... 3-3
Computation of lag..... 3-5
  Hydrograph method..... 3-5
  Modified curve number method..... 3-5
  Example 3-2..... 3-9

Table B .1--Continued

FREESTONE	C	GASCONADE	D	GLENFIELD	D	GRANGER	C	GUNN	B
FREEZENER	B	GAS CREEK	C	GLENFORD	C	GRANGEVILLE	B/C	GUNTER	A
FREMONT	C	GASKELL	C	GLENHALL	B	GRANILE	B	GURABO	D
FRENCH	C	GASS	D	GLENHAP	B	GRANC	D	GURLEY	C
FRENCHTOWN	D	GASSET	D	GLENHORA	C	GRANT	B	GUSTAVUS	B
FRENEAU		GATESBURG	A	GLENHALLEN	C	GRANTSBURG	C	GUSTIN	C
FRESNO	C	GATEVIEW	B	GLENOMA	B	GRANTSDALE	A	GUTHRIE	D
FRIANA	D	GATEWAY	C	GLENRCSE	B	GRANVILLE	B	GUYTON	D
FRIANT	D	GATEWOOD	D	GLENSTED	D	GRAPEVINE	C	GWIN	D
FRIDLO	C	GAULDY	B	GLENTON	B	GRASMERE	B	GWINNETT	B
FRIEDMAN	B	GAVINS	C	GLENVIEW	B	GRASSHA	B	GYNER	C
FRIES	D	GAVIOTA	D	GLENVILLE	C	GRASSY BUTTE	A		
FRIO	B	GAY	D	GLIDE	B	GRATZ	C	HACCKE	C
FRIZZELL	C	GAYLORD	B	GLIKON	B	GRAVDEN	C	HACIENDA	C
FROBERG	D	GAYNOR	C	GLORIA	C	GRAVE	B	HACK	B
FROHMAN	C	GAYVILLE	B	GLOUCESTER	A	GRAVITY	C	HACKERS	B
FRONHOFER	C	GAZELLE	D	GLOVER	C/D	GRAYCALM	A	HACKETTSTOWN	B
FRONTON	D	GAZOS	B	GLYNDON	B	GRAYFORD	B	HADLEY	B
FROST	D	GEARHART	A	GLYNN	C	GRAYLING	A	HADO	B
FRUITA	B	GEARY	B	GOBLE	C	GRAYLOCK	B	HAGEN	B
FRUITLAND	B	GEE	B	GOCCARO	B	GRAYPOINT	B	HAGENBARTH	B
FRYE	D	GEEBURG	C	GODDE	D	GRAYS	B	HAGENER	A
FUEGO	C	GEER	C	GOEDECKE	D	GREAT BEND	B	HAGER	C
FUERA	C	GEFO	A	GODFREY	C	GREELEY	B	HAGERMAN	B
FULDA	C	GELKIE	B	GODWIN	D	GREEN BLUFF	B	HAGERSTOWN	C
FULLERTON	B	GEM	C	GOEGLEIN	C	GREEN CANYON	B	HAGGA	B
FULMER	B/D	GENIO	C	GOESSEL	D	GREENCREEK	B	HAIG	C
FULSHEAR	C	GENSON	C	GOFF	C	GREENDALE	B	HAIKU	B
FULTON	D	GENESEE	B	GOGEBIC	B	GREENFIELD	B	HAILMAN	B
FUQUAY	B	GENEVA	C	GOLBIN	C	GREENHORN	D	HAINES	B/C
FURNIS	B/D	GENOA	D	GOLCONDA	D	GREENLEAF	B	HAIRE	C
FURY	B/D	GENOLA	B	GOLDENDALE	B	GREENOUGH	C	HALAWA	B
		GEORGEVILLE	B	GOLDFIELD	B	GREENPORT		HALCER	C
GAASTRA	C	GEORGIA	B	GOLDHILL	B	GREEN RIVER	B	HALE	B
GABALDON	C	GERALD	D	GOLDMAN	C	GREENSBORO		HALEIWA	B
GABICA	D	GERBER	D	GOLDRIDGE	B	GREERSON	C	HALEY	B
GACEY	D	GERIG	B	GOLDRUN	A	GREENTON	C	HALF MOON	B
GADDES	C	GERING	B	GOLDSBORO	C	GREENVILLE	B	HALFORD	A
GADES	G	GERLAND	C	GOLDSTON	C	GREENWATER	A	HALFWAY	D
GADSDEN	D	GERMANIA		GOLDSTREAM	D	GREENWICH	B	HALII	B
GAGE		GERMANY	B	GOLDVALE	C	GREENWOOD	D	HALIIMAILE	B
GAGEBY	B	GESTRIN	B	GOLDVEIN	C	GREER	C	HALIS	B
GAGETOWN	C	GETTA	C	GOLIAD	C	GREGORY	A	HALL	B
GAHEE	B	GETTYS	C	GOLLAHER	A	GRELL	C	HALLECK	B
GAINES	C	GEYSER	D	GOMEZ	B	GRENADA	C	HALL RANCH	C
GAINESVILLE	A	GHENT	C	GONVICK	B	GRENVILLE	B	HALLVILLE	B
GALATA	D	GIBBLER	C	GOOCH	D	GRESHAM	C	HALSEY	D
GALE	B	GIBBON	B	GOODALE	C	GREWINGK	C	HAMAKUAPOKO	B
GALEN	B	GIBBS	D	GOODING	C	GREYBACK	B	HAMAN	B
GALENA	C	GIBBSTOWN	A	GOODINGTON	C	GREYBULL	C	HAMAR	B
GALEPPI	C	GIFFIN	C	GOODLOE	B	GREYCLIFF	C	HAMBLEN	C
GALESTOWN	A	GIFFORD	C	GOODMAN	B	GRIFFY	B	HAMBRIGHT	D
GALEY	B	GILA	C	GOODRICH	B	GRIGSTON	B	HAMBURG	B
GALISTEO	D	GILBY	B	GOODSPRINGS	D	GRIPSTAD	B	HAMEL	C
GALLAGHER	B	GILCHRIST	B	GOOSE CREEK	B	GRISWOLD	B	HAMERLY	C
GALLATIN	A	GILCREST	B	GOOSE LAKE	C	GRIVER	C	HAMILTON	A
GALLEGOS	B	GILEAD	C	GOOSMUS	B	GRIZZLY	C	HAMLET	B
GALLINA	C	GILES	B	GORCO	C	GROGAN	B	HAMLIN	B
GALLION	B	GILFORD	B/D	GORE	D	GROSECLOSE	C	HAMPDEN	
GALVA	B	GILHOULY	B	GORGONIO	A	GROSS	C	HAMPSHIRE	C
GALVESTON	A	GILISPIE	C	GORHAM	B	GROTON	A	HAMPTON	C
GALVIN	C	GILLIAM	C	GORIA	C	GROVE	A	HANTAN	C
GAMBLER	A	GILLIGAN	B	GORING	C	GROVELAND	B	HANA	A
GANNETT	D	GILLS	C	GORMAN	B	GROVER	B	HANALEI	C
GANSNER	D	GILMORE	D	GORUS	A	GROVETON	B	HANAMAULU	A
GAPO	D	GILPIN	C	GORZELL	B	GRUBBS	D	HANCEVILLE	B
GAPPMAYER	B	GILROY	C	GOSPER	B	GRULLA	D	HAND	B
GARA	B	GILSON	B	GOSHUTE	D	GRUMMIT	C	HANDFORD	B
GARBER	B	GILT EDGE	C	GOSPORT	C	GRUNCY	C	HANEY	B
GARBUTT	B	GINAT	D	GOTHAM	A	GRUVER	C	HANGAARD	C
GARCENO	C	GINGER	C	GOTHARD	D	GRYGLA	C	HANGER	B
GARDENA	B	GINI	B	GOTHIC	C	GUADALUPE	B	HANIPOE	B
GARDINER	A	GINSER	C	GOTHO	C	GUAJE	A	HANKINS	C
GARDNERS FORK	B	GIRD	A	GOULDING	D	GUALALA	D	HANKS	B
GARDNERVILLE	D	GIVEN	C	GOVAN	C	GUAMANI	B	HANLY	A
GARDONE	A	GLADCEN	A	GOVE	B	GUANAJIBO	C	HANNA	B
GAREY	C	GLADSTONE	B	GOWEN	B	GUANICA	D	HANOVER	C
GARFIELD	C	GLADWIN	A	GRABE	B	GUAYABO	B	HANS	C
GARITA	C	GLAMIS	C	GRABLE	B	GUAYABOTA	D	HANSEL	C
GARLAND	B	GLANN	B/C	GRACEPONT	B	GUAYAMA	D	HANSKA	C
GARLET	A	GLASGOW	C	GRACEVILLE	B	GUBEN	B	HANSON	A
GARLOCK	C	GLEAN	B	GRACY	D	GUCKEEN	C	HANTHO	B
GARNUN	C	GLEASON	C	GRAFTON	B	GUELPH	B	HANTZ	D
GARMORE	A	GLEN	B	GRAHAM	D	GUENCO	C	HAP	B
GARNER	D	GLENBERG	B	GRAIL	C	GUERNSEY	C	HAPGOOD	B
GARO	D	GLENBROOK	D	GRAPH	B	GUERRERO	C	HAPNEY	C
GARR	D	GLENCOE	C	GRANATH	B	GUEST	D	HARBORD	B
GARRARD	B	GLENDALE	B	GRANBY	A/D	GUIN	A	HARBOURTON	
GARRETSON	B	GLENDALE	B	GRANDE RONDE	D	GULER	B	HARCO	B
GARRETT	B	GLENDIVE	B	GRANDFIELD	B	GULKANA	B	HARDEMAN	B
GARRISON	B	GLENDORA	C	GRANDVIEW	C	GUNBOAT	C	HARDESTY	B
GARWIN	C	GLENELG	B	GRANER	C	GUNSAMMEL	A	HARDING	D

NOTES A BLANK HYDROLOGIC SOIL GROUP INDICATES THE SOIL GROUP HAS NOT BEEN DETERMINED
TWO SOIL GROUPS SUCH AS B/C INDICATES THE DRAINED/UNDRAINED SITUATION

recycled paper
recycled paper

ecology and environment

Table B.1—Continued

METOLIUS	B	MISSION	B	MORGANFIELD	B	NABESNA	C	NESS	D
METRE	D	MITCH	B	MORGNEC		NACEVILLE	C	NESSEL	B
METZ	A	MITCHELL	B	MORIARTY	D	NACHES	B	NESSOPAN	B
MEXICO	D	MITTWANGA	C	MORICAL	C	NACIPIENTO	C	NESTER	C
MHOON	D	MIZPAH	C	MORLEY	C	NACOGDOCHES	B	NESTUCCA	C
MIAMI	B	MOANC	D	MORPCH MESA	C	NADEAN	B	NETAATS	A
MIANIAN	C	MOAPA	D	MORROCO	A/C	NADINA	B	NETC	B
MICCO	A/D	MOAULA	A	MORCHI	D	NAFF	B	NETTLETON	C
MICHELSON	B	MOBEETIE	B	MORCP	C	NAGEESI	B	NEUBERT	B
MICHIGAMME	C	MOCA	D	MORRILL	B	NAGITSY	C	NEUAS	B
MICK	B	MOCHO	B	MORRIS	C	NAGLE	B	NEUSKE	B
MIDAS	D	MODA	D	MORRISON	B	NAHMA	C	NEVADOR	C
MIDOLF	C	MOCALE	C	MORROW	C	NAHUNTA	C	NEVILLE	B
MIDDLEBURY	B	MOOEL	C	MORSE	D	NAIBA	B	NEVIN	C
MIDESSA	B	MODENA	B	MORTENSON	C	NAKAI	B	NEVINE	B
MIDLAND	D	MODESTO	C	MORTON	B	NAKNEK	D	NEVOYER	D
MIDNIGHT	C	MODOC	C	MORVAL	C	NAMAE	B	NEVTAH	C
MIDVALE	C	MOENKOPIE	D	MOSBY	C	NAMAPKIN	A	NEVU	D
MIDWAY	D	MOFFAT	B	MOSCA	A	NANCY	B	NEWARK	C
MIFFLIN	B	MOGOLLON	B	MOSEL	C	NANNY	B	NEWART	B
MIFFLINBURG	B	MOGUL	B	MOSHANNON	B	NARAYTON	B	NEWAYGO	B
MIGUEL	C	MOHAVE	B	MOSHER	D	NANSENE	B	NEWBERG	B
MIKE	D	MOHAVE	B	MOSHERVILLE	C	NANTUCKET	C	NEWBERRY	C
MIKESELL	C	MOHAWK	B	MOSIDA	B	NANUP	C	NEWBY	B
MILACA	B	MOIKA	C	MOSQUET	D	NAPA	C	NEW CANARIA	C
MILAN	B	MOKELUMNE	D	MOSSYROCK	B	NAPIER	B	NEW CASTLE	B
MILES	B	MOKENA	C	MOTA	B	NAPLES	B	NEWCOMB	A
MILFORD	C	MOKULEIA	B	MOTTSVILLE	A	NAPPANEE	D	NEWDALE	B
MILHAN	C	MOLAND	B	MOULTON	B	NAPTOWNE	B	NEWELL	B
MILHEIM	C	MOLCAL	B	MOUND	C	NARANJITO	C	NEWELLTON	D
MILL	B	MOLENA	A	MOUNTAINBURG	D	NARANJO	C	NEWPANE	
MILLARD	B	MOLINIS	B	MOUNTAINVIEW	B/D	NARCISSE	B	NEWFORK	D
MILLBORO	D	MOLLY	B	MOUNTAINVILLE	B	NARD	B	NEWKIRK	B
MILLBROOK	B	MOLOKAI	B	MOUNT AIRY	A	NARLON	C	NEWLANDS	B
MILLBURNE	B	MOLSON	B	MOUNT CARROLL	B	NARCA	B	NEWLIN	B
MILLCREEK	B	MOLVREUX	B	MOUNT HOPE	B	NARRAGANSETT	B	NEWMARKET	B
MILLER	D	MOMAD	A	MOUNT HOOD	B	NARROWS	D	NEWPORT	C
MILLERLUX	C	MONAHAN	C	MOUNT LUCAS	C	NASER	B	NEWRY	B
MILLERTON	D	MONAMANS	B	MOUNT CLIVE	D	NASH	B	NEWSKAN	B
MILLETT	B	MONARDA	D	MOUNTVIEW	B	NASHUA	A	NEWSTEAD	D
MILLGROVE	A/D	MONCLOVA	B	MOVILLE	C	NASHVILLE	B	NEWTON	A/D
MILL HOLLOW	B	MONDAMIN	C	MOWATA	D	NASON	C	NEWTONIA	B
MILLICH	D	MONDOVI	B	MOWER	C	NASSAU	C/D	NEWTOWN	C
MILLINGTON	B	MONEE	D	MOYIAA	D	NASSET	B	NEWVILLE	C
MILLIS	C	MONICO	B	MUCAHA	D	NATALIE	C	NEZ PERCE	C
MILLRACE	B	MONIUA	B	MUCET	C	NATCHEZ	B	NIAGARA	C
MILLSAP	C	MONITEAU	D	MUDRAY	D	NATHROP	B	NIART	B
MILLSDALE	B/D	MONMOUTH	C	MUD SPRINGS	C	NATIONAL	A	NIBLEY	C
MILLSHOLM	C	MONO	D	MUGHOUSE	C	NATRONA	B	NICHOLSON	C
MILLVILLE	B	MONOLITH	C	MUIR	B	NATURITA	B	NICHOLVILLE	C
MILLWOOD	D	MONONA	B	MUIRKIRK	B	NAUKATI	D	NICKEL	B
MILNER	C	MONONGAHELA	C	MUKILTEO	D	NAUNBURG	C	NICKLE	B
MILPITAS	C	MONROE	B	MULDROW	D	NAVAJO	D	NICODEMUS	B
MILROY	D	MONROEVILLE	C/D	MULKEY	C	NAVAN	D	NICOLAUS	C
MILTON	C	MONSE	B	MULLENS	D	NAVARCO	B	NICOLLET	B
MINGHES	C	MONSERATE	C	MULT	C	NAVESINK		NIELSEN	D
MINOSA	C	MONTAGUE	D	MULTCRPOR	A	NAYLOR		NIGHTHAWK	B
MINAM	B	MONTALTO	C	MUNFORD	B	NAZ	B	NIHILL	B
MINATARE	D	MONTARA	D	MUNDELEIN	B	NEAPOLIS	B/D	NIKISHKA	B
MINCHEY	B	MONTAUK	C	MUNISING	B	NEBEKER	C	NIKLASON	B
MINCO	B	MONTCALM	A	MUNK	C	NEBISH	B	NIKOLAI	D
MINDALE	B	MONTE CRISTO	D	MUNSON	D	NEBO		NILAND	C
MINDEGO	B	MONTEGRANDE	D	MUNUSCONG	D	NECHE	C	NILES	C
MINDEMAN	B	MONTELL	D	MURDO	B	NEDERLAND	B	NIMROD	C
MINDEN	C	MONTELLO	C	MURDOCK	C	NEEDHAM	D	NINCH	C
MINE	B	MONTEVALLO	D	MUREN	B	NEEDLE PEAK	C	NINEMILE	D
MINEOLA		MONTGOMERY	D	MURRILL	B	NEEDMORE	C	NINEVEH	B
MINER	D	MONTICELLO	B	MUSCATINE	B	NEELEY	B	NINIGRET	B
MINERAL	A	MONTIETH	A	MUSE	C	NEGITA	B	NININGER	B
MINERAL MT.	C	MONTMORENCI	B	MUSELLA	B	NEGLEY	B	NINNESCAH	B
MINERVA	B	MONTOSA	C	MUSICK	B	NEHALEM	B	NIOBELL	C
MING	B	MONTOUR	D	MUSINIA	B	NEILTON	A	NIOTA	D
MINGO	B	MONTOYA	C	MUSKINGUM	C	NEISSON	B	NIPE	B
MINIDOKA	C	MONTPELLIER	C	MUSKOGEE	C	NEKTA	C	NIPPERSINK	B
MINNEISKA	C	MONTRUSE	B	MUSSELSHELL	B	NELLIS	B	NIPSUM	C
MINNEOSA	A	MONTVALE	D	MUSSEY	D	NELSCOTT	B	NIRA	B
MINNEQUA	B	MONTVERDE	A/D	MUSTANG	A/D	NELSON	B	NISHNA	C
MINNETONKA	D	MONTWELL	C	MUTKALA	B	NEPAH	C	NISHON	B
MINNEWAUKAN	B	MOODY	B	MUTUAL	B	NERAAA	B	NISQUALLY	A
MINNIECE	D	MOONCO	B	MYAKKA	A/D	NENAC	B	NISSWA	B
MINOA	C	MOOSE RIVER	C	MYATT	B/D	NEGLA	D	NIU	B
MINORA	C	MOPA	B	MYERS	D	NEOTOMA	B	NIULII	C
MINTO	B	MORADO	C	MYERSVILLE	B	NEPESTA	C	NIVLOC	C
MINU	D	MORALES	C	MYLNEA	B	NEPHI	B	NINCT	C
MINVALE	B	MORO	C	MYRICK	D	NEPPEL	B	NIRA	C
MIRABAL	C	MORFAU	C	MYRTLE	B	NEPTUNE	A	NIRCN	B
MIRACLE	B	MOREHEAD	C	MYSTEN	A	NERESON	B	NIXONTON	B
MIRAMAR	B	MOREMOUSE	C	MYSTIC	D	NESOA	A	NIZIAN	A
MIRANDA	D	MORELAND	D	MYTON	B	NESHAMINY	B	NOBLE	B
MIRES	B	MORELANDTOWN	A			NESIKA	B	NOBSCOTT	A
MIRROR	B	MOREY	D	N-BAR	B	NESKOWIN	B	NODAWAY	B
MIRROR LAKE	A	MORFITT	B	NAALEHU	B	NESPELEM	B	NOEL	D

NOTES A BLANK HYDROLOGIC SOIL GROUP INDICATES THE SOIL GROUP HAS NOT BEEN DETERMINED
TWO SOIL GROUPS SUCH AS B/C INDICATES THE DRAINED/UNDRAINED SITUATION

REFERENCE: 8

Summary Appraisals of the Nation's Ground-Water Resources—Texas-Gulf Region

By E. T. BAKER, JR., *and* J. R. WALL

GEOLOGICAL SURVEY PROFESSIONAL PAPER 813-F

A summary of the distribution, availability, and quality of ground water and its importance in the regional water supply

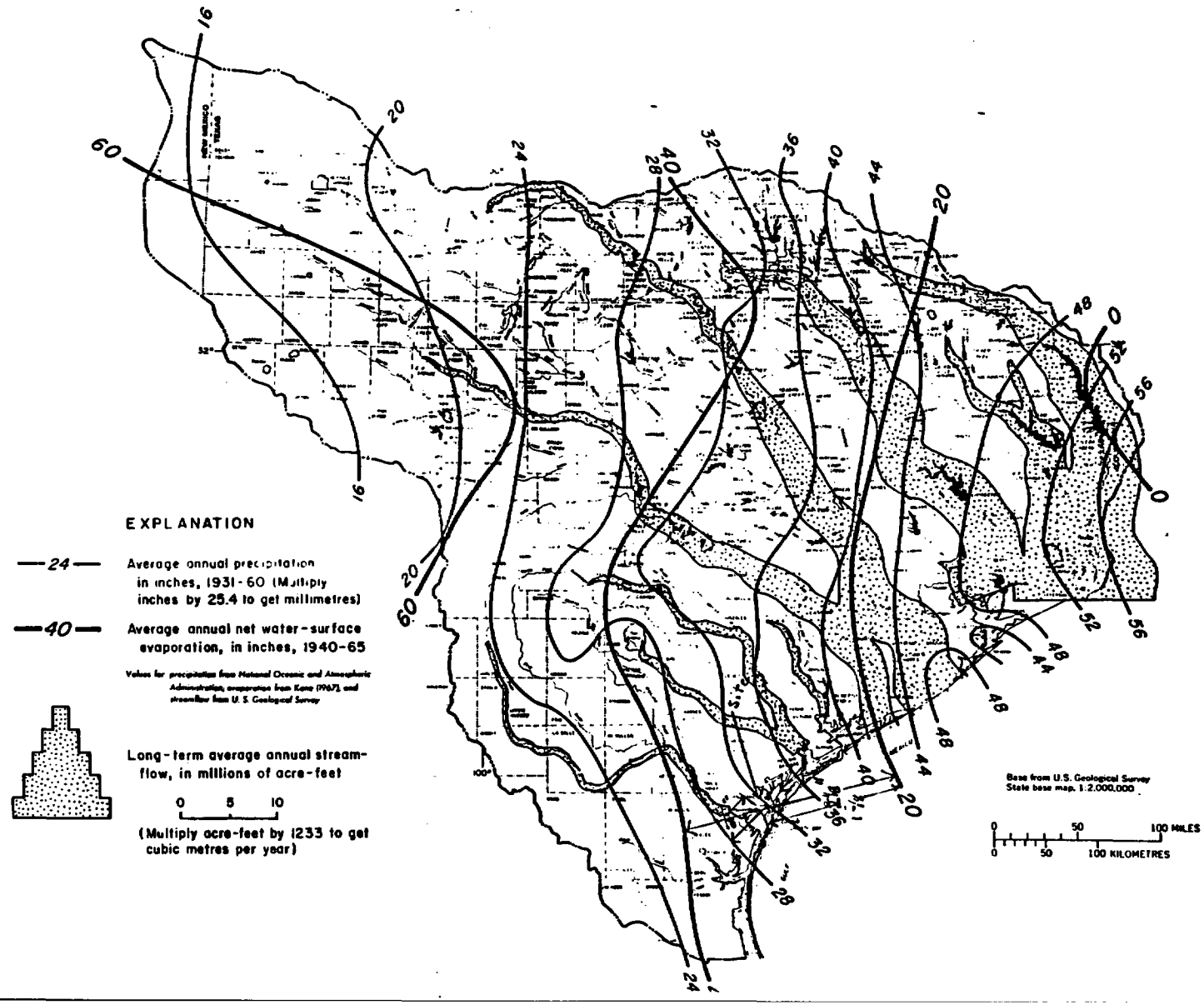
~~Public Library~~

AUG 12 1976

Dallas, Texas

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1976

Dallas, Texas



Report 286

STRATIGRAPHIC AND HYDROGEOL[illegible] FRAMEWORK OF PART OF THE COASTAL PLAIN OF TEXAS

[illegible]

TEXAS DEPARTMENT OF WATER RESOURCES

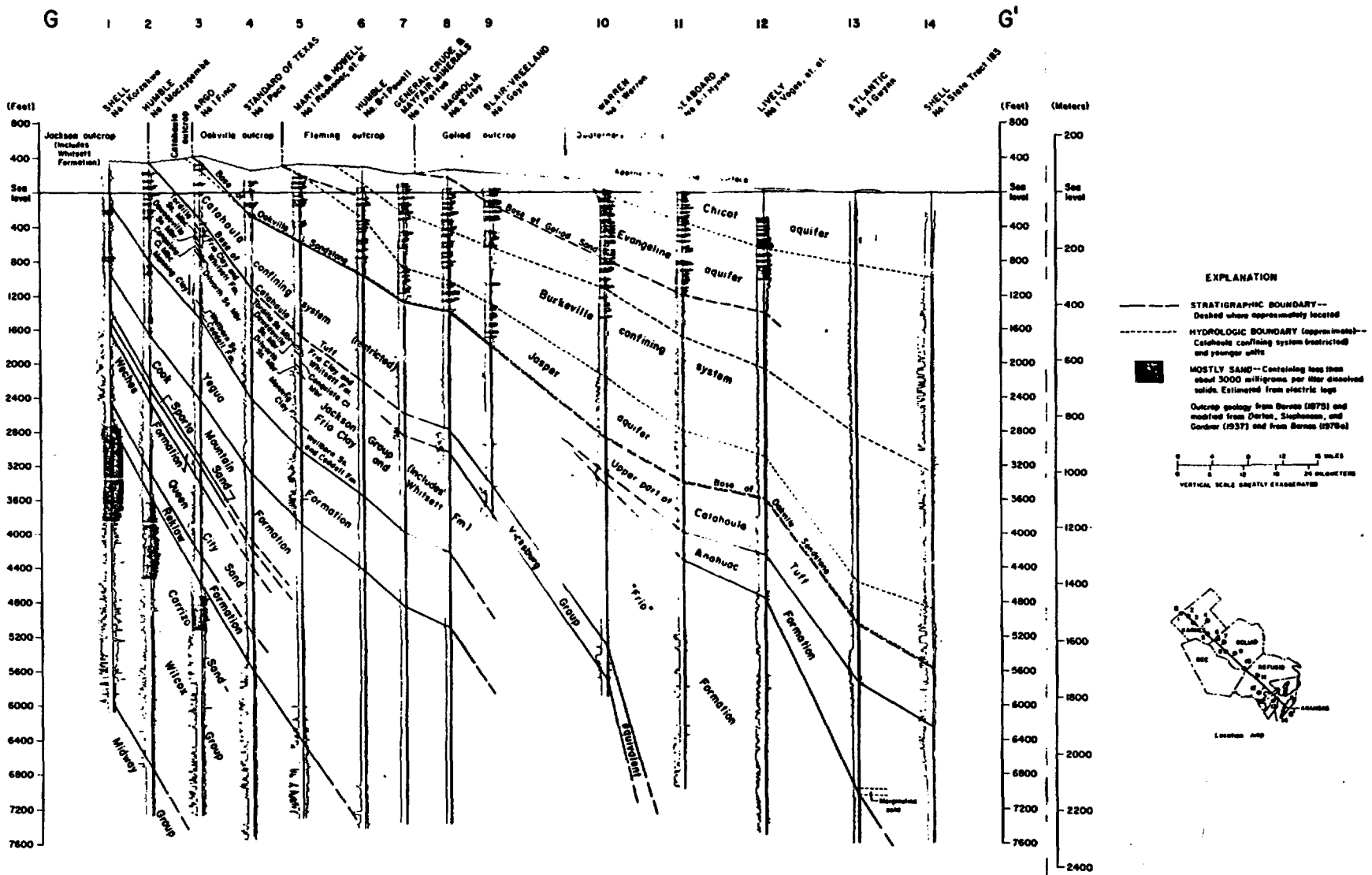


Figure 8
Stratigraphic and Hydrogeologic Section G-G'

RECORD OF COMMUNICATION	(Record of Item Checked Below) x Phone Call ___Discussion ___Field Trip ___Conference ___Other(Specify)	
To: Jimmy Durham Aransas Water Dept (512) 758-2441	From: Kurt Soutendijk FIT Chemist Kurt Soutendijk	Date: 11-16-89 Time: 9:45 a.m.

SUBJECT: Falcon Refinery, Drinking Water

SUMMARY OF COMMUNICATION

The FIT called Jimmy Durham to inquire about sources for drinking water in Aransas. Jimmy said that the source of Aransas water was Lake Corpus Christi, and that there are very few wells if any in Aransas.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES TO:

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

RECORD OF COMMUNICATION	(Record of Item Checked Below) x Phone Call ___Discussion ___Field Trip ___Conference ___Other(Specify)	
To: Wilfred Hansen County Health Office (512) 364-3308	From: Kurt Soutendijk FIT Chemist Kurt Soutendijk	Date: 11/16/89 Time: 10:05 a.m.

SUBJECT: Falcon Refinery, Drinking Water

SUMMARY OF COMMUNICATION

The FIT contacted Wilfred Hansen of the Sinton County Health Department to inquire about well usage for drinking water between Ingleside and Aransas. Wilfred said that there was not any public water being supplied to RR 2725 or 1069. Wilfred purported to be the chief sanitarian. Wilfred said wells can be as shallow as 80 feet deep.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES TO:

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

RECORD OF COMMUNICATION	(Record of Item Checked Below) x Phone Call ___Discussion ___Field Trip ___Conference ___Other(Specify)	
To: George Kneuper Ingleside Water Department (512) 776-2517	From: Kurt Soutendijk FIT Chemist Kurt Soutendijk	Date: 11-16-89 Time: 9:55 a.m.

SUBJECT: Falcon Refinery, Drinking Water

SUMMARY OF COMMUNICATION

The FIT called George Kneuper to inquire about sources for drinking water in Ingleside. George said that the water comes from the Nueces River, and that only one well was used. The well is used to fill a pool. George said most wells in this area are approximately 160 feet deep.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES TO:

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.