CONFIDENTIAL

PROJECTED HRS SCORE

DATE: 12/8/88

BASED ON: ☐ PA ☑ RECON. ☐ SI AND ASSUMPTIONS

FOR Darby Creek Tank Farm

TDD F3-8811-22

EPA NO. 788

ORIGINAL (Red)

	S	S^2 PFE
Groundwater Route Score (S_{gw})	5.18	26.83
Surface Water Route Score (S_{sw})	12.31	151.54
Air Route Score (S_a)		
$S_{gw}^2 + S_{sw}^2 + S_a^2$		178.37
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		13.36
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		7.72

NOTES:

(POTENTIAL FOR AIR RELEASE) None observed

HRS-2 CONCERNS:

AREA G.W. SUPPLIES CONTAMINATED ?

Six inches of oil was observed floating on top of the groundwater in monitoring well D-71

S.W. INTAKES WITHIN 15 S.M. ?

None

RECREATION/SENSITIVE ENVIRONMENTS WITHIN 15 S.M. ?

Tinicum Environmental Center lies 1/4 mile south of the site

CONTAMINATED SURFACE SOILS ACCESSIBLE ? yes - however site is Fenced.

PREPARED BY [redacted] Not responsive due to revised scope

DATE 12/8/88

REVIEWED BY [redacted] Not responsive due to revised scope

DATE 2/6/89

SEMS DocID 2334608

CONFIDENTIAL

PROJECTED HRS SCORE

DATE: 12/8/88

BASED ON: ☐ PA ☑ RECON. ☐ SI AND ASSUMPTIONS

FOR Gulf Oil Darby Creek Tank Farm

TDD F3-8811-22 EPA NO. 788

ORIGINAL (Red)

DEF

Ground Water Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 Observed Release	0 45	1	45	45	3.1
If observed release is given a score of 45, proceed to line 4. If observed release is given a score of 0, proceed to line 2.					
2 Route Characteristics					3.2
Depth to Aquifer of Concern	0 1 2 3	2		6	
Net Precipitation	0 1 2 3	1		3	
Permeability of the Unsaturated Zone	0 1 2 3	1		3	
Physical State	0 1 2 3	1		3	
Total Route Characteristics Score				15	
3 Containment	0 1 2 3	1		3	3.3
Waste Characteristics					3.4
Toxicity/Persistence	0 3 6 9 12 15 18	1	18	18	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1	4	8	
Total Waste Characteristics Score			22	26	
5 Targets					3.5
Ground Water Use	0 1 2 3	3	3	9	
Distance to Nearest Well/Population Served	0 4 6 8 10 / 12 16 18 20 / 24 30 32 35 40	1	0	40	
Total Targets Score			3	49	
6 If line 1 is 45, multiply 1 x 4 x 5; If line 1 is 0, multiply 2 x 3 x 4 x 5			2970	57,330	
7 Divide line 6 by 57,330 and multiply by 100			S_{gw} = 5.18		

SOURCE/ASSUMPTION

(IDENTIFY SOURCE OF DOCUMENTATION, PROFESSIONAL JUDGMENT OR NOTE AS "SAME AS PRESCORE")

IF SCORED: ☐ PRESCORE ☐ SEE BELOW

Same as prescore

Same as prescore

Same as prescore

Same as prescore

NOTES

Six inches of oil was discovered floating on top of the water in monitoring well D-71

OBSERVED RELEASE

CONT.	D.L.	WELL # D-71	WELL # ____	WELL # ____	WELL # ____
oil	no sampling performed	6" of oil			

SOURCE: Darby Creek Tank Farm - Chevron Representative - Frank Hannigan

PREPARED BY [redacted] Not responsive due to revised scope

DATE 12/8/88

REVIEWED BY [redacted] Not responsive due to revised sco

DATE 2/10/89

CONFIDENTIAL

PROJECTED HRS SCORE

DATE: 12/8/88

BASED ON: ☐ PA ☑ RECON ☐ SI AND ASSUMPTIONS

ORIGINAL (Red)

FOR Gulf Oil Darby Creek

TDD - F3 - 8811-22

EPA No. 788

Surface Water Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 Observed Release	(0) 45	1	0	45	4.1
If observed release is given a value of 45, proceed to line 4. If observed release is given a value of 0, proceed to line 2.					
2 Route Characteristics					4.2
Facility Slope and Intervening Terrain	0 (1) 2 3	1	1	3	
1-yr. 24-hr. Rainfall	0 1 (2) 3	1	2	3	
Distance to Nearest Surface Water	0 1 2 (3)	2	6	6	
Physical State	0 1 2 (3)	1	3	3	
Total Route Characteristics Score			12	15	
3 Containment	0 1 2 (3)	1	3	3	4.3
4 Waste Characteristics					4.4
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18	
Hazardous Waste Quantity	0 1 2 3 (4) 5 6 7 8	1	4	8	
Total Waste Characteristics Score			22	26	
5 Targets					4.5
Surface Water Use	0 1 (2) 3	3	6	9	
Distance to a Sensitive Environment	0 1 (2) 3	2	4	6	
Population Served/Distance to Water Intake Downstream	(0) 4 6 8 10 / 12 16 18 20 / 24 30 32 35 40	1	0	40	
Total Targets Score			10	55	
6 If line 1 is 45, multiply 1 x 4 x 5; If line 1 is 0, multiply 2 x 3 x 4 x 5			7920	64,350	
7 Divide line 6 by 64,350 and multiply by 100			S_{sw} = 12.31		

SOURCE/ASSUMPTION

(IDENTIFY SOURCE OF DOCUMENTATION, PROFESSIONAL JUDGMENT OR NOTE AS "SAME AS PRESCORE")

IF SCORED: ☐ PRESCORE ☐ SEE BELOW

Same as prescore

Same as prescore

Same as prescore

Same as prescore

Same as prescore

Same as prescore

Same as prescore

Same as prescore

Same as prescore

Same as prescore

Same as prescore

Same as prescore

NOTES

OBSERVED RELEASE

CONT.	DL.	SAMPLE #	SAMPLE #	SAMPLE #	SAMPLE #

SOURCE:

PREPARED BY [redacted]

DATE 12/8/88

REVIEWED BY [redacted]

DATE 2/6/89

CONFIDENTIAL

PROJECTED HRS SCORE

DATE: 12/8/88

BASED ON: ☐ PA ☑ RECON. ☐ SI AND ASSUMPTIONS

FOR Dalby Creek Tank Farm

TOD - F3 - 8811 - 22

EPA - No. 788

ORIGINAL (Red)

PFE

NO POTENTIAL FOR RELEASE IS EVALUATED. TRANSFER AIR SCORE FROM PRESCORE. IF AN AIR RELEASE IS LIKELY, COMMENT BELOW:

NOTES:

Air Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 Observed Release	0 45	1		45	5.1
Date and Location: No observed air release					
Sampling Protocol:					
If line 1 is 0, the S_a = 0. Enter on line 5. If line 1 is 45, then proceed to line 2.					
2 Waste Characteristics					5.2
Reactivity and Incompatibility	0 1 2 3	1		3	
Toxicity	0 1 2 3	3		9	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
Total Waste Characteristics Score				20	
3 Targets					5.3
Population Within 4-Mile Radius	0 9 12 15 18 21 24 27 30	1		30	
Distance to Sensitive Environment	0 1 2 3	2		6	
Land Use	0 1 2 3	1		3	
Total Targets Score				39	
4 Multiply 1 x 2 x 3				35,100	
5 Divide line 4 by 35,100 and multiply by 100			S_a =		

IF >0 SEE PRESCORE SHEETS FOR DOCUMENTATION

PREPARED BY [redacted] Not responsive due to revised scope

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REVIEWED BY [redacted] Not responsive due to revised scope

DATE 2/6/89

CONFIDENTIAL

PRELIMINARY HRS SCORE

DATE: 12/8/88

BASED ON: ☐ PA ☑ RECON. ☐ SI

FOR Gulf Oil Darby Creek Tank Farm

TDD F3-8811-22 EPA NO. 788

ORIGINAL (Red)

SOURCE

(UNKNOWN DATA MUST RECEIVE LOWEST NON-ZERO SCOR AND SOURCE SHOULD BE NOTED AS DEFAULT)

Ground Water Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)	SOURCE
1 Observed Release	(0) 45	1	0	45	3.1	IF SCORED COMPLETE BELOW
If observed release is given a score of 45, proceed to line 4. If observed release is given a score of 0, proceed to line 2.						Groundwater depths range from 3 to 13 feet deep
2 Route Characteristics					3.2	
Depth to Aquifer of Concern	0 1 2 (3)	2	6	6		6 to 14 inches (approximately 11 inches)
Net Precipitation	0 1 (2) 3	1	2	3		$10^{-3} - 10^{-5}$ cm/sec
Permeability of the Unsaturated Zone	0 1 (2) 3	1	2	3		waste sludge and liquid materials
Physical State	0 (1) 2 (3)	1	3	3		
Total Route Characteristics Score			13	15		
3 Containment	0 1 2 (3)	1	3	3	3.3	landfill, no liner or run-on control
4 Waste Characteristics					3.4	
Toxicity/Persistence	0 3 6 9 12 15 (18)	6	18	18		Process waste from the refinery containing Chromium + lead
Hazardous Waste Quantity	0 1 2 3 (4) 5 6 7 8	1	4	8		140 cubic yards of oily sludge and various refinery catalysts were removed.
Total Waste Characteristics Score			22	26		
5 Targets					3.5	
Ground Water Use	0 (1) 2 3	3	3	9		default
Distance to Nearest Well/Population Served	(0) 4 6 8 10 / 12 16 18 20 / 24 30 32 35 40	1	0	40		no wells or intakes within 3 miles
Total Targets Score			3	49		
6 If line 1 is 45, multiply 1 x 4 x 5; If line 1 is 0, multiply 2 x 3 x 4 x 5			2574	57 330		
Divide line 6 by 57,330 and multiply by 100			S_{gw} = 4.49			

NOTES

OBSERVED RELEASE

CONT	D.L.	WELL # ____	WELL # ____	WELL # ____	WELL # ____

SOURCE: _____

PREPARED BY [redacted] Not responsive due to revised scope

DATE 12/8/88

REVIEWED BY [redacted] Not responsive due to revised scope

DATE 2/1/89

CONFIDENTIAL

PRELIMINARY HRS SCORE

DATE: 12/8/88

BASED ON: ☐ PA ☑ RECON ☐ SI

FOR Gulf Oil Darby Creek Tank Farm

TDD F3-8811-22 EPA NO. 788

ORIGINAL (Red)

Surface Water Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)	SOURCE (UNKNOWN DATA MUST RECEIVE LOWEST NON-ZERO SCORE AND SOURCE SHOULD BE NOTED AS DEFAULT)
1 Observed Release	(0) 45	1	0	45	4.1	IF SCORED COMPLETE BELOW
If observed release is given a value of 45, proceed to line 4. If observed release is given a value of 0, proceed to line 2.						
2 Route Characteristics					4.2	
Facility Slope and Intervening Terrain	0 (1) 2 3	(1)	1	3		≤ 3%
1-yr. 24-hr. Rainfall	0 1 (2) 3	1	2	3		2.7 inches
Distance to Nearest Surface Water	0 1 2 (3)	2	6	6		≥150 feet
Physical State	0 1 2 (3)	1	3	3		sludge
Total Route Characteristics Score			12	15		
3 Containment	0 1 2 (3)	1	3	3	4.3	no liner or run-on control
Waste Characteristics					4.4	process waste from the refinery containing
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18		lead + chromium
Hazardous Waste Quantity	0 1 2 3 (4) 5 6 7 8	1	4	8		140 cubic yards of oily sludges and various refinery catalysts were removed.
Total Waste Characteristics Score			22	26		
5 Targets					4.5	
Surface Water Use	0 1 (2) 3	3	6	9		warm cold water fishes
Distance to a Sensitive Environment	(0) 1 (2) 3	2	4	6		Tinicum Environmental Center is
Population Served/Distance to Water Intake Downstream	0 4 6 8 10 / 12 16 18 20 / 24 30 32 35 40	1	0	40		1/4 mile south of site
Total Targets Score			10	55		no intakes downstream
6 If line 1 is 45, multiply 2 x 4 x 5 / If line 1 is 0, multiply 2 x 3 x 4 x 5	7920			64,350		
Divide line 6 by 64,350 and multiply by 100			S_{sw} = 12.31			

OBSERVED RELEASE

CONT.	DL.	SAMPLE #	SAMPLE #	SAMPLE #	SAMPLE #

SOURCE:

NOTES

PREPARED BY [redacted] Not responsive due to revised scope

DATE 12/8/88

REVIEWED BY [redacted] Not responsive due to revised scope

2/6/89

CONFIDENTIAL

PRELIMINARY HRS SCORE

BASED ON: ☐ PA ☑ RECON. ☐ SI

FOR Darby Creek Tank Farm

TDD F3-8811-22 EPA NO. 788

ORIGINAL (Red)

PFE

Air Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 Observed Release	0 45	1		45	5.1
Date and Location:					
Sampling Protocol: No observed air release					
If line 1 is 0, the S_a = 0. Enter on line 5. If line 1 is 45, then proceed to line 2.					
2 Waste Characteristics					5.2
Reactivity and Incompatibility	0 1 2 3	1		3	
Toxicity	0 1 2 3	3		9	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
Total Waste Characteristics Score				20	
3 Targets					5.3
Population Within 4-Mile Radius	0 9 12 15 18 21 24 27 30	1		30	
Distance to Sensitive Environment	0 1 2 3	2		6	
Land Use	0 1 2 3	1		3	
Total Targets Score				39	
4 Multiply 1 x 2 x 3				35,100	
Divide line 4 by 35,100 and multiply by 100	S_a =				

SOURCE

NOTE: NO POTENTIAL FOR RELEASE MAY BE SCORED. IF AN OBSERVED RELEASE IS SCORED, COMPLETE BELOW. UNKNOWN DATA FOR REMAINING FACTORS MUST RECEIVE THE LOWEST NON-ZERO SCORE AND SHOULD BE NOTED AS DEFAULT.

NOTES

OBSERVED RELEASE

CONT.	D.L.	WASTE SAMPLE	UPWIND #	DOWNWIND #

SOURCE: _____

PREPARED BY [redacted]

DATE 12/8/88

REVIEWED BY [redacted]

DATE 2/6/89

CONFIDENTIAL

PRELIMINARY HRS SCORE

DATE: 12/8/88

BASED ON: ☐ PA ☒ RECON. ☐ SI

FOR Darby Creek Tank Farm

TDD F3 - 8811-22

EPA NO. 788

ORIGINAL (Red)

PFE

	S	S^2
Groundwater Route Score (S_{gw})	4.49	20.16
Surface Water Route Score (S_{sw})	12.31	151.54
Air Route Score (S_a)		
$S_{gw}^2 + S_{sw}^2 + S_a^2$		171.70
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		13.1
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		7.57

NOTES:

DEFAULT VALUES:

(LIST THOSE FACTORS FOR WHICH DEFAULT VALUES WERE APPLIED)

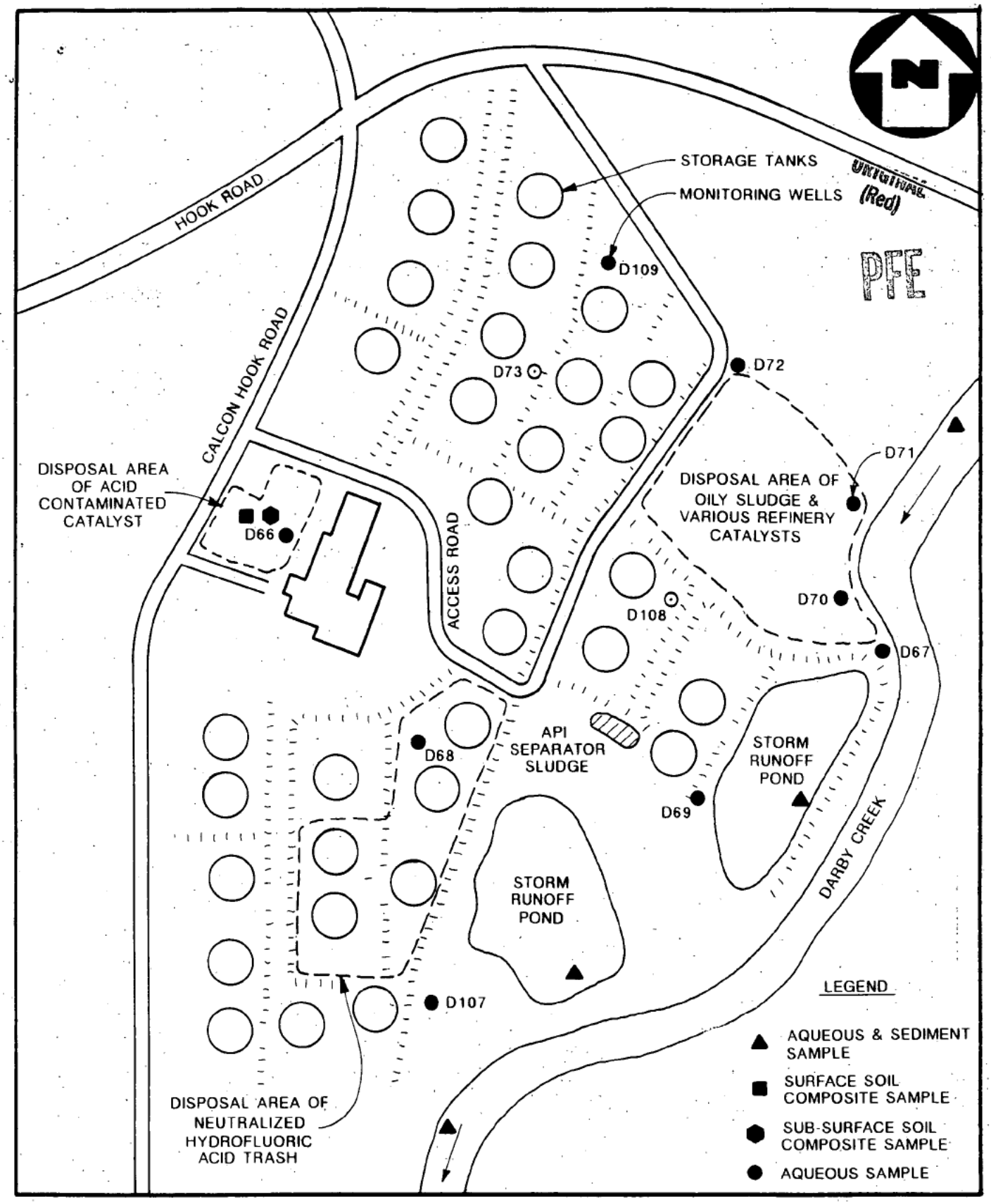
Ground water use - there are no known private wells in the study area.
No munic well supplies in study area.

PREPARED BY [redacted] Not responsive due to revised scope

DATE 12/8/88

REVIEWED BY [redacted] Not responsive due to revised

DATE 2/6/89



PROPOSED SAMPLE LOCATIONS

GULF OIL DARBY CREEK TANK FARM, DARBY, PA

(NO SCALE)

NUS CORPORATION