SHELL OIL CO-DEER PARK TX0000004871
DEER PARK TX NP CO VOL 03
2078 .TX0004871 0003
SHELL OIL CO-DEER PARK
DEER PARK TX

00000000091339 WA/NP/EN

9101136

TX0004871
Lebra
①

Study Title

Short-Term Chronic Toxicity of Outfall R-007 Effluent from
Shell Refinery Company - Deer Park
To the Mysid (*Mysidopsis bahia*)
Under Static-Renewal Test Conditions

TEST INVALID

Performed For
Shell Refinery Company
P.O. Box 100, ECB #123
Deer Park, Texas 77536

Put in
Accordion
folder

Project Officer
Roy Garza

Author
Neil A. Rodrigue, M.S.

Study Period
'ember 2001 to 19 November 2001

Performing Laboratory

STILLMEADOW
INCORPORATED

Environmental Toxicology Laboratory
12852 Park One Drive
Sugar Land, TX 77478

Telephone: (281) 240-8828
Fax: (281) 240-8448

Project Number
01-227-046

STATEMENT OF PROCEDURAL COMPLIANCE

I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. The information contained herein is accurate and complete.

Neil A. Rodrigue — 10 Jan 02

Neil A. Rodrigue, M.S. — Date

STATEMENT OF QUALITY ASSURANCE

The test data were reviewed to assure that the study was performed in accordance with published guidelines and standard operating procedures. This report is an accurate reflection of the raw data.

Hernan Hernandez — 09 JAN 02

Reviewer — Date

EXECUTIVE SUMMARY

Objective	The objective of this study was to determine the toxicity of Outfall R-007 samples submitted by Shell Refinery Company to the mysid, *Mysidopsis bahia.*			
Permit Number	TX000471, 00403			
Study Director	Neil A. Rodrigue, M.S.			
Test Type	7-Day Static Renewal Short Term Chronic Toxicity Test			
Test Method	U.S. Environmental Protection Agency (EPA/600/4-91/003) (1994) Method 1007.0			
Test Dates (Times)	12 November 2001 (1710) to 19 November 2001 (1510)			
Test Substance	Outfall R-007			
Dilution Water	Synthetic Seawater			
Test Concentrations	3%, 5%, 6%, 8%, 11% (Critical Concentration 8%)			
Source of Organisms	STILLMEADOW, Inc. Culture Laboratory			
Age of Test Organisms	7 days			
Test Acceptability	**Parameter**		**Test Data**	**EPA Criterion**
	Survival	Control	75%[1]	≥80%
		Control CV[2]	31.07%	≤40%
		Low Flow CV	9.75%	≤40%
	Growth	Control	N/A[2]	≥0.20 mg
		Control CV	N/A[2]	≤40%
		Low Flow CV	N/A[2]	≤40%
Test Results	**Parameter**		**Critical Conc.**	**NOEC[3] Test Solution**
	Survival		Invalid	
	Growth		Invalid	

[1]Test Invalid. Control survival did not meet minimum criterion.
[2]Not Applicable. Growth data not analyzed due to control survival invalidating the test.
[3]NOEC = No Observed Effect Concentration

1.0 INTRODUCTION

The objective of this study was to determine the chronic toxicity to *Mysidopsis bahia* of Outfall R-007 samples submitted by Shell Refinery Company. All original data, laboratory notebooks, and associated documentation are archived by STILLMEADOW, Inc.'s Environmental Toxicology Laboratory.

2.0 CHARACTERISTICS OF TEST SUBSTANCE AND DILUTION WATER

2.1 Test Substance

Three 24-hour composite effluent samples were used for testing. Copies of chain of custody records are included in Appendix A of this report. Upon sample arrival at STILLMEADOW, Inc., chemical and physical parameters were measured and recorded. Copies of the sample check-in forms and chemical analysis forms (if additional chemistries were requested) can be found in Appendix B.

2.2 Dilution Water

Dilution water was synthetic seawater prepared according to USEPA (1994) guidelines. Initial characterization of the dilution water is given in Table 1.

Table 1. Chemical characterization of dilution water.

Batch/Sample #	pH (SU)	Salinity (ppt)	Ammonia (mg/L NH_3N)	Total Residual Chlorine (mg/L)
QA01104	8.0	26	<0.1	<0.05

3.0 TEST CONDITIONS

The 7-day short-term chronic test using *Mysidopsis bahia* and subsequent data analyses were carried out according to procedures specified by USEPA (1994) guidelines and STILLMEADOW, Inc. Environmental Toxicology Laboratory's Standard Operating Procedures. Table 2 lists a summary of the test conditions.

Table 2. Summary of test conditions.

Organism lot #	AE010869
Organism age	7 days
Organisms per replicate	5
Replicates per concentration	8
Volume of test solution	150 mL
Test chamber	266-mL polystyrene beaker
Test temperature	26±1°C
Test duration	7 days
Dissolved oxygen	≥4.0 mg/L
Photoperiod	16 L/ 8 D
Light intensity	50 – 100 ft c
Feeding regimen	twice daily

Test solutions (solutions for test renewals) were prepared daily at the STILLMEADOW, Inc. Environmental Toxicology Laboratory. The solutions were used for the renewals the day they were prepared.

Dissolved oxygen, salinity, pH, and temperature were measured in each treatment at the beginning and end of each 24-hour exposure period. Chamber temperature was also monitored continuously and recorded on a circular chart. Aeration was not employed.

Test solutions were renewed by gently pouring old solutions out of the test beakers and replacing with new test solutions. During the renewal the larvae remained in the beaker along with approximately 20% of the old test solution.

At test initiation, at each renewal, and at test termination, the total number of live mysids was recorded for each test chamber. The unpreserved mysids from each test beaker were transferred to tared weigh boats at test termination and dried at 105°C for a minimum of 6 hours. The dried mysids were weighed to the nearest 0.001 mg for determination of growth effects.

Daily survival counts, water chemistry measurements, and raw weight data are included in Appendix C.

4.0 DATA ANALYSIS

The data set included for this study did not undergo statistical analyses due to the low survival in the control that invalidated all results. All valid data is analyzed according to the statistical flow chart outlined in the EPA chronic testing manual (USEPA 1994).

TOXSTAT Version 3.5 (West, Inc. and Gulley 1996) is normally used for all statistical evaluations. Survival and growth data are analyzed using hypothesis-testing techniques.

5.0 RESULTS

Survival and growth (mean dry weight) data for test organisms are provided in Table 3. Survival and mean dry weight at each concentration were not compared to survival and weight of the control to determine statistically significant effects. The results of these comparisons are given in Table 4.

Table 3. Survival and mean dry weight for *M. bahia* exposed to test solutions for 7 days.

Treatment (% Effluent)	Percent Survival (by day)				Dry Weight				Significant Effect Relative to Control	
					Original # of mysids		Surviving # of mysids			
	1	2	7	CV (%)	Mean (mg)	CV (%)	Mean (mg)	CV (%)	Survival	Mean Dry Weight
0 (Control)	100	100	75[1]	31.07	N/A[2]	N/A	N/A	N/A		
3	100	100	90	16.80	N/A	N/A	N/A	N/A	N/A[2]	N/A
5	98	98	93	11.19	N/A	N/A	N/A	N/A	N/A	N/A
6	98	98	85	16.64	N/A	N/A	N/A	N/A	N/A	N/A
8	100	100	95	9.75	N/A	N/A	N/A	N/A	N/A	N/A
11	100	100	100	0.00	N/A	N/A	N/A	N/A	N/A	N/A

[1]Test Invalid. Control survival did not meet minimum criterion.
[2]N/A = Not Applicable. Data unable to be analyzed for significance.

Table 4. Summary of Statistical Endpoints.

Endpoint	Value (percent effluent)
Survival NOEC (No Observed Effect Concentration)	Invalid
Growth NOEC	Invalid

6.0 REFERENCE TOXICANT TEST RESULTS

STILLMEADOW, Inc. conducts routine standard reference toxicant testing using *Mysidopsis bahia* obtained from STILLMEADOW, Inc. cultures. Copper sulfate is used as the reference toxicant with synthetic seawater as the dilution water; the test method followed is USEPA method 1007.0 (USEPA, 1994). A copy of STILLMEADOW, Inc.'s most recent standard reference toxicant control chart is presented in Appendix D.

7.0 STUDY DEVIATIONS

The third effluent sample was received outside the prescribed temperature guidelines of 1-4°C. This deviation is not thought to have had an adverse affect on the outcome of the study. No other deviations from the prescribed guidelines or standard operating procedures were identified during the study.

8.0 REFERENCES

U.S. Environmental Protection Agency (USEPA). 1994. *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms*. Second Edition. EPA/600/4-91/003.

West, Inc. and D.D. Gulley. 1996. TOXSTAT Version 3.5. Western EcoSystems Technology, Inc. Cheyenne, Wyoming.

APPENDIX A

Chain of Custody Forms

CHAIN OF CUSTODY RECORD

Client/Project Name: Shell Oil Company

Project Location: R-007 Outfall - Deer Park Refinery

Project No.: MESA 021698-JJG/087251

Field Logbook No.:

Sampler: (Signature) Gary Bayn

Chain of Custody Tape No.:

ANALYSES

Sample No./ Identification	Start Date	Start Time	Finish Date	Finish Time	Lab Sample Number	Type of Sample	24 hr. Acute Mysid	24 hr. Acute Menidia	Chronic Mysid	Chronic Menidia		REMARKS
R-007	11/11/01	0300	11/12/01	0300	Q10792.01	24 hr. Composite	X	X	X	X		

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Gary Bayn	11-12-01	0300	Odie Dai	11-12-01	0300
Odie Dai	11-12-01	0320	Ronnie L. Turpen	11-12-01	0700
Ronnie L. Turpen	11-12-01	1055	[illegible]	11-12-01	12:20

Sample Disposal Method:

Disposed of by: (Signature) Date Time

SAMPLE COLLECTOR

STILLMEADOW, Inc.
Environmental Toxicology Laboratory
10161 Harwin Drive, Suite 150
Houston, Texas 77036
713-272-7444

ANALYTICAL LABORATORY

STILLMEADOW INCORPORATED

CHAIN OF CUSTODY RECORD

Client/Project Name: Shell Oil Company

Project Location: R-007 Outfall-Deer Park Refinery

Project No.: MESA 021698-JJG / 087251

Field Logbook No.:

Sampler: (*Signature*)

Chain of Custody Tape No.:

ANALYSES

Sample No./ Identification	Start Date	Start Time	Finish Date	Finish Time	Lab Sample Number	Type of Sample	24hr. Acute Mysid	24 hr. Acute Menidia	Chronic Mysid	Chronic Menidia		REMARKS
R-007	11/13/01	0300	11/14/01	0300	Q10792.02	24 hr. Composite	X	X	X	X		

Relinquished by: (*Signature*)	Date	Time	Received by: (*Signature*)	Date	Time
Jon Kelley	11-14-01	0245	Bill Kroll	11-14-01	0245
Bill Kroll	11-14-01	03:55	Ronnie L. Turpen	11-14-01	0700
Ronnie L. Turpen	11-14-01	1015	[illegible]	14 NOV 01	1015

Sample Disposal Method:

Disposed of by: (*Signature*)

Date:

Time:

SAMPLE COLLECTOR

STILLMEADOW, Inc.
Environmental Toxicology Laboratory
10161 Harwin Drive, Suite 150
Houston, Texas 77036
713-272-7444

ANALYTICAL LABORATORY

STILLMEADOW
INCORPORATED

CHAIN OF CUSTODY RECORD

Client/Project Name: Shell Oil Company

Project Location: R-007 Outfall - Deerpark Refinery

Project No.: MESA 021698-JJG/087251

Field Logbook No.:

Sampler: (*Signature*)

Chain of Custody Tape No.:

ANALYSES

Sample No./ Identification	Start Date	Start Time	Finish Date	Finish Time	Lab Sample Number	Type of Sample	24hr. Acute Mysid	24hr. Acute Menidia	Chronic Mysid	Chronic Menidia		REMARKS
R-007	11/15/01	0300	11/16/01	0300	Q10792.03	24hr. Composite	X	X	X	X		

Relinquished by: (*Signature*)	Date	Time	Received by: (*Signature*)	Date	Time
Jan Kelley	11-16-01	0245	Bill Knoll	11-16-01	0245
Bill Knoll	11-16-01	03:05	[illegible]	11/16/01	0710
[illegible]	11/16/01	1100	[illegible]	16 Nov 01	1100

Sample Disposal Method:

Disposed of by: (*Signature*) Date Time

SAMPLE COLLECTOR

STILLMEADOW, Inc.
Environmental Toxicology Laboratory
10161 Harwin Drive, Suite 150
Houston, Texas 77036
713-272-7444

ANALYTICAL LABORATORY

STILLMEADOW INCORPORATED

APPENDIX B

Chemical and Physical Parameters of Effluent Samples

STILLMEADOW, Inc. ENVIRONMENTAL TOXICOLOGY LABORATORY
Test Reference & Control Substance Receipt & Inventory Log

Project Number: 01-227-045/046	Sample No.: Q10792.01
Substance Name: R-007	Sponsor: Shell
Description: liquid	No./Size Containers: 1-5 gal
Amount Received: 5 gal	Lot/Batch/Set No. 1
Received By: BJ	Date/Time Received: 12 Nov 01 / 1220
Received From: K. Rodriguez	Condition: good
Shipper: STILLMEADOW, Inc. Other _____ (circle)	Bill of Lading No.: —
Storage Requirements: 1-4°C	Storage Location: 3
Comments:	

Parameters Upon Arrival:		Init./Date: BJ / 12 Nov 01
Salinity (ppt): 2	Meter #: 57	
PH (SU): 7.8	Meter #: 339	
Temp (°C): 3°	Meter #: 131	
Refrigerant: Frozen Thawed None (circle)	Ice Cubes or Igloo Ice (circle)	
DO (mg/L): 11.5	Meter #: 288	
Cond. (µmhos/cm): 1300	Meter #: 289	
Initial TRC: 0.02	Meter #: 303	
Amount Na_2SO_3 Added:		
Post Dechlorination TRC:	Meter #:	
Chemistry Sample List:	Y or N (circle)	
Black Spots:	Y or N (circle)	
Foul Smell:	Y or N (circle)	
OSG & Block: —		
Preserved with Nitrogen:	Y or N (circle)	

Notes:

Signature: Brian Myffist

STILLMEADOW, Inc. ENVIRONMENTAL TOXICOLOGY LABORATORY

Test Reference & Control Substance Receipt & Inventory Log

Project Number: 01-227-045/046	Sample No.: Q10792.02
Substance Name: R-007	Sponsor: Shell
Description: liquid	No./Size Containers: 1-5 gal
Amount Received: 5 gal	Lot/Batch/Set No. 2
Received By: BS	Date/Time Received: 14Nov01 1015
Received From: K. Rodriguez	Condition: good
Shipper: STILLMEADOW, Inc. Other _____ (circle)	Bill of Lading No.: —
Storage Requirements: 1-4°C	Storage Location: 3
Comments:	

Parameters Upon Arrival:		Init./Date: BS 14Nov01
Salinity (ppt): 3	Meter #: 57	
PH (SU): 8.52 ①	Meter #: 339	
Temp (°C): 3°	Meter #: 131	
Refrigerant: Frozen Thawed None (circle)	Ice Cubes or Igloo Ice (circle)	
DO (mg/L): 11.6	Meter #: 289	
Cond. (µmhos/cm): 1200	Meter #: 289	
Initial TRC: 0.03	Meter #: 303	
Amount Na_2SO_3 Added:		
Post Dechlorination TRC:	Meter #:	
Chemistry Sample List:	Y or N (circle)	
Black Spots:	Y or N (circle)	
Foul Smell:	Y or N (circle)	
OSG & Block: —		
Preserved with Nitrogen:	Y or N (circle)	

Notes: ① BS 14Nov01 1E

Signature: Brandy Reppert

STILLMEADOW, Inc. ENVIRONMENTAL TOXICOLOGY LABORATORY

Test Reference & Control Substance Receipt & Inventory Log

Project Number: 01-227-045/046	Sample No.: Q10792.03
Substance Name: R-007	Sponsor: SHELL
Description: LIQUID	No./Size Containers: 1-5gal
Amount Received: 5gal	Lot/Batch/Set No. 3
Received By: MSR	Date/Time Received: 16NOV01/1530
Received From: KR	Condition: GOOD
Shipper: (STILLMEADOW) Inc. Other _____ (circle)	Bill of Lading No.: —
Storage Requirements: 1-4°C	Storage Location: B3
Comments:	

Parameters Upon Arrival:		Init./Date: MSR/16NOV01
Salinity (ppt): 5	Meter #: 57	
PH (SU): 7.2	Meter #: 339	
Temp (°C): 5	Meter #: 131	
Refrigerant: (Frozen) Thawed None (circle)	Ice Cubes or Igloo Ice (circle)	
DO (mg/L): ① ~~11.7~~ 12.0	Meter #: 288	
Cond. (µmhos/cm): 1300	Meter #: 289	
Initial TRC: 0.00	Meter #: 303	
Amount Na_2SO_3 Added:		
Post Dechlorination TRC:	Meter #: —	
Chemistry Sample List:	Y or (N) (circle)	
Black Spots:	Y or (N) (circle)	
Foul Smell:	Y or (N) (circle)	
OSG & Block:	—	
Preserved with Nitrogen:	Y or (N) (circle)	

Notes: ① MSR 16NOV01 1E

Signature: Mel Rowin

APPENDIX C

Laboratory Notebook with Water Quality Parameters

Mysidopsis bahia 7-DAY STATIC RENEWAL CHRONIC TOXICITY TEST

Test Information Summary

Protocol/Guideline	EPA / 600 / 4-91 / 003	Organism Age	7 days
TNRCC Permit Number	00402	Organisms per Replicate	5
EPA Permit Number	TX0004863	Number of Replicates	8
Test Substance	Outfall R-007	Feeding Frequency	Twice daily
Diluent	Synthetic seawater	Test Salinity	25±2 ppt
Test Chambers	266 mL	Test Temperature	26±1°C
Solution Volume	150 mL	**CHEMICAL ANALYSES**	**FREQUENCY**
Environmental Chamber ID	Chamber A		
Sample 1 Receive Date	12Nov01		
Sample 2 Receive Date	14Nov01		
Sample 3 Receive Date	16Nov01		

Test Substance Concentrations

Test Concentrations	3%, 5%, 6%, 8%, 11%

Special Procedures and Considerations

Notebook Approved By:	**Date:**

Data Verification of Completed Notebook

	Laboratory Staff	Study Director	Quality Assurance
Initials	BJ	[illegible]	
Date	21NOV01	26Nov01	

Test Substance (Sample) Information Log

	Sample 1	Sample 2	Sample 3	Sample 4
Sample ID	Q10792.02 ①	Q10792.02	Q10792.03	
Sample Expiration for Test Initiation	13NOV01 1500	Not Applicable	Not Applicable	Not Applicable
Sample Expiration for Test Renewal	15NOV01 1500	17NOV01 0300	19NOV01 0300	
Sample Aliquoted (Initials/Time/Date)	JT/1505/12NOV01	BJ/1339/14NOV01	MSR/1730/16NOV01	
Diluent ID	QA01104	QA01104	QA01104	
Control ID	QA01104	QA01104	QA01104	
Initial/Time/Date Sample Used in Test	JT/1530/12NOV01	JT/0815/15NOV01	MSR/1005/17NOV01	
	JT/0800/13NOV01	JT/0816/16NOV01	MSR/0952/18NOV01	
	JT/0805/14NOV01			
	~~JT/0815/15NOV01~~ ②			

① JT 12NOV01 JE
② JT 15NOV01 JE

Preparation of Test Solutions

Concen-tration	Sample Volume	Diluent Volume	Total Volume	Sample Volume	Diluent Volume	Total Volume	Sample Volume	Diluent Volume	Total Volume
0%	0	3500	3500	0	3000	3000			
3%	105	3395	3500	90	2910	3000			
5%	175	3325	3500	150	2850	3000			
6%	210	3290	3500	180	2820	3000			
8%	280	3220	3500	240	2760	3000			
11%	385	3118	3500	330	2670	3000			
TOTAL	1155			990					
I/T/D[1]	JT/1530/12NOV01								
I/T/D[1]	~~JT/0500/13NOV01~~ ①			JT/0500/13NOV01					
I/T/D[1]	~~JT/0800/14NOV01~~ ①			JT/0800/14NOV01					
I/T/D[1]				JT/0815/15NOV01					
I/T/D[1]				JT/0830/16NOV01					
I/T/D[1]				MSR/0946/17NOV01					
Calculation Check I/T/D[1]	BM / 1105 / 26NOV01			MSR/0940/18NOV01 BM / 1105 / 26NOV01			/ /		

Test Organism Randomization

Organism Lot Number / Organism Source	AE010869 / SM
Initials	JT
Time	1637
Date	12NOV01

Test Feeding Log

Day	Food Volume a.m.	Food Volume p.m.	Food Concentration	1st Feeding (I/T/D)[1]	2nd Feeding (I/T/D)[1]
0	1 Drop	2 Drops	Concentrated artemia		BM 1745 12NOV01
1	1 Drop	2 Drops	Concentrated artemia	BM 0745 13NOV01	JT 1715 13NOV01
2	1 Drop	2 Drops	Concentrated artemia	JT 0800 ① ~~15NOV01~~ 14NOV01	BM 1656 14NOV01
3	1 Drop	2 Drops	Concentrated artemia	JT ~~1625~~ 0800① 15NOV01	JT 1625 15NOV01
4	1 Drop	2 Drops	Concentrated artemia	JT 0800 16NOV01	JT 1700 16NOV01
5	1 Drop	2 Drops	Concentrated artemia	MSR 0824 17NOV01	MSR 1647 17NOV01
6	1 Drop	2 Drops	Concentrated artemia	MSR 0818 18NOV01	MSR 1542 18NOV01
7	1 Drop	2 Drops	Concentrated artemia	MSR 0814 19NOV01	

[1]I/T/D = Initials/Time/Date

① JT 14NOV01 IE

Daily Survival Counts

Conc.	Rep.	Number of Surviving Organism								Comments
		Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	
0%	A	5	5	5	5	4	3	3	3	
	B	5	5	5	5	5	5	5	5	
	C	5	5	5	5	5	5	5	5	
	D	5	5	5	5	4	4	4	4	
	E	5	5	5	5	2	2	2	2	
	F	5	5	5	5	3	3	3	3	
	G	5	5	5	5	5	5	5	5	
	H	5	5	5	5	5	3	3	3	
3%	A	5	5	5	5	5	5	5	5	
	B	5	5	5	5	5	5	5	5	
	C	5	5	5	5	3	3	3	3	
	D	5	5	5	5	5	5	5	5	
	E	5	5	5	5	5	5	5	5	
	F	5	5	5	5	5	5	5	4	
	G	5	5	5	5	5	5	5	5	
	H	5	5	5	5	5	5	5	4	
5%	A	5	5	5	5	5	5	4	4	
	B	5	5	5	5	5	5	5	5	
	C	5	5	5	5	5	5	5	5	
	D	5	5	5	5	5	5	5	5	
	E	5	5	5	5	5	5	5	5	
	F	5	4	4	4	4	4	4	4	
	G	5	5	5	5	5	5	5	5	
	H	5	5	5	5	5	5	5	4	
6%	A	5	5	5	5	5	5	4	4	
	B	5	5	5	5	5	5	5	5	
	C	5	4	4	4	4	4	4	4	
	D	5	5	5	5	4	4	4	4	
	E	5	5	5	5	5	5	5	5	
	F	5	5	5	5	5	4	4	4	
	G	5	5	5	5	5	5	5	5	
	H	5	5	5	5	4	4	4	3	
8%	A	5	5	5	5	5	5	5	5	
	B	5	5	5	5	4	4	4	4	
	C	5	5	5	5	5	5	5	5	
	D	5	5	5	5	5	5	5	5	
	E	5	5	5	5	5	5	5	5	
	F	5	5	5	5	5	5	5	5	
	G	5	5	5	5	5	5	5	5	
	H	5	5	5	5	4	4	4	4	

Daily Survival Counts (Continued)

Conc.	Rep.	Number of Surviving Organism								Comments
		Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	
11%	A	5	5	5	5	5	5	5	5	
	B	5	5	5	5	5	5	5	5	
	C	5	5	5	5	5	5	5	5	
	D	5	5	5	5	5	5	5	5	
	E	5	5	5	5	5	5	5	5	
	F	5	5	5	5	5	5	5	5	
	G	5	5	5	5	5	5	5	5	
	H	5	5	5	5	5	5	5	5	
	A									
	B									
	C									
	D									
	E									
	F									
	G									
	H									
	A									
	B									
	C									
	D									
	E									
	F									
	G									
	H									
Initials		JT	JT	JT	MSR	JT	MSR	MSR	JT	
Time		1110	1025	1020	1105	1250	1142	1331	1510	
Date		12NOV01	13NOV01	14NOV01	15NOV01	16NOV01	17NOV01	18NOV01	19NOV01	

Additional Notes:

Test Solutions Physical Parameter Measurements

Conc.	Day 0	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7
	Dissolved Oxygen (mg/L)													
	New	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	Old
0%	6.8	6.6	7.0	6.9	6.8	6.8	6.4	6.5	6.3	6.8	5.6	6.7	5.6	5.2
3%	6.7	6.7	7.0	6.8	6.4	7.0	6.4	6.5	6.3	6.8	5.6	6.8	5.4	5.2
5%	6.7	6.7	7.0	6.8	6.4	6.8	6.2	6.5	6.2	6.8	5.6	6.8	5.4	5.0
6%	6.7	6.7	6.9	6.8	6.4	6.8	③ 6.2	6.5	6.2	6.8	5.6	6.5	5.4	5.0
8%	6.7	6.6	6.9	6.8	6.8	6.8	6.4	6.5	6.4	6.8	5.4	6.5	5.4	4.8
11%	6.6	6.7	6.8	6.7	6.6	6.8	6.4	6.4	6.4	6.8	5.4	6.5	5.2	4.8
Meter	288	288	288	288	288	288	288	288	288	288	288	288	288	288
	pH (standard units)													
0%	7.6	7.7	7.4	7.5	7.7	① 7.9	7.4	7.5	7.2	7.6	7.6	7.5	7.5	7.4
3%	7.6	7.6	7.4	7.5	7.7	7.9	7.4	7.5	7.2	7.6	7.6	7.5	7.5	7.4
5%	7.6	7.6	7.4	7.5	7.6	7.9	7.4	7.5	7.2	7.6	7.6	7.5	7.5	7.4
6%	7.6	7.6	7.4	7.5	7.6	7.9	7.4	7.5	7.2	7.6	7.6	7.5	7.5	7.4
8%	7.6	7.6	7.4	7.5	7.6	7.9	7.4	7.5	7.2	7.6	7.6	7.5	7.5	7.4
11%	7.6	7.6	7.4	7.5	7.6	7.9	7.4	7.5	7.2	7.6	7.6	7.5	7.5	7.4
Meter	339	339	339	339	339	339	339	339	339	339	339	339	339	339
	Salinity (parts per thousand)													
0%	25	26	26	26	26	26	27	25	27	26	27	26	27	27
3%	25	26	26	26	26	26	27	26	27	26	27	26	28	28
5%	25	26	26	26	26	26	27	26	27	26	27	26	28	28
6%	25	26	26	26	26	26	27	25	27	26	28	26	28	28
8%	25	26	26	26	26	26	27	25	27	26	28	26	28	28
11%	25	26	26	26	26	26	27	25	27	26	28	26	28	28
Meter	57	57	57	57	57	57	57	57	57	57	57	57	57	57
	Temperature (°Centigrade)													
0%	22 ⑥	26	26	25	26	26	26	26	26	25	26	25	26	26
3%	22	26		25		26		26		25		25		
5%	22	26		25		26		26		25		25		
6%	22	26		25		26		26		25		25		
8%	22	26		25		26		26		25		25		
11%	22	26		25		26		26		25		25		
Meter	131	131	44	131	44	131	44	131	44	131	44	131	44	44
Initials	JT/MSR	JT RG	MSR	JT RG	JT	JT RG	MSR	RG	JT	MSR	MSR	MSR	MSR	MSR
Time	1615	0854	1115	0908	1100	0911	1302	0945	1330	1036	1428	1047	1352	1655
Date	12NOV01	13NOV01	13NOV01	14NOV01	14NOV01	15NOV01	15NOV01	16NOV01	16NOV01	17NOV01	17NOV01	18NOV01	18NOV01	19NOV01

Old solution temperature readings are recorded from chamber thermometer.

Additional Notes:

⑥ Temp. warmed up to 26°C in chamber

① RG 15NOV01 IE

③ MSR 15NOV01 IE

Organism Drying Times

	Placed Into Oven	Removed From Oven
Initials	JT	JT
Time	1605	0740
Date	19NOV01	20NOV01
Oven Number	320	

Dry Weight Measurements

Boat Cell Number	Concentration	Replicate	Tare Weight (mg)	Gross Weight (mg)
1	0%	A	7.228	8.084
2		B	6.583	7.812
3		C	5.665	7.112
4		D	6.569	7.699
5		E	6.410	7.047
6		F	7.027	7.759
7		G	7.278	8.662
8		H	6.469	7.311
9	3%	A	6.594	8.026
10		B	7.396	8.332
11		C	8.520	9.224
12		D	5.845	7.037
13		E	6.245	7.315
14		F	6.739	8.267
15		G	6.884	7.989
16		H	6.242	7.748
17	5%	A	7.201	8.301
18		B	6.918	8.384
19		C	6.912	8.307
20		D	7.101	8.329
21		E	7.069	8.488
22		F	6.053	6.830
23		G	6.437	7.541
24		H	6.665	① ~~7.899~~ 800
25	6%	A	6.394	7.375
26		B	6.308	7.840
27		C	6.997	8.057
28		D	6.785	7.762
29		E	6.656	8.184
30		F	6.639	② 7.5014
31		G	7.165	8.625
32		H	6.557	7.468
33	8%	A	6.697	② 8.0067.9
34		B	6.201	7.230
35		C	7.091	8.469
36		D	7.805	9.058
37		E	7.063	8.246
38		F	5.908	7.314
39		G	6.143	7.433
40		H	6.216	7.385

① JT 21NOV01 IE

Dry Weight Measurements (Continued)

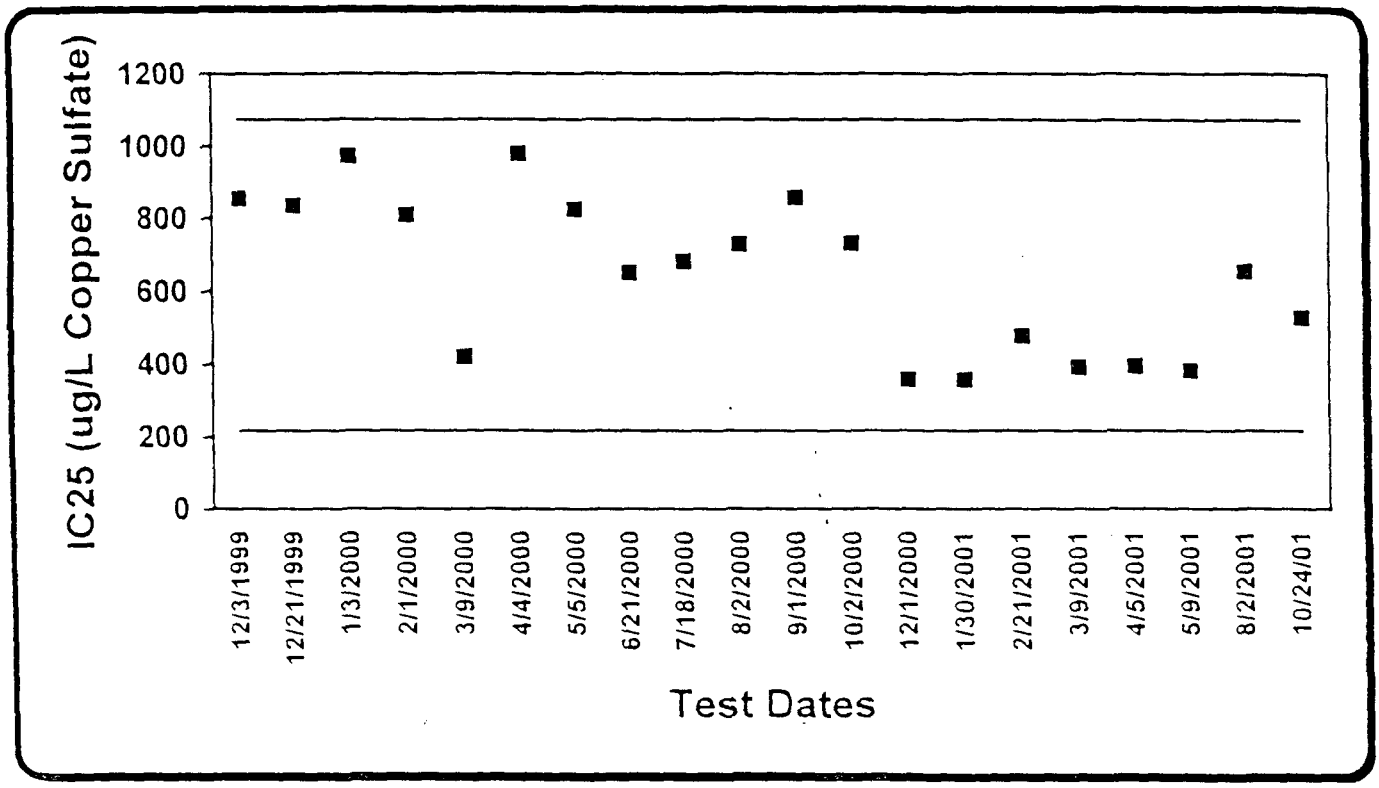
Boat Cell Number	Concentration	Replicate	Tare Weight (mg)	Gross Weight (mg)
41	11%	A	6.617	7.838
42		B	6.190	7.540
43		C	7.605	8.616
44		D	6.526	8.216
45		E	6.564	7.904
46		F	6.471	7.846
47		G	6.780	8.356
48		H	8.224	9.524
		A		
		B		
		C		
		D		
		E		
		F		
		G		
		H		
		A		
		B		
		C		
		D		
		E		
		F		
		G		
		H		
Boat ID ⇓	Balance ID ⇒		251	251
	Initials ⇒		MSR	JT
K	Time ⇒		1102	1009
	Date ⇒		19 NOV 01	21 NOV 01

APPENDIX D

Standard Reference Toxicant Control Chart

Mysidopsis bahia Chronic Standard Reference Toxicant Control Chart

IC25 (*u* g/L Copper Sulfate)



TX 4871

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

RECEIVED
AUG 5 1992
6W-EA

TX 4871

June 26, 1992

MEMORANDUM

SUBJECT: Report from the TRRP Multi-media Inspection at Shell, Deer Park

FROM: Michael T. Michaud
Acting Chief
Surveillance Branch (6E-S)

TO: Addressees

Attached to this memorandum is the copy of the report from the category of individual inspection for your respective program that was conducted during the TRRP Multi-media Inspection at the Shell - Deer Park Manufacturing Complex. Also with the report is a copy of the Executive Summary from the multi-media inspection. You will also find attached materials that could not be easily copied by the copy room or are originals of material that were collected during the inspection. The latter items are necessary for your program's files. A full copy of the multi-media report is being sent to ORC and the State. After the review of the report by ORC, all or parts of the report will be sent to Shell. If you have any questions concerning the report please contact me or Walt Helmick at ext. 6491.

1 - Permit/CD
2 - AO & AO matl
3 - DMR's
4 - Vio. Sum. Log
5 - NCR
6 - Correspondence
7 - CRAS
Date Filed
Clerk's Inits.

ADDRESSEES:

J. Hepola (6T-E)
R. Hartung (6W-E)
T. Love (6W-S)
R. Brown (6H-C)
C. Gazda (6E-E)
B. Murphy (6T-P)
B. Stokes (6C-M)
N. Thomas (6E-F)
S. Coleman (6H-A)

Printed on Recycled Paper

EXECUTIVE SUMMARY

This summary will discuss the schedule and findings of the Multi-media inspection at the Shell - Deer Park Manufacturing Complex (DPMC) in Deer Park, Texas. This inspection is the final scheduled multi-media inspection in the Toxic Release Reduction Project (TRRP). The TRRP was begun in 1990 and it involved multi-media inspections at five facilities in Texas and two in Louisiana. This purpose of the TRRP was to use multi-media (multi-program) inspections at the selected facilities with the ultimate goal of reducing toxic emissions.

The Multi-Media Inspection Scheme and Outline

The inspection at Shell DPMC was conducted in two phases. The first phase (Phase A) took place from December 9 to December 16, 1991 with no inspections being conducted on Sunday, December 15, 1992. The second phase (Phase B) took place from January 13 to 17, 1992. The Phase A portion of the inspection involved individual program inspections in twelve program categories. These categories are as follows:

- RCRA Permitted Facility Compliance Evaluation (PCE)
- RCRA Ground Water and Corrective Action
- NPDES Compliance Inspection and Sampling
- TWC Annual Compliance Inspection for Industrial Wastewater Discharge
- Air Media Programs (NSPS, NESHAP, SIP and State Permits)
- EPCRA Sections 301 - 312 and CERCLA 103(a)
- TSCA - PCB
- TSCA Sections 5 and 8
- Underground Injection Control (UIC)
- Wetlands
- Public Water Supply
- Spill Prevention Control and Countermeasures (SPCC)

The Phase B of the multi-media inspection consisted of the following inspection categories:

- RCRA Sampling
- Air Media Programs Sampling
- Underground Storage Tank (UST)
- EPCRA Section 313

This multi-media inspection report consists of the individual reports from these sixteen inspection categories. The SPCC inspection was conducted by members the Technical Assistance Team (TAT) who are employees of Environment and Ecology, Inc. under contract to the EPA. The SPCC report was forwarded directly to the SPCC program office in EPA Region 6 and is not included with this report. The findings of the SPCC inspection

are also not discussed in this Executive Summary. Also, during the Phase B of the inspection, an experimental device was used to monitor for the release of certain organic compounds to the atmosphere. This device is an Open-Path Fourier Transform Infrared (FTIR) Spectrometer. The investigation using this device was conducted by a team from Kansas State University under grant to EPA Region 7. The investigation was done at the request of EPA Region 6. The FTIR survey was not considered a formal inspection category for the multi-media inspection and its findings will not be reported here.

The inspection began on Monday, December 9, 1992 with an initial entry of seven EPA inspectors at approximately 0930 hrs. The inspectors met with John Holden and Jack Sowle with Shell and conducted an entrance briefing. During this entrance briefing, credentials were presented and the schedule for the inspection was discussed. At 1230 hrs. the initial team of inspectors was given a safety briefing by Chuck Vasek and Wayne Austin, with Shell's office for health and safety. This briefing was followed by a tour of the facility. The purpose of this tour was to review the health and safety conditions in the facility that would have an effect on the inspection.

The full inspection of the facility began on the next day, Tuesday, December 10, 1992. A briefing was conducted to make introductions, discuss the purpose of the inspection and discuss the schedule for the inspection. After the briefing, the Shell personnel were divided into groups to assist the inspectors and the individual inspection teams began their inspections. So that inspectors could have an appropriate facility contact for their individual inspection category, inspections were begun on different days. Some of the inspections were even delayed until the Phase B. The individual inspection reports should be consulted for the timing of the individual inspections.

During both phases of the inspection, a briefing was held each morning so that Shell management could be informed of each individual inspection's progress. Following the morning briefing, inspectors and their facility contacts met and continued with their inspection.

Exit briefings were held as each individual inspection was completed. The Shell personnel were informed of any potential violations and areas of regulatory concern at these exit briefings. They were also given an opportunity to discuss the findings with the inspector.

During the initial entrance briefing, Shell requested that photographs taken at the facility be considered Confidential Business Information (CBI) until they could review them. Walter Helmick collected the film from each inspector at the close of each inspection. Following the inspection, all the film was

processed and a copy of each print was sent to the facility for their review and determination of continued claim of confidentiality. A copy of the letter that was sent with the photographs and a copy of the facility's reply are attached to this summary. Shell decided that the claim of CBI was no longer necessary.

There was a large number of both EPA, State and Shell personnel who participated in this inspection. Each individual inspection report should be consulted for the participants who contributed to that inspection category. However, there were several people who did not participate in the individual inspections but who were involved in the multi-media inspection. These people are as follows:

EPA Region 6, Dallas TX

Walter Helmick, Lead Inspector	214/655-6491
Gerald Stokley, Regional Health & Safety Officer	214/655-6560

Shell - Deer Park Manufacturing Complex, Deer Park TX

Ron Kingsbury, General Manager	713/246-6887
John Holden, Manager Environmental Compliance	713/246-7667
Jack Sowle, Environmental Compliance	713/246-7667
Michael Hulse, Sr. Eng. Environmental Compliance	713/246-6480
T. M. Dossey, Superintendent, Facility Support	713/246-6489

In addition to the above listing of participants, Dale Burnett with the Field Operations Division of the Texas Water Commission spent several days observing the inspection.

The multi-media inspection was completed on January 17, 1992. A final exit briefing was begun at 1310 hrs. and was completed at 1338 hrs. All inspectors exited the facility at 1350 hrs.

Inspection Findings

The following is a list of potential violations and regulatory areas of concern. These findings are considered preliminary and may or may not constitute the violations that will be cited against Shell. The final determination of violations will be determined by the respective program office. Areas of concern may become violations after further evaluation.

A. Public Water Supply

No potential violations. The facility is working with the Texas Department of Health to correct any violations that were found during a previous inspection.

B. EPCRA Section 313

No potential violations were noted during the inspection. Shell will provide a written response to certain questions and requests within 15 days.

C. EPCRA Section 301 - 312 and CERCLA 103(a)

Shell failed to immediately report eight (8) releases over the last two years. This is a potential violation of the CERCLA 103(a) release notification requirements.

D. TSCA Sections 5 and 8

No potential violations were noted pending a review of older records.

E. Underground Storage Tanks (UST)

No potential violations of the EPA's UST regulations were found. The only area of concern was the failure of Shell to submit a signed and dated notification form to the Texas Water Commission (TWC). The notification form was submitted to TWC but it failed to have the necessary date and signature.

F. Wetlands

No potential violations or areas of concern were noted.

G. Underground Injection Control (UIC)

No potential violations were found. An area of concern is the chipped paint on the wellhead and annulus monitoring equipment and the areas of rust on the pre-injection facilities. It was recommended that these areas be cleaned and repainted.

H. NPDES Compliance Monitoring Inspection

No potential violations were found. One area of concern was that bubbles were noted in the BOD bottles. This was probably due to the mechanized system used to fill the bottles. The facility personnel were working to resolve the problem during the laboratory audit.

I. NPDES Laboratory Report

No potential violations or areas of concern were noted. Data collected in support of the Compliance Monitoring Inspection.

J. TWC Annual Compliance Report for Industrial Wastewater Discharge

No potential violations or areas of concern.

K. Air Media Programs - NSPS, NESHAP and SIP Report

40 CFR 61.246-6. Open-ended Valves in NESHAP Service. One 1"-valve on the Benzene Column V908 located in the Aromatics Concentration Unit was found to be open-ended.

40 CFR 61.247(b)(2). Semi-annual NESHAP Report. Monitoring for the month of March 1991 in the Aromatics Unit was not included in the report.

40 CFR 61.247(b)(2)(i). Semi-annual Report. Report indicates that 130 valves in the Aromatics Unit were found to be leaking. Records indicate that 130 valves were monitored.

40 CFR 61.247(b)(2)(iv). Semi-annual Report. Two pumps in the Distribution Area were found to be leaking and not repaired within 15 days. These two pumps were not included in the Semi-annual Report.

TACB 115.251-4. Open-ended Valves. Two-inch valve 0820L and one-inch valve 0819L, located in the butadiene unit BD-II were found to open-ended.

L. Air Media Programs - State Permits Review

The facility appears to be in compliance with most TACB permits although there are some areas of concern. One area of concern is with the analyses being conducted of the waste feed to the incinerators. No documentation was provided by TWC or TACB that demonstrated that the facility did not have to verify that

bromine, fluorine or 40 CFR Part 261 Appendix VIII constituents were not present. Regulation VI, Rule 116.4 (TACB) requires compliance with Permit Provisions. The Bio-solids incinerator Hw500099-001 waste feed is not being analyzed for these compounds.

Another area of concern is with the regulation NSPS 60.18 (Flares) Method 22. Even though the facility is now in compliance, it has in the past been out of compliance and Shell signed an agreement on December 9, 1991 to come into compliance.

M. Air Media Programs - NESHAP Asbestos Inspection

No potential violations were found but several areas of concern were noted. One area of concern is that the barricade tape used by the facility should be the appropriate asbestos warning sign instead of the banner-type now in use. It was recommended that the warning sign should be in both English and Spanish.

It is also recommended that the facility personnel enroll in an EPA-approved asbestos training course. An "asbestos survey" of the facility needs to be conducted and the appropriate areas need to be labeled with ACM or non-ACM warning labels.

N. TSCA - PCB Inspection

Numerous problems were noted with the PCB Annual Reports 1979 to 1989 and with the 1990 PCB Annual Document Log. Also numerous problems were noted with Written Quarterly Inspections for PCB Transformers, Written Inventory of PCB Transformers and PCB Capacitors in Use, Written Inventory or Other Information on Pole Transformers and Pole Transformers Assumed to be PCB, Written Inventory for PCB Storage Area, Written Inspection for PCB Storage Area,
Written PCB Spill Reports, Notification of Primary Fire Response Personnel, and PCB Manifests. During the inspection, four (4) transformer leaks and two (2) possible transformer spills were noted. Two (2) instances were noted where combustible materials were within 5 meters of PCB transformers. Several problems were noted with the facility's marking of PCB capacitors. Numerous problems were found in areas used for PCB temporary storage (up to 30 days). The one area of concern that was noted was related to the lack of retrofilling records.

O. RCRA Compliance Inspection

40 CFR 262.21. Manifests. Inspector noted one generator copy of the manifest with no transporter information.

40 CFR 264.53. Required Aisle Space. Aisle space was noted to range from 0.7 to 5.0 feet. The narrower measurements would impede personnel and drum movement.

40 CFR 265.171. Condition of Containers. One fibre drum containing a hazardous waste in the Experimental Building Container Storage Area was in poor condition and the waste had not been transferred to another container.

40 CFR 265.193(b)(1). Containment and Detection of Releases. The containment for tanks X-324 and X-328 was cracked and had loose joint sealant. The containment for tank T-1333 also had loose joint sealant.

40 CFR 265.172. Compatibility of Waste With Container. One fibre drum containing a hazardous waste in the Experimental Building Container Storage Area was noted to have seepage from inside the drum.
Violation of HSWA Permit Condition - Condition V.J.2 - The facility failed to make a Waste Minimization Certification to EPA Region 3.

Several Areas of Concern were noted as follows:

During the review of manifests it was noted that some LDR notifications contained dates which did not agree with the associated manifests. Also, LDR notifications were copies with copied signatures. The authorizing signatures should be originals.

At the DuPont Paint Area Container Storage Area, empty paint and paint solvent product containers were found to be stored in an area contiguous with an area posted for hazardous waste. Some spills onto bare ground were also noted in this area. The area should be reposted and greater care taken to minimize ground spills.

During the inspection of the Shell Paint Area Container Storage Area, paint and paint solvent product containers were being stored awaiting processing through the solvent recovery still. These partially filled containers were stored with not dates to show when they entered storage nor was there any indication of hazardous waste markings.

The review of the DPMC Contingency Plan found no listing for a primary hazardous waste emergency coordinator. This contingency plan used an incident command structure, common in emergency response activities, to address all emergencies in the plant, but failed to name a primary hazardous waste emergency coordinator. RCRA regulations 40 CFR 264.52(d) requires that a primary hazardous waste emergency coordinator be named.

P. RCRA Ground Water, Corrective Action, and Sampling Reports

This category of inspection covers the inspections concerning ground water and corrective action issues. The reports on the sampling that was conducted to support these inspections and the RCRA compliance inspection are included as parts of these reports. The following is a list of the areas of concern that were noted in these reports.

The remediation of the EDC/VCM plume originating from the Oxy VCM plant must be further evaluated. The RFI Workplan should include delineation and characterization of this contaminant plume.

The remediation of the crude spill in the Refinery WMA must be further evaluated.

The monitoring status of the SWWMA must be reviewed. Two downgradient wells contain statistically significant increases of TOX and TOC compared to the upgradient wells. Shell should be in assessment monitoring in the SWWMA to determine the extent of contamination.

Closure data for the South Pond must be further reviewed to determine whether closure was adequate.

The absence of ground-water monitoring wells in the RFI Workplan needs to be reviewed. The wells are required pursuant to Section IX of the RCRA permit.

The source of the low pH recovered ground water needs to be investigated.

Shell has numerous piezometers which are used to collect ground water quality data on an annual basis. In effect, these wells are being used as monitoring wells. These wells should have surface pads, bumper poles, protective casing, and locks.

Piezometer No. 70 had been hit by a car which had broken the PVC casing. Hot mix asphalt was surrounding the piezometer and falling in the hole. A plug was placed in the piezometer four days after it had been noticed by EPA inspectors.

Grout in a recently abandoned well (MW-401) had settled excessively (4 to 5 feet).

Monitoring well 2-T was not locked.

Monitoring wells 2D and 3D had surface pads which were cracked and had pulled away from the PVC casing. The integrity of the borehole could be jeopardized, creating a conduit to the aquifer in which the wells are completed.

- Historical aerial photographs from 1932 to the present indicate numerous lagoons on Shell property. The aerial photos need to be carefully reviewed as part of the RFI process to determine historical areas of contamination.

UNITED STATES

ENVIRONMENTAL PROTECTION AGENCY

TOXIC RELEASE REDUCTION PROJECT

MULTI-MEDIA INSPECTION REPORT

SHELL - DEER PARK MANUFACTURING COMPLEX

DECEMBER 9 TO 16, 1991

AND

JANUARY 13 - 17, 1992

VOLUME II OF V

VOLUME II OF V

CONTENTS OF VOLUME II

NPDES Compliance Monitoring Report

NPDES Laboratory Report

TWC Annual Compliance Report for Industrial Wastewater Discharge

NPDES COMPLIANCE MONITORING REPORT

February 7, 1992

MEMORANDUM

SUBJECT: Shell TRRP inspection report--Deer Park, Texas

FROM: Jana Harvill
Environmental Engineer (6E-SC)

TO: Walter Helmick
Hydrogeologist (6E-SH)

Attached is the inspection report for the Shell TRRP conducted the weeks of 12/9/91 and 1/13/92.

If you have any questions, please contact me at 5-6486

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
ALLIED BANK TOWER AT FOUNTAIN PLACE
1445 ROSS AVENUE
DALLAS, TEXAS 75202

MEMORANDUM

DATE: 2/7/92

SUBJECT: Transmittal Memo - Compliance Monitoring Report(s)

FROM: Jana Harvill (Inspector)

TO: Robert C. Clark, Chief
Facilities Compliance Section (6E-SC)

A compliance monitoring inspection was conducted on 12/9/91 at the following location:

Facility Name: Shell Chemical Co.

Address: Box 100

City: Deer Park State: TX 77536

Type Facility: Federal ( ) Municipal ( ) Non-Municipal (✓)

Compliance monitoring reports attached: (Check appropriate box)

NPDES

(✓) Major	( ) CEI	( ) PAI	( ) PCI
( ) Minor	( ) CSI	( ) DIA	( ) IU
( ) NOD	(✓) CSI-Toxics	(✓) BIO	

AIR

( ) Primacy	( ) EPA Lead Overview	( ) Case Development
	( ) State Lead Overview	( ) SIP
( ) PSD	( ) SIP	( ) PSD
( ) NSPS	( ) PSD	( ) NSPS
( ) NESHAP	( ) NSPS	( ) NESHAP
	( ) NESHAP	

( ) Training

OTHER

( ) SPCC ( ) TSCA ( ) RCRA ( ) Oil & Hazardous Substance Spill Investigation Form

Comments: _____

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
ALLIED BANK TOWER AT FOUNTAIN PLACE
1445 ROSS AVENUE
DALLAS, TEXAS 75202

MEMORANDUM

DATE: 2/7/92

SUBJECT: Transmittal Memo - Compliance Monitoring Report(s)

FROM: Jana Harvill (Inspector)

TO: Robert C. Clark, Chief
Facilities Compliance Section (6E-SC)

A compliance monitoring inspection was conducted on 12/9/91 at the following location:

Facility Name: Shell Oil Company

Address: Box 100

City: Deer Park State: TX 77536

Type Facility: Federal ( ) Municipal ( ) Non-Municipal (✓)

Compliance monitoring reports attached: (Check appropriate box)

NPDES

(✓) Major	( ) CEI	( ) PAI	( ) PCI
( ) Minor	( ) CSI	( ) DIA	( ) IU
( ) NOD	(✓) CSI-Toxics	(✓) BIO	

AIR

( ) Primacy	( ) EPA Lead Overview	( ) Case Development
	( ) State Lead Overview	( ) SIP
( ) PSD	( ) SIP	( ) PSD
( ) NSPS	( ) PSD	( ) NSPS
( ) NESHAP	( ) NSPS	( ) NESHAP
	( ) NESHAP	

( ) Training

OTHER

( ) SPCC ( ) TSCA ( ) RCRA ( ) Oil & Hazardous Substance Spill Investigation Form

Comments: _____

United States Environmental Protection Agency
Washington, D. C. 20460

EPA NPDES Compliance Inspection Report

Form Approved.
OMB No. 2040-0057
Approval expires 4-30-88

Section A: National Data System Coding

Transaction Code	NPDES	yr/mo/day	Inspection Type	Inspector	Fac Type
1 N 2 5	3 TX0004863 11	12 91/1/09 17	18 X	19 R	20 2

Remarks

21 66

Reserved	Facility Evaluation Rating	BI	QA	Reserved
67 69	70 3	71 D	72 N	73 74 75 80

Section B: Facility Data

Name and Location of Facility Inspected	Entry Time	Permit Effective Date
Shell Deer Park Chemical Company Hwy 225 Deer Park, TX 77536	12/9/91 ☐ AM ☐ PM	9/25/90
	Exit Time/Date 12/14/91	Permit Expiration Date 9/24/95

Name(s) of On-Site Representative(s)	Title(s)	Phone No(s)
Aimee S. Anant	Process Eng	713 246-7070
Tyler J. Huber	Process Eng	246-7098

Name, Address of Responsible Official	Title	Contacted
John Holden Deer Park Manuf. Complex P.O. Box 100 Deer Park, TX 77536	mgr. Environmental Compliance	☑ Yes ☐ No
	Phone No. (713) 246-7667	

Section C: Areas Evaluated During Inspection

(S = Satisfactory, M = Marginal, U = Unsatisfactory, N = Not Evaluated)

S	Permit	S	Flow Measurement	NA	Pretreatment	M	Operations & Maintenance
S	Records/Reports	S	Laboratory	NA	Compliance Schedules	S	Sludge Disposal
S	Facility Site Review	S	Effluent/Receiving Waters	S	Self-Monitoring Program		Other:

Section D: Summary of Findings/Comments *(Attach additional sheets if necessary)*

Name(s) and Signature(s) of Inspector(s)	Agency/Office/Telephone	Date
Jana Harvill Jana Harvill	EPA / Region 6 / 214 6556486	1/30/92
Sammy Mitz		
Signature of Reviewer	Agency/Office	Date

Regulatory Office Use Only

Action Taken	Date	Compliance Status
		☐ Noncompliance ☐ Compliance

EPA Form 3560-3 (Rev. 3-85) Previous editions are obsolete.

United States Environmental Protection Agency
Washington, D. C. 20460

EPA NPDES Compliance Inspection Report

Form Approved.
OMB No. 2040-0057
Approval expires 4-30-88

Section A: National Data System Coding

Transaction Code	NPDES	yr/mo/day	Inspection Type	Inspector	Fac Type
1 N 2 5	3 TX0004871 11	12 911209 17	18 C	19 R	20 2

10 pgs

Remarks

21 66

Reserved	Facility Evaluation Rating	BI	QA	Reserved
67 69	70 3	71 D	72 N	73 74 75 80

Section B: Facility Data

Name and Location of Facility Inspected	Entry Time	Permit Effective Date
Shell Deer Park (Oil Company) Hwy 225 Deer Park, TX 77536	12/9/91 ☐ AM ☐ PM	11/7/89
	Exit Time/Date 12/14/91	Permit Expiration Date 11/6/94

Name(s) of On-Site Representative(s)	Title(s)	Phone No(s)
Aimee S. Anani	Process Eng.	713 246-7070
Tyler Huber	Process Eng.	246-7098

Name, Address of Responsible Official	Title	Contacted
John Holden Deer Park Complex P.O. Box 100 Deer Park, TX 77536	Mgr. Environmental Compliance Phone No. (713) 246-7667	☑ Yes ☐ No

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Name(s) and Signature(s) of Inspector(s)	Agency/Office/Telephone	Date
Jana Harvill Jana Harvill	EPA / Reg. 6 214 655 6486	1/30/92
Sammy Mitz	" "	

Signature of Reviewer	Agency/Office	Date

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Name(s) and Signature(s) of Inspector(s)	Agency/Office/Telephone	Date
Jana Harwell Jana Harwell	EPA / Reg. 6 214 6556486	1/30/92
Sammy Mitz	" "	
Signature of Reviewer	Agency/Office	Date

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EPA

United States Environmental Protection Agency
Washington, D. C. 20460

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Section A: National Data System Coding

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1 N 2 5	3 TX0004871 11 48631	12 911209 17 10 pcs	18 B	19 R	20 2

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Name(s) of On-Site Representative(s)	Title(s)	Phone No(s)
Aimee S. Anani Tyler Huber	Process Eng. Process Eng.	713 246-7070 246-7098

Name, Address of Responsible Official	Title	
John Holden Deer Park Complex P.O. Box 100 Deer Park, TX 77536	Mgr. Environmental Compliance	
	Phone No. (713) 246-7667	Contacted ☑ Yes ☐ No

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INTRODUCTION

A compliance toxics sampling inspection and laboratory audit were conducted at the Shell Deer Park complex during the weeks of 12/9/91 (Phase A) and 1/13/92 (Phase B) under the provisions of the Clean Water Act. During phase A, visual inspections of the two wastewater treatment plants associated with the complex were completed. During Phase B, the lab audit, which was begun in Phase A, was completed. The toxics samplings of the two process outfalls were completed also in Phase B.

The Deer Park complex consists of the Shell Oil Company and Shell Chemical Company with the wastestreams for the two facilities being handled independent of each other. The treatment plants are designated as the North and South Treaters with flows from the Oil and Chemical plants being routed to their respective Treaters. The North Treater handles flows (process and stormwater) from the Shell Oil Company (TX0004871) and the South Treater is responsible for the flows (process and stormwater) from the Shell Chemical Company (TX0004863).(attachment 1)

The inspection team during Phase A included:

JANA HARVILL -- LEAD NPDES INSPECTOR (EPA 6)
PATRICK NOLL --INSPECTOR (TWC DISTRICT 7)
NICOLE BEALLE --INSPECTOR (TWC DISTRICT 7)

The inspection team during Phase B included:

JANA HARVILL -- LEAD NPDES INSPECTOR (EPA 6)
SAMMY MITZ -- NPDES INSPECTOR (EPA 6)
PATRICK NOLL -- INSPECTOR (TWC DISTRICT 7)

The facility representatives during Phase A and Phase B of the inspection included:

AIMEE S. ANANI -- PROCESS ENGINEER
TYLER J. HUBER -- PROCESS ENGINEER
MILLIE HEBERT -- LAB MANAGER
DAVE FERGUSON -- LAB SUPERVISOR
RON TURPEN -- LAB TECHNICIAN
CASSANDRA IDLEBIRD-DIXON -- LAB TECHNICIAN
ALICIA CRADDOCK -- LAB TECHNICIAN

FACILITY DESCRIPTION

SHELL DEER PARK COMPLEX

Under the National Pollutant Discharge Elimination System (NPDES) program, the complex operates under two NPDES permits. The Oil Company is designated by TX0004871 and the Chemical Company is identified by TX0004863. In the past year, both the Oil and Chemical plants have experienced excursions with respect to various discharge limitations. Copper and oil and grease limits were exceeded at different outfalls for the Oil Company. The copper problem is an on going issue due to the extremely low limits set forth in the permit. With these limits, Shell has had difficulty meeting the allowable limit for copper and has stated that a permit modification would be requested. The permit parameters ammonia and pH have been exceeded on occasion at the Chemical plant outfalls as was 1,2 dichloroethane. The dichloroethane noncompliance was traced to a valving problem at the Occidental Chemical Company and steps were implemented by Shell to prevent any similar incidents in the future.

Also located geographically within the complex is a vinyl chloride monomer (VCM) facility owned and operated by Occidental Chemical Corporation. Although the inspection focused on the two Shell facilities, a visit was made on 12/13/91 to the Occidental operation located within the Deer Park complex. Under a contract between Shell and Occidental, the wastestream from the VCM plant is discharged to and treated by Shell's South Treater. According to the specifications in the agreement between Occidental and Shell, discharge limits for 1,2 dichloroethane in the total effluent is limited to a daily maximum of 20 lbs/day. The total effluent includes all effluent streams e.g., drainage from the tank area, spills, the rock box effluent, and VCM steam stripper bottoms. There is also a daily maximum of 10 lbs/day on chloroform being discharged from the plant to the Shell South Treater.

Compliance of the Occidental discharge to Shell is monitored in various ways. Occidental has an autoanalyzer, set-up prior to the effluent discharge to analyze wastestream samples. This sampling can determine non-compliance and discharge can be stopped to Shell's South Treater. Shell also determines compliance of the discharge from the VCM wastestream through results of six daily grab samples or from the daily 24-hour composite sample.

SHELL OIL COMPANY (TX0004871)

The Shell Oil Company operates a petroleum refinery in the Deer Park complex with products ranging from gasoline and jet fuel to kerosene and liquified petroleum gases. The facility is supplied water from two major sources: well water and purchased surface water. The two sources account for approximately 14.9 million gallons per day with 800,000 gallons being supplied by well water. About one third of the well water is used in sanitary service and the remainder is utilized for cooling and condensing. Purchased surface water is used for cooling and condensing, for the refinery processes, and for the boilers and demineralizers. According to the permit application, the discharge from the primary outfall R007 is 7.9 million gallons per day. This takes into account recycling, evaporation, and other contributing factors for water usage.

GENERAL DESCRIPTION OF WASTE FLOW (TX0004871)

All process wastestreams are routed through the North wastewater treatment plant known as the North Treater. Wastestreams enter the North Treater system through 5 distinct corrugated plate interceptors (CPIs). The CPIs are designated as DD-2 (includes contaminated stormwater), CCLP (includes catalytic cracker and lube waste), TC & G (includes thermal cracking and gas wastestreams), CP-1, and CP-2.

Samples are taken every shift at the CPIs to determine if a problem exists prior to the flow entering the North Treater. If the samples indicate a problem, the waste streams can be diverted to the spill diversion sump which has a volume of 50,000 gallons and from there the flow would be routed to the spill diversion tank. Diverted flows can also be routed to the North holding pond with a volume of 5 million gallons if treatment problems occur. There is a South holding pond which can be used if the need arises for flow diversion. Stormwater can be pumped from the South holding pond to the North pond and then through the Treater. Although this South pond is available, the facility is waiting for a permit to proceed with a "clean closure" of this area. Therefore, the facility does not often use the pond.

During excessive rains, the DD-2 CPI can be diverted to the 45 million gallon storm impoundment area. The storm impoundment pond gravity flows back to the X-330 sump where all wastestreams enter the North Treater through the X-330 sump. The sump has a volume of approximately 46,000 gallons but usually only 60 % of the volume is used (approximately 27,600 gallons).

GENERAL DESCRIPTION OF WASTE FLOW (TX0004871) (continued)

Just as samples are taken at the CPIs, the sump is sampled every 4 hours to ensure no problems are evident. From the sump, the flow proceeds to a two million gallon tank (X-330) for equalization. Flow then enters a flash mixer followed by a flocculator and proceeds in parallel trains through two dissolved air flotation (DAF) units. The oily portion from the DAFs goes to a holding tank (X-316) and is disposed of off-site. The decant line from the DAFs is routed to the Trickling Filter (T.F.) and from there the flow runs through 2 aeration basins in parallel. Approximately 6.3 million gallons are recycled to the aeration basins while the remainder of the flow is routed to two parallel clarifiers. From the clarifiers, the wastestream is routed through sand filters prior to discharge while the backwash from the filters is fed back through the basins.

The wasted sludge is pumped to a thickener and from there is sent on to the digestor. The sludge is piped to tank T13145 and is then sent to the incinerator (see description of solids disposal).

VISUAL OBSERVATIONS AT NORTH TREATER (TX0004871)

During the visual inspection of the North Treater the following observations were noted:

1) **At the South diversion pond, there was a pipe sticking out of the bank of the pond. The Shell contacts could not identify where the pipe originated from or what could be discharged through the pipe. The facility is waiting to do a "clean closure" on this pond.**

2) **Runoff was noted at the Trickling Filter sump area. According to facility personnel, leaking valves were the problem.**

3) **The <u>North aeration basin</u> was leaking. The leakage is "contained" by running into the storm water runoff area. It was also noted that with high winds, foam, liquid, etc. run down the side of the basin. It eventually washes into the drain that feeds the North pond.**

4) **The West clarifier had excessive foam in the center well. Pin floc was flowing over the weirs and there was excessive scum on the clarifier surface.**

VISUAL OBSERVATIONS AT NORTH TREATER (TX0004871) (continued)

5) The East clarifier had excessive scum on the surface and heavy foam in the center well. Pin floc was also observed flowing over the weirs.

6) The storm impoundment which accepts diverted flow from the North Treater is also presently accepting ground water monitoring well discharge (GW-7). This discharge to the storm impoundment has a pH of less then 2. In the past, ballast water tanks were also drained in the impoundment. One concern is the language of the permit (NPDES TX0004871) (attachment 2) which states that through outfall R008, the outfall that the storm impoundment would discharge through, should be stormwater runoff. It does not state that groundwater or ballast water can be discharged through the outfall. Although most of the water in the storm impoundment is routed back through the North Treater, there is the possibility of direct discharge from this area through outfall R008.

7) Another area of concern is the treatment of the waste in the storm impoundment. The drain valve on the impoundment is usually less than 50% open with gravity flow from the impoundment to the X-330 sump at the North Treater. The facility generally operates the sump at the 60 % level so the sump is not overflowed. Generally, flow through this area is approximately 1000 gallons per minute. In reviewing the records kept on this area, it was noted that on occasion the drain valve was completely closed. So although the storm impoundment water supposedly is continuously being routed through the North Treater, the flow can be minimal or none at all.

8) All outfalls (8) were visually inspected during Phase A. At outfall R006, there was some leakage around the effluent "weir". At outfall R004, the surface of the discharge canal was very oily. The "shift" foreman had noted the problem and had called for a vacuum truck to eliminate the problem.

9) During Phase B, an unidentified discharge from a pipe located South of the refinery outfall R003 was discovered. It was eventually identified as a leaking de-sand line on water well #10. This is potable water and therefore presents no problem under the NPDES program.

10) Also during Phase B, a sulfur spill that had occurred approximately a week before was investigated. The accident took place in the SR-5 area. The facility was loading a tank and rail car but in the process of switching to the other container did not completely close the valve from the vessel which had just been filled. Therefore, a discharge occurred causing elemental sulfur to be spilled. Due to the high melting point of 245^0, the sulfur solidified and did not appear to be a threat to the effluent. Personnel were in the process of cleaning the area and disposing of the solidified sulfur.

SOLIDS DISPOSAL FOR TX0004871 AND TX0004863

Initial processing of all sludges is handled at the belt filter press area. This facility is located south of the Chemical plant's wastewater treatment plant. Primary sludge from the South Treater and secondary or biosludge from both the North and South Treatment plants are transported to the press area for dewatering. According to the facility personnel, approximately two to ten tons of sludge are routed through the presses each hour.

So that the primary and secondary sludges are not commingled, certain presses are dedicated for each type. Of the five presses available, two are used exclusively for the primary and two for the secondary. The additional press is used primarily for the secondary sludge. This keeps the solids from the press area separate and ultimate disposal can be achieved more easily.

The drainage from the belt filter press area is routed to the South Treater.

The final disposal of the solids is segregated as is the dewatering process. The primary sludge is disposed of in the facility's one active landfill (#104). This particular site is a polyethylene double-lined area and has been in service since 1990.

The leachate from the landfill is routed back to the North Treater.

The secondary or biosludge is disposed of by incineration. The incinerator or "bug burner" is located adjacent to the belt filter press area. It was stated by the facility staff that approximately four tons of sludge are sent to the incinerator each hour.

The ash from the incinerator is routed back through the South Treater.

SHELL CHEMICAL COMPANY (TX0004863)

Within the Shell Deer Park complex, the Chemical company manufactures petrochemical products. These include industrial organic chemicals, plastic materials and synthetics. As was the case with the Oil Company, the facility uses both well water and purchased surface water. However, the Chemical plant also has water usage input from raw/process materials and some rain water and storm drain areas. Again as in the situation at the refinery, the majority of useable water is obtained from the purchased surface water. Well water is used only through the sanitary service while the surface, process materials, and rain waters are used throughout the facility (e.g. cooling, condensing, boilers, mineralizers, chemical processes). Discharge through the primary outfall C001 is approximately 9.9 million gallons per day. This includes evaporation and recycling.

GENERAL DESCRIPTION OF WASTE FLOW (TX0004863)

STORMWATER SYSTEM

There are four cells designated as stormwater impoundments. The cells are identified as A, B, C, and D. According to Shell personnel, the combined volume of the four cells is approximately 56 million gallons. There is also a 5 million gallon tank which collects contaminated stormwater. This tank drains into the chemical sewer and then through the South Treater. Surface drainage from the chemical areas mix with the "normal" chemical sewer contents and increase the flow to the South Treater. If flows are excessive, the excess is pumped to a diversion tank (T1318). When flows permit, the impounded water is returned to the influent to be routed through the treatment system.

The stormwater impoundments A, B, and C have a combined capacity of greater than a 10 year storm event. Discharge from these cells is through outfall C002 if permit limitations are met. Water from these cells can also be routed through the South Treater for treatment. Cell D contains stormwater runoff from parking lots, storage areas, and shipping facilities. As in the case of the other 3 cells, cell D can be routed through the South Treater or discharged through outfall C002 if permit requirements are met.

Discharge from outfall C003 would not occur unless all cells were filled. According to Shell personnel, this has not occurred since the late 1970's.

GENERAL DESCRIPTION OF WASTE FLOW (TX0004863) (continued)

Flows from the various process areas mix into the chemical sewer system and from there enter the South Treater. The process areas contributing to the influent to the South Treater include:

PROCESS AREAS

OP-2/3	**PYROLYSIS GASOLINES** **BENZENE** **1,3 BUTADIENE** **PROPYLENE** **ETHYLENE**
C	**EPICHLOROYDRIN**
A	**ISOPROPANOL** **ACETONE**
M	**DIACETONE ALCOHOL** **METHYL ISOBUTYL KETONE** **METHYL ISOBUTYL CARBINOL** **HEXYLENE GLYCOL**
VCM	**VINYL CHLORIDE** **1,2 DICHLOROETHANE**
BA	**n-BUTYL ALCOHOL** **2-ETHYL HEXANOL**
PHENOL/ACETONE	**ACETONE** **CUMENE** **PHENOL**
BPA	**BISPHENOL**
RESINS	**EPOXY RESINS**

In addition to these process areas, hydraulic loadings to the wastewater plant come from cooling water tower blowdown, non-process stormwater, and miscellaneous non-point source areas.

GENERAL DESCRIPTION OF WASTE FLOW (TX0004863) (continued)

Flows enter the plant through two American Petroleum Institute (API) separators operated in parallel. From here the flow is routed through three "neutralizers" in series for pH adjustment. The wastestream is then pumped to primary clarifiers run in parallel. There is a 3.5 million gallon diversion tank (T1319) that should it be needed, flow can be routed there and feed back through the chemical sewer. From the clarifiers, flow is then distributed to three activated sludge basins run in parallel. The wastestream is gravity-fed to the East and middle basins and pumped to the West. From the basins, the flow proceeds to the secondary clarifiers which are also in parallel. A polymer is fed into the system at the splitter box prior to the secondary clarifiers to enhance settling. The effluent is then discharged through outfall C001.

Sludge disposal was discussed in the solids disposal portion of the report.

VISUAL OBSERVATIONS AT SOUTH TREATER (TX0004863)

1) **One of the three primary lift pumps had a packing leak. This was causing leakage around the pump area. This did not appear to be affecting the treatment.**

2) **The North API was "down". The metal fittings were being replaced with plastic to improve preventative maintenance. Having only one API in service did not appear to affect treatment.**

3) **At outfall C002 there appeared to be a leaking valve. There was a small amount of discharge from the effluent pipe.**

LABORATORY AUDIT

During Phase A and Phase B, a laboratory audit was performed on the Shell Deer complex. This includes parameters addressed in both permits (TX0004871 and TX0004863).

The purpose of the audit was to evaluate the subject laboratory in order to ascertain the quality of the self-monitoring data submitted by the permittee to the EPA in partial fulfillment of its NPDES permit conditions.

The laboratory inspection was comprised of six identifiable major steps: 1) examination of laboratory staff capabilities; 2) evaluation of the laboratory equipment and facilities; 3) observation of actual sample preservation and transportation techniques; 4) observation of protocols and procedures used in sample analysis; 5) review of laboratory record-keeping practices; and 6) evaluation of the analytical quality assurance program.

The information required to complete the laboratory performance audit was provided by:

MILLIE HEBERT	**LAB MANAGER**
DAVE FERGUSON	**LAB SUPERVISOR**
RON TURPEN	**LAB TECHNICIAN**
CASSANDRA IDLEBIRD-DIXON	**LAB TECHNICIAN**
ALICIA CRADDOCK	**LAB TECHNICIAN**

LABORATORY AUDIT (continued)

SUMMARY AND CONCLUSIONS

STAFF CAPABILITIES

The subject laboratory is staffed by: **Alicia Craddock, lab tech, Cassandra Idlebird-Dixon, lab tech, and Ron Turpen, lab tech.**

The following analyses were reviewed: **CHEMICAL OXYGEN DEMAND (COD), OIL AND GREASE (O & G), COPPER (T), ZINC (T), TOTAL ORGANIC CARBON (TOC), BIOCHEMICAL OXYGEN DEMAND (BOD_5), TOTAL SUSPENDED SOLIDS (TSS), PHENOLS, AMMONIA AS NITROGEN (NH_3-N), SULFIDE, CHROMIUM (T), HEXAVALENT CHROMIUM, AND LEAD (T).**

LABORATORY EQUIPMENT AND FACILITIES

Analytical Equipment: **BOD- A ZYMATE II PLUS WITH ACCUTRAK. TSS- METTLER BALANCE AE 163. ORGANIC CHLORIDE- METTLER P1200. PHENOL- ALTEX MODEL 5 CHEMICAL ANALYZER 460. SULFIDES- ALTEX MODEL 5 (WAVELENGTH 625). TOC- SHIMADZU AUTO SAMPLE INJECTOR ASI-502. OTHER EQUIPMENT INCLUDED: SAMPLE REFRIGERATOR, TSS OVEN, AND BOD INCUBATOR.**

Maintenance and Calibration: **The staff does a good job of maintaining and monitoring the calibration of necessary equipment. The only discrepancy noted during the inspection was the sample refrigerator occasionally registered higher then the 4^0C required for sample storage.**

Records: **Good records are maintained for all areas. Documentation is available for duplicates, standards, calibration curves , etc. Informative records are also kept with respect to the sample collection and preservation.**

Laboratory Safety Features: **There were no apparent problems in this area. Appropriate clothing and eyewear were worn by the staff and safety showers for possible accidents were available if the need arose.**

PRESERVATION AND TRANSPORTATION TECHNIQUES

Preservation is handled according to established guidelines in the lab. All parameters are preserved according to 40 CFR part 136 and either prepared for analysis "in-house" or packed for shipment or pick-up by the contract lab.

ANALYTICAL PROTOCOLS AND PROCEDURES

References and QA/QC practices: The facility references those approved methods as stated in 40 CFR part 136. The lab has developed very good standard operating procedures for the large number of parameters analyzed "in-house". A standard called Alpha Control Standard is used extensively in the lab as a check to validate results. The lab also does appropriate duplicates, blanks and spikes to verify lab practices and procedures.

OBSERVATIONS DURING LAB AUDIT

1) BOD_5- The lab was experiencing a minor problem with air bubbles in the BOD_5 bottles. It appeared that due to the robotic method employed by the lab, air was being entrained in some of the BOD_5 bottles. Quite a bit of agitation occurred when the bottles were being filled. The lab has already taken steps to prevent this problem in the future.

2) Although the lab does not do the actual analyses for the metals, they do prepare the samples. The facility's refinery lab runs the metals analyses. The lab was under the impression that the microwave method of metals analyses was already approved. This method has been proposed but not approved yet. "Therefore, unless the facility has applied for and been approved for an "ALTERNATE TEST PROCEDURE", this method can not be used. The lab immediately reverted to the digestion process of metal preparation which they had been using in the past.

3) The lab had no thermometer in the oil and grease water bath to verify that the appropriate temperature was achieved and maintained. The facility corrected this problem immediately.

4) Shell has implemented what they refer to as SLAP (Shell Lab Accreditation Program). The contract lab must be approved by Shell before any of their facilities can use the lab. Shell verifies correct laboratory procedures and ensures that the contractor follows approved methodologies. If it is determined that the lab is acceptable and meets all the criteria set forth by the SLAP, then a Shell facility can use the contract lab.

SAMPLING NARRATIVE

The sampling portion of the inspection was conducted during Phase B by Jana Harvill and Sammy Mitz of the Environmental Protection Agency (EPA), region 6. Aimee Anani and Tyler Huber from Shell collected samples for the facility.

The sampling was conducted at the facility's process outfalls. Samples were collected at the refinery outfall R007 and the chemical outfall C001. No samples were collected at any stormwater outfalls during either Phases of the inspection.

At C001, two Isco automatic samplers were used to collect samples. One was designated for BOD/TSS, COD/NH_3-N, AND METALS. The other sampler set up at this process outfall was for the 24-hour BIOASSAY.

In addition, grab samples were collected for manual compositing. Samples for PHENOLS, PCB/PEST, ABNs, and VOAs were collected every two hours for a 24-hour period. All samples mentioned above, except for the VOAs, were flow composited prior to being sent to the EPA lab in Houston. The VOAs were flow composited after arriving at the EPA lab. The only discrete grab sample collected at C001 was for CYANIDE.

At R007, only one Isco automatic sampler was set-up. The sampler was used to collect for BOD/TSS, TOC/NH_3-N, and METALS analyses.

Grab samples were also collected at R007 for manual compositing. Samples for PCB/PEST, ABNs, and VOAs were collected every six hours for a 24-hour period. All samples were flow composited except for the VOAs. The VOAs were sent as discrete grab samples and flow composited by the EPA lab. Single grab samples were collected at R007 for the following parameters: OIL & GREASE, PHENOLIC COMPOUNDS, SULFIDES, CYANIDE, and for the BIOASSAY.

The copies of the chain of custodies used to transfer the samples to the lab are included at the end of the report.

Results from the BIOASSAYS collected at the process outfalls were returned by the EPA lab and indicated that "no significant effect" was noted for the test organism Cyprinodon variegatus at either R007 or C001. (attachment 3)

TOXICITY REDUCTION EVALUATION

SHELL OIL COMPANY (TX0004871)

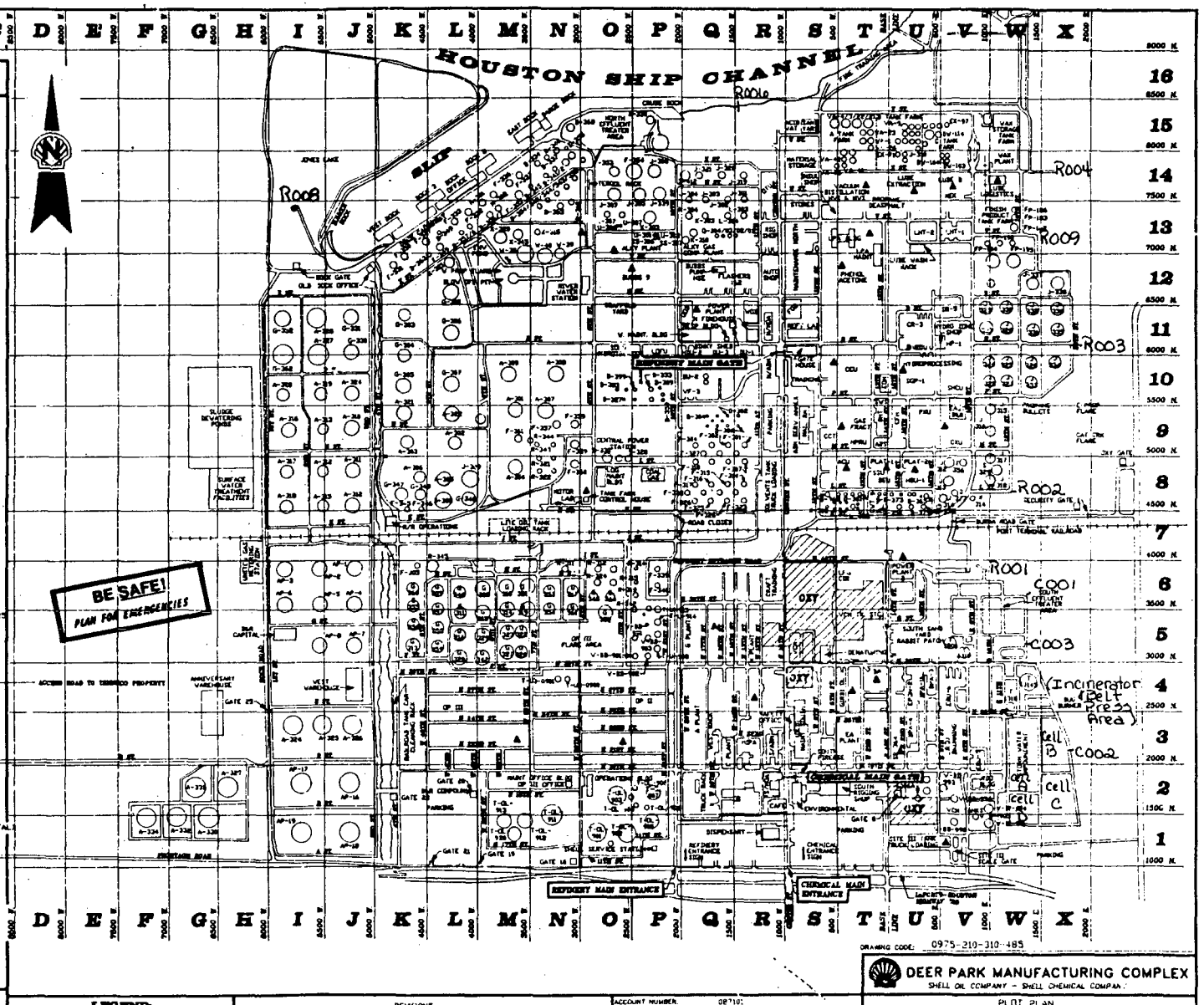
The Shell Oil Company successfully completed the biomonitoring requirements as required by order no. VI-89-1785. Aquatic Bioassay laboratories, Inc. of Baton Rouge, La. conducted the biomonitoring tests using Mysidopsis bahia and Sheepshead minnow for the process outfall R007. The tests indicated no toxicity at the critical and twice critical dilutions and, therefore, the biomonitoring requirements of the permit have expired.

SHELL CHEMICAL COMPANY (TX0004863)

In December 1990, The Shell Chemical Company submitted the second and third set of biomonitoring results for outfall C001. These tests were also conducted by Bioassay Laboratories, Inc. of Baton Rouge, La. The results indicated that the Cyprinodon variegatus test passed, but the Mysidopsis bahia test failed.

In accordance with the provisions of the NPDES permit (no. 7 special conditions on page 4 of Part II) (attachment 4), Shell submitted a Toxicity Reduction Evaluation (TRE). The facility has been involved in a study to identify the source of the toxicity (attachment 5). Through the evaluation, the facility suspected that calcium in the effluent was the toxicant to the Mysid.

ATTACHMENT 1



UNITS, BUILDINGS & AREAS

Q-3 A & B DISTRIBUTION
S-15 ACID CLEANING FACILITIES
O/P-11 ACID LOADING AND UNLOADING RACKS
R-10 ADMINISTRATION BUILDING - NORTH
R-3 ADMINISTRATION BUILDING - SOUTH
R-2 ADMINISTRATIVE SERVICES
S-9 ADMINISTRATIVE SERVICES ANNEX
H-4 AIR COMPRESSOR OP-II - ET AREA
O/P-13 ALKYLATION UNIT & ALKY DEPROPANIZER
J-7 AP PUMPHOUSE & MANIFOLD PIT
T-8 AROMATICS CONCENTRATING UNIT
R-12 AUTOMOTIVE GARAGE AND FACILITIES
T-4 BA, PA & DA - E AREA
U-17 BARGE DOCK
H-6 BAYOU PUMPHOUSE
T/U-9 BENZENE EXTRACTION UNIT
O,P-3/4 BLOCKS 1,2,3,4,5,6,7 - OP-II
N-12 BLOW-OFF PIT
U-4 BPA-1 - P&R AREA
U-4 BPA-2 - P&R AREA
U-4 BPA-3 - P&R AREA
L-2 BROWN & ROOT 1ST AID
V-9 BROWN & ROOT EAST
K-3 BROWN & ROOT MAINTENANCE
X-4 BUG BURNER
J-13 BUNKER DOCK
O-4 BUTADIENE II - OP-II
N-4 BUTADIENE III - OP-III (LO-2, PYRO-3)
S-6 CA PLANT - G AREA
R-9 CAFETERIA - NORTH
R-2 CAFETERIA - SOUTH
H-6 CASINGHEAD PUMPHOUSE AND MANIFOLD PIT
H-7 CASINGHEAD UNLOADING RACK
U/V-10 CAT FEED HYDROTREATER
S/T-10 CATALYTIC CRACKING UNIT
T-9 CC GAS FRACTIONATOR UNIT
S/T-9 CC GAS TREATERS
L-9 CENTRAL POWER STATION
R-2 CHANGE HOUSE - S AREA
Q-4 CHEMICO - A AREA
Q-6 CHLORINE STORAGE - G AREA (OCCIDENTAL)
F-16 CHRISTENSEN YARD
T-3 COMPRESSOR EP - E AREA
V-10 CONTROL CENTER - HYDROCRACKING & CAT REFORMING
Q-1 CONTROL CENTER - UTILITY
R-4 CONTROL ROOM, A&B DIST. - A AREA
T-4 CONTROL ROOM, BA & PA - E AREA
Q-5 CONTROL ROOM, G390
P-3 CONTROL ROOM, OP-II
V-1 CONTROL ROOM, SITE III - E AREA
S-3 CONTROL ROOM, VCM - G AREA(OCCIDENTAL)
U-11 CR-3
T-13 DA
T-13 DEASPHALTING - PROPANE
P-4 DEMINERALIZER, ET AREA - OP-II
S-5 DENATURING - G AREA
T-9 DISTILLING HYDROTREATER NO.1
Q-4 DMC FURNACES - A AREA
P-15 DOCK - CRUDE
M/N-15 DOCK - EAST
K-13 DOCK - WEST
L/M-14 DOCK 2
K/L-14 DOCK 3
L-14 DOCK OFFICE BUILDING
L-11 DOCK PUMPHOUSE
R-3 DPS - LPG - A AREA
V-3 DRUMMING & SHIPPING, HSRF - P&R AREA
Q/R-10 DU-1
Q/R-10 DU-2
Q/R-10 DU-3
O/P-12 DUBBS 2
Q-19 DUBBS PUMP HOUSE
T-10 EAST OPERATORS MAINTENANCE BUILDING
X-9 EAST PROPERTY FLARE
N-3 EFFLUENT TREATER - OP-III
V-3 EFFLUENT TREATER AREA
S-11 ENGINEERING FIELD OFFICE
T-2 ENVIRONMENTAL - S AREA
H-16 ENVIRONMENTAL NE WASTE TREATING AREA
Q-2 ERU-1, P & R AREA
V/W-4 ERU-2 TO 6 - P&R AREA
L-3 ETHYL BLENDING FACILITIES - NO. 2
L-6 ETHYL BLENDING FACILITIES - NO. 4
R-3 EXPERIMENTAL LAB
T-3 FEED PREP. E AREA
T-3 FINISHING EA - E AREA
J-7 FIRE HOSE HOUSE 14
R-11 FIRE HOUSE - NORTH
S-2 FIRE HOUSE - SOUTH
T-16 FIRE TRAINING AREA
U-5 FLARE - OP-II
N-5 FLARE - OP-III
Q-4 FLARE BLOWDOWN DRUMS - OP-II
Q,R-12 FLAKERS NO. 1 & 2
V-14 FP PUMPHOUSE
T-9 FUEL GAS BLEND FACILITIES - EAST
Q-12 FUEL GAS BLEND FACILITIES - WEST
N-3 FUEL GAS/LUBE OIL - OP-III
Q/R-5 G UNITS (100 TO 500)
Q-13 GAS COMPRESSOR PLANT - ALKY
M-7 GASOLINE ADDITIVE AND BLENDING
L-2 GATE 6 19
S-11 GATEHOUSE - NORTH
S-2 GATEHOUSE - SOUTH
Q-12 GENERATOR BLDG. - P.P. NO. 1
R-5 H PLANT - G AREA
R-4 HCL ABSORBER - A AREA
U-8 HDU-1
T-2 HEO & CRANE PARKING
S/T-13 HVI & HVI
V-11 HYDROGEN PLANT 1
N-3 HYDROTREATER III - OP-III
R-5 INCINERATOR, HCIN 1 - G AREA
S-4 INCINERATOR, HCIN 2 & 3 - G AREA (OCCIDENTAL)
R-3 IFA REACTORS - A AREA
Q-3 IPA STRIPPER - A AREA
S-2 LABORATORY - S AREA
U-2 LIQUID RESINS FACILITY
P-10/11 LOFU
O-8 LOGISTICS MAINT BLDG
T-12/13 LPA MAINTENANCE BLDG
T-13 LPA OFFICE BLDG
T-6 LPG STORAGE, SHIPPING - E AREA
U-14 LUBE EXTRACTION
V-13 LUBE HYDROTREATER NO. 1
U-13 LUBE HYDROTREATER NO. 2
V-14/15 LUBE PLANT - LOADING RACKS
U-13 LUBE PLANT - OFFICE BLDG
U-12 LUBE WASH RACK
V-14 LUBE ZONE SHOP
R-3 M PLANT - G AREA
S-5 MAIL ROOM - ADMIN SERV ANNEX
S-9 MAIN OIL PUMPHOUSE
T-3 MAINTENANCE BLDG - EAST
R-6 MAINTENANCE BLDG - G AREA
U-3 MAINTENANCE BLDG - P & R AREA
G-4 MANTIUS CONCEN. - A AREA
S-14 MATERIAL STORAGE
V-14 MEK
N-2 MODEL BUILDING
S/T-9 MOL SIEVE
R-15 OIL SLUDGE DECANT FACILITIES
N-2 OP-II & III SHUTDOWN TRAILERS
Q-2 OP-II OFFICE & MAINT.
N-3 OP-II X-FURNACE
N-2 OP-III OFFICE & MAINT.
V-9 ORTHOXYLENE PLANT
T-9 PARAFFIN, NORMAL
U-9 PARAXYLENES
V-14 PCRC BLDG
T-12 PHENOL/ACETONE PLANT
T-8 PLATFORMER NO. 1
U-8 PLATFORMER NO. 2
U-6 PP #2
Q-4 PRESSURE STORAGE - A AREA
V-3 PROPANE OUTLETS
S-13 PURCHASING - STORES FACILITIES
T-3 PURIFICATION, E-E AREA
V-2 QUALITY CONTROL LAB - P&R AREA
U-5 RABBIT PATCH SAND YARD
T-3 REACTOR, E AREA
O-15 REFINERY AQUEOUS EFFLUENT
S-11 REFINERY LAB
S-11 REFINERY OPER. BLDG
V-2 RESINS DISTRIBUTION OFFICE
O-12 RIVER WATER STATION
R-5 S DISTILLATION - G AREA
R-11 SAFETY - NORTH
R-2 SAFETY - SOUTH
T-3 SAFETY OFFICE (NEW)
U-10 SATURATES GAS PLANT NO. 1
D-11 SCAFFOLD YARD
Q-9 SEPARATOR - PARALLEL PLATE 1
V-8 SEPARATOR - PARALLEL PLATE 2
P-8 SHELL COAL GASIFICATION PLANT
Q-3 SHIPPING A AREA & WEST RACK
Q/R-2 SHIPPING ERU-1 - P&R AREA
U-1 SHIPPING ERU-1 TO 4 - P&R AREA
S-12/13 SHOPS - BUILDING & MAINTENANCE
T-3 SHOPS - SOUTH
U/V-1 SITE III
T-16 SOUR WATER STRIPPER
T-3 SPUR BIGGING SHOP
V-11/16 STORAGE & LOADING FACILITIES - SRS
R-7 SUBSTATION - 1201
S-8 SUBSTATION - 1202
V-11/12 SULPHUR PIT
V-12 SULPHUR 5
H-18 SURFACE WATER CLARIFIER
K-3/4 TANK CAR CLEANING RACK
M/N-7 TANK CAR LOADING - LIGHT OILS
Q-3 TANK FARM A - A AREA
T-14/15 TANK FARM A - LUBE PLANTS
Q-4 TANK FARM B - A AREA
U-14/15 TANK FARM B - LUBE PLANT
T-5 TANK FARM BA & PA - E AREA
V-7 TANK FARM BPA - P&R AREA
V-14/18 TANK FARM C - LUBE PLANT
R-2 TANK FARM C - P&R AREA
T-3 TANK FARM CONT. HOUSE
V/W-13 TANK FARM D - LUBE PLANT
R-2 TANK FARM ERU-1, P&R AREA
L-3 TANK FARM ERU-3, P&R AREA
U-3 TANK FARM ERU-4, P&R AREA
V-3 TANK FARM ERU-5, P&R AREA
Q-5 TANK FARM G - G AREA
Q-6 TANK FARM H - G AREA
P-3 TANK FARM NORTH - OP-II & III
Q-5 TANK FARM P - G AREA
O/P-1/2 TANK FARM SOUTH - OP-II
N/N-1/2 TANK FARM SOUTH - OP-III
T-5 TANK FARM VCM - G AREA (OCCIDENTAL)
V-15 TANK FARM - WAX STORAGE
R-8 TANK TRUCK LOADING - SOLVENTS
R-6 TRAINING - CRAFT
S-10 TRAINING OFFICE
V/W-13 TRUCK LOADING HRSF - P&R AREA
V-17 TRUCK WASH SLAB
U-11 UOP
S/T-13 VACUUM DIST. - HVI & HVI
R-14 WAREHOUSE STORAGE
R-13 WAREHOUSE STORAGE
R-4 WATER TREATING - A AREA
V-18 WAX MOLDING & SHIPPING
V-14 WAX POLYMER BLDG & PLANT
Q-11 WEST DIST MAINT. BLDG
Q-3 WEST LOADING RACK

COOLING WATER TOWERS

SOUTH		NORTH	
Q-4 OP-II	U-5 #6 & #9	N-11 #1 & #2	T-8 #9
N-4 OP-III	S/T-5 #11 & #12	N-13 #3 & #4	T-9 #10
Q-4 #1	V-4 #14	P-10 #5 & #6	V-11 #11
Q-5 #2		U-11/12 #7	P-9 #12
T-5 #3 & #10		U-11/12 #8	U-11/12 #13
Q-5 #4 & #5		S/T-14 #8A	C-16 #14

LEGEND:

▲ CONTROL ROOM

▨ OCCIDENTAL PETROLEUM CO. PROPERTY

REVISIONS								
NO.	DATE	JOB	DESCRIPTION	MADE	CHK'D	APP'D	APP'D	APP'D
01	10/7/87	087101	REVISED TO DATE	THS	MP		NGC	DLE
02	8/18/89	048830	CONVERTED FROM AUTO-TROL	THS	MP			

ACCOUNT NUMBER: 087101
FILE DATES: 10/5/87 12/18/87 3-9-89

DRAWING CODE: 0975-210-310-485

DEER PARK MANUFACTURING COMPLEX
SHELL OIL COMPANY - SHELL CHEMICAL COMPANY

PLOT PLAN
PROCESS UNIT LOCATIONS FOR EMERGENCY IDENTIFICATION
DEER PARK MANUFACTURING COMPLEX

DRAWN THS | CHECKED MP | APPROVED NGC | SCALE 1"=1000' | ISSUE DATE 10/1/87 | DWG No. E-50934-02

ATTACHMENT 2

OUTFALL 002, 003, 004, 006, 008, and 009

During the period beginning the effective date and lasting through the expiration date, the permittee is authorized to discharge from Outfall 002, 003, 004, 006, 008, and 009: stormwater runoff.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations			
	Mass(lbs/day)		Other Units (mg/l)	
	Daily Avg	Daily Max	Daily Avg	Daily Max
Flow (MGD)	N/A	N/A	N/A	N/A
Total Organic Carbon	N/A	N/A	N/A	70
Oil & Grease	NM/A	N/A	N/A	15

Effluent Characteristic	Monitoring Requirements	
	Measurement Frequency	Sample Type
Flow (MGD)	N/A	N/A
Total Organic Carbon	1/day (*1)	Grab
Oil & Grease	1/day (*1)	Grab

ATTACHMENT 3

FACILITY: Shell Refinery
NPDES NUMBER: TX4871
OUTFALL NUMBER: 007
DATE COLLECTED: 01/14/92

LABORATORY NUMBER: 2AFERS0503
TEST ORGANISM: *Cyprinodon variegatus*
ANALYST: Hollister

Results: After nine days, no significant effect was observed in organisms exposed to the Shell Refinery effluent (Table 1).

Measurements of water chemistry are given in Table 2.

Dissolved oxygen remained ≥89% of saturation throughout the exposure period. Temperature was maintained at 25±1°C.

TABLE 1. Percentage of sheepshead minnow embryo/larvae affected after nine days of exposure. Twenty embryos were exposed to each concencentration and the control. The salinity of the effluent was adjusted to that of the control (20ppt) before testing was initiated.

Concentration (%)	Organisms Affected[a] (%)
Control (Culture Water)	10
6	5
12	0
25	5
50	5
100	5

[a]Effects include the combined number of dead embryos (unhatched) and larvae, also, organisms exhibiting terata and abnormal swimming behavior.

TABLE 2. Water chemistry data recorded on day 0 for the control water and and 100% effluent. Values are given as milligrams per liter.

	Parameter					
	pH	Alkalinity	Conductivity	Total Ammonia	Total Chlorine	Salinity
Control	7.8	48	29,110	<0.1	<0.1	20,000
Effluent	7.5	216	1,240	2.0[a]	<0.1	2,000

[a]Unionized ammonia was <0.1.

ATTACHMENT 4

FACILITY: Shell Chemical
NPDES NUMBER: TX4863
OUTFALL NUMBER: 001
DATE COLLECTED: 01/14/92

LABORATORY NUMBER: 2AFERS0402
TEST ORGANISM: *Cyprinodon variegatus*
ANALYST: Hollister

Results: After nine days, no significant effect was observed in organisms exposed to the Shell Chemical effluent (Table 1).

Measurements of water chemistry are given in Table 2.

Dissolved oxygen remained ≥90% of saturation throughout the exposure period. Temperature was maintained at 25±1°C.

TABLE 1. Percentage of sheepshead minnow embryo/larvae affected after nine days of exposure. Twenty embryos were exposed to each concencentration and the control. The salinity of the effluent was adjusted to that of the control (20ppt) before testing was initiated.

Concentration (%)	Organisms Affected[a] (%)
Control (Culture Water)	10
6	5
12	0
25	0
50	10
100	5

[a]Effects include the combined number of dead embryos (unhatched) and larvae, also, organisms exhibiting terata and abnormal swimming behavior.

TABLE 2. Water chemistry data recorded on day 0 for the control water and and 100% effluent. Values are given as milligrams per liter.

	Parameter					
	pH	Alkalinity	Conductivity	Total Ammonia	Total Chlorine	Salinity
Control	7.8	48	29,110	<0.1	<0.1	20,000
Effluent	7.7	230	8,300	2.3[a]	<0.1	8,000

[a]Unionized ammonia was <0.1.

stored.

6. The toxicity tests specified above shall be conducted once per month.

7. Special Conditions

a. If any toxicity test at the 71% effluent concentration demonstrates toxicity, the permittee shall resample and again conduct the toxicity test(s) for the species that showed toxicity within fifteen (15) days. There shall be a total of three (3) consecutive toxicity tests during a forty-five (45) day period. If one or more of the retests show toxicity at the 71% effluent concentration, the permittee may suspend additional retesting for this reporting period if written notification is sent to EPA Region 6 and all test results are submitted within fifteen (15) days.

b. Within thirty (30) days after submitting the test results which demonstrate toxicity in one or more of the retests, the permittee shall submit to EPA Region 6 an approvable plan for conducting a Toxicity Reduction Evaluation (TRE). The TRE Plan shall specify the approach and methodology to be used in performing the TRE. The Plan shall specify the date which the permittee will initiate the TRE.

c. If any retest in item 7.a indicates toxicity at the 71% effluent concentration, the permittee shall continue biomonitoring once per month for the toxicity test(s) showing toxicity using the same procedures as specified in items 2-5 above until the expiration date of this permit unless otherwise authorized by the permitting authority.

d. The provisions of items 7.a and 7.b are suspended upon submittal of the TRE Plan.

8. If toxicity is shown at the 83% effluent concentration during the first year of testing, the permittee shall continue biomonitoring after the first year of testing at a frequency of once per six (6) months until the expiration date of the permit using the same procedures as specified in items 2-5 above.

9. If the toxicity tests do not indicate toxicity at both the 71% and 83% effluent concentrations for all organisms during the first year, the permittee shall certify this information in writing to EPA Region 6, and these biomonitoring requirements shall expire.

10. The permittee shall prepare a full report of the results according to "Report Preparation and Data Utilization" section of the "Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms." The full report must be submitted with the first DMR containing these biomonitoring results, but it need not be submitted with subsequent DMR's, unless requested. However, the report shall be retained following the provisions of Part III.C.3 of this permit. The permittee shall submit the toxicity testing information contained in Table 1 of this permit to EPA Region 6 along with the DMR submitted for the end of the reporting period following the toxicity test.

11. If the permittee has conducted toxicity testing prior to the effective date of the permit in accordance with the provisions of this section, the test results may be submitted to EPA Region 6 for approval. If approved, the test(s) will constitute partial fulfillment of the toxicity testing requirements of the permit.

12. This permit may be reopened to require effluent limits, additional testing, and/or other appropriate actions to address toxicity. Accelerated or intensified toxicity testing may be required in accordance with Section 308 of the Clean Water Act.

ATTACHMENT 5

SD-32 (REV. 5-78)

Shell Development Company
Interoffice Memorandum

NOVEMBER 8, 1991

DRAFT

FROM: G. DRINKARD, RESEARCH MANAGER, ENVIRONMENTAL R&D, WESTHOLLOW RESEARCH CENTER

TO: C. A. BLAND, HS&E, ENVIRONMENTAL CONSERVATION, DEER PARK MANUFACTURING COMPLEX

SUBJECT: DEER PARK MANUFACTURING COMPLEX - SOUTH EFFLUENT TREATER TOXICITY IDENTIFICATION

WRC has been involved in a study to identify the source of Mysidopsis bahia toxicity in Outfall 001 since January 1991. This memo summarizes the results of our studies obtained through July, 1991. Our results indicate that the calcium in the effluent is the source of mysid toxicity.

If you have any questions regarding these results, please contact Susan Newman (493-8619).

for G. Drinkard

Attachments

SGN/glp

cc: Shell Oil Company
Deer Park Manufacturing Complex
A. S. Anani
J. R. Armstrong
C. M. Hutchings
J. M. Sowle
Norco Manufacturing Complex
W. L. Caughman
R. L. Jacoby
Odessa Refinery
J. Topper
Head Office
J. B. Du Bois
J. W. Ivie
R. H. Klug
A. F. Schmit
V. W. Roush
D. M. Prett

Shell Development Company
P. B. Dorn
C. L. Meyer
R. van Compernolle

SD-32 (REV. 5-78)

Shell Development Company
Interoffice Memorandum

NOVEMBER 7, 1991

DRAFT

FROM: S. G. NEWMAN

TO: G. DRINKARD

SUBJECT: DEER PARK MANUFACTURING COMPLEX - SOUTH EFFLUENT TREATER TOXICITY IDENTIFICATION

SUMMARY

The Deer Park Manufacturing Complex South Effluent Treater effluent has consistently shown toxicity to *Mysidopsis bahia* at the critical low flow dilution value of 71%. The effluent has shown no toxicity to *Cyprinodon variegatus* at this dilution. The NPDES permit requires that a toxicity identification evaluation be performed. Our results to date indicate that the toxicity to the mysid is due to the calcium in the effluent.

INTRODUCTION

Deer Park Manufacturing Complex South Effluent Treater (SET) is required by their NPDES permit to perform acute bioassay tests using *Cyprinodon variegatus* and *Mysidopsis bahia*. All tests with *Cyprinodon variegatus* have shown no toxicity. However, toxicity below the critical low flow dilution level of 71% effluent has been observed in all mysid tests. Thus, a toxicity identification evaluation is required. Analytical data showed calcium concentrations in the effluent to be present at levels toxic to mysid and softening experiments were designed to determine if calcium is the source of toxicity.[1] In addition, the solid phase extraction protocol, established in the EPA Phase I Toxicity Characterization Procedures, was followed to test for the presence of organic contributors to toxicity. This memorandum summarizes the results to date. The toxicity testing lab data is included in full as an attachment.

TESTING PROGRAM

Monthly testing of the effluent to determine the source of toxicity began in January, 1991. Table 1 summarizes the sample dates, test procedures and laboratories used. The 24 hour composite samples were tested for toxicity before and after calcium removal (softening). Starting in March, both softened and unsoftened samples were subjected to solid phase extraction (SPE) using C_{18} SPE columns following EPA Toxicity Identification Evaluation procedures to test for toxic organics.[2]

Metals analyses were performed on the March, May, and June samples. The analyses were used to confirm that calcium was the only metal removed during softening.

In July, an additional organism, Artemia salina, was tested to determine the response of another invertebrate to the effluent. Artemia salina is being evaluated in our laboratory as a screening tool for toxicity. It provides a rapid method of evaluating effluents for toxicity, and is potentially useful for such monitoring purposes.

In order to facilitate the TIE, toxicity tests on the March TIE sample fractions were performed at SeaCrest Laboratory. A comparison of the test results between SeaCrest and ABL, the NPDES testing laboratory, indicated ABL to have more sensitive organisms. Therefore, all remaining TIE fractions were tested at ABL to be consistent with the NPDES testing. Some testing of unsoftened effluent continued at SeaCrest to evaluate the variability in the culture sensitivity between the two laboratories. Chromium was used at both laboratories as the standard reference toxicant to quantify the mysid sensitivity.

RESULTS AND DISCUSSION

The results of the TIE thus far indicate that calcium is the source of toxicity in Outfall C-001. As seen in Figures 1 through 4, softening increased mysid survival to 90%, or greater, at the 97% effluent concentration. Adjusting the sample pH to 9 also increased mysid survival, due to the precipitation of calcium at this pH. In January and February (Figure 5), softening did not remove all toxicity. Discussions with DPMC technical staff indicate that the effluent samples were nonrepresentative due to operational problems caused by freezing weather. In June, mortality was seen in the higher effluent concentration samples due to an over-addition of seasalts in the laboratory.

The January and February results prompted us to use the SPE procedure on subsequent samples to confirm the absence of organic toxicants. SPE treatment on subsequent samples had no effect on the survival in either the softened or unsoftened samples. Thus, there appear to be no organic toxicants present.

Tables 2 and 3 summarize the results from the metal analyses on the March, May, June and July effluent samples. Copper analyses were higher than expected due to the analytical procedure. In the plasma emission scan analysis, procedure M037, used for this study, sodium interferes with the copper. DPMC permit monitoring uses graphite furnace atomic absorption, which is not sensitive to sodium, and therefore is more accurate. The analysis via graphite furnace indicated that the copper concentration in the May 7, 1991 sample was 4 ppb and was 8 ppb in the June 11, 1991 sample. Thus, none of the metals analyzed for are present at toxic levels, and they are not removed in the softening process.

Exposure of Artemia to samples of July, 1991 effluent caused no toxicity at any concentration in either softened or unsoftened samples. This emphasizes the greater sensitivity to calcium by the mysid compared to other species.

Although it initially appeared that the mysid from the two laboratories had different sensitivities, further testing indicated that this is not the case. Figures 6, 7 and 8 compare the results of the NPDES permit tests done at ABL with tests done at SeaCrest for May, June and July. The results of the Cr+6 standard reference toxicant tests are shown in Table 4. There was no consistent difference in mysid sensitivity observed between the two labs.

CONCLUSION

The results of our TIE study indicate that calcium is the source of toxicity in Outfall C-001 under normal operating conditions. This has been confirmed by the repeated observation of a removal of toxicity when the effluent is softened or the pH is adjusted to 9 causing calcium precipitation. Application of appropriate Phase I testing procedures and metal analyses failed to identify any other possible sources of toxicity.

There continues to be a serious lack of appropriate test species or methods for effluents with salinities or ionic balances that may be outside the tolerance ranges for invertebrate test species but would have no ecological impact on a receiving stream.

REFERENCES

1. Dorn, P. B. and J. H. Rodgers, Jr. 1989. "Variability Associated with Identification of Toxics in National Pollutant Discharge Elimination System (NPDES) Effluent Toxicity Tests". Environmental Toxicology and Chemistry. 8:893-902.

2. U. S. Environmental Protection Agency. 1988. Methods for Aquatic Toxicity Identification Evaluation: Phase I Toxicity Characterization Procedures. EPA 600/3-88/034. Office of Research and Development, Duluth, MN.

S. G. Newman

Attachments

SGN/glp

Table 1
Sampling and Testing Schedule

Sample Date	Softened?	SPE?	Test Lab	Duplicate NPDES test	Other Analyses Performed
1/8-9/1991	Yes	No	ABL	No	
2/5-6/1991	Yes	No	ABL	No	
3/18/1991	Yes	Yes	SeaCrest	No	Metals
5/7/1991	Yes	Yes	ABL	Yes	Metals
6/11/1991	Yes	Yes	ABL	Yes	Metals
7/8/1991	Yes	Yes	ABL	Yes	Metals *Artemia salina*

Table 2
March and May Plasma Emission Scan Results

Element	March Unsoft	March Soft	May Unsoft	May Soft
Nickel	0.081	0.081	0.25	0.12
Cadmium	<1.7	<1.5	0.17	0.094
Zinc	0.067	<0.068	0.51	0.26
Silicon	4.9	4.3	2.6	2.3
Boron	2.0	2.3	2.1	2.0
Phosphorous	<0.66	<0.67	3.0	1.4
Manganese	0.11	0.016	0.24	0.18
Magnesium	0.083%w	0.077%w	0.055%w	0.054%w
Molybdenum	0.064	0.044	0.22	0.06
Vanadium	2.5	2.6	0.83	0.61
Titanium	<0.01	<0.01	0.24	0.12
Copper	0.055	0.044	0.25	0.13
Cobalt	0.022	0.015	0.32	0.15
Aluminum	<0.021	<0.030	<0.01	<0.01
Lead	0.44	0.15	0.61	0.17
Iron	0.34	0.15	0.19	<0.01
Potassium	0.020%w	0.027%w	0.018%w	0.018%w
Sodium	0.79%w	0.95%w	0.77%w	0.84%w
Chromium	0.041	0.031	0.27	0.13
Calcium	0.12%w	0.020%w	0.11%w	0.017%w

All values in ppm.
Unsoft represents values for unsoftened effluent.
Soft represents values for softened effluent.

Table 3
June and July Plasma Emission Scan Results

Element	June Unsoft	June Soft	July Unsoft	July Soft
Nickel	0.53	0.54	0.28	0.24
Cadmium	0.37	0.38	0.24	0.24
Zinc	0.83	0.79	0.60	0.53
Silicon	2.5	2.6	3.7	3.1
Boron	6.6	6.4	2.9	2.0
Phosphorous	6.8	6.7	3.1	2.9
Manganese	0.65	0.56	0.28	0.24
Magnesium	0.19%w	0.15%w	0.065%w	0.059%w
Molybdenum	0.72	0.76	0.67	0.34
Vanadium	2.7	2.2	0.87	0.69
Titanium	0.32	0.33	0.19	0.18
Copper	0.63	0.64	0.33	0.29
Cobalt	0.89	0.88	0.42	0.36
Aluminum	0.25	0.60	0.97	0.17
Lead	1.8	1.5	0.77	0.62
Iron	1.5	1.4	1.2	0.65
Potassium	0.047%w	0.050%w	0.020%w	0.020%w
Sodium	1.4%w	1.3%w	0.71%w	0.67%w
Chromium	0.82	0.81	0.64	0.54
Calcium	0.17%w	0.049%w	0.15%w	0.0245%w

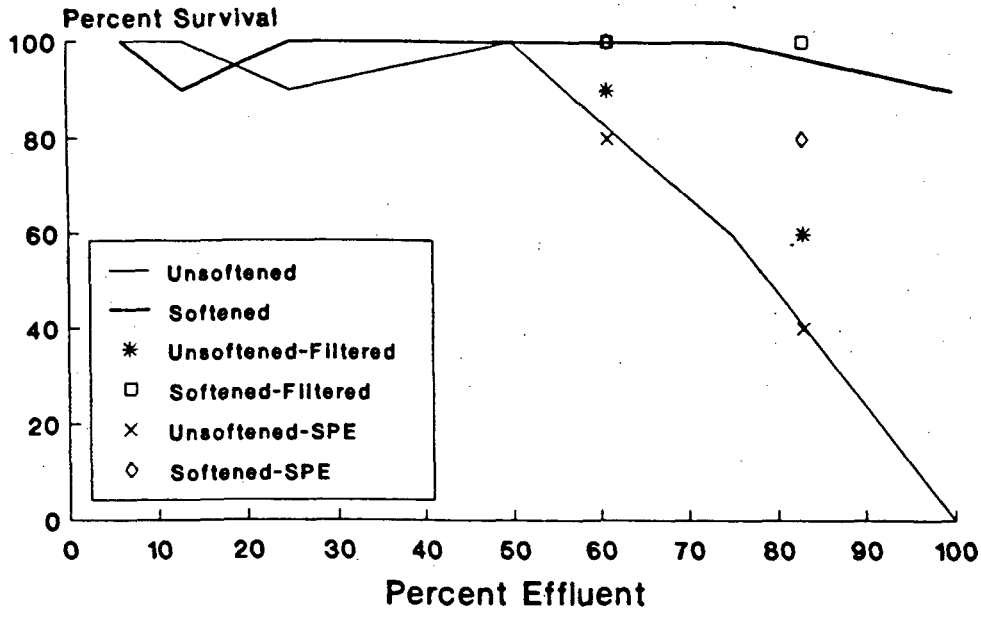
All values in ppm.
Unsoft represents values for unsoftened effluent.
Soft represents values for softened effluent.

Table 4
Cr^{+6} Standard Reference Toxicant Test
48-Hour LC50 (ppm)

	Aquatic Bioassay Laboratories	SeaCrest Environmental Services
	LC50 (95% C.I.)	LC50 (95% C.I.)
May	10.4 (8.9-12.4)*	13.2 (12.4-14.7)*
June	11.4 (9.2-14.4)*	12.7 (11.1-16.8)*
July	6.9 (5.7-8.5)*	14.0 (NA)**

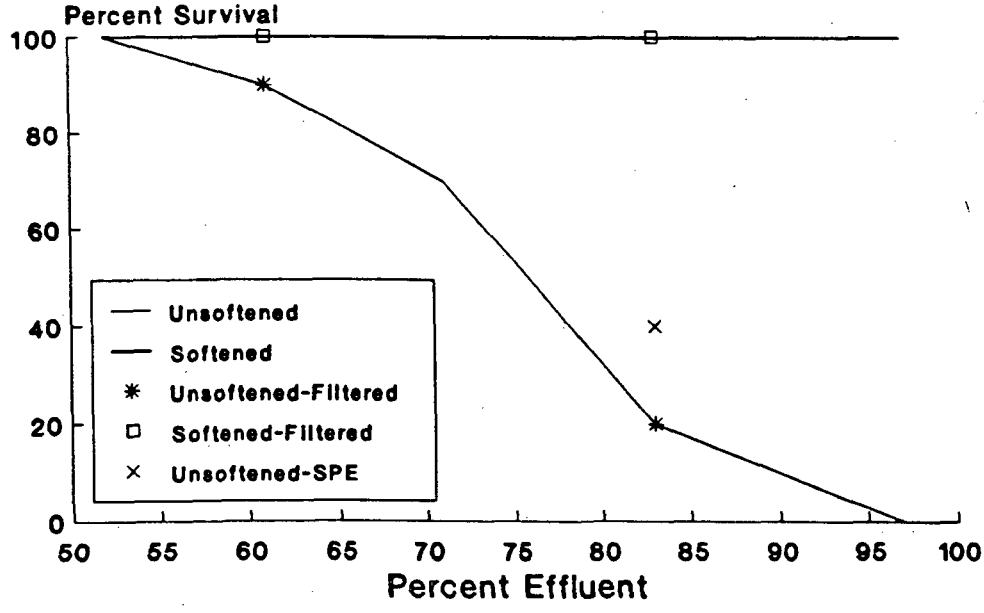
* Measured concentrations
** Nominal concentration
LC50's determined using Probit and Moving Average Methods

Figure 1
March TIE Results



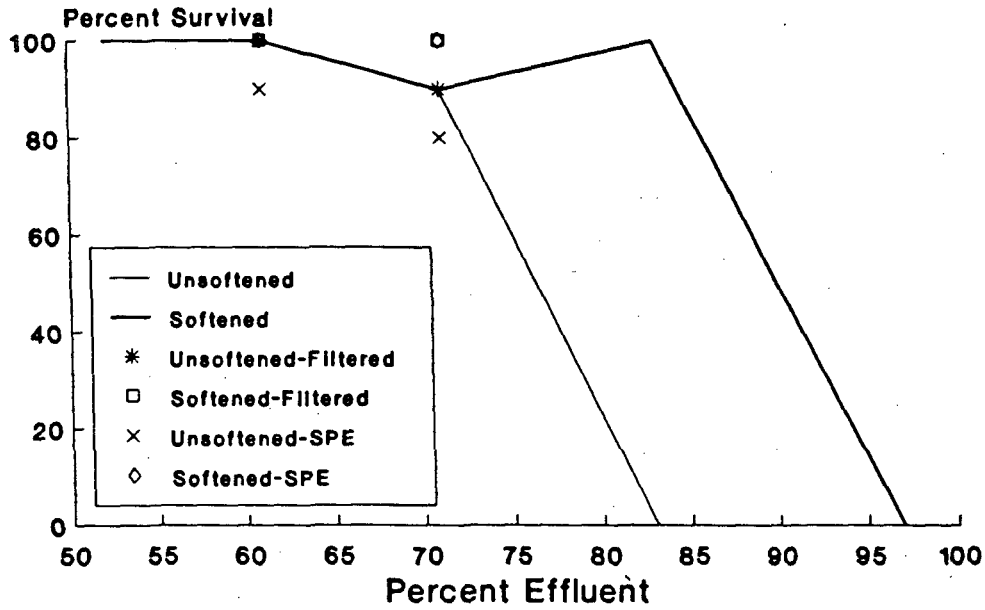
Initial pH

Figure 2
May TIE Results



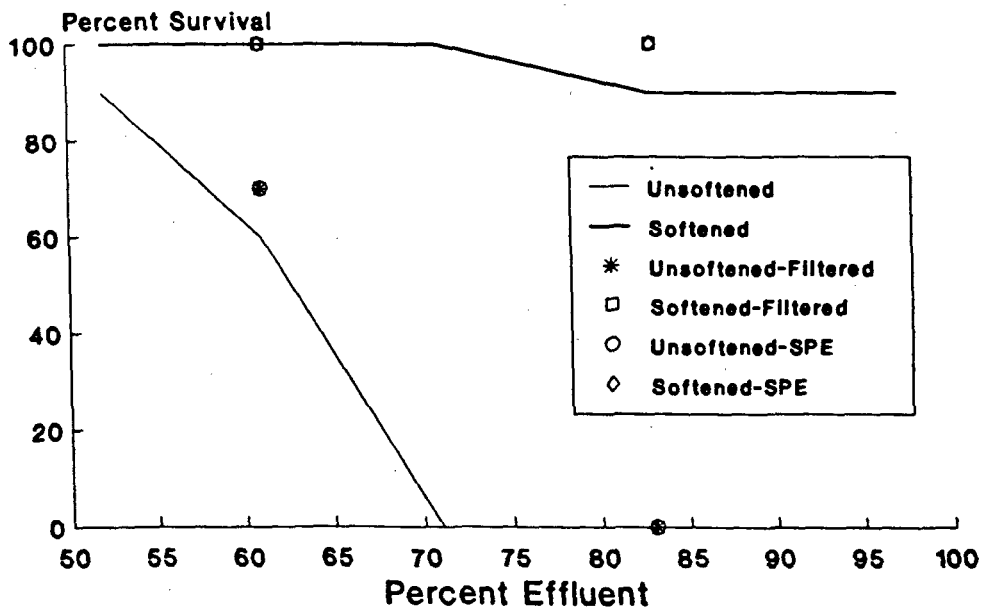
Initial pH

Figure 3
June TIE Results



Initial pH

Figure 4
July TIE Results



Initial pH

Figure 5
January and February Results

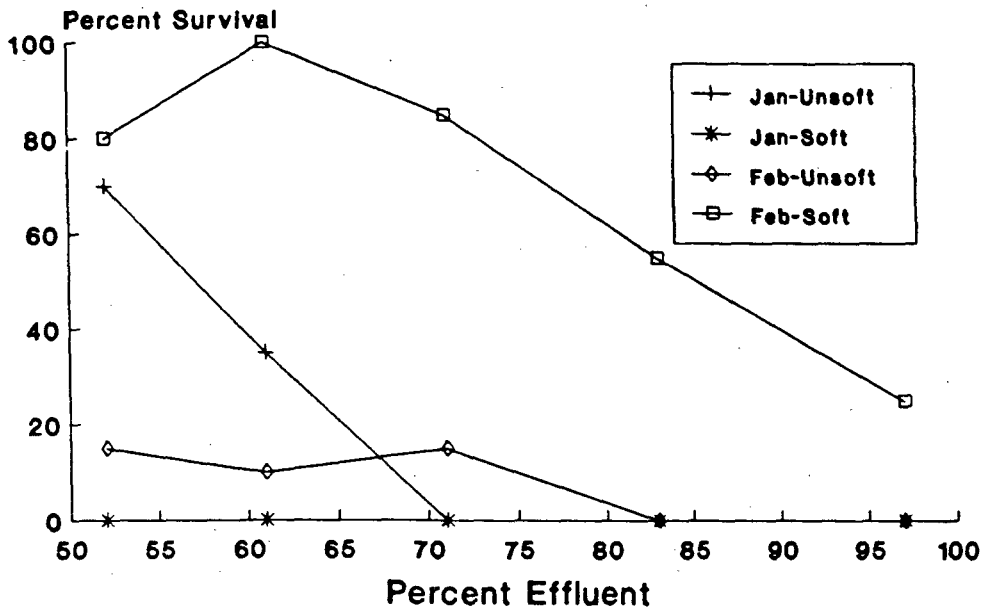
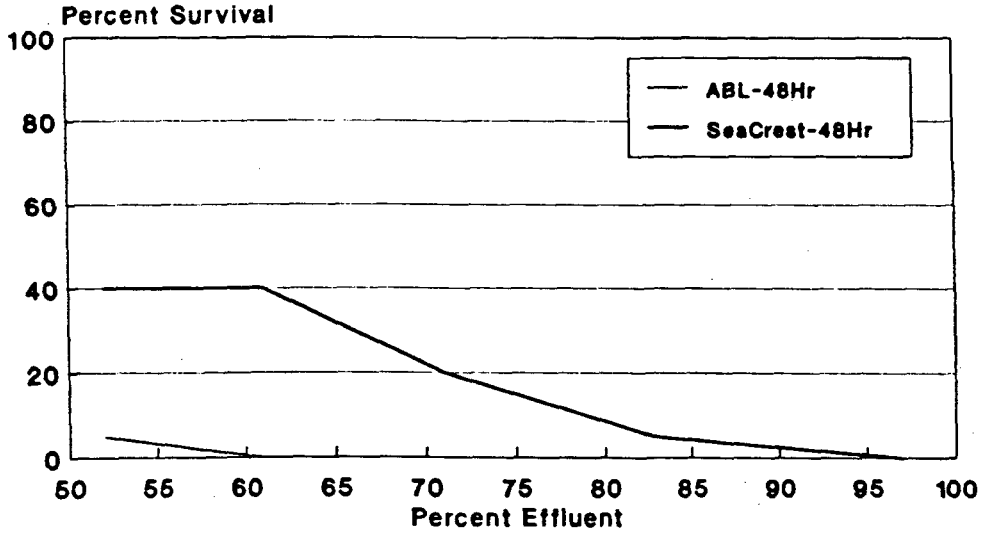
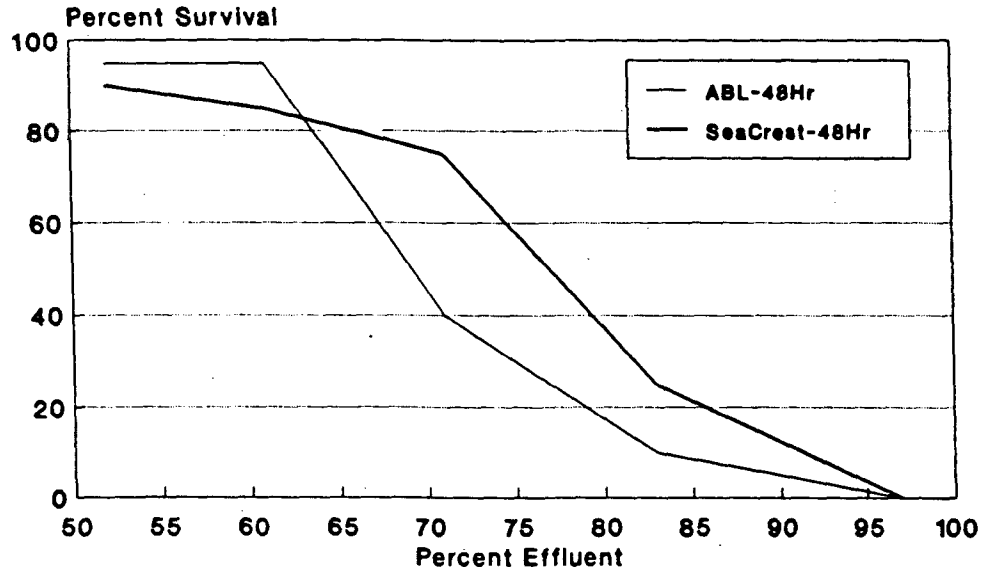


Figure 6
May NPDES Permit Test
Mysidopsis bahia



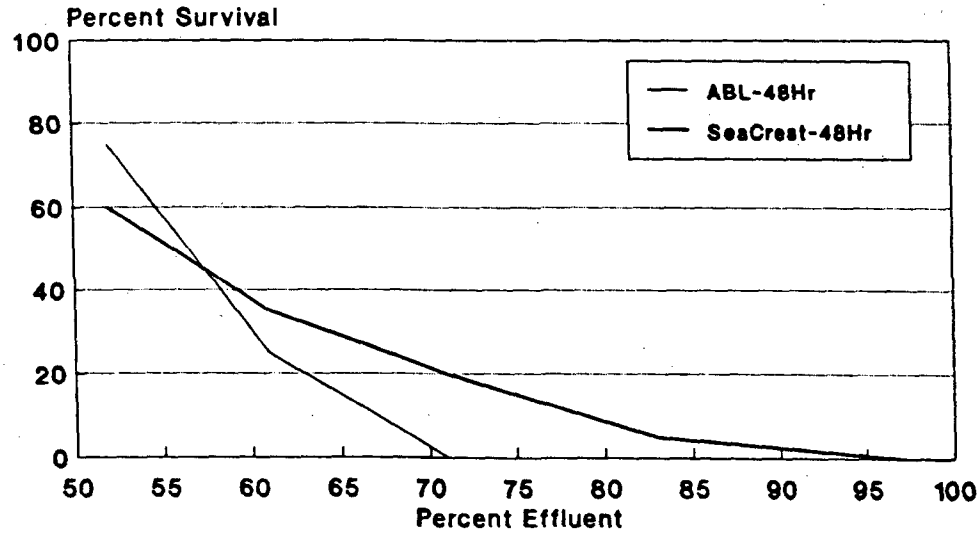
Effluent Collected on May 6 & 7
Permit Test was Repeated Due to ABL's
Bad Receiving Water Control (60% Surviv)

Figure 7
June NPDES Permit Test
Mysidopsis bahia



Effluent Collected on June 10 & 11

Figure 8
July NPDES Permit Test
Mysidopsis bahia



Effluent Collected on July 8 & 9
Permit Test was Repeated Due to ABL's
Bad Control (85% Survival)

ATTACHMENT 6

ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement

REGION 6
First International Bldg., 1201 Elm St.
Dallas, Texas 75270

CHAIN OF CUSTODY RECORD

PROJ. NO.: AFE
PROJECT NAME: TX4863
SAMPLERS: (Signature) Jana Harwell

STA. NO.	DATE 92	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	PCB/PEST #05	ABN #06	PCB/PEST, ABN #33	Phenols #04			REMARKS
001	1/13	Begin 12:24pm			outfall 001, TX4863	1	X						12 part-manual flow wt comp. sample 80 oz amber
	1/14	End 10:42am	X										
001	1/13	Begin 12:24pm			outfall 001, TX4863	1		X					12 part manual flow wt comp. sample 80 oz amber
	1/14	End 10:42am	X										
001	1/13	Begin 12:24pm			outfall 001, TX4863	1			X				Dup. of 12 part for PCB/PEST, ABN 80 oz amber
	1/14	End 10:42am	X										
001	1/13	Begin 12:24pm			outfall 001, TX4863	1				X			12 part man. flow wt comp sample 1 qt glass H_2SO_4 pH < 2; ice
	1/14	End 10:42am	X										

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Jana Harwell	1/14/92 6:10	[illegible]			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

6-13142

ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement

REGION 6
First International Bldg., 1201 Elm St.
Dallas, Texas 75270

CHAIN OF CUSTODY RECORD

PROJ. NO.: AFE
PROJECT NAME: Tx 4863
SAMPLERS: (Signature)

STA. NO.	DATE 1992	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	PCB/PEST/ABN-DUP						REMARKS
007	1/13-1/14	6:30 p.m.-12:30 a.m.	X		OUTFALL 007 - Tx 4871	1	X						ICE, 80 oz. AMBER (SAMPLE 16)

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	1/14/92 6:00 p.m.	Ken Cooper			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

6-13144

ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement

REGION 6
First International Bldg., 1201 Elm St.
Dallas, Texas 75270

CHAIN OF CUSTODY RECORD

PROJ. NO.: AFF
PROJECT NAME: TX 4863
SAMPLERS: (Signature) Jana Harwell

STA. NO.	DATE 192	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	COD, NH3-N, SAMPLE #02	METALS, SAMPLE #03	BOD, TSS, SAMPLE #01	BIO, SAMPLE #34	PCB/PEST, SAMPLE #8	ABN, SAMPLE #7	REMARKS
001	1/13-1/14	2:30 p.m. - 1:30 p.m.	X		OUTFALL 001 - TX 4863	1	X						PRESERVED W/ H_2SO_4, pH<2 - 1 QT. CUBIT.
001	1/13-14	2:30 p.m. - 1:30 p.m.	X		OUTFALL 001 - TX 4863	1		X					HNO_3 - pH<2, 1 QT. CUBIT.
001	1/13-14	"	X		" " " "	1			X				ICE, 1 GAL. CUBIT.
001	" "	"	X		" " " "	1				X			ICE, 2.5 GAL. CUBIT.
007	" "	6:30 p.m. - 12:30 p.m.	X		OUTFALL 007 - TX 4871	1					X		ICE, 80 OZ. AMBER
"	" "	"	X		" " " "	1						X	" " " "

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	1/14/92 6:00 p.m.	Ken Cooper			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

6-13143

ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement

REGION 6
First International Bldg., 1201 Elm St.
Dallas, Texas 75270

CHAIN OF CUSTODY RECORD

PROJ. NO.: AFE

PROJECT NAME: TX 4871

SAMPLERS: (Signature) Jana Harwell

STA. NO.	DATE 92	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	BOD, TSS #01	TOC, NH3-N #2	Metals #03				REMARKS
007	1/13/92 1/14/92	6:15pm 6:15pm	X		outfall 007 TX4871	1	X						1 gal. cub
007	1/13/92 1/14/92	6:15pm 6:15pm	X		outfall 007 TX4871	1		X					H_2SO_4 pH<2, ice
007	1/13/92 1/14/92	6:15pm 6:15pm	X		outfall 007 TX4871	1			X				HNO_3 ice

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Jana Harwell	1/14/92 7pm	Ken Cooper			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

6-13145

ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement

REGION 6
First International Bldg., 1201 Elm St.
Dallas, Texas 75270

CHAIN OF CUSTODY RECORD

PROJ. NO.: AFE
PROJECT NAME: TX4863/TX4871
SAMPLERS: (Signature) Jana Harrell

STA. NO.	DATE 92	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOAs #13, #14	VOAs #9, #12	VOAs #1B, #1A	VOAs #13, #14	VOAs #8, #7	VOAs #23, #21	REMARKS
007	1/14	12:49pm 12:50pm		X	outfall 007 TX 4871	2	X						(2) 40ml vials; ice
007	1/13	6:25pm 6:30pm		X	outfall 007 TX 4871	2		X					(2) 40 ml vials; ice
007	1/14	6:44am 6:45am		X	outfall 007 TX4871	2			X				(2) 40 ml vials; ice
001	1/13	7:23pm 7:25pm		X	outfall 001 TX4863	2				X			(2) 40 ml vials; ice
001	1/13	12:34pm 12:40pm		X	outfall 001 TX4863	2					X		(2) 40 ml vials; ice
001	1/14	7:06am 7:07am		X	outfall 001 TX4863	2						X	(2) 40 ml vials; ice

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Jana Harrell	1/14/92 16:10	[illegible]			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

6-19419

ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement

REGION 6
First International Bldg., 1201 Elm St.
Dallas, Texas 75270

CHAIN OF CUSTODY RECORD

PROJ. NO.: AFE
PROJECT NAME: TX4863
SAMPLERS: (Signature) Janar Harwell

STA. NO.	DATE 92	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOAs #16, #15	VOAs #29, #30	VOAs #19, #20	VOAs #11, #12	VOAs #26, #28	VOAs #17, #18	REMARKS
001	1/13	8:47pm 8:49pm		X	outfall 001 TX4863	2	X						(2) 40ml vials; ice
001	1/14	1:31am 1:32am		X	outfall 001 TX4863	2		X					(2) 40ml vials; ice
001	1/14	4:33am 4:34am		X	outfall 001 TX4863	2			X				(2) 40ml vials; ice
001	1/13	4:52pm 4:55pm		X	outfall 001 TX4863	2				X			(2) 40ml vials; ice
001	1/13	10:54pm 10:55pm		X	outfall 001 TX4863	2					X		(2) 40ml vials; ice
001	1/14	2:37am 2:38am		X	outfall 001 TX4863	2						X	(2) 40ml vials; ice

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Janar Harwell	1/14/92 16:10	[signature]			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

6-13140

ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement

REGION 6
First International Bldg., 1201 Elm St.
Dallas, Texas 75270

CHAIN OF CUSTODY RECORD

PROJ. NO.: AFE

PROJECT NAME: TX4863, TX4871

SAMPLERS: (Signature) Jana Harwell

STA. NO.	DATE 92	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOAs #22, #24	VOAs #9, #10	VOAs #32B, #15	VOAs #25, #27	VOAs #1C, #1D	REMARKS
001	1/14	8:37am 8:40am		X	outfall 001 TX4863	2	X					(2) 40 ml vials; ice
001	1/13	12:50pm 12:52pm		X	outfall 001 TX4863	2		X				(2) 40 ml vials; ice
Field blank	1/10	9am 9am		X	blanks - DeIon H_2O prepared in Dallas	2			X			(2) 40 ml vials; ice
001	1/14	10:43am 10:41am		X	outfall 001 TX 4863	2				X		(2) 40 ml vials; ice
007	1/14	12:41pm 12:42pm		X	outfall 007 TX 4871	2					X	(2) 40 ml vials; ice

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Jana Harwell	1/14/92 / 6:10	[illegible]			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

6-13141

ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement

REGION 6
First International Bldg., 1201 Elm St.
Dallas, Texas 75270

CHAIN OF CUSTODY RECORD

PROJ. NO. AFE

PROJECT NAME TX 4863 / TX4871

SAMPLERS: (Signature) Jana Harwell [signature]

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Cyanide #35	Cyanide #11	Bio #10	Odg #3	Phenolic cmpds #4	Sulfides #5	REMARKS
outfall	92												
001	1/13	12:47pm		X	outfall 001; Chem. Co TX4863	1	X						NaOH pH>12; ice 1 qt
007	1/13	6:05pm		X	outfall 007; Refinery TX4871	1		X	~~X~~	1/13/92			NaOH pH>12; ice 1 qt.
007	1/13	6pm		X	outfall 007; Refinery TX4871	1			X				ice 2.5 gal. cub.
007	1/13	6:17pm		X	outfall 007; Refinery TX4871	1				X			H_2SO_4 pH<2; ice 1 qt. glass
007	1/13	6:15pm		X	outfall 007; Refinery TX4871	1					X		H_2SO_4 pH<2; ice 1 qt. glass
007	1/13	6:20pm		X	outfall 007; Refinery TX4871	1						X	Zinc Acetate + NaOH pH>9; ice 1 qt glass

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Jana Harwell	1/14/92 7:55am	[signature]			
Relinquished by: (Signature) [signature]	Date / Time 1/14/92 16:10	Received by: (Signature) [signature]	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

6-19418

NPDES LABORATORY REPORT

April 22, 1992

MEMORANDUM

SUBJECT: Shell TRRP -- Photograph Log

FROM : Jana Harvill
Environmental Engineer (6E-SC)

TO : Walter Helmick
Hydrogeologist (6E-SH)

Attached are the photographs taken during the Shell TRRP multi-media inspection the week of 12/9/91.

If you have any questions, please contact me at 5-6486

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

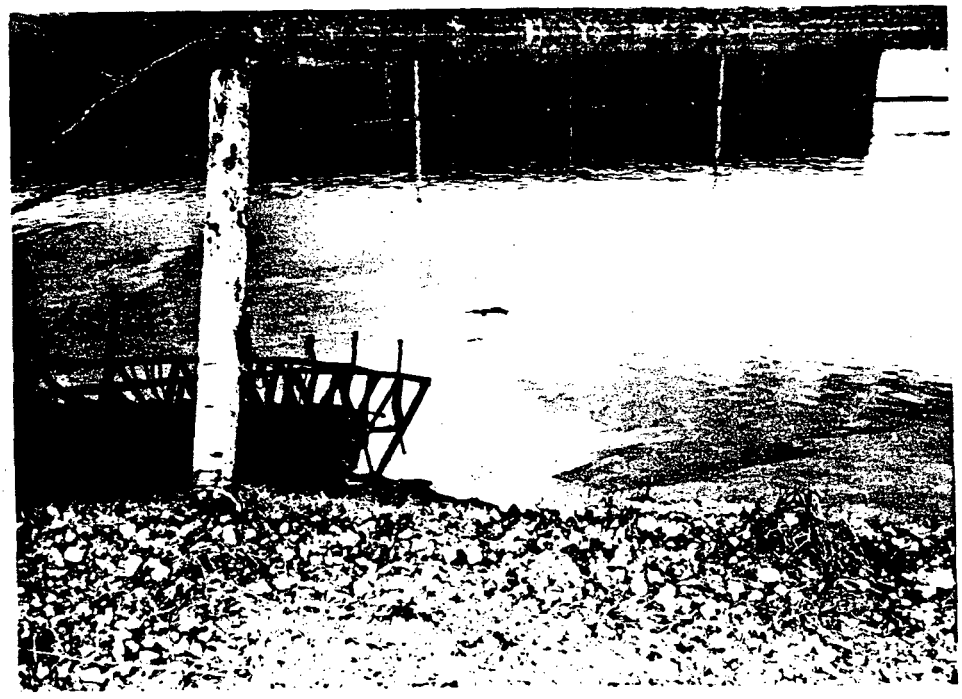


Photo Number: 1 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: STORM WATER POND IMPOUNDMENT
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 1:03 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

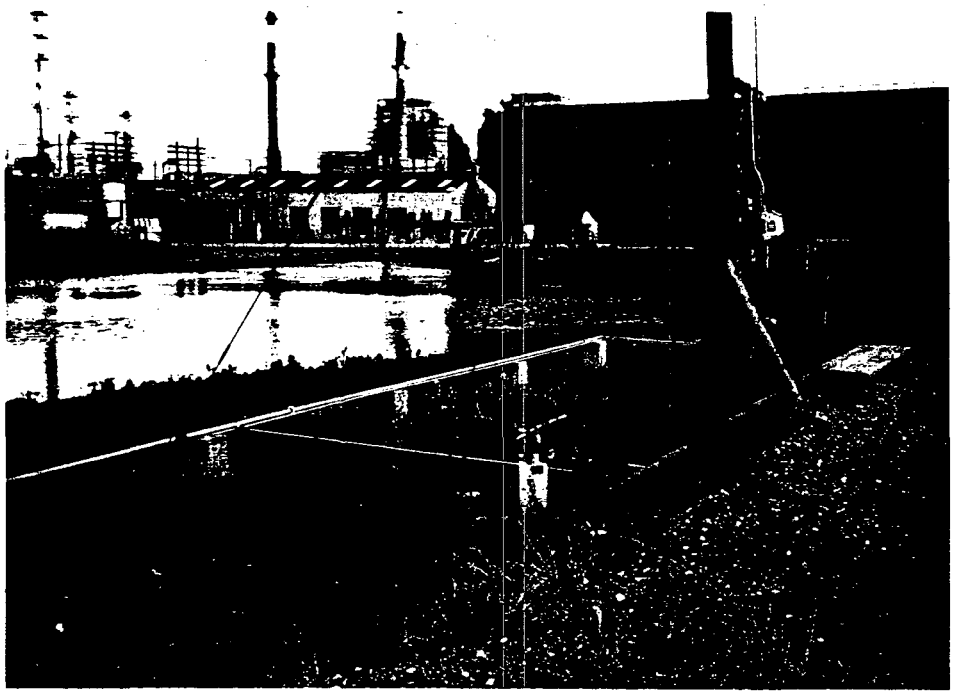


Photo Number: 2 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: COOLING TOWER POND (NO CR)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 1:25 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

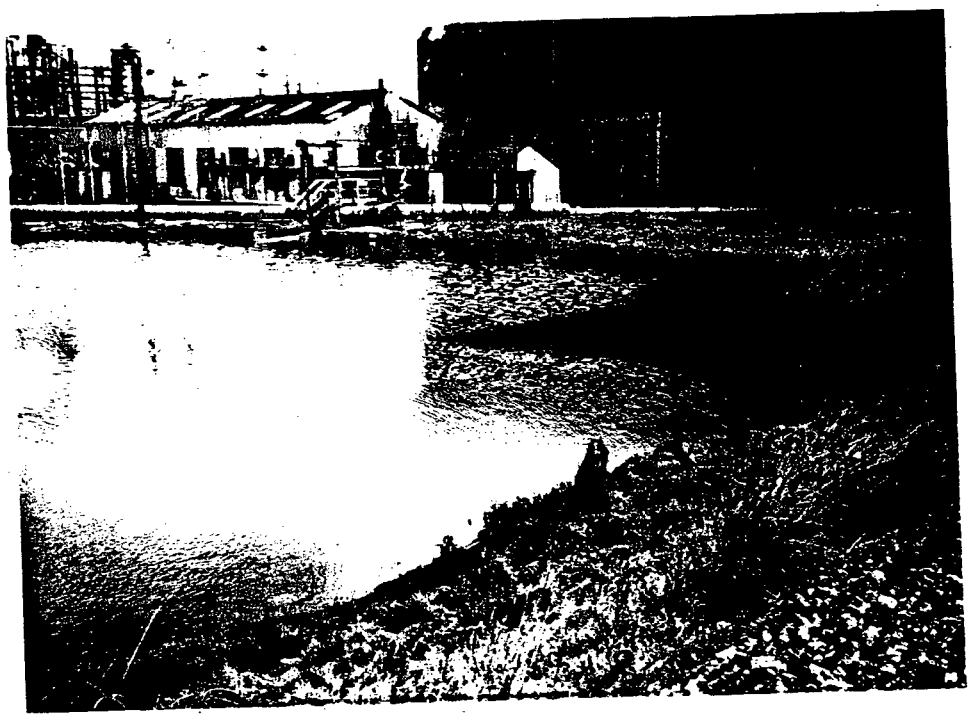


Photo Number: 3 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: COOLING TOWER POND (NO CR)NEXT TO STORM POND
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 1:27 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

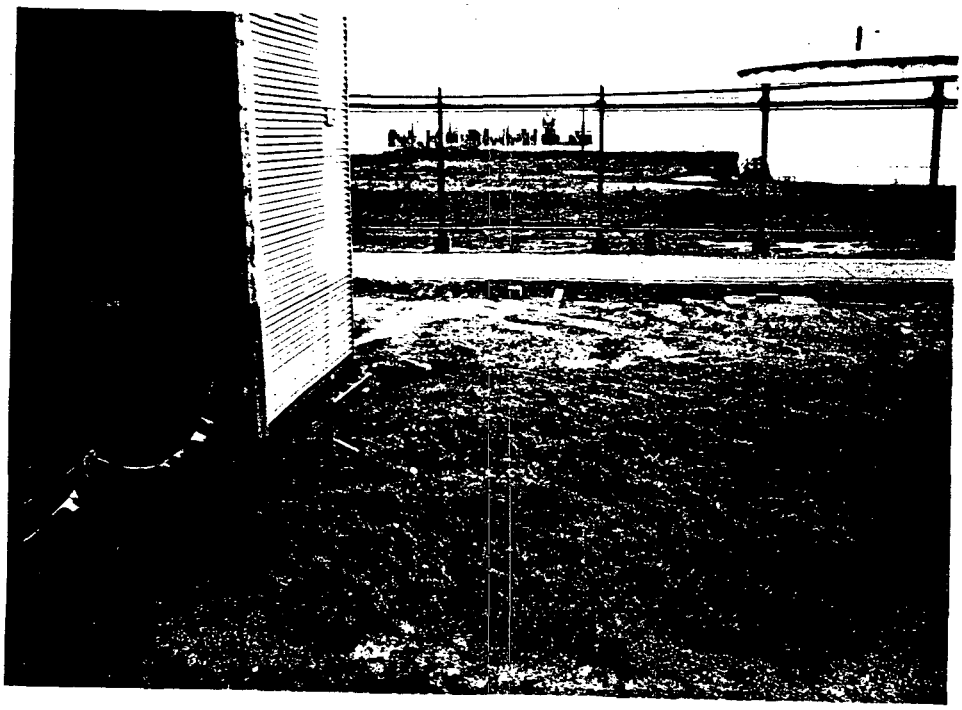


Photo Number: 4 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: COOLING TOWER RUNOOF INTO DITCH
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 1:30 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

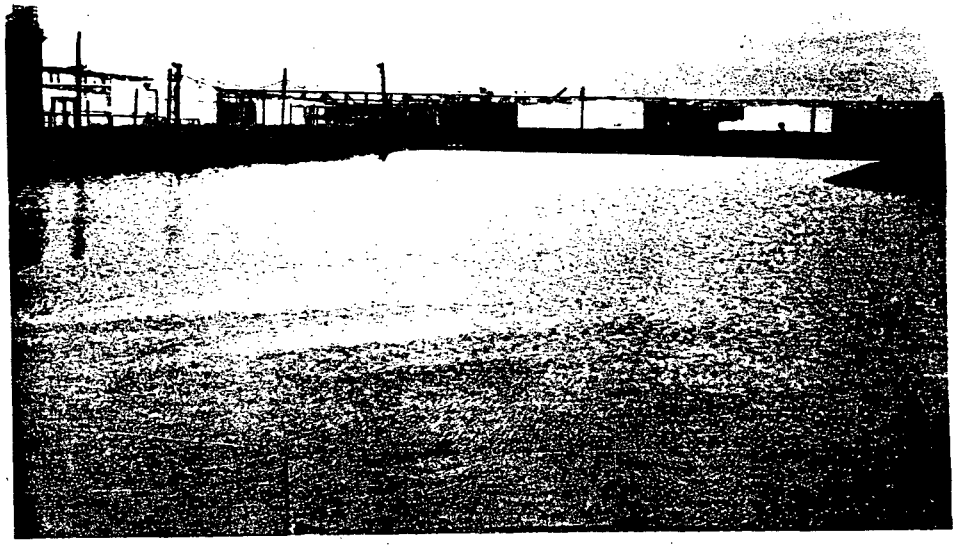


Photo Number: 5 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: STORM POND (NOTE DISCOLORATION)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 1:32 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

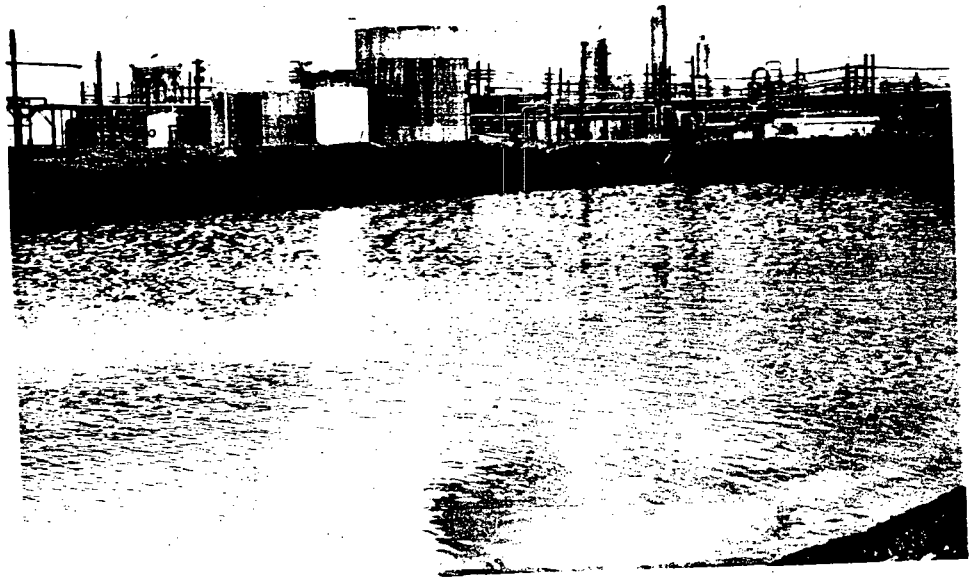


Photo Number: 6 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: STORM POND (NOTE DISCOLORATION)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 1:34 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 7 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: DISCHARGE PIPE FROM STORM POND
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 1:37 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

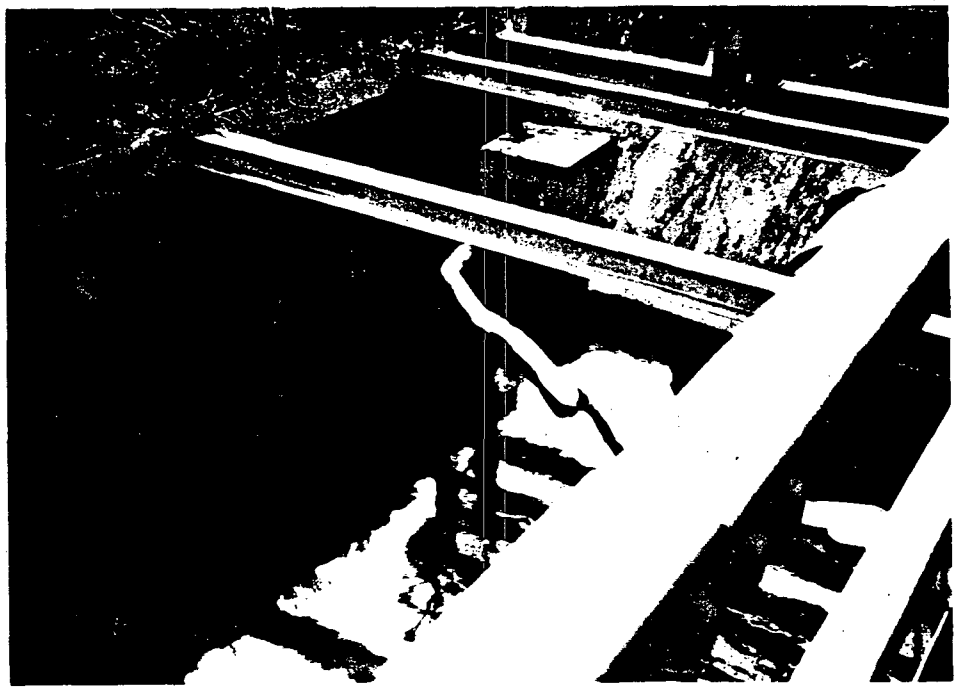


Photo Number: 8 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: OUTFALL R004(RUNOFF FROM CAPPED PONDS)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:00 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

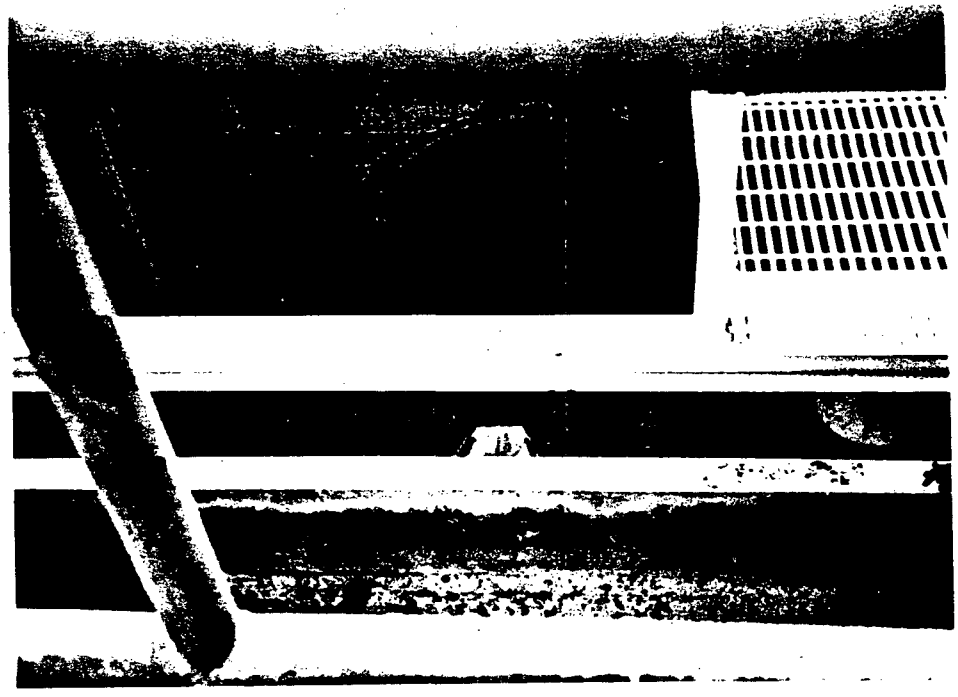


Photo Number: 9 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: OUTFALL R009
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:10 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

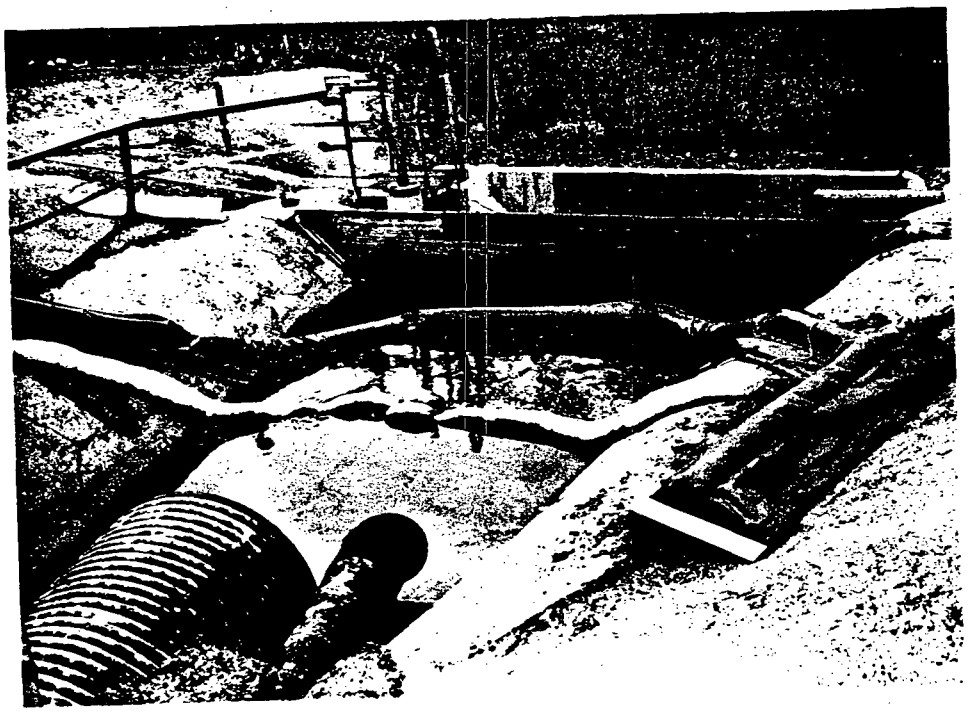


Photo Number: 10 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: OUTFALL R006
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:16 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 11 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: OUTFALL R006(NOTE LEAKAGE AT WEIR)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:18 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

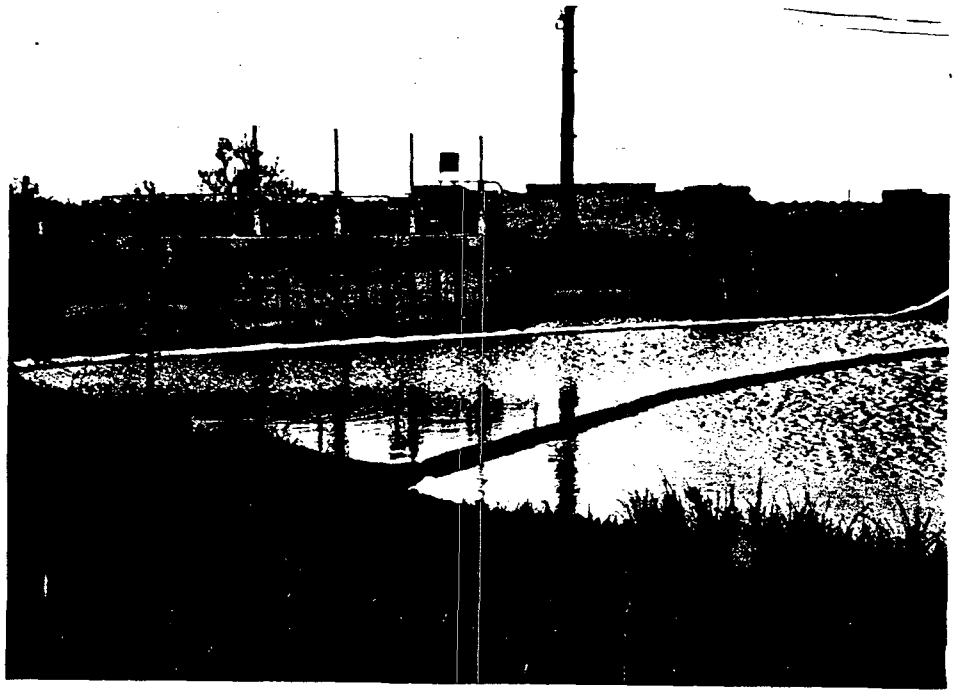


Photo Number: 1 Photographer: JANA HARVILL
Location: SHELL DEER PARK (2ND ROLE OF FILM)
Subject: OUTFALL R008 (CAN GO TO STORM POND)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:26 PM Weather: PARTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

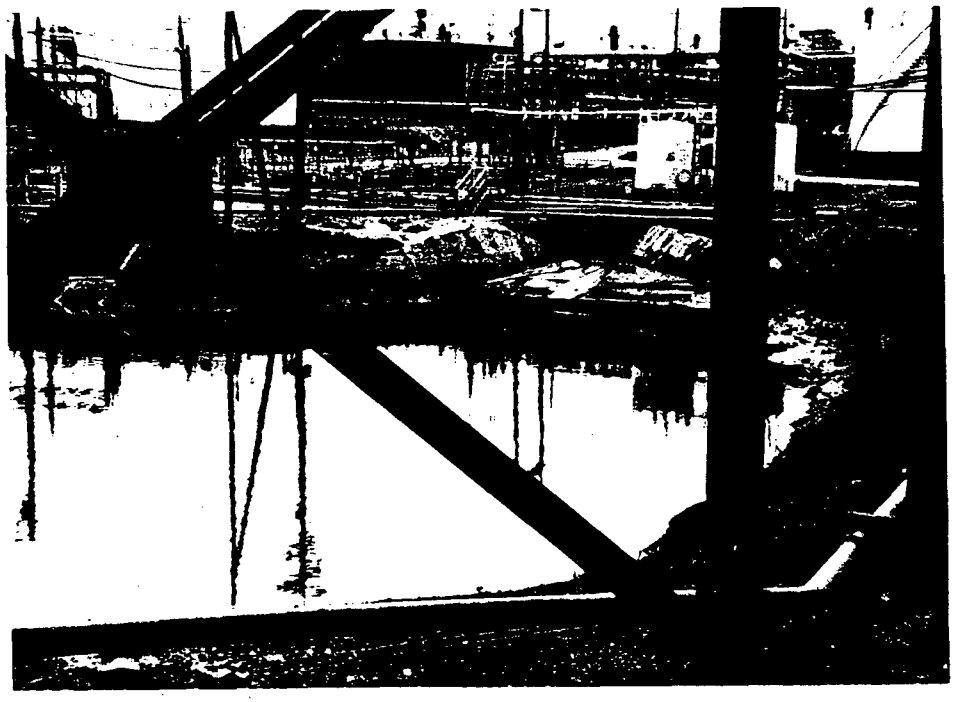


Photo Number: 2 Photographer: JANA HARVILL
Location: SHELL DEER PARK (2ND ROLE OF FILM)
Subject: NORTH POND (REFINERY)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:32 PM Weather: PARTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

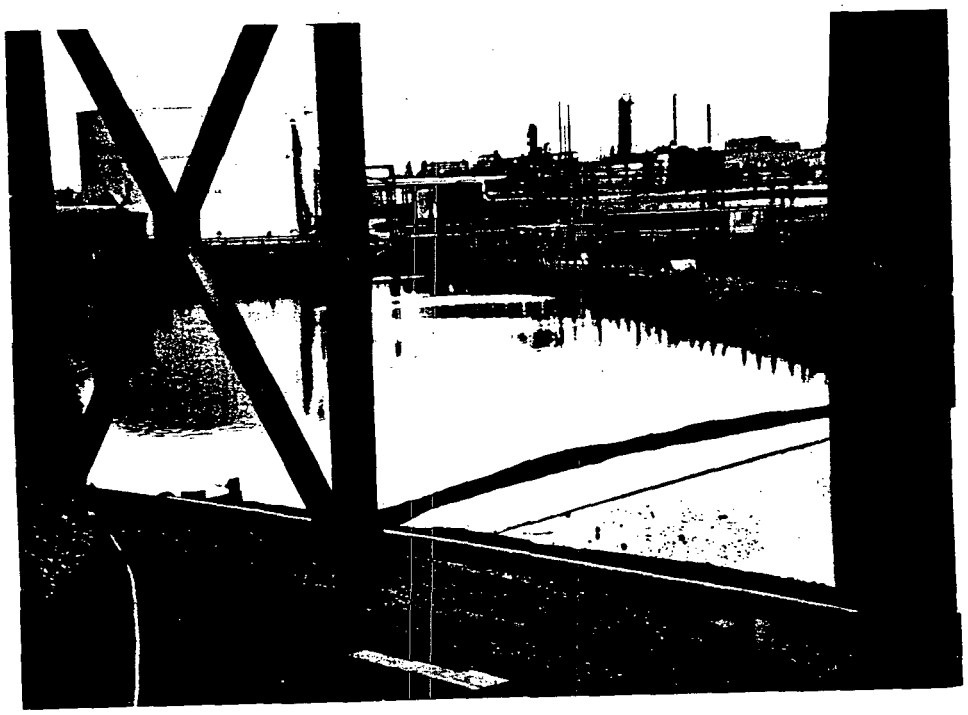


Photo Number: 3 Photographer: JANA HARVILL
Location: SHELL DEER PARK (2ND ROLE OF FILM)
Subject: NORTH POND (REFINERY)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:33 PM Weather: PARTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

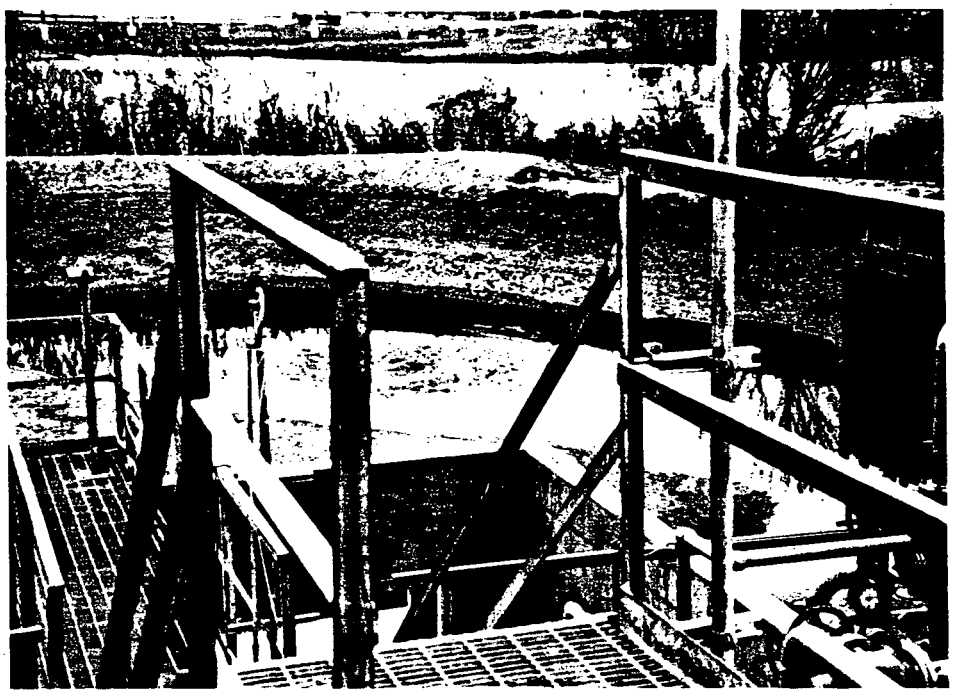


Photo Number: 4 Photographer: JANA HARVILL
Location: SHELL DEER PARK (2ND ROLE OF FILM)
Subject: OUTFALL R003 (INNER POND)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:42 PM Weather: PARTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

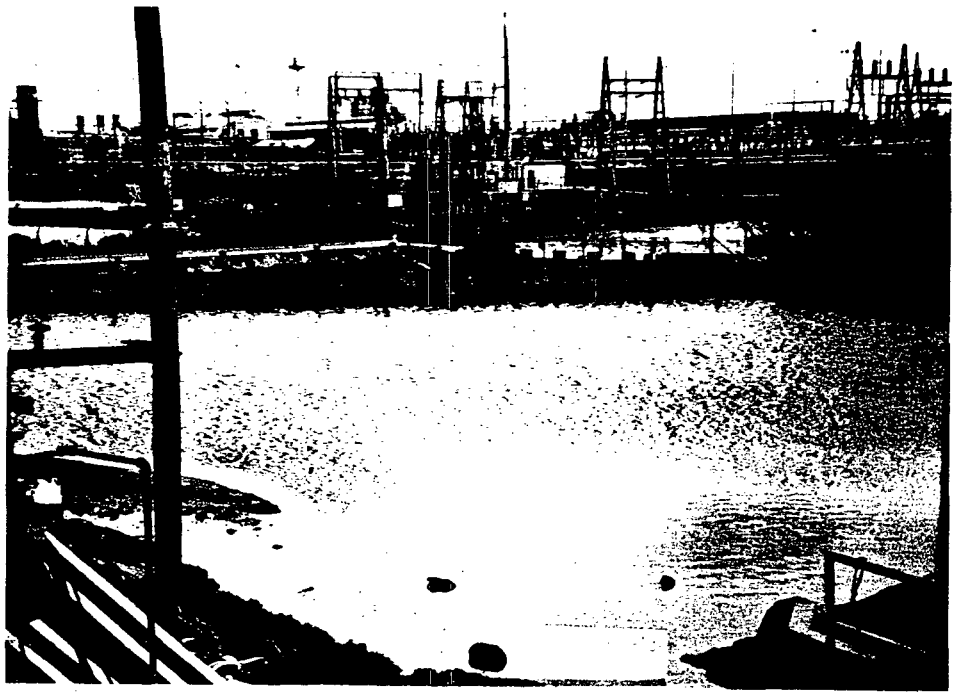


Photo Number: 5 Photographer: JANA HARVILL
Location: SHELL DEER PARK (2ND ROLE OF FILM)
Subject: OUTFALL R003 (OUTER POND)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:44 PM Weather: PARTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 6 Photographer: JANA HARVILL
Location: SHELL DEER PARK (2ND ROLE OF FILM)
Subject: OUTFALL R002 (INNER POND)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:54 PM Weather: PARTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 7 Photographer: JANA HARVILL
Location: SHELL DEER PARK (2ND ROLE OF FILM)
Subject: OUTFALL R002 (OUTER POND)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:56 PM Weather: PARTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

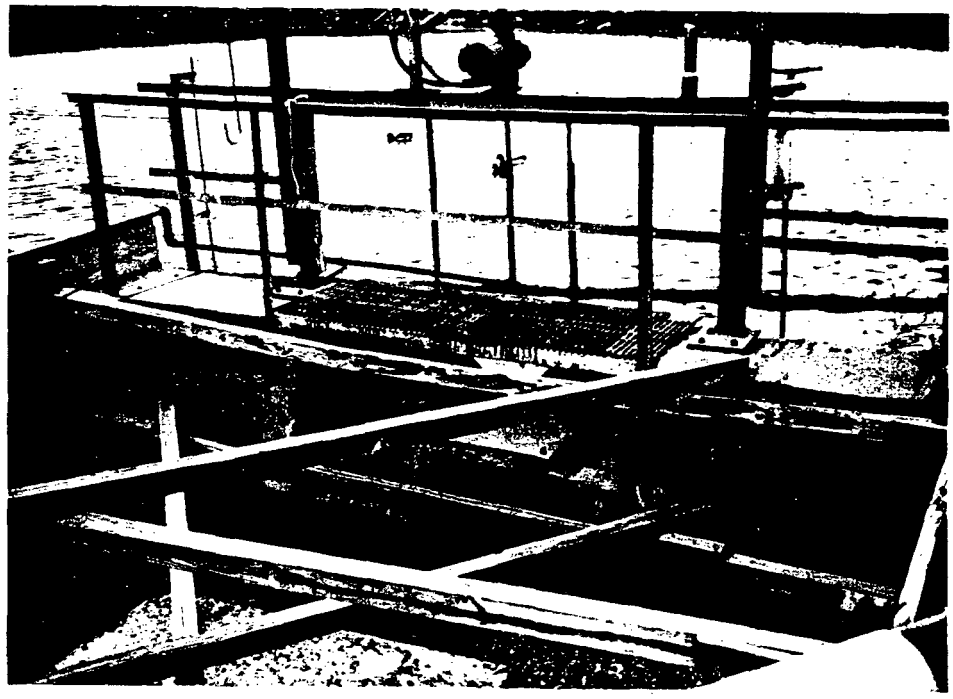


Photo Number: 8 Photographer: JANA HARVILL
Location: SHELL DEER PARK (2ND ROLE OF FILM)
Subject: OUTFALL R001
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 4:12 PM Weather: PARTLY CLOUDY

March 6, 1992

MEMORANDUM

SUBJECT: Shell TRRP -- Laboratory Report

FROM : Jana Harvill
Environmental Engineer (6E-SC)

TO : Walter Helmick
Hydrogeologist (6E-SH)

Attached is the laboratory report for the Shell TRRP sampling conducted the week of 1/13/92.

If you have any questions, please contact me at 5-6486

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

RECEIVED
FEB 24 1992
6E-SC

MEMORANDUM

DATE: February 21, 1992

SUBJECT: Notice of Intent to Dispose of Samples

FROM: Diana G. Ayers, Chief, Houston Branch; 6E-H Don L. Payne for

TO: James Stiebing, Chief,
Surveillance Branch; 6E-S

The Houston Laboratory is required to dispose of all hazardous wastes we generate in a manner consistent with RCRA regulations. This includes all samples received for analysis provided we find them to contain contaminants which classify them as RCRA hazardous wastes. In addition, any samples found to contain PCBs must be disposed of according to TCSA regulations.

I have included this memorandum in the final analytical report to serve as notice to the program that we have completed all analysis. If we have any of the original sample remaining after analysis is complete we will dispose of it within 90 days. Please note that even though original sample may be left over, it does not mean that a reanalysis of the sample may be requested since the sample has most likely exceeded its holding time and any subsequent analysis may not be valid.

If you have a need to hold these samples in custody longer than 90 days, please sign below and return this memorandum to me within the next 30 days. Also, state briefly your need to hold these samples in custody.

Thank you for your cooperation in this request.

SHELL REFINERY (2AFERS05)

Facility Name

Program Manager Date

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

MEMORANDUM

DATE: February 21, 1992

SUBJECT: Laboratory Results for Shell Refinery

FROM: Diana G. Ayers, Chief, Houston Branch; 6E-H Ken L Payne for

TO: James Stiebing, Chief, Surveillance Branch; 6E-S

ATTN: Jana Harvill; 6E-SC

Attached are the analytical results for the subject site. Five water samples were received for analysis on January 15, 1992.

This is a final report.

Attachments

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

MEORANDUM

DATE: February 14, 1992

SUBJECT: Organic Analysis of Shell Refinery.

FROM: Michael Daggett
Chief; Organic Section

TO: Diana Ayers
Chief; Houston Branch

Attached are the organic section analysis reports for samples 2AFERS05-01 thru 2AFERS05-05. These samples were analyzed for PCBs, pesticides, ABNs and VOAs. There were no target compounds detected in these samples.

This is a final report.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

MEMORANDUM

Date: February 21, 1992

Subject: Laboratory Results for Shell Refinery

From: David C. Stockton, Chief, Inorganic Lab Section, 6E-HI

To: Diana G. Ayers, Chief, Houston Branch, 6E-H

Attached are laboratory results for the subject site. Two (2) samples were received on January 15, 1992, to be analyzed for Metals, BOD, Ammonia, TOC, TSS, Phenols, Sulfide, and Oil and Grease.

The laboratory numbers assisgned were 2AFERS0502 and 03.

This is a final report.

Attachments (2)

Date: 02/21/92

Attachment 1

US ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL SERVICE DIVISION
HOUSTON LABORATORY SECTION

LAB SAMPLE REPORT

Activity Number: 2AFERS05 Date Recvd: 01/15/92 Date Collected: 01/13/92
Sample Number: 1 Time Recvd: 07:00 Time Collected: 18:30

Source: SHELL REFINERY Tag Number:
Site Description: STA#007 OUTFALL 007-COMPOSITE
Sample Type: WATER
Sample Retention:

Param- Organic: ABN PCB PES
Metals:
Inorganic:
Biology:

Due Date: 02/14/92
Date Projected: 02/14/92
Date Completed: 02/21/92
Comment:
Your Initials: CH

ORGANIC ANALYSIS DATA

6ES-HL SAMPLE NO.: 2AFERS05-01 DATE REPORTED: 1/27/92

SAMPLE TYPE: WATER ANALYST:MARVELYN HUMPHREY

HSL ACID BASE/NEUTRAL COMPOUNDS BY METHOD 625

COMPOUND	ug/L	COMPOUND	ug/L
Phenol	nd dl=4	Acenaphthene	nd dl=2
bis(2-Chloroethyl) Ether	nd dl=2	2,4-Dinitrophenol	nd dl=30
2-Chlorophenol	nd dl=4	4-Nitrophenol	nd dl=13
1,3-Dichlorobenzene	nd dl=3	Dibenzofuran	nd dl=2
1,4-Dichlorobenzene	nd dl=3	2,4-Dinitrotoluene	nd dl=6
Benzyl Alcohol	nd dl=4	2,6-Dinitrotoluene	nd dl=6
1,2-Dichlorobenzene	nd dl=3	Diethylphthalate	nd dl=2
2-Methylphenol	nd dl=6	4-Chlorophenylphenyl Ether	nd dl=8
bis(2-chloroisopropyl)Ether	nd dl=2	Fluorene	nd dl=2
4-Methylphenol	nd dl=6	4-Nitroaniline	nd dl=8
N-Nitroso-Di-n-Propylamine	nd dl=6	4,6-Dinitro-2-Methylphenol	nd dl=20
Hexachloroethane	nd dl=3	N-Nitrosodiphenylamine	nd dl=4
Nitrobenzene	nd dl=2	4-Bromophenylphenyl Ether	nd dl=8
Isophorone	nd dl=4	Hexachlorobenzene	nd dl=2
2-Nitrophenol	nd dl=10	Pentachlorophenol	nd dl=15
2,4-Dimethylphenol	nd dl=6	Phenanthrene	nd dl=2
Benzoic Acid	nd dl=10	Anthracene	nd dl=2
bis(2-Chloroethoxy)Methane	nd dl=2	Di-n-Butylphthalate	nd dl=2
2,4-Dichlorophenol	nd dl=6	Fluoranthene	nd dl=2
1,2,4-trichlorobenzene	nd dl=3	Benzidine	nd dl=20
Naphthalene	nd dl=2	Pyrene	nd dl=2
4-Chloroaniline	nd dl=4	Butylbenzylphthalate	nd dl=4
Hexachlorobutadiene	nd dl=5	3,3'-Dichlorobenzidine	nd dl=10
4-Chloro-3-Methylphenol	nd dl=8	Benzo(a)Anthracene	nd dl=8
2-Methylnaphthalene	nd dl=2	bis-(2-Ethylhexyl)Phthalate	nd dl=4
Hexachlorocyclopentadiene	nd dl=10	Chrysene	nd dl=8
2,4,6-Trichlorophenol	nd dl=6	Di-n-Octyl Phthalate	nd dl=4
2,4,5-Trichlorophenol	nd dl=6	Benzo(b)Fluoranthene	nd dl=8
2-Chloronaphthalene	nd dl=2	Benzo(k)Fluoranthene	nd dl=8
2-Nitroaniline	nd dl=8	Benzo(a)Pyrene	nd dl=8
DimethylPhthalate	nd dl=2	Indeno(1,2,3-cd) Pyrene	nd dl=8
Acenaphthylene	nd dl=2	Dibenzo(a,h)Anthracene	nd dl=8
3-Nitroaniline	nd dl=8	Benzo(g,h,i)Perylene	nd dl=8

ORGANIC ANALYSIS DATA

6ES-HL SAMPLE NO.: 2AFERS05-01 DATE REPORTED: 1/27/92

SAMPLE TYPE: WATER

ANALYST: MARVELYN HUMPHREY

TENTATIVE COMPOUNDS BY METHOD 625

SCAN#	CAS #	EST.CONC (ug/L)	COMPOUND NAME
181	79345	12	1,1,2,2-TETRACHLOROETHANE
578		32	UNKNOWN
792		6	UNKNOWN
1328	123795	5	HEXANEDIOIC ACID, DIOCTYL ESTER

* ANALYSTS NOTE ! - THE COMPOUNDS LISTED ARE TENATIVELY IDENTIFIED BY THE BEST MATCH WITH THE NIH/EPA/WILEY MASS SPECTRAL DATA BASE OR BY MANUAL MASS SPECTRA INTERPRETATION. STANDARDS WERE NOT AVAILABLE FOR CONFIRMATION OR QUANTITATION.
** Estimated concentration is based on a RF of 1.0 to internal standard !

PESTICIDE/PCB ANALYSIS

6ES-HL SAMPLE NO : 2AFERS050: DATE REPORTED: 1 /28/1992

SAMPLE TYPE: AQUEOUS

ANALYST: L.C. MINER,JR.

CAS#		UG/L (PPB)
319-84-6	alpha-BHC	ND DL=< 0.05
319-85-7	beta-BHC	ND DL=< 0.05
319-86-8	delta-BHC	ND DL=< 0.05
58-89-9	gamma-BHC (Lindane)	ND DL=< 0.05
76-44-8	Heptachlor	ND DL=< 0.05
309-00-2	Aldrin	ND DL=< 0.05
1024-57-3	Heptachlor epoxide	ND DL=< 0.05
959-98-8	Endosulfan I	ND DL=< 0.05
60-57-1	Dieldrin	ND DL=< 0.05
72-55-9	4,4'-DDE	ND DL=< 0.05
72-20-8	Endrin	ND DL=< 0.05
33213-65-9	Endosulfan II	ND DL=< 0.05
72-54-8	4,4'-DDD	ND DL=< 0.05
7421-93-4	Endrin aldehyde	ND DL=< 0.10
53494-70-5	Endrin ketone	ND DL=< 0.10
1031-07-8	Endosulfan sulfate	ND DL=< 0.10
50-29-3	4,4'-DDT	ND DL=< 0.10
72-43-5	Methoxychlor	ND DL=< 0.20
5103-71-9	alpha-Chlordane	ND DL=< 0.05
5103-74-2	gamma-Chlordane	ND DL=< 0.05
8001-35-2	Toxaphene	ND DL=< 2.00
12674-11-2	Aroclor-1016	ND DL=< 1.00
11104-28-2	Aroclor-1221	ND DL=< 2.00
11141-16-5	Aroclor-1232	ND DL=< 1.00
53469-21-9	Aroclor-1242	ND DL=< 1.00
12672-29-6	Aroclor-1248	ND DL=< 1.00
11097-69-1	Aroclor-1254	ND DL=< 1.00
11096-82-5	Aroclor-1260	ND DL=< 1.00

ND DL = NOT DETECTED, DETECTION LIMIT

Date: 02/21/92

Attachment 2

US ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL SERVICE DIVISION
HOUSTON LABORATORY SECTION

LAB SAMPLE REPORT

Activity Number: 2AFERS05 Date Recvd: 01/15/92 Date Collected: 01/13/92
Sample Number: 2 Time Recvd: 07:00 Time Collected: 18:15

Source: SHELL REFINERY Tag Number:
Site Description: STA#007 OUTFALL 007-COMPOSITE
Sample Type: WATER
Sample Retention:

Param- Organic:
Metals: MET
Inorganic: BOD NH3 TOC TSS
Biology:

Due Date: 02/14/92
Date Projected: 02/14/92
Date Completed: 02/21/92
Comment:
Your Initials: CH

US EPA HOUSTON BRANCH

SAMPLE #:	2AFERS05-02	DATE RECEIVED:	15-Jan-92
SOURCE:	SHELL REFINERY		
TYPE:	AQUEOUS	DATE REPORTED:	21-Feb-92
ANALYSTS:	RC,LC,JL,TWC		

PARAMETER	CONCENTRATION	DETECTION LIMIT <=	UNITS
ANTIMONY	ND	60	UG/L
ARSENIC	ND	6.4	UG/L
BERYLLIUM	ND	5	UG/L
CADMIUM	ND	5	UG/L
CHROMIUM	34	10	UG/L
COPPER	ND	20	UG/L
LEAD	ND	30	UG/L
MERCURY	ND	0.2	UG/L
NICKEL	ND	20	UG/L
SELENIUM	ND	29	UG/L
SILVER	ND	10	UG/L
THALLIUM	ND	4.8	UG/L
ZINC	74	20	UG/L
BOD	ND	5	MG/L
NH3-N	1.80	0.01	MG/L
TOC	20	1	MG/L
TSS	3.6	1	MG/L

ND: LESS THAN DETECTION LIMIT

Date: 02/21/92

Attachment 3

US ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL SERVICE DIVISION
HOUSTON LABORATORY SECTION

LAB SAMPLE REPORT

Activity Number: 2AFERS05 Date Recvd: 01/15/92 Date Collected: 01/13/92
Sample Number: 3 Time Recvd: 07:00 Time Collected: 18:00

Source: SHELL REFINERY Tag Number:
Site Description: STA#007 OUTFALL 007-GRAB
Sample Type: WATER
Sample Retention:

Param- Organic:
Metals:
Inorganic: CN O&G OH- S=
Biology: BSH

Due Date: 02/14/92
Date Projected: 02/14/92
Date Completed: 02/21/92
Comment:
Your Initials: CH

US EPA HOUSTON BRANCH

SAMPLE #:	2AFERS05-03	DATE RECEIVED:	15-Jan-92
SOURCE:	SHELL REFINERY		
TYPE:	AQUEOUS	DATE REPORTED:	21-Feb-92
ANALYSTS:	TWC		

PARAMETER	CONCENTRATION	DETECTION LIMIT <=	UNITS
PHENOLS	19.3	0.01	MG/L
SULFIDE	0.01	0.01	MG/L
OIL AND GREASE	ND	5	MG/L

ND: LESS THAN DETECTION LIMIT

FACILITY: Shell Refinery
NPDES NUMBER: TX4871
OUTFALL NUMBER: 007
DATE COLLECTED: 01/14/92

LABORATORY NUMBER: 2AFERS0503
TEST ORGANISM: *Cyprinodon variegatus*
ANALYST: Hollister

Results: After nine days, no significant effect was observed in organisms exposed to the Shell Refinery effluent (Table 1).

Measurements of water chemistry are given in Table 2.

Dissolved oxygen remained ≥89% of saturation throughout the exposure period. Temperature was maintained at 25±1°C.

TABLE 1. Percentage of sheepshead minnow embryo/larvae affected after nine days of exposure. Twenty embryos were exposed to each concencentration and the control. The salinity of the effluent was adjusted to that of the control (20ppt) before testing was initiated.

Concentration (%)	Organisms Affected[a] (%)
Control (Culture Water)	10
6	5
12	0
25	5
50	5
100	5

[a]Effects include the combined number of dead embryos (unhatched) and larvae, also, organisms exhibiting terata and abnormal swimming behavior.

TABLE 2. Water chemistry data recorded on day 0 for the control water and and 100% effluent. Values are given as milligrams per liter.

	Parameter					
	pH	Alkalinity	Conductivity	Total Ammonia	Total Chlorine	Salinity
Control	7.8	48	29,110	<0.1	<0.1	20,000
Effluent	7.5	216	1,240	2.0[a]	<0.1	2,000

[a]Unionized ammonia was <0.1.

Date: 02/21/92

Attachment 4

US ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL SERVICE DIVISION
HOUSTON LABORATORY SECTION

LAB SAMPLE REPORT

Activity Number: 2AFERS05 Date Recvd: 01/15/92 Date Collected: 01/13/92
Sample Number: 4 Time Recvd: 07:00 Time Collected: 18:25

Source: SHELL REFINERY Tag Number:
Site Description: STA#007 OUTFALL 007-IN LAB COM
Sample Type: WATER
Sample Retention:

Param- Organic: VOA
Metals:
Inorganic:
Biology:

Due Date: 02/14/92
Date Projected: 02/14/92
Date Completed: 02/21/92
Comment:
Your Initials: CH

ORGANIC ANALYSIS DATA

6E-HL SAMPLE NO: 2AFERS05-04 DATE REPORTED: 29 Jan 1992

SAMPLE TYPE: water

ANALYST: Edward O'Neill

VOLATILE COMPOUNDS BY METHOD 624

PP#	CAS#		(ug/l)	
	67-64-1	acetone	ND	DL= 5
(2V)	107-02-8	acrolein	ND	DL=100
(3V)	107-13-1	acrylonitrile	ND	DL=100
(4V)	71-43-2	benzene	ND	DL= 2
	78-93-3	2-butanone	ND	DL= 5
	75-15-0	carbon disulfide	ND	DL= 5
(6V)	56-23-5	carbon tetrachloride	ND	DL= 2
(7V)	108-90-7	chlorobenzene	ND	DL= 2
(10V)	107-06-2	1,2-dichloroethane	ND	DL= 2
(11V)	71-55-6	1,1,1-trichloroethane	ND	DL= 2
(13V)	75-34-3	1,1-dichloroethane	ND	DL= 2
(14V)	79-00-5	1,1,2-trichloroethane	ND	DL= 2
(15V)	79-34-5	1,1,2,2-tetrachloroethane	ND	DL= 2
(16V)	75-00-3	chloroethane	ND	DL= 5
(23V)	67-66-3	chloroform	ND	DL= 2
(29V)	75-35-4	1,1-dichloroethene	ND	DL= 2
(30V)	156-60-5	trans-1,2-dichloroethene	ND	DL= 2
	156-59-2	cis-1,2-dichloroethene	ND	DL= 2
(32V)	78-87-5	1,2-dichloropropane	ND	DL= 2
(33V)	10061-02-6	trans-1,3-dichloropropene	ND	DL= 2
	10061-01-5	cis-1,3-dichloropropene	ND	DL= 2
(38V)	100-41-4	ethylbenzene	ND	DL= 5
	519-78-6	2-hexanone	ND	DL= 5
	108-10-1	4-methyl-2-pentanone	ND	DL= 5
(44V)	75-09-2	methylene chloride	ND	DL= 5
(45V)	74-87-3	chloromethane	ND	DL= 5
(46V)	74-83-9	bromomethane	ND	DL= 5
(47V)	75-25-2	bromoform	ND	DL= 2
(48V)	75-27-4	bromodichloromethane	ND	DL= 2
(51V)	124-48-1	chlorodibromomethane	ND	DL= 2
	100-42-5	styrene	ND	DL= 5
(85V)	127-18-4	tetrachloroethene	ND	DL= 2
(86V)	108-88-3	toluene	ND	DL= 5
(87V)	79-01-6	trichloroethene	ND	DL= 2
	108-05-4	vinyl acetate	ND	DL= 5
(88V)	75-01-4	vinyl chloride	ND	DL= 5
	95-47-6	o-xylene	ND	DL= 5
	108-38-3	m- and/or (CAS# 106-42-3)p-xylene	ND	DL= 5

ORGANIC ANALYSIS DATA

6E-HL SAMPLE NO: 2AFERS05-04 DATE REPORTED: 29 Jan 1992

SAMPLE TYPE: water

ANALYST: Edward O'Neill

VOLATILE COMPOUNDS BY METHOD 624

Scan#	CAS#	EST.CONC (ug/l)	COMPOUND NAME
294		11	unknown compound

* ANALYSTS NOTE - THE COMPOUNDS LISTED ARE TENTATIVELY IDENTIFIED BY THE BEST MATCH WITH THE NIH/EPA/WILEY MASS SPECTRAL DATA BASE OR BY MANUAL INTERPRETATION. STANDARDS WERE NOT AVAILABLE FOR CONFIRMATION OR QUANTITATION.

**Estimated concentration is based on a RF of 1.0 to internal standard.

Date: 02/21/92

Attachment 5

US ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL SERVICE DIVISION
HOUSTON LABORATORY SECTION

LAB SAMPLE REPORT

Activity Number: 2AFERS05 Date Recvd: 01/15/92 Date Collected: 01/10/92
Sample Number: 5 Time Recvd: 07:00 Time Collected: 09:00

Source: SHELL REFINERY Tag Number:
Site Description: FIELD BLANK (#32(B))
Sample Type: WATER
Sample Retention:

Param- Organic: VOA
Metals:
Inorganic:
Biology:

Due Date: 02/14/92
Date Projected: 02/14/92
Date Completed: 02/21/92
Comment:
Your Initials: CH

ORGANIC ANALYSIS DATA

6E-HL SAMPLE NO: 2AFERS05-05 DATE REPORTED: 29 Jan 1992

SAMPLE TYPE: water

ANALYST: Edward O'Neill

VOLATILE COMPOUNDS BY METHOD 624

PP#	CAS#		(ug/l)	
	67-64-1	acetone	ND	DL= 5
(2V)	107-02-8	acrolein	ND	DL=100
(3V)	107-13-1	acrylonitrile	ND	DL=100
(4V)	71-43-2	benzene	ND	DL= 2
	78-93-3	2-butanone	ND	DL= 5
	75-15-0	carbon disulfide	ND	DL= 5
(6V)	56-23-5	carbon tetrachloride	ND	DL= 2
(7V)	108-90-7	chlorobenzene	ND	DL= 2
(10V)	107-06-2	1,2-dichloroethane	ND	DL= 2
(11V)	71-55-6	1,1,1-trichloroethane	ND	DL= 2
(13V)	75-34-3	1,1-dichloroethane	ND	DL= 2
(14V)	79-00-5	1,1,2-trichloroethane	ND	DL= 2
(15V)	79-34-5	1,1,2,2-tetrachloroethane	ND	DL= 2
(16V)	75-00-3	chloroethane	ND	DL= 5
(23V)	67-66-3	chloroform	ND	DL= 2
(29V)	75-35-4	1,1-dichloroethene	ND	DL= 2
(30V)	156-60-5	trans-1,2-dichloroethene	ND	DL= 2
	156-59-2	cis-1,2-dichloroethene	ND	DL= 2
(32V)	78-87-5	1,2-dichloropropane	ND	DL= 2
(33V)	10061-02-6	trans-1,3-dichloropropene	ND	DL= 2
	10061-01-5	cis-1,3-dichloropropene	ND	DL= 2
(38V)	100-41-4	ethylbenzene	ND	DL= 5
	519-78-6	2-hexanone	ND	DL= 5
	108-10-1	4-methyl-2-pentanone	ND	DL= 5
(44V)	75-09-2	methylene chloride	ND	DL= 5
(45V)	74-87-3	chloromethane	ND	DL= 5
(46V)	74-83-9	bromomethane	ND	DL= 5
(47V)	75-25-2	bromoform	ND	DL= 2
(48V)	75-27-4	bromodichloromethane	ND	DL= 2
(51V)	124-48-1	chlorodibromomethane	ND	DL= 2
	100-42-5	styrene	ND	DL= 5
(85V)	127-18-4	tetrachloroethene	ND	DL= 2
(86V)	108-88-3	toluene	ND	DL= 5
(87V)	79-01-6	trichloroethene	ND	DL= 2
	108-05-4	vinyl acetate	ND	DL= 5
(88V)	75-01-4	vinyl chloride	ND	DL= 5
	95-47-6	o-xylene	ND	DL= 5
	108-38-3	m- and/or (CAS# 106-42-3)p-xylene	ND	DL= 5

ORGANIC ANALYSIS DATA

6E-HL SAMPLE NO: 2AFERS05-05 DATE REPORTED: 29 Jan 1992

SAMPLE TYPE: water

ANALYST: Edward O'Neill

VOLATILE COMPOUNDS BY METHOD 624

Scan#	CAS#	EST.CONC (ug/l)	COMPOUND NAME
			No VOA TIC's detected.

* ANALYSTS NOTE - THE COMPOUNDS LISTED ARE TENTATIVELY IDENTIFIED BY THE BEST MATCH WITH THE NIH/EPA/WILEY MASS SPECTRAL DATA BASE OR BY MANUAL INTERPRETATION. STANDARDS WERE NOT AVAILABLE FOR CONFIRMATION OR QUANTITATION.

**Estimated concentration is based on a RF of 1.0 to internal standard.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

RECEIVED
FEB 24 1992
6E-SC

MEMORANDUM

DATE: February 21, 1992

SUBJECT: Notice of Intent to Dispose of Samples

FROM: Diana G. Ayers, Chief, Houston Branch; 6E-H Don L Payne for

TO: James Stiebing, Chief,
Surveillance Branch; 6E-S

The Houston Laboratory is required to dispose of all hazardous wastes we generate in a manner consistent with RCRA regulations. This includes all samples received for analysis provided we find them to contain contaminants which classify them as RCRA hazardous wastes. In addition, any samples found to contain PCBs must be disposed of according to TCSA regulations.

I have included this memorandum in the final analytical report to serve as notice to the program that we have completed all analysis. If we have any of the original sample remaining after analysis is complete we will dispose of it within 90 days. Please note that even though original sample may be left over, it does not mean that a reanalysis of the sample may be requested since the sample has most likely exceeded its holding time and any subsequent analysis may not be valid.

If you have a need to hold these samples in custody longer than 90 days, please sign below and return this memorandum to me within the next 30 days. Also, state briefly your need to hold these samples in custody.

Thank you for your cooperation in this request.

SHELL CHEMICAL (2AFERS04)

_____
Facility Name

_____
Program Manager Date

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

MEMORANDUM

DATE: February 21, 1992

SUBJECT: Laboratory Results for Shell Chemical

FROM: Diana G. Ayers, Chief, Houston Branch; 6E-H Don L Rayne for

TO: James Stiebing, Chief, Surveillance Branch; 6E-S

ATTN: Jana Harvill; 6E-SC

Attached are the analytical results for the subject site. Five water samples were received for analysis on January 15, 1992.

This is a final report.

Attachments

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

MEORANDUM

DATE: February 14, 1992

SUBJECT: Organic Analysis of Shell Chemical.

FROM: Michael Daggett
Chief; Organic Section

TO: Diana Ayers
Chief; Houston Branch

Attached are the organic section analysis reports for samples 2AFERS04-01 thru 2AFERS04-05. These samples were analyzed for PCBs, pesticides, ABNs and VOAs. Sample #04 contained 6.4 ug/l (ppb) of chloroform and 16 ug/l of a TIC 1,2,3-trichloropropane.

This is a final report.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

MEMORANDUM

Date: February 21, 1992

Subject: Laboratory Results for Shell Chemical Co.

From: David C. Stockton, Chief, Inorganic Lab Section, 6E-HI

To: Diana G. Ayers, Chief, Houston Branch, 6E-H

Attached are laboratory results for the subject site. Three (3) samples were received on January 15, 1992, to be analyzed for Phenols, Metals, BOD, COD, Ammonia, TSS, and Cyanide.

The laboratory numbers assisgned were 2AFERS0401 through 03.

This is a final report.

Attachments (3)

Date: 02/21/92

Attachment 1

US ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL SERVICE DIVISION
HOUSTON LABORATORY SECTION

LAB SAMPLE REPORT

Activity Number: 2AFERS04 Date Recvd: 01/15/92 Date Collected: 01/13/92
Sample Number: 1 Time Recvd: 07:00 Time Collected: 12:24

Source: SHELL CHEMICAL CO. Tag Number:
Site Description: STA#001 OUTFALL 001 COMPOSITE
Sample Type: WATER
Sample Retention:

Param- Organic: ABN PCB PES
Metals:
Inorganic: OH-
Biology:

Due Date: 02/14/92
Date Projected: 02/14/92
Date Completed: 02/21/92
Comment:
Your Initials: CH

ORGANIC ANALYSIS DATA

6ES-HL SAMPLE NO.: 2AFERS04-01 DATE REPORTED: 1/27/92

SAMPLE TYPE: WATER ANALYST:MARVELYN HUMPHREY

HSL ACID BASE/NEUTRAL COMPOUNDS BY METHOD 625

COMPOUND	ug/L	COMPOUND	ug/L
Phenol	nd dl=4	Acenaphthene	nd dl=2
bis(2-Chloroethyl) Ether	nd dl=2	2,4-Dinitrophenol	nd dl=30
2-Chlorophenol	nd dl=4	4-Nitrophenol	nd dl=13
1,3-Dichlorobenzene	nd dl=3	Dibenzofuran	nd dl=2
1,4-Dichlorobenzene	nd dl=3	2,4-Dinitrotoluene	nd dl=6
Benzyl Alcohol	nd dl=4	2,6-Dinitrotoluene	nd dl=6
1,2-Dichlorobenzene	nd dl=3	Diethylphthalate	nd dl=2
2-Methylphenol	nd dl=6	4-Chlorophenylphenyl Ether	nd dl=8
bis(2-chloroisopropyl)Ether	nd dl=2	Fluorene	nd dl=2
4-Methylphenol	nd dl=6	4-Nitroaniline	nd dl=8
N-Nitroso-Di-n-Propylamine	nd dl=6	4,6-Dinitro-2-Methylphenol	nd dl=20
Hexachloroethane	nd dl=3	N-Nitrosodiphenylamine	nd dl=4
Nitrobenzene	nd dl=2	4-Bromophenylphenyl Ether	nd dl=8
Isophorone	nd dl=4	Hexachlorobenzene	nd dl=2
2-Nitrophenol	nd dl=10	Pentachlorophenol	nd dl=15
2,4-Dimethylphenol	nd dl=6	Phenanthrene	nd dl=2
Benzoic Acid	nd dl=10	Anthracene	nd dl=2
bis(2-Chloroethoxy)Methane	nd dl=2	Di-n-Butylphthalate	nd dl=2
2,4-Dichlorophenol	nd dl=6	Fluoranthene	nd dl=2
1,2,4-trichlorobenzene	nd dl=3	Benzidine	nd dl=20
Naphthalene	nd dl=2	Pyrene	nd dl=2
4-Chloroaniline	nd dl=4	Butylbenzylphthalate	nd dl=4
Hexachlorobutadiene	nd dl=5	3,3'-Dichlorobenzidine	nd dl=10
4-Chloro-3-Methylphenol	nd dl=8	Benzo(a)Anthracene	nd dl=8
2-Methylnaphthalene	nd dl=2	bis-(2-Ethylhexyl)Phthalate	nd dl=4
Hexachlorocyclopentadiene	nd dl=10	Chrysene	nd dl=8
2,4,6-Trichlorophenol	nd dl=6	Di-n-Octyl Phthalate	nd dl=4
2,4,5-Trichlorophenol	nd dl=6	Benzo(b)Fluoranthene	nd dl=8
2-Chloronaphthalene	nd dl=2	Benzo(k)Fluoranthene	nd dl=8
2-Nitroaniline	nd dl=8	Benzo(a)Pyrene	nd dl=8
DimethylPhthalate	nd dl=2	Indeno(1,2,3-cd) Pyrene	nd dl=8
Acenaphthylene	nd dl=2	Dibenzo(a,h)Anthracene	nd dl=8
3-Nitroaniline	nd dl=8	Benzo(g,h,i)Perylene	nd dl=8

ORGANIC ANALYSIS DATA

6ES-HL SAMPLE NO.: 2AFERS04-01 DATE REPORTED: 1/27/92

SAMPLE TYPE: WATER

ANALYST: MARVELYN HUMPHREY

TENTATIVE COMPOUNDS BY METHOD 625

SCAN#	CAS #	EST.CONC (ug/L)	COMPOUND NAME
117		11	UNKNOWN
193	96184	23	1,2,3-TRICHLOROPROPANE
250		23	UNKNOWN
310		15	UNKNOWN
372		17	UNKNOWN
440		37	UNKNOWN
449		9	UNKNOWN
459		210	UNKNOWN
466		45	UNKNOWN
510		220	UNKNOWN
575	6970565	10	5,6-DIHYDRO-4,6,6-TRIMETHYL-2H-PYRAN-2-ONE
654		9	UNKNOWN
662		33	UNKNOWN
683		13	UNKNOWN
698		23	UNKNOWN
791		16	BIS(2,3-DICHLOROPROPYL)ETHER
839	59483	42	1,3-DIYDRO-2H-INDOL-2-ONE
844		12	UNKNOWN
1200		14	UNKNOWN HYDROCARBON

* ANALYSTS NOTE ! - THE COMPOUNDS LISTED ARE TENATIVELY IDENTIFIED BY THE BEST MATCH WITH THE NIH/EPA/WILEY MASS SPECTRAL DATA BASE OR BY MANUAL MASS SPECTRA INTERPRETATION. STANDARDS WERE NOT AVAILABLE FOR CONFIRMATION OR QUANTITATION.
** Estimated concentration is based on a RF of 1.0 to internal standard !

PESTICIDE/PCB ANALYSIS

[illegible]-HL SAMPLE NO.: 2AFEP50401 DATE REPORTED: [illegible] /28/1992

SAMPLE TYPE: AQUEOUS

ANALYST: L.C. [illegible]

CAS#		UG/L (PPB)
319-84-6	alpha-BHC	ND DL=< 0.05
319-85-7	beta-BHC	ND DL=< 0.05
319-86-8	delta-BHC	ND DL=< 0.05
58-89-9	gamma-BHC (Lindane)	ND DL=< 0.05
76-44-8	Heptachlor	ND DL=< 0.05
309-00-2	Aldrin	ND DL=< 0.05
1024-57-3	Heptachlor epoxide	ND DL=< 0.05
959-98-8	Endosulfan I	ND DL=< 0.05
60-57-1	Dieldrin	ND DL=< 0.05
[illegible]-55-9	4,4'-DDT	ND DL=< 0.05
72-20-8	Endrin	ND DL=< 0.05
[illegible]	[illegible]	ND DL=< 0.05
[illegible]	4,4'-DDT	ND DL=< 0.05
[illegible]	Endrin aldehyde	ND DL=< 0.10
53494-70-5	Endrin ketone	ND DL=< 0.10
1031-07-8	Endosulfan sulfate	ND DL=< 0.10
[illegible]	4,4'-DDT	ND DL=< 0.10
72-43-5	Methoxychlor	ND DL=< 0.20
[illegible]-71-9	alpha-Chlordane	ND DL=< 0.05
[illegible]-74-2	gamma-Chlordane	ND DL=< 0.05
[illegible]	Toxaphene	ND DL=< 2.00
[illegible]	[illegible]	ND DL=< 1.00
11104-28-2	Aroclor-1221	ND DL=< 2.00
[illegible]	Aroclor-1232	ND DL=< 1.00
53469-21-9	Aroclor-1242	ND DL=< 1.00
12672-29-6	Aroclor-1248	ND DL=< 1.00
11097-69-1	Aroclor-1254	ND DL=< 1.00
11096-82-5	Aroclor-1260	ND DL=< 1.00

ND DL = NOT DETECTED, DETECTION LIMIT

US EPA HOUSTON BRANCH.

SAMPLE #:	2AFERS04-01	DATE RECEIVED:	15-Jan-92
SOURCE:	SHELL CHEMICAL COMPANY		
TYPE:	AQUEOUS	DATE REPORTED:	21-Feb-92
ANALYSTS:	TWC		

PARAMETER	CONCENTRATION	DETECTION LIMIT <=	UNITS
PHENOLS	19.3	5	UG/L

Date: 02/21/92

Attachment 2

US ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL SERVICE DIVISION
HOUSTON LABORATORY SECTION

LAB SAMPLE REPORT

Activity Number: 2AFERS04 Date Recvd: 01/15/92 Date Collected: 01/13/92
Sample Number: 2 Time Recvd: 07:00 Time Collected: 14:30

Source: SHELL CHEMICAL CO. Tag Number:
Site Description: STA#001 OUTFALL 001 COMPOSITE
Sample Type: WATER
Sample Retention:

Param- Organic:
Metals: MET
Inorganic: BOD COD NH3 TSS
Biology: BSH

Due Date: 02/14/92
Date Projected: 02/14/92
Date Completed: 02/21/92
Comment:
Your Initials: CH

US EPA HOUSTON BRANCH

SAMPLE #:	2AFERS04-02	DATE RECEIVED:	15-Jan-92
SOURCE:	SHELL CHEMICAL COMPANY		
TYPE:	AQUEOUS	DATE REPORTED:	21-Feb-92
ANALYSTS:	RC, LC		

PARAMETER	CONCENTRATION	DETECTION LIMIT <=	UNITS
ANTIMONY	ND	60	UG/L
ARSENIC	ND	6.4	UG/L
BERYLLIUM	ND	5	UG/L
CADMIUM	ND	5	UG/L
CHROMIUM	23	10	UG/L
COPPER	ND	20	UG/L
LEAD	ND	30	UG/L
MERCURY	ND	0.2	UG/L
NICKEL	20	20	UG/L
SELENIUM	ND	29	UG/L
SILVER	ND	10	UG/L
THALLIUM	ND	4.8	UG/L
ZINC	ND	20	UG/L
BOD	ND	5	MG/L
COD	76	5	MG/L
NH3-N	2.44	0.01	MG/L
TSS	16.8	1	MG/L

ND: LESS THAN DETECTION LIMIT

FACILITY: Shell Chemical
NPDES NUMBER: TX4863
OUTFALL NUMBER: 001
DATE COLLECTED: 01/14/92

LABORATORY NUMBER: 2AFERS0402
TEST ORGANISM: *Cyprinodon variegatus*
ANALYST: Hollister

Results: After nine days, no significant effect was observed in organisms exposed to the Shell Chemical effluent (Table 1).

Measurements of water chemistry are given in Table 2.

Dissolved oxygen remained ≥90% of saturation throughout the exposure period. Temperature was maintained at 25±1°C.

TABLE 1. Percentage of sheepshead minnow embryo/larvae affected after nine days of exposure. Twenty embryos were exposed to each concencentration and the control. The salinity of the effluent was adjusted to that of the control (20ppt) before testing was initiated.

Concentration (%)	Organisms Affected[a] (%)
Control (Culture Water)	10
6	5
12	0
25	0
50	10
100	5

[a]Effects include the combined number of dead embryos (unhatched) and larvae, also, organisms exhibiting terata and abnormal swimming behavior.

TABLE 2. Water chemistry data recorded on day 0 for the control water and and 100% effluent. Values are given as milligrams per liter.

	Parameter					
	pH	Alkalinity	Conductivity	Total Ammonia	Total Chlorine	Salinity
Control	7.8	48	29,110	<0.1	<0.1	20,000
Effluent	7.7	230	8,300	2.3[a]	<0.1	8,000

[a]Unionized ammonia was <0.1.

Date: 02/21/92

Attachment 3

US ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL SERVICE DIVISION
HOUSTON LABORATORY SECTION

LAB SAMPLE REPORT

Activity Number: 2AFERS04 Date Recvd: 01/15/92 Date Collected: 01/13/92
Sample Number: 3 Time Recvd: 07:00 Time Collected: 12:47

Source: SHELL CHEMICAL CO. Tag Number:
Site Description: STA#001 OUTFALL 001 GRAB
Sample Type: WATER
Sample Retention:

Param- Organic:
Metals:
Inorganic: CN
Biology:

Due Date: 02/14/92
Date Projected: 02/14/92
Date Completed: 02/21/92
Comment:
Your Initials: CH

US EPA HOUSTON BRANCH

SAMPLE #:	2AFERS04-03	DATE RECEIVED:	15-Jan-92
SOURCE:	SHELL CHEMICAL COMPANY		
TYPE:	AQUEOUS	DATE REPORTED:	21-Feb-92
ANALYSTS:	TWC		

PARAMETER	CONCENTRATION	DETECTION LIMIT <=	UNITS
CYANIDE	ND	0.02	MG/L

Date: 02/21/92

Attachment 4

US ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL SERVICE DIVISION
HOUSTON LABORATORY SECTION

LAB SAMPLE REPORT

Activity Number: 2AFERS04 Date Recvd: 01/15/92 Date Collected: 01/13/92
Sample Number: 4 Time Recvd: 07:00 Time Collected: 08:47

Source: SHELL CHEMICAL CO. Tag Number:
Site Description: STA#001 OUTFALL 001-IN LAB COM
Sample Type: WATER
Sample Retention:

Param- Organic: VOA
Metals:
Inorganic:
Biology:

Due Date: 02/14/92
Date Projected: 02/14/92
Date Completed: 02/21/92
Comment:
Your Initials: CH

ORGANIC ANALYSIS DATA

6E-HL SAMPLE NO: 2AFERS04-04 DATE REPORTED: 29 Jan 1992

SAMPLE TYPE: water

ANALYST: Edward O'Neill

VOLATILE COMPOUNDS BY METHOD 624

PP#	CAS#		(ug/l)
	67-64-1	acetone	ND DL= 5
(2V)	107-02-8	acrolein	ND DL=100
(3V)	107-13-1	acrylonitrile	ND DL=100
(4V)	71-43-2	benzene	ND DL= 2
	78-93-3	2-butanone	ND DL= 5
	75-15-0	carbon disulfide	ND DL= 5
(6V)	56-23-5	carbon tetrachloride	ND DL= 2
(7V)	108-90-7	chlorobenzene	ND DL= 2
(10V)	107-06-2	1,2-dichloroethane	ND DL= 2
(11V)	71-55-6	1,1,1-trichloroethane	ND DL= 2
(13V)	75-34-3	1,1-dichloroethane	ND DL= 2
(14V)	79-00-5	1,1,2-trichloroethane	ND DL= 2
(15V)	79-34-5	1,1,2,2-tetrachloroethane	ND DL= 2
(16V)	75-00-3	chloroethane	ND DL= 5
(23V)	67-66-3	chloroform	6.4
(29V)	75-35-4	1,1-dichloroethene	ND DL= 2
(30V)	156-60-5	trans-1,2-dichloroethene	ND DL= 2
	156-59-2	cis-1,2-dichloroethene	ND DL= 2
(32V)	78-87-5	1,2-dichloropropane	ND DL= 2
(33V)	10061-02-6	trans-1,3-dichloropropene	ND DL= 2
	10061-01-5	cis-1,3-dichloropropene	ND DL= 2
(38V)	100-41-4	ethylbenzene	ND DL= 5
	519-78-6	2-hexanone	ND DL= 5
	108-10-1	4-methyl-2-pentanone	ND DL= 5
(44V)	75-09-2	methylene chloride	ND DL= 5
(45V)	74-87-3	chloromethane	ND DL= 5
(46V)	74-83-9	bromomethane	ND DL= 5
(47V)	75-25-2	bromoform	ND DL= 2
(48V)	75-27-4	bromodichloromethane	ND DL= 2
(51V)	124-48-1	chlorodibromomethane	ND DL= 2
	100-42-5	styrene	ND DL= 5
(85V)	127-18-4	tetrachloroethene	ND DL= 2
(86V)	108-88-3	toluene	ND DL= 5
(87V)	79-01-6	trichloroethene	ND DL= 2
	108-05-4	vinyl acetate	ND DL= 5
(88V)	75-01-4	vinyl chloride	ND DL= 5
	95-47-6	o-xylene	ND DL= 5
	108-38-3	m- and/or (CAS# 106-42-3)p-xylene	ND DL= 5

ORGANIC ANALYSIS DATA

6E-HL SAMPLE NO: 2AFERS04-04 DATE REPORTED: 29 Jan 1992

SAMPLE TYPE: water

ANALYST: Edward O'Neill

VOLATILE COMPOUNDS BY METHOD 624

Scan#	CAS#	EST.CONC (ug/l)	COMPOUND NAME
324		14	unknown compound
814	96184	16	1,2,3-trichloropropane

* ANALYSTS NOTE - THE COMPOUNDS LISTED ARE TENTATIVELY IDENTIFIED BY THE BEST MATCH WITH THE NIH/EPA/WILEY MASS SPECTRAL DATA BASE OR BY MANUAL INTERPRETATION. STANDARDS WERE NOT AVAILABLE FOR CONFIRMATION OR QUANTITATION.

**Estimated concentration is based on a RF of 1.0 to internal standard.

Date: 02/21/92

Attachment 5

US ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL SERVICE DIVISION
HOUSTON LABORATORY SECTION

LAB SAMPLE REPORT

Activity Number: 2AFERS04 Date Recvd: 01/15/92 Date Collected: 01/10/92
Sample Number: 5 Time Recvd: 07:00 Time Collected: 09:00

Source: SHELL CHEMICAL CO. Tag Number:
Site Description: FIELD BLANK (SAMPLE #15)
Sample Type: WATER
Sample Retention:

Param- Organic: VOA
Metals:
Inorganic:
Biology:

Due Date: 02/14/92
Date Projected: 02/14/92
Date Completed: 02/21/92
Comment:
Your Initials: CH

ORGANIC ANALYSIS DATA

6E-HL SAMPLE NO: 2AFERS04-05 DATE REPORTED: 29 Jan 1992

SAMPLE TYPE: water

ANALYST: Edward O'Neill

VOLATILE COMPOUNDS BY METHOD 624

PP#	CAS#		(ug/l)	
	67-64-1	acetone	ND	DL= 5
(2V)	107-02-8	acrolein	ND	DL=100
(3V)	107-13-1	acrylonitrile	ND	DL=100
(4V)	71-43-2	benzene	ND	DL= 2
	78-93-3	2-butanone	ND	DL= 5
	75-15-0	carbon disulfide	ND	DL= 5
(6V)	56-23-5	carbon tetrachloride	ND	DL= 2
(7V)	108-90-7	chlorobenzene	ND	DL= 2
(10V)	107-06-2	1,2-dichloroethane	ND	DL= 2
(11V)	71-55-6	1,1,1-trichloroethane	ND	DL= 2
(13V)	75-34-3	1,1-dichloroethane	ND	DL= 2
(14V)	79-00-5	1,1,2-trichloroethane	ND	DL= 2
(15V)	79-34-5	1,1,2,2-tetrachloroethane	ND	DL= 2
(16V)	75-00-3	chloroethane	ND	DL= 5
(23V)	67-66-3	chloroform	ND	DL= 2
(29V)	75-35-4	1,1-dichloroethene	ND	DL= 2
(30V)	156-60-5	trans-1,2-dichloroethene	ND	DL= 2
	156-59-2	cis-1,2-dichloroethene	ND	DL= 2
(32V)	78-87-5	1,2-dichloropropane	ND	DL= 2
(33V)	10061-02-6	trans-1,3-dichloropropene	ND	DL= 2
	10061-01-5	cis-1,3-dichloropropene	ND	DL= 2
(38V)	100-41-4	ethylbenzene	ND	DL= 5
	519-78-6	2-hexanone	ND	DL= 5
	108-10-1	4-methyl-2-pentanone	ND	DL= 5
(44V)	75-09-2	methylene chloride	ND	DL= 5
(45V)	74-87-3	chloromethane	ND	DL= 5
(46V)	74-83-9	bromomethane	ND	DL= 5
(47V)	75-25-2	bromoform	ND	DL= 2
(48V)	75-27-4	bromodichloromethane	ND	DL= 2
(51V)	124-48-1	chlorodibromomethane	ND	DL= 2
	100-42-5	styrene	ND	DL= 5
(85V)	127-18-4	tetrachloroethene	ND	DL= 2
(86V)	108-88-3	toluene	ND	DL= 5
(87V)	79-01-6	trichloroethene	ND	DL= 2
	108-05-4	vinyl acetate	ND	DL= 5
(88V)	75-01-4	vinyl chloride	ND	DL= 5
	95-47-6	o-xylene	ND	DL= 5
	108-38-3	m- and/or (CAS# 106-42-3)p-xylene	ND	DL= 5

ORGANIC ANALYSIS DATA

6E-HL SAMPLE NO: 2AFERS04-05 DATE REPORTED: 29 Jan 1992

SAMPLE TYPE: water

ANALYST: Edward O'Neill

VOLATILE COMPOUNDS BY METHOD 624

Scan#	CAS#	EST.CONC (ug/l)	COMPOUND NAME
			No VOA TIC's detected.

* ANALYSTS NOTE - THE COMPOUNDS LISTED ARE TENTATIVELY IDENTIFIED BY THE BEST MATCH WITH THE NIH/EPA/WILEY MASS SPECTRAL DATA BASE OR BY MANUAL INTERPRETATION. STANDARDS WERE NOT AVAILABLE FOR CONFIRMATION OR QUANTITATION.

**Estimated concentration is based on a RF of 1.0 to internal standard.

TWC ANNUAL COMPLIANCE REPORT

FOR

INDUSTRIAL WASTEWATER DISCHARGE

John Hall, Chairman
Pam Reed, Commissioner
Peggy Garner, Commissioner

TEXAS WATER COMMISSION

PROTECTING TEXANS' HEALTH AND SAFETY BY PREVENTING AND REDUCING POLLUTION

February 13, 1992

Mr. Walt Helmick
U. S. Environmental Protection Agency
1445 Ross Avenue, St. 1200
Dallas, Texas 75202

Re: Annual Compliance Inspections
Shell Wastewater Plants - Refinery (TX0004871)
and Chemical Plant (TX0004863)
TWC Permit Nos. WQ00403 and WQ 00402

Dear Mr. Helmick:

We have enclosed copies of the annual compliance reports for the inspections of the two Shell - Deer Park facilities, made jointly with your staff during the multi-media event in December, 1991 and January, 1992. We appreciate the opportunity to work with you and your staff, especially on such an extensive project.

If you have any questions, feel free to contact Patrick Noll or Jay Muschenheim of this office.

Sincerely,

Donna G. Phillips

Donna G. Phillips
Water Quality Manager

DGP/JPN/vjn

Enclosures

REPLY TO: DISTRICT 7 / 5144 E. SAM HOUSTON PARKWAY N. / HOUSTON, TEXAS 77015 / AREA CODE 713/457-5191

P.O. Box 13087 • 1700 North Congress Avenue • Austin, Texas 78711-3087 • 512/463-7830

PRINTED ON RECYCLED PAPER

TEXAS WATER COMMISSION
INSPECTION SUMMARY REPORT

WQ - 0000403 - 001 - 009 Permit Number

Shell Oil Company (Refinery) Entity 7 District

Classification: ☑ Major ☐ 92-500 Minor ☐ Significant Minor ☐ Other

INSPECTION DATA

911210 Date of Inspection (YYMMDD)

920206 Date of Letter to Permittee (YYMMDD) ☐ N/A

TYPE WASTE (check one)
- ☐ DOM - Domestic
- ☑ IND - Industrial
- ☐ AGR - Agricultural

TYPE INSPECTION (check one)
- ☑ ACI - Annual Compliance (WWTP)
- ☐ PAI - Performance Audit (lab)
- ☐ PCI - Pretreatment Compliance
- ☐ DIA - Diagnostic
- ☐ PSA - Permit Site Assessment
- ☐ OTH - Other

920206 Date of Inspection Report (YYMMDD)

TYPE EFFLUENT SAMPLING
- ☐ COM - Composite
- ☐ GRB - Grab
- ☑ NON - None
- ☐ N/A - Not Applicable

☐ Yes ☑ No ☐ N/A Annual CSI (Majors Only)

☐ Yes ☐ No ☐ N/A Biomonitoring Sampling

INSPECTION FINDINGS

☐ Yes ☑ No ☐ N/A Violations/Substantial Deficiencies Noted

☐ Yes ☑ No ☐ N/A Permittee Response Required

___ ___ ___ ___ ___ ___ Date Response Due (YYMMDD)

JPN Inspector Initials

Comments: _____

PERMITTEE RESPONSE

___ ___ ___ ___ ___ ___ Date Response Submitted (YYMMDD)

☐ Yes ☐ No Response Adequate

☐ Yes ☐ No Follow-up Action Needed: ☐ District ☐ Central Office

Comments: _____

J. Patrick Noll
Signature

TWC-0228 (Rev. 11-21-90)

John Hall, Chairman
Pam Reed, Commissioner
Peggy Garner, Commissioner

TEXAS WATER COMMISSION

PROTECTING TEXANS' HEALTH AND SAFETY BY PREVENTING AND REDUCING POLLUTION

February 6, 1992

Mr. Jack Sowle, Environmental Manager
Shell Oil Company
P.O. Box 100
Deer Park, Texas 77536

Re: Annual Compliance Inspection
Wastewater Treatment Plant - Refinery North Effluent Treater
Permit No. 00403

Dear Mr. Sowle:

On December 10, 1991, Water Quality Specialist Patrick Noll conducted an annual compliance inspection of the above-referenced facility. Present during the inspection were Mr. Charles Bland, Ms. Aimee Anani and Mr. Tyler Huber of Shell, and Ms. Jana Harvill of the Environmental Protection Agency, Region VI Office. The facility appeared to be well maintained and operated.

A copy of the inspection report is available upon request. If you have any questions, feel free to contact Patrick Noll or Jay Muschenheim of this office.

Sincerely,

Donna G. Phillips

Donna G. Phillips
Water Quality Manager

DGP/JPN/vjn

REPLY TO: DISTRICT 7 / 5144 E. SAM HOUSTON PARKWAY N. / HOUSTON, TEXAS 77015 / AREA CODE 713/457-5191

P.O. Box 13087 • 1700 North Congress Avenue • Austin, Texas 78711-3087 • 512/463-7830

ted States Environmental Protection Agency
Washington, D. C. 20460

EPA NPDES Compliance Inspection Report

Form Approved.
OMB No. 2040-0057
Approval expires 4-30-88

Section A: National Data System Coding

Transaction Code	NPDES	yr/mo/day	Inspection Type	Inspector	Fac Type
1 N 2 5	3 TX0004871 11	12 911210 17	18 S	19 S	20 2

Remarks

21 66

Reserved	Facility Evaluation Rating	BI	QA	Reserved
67 69	70 4	71 N	72 N	73 74 75 80

Section B: Facility Data

Name and Location of Facility Inspected	Entry Time	Permit Effective Date
Shell Oil Company P.O. Box 100 Deer Park, Texas 77536	☒ AM ☐ PM 8:00	11/7/89
	Exit Time/Date 1200/ 1/15/92	Permit Expiration Date 11/6/94

Name(s) of On-Site Representative(s)	Title(s)	Phone No(s)
Jack Sowle / John Holden	Envt'l Mgr (outgoing/incoming)	713/ 246-7146
Charles Bland	Envt'l + Compliance Eng.	246-7895
Tyler Huber	Tech'l Support Operations	246-7070

Name, Address of Responsible Official	Title	
Jack Sowle/John Holden P.O. Box 100 Deer Park, Tx. 77536	Environmental Manager	
	Phone No 713/ 246-7146	Contacted ☑ Yes ☐ No

Section C: Areas Evaluated During Inspection

(S = Satisfactory, M = Marginal, U = Unsatisfactory, N = Not Evaluated)

S	Permit	S	Flow Measurement	S	Pretreatment	S	Operations & Maintenance
S	Records/Reports	S	Laboratory	S	Compliance Schedules	S	Sludge Disposal
S	Facility Site Review	S	Effluent/Receiving Waters	S	Self-Monitoring Program	–	Other:

Section D: Summary of Findings/Comments *(Attach additional sheets if necessary)*

The facility appears to be well maintained and operated.

Biomonitoring for Outfalls R001 and R007 were complete November, 1990.

The Permittee is working with the EPA to modify the R001 and R007 permit requirements for copper in response to EPA Administrative Order VI-91-388.

Name(s) and Signature(s) of Inspector(s)	Agency/Office/Telephone	Date
J. Patrick Noll J. Patrick Noll	TWC/D7/(713)457-5196	2-6-92
Signature of Reviewer	Agency/Office	Date
Donna Phillips	TWC/ District 7	2-6-92

Regulatory Office Use Only

Action Taken	Date	Compliance Status
		☐ Noncompliance ☐ Compliance

EPA Form 3560-3 (Rev. 3-85) Previous editions are obsolete.

TEXAS WATER COMMISSION
INSPECTION SUMMARY REPORT

001 - 009 (excl. 005)

WQ - 0000403 - 007 Permit Number

Shell Oil Company Entity 7 District

Classification: ☑ Major ☐ 92-500 Minor ☐ Significant Minor ☐ Other

INSPECTION DATA

___ ___ ___ ___ ___ ___ Date of Inspection (YYMMDD)

___ ___ ___ ___ ___ ___ Date of Letter to Permittee (YYMMDD) ☐ N/A

TYPE WASTE (check one)

- ☐ DOM - Domestic
- ☑ IND - Industrial
- ☐ AGR - Agricultural

TYPE INSPECTION (check one)

- ☑ ACI - Annual Compliance (WWTP)
- ☐ PAI - Performance Audit (lab)
- ☐ PCI - Pretreatment Compliance
- ☐ DIA - Diagnostic
- ☐ PSA - Permit Site Assessment
- ☐ OTH - Other

___ ___ ___ ___ ___ ___ Date of Inspection Report (YYMMDD)

TYPE EFFLUENT SAMPLING

- ☐ COM - Composite
- ☐ GRB - Grab
- ☐ NON - None
- ☐ N/A - Not Applicable

☑ Yes ☐ No ☐ N/A Annual CSI (Majors Only)

☐ Yes ☑ No ☐ N/A Biomonitoring Sampling

INSPECTION FINDINGS

☐ Yes ☑ No ☐ N/A Violations/Substantial Deficiencies Noted

☐ Yes ☑ No ☐ N/A Permittee Response Required

___ ___ ___ ___ ___ ___ Date Response Due (YYMMDD)

JPN Inspector Initials

Comments: _____

PERMITTEE RESPONSE

___ ___ ___ ___ ___ ___ Date Response Submitted (YYMMDD)

☐ Yes ☐ No Response Adequate

☐ Yes ☐ No Follow-up Action Needed: ☐ District ☐ Central Office

Comments: _____

J Patrick Nell
Signature

TWC-0228 (Rev. 11-21-90)

Texas Water Commission

TO: Field Support Section, Field Operations Division

THRU:

FROM: District 7 Office

SUBJECT: Routing of Attached Water Quality Document

After processing, please transmit the attached water quality document as follows:

Wastewater Permits Section

_____ Municipal Unit

_____ Industrial Unit

_____ Applications Unit

_____ Toxicity Evaluation Unit

_____ Pretreatment Unit

Wastewater Enforcement Section

_____ Enforcement Coordinator

_____ Operator Certification

_____ Administrative Support (Self-Reporting Program)

✓ Central Records

_____ Other (_____)

TWC-0173 (Rev. 03-18-91)

EPA

United States Environmental Protection Agency
Washington, D. C. 20460

NPDES Compliance Inspection Report

Form Approved.
OMB No. 2040-0057
Approval expires 4-30-88

Section A: National Data System Coding

Transaction Code	NPDES	yr/mo/day	Inspection Type	Inspector	Fac Type
1 N 2 5	3 TX0004871 11	12 911210 17	18 S	19 S	20 2

Remarks

21 66

Reserved	Facility Evaluation Rating	BI	QA	Reserved
67 69	70 4	71 N	72 N	73 74 75 80

Section B: Facility Data

Name and Location of Facility Inspected	Entry Time	Permit Effective Date
Shell Oil Company PO Box 100 Deer Park, Texas 77536	☒ AM ☐ PM 8:00	11/7/89
	Exit Time/Date 1200 / 1/15/92	Permit Expiration Date 11/6/94

Name(s) of On-Site Representative(s)	Title(s)	Phone No(s)
Charles Bland Tyler Huber	Envt'l + Compliance Engr Tech'l Support Operations	713/ 246-7895 246-7070

Name, Address of Responsible Official	Title	
Jack Sowle / John Holden P.O. Box 100 Deer Park, Texas 77536	Environmental Manager	
	Phone No. 713/ 246-7146	Contacted ☑ Yes ☐ No

Section C: Areas Evaluated During Inspection

(S = Satisfactory, M = Marginal, U = Unsatisfactory, N = Not Evaluated)

S	Permit	S	Flow Measurement	S	Pretreatment	S	Operations & Maintenance
S	Records/Reports	S	Laboratory	S	Compliance Schedules	S	Sludge Disposal
S	Facility Site Review	S	Effluent/Receiving Waters	S	Self-Monitoring Program	–	Other:

Section D: Summary of Findings/Comments *(Attach additional sheets if necessary)*

The facility appears to be well maintained and operated. Four oil and grease excursions were noted, three at outfall R003 and one at R001. The permittee is working with the EPA to modify the R001 permit requirements for copper in response to EPA A.O. VI-91-388.

Name(s) and Signature(s) of Inspector(s)	Agency/Office/Telephone	Date
J. Patrick Noll J. Patrick Noll	TWC/D7/(713) 457-5196	
Signature of Reviewer	Agency/Office	Date

Regulatory Office Use Only

Action Taken	Date	Compliance Status
		☐ Noncompliance ☐ Compliance

EPA Form 3560-3 (Rev. 3-85) Previous editions are obsolete.

- 02, 03, 04, 06, 08, 09

State Permit No. 00403 - 01; 07;
NPDES Permit No. TX 0004871

TEXAS WATER COMMISSION
INDUSTRIAL DISCHARGE WWTP—INSPECTION REPORT

Permittee Name: Shell Oil Company	Facility Name: Deer Park Facility
Permittee Address: P.O. Box 100, Deer Park, Texas 77536	Type Industry: Oil Refinery
	Inspection Date:
	District: 07

Officials	Title	Check if contacted	713/ Phone
Jack Sowle	Envt'l Mgr - outgoing	✓	246-7146
John Holden	" " - incoming	✓	" "
Charles Bland	Envt'l Eng - Compl.	✓	246-7895
Tyler Kauber	" " (Refinery)	✓	246-7098
Aimee Anani	" " (Chem Plant)	✓	246-7070

A. **TYPE TREATMENT PLANT.** Attach schematic of disposal/treatment systems and/or maps showing outfalls and major components of system. See attached.

B. **INSPECTION SAMPLE RESULTS.**

Outfall & Parameter	Measured Value	Permitted Value	Type Sample	COC Tag No.	Primary Source of Wastewater

NO SAMPLES

C. **RECEIVING WATER**. Effluent is discharged to:

( ) Dry ditch
( ) Dry creek channel
( ) Spring fed creek
( ) Normally flowing creek
( ) River
( ) Lake
(✓) Other PATRICK'S BAYOU AND THE HOUSTON SHIP CHANNEL

Report observed condition of receiving waters. Describe such conditions as foaming, floating materials, sludge deposits, or color and turbidity which appear either naturally or as a result of the discharge. Also, indicate the observed presence or absence of fish and other aquatic life in the area of the discharge.

OUTFALLS 001, 002, 003, 004 AND 009 DISCHARGE INTO PATRICK'S BAYOU ON THE EAST SIDE OF THE FACILITY. DUCKS WERE NOTED ON THE POND AT 001. OUTFALLS 006, 007, AND 008 DISCHARGE INTO THE HOUSTON SHIP CHANNEL (HSC). DUCKS WERE NOTED ALSO AT (See Att 4)

Include Attachment 1, Stream Quality Results, if applicable.

D. **OTHER REGISTRATIONS OR PERMITS**. Indicate any solid waste registration and/or waste disposal well permits issued to the company by this agency.

Registration/Permit No.	Type Waste Disposed
SW# 30007	IH, I, II, III

E. **PLANT MODIFICATIONS**. Has the treatment plant been modified since the last annual inspection?
( ) Yes (✓) No If yes, explain changes made and identify date that modifications were completed.

None

F. **BYPASSING**. To the best of your knowledge, has there been any bypassing of treatment facilities since the last annual inspection which caused either repeated or prolonged discharges of inadequately treated wastewater?
( ) Yes (X) No If yes, explain and describe permittee's corrective action.

N/A

Did the permittee provide noncompliance notification for bypasses?
( ) Yes ( ) No (X) N/A—No bypassing.

* NET = North Effluent Treater (Refinery WWTP).

G. **OPERATION AND MAINTENANCE.**

1. *Sludge Disposal.* Identify method of sludge disposal.

Numerous sludges are generated at the NET. Biological solids are generated by the 2° (See Att 3)

Is handling of solids regulated under the State Solid Waste Disposal Act, Article 4477-7? (✓) Yes ( ) No
If yes, identify the classification of solids.

III, II

2. *Flow Measurement.* Identify the type of primary flow measuring device.

002, 003, 004, 006, 008, 009 – None; 007 – 14.625" Venturi + Meter; 001 – Totalizer

Is flow indicating/recording equipment provided? (✓) Yes—Operable ( ) Yes—Not Operable ( ) No
If operable equipment is provided, complete Attachment 2, Accuracy Check.

Is the flow measurement equipment adequate to handle the expected ranges of flow rates? (✓) Yes ( ) No
If no, explain.

3. *O&M.* Describe operation, maintenance and housekeeping problems found during the inspection. Include Attachment 3 for additional explanations if necessary.

The NET* receives dry weather process effluent flow from the main refinery, and, additional wet weather flow from the North Pond (5MG) and the Storm Impoundment Pond (45MG). Effluent from the NET discharges into the Houston Ship Channel (HSC) via outfall R007.

The NET facility consists of three onsite CPI separators (1. CCLP – Cat Cracking + Lube Plant; 2. TC+G – Thermal Cracking + Gas; 3. DD2 – Distillation + Dispatching) and two offsite CPI's (4. CPI1 – located near Hydro Processing, and 5. CPI2 –

Industrial Discharge
(See Att 3B)

H. **SELF-REPORTING**. Does the permittee use a commercial or in-house laboratory? BOTH
If an in-house lab is used, were any quality assurance deficiencies noted? ( ) Yes ( ) No If yes, explain.

A LIST OF THE COMMERCIAL LABS USED BY SHELL AND THE ANALYSES THEY PERFORM IS ATTACHED. AT THE TIME OF THIS INSPECTION, THE EPA REGION VI INSPECTOR BEGAN A LAB AUDIT OF EACH OF THE ANALYSES

Check the following statements and comment on no responses. (See Att. 4)

(✓) Yes	( ) No	*Type of samples collected and measurements made conform to requirements.*
(✓) Yes	( ) No	Samples are taken and measurements are made at required frequencies.
(✓) Yes	( ) No	Adequate records are maintained to document effluent report data.
(✓) Yes	( ) No	Lab data verifies reported values on effluent reports.
(✓) Yes	( ) No	Effluent reports are submitted monthly.
( ) Yes	( ) No	Noncompliance notification is provided for excursions.

Is the permittee complying with permit parameters as indicated by self-reported data? ( ) Yes ( ) No
If no, explain.

I. **SPECIAL PERMIT PROVISIONS**. Is the permittee in compliance with special permit provisions?
( ) Yes (✓) No ( ) N/A—No special provisions. If no, explain.

FOR THE PERIOD 8/90 THROUGH 6/91, THREE O+G EXCURSIONS WERE REPORTED @ R003 (8/90, 10/90, AND 2/91), AND ONE O+G EXCURSION WAS REPORTED @ R008, ALL IN VIOLATION OF PART 5, PAGE 8 OF TWC PERMIT.

J. **COMPLIANCE SCHEDULE.** Is the permittee under any State compliance schedule (permit, enforcement letter, commission order, court order)? ( ) Yes ( ) No If yes, identify the enforcement document and describe actions taken by the permittee pursuant to the document.

EPA ADMIN ORDER DOCKET NO. VI - 91 - 388, ISSUED AUG 30, 1991, RELATING TO COPPER, HEXAVALENT CHROMIUM, AND O+G EXCURSIONS IN VARIOUS MONTHS FROM 6/90 THROUGH 6/91. THE PERMITTEE HAS RESPONDED IN WRITING TO THIS ORDER (SEE ATTACHED SCHEDULE J) AND HAS MET WITH THE EPA IN DALLAS ON 10/10/91 (WITH MONA TATES, IN ENFORCE-

Has a Federal administrative order or court order been issued? ✓ Yes ( ) No (See J, ABOVE) (See ATT 4)

K. **STATUS OF PLANNED IMPROVEMENTS.** If the permittee is pursuing expansion or major upgrading, briefly explain the permittee's plans and indicate the status of the project.

NONE IN 1991 AND NONE ARE PLANNED FOR 1992.

L. **OTHER AREAS OF INTEREST OR CONCERN.**

THERE EXISTS A SMALL POND IMMEDIATELY NE OF LANDFILL # 104, DESIGNATED AS CCUC SITE 301. SPENT CATALYTIC CRACKING UNIT CATALYST, CLASSIFIED AS CLASS III MATERIAL, IS STORED IN THE POND UNTIL IT CAN BE LANDFILLED. STORING THE CATALYST IN THE POND REPORTEDLY KEEPS THE DUST DOWN.

THERE IS A RAIL TANK CAR WASHDOWN SITE ON THE WEST SIDE OF THE FACILITY AT 4th AND 30th STREETS. TANK CARS ARE

(See ATT 4

M. **FIELD OFFICE ACTION.** Describe action proposed or taken to address deficiencies or noncompliances.

A letter will be sent to the permittee summarizing the findings of this inspection.

N. **CENTRAL OFFICE ACTION REQUESTED.**

None

Investigator J. Patrick Noll District Manager

Signature Date

OPERATION AND MAINTENANCE

Explanations (continued)

G O+M/1 .... SEGMENT OF THE FACILITY, WHICH BEGINS AT THE TRICKLING FILTER AND INCLUDES THE TWO AERATION BASINS AND THE TWO CLARIFIERS. WASTED SLUDGE FROM THE CLARIFIERS IS THICKENED AND DIGESTED ONSITE, THEN PUMPED TO TANK 13145 IN THE SOUTH EFFLUENT TREATER (SET) AREA (THE CHEMICAL PLANT WWTP) FOR MIXING, THEN INCINERATED AT THE SET. THE ASH FROM THE INCINERATED BIO SLUDGE IS INTRODUCED INTO THE SET JUST UP-STREAM OF THE 1° CLARIFIERS.

CPI SLUDGES, OBTAINED FROM THE FIVE NET CPI'S (SEE G.O+M/3), HAVE BEEN CHARACTERIZED AS A CLASS II WASTE, AND ARE DISPOSED OF IN THE ONSITE LANDFILL, SITE #104. THESE SLUDGES ARE PUMPED TO THE EAST DECANT PIT AT THE NET BEFORE HAULING TO THE LANDFILL. TCLP ATT'D.

THE WEST DECANT PIT AT THE NET RECEIVES PROCESS SLUDGES THAT HAVE BEEN CHARACTERIZED AS A CLASS IH WASTE, AND ARE INCINERATED OFFSITE BY ROLLINS AS A LAND BAN SLUDGE. IN 1991, ROLLINS INCIN-

(See 3A)

OPERATION AND MAINTENANCE

Explanations (continued) ----- ERATED 201 TONS OF DECANT PIT CLASS IH SLUDGE.

DAF FLOAT MATERIAL HAS BEEN CHARACTERIZED AS CLASS IH (TCLP IS ATTACHED) AND IS TAKEN OFFSITE TO RHONE-POULENC FOR DISPOSAL. FROM 1/91 THROUGH 12/91, 1230 DRY TONS OF DAF FLOAT SLUDGE WERE TAKEN TO RHONE-POULENC FOR INCINERATION. AN ADDITIONAL 219 DRY TONS WERE INCINERATED AT ROLLINS IN 1991. THIS IH SLUDGE IS NOT CHARACTERIZED AS LAND BAN MATERIAL.

OPERATION AND MAINTENANCE

Explanations (continued)

G. O+M/3 .... LOCATED ADJACENT TO R002); A NEUTRALIZATION SUMP (X-330 SUMP); AN EQUALIZATION TANK (X-330); A FLASH MIXER (EWT 7) AND A FLOCCULATOR (EWT 8); TWO DAF UNITS (EWT 9 + 10); AN OILY SLUDGE TANK (X-316) FOR THE DAF FLOAT MATERIAL (SLUDGE); 5 - OILY SLUDGE HOLDING TANKS (X-324 - 328); A TRICKLING FILTER; TWO ABOVE GROUND AERATION BASINS; TWO CLARIFIERS; AND 10 SAND FILTERS. ALSO AT THE NET ARE A THICKNER, A DIGESTER, A SPILL DIVERSION SUMP AND TANK (5-412) FOR OFF-SPEC/ HIGH DEMAND PROCESS EFFLUENT, AS WELL AS A 5MG STORM IMPOUNDMENT (NORTH POND) AND A 45 MG STORM IMPOUNDMENT POND. BOTH OF THE STORM IMPOUNDMENT PONDS FEED BACK TO THE NET VIA THE X-330 SUMP FOR TREATMENT. A SMALL POND, IMMEDIATELY ADJACENT AND SOUTH OF THE NORTH POND, CALLED THE SOUTH POND, IS OUT OF SERVICE. IT FORMERLY SERVED AS THE NEUTRALIZATION AND EQUALIZATION PONDS UNTIL 1987, WHEN THE X-330 SUMP AND THE X-330 TANKS WERE BUILT. ANOTHER

(See 3C)

OPERATION AND MAINTENANCE

Explanations (continued)

G. O+M/3 .... TANK, X-321, IS AN OFF-SITE SLOP OIL TANK THAT RECEIVES OIL SKIMMINGS FROM THE FIVE CPI'S. THE OIL IN X-321 IS FED TO THERMAL CRACKING AS A FEEDSTOCK, AND THE WATER IS FED BACK TO THE TC+G CPI FOR TREATMENT.

EACH OF THE EIGHT OUTFALLS HAVE PUMP BACK CAPABILITY DURING RAINFALL OR OFF-SPEC EVENTS (EXCEPT FOR R006, WHICH IS PLUGGED AND GRAVITY FLOWS BACK). THE FLOWS BACK TO THE NET ARE AS FOLLOWS:

R001 - TO DD2 CPI OR SOUTH EFFLUENT TREATER (SET).
R002 - TO DD2 CPI
R003 - TO CCLP CPI
R004 - TO CCLP CPI
R006 - PLUG; DRAINS TO CCLP CPI
R007 - TO NORTH POND
R008 - TO STORM IMPOUNDMENT POND
R009 - TO CCLP CPI

NO MAJOR PROBLEMS OR DEFICIENCIES WERE NOTED AT THE NET, AND, OVERALL,

(See 3D)

OPERATION AND MAINTENANCE

Explanations (continued)

G. O+M/3 .... THE FACILITY APPEARS TO BE WELL MAINTAINED AND OPERATED. A FEW MINOR CONCERNS WERE NOTED, HOWEVER, AND THEY ARE AS FOLLOWS:

1. OUTFALL R006 HAD LEAKAGE BETWEEN THE METAL PLATE WEIR AND THE CONCRETE SIDEWALLS.

2. GROUNDWATER WELLS FROM A REPORTEDLY OLD ACID PIT WERE PUMPING INTO THE STORM IMPOUNDMENT POND, WHICH IS PERMITTED FOR STORMWATER.

3. THE STORM IMPOUNDMENT POND (S.I.P.) CAN OUTFALL TO R008. DAILY RECORDS ARE AVAILABLE AS TO IF AND/OR WHEN THE S.I.P. OUTFALLS TO R008 - REPORTEDLY RARELY - BUT THIS INFORMATION IS NOT PULLED OFF THE DAILY SHIFT REPORTS FOR EITHER EXTERNAL, OR INTERNAL, REPORTING. THE EARTHEN SIDEWALLS OF THE S.I.P. ARE BLACK WITH OILY RESIDUE. IN SUBSEQUENT CONVERSATIONS WITH THE PERMITTEE, IT WAS REPORTED THAT FLOWS FROM THE BIG DITCH (SEE ATTACHED COLORED SCHEMATIC) ARE NO LONGER ROUTINELY PUMPED TO THE STORM

(SEE ATT 3E)

OPERATION AND MAINTENANCE

Explanations (continued)

G. O+M/3).... IMPOUNDMENT POND, AS THEY WERE BEFORE EARLY 1991. CONSEQUENTLY, THE PERMITTEE BELIEVED 1991 FLOWS FROM THE STORM IMPOUNDMENT POND TO OUTFALL 008 WERE LITTLE TO NONE. BIG DITCH FLOWS TO OUTFALL 008 AND WOULD BE SAMPLED AS SUCH.

R001 IS CALLED THE UTILITIES OUTFALL. IT RECEIVES FLOW FROM THE COOLING TOWER AND STEAM BLOWDOWN SYSTEMS, AND THE DEMINERALIZER. MORE OF THE R001 FLOW IS BEING ROUTED TO THE CHEMICAL PLANT SET FOR TREATMENT.

BIOMONITORING FOR BOTH R001 AND R007 WERE COMPLETED IN 11/90 (SEE ATTACHED SHELL AND EPA DOCUMENTS).

COMMENTS

C)....THE POND AT 008, BUT NO OTHER FAUNA WAS NOTED AT ANY OF THE OTHER OUTFALLS. NO OIL, SLUDGE, SHEEN, DEBRIS, OR ANY OTHER NEGATIVE EFFECTS OF DISCHARGE WERE NOTED AT ANY OF THE OUTFALLS. NOTE: THERE WAS A SLIGHT SEEPAGE AROUND THE STEEL PLATE WEIR AT 006. NOTE[2]: THERE IS NO OUTFALL 005. NOTE[3]: THE REFINERY (NORTH EFFLUENT TREATER, OR NET) WWTP OUTFALLS THROUGH 007.

H).... AND PREPARATIONS PERFORMED BY THE SHELL LAB. THEY ARE AS FOLLOWS:

pH	HEXAVALENT CHROME
TSS	GRAVIMETRIC O+G
BOD	SULFIDE
TOC	TOTAL Cr
COD	TOTAL Pb
PHENOL	ORGANIC CHLORIDE PREPARATION.

DUE TO TIME LIMITATIONS, THE LAB AUDIT WAS NOT COMPLETED. DURING PHASE II OF THE MULTI MEDIA INSPECTION, THE EPA INSPECTOR PLANS TO FINISH THE AUDIT. THE FINAL SEGMENT OF THE EPA LAB AUDIT WAS COMPLETED DURING PHASE II

(See 4A)

COMMENTS

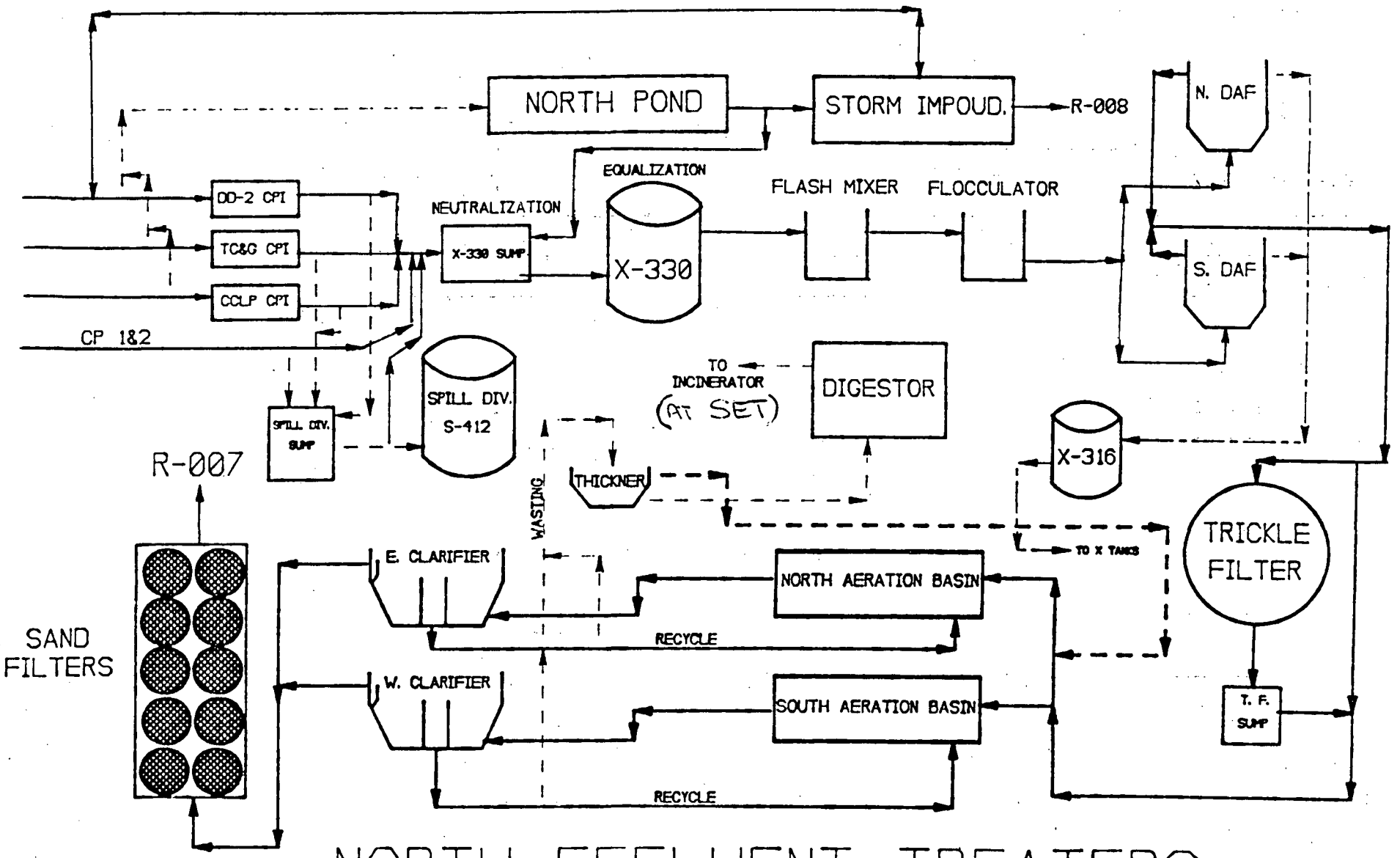
H).... ON 1/15/92 DURING THE SAMPLING SEGMENT OF THE MULTIMEDIA INSPECTION.

L).... CLEANED AND THE WASH EFFLUENT IS HANDLED AS FOLLOWS:

1) OILY WASTE IS WASHED INTO THE "SOUTH INLET" IN THE CONCRETE CLEANING SLAB AND IS PUMPED INTO THE X 321 SLOP OIL TANK AT THE NET. THE DE-CANTED WATER IS TREATED AT THE NET AFTER GOING THROUGH THE TC + G API, AND THE RECOVERED OIL IS FED TO TC AS A FEEDSTOCK.

2) WAXES ARE WASHED TO AN ONSITE SUMP. THIS MATERIAL IS COLLECTED VIA A VACUUM TRUCK AND IS CARRIED TO THE LUBE PLANT FOR REPROCESSING.

J).... MENT AND SCOTT WILSON, THE PERMIT WRITER) AND ON 1/10/92 (WITH SCOTT WILSON AND HIS MANAGER, BOB VICKERY). SHELL IS REQUESTING A PERMIT MODIFICATION FOR THE COPPER PARAMETER AT R001 AND R007.

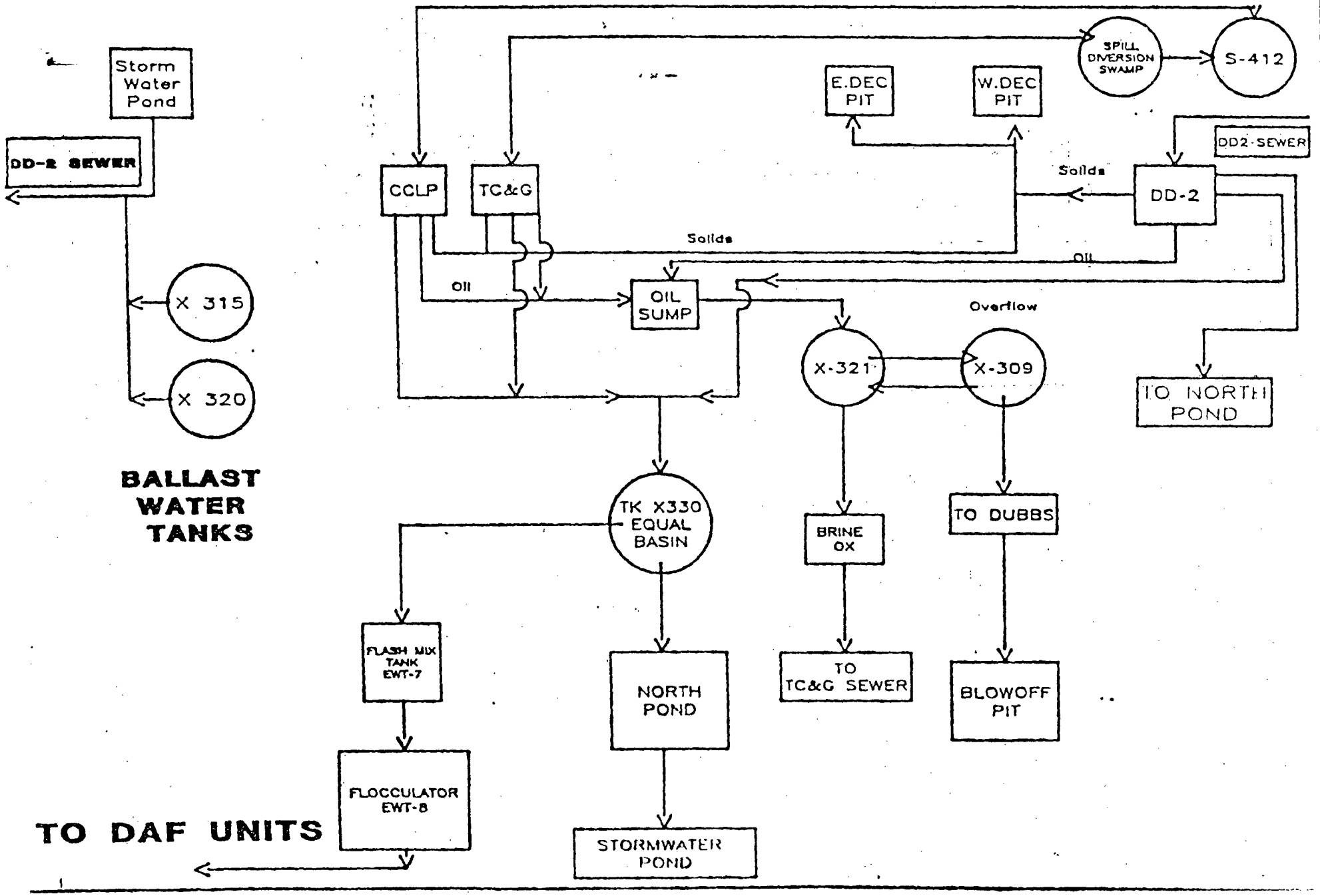


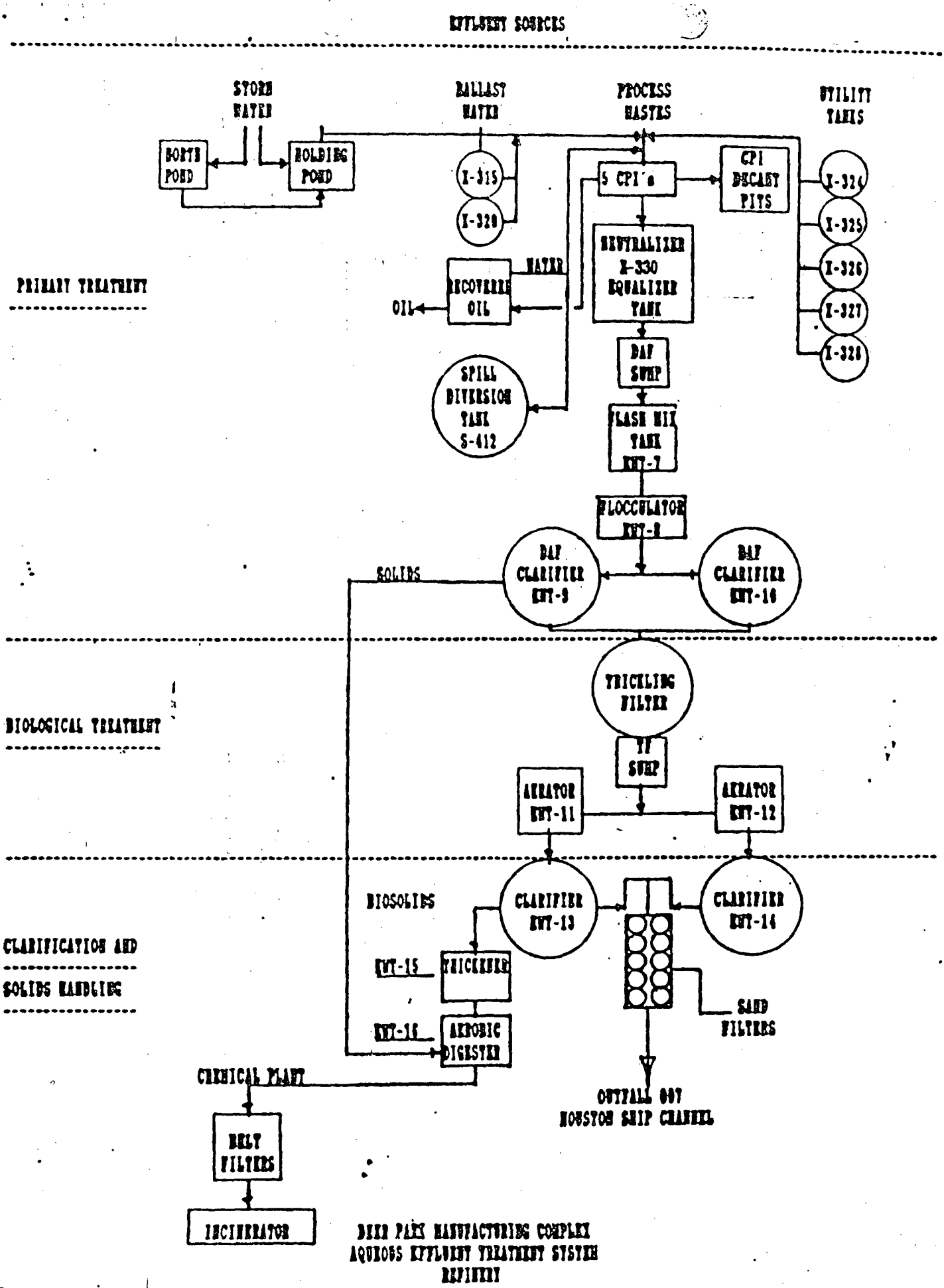
NORTH EFFLUENT TREATERS

SHELL REFINERY
PERMIT NO. 00403

SHELL OIL COMPANY (DPMC)

NORTH EFFLUENT TREATERS





DEER PARK MANUFACTURING COMPLEX
AQUEOUS EFFLUENT TREATMENT SYSTEM
REFINERY

SHELL - DEER PARK, TEXAS FACILITY

OUTSIDE LAB SAMPLE SCHEDULE & CONTACTS

NAME	CONTACT	SAMPLE	ANALYSIS	FREQUENCY
ACS Lab Hou	Ernie Williams 579-8822	Anerobic samples	LiCl~	daily during Tracer Study
ABL LAB L.A.	STEVE MATHIS 1-800-333-2879 8-504-924-2618	R001 R007 C001	ACUTE BIOASSAY " "	1/Mo WED 1/QT WED ?
CORE Hou	LISA ROBINSON 943-9776	C001 T19051 T19052 T 2800	ORG CL. " " "	1/WK THUR " " "
ENSECO COLORADO	SUSAN WYATT 1-303-421-6611	MONITOR WELLS NESHAPS SX.	SEE SCHEDULE BENZENE #625	1/QT. 3WKS M-Th
		C001	BZ.TOL #8020 CCL3,1,2DCE #8010 CH2CL3	1/WK MON 1/WK MON
JORDAN Corpus Christi	GERALD BOWLING 1-512-884-0371	C001	PHENOL #8270 NAPHTHALENE- #8270	1/WK MON 1/WK MON
KEYSTONE Hou	ROB JAROS 266-6800	NESHAPS	BENZENE #625	M-F
NUS Hou	SCOTT MAYO 488-1810	OTHER WELLS	TOX.OH,T.CR T.Pb,T.Ca	M-TH
		C-001	T.Cu AA G/F	WED
		R-007	T.Cu AA G/F	MWF
	WASTE CHARACTERIZATIONS - AS REQUIRED			
EDNA WOOD Hou	ALICE PERRY	C001	NH3 NESSLER'S #4500-C	MWF
	RITA WELLS		METALS QTLY AA G/F	MON
	747-7271	R007	METALS QTLY AA G/F	"
		R001	METALS QTLY AA G/F	MON

NUS CORPORATION

LABORATORY SERVICES DIVISION
9615 BRIAR AVENUE
HOUSTON, TX 77036
713-488-1810

BALTIMORE, MD 21203-0032

North Effluent Treater DAF Float
or, Refinery

LAB ANALYSIS REPORT

CLIENT NAME: SHELL CHEMICAL-BPMC
ADDRESS: P.O. BOX 100
BEER PARK, TX 77536
ATTENTION: MILLIE MEBERT

REPORT DATE: 07/24/89

NUS CLIENT NO: 281015
NUS SAMPLE NO: 29062571
VENDOR NO: 03999007
WORK ORDER NO: 53680
DATE RECEIVED: 06/23/89

SAMPLE IDENTIFICATION: DAF FLOAT X 316 06/23

TEST	DETERMINATION	RESULTS	UNITS	SURROGATE CONC	UNITS	SURROGATE RECOVERY	UNITS
M350	EP TOXICITY METALS						
M039	Arsenic, EP Extraction	0.011	mg/l				
M049	Barium, EP Extraction	< 0.2	mg/l				
M099	Cadmium, EP Extraction	< 0.005	mg/l				
M149	Chromium, EP Extraction	0.03	mg/l				
M209	Lead, EP Extraction	< 0.05	mg/l				
M259	Mercury, EP Extraction	0.0004	mg/l				
M299	Selenium, EP Extraction	0.042	mg/l				
M309	Silver, EP Extraction	< 0.01	mg/l				
S908	Aqueous Dis/EPX						
S909	Aqueous Dis/EPX(As/Se)						
S910	EP Toxicity Extraction						
S249	REACTIVITY						
S074	Cyanide, RCRA (CN)	0.35#	mg/kg				
S193	Sulfide, RCRA (S)	14	mg/kg				
S071	Corrosion Rate	< 0.01	IPY				
S090	Flash Point (Pensky-Martens)	> 212	F				
B110	VOLATILES-PP IN WATER(EPA 624)						
BV01	Acrolein	< 50,000	ug/l				
BV02	Acrylonitrile	< 50,000	ug/l				
BV03	Benzene	< 2500	ug/l				
BV05	Bromoform	< 2500	ug/l				
BV06	Carbon tetrachloride	< 2500	ug/l				
BV07	Chlorobenzene	< 2500	ug/l				
BV08	Dibromochloromethane	< 2500	ug/l				
BV09	Chloroethane	< 5000	ug/l				
BV10	2-Chloroethylvinyl ether	< 5000	ug/l				
BV11	Chloroform	< 2500	ug/l				
BV12	Bromodichloromethane	< 2500	ug/l				
BV13	trans-1,3-Dichloropropene	< 2500	ug/l				

NUS CORPORATION

LABORATORY SERVICES DIVISION
800 GEMINI AVENUE
HOUSTON, TX 77058
713-488-1810

SUBMIT TO:
800 GEMINI AVENUE
HOUSTON, TX 77058

LAB ANALYSIS REPORT

CLIENT NAME: SHELL CHEMICAL-BPMC
ADDRESS: P.O. BOX 100
BEER PARK, TX 77536
ATTENTION: MILLIE HEBERT

REPORT DATE: 07/24/89

NUS CLIENT NO: 281015
NUS SAMPLE NO: 29062571
VENDOR NO: 03999007
WORK ORDER NO: 55680
DATE RECEIVED: 06/23/89

SAMPLE IDENTIFICATION: BAE FLOAT X 316 06/23

TEST	DETERMINATION	RESULTS	UNITS	SURROGATE CONC	UNITS	SURROGATE RECOVERY	UNITS
8V14	1,1-Dichloroethane	< 2500	ug/l				
8V15	1,2-Dichloroethane	< 2500	ug/l				
8V16	1,1-Dichloroethene	< 2500	ug/l				
8V17	1,2-Dichloropropane	< 2500	ug/l				
8V18	cis-1,3-Dichloropropene	< 2500	ug/l				
8V19	Ethylbenzene	< 2500	ug/l				
8V20	Methyl bromide	< 5000	ug/l				
8V21	Methyl chloride	< 5000	ug/l				
8V22	Methylene chloride	< 2500	ug/l				
8V23	1,1,2,2-Tetrachloroethane	< 2500	ug/l				
8V24	Tetrachloroethene	< 2500	ug/l				
8V25	Toluene	< 2500	ug/l				
8V26	trans-1,2-Dichloroethene	< 2500	ug/l				
8V27	1,1,1-Trichloroethane	< 2500	ug/l				
8V28	1,1,2-Trichloroethane	< 2500	ug/l				
8V29	Trichloroethene	< 2500	ug/l				
8V31	Vinyl chloride	< 5000	ug/l				
8VS0	d8-Toluene(Surrogate)			50	ug/l	102	%
8VS1	Bromofluorobenzene(Surrogate)			50	ug/l	111	%
8VS2	d4-1,2-Dichloroethane(Surr.)			50	ug/l	103	%
8120	ACID EXTRACTABLES (EPA 625)						
8A01	2-Chlorophenol	< 100	ug/l				
8A02	2,4-Dichlorophenol	< 100	ug/l				
8A03	2,4-Dimethylphenol	< 100	ug/l				
8A04	2-Methyl-4,6-dinitrophenol	< 500	ug/l				
8A05	2,4-Dinitrophenol	< 500	ug/l				
8A06	2-Nitrophenol	< 100	ug/l				
8A07	4-Nitrophenol	< 500	ug/l				
8A08	4-Chloro-3-methylphenol	< 100	ug/l				
8A09	Pentachlorophenol	< 500	ug/l				

NUS CORPORATION

LABORATORY SERVICES DIVISION
800 GEMINI AVENUE
HOUSTON, TX 77058
713-488-1810

SUBMIT TO:
800 GEMINI AVENUE
HOUSTON, TX 77058

LAB ANALYSIS REPORT

CLIENT NAME: SHELL CHEMICAL-DPMC
ADDRESS: P.O. BOX 100
BEER PARK, TX 77536
ATTENTION: MILLIE HEBERT

REPORT DATE: 07/24/89

NUS CLIENT NO: 281015
NUS SAMPLE NO: 29062571
VENDOR NO: 03999047
WORK ORDER NO: 55680
DATE RECEIVED: 06/23/89

SAMPLE IDENTIFICATION: BAE FLOAT X 316 06/23

TEST	DETERMINATION	RESULTS	UNITS	SURROGATE CONC	UNITS	SURROGATE RECOVERY	UNITS
0A10	Phenol	< 100	ug/l				
0A11	2,4,6-Trichlorophenol	< 100	ug/l				
0AS0	d5-Phenol(Surrogate)			200	ug/l	UNRECOVERY	ug/l
0AS1	2-Fluorophenol(Surrogate)			200	ug/l	UNRECOVERY	ug/l
0AS2	2,4,6-Tribromophenol(Surrogate			200	ug/l	UNRECOVERY	ug/l
0AS3	Pentafluorophenol(Surrogate)			200	ug/l	UNSPIKED	ug/l
0130	BASE/NEUTRAL EXTRACT.(EPA 625)						
0B01	Acenaphthene	< 100	ug/l				
0B02	Acenaphthylene	< 100	ug/l				
0B03	Anthracene	< 100	ug/l				
0B04	Benzidine	< 500	ug/l				
0B05	Benzo[a]anthracene	< 100	ug/l				
0B06	Benzo[a]pyrene	< 100	ug/l				
0B07	Benzo[b]fluoranthene	< 100	ug/l				
0B08	Benzo[ghi]perylene	< 100	ug/l				
0B09	Benzo[k]fluoranthene	< 100	ug/l				
0B10	Bis(2-chloroethoxy)methane	< 100	ug/l				
0B11	Bis(2-chloroethyl)ether	< 100	ug/l				
0B12	Bis(2-chloroisopropyl)ether	< 100	ug/l				
0B13	Bis(2-ethylhexyl)phthalate	< 100	ug/l				
0B14	4-Bromophenyl phenyl ether	< 100	ug/l				
0B15	Benzyl butyl phthalate	< 100	ug/l				
0B16	2-Chloronaphthalene	< 100	ug/l				
0B17	4-Chlorophenyl phenyl ether	< 100	ug/l				
0B18	Chrysene	< 100	ug/l				
0B19	Dibenzo[a,h]anthracene	< 100	ug/l				
0B20	1,2-Dichlorobenzene	< 100	ug/l				
0B21	1,3-Dichlorobenzene	< 100	ug/l				
0B22	1,4-Dichlorobenzene	< 100	ug/l				
0B23	3,3'-Dichlorobenzidine	< 200	ug/l				

NUS CORPORATION

LABORATORY SERVICES DIVISION
800 GEMINI AVENUE
HOUSTON, TX 77058
713-488-1910

SEND TO:
800 GEMINI AVENUE
HOUSTON, TX 77058

LAB ANALYSIS REPORT

CLIENT NAME: SHELL CHEMICAL-BPMC
ADDRESS: P.O. BOX 100
BEER PARK, TX 77536
ATTENTION: NILLIE NEBERT

REPORT DATE: 07/24/89

NUS CLIENT NO: 281015
NUS SAMPLE NO: 29062571
VENDOR NO: 03999047
WORK ORDER NO: 55680
DATE RECEIVED: 06/23/89

SAMPLE IDENTIFICATION: BAE FLOAT X 316 06/23

TEST	DETERMINATION	RESULTS	UNITS	SURROGATE CONC	UNITS	SURROGATE RECOVERY	UNITS
0024	Diethyl phthalate	< 100	ug/l				
0025	Dimethyl phthalate	< 100	ug/l				
0026	Di-n-butyl phthalate	< 100	ug/l				
0027	2,4-Dinitrotoluene	< 100	ug/l				
0028	2,6-Dinitrotoluene	< 100	ug/l				
0029	Di-n-octyl phthalate	< 100	ug/l				
0030	1,2-Diphenylhydrazine(Azobz)	< 100	ug/l				
0031	Fluoranthene	< 100	ug/l				
0032	Fluorene	< 100	ug/l				
0033	Hexachlorobenzene	< 100	ug/l				
0034	Hexachlorobutadiene	< 100	ug/l				
0035	Hexachlorocyclopentadiene	< 100	ug/l				
0036	Hexachloroethane	< 100	ug/l				
0037	Indeno(1,2,3-cd)pyrene	< 100	ug/l				
0038	Isophorone	< 100	ug/l				
0039	Naphthalene	< 100	ug/l				
0040	Nitrobenzene	< 100	ug/l				
0041	N-Nitrosodimethylamine	< 100	ug/l				
0042	N-Nitrosodi-n-propylamine	< 100	ug/l				
0043	N-Nitrosodiphenylamine	< 100	ug/l				
0044	Phenanthrene	< 100	ug/l				
0045	Pyrene	< 100	ug/l				
0046	1,2,4-Trichlorobenzene	< 100	ug/l				
0050	d5-Nitrobenzene(Surrogate)			100	ug/l	UNRECOVERY	ug/l
0051	2-Fluorobiphenyl(Surrogate)			100	ug/l	UNRECOVERY	ug/l
0052	d-14-p-Terphenyl(Surrogate)			100	ug/l	UNRECOVERY	ug/l
0053	Decafluorobiphenyl(Surrogate)			100	ug/l	UNSPIKED	ug/l

COMMENTS: * AS RECEIVED

Reviewed and Approved by: Diane Heser

NUS CORPORATION

LABORATORY SERVICES DIVISION
900 GEMINI AVENUE
HOUSTON, TX 77058
713 - 488-1810

REMIT TO:
900 GEMINI AVENUE
HOUSTON TX 77058

North Effluent Treater (Refinery) CPI Sludge
CPI Sludge (East Decant Pit) CPI Sludge
950430

LAB ANALYSIS REPORT

CLIENT NAME: SHELL CHEMICAL COMPANY-DPMC
ADDRESS: P.O. BOX 100
DEER PARK, TX 77536
REPORT DATE: 09/09/88
ATTENTION: MILLIE HEBERT

NUS CLIENT NO: 281016
NUS SAMPLE NO: 28082510
VENDOR NO: 03999000
WORK ORDER NO: 55680
DATE RECEIVED: 08/09/88

SAMPLE IDENTIFICATION: DECANT PIT-SOLID PHASE 08/08

TEST	DETERMINATION	RESULTS	UNITS	SURROGATE CONC	UNITS	SURROGATE RECOVERY	UNITS
0B76	Di-n-butyl phthalate	< 400,000	ug/kg				
0D89	Naphthalene	< 400,000	ug/kg				
0B94	Phenanthrene	< 400,000	ug/kg				
0B95	Pyrene	< 400,000	ug/kg				
0D06	2-Methylphenol	< 400,000	ug/kg				
0D07	4-Methylphenol	< 400,000	ug/kg				
0F44	Total Xylenes	*	ug/kg				
0V43	Benzene	*	ug/kg				
0V65	Toluene	*	ug/kg				

COMMENTS: *NOT RECOVERED DUE TO EXTRACT DILUTION

Reviewed and Approved by: Diane Meyer

NUS CORPORATION

LABORATORY SERVICES DIVISION
900 GEMINI AVENUE
HOUSTON, TX 77058
713 · 488-1810

REMIT TO:
900 GEMINI AVENUE
HOUSTON, TX 77058

LAB ANALYSIS REPORT

CLIENT NAME: SHELL CHEMICAL COMPANY-DPMC
ADDRESS: P.O. BOX 100
DEER PARK, TX 77536
ATTENTION: MILLIE HEBERT

REPORT DATE: 09/09/88

NUS CLIENT NO: 281016
NUS SAMPLE NO: 28082510
VENDOR NO: 03999000
WORK ORDER NO: 55680
DATE RECEIVED: 08/09/88

SAMPLE IDENTIFICATION: DECANT PIT-SOLID PHASE 08/08

TEST	DETERMINATION	RESULTS	UNITS	SURROGATE CONC	UNITS	SURROGATE RECOVERY	UNITS
M039	Arsenic, EP Extraction	< 0.005	mg/l				
M149	Chromium, EP Extraction	< 0.03	mg/l				
M168	Copper, EP Extraction (Cu)	0.47	mg/l				
M275	Nickel, EP Extraction	0.03	mg/l				
M299	Selenium, EP Extraction	< 0.005	mg/l				
M368	Vanadium, EP Extraction	< 0.2	mg/l				
M399	Zinc, EP Extraction (Zn)	4.6	mg/l				
M900	Filtration						
S080	Cyanide, Total (CN)	0.19	mg/kg				
S898	Aqueous Digestion						
S899	Aqueous Dig.(As,Se)						
S910	EP Toxicity Extraction						
0901	SURROGATES/ACID EXT. IN SOLIDS						
0AS5	d5-Phenol(Surrogate)			200	ug/l	*	%
0AS6	2-Fluorophenol(Surrogate)			200	ug/l	*	%
0AS7	2,4,6-Tribromophenol(Surrogate			200	ug/l	*	%
0AS8	Pentafluorophenol(Surrogate)			200	ug/l	*	%
0903	SURROGATES/BN EXT. IN SOLIDS						
0BS5	d5-Nitrobenzene(Surrogate)			100	ug/l	*	%
0BS6	2-Fluorobiphenyl(Surrogate)			100	ug/l	*	%
0BS7	d-14-p-Terphenyl(Surrogate)			100	ug/l	*	%
0BS8	Decafluorobiphenyl(Surrogate)			100	ug/l	*	%
0905	SURROGATES/P.P. VOA IN SOLIDS						
0VS5	d8-Toluene(Surrogate)					*	%
0VS6	Bromofluorobenzene(Surrogate)					*	%
0VS7	d4-1,2-Dichloroethane(Surr.)					*	%
0A30	Phenol	< 400,000	ug/kg				
0B56	Benzo(a)pyrene	< 400,000	ug/kg				
0B63	Bis(2-ethylhexyl)phthalate	< 400,000	ug/kg				
0B68	Chrysene	< 400,000	ug/kg				

NUS CORPORATION

LABORATORY SERVICES DIVISION
900 GEMINI AVENUE
HOUSTON TX 77058
713 - 488 1810

REMIT TO:
900 GEMINI AVENUE
HOUSTON TX 77058

QUALITY ASSURANCE REPORT

CLIENT NAME: SHELL CHEMICAL COMPANY-DPMC
ADDRESS: P.O. BOX 100
DEER PARK, TX 77536
ATTENTION: MILLIE HEBERT

REPORT DATE: 09/09/88

NUS CLIENT NO: 281016
NUS SAMPLE NO: 28082510
VENDOR NO: 03999000
WORK ORDER NO: 55680
DATE RECEIVED: 08/09/88

SAMPLE IDENTIFICATION: DECANT PIT-SOLID PHASE 08/08

ORGANICS

TEST	DETERMINATION	QA SAMPLE	ANALYST	DATE & TIME RUN	LIT REFERENCE	ORIGINAL RESULT	SPIKE CONC	SPIKE RECOVERY(%)	ACCEPTABLE RANGE (%)	REAGENT BLANK	UNIT
OA30	Phenol	28073597	SN	08/09/88 01:20	4-MB270	< 1600	200	78/75	ND TO ND	< 330	ug/k
OB56	Benzo(a)pyrene	28073597	SN	08/10/88 01:20	4-MB270	< 1600		UNSPIKED	ND TO ND	< 330	ug/k
OB63	Bis(2-ethylhexyl)phthalate	28073597	SN	08/10/88 01:20	4-MB270	< 1600		UNSPIKED	ND TO ND	< 330	ug/k
OB68	Chrysene	28073597	SN	08/10/88 01:20	4-MB270	< 1600		UNSPIKED	ND TO ND	< 330	ug/k
OB76	Di-n-butyl phthalate	28073597	SN	08/10/88 01:20	4-MB270	< 1600		UNSPIKED	ND TO ND	< 330	ug/k
OB89	Naphthalene	28073597	SN	08/10/88 01:20	4-MB270	< 1600		UNSPIKED	ND TO ND	< 330	ug/k
OB94	Phenanthrene	28073597	SN	08/10/88 01:20	4-MB270	< 1600		UNSPIKED	ND TO ND	< 330	ug/k
OB95	Pyrene	28073597	SN	08/10/88 01:20	4-MB270	< 1600		70/69	ND TO ND	< 330	ug/k

LITERARY REFERENCES:
4. EPA-Environmental Protection Agency, "Test Methods for Evaluating Solid Waste," SW-846, 2nd Edition, April, 1984.

Reviewed and Approved by: Diane Meyer

LD

NUS CORPORATION

LABORATORY SERVICES DIVISION
900 GEMINI AVENUE
HOUSTON TX 77058
713 488 1810

REMIT TO:
900 GEMINI AVENUE
HOUSTON TX 77058

QUALITY ASSURANCE REPORT

CLIENT NAME: SHELL CHEMICAL COMPANY-DPMC
ADDRESS: P.O. BOX 100
DEER PARK, TX 77536

REPORT DATE: 09/09/88

ATTENTION: MILLIE HEBERT

NUS CLIENT NO: 281016
NUS SAMPLE NO: 28082510
VENDOR NO: 03999000
WORK ORDER NO: 55680
DATE RECEIVED: 08/09/88

SAMPLE IDENTIFICATION: DECANT PIT-SOLID PHASE 08/08

INORGANICS

TEST	DETERMINATION	QA SAMPLE	ANALYST	DATE & TIME RUN	LIT REFERENCE	ORIGINAL RESULT & ALIQUOT	DUPLICATE RESULT & ALIQUOT	SPIKE AMT/CONC	SPIKE RESULT & ALIQUOT	THEORETICAL RESULT	UN
M039	Arsenic, EP Extraction	28082688	LS	08/23/88 06:04	4-7060	< 0.005 10/10ml	< 0.005 10/10ml	.025 ml of 20 mg/l	0.022 25ml	0.020	mg
M149	Chromium, EP Extraction	28082688	DQ	08/18/88 22:21	2-200.7	< 0.03 10/10ml	< 0.03 10/10ml	0.5 ml of 20 mg/l	0.29 50ml	0.20	mg
M168	Copper, EP Extraction (Cu	28082511	LJR	08/31/88 21:05	4-7210	0.56 10/10ml	0.48 5/10ml	2 ml of 1.0 mg/l	1.5 5/10ml	1.6	mg
M299	Selenium, EP Extraction	28082688	LS	08/19/88 05:54	4-7740	< 0.005 10/10ml	< 0.005 10/10ml	.025 ml of 10.0 mg/l	0.008 25ml	0.010	mg
M388	Vanadium, EP Extraction	28082510	JR	08/19/88 07:59	4-6010	< 0.2 10/10ml	< 0.2 10/10ml	5 ml of 1.0 mg/l	1.0 5/10ml	1.0	mg
M399	Zinc, EP Extraction (Zn)	28082511	JP	08/24/88 08:35	4-7950	2.6 2/10ml	2.7 1/10ml	2 ml of 1.0 mg/l	4.7 1/10ml	4.6	mg
M900	Filtration	28082510	JP	08/12/88 21:30		DONE ml	ml		ml		
S080	Cyanide, Total (CN)	28082511	GT	08/26/88 13:00	3-4120	< 0.09 11.07g	< 0.09 10.96g	5 ml of 1100 mg/l	0.11 5ml	0.110	mg
S695	Aqueous Digestion	28082495	JPA	08/18/88 01:00	19-3010						
S699	Aqueous Dig.(As/Se)	28082495	JPA	08/18/88 01:00	20						
S910	EP Toxicity Extraction	28082510	RF	08/15/88 10:45	4-1310	DONE ml	ml		ml		

LITERARY REFERENCES:

2. EPA-Environmental Protection Agency, "Methods for Chemical Analysis of Water and Wastes," 1979 & "Tech.Add." 1982, 1984.
3. American Public Health Association, "Standard Methods for the Examination of Water and Wastewater," 16th Edition, 1985.
4. EPA-Environmental Protection Agency, "Test Methods for Evaluating Solid Waste," SW-846, 2nd Edition, April, 1984.
19. EPA-Environmental Protection Agency, "Test Methods for Evaluating Solid Waste," SW-846, 3rd Edition, November, 1986.
20. EPA, "Test Methods for Evaluating Solid Waste," SW-846, 3rd Ed., Nov. 1986, Methods 7740 and 7060.

Reviewed and Approved by: Diane Meyer

TEXAS WATER COMMISSION
LABORATORY INSPECTION CHECKLIST

COMPANY NAME: Shell Envir Lab PERMIT NO: 00403
INSPECTOR: J. Patrick Noll DATE: 12/11/91

INSTRUMENTS

Balance:	Serviced by technician annually	✓
	or complete calibration annually	✓
	Calibration check monthly* (1)	✓
	Log book kept (2)	✓
D.O. Probe:	Calibrated daily	✓
	Calibrated against Winkler	✓
	Log book kept (2)	✓
pH Meter:	Calibrated daily with 2 buffers (1, 2)	✓
	Buffers bracket pH value of samples (1)	✓
	Log book kept (2)	✓
Incubator:	Temperature @ 20°C (1, 4)	✓
	Log book kept (2)	✓
Oven:	Temperature @ 103 - 105°C (1, 4)	✓
	Log book kept (2)	✓
Refrigerator:	Temperature @ 4°C (3)	5°C
	Log book kept (2)	✓

*It is suggested to check with a known weight prior to use.

METHODS - MUNICIPAL

Chlorine Residual:	Correct for MnOx (1, 4)	N/A
	Analyzed immediately	
	Grab sample analyzed	
Chlorine Removal:	Sodium Sulfite used	✓
BOD_5:	pH = 6.5 - 7.5 su	✓
	Seed type	From Chemical WWT
	Seed Correction Factor (0.6) - 1.0) mg/l)	✓
	Seed Depletion (40-70%)	✓
	Sample Depletion $\geq$2.0 mg/l (after corrected for seed)	✓
	D.O. >1.0 after incubation	✓
	Blank Depletion $\leq$.2 mg/l	✓
	Duplicates set up 10% of X**	✓
	Duplicates close ($\pm$15%)	✓
	Dilutions (?) How Many?	4

Note: 2 dilutions are okay if one of them has a residual of 1.0 mg/l D.O. and a depletion of 2.0 mg/l D.O. Randomly check some of the bench sheets to determine if BOD_5 calculations are performed correctly.

Glucose/glutamic acid (200 $\pm$ 37)	✓
GGA with each BOD set (?)	✓
GGA prepared fresh with each set (?)	WEEKLY - PREPARED ONCE FOR W, Th, AND F RUNS.

** X = time throughout this checklist

	Dilution water nutrients	✓
	* Magnesium Sulfate ($MgSO_4$)	✓
	Calcium Chloride ($CaCl_2$)	✓
	Phosphate Buffer	✓
	Ferric Chloride ($FeCl_3$)	✓
	Method Referenced	405.1 / 5210 (17th)
	Holding time (48 hours)	✓
	No air in bottles; 250-300 ml	AIR OBSERVED
	Bottles with ground glass stoppers	✓
	Water seal maintained	✓
TSS:	Duplicates 10% of X	✓
	Duplicates close (±15%)	✓
	Blank run 1/day	✓
	Method referenced	160.2 / 2540D (17th)
	Holding time (7 days)	✓
NH_3-N:	Dechlorination immediately	N/A
	Samples distilled before analysis	SENT OUT TO
	If not, comparison data available	EDWA WOODS' LAB
	Blank & Standard run 1/day (2)	
	Duplicates 10% of X	
	Spikes 10% of X	
	Holding time (28 days w/preserv.)	
	Solutions mixed with NH_3 free water?	✓
pH:	Holding time (?) (1, 3)	<15 min onsite
	Grab sample analyzed	AT CONTROL ROOM
	METHOD REF'S	150.1 / 4500-H

All samples to be preserved should be done immediately: Check for time preserved.

METHODS - INDUSTRIAL

Oil & Grease:	Method used	413.1/5520B(17th
	Duplicate or Standard 10% of X (2)	✓

Note: if less than 10 samples are analyzed on a particular day, then 1 STD shall be analyzed. Duplicates may be analyzed in lieu of STD for oil and grease analysis.

	Sample container (1, 4)	
	Preserved (?)	
	Holding time (28 days w/preserv.)	
	No composites	
COD:	Duplicates run 10% of X (2)	✓
	Blanks & Standards 1/day (2)	✓
	Spike 10% of X (2)	✓
	Preserved (?)	✓
	Method referenced	410.3/5220B(17th)
	Holding time? (28 days w/preserv.)	✓
TOC:	Daily calibration solution	
	Duplicates 10% of X (2)	✓
	Spikes 10% of X (2)	✓
	Blanks & Standards 1/day (2)	✓
	Preserved (?)	IF NOT RUN IMMEDIATELY
	Method referenced	415.1/505(17th)
	Holding time ? (28 days w/preserv.)	✓

Phenol:	Blank & Standard 1/day (2)	✓
	Duplicate 10% of X (2)	✓
	Method referenced	420.1/510B (14th)
	Holding time? (28 days w/preserv.)	✓
AA:	Standard curve, calibration check daily	_____
	Duplicate 10% of X (2)	_____
	Spikes 10% of X (2)	_____
	Samples, dupes, and spikes digested	_____
GC & GCMS:	Blanks & Standards with each set (2)	_____
	Duplicate & Spike 5% of X (2)	_____

Note: If 1-20 samples are analyzed in a month then 1 duplicate & 1 spike analyses per month shall be performed.

Heavy Metals: See FEDERAL REGISTER for methods, Standard Methods for procedures

Other parameters as applicable: _____

All lab records available for past 3 years (2) _____

CHEMICALS DATED stock solutions good for one (1) year, standard solutions good for one (1) month.

CHEMICALS = expiration dates?

Cu - SENT TO NUS (PREPRESERVED).
NH_3 - SENT TO EDNA WOODS.
ORG. Cl - METHANOL EXTRACTION @ SHELL, THEN SENT TO CORE FOR MICROCOLUMNETER ANALYSIS

Also, see the following for information on chlorine, approved test methods, quality control, quality assurance, and actual testing procedure.

a. Memo of September 8, 1987 from Terry Mills - MnOx correction.

b. Federal Register, Vol. 3, No. 125, June 30, 1986, pp 23692-23704.

c. Subchapter A: Monitoring & Reporting Requirements 319.11
Sampling & Laboratory Testing Methods. (7/88)

d. Subchapter A: Monitoring & Reporting Requirements 319.7
Quality Assurance. (7/88)

e. Standard Methods and/or the EPA Method Manual.

REFERENCES - The numbers in parenthesis on the inspection form correspond to the following references.

1. Standard Methods. 1985. Sixteenth Edition. Mary Ann Franson Editor.

2. Texas Administrative Code. Chapter 31, Section 319.

3. Federal Register. 49:209, October 28, 1984.

4. EPA Manual: Methods for Chemical Analysis of Water & Wastewater. 1979.

Shell Oil Company

Biomonitoring Checklist

1. Does the permittee have biomonitoring requirements in their TWC or NPDES permit? (✓)YES ( )NO.

2. Which permit requires biomonitoring? ( )TWC (✓)NPDES ( )BOTH

3. Has the permittee completed the biomonitoring requirements? (✓)YES (–)NO ( )N/A. If no, discuss the status of the biomonitoring completed thus far (including biomonitoring continued beyond the first year where required). Pool + Room Completed in November, 1990 (See Attached Documentation).

4. What biomonitoring tests is the permittee required to conduct? (–)Marine acute, (–)Marine chronic, (–)Freshwater acute, ( )Freshwater chronic.

5. Has the permittee initiated a Toxicity Reduction Evaluation (TRE)? ( )YES, Start date _____ (✓)NO

   a. If yes, comment on the status of the TRE. _____

   b. If yes, is the permittee submitting quarterly TRE status reports? ( )YES ( )NO. If no, explain. _____

Select one or several biomonitoring tests for review.

6. What tests were reviewed (test dates and species)? _____

7. Does the permittee have a full report on file for each biomonitoring test reviewed? ( )YES ( )NO. If no, explain. _____

8. Does the full report clearly define the toxicity test starting and ending date and times? ( )YES ( )NO. If no, explain. _____

9. Was the toxicity test initiated within 36 hours after collection of the first composite? ( )YES ( )NO. If no, explain. _____

Were all composite samples used within 72 hours after collection of the composite sample? ( )YES ( )NO. If no, explain. _____

10. Were 24-hour composite samples collected pursuant to permit requirements? ( )YES ( )NO. If not, what sampling regime was utilized? _____

Were the minimum number of composite samples collected? YES( ) NO( ). If no, explain. _____

11. Are the effluent and receiving water sample collection locations, dates, and times clearly documented? ( )YES ( )NO. If no, explain. _____

12. Dilution water utilized in the test(s). ( )Synthetic dilution water ( )Receiving water ( )Other _____.

If receiving water was used in the biomonitoring test(s), specifically where was the receiving water collected? _____

If synthetic dilution water was used, did the permittee satisfy the requirements given in the permit concerning the use of synthetic dilution water? ( )YES ( )NO ( )NA. If no, explain. _____

13. If receiving water toxicity has been demonstrated in any of the permittee's biomonitoring results, discuss any known reasons for the toxicity. _____

14. Are the biomonitoring samples collected at the location prescribed in the permit? ( )YES ( )NO. If no, explain. _____

15. Was the biomonitoring sample dechlorinated in the laboratory? ( )YES ( )NO If yes, does the permit authorize the sample dechlorination? ( )YES ( )NO. If no, explain. _____

16. What laboratory(ies) conducted the biomonitoring tests reviewed? _____

Schedule J

Shell Oil Company • Shell Chemical Company
A Division of Shell Oil Company

Deer Park Manufacturing
P.O. Box 100
Deer Park, TX 77536

July 12, 1991

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

U. S. Environmental Protection Agency, Region VI
Permits Issuance Section (6W-PS)
ATTN: Industrial NPDES Permits Section
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202

Gentlemen:

SUBJECT: REQUEST TO MODIFY NPDES PERMIT
SHELL OIL COMPANY
EPA ID NO. TXD067285973
NPDES PERMIT NO. TX0004871

We request permit limits for copper established for Outfalls R-001 and R-007 be modified consistent with revised Water Quality Standards recently adopted by the Texas Water Commission. The requested changes are as follows:

	Mass Limits		Concentration Limit	
	Daily Avg. (lbs/Day)	Daily Max. (lbs/Day)	Daily Avg. ug/L	Daily Max. ug/L
R-001			76.5	162
R-007	1.4	3.0		

We are including as Attachment 1 a revised page 11 of the Fact Sheet which accompanied our NPDES permit. This sheet presents the modified calculations used to arrive at our requested changes. We are also including an updated Form 1.

This request has been discussed with Mr. Scott Wilson of your staff and representatives of the Texas Water Commission.

The requested changes for Outfall R-007 reflect only the recently adopted acute criteria for copper. The requested changes for R-001 include a change in the dilution to 10% effluent made possible by the relatively small discharge of this outfall into a large stream flow even under dry weather conditions.

The flow from R-001 is miniscule when considering stormwater flow and/or average flows into Patricks Bayou; thus, we believe acute criteria to be controlling rather than chronic criteria.

The present permit limits which are established at essentially the practical quantitation levels are causing significant compliance concerns to us.

Your prompt attention to this request is greatly appreciated.

If you have any questions pertaining to this request, please contact C. A. Bland at (713) 246-7895.

Respectfully submitted,

J. M. Sowle, Manager
Environmental Compliance

Attachments

cc: Texas Water Commission
ATTN: Waste Water Permits Section
P.O. Box 13087, Capitol Station
Austin, Texas 78711

EPA Region VI - Mr. Scott Wilson (6W-PI)

Shell Oil Company • Shell Chemical Company
A Division of Shell Oil Company

Deer Park Manufacturing Com
P.O. Box 100
Deer Park, TX 77536

September 30, 1991

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Myron O. Knudson, P.E.
Director, Water Management Division (6W)
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202

Re: Administrative Order Docket No. VI-91-388
NPDES Permit No. TX0004871

Dear Mr. Knudson:

The following is in response to the Administrative Order dated August 30, 1991. We have taken specific actions to prevent recurrence of noncomplying discharges.

We understand the issuance of the order was mainly precipitated by the number of copper exceedances reported for Outfall R001. Our response will address these as a group. The other exceedances noted on Page 3 of the Administrative Order will be addressed individually.

Copper Exceedances at Outfall R001 and R007

Limits for copper in our permit are based on Texas Surface Water Quality Standards adopted in 1988. The basis for setting marine acute criteria for copper by the state has been recognized to be in error. Permits issued using the early criteria resulted in unreasonably stringent permit values.

Shell took issue with the extremely low value of copper included in the permit with the knowledge that the criteria were in error and would be corrected. The EPA, in reissuing our NPDES permit on September 29, 1989, reported their requirement to use the state water quality standards in effect at the time. On June 25, 1991, the Texas Water Commission revised upward the marine acute criteria for copper.

On July 12, 1991, following discussions with Mr. Scott Wilson of your staff, we requested modification of the copper limits in our permit in accord with guidance given to us. In addition, this matter was discussed with TWC personnel who recognize the compliance problem caused by the extremely low values for copper.

None the less, we have taken steps to reduce copper in our discharge to a minimum. However, because of the extremely low level, we can not achieve the values listed in our permit. We request the modification of the permit limits be granted as soon as possible.

RESPONSE TO INDIVIDUAL EXCEEDANCES

June 1990 R007 Hexavalent Chromium, Daily max.
7.83 lbs/day vs permit value of 5.4 lbs/day

As reported in our June 19, 1990 letter, this event occurred following a spill of a cooling water additive. Historically, we have been able to achieve this permit requirement.

We are converting to non-chromate treatment of cooling water; thus, future episodes will be precluded. This conversion program will be complete during 1992.

We do not expect any further exceedances of this permit parameter.

July 1990 R003 Oil & Grease, Daily Max.
and 22.8 mg/L vs permit value of 15 mg/L
Oct 1990 R003 Oil & Grease, Daily Max.
20.8 mg/L vs permit value of 15 mg/L

During the third quarter of 1990, facilities at this stormwater outfall were refurbished. This included cleanout of an impoundment to contain rainfall and improve control of the oil and grease parameter. In addition, we have recently completed installation of added pumpback capability to control dry-weather flow and contain the first flush of the storm sewer during rains.

We are conducting a detailed review of the storm sewer and process sewer systems. Stormwater management procedures are being revised as appropriate to reduce potential of oil entering storm sewers.

April 1991 R008 Oil & Grease, Daily Max.
35 mg/L vs permit value of 15 mg/L

Outfall R008 is a stormwater outfall through which rain falling on a large area of the refinery discharges. The exceedance noted is the only one recorded this year. There were none reported in 1990. We have reviewed our procedures for managing stormwater and are taking extra precautions to prevent oil discharging to this outfall. Although we were unable to identify the exact cause for the noted incident, we believe our facilities and procedures are sufficient.

April 1991 R001 Copper Not Reported
Flow Not reported

Attachment 2 was previously submitted to the EPA Region 6 which reported flow and copper for April 1991.

Shell is committed to achieving compliance with all environmental requirements. We believe this commitment has been demonstrated by the design of our facilities and performance over the years in meeting water discharge permit parameters.

With the exception of the copper issue, we believe measures already taken will achieve compliance with our discharge permit. As previously discussed, we request the EPA modify the copper limits in our permit as soon as possible.

Respectfully submitted,

J. M. Sowle, Manager
Environmental Compliance

cc: Adolphus Talton
Enforcement Branch (6W-EAT)
EPA Region 6

Ms. Jennifer Sidnell
Wastewater Enforcement
Texas Water Commission

Shell Oil Company • Shell Chemical Company
A Division of Shell Oil Company

Deer Park Manufacturing Com
P.O. Box 100
Deer Park, TX 77536

October 17, 1991

Ms. Mona Tates
U.S. EPA Region 6
1445 Ross Avenue
Dallas, Texas 75202

Re: Administrative Order Docket No. VI-91-388
NPDES Permit No. TX0004871

Dear Ms. Tates:

We appreciated the opportunity to meet with you and Scott Wilson on October 10, 1991 to review our earlier response to the above referenced matter.

We are providing the following information in response to your request for amplification of measures we have taken to prevent permit exceedances at outfall R001. Facilities were completed and placed in service on July 5, 1991 to reroute regeneration water from ion exchange units and boiler blowdown water to our wastewater treatment facility. These facilities, installed at a cost of over $100,000, rerouted the approximate 50 to 70 gpm of dry weather flow which would ordinarily discharge through R001; thereby, eliminating possible further exceedances from this source. No exceedances occurred during July and August.

Unfortunately, on September 5, 1991, another exceedance was measured. We received 1.43 inches of rain on September 4 and 1.0 inches on September 5. We are investigating the cause of this latest incident. Plans are to sample rain runoff from areas draining to the R001 system. Additionally, samples of sludge in the impoundment are being analyzed to determine presence of copper. These additional samples will determine what further efforts are required.

We believe we have acted responsibly in our efforts to prevent exceedances.

Please call be at (713) 246-7667 if you have any more questions.

Respectfully yours,

J. M. Sowle, Manager
Environmental Compliance

c11.4

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TEXAS 75202-2733

DEC 27 1990

ENVIRONMENTAL	
DATE 12/31/90	NAME J. M. Sowle
	Return Document to File
	Record Copy in File
	Information Copy
Record Copy in ECB	
Copy: AFS, JRA, CAB	
Circulate:	

Reply to 6W-PT

J. M. Sowle
Manager, Environmental Compliance
Shell Chemical Company
Deer Park Complex
P. O. Box 100
Deer Park, Texas 77536

Re: Order No. VI-89-1785
NPDES Permit No. TX0004871
Confirmation of Biomonitoring Cessation

Dear Mr. Sowle:

This correspondence is to confirm the successful completion of the biomonitoring requirements of your facility as required by order no. VI-89-1785. All biomonitoring tests conducted using both test organisms indicated no toxicity at the critical and twice critical dilutions.

Therefore, in accordance with paragraph 9 on page 3 of 6 of order no. VI-89-1785, the biomonitoring requirements of the permit hereby expire.

If you have any questions concerning the expiration of the aforementioned biomonitoring requirements, please contact Ms. Gloria Vaughn at (214) 655-7175.

Sincerely yours,

for Robert L. Vickery
Acting Section Chief
Toxics Control Section (6W-PT)

cc: Vicki Reat
Texas Water Commission

Shell Oil Company • Shell Chemical Company
A Division of Shell Oil Company

Deer Park Manufacturing Complex
P.O. Box 100
Deer Park, TX 77536

November 30, 1990

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Ms. Terry Lane (6W-EA)
Enforcement Branch
Water Management Division
EPA Region VI
1445 Ross Avenue
Dallas, Texas 75202-2733

Dear Ms. Lane:

SUBJECT: DOCK NO. IV-89-1785
NPDES PERMIT TX0004871 - OUTFALL R-007
TWC PERMIT 00403
ACUTE BIOMONITORING RESULTS - SAMPLE DATE 10/22/90

As required by Order for Information Docket No. IV-89-1785, we hereby submit the Acute Biomonitoring results for Outfall R-007. The test was conducted in accordance with the procedures outlined in the Order for Information by Aquatic Bioassay Laboratories, Inc. of Baton Rouge, La. The initial sample was taken on 10/22/90. The test was conducted using Mysidopsis Bahia and Sheepshead Minnow. The results did not indicate toxicity for either species.

We are now completed one year's work and no toxicity was detected. We are including copies of all results as a summary. We have fulfilled all requirements of the Order and plan to cease biomonitoring at Outfall R-007.

If you have any questions, please contact Ms. Ann Harris at (713) 246-7242.

Very truly yours,

J. M. Sowle, Manager
Environmental Compliance

Attachments

BCBS9033401 - 0001.0.0

Shell Oil Company • Shell Chemical Company
A Division of Shell Oil Company

Deer Park Manufacturing Complex
P.O. Box 100
Deer Park, TX 77536

December 12, 1990

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Ms. Terry Lane (6W-EA)
Enforcement Branch
Water Management Division
EPA Region VI
1445 Ross Avenue
Dallas, Texas 75202-2733

Dear Ms. Lane:

SUBJECT: DOCK NO. IV-89-1785
NPDES PERMIT TX0004871 - OUTFALL R-001
TWC PERMIT 00403
ACUTE BIOMONITORING RESULTS - SAMPLE DATE 11/05/90

As required by Order for Information Docket No. IV-89-1785, we hereby submit the Acute Biomonitoring results for Outfall R-001. The test was conducted in accordance with the procedures outlined in the Order for Information by Aquatic Bioassay Laboratories, Inc. of Baton Rouge, La. The initial sample was taken on 11/05/90. The test was conducted using Mysidopsis Bahia and Sheepshead Minnow. The results did not indicate toxicity for either species.

We are now completed one year's work and no toxicity was detected. We are including copies of all 1990 monthly results as a summary. We have fulfilled all requirements of the Order and plan to cease biomonitoring at Outfall R-001.

If you have any questions, please contact Ms. Ann Harris at (713) 246-7242.

Very truly yours,

J. M. Sowle, Manager
Environmental Compliance

Attachments

BCBS9033401 - 0001.0.0

TEXAS WATER COMMISSION
INSPECTION SUMMARY REPORT

WQ - 0000402 - 001 Permit Number

Shell Chemical Company, Deer Park Entity 7 District

Classification: ☑ Major ☐ 92-500 Minor ☐ Significant Minor ☐ Other

INSPECTION DATA

911210 Date of Inspection (YYMMDD)

920206 Date of Letter to Permittee (YYMMDD) ☐ N/A

TYPE WASTE (check one)

- ☐ DOM - Domestic
- ☑ IND - Industrial
- ☐ AGR - Agricultural

TYPE INSPECTION (check one)

- ☑ ACI - Annual Compliance (WWTP)
- ☐ PAI - Performance Audit (lab)
- ☐ PCI - Pretreatment Compliance
- ☐ DIA - Diagnostic
- ☐ PSA - Permit Site Assessment
- ☐ OTH - Other

920206 Date of Inspection Report (YYMMDD)

TYPE EFFLUENT SAMPLING

- ☐ COM - Composite
- ☐ GRB - Grab
- ☑ NON - None
- ☐ N/A - Not Applicable

☑ Yes ☑ No ☐ N/A Annual CSI (Majors Only)

☐ Yes ☑ No ☐ N/A Biomonitoring Sampling

INSPECTION FINDINGS

☐ Yes ☑ No ☐ N/A Violations/Substantial Deficiencies Noted

☐ Yes ☑ No ☐ N/A Permittee Response Required

N/A Date Response Due (YYMMDD)

JPN Inspector Initials

Comments:

PERMITTEE RESPONSE

Date Response Submitted (YYMMDD)

☐ Yes ☐ No Response Adequate

☐ Yes ☐ No Follow-up Action Needed: ☐ District ☐ Central Office

Comments:

J Patrick Noll
Signature

TWC-0228 (Rev. 11-21-90)

Texas Water Commission

TO: Field Support Section, Field Operations Division

THRU:

FROM: District ____7____ Office

SUBJECT: Routing of Attached Water Quality Document

After processing, please transmit the attached water quality document as follows:

Wastewater Permits Section

_____ Municipal Unit

_____ Industrial Unit

_____ Applications Unit

_____ Toxicity Evaluation Unit

_____ Pretreatment Unit

Wastewater Enforcement Section

_____ Enforcement Coordinator

_____ Operator Certification

_____ Administrative Support (Self-Reporting Program)

✓ Central Records

_____ Other (_____)

TWC-017 (Rev. 02-18-91)

John Hall, Chairman
Pam Reed, Commissioner
Peggy Garner, Commissioner

TEXAS WATER COMMISSION

PROTECTING TEXANS' HEALTH AND SAFETY BY PREVENTING AND REDUCING POLLUTION

February 6, 1992

Mr. Jack Sowle, Environmental Manager
Shell Chemical Company
P. O. Box 100
Deer Park, Texas 77536

Re: Annual Compliance Inspection
Wastewater Treatment Plant - South Effluent Treater
Permit No. 00402

Dear Mr. Sowle:

On December 10, 1991, Water Quality Specialist Patrick Noll conducted an annual compliance inspection of the above referenced facility. Present during the inspection were Mr. Charles Bland, Ms. Aimee Anani, and Mr. Tyler Huber of Shell, and Ms. Jana Harvill with the Environmental Protection Agency, Region VI office. No deficiencies or major concerns were noted during this inspection and the facility appeared to be well maintained and operated.

A copy of the inspection report is available upon request. If you have any questions, feel free to contact Patrick Noll or Jay Muschenheim of this office.

Sincerely,

Donna G. Phillips

Donna G. Phillips
Water Quality Manager

DGP/JPN/mo

REPLY TO: DISTRICT 7 / 5144 E. SAM HOUSTON PARKWAY N. / HOUSTON, TEXAS 77015 / AREA CODE 713/457-5191

P.O. Box 13087 • 1700 North Congress Avenue • Austin, Texas 78711-3087 • 512/463-7830

PRINTED ON RECYCLED PAPER

United States Environmental Protection Agency
Washington, D. C. 20460

EPA NPDES Compliance Inspection Report

Form Approved.
OMB No. 2040-0057
Approval expires 4-30-88

Section A: National Data System Coding

Transaction Code	NPDES	yr/mo/day	Inspection Type	Inspector	Fac Type
1 N 2 5	3 TX0004863 11	12 911210 17	18	19 S	20 2

Remarks: 21 — 66

Reserved	Facility Evaluation Rating	BI	QA	Reserved
67 — 69	70 S	71 N	72 N	73 — 74 / 75 — 80

Section B: Facility Data

Name and Location of Facility Inspected	Entry Time	Permit Effective Date
Shell Chemical Company P.O. Box 100 Deer Park, Texas 77536	8:00 ☒ AM ☐ PM Exit Time/Date: 3:45pm / 1/28/92	9/25/90 Permit Expiration Date: 9/24/95

Name(s) of On-Site Representative(s)	Title(s)	Phone No(s)
Charles Bland Aimee Anani	Envir. Compliance Eng. Tech'l Support, Operations	713/ 246-7895 246-7070

Name, Address of Responsible Official	Title	Contacted
Jack Soule / John Holden P.O. Box 100 Deer Park, Texas 77536	Environmental Manager Phone No. 713/ 246-7667	☒ Yes ☐ No

Section C: Areas Evaluated During Inspection

(S = Satisfactory, M = Marginal, U = Unsatisfactory, N = Not Evaluated)

S	Permit	S	Flow Measurement	S	Pretreatment	S	Operations & Maintenance
S	Records/Reports	S	Laboratory	—	Compliance Schedules	S	Sludge Disposal
S	Facility Site Review	S	Effluent/Receiving Waters	S	Self-Monitoring Program	—	Other:

Section D: Summary of Findings/Comments *(Attach additional sheets if necessary)*

THIS FACILITY APPEARED TO BE WELL MAINTAINED AND OPERATED. NO MAJOR DEFICIENCIES OR CONCERNS WERE NOTED. A BIOMONITORING TRE PLAN HAS BEEN SUBMITTED TO THE EPA TO ADDRESS CALCIUM TOXICITY.

Name(s) and Signature(s) of Inspector(s)	Agency/Office/Telephone	Date
J. Patrick Noll J. Patrick Noll	TWC / D-7; 713/ 457-5196	

Signature of Reviewer	Agency/Office	Date

Regulatory Office Use Only

Action Taken	Date	Compliance Status
		☐ Noncompliance ☐ Compliance

EPA Form 3560-3 (Rev. 3-85) Previous editions are obsolete.

State Permit No. 00402
NPDES Permit No. TX 0004863

TEXAS WATER COMMISSION
INDUSTRIAL DISCHARGE WWTP—INSPECTION REPORT

Permittee Name Shell Chemical Company	Facility Name Deer Park Facility
Permittee Address P.O. Box 100 Deer Park, Texas 77536	Type Industry Petrochemical Manufacturer Inspection Date District 7

Officials	Title	Check if contacted	713/ Phone
Jack Sowle	Envtl Mgr - outgoing	✓	246-7146
John Holden	" " incoming	✓	" "
Charles Blend	" Engr - Compliance	✓	" 7225
Tyler Huber	" " (Refinery)	✓	" 7098
Aimee Anani	" " (Chem Plant)	✓	" 7070

A. **TYPE TREATMENT PLANT.** Attach schematic of disposal/treatment systems and/or maps showing outfalls and major components of system. See attached.

B. **INSPECTION SAMPLE RESULTS.**

Outfall & Parameter	Measured Value	Permitted Value	Type Sample	COC Tag No.	Primary Source of Wastewater

NO SAMPLES

C. **RECEIVING WATER**. Effluent is discharged to:

( ) Dry ditch
( ) Dry creek channel
( ) Spring fed creek
( ) Normally flowing creek
( ) River
( ) Lake
(✓) Other PATRICK'S BAYOU

Report observed condition of receiving waters. Describe such conditions as foaming, floating materials, sludge deposits, or color and turbidity which appear either naturally or as a result of the discharge. Also, indicate the observed presence or absence of fish and other aquatic life in the area of the discharge.

001 - CLEAN; NO DEBRIS NOTED, NOR FAUNA.
* 002 - CLEAN; NO DEBRIS NOTED, NOR FAUNA.
003 - CLEAN; NO DEBRIS NOTED, NOR FAUNA.

* THERE WAS A SLIGHT LEAK AT THE VALVE THUS ALLOWING A SLIGHT DISCHARGE @ 002.

Include Attachment 1, Stream Quality Results, if applicable.

D. **OTHER REGISTRATIONS OR PERMITS**. Indicate any solid waste registration and/or waste disposal well permits issued to the company by this agency.

Registration/Permit No.	Type Waste Disposed
SW # 30007	I, IH, II, III

E. **PLANT MODIFICATIONS**. Has the treatment plant been modified since the last annual inspection?
( ) Yes (✓) No If yes, explain changes made and identify date that modifications were completed.

N/A

F. **BYPASSING**. To the best of your knowledge, has there been any bypassing of treatment facilities since the last annual inspection which caused either repeated or prolonged discharges of inadequately treated wastewater?
( ) Yes (X) No If yes, explain and describe permittee's corrective action.

N/A

Did the permittee provide noncompliance notification for bypasses?
( ) Yes ( ) No (X) N/A—No bypassing.

G. **OPERATION AND MAINTENANCE.**

1. *Sludge Disposal.* Identify method of sludge disposal.

PRIMARY (1°) CLARIFIER SLUDGE IS DEWATERED VIA TWO DEDICATED BELT PRESSES AND (See Att #3)

Is handling of solids regulated under the State Solid Waste Disposal Act, Article 4477-7? (✓) Yes ( ) No
If yes, identify the classification of solids.

II

2. *Flow Measurement.* Identify the type of primary flow measuring device.

001 - 2' PARSHALL FLUME; 002 + 003 - NONE

Is flow indicating/recording equipment provided? (✓) Yes—Operable ( ) Yes—Not Operable ( ) No
If operable equipment is provided, complete Attachment 2, Accuracy Check.

Is the flow measurement equipment adequate to handle the expected ranges of flow rates? (✓) Yes ( ) No
If no, explain.

3. *O&M.* Describe operation, maintenance and housekeeping problems found during the inspection. Include Attachment 3 for additional explanations if necessary.

NO PROBLEMS, DEFICIENCIES, OR MAJOR CONCERNS WERE NOTED. OVERALL, THE FACILITY APPEARED TO BE WELL MAINTAINED AND OPERATED.

THE MAIN LINE INTO THE SOUTH EFFLUENT TREATER (SET) IS THE 30th ST. INTERCEPTOR WHICH COLLECTS VARIOUS CHEMICAL PLANT PROCESS FLOWS. THIS INFLUENT IS USUALLY ACIDIC AND IS NEUTRALIZED IN THE FOUR NEUTRALIZATION TANKS. OIL IS REMOVED AT THE 2 API SEPARATORS AND IS STORED ONSITE IN TANKS T-6 AND 1300.

THE INFLUENT THEN FLOWS TO TWO (See Att 3)

H. **SELF-REPORTING**. Does the permittee use a commercial or in-house laboratory? BOTH
If an in-house lab is used, were any quality assurance deficiencies noted? ( ) Yes ( ) No If yes, explain.

A LIST OF THE COMMERCIAL LABS USED BY SHELL AND THE ANALYSES THEY PERFORM IS ATTACHED. AT THE TIME OF THIS INSPECTION, THE EPA REGION VI INSPECTOR BEGAN A LAB AUDIT OF EACH OF THE ANALYSES (See Att. 4)

Check the following statements and comment on no responses.

(✓) Yes ( ) No Type of samples collected and measurements made conform to requirements.
(✓) Yes ( ) No Samples are taken and measurements are made at required frequencies.
(✓) Yes ( ) No Adequate records are maintained to document effluent report data.
(✓) Yes ( ) No Lab data verifies reported values on effluent reports.
(✓) Yes ( ) No Effluent reports are submitted monthly.
* (✓) Yes ( ) No Noncompliance notification is provided for excursions.

* No excursions reported from 8/90 through 5/91.

Is the permittee complying with permit parameters as indicated by self-reported data? (✓) Yes ( ) No
If no, explain.

I. **SPECIAL PERMIT PROVISIONS**. Is the permittee in compliance with special permit provisions?
(✓) Yes ( ) No ( ) N/A—No special provisions. If no, explain.

J. **COMPLIANCE SCHEDULE.** Is the permittee under any State compliance schedule (permit, enforcement letter, commission order, court order)? ( ) Yes (✓) No If yes, identify the enforcement document and describe actions taken by the permittee pursuant to the document.

N/A

Has a Federal administrative order or court order been issued? ( ) Yes (✓) No

K. **STATUS OF PLANNED IMPROVEMENTS.** If the permittee is pursuing expansion or major upgrading, briefly explain the permittee's plans and indicate the status of the project.

None in 1991, and none are planned for 1992.

L. **OTHER AREAS OF INTEREST OR CONCERN.**

Shell has been involved in a study to identify the source of Mysidopsis bahia toxicity in Outfall 001 since January, 1991. Recent results indicate calcium in the effluent is the source of mysid toxicity. A TRE plan has been forwarded to EPA, and Shell is prepared to enter into a contract with Entrix, Inc., Houston, Texas, to conduct the actual TRE.

(See Att 4)

M. **FIELD OFFICE ACTION**. Describe action proposed or taken to address deficiencies or noncompliances.

A LETTER WILL BE SENT TO THE PERMITTEE SUMMARIZING THE FINDINGS OF THIS INSPECTION.

N. **CENTRAL OFFICE ACTION REQUESTED.**

None

Investigator J. Patrick Nill

District Manager

Signature Date

ACCURACY CHECK
FLOW INDICATING/RECORDING EQUIPMENT

A. Outfall C001

Type of flow measuring device 2' PARSHALL FLUME ; Time 2:25PM Head 14½ inches;

Recorded flow at time listed 6.782 MGD ; Calculated flow 6.859 MGD ;

Reference for calculated flow ISCO HANDBOOK

$$\% \text{ error} = \frac{\text{recorded value - calculated value (100)}}{\text{calculated value}} \quad \frac{6.782 - 6.859}{6.859} \times 100$$

% error = 1%

Date of last calibration 12/11/91

B. Comments:

SET = SOUTH EFFLUENT TREATER (CHEMICAL WWTP)

OPERATION AND MAINTENANCE

Explanations (continued)

G. O+M/1) .... DISPOSED IN THE ONSITE LANDFILL #104 AS A CLASS II WASTE. FROM 1/91 THROUGH 11/91, 2,212.52 DRY TONS OF DEWATERED 1° FILTER CAKE (ESTIMATED AVERAGE SOLIDS CONTENT OF 20%) WAS DISPOSED AT THE LANDFILL.

SECONDARY (2°) BIOSLUDGE FROM THE 2° CLARIFIERS IS DEWATERED VIA 3 DEDICATED BELT PRESSES AND THEN INCINERATED ONSITE. THE LEFTOVER ASH IS INTRODUCED BACK INTO THE SOUTH EFFLUENT TREATER (SET) JUST UPSTREAM OF THE 1° CLARIFIERS. THIS ASH SETTLES OUT AS 1° CLARIFIER SLUDGE, WHICH IS DEWATERED AND LANDFILLED (AS PER ABOVE). FROM 1/91 TO 11/91, THE AMOUNT OF SLUDGE WET PUMPED TO THE BELT PRESSES FOR DEWATERING WAS 26,149.03 WET TONS. TCLP'S ARE ATTACHED.

G. O+M/3) .... PRIMARY (1°) CLARIFIERS, THEN TO THREE AERATION PONDS (CONCRETE-WALLED IMPOUNDMENTS) VIA A DISTRIBUTION BOX, THEN TO THREE SECONDARY (2°) CLARIFIERS, THEN TO OUTFALL C001.

AUXILLARY TREATMENT UNITS TO THE

(See 3A)

OPERATION AND MAINTENANCE

Explanations (continued)

G. O+M/3) .... ABOVE - MENTIONED MAIN SYSTEM ARE TANKS A1318 AND A1315 FOR THICKNING AND DIGESTION OF 2° BIO SLUDGE; TANK 13145 FOR BIO SLUDGE MIXING (FROM NET AND SET); THE BELT PRESSES, 2 DEDICATED TO 1° SLUDGE DEWATERING FROM THE SET ONLY, AND 3 DEDICATED TO 2° SLUDGE DEWATERING FROM TANK 13145. THE 1° SLUDGE CAKE IS DISPOSED ONSITE AT LANDFILL #104. THE 2° SLUDGE CAKE IS INCINERATED ONSITE BY AN 8-HEARTH, AFTERBURNER AND SCRUBBER EQUIPPED INCINERATOR (INSTALLED IN 1976). THE ASH IS INTRODUCED BACK INTO THE SET JUST UPSTREAM OF THE 1° CLARIFIERS. OFF-SPEC INFLUENT CAN BE DIVERTED FROM THE SET TO SURGE TANKS 1318 AND 1319 (5 MG AND 3.5 MG, RESPECTIVELY), AND FED TO THE SET IN A CONTROLLED MANNER. ALSO ON-SITE IS AN ANAEROBIC DIGESTER (PRETREATER) UNIT, WHICH CONSISTS OF TWO REACTOR TANKS, IN PARALLEL, WHICH TREAT AN EPON 5 RESINS UNIT STREAM WITH HIGH CHLORINATED COD LEVELS. THE UNIT IS

(See 3B)

OPERATION AND MAINTENANCE

Explanations (continued)

G. O+M(3) .... TREATING 60 – 80 GPM.

ANOTHER COMPONENT OF THE SET IS THE STORMWATER COLLECTION AND IMPOUNDMENT SYSTEM. THIS CONSISTS OF FOUR IMPOUNDMENT PONDS (A, B, C + D), OUTFALLS C002 AND C003, AND THE CAPACITY TO PUMP RAIN WATER THROUGH THE SET FOR TREATMENT. RAINWATER THAT COMES OFF THE CHEMICAL PLANT COLLECTS AT THE C003 COLLECTION SUMP AND IS PUMPED TO PONDS A, B, OR C VIA THREE, 50,000 GPM PUMPS. POND D RECEIVES RAINWATER FROM THE SOUTH PARKING LOT RUNOFF ONLY. THIS WATER IS TESTED, AND, IF IT MEETS PERMIT PARAMETERS, IS DISCHARGED THROUGH C002. FROM 8/90 THROUGH 5/91 THERE WERE NO PERMIT VIOLATIONS AT EITHER C002 OR C003, NOR WERE ANY VIOLATIONS REPORTED THROUGH THE MAIN SET AT C001. ALL WATER IN PONDS A, B, AND C IS EVENTUALLY PUMPED TO THE SET FOR TREATMENT BEFORE IT IS RELEASED. IF THE D POND IS OFF SPEC, IT TOO, CAN BE PUMPED TO THE SET FOR TREATMENT.

COMMENTS

H) ... AND PREPARATIONS PERFORMED BY THE SHELL LAB. THEY ARE AS FOLLOWS:

pH	HEXAVALENT CHROME
TSS	GRAVIMETRIC O+G
BOD	SULFIDE
COD	TOTAL Cr
PHENOL	TOTAL Pb
TOC	ORGANIC CHLORIDE PREPARATION.

DUE TO TIME LIMITATIONS, THE LAB AUDIT WAS NOT COMPLETED. DURING PHASE II OF THE MULTI MEDIA INSPECTION, THE EPA INSPECTOR PLANS TO FINISH THE AUDIT.

(See ATT 4B)

L) CONCERNS / INTERESTS:

THERE EXISTS A BUSINESS RELATIONSHIP BETWEEN SHELL AND OXY CHEMICAL THAT MERITS REPORT AND MONITORING. A FEW YEARS AGO, SHELL SOLD THEIR VINYL CHLORIDE MONOMER (VCM) PRODUCING FACILITIES TO OXY CHEMICAL. THESE FACILITIES ARE WITHIN THE SHELL CHEMICAL COMPANY FACILITIES AND IS DESIGNATED AS OXY/VCM. SHELL'S SET TREATS TWO OF OXY/VCM'S EFFLUENT STREAMS: 1) THE HCIN STREAM (HYDROCARBON INCINERATOR, REPORTED TO HAVE

(See 4A)

COMMENTS

L) .... A 99.997% DESTRUCTION EFFICIENCY); AND 2) THE SPOT 10 STEAM STRIPPER STREAM (WHICH CAN HIT THE SET WITH 0.5 pH @ 350 GPM). THE HCIN STREAM (ALSO CALLED THE "ROCK BOX" BECAUSE OF A LIME SLURRY MIX IT PROCESSES) ENTERS THE SET AT THE #2 NEUTRALIZER, AND THE SPOT 10 STRIPPER STREAM ENTERS THE 30th ST. MAIN INTERCEPTOR LINE AT 5th STREET. THE TREATMENT AGREEMENT BETWEEN OXY/VCM AND SHELL IS ATTACHED (SCHEDULE L).

QUESTIONS AND CONCERNS WHICH CAME UP DURING THIS PART OF THE INSPECTION RELATE TO VINYL CHLORIDE: 1) IS VC SAMPLING AND MONITORING BEING CONDUCTED? 2) IF SO, BY WHOM AND HOW OFTEN? 3) HOW DOES THE RELATIONSHIP BETWEEN OXY/VCM AND SHELL AFFECT TWC/EPA ABILITIES/RIGHTS/OBLIGATIONS TO MONITOR OXY/VCM EFFLUENT? (REFER TO 40 CFR, 61.65, 9, i. FOR ADDITIONAL VINYL CHLORIDE EFFLUENT PARAMETERS). IN SUBSEQUENT CONVERSATIONS WITH THE PERMITTEE, IT WAS REPORTED THAT SHELL CONDUCTS EXTENSIVE SAMPLING OF THE TWO ABOVE-MENTIONED OXY/VCM

(See 4B)

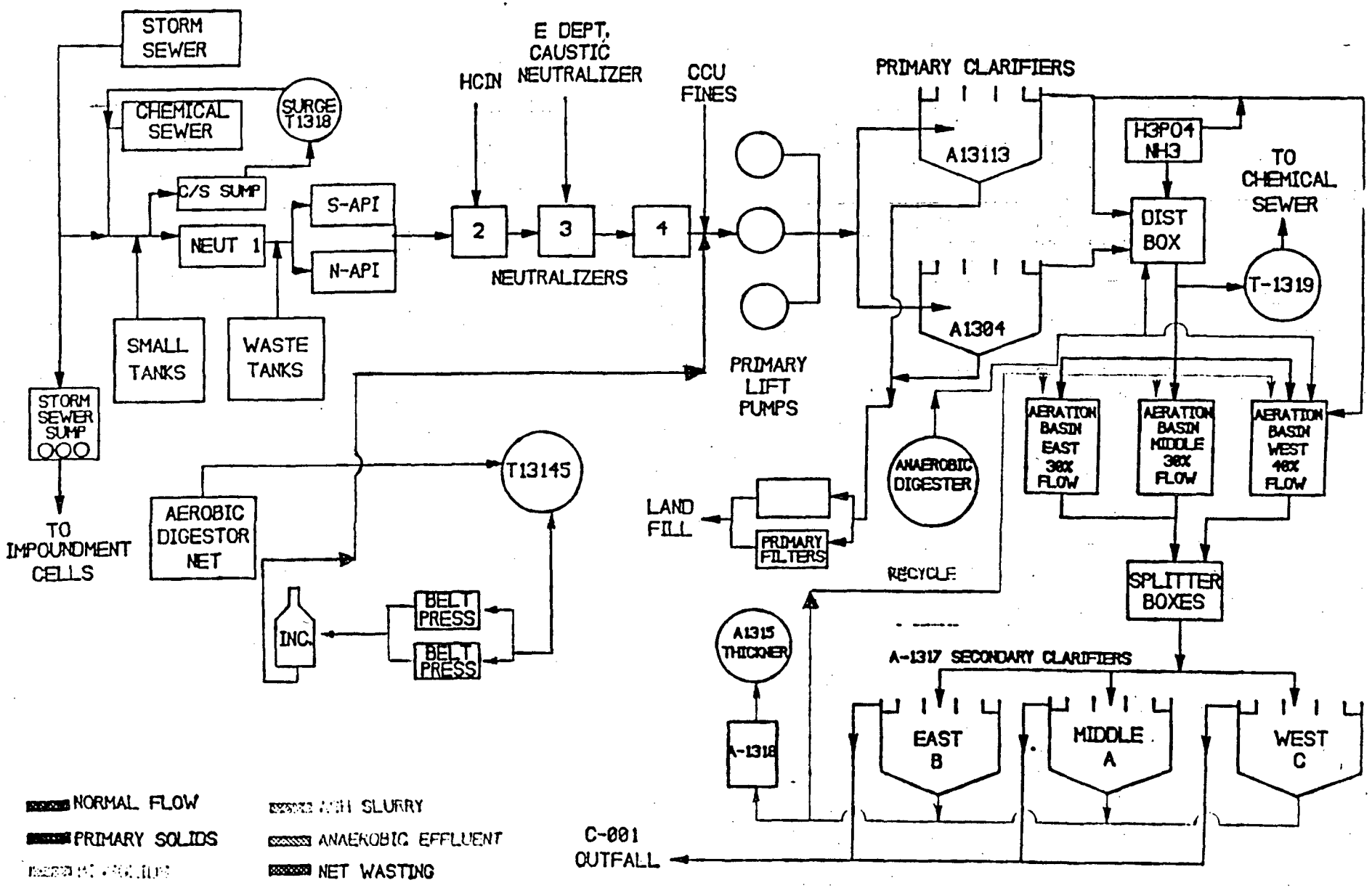
COMMENTS

L) ....STREAMS. OXY/VCM is not permitted by either EPA or TWC. Shell is thus responsible for the quality of the final effluent, including Oxy's contribution. (See attached Schedule L).

H) The EPA inspector did complete the lab audit on 1/15/92, during the Phase II sampling part of the multimedia inspection.

SOUTH EFFLUENT TREATERS

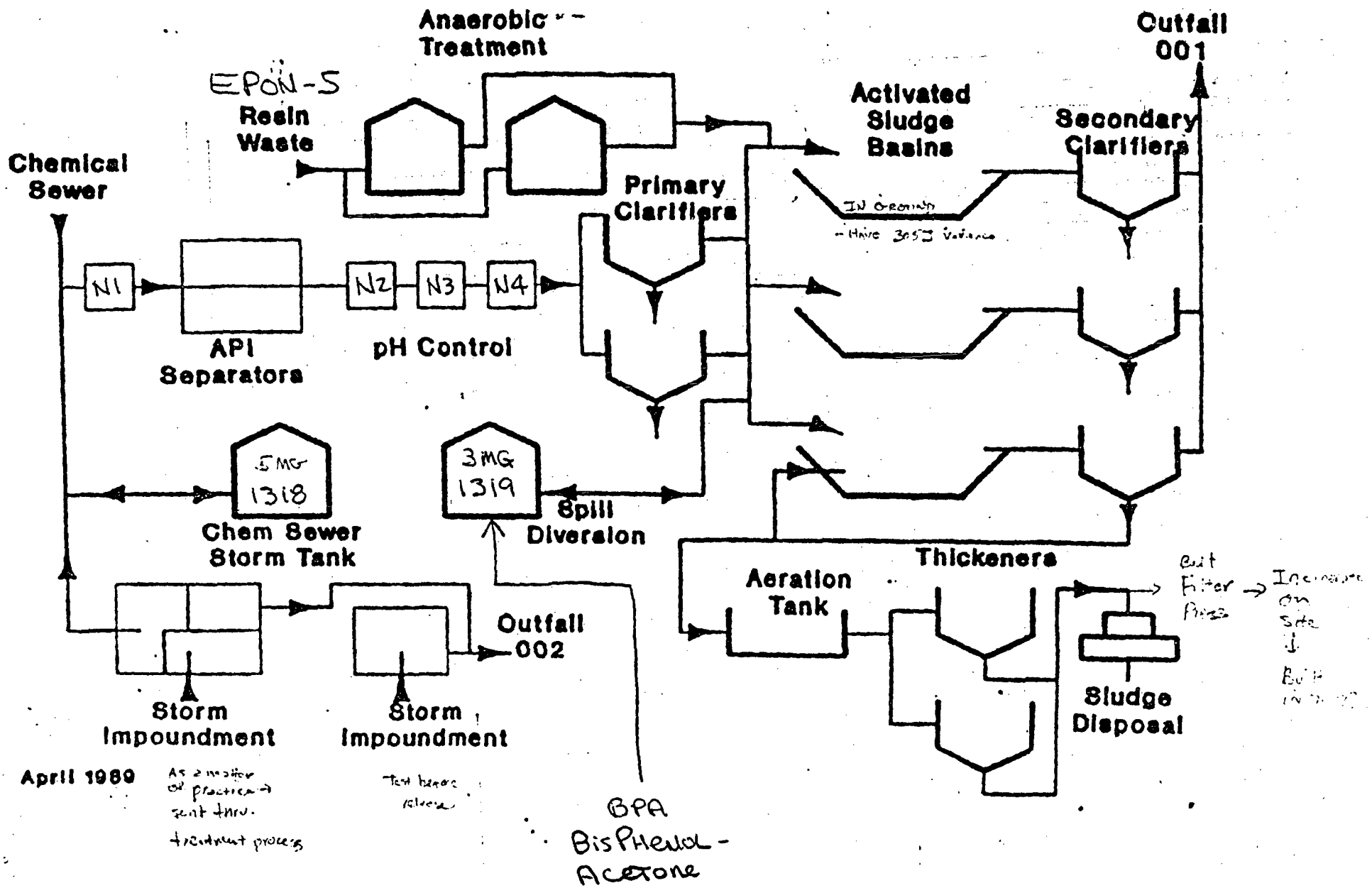
(7/90)



CHEMICAL EFFLUENT TREATMENT SYSTEM

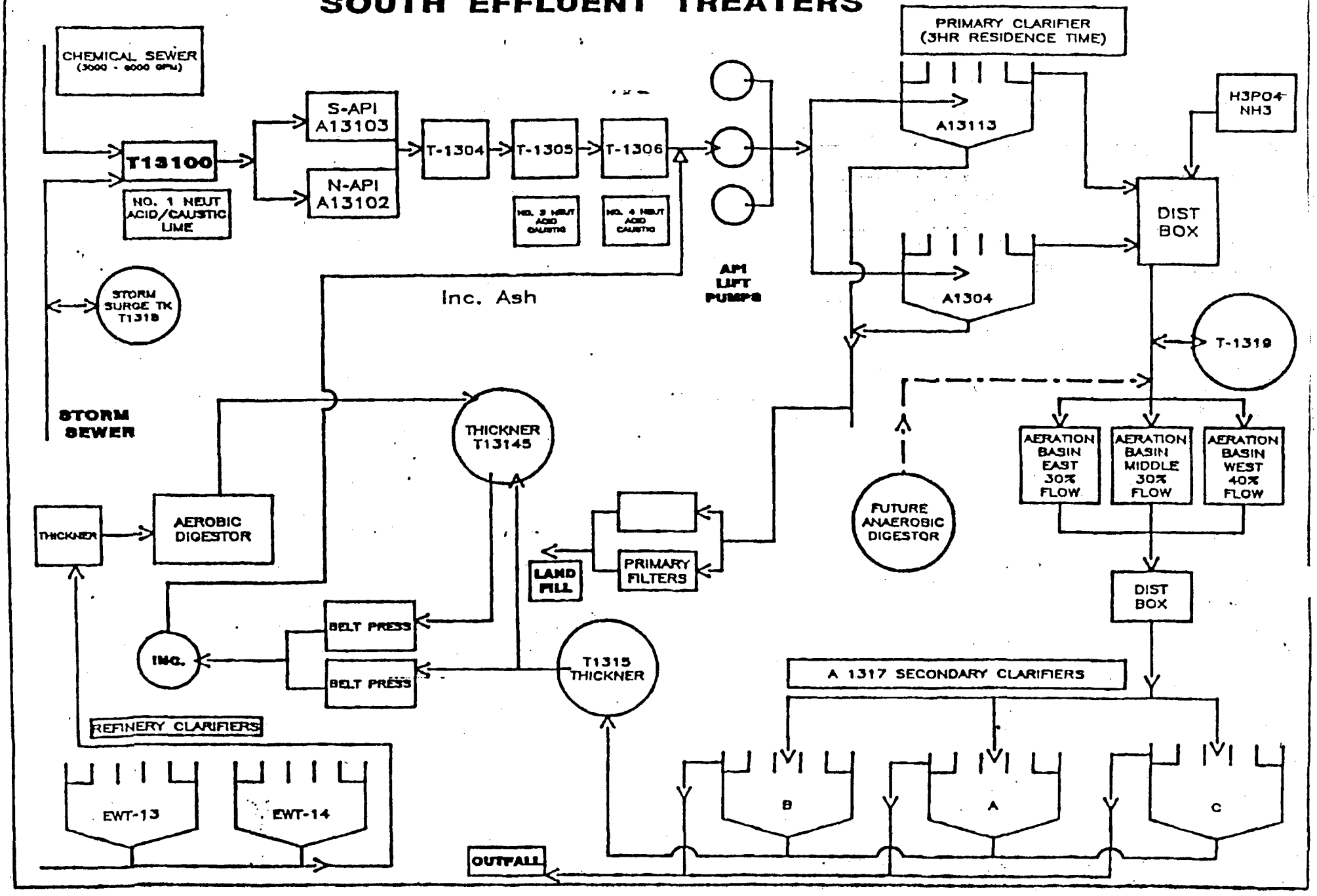
Chem Treatment

Deer Park Manufacturing Complex



SHELL OIL COMPANY (DPMC)

SOUTH EFFLUENT TREATERS



SHELL - DEER PARK, TEXAS FACILITY

OUTSIDE LAB SAMPLE SCHEDULE & CONTACTS

NAME	CONTACT	SAMPLE	ANALYSIS	FREQUENCY
ACS Lab Hou	Ernie Williams 579-8822	Anerobic samples	LiCl~	daily during Tracer Study
ABL LAB L.A.	STEVE MATHIS 1-800-333-2879 8-504-924-2618	R001	ACUTE BIOASSAY	1/Mo WED
		R007	"	1/QT WED
		C001	"	?
CORE Hou	LISA ROBINSON 943-9776	C001	ORG CL.	1/WK THUR
		T19051	"	"
		T19052	"	"
		T 2800	"	"
ENSECO COLORADO	SUSAN WYATT 1-303-421-6611	MONITOR WELLS NESHAPS SX.	SEE SCHEDULE BENZENE #625	1/QT. 3WKS M-Th
		C001	BZ.TOL #8020	1/WK MON
			CCL3,1.2DCE #8010 CH2CL3	1/WK MON
JORDAN Corpus Christi	GERALD BOWLING 1-512-884-0371	C001	PHENOL #8270	1/WK MON
			NAPHTHALENE- #8270	1/WK MON
KEYSTONE Hou	ROB JAROS 266-6800	NESHAPS	BENZENE #625	M-F
NUS Hou	SCOTT MAYO 488-1810	OTHER WELLS	TOX.OH,T.CR T.Pb,T.Ca	M-TH
		C-001	T.Cu AA G/F	WED
		R-007	T.Cu AA G/F	MWF
	WASTE CHARACTERIZATIONS - AS REQUIRED			
LDNA WOOD Hou	ALICE PERRY	C001	NH3 NESSLER'S #4500-C	MWF
	RITA WELLS		METALS QTLY AA G/F	MON
	747-7271	R007	METALS QTLY AA G/F	"
		R001	METALS QTLY AA G/F	MON

TEXAS WATER COMMISSION
LABORATORY INSPECTION CHECKLIST

COMPANY NAME: SHELL EMULT LAB PERMIT NO: 00402
INSPECTOR: J. Patrick Noll DATE: 12/11/91

INSTRUMENTS

Balance:	Serviced by technician annually	✓
	or complete calibration annually	✓
	Calibration check monthly* (1)	✓
	Log book kept (2)	✓
D.O. Probe:	Calibrated daily	✓
	Calibrated against Winkler	✓
	Log book kept (2)	✓
pH Meter:	Calibrated daily with 2 buffers (1, 2)	✓
	Buffers bracket pH value of samples (1)	✓
	Log book kept (2)	✓
Incubator:	Temperature @ 20°C (1, 4)	✓
	Log book kept (2)	✓
Oven:	Temperature @ 103 - 105°C (1, 4)	✓
	Log book kept (2)	✓
Refrigerator:	Temperature @ 4°C (3)	5°C
	Log book kept (2)	✓

*It is suggested to check with a known weight prior to use.

METHODS - MUNICIPAL

Chlorine Residual:	Correct for MnOx (1, 4)	N/A
	Analyzed immediately	
	Grab sample analyzed	
Chlorine Removal:	Sodium Sulfite used	✓
BOD_5:	pH = 6.5 - 7.5 su	✓
	Seed type	From Chemical WWTP
	Seed Correction Factor (0.6) - 1.0) mg/l)	✓
	Seed Depletion (40-70%)	✓
	Sample Depletion ≥2.0 mg/l (after corrected for seed)	✓
	D.O. >1.0 after incubation	✓
	Blank Depletion ≤.2 mg/l	✓
	Duplicates set up 10% of X**	✓
	Duplicates close (±15%)	✓
	Dilutions (?) How Many?	4

Note: 2 dilutions are okay if one of them has a residual of 1.0 mg/l D.O. and a depletion of 2.0 mg/l D.O. Randomly check some of the bench sheets to determine if BOD_5 calculations are performed correctly.

Glucose/glutamic acid (200 ± 37)	✓
GGA with each BOD set (?)	✓
GGA prepared fresh with each set (?)	WEEKLY - PREPARED ONCE FOR W, Th, + F RUNS.

** X = time throughout this checklist

	Dilution water nutrients	✓
	* Magnesium Sulfate ($MgSO_4$)	✓
	Calcium Chloride ($CaCl_2$)	✓
	Phosphate Buffer	✓
	Ferric Chloride ($FeCl_3$)	✓
	Method Referenced	405.1 / 5210 (17th)
	Holding time (48 hours)	✓
	No air in bottles; 250-300 ml	AIR OBSERVED
	Bottles with ground glass stoppers	✓
	Water seal maintained	✓
TSS:	Duplicates 10% of X	✓
	Duplicates close (±15%)	✓
	Blank run 1/day	✓
	Method referenced	160.2/2540D (17th)
	Holding time (7 days)	✓
NH_3-N:	Dechlorination immediately	N/A
	Samples distilled before analysis	SENT OUT TO
	If not, comparison data available	EDNA WOODS' LAB.
	Blank & Standard run 1/day (2)	
	Duplicates 10% of X	
	Spikes 10% of X	
	Holding time (28 days w/preserv.)	
	Solutions mixed with NH_3 free water?	✓
pH:	Holding time (?) (1, 3)	≤ 15 min (onsite)
	Grab sample analyzed	AT CONTROL ROOM
	METHOD REF'S	150.1 / 4500-H

All samples to be preserved should be done immediately: Check for time preserved.

METHODS - INDUSTRIAL

Oil & Grease:	Method used	413.1/5520B(17th
	Duplicate or Standard 10% of X (2)	✓

Note: if less than 10 samples are analyzed on a particular day, then 1 STD shall be analyzed. Duplicates may be analyzed in lieu of STD for oil and grease analysis.

	Sample container (1, 4)	✓
	Preserved (?)	✓
	Holding time (28 days w/preserv.)	✓
	No composites	✓
COD:	Duplicates run 10% of X (2)	✓
	Blanks & Standards 1/day (2)	✓
	Spike 10% of X (2)	✓
	Preserved (?)	✓
	Method referenced	410.3/5220B(17th)
	Holding time? (28 days w/preserv.)	✓
TOC:	Daily calibration solution	
	Duplicates 10% of X (2)	✓
	Spikes 10% of X (2)	✓
	Blanks & Standards 1/day (2)	✓
	Preserved (?)	IF NOT RUN IMMEDIATELY
	Method referenced	415.1/505 (17th)
	Holding time ? (28 days w/preserv.)	✓

Phenol:	Blank & Standard 1/day (2)	✓
	Duplicate 10% of X (2)	✓
	Method referenced	420.1/510B (14th)
	Holding time? (28 days w/preserv.)	✓
AA:	Standard curve, calibration check daily	✓
	Duplicate 10% of X (2)	✓
	Spikes 10% of X (2)	✓
	Samples, dupes, and spikes digested	✓
GC & GCMS:	Blanks & Standards with each set (2)	✓
	Duplicate & Spike 5% of X (2)	✓

Note: If 1-20 samples are analyzed in a month then 1 duplicate & 1 spike analyses per month shall be performed.

Heavy Metals: See FEDERAL REGISTER for methods, Standard Methods for procedures

Other parameters as applicable: _____

All lab records available for past 3 years (2) _____

CHEMICALS DATED stock solutions good for one (1) year, standard solutions good for one (1) month.

CHEMICALS = expiration dates?

Cu - SENT TO NUS (PREPRESERVED)
NH_3 - SENT TO EDNA WOODS
ORG. Cl - METHANOL EXTRACTION @ SHELL, THEN SENT TO CORE FOR MICROCOLUMNETER ANALYSIS.

Also, see the following for information on chlorine, approved test methods, quality control, quality assurance, and actual testing procedure.

a. Memo of September 8, 1987 from Terry Mills - MnOx correction.

b. Federal Register, Vol. 3, No. 125, June 30, 1986, pp 23692-23704.

c. Subchapter A: Monitoring & Reporting Requirements 319.11
Sampling & Laboratory Testing Methods. (7/88)

d. Subchapter A: Monitoring & Reporting Requirements 319.7
Quality Assurance. (7/88)

e. Standard Methods and/or the EPA Method Manual.

REFERENCES - The numbers in parenthesis on the inspection form correspond to the following references.

1. Standard Methods. 1985. Sixteenth Edition. Mary Ann Franson Editor.

2. Texas Administrative Code. Chapter 31, Section 319.

3. Federal Register. 49:209, October 28, 1984.

4. EPA Manual: Methods for Chemical Analysis of Water & Wastewater. 1979.

NUS CORPORATION

LABORATORY SERVICES DIVISION
900 GEMINI AVENUE
HOUSTON TX 77058

REMIT TO:
900 GEMINI AVENUE
HOUSTON TX 77058

LAB ANALYSIS REPORT

CLIENT NAME: SHELL CHEMICAL COM AND-DPMC
ADDRESS: P.O. BOX [illegible]
DEER PARK TX 77536

ATTENTION: MILLIE [illegible]

REPORT DATE: 09/28/88

2° BioSolids

NUS CLIENT NO: [illegible]
NUS SAMPLE NO: [illegible]
VENDOR NO: [illegible]
WORK ORDER NO: 55[illegible]
DATE RECEIVED: 08/31/[illegible]

SAMPLE IDENTIFICATION: CAKE BELT FILTER 08/31

TEST	DETERMINATION	RESULTS	UNITS	SURROGATE CONC	UNITS	SURROGATE RECOVERY	UNITS
M900	Filtration						
S080	Cyanide, Total (CN)	2.0	mg/kg				
S140	Phenolics	< 0.2	mg/kg				
S430	Chromium (Cr)	730	mg/kg				
S450	Lead (Pb)	15	mg/kg				
S510	Zinc (Zn)	270	mg/kg				
S950	Acid Digestion						
0901	SURROGATES/ACID EXT. IN SOLIDS						
0AS5	d5-Phenol(Surrogate)			200	ug	*	%
0AS6	2-Fluorophenol(Surrogate)			200	ug	*	%
0AS7	2,4,6-Tribromophenol(Surrogate			200	ug	*	%
0AS8	Pentafluorophenol(Surrogate)			200	ug	*	%
0903	SURROGATES/BN EXT. IN SOLIDS						
0BS5	d5-Nitrobenzene(Surrogate)			100	ug	*	%
0BS6	2-Fluorobiphenyl(Surrogate)			100	ug	*	%
0BS7	d-14-p-Terphenyl(Surrogate)			100	ug	*	%
0BS8	Decafluorobiphenyl(Surrogate)			100	ug	*	%
0905	SURROGATES/P.P. VOA IN SOLIDS						
0VS5	d8-Toluene(Surrogate)			50	ng	108	%
0VS6	Bromofluorobenzene(Surrogate)			50	ng	94	%
0VS7	d4-1,2-Dichloroethane(Surr.)			50	ng	86	%
0A23	2,4-Dimethylphenol	< 33,000	ug/kg				
0A30	Phenol	< 33,000	ug/kg				
0B51	Acenaphthene	< 33,000	ug/kg				
0B53	Anthracene	< 33,000	ug/kg				
0B56	Benzo(a)pyrene	< 33,000	ug/kg				
0B63	Bis(2-ethylhexyl)phthalate	< 33,000	ug/kg				
0B68	Chrysene	< 33,000	ug/kg				
0B76	Di-n-butyl phthalate	< 33,000	ug/kg				
0B82	Fluorene	< 33,000	ug/kg				

NUS CORPORATION

LABORATORY SERVICES DIVISION
800 GEMINI AVENUE
HOUSTON TX 77058
713 488 1510

REMIT TO:
800 GEMINI AVENUE
HOUSTON TX 77058

LAB ANALYSIS REPORT

CLIENT NAME: SHELL CHEMICAL COMPANY DPMC
ADDRESS: P.O. BOX 10
DEER PA 77536
REPORT DATE: 09/28/88
ATTENTION: MILLIE HEBERT

NUS CLIENT NO: 261016
NUS SAMPLE NO: 28084765
VENDOR NO: 03999001
WORK ORDER NO: 55680
DATE RECEIVED: 08/31/88

SAMPLE IDENTIFICATION: CAKE BELT FILTER 08/31

TEST	DETERMINATION	RESULTS	UNITS	SURROGATE CONC	UNITS	SURROGATE RECOVERY	UNITS
0B89	Naphthalene	< 33,000	ug/kg				
0D94	Phenanthrene	< 33,000	ug/kg				
0B95	Pyrene	< 33,000	ug/kg				
0D06	2-Methylphenol	< 33,000	ug/kg				
0D07	4-Methylphenol	< 33,000	ug/kg				
0F44	Total Xylenes	< 5	ug/kg				
0V43	Benzene	< 5	ug/kg				
0V65	Toluene	< 5	ug/kg				

COMMENTS: NOT RECOVERED DUE TO EXTRACT DILUTION

Reviewed and Approved by: Diane Meyer

NUS CORPORATION

LABORATORY SERVICES DIVISION
900 GEMINI AVENUE
HOUSTON TX 77058
713 488-1810

REMIT TO:
900 GEMINI AVENUE
HOUSTON TX 77058

QUALITY ASSURANCE REPORT

CLIENT NAME: SHELL CHEMICAL COMPANY-DPMC
ADDRESS: P.O. BOX 100
DEER PARK TX 77536

REPORT DATE: 09/28/88

ATTENTION: MILLIE REPERT

NUS CLIENT NO: 28101
NUS SAMPLE NO: 28084[illegible]
VENDOR N [illegible]
WORK ORDER NO [illegible]
DATE RECEIVED [illegible]

SAMPLE IDENTIFICATION: CAKE BELT FILTER 08.[illegible]

ORGANICS

TEST	DETERMINATION	QA SAMPLE	ANALYST	DATE & TIME RUN	LIT REFERENCE	ORIGINAL RESULT	SPIKE CONC	SPIKE RECOVERY(%)	ACCEPTABLE RANGE (%)	REAGENT BLANK	UNI
OA23	2,4-Dimethylphenol	28084764	RT	09/12/88 01:00	4-148270		200	ND	TO ND		
OA30	Phenol	28084764	RT	09/12/88 01:00	4-148270	< 330	200	99 ND	TO ND	< 330	us/
OB51	Acenaphthene	28084764	RT	09/12/88 01:00	4-M8270		100	ND	TO ND		
OB53	Anthracene	28084764	RT	09/12/88 01:00	4-M8270		100	ND	TO ND		
OB56	Benzo(a)pyrene	28084764	RT	09/12/88 01:00	4-M8270	< 330	100	UNSPIKED ND	TO ND	< 330	us/
OB63	Bis(2-ethylhexyl)phthalate	28084764	RT	09/12/88 01:00	4-M8270	< 330	100	UNSPIKED ND	TO ND	< 330	us/
OB68	Chrysene	28084764	RT	09/12/88 01:00	4-M8270	< 330	100	UNSPIKED ND	TO ND	< 330	us/
OB76	Di-n-butyl phthalate	28084764	RT	09/12/88 01:00	4-M8270	< 330	100	UNSPIKED ND	TO ND	< 330	us/
OB82	Fluorene	28084764	RT	09/12/88 01:00	4-M8270		100	ND	TO ND		
OB89	Naphthalene	28084764	RT	09/12/88 01:00	4-M8270	< 330	100	UNSPIKED ND	TO ND	< 330	us/
OB94	Phenanthrene	28084764	RT	09/12/88 01:00	4-M8270	< 330	100	UNSPIKED ND	TO ND	< 330	us/
OB95	Pyrene	28084764	RT	09/12/88 01:00	4-M8270	< 330	100	100 ND	TO ND	< 330	us/

LITERARY REFERENCES:

4. EPA Environmental Protection Agency, "Test Methods for Evaluating Solid Waste," SW-846, 2nd Edition, April, 1984.

Reviewed and Approved by: Diane Meyer

NUS CORPORATION

LABORATORY SERVICES DIVISION
900 GEMINI AVENUE
HOUSTON, TX 77058
713-488-1810

REMIT TO:
PO BOX 630832
BALTIMORE, MD 21263-0832

LABORATORY ANALYSIS REPORT

CLIENT NAME: SHELL CHEMICAL COMPANY - DPMC
ADDRESS: P O BOX 100
DEER PARK, TX 77536-

REPORT DATE: 11/30/89

ATTENTION: MILLIE-HEBERT

NUS CLIENT NO: 0226 0001
REPORT NO: 08001017
VENDOR NO: 03999000
WORK ORDER NO: 35680

SAMPLE IDENTIFICATION: INCINERATOR ASH
NUS SAMPLE NO: [illegible]
DATE SAMPLED: 17-OCT-89
DATE RECEIVED: 19-OCT-89
APPROVED BY: D F SUMMERS

LN	TEST CODE	DETERMINATION	RESULT	UNIT
1	AASS	Arsenic, Total (As)	22	ug/kg
2	ACRA	Chromium, Low Level (Cr)	4,300	ug/kg
3	ANIA	Nickel, low level	140	ug/kg
4	1270	Cyanide, Total (CN)	1.2	ug/kg
5	DSUPPS	ACID-BASE NEUTRAL EXTRACTABLES		
		2,4,6-Trichlorophenol	< 330	ug/kg
		2,4-Dichlorophenol	< 330	ug/kg
		2,4-Dimethylphenol	< 330	ug/kg
		2,4-Dinitrophenol	< 1600	ug/kg
		2-Chlorophenol	< 330	ug/kg
		2-Methyl-4,6-dinitrophenol	< 1600	ug/kg
		2-Nitrophenol	< 330	ug/kg
		4-Chloro-3-methylphenol	< 330	ug/kg
		4-Nitrophenol	< 1600	ug/kg
		Anthracene	< 330	ug/kg
		Benzo(a)anthracene	< 330	ug/kg
		Benzo(a)pyrene	< 330	ug/kg
		Chrysene	< 330	ug/kg
		Di-n-butylphthalate	< 330	ug/kg
		Naphthalene	< 330	ug/kg
		Pentachlorophenol	< 1600	ug/kg
		Phenanthrene	< 330	ug/kg
		Phenol	< 330	ug/kg
		Pyrene	< 330	ug/kg
		bis(2-Ethylhexyl)phthalate	< 330	ug/kg
		o-Cresol	< 330	ug/kg
		p-Cresol	< 330	ug/kg
7	DVPPS	VOLATILES		
		Benzene	< 5	ug/kg
		Ethylbenzene	< 5	ug/kg
		Toluene	< 5	ug/kg
		Xylene	< 5	ug/kg

COMMENTS:

NUS CORPORATION

LABORATORY SERVICES DIVISION
800 GEMINI AVENUE
HOUSTON, TX 77058
713-488-1810

REMIT TO:
PO BOX 830832
BALTIMORE, MD 21283-0832

LABORATORY ANALYSIS REPORT

CLIENT NAME SHELL CHEMICAL COMPANY - DPMC
ADDRESS P O BOX 100
DEER PARK, TX 77536-

REPORT DATE: 11/30/89

ATTENTION WILLIE HEBERT

NUS CLIENT NO: 0226 0001
REPORT NO: 00001017
VENDOR NO: 03999000
WORK ORDER NO: 35680

SAMPLE IDENTIFICATION: S 18162 FILTER CAKE primary solids
NUS SAMPLE NO: 00107825
DATE SAMPLED : 17-OCT-89
DATE RECEIVED 18-OCT-89
APPROVED BY: D F SUMMERS

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	AASS	Arsenic, Total (As)	4.6	mg/kg
2	ACRA	Chromium, Low Level (Cr)	1,400	mg/kg
3	AMIA	Nickel, low level	40	mg/kg
4	I270	Cyanide, Total (CN)	<0.24	mg/kg
5	DSVPPS	ACID-BASE NEUTRAL EXTRACTABLES		
		2,4,6-Trichlorophenol	< 17,000	ug/kg
		2,4-Dichlorophenol	< 17,000	ug/kg
		2,4-Dimethylphenol	< 17,000	ug/kg
		2,4-Dinitrophenol	< 83,000	ug/kg
		2-Chlorophenol	< 17,000	ug/kg
		2-Methyl-4,6-dinitrophenol	< 83,000	ug/kg
		2-Nitrophenol	< 17,000	ug/kg
		4-Chloro-3-methylphenol	< 17,000	ug/kg
		4-Nitrophenol	< 83,000	ug/kg
		Anthracene	< 17,000	ug/kg
		Benzo(a)anthracene	< 17,000	ug/kg
		Benzo(a)pyrene	< 17,000	ug/kg
		Chrysene	< 17,000	ug/kg
		Di-n-butylphthalate	< 17,000	ug/kg
		Naphthalene	< 17,000	ug/kg
		Pentachlorophenol	< 83,000	ug/kg
		Phenanthrene	< 17,000	ug/kg
		Phenol	< 17,000	ug/kg
		Pyrene	< 17,000	ug/kg
		bis(2-Ethylhexyl)phthalate	< 17,000	ug/kg
		o-Cresol	< 17,000	ug/kg
		p-Cresol	< 17,000	ug/kg

NUS CORPORATION

LABORATORY SERVICES DIVISION
900 GEMINI AVENUE
HOUSTON, TX 77058
713-488-1810

REMIT TO:
PO BOX 630632
BALTIMORE, MD 21263-083

CLIENT NAME: SHELL CHEMICAL COMPANY - DPMC
ADDRESS: P O BOX 100
DEER PARK, TX 77536-

NUS CLIENT NO: 0226 0001
REPORT NO: 00001017
VENDOR NO: 00999000
WORK ORDER NO: 55480

REPORT DATE: 11/30/89

ATTENTION: MILLIE HEBERT

SAMPLE IDENTIFICATION: S 13162 FILTER CAKE
NUS SAMPLE NO: N0187025
DATE SAMPLED: 17-OCT-89
DATE RECEIVED: 18-OCT-89
APPROVED BY: D F SUMMERS

LN	TEST CODE	DETERMINATION	RESULT	UNITS
7	DVPPS	VOLATILES		
		Benzene	< 1000	ug/kg
		Ethylbenzene	< 1000	ug/kg
		Toluene	15,000	ug/kg
		Xylene	< 1000	ug/kg

COMMENTS:

NUS CORPORATION

LABORATORY SERVICES DIVISION
500 GEMINI AVENUE
HOUSTON, TX 77058
713-488-1810

REMIT TO:
PO BOX 830832
BALTIMORE, MD 21283-0832

REPORT NO 00001017

QUALITY CONTROL REPORT
SUPPLEMENTAL INFORMATION

			SAMPLE PREPARATION			SAMPLE ANALYSIS			
LN	TEST CODE	BATCH	METHOD	DATE/TIME	ANALYST	METHOD	DATE/TIME	ANALYST	INSTRUMENT
SAMPLE ID INCINERATOR ASH						NUS SAMPLE NO: N0107324			
1	MASS	1222	19-3050	27-OCT-89		19-7060	09-NOV-89 750	D T ROSE	305MET
2	ACRA	1222	19-3050	28-OCT-89 0900	C M GINGRICH	02-218.2	13-NOV-89 1119	J V RODRIGUEZ	500MET
3	AMIA	1222	19-3050			2-249.2	29-NOV-89 1122	L J RIZZO	500MET
4	1270	1780	NA			ASTMD-T?	29-NOV-89 1115	B BROWN	300WAT
5	DSVPPS	1185	19-3550	27-OCT-89 1600	R C GREEN	19-8270	02-NOV-89 1824	C A HILL	07GCMS
7	DVPPS	1261	NA			19-8240	27-OCT-89 1424	J B PERRIGO	02GCMS

Method Code	Method	Literary Reference
19-3050	3050	EPA-Test Methods for Evaluating Solid Waste, 3rd ed. Nov. 1986
19-3550	3550	EPA-Test Methods for Evaluating Solid Waste, 3rd ed. Nov. 1986
02-218.2	218.2	EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
19-7060	7060	EPA-Test Methods for Evaluating Solid Waste, 3rd ed. Nov. 1986
19-8240	8240	EPA-Test Methods for Evaluating Solid Waste, 3rd ed. Nov. 1986
19-8270	8270	EPA-Test Methods for Evaluating Solid Waste, 3rd ed. Nov. 1986

			SAMPLE PREPARATION			SAMPLE ANALYSIS			
SAMPLE ID S 13162 FILTER CAKE						NUS SAMPLE NO: N0107325			
1	MASS	1222	19-3050	27-OCT-89		19-7060	09-NOV-89 750	D T ROSE	305MET
2	ACRA	1222	19-3050	28-OCT-89 0900	C M GINGRICH	02-218.2	13-NOV-89 1119	J V RODRIGUEZ	500MET
3	AMIA	1222	19-3050			2-249.2	29-NOV-89 1122	L J RIZZO	500MET
4	1270	1780	NA			ASTMD-T?	29-NOV-89 1115	B BROWN	300WAT
5	DSVPPS	1185	19-3550	27-OCT-89 1600	R C GREEN	19-8270	02-NOV-89 2140	J B PERRIGO	07GCMS
7	DVPPS	1406	NA			19-8240	27-OCT-89 2044	R J TAYLOR	02GCMS

Method Code	Method	Literary Reference
19-3050	3050	EPA-Test Methods for Evaluating Solid Waste, 3rd ed. Nov. 1986
19-3550	3550	EPA-Test Methods for Evaluating Solid Waste, 3rd ed. Nov. 1986
02-218.2	218.2	EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
19-7060	7060	EPA-Test Methods for Evaluating Solid Waste, 3rd ed. Nov. 1986
19-8240	8240	EPA-Test Methods for Evaluating Solid Waste, 3rd ed. Nov. 1986
19-8270	8270	EPA-Test Methods for Evaluating Solid Waste, 3rd ed. Nov. 1986

NUS CORPORATION

LABORATORY SERVICES DIVISION
800 GEMINI AVENUE
HOUSTON, TX 77058
713-488-1810

REMIT TO:
PO BOX 830832
BALTIMORE, MD 21283-083

REPORT NO: 00001017

QUALITY CONTROL REPORT
SURROGATE STANDARD RECOVERY

LN	TEST CODE	SURROGATE COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS	REF LN
SAMPLE ID:		INCINERATOR ASH	NUS SAMPLE NO:	N0107324	
6	8BNAS	GC/MS BNA SURROGATES			5
		2,4,6-Tribromophenol	39.0	-	
		2-fluorobiphenyl	72.0	-	
		2-fluorophenol	48.0	-	
		Nitrobenzene-d5	67.0	-	
		Phenol-d5	60.0	-	
		p-Terphenyl-d14	49.0	-	
8	8VOAS	GC/MS VOLATILES SURROGATES			7
		1,2-Dichloroethane-d4	185.0	-	
		4-Bromofluorobenzene	88.0	-	
		Toluene-d8	104.0	-	
SAMPLE ID.		S 13162 FILTER CAKE	NUS SAMPLE NO:	N0107325	
6	8BNAS	GC/MS BNA SURROGATES			5
		2,4,6-Tribromophenol	.0	-	
		2-fluorobiphenyl	.0	-	
		2-fluorophenol	.0	-	
		Nitrobenzene-d5	.0	-	
		Phenol-d5	.0	-	
		p-Terphenyl-d14	.0	-	
8	8VOAS	GC/MS VOLATILES SURROGATES			7
		1,2-Dichloroethane-d4	98.0	-	
		4-Bromofluorobenzene	75.0	-	
		Toluene-d8	87.0	-	

NUS CORPORATION

LABORATORY SERVICES DIVISION
900 GEMINI AVENUE
HOUSTON, TX 77058
713-488-1810

REMIT TO:
PO BOX 830832
BALTIMORE, MD 21283-0832

REPORT NO 00001017

QUALITY CONTROL REPORT
DUPLICATE AND MATRIX SPIKE DATA

NUS SAMPLE NO. N 0107324

LN	BATCH	PREP METHOD	ANALYSIS METHOD	TEST CODE	TEST DESCRIPTION
1	1222	19-3050	19-7060	AASS	Arsenic Total (As)

DETERMINATION	ORIGINAL RESULT	DUPLICATE RESULT	UNITS	RANGE / RPD	UNITS	MS RESULT	MS % RECVRY
Arsenic Total (As)	22	22	ng/kg	0	ng/kg	23	95.8

LN	BATCH	PREP METHOD	ANALYSIS METHOD	TEST CODE	TEST DESCRIPTION
2	1222	19-3050	02-218.2	ACRA	Chromium, Low Level (Cr)

DETERMINATION	ORIGINAL RESULT	DUPLICATE RESULT	UNITS	RANGE / RPD	UNITS	MS RESULT	MS % RECVRY
Chromium, Low Level (Cr)	4,300	4,600	ng/kg	6.742	ng/kg	9,400	101.1

LN	BATCH	PREP METHOD	ANALYSIS METHOD	TEST CODE	TEST DESCRIPTION
3	1222	19-3050	2-249.2	ANIA	Nickel, low level

DETERMINATION	ORIGINAL RESULT	DUPLICATE RESULT	UNITS	RANGE / RPD	UNITS	MS RESULT	MS % RECVRY
Nickel, low level	140	140	ng/kg	0	ng/kg	160	94.1

LN	BATCH	PREP METHOD	ANALYSIS METHOD	TEST CODE	TEST DESCRIPTION
2	1222	19-3050	02-218.2	ACRA	Chromium, Low Level (Cr)

DETERMINATION	ORIGINAL RESULT	DUPLICATE RESULT	UNITS	RANGE / RPD	UNITS	MS RESULT	MS % RECVRY

NUS CORPORATION

LABORATORY SERVICES DIVISION
800 GEMINI AVENUE
HOUSTON, TX 77058
713-488-1810

REMIT TO:
PO BOX 630632
BALTIMORE, MD 21263-0632

REPORT NO: 00001017

QUALITY CONTROL REPORT
DUPLICATE AND MATRIX SPIKE DATA

NUS SAMPLE NO: H 0107324

LN	BATCH	PREP METHOD	ANALYSIS TEST METHOD	CODE	TEST DESCRIPTION
2	1222	19-3050	02-218.2	ACRA	Chromium, Low Level (Cr)

DETERMINATION	ORIGINAL RESULT	DUPLICATE RESULT	UNITS	RANGE / RPD	UNITS	MS RESULT	MS % RECVRY
Chromium, Low Level (Cr)	4.900	4.600	ug/kg	6.742	ug/kg	9.400	101.1

SHELL 00402

Biomonitoring Checklist

1. Does the permittee have biomonitoring requirements in their TWC or NPDES permit? (✓)YES ( )NO.

2. Which permit requires biomonitoring? ( )TWC (✓)NPDES ( )BOTH

3. Has the permittee completed the biomonitoring requirements? ( )YES (✓)NO ( )N/A. If no, discuss the status of the biomonitoring completed thus far (including biomonitoring continued beyond the first year where required). This TRE WILL BE INITIATED SOON

4. What biomonitoring tests is the permittee required to conduct? (✓)Marine acute, ( )Marine chronic, ( )Freshwater acute, ( )Freshwater chronic.

5. Has the permittee initiated a Toxicity Reduction Evaluation (TRE)? (✓)YES, Start date EARLY 92 ( )NO

   a. If yes, comment on the status of the TRE. CALCIUM HAS RECENTLY BEEN IDENTIFIED AS THE PROBABLE TOXICANT. TRE PLAN HAS BEEN SENT TO EPA (enclosed). TRE TO BE CONTRACTED TO ENTRIX.

   b. If yes, is the permittee submitting quarterly TRE status reports? ( )YES (X)NO. If no, explain. See a

Select one or several biomonitoring tests for review.

6. What tests were reviewed (test dates and species)? CYPRINODON VARIEGATUS
   MYSIDOPSIS BAHIA

7. Does the permittee have a full report on file for each biomonitoring test reviewed? (✓)YES ( )NO. If no, explain.

8. Does the full report clearly define the toxicity test starting and ending date and times? (✓)YES ( )NO. If no, explain.

9. Was the toxicity test initiated within 36 hours after collection of the first composite? (✓)YES ( )NO. If no, explain.

Were all composite samples used within 72 hours after collection of the composite sample? (✓)YES ( )NO. If no, explain. _____

10. Were 24-hour composite samples collected pursuant to permit requirements? (✓)YES ( )NO. If not, what sampling regime was utilized? _____

Were the minimum number of composite samples collected? YES(✓) NO( ). If no, explain. _____

11. Are the effluent* and receiving water** sample collection locations, dates, and times clearly documented? (X)YES* (X)NO. If no, explain. Receiving water COC TAE simply says "Patricks Bayou" w/ specifying site.

12. Dilution water utilized in the test(s). ( )Synthetic dilution water (✓)Receiving water ( )Other _____.

If receiving water was used in the biomonitoring test(s), specifically where was the receiving water collected? Not clearly defined

If synthetic dilution water was used, did the permittee satisfy the requirements given in the permit concerning the use of synthetic dilution water? ( )YES ( )NO (✓)NA. If no, explain. _____

13. If receiving water toxicity has been demonstrated in any of the permittee's biomonitoring results, discuss any known reasons for the toxicity. Receiving water toxicity has been demonstrated, no explanation or comment.

14. Are the biomonitoring samples collected at the location prescribed in the permit? (✓)YES ( )NO. If no, explain. _____

15. Was the biomonitoring sample dechlorinated in the laboratory? ( )YES ( )NO If yes, does the permit authorize the sample dechlorination? ( )YES ( )NO. If no, explain. Not addressed in the report

16. What laboratory(ies) conducted the biomonitoring tests reviewed? Aquatic Bioassay Labs Inc
8142 Greenwell Springs Rd.
Baton Rouge, LA. 70814
504/924-2618

Shell Oil Company • Shell Chemical Company
A Division of Shell Oil Company

Deer Park Manufacturing Complex
P.O. Box 100
Deer Park, TX 77536

December 19, 1990

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Water Management Division
Enforcement Branch (6W-E)
Environmental Protections Agency, Region 6
1445 Ross Avenue
Dallas, Texas 75202-2733

Dear Sir:

SUBJECT: SHELL CHEMICAL COMPANY - DEER PARK MANUFACTURING COMPLEX
NPDES PERMIT NO. TX0004863
BIOMONITORING TEST RESULTS AND PROPOSED PLAN

The second and third set of biomonitoring test results for outfall C-001 are submitted as Attachments 1 and 2. These results, similar to those submitted on November 19, 1990, show that the Cyprinodon variegatus test passed; however, the Mysidopsis bahia test failed. The tests were conducted by Aquatic Bioassay Laboratories, Inc. of Baton Rouge, Louisiana.

In accord with provisions of our NPDES permit (e.g., Item 7 on page 4 of Part II), we are submitting a plan for conducting a Toxicity Reduction Evaluation (TRE). We suspect the concentration of calcium in our effluent to be toxic to the mysid. We are including as Attachment 3 a reprint of a technical article which provides the bases for our suspicion. Please note that the titles in Figures 5A and 5B of Attachment 3 are reversed. Figure 5B shows the calcium toxicity to mysid.

We propose to determine the toxicity contribution of calcium by performing a series of biomonitoring tests with effluent treated with sodium carbonate to reduce the calcium concentration to less than about 150 mg/L. The contribution of calcium to toxicity will be determined by a significant difference between survival rates when comparing results with and without "softened" effluent.

We plan to conduct the test with three sets of samples collected at two week intervals. The procedure to be followed is shown in Attachment 4. The tests will begin with samples collected the week of January 7, 1991. We anticipate completion of tests and report prepared during the first quarter of 1991.

Depending on results of the evaluation of calcium as the toxicant, we may propose to reevaluate the dilution criteria on which our permit was based. In the absence of plume dispersion data, the low-flow effluent concentration for our discharge was simplistically determined to be the high fraction of our discharge to the total flow in Patricks Bayou. This relative flow was determined from a review of non-rain flow data over a two year period. The resulting low-flow effluent concentration of 71% (i.e., critical dilution) is believed overly protective for marine organisms at the point of our discharge.

Please contact C. A. Bland at (713) 246-7895 if you require additional information.

Respectfully submitted,

J. M. Sowle, Manager
Environmental Compliance

cc: Texas Water Commission
Water Quality Division
Wastewater Permit Section
P.O. Box 13087, Capitol Station
Austin, Texas 78711

TABLE 1 (SHEET 1 OF 2)

Permittee: Shell Oil Company
NPDES No.: TX0004863
Outfall NO.: C-001

MYSIDOPSIS BAHIA SURVIVAL

Date Composites Collected: No. 1: FROM 11/05/90 TO: 11/06/90
No. 2: FROM 11/06/90 TO: 11/07/90

Test initiated: 10:20am 11/07/90

Dilution water used: XX Receiving water __ Synthetic water

PERCENT SURVIVAL
Percent Effluent (%)

TIME	REP	CA	CB	52%	61%	71%	83%	97%
24h	A	100	100	70	70	40	40	40
	B	100	100	70	50	40	30	40
48h	A	100	100	20	0	0	0	0
	B	100	100	20	0	0	0	0

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate. Is the mean survival at 48 hours significantly less (p=0.05) than the control survival for the % effluent corresponding to:

   a. LOW FLOW OR CRITICAL DILUTION (71%): XX YES ____ NO

2. Enter percent effluent corresponding to the LC50 below:

   LC50 (Mysidopsis) = <52.0% effluent

   95% confidence limits: N/A

   Method of LC50 calculation: Binomial Test

3. If you answered NO to 1.a. enter P; otherwise enter F: F
   Reference: Parameter No. ?

4. If you answered NO to 1.b, enter P; otherwise enter F: --
   Reference: Parameter No. ?

DOCKET No. 6-89-1785 ~~ENCLOSURE (Page 6 of 6)~~

TABLE 1 (SHEET 2 OF 2)

Permittee: Shell Oil Company
NPDES No.: TX0004863
Outfall NO.: C-001

SHEEPSHEAD MINNOW SURVIVAL
(Cyprinodon variegatus)

Date Composites Collected: No. 1: FROM 11/05/90 TO: 11/06/90
No. 2: FROM 11/06/90 TO: 11/07/90

Test initiated: 10:20am 11/07/90

Dilution water used: XX Receiving water __ Synthetic water

PERCENT SURVIVAL
Percent Effluent (%)

TIME	REP	C	CA	52%	61%	71%	83%	97%
24h	A	100	100	100	100	100	100	100
	B	100	100	100	90	100	90	90
48h	A	100	100	100	80	100	100	100
	B	100	100	100	90	90	90	90

1. Dunnett's Procedure or Steel's Many-One Test as appropriate. Is the mean survival at 48 hours significantly less (p=0.05) than the control survival for the % effluent corresponding to:

   a. LOW FLOW OR CRITICAL DILUTION (71%): ____ YES XX NO

2. Enter percent effluent corresponding to the LC50 below:

   LC50 (Cyprinodon) = >97.0% effluent

   95% confidence limits: N/A

   Method of LC50 calculation: N/A

3. If you answered NO to 1.a. enter P; otherwise enter F: P
   Reference: Parameter No. TEM6A.

4. If you answered NO to 1.b. enter P; otherwise enter F: __
   Reference: Parameter No. TFM6A.

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ATTACHMENT 2 (1 page)

DOCKET No. 6-89-1785 ~~ENCLOSURE (Page 5 of 6)~~

TABLE 1 (SHEET 1 OF 2)

Permittee: Shell Oil Company
NPDES No.: TX0004863
Outfall NO.: C-001

MYSIDOPSIS BAHIA SURVIVAL

Date Composites Collected: No. 1: FROM 12/03/90 TO: 12/04/90
No. 2: FROM 12/04/90 TO: 12/05/90

Test initiated: 2:50pm 12/04/90

Dilution water used: XX Receiving water __ Synthetic water

PERCENT SURVIVAL
Percent Effluent (%)

TIME	REP	CA	CB	52%	61%	71%	83%	97%
24h	A	100	100	50	50	20	0	0
	B	100	100	30	40	30	0	0
48h	A	100	90	50	20	0	0	0
	B	100	100	30	30	20	0	0

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate. Is the mean survival at 48 hours significantly less (p=0.05) than the control survival for the % effluent corresponding to:

   a. LOW FLOW OR CRITICAL DILUTION (71%): XX YES ____ NO

2. Enter percent effluent corresponding to the LC50 below:

   LC50 (Mysidopsis) = <52.0% effluent

   95% confidence limits: N/A

   Method of LC50 calculation: Binomial Test

3. If you answered NO to 1.a. enter P; otherwise enter F: F
   Reference: Parameter No. ?

4. If you answered NO to 1.b, enter P; otherwise enter F: --
   Reference: Parameter No. ?

EFF901204-01

Attachment C (Page

DOCKET No. 6-89-1785 ~~ENCLOSURE (Page 6 of 6)~~

TABLE 1 (SHEET 2 OF 2)

Permittee: Shell Oil Company
NPDES No.: TX0004863
Outfall NO.: C-001

SHEEPSHEAD MINNOW SURVIVAL
(Cyprinodon variegatus)

Date Composites Collected: No. 1: FROM 12/03/90 TO: 12/04/90
No. 2: FROM 12/04/90 TO: 12/05/90

Test initiated: 2:50pm 12/04/90

Dilution water used: XX Receiving water __ Synthetic water

PERCENT SURVIVAL
Percent Effluent (%)

TIME	REP	C	CA	52%	61%	71%	83%	97%
24h	A	100	100	100	90	90	100	100
	B	90	100	100	100	100	100	100
48h	A	100	90	90	90	70	80	100
	B	90	100	80	90	70	90	90

1. Dunnett's Procedure or Steel's Many-One Test as appropriate. Is the mean survival at 48 hours significantly less (p=0.05) than the control survival for the % effluent corresponding to:

   a. LOW FLOW OR CRITICAL DILUTION (71%): ____ YES XX NO

2. Enter percent effluent corresponding to the LC50 below:

   LC50 (Cyprinodon) = Incalculable

   95% confidence limits: N/A

   Method of LC50 calculation: N/A

3. If you answered NO to 1.a. enter P; otherwise enter F: P
   Reference: Parameter No. TEM6A.

4. If you answered NO to 1.b. enter P; otherwise enter F: __
   Reference: Parameter No. TFM6A.

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ATTACHMEN

VARIABILITY ASSOCIATED WITH IDENTIFICATION OF TOXICS IN NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) EFFLUENT TOXICITY TESTS

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(*Received* 28 *March* 1988; *Accepted* 18 *February* 1989)

Abstract—Effluent toxicity testing is a routine National Pollutant Discharge Elimination System (NPDES) permit monitoring requirement for many municipal and industrial dischargers. Effluent toxicity compliance limits are being set in an increasing effort to limit discharge of toxics into U.S. water bodies. To that end, hazard assessment principles are being applied to limit discharged toxicity based on instream effects as judged by effluent toxicity, fate and exposure. Uncertainty arises in complying with effluent toxicity limits because of a number of factors, including an unacceptably toxic effluent, error in conducting a specified test, test organism health, statistical variability and interferences in the test solution that mask the toxic effect.

Three factors that may influence compliance with toxicity limits and/or identification of toxics are discussed. These factors indicate the need for additional consideration before setting permit limits, determining requirements for toxicity reduction and possibly implementing additional effluent treatment.

Comparisons between reference toxicant data and control mortality showed that reference toxicant data provide an additional control for determining whether effluent toxicity test results are valid and that they can be used to test regulatory compliance. Statistical sampling theory was explored to determine compliance with an effluent toxicity requirement of 80% survival in 100% effluent. Third, several test species were used to determine the causative toxic agents in order to correctly identify toxicity and to separate true toxic effects from interferences in exposures to receiving water.

Keywords—National Pollutant Discharge Elimination System (NPDES) compliance Calcium Effluent toxicity Total organic halides

INTRODUCTION

Toxicity testing has become a routine monitoring requirement for National Pollutant Discharge Elimination System (NPDES) permits for many point source industrial and municipal discharges. The tests are implemented for the purposes of limiting the discharge of toxics and protecting receiving waters from exposure to toxic effluents. Although numerical water quality criteria have been derived [1] to protect receiving waters and establish control technology, not all pollutants can be easily identified in complex effluents. With implementation of the U.S. Environmental Protection Agency (EPA) water-quality-based approach to toxics control [2], hazard assessment principles [3,4] are being applied in estimating safe instream effluent concentrations. It has been recognized that duration and frequency of exposure to toxic effluents, rather than the toxicity of the whole effluent alone, are important considerations in setting safe discharge limits.

Recently, industrial dischargers have been faced with specific protocols and species in toxicity tests for determining the presence of toxicity and identifying the possible causes of toxicity. In addition to the new tests, some regulators have proposed discharge limits based on simple laboratory tests. For example, a requirement of survival of 80% of the test animals in 100% effluent has been used. However, these may not be representative of environmental exposures.

Uncertainty arises in attempting to comply with such requirements for many reasons. Several studies have reported the variability of specific tests when conducted by several laboratories [5,6], and

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a recent study evaluated the variability of effluent toxicity tests [7]. Based on observations in our laboratories during the last five years, we believe that there are at least five factors of potential variability that should be considered in setting permit limits, whether for a water-quality-based or technology-based approach. They are animal health, statistical variability, interferences, changing effluent characteristics and test method.

This study examined the results of studies to investigate the first three factors: test animal health, statistical variability and interferences. The examples presented illustrate (a) the importance of determining animal health by using the reference toxicant test; (b) the statistical variability associated with compliance by two refinery effluents with toxicity limits; and (c) how compounds often considered nontoxic can interfere with toxicity test results for a chemical plant effluent.

MATERIALS AND METHODS

Experimental studies

Three studies were conducted to determine the additional sources of variability in identifying effluent toxicity and permit compliance. The subject effluents were from two refineries and two chemical plants. The statistical effluent analyses were performed on the refinery data; the toxicity identification study was performed using one chemical plant effluent.

Toxicity tests

Acute toxicity tests with aquatic invertebrates and fish were conducted at the University of North Texas, Denton, Texas, using EPA methods [8,9]. The EC50 or LC50 was determined in all tests using 48-h (invertebrates) or 96-h (vertebrates) static exposures. The tests with invertebrates consisted of five experimental concentrations and a control, with five replicates of 10 organisms at each of the concentrations and the control. The fish tests utilized five concentrations and a control, with two replicates of 10 organisms at each exposure.

Daphnids, *Daphnia pulex* (DeGeer), were cultured and tested in the laboratory at the University of North Texas following procedures previously described [10,11]. They were cultured and tested in moderately hard reconstituted water (72–80 mg/L as $CaCO_3$). Ten milliliters of concentrated *Selanastrum capricornutum* culture (1 ml equals 8–9 $\times 10^6$ cells) was fed daily to the daphnids in culture, but not during testing.

Opossum shrimp (mysids), *Mysidopsis bahia* (Molenock), were obtained from two different commercial suppliers. Test animals were 24 h old on receipt and were acclimated for 24 h at 20‰ salinity in artificial seawater (Rila sea salts). They were fed laboratory-hatched 48-h-old *Artemia* nauplii daily. An 18-h light:6-h dark photoperiod was maintained.

Sheepshead minnows, *Cyprinodon variegatus*, less than 30 d old, were obtained from a commercial supplier and were acclimated to laboratory conditions at 20‰ salinity in artificial seawater for at least 10 d. The fish were fed Tetramin flake food and *Artemia* nauplii ad libitum daily.

The Microtox luminescent bacterial assay using *Photobacterium phosphoreum* [12] was used as a comparative test method in one example. Microtox exposures were measured at the Shell Development Company Westhollow Research Center for 5 min and used four concentrations of effluent and a control, each treatment having two replicates. EC50 measurements for all toxicity tests were calculated by probit analysis.

Analytical methods

The chemical measurements required in toxicity tests [8,9] were performed according to standard methods [13]. Reference toxicity tests with chromium were performed with measured concentrations by atomic absorption spectrophotometry [13]. Effluents in one of the examples were analyzed for total organic halides [14] using a Dohrman DX-20 analyzer and for calcium by atomic absorption [13].

Determination of animal health

In the first experiment, the response of test organisms to reference toxicants was measured using hexavalent chromium ($K_2Cr_2O_7$, MCB Reagents; K_2CrO_4, Fisher Scientific Co.) and compared with control survival. During 4 years of effluent toxicity testing, from 1983 to 1986, reference toxicant control experiments were conducted [10,11]. In this report, we present results from 35 *D. pulex* and 18 *M. bahia* experiments using chromium.

The rationale for using parallel reference toxicity in conjunction with the effluent test was that measurement of control solution mortality indicates weak animals in the test population [10]. The weaker test animals in the laboratory population may die in control experiments, though this does not demonstrate sensitivity of the group to toxicant stress. The reference toxicity test produces a graded response of either stronger, weaker or equally sensitive organisms. A more resistant test response may indicate a different test population from previous tests, a less resistant response may show the

reverse. Therefore, from experience, we perform parallel reference toxicity testing in conjunction with NPDES effluent toxicity testing.

Permit compliance affected by statistical variability

The compliance of two effluents with toxicity limits using the response of *Daphnia* was evaluated in the second study. The toxicities of effluent from two petroleum refineries were measured in June 1984 at one location and from September 1984 to March 1986 at the second location. EC50 concentrations (dilutions) were calculated, when possible, and 100% effluent concentrations were included in the toxicity test design. The statistical compliance of both effluents with an 80% survival criterion was tested by null hypothesis [15].

Interferences affecting identification of toxics and compliance

The third study examined the value of toxicity tests involving more than one species for revealing a nontoxic entity's interfering with and masking responses to a toxic effluent fraction. In a three-plant study (two chemical plants and one refinery) to develop toxicity data for permit compliance, the protocol dictated by specific permit language was followed. Acute tests were run on either a freshwater or saltwater species, with the selection of species based on effluent salinity. If the salinity was less than 5‰, *Daphnia* sp. were used; if the salinity was greater than 5‰, *Mysidopsis* sp. were used.

In the first part of the investigation, untreated process streams to the treatment facilities and effluents were tested at three locations (sites A, B and C) over one- to three-week periods to determine effluent toxicity and the effectiveness of the treatment system in reducing toxicity.

The second part of the study was performed at a chemical plant on site (site A) to investigate the probable causes of toxicity and the effectiveness of modified treatment in reducing effluent toxicity.

The third part of this series of experiments involved identifying the specific role of calcium in affecting the effluent's toxicity. Based on prior knowledge of the processes, the effluent treatment system and effluent composition, cationic species and organics, specifically calcium and organic halides, were identified as primary candidates in causing toxicity. This approach was used to screen candidate effluents by required NPDES protocols, and to identify toxic effluents and toxicity. Reduction schemes will be described elsewhere. Untreated process streams and effluents were fractionated into component mixtures of total organic halides and calcium to create a two-factor experiment with four levels of each factor. A matrix of 0, 100, 1,000 and about 6,000 mg/L Ca, and of 0, 10, 20 and about 50 mg/L total organic halide was created by carbon sorption fractionating and Na_2CO_3 precipitation of calcium. These represented the ranges in concentration of the calcium and total organic halide measured in the untreated process streams and effluent. No other effluent parameters were affected by this treatment. Acute toxicity testing was performed with *Mysidopsis*, *Cyprinodon* and Microtox. For each combination of Ca^{2+} and total organic halide, an EC50 or LC50 was determined using the protocol previously described [9].

RESULTS AND DISCUSSION

Test variability affected by animal health

Effluent acute toxicity testing methods [8,9] require that test organism survival be greater than 90% in control treatments. The use of reference toxicants in conjunction with effluent toxicity tests is also indicated [9] but often ignored by laboratories. Reference toxicant tests were used to determine whether there was any benefit in developing additional response data for control purposes.

The use of a reference toxicant measures the median response of the entire test population to the toxic challenge (using the EC50 and confidence limits). If the reference toxicant data for that species are below some laboratory-specific control limit or statistically derived limit, the population is not acceptable and the test data on the effluent are suspect. It should be noted that when testing for NPDES reporting requirements, "bad" test data must be reported unless the test can be rerun with the same effluent, which often is not possible. The use of reference toxicant data, therefore, could support the assertion that the test result does not accurately reflect the characteristics of the effluent.

The results of 35 *Daphnia* reference toxicity tests conducted between September 1983 and August 1986 show that, for chromium, EC50 values ranged from 0.06 to 0.28 mg/L Cr^{6+}. The geometric and arithmetic mean EC50s of the 35 tests were 0.15 and 0.16 mg/L Cr^{6+}, respectively. The standard deviation of the mean EC50 for all tests was 0.05 mg/L Cr^{6+}, with a coefficient of variation (C.V.) of 32%. Control mortality averaged 4% and ranged between 0 and 24%. The variation in control survival was greater than the variation in the toxicity tests. The standard deviation for controls was 5%, with a 147% C.V. There was a significant correlation ($r = -0.41$, $\alpha = 0.05$) between control

mortality and acute toxicity. However, in five successive tests when control mortality was between 12 and 24%, the acute toxicity ranged from 0.06 to 0.14 mg/L Cr^{6+}. Thus, the measured toxicity of chromium was greatest during this period, with 3 of 5 values in the lower range of the measured data points (Fig. 1A).

In 1983 and 1984, when the laboratory began testing and rearing *Daphnia* on a routine basis, there was high observed control mortality and increased relative sensitivity to chromium. The data are interpreted to indicate an unhealthy culture resulting in weak animals that are more susceptible to toxicant stress. Test results should be used to set laboratory-specific control limits for each species.

Eighteen acute chromium toxicity tests were conducted between September 1984 and July 1986 using *M. bahia*. EC50s ranged from 1.20 to 7.14 mg/L Cr^{6+}. The geometric and arithmetic means for the 18 tests were 3.93 and 4.38 mg/L Cr^{6+}, respectively. The standard deviation of the mean LC50 for all 18 tests was 1.79 mg/L Cr^{6+}, with a 41% C.V. Control mortality for mysids was more variable, as for *D. pulex*; mysid mortality in controls showed a 75% C.V. and 6.7% standard deviation around the mean 9% mortality. Control mortality ranged from 0 to 22%, with six tests having control mortalities greater than 10% (Fig. 1B). The correlation between chromium toxicity and control mortality was significant ($r = -0.47$, $\alpha = 0.05$). A trend toward increased sensitivity and increasing control mortality from spring to summer 1986 suggests that commercial supplies were becoming more susceptible to stress. During that period, suppliers were overharvesting mysids to meet the offshore oil and gas industry's need for extensive toxicity testing of drilling fluids [16]. During the summer of 1986, mysid supplies were unavail-

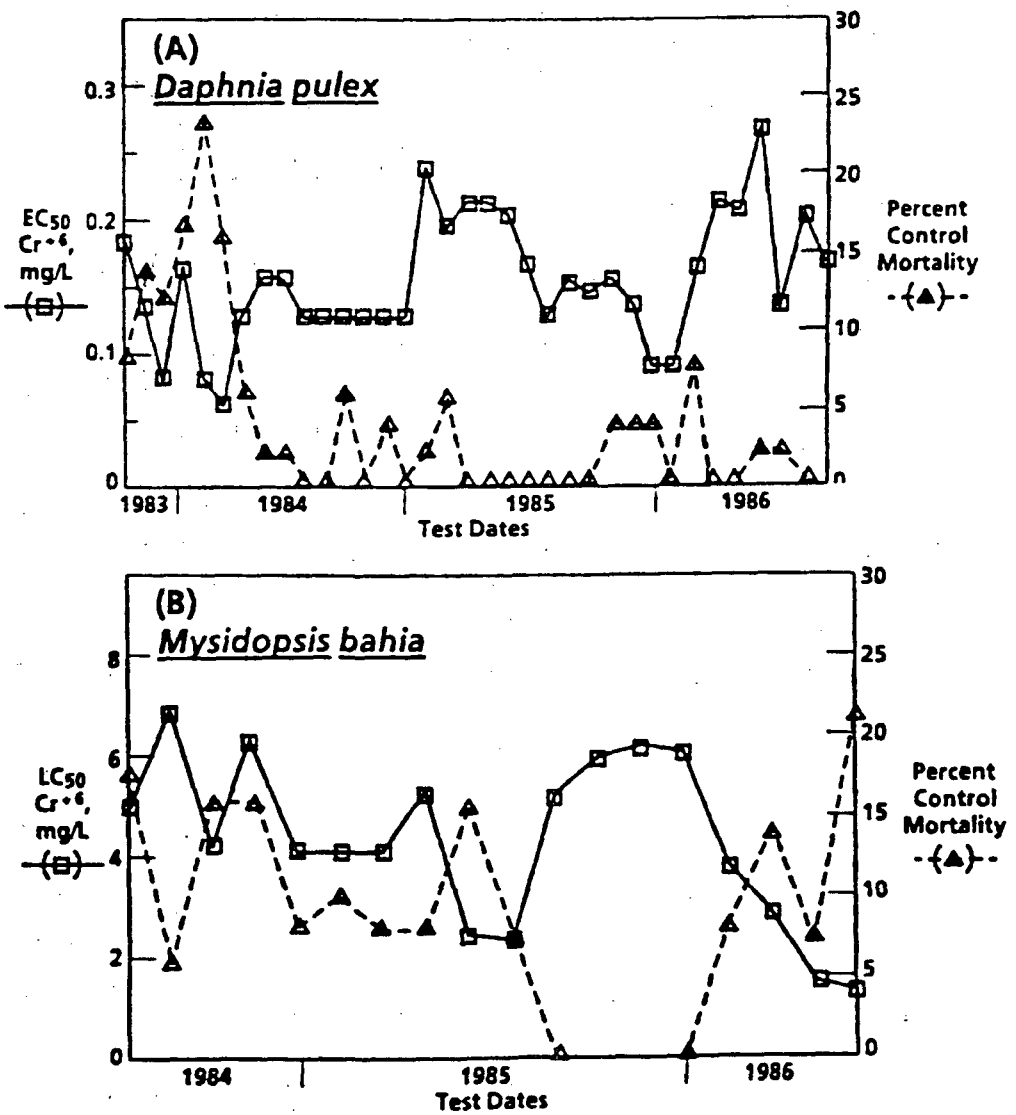

Fig. 1. Temporal toxicity of reference compound (Cr^{6+}) compared with control mortality.

able, with numerous culture crashes and unacceptable test results in controls. The EC50 measurements indicate the response of the entire test group, whereas control mortality represents only the percentage (or number) of weak organisms. Response to toxicants indicates that the measurement is representative of the entire population, with little variability. Tests with higher than 10% control mortality are sometimes associated with more sensitive toxic responses (lower EC50s).

Permit compliance affected by statistical variability

The use of test variability has received serious attention in discussions of effluent toxicity testing [7]. The same is not true regarding the use of statistical variability in effluent toxicity compliance testing. The EPA has recognized statistical variability as playing a role in effluent toxicity test results [2], but believes that temporal variability is more important in setting a discharge limit (W. F. Brandes, U.S. EPA, personal communication). Regulatory authorities have designed many of the effluent toxicity testing methods to be cost-effective. In some instances, tests have been streamlined to save time and money for the permittee. However, local regulatory authorities develop permits based on compliance limits, and to date we are aware of few authorities that allow a variability factor in effluent toxicity compliance. One that does, Virginia, has incorporated variability considerations and requires that six of eight tests comport with permit requirements for compliance.

The compliance requirement that *Daphnia* survival must be 80% or greater in 100% effluent was tested using two effluents from two locations. Using a level of statistical significance of $p < 0.05$, there was a 1 in 20 chance that the test results would fail to meet the criterion when they should have passed. Our examples used quarterly petroleum refinery effluent data from two locations. Tests were conducted with *D. pulex* using five replicates of 10 organisms at each effluent concentration; the basic test protocol allows 20 organisms to be used [9]. Based on the statistical variability of these effluent data, the theoretical presentation of the compliance and noncompliance zones indicates that above 80% survival it is certain that the results would meet the criterion, but below 80% survival, there was an asymptotic line of compliance based on replicates run (Fig. 2). A 69% survival rate or greater allowed us to conclude that we could not demonstrate whether the results would differ from the 80% criterion in a test using five replicates of 10 animals each (n = 50). A 59% survival rate could be judged to be not

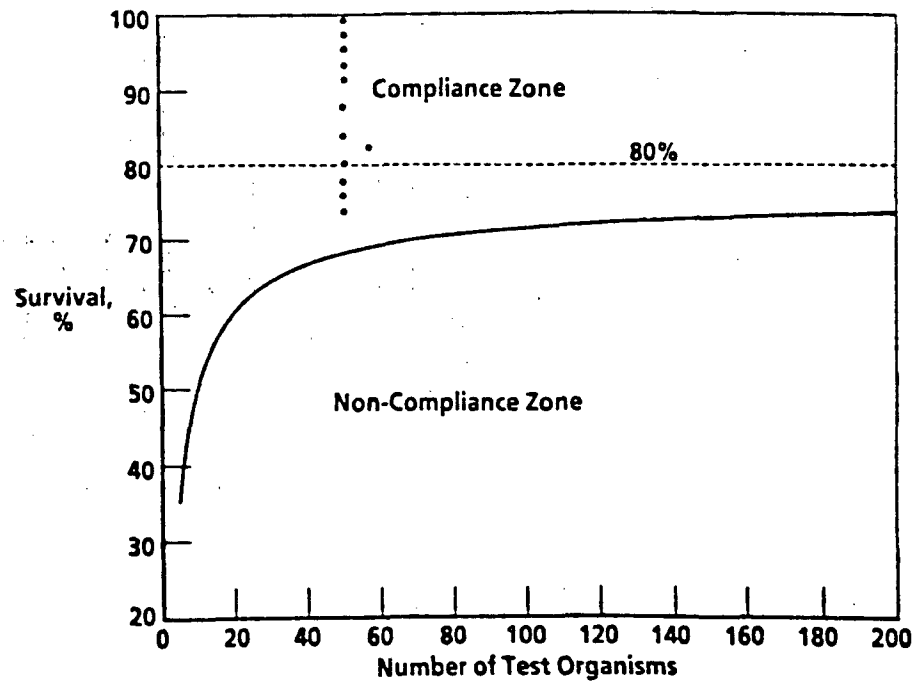

Fig. 2. Statistical limits of compliance for a criterion of 80% survival in 100% effluent. There is statistical compliance with the 80% survival requirement within the 69% boundary (for 50-organism tests) at $p \leq 0.05$, as indicated by the asymptote. Three test results would have not met an absolute 80% survival limit, even though the values are not statistically different from 80%.

out of compliance in a two-replicate test ($n = 20$). Of 12 effluent tests conducted during a permit compliance period, the nine values above 80% survival clearly met the performance criterion. The remaining three test results were below 80% survival but were not statistically different from the survival criterion for the number of replicates used ($n = 50$). We conclude from the data set that our results were not statistically out of compliance in any of the tests. A second example (Table 1) of effluent toxicity tests conducted for six quarters showed that two survival rates were below the 80% criterion, although they were above the statistical rejection level for noncompliance. If one more *Daphnia* had been affected in the test conducted during the first quarter of 1985 (Table 1), we would have concluded that that was a noncompliance result.

In establishing toxicity limits in the NPDES permit process, there is a need to consider variability in test results not attributable to toxicity alone. The above example shows how a discharge may be "out of compliance" with a set numerical threshold limit, but not out of compliance when a statistical test of significance is applied. The same argument could be made with regard to chemical monitoring parameters identified in an effluent variability analysis [7].

Interferences affecting identification of toxics and compliance

Untreated process streams from sites B and C were toxic to *D. pulex*, but treatment resulted in an effluent that was not acutely toxic. Site A had a very toxic influent and equally toxic effluent on three successive weekly samplings. The treatment system at site A appeared to be ineffective and resulted in an acutely toxic effluent (Table 2).

A toxicity identification/toxicity reduction evaluation was initiated using 13 *M. bahia*, 11 *C. variegatus* and 12 Microtox tests. Untreated process streams and effluents from plant site A and an experimental pilot plant were tested for aquatic toxicity and the results compared with the total organic halide concentration in the solutions (Fig. 3).

Table 1. *Daphnia* survival in 100% effluent

Date	Number surviving	Total tested	Percent survival	Critical value for rejection[a]
Fourth quarter, 1984	47	47	100	33
First quarter, 1985	31	44	70	30
Second quarter, 1985	39	47	83	33
Third quarter, 1985	40	43	93	29
Fourth quarter, 1985	41	50	82	35
First quarter, 1986	39	50	78	35

100% survival in controls. Critical value for compliance was 69% survival with 50 animals.
[a]Number of surviving animals required to pass the statistical criterion, considering the total tested.

Table 2. Treatment effectiveness in toxicity reduction (48-h EC50 as percent effluent)

	Week	EC50 before treatment	EC50 after treatment
Site A[a]	1	6.89 (6.2–12.5)	8.56 (7.3–9.9)
	2	9.57 (8.6–10.8)	9.29 (8.4–10.2)
	3	7.89 (6.5–9.1)	8.21 (6.6–9.7)
Site B[b]	1	37.7 (33.6–42.6)	>100
	2	<6.25	>100
	3	9.5 (7.3–13.6)	>100
Site C[b]	1	<6.25	>100

95% confidence limits in parentheses.
[a]*Mysidopsis bahia.*
[b]*Daphnia pulex.*

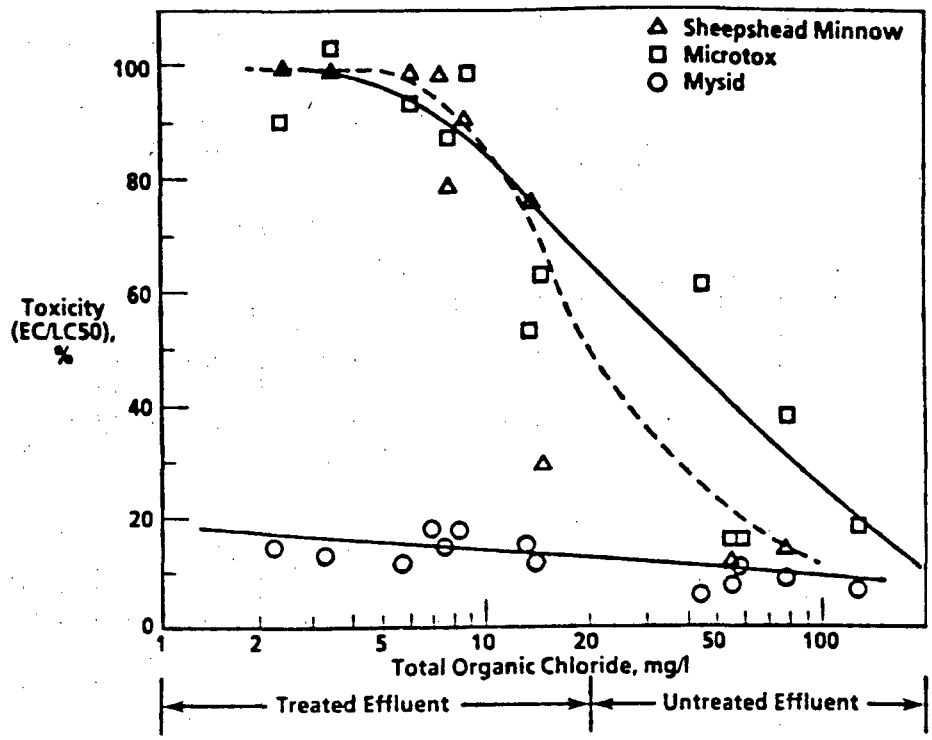

Fig. 3. Relationship between effluent toxicity and total organic halide concentration in untreated process streams and effluent. Effluent toxicity data from a pilot plant study show that the response of *Mysidopsis* is independent of total organic chloride concentration; the organism shows similar toxicity responses to untreated and to treated effluent. *Cyprinodon* and Microtox show decreased toxicity to treated effluent as compared with untreated effluent, and a dose response to total organic halide concentration. The lack of mysid response was subsequently attributed to calcium toxicity.

There was little difference between untreated process streams and effluent EC50 values for *Mysidopsis* observed in the three-week study at site A (Table 2). In the second part of the study, which used modified treatment, toxicity ranged for 6.1 to 18.5% dilution in the untreated process streams and from 6.1 to 17.5% dilution in the effluents (Fig. 3). The site A effluents were less toxic to *Cyprinodon*. The untreated process stream EC50s were less than the effluent values, indicating the effectiveness of treatment in reducing toxicity. Toxicity to *Cyprinodon* ranged for 11.7 to 37.9% in the untreated process stream and from 76.1 to more than 100% in the effluent.

Microtox toxicity was lower in effluents than in untreated process streams. The Microtox response to untreated process streams ranged from 15.5 to 62.9% concentration (as EC50) and from 52.9 to more than 100% concentration (as EC50) in the site A effluents.

In addition to total organic halides in the site A effluent, we identified high calcium chloride concentrations. Calcium concentrations ranged from 5,000 to 6,000 mg/L and were suspected to play a role in the observed toxic responses. Although calcium could be considered a toxicant by itself, we considered the effluent dilution in the receiving water of greater than 100,000:1 sufficient to reduce concentrations to background.

The acute toxicity of calcium chloride to marine aquatic species was also tested. For *Mysidopsis*, the 96-h LC50s were found to be 1,140 and 1,178 mg/L Ca^{2+} in two tests, values that are approximately one-fifth of the effluent site A concentration of 5,000 to 6,000 mg/L Ca^{2+}. For *Cyprinodon*, the 96-h LC50s were 2,766 and 5,640 mg/L Ca^{2+} in two tests using diluent water [8], and 5,300 mg/L Ca^{2+} in site A effluent. Based on a simple comparison between chemicals, we identified the apparent mysid toxicity to be a calcium effect; toxicity to sheepshead was attributed mainly to total organic halides, with some small portion resulting from calcium.

In a definitive follow-up study, laboratory fractionation (or matrix) experiments were conducted with site A untreated process stream and effluent to measure the toxicity of 28 combinations of calcium and total organic halide to *Mysidopsis* and *Cyprinodon* to demonstrate the roles of calcium and total organic halide in affecting toxicity. At 200 mg/L Ca^{2+}, mysid mortality ranged from 5% at 2 mg/L total organic halide to 60% at 10 mg/L

total organic halide. As calcium concentrations increased, the differential response to total organic halide was lessened or masked. At 1,200 mg/L Ca^{2+} there was 77% mortality at 2 mg/L total organic halide and 85% mortality at 10 mg/L total organic halide (Fig. 4).

A comparison of the responses of the *Mysidopsis* and *Cyprinodon* to combinations of Ca^{2+} and total organic halide reveals that both respond similarly to total organic halide. The 48-h EC50 for *M. bahia* is 13.7 mg/L total organic halide, and for *Cyprinodon* the 96-h LC50 is 9.7 mg/L total organic halide. The difference in response to the effluent is attributed to calcium toxicity. *Cyprinodon* is affected to a lesser degree than *Mysidopsis* (Fig. 5).

The calcium masked the effect of total organic halide as well as the effectiveness of the plant treatment in reducing process stream toxicity. In this instance, had detailed investigations not been conducted, incorrect conclusions would have been drawn concerning toxics in the effluent and the performance of the plant treatment system. The simple measurement of salinity by conductivity or total dissolved solids is not representative of the actual balance of cationic and anionic species in an effluent.

Recent studies by Price et al. [17] demonstrated that *Mysidopsis* has a very limited ability to regulate ion levels in response to calcium changes, whereas *Cyprinodon* has better capabilities. Salinity cannot be considered a broadly applicable term when measuring effluents. Complex effluents, by their nature, contain different balances of cationic and anionic species that are measured as total dissolved solids, conductivity and, sometimes, salinity. If salinity is to be a determinant of species selection, specific ionic composition and ratios consistent with standard seawater should be used in making decisions. In evaluating the potential for osmotic effects resulting from ions such as calcium and magnesium, it is recommended that specific ion analysis be conducted. Provided that "natural" ratios of anionic and cationic species are present, standard toxicity tests can be conducted. Salinity measurements in effluents using conductivity and refractometry should be avoided unless seawater is used as the process water source. Options such as ion exchange, ion precipitation or alternative test species should be considered and evaluated in specific cases.

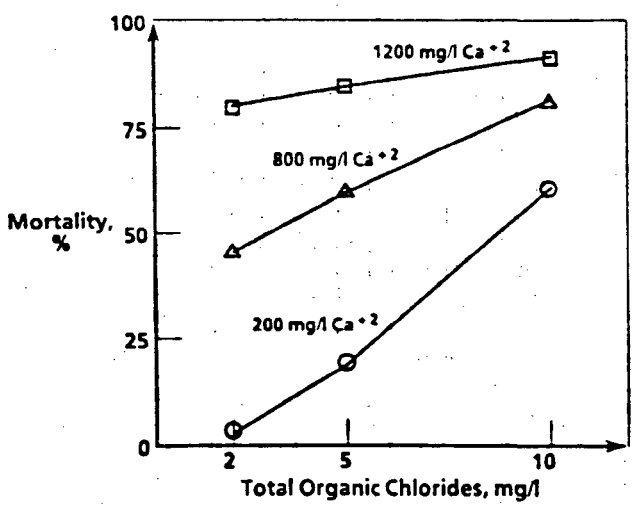

Fig. 4. Interaction of calcium and total organic halides in causing acute toxicity to *Mysidopsis*. Concentrations at and below acutely toxic concentrations of calcium and total organic halides from effluent fractionation are shown. At low calcium concentrations, the response of mysids to total organic halides is expressed; at high calcium concentrations, the effect of total organic halides is masked. Calcium interferes with the evaluation of the "true" source of effluent toxicity, since the effluent is discharged into fresh water at high dilution.

SUMMARY

Decisions regarding compliance with effluent toxicity criteria that may result in requirements for reducing toxicity and/or additional treatment facilities are, by necessity, made using data that contain variability. The examples presented suggest that there are approaches that may help reduce such variability. We believe that reference toxicant tests run concurrently with effluent toxicity tests can provide an additional control to aid in evaluating the health of the test animals, which may be the basis for decisions regarding compliance.

Test or organism variability should be acknowledged when statistical boundaries demarcate compliance versus noncompliance. The use of replicates can be a double-edged sword, however, and dischargers should be aware that low replication promotes higher variability and hence inability to detect differences, whereas higher replication decreases variability. A compromise between replication and variability would seem appropriate.

Test designs should be sufficiently flexible so that protocols could be modified for specific situations. The interferences observed in our study may have resulted in extraordinary treatment modifications or technology changes to reduce apparent "toxicity." Toxicity reduction evaluations may need to be carefully conducted until considerable experience is gained or the tolerance and physiological responses of test species are better known.

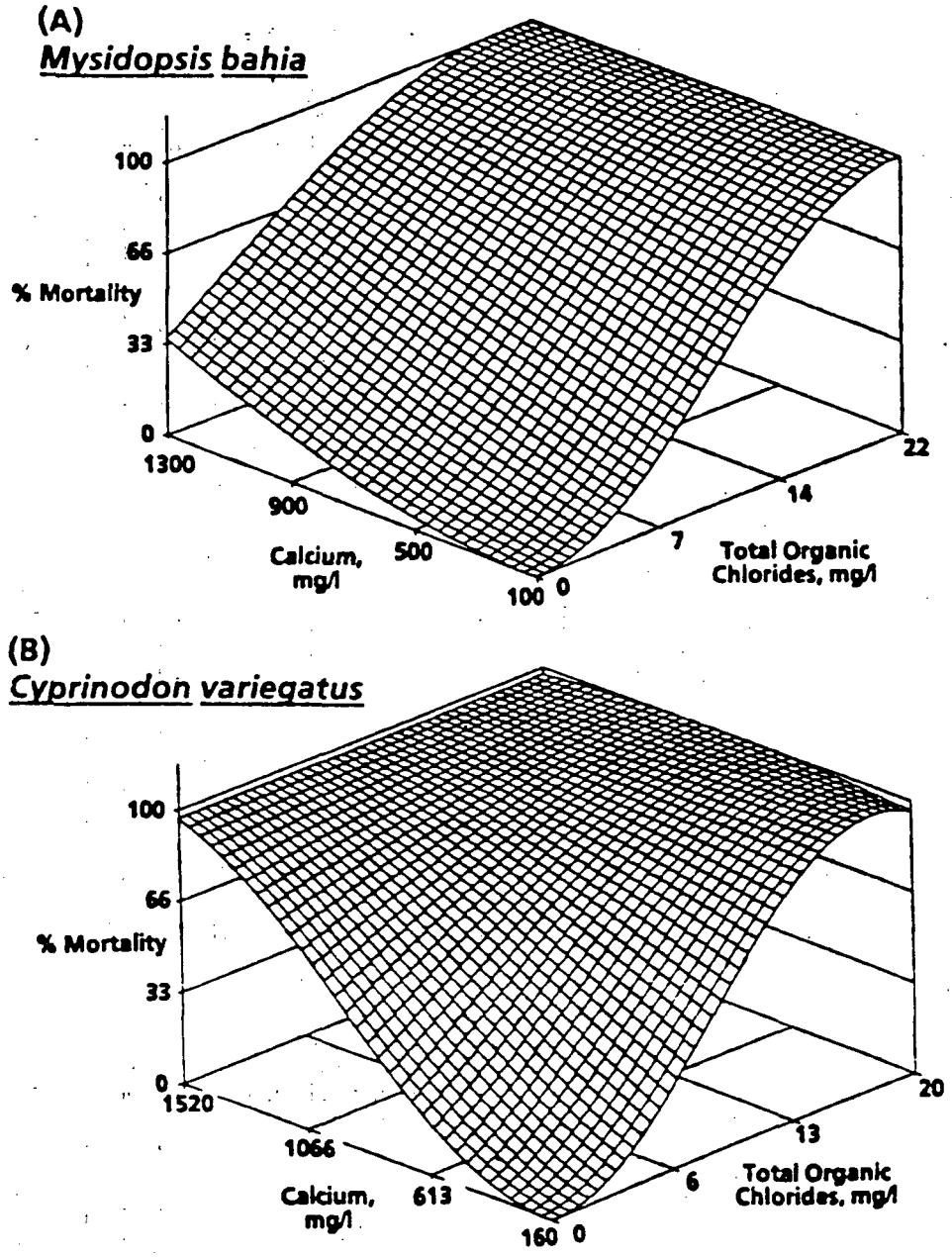

Fig. 5. Acute responses of mysids (A) and sheepshead minnows (B) to combinations of calcium and total organic halides. All toxicity data from fractionated effluents are plotted to show the response surfaces for mysids and sheepshead minnows. The responses of both species to total organic halides are similar at the lowest calcium concentrations. Mysid toxicity due to calcium is expressed at concentrations of one-third those in the effluent. The sheepshead minnow response to calcium is less than that of mysids.

Acknowledgement—We acknowledge Sharon Evans for Microtox experimentation, Alan Zimmermann for statistical assistance, Joe Raia and Cherie Price for chemical analysis and Sharon Mooney for manuscript preparation.

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ATTACHMENT 4

PROCEDURE FOR DETERIMINING CALCIUM CONTRIBUTION TO MYSID TOXICITY

1. Determine hardness, as calcium carbonate, of effluent sample and estimate calcium concentration.

2. Add the stoichiometric amount of sodium carbonate required to precipitate calcium, maintaining a soluble calcium concentration of 100 to 150 mg/L (i.e., hardness of 250 to 350 mg $CaCO_3$ /L).

3. Conduct bioassay test at dilutions stated in the permit (e.g., 97, 83, 71, 61, and 52%) using protocol required by permit.

4. On a split sample of effluent, run the same bioassay on unsoftened effluent.

5. Measure hardness in all dilutions, including 100% efffluent and the control.

6. Perform three (3) replicate tests at two week intervals following this protocol.

SCHEDULE L

EFFLUENT TREATMENT

1. SERVICE: Treatment and disposal of effluents in the following streams associated with the VCM plant (1) steam stripper bottoms, (2) limestone neutralizer effluent, (3) CWT 3 blowdown, (4) non-metered streams, (5) storm water treatment, (6) CWT 12 blowdown if not routed to the limestone neutralizer, in a manner which involves, but is not limited to, pretreatment (neutralization), primary effluent treatment, secondary effluent treatment, environmental landfill (primary solids) and biosolids disposals.
2. Estimated Requirements:

Steam stripper average	150 gpm not to exceed 350 gpm (0.50MM gpd) metered.
Limestone neutralizer	100 gpm not to exceed 255 gpm (0.38MM gpd) metered.
CWT-3 blowdown	100 gpm up to 200 gpm metered x 0.70.
Other incidental	10 gpm predetermined.
Storm water	54 gpm predetermined.

3. Delivery Points: As set out in Schedule L-1.
4. Meter Locations and Upkeep: As set out in Schedule GG.
5. Acidity Specifications:
   Steam stripper not less than pH 0.5, nor more than pH 7.0, emergency operation above pH 7 requires immediate notification to Shell. Limestone neutralizer not less than pH 1.0, nor more than pH 7.0.
6. Suspended Solids Specification: Limestone neutralizer average 3,500 lbs/day not to exceed 7,000 lbs/day.
7. Organics in Steam Stripper Effluent Expected:

(Total organic Carbon)	TOC maximum 2,000 ppm or 4000 lbs./day
	TOC averate 1,200 ppm

8. Chlorinated Hydrocarbons Specifications: Discharge limits for 1.2 dichloroethane in the total effluent which includes all effluent streams e.g. the VCM steam stripper bottoms, the Rock box effluent, drains from tank farm area, spills, etc. shall be a daily maximum of 20 lbs./day and the discharge limits for chloroform shall be a daily maximum of 10 lbs./day. Shell reserves the right to impose a mutually agreed to discharge limit for methylene chloride if required.

9. Other Provisions:

Compliance:

(a) OEC shall comply with all necessary permits and regulations relating to the levels of chlorinated hydrocarbons present in the total effluent.

(b) If for any reason OEC exceeds, by Shell's analysis (d), the discharge limits for 1.2 dichloroethane of chloroform and this results in exceedances of Shell's NPDE's permit limits then Occidental will be accountable for the exceedance together with any extra ordinary costs incurred by Shell. If the defined limits for suspended solids or pH are exceeded then Shell and OEC shall evaluate the impact of such situation and if it results in extra ordinary costs for Shell, OEC shall be accountable for such costs.

(c) Title to the effluent streams shall pass from OEC to Shell at the delivery point set out in paragraph 3 above.

(d) Shell's analysis is based on Shell's "p-1309" analysis which is a grab sample analyzed 6 times/day or the "Distribution Box" analysis which is a 24 hour composite analysis once/day or daily analysis of the VCM effluents.

10. Notice of Termination by OEC 3 months.

April 22, 1992

MEMORANDUM

SUBJECT: Shell TRRP -- Photograph Log

FROM : Jana Harvill
Environmental Engineer (6E-SC)

TO : Walter Helmick
Hydrogeologist (6E-SH)

Attached are the photographs taken during the Shell TRRP multi-media inspection the week of 12/9/91.

If you have any questions, please contact me at 5-6486

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 1 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: STORM WATER POND IMPOUNDMENT
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 1:03 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 2 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: COOLING TOWER POND (NO CR)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 1:25 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 3 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: COOLING TOWER POND (NO CR)NEXT TO STORM POND
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 1:27 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 4 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: COOLING TOWER RUNOOF INTO DITCH
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 1:30 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 5 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: STORM POND (NOTE DISCOLORATION)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 1:32 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 6 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: STORM POND (NOTE DISCOLORATION)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 1:34 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 7 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: DISCHARGE PIPE FROM STORM POND
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 1:37 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 8 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: OUTFALL R004(RUNOFF FROM CAPPED PONDS)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:00 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 9 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: OUTFALL R009
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:10 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 10 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: OUTFALL R006
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:16 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 11 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: OUTFALL R006(NOTE LEAKAGE AT WEIR)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:18 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 1 Photographer: JANA HARVILL
Location: SHELL DEER PARK (2ND ROLE OF FILM)
Subject: OUTFALL R008 (CAN GO TO STORM POND)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:26 PM Weather: PARTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 2 Photographer: JANA HARVILL
Location: SHELL DEER PARK (2ND ROLE OF FILM)
Subject: NORTH POND (REFINERY)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:32 PM Weather: PARTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 3 Photographer: JANA HARVILL
Location: SHELL DEER PARK (2ND ROLE OF FILM)
Subject: NORTH POND (REFINERY)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:33 PM Weather: PARTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 4 Photographer: JANA HARVILL
Location: SHELL DEER PARK (2ND ROLE OF FILM)
Subject: OUTFALL R003 (INNER POND)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:42 PM Weather: PARTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 5 Photographer: JANA HARVILL
Location: SHELL DEER PARK (2ND ROLE OF FILM)
Subject: OUTFALL R003 (OUTER POND)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:44 PM Weather: PARTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 6 Photographer: JANA HARVILL
Location: SHELL DEER PARK (2ND ROLE OF FILM)
Subject: OUTFALL R002 (INNER POND)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:54 PM Weather: PARTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 7 Photographer: JANA HARVILL
Location: SHELL DEER PARK (2ND ROLE OF FILM)
Subject: OUTFALL R002 (OUTER POND)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:56 PM Weather: PARTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 8 Photographer: JANA HARVILL
Location: SHELL DEER PARK (2ND ROLE OF FILM)
Subject: OUTFALL R001
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 4:12 PM Weather: PARTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

A. R.

Shell Deer Park Oil Co.
TX 4871

Photo Number: 1 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: STORMWATER POND (R008)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 1:05 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Official Photograph Log

Photo Number: 2 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: COOLING TOWER POND (NO CR)
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 1:25 PM Weather: MOSTLY CLOUDY

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Subject: STORM POND (NOTE DISCOLORATION)
City/County: DEER PARK/HARRIS State: TX
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Date: 12/12/91 Time: 3:00 PM Weather: MOSTLY CLOUDY

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Photo Number: 9 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: OUTFALL R009
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:10 PM Weather: MOSTLY CLOUDY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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Photo Number: 10 Photographer: JANA HARVILL
Location: SHELL DEER PARK
Subject: OUTFALL R006
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 3:16 PM Weather: MOSTLY CLOUDY

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Photo Number: 8 Photographer: JANA HARVILL
Location: SHELL DEER PARK (2ND ROLE OF FILM)
Subject: OUTFALL R001
City/County: DEER PARK/HARRIS State: TX
Date: 12/12/91 Time: 4:12 PM Weather: PARTLY CLOUDY

30 sets spiral bound
200

TX0004871

1 - Permit/CD
2 - AO & AO matl
3 - DMR's
4 - Vio. Sum. Log
5 - NCR
AD 6 - Correspondence
7 - CRAS
Date Filed
Clerk's Inits.

RECEIVED
AUG 7 1991
6W-EA

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90 SEP 25 PM 3:57

Ramon Lopez
Vice President
Manufacturing & Technical

Shell Oil Company

One Shell Plaza
P. O. Box 2463
Houston, Texas 77252

Tx 4871

September 21, 1990

RECEIVED
AUG 7 1991
6W-EA

Mr. Robert E. Layton Jr., P.E.
Regional Administrator
United States Environmental Protection Agency Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Dear Mr. Layton:

Enclosed is Shell's response to your Regional Pilot Project on Toxics Release Reductions. Our response is consistent with our corporate policy of continuously improving our environmental performance and in doing so, to be recognized as a leader by the public, industry and applicable governmental authorities.

Shell appreciates the opportunity to work with the EPA and the Texas agencies in a cooperative effort. Shell is already publicly committed to a 30-40% reduction in SARA 313 air emissions from the Deer Park Manufacturing Complex (DPMC) over the next five years. However, as a result of EPA's Toxics Reduction Request, we have modified those plans and now estimate that reductions in DPMC's toxic air emissions will be in the range of 40-50%. Significant reductions will be achieved during the next two years through improved leak detection and repair programs. The estimated expenditures to achieve these planned reductions are likely to exceed $50 million in the next five years. In addition Shell estimates expenditures of over $300 million on environmental activities in our base operations and for compliance with environmental regulations.

Shell is actively participating in the development of the CMA Responsible Care Program and fully supports the CMA Codes of Management Practices. In our programs developed to reduce air emissions, the application of these practices was extended to the Deer Park refinery processes and lubricants plant in addition to chemical process units.

We have addressed in our reduction plan the specific commitments requested in your letter of July 20, 1990. If you have any questions regarding the information in this package, please contact Mr. Jack Sowle, Manager Environmental Compliance, Deer Park Manufacturing Complex, at 713-246-7667.

Sincerely,

Ramon Lopez

cc - Allen P. Beinke, Jr., Texas Water Commission
Robert Bernstein, Texas Department of Health
Steve Spaw, P.E., Texas Air Control Board
R. M. Kingsbury, General Manager -
Deer Park Manufacturing Complex, Shell Oil Company

SHELL DEER PARK MANUFACTURING COMPLEX

RESPONSE TO

USEPA REGION 6 TOXIC RELEASE REDUCTION REQUEST

INTRODUCTION

Shell recognizes that both public and private concerns about "toxics in the environment" must be addressed, and welcomes the opportunity to participate in USEPA's Pollution Prevention Program. We consider this fundamental to the intent of our Corporate Policy On Environmental Performance:

SHELL OIL COMPANY IS COMMITTED TO THE PROTECTION OF THE ENVIRONMENT WHEREVER WE CONDUCT OUR BUSINESS ACTIVITIES. OUR OBJECTIVE IS TO CONTINUOUSLY IMPROVE OUR ENVIRONMENTAL PERFORMANCE AND IN DOING SO, BE RECOGNIZED AS A LEADER BY THE PUBLIC, INDUSTRY, AND APPLICABLE GOVERNMENTAL AUTHORITIES. WE WILL COMPLY WITH THE SPIRIT AS WELL AS THE LETTER OF ALL ENVIRONMENTAL LAWS AND REGULATIONS, AND WILL MANAGE ENVIRONMENTAL PERFORMANCE IN THE SAME MANNER AS FINANCIAL, HEALTH AND SAFETY PERFORMANCE.

Shell has met this commitment in the past with substantial investments for environmental protection. For example, in the past five years over $100 million has been spent in our manufacturing sites on withdrawing from underground disposal of hazardous wastes. This investment has reduced our releases of hazardous materials into the environment by over 90 percent. Shell has also taken a leadership position in certain critical technological areas, for example in air dispersion modeling.

DEER PARK MANUFACTURING COMPLEX

Deer Park is one of Shell's largest and most complex manufacturing facilities and is committed to environmental excellence. A staff of about 65 dedicated people directly support environmental activities. Annual capital expenditures for environmental projects have averaged over $20 million in recent years. Operating practices have been tuned to reflect our corporate environmental policy as well as for compliance with a multitude of permits and regulations. For example, every process unit in the complex is already doing a leak detection and repair program on valves and pumps.

As a result of the insight gained in determining SARA emissions, several opportunities were identified and projects are being developed to reduce emissions. Plans for reducing total SARA air emissions were modified in response to the EPA Region 6 Toxic Reduction Request. It is now estimated that annual reductions of 2.2-2.5 million pounds can be achieved by 1995. Expenditures of over $50 million will be required to achieve these reductions. For example, in addition to the commitments made in response to the EPA's specific requests, we plan to develop a project in the Deer Park lubricants plant to reduce emissions of toluene and methyl ethyl ketone by over 800,000 pounds. Although the scope of this project is not well defined, we estimate that it may cost up to $10 million and be completed in phases between 1992 and 1995. Other defined projects will reduce air emissions by about 200,000 pounds.

A description of Shell's program developed to be responsive to the commitments requested by EPA follows:

Item 1. A plan describing the action Shell is taking or will take to reduce air emissions of 1,3-butadiene, benzene, epichlorohydrin from its operations.

Shell commits to implement over the next five years the CMA initiative for leak detection and repair, application of Best Control Technology for pump seals and storage tanks, and the use of vapor recovery during loading operations. A detailed description of the plan for butadiene is given in Attachment 1 as an example. This was received favorably by the EPA at Research Triangle Park. We estimate the actions planned could achieve reductions up to 80% from the 1989 SARA 313 levels for butadiene. Similar plans will also be implemented for benzene and epichlorohydrin. The annual reduction of air emissions for the three chemicals is estimated to be up to 500,000 pounds at a cost of $10-15 million.

Although not requested as part of the Region 6 Toxics Reduction Plan, Shell also plans to eliminate air emissions of chromium over the next three years by retrofitting equipment to enable chemical substitution in cooling water treatment. The anticipated cost is $600M for an air emissions reduction of 60,000 pounds.

Item 2. A commitment to implement the program described in the Chemical Manufacturers Association (CMA) letter dated February 9, 1990, for all equipment leak components except for existing compressors. Shell is requested to submit a facility-specific control plan for any existing compressors.

In Item 1, Shell agreed to implement the CMA letter for leak detection and repair (LDAR) on process units that have significant emissions of butadiene, benzene, and epichlorohydrin. The major difference between this program and Shell's current program is the threshold value for determining a leaking component. Deer Park currently uses 10,000 ppm, but Shell will use the level established in the current regulatory negotiation process which EPA is leading.

In addition, Deer Park will expand the use of enhanced LDAR techniques to a number of refinery units not in the scope of the CMA program which, as you know, only applies to materials identified in EPA's ATERIS Program. Although minor changes may be made to the LDAR program to adapt it to our practices, reductions from these programs are estimated to be 700,000 to 900,000 pounds/year of SARA emissions. Implementation will begin in 1991 and should be completed in 3 to 5 years at a cost that could reach $15 million.

As shown in Attachment 2, all of Deer Park's compressors handling streams containing five percent or greater of the targeted compounds meet the NSPS for compressors. Although there are two reciprocating compressors that are not required to meet NSPS, their emissions are minor and they do not handle targeted compounds at greater than five percent concentrations. We do not propose to retrofit these compressors at the present time.

Item 3. A plan to take immediate steps to achieve at least 90 percent control of process vent emissions of air toxics plant-wide.

Shell's Deer Park complex currently achieves over 99 percent control of plant-wide process vent emissions of air toxics. Attachment 3 lists the process vents of air toxics for DPMC with corresponding emissions control devices and efficiencies. We do not propose additional process vent controls at this time.

Item 4. A plan to commence installation of Best Control Technology on all tanks storing chemicals having air toxics potential. Such technology would be similar to the recently promulgated requirements for benzene storage facilities.

For your information, Attachments 4 and 5 list all fixed and floating roof tanks for the Shell Deer Park Complex with corresponding yearly emissions of air SARA toxics from each tank. Shell plans to upgrade to BACT the fixed roof tanks which have uncontrolled air emissions of carcinogenic chemicals. These tanks are identified in Attachment 4. The upgrades will occur within the next 3-5 years at a cost of approximately $1 million and will result in a projected air toxics emissions reduction of approximately 30,000 pounds.

In addition, Shell plans to convert seals on all existing floating roof tanks to Best Available Control Technology (where BACT is not already in place), except in those cases where Best Control Technology is technically impractical for a particular tank or service. Each existing floating roof tank will be converted when it comes out of service for routine maintenance. Anticipated air toxics emissions reductions from upgrading these tanks to Best Available Control Technology is approximately 40,000 pounds.

Item 5. An evaluation of current ground water contamination, any remediation in progress, an a plan to reduce and prevent further ground water contamination.

Shell initiated a program at DPMC over ten years ago to understand the subsurface environment. An extensive site assessment was completed in 1981 and updated in 1984. In addition, major hydrogeologic investigations, completed in our four waste management areas, have further delineated the stratigraphy of the site. There are three transmissive zones within about 100 feet of land surface. Each of these are separated by thick layers of clay which impede vertical migration of shallow groundwater.

We have installed approximately 370 wells in these zones for evaluating any impacts resulting from our operations. These wells are strategically located within tank farms, areas where lines are underground and around waste management areas. Sampling of these wells gives early indication of leaks and allows timely response.

Some product, raw and process materials have been identified in the shallow groundwater at concentrations considered sufficient to warrant control. Cones of depression prevent expansion of these contaminant plumes. These efforts have significantly reduced the amount of contaminants in the shallow groundwater. Recovery operations, underway for some time in five localized areas, have been discussed on a number of occasions with the Texas Water Commission (TWC) and Region VI EPA.

Groundwater has been sampled in accord with approved investigation plans for solid waste management areas. With few exceptions, Appendix IX constituents are not present or are at very low concentrations. Remedial actions are being implemented in two localized areas of our Southeast Waste Management Area and in our Northeast Waste Management Area. Evaluations of these areas show the constituents in the shallow groundwater present no significant threat to human health or the environment.

Facility design, operating and maintenance procedures, including our SPCC Plan, are directed toward spill prevention. Routine inspection of tank farms and operating areas provide early detection of spills and leaks. Should spills occur, they are promptly cleaned up.

Hazardous waste tanks are designed with either double bottoms with leak detection systems or with secondary containment which minimize the likelihood of undetected leaks.

The design of new units avoid underground lines to the extent practical. A program to replace existing underground piping will be funded at the rate of approximately $1-2 million annually extending into the foreseeable future.

These programs are effective in reducing and preventing further ground water contamination. We are not aware of any problems which are presenting a significant threat to human health or the environment.

Activities, including analyses of groundwater, are extensively documented and have been reported to EPA Region VI and the TWC. We are prepared to further review this information with agency personnel as may be requested. Attachment 6 provides a more detailed discussion of the DPMC groundwater programs.

Item 6. A protocol or program for environmental auditing at the Shell, Deer Park facility.

Environmental Auditing at DPMC is both a corporate and local management responsibility. A corporate Compliance Assurance Review is conducted at three year intervals while the DPMC Internal Audit Program is an ongoing effort.

Shell first initiated internal environmental auditing in the mid-1970's. Internal environmental auditing is an important management system at DPMC, one that has undergone continuous improvement over many years. It has become a thorough and reliable method to ensure compliance with Federal, State, local and Corporate requirements. This management system includes:

1. Tri-annual Corporate Compliance Assessment Reviews.

2. Annual department specific environmental audits. (There are 26 operating departments at DPMC).

3. Focused audits on procedures, equipment, or goals.

4. Follow up on Agency inspections, environmental incidents, and management concerns.

Each of these environmental audit programs is described in more detail as follows:

CORPORATE COMPLIANCE ASSESSMENT REVIEWS

These tri-annual reviews have two basic objectives: to provide corporate senior management with an assessment of how well each location (like DPMC) meets the various operating requirements imposed by federal, state, and local authorities, as well as internal Shell standards. These reviews also provide another method of discovering opportunities to reduce emissions above and beyond what is required by regulation.

Shell internal compliance reviews date back to the 1970's when there was significant generation of new environmental regulations. Shell management at the most senior level insisted that all the operations be in step with the time, and this led to compliance reviews at all locations.

These audits have changed with the times. In those early days, review teams focused on federal regulations because they almost always superseded state and local requirements. Now many state regulations go beyond federal requirements and the audit teams have expanded their scope of review to include them. In some cases Shell environmental policy goes beyond agency regulations and these requirements are reviewed as well.

These corporate audits of DPMC are conducted by seven or eight Shell environmental professionals. The Corporate audits take two weeks, beginning with a meeting with all managers. The auditors tour the manufacturing units checking operating procedures, practices, equipment, general facility conditions, employees' environmental attitude and knowledge and management systems. The areas examined during these internal audits are shown on Attachment 7.

If problems or concerns are found they are discussed with DPMC management, and frequently suggestions are made for corrective action. The findings are also communicated to corporate management. DPMC is obligated to resolve all the issues, and quarterly progress reports are required until all these issues are resolved.

A more detailed description of the Corporate Compliance Reviews may be found in Attachment 8.

DPMC DEPARTMENT SPECIFIC AUDITS

A new program was introduced during 1989 at DPMC called "Environmental Awareness and Training". Each of the 26 operating departments, one at a time, are developing individualized packages that include department specific environmental requirements, and an audit checklist (see Attachment 9 for an example). To date nine of the departments have already developed Awareness and Training documents with the assistance of environmental staff professionals. All 26 departments should be completed in 1992.

During 1989, the departments with the newly created documents, which include checklists, were subjected to a one or two day environmental audit. Those department without a completed Awareness and Training package participated in a half-day "walk through" audits conducted by environmental compliance and operating management personnel. Audit results are shared with that Department's management as well as senior management, along with plans to correct any deficiencies found. All departments will be audited in a similar fashion each year.

DPMC FOCUSED INTERNAL AUDITS

In addition to regularly scheduled general environmental audits (Compliance Assessment Review and department specific audits), internal audits are also performed in specific areas of interest/concern. An example of such a program was the tank farm drainage environmental audit completed in late 1989.

Shell Head Office Environmental Coservation requested that this internal audit be done at all manufacturing locations, including DPMC. The effort was substantial. Audits were conducted to confirm that practices were in conformance with the "Requirements for Management of Tank Farm Drainage" (see Attachment 10).

DPMC FOLLOW UP TO AGENCY INSPECTIONS

DPMC is frequently audited by agencies including the EPA, Texas Water Commission (TWC) and the Texas Air Control Board (TACB). When deficiencies are found, DPMC management takes appropriate corrective action to resolve the concerns. As a follow-up to Agency audits and/or inspections, internal audits are done to better understand the scope of the problem and to aid in developing an action plan.

An example of this type of internal audit is one that is currently under way. An Environmental Supervisor (from operations) is on a full-time special assignment working in Environmental Compliance to audit the Fugitive Emission Programs in five operating departments. These departments were cited by the TACB following their May, 1990, annual two-week inspection as having record keeping deficiencies.

LIST OF ATTACHMENTS

Attachment 1: Reduction Plan for 1,3 Butadiene

Attachment 2: Compressor Listing

Attachment 3: Process Vent Emissions

Attachment 4: Fixed Roof Tank Emissions

Attachment 5: Floating Roof Tank Emissions

Attachment 6: Ground Water Programs

Attachment 7: Areas Examined During Compliance Assessment Review

Attachment 8: Shell Corporate Compliance Reviews

Attachment 9: Example of DPMC Internal Audit Program

Attachment 10: Tank Farm Drainage Audit

ATTACHMENT 1

SITE-SPECIFIC EVALUATION OF 1,3-BUTADIENE EMISSIONS FROM THE SHELL DEER PARK MANUFACTURING FACILITY DEER PARK, TEXAS

SEPTEMBER 1990

REPORT ORGANIZATION

Section 1.0 Summary

Section 2.0 EPA Risk Screening Analysis Procedure

Section 3.0 Geographical Features Surrounding DPMC

Section 4.0 Sources of BD Emissions

Section 5.0 Emission Reduction Plans

Section 6.0 Toxicology Summary and Risk Estimates

Section 7.0 Air Dispersion Modeling and Risk Estimates

Section 8.0 Air Monitoring Results

Section 9.0 ATERIS 1,3-Butadiene Maximum Individual Risk Estimate Revisited

1.0 SUMMARY

In order to prioritize emission source categories on a national basis for further investigation, the U.S. Environmental Protection Agency (EPA) utilizes a simple screening procedure using the Human Exposure Model (HEM) for estimating maximum individual risk levels and ranking of facilities. While EPA has clearly stated that this procedure produces rough estimates to be used only for ranking purposes, the risk estimates are available in the public domain and have been recently used to draw attention to the Shell Deer Park Manufacturing Complex (DPMC). The most recent EPA maximum individual risk estimate for community exposure to DPMC's 1,3-butadiene (BD) emissions is a greater than 1 in 100 but less than 1 in 10 cancer risk. This estimate has the potential for causing unwarranted concern in the Deer Park community.

To address this concern, DPMC has conducted a thorough site-specific evaluation of emission sources and potential community risk. This has included complete reviews of DPMC for all potential sources of BD emissions, emission estimating assumptions, and projected emissions reductions to be achieved from both changes in work practices (e.g., fugitive emissions monitoring) and completion of new capital projects (e.g., changes in pump seals). Modeling of emission sources using the Industrial Source Complex Long Term (ISCLT) model was then conducted for both the 1989 and reduced emissions estimates.

While the current EPA maximum individual risk estimate is reported to be greater than 1 in 100 based upon simplified modeling of estimated 1988 BD

emissions, more realistic air dispersion modeling (i.e., ISCLT) of emission sources shows a risk estimate closer to 1 in 3100 for a 70 year exposure. Emission reductions are targeted at 60 to 80%, but were conservatively modeled at an approximate 55% reduction. The modeled emissions reduction case shows an associated risk estimate of 1 in 7,000. For a more reasonable 30 year exposure scenario, the risk estimate is 1 in 7,200 basis estimated 1989 emissions, and 1 in 16,000 for the reduced emissions case.

Shell believes these risk levels remain conservative due to such factors as inhalation exposure assumptions and the current means of estimating fugitive emissions. The purpose of this report is to review some of the assumptions used in establishing the risk estimate currently published in the ATERIS database and establish a more reasonable (e.g., 1 in 16,000) risk estimate for DPMC BD emissions.

2.0 EPA RISK SCREENING ANALYSIS PROCEDURE

The EPA risk screening analysis procedure must necessarily utilize simple assumptions to rank the large number of existing emission sources for further review. This procedure first involves the gathering of up-to-date emission information which is then utilized in EPA's Human Exposure Model (HEM) to generate exposure and risk numbers. The simplifying modeling assumptions locate all emission sources at a single central point and assumes that there is a 200 meter fenceline from these emission sources. Further, EPA assumes that an individual will live at this 200 meter fenceline and be exposed continuously to the maximum modeled fenceline concentration for a 70 year period. Thus the maximum modeled fenceline concentration is multiplied by the inhalation unit risk factor for a 70 year continuous exposure to derive a maximum individual cancer risk value.

The inhalation unit risk factor for BD is currently 2.8×10^{-4} ug/m3 basis data derived from animal toxicology studies. The emissions estimate used by EPA was 75,800 lb/yr basis information supplied by Shell in both SARA 313 emissions estimates for 1988 and in response to an EPA Section 114 inquiry. It is presumed that EPA modeled a maximum concentration of at least 36 ug/m3 which results in a cancer risk estimate of at least 1 in 100.

EPA's risk estimate was stored in the Air Toxics Exposure and Risk *Information System (ATERIS) database* which is publicly available. It was also used in press releases by U.S. Representative Henry A. Waxman. As

these risk estimates do not take into consideration actual sources of emissions relative to community boundaries or the planned BD emission reductions to be achieved by DPMC, there is the potential for unwarranted concern by the community of Deer Park regarding exposure to BD.

3.0 GEOGRAPHICAL FEATURES SURROUNDING DPMC

In order to help evaluate the potential impact of BD emissions on the Deer Park community, it is important to know the key geographical features of the area surrounding DPMC - these features are shown in Figure 1[1]. To the north of DPMC is the Houston Ship Channel and a predominately industrial area. Both the east and west areas from DPMC are also industrial in nature. Immediately south of DPMC is Highway 225 and a strip of land owned by Shell as a pipeline corridor prior to the northern boundary of the city of Deer Park. To the southwest is the eastern edge of the community of Pasadena; an industrial park area is located between Pasadena and Deer Park. Thus the nearest potential residential exposure is some 500 feet from the south DPMC fenceline.

As noted by Figure 1, community exposure to emission sources at DPMC is very unlikely unless the wind is from the NW to the NE sectors. Figure 2 shows a wind rose from the Houston Hobby Airport for the years 1974 through 1978. As can be readily seen, the wind direction is from these northerly directions approximately 35% of the time, thus minimizing potential community exposure to BD on an annual basis.

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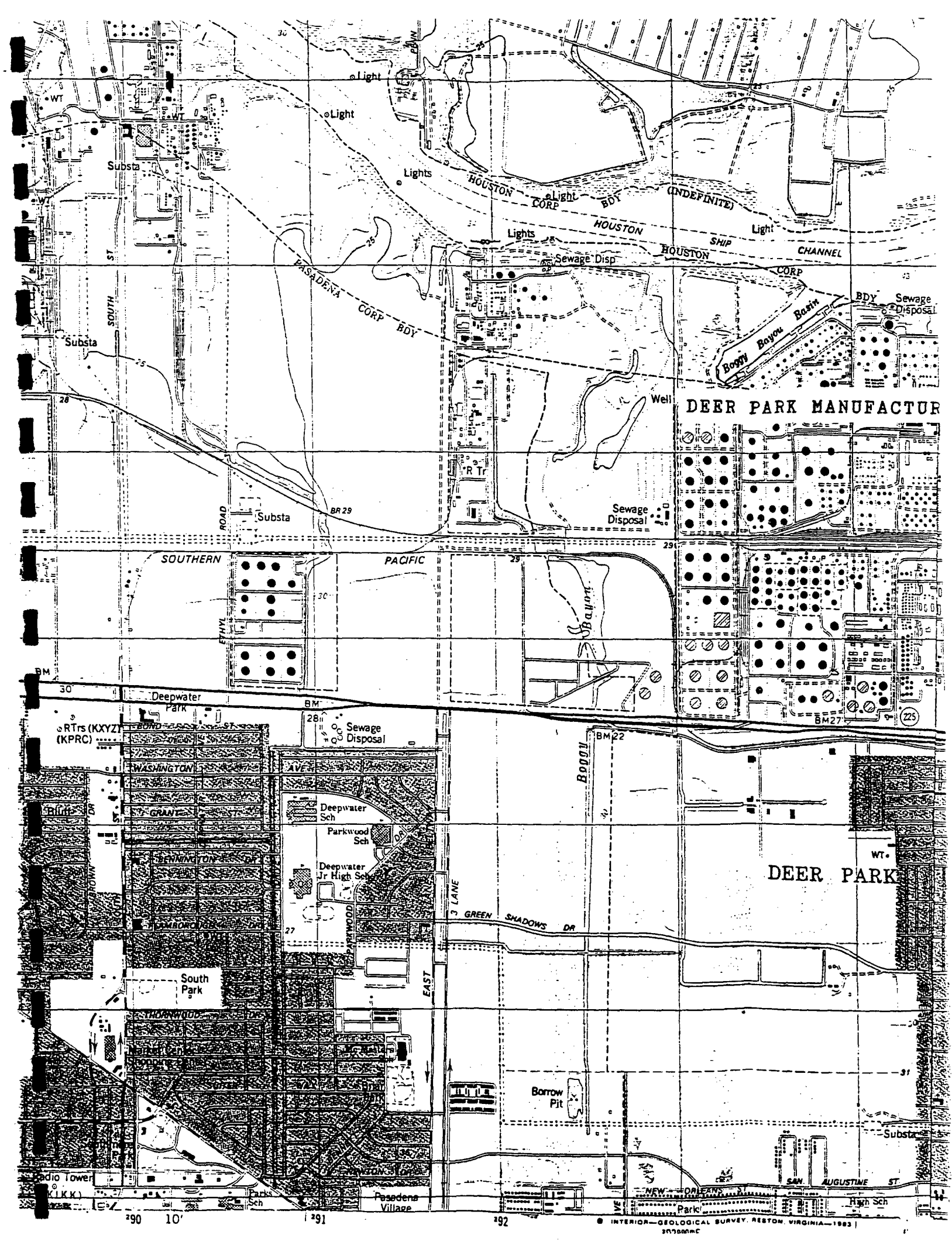
[1] Figure 1 is a composite from USGS maps for the Pasadena and La Porte quadrangles.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HOUSTON CORP
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BDY
Sewage Disposal
Boggy Bayou Basin
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Well
DEER PARK MANUFACTUR
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BR 29
Sewage Disposal
SOUTHERN PACIFIC
Bayou
Deepwater Park
Sewage Disposal
RTrs (KXYZ)
(KPRC)
BM22
WASHINGTON AVE
GRANT ST
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Parkwood Sch
Deepwater Jr High Sch
DEER PARK
GREEN SHADOWS DR
South Park
Borrow Pit
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Radio Tower
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Pasadena Village
NEW ORLEANS
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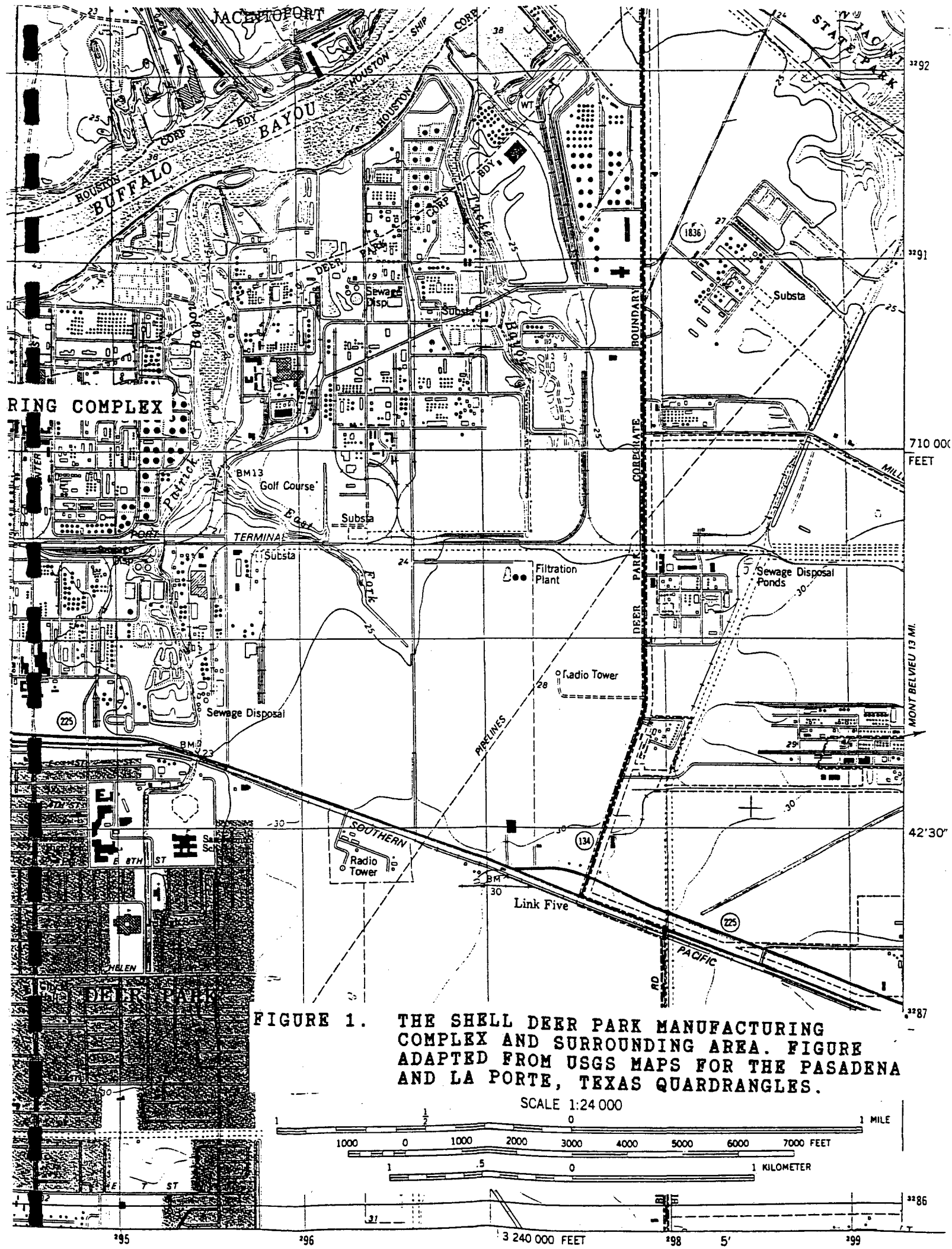

FIGURE 1. THE SHELL DEER PARK MANUFACTURING COMPLEX AND SURROUNDING AREA. FIGURE ADAPTED FROM USGS MAPS FOR THE PASADENA AND LA PORTE, TEXAS QUARDRANGLES.

SCALE 1:24 000

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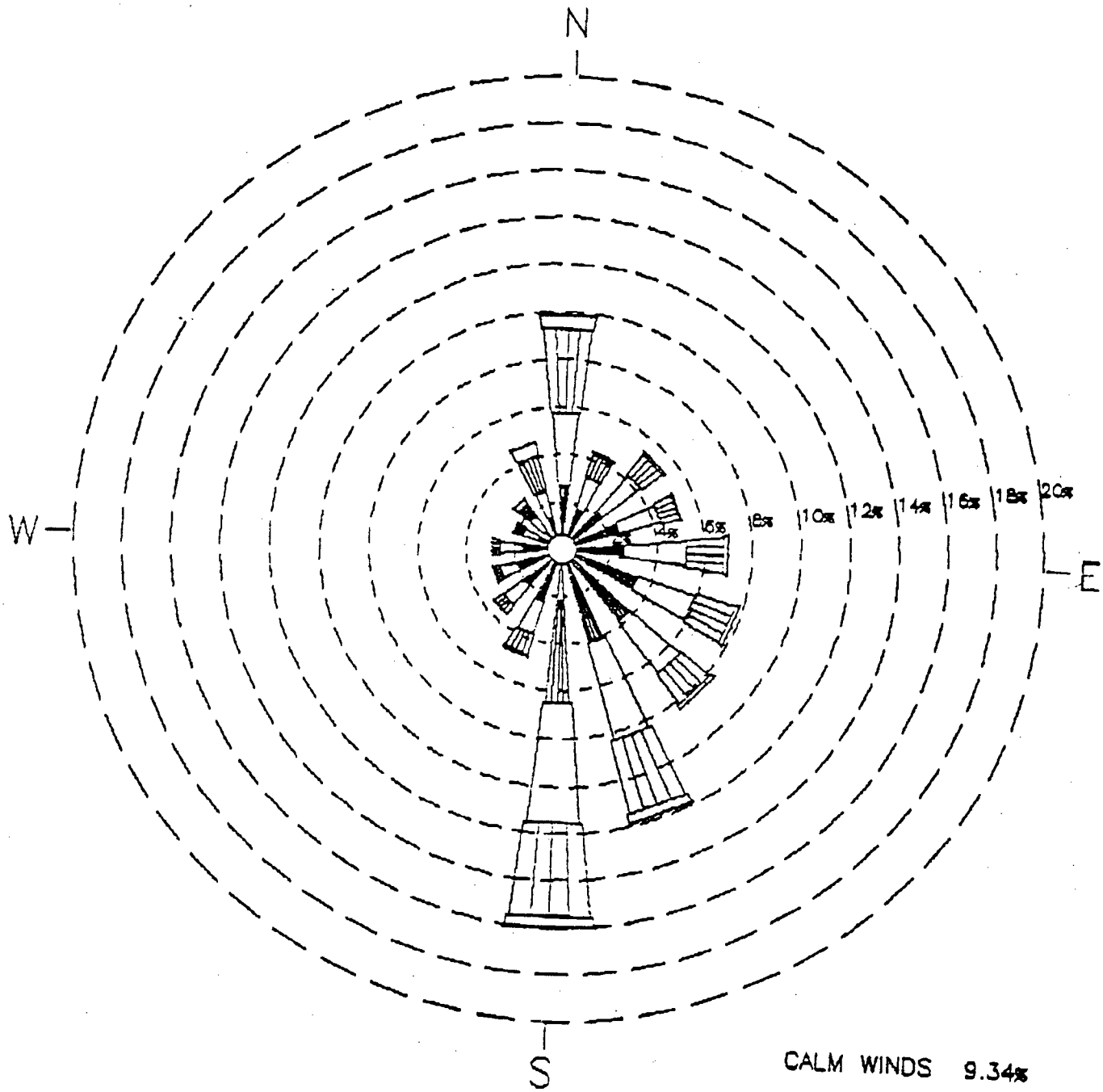
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

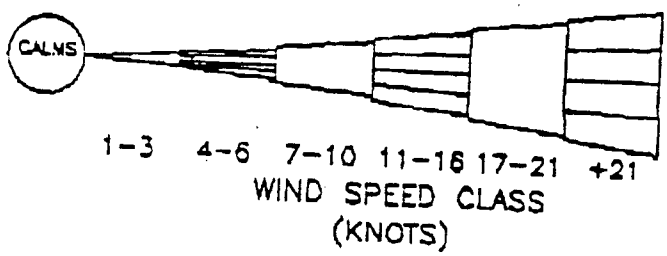
1 .5 0 1 KILOMETER

FIGURE 2. FREQUENCY OF WIND SPEED AND DIRECTION



CALM WINDS 9.34%

WINDROSE
HOUSTON, TX
1974 – 1978



4.0 Sources of BD Emissions

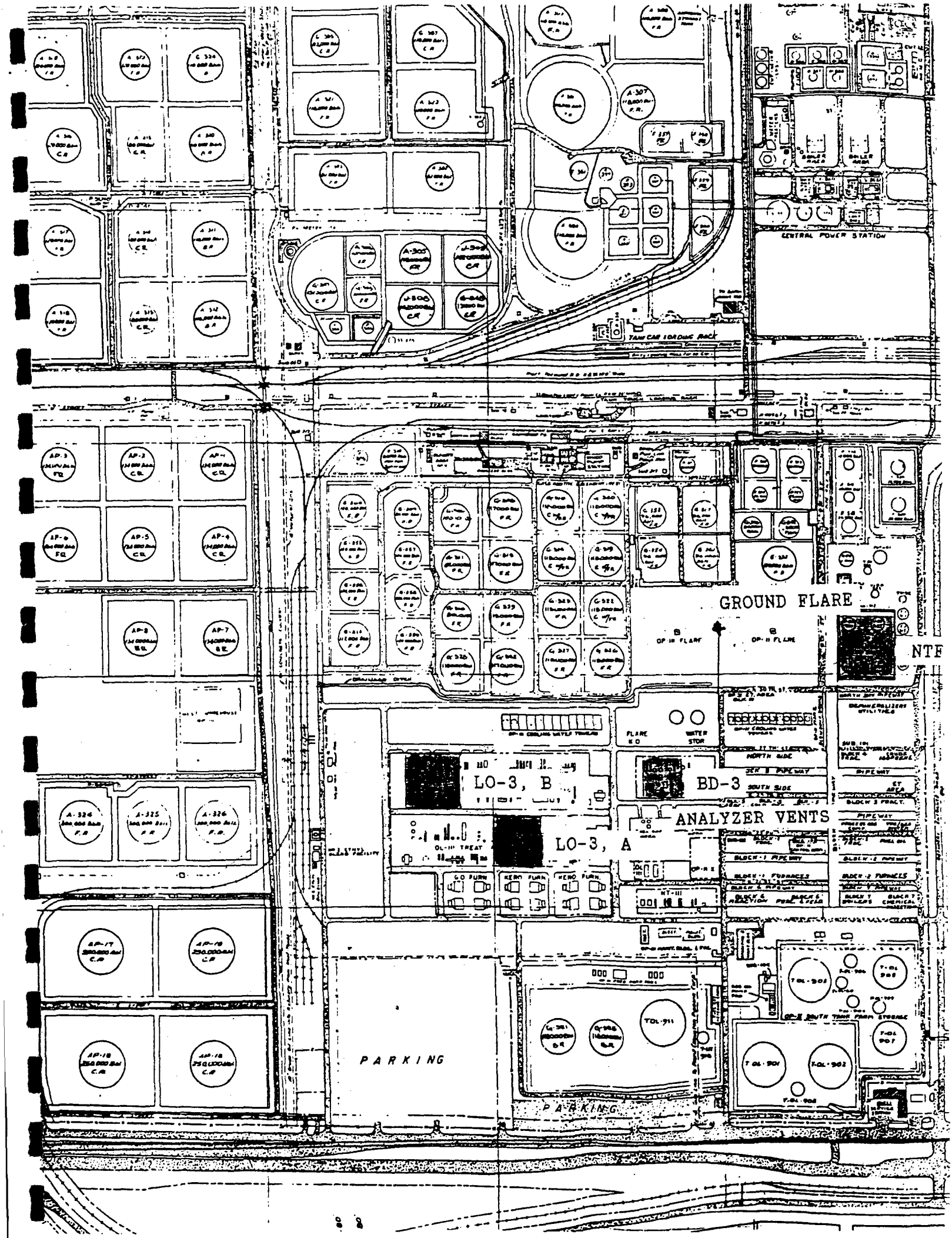
BD emissions at DPMC are predominately from fugitive sources associated with the Olefins Plant and finished product storage facilities. A thorough review of emission sources was conducted in early 1990 to ensure accuracy of emission estimates to identify potential means of reducing both worker and community exposure to BD. Fugitive sources were grouped into eight geographical areas, and two point sources were identified. The location of the emission sources are tabulated in Table 1, and shown in Figure 3 (Note: The "Docks" emission source is at the northern boundary along the Houston Ship Channel and is not shown in Figure 3). As shown in Table 1, the major fugitive emissions source is the BD finishing unit (BD-3) which is some 1500 feet from the south DPMC fenceline. Estimated emissions for 1989 are 104,000 lb/yr compared to 76,000 lb/yr originally reported for 1988. The reasons for this change are discussed below.

As noted, most BD emissions at DPMC are from fugitive sources. In 1988, DPMC participated in a Chemical Manufacturers Association/EPA BD Fugitive Emissions Study. This study surveyed all fugitive emission sources in greater than 5% BD service in the Light Olefins-III and BD-III process units of the Olefins Plant, and the BD finished product storage area at Site-III. Results from DPMC were combined with other participating plants to develop average leak factors for the different components, e.g., valves and flanges. These average factors were then used by DPMC to develop the 1988 BD emissions estimate for SARA 313 reporting. This estimate was revised upward for the 1989 emissions estimate for several

TABLE 1. ESTIMATED 1,3-BUTADIENE EMISSIONS FROM THE SHELL DEER PARK MANUFACTURING COMPLEX DURING 1989.

SOURCES	POUNDS/YEAR
FUGITIVES	
Light Olefins-III, A (LO-3, A)	4,200
Light Olefins-III, B (LO-3, B)	3,900
Butadiene-III (BD-3)	60,000
North Tank Farm (NTF)	6,600
Pyrolysis-III[a]	200
Hydrotreater-III[a]	200
Crude Isoprene[a]	200
Cooling Water Tower[a]	200
Site 3, A (Site 3, A)	5,300
Site 3, B (Site 3, B)	10,500
Docks	2,400
Cat Cracking Unit	1,300
POINT SOURCES	
Analyzer Vents	5,000
Olefins Ground Flare	4,000
TOTAL	104,000

[a] For modeling purposes these minor sources were combined with the nearest major fugitive source.


CENTRAL POWER STATION
TANK CAR LOADING RACK
GROUND FLARE
OP-II FLARE
OP-II FLARE
FLARE K.O.
WATER STOR
LO-3, B
BD-3
ANALYZER VENTS
LO-3, A
OL-III TREAT
GO FURN
KERO FURN
KERO FURN
NORTH SIDE
SOUTH SIDE
PIPEWAY
BLOCK I PIPEWAY
BLOCK II FURNACES
BLOCK III FURNACES
BLOCK V BOILERS
BLOCK VI CHEMICAL
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BLOCK VI PROC. & FEED
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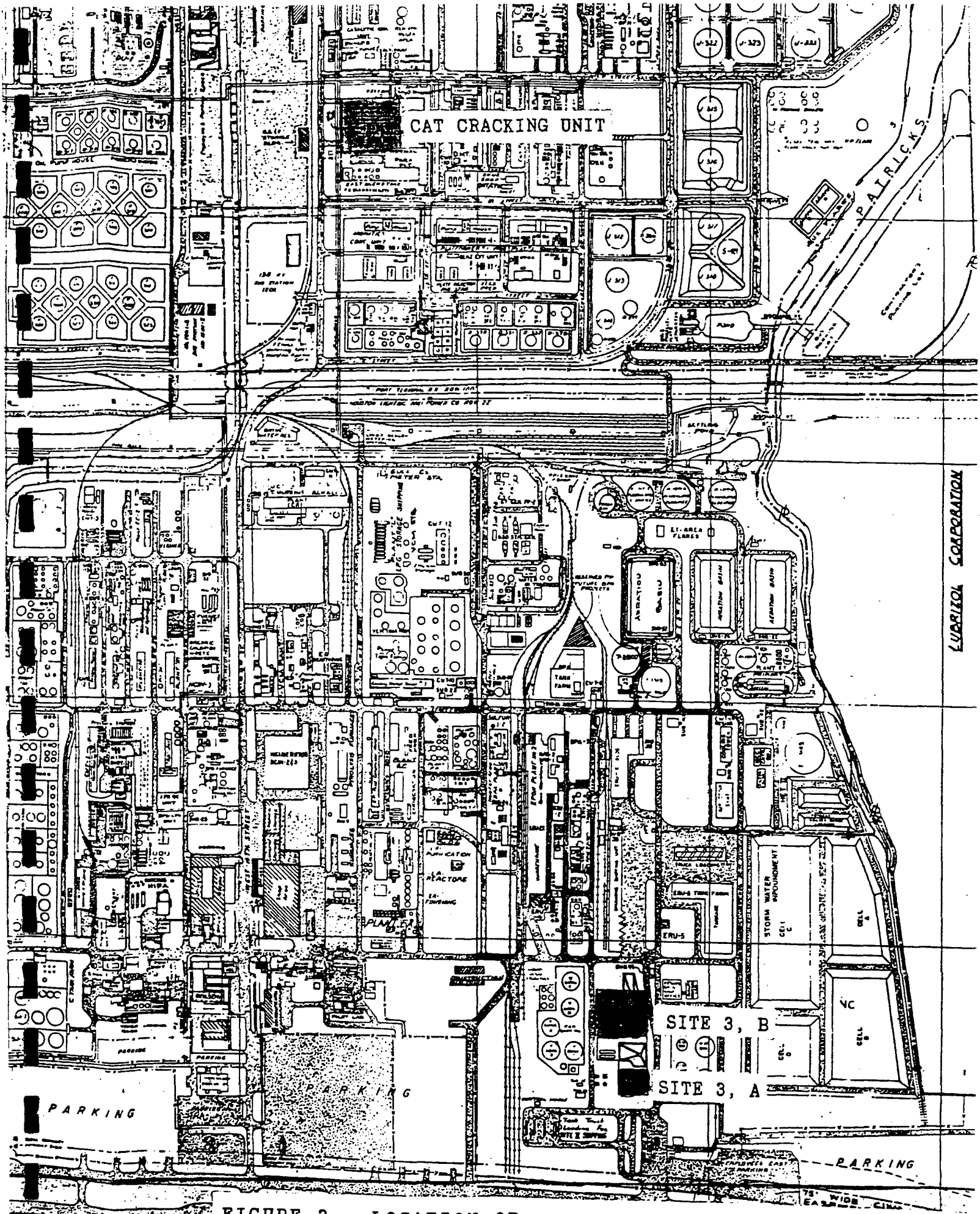

FIGURE 3. LOCATION OF 1,3-BUTADIENE EMISSION SOURCES AT THE SHELL DEER PARK MANUFACTURING COMPLEX.

reasons. First, the 1988 estimate included a 96% stream factor which was raised to 100% to develop a maximum estimate. Second, a review of equipment in the LO-III and BD-III units identified some additional equipment to be included in the greater than 5% service, and an additional 5% emissions estimate was added in to account for those components in under 5% BD service that were not included in the CMA/EPA study. Finally, minor amounts of BD fugitive emissions were also identified from equipment at several other units in the Olefins Plant, and from other equipment at some sections in the Cat Cracking Unit and the Docks facilities. Emissions from these latter sources were estimated using SOCMI leak/no leak factors and results of routine leak monitoring conducted under Texas Air Control Board (TACB) fugitive emission programs.

Point sources include analyzer vents and the ground flare in the Olefins Plant. For modeling purposes, several analyzer vents were grouped together as a single point source located within the BD-III unit. Analyzer vent emissions are readily estimated basis flow through the analyzers and the known stream compositions. Flow to the ground flare is measured and analyzed continuously. The flow to the ground flare is dependent upon such factors as maintenance activities, upsets, etc.

Past BD emission estimates were reviewed in light of the more comprehensive estimating techniques used for estimating 1989 emissions, and the estimates for 1987 and 1988 were revised upward. This information was communicated to the EPA in July 1990 via revised Form R's for BD.

5.0 EMISSION REDUCTION PLANS

As noted in the last section, the primary sources of BD emissions from DPMC are fugitive emissions. These emissions have been controlled by fugitive emissions monitoring and maintenance programs required by the Texas Air Control Board (TACB) under their Regulation V. However, DPMC is currently implementing (basis our current understanding) the fugitive emissions program (i.e., the Maximum Available Control Technology) that is being negotiated by the EPA, the Chemical Manufacturers Association, and other participating parties. Key differences from the TACB program are a lower leak definition, more frequent monitoring, and inclusion of additional equipment not previously monitored (i.e., flanges).

The new DPMC BD Fugitive Emissions Monitoring Program covers equipment in BD service, i.e., contains 5 - 100% wt BD. Most valves and flanges in BD service are now being monitored on a quarterly basis using a 500 ppm leak definition. The exception to this is that valves and flanges which are difficult-to-monitor and in 5 - 30% wt service are monitored on a semi-annual basis. Pumps are currently being monitored on a quarterly basis to gather historical information below the TACB 10,000 ppm leak definition. As these pumps have single mechanical seals, it is anticipated that a number of pumps will be replaced by pumps with double mechanical seals or newer "leakless" pump technology to consistently stay below a 1000 ppm leak definition. For those pumps requiring replacement the leak definition will be lowered to 1000 ppm after replacement. It is estimated that fugitive emissions will be reduced approximately 60 to

80% with the new leak detection and repair program along with implementation of capital projects.

Additional efforts are being made to reduce point source emissions. For example, analyzer vents emissions have been reduced by redesign of flow rates (BD emissions from analyzer vents were reduced from 8600 lb/yr in 1987 to 5000 lb/yr in 1989) and will be further reduced in the future by routing to recovery or flare systems. Plans are being developed to minimize flows to the ground flare by minimizing purging of material during maintenance activities and similar work activities.

6.0 BUTADIENE RISK ESTIMATES

A standard method for estimating risk is to multiply a unit risk factor times an exposure estimate. For example, the maximum individual risk to a community resident exposed to an air contaminant which potentially causes a chronic health effect would be calculated by multiplying the estimated maximum annual concentration to which an individual would be exposed by the inhalation unit risk factor for a 70 year continuous exposure, i.e.,

$$\text{Maximum Individual Risk} = \text{Maximum Annual Concentration} \times \text{Inhalation Unit Risk Factor}$$

Such a risk estimating procedure has several conservative assumptions. For example, the unit risk factor for BD is based upon animal toxicity data which uses conservative assumptions to extrapolate from high dose to low dose levels. In addition, exposure to the estimated maximum ambient annual concentration is considered to occur continuously every day for years of exposure; yet exposure is likely mitigated by such factors as daily mobility, staying within an air-conditioned or heated house, and other similar social behaviors difficult to account for in predicting exposure to ambient air concentrations. However, EPA has given guidance that a 30 year exposure level is appropriate for calculating a reasonable maximum residential exposure[2]. Thus this report will look at risk estimates using both a 70 and a 30 year exposure scenario.

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[2] U.S. Environmental Protection Agency. Risk Assessment Guidance for Superfund. Volume 1 Human Health Evaluation Manual (Part A). Interim Final. EPA 540/1-89-002. December 1989.

The EPA has developed an inhalation unit risk factor of 2.8 E-4 $(ug/m3)^{-1}$ for BD basis a 70 year exposure. This number is converted to a 30-year inhalation unit risk factor by multiplying by 30/70 giving a new inhalation unit risk factor of 1.2 E-4 $(ug/m3)^{-1}$. Basis these inhalation unit risk factors, the following table illustrates that higher ambient concentrations for a 30 year exposure period result in an equivalent risk level to that calculated using lower ambient concentrations for a 70 year exposure period.

TABLE 2. RISK LEVELS AND ASSOCIATED AMBIENT AIR CONCENTRATIONS BASIS 70 YEAR AND 30 YEAR EXPOSURE SCENARIOS.

RISK LEVEL	CONCENTRATION IN ug/m3 70 YEAR EXPOSURE	30 YEAR EXPOSURE
1 in 1,000	3.6	8.4
1 in 10,000	3.6 E-1	8.4 E-1
1 in 100,000	3.6 E-2	8.4 E-2
1 in 1,000,000	3.6 E-3	8.4 E-3

7.0 AIR DISPERSION MODELING AND ESTIMATED COMMUNITY RISK

Two emission cases were modeled: the 1989 emissions estimate and the "55%-reduction" emissions estimate. Sources and emissions estimates for the 1989 case were presented in Section 4.0, Table 1. As discussed earlier, the emissions reduction plan is projected to achieve a 60 to 80% emissions reduction, but a conservative 55% reduction in fugitive emissions was modeled for the reduced emissions case. Modeling procedures were in accordance with standard TACB and/or EPA practices. For example, fugitives were modeled as single volume sources, elevated and not on or adjacent to a building. Table 3 shows other key modeling parameters.

Basis preliminary modeling, the maximum off-property concentration was expected to be near the DPMC fenceline - which is consistent with the fact that the majority of DPMC BD emissions are non-buoyant fugitive emissions. As noted under Section 3.0, the nearest potential residential exposure occurs some 500 feet from the south DPMC fenceline as Highway 225 and a Shell pipeline corridor are immediately south of DPMC. Figure 4 shows the estimated maximum community, i.e., residential, modeled ambient concentrations for both the 1989 and the reduced emissions estimates, Case 1 and Case 2, respectively. The estimated maximum individual risk associated with these concentrations are:

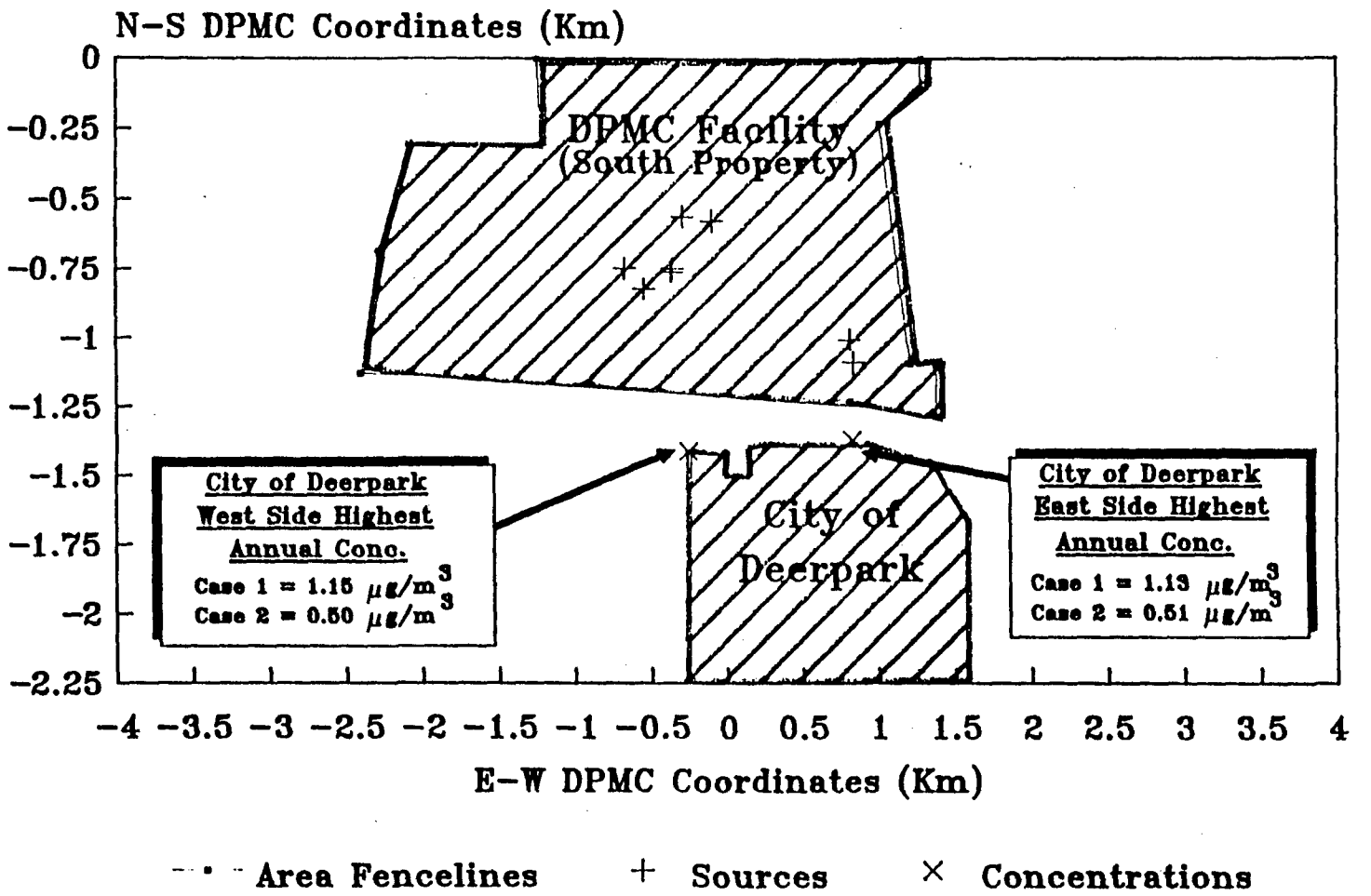
	ug/m3	70 YEAR	30 YEAR
Case 1-1989 EMISSIONS ESTIMATE	1.15	1 in 3,100	1 in 7,200
Case 2-REDUCED EMISSIONS EST.	0.51	1 in 7,000	1 in 16,000

These risk estimates are substantially different from the "greater than 1 in 100" risk currently stored in the ATERIS database. Figures 5 and 6

TABLE 3. KEY MODELING PARAMETERS FOR ESTIMATING MAXIMUM AMBIENT BD CONCENTRATIONS

Model	Industrial Source Complex Long Term	
Options		
Dispersion coefficients	Urban	
Terrain	Flat	
Other	Gradual Plume Rise	
	Stack Downwash	
	Buoyant Induced Dispersion	
Source Characteristics		
Number of sources	Fugitives	NA
	Points	2
Exit Temperature	Flare	1273
	Analyzers	305
Exit Velocity	Fugitives	NA
	Flare	20
	Analyzers	0.03
Diameter	Flare	2.9
	Analyzers	0.03
Height	Fugitives	3.5
	Flare	20.4
	Analyzers	4.6
Heat Input (cal/sec)	Flare	11,055,400
Building Downwash	Not used	
Meteorological Data	Houston Hobby Airport (1974 -1978)	
Receptor Grid	25 meter spacing	

Figure 4. DPMC Estimated Annual and Local 1,3-Butadiene Maxima (1989 and Reduced Emissions Cases)



show additional details regarding modeled concentration isopleths off DPMC property for the reduced emissions case. Figure 5 shows a 70-year exposure scenario with a concentration isopleth of 0.036 ug/m3 being associated with a risk level of 1 in 100,000. Figure 6 shows a 30-year exposure scenario with a concentration isopleth of 0.084 ug/m3 being associated with a risk level of 1 in 100,000.

Figure 5. Reduced Emissions (Case 2) – For Estimating Risk Levels Associated With 70–Yr Exposure Scenario

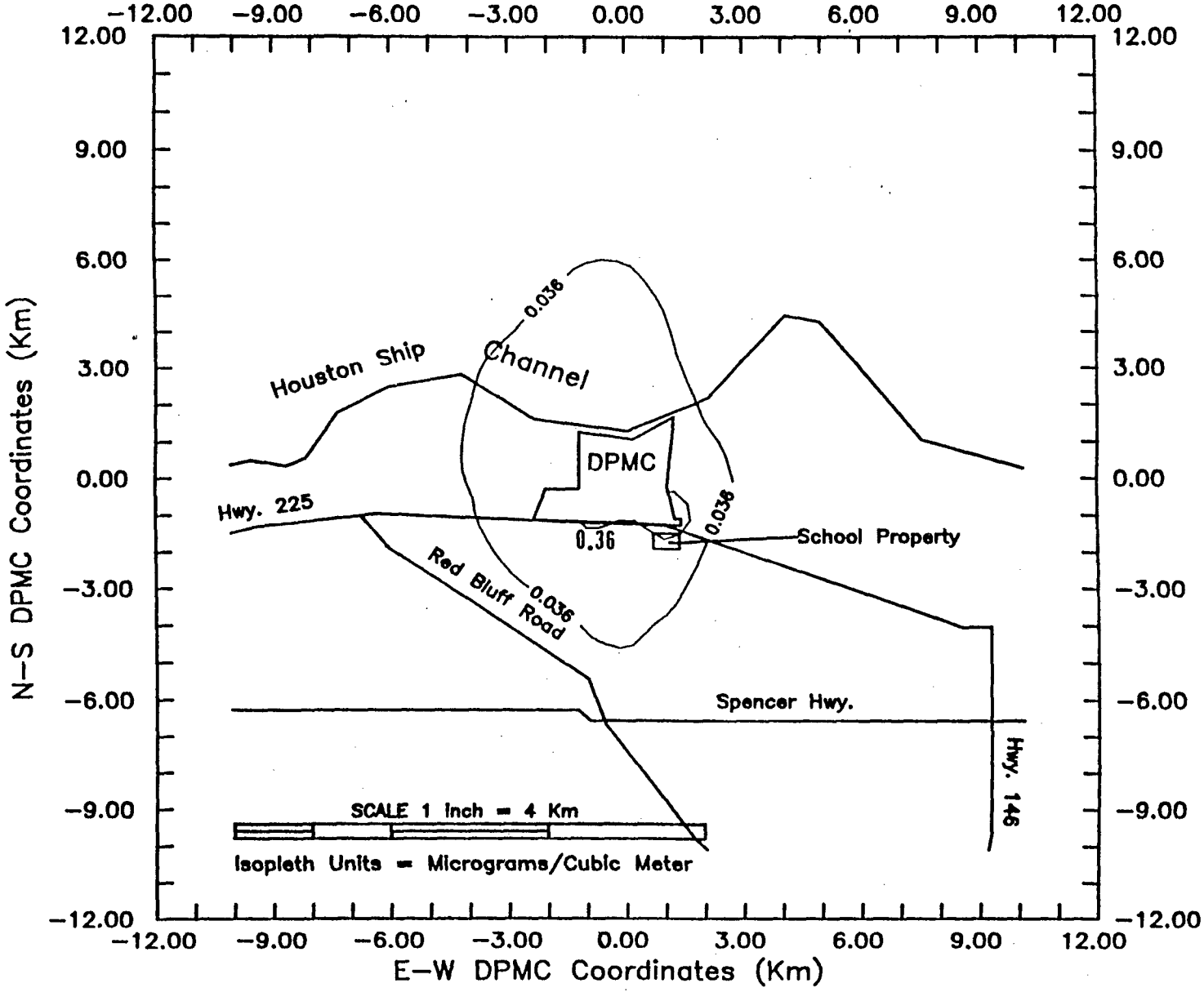
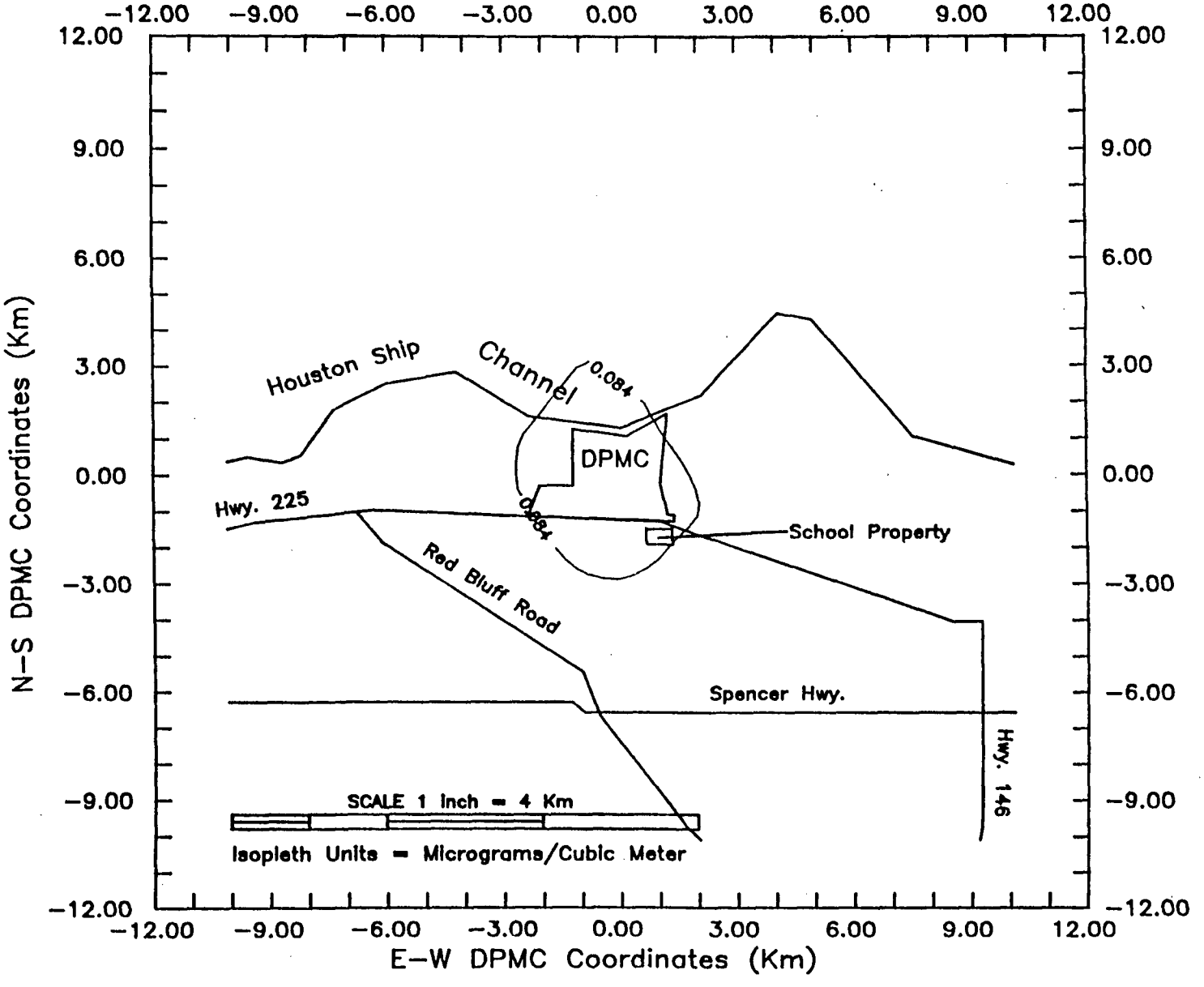


Figure 6. Reduced Emissions (Case 2) – For Estimating Risk Levels Associated With 30–Yr Exposure Scenario



8.0 Air Monitoring Results

There have been two air quality monitoring programs which have looked at butadiene concentrations in ambient air at and near the DPMC facility. These studies may provide a reference by which the air quality modeling results may be externally validated.

During February 1989 the TACB conducted ambient air measurements for butadiene and several other compounds in the Highway 225 and Tidal Road areas bordering DPMC. The reported limit of detection for butadiene was 0.5 ppbv. The TACB did not detect any butadiene during this study.

During the first half of 1990 DPMC contracted with Radian Corporation (Austin, Texas) to conduct independent ambient air measurements along the south DPMC fenceline bordering Highway 225, and along Shell property just south of Highway 225 bordering the north limits of the City of Deer Park. The limit of detection was 0.25 ppbv in this study. Monitoring sites, shown in Figure 7, were situated at several locations to increase the probability of detecting butadiene during periods when the wind direction was from the north (wind direction >270 degrees but <90 degrees). Samples were also taken when the wind was from the south (wind direction >90 degrees but <270 degrees). As there are no known BD sources immediately south of DPMC these latter samples function as a "control" group.

The methodology used for sample collection and analysis has been well established for some time. The same protocols are used by Radian Corporation under contract to the Houston Regional Monitoring (HRM)

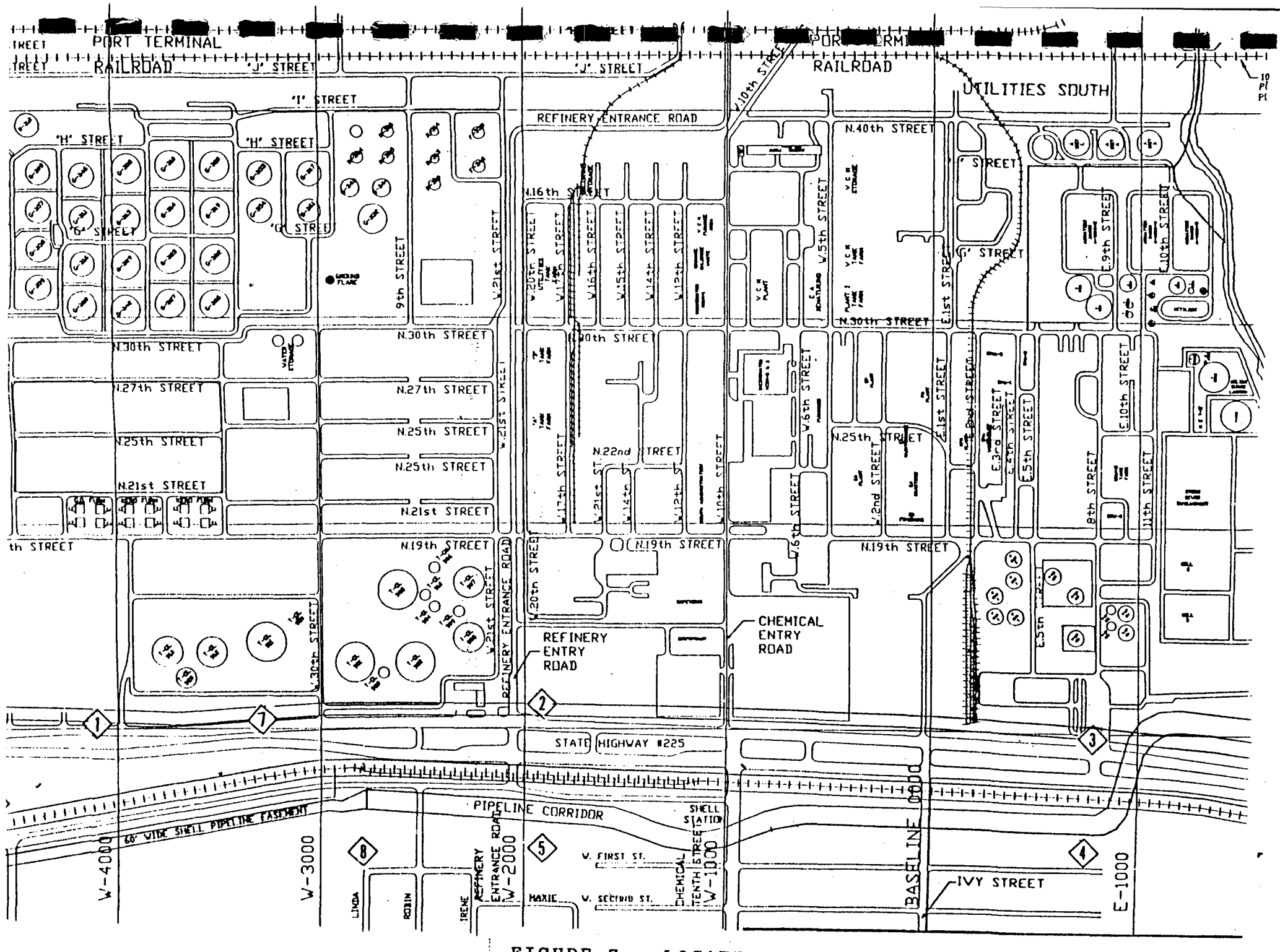


FIGURE 7. LOCATION OF MONITORING SITES FOR SHORT-TERM 1,3-BUTADIENE AIR MONITORING PROGRAM.

Corporation. Information on sampling methodology for HRM has been communicated to the EPA and TACB in the past.

The results of the BD monitoring program are shown in Tables 4 and 5. As readily seen in Table 4, there is no BD detected with a southerly breeze, i.e., wind direction from 270 to 90 degrees, with the exception of two sample events on February 7. This anomaly has not been explained at this point. During northerly winds, i.e., wind direction from 270 to 90 degrees (Table 5), BD was detected at some sites, but not all of the time. The results are reasonably consistent with what is known about the location of the emission sources, the monitoring locations, and the wind direction. While work is still underway to use the monitoring data to gauge the modeling work, it appears that emission sources may be over-estimated slightly at this time.

TABLE 4

SUMMARY OF 1,3-BUTADIENE MEASUREMENTS FROM
SHELL DEER PARK MONITORING PROGRAM
SOUTHERLY WIND DIRECTION

Sampling Date	Run Type	Wind Direction	1,3-Butadiene Concentration by Site (ppbV-Species)							
			1	2	3	4	5	6	7	8
02/05	LT	E					ND	ND		
02/05	ST	E	ND	ND	ND		ND	ND		
02/07	LT	SE					ND	ND		
02/07	ST	SE	ND	ND	ND		ND	ND		
02/07	ST	E	ND	0.7[b]	0.7[b]		ND	ND		
02/12	LT	S				ND	ND			
02/13	LT	S				ND	ND			
02/13	ST	S	ND	ND	ND	ND	ND			
02/14	LT	S				ND	ND			
02/14	ST	SE	ND	ND	ND	ND	ND			
03/24	LT	SW				-[a]	ND		ND	-[a]
04/05	LT	S				ND	ND		ND	ND
04/08	LT	SE				ND	ND		ND	ND
04/17	LT	E				ND	ND		-[f]	ND
04/20	LT	SE				ND	ND		ND	ND
04/23	LT	SE				ND	ND		ND	ND
04/26	LT	SE				ND	ND		ND	ND
04/28	LT	SE				-[a]	-[a]		ND	-[f]
05/02	LT	SE				ND	ND		ND	-[d]
05/10	LT	E				ND	ND		ND	ND

ST = Short-term sampling run, nominally 2-4 hours

LT = Long-term sampling run, nominally 24 hours

[a] Canister leaked

[b] Value is less than the nominal reporting limit of 1 ppbv-species (ie, value is approximately four times the detection limit).

[c] Suspect interference with contaminant. Data omitted from mean calculations.

[d] Coelution with isobutene and butene. Not able to quantify.

[e] Pattern suggests presence of 1,3-butadiene but peak is too small to quantify.

[f] Quantitation not possible due to interference peak.

ND = Not detected

Blank spaces indicate no sample collected

TABLE 5

SUMMARY OF 1,3-BUTADIENE MEASUREMENTS FROM
SHELL DEER PARK MONITORING PROGRAM
NORTHERLY WIND DIRECTION

Sampling Date	Run Type	Wind Direction	1,3-Butadiene Concentration by Site (ppbV-Species)							
			1	2	3	4	5	6	7	8
02/09	LT	N				1.0	2.0			
02/09	ST	NW	ND	2.2	1.1	ND	2.0			
02/10	ST	NW	ND	1.5	1.9	ND	0.6[b]			
02/10	ST	N	ND	2.6	1.6	0.9[b]	1.9			
02/10	LT	NW				ND	0.8[b]			
02/10	ST	N	0.7[b]	2.5	0.6[b]	1.7	0.4[b]			
02/11	ST	NW	1.8	1.9	1.6	2.1	1.3			
02/16	LT	N				0.5[b]	ND			
02/17	LT	NE				0.5[b]	1.4	1.9		
03/25	LT	N				ND	ND		ND	-[a]
03/26	LT	N				-[d]	ND		-[d]	-[a]
03/30	LT	N				-[d]	ND		4.3	1.9
04/02	LT	N				ND	ND		ND	ND
04/11	LT	NE				-[f]	ND		1.7	ND
04/14	LT	NE				ND	ND		ND	ND
05/05	LT	N				4.5	ND		ND	1.1

ST = Short-term sampling run, nominally 2-4 hours

LT = Long-term sampling run, nominally 24 hours

[a] Canister leaked

[b] Value is less than the nominal reporting limit of 1 ppbv-species (ie, value is approximately four times the detection limit).

[c] Suspect interference with contaminant. Data omitted from mean calculations.

[d] Coelution with isobutene and butene. Not able to quantify.

[e] Pattern suggests presence of 1,3-butadiene but peak is too small to quantify.

[f] Quantitation not possible due to interference peak.

ND = Not detected

Blank spaces indicate no sample collected

9.0 ATERIS 1,3-BUTADIENE MAXIMUM INDIVIDUAL RISK ESTIMATE REVISITED

The current maximum individual risk estimate published in the ATERIS database is a "greater than 1 in 100 but less than 1 in 10" range. As discussed, this is a rather conservative risk estimate based upon simplified modeling assumptions. While this risk estimate was to be used solely for ranking facilities for further review, the information is publicly available and has the potential for causing unwarranted concern by the Deer Park community. Thus, Shell has conducted a more detailed modeling analysis of both the 1989 BD emissions estimate and a reduced emissions estimate. The reduced emissions case was based on an approximately 55% reduction although the emissions reduction is targeted for 60 to 80%. With the reduced emissions case and a 30-year exposure scenario, the risk estimate is approximately 1 in 16,000. Thus, Shell believes that a more appropriate range for the published maximum individual risk is "greater than 1 in 100,000 but less than 1 in 10,000".

ATTACHMENT 2

EPA EMISSION REDUCTION PROGRAM
ITEM #2 - COMPRESSOR LIST
COMPRESSORS IN TOXIC SERVICE
DATA FROM MECH. EQUIP. DEPT.

BA	LOCATION	COMP TYPE	COMP #	SERVICE	MEET NSPS (Y/N)
OLEFINS	OP-III	RECIP	KU3-900	HC	Y
OLEF	OL-III	CENT	K-R3-5001	PROPYLENE	Y
OLEF	OL-III	CENT	K-C3-3001A	HC MIXTURE	Y
OLEF	OL-III	CENT	K-C3-3001B	HC MIXTURE	Y
OLEF	OL-II	CENT	K-OL-602	HC MIXTURE	Y
OLEF	BD-III	CENT	K-B3-101	BUTEDIENE	Y
OLEF	OL-III	CENT	K-C3-3001C	HC MIXTURE	Y
OLEF	OL-III	CENT	K-R3-5020	ETHYLENE	Y
FUELS	SGP	CENT	C-5600	H2S + HC	Y
FUELS	CFH	RECIP	C-134	VENT GAS	Y
FUELS	HCU	CENT	C-5403	H2 + HC	Y
FUELS	ALKY	RECIP	C-099	AMMONIA	Y
FUELS	HP-1	CENT	C-5510	H2 + HC	Y
FUELS	GAS COMP	RECIP	C-070	H2S + HC	Y
FUELS	HCU	CENT	C-5401	H2 + HC	Y
FUELS	HDU-1	RECIP	C-5500	FEED GAS	Y
FUELS	CCU	RECIP	C-136	VENT GAS	N
FUELS	HCU-1	RECIP	C-5501	FEED GAS	Y
FUELS	HCU-1	RECIP	C-5405	FLARE	N
FUELS	GAS COMP	RECIP	C-094	H2S + HC	Y
FUELS	HCU	CENT	C-5403A	H2 + HC	Y
FUELS	GAS COMP	RECIP	C-095	H2S + HC	Y
FUELS	ALKY	CENT	C-109	AMMONIA	Y
FUELS	DHT	RECIP	C-120	H2S + HC	Y
FUELS	CR3	CENT	C-5301	H2 + HC	Y
FUELS	HCU	CENT	C-5400A	H2 + HC	Y
FUELS	HP-1	CENT	C-5511	H2 + HC	Y
FUELS	DHT	RECIP	C-121	H2S + HC	Y
FUELS	HCU	CENT	C-5400	H2 + HC	Y

TOTAL NUMBER OF COMPRESSORS = 29
TOTAL NUMBER OF RECIP = 12
TOTAL NUMBER OF CENT = 17

NUMBER OF RECIPS MEETING NSPS = 10
NUMBER OF CENT MEETING NSPS = 17

% RECIP MEETING NSPS = 83
% CENT MEETING NSPS = 100
% OVERALL MEETING NSPS = 93

EPA VOLUNTARY EMMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS
PROCESS VENTS TO ATMOSPHERE
DATA TAKEN FROM 1989 SARA

BA	DEPT.	UNIT	SERVICE	CONTROL DEVICE (Y/N)	CONTROL DEVICE TYPE	EFFICENCY %	TOTAL FLOW TO C.D. (SCFM)	TOTAL FLOW TO C.D. (T/Y)	INERT FLOW TO C.D. (T/Y)
RESINS	BPA	BPA	ERU3 ERU2 ATMOS	Y	CONDENSER	10	1.3	26.2	24.
RESINS	BPA	BPA	BAGGING DUST	Y	MECH. SEPARATION	99	4000	82370	8200
RESINS	BPA	BPA	CAUSTIC SCR	Y	SCRUBBER	99	95	1927	190
RESINS	BPA	BPA	BULK LOAD COLLECT	Y	MECH. SEPARATION	99	800	17610	1640
RESINS	BPA	BPA	DEBAGGING DUST	Y	MECH. SEPARATION	99	2100	43058	4304
RESINS	BPA	BPA	FLAKING DUST	Y	MECH. SEPARATION	99	23000	471610	47147
RESINS	MAJRESIN	EPON 5	V-2718	Y	SCRUBBER	98	1000	52207	5220
FUELS	SOLTR	SOLTR	VM&P COL ACC	N	ATMOS	----------	0.0072	0.5	
FUELS	SOLTR	SOLTR	ATMOS ACCUM	N	ATMOS	----------	0.0041	0.3	
FUELS	HYDROPR.	CR3	REGEN GAS-CWWC	Y	SCRUBBER	99.99	3038	60422	60401.999
CHEM	E	BA	V-5362(C5355)	N	ATMOS	----------	13.5	58	57.
CHEM	E	BA	V-5202(C-5201)	N	ATMOS	----------	1	19.4	
CHEM	E	BA	V-5361(C-5353)	N	ATMOS	----------	2.3	24	20.
LPA	PAU	PAU	CLEAVAGE REACTOR	Y	CONDENSER	60	21.7	473	32
LPA	PAU	PAU	OXIDIZER SPENT AIR	Y	INCINERATOR	98.2	51	762	48
LPA	PAU	PAU	GAS SCR	Y	SCR	77	7.17	151.9	134.
LPA	PAU	PAU	V-398	N	ATMOS	----------	----------	10.459	
LPA	PAU	PAU	ACETONE COLUMN VENT	Y	CONDENSER	92	3.88	71.4	45.
LPA	LUBE MFG.	HVI	HVI VENT	Y	FURANCE	98	33	925	
LPA	LUBE MFG.	MVI	MVI	Y	FURNACE	98	50	1400	1.
LPA	LUBE MFG.	MEK	P.D. STRATCO	N	ATMOS	----------	35	438	437.99
CHEM	A	A	DRIPS POT VENT	N	ATMOS	----------	0.001	0.05	
CHEM	A	A	C-15 DMK SCR	Y	SCR	95	175	418	38
CHEM	A	A	V-118 VENT	N	ATMOS	----------	0.1	2.7	0.7
CHEM	A	A	MANTIUS STACK	N	ATMOS	----------	7000	130000	129999
CHEM	A	A	C-47 DMK SCR	Y	SCR	95	44	570	43
CHEM	CG	CG	C41 OVHD ACC	Y	SCR	98	15	150	135
CHEM	CG	CG	C801 OVHD ACC	N	ATMOS	----------	----------	11	8.3
CHEM	CG	CG	C40 OVHD ACC	Y	SCR	98	6.5	55	40
CHEM	CG	CG	C801 OVHD ACC	N	ATMOS	----------	----------	9	8.3
CHEM	CG	CG	C35 OVHD ACC	Y	SCR	100	12	265	235

UMMARY OF TOXIC FLOW (T/Y)
BEFORE CD = 2357.22
AFTER CD = 62.78

EPA VOLUNTARY EMMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS
PROCESS VENTS TO ATMOSPHERE
DATA TAKEN FROM 1989 SARA

BA	DEPT.	UNIT	SERVICE	H.C. FLOW TO C.D. (T/Y)	FLOW TOXIC TO C.D. (T/Y)	ACETONE	ACETRONITRILE	AMMONIA	BENZENE
RESINS	BPA	BPA	ERU3 ERU2 ATMOS	0.94	0.66				
RESINS	BPA	BPA	BAGGING DUST	0	370				
RESINS	BPA	BPA	CAUSTIC SCR	24.8	2.2				
RESINS	BPA	BPA	BULK LOAD COLLECT	0	1212				
RESINS	BPA	BPA	DEBAGGING DUST	0	18				
RESINS	BPA	BPA	FLAKING DUST	0	180				
RESINS	MAJRESIN	EPDN-5	V-2718	4.03	0.97				
FUELS	SOLTR	SOLTR	VM&P COL ACC	0.46	0.04				
FUELS	SOLTR	SOLTR	ATMOS ACCUM	0.25	0.05				
FUELS	HYDROPR.	CR3	REGEN GAS-CWHC	0	0.0002				
CHEM	E	BA	V-5362(C5355)	0.53	0.07				
CHEM	E	BA	V-5202(C-5201)	14.16	5.24				
CHEM	E	BA	V-5361(C-5353)	1.892	1.708				
LPA	PAU	PAU	CLEAVAGE REACTOR	137.1814	10.3186	10.8			
LPA	PAU	PAU	OXIDIZER SPENT AIR	0	281.8	86.9			5.9
LPA	PAU	PAU	GAS SCR	13.24	4.06	0.12			0.009
LPA	PAU	PAU	V-396	3.35	7.109	7.06			
LPA	PAU	PAU	ACETONE COLUMN VENT	6.74	19.1	19.1			
LPA	LUBE MFG.	HVI	HVI VENT	916.96	0.04				0.04
LPA	LUBE MFG.	MVI	MVI	1387.7	0.3				0.3
LPA	LUBE MFG.	MEK	P.O. STRATCO	0	0.009				
CHEM	A	A	DRIPS POT VENT	0	0.05	0.05			
CHEM	A	A	C-15 DMK SCR	0	38	38			
CHEM	A	A	V-118 VENT	1.4	0.6				
CHEM	A	A	MANTIUS STACK	0	2				
CHEM	A	A	C-47 DMK SCR	0	140	140			
CHEM	CG	CG	C41 OVHD ACC	0	15				
CHEM	CG	CG	C801 OVHD ACC	0.8	1.4	1.4			
CHEM	CG	CG	C40 OVHD ACC	2	13	11			
CHEM	CG	CG	C801 OVHD ACC	0.1	0.1	0.1			
CHEM	CG	CG	C35 OVHD ACC	0	40	40			
				TOTAL TOXIC = BEFORE CD	2364.3248				

SUMMARY OF TOXIC FLOW (T/Y)
BEFORE CD = 2357.22
AFTER CD = 62.78

EPA VOLUNTARY EMMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS
PROCESS VENTS TO ATMOSPHERE
DATA TAKEN FROM 1989 SARA

BA	DEPT.	UNIT	SERVICE	BISPHENOL A	N-BUTYL ALC.	S-BUTYL ALC.	T-BUTYL ALC.	CUMENE	CYCLOHEXANE
RESINS	BPA	BPA	ERU3 ERU2 ATMOS						
RESINS	BPA	BPA	BAGGING DUST	370					
RESINS	BPA	BPA	CAUSTIC SCR						
RESINS	BPA	BPA	BULK LOAD COLLECT	1210					
RESINS	BPA	BPA	DEBAGGING DUST	18					
RESINS	BPA	BPA	FLAKING DUST	180					
RESINS	MAJRESIN	EPON 5	V-2718						
FUELS	SOLTR	SOLTR	VM&P COL ACC						
FUELS	SOLTR	SOLTR	ATMOS ACCUM						
FUELS	HYDROFR.	CR3	REGEN GAS-CWWC						
CHEM	E	BA	V-5362(C5355)		0.03				
CHEM	E	BA	V-5202(C-5201)		0.94				
CHEM	E	BA	V-5361(C-5353)		1.7				
LPA	PAU	PAU	CLEAVAGE REACTOR					0.0178	
LPA	PAU	PAU	OXIDIZER SPENT AIR					18.1	
LPA	PAU	PAU	GAS SCR					1.97	
LPA	PAU	PAU	V-398					0.049	
LPA	PAU	PAU	ACETONE COLUMN VENT						
LPA	LUBE MFG.	HVI	HVI VENT						
LPA	LUBE MFG.	MVI	MVI						
LPA	LUBE MFG.	MEK	P.D. STRATCO						
CHEM	A	A	DRIPS POT VENT						
CHEM	A	A	C-15 DMK SCR						
CHEM	A	A	V-118 VENT						
CHEM	A	A	MANTIUS STACK						
CHEM	A	A	C-47 DMK SCR						
CHEM	CG	CG	C41 OVHD ACC						
CHEM	CG	CG	C801 OVHD ACC						
CHEM	CG	CG	C40 OVHD ACC						
CHEM	CG	CG	C801 OVHD ACC						
CHEM	CG	CG	C35 OVHD ACC						

SUMMARY OF TOXIC FLOW (T/Y)
BEFORE CD = 2357.22
AFTER CD = 62.78

EPA VOLUNTARY EMMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS
PROCESS VENTS TO ATMOSPHERE
DATA TAKEN FROM 1989 SARA

BA	DEPT.	UNIT	SERVICE	DIETHYLAMINE	ECH	ACRYLATE	ETHYL BENZENE	HYDRAZINE	METHANOL
ESINS	BPA	BPA	ERU3 ERU2 ATMOS		0.66				
ESINS	BPA	BPA	BAGGING DUST						
RESINS	BPA	BPA	CAUSTIC SCR						
ESINS	BPA	BPA	BULK LOAD COLLECT						
ESINS	BPA	BPA	DEBAGGING DUST						
RESINS	BPA	BPA	FLAKING DUST						
RESINS	MAJRESIN	EPON 5	V-2718		0.97				
UELS	SOLTR	SOLTR	VM&P COL ACC				0.01		
UELS	SOLTR	SOLTR	ATMOS ACCUM						
FUELS	HYDROPR.	GRJ	REGEN GAS-CWNC						
HEM	E	BA	V-5362(C5355)						
EM	E	BA	V-5202(C-5201)						
CHEM	E	BA	V-5361(C-5353)						
PA	PAU	PAU	CLEAVAGE REACTOR				0.0008		
A	PAU	PAU	OXIDIZER SPENT AIR						165
LPA	PAU	PAU	GAS SCR						
LPA	PAU	PAU	V-398						
A	PAU	PAU	ACETONE COLUMN VENT						
A	LUBE MFG.	HVI	HVI VENT						
LPA	LUBE MFG.	MVI	MVI						
A	LUBE MFG.	MEK	P.O. STRATCO						
EM	A	A	DRIPS POT VENT						
CHEM	A	A	C-15 DMK SCR						
HEM	A	A	V-118 VENT						
EM	A	A	MANTIUS STACK						
CHEM	A	A	C-47 DMK SCR						
CHEM	CG	CG	C41 OVHD ACC						
EM	CG	CG	C801 OVHD ACC						
HEM	CG	CG	C40 OVHD ACC						
CHEM	CG	CG	C801 OVHD ACC						
EM	CG	CG	C35 OVHD ACC						

SUMMARY OF TOXIC FLOW (T/Y)
BEFORE CD = 2357.22
AFTER CD = 62.78

VOLUNTARY EMMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS
PROCESS VENTS TO ATMOSPHERE
DATA TAKEN FROM 1989 SARA

BA	DEPT.	UNIT	SERVICE	MEK	MIBK	HCL	MTBE	O-XYLENE	PHENOL
RESINS	BPA	BPA	ERU3 ERU2 ATMOS						
RESINS	BPA	BPA	BAGGING DUST						
RESINS	BPA	BPA	CAUSTIC SCR						2.2
RESINS	BPA	BPA	BULK LOAD COLLECT						
RESINS	BPA	BPA	DEBAGGING DUST						
RESINS	BPA	BPA	FLAKING DUST						
RESINS	MAJRESIN	EPON 5	V-2718						
FUELS	SOLTR	SOLTR	VM&P COL ACC					0.01	
FUELS	SOLTR	SOLTR	ATMOS ACCUM					0.01	
FUELS	HYDROPR.	CR3	REGEN GAS-CWWC			0.0002			
CHEM	E	BA	V-5362(C5355)						
CHEM	E	BA	V-5202(C-5201)						
CHEM	E	BA	V-5361(C-5353)						
LPA	PAU	PAU	CLEAVAGE REACTOR						
LPA	PAU	PAU	OXIDIZER SPENT AIR						
LPA	PAU	PAU	GAS SCR						
LPA	PAU	PAU	V-398						
LPA	PAU	PAU	ACETONE COLUMN VENT						
LPA	LUBE MFG.	HVI	HVI VENT						
LPA	LUBE MFG.	MVI	MVI						
LPA	LUBE MFG.	MEK	P.O. STRATCO	0.0045					
CHEM	A	A	DRIPS POT VENT						
CHEM	A	A	C-15 DMK SCR						
CHEM	A	A	V-118 VENT						
CHEM	A	A	MANTIUS STACK						
CHEM	A	A	C-47 DMK SCR						
CHEM	CG	CG	C41 OVHD ACC		15				
CHEM	CG	CG	C801 OVHD ACC						
CHEM	CG	CG	C40 OVHD ACC		2				
CHEM	CG	CG	C801 OVHD ACC						
CHEM	CG	CG	C35 OVHD ACC						

SUMMARY OF TOXIC FLOW (T/Y)
BEFORE CD = 2357.22
AFTER CD = 62.78

EP VOLUNTARY EMMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS
PROCESS VENTS TO ATMOSPHERE
DA TAKEN FROM 1989 SARA

BA	DEPT.	UNIT	SERVICE	PROPYLENE	SULFURIC ACID	TOLUNE	1,1,1-TCE	1,2,4-TMB	MIXED XYLENE
RE NS	BPA	BPA	ERU3 ERU2 ATMOS						
RESINS	BPA	BPA	BAGGING DUST						
RE NS	BPA	BPA	CAUSTIC SCR						
RE NS	BPA	BPA	BULK LOAD COLLECT						
RESINS	BPA	BPA	DEBAGGING DUST						
RESINS	BPA	BPA	FLAKING DUST						
RE NS	MAJRESIN	EPON 5	V-2718						
FUELS	SOLTR	SOLTR	VM&P COL ACC						0.02
FUELS	SOLTR	SOLTR	ATMOS ACCUM			0.02		0.02	
FU S	HYDROPR.	CR3	REGEN GAS-CWHC						
CH	E	BA	V-5362(C5355)						
CHEM	E	BA	V-5202(C-5201)	1.5					
CH	E	BA	V-5361(C-5353)						
P	PAU	PAU	CLEAVAGE REACTOR						
P	PAU	PAU	OXIDIZER SPENT AIR			5.9			
PA	PAU	PAU	GAS SCR			1.97			
P	PAU	PAU	V-398						
PA	PAU	PAU	ACETONE COLUMN VENT						
PA	LUBE MFG.	HVI	HVI VENT						
PA	LUBE MFG.	MVI	MVI						
PA	LUBE MFG.	MEK	P.O. STRATCO			0.0045			
HEM	A	A	DRIPS POT VENT						
HEM	A	A	C-15 DMK SCR						
HE	A	A	V-118 VENT	0.6					
HEM	A	A	MANTIUS STACK		2				
HEM	A	A	C-47 DMK SCR						
HE	CG	CG	C41 OVHD ACC						
HE	CG	CG	C801 OVHD ACC						
HEM	CG	CG	C40 OVHD ACC						
HE	CG	CG	C801 OVHD ACC						
HE	CG	CG	C35 OVHD ACC						

JMMARY OF TOXIC FLOW (T/Y)
BEFORE CD = 2357.22
AFTER CD = 62.78

E[redacted] VOLUNTARY EMMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS
PROCESS VENTS TO ATMOSPHERE
DA[redacted] TAKEN FROM 1989 SARA

BA	DEPT.	UNIT	SERVICE	1,3-BD	BUTYRALDEHYDE	2-ETHOXYETHANOL	ETHYLENE	CHLORINE	CHROM. CMPDS.
RE[redacted]NS	BPA	BPA	ERU3 ERU2 ATMOS						
RESINS	BPA	BPA	BAGGING DUST						
RE[redacted]NS	BPA	BPA	CAUSTIC SCR						
RE[redacted]NS	BPA	BPA	BULK LOAD COLLECT						
RESINS	BPA	BPA	DEBAGGING DUST						
RE[redacted]NS	BPA	BPA	FLAKING DUST						
RE[redacted]NS	MAJRESIN	EPON 5	V-2718						
FU[redacted]S	SOLTR	SOLTR	VM&P COL ACC						
FUELS	SOLTR	SOLTR	ATMOS ACCUM						
FU[redacted]S	HYDROFR.	CR3	REGEN GAS-CWWC						
CH[redacted]	E	BA	V-5362(C5355)		0.04				
CHEM	E	BA	V-5202(C-5201)		2.3				
CH[redacted]	E	BA	V-5361(C-5353)		0.008				
LP[redacted]	PAU	PAU	CLEAVAGE REACTOR						
LPA	PAU	PAU	OXIDIZER SPENT AIR						
LPA	PAU	PAU	GAS SCR						
LP[redacted]	PAU	PAU	V-398						
LP[redacted]	PAU	PAU	ACETONE COLUMN VENT						
LPA	LUBE MFG.	HVI	HVI VENT						
LP[redacted]	LUBE MFG.	MVI	MVI						
LP[redacted]	LUBE MFG.	MEK	P.O. STRATCO						
CHEM	A	A	DRIPS POT VENT						
CHE[redacted]	A	A	C-15 DMK SCR						
CHE[redacted]	A	A	V-118 VENT						
CHEM	A	A	MANTIUS STACK						
CHE[redacted]	A	A	C-47 DMK SCR						
CHE[redacted]	CG	CG	C41 OVHD ACC						
CHE[redacted]	CG	CG	C801 OVHD ACC						
CHEM	CG	CG	C40 OVHD ACC						
CHE[redacted]	CG	CG	C801 OVHD ACC						
HE[redacted]	CG	CG	C35 OVHD ACC						

UMMARY OF TOXIC FLOW (T/Y)
BEFORE CD = 2357.22
AFTER CD = 62.78

A VOLUNTARY EMMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS
PROCESS VENTS TO ATMOSPHERE
TA TAKEN FROM 1989 SARA

BA	DEPT.	UNIT	SERVICE	COBALT COMPDS.	CUMENE HYDROP.	MONOMETHYL GLYCOLE	ETHER CMPDS.	PHOSPHORIC ACID	ZINC CMPDS.
INS	BPA	BPA	ERU3 ERU2 ATMOS						
RESINS	BPA	BPA	BAGGING DUST						
RESINS	BPA	BPA	CAUSTIC SCR						
INS	BPA	BPA	BULK LOAD COLLECT						
RESINS	BPA	BPA	DEBAGGING DUST						
RESINS	BPA	BPA	FLAKING DUST						
INS	MAJRESIN	EPON 5	V-2718						
S	SOLTR	SOLTR	VM&P COL ACC						
FUELS	SOLTR	SOLTR	ATMOS ACCUM						
S	HYDROPR.	CR3	REGEN GAS-CWWC						
	E	BA	V-5362(C5355)						
CHEM	E	BA	V-5202(C-5201)						
	E	BA	V-5361(C-5353)						
	PAU	PAU	CLEAVAGE REACTOR						
LPA	PAU	PAU	OXIDIZER SPENT AIR						
LPA	PAU	PAU	GAS SCR						
	PAU	PAU	V-398						
	PAU	PAU	ACETONE COLUMN VENT						
LPA	LUBE MFG.	HVI	HVI VENT						
	LUBE MFG.	MVI	MVI						
	LUBE MFG.	MEK	P.O. STRATCO						
CHEM	A	A	DRIPS POT VENT						
CHEM	A	A	C-15 DMK SCR						
	A	A	V-118 VENT						
CHEM	A	A	MANTIUS STACK						
CHEM	A	A	C-47 DMK SCR						
	CG	CG	C41 OVHD ACC						
	CG	CG	C801 OVHD ACC						
CHEM	CG	CG	C40 OVHD ACC						
	CG	CG	C801 OVHD ACC						
	CG	CG	C35 OVHD ACC						

TOTAL TOXIC =
AFTER CD

UMMARY OF TOXIC FLOW (T/Y)
BEFORE CD = 2357.22
AFTER CD = 62.78

EPA VOLUNTARY EMMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS
PROCESS VENTS TO ATMOSPHERE
DATA TAKEN FROM 1989 SARA

BA	DEPT.	UNIT	SERVICE	FLOW TOXICS FROM C.D. (T/Y)	ACETONE	ACETRONITRILEAMMONIA	BENZENE	BISPHENOL A
RESINS	BPA	BPA	ERU3 ERU2 ATMOS	0.594				
RESINS	BPA	BPA	BAGGING DUST	3.7				3.7
RESINS	BPA	BPA	CAUSTIC SCR	0.022				
RESINS	BPA	BPA	BULK LOAD COLLECT	12.1				12.1
RESINS	BPA	BPA	DEBAGGING DUST	0.18				0.18
RESINS	BPA	BPA	FLAKING DUST	1.8				1.8
RESINS	MAJRESIN	EPON 5	V-2718	0.0194				
FUELS	SOLTR	SOLTR	VM&P COL ACC	0.04				
FUELS	SOLTR	SOLTR	ATMOS ACCUM	0.05				
FUELS	HYDROPR.	CR3	REGEN GAS-CWWC	0				
CHEM	E	BA	V-5362(C5335)	0.07				
CHEM	E	BA	V-5202(C-5201)	5.24				
CHEM	E	BA	V-5361(C-5353)	1.708				
LPA	PAU	PAU	CLEAVAGE REACTOR	4.327	4.32			
LPA	PAU	PAU	OXIDIZER SPENT AIR	5.64	1.74		0.12	
LPA	PAU	PAU	GAS SCR	0.936	0.0276		0.0021	
LPA	PAU	PAU	V-399					
LPA	PAU	PAU	ACETONE COLUMN VENT	9.55	9.55			
LPA	LUBE MFG.	HVI	HVI VENT	0.0008			0.0008	
LPA	LUBE MFG.	MVI	MVI	0.006			0.006	
LPA	LUBE MFG.	MEK	P.O. STRATCO	0.009				
CHEM	A	A	DRIPS POT VENT	0.05	0.05			
CHEM	A	A	C-15 DMK SCR	1.9	1.9			
CHEM	A	A	V-118 VENT	0.6				
CHEM	A	A	MANTIUS STACK	2				
CHEM	A	A	C-47 DMK SCR	7	7			
CHEM	CG	CG	C41 OVHD ACC	0.3				
CHEM	CG	CG	C801 OVHD ACC	1.4	1.4			
CHEM	CG	CG	C40 OVHD ACC	0.26	0.22			
CHEM	CG	CG	C801 OVHD ACC	0.1	0.1			
CHEM	CG	CG	C35 OVHD ACC	0				
				59.6022				

SUMMARY OF TOXIC FLOW (T/Y)
BEFORE CD = 2357.22
AFTER CD = 62.78

:PA VOLUNTARY EMMISSIONS REDUCTIONS
:TE[redacted]3 - PROCESS VENTS
'RO[redacted]SS VENTS TO ATMOSPHERE
:ATA TAKEN FROM 1989 SARA

[redacted]A	DEPT.	UNIT	SERVICE	N-BUTYL ALC.	S-BUTYL ALC.	T-BUTYL ALC.	CUMENE	CYCLOHEXANE	DIETHYLAMINE
:ESINS	BPA	BPA	ERU3 ERU2 ATMOS						
ES[redacted]S	BPA	BPA	BAGGING DUST						
ES[redacted]S	BPA	BPA	CAUSTIC SCR						
ESINS	BPA	BPA	BULK LOAD COLLECT						
ES[redacted]G	BPA	BPA	DEBAGGING DUST						
ES[redacted]S	BPA	BPA	FLAKING DUST						
ESINS	MAJRESIN	EPON 5	V-2718						
UEL[redacted]	SOLTR	SOLTR	VM&P COL ACC.						
UE[redacted]	SOLTR	SOLTR	ATMOS ACCUM						
UEL[redacted]	HYDROPR.	CR3	REGEN GAS-CNWC						
HEM	E	BA	V-5362(C5355)	0.03					
HE[redacted]	E	BA	V-5202(C-5201)	0.94					
HE[redacted]	E	BA	V-5361(C-5353)	1.7					
'A	PAU	PAU	CLEAVAGE REACTOR				0.00668		
'A	PAU	PAU	OXIDIZER SPENT AIR				0.36		
'A[redacted]	PAU	PAU	GAS SCR				0.453		
'A	PAU	PAU	V-398						
'A	PAU	PAU	ACETONE COLUMN VENT						
'A[redacted]	LUBE MFG.	HVI	HVI VENT						
'A[redacted]	LUBE MFG.	MVI	MVI						
'A	LUBE MFG.	MEX	P.O. STRATCO						
IEM[redacted]	A	A	DRIPS POT VENT						
IEM[redacted]	A	A	C-15 DMK SCR						
IEM	A	A	V-118 VENT						
IEM[redacted]	A	A	MANTIUS STACK						
IEM[redacted]	A	A	C-47 DMK SCR						
'EM	CG	CG	C41 OVHD ACC						
EM	CG	CG	C801 OVHD ACC						
EM[redacted]	CG	CG	C40 OVHD ACC						
EM[redacted]	CG	CG	C801 OVHD ACC						
EM	CG	CG	C35 OVHD ACC						

MMARY OF TOXIC FLOW (T/Y)
[redacted] BEFORE CD = 2357.22
AFTER CD = 62.78

EPA VOLUNTARY EMMISSIONS REDUCTIONS
I[redacted]M #3 - PROCESS VENTS
P[redacted]CESS VENTS TO ATMOSPHERE
DATA TAKEN FROM 1989 SARA

[redacted]BA	DEPT.	UNIT	SERVICE	ECH	ACRYLATE	ETHYL BENZENE	HYDRAZINE	METHANOL	MEK
RESINS	BPA	BPA	ERU3 ERU2 ATMOS	0.594					
R[redacted]NS	BPA	BPA	BAGGING DUST						
R[redacted]NS	BPA	BPA	CAUSTIC SCR						
RESINS	BPA	BPA	BULK LOAD COLLECT						
R[redacted]NS	BPA	BPA	DEBAGGING DUST						
R[redacted]NS	BPA	BPA	FLAKING DUST						
RESINS	MAJRESIN	EPON 5	V-2718	0.0194					
FU[redacted]S	SOLTR	SOLTR	VM&P COL ACC			0.01			
FU[redacted]S	SOLTR	SOLTR	ATMOS ACCUM						
FUELS	HYDROPR.	CR3	REGEN GAS-CWWC						
CHEM	E	BA	V-5362(C5355)						
CH[redacted]	E	BA	V-5202(C-5201)						
CH[redacted]	E	BA	V-5361(C-5353)						
[redacted]PA	PAU	PAU	CLEAVAGE REACTOR			0.00032			
[redacted]PA	PAU	PAU	OXIDIZER SPENT AIR					3.3	
[redacted]PA	PAU	PAU	GAS SCR						
[redacted]PA	PAU	PAU	V-398						
[redacted]PA	PAU	PAU	ACETONE COLUMN VENT						
[redacted]PA	LUBE MFG.	HVI	HVI VENT						
[redacted]PA	LUBE MFG.	MVI	MVI						
[redacted]PA	LUBE MFG.	MEK	P.O. STRATCO						0.0045
[redacted]HE	A	A	DRIPS POT VENT						
[redacted]HE	A	A	C-15 DMK SCR						
HEM	A	A	V-116 VENT						
HE[redacted]	A	A	MANTIUS STACK						
HE[redacted]	A	A	C-47 DMK SCR						
HEM	CG	CG	C41 OVHD ACC						
HEM	CG	CG	C801 OVHD ACC						
HE[redacted]	CG	CG	C40 OVHD ACC						
HE[redacted]	CG	CG	C801 OVHD ACC						
HEM	CG	CG	C35 OVHD ACC						

[redacted]MMARY OF TOXIC FLOW (T/Y)
[redacted] BEFORE CD = 2357.22
AFTER CD = 62.78

EPA VOLUNTARY EMMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS
PROCESS VENTS TO ATMOSPHERE
DATA TAKEN FROM 1989 SARA

BA	DEPT.	UNIT	SERVICE	MIBK	HCL	MTBE	O-XYLENE	PHENOL	PROPYLENE
RESINS	BPA	BPA	ERU3 ERU2 ATMOS						
RESINS	BPA	BPA	BAGGING DUST						
RESINS	BPA	BPA	CAUSTIC SCR					0.022	
RESINS	BPA	BPA	BULK LOAD COLLECT						
RESINS	BPA	BPA	DEBAGGING DUST						
RESINS	BPA	BPA	FLAKING DUST						
RESINS	MAJRESIN	EPON 5	V-2718						
FUELS	SOLTR	SOLTR	VM&P COL ACC				0.01		
FUELS	SOLTR	SOLTR	ATMOS ACCUM				0.01		
FUELS	HYDROPR.	CR3	REGEN GAS-CWWC		0.00000002				
HEM	E	BA	V-5362(C5355)						
HEM	E	BA	V-5202(C-5201)						1.5
HEM	E	BA	V-5361(C-5353)						
PA	PAU	PAU	CLEAVAGE REACTOR						
PA	PAU	PAU	OXIDIZER SPENT AIR						
PA	PAU	PAU	GAS SCR						
PA	PAU	PAU	V-398						
PA	PAU	PAU	ACETONE COLUMN VENT						
PA	LUBE MFG.	HVI	HVI VENT						
PA	LUBE MFG.	MVI	MVI						
PA	LUBE MFG.	MEK	P.O. STRATCO						
HEM	A	A	DRIPS POT VENT						
HEM	A	A	C-15 DMK SCR						
HEM	A	A	V-118 VENT						0.6
HEM	A	A	MANTIUS STACK						
HEM	A	A	C-47 DMK SCR						
HEM	CG	CG	C41 OVHD ACC	0.3					
HEM	CG	CG	C801 OVHD ACC						
HEM	CG	CG	C40 OVHD ACC	0.04					
HEM	CG	CG	C801 OVHD ACC						
HEM	CG	CG	C35 OVHD ACC						

MMARY OF TOXIC FLOW (T/Y)
BEFORE CD = 2357.22
AFTER CD = 62.78

EPA VOLUNTARY EMMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS
PROCESS VENTS TO ATMOSPHERE
DATA TAKEN FROM 1989 SARA

BA	DEPT.	UNIT	SERVICE	SULFURIC ACID	TOLUNE	1,1,1-TCE	1,2,4-TMB	MIXED XYLENE	1,3-BD
RESINS	BPA	BPA	ERU3 ERU2 ATMOS						
RESINS	BPA	BPA	BAGGING DUST						
RESINS	BPA	BPA	CAUSTIC SCR						
RESINS	BPA	BPA	BULK LOAD COLLECT						
RESINS	BPA	BPA	DEBAGGING DUST						
RESINS	BPA	BPA	FLAKING DUST						
RESINS	MAJRESIN	EPON 5.	V-2718						
FUELS	SOLTR	SOLTR	VM&P COL ACC					0.02	
FUELS	SOLTR	SOLTR	ATMOS ACCUM		0.02		0.02		
FUELS	HYDROPR.	CR3	REGEN GAS-CWWC						
CHEM	E	BA	V-5362(C5355)						
CHEM	E	BA	V-5202(C-5201)						
CHEM	E	BA	V-5361(C-5353)						
LPA	PAU	PAU	CLEAVAGE REACTOR						
LPA	PAU	PAU	OXIDIZER SPENT AIR		0.12				
LPA	PAU	PAU	GAS SCR		0.453				
LPA	PAU	PAU	V-398						
LPA	PAU	PAU	ACETONE COLUMN VENT						
LPA	LUBE MFG.	HVI	HVI VENT						
LPA	LUBE MFG.	MVI	MVI						
LPA	LUBE MFG.	MEK	P.O. STRATCO		0.0045				
CHEM	A	A	DRIPS POT VENT						
CHEM	A	A	C-15 DMK SCR						
CHEM	A	A	V-118 VENT						
CHEM	A	A	MANTIUS STACK	2					
CHEM	A	A	C-47 DMK SCR						
CHEM	CG	CG	C41 OVHD ACC						
CHEM	CG	CG	C801 OVHD ACC						
CHEM	CG	CG	C40 OVHD ACC						
CHEM	CG	CG	C801 OVHD ACC						
CHEM	CG	CG	C35 OVHD ACC						

SUMMARY OF TOXIC FLOW (T/Y)
BEFORE CD = 2357.22
AFTER CD = 62.78

EPA VOLUNTARY EMMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS
PROCESS VENTS TO ATMOSPHERE
DATA TAKEN FROM 1989 SARA

BA	DEPT.	UNIT	SERVICE	BUTYRALDEHYDE	2-ETHOXYETHANOL	ETHYLENE	CHLORINE	CHROM. CMPDS.	COBALT COMPDS.
RESINS	BPA	BPA	ERU3 ERU2 ATMOS						
RESINS	BPA	BPA	BAGGING DUST						
RESINS	BPA	BPA	CAUSTIC SCR						
RESINS	BPA	BPA	BULK LOAD COLLECT						
RESINS	BPA	BPA	DEBAGGING DUST						
RESINS	BPA	BPA	FLAKING DUST						
RESINS	MAJRESIN	EPON 5	V-2718						
FUELS	SOLTR	SOLTR.	VM&P COL ACC						
FUELS	SOLTR	SOLTR	ATMOS ACCUM						
FUELS	HYDROPR.	CR3	REGEN GAS-CWWC						
CHEM	E	BA	V-5362(C5355)	0.04					
CHEM	E	BA	V-5202(C-5201)	2.9					
CHEM	E	BA	V-5361(C-5353)	0.008					
LPA	PAU	PAU	CLEAVAGE REACTOR						
LPA	PAU	PAU	OXIDIZER SPENT AIR						
LPA	PAU	PAU	GAS SCR						
LPA	PAU	PAU	V-398						
LPA	PAU	PAU	ACETONE COLUMN VENT						
LPA	LUBE MFG.	HVI	HVI VENT						
LPA	LUBE MFG.	MVI	MVI						
LPA	LUBE MFG.	MEK	P.D. STRATCO						
CHEM	A	A	DRIPS POT VENT						
CHEM	A	A	C-15 DMK SCR						
CHEM	A	A	V-118 VENT						
CHEM	A	A	MANTIUS STACK						
CHEM	A	A	C-47 DMK SCR						
CHEM	CG	CG	C41 OVHD ACC						
CHEM	CG	CG	C801 OVHD ACC						
CHEM	CG	CG	C40 OVHD ACC						
CHEM	CG	CG	C801 OVHD ACC						
CHEM	CG	CG	C35 OVHD ACC						

SUMMARY OF TOXIC FLOW (T/Y)
BEFORE CD = 2357.22
AFTER CD = 62.78

EPA VOLUNTARY EMMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS
PROCESS VENTS TO ATMOSPHERE
DATA TAKEN FROM 1989 SARA

BA	DEPT.	UNIT	SERVICE	CUMENE HYDROP.	MONOMETHYL GLYCOLE	ETHER CMPDS.	PHOSPHORIC ACID	ZINC CMPDS.
RESINS	BPA	BPA	ERU3 ERU2 ATMOS					
RESINS	BPA	BPA	BAGGING DUST					
RESINS	BPA	BPA	CAUSTIC SCR					
RESINS	BPA	BPA	BULK LOAD COLLECT					
RESINS	BPA	BPA	DEBAGGING DUST					
RESINS	BPA -	BPA	FLAKING DUST					
RESINS	MAJRESIN	EPON 5	V-2718					
FUELS	SOLTR	SOLTR	VM&P COL ACC					
FUELS	SOLTR	SOLTR	ATMOS ACCUM					
FUELS	HYDROPR.	CR3	REGEN GAS-CWWC					
CHEM	E	BA	V-5362(C5355)					
CHEM	E	BA	V-5202(C-5201)					
CHEM	E	BA	V-5361(C-5353)					
LPA	PAU	PAU	CLEAVAGE REACTOR					
LPA	PAU	PAU	OXIDIZER SPENT AIR					
LPA	PAU	PAU	GAS SCR					
LPA	PAU	PAU	V-398					
LPA	PAU	PAU	ACETONE COLUMN VENT					
LPA	LUBE MFG.	HVI	HVI VENT					
LPA	LUBE MFG.	MVI	MVI					
LPA	LUBE MFG.	MEK	P.O. STRATCO					
CHEM	A	A	DRIPS POT VENT					
CHEM	A	A	C-15 DMK SCR					
CHEM	A	A	V-118 VENT					
CHEM	A	A	MANTIUS STACK					
CHEM	A	A	C-47 DMK SCR					
CHEM	CG	CG	C41 OVHD ACC					
CHEM	CG	CG	C801 OVHD ACC					
CHEM	CG	CG	C40 OVHD ACC					
CHEM	CG	CG	C801 OVHD ACC					
CHEM	CG	CG	C35 OVHD ACC					

SUMMARY OF TOXIC FLOW (T/Y)
BEFORE CD = 2357.22
AFTER CD = 62.78

EPA VOLUNTARY EMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS CONTINUED
PROCESS VENTS TO FLARE
1898 SARA

BA	DEPT	UNIT	FLARE NAME	TOTAL TOXICS FLOW TO FLARE (LB/Y)	ACETONE	ACETRONITRI	AMMONIA	BENZENE	BISPHENOL A
CHEM	A	A DEPT	A&S*	192553	11325	0	0	0	
CHEM	A	A DEPT	HIPI*	4365819	1362573	0	0	0	
CHEM	E	E DEPT	EP FLARE	0	0	0	0	0	
FUELS	CC&G	CCU	CCU	44826	0	0	0	0	
FUELS	HYDROPR	CR-3	EAST PROPERTY	57128	0	0	0	0	
LOGISTICS	ENVIRON	ENVR N	WEST PROPERTY	324699	0	0	0	2094	
LPA	LUBE MANU.	LUBE MANU	LUBE	630000	0	0	0	0	
LPA	LUBE MANU	LUBE MANU	LHT-1	1300	0	0	0	1300	
OLEF	LO-III	LO3	OP-III ELEVATED*	12446000	0	0	0	0	
OLEF	LO-III	LO3	OP-III GROUND**	15167640	0	0	0	0	
			TOTAL FLARE FLOWS	33229765	1373898	0	0	3394	

*ASSUMES 99.5% FLARE EFFICIENCY INCLUDES UPSE
**ASSUMES 99.9% FLARE EFFICIENCY

TOTAL TOXIC FLOW PRIOR TO CD (LB/Y)	TOTAL TOXIC AFTER CD-LB/Y	OVERALL EFFICIENCY (%)
37944405	244860	99.35

EPA VOLUNTARY EMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS CONTINUED
PROCESS VENTS TO FLARE
1993 SARA

BA	DEPT	UNIT	FLARE NAME	N-BUTYL ALC.	S-BUTYL ALC.	CUMENE	CYCLOHEXANE	DIETHYLAMINE	ECH
CHEM	A	A DEPT	A&S*	0	0	0	0	0	0
CHEM	A	A DEPT	HIPI*	1823	0	0	0	0	0
CHEM	E	E DEPT	EP FLARE	0	0	0	0	0	0
FUELS	CC&G	CCU	CCU	0	0	0	0	0	0
FUELS	HYDROPR	CR-3	EAST PROPERTY	0	0	0	0	0	0
LOGISTICS	ENVIRON	ENVR N	WEST PROPERTY	0	0	0	0	0	0
LPA	LUBE MANU.	LUBE MANU	LUBE	0	0	0	0	0	0
LPA	LUBE MANU	LUBE MANU	LHT-1	0	0	0	0	0	0
OLEF	LO-III	LO3	OP-III ELEVATED*	0	0	0	0	0	0
OLEF	LO-III	LO3	OP-III GROUND**	0	0	0	0	0	0
			TOTAL FLARE FLOWS	1823	0	0	0	0	0

*ASSUMES 99.5% FLARE EFFICIENCY
**ASSUMES 99.9% FLARE EFFICIENCY

TOTAL TOXIC FLOW
PRIOR TO CD (LB/Y)

37944405

EPA VOLUNTARY EMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS CONTINUED
PROCESS VENTS TO FLARE
1996 SARA

BA	DEPT	UNIT	FLARE NAME	ETHYL ACRYLATE	ETHYL BENZENE	HYDRAZINE	METHANOL	MEK	MIBK
CHEM	A	A DEPT	A&S*	0	0	0	0	0	62286
CHEM	A	A DEPT	HIPI*	0	0	0	0	0	0
CHEM	E	E DEPT	EP FLARE	0	0	0	0	0	0
FUELS	CC&G	CCU	CCU	0	0	0	0	0	0
FUELS	HYDROPR	CR-3	EAST PROPERTY	0	0	0	0	0	0
LOGISTICS	ENVIRON	ENVR N	WEST PROPERTY	0	0	0	0	0	0
LPA	LUBE MANU	LUBE MANU	LUBE	0	0	0	0	240000	0
LPA	LUBE MANU	LUBE MANU	LHT-1	0	0	0	0	0	0
OLEF	LO-III	LO3	OP-III ELEVATED*	0	0	0	0	0	0
OLEF	LO-III	LO3	OP-III GROUND**	0	0	0	0	0	0
			TOTAL FLARE FLOWS	0	0	0	0	240000	62286

*ASSUMES 99.3% FLARE EFFICIENCY
**ASSUMES 99.9% FLARE EFFICIENCY

TOTAL TOXIC FLOW
PRIOR TO CD (LB/Y)

37944405

EPA VOLUNTARY EMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS CONTINUED
PROCESS VENTS TO FLARE
1898 SARA

BA	DEPT	UNIT	FLARE NAME	T-BUTYL ALC.	HCL	MTBE	O-XYLENE	PHENOL	PROPYLENE
CHEM	A	A DEPT	A&S*	0	0	0	0	0	96246
CHEM	A	A DEPT	HIPI*	0	0	0	0	0	2322318
CHEM	E	E DEPT	EP FLARE	0	0	0	0	0	0
FUELS	CC&G	CCU	CCU	0	0	0	0	0	31454
FUELS	HYDROPR	CR-3	EAST PROPERTY	0	0	0	0	0	49121
LOGISTICS	ENVIRON	ENVR N	WEST PROPERTY	0	0	0	0	0	233366
LPA	LUBE MANU	LUBE MANU	LUBE	0	0	0	0	0	0
LPA	LUBE MANU	LUBE MANU	LHT-1	0	0	0	0	0	0
OLEF	LO-III	LO3	OP-III ELEVATED*	0	0	0	0	0	0
OLEF	LO-III	LO3	OP-III GROUND**	0	0	0	0	0	5181770
			TOTAL FLARE FLOWS	0	0	0	0	0	7914275

*ASSUMES 99.5% FLARE EFFICIENCY
**ASSUMES 99.9% FLARE EFFICIENCY

TOTAL TOXIC FLOW
PRIOR TO CD (LB/Y)

37944405

EPA VOLUNTARY EMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS CONTINUED
PROCESS VENTS TO FLARE
1898 SARA

BA	DEPT	UNIT	FLARE NAME	SULFURIC ACID	TOLUENE	1,1,1-TCE	1,2,4-TMB	MIXED XYLENE	1,3-BD
CHEM	A	A DEPT	A&S*	0	0	0	0	0	22696
CHEM	A	A DEPT	HIPI*	0	0	0	0	0	0
CHEM	E	E DEPT	EP FLARE	0	0	0	0	0	0
FUELS	CC&G	CCU	CCU	0	0	0	0	0	259
FUELS	HYDROPR	CR-3	EAST PROPERTY	0	0	0	0	0	0
LOGISTICS	ENVIRON	ENVR N	WEST PROPERTY	0	0	0	0	0	0
LPA	LUBE MANU	LUBE MANU	LUBE	0	390000	0	0	0	0
LPA	LUBE MANU	LUBE MANU	LHT-1	0	0	0	0	0	0
OLEF	LO-III	LO3	OP-III ELEVATED*	0	0	0	0	0	0
OLEF	LO-III	LO3	OP-III GROUND**	0	0	0	0	0	3957330
			TOTAL FLARE FLOWS	0	390000	0	0	0	3980285

*ASSUMES 99.5% FLARE EFFICIENCY
**ASSUMES 99.9% FLARE EFFICIENCY

TOTAL TOXIC FLOW
PRIOR TO CD (LB/Y)

37944405

EPA VOLUNTARY EMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS CONTINUED
PROCESS VENTS TO FLARE
1898 SARA

BA	DEPT	UNIT	FLARE NAME	BUTYRALDEHYDE	2-ETHOXYETHANOL	ETHYLENE	CHLORINE	CHROM CMPDS.	COBALT COMPDS.
CHEM	A	A DEPT	A&S*	0	0	0	0	0	
CHEM	A	A DEPT	HIPI*	198715	0	480390	0	0	
CHEM	E	E DEPT	EP FLARE	0	0	0	0	0	
FUELS	CC&G	CCU	CCU	0	0	13113	0	0	
FUELS	HYDROPR	CR-3	EAST PROPERTY	0	0	8007	0	0	
LOGISTICS	ENVIRON	ENVR N	WEST PROPERTY	0	0	89239	0	0	
LPA	LUBE MANU	LUBE MANU	LUBE	0	0	0	0	0	
LPA	LUBE MANU	LUBE MANU	LHT-1	0	0	0	0	0	
OLEF	LO-III	LO3	OP-III ELEVATED*	0	0	12446000	0	0	
OLEF	LO-III	LO3	OP-III GROUND**	0	0	6028540	0	0	
			TOTAL FLARE FLOWS	198715	0	19065289	0	0	

*ASSUMES 99.5% FLARE EFFICIENCY
**ASSUMES 99.9% FLARE EFFICIENCY

TOTAL TOXIC FLOW
PRIOR TO CD (LB/Y)

37944405

EPA VOLUNTARY EMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS CONTINUED
PROCESS VENTS TO FLARE
1898 SARA

BA	DEPT	UNIT	FLARE NAME	CUMENE HYDROP.	NONMETHYL GLYCOLE	ETHER CMPDS.	PHOSPHORIC ACID	ZINC CMPDS.	TOTAL TOXICS FLOW FROM FLARE (T/Y)
CHEM	A	A DEPT	A&S*	0	0	0	0	0	980
CHEM	A	A DEPT	HIPI*	0	0	0	0	0	20940
CHEM	E	E DEPT	EP FLARE	0	0	0	0	0	0
FUELS	CC&G	CCU	CCU	0	0	0	0	0	880
FUELS	HYDROPR	CR-3	EAST PROPERTY	0	0	0	0	0	1140
LOGISTICS	ENVIRON	ENVR N	WEST PROPERTY	0	0	0	0	0	6480
LPA	LUBE MANU	LUBE MANU	LUBE	0	0	0	0	0	12600
LPA	LUBE MANU	LUBE MANU	LHT-1	0	0	0	0	0	20
OLEF	LO-III	LO3	OP-III ELEVATED*	0	0	0	0	0	62240
OLEF	LO-III	LO3	OP-III GROUND**	0	0	0	0	0	15160
			TOTAL FLARE FLOWS	0	0	0	0	0	120440

*ASSUMES 99.5% FLARE EFFICIENCY
**ASSUMES 99.9% FLARE EFFICIENCY

TOTAL TOXIC FLOW
PRIOR TO CD (LB/Y)

37944405

EPA VOLUNTARY EMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS CONTINUED
PROCESS VENTS TO FLARE
1898 SARA

BA	DEPT	UNIT	FLARE NAME	ACETONE	ACETRONITRILE	AMMONIA	BENZENE	BISPHENOL A	N-BUTYL ALC.
CHEM	A	A DEPT	A&S*	60	0	0	0	0	0
CHEM	A	A DEPT	HIPI*	6820	0	0	0	0	0
CHEM	E	E DEPT	EP FLARE	0	0	0	0	0	0
FUELS	CC&G	CCU	CCU	0	0	0	0	0	0
FUELS	HYDROPR	CR-3	EAST PROPERTY	0	0	0	0	0	0
LOGISTICS	ENVIRON	ENVR N	WEST PROPERTY	0	0	0	40	0	0
LPA	LUBE MANU	LUBE MANU	LUBE	0	0	0	0	0	0
LPA	LUBE MANU	LUBE MANU	LHT-1	0	0	0	20	0	0
OLEF	LO-III	LO3	OP-III ELEVATED*	0	0	0	0	0	0
OLEF	LO-III	LO3	OP-III GROUND**	0	0	0	0	0	0
			TOTAL FLARE FLOWS	6880	0	0	60	0	0

*ASSUMES 99.5% FLARE EFFICIENCY
**ASSUMES 99.9% FLARE EFFICIENCY

TOTAL TOXIC FLOW
PRIOR TO CD (LB/Y)

37944405

EPA VOLUNTARY EMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS CONTINUED
PROCESS VENTS TO FLARE
1898 SARA

BA	DEPT	UNIT	FLARE NAME	S-BUTYL ALC.	CUMENE	CYCLOHEXANE	DIETHYLAMINE	ECH	ETHYL ACRYLATE
CHEM	A	A DEPT	A&S*	0	0	0	0	0	0
CHEM	A	A DEPT	HIPI*	0	0	0	0	0	0
CHEM	E	E DEPT	EP FLARE	0	0	0	0	0	0
FUELS	CC&G	CCU	CCU	0	0	0	0	0	0
FUELS	HYDROPR	CR-3	EAST PROPERTY	0	0	0	0	0	0
LOGISTICS	ENVIRON	ENVR N	WEST PROPERTY	0	0	0	0	0	0
LPA	LUBE MANU	LUBE MANU	LUBE	0	0	0	0	0	0
LPA	LUBE MANU	LUBE MANU	LHT-1	0	0	0	0	0	0
OLEF	LO-III	LO3	OP-III ELEVATED*	0	0	0	0	0	0
OLEF	LO-III	LO3	OP-III GROUND**	0	0	0	0	0	0
			TOTAL FLARE FLOWS	0	0	0	0	0	0

*ASSUMES 99.5% FLARE EFFICIENCY
**ASSUMES 99.9% FLARE EFFICIENCY

TOTAL TOXIC FLOW
PRIOR TO CD (LB/Y)

37944405

EPA VOLUNTARY EMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS CONTINUED
PROCESS VENTS TO FLARE
1898 SARA

BA	DEPT	UNIT	FLARE NAME	ETHYL BENZENE	HYDRAZINE	METHANOL	MEK	MIBK	T-BUTYL ALC.
CHEM	A	A DEPT	A&S*	0	0	0	0	320	0
CHEM	A	A DEPT	HIPI*	0	0	0	0	0	0
CHEM	E	E DEPT	EP FLARE	0	0	0	0	0	0
FUELS	CC&G	CCU	CCU	0	0	0	0	0	0
FUELS	HYDROPR	CR-3	EAST PROPERTY*	0	0	0	0	0	0
LOGISTICS	ENVIRON	ENVR N	WEST PROPERTY	0	0	0	0	0	0
LPA	LUBE MANU	LUBE MANU	LUBE	0	0	0	4800	0	0
LPA	LUBE MANU	LUBE MANU	LHT-1	0	0	0	0	0	0
OLEF	LO-III	LO3	OP-III ELEVATED*	0	0	0	0	0	0
OLEF	LO-III	LO3	OP-III GROUND**	0	0	0	0	0	0
			TOTAL FLARE FLOWS	0	0	0	4800	320	0

*ASSUMES 99.5% FLARE EFFICIENCY
**ASSUMES 99.9% FLARE EFFICIENCY

TOTAL TOXIC FLOW
PRIOR TO CD (LB/Y)

37944405

EPA VOLUNTARY EMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS CONTINUED
PROCESS VENTS TO FLARE
1898 SARA

BA	DEPT	UNIT	FLARE NAME	HCL	MTBE	O-XYLENE	PHENOL	PROPYLENE	SULFURIC ACID
CHEM	A	A DEPT	A&S*	0	0	0	0	480	0
CHEM	A	A DEPT	HIPI*	0	0	0	0	11620	0
HEM	E	E DEPT	EP FLARE	0	0	0	0	0	0
UELS	CC&6	CCU	CCU	0	0	0	0	620	0
FUELS	HYDROPR	CR-3	EAST PROPERTY-	0	0	0	0	980	0
OGISTICS	ENVIRON	ENVR N	WEST PROPERTY	0	0	0	0	4660	0
PA	LUBE MANU	LUBE MANU	LUBE	0	0	0	0	0	0
LPA	LUBE MANU	LUBE MANU	LHT-1	0	0	0	0	0	0
LEF	LO-III	LO3	OP-III ELEVATED*	0	0	0	0	0	0
LEF	LO-III	LO3	OP-III GROUND**	0	0	0	0	5180	0
			TOTAL FLARE FLOWS	0	0	0	0	23540	0

*ASSUMES 99.5% FLARE EFFICIENCY
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TOTAL TOXIC FLOW
PRIOR TO CD (LB/Y)

37944405

EPA VOLUNTARY EMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS CONTINUED
PROCESS VENTS TO FLARE
1898 SARA

BA	DEPT	UNIT	FLARE NAME	TOLUENE	1,1,1-TCE	1,2,4-TMB	MIXED XYLENE	1,3-BD	BUTYRALDEHYDE
CHEM	A	A DEPT	A&S*	0	0	0	0	120	0
CHEM	A	A DEPT	HIPI*	0	0	0	0	0	100
CHEM	E	E DEPT	EP FLARE	0	0	0	0	0	0
FUELS	CC&G	CCU	CCU	0	0	0	0	0	0
FUELS	HYDROPR	CR-3	EAST PROPERTY	0	0	0	0	0	0
LOGISTICS	ENVIRON	ENVR N	WEST PROPERTY	0	0	0	0	0	0
LPA	LUBE MANU	LUBE MANU	LUBE	7800	0	0	0	0	0
LPA	LUBE MANU	LUBE MANU	LHT-1	0	0	0	0	0	0
OLEF	LO-III	LO3	OP-III ELEVATED*	0	0	0	0	0	0
OLEF	LO-III	LO3	OP-III GROUND**	0	0	0	0	3960	0
			TOTAL FLARE FLOWS	7800	0	0	0	4080	100

*ASSUMES 99.5% FLARE EFFICIENCY
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TOTAL TOXIC FLOW
PRIOR TO CD (LB/Y)

37944405

EPA VOLUNTARY EMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS CONTINUED
PROCESS VENTS TO FLARE
1898 SARA

BA	DEPT	UNIT	FLARE NAME	2-ETHOXYETHAN	ETHYLENE	CHLORINE	CHROM CMPDS.	COBALT COMPDS.	CUMENE HYDROP.
CHEM	A	A DEPT	A&S*	0	0	0	0	0	0
CHEM	A	A DEPT	HIPI*	0	2400	0	0	0	0
CHEM	E	E DEPT	EP FLARE	0	0	0	0	0	0
FUELS	CC&G	CCU	CCU	0	260	0	0	0	0
FUELS	HYDROPR	CR-3	EAST PROPERTY	0	160	0	0	0	0
LOGISTICS	ENVIRON	ENVR N	WEST PROPERTY	0	1780	0	0	0	0
LPA	LUBE MANU	LUBE MANU	LUBE	0	0	0	0	0	0
LPA	LUBE MANU	LUBE MANU	LHT-1	0	0	0	0	0	0
LEF	LO-III	LO3	OP-III ELEVATED*	0	62240	0	0	0	0
LEF	LO-III	LO3	OP-III GROUND**	0	6020	0	0	0	0
			TOTAL FLARE FLOWS	0	72860	0	0	0	0

*ASSUMES 99.5% FLARE EFFICIENCY
**ASSUMES 99.9% FLARE EFFICIENCY

TOTAL TOXIC FLOW
PRIOR TO CD (LB/Y)

37944405

LPA VOLUNTARY EMISSIONS REDUCTIONS
ITEM #3 - PROCESS VENTS CONTINUED
ROCESS VENTS TO FLARE
898 SARA

BA	DEPT	UNIT	FLARE NAME	NONMETHYL GLYCOLE	ETHER CMPDS.	PHOSPHORIC ACID	ZINC CMPDS.
CHEM	A	A DEPT	A&S*	0	0	0	0
EM	A	A DEPT	HIPI*	0	0	0	0
EM	E	E DEPT	EP FLARE	0	0	0	0
FUELS	CC&G	CCU	CCU	0	0	0	0
ELS	HYDROPR	CR-3	EAST PROPERTY	0	0	0	0
GISTICS	ENVIRON	ENVR N	WEST PROPERTY	0	0	0	0
LPA	LUBE MANU	LUBE MANU	LUBE	0	0	0	0
LPA	LUBE MANU	LUBE MANU	LHT-1	0	0	0	0
EF	LO-III	LO3	OP-III ELEVATED*	0	0	0	0
EF	LO-III	LO3	OP-III GROUND**	0	0	0	0
			TOTAL FLARE FLOWS	0	0	0	0

*ASSUMES 99.5% FLARE EFFICIENCY
**ASSUMES 99.9% FLARE EFFICIENCY

TOTAL TOXIC FLOW
PRIOR TO CD (LB/Y)

37944405

TOXIC EMISSIONS FROM FIXED ROOF TANKS
SHELL DEER PARK MANUFACTURING COMPLEX

BA	DEPT	UNIT	TANK NAME	MAJOR COMPONENTS	TOXIC EMISSIONS, TONS/YR (1)	COMMENTS
LOGISTICS	DOCKS	DOCKS	F-355	MIXED XYLENES	8.5	
CHEM	A	A	T81	DMK, IPA, WATER	8.2	
FUELS	AROM	ACU	X303	TOLUENE	7.1	
FUELS	AROM	ACU	X304	TOLUENE	7.1	
CHEM	CG	CG	T40601	F. MIBK	6.4	(3)
LPA	PAU	PAU	G-331	CUMENE	5.8	
CHEM	CG	CG	T720	CRUDE ECH	5.8	(2)
LPA	PAU	PAU	D-394	CUMENE	5.3	
LPA	PAU	PAU	G-330	CUMENE	5.0	
LOGISTICS	DOCKS	DOCKS	D-354	NBA	4.4	
LOGISTICS	DOCKS	DOCKS	F-349	N BUTY ALCOHOL	4.1	
LOGISTICS	UTILPROD	UTILSO	TUT-605	OILY WATER	4.0	(2)
LOGISTICS	UTILPROD	UTILSO	TUT-604	OILY WATER	4.0	(2)
CHEM	CG	CG	T40602	CRUDE MIBK	3.4	(3)
CHEM	CG	CG	T25601	CR. MIBK	3.1	(3)
LOGISTICS	DOCKS	DOCKS	D-348	MIBK	3.0	
CHEM	A	A	T89	DMK,IPA,MIBK,H2O	2.7	
FUELS	HYDROPR	CATREF	L-333	MIXED XYLENES	2.3	
FUELS	HYDROPR	CATREF	L-306	MIXED XYLENES	2.3	
FUELS	HYDROPR	CATREF	L-332	MIXED XYLENES	2.3	
FUELS	HYDROPR	CATREF	L-308	MIXED XYLENES	2.3	
FUELS	AROM	ACU	D303	TOLUENE	2.2	
CHEM	CG	CG	T1512	F. MIBK	1.4	(3)
CHEM	CG	CG	T1513	F. MIBK	1.4	(3)
CHEM	E	BA	T-5444	NBA	1.3	
CHEM	CG	CG	D-358	FIN. ECH (DOCKS)	1.3	(2)
LPA	PAU	PAU	D-395	CUMENE	1.3	
CHEM	E	BA	T-5441	CRUDE C4	1.1	
LOGISTICS	DOCKS	DOCKS	D-343	ECH	1.0	(2)
LPA	PAU	PAU	D-400	CUMENE	1.0	
CHEM	E	BA	T-9561	AZEO. COLUMN BTMS.	1.0	
LOGISTICS	DOCKS	DOCKS	D-342	CUMENE	0.9	
CHEM	E	BA	T-5437	NBA	0.7	
CHEM	E	BA	T-5438	NBA	0.6	
CHEM	CG	CG	T3020	MIBK H.E.	0.6	
CHEM	A	A	T92	IPA, IPE, DMK	0.6	
LPA	PAU	PAU	D-313	TOLUENE	0.5	
FUELS	AROM	HDU1	J316	PL2 NSB HVY NAPHTHA	0.5	
CHEM	CG	CG	T3401	CR. ECH	0.4	
LPA	LUBELOG	LUBEC	J311	CUTTER STOCK	0.4	
LPA	LUBELOG	LUBEC	J310	CUTTER STOCK	0.4	
LPA	PAU	PAU	D-403	PHENOL	0.3	
LPA	PAU	PAU	D-402	PHENOL	0.3	
RESINS	BPA	BPA	T2415	Phenol/BPA	0.3	
FUELS	SOLTR	SOLTR	S343	GASOLINE ON CAUSTIC	0.3	
FUELS	SOLTR	SOLTR	S344	GASOLINE ON CAUSTIC	0.3	
RESINS	BPA	BPA	T2414	Phenol	0.3	

TOXIC EMISSIONS FROM FIXED ROOF TANKS
SHELL DEER PARK MANUFACTURING COMPLEX

BA	DEPT	UNIT	TANK NAME	MAJOR COMPONENTS	TOXIC EMISSIONS, TONS/YR (1)	COMMENTS
LOGISTICS	DOCKS	DOCKS	D-307	PHENOL	0.3	
LOGISTICS	DOCKS	DOCKS	D-306	PHENOL	0.3	
CHEM	CG	CG	T302	CRUDE DAA	0.3	
FUELS	AROM	HDU1	J315	PL2 NSB HVY NAPHTHA	0.2	
CHEM	CG	CG	T256	CRUDE DAA	0.2	
CHEM	CG	CG	T3407	F. ECH	0.2	
CHEM	CG	CG	T396	F. ECH	0.2	
CHEM	CG	CG	T397	F. ECH	0.2	
CHEM	CG	CG	T4010	CRUDE MIBC	0.2	
CHEM	CG	CG	T154	WATER SLOPS	0.1	
CHEM	CG	CG	T151	WATER SLOPS	0.1	
CHEM	CG	CG	T15608	F. SBA	0.1	
FUELS	SOLTR	SOLTR	D389	C9-C11 SOLV(CS-53)	0.1	
FUELS	SOLTR	SOLTR	D384	C9-C11 SOLV(CS-53)	0.1	
FUELS	SOLTR	SOLTR	S325	C10 HC ON CAUSTIC	0.1	
CHEM	A	A	T69C	IPA, DMK, IPE, H2O	0.1	
CHEM	A	A	T73C	IPA, DMK, IPE, H2O	0.1	
FUELS	SOLTR	SOLTR	I303	C9-C13 AROMATICS	0.1	
CHEM	CG	CG	T3402	FIN. ECH	0.1	
CHEM	CG	CG	T3403	F. ECH	0.1	
FUELS	DISTIL	DU2	S-320	Aq NH3	0.1	
CHEM	E	BA	T-9565	EMP TOPS	0.1	
CHEM	E	BA	T-5421	CRUDE BA	0.1	
OLEF	LO-III	LO-III	TC33007	HYDRAZINE 35 WT%	0.1	
FUELS	SOLTR	SOLTR	S326	C10 HC ON CAUSTIC	0.1	
CHEM	E	BA	T-5439	E.R. TANK	0.1	
CHEM	E	BA	T-9569	CRUDE C8	0.1	
FUELS	CC&G	GR	J322	CCULGO	0.1	
FUELS	CC&G	CCU	J336	CCULGO	0.1	
LPA	LUBELOG	LUBEC	SS301	SWIM 5	0.0	
CHEM	CG	CG	T772	CRUDE TOP	0.0	
FUELS	DISTIL	DU1	V-329	METHANOL	0.0	
FUELS	SOLTR	SOLTR	D376	C10-C12 SOLV(CS-63)	0.0	
FUELS	SOLTR	SOLTR	D375	C10-C12 SOLV(CS-63)	0.0	
FUELS	AROM	HDU1	J328	HDU1 MS FEED	0.0	
CHEM	E	BA	T-9563	2EH LIGHT ENDS	0.0	
FUELS	CC&G	CCU	J323	CCULGO (SHARED)	0.0	
RESINS	MAJRESINS	EPON5	T2701	WATER,ECH,IPA	0.0	
CHEM	E	BA	T-9513	RM-14 SOLUTION	0.0	
CHEM	E	BA	T-9523	AZEO COL. PURGE	0.0	
RESINS	BPA	BPA	T147	IPE/Phenol	0.0	
CHEM	A	A	T69A	MEK, DMK, H2O, IPA	0.0	
FUELS	CC&G	CCU	J337	CCULGO (SHARED)	0.0	
FUELS	AROM	HDU1	J326	HDU1 FEED SOUR ASTF	0.0	
LPA	LUBEMANUF	LUBEB	SS403	SWIM-5	0.0	
FUELS	AROM	PLAT2	J332	SOUR KEROSENE	0.0	
FUELS	DISTIL	DU2	V-1111	METHANOL	0.0	

TOXIC EMISSIONS FROM FIXED ROOF TANKS
SHELL DEER PARK MANUFACTURING COMPLEX

BA	DEPT	UNIT	TANK NAME	MAJOR COMPONENTS	TOXIC EMISSIONS, TONS/YR (1)	COMMENTS
CHEM	E	BA	T-5442	STEP I BTMS.	0.0	
CHEM	CG	CG	T2402	ECH H.E.	0.0	
RESINS	MAJRESINS	EPON5	T2702	BPA,WATER,ECH,IPA	0.0	
FUELS	DISTIL	DU2	S5404	AQ AMMONIA	0.0	
FUELS	CC&G	CCU	J338	CCULGO (SHARED)	0.0	
CHEM	E	BA	T-9541	SDF BTMS.	0.0	
CHEM	E	BA	T-9556	AZEO COL. PURGE	0.0	
CHEM	CG	CG	T799	ECH H.E.	0.0	
CHEM	CG	CG	T392	TOPPED TCP	0.0	
RESINS	MAJRESINS	EPON5	T2735	RESIN,XYLENE	0.0	
RESINS	BPA	BPA	T1857	IPE/Phenol	0.0	
FUELS	SOLTR	SOLTR	S372	C10 HC ON CAUSTIC	0.0	
CHEM	CG	CG	T393	TOPPED TCP	0.0	
RESINS	BPA	BPA	V2426	Pan Dryer Btms	0.0	
CHEM	CG	CG	T783	CRUDE TCP	0.0	
RESINS	MAJRESINS	EPON5	T2739	RESIN,XYLENE	0.0	
LPA	LUBELOG	LUBEC	D346	NAPHTHA	0.0	
FUELS	SOLTR	SOLTR	S327	C10-C12 HC ON WATER	0.0	
LPA	LUBELOG	LUBEC	D347	NAPHTHA	0.0	
RESINS	MAJRESINS	EPON5	T2734	RESIN,XYLENE	0.0	
CHEM	E	BA	T-9521	WASTE	0.0	
FUELS	HYDROPR	SGP	S-305	30% DEA IN H2O	0.0	
FUELS	AROM	ACU	S392	SULFOLANE	0.0	
FUELS	AROM	ACU	S390	SULFOLANE	0.0	
FUELS	AROM	ACU	S391	SULFOLANE	0.0	
OLEF	BDHTIP	BDHTIP	TOL-400	HYDROTREATED GAS OIL	0.0	
FUELS	DISTIL	DU2	S-347	DE-EMULSIFIER	0.0	
CHEM	E	BA	T-5431	PROCESS WATER	0.0	
CHEM	E	BA	T-5432	PROCESS WATER	0.0	
LOGISTICS	UTILPROD	UTILSO	TOL-309	HYDRAZINE	0.0	
FUELS	DISTIL	DU2	SS-336	CORROSION INHIBITOR	0.0	
FUELS	CC&G	GR	S402	DEA/H2S	0.0	
FUELS	HYDROPR	SGP	S-306	85% DEA IN H2O	0.0	
RESINS	MAJRESINS	EPON5	T2707	WATER,ECH,IPA	0.0	
RESINS	MAJRESINS	EPON5	T2705	RESIN,WATER,ECH,IPA	0.0	
RESINS	MAJRESINS	EPON5	T2706	RESIN,WATER,ECH,IPA	0.0	
CHEM	E	GIRBOTOL	T-1003	DEA (FRESH, 80%)	0.0	
RESINS	BPA	BPA	T1854	DRIPS	0.0	
OLEF	LO-III	LO-III	TC33002	50 WT% DEA IN WATER	0.0	
CHEM	E	GIRBOTOL	T-1211	DEA (FRESH, 80%)	0.0	
CHEM	E	GIRBOTOL	T-1001	DEA (SLOPS, 25%)	0.0	
CHEM	E	GIRBOTOL	T-1212	DEA (SLOPS, 25%)	0.0	
CHEM	E	EA	T-1206A	EA-190	0.0	
CHEM	E	EA	T-1206E	EA-190	0.0	
CHEM	E	EA	T-1215	EA-190	0.0	
CHEM	CG	CG	T251	F. HG	0.0	

TOXIC EMISSIONS FROM FIXED ROOF TANKS
SHELL DEER PARK MANUFACTURING COMPLEX

BA	DEPT	UNIT	TANK NAME	MAJOR COMPONENTS	TOXIC EMISSIONS, TONS/YR (1)	COMMENTS
CHEM	E	EA	T-1205C	EA-190	0.0	
CHEM	CG	CG	T-742	25% NAOH	0.0	
CHEM	CG	CG	T10801	F. DAA	0.0	
CHEM	E	EA	T-1207A	EA-190/200	0.0	
CHEM	E	EA	T-1603	IPA	0.0	
CHEM	CG	CG	T253	F. HG	0.0	
CHEM	CG	CG	T-765	50% NAOH	0.0	
CHEM	CG	CG	T25602	RXR GRADE DAA	0.0	
CHEM	CG	CG	T1218	F. MIBC	0.0	
CHEM	CG	CG	T-741	25% NAOH	0.0	
CHEM	A	A	T79C	IPA	0.0	
CHEM	E	E DIST	T-1617	FILMCOL	0.0	
CHEM	A	A	T87	NAOH, WATER	0.0	
CHEM	CG	CG	T-785	FKB WASHING	0.0	
CHEM	CG	CG	T2516	F. MIBC	0.0	
CHEM	E	BA	T-9570	2EH	0.0	
CHEM	A	A	T82	H2SO4, WATER	0.0	
CHEM	CG	CG	T1219	F. MIBC	0.0	
CHEM	CG	CG	T15605	MIBC H.E.	0.0	
CHEM	E	EA	T-1214	EA-190	0.0	
CHEM	A	A	T3033	NAOH, WATER	0.0	
CHEM	CG	CG	T25804	F. DAA	0.0	
CHEM	CG	CG	T10803	F. DAA	0.0	
CHEM	A	A	T70B	IPA, WATER	0.0	
CHEM	A	A	T104	NAOH, WATER	0.0	
CHEM	CG	CG	T723	FIN. HG	0.0	
CHEM	A	A	T123	H2SO4, WATER	0.0	
CHEM	CG	CG	T40806	CRUDE HG	0.0	
CHEM	A	A	T359	NAOH, WATER	0.0	
CHEM	E	EA	T-1206B	EA-190	0.0	
CHEM	E	EA	T-3229	BRUCINE SULFATE SOL.	0.0	
CHEM	A	A	V4C	IPE, C6, C8, C4	0.0	
CHEM	E	EA	T-1613	BITREX SOLUTION	0.0	
CHEM	CG	CG	T-784	FKB NEUTRALIZATION	0.0	
CHEM	CG	CG	T-6025	10% NAOH	0.0	
CHEM	CG	CG	T15606	MIBC H.E.	0.0	
CHEM	E	E DIST	T-1611	FILMCOL	0.0	
CHEM	E	EA	T-1207B	EA-190	0.0	
CHEM	E	BA	T-5153	RM-17 SOLUTION	0.0	
CHEM	A	A	T79B	IPA	0.0	
CHEM	E	EA	T-1610B	TOLUENE	0.0	
CHEM	E	BA	T-9551	IBA	0.0	
CHEM	A	A	T181	NAOH, WATER	0.0	
CHEM	CG	CG	T724	FIN. HG	0.0	
CHEM	E	E DIST	T-1612	NEOSOL	0.0	
CHEM	CG	CG	T1014	MIBC H.E.	0.0	
CHEM	E	BA	T-9514	IBA	0.0	

TOXIC EMISSIONS FROM FIXED ROOF TANKS
SHELL DEER PARK MANUFACTURING COMPLEX

BA	DEPT	UNIT	TANK NAME	MAJOR COMPONENTS	TOXIC EMISSIONS, TONS/YR (1)	COMMENTS
CHEM	A	A	T116A	H2SO4, WATER	0.0	
CHEM	E	BA	T-9543	KOH	0.0	
CHEM	E	EA	T-1614	ETHYL ACETATE	0.0	
CHEM	CG	CG	T-788	50% NAOH	0.0	
CHEM	E	BA	T-9559	WASTE WATER	0.0	
CHEM	CG	CG	T-955	24% NAOH	0.0	
CHEM	E	BA	T-5435	IBA	0.0	
CHEM	CG	CG	T20601	MIBC H.E.	0.0	
CHEM	E	BA	T-5436	2EH	0.0	
CHEM	A	A	T80	TO BE DEMOLISHED	0.0	
CHEM	CG	CG	T2514	F. MIBC	0.0	
CHEM	A	A	T114A	H2SO4, WATER	0.0	
CHEM	E	BA	T-9558	WASTE WATER	0.0	
CHEM	A	A	T124	H2SO4, WATER	0.0	
CHEM	E	EA	T-1206D	EA-200	0.0	
CHEM	CG	CG	T252	F. HG	0.0	
CHEM	E	EA	T-1601	METHYL ALCOHOL	0.0	
CHEM	E	BA	T-9560	IBA	0.0	
CHEM	E	GIRBOTOL	T-1604	DIETHYLAMINE	0.0	
CHEM	CG	CG	T-954	4% NAOH	0.0	
CHEM	E	E DIST	T-1608	OFF-SPEC ALCOHOL	0.0	
CHEM	E	EA	T-1205A	EA-190	0.0	
CHEM	E	EA	T-1205B	EA-190	0.0	
CHEM	A	A	T360	H2SO4, WATER	0.0	
CHEM	A	A	T79A	IPA	0.0	
CHEM	E	BA	T-9557	RM-17 SOLUTION	0.0	
CHEM	A	A	T96	NAOH, WATER	0.0	
CHEM	A	A	T63	IDLE	0.0	
CHEM	E	BA	T-9552	IBA	0.0	
CHEM	CG	CG	T25805	F. DAA	0.0	
CHEM	E	EA	T-1206C	EA-200	0.0	
CHEM	CG	CG	T20602	HG H.E.	0.0	
CHEM	CG	CG	T25604	RXR GRADE DAA	0.0	
CHEM	A	A	T340C	H2SO4, WATER	0.0	
CHEM	E	BA	T-9522	RM-14 SOLUTION	0.0	
CHEM	E	BA	T-5434	IBA	0.0	
CHEM	CG	CG	T25603	RXR GRADE DAA	0.0	
CHEM	E	EA	T-1609B	TBA/EA	0.0	
CHEM	CG	CG	T10802	F. DAA	0.0	
CHEM	E	EA	T-1213	EA-200	0.0	
CHEM	E	BA	T-9542	IBA	0.0	
CHEM	A	A	T101B	H2SO4, WATER	0.0	
CHEM	A	A	T362B	H2SO4, WATER	0.0	
CHEM	E	BA	T-5433	2EH	0.0	
CHEM	E	EA	T-1852	OXITOL	0.0	
CHEM	E	EA	T-1616	SHELL SOL B	0.0	
CHEM	CG	CG	T744B	ECH/H2O SLOPS	0.0	

TOXIC EMISSIONS FROM FIXED ROOF TANKS
SHELL DEER PARK MANUFACTURING COMPLEX

BA	DEPT	UNIT	TANK NAME	MAJOR COMPONENTS	TOXIC EMISSIONS, TONS/YR (1)	COMMENTS
CHEM	A	A	T3143	IPA, WATER	0.0	
CHEM	E	EA	T-1602	BITREX SOLUTION	0.0	
CHEM	CG	CG	T395	F, TCP	0.0	
FUELS	ATC	THCR	J-306	STR RUN RESIDUE	0.0	
FUELS	ATC	THCR	N-303	STR RUN RESIDUE	0.0	
FUELS	CC&G	GR	J349	CCFEED	0.0	
FUELS	ATC	THCR	G-303	SLURRY	0.0	
FUELS	ATC	THCR	K-311	PITCH	0.0	
FUELS	AROM	ACU	D304	C7 PARAFFINS	0.0	
FUELS	HYDROPR	CATREF	SS-351	IPA	0.0	
FUELS	DISTIL	DU2	SS-343	SEAL OIL	0.0	
FUELS	CC&G	GR	J348	CFH FEED	0.0	
FUELS	ATC	ALKY	U-307	ALKYLATE BTMS	0.0	
FUELS	DISTIL	DU1	H-337	NEUTRALIZING AMINE	0.0	
FUELS	ATC	THCR	K-301	LUBEE	0.0	
FUELS	ATC	THCR	J-307	RESIDUE	0.0	
FUELS	DISTIL	DU2	F339	HEAVY GAS OIL	0.0	
FUELS	DISTIL	DU2	J-336	GAS OIL (SHARED)	0.0	
FUELS	ATC	ALKY	S-310	FRESH CAUSTIC	0.0	
FUELS	ATC	THCR	J-302	SLURRY	0.0	
FUELS	SOLTR	SOLTR	H316	ALKYLATE ON ACID	0.0	
FUELS	SOLTR	SOLTR	F332	VM&P-HT	0.0	
FUELS	ATC	THCR	O-307	GAS OIL	0.0	
FUELS	ATC	THCR	J-301	SLURRY	0.0	
FUELS	SOLTR	SOLTR	D383	C7 SOLVENT(TOLW-HT)	0.0	
FUELS	SOLTR	SOLTR	D316	C11-C12 SOLVENT(71)	0.0	
FUELS	AROM	ACU	R320	SULFOLANE WASTE H2O	0.0	
FUELS	ATC	THCR	G-307	MFO	0.0	
FUELS	DISP	DISP	S318	DIETH GLYC MONO ETHER	0.0	
FUELS	AROM	ACU	D373	SULFOLANE WASTE H2O	0.0	
FUELS	ATC	THCR	O-303	GAS OIL	0.0	
FUELS	ATC	THCR	AP-2	MFO	0.0	
FUELS	ATC	ALKY	U-301	ALKYLATE ON ACID	0.0	
FUELS	AROM	ACU	L335	SULFOLANE WASTE H2O	0.0	
FUELS	AROM	ACU	F356	SULFOLANE WASTE H2O	0.0	
FUELS	ATC	THCR	K-303	COLGO	0.0	
FUELS	DISTIL	DU1	SS-305	DEMULSIFIER	0.0	
FUELS	AROM	PLAT2	G347	JET KEROSENE	0.0	
FUELS	ATC	THCR	N-304	STR RUN RESIDUE	0.0	
FUELS	ATC	THCR	G-302	MFO	0.0	
FUELS	CC&G	GR	D365	NORMAL OCTANE	0.0	
FUELS	CC&G	GR	D367	NORMAL PARAFFINS	0.0	
FUELS	CC&G	GR	SS308	JP-8 ANTI-ICANT	0.0	
FUELS	ATC	THCR	J-305	RESIDUE	0.0	
FUELS	HYDROPR	HYDCR	J331	SRHGO	0.0	
FUELS	CC&G	GR	SS310	KEROSENE (F.D ADD.)	0.0	

TOXIC EMISSIONS FROM FIXED ROOF TANKS
SHELL DEER PARK MANUFACTURING COMPLEX

BA	DEPT	UNIT	TANK NAME	MAJOR COMPONENTS	TOXIC EMISSIONS, TONS/YR (1)	COMMENTS
FUELS	ATC	THCR	AP-1	MFO	0.0	
FUELS	HYDROPR	HYDCR	J337	CCLGO/SRHGO (SHARED)	0.0	
FUELS	CC&G	GR	SS331	DUPONT ADDITIVE	0.0	
FUELS	CC&G	DHT	J-309	PGO	0.0	
FUELS	ATC	THCR	K-310	PITCH	0.0	
FUELS	HYDROPR	HYDCR	SS344	SULFINOL	0.0	
FUELS	CC&G	GR	G304	SRHGO	0.0	
FUELS	DISTIL	DU1	S-395	CAUSTIC	0.0	
FUELS	ATC	THCR	J-303	SLURRY	0.0	
FUELS	HYDROPR	HYDCR	SS352	DIPA	0.0	
FUELS	CC&G	GR	G322	CCULGO	0.0	
FUELS	CC&G	DHT	J-308	RFO	0.0	
FUELS	ATC	THCR	K-302	LUBES	0.0	
FUELS	CC&G	GR	D366	NORMAL PARAFFINS	0.0	
FUELS	CC&G	GR	J324	CCULGO	0.0	
FUELS	AROM	ACU	D374	SULFOLANE WASTE H2O	0.0	
FUELS	CC&G	GR	D364	NORMAL OCTANE	0.0	
FUELS	ATC	ALKY	S-307	FRESH CAUSTIC	0.0	
FUELS	AROM	ACU	L334	SULFOLANE WASTE H2O	0.0	
FUELS	DISTIL	DU2	F340	HEAVY GAS OIL	0.0	
FUELS	CC&G	GR	AP17	CCFEED	0.0	
FUELS	AROM	ACU	D332	C6 PARAFFINS	0.0	
FUELS	CC&G	GR	AP16	SOUR WATER	0.0	
FUELS	ATC	ALKY	SS-306	FRESH SULFURIC ACID	0.0	
FUELS	CC&G	GR	AP16	CCFEED	0.0	
FUELS	SOLTR	SOLTR	D327	C7 SOLVENT(TOLW-HT)	0.0	
FUELS	SOLTR	SOLTR	D335	C10-C11 SOLV(140-HT)	0.0	
FUELS	ATC	ALKY	SS-307	FRESH SULFURIC ACID	0.0	
FUELS	AROM	ACU	D372	SULFOLANE WASTE H2O	0.0	
FUELS	DISTIL	DU2	H-336	CHROMATE	0.0	
FUELS	SOLTR	SOLTR	D315	C3 SOLV(VM&P-HT)	0.0	
FUELS	AROM	ACU	D334	C7 PARAFFINS (DOCKS)	0.0	
FUELS	SOLTR	SOLTR	D326	ALKYLATE BOTTOMS	0.0	
FUELS	CC&G	GR	AP17	SOUR WATER	0.0	
FUELS	DISTIL	DU2	J-323	GAS OIL (SHARED)	0.0	
FUELS	CC&G	GR	SS329	F.O. ADDITIVE	0.0	
FUELS	SOLTR	SOLTR	D336	C10-C11 SOLV(140-HT)	0.0	
FUELS	HYDROPR	HYDCR	SULFUR	SULFUR	0.0	
FUELS	ATC	ALKY	U-306	ALKYLATE BTMS	0.0	
FUELS	DISTIL	DU1	S-380	CORROSION INHIBITOR	0.0	
FUELS	ATC	THCR	O-306	GAS OIL	0.0	
FUELS	HYDROPR	HYDCR	V709	DIPA-OXYZOLIDONE	0.0	
FUELS	ATC	THCR	J-304	CCLGO	0.0	
FUELS	DISTIL	DU2	S-348	CAUSTIC	0.0	
FUELS	CC&G	GR	G322	JET FUEL	0.0	
FUELS	AROM	PLAT2	SS375	METHYOXITOL FA4	0.0	

TOXIC EMISSIONS FROM FIXED ROOF TANKS
SHELL DEER PARK MANUFACTURING COMPLEX

BA	DEPT	UNIT	TANK NAME	MAJOR COMPONENTS	TOXIC EMISSIONS, TONS/YR (1)	COMMENTS
FUELS	DISTIL	DU2	J-325	GAS OIL	0.0	
FUELS	DISP	DISP	SS-364	ANTI-OXIDANT	0.0	
FUELS	DISTIL	DU2	SS-341	CONDENSATE	0.0	
FUELS	ATC	ALKY	S-313	FRESH CAUSTIC	0.0	
FUELS	AROM	HDU1	J327	HDU1 HYDRO TREATED MS	0.0	
FUELS	SOLTR	SOLTR	D314	C9-C11 SOLV(340-HT)	0.0	
FUELS	HYDROPR	HYDCR	SS388	DIPA	0.0	
FUELS	AROM	ACU	L336	SULFOLANE WASTE H2O	0.0	
FUELS	SOLTR	SOLTR	F333	SOL 340 - HT	0.0	
FUELS	ATC	THCR	N-301	STR RUN RESIDUE	0.0	
FUELS	DISP	DISP	D-363	DIETH GLYC MONO ETHER	0.0	
FUELS	CC&G	GR	S429	SOUR WATER	0.0	
FUELS	CC&G	GR	S312	JET A	0.0	
FUELS	DISTIL	DU2	COREXIT	CORROSION INHIBITOR	0.0	
FUELS	DISTIL	DU2	S-381	NEUTRALIZING AMINE	0.0	
FUELS	SOLTR	SOLTR	SS314	ALKYLATE ON ACID	0.0	
FUELS	ATC	ALKY	U-302	ALKYLATE ON ACID	0.0	
FUELS	CC&G	GR	G320	SALES NAPHTHA	0.0	
FUELS	HYDROPR	HYDCR	J338	CCLGO/SRHGO (SHARED)	0.0	
FUELS	AROM	ACU	S400	SULFOLANE	0.0	
FUELS	CC&G	GR	G322	SRHGO	0.0	
FUELS	AROM	ACU	D369	SULFOLANE WASTE H2O	0.0	
FUELS	AROM	PLAT2	SS330	METHYOXITOL FA4	0.0	
LOGISTICS	ENV	ENVNO	X-330	WASTEWATER	0.0	
LOGISTICS	DOCKS	DOCKS	P-311	OUT OF SERIVCE	0.0	
LOGISTICS	ENV	ENVNO	S-417	EMPTY	0.0	
LOGISTICS	UTILPROD	UTILSO	D-388	FUEL OIL	0.0	
LOGISTICS	DOCKS	DOCKS	P-312	OUT OF SERIVCE	0.0	
LOGISTICS	ENV	ENVNO	X-328	CONC. WASTEWATER	0.0	
LOGISTICS	UTILPROD	UTILNO	SS390	CAUSTIC STORAGE	0.0	
LOGISTICS	UTILPROD	UTILNO	SS389	H2SO4 STORAGE	0.0	
LOGISTICS	UTILPROD	UTILSO	SS-401	50% CAUSTIC	0.0	
LOGISTICS	DOCKS	DOCKS	K-306	PITCH	0.0	
LOGISTICS	UTILPROD	UTILSO	SS-398	50% CAUSTIC	0.0	
LOGISTICS	UTILPROD	UTILNO	K312	BLENDED PITCH	0.0	
LOGISTICS	ENV	ENVSO	T-1301	25% NAOH, WATER	0.0	
LOGISTICS	ENV	ENVSO	T-1319	<= 0.1% ORGANICS, REM	0.0	
LOGISTICS	UTILSYS	UTILSYS	S-317	93% SULFURIC ACID	0.0	
LOGISTICS	DOCKS	DOCKS	D-357	CYCLOSOL 53	0.0	
LOGISTICS	ENV	ENVSO	A-1323	ASSUME 50 % ORGANICS,	0.0	
LOGISTICS	DOCKS	DOCKS	F-347	NORM PARAFFINS	0.0	
LOGISTICS	DOCKS	DOCKS	D-382	CAUSTIC	0.0	
LOGISTICS	DOCKS	DOCKS	D-368	CAUSTIC	0.0	
LOGISTICS	DOCKS	DOCKS	M-302	MARINE DIESEL	0.0	
LOGISTICS	ENV	ENVNO	S-416	EMPTY	0.0	

TOXIC EMISSIONS FROM FIXED ROOF TANKS
SHELL DEER PARK MANUFACTURING COMPLEX

BA	DEPT	UNIT	TANK NAME	MAJOR COMPONENTS	TOXIC EMISSIONS, TONS/YR (1)	COMMENTS
LOGISTICS	DOCKS	DOCKS	D-385	OUT OF SERVICE	0.0	
LOGISTICS	DOCKS	DOCKS	P-313	OUT OF SERV	0.0	
LOGISTICS	ENV	ENVSO	T2800	BRINE	0.0	
LOGISTICS	DOCKS	DOCKS	D-355	HEXYL GLYCOL	0.0	
LOGISTICS	ENV	ENVSO	T-1307A	EMPTY	0.0	
LOGISTICS	ENV	ENVNO	X-310	EMPTY	0.0	
LOGISTICS	ENV	ENVNO	SS-335	30 % CAUSTIC	0.0	
LOGISTICS	ENV	ENVNO	S-412	WASTEWATER	0.0	
LOGISTICS	UTILPROD	UTILNO	D378	FUEL OIL	0.0	
LOGISTICS	ENV	ENVSO	T-1317	ASSUME 50% ORGANICS, 5	0.0	
LOGISTICS	UTILPROD	UTILSO	SS-397	50% CAUSTIC	0.0	
LOGISTICS	ENV	ENVNO	X-324	CONC. WASTEWATER	0.0	
LOGISTICS	ENV	ENVNO	X-327	CONC. WASTEWATER	0.0	
LOGISTICS	ENV	ENVNO	SS-336	30% SULFURIC ACID	0.0	
LOGISTICS	ENV	ENVSO	T-1318	WATER	0.0	
LOGISTICS	ENV	ENVSO	T-1302	1% IPA, 30% NaOH, WATE	0.0	
LOGISTICS	DOCKS	DOCKS	D-337	TOL A	0.0	
LOGISTICS	DOCKS	DOCKS	P-302	OUT OF SERIVCE	0.0	
LOGISTICS	DOCKS	DOCKS	D-341	2-EH	0.0	
LOGISTICS	ENV	ENVNO	X-325	CONC. WASTEWATER	0.0	
LOGISTICS	UTILPROD	UTILSO	H-313	FUEL OIL	0.0	
LOGISTICS	ENV	ENVSO	T-6	EMPTY	0.0	
LOGISTICS	UTILPROD	UTILSO	SS-356	SULFURIC ACID	0.0	
LOGISTICS	DOCKS	DOCKS	M-301	THIN FUEL 180	0.0	
LOGISTICS	ENV	ENVNO	S-415	EMPTY	0.0	
LOGISTICS	DOCKS	DOCKS	F-352	OUT OF SERVICE	0.0	
LOGISTICS	ENV	ENVSO	T-13146	<5%DEA, 95% WATER	0.0	
LOGISTICS	ENV	ENVSO	T-1300	ASSUME 50% ORGANICS, 5	0.0	
LOGISTICS	UTILPROD	UTILSO	TUT-401	DIESEL FUEL	0.0	
LOGISTICS	DOCKS	DOCKS	K-307	PITCH	0.0	
LOGISTICS	DOCKS	DOCKS	P-301	LUBE OIL SLOP	0.0	
LOGISTICS	ENV	ENVNO	S-418	EMPTY	0.0	
LOGISTICS	ENV	ENVNO	X-326	CONC. WASTEWATER	0.0	
LOGISTICS	ENV	ENVSO	T-1311	ORGANIC PHASE ON SULFU	0.0	
LOGISTICS	ENV	ENVNO	S-413	35% PHOSPHORIC ACID	0.0	
LPA	LUBEMANUF	LUBEA	VA 36	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	US145	FLUX	0.0	
LPA	LUBEMANUF	LUBEA	VA 9	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	DW117	CRUDE WAX	0.0	
LPA	LUBEMANUF	LUBEA	VA 3	LUBE RESIDUE	0.0	
LPA	LUBELOG	LUBEC	VA15	FLUX	0.0	
LPA	LUBEMANUF	LUBEA	DW 110	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	DW211	SHELLFLEX	0.0	
LPA	LUBEMANUF	LUBEA	VA 29	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	US144	FLUX	0.0	
LPA	LUBEMANUF	LUBEA	DA 48	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	EX91	DUTREX	0.0	
LPA	LUBEMANUF	LUBEA	VA 28	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	DA50	DA ASPHALT	0.0	

TOXIC EMISSIONS FROM FIXED ROOF TANKS
SHELL DEER PARK MANUFACTURING COMPLEX

BA	DEPT	UNIT	TANK NAME	MAJOR COMPONENTS	TOXIC EMISSIONS, TONS/YR (1)	COMMENTS
LPA	LUBEMANUF	LUBEA	DW 104	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	EX95	DUTREX	0.0	
LPA	LUBEMANUF	LUBEA	VA 27	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	DW210	CRUDE WAX	0.0	
LPA	LUBEMANUF	LUBEB	EX55	LUBE RAFFINATE	0.0	
LPA	LUBELOG	LUBEC	FP162	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEA	VA 26	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	DW214	EXTRACT	0.0	
LPA	LUBEMANUF	LUBEA	DW 103	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	FP166	DIALA	0.0	
LPA	LUBEMANUF	LUBEA	VA 23	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	EX94	DUTREX	0.0	
LPA	LUBEMANUF	LUBEA	VA 5	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	FP170	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEA	VA 22	LUBE RESIDUE	0.0	
LPA	LUBELOG	LUBEC	FP161	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEB	DW123	CRUDE WAX	0.0	
LPA	LUBELOG	LUBEC	FP174	DIALA	0.0	
LPA	LUBEMANUF	LUBEA	VA 21	LUBE RESIDUE	0.0	
LPA	LUBELOG	LUBEC	FP165	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEB	EX82	LUBE RAFFINATE	0.0	
LPA	LUBELOG	LUBEC	FP178	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEA	VA 2	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEB	EX53	LUBE RAFFINATE	0.0	
LPA	LUBELOG	LUBEC	FP164	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	FP182	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEA	VA 12	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEB	DW125	CRUDE WAX	0.0	
LPA	LUBEMANUF	LUBEA	DW 102	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	FP186	DIALA	0.0	
LPA	LUBEMANUF	LUBEA	VA 11	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEB	DW119	CRUDE WAX	0.0	
LPA	LUBEMANUF	LUBEB	EX81	LUBE RAFFINATE	0.0	
LPA	LUBELOG	LUBEC	FP190	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEA	VA 10	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEA	VA 7	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	WX225	WAX	0.0	
LPA	LUBELOG	LUBEC	FP194	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEA	VA 1	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEA	VA 42	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	DA49	DA ASPHALT	0.0	
LPA	LUBELOG	LUBEC	RD133	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	J329	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	EX96	EXTRACT	0.0	
LPA	LUBEMANUF	LUBEB	VA39	CRUDE WAX	0.0	
LPA	LUBELOG	LUBEC	RD137	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	US141	FLUX	0.0	
LPA	LUBEMANUF	LUBEB	EX59	LUBE RAFFINATE	0.0	
LPA	LUBEMANUF	LUBEB	EX85	LUBE RAFFINATE	0.0	

TOXIC EMISSIONS FROM FIXED ROOF TANKS
SHELL DEER PARK MANUFACTURING COMPLEX

BA	DEPT	UNIT	TANK NAME	MAJOR COMPONENTS	TOXIC EMISSIONS, TONS/YR (1)	COMMENTS
LPA	LUBELOG	LUBEC	DW213	SHELLFLEX	0.0	
LPA	LUBELOG	LUBEC	SS285	IONOL	0.0	
LPA	LUBEMANUF	LUBEB	EX51	LUBE RAFFINATE	0.0	
LPA	LUBELOG	LUBEC	WX229	WAX	0.0	
LPA	LUBELOG	LUBEC	EX97	EXTRACT	0.0	
LPA	LUBELOG	LUBEC	DW111	DUTREX	0.0	
LPA	LUBELOG	LUBEC	WX221	WAX	0.0	
LPA	LUBELOG	LUBEC	WX242	WAX	0.0	
LPA	LUBELOG	LUBEC	FP168	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEB	EX60	LUBE RAFFINATE	0.0	
LPA	LUBELOG	LUBEC	SS332	CONDENSATE	0.0	
LPA	LUBELOG	LUBEC	SS318	IONOL	0.0	
LPA	LUBELOG	LUBEC	FP176	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEB	EX58	LUBE RAFFINATE	0.0	
LPA	LUBELOG	LUBEC	DW212	SHELLFLEX	0.0	
LPA	LUBELOG	LUBEC	WX258	WAX	0.0	
LPA	LUBELOG	LUBEC	FP184	DIALA	0.0	
LPA	LUBEMANUF	LUBEB	EX56	LUBE RAFFINATE	0.0	
LPA	LUBELOG	LUBEC	SS325	WATER	0.0	
LPA	LUBELOG	LUBEC	WX266	WAX	0.0	
LPA	LUBELOG	LUBEC	FP192	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEB	EX54	LUBE RAFFINATE	0.0	
LPA	LUBEMANUF	LUBEA	EX 73	NMP	0.0	
LPA	LUBELOG	LUBEC	WX279	WAX	0.0	
LPA	LUBELOG	LUBEC	RD135	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEB	EX52	LUBE RAFFINATE	0.0	
LPA	LUBEMANUF	LUBEA	EX 71	NMP	0.0	
LPA	LUBELOG	LUBEC	DW109	DUTREX	0.0	
LPA	LUBELOG	LUBEC	EX93	DUTREX	0.0	
LPA	LUBEMANUF	LUBEB	DW126	CRUDE WAX	0.0	
LPA	LUBEMANUF	LUBEA	DW 127	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	DW105	DUTREX	0.0	
LPA	LUBELOG	LUBEC	FP172	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEB	DW124	CRUDE WAX	0.0	
LPA	LUBEMANUF	LUBEA	DW 120	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEA	EX 84	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	FP188	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEB	DW121	CRUDE WAX	0.0	
LPA	LUBEMANUF	LUBEA	DW 112	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	WX233	WAX	0.0	
LPA	LUBELOG	LUBEC	DW130	CRUDE WAX	0.0	
LPA	LUBEMANUF	LUBEB	DW116	CRUDE WAX	0.0	
LPA	LUBELOG	LUBEC	DW122	CRUDE WAX	0.0	
LPA	LUBELOG	LUBEC	WX254	WAX	0.0	
LPA	LUBELOG	LUBEC	FP180	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEA	VA 8	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	FP163	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	WX271	WAX	0.0	
LPA	LUBELOG	LUBEC	RD131	LUBE OIL	0.0	

TOXIC EMISSIONS FROM FIXED ROOF TANKS
SHELL DEER PARK MANUFACTURING COMPLEX

BA	DEPT	UNIT	TANK NAME	MAJOR COMPONENTS	TOXIC EMISSIONS, TONS/YR (1)	COMMENTS
LPA	LUBEMANUF	LUBEA	VA 6	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEA	EX 62	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	DW107	EXTRACT	0.0	
LPA	LUBEMANUF	LUBEA	DW 101	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEA	VA 43	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEA	DW 115	LUBE OIL	0.0	
LPA	PAU	PAU	EX-67	WATER,PHENATE	0.0	
LPA	LUBEMANUF	LUBEB	EX61	LUBE RAFFINATE	0.0	
LPA	LUBEMANUF	LUBEA	VA 41	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	EX92	DUTREX	0.0	
LPA	LUBELOG	LUBEC	WX262	WAX	0.0	
LPA	LUBEMANUF	LUBEA	EX 74	NMP	0.0	
LPA	LUBEMANUF	LUBEA	S 365	NMP	0.0	
LPA	LUBEMANUF	LUBEA	DW 127	LUBE OIL	0.0	
LPA	PAU	PAU	S-308	10% NA2CO3	0.0	
LPA	LUBELOG	LUBEC	WX264	WAX	0.0	
LPA	LUBELOG	LUBEC	DW113	EXTRACT	0.0	
LPA	LUBELOG	LUBEC	US146	CRUDE WAX	0.0	
LPA	LUBELOG	LUBEC	WX246	WAX	0.0	
LPA	LUBEMANUF	LUBEB	EX57	LUBE RAFFINATE	0.0	
LPA	PAU	PAU	S-303	SULFURIC ACID	0.0	
LPA	LUBELOG	LUBEC	WX228	WAX	0.0	
LPA	LUBELOG	LUBEC	FP167	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	SS277	WATER	0.0	
LPA	LUBELOG	LUBEC	FP169	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	WX230	WAX	0.0	
LPA	LUBELOG	LUBEC	FP171	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	DW106	DUTREX	0.0	
LPA	LUBELOG	LUBEC	FP173	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	WX232	WAX	0.0	
LPA	LUBELOG	LUBEC	FP175	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	RD511	WAX	0.0	
LPA	LUBELOG	LUBEC	FP177	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	WX234	WAX	0.0	
LPA	LUBELOG	LUBEC	SS324	WATER	0.0	
LPA	LUBELOG	LUBEC	US142	FLUX	0.0	
LPA	LUBELOG	LUBEC	FP181	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	WX241	WAX	0.0	
LPA	LUBELOG	LUBEC	FP183	DIALA	0.0	
LPA	LUBELOG	LUBEC	RD510	WAX	0.0	
LPA	LUBELOG	LUBEC	FP185	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	WX243	WAX	0.0	
LPA	LUBELOG	LUBEC	FP187	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	US150	FLUX	0.0	
LPA	LUBELOG	LUBEC	FP189	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	WX245	WAX	0.0	
LPA	LUBELOG	LUBEC	FP191	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	RD509	WAX	0.0	
LPA	LUBELOG	LUBEC	FP193	LUBE OIL	0.0	

TOXIC EMISSIONS FROM FIXED ROOF TANKS
SHELL DEER PARK MANUFACTURING COMPLEX

BA	DEPT	UNIT	TANK NAME	MAJOR COMPONENTS	TOXIC EMISSIONS, TONS/YR (1)	COMMENTS
LPA	LUBELOG	LUBEC	WX247	WAX	0.0	
LPA	LUBELOG	LUBEC	FP195	DIALA	0.0	
LPA	LUBELOG	LUBEC	WX223	WAX	0.0	
LPA	LUBELOG	LUBEC	RD132	SHELLFLEX	0.0	
LPA	LUBELOG	LUBEC	WX249	WAX	0.0	
LPA	LUBELOG	LUBEC	RD134	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	RD508	WAX	0.0	
LPA	LUBELOG	LUBEC	RD136	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	WX251	WAX	0.0	
LPA	LUBELOG	LUBEC	SS284	SCRAP WAX	0.0	
LPA	LUBELOG	LUBEC	WX231	WAX	0.0	
LPA	LUBELOG	LUBEC	VA24	FLUX	0.0	
LPA	LUBELOG	LUBEC	WX253	WAX	0.0	
LPA	LUBELOG	LUBEC	SS283	SCRAP WAX	0.0	
LPA	LUBELOG	LUBEC	RD507	WAX	0.0	
LPA	LUBELOG	LUBEC	WX235	HVY GAS OIL	0.0	
LPA	LUBELOG	LUBEC	WX255	WAX	0.0	
LPA	LUBELOG	LUBEC	SS282	SCRAP WAX	0.0	
LPA	LUBELOG	LUBEC	WX244	WAX	0.0	
LPA	LUBELOG	LUBEC	WX256	WAX	0.0	
LPA	LUBELOG	LUBEC	WX257	WAX	0.0	
LPA	LUBELOG	LUBEC	SS278	POLYMER	0.0	
LPA	LUBELOG	LUBEC	RD506	WAX	0.0	
LPA	LUBELOG	LUBEC	WX273	WAX	0.0	
LPA	LUBELOG	LUBEC	WX259	WAX	0.0	
LPA	LUBEMANUF	LUBEB	EX86	LUBE RAFFINATE	0.0	
LPA	LUBELOG	LUBEC	WX252	WAX	0.0	
LPA	LUBEMANUF	LUBEB	VA38	CRUDE WAX	0.0	
LPA	LUBELOG	LUBEC	WX261	WAX	0.0	
LPA	LUBEMANUF	LUBEA	DA 46	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	RD505	WAX	0.0	
LPA	LUBEMANUF	LUBEA	VA 40	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	WX263	WAX	0.0	
LPA	LUBELOG	LUBEC	SS303	ECA10022	0.0	
LPA	LUBELOG	LUBEC	WX260	WAX	0.0	
LPA	LUBELOG	LUBEC	US146	CRUDE WAX	0.0	
LPA	LUBELOG	LUBEC	WX265	WAX	0.0	
LPA	LUBELOG	LUBEC	SS302	ECA10022	0.0	
LPA	LUBELOG	LUBEC	RD504	WAX	0.0	
LPA	LUBELOG	LUBEC	FP179	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	WX267	WAX	0.0	
LPA	LUBELOG	LUBEC	US147	CRUDE WAX	0.0	
LPA	LUBELOG	LUBEC	WX268	WAX	0.0	
LPA	LUBELOG	LUBEC	US151	CRUDE WAX	0.0	
LPA	LUBELOG	LUBEC	WX270	WAX	0.0	
LPA	LUBELOG	LUBEC	WX220	WAX	0.0	
LPA	LUBELOG	LUBEC	RD503	WAX	0.0	
LPA	LUBELOG	LUBEC	WX224	WAX	0.0	
LPA	LUBELOG	LUBEC	WX272	WAX	0.0	

TOXIC EMISSIONS FROM FIXED ROOF TANKS
SHELL DEER PARK MANUFACTURING COMPLEX

BA	DEPT	UNIT	TANK NAME	MAJOR COMPONENTS	TOXIC EMISSIONS, TONS/YR (1)	COMMENTS
LPA	LUBEMANUF	LUBEA	VA 31	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	WX281	WAX	0.0	
LPA	LUBEMANUF	LUBEA	VA 37	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	WX274	WAX	0.0	
LPA	LUBEMANUF	LUBEA	DA 47	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	RD502	WAX	0.0	
LPA	LUBELOG	LUBEC	J330	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	WX280	WAX	0.0	
LPA	LUBELOG	LUBEC	US143	FLUX	0.0	
LPA	LUBELOG	LUBEC	DW108	DUTREX	0.0	
LPA	LUBELOG	LUBEC	VA16	FLUX	0.0	
LPA	LUBELOG	LUBEC	DW114	EXTRACT	0.0	
LPA	LUBELOG	LUBEC	WX226	WAX	0.0	
LPA	LUBELOG	LUBEC	RD138	LUBE OIL	0.0	
LPA	LUBEMANUF	LUBEA	VA 4	LUBE RESIDUE	0.0	
LPA	LUBELOG	LUBEC	WX250	WAX	0.0	
LPA	LUBELOG	LUBEC	WX227	WAX	0.0	
LPA	LUBEMANUF	LUBEA	EX 75	NMP	0.0	
LPA	LUBELOG	LUBEC	WX222	WAX	0.0	
LPA	LUBEMANUF	LUBEA	VA 30	LUBE OIL	0.0	
LPA	LUBELOG	LUBEC	WX248	WAX	0.0	
LPA	LUBEMANUF	LUBEA	EX 72	NMP	0.0	
LPA	LUBELOG	LUBEC	US149	FLUX	0.0	
LPA	LUBEMANUF	LUBEB	EX83	LUBE RAFFINATE	0.0	
OLEF	BDHTIP	BDHTIP	TOL-601	EMPTY	0.0	
OLEF	LO-III	LO-III	TU30907	LUBE OIL (TURBO 68)	0.0	
OLEF	LO-III	LO-III	VC33034	LUBE OIL (TURBO 32)	0.0	
OLEF	BDHTIP	BDHTIP	TUT-918	DCPD CONCENTRATE	0.0	
OLEF	LO-III	LO-III	VU30900	WATER	0.0	
OLEF	LO-III	LO-III	TF34001	NORMAL PROPANOL	0.0	
OLEF	PYRO-III	PYRO-III	T-P3-1005	FILMING AMINE	0.0	
OLEF	PYRO-III	PYRO-III	T-OL-909	CLGO	0.0	
OLEF	PYRO-III	PYRO-III	T-OL-917	EMULSION BREAKER	0.0	
OLEF	LO-III	LO-III	VU3930	SULFURIC ACID (98%)	0.0	
OLEF	PYRO-III	PYRO-III	TOL-907	PYROLYSIS PITCH	0.0	
OLEF	PYRO-III	PYRO-III	T-OL-903	OP-3 GASOIL FEED	0.0	
OLEF	LO-III	LO-III	TU39001	WATER	0.0	
OLEF	LO-III	LO-III	TC33004	CAUSTIC 26 wt %	0.0	
OLEF	PYRO-III	PYRO-III	T-OL-902	OP-3 GASOIL FEED	0.0	
OLEF	LO-III	LO-III	TU30911	WATER	0.0	
OLEF	LO-III	LO-III	TR35001	LUBE OIL (TURBO 32)	0.0	
OLEF	LO-III	LO-III	TU30913	WATER	0.0	
OLEF	LO-III	LO-III	TU30912	PETROMEEN	0.0	
OLEF	LO-III	LO-III	TR35020	LUBE OIL (TURBO 32)	0.0	
OLEF	PYRO-III	PYRO-III	TOL-906	PYROLYSIS PITCH	0.0	
OLEF	LO-III	LO-III	TU30914	LUBE OIL (TURBO 68)	0.0	
OLEF	PYRO-III	PYRO-III	T-OL-910	CHGO	0.0	
OLEF	BDHTIP	BDHTIP	TOL-401	OUT OF SERVICE	0.0	
OLEF	BDHTIP	BDHTIP	TOL-701	OUT OF SERVICE	0.0	

TOXIC EMISSIONS FROM FIXED ROOF TANKS
SHELL DEER PARK MANUFACTURING COMPLEX

BA	DEPT	UNIT	TANK NAME	MAJOR COMPONENTS	TOXIC EMISSIONS, TONS/YR (1)	COMMENTS
OLEF	LO-III	LO-III	TU30900	WATER	0.0	
OLEF	LO-III	LO-III	TU30906	LUBE OIL (TURBO 32)	0.0	
OLEF	LO-III	LO-III	TC33001	GAS OIL	0.0	
OLEF	PYRO-III	PYRO-III	TOL-908	BLENDED PITCH	0.0	
OLEF	LO-III	LO-III	TC33003	WATER	0.0	
OLEF	BDHTIP	BDHTIP	TOL-602	OUT OF SERVICE	0.0	
OLEF	BDHTIP	BDHTIP	TOL-600	LUBE OIL	0.0	
OLEF	LO-III	LO-III	TC33005	LUBE OIL (TURBO 32)	0.0	
OLEF	LO-III	LO-III	TF34002	LUBE OIL (TURBO 32)	0.0	
OLEF	LO-III	LO-III	TU30915	LUBE OIL (TURBO 68)	0.0	
RESINS	BPA	BPA	T18508	WATER	0.0	
RESINS	MAJRESINS	EPON5	T2720	NEAT RESIN	0.0	
RESINS	MAJRESINS	EPON5	T2712	WATER,ECH,IPA	0.0	
RESINS	BPA	BPA	V1832	WATER/HCL	0.0	
RESINS	MAJRESINS	ERU6	T-2611	SOLID EPOXY RESIN	0.0	
RESINS	BPA	BPA	V2511	GLYCERINE	0.0	
RESINS	BPA	BPA	T-1942	MIBK/MEK/DMK	0.0	
RESINS	MAJRESINS	EPON5	T2725	RESIN,BGE	0.0	
RESINS	MAJRESINS	ERU6	T-2609	SOLID EPOXY RESIN	0.0	
RESINS	MAJRESINS	ERU6	T-2603	MOLTEN EPOXY RESIN	0.0	
RESINS	MAJRESINS	EPON5	T-6005	MIBK	0.0	
RESINS	MAJRESINS	EPON5	T2721	NEAT RESIN	0.0	
RESINS	BPA	BPA	T18521	PHENOLIC WATER	0.0	
RESINS	MAJRESINS	ERU6	T-2613	SOLID EPOXY RESIN	0.0	
RESINS	BPA	BPA	V2208	WATER	0.0	
RESINS	MAJRESINS	EPON5	T2726	RESIN,BGE	0.0	
RESINS	MAJRESINS	ERU6	T-2619	WATER (RUNOFF/WASH)	0.0	
RESINS	MAJRESINS	EPON5	T1903	NEAT RESIN	0.0	
RESINS	MAJRESINS	EPON5	T2704	NAOH, WATER	0.0	
RESINS	MAJRESINS	ERU6	T-2606	COOLING WATER	0.0	
RESINS	MAJRESINS	ERU6	T-2617	98% SULFURIC ACID	0.0	
RESINS	BPA	BPA	T18509	PHENOLIC WATER	0.0	
RESINS	BPA	BPA	V1144	WATER	0.0	
RESINS	MAJRESINS	EPON5	T2727	RESIN,BGE	0.0	
RESINS	MAJRESINS	ERU6	T-2618	WATER (RUNOFF/WASH)	0.0	
RESINS	BPA	BPA	T-2504	MIBK/MEK/DMK/BPA	0.0	
RESINS	MAJRESINS	EPON5	T2729	RESIN,CGE	0.0	
RESINS	MAJRESINS	EPON5	T2722	NEAT RESIN	0.0	
RESINS	MAJRESINS	ERU6	T-2614	SOLID EPOXY RESIN	0.0	
RESINS	MAJRESINS	EPON5	T2733	CGE	0.0	
RESINS	MAJRESINS	EPON5	T2738	RESIN	0.0	
RESINS	MAJRESINS	EPON5	T2708	NEAT RESIN	0.0	
RESINS	MAJRESINS	EPON5	T2719	NEAT RESIN	0.0	
RESINS	MAJRESINS	EPON5	T2731	RESIN,BGE	0.0	
RESINS	MAJRESINS	EPON5	T2700	IPA	0.0	
RESINS	MAJRESINS	EPON5	T2717	NEAT RESIN	0.0	
RESINS	MAJRESINS	ERU6	T-2607	SOLID EPOXY RESIN	0.0	
RESINS	MAJRESINS	ERU6	T-2616	SOLID EPOXY RESIN	0.0	
RESINS	MAJRESINS	ERU6	T-2608	SOLID EPOXY RESIN	0.0	

TOXIC EMISSIONS FROM FIXED ROOF TANKS
SHELL DEER PARK MANUFACTURING COMPLEX

BA	DEPT	UNIT	TANK NAME	MAJOR COMPONENTS	TOXIC EMISSIONS, TONS/YR (1)	COMMENTS
RESINS	MAJRESINS	ERU6	T-2601	MOLTEN EPOXY RESIN	0.0	
RESINS	BPA	BPA	T770	BRINE	0.0	
RESINS	BPA	BPA	T9562	PHENOLIC BRINE	0.0	
RESINS	MAJRESINS	EPON5	T2703	NAOH, WATER	0.0	
RESINS	MAJRESINS	ERU6	T-2602	MOLTEN EPOXY RESIN	0.0	
RESINS	MAJRESINS	ERU6	T-2610	SOLID EPOXY RESIN	0.0	
RESINS	BPA	BPA	T-1965	MIBK/MEK/DMK	0.0	
RESINS	MAJRESINS	ERU6	T-2604	MOLTEN EPOXY RESIN	0.0	
RESINS	BPA	BPA	T18500	WATER	0.0	
RESINS	MAJRESINS	EPON5	T2710	NEAT RESIN	0.0	
RESINS	MAJRESINS	EPON5	T2714	RESIN,BGE	0.0	
RESINS	MAJRESINS	ERU6	T-2612	SOLID EPOXY RESIN	0.0	
RESINS	MAJRESINS	EPON5	T2715	RESIN,WATER,ECH,IPA	0.0	
RESINS	BPA	BPA	T-2101	50% NAOH	0.0	
RESINS	MAJRESINS	EPON5	T2730	RESIN,GLYCERINE	0.0	
RESINS	BPA	BPA	T2413	IPE	0.0	
RESINS	MAJRESINS	EPON5	T2737	RESIN	0.0	
RESINS	MAJRESINS	ERU6	T-2615	SOLID EPOXY RESIN	0.0	
RESINS	MAJRESINS	EPON5	T2709	NEAT RESIN	0.0	
RESINS	MAJRESINS	ERU6	T-2621	WATER (RUNOFF/WASH)	0.0	
RESINS	MAJRESINS	EPON5	T2732	EPOXIDE 8	0.0	
RESINS	MAJRESINS	EPON5	T2718	NEAT RESIN	0.0	
RESINS	MAJRESINS	EPON5	T2711	NEAT RESIN	0.0	
RESINS	MAJRESINS	ERU6	T-2605	COOLING WATER	0.0	
RESINS	MAJRESINS	EPON5	T2728	RESIN,EPOXIDE 8	0.0	
RESINS	MAJRESINS	EPON5	T2713	WATER,ECH,IPA	0.0	
RESINS	MAJRESINS	EPON5	T2740	BGE	0.0	

(1) EMISSIONS OF SARA 313 COMPOUNDS
(2) TANKS THAT ARE PROPOSED TO BE CONVERTED TO BEST CONTROL TECHNOLOGY
(3) TANKS NOW BEING CONVERTED TO BEST CONTROL TECHNOLOGY
AS PART OF OTHER PROJECTS

TOXIC EMISSIONS FROM FLOATING ROOF TANKS
SHELL DEER PARK MANUFACTURING COMPLEX

BA	DEPT	UNIT	TANK	SERVICE	TOXIC EMISSIONS. TONS/YR (1)	IFR OR EF
LOGISTICS	DOCKS	DOCKS	F-354	DMK	10.1	IFR
FUELS	DISP	DISP	G-354	MTBE	3.7	EFR
OLEF	BDHTIP	BDHTIP	A18	AP-18	2.7	IFR
OLEF	BDHTIP	BDHTIP	A19	AP-19	2.7	IFR
LPA	PAU	PAU	D-390	D-390	2.1	IFR
LPA	PAU	PAU	D-391	D-391	2.1	IFR
LPA	PAU	PAU	D-392	D-392	2.1	IFR
OLEF	BDHTIP	BDHTIP	T02T913	TOL-913	2.1	IFR
FUELS	DISP	DISP	G-308	GASOLINE	2.0	EFR
LOGISTICS	DOCKS	DOCKS	F-351	MEK	1.8	IFR
FUELS	AROM	ACU	F360	PRODUCT BENZENE	1.8	IFR
FUELS	AROM	ACU	F361	PRODUCT BENZENE	1.8	IFR
FUELS	AROM	ACU	F359	PRODUCT BENZENE	1.8	IFR
FUELS	DISP	DISP	A-308	GASOLINE	1.7	EFR
FUELS	DISP	DISP	G-309	GASOLINE	1.7	EFR
FUELS	AROM	ACU	J313	BENZENE CONCENTRATE	1.7	IFR
OLEF	PYRO-III	PYRO-III	T02T912	T-OL-912	1.5	IFR
CHEM	CG	CG	T3017	F. DMK	1.5	IFR
CHEM	A	A	T182	FINISHED DMK	1.4	IFR
CHEM	A	A	T140B	FINISHED DMK	1.4	IFR
CHEM	A	A	T105	FINISHED DMK	1.4	IFR
FUELS	DISP	DISP	F-345	MTBE	1.4	IFR
FUELS	DISP	DISP	F-346	MTBE	1.4	IFR
LOGISTICS	DOCKS	DOCKS	D-345	OFFTEST DMK	1.2	IFR
FUELS	AROM	ACU	J314	BENZENE CONCENTRATE	1.2	IFR
FUELS	AROM	ACU	G359	TOL CONCENTRATE	1.2	EFR
FUELS	DISTIL	DU1	T1F323	DU-1 DEBUT BTMS	1.1	EFR
CHEM	A	A	T74B	FINISHED DMK	1.0	IFR
CHEM	A	A	T65B	TENN. EST. DMK	1.0	IFR
CHEM	A	A	T74D	FINISHED DMK	0.9	IFR
CHEM	A	A	T74C	FINISHED DMK	0.9	IFR
CHEM	A	A	T66	FINISHED DMK	0.9	IFR
OLEF	BDHTIP	BDHTIP	T02T905	FEED TANK TOL-905	0.8	EFR
LPA	PAU	PAU	D-393	D-393	0.8	IFR
RESINS	BPA	BPA	T1851	ACETONE	0.8	IFR
FUELS	AROM	ACU	D377	B COLUMN FEED	0.8	IFR
FUELS	AROM	ACU	D350	OFF SPEC BENZENE	0.7	IFR
CHEM	A	A	T3406	FINISHED MEK	0.7	IFR
FUELS	AROM	ACU	D380	FINISHED BENZENE	0.6	IFR
FUELS	AROM	ACU	D381	FINISHED BENZENE	0.6	IFR
FUELS	DISP	DISP	G-316	TOLUENE CONCENTRATE	0.6	EFR
FUELS	AROM	ACU	F357	PRODUCT TOLUENE	0.6	IFR
FUELS	AROM	ACU	F358	PRODUCT TOLUENE	0.6	IFR
FUELS	AROM	ACU	D353	BENZENE CONCENTRATE	0.6	IFR
FUELS	AROM	ACU	D370	FINISHED BENZENE	0.6	IFR
FUELS	AROM	ACU	D371	FINISHED BENZENE	0.6	IFR
FUELS	DISP	DISP	G-326	GASOLINE	0.6	EFR
FUELS	DISP	DISP	A-309	GASOLINE	0.6	EFR
FUELS	AROM	ACU	D379	B COLUMN FEED	0.4	IFR

TOXIC EMISSIONS FROM FLOATING ROOF TANKS
SHELL DEER PARK MANUFACTURING COMPLEX

BA	DEPT	UNIT	TANK	SERVICE	TOXIC EMISSIONS, TONS/YR (1)	IFR OR EF
OLEF	PYRO-III	PYRO-III	A327	STORAGE TANK A-327	0.4	EFR
OLEF	PYRO-III	PYRO-III	A328	STORAGE TANK A-328	0.4	EFR
FUELS	AROM	ACU	D352	B COLUMN TOPS	0.4	IFR
FUELS	AROM	ACU	D351	B COLUMN TOPS	0.4	IFR
FUELS	AROM	ACU	L305	OFF SPEC BENZENE	0.4	IFR
OLEF	PYRO-III	PYRO-III	T02T904	T-OL-904	0.4	IFR
CHEM	A	A	T65C	RECYCLE DMK	0.3	IFR
OLEF	PYRO-III	PYRO-III	T02T901	STORAGE TANK T-OL-901	0.3	EFR
FUELS	AROM	PLAT2	G329	LOW PLATFORMATE	0.3	EFR
FUELS	DISTIL	DU1	T1F324	DU-1 DEBUT BTMS	0.3	EFR
LOGISTICS	DOCKS	DOCKS	F-350	XYLENE	0.3	EFR
FUELS	DISTIL	DU2	T1F328	HDU-2 FEED	0.2	EFR
FUELS	DISP	DISP	AP-6	GASOLINE	0.2	EFR
CHEM	A	A	T3	WET DMK	0.2	IFR
FUELS	DISP	DISP	AP-8	GASOLINE	0.2	IFR
OLEF	BDHTIP	BDHTIP	T6356	PRODUCT TANK (DISP)	0.2	EFR
FUELS	DISP	DISP	G-323	GASOLINE	0.1	EFR
FUELS	HYDROPR	CATREF	TJ334	CR-3 NAPHTHA	0.1	IFR
FUELS	HYDROPR	CATREF	TJ335	CR-3 NAPHTHA	0.1	IFR
OLEF	BDHTIP	BDHTIP	T-BD-912	FRESH SOLVENT	0.1	IFR
OLEF	BDHTIP	BDHTIP	T-BD-910	FRESH SOLVENT	0.1	IFR
FUELS	DISP	DISP	SS-378	GASOLINE	0.1	IFR
FUELS	DISTIL	DU1	TA322	DU-1 LA. LUBE CRUDE	0.1	EFR
FUELS	DISTIL	DU1	TA321	DU-1 LA. LUBE CRUDE	0.1	EFR
FUELS	DISP	DISP	SS-377	GASOLINE	0.1	IFR
FUELS	HYDROPR	CATREF	TJ333	CR-3 NAPHTHA	0.1	IFR
FUELS	CC&G	CCU	T6360	HCCGASOLINE	0.1	EFR
OLEF	BDHTIP	BDHTIP	T-BD-913	FRESH SOLVENT	0.1	IFR
FUELS	AROM	HDU1	J317	SOUR NAPHTHA	0.1	IFR
FUELS	AROM	HDU1	J318	SOUR NAPHTHA	0.1	IFR
FUELS	DISP	DISP	G-353	RAFFINATES	0.1	EFR
FUELS	DISTIL	DU2	TA314	A-314	0.1	IFR
FUELS	DISTIL	DU2	F-327	HDU-2 FEED	0.1	EFR
FUELS	AROM	PLAT2	G342	HIGH PLATFORMATE	0.1	EFR
CHEM	E	EA	T-1209	ETHYL ACRYLATE	0.1	IFR
FUELS	DISP	DISP	SS-379	GASOLINE	0.1	IFR
FUELS	DISTIL	DU2	TA313	A-313	0.1	IFR
FUELS	CC&G	CCU	T6357	LCCGASOLINE	0.1	EFR
OLEF	BDHTIP	BDHTIP	T-BD-911	RECOVERED SOLVENT	0.1	IFR
FUELS	DISTIL	DU2	TA307	CRUDE	0.1	EFR
FUELS	DISTIL	DU2	TA330	CRUDE	0.1	EFR
FUELS	DISTIL	DU2	TA329	CRUDE	0.1	EFR
FUELS	DISTIL	DU2	TA318	CRUDE	0.1	EFR
FUELS	DISTIL	DU2	TA320	CRUDE	0.1	EFR
FUELS	DISTIL	DU2	TA319	CRUDE	0.1	EFR
LOGISTICS	DOCKS	DOCKS	D-344	MIBK	0.1	IFR
FUELS	DISTIL	DU2	TJ339	HDU-2 FEED TANK	0.1	IFR
FUELS	CC&G	CCU	T6355	HCCGASOLINE	0.1	EFR
FUELS	DISTIL	DU1	T6362	CRUDE (DU-2)	0.1	EFR

TOXIC EMISSIONS FROM FLOATING ROOF TANKS
SHELL DEER PARK MANUFACTURING COMPLEX

BA	DEPT	UNIT	TANK	SERVICE	TOXIC EMISSIONS, TONS/YR (1)	IFR OR EF
FUELS	AROM	HDU1	G328	REGULAR GASOLINE	0.1	EFR
FUELS	CC&G	CCU	TG358	LCCGASOLINE	0.1	EFR
FUELS	DISTIL	DU1	TG324	DU-1 LA.LUBE CRUDE	0.1	IFR
CHEM	E	BA	T-9568	CRUDE BA	0.1	IFR
FUELS	DISP	DISP	G-313	GASOLINE	0.0	EFR
FUELS	DISP	DISP	G-315	GASOLINE	0.0	EFR
FUELS	DISP	DISP	G-311	GASOLINE	0.0	EFR
CHEM	E	BA	T-9571	CRUDE BA	0.0	IFR
FUELS	DISTIL	DU1	T1F348	SOUR NAPHTHA	0.0	EFR
FUELS	AROM	ACU	G343	BTX RAFFINATE	0.0	EFR
OLEF	BDHTIP	BDHTIP	TBD301	UNIT DRIPS	0.0	IFR
FUELS	DISTIL	DU1	TA305	DU-1 LVI CRUDE	0.0	EFR
FUELS	DISTIL	DU1	TA302	DU-1 LVI CRUDE	0.0	EFR
CHEM	CG	CG	T3016	CRUDE MO	0.0	IFR
CHEM	CG	CG	T3018	CRUDE MO	0.0	IFR
FUELS	DISTIL	DU1	TA316	BRYANS MILL	0.0	IFR
FUELS	AROM	HDU1	J312	SHCU HVY NAPHTHA	0.0	IFR
FUELS	DISTIL	DU2	TJ321	HDU-2 FEED TANK	0.0	IFR
FUELS	DISTIL	DU2	T1F329	F-329	0.0	IFR
FUELS	DISTIL	DU2	T1F330	F-330	0.0	IFR
FUELS	DISTIL	DU2	TA332	CRUDE	0.0	EFR
FUELS	DISTIL	DU2	TA334	CRUDE	0.0	EFR
CHEM	A	A	T90	CRUDE IPA	0.0	IFR
OLEF	PYRO-III	PYRO-III	T02T912	T-OL-912	0.0	IFR
FUELS	AROM	PLAT2	F325	SHELL JET A	0.0	EFR
CHEM	A	A	T74A	IPA-CBM	0.0	IFR
CHEM	A	A	T67B	IPA-CBM	0.0	IFR
FUELS	AROM	PLAT2	F326	SHELL JET A	0.0	EFR
FUELS	CC&G	CCU	TG346	LCCGASOLINE (DISP)	0.0	EFR
CHEM	A	A	T91	CRUDE IPA	0.0	IFR
FUELS	SOLTR	SOLTR	D387	SOL AND TREAT NAPH	0.0	IFR
FUELS	DISTIL	DU1	TA311	DU-1 E.T. CRUDE	0.0	IFR
FUELS	DISTIL	DU1	TA312	DU-1 E.T. CRUDE	0.0	IFR
CHEM	A	A	T97	FURNACE FEED	0.0	IFR
CHEM	A	A	T3141	FURNACE FEED	0.0	IFR
FUELS	AROM	HDU1	G327	REGULAR GASOLINE	0.0	EFR
FUELS	DISTIL	DU1	TA310	DU-1 E.T. CRUDE	0.0	IFR
FUELS	ATC	THCR	L-301	L-301	0.0	IFR
FUELS	DISTIL	DU2	S339	OXIDIZER FEED (S-339)	0.0	IFR
FUELS	AROM	PLAT2	G314	JP-5	0.0	IFR
LOGISTICS	ENV	ENVNO	X315	BALLAST WATER (DOCKS)	0.0	EFR
FUELS	SOLTR	SOLTR	TD309	SOL AND TREAT NAPH	0.0	IFR
FUELS	DISTIL	DU2	TA317	CRUDE	0.0	EFR
FUELS	DISTIL	DU2	TA331	CRUDE	0.0	EFR
FUELS	DISTIL	DU2	TA301	CRUDE	0.0	EFR
CHEM	CG	CG	D-340	ECH (DOCKS)	0.0	IFR
FUELS	DISP	DISP	SS-376	GASOLINE	0.0	IFR
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0	IFR

TOXIC EMISSIONS FROM FLOATING ROOF TANKS
SHELL DEER PARK MANUFACTURING COMPLEX

BA	DEPT	UNIT	TANK	SERVICE	TOXIC EMISSIONS, TONS/YR (1)	IFR OR EF
FUELS	AROM	PLAT2	G352	JP-5	0.0	IFR
FUELS	ATC	THCR	L-303	L-303	0.0	IFR
FUELS	ATC	THCR	L-304	L-304	0.0	IFR
FUELS	AROM	PLAT2	G319	JP-5	0.0	IFR
FUELS	AROM	PLAT2	G345	JET KEROSENE	0.0	EFR
LOGISTICS	ENV	ENVNO	X321	WASTEWATER TREATMENT	0.0	EFR
FUELS	DISP	DISP	D-349	OLEFIN FEED (DOCKS)	0.0	IFR
FUELS	DISTIL	DU2	TA324	CRUDE	0.0	EFR
FUELS	DISTIL	DU2	TA326	CRUDE	0.0	EFR
FUELS	DISTIL	DU2	TA325	CRUDE	0.0	EFR
LOGISTICS	ENV	ENVNO	X309	X-309 RERUN OIL	0.0	IFR
FUELS	DISTIL	DU2	TA315	A-315	0.0	IFR
FUELS	DISTIL	DU2	G310	G-310	0.0	IFR
FUELS	DISTIL	DU2	TA303	CRUDE	0.0	EFR
FUELS	DISTIL	DU1	TA316	DU-1 HVI CRUDE	0.0	IFR
LOGISTICS	ENV	ENVNO	X301	X-301 RERUN OIL	0.0	IFR
FUELS	ATC	THCR	L-302	L-302	0.0	IFR
RESINS	BPA	BPA	T9554	BRINE	0.0	IFR
CHEM	A	A	T70A	IPA-91	0.0	IFR
CHEM	A	A	T76B	FINISHED IPE	0.0	IFR
CHEM	A	A	T67A	FINISHED IPA	0.0	IFR
CHEM	A	A	T75B	FINISHED IPE	0.0	IFR
CHEM	A	A	T216	CRUDE IPE	0.0	IFR
CHEM	A	A	T75A	FINISHED IPE	0.0	IFR
CHEM	A	A	T68	ANHYDR. IPA	0.0	IFR
CHEM	A	A	T3405	FINISHED IPA	0.0	IFR
CHEM	A	A	T95	FINISHED IPA	0.0	IFR
CHEM	A	A	T188	FINISHED IPE	0.0	IFR
CHEM	A	A	T88	IPA-91	0.0	IFR
FUELS	CC&G	CCU	AP5	CCFEED	0.0	IFR
FUELS	SOLTR	SOLTR	TD386	VM&P-HT	0.0	IFR
FUELS	SOLTR	SOLTR	B321	SS-140-HT	0.0	EFR
FUELS	SOLTR	SOLTR	B323	SS-140-HT	0.0	EFR
FUELS	DISTIL	DU2	TK305	K-305	0.0	IFR
FUELS	CC&G	CCU	AP3	TREATED CCU LGO	0.0	EFR
FUELS	ATC	THCR	J-320	J-320	0.0	IFR
FUELS	CC&G	CCU	AP3	CCFEED	0.0	EFR
FUELS	ATC	THCR	K-304	K-304	0.0	IFR
FUELS	DISP	DISP	F-315	SOUR NAPHTHA	0.0	EFR
FUELS	DISTIL	DU2	F-327	KEROSINE	0.0	EFR
FUELS	DISTIL	DU2	TA306	CRUDE	0.0	EFR
FUELS	AROM	ACU	D302	SHELL SOL-B	0.0	IFR
FUELS	CC&G	CCU	AP3	PYROLYSIS GAS OIL	0.0	EFR
FUELS	ATC	ALKY	G-317	ALKYLATE	0.0	EFR
FUELS	AROM	ACU	D305	SULFOLANE WASTE WATER	0.0	EFR
FUELS	DISTIL	DU2	T1F328	KEROSINE	0.0	EFR
FUELS	DISP	DISP	G-332	SALES NAPHTHA	0.0	EFR
FUELS	DISTIL	DU2	TA303	CRUDE	0.0	EFR
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

TOXIC EMISSIONS FROM FLOATING ROOF TANKS
SHELL DEER PARK MANUFACTURING COMPLEX

BA	DEPT	UNIT	TANK	SERVICE	TOXIC EMISSIONS, TONS/YR (1)	IFR OR EF
FUELS	DISP	DISP	G-344	RAFFINATES	0.0	EFR
FUELS	DISP	DISP	F-302	AVIATION GASOLINE	0.0	EFR
FUELS	DISP	DISP	F-317	SOUR NAPHTHA	0.0	EFR
FUELS	SOLTR	SOLTR	D362	SS-140-HT	0.0	EFR
FUELS	SOLTR	SOLTR	T1304	OUT OF SERVICE	0.0	IFR
FUELS	SOLTR	SOLTR	B324	SS-140-HT	0.0	EFR
FUELS	CC&G	CCU	AP7	CCFEED	0.0	IFR
FUELS	CC&G	GR	F307	NORMAL PARAFFINS	0.0	EFR
FUELS	ATC	THCR	J-319	J-319	0.0	IFR
FUELS	SOLTR	SOLTR	D360	SOL AND TRT SOL 71	0.0	EFR
FUELS	AROM	ACU	D333	SHELL SOL-B	0.0	IFR
FUELS	DISP	DISP	F-304	AVIATION GASOLINE	0.0	EFR
FUELS	ATC	ALKY	G-361	ALKYLATE	0.0	EFR
FUELS	SOLTR	SOLTR	D359	SOL AND TRT SOL 71	0.0	EFR
FUELS	HYDROPR	CATREF	T1F310	OUT OF SERVICE	0.0	IFR
FUELS	DISP	DISP	F-303	AVIATION GASOLINE	0.0	EFR
FUELS	AROM	ACU	F308	SHELL SOL-B	0.0	IFR
FUELS	SOLTR	SOLTR	D361	SS-140-HT	0.0	EFR
FUELS	ATC	THCR	D-305	D-305	0.0	IFR
FUELS	DISP	DISP	F-316	SOUR NAPHTHA	0.0	EFR
FUELS	AROM	ACU	D317	TOLUSOL A	0.0	IFR
FUELS	SOLTR	SOLTR	T1F318	SS-340-HT	0.0	EFR
FUELS	DISP	DISP	F-305	BLENDING STOCK	0.0	EFR
FUELS	SOLTR	SOLTR	B322	SS-140-HT	0.0	EFR
FUELS	ATC	THCR	AP-4	AP-4	0.0	IFR
FUELS	DISTIL	DU2	TA304	CRUDE	0.0	EFR
FUELS	AROM	ACU	F338	TOLUSOL A	0.0	IFR
FUELS	DISP	DISP	F-314	SOUR NAPHTHA	0.0	EFR
LOGISTICS	DOCKS	DOCKS	F-337	EA 190	0.0	IFR
LOGISTICS	DOCKS	DOCKS	F-335	EA-200	0.0	IFR
LOGISTICS	ENV	ENVNO	X312	X-312 SETTLING TANK	0.0	IFR
LOGISTICS	DOCKS	DOCKS	F-336	N-PARAFFIN	0.0	IFR
LOGISTICS	ENV	ENVNO	X313	X-313 SETTLING TANK	0.0	IFR
LOGISTICS	ENV	ENVNO	X320	BALLAST WATER (DOCKS)	0.0	EFR
LOGISTICS	ENV	ENVNO	X311	X-311 SETTLING TANK	0.0	IFR
LOGISTICS	ENV	ENVSO	T1306	T-1306 AMMONIA WATER TANK	0.0	IFR
LOGISTICS	DOCKS	DOCKS	F-353	IPA	0.0	IFR
OLEF	PYRO-III	PYRO-III	T02T911	STORAGE TANK T-OL-911	0.0	EFR
OLEF	PYRO-III	PYRO-III	T02T920	T-OL-920	0.0	IFR
OLEF	PYRO-III	PYRO-III	T02T911	STORAGE TANK T-OL-911	0.0	EFR

(1) EMISSIONS OF SARA 313 COMPOUNDS

ATTACHMENT 6

DEER PARK MANUFACTURING COMPLEX

SUMMARY OF

GROUNDWATER PROGRAMS

1990

CTW9026202 - 0001.0.0

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DPMC GROUNDWATER PROGRAM

1.0 FACILITY DESCRIPTION

The Deer Park manufacturing Complex (DPMC) is an integrated oil refining and chemical manufacturing facility owned by Shell Oil Company. The facility is located in the eastern part of Harris County and is situated on the Houston Ship Channel which forms its northern boundary. DPMC is bounded on the east by Patricks Bayou and on the south by State Highway 225. Occidental Chemical Corporation is located west of DPMC.

Oil refining units are situated mainly in the northern half of the complex. Initial operations began in 1929. Products from refining crude oil include gasolines, aviation fuels, fuel oils, lube stocks and raw materials for chemical facilities.

Chemical facilities, located mainly in the southern half of the complex, began initial operation in 1941. Chemicals produced include alcohols, solvents, epoxy resins and olefins.

There are four land based waste management areas within the Deer Park Manufacturing Complex. Each of these were identified in Shell's Part B Application and are briefly described below.

1.1 Southeast Waste Management Area (SEWMA). The wastewater management facilities for the chemical plant are located in the southeast portion of the property.

The three activated sludge basins (i.e., subjects for which EPA have granted a 3005 (j) variance from retrofitting) are part of the secondary biological treatment plant located in this area.

Belt filter presses and a multiple hearth incinerator for biosolids disposal are located in this area. In addition, four impoundments for accumulating clean stormwater are located in the southern part of the SEWMA.

1.2 Refinery Waste Management Area (RWMA). A stormwater surface impoundment and wastewater equalization tank, along with various gravity separators and biological treatment facilities are located in the north-central portion of the site to manage wastewaters generated within the refinery complex. The South Pond is located within this area. It has been removed from service and is being clean closed.

1.3 Northeast Waste Management Area (NEWMA). Solid wastes from various treatment facilities in both the chemical plant and refinery are managed in this site. A new MTR landfill is being constructed in this area with commissioning expected in November 1990. The present landfill Site 102 will be closed following completion of the new landfill. There are a number of other facilities in this area which have been closed or activities underway to close.

1.4 Southwest Waste Management Area (SWWMA). Contaminated soils and debris from various construction activities were placed in this waste management unit. The facilities have been closed under interim status provisions.

2.0 PROGRAMS TO UNDERSTAND SUBSURFACE ENVIRONMENT

Shell initiated a program at DPMC over ten years ago to understand the subsurface environment. The objectives of the program were to identify any impacts from our operation, and initiate remedial actions as appropriate. In addition, Shell entered into an Agreed Order in 1987 with the TWC to conduct extensive hydrogeologic investigations in our four waste management areas and modify our monitor well network as considered appropriate. We have also conducted major groundwater quality investigations in each waste management area.

2.1 Voluntary Program

An extensive site assessment was completed in 1981 and updated in 1984. As described in Section 4.0 there are three identifiable transmissive zones within about 100 feet of land surface. Each of these zones are separated by thick layers of basal clay. We have approximately 370 wells installed in these zones.

As shown the major number of wells are installed in the shallow zone where groundwater is first encountered. Wells are also provided for sampling the second (intermediate) and third (deep) zones.

Observation wells are located throughout the complex to identify any impacts from operations. Groundwater from these wells are analyzed for pH, total organic carbon and conductivity. More detailed analyses are performed on wells which have shown some contamination or are monitor wells associated with RCRA facilities.

Some product, raw and process materials have been identified in the groundwater at concentrations considered sufficient to warrant control. Recovery operations have been underway for some time in five localized areas. Details on these are provided Section 6.0.

2.2 Agreed Order with TWC

Shell entered into an Agreed Order with the TWC on August 6, 1987. We have completed extensive hydrogeologic investigations in each of the four waste management areas and installed additional monitor wells as determined appropriate. These studies have considerably expanded our knowledge of the hydrology and geology beneath our site.

Extensive characterization of the site hydrogeology have been provided in reports submitted May 12, 1988, October 27, 1988, January 3, 1989 and January 5, 1989 for the SEWMA, NEWMA, SWWMA and RWMA, respectively. Findings are discussed in Section 4.0. Shallow groundwater moves slowly to Patricks Bayou and the Houston Ship Channel. Thick layers of clay separate deeper transmissive zones impeding vertical migration of water. The lower zones are actually "artesian", thereby, producing an upper component to flow.

Groundwater has been sampled in accord with ground water quality investigation plans. With few exceptions, Appendix IX constituents are not present or are at very low concentrations. Remedial actions are being implemented where necessary. These are discussed in Section 6.0.

3.0 INVOLVEMENT OF REGULATORY AGENCIES

Our groundwater program and recovery activities have been discussed with the TWC and Region VI EPA on numerous occasions over the past several years. Additionally we have spent considerable effort in developing plans and reporting progress under the Agreed Order with the TWC.

During an EPA inspection in February 1988, a request was made for information on our groundwater program. Extensive information was provided in a transmittal dated March 10, 1988. Information included:

a. Original sampling logs of all RCRA groundwater monitoring wells at DPMC including all analytical data obtained prior to and that obtained after submittal of Part B application which was made in 1984.

b. Map showing the location of all monitoring wells, observation wells and recovery wells.

c. Sampling results from observation wells at the Refinery Waste Management Area.

d. Construction and boring logs for all wells noted at the Refinery Area.

In March 1988 and November 1989, progress related to our recovery programs were reviewed with the TWC and EPA Region VI.

Information developed in accord with the Agreed Order is routinely reported to the TWC and EPA Region VI.

We have regarded the TWC as having regulatory control with respect to any contamination of "waters of the state"; thus, we have kept them informed, both at the local and state level, of progress of recovery operations related to non-RCRA facilities. Our understanding is that the TWC have been satisfied with our keeping them informed of our remedial activities.

4.0 SITE HYDROGEOLOGY

The site hydrogeology has been characterized by numerous routine soil borings made for construction projects as well as special borings and evaluation of well completion data related to observation and monitoring wells. A site assessment was made in 1981 and updated in 1984.

These early characterizations have been supplemented by extensive hydrogeologic studies completed under the Agreed Order with the TWC. These studies extend to depths of over 120 feet below land surface and indicate:

a. Shallow groundwater moves toward Patricks Bayou and the Houston Ship Channel.

b. Shallow groundwater is on top of a thick layer of impermeable clay which is 15 to 30 feet below land surface.

c. This shallow ground water is separated from lower water zones which are also separated by thick clay layers.

d. The two successive water zones, confined between thick clay barriers, are artesian (i.e., under pressure). This fact significantly reduces the potential for downward migration of contaminants.

The hydrogeologic investigation reports prepared for each of our four waste management areas have been provided to EPA Region VI. Remaining reports were submitted May 12, 1988, January 3, 1989 and January 5, 1989 for the SEWMA, SWWMA and RWMA, respectively.

5.0 CHARACTERIZATION OF UNDERGROUND CONTAMINATION

The DPMC program which began over ten years ago and work under the Agreed Order with the TWC have provided considerable information on the quality of groundwater beneath DPMC.

Some product, raw and process materials have been identified in the groundwater at concentrations considered sufficient to warrant control. Recovery operations are underway in five localized areas. Details on recovery operations are covered in Section 6.0.

Analyses of three deep wells in the northeast of our site showed no constituents present.

Drinking water from wells approximately 400 feet under DPMC are also routinely analyzed with no hazardous constituents ever detected.

Groundwater is analyzed quarterly from monitor wells associated with our waste management areas. These data are routinely submitted to the TWC and EPA Region VI. Corrective actions are underway in some areas as discussed in Section 6.0. These data show, with few exceptions, that Appendix IX constituents are generally not present or are at very low levels. Benzene is the most frequent contaminant found at concentrations in the 100 parts per billion range.

As a result of our studies and knowledge of the hydrogeology of the site, we believe the contaminants identified present no significant threat to human health or the environment. We are however implementing corrective actions as appropriate to control those contaminants which have been measured in groundwater.

6.0. REMEDIATION OPERATIONS

We are implementing corrective actions in several areas as a result of groundwater quality investigations completed under the Agreed Order with the TWC. In addition, we have recovery operations underway in five areas of the complex. These latter operations are not associated with waste management areas.

6.1 Corrective Actions under Agreed Order

6.1.1 Basins Area (SEWMA). Chemical constituents were identified in the Basins Area of our Southeast Waste Management Area. A corrective action program is being implemented in accord with plans approved by the TWC. A report prepared by McClelland Consultants (Southwest), Inc. entitled "Groundwater Quality Assessment and Corrective Action Plan for the Basins Area" has been submitted to the TWC.

The recovery wells and additional observation and monitor wells proposed are installed. A subsequent report has been prepared by McClelland Consultants.

Corrective actions will control the movement of and eventual remove constituents detected in the shallow groundwater.

6.1.2 Cell C Area (SEWMA). Low levels of some constituents have been analyzed in wells downgradient from Cell C and the Primary Solids Emergency Lagoons.

We are presently implementing a plan approved by the TWC. Information being collected will be used to install corrective measures as appropriate.

6.1.3 Site 102 Area (NEWMA).

Benzene has been detected at low concentrations (i.e., less than 150 ppb) along with several other constituents marginally above the analytical detection limits. A program is being implemented to completely define the area of impact. Groundwater from a well, recently installed in the second zone, has been sampled. We are awaiting results.

We believe the low level of constituents are from past waste management activities. The source was removed when Site 102 and the Decant Pond were constructed.

We have requested modifications be made to our Compliance Plan. A report prepared by McClelland Consultants presents information from an investigation performed in accordance with a work plan submitted April 2, 1990.

6.1.4 Site 101/103 Area (NEWMA).

Low levels of some constituents are indicated present in some wells. Samples were recently submitted for analyses of groundwater from the second zone to determine any vertical migration. A plan for further response will be developed and submitted to TWC for their approval.

6.2 Recovery Operations

Details for each area where recovery operations are being

implemented are discussed below. Product is being recovered where practical. All water recovered is treated in activated sludge biotreaters before being discharged through NPDES permitted outfalls.

6.2.1 Oil Recovery in Central Part of the Refinery (6 wells)

First efforts were initiated in 1957, when product was observed floating on shallow groundwater. This program was expanded about ten years ago with an extensive array of observation wells to define the extent of product and to locate recovery wells.

Groundwater containing products, being removed from six wells, is routed to effluent handling systems where refinery products are recovered.

Water elevations and thickness of product are measured semi-annually. Plume profiles are constructed annually. A comparison of the product plume defined by recent measurements of separate phase materials in the observation wells with earlier measurements show a significant reduction in both the volume and area of impact. These data show conclusively that the contaminants are being controlled on-site by the cones of depression developed by the recovery wells.

6.2.2 Soluble Organics in Dock Area (1 well)

A recovery well was installed in 1985 following the detection of chemical constituents in an observation well. The area impacted is very localized because of extremely low conductive soils. A french-drain installed between this area and the dock serves as a back-up control.

6.2.3 Soluble Organics in Southeast Waste Management Area (2 wells).

Two recovery wells are being used in the area along the east side of our SEWMA. Recovery began in 1982. The area impacted is small and localized. The hydraulic conductivity of the clayey soils is very low; thus, the potential for migration is considered to be non-existent.

6.2.4 Soluble Organics in Chemical Plant (4 wells).

In preparations for sale of the VCM-EDC unit in 1987, an evaluation of groundwater identified constituents in the shallow groundwater. About twenty observation wells including 3 deep wells have been used to define the area of impact. Recovery began in November 1987.

Four wells are being used to recover product from first encountered groundwater. EDC and other chlorinated organics at low concentrations have been measured. Groundwater elevations indicated cones of depression are being maintained.

6.2.5 Dewatering Wells Near Refinery Stormwater Pond (Two wells removing low pH water)

Groundwater elevations relative to the bottom of the stormwater pond caused some concern regarding integrity of the pond structure.

Eight dewatering wells were installed to protect the integrity of dikes around the stormwater impoundment.

Water being removed from two of the wells has a low pH. Since recovery operations began in 1979, pH of the water has continued to improve.

7.0 PROGRAMS TO REDUCE FUTURE GROUND WATER CONTAMINATION

Facility design, operating and maintenance procedures, including our SPCC Plan, are directed toward spill prevention. Should spills occur they are promptly controlled. Response measures include cleanup of any residual materials which may spill on unprotected soils to minimize impacts on groundwater.

Routine inspection of tank farms and operating areas provide early detection of spills and leaks. Again, rapid response to spills prevents any significant migration of contaminants to groundwater.

Observation wells have been strategically located within tank farms and areas where lines are underground to detect subsurface leaks. Sampling of these wells give early indication of leaks and allow timely response.

The design of new units avoid underground lines to the extent practical. A program to replace existing underground lines includes: (1) updating of drawings showing locations of all underground piping, (2) installation of piping above grade when necessary to replace for maintenance purposes, and (3) longer term project directed at a schedule of replacement.

Tanks provided for hazardous waste are designed with either double bottoms with leak detection systems or with secondary containment which minimize the likelihood of undetected leaks. Any leakage is controlled and will not escape to groundwater.

Closures being provided for impoundments and land based facilities securely isolate remaining waste products from groundwater. Although thick clay deposits beneath our site afford groundwater protection, the new state-of-the-art landfill will significantly reduce the potential for contaminants reaching groundwater.

A program to replace underground lines with above ground piping will be funded at the rate of approximately $1 - $2 million annually, extending into the foreseeable future.

These programs are effective in reducing and preventing further groundwater contamination. Remediation efforts underway have significantly reduced the amount of contaminants in the shallow groundwater. Cones of depression which are

being maintained in the areas of impact are preventing expansion of the plume of contaminants. Furthermore, the stratigraphy of the site precludes any vertical migration. We are not aware of any problems which are presenting a significant threat to human health or the environment.

ATTACHMENT 7

ENVIRONMENTAL COMPLIANCE ASSESSMENT REVIEWS

Solid Waste
- General

Air Pollution
- General
- Permits and Regulations
- Stationary Sources
- NESHAPS
- NSPS
- Fugitive Emissions
- Mobile Sources
- State Implementation Plans and Local Rules

Water Pollution
- General
- Point Source Discharges
- Sanitary Waste Systems
- Spill Prevention and Control
- Marine
- NPDES Permits

The Underground
- General
- Injection Wells

FIFRA

Toxic Substance Control
- PCB Use and Disposal
- Suspect Hazards
- Recording of Allegations

CERCLA Hazardous Substances
- Reportable Releases
- Hazardous Substances Inventory
- SARA - Emergency Planning and Notification
- SARA - Hazardous Chemical Reporting
- SARA - Toxic Chemical Release Reporting

SEC
- Proceedings and Costs

Drinking Water Supply

Noise

ATTACHMENT 8

SUMMARY OF SHELL'S ENVIRONMENTAL COMPLIANCE ASSESSMENT PROGRAM

SEPTEMBER 1989

TR9024804-0001.0.0

I. INTRODUCTION

The Executive Vice President Administration is delegated the responsibility of assuring that the Company's business and affairs are conducted in compliance with the various laws--including environmental. The Vice President, Health, Safety and Environment, is subsequently delegated the authority to review the performance of the company's activities to assure compliance with laws, regulations and company policies related to health, safety and environmental matters. This delegation requires the periodic assessment of the company's compliance status and reporting to Senior Management. The purpose of this document is to describe the Shell Environmental Compliance Assessment Review Program (CAR) which has been developed to meet these requirements.

II. OBJECTIVES OF REVIEW

The responsibility for environmental compliance is entrusted to operating line management who have developed various internal programs for monitoring environmental performance. Included are routine monitoring efforts by location personnel and preparation and submission of incident and noncompliance reports and environmental performance data to functional environmental staff support offices. In some cases, internal functional environmental reviews are also conducted. The independent compliance reviews which comprise the corporate program are meant to supplement line management's programs and to provide credible evidence of compliance. The primary objectives of the corporate environmental compliance assessment program are defined as follows:

1. Substantiate compliance with federal, state and local requirements and Shell's policies and standards.

2. Verify that adequate controls and procedures are in place to assess the degree of compliance.

3. Assist line operating management in complying with environmental requirements.

4. Inform Company management of compliance status and environmental matters requiring their attention.

III. PROCEDURES

Products Organization:

The Products Organization has established an environmental review program which includes the required elements of the Corporate CAR program. Products environmental review activities are coordinated by Products, Environmental Conservation, Manufacturing & Technical with review findings being reported in accordance with the Corporate CAR procedures described later. CAR audits are scheduled cooperatively with Environmental Affairs, HS&E, who will participate

in the majority of the Products reviews to verify that the CAR program elements and objectives are being met.

Other Organizations:

For those functions without an established functional review program (E&P, Shell Development Company, Shell Credit Card Center, Information and Computer Services, etc.) CAR audits are scheduled cooperatively with appropriate management and coordinated by Environmental Affairs, who subsequently generate and distribute the final report to the location and functional environmental managers and to appropriate Head Office organizations.

IV. PROGRAM ELEMENTS

Scope

The purpose of the compliance assessment review is to make a first-hand judgement of the location's compliance status with reference to federal, state and local laws and regulations, and Shell policy. Based on the review of records, work practices and procedures, an assessment is made of the adequacy of management systems, and plans and programs for maintaining the location's environmental compliance.

Depth of Coverage

The CAR program is based on on-site assessments carried out by independent audit teams. These assessments focus on compliance status and control by reviewing, where appropriate, a statistically valid sampling of randomly selected records, observing work practices and emergency procedures, making facility inspections, and conducting interviews with location supervisory and operating personnel. Evaluation of environmental controls and procedures typically includes examination of environmental training and training records, internal and external communications, environmental goal setting, inspection procedures, internal audit findings, compliance and noncompliance documentation, awareness programs, operating guidelines and procedures, etc. Recommendations from the preceding environmental audit and the follow-up documentation are reviewed to determine their status or resolution. If the documentation is not adequate or if certain recommendations have not been addressed by the location, a finding to this effect is made in the new audit report. Similarly, the latest reports from financial and health and safety audits and other effectiveness reviews may provide useful information to the CAR audit team and should be reviewed for findings related to compliance with environmental statutes and regulations.

Review Team Attributes

The composition and size of the audit team is determined by the scope and anticipated complexity of the audit. In all instances, the team is staffed to assure a high level of regulatory and technical knowledge, and chosen for, or trained in, acceptable auditing skills and techniques. An important consideration in team staffing is the level of functional and operational knowledge

required of the team members to perform an objective and factual audit. Team members are selected to maintain the "arms length" independence from line operating management.

Each audit team is headed up by a team leader of sufficient stature and authority to gain the cooperation of all individuals whose participation is important to the audit effort.

Review Intervals

CAR audits are done on a nominal three-year cycle, although longer intervals of four to five years are considered for non-major facilities based on their complexity and the results of previous audits. Major locations will be audited at intervals of no longer than three years. Where the numbers of auditable units is large (i.e.; Service stations, production leases and platforms, exploration sites, etc.), a sampling of those units will be audited and used to assess the compliance status of the District, Division, etc.

Reporting (General)

Report Format:

Following the location visit, a draft report is prepared by the audit team for review by the function/location and, subsequently, a final report of the audit findings is prepared for distribution to location, function and Corporate management. The report summarizes the location's compliance status, identifies areas in which compliance requirements may not be met, and makes recommendations for corrective action by the location where appropriate. The final report provides basic documentation in support of the Company's environmental compliance status. It is normally distributed within 60 days of the on-site visit.

Audit findings are divided into three categories: Serious Deficiencies, Concerns, and Observations. Serious Deficiencies and Concerns require follow-up action by the audited location as discussed in the following section, "Location Response." For purposes of compliance assessment reviews, the audit finding categories are defined as follows:

Serious Deficiency:

An audit finding which in the judgement of the Manager, Environmental Affairs, indicates:

1. Lack of sufficient awareness to assure compliance with applicable laws, regulations and/or Shell policies related to environmental compliance.

2. Specific deficiencies which could result in:
   - Substantial non-compliance with environmental laws or regulations or Shell policy;

- Substantial harm for the employees, the public or the environment;
- Citations that could result in substantial fines or criminal prosecution;
- Major adverse publicity.

Concerns:

An audit finding which does not meet the Criteria of a "Serious Deficiency" but is a finding of:

1. Non-compliance conditions of more than an isolated, marginal nature, or

2. Management, organizational or awareness situations which are likely to lead to non-compliance.

Observations:

This category is intended to provide location management with opinions regarding practices or procedures which may lead to improved program effectiveness or efficiency but are not legally required. It is also used to acknowledge environmental efforts taken by a location which go beyond legal requirements and/or Shell's environmental procedures. Observations are defined as:

- Noncompliance situations which are only of an isolated or marginal nature.
- Administrative or operational practices that could result in noncompliance with regulations or Shell policy.
- Opinions regarding changes in practices or procedures which may improve the current program.

Deficiencies which the team believes may qualify as "Serious Deficiencies" will be identified as such to the location manager before the team leaves the location. The potential serious deficiency will be reviewed by the team leader with the Manager Environmental Affairs as soon as practical after the review. If, in the judgement of the Manager Environmental Affairs, the deficiency is serious, it will be reviewed with the functional environmental manager. If, after review with the functional environmental manager, it is agreed that the deficiency is serious, the Manager Environmental Affairs will report the findings to the Vice President, HS&E, promptly. In the event agreement cannot be reached, it shall be the responsibility of the Manager Environmental Affairs to report the findings and lack of agreement to the Vice President, HS&E.

Pending Legal Review:

In addition to the three categories of CAR findings described above, an additional classification of a finding, termed "Pending Legal Review", was incorporated in the HS&E CAR program on September 5, 1989. This classification includes any findings which HS&E, after initial consultation with Head Office Legal, is

unable to categorize due to unclear or ambiguous regulatory requirements, but which are judged to be potential situations which meet the definition of "Serious Deficiency".

The CAR final report will recommend that the responsible line manager immediately solicit formal legal review in order to bring any finding classified as "Pending Legal Review" to a definitive conclusion.

A written follow-up response from the responsible line manager to the senior line management and Environmental Affairs is required until a resolution is obtained.

Location Response:

An objective of the compliance assessment program is to assist operating line mangers to comply with environmental regulations. The final compliance review report summarizes compliance status, identifies areas which require location management attention and, where appropriate, recommends specific corrective action. The location is then responsible for timely follow-up activities to correct the identified discrepancies.

For all audit findings identified as "Concerns" or "Serious Deficiencies," the audited locations must submit a corrective action plan and an implementation schedule for resolution of the concerns and serious deficiencies. Although corrective action plans are not required for "Observations," these recommendations should be considered since they represent the audit team's collective thoughts on program improvements. The environmental review follow-up procedures for the Products and E&P organizations are established by these respective organizations.

For Shell locations outside the Products and E&P organizations, the corrective action plan should be submitted to Environmental Affairs, HS&E, within thirty days of receipt of the final CAR report. Environmental Affairs, in turn, will review the location's corrective action plan to determine that it appropriately addresses the audit recommendations in a timely manner. Any disagreements with the location's plan will be discussed with them and resolved before being implemented. The corrective action plan should address immediately the resolution of serious deficiencies, while concerns should be addressed in a timely manner. Quarterly progress reports must be submitted to Environmental Affairs until all concerns and serious deficiencies have been resolved.

Environmental Affairs will advise the Vice President, HS&E, on a quarterly basis of the status and/or resolution of any "Serious Deficiencies".

The above procedures are considered to contain the necessary elements of a responsible follow-up procedure for the Shell Environmental Compliance Assessment Program.

ENVIRONMENTAL AWARENESS/TRAINING

DPMC

ENVIRONMENTAL - MAJOR RESINS - DECEMBER 1, 1989

SUMMARY

As part of a program at DPMC to improve environmental training and to increase environmental awareness, a team, consisting of members from Major Resins and Environmental Compliance, developed an outline of the environmental requirements for Major Resins (see attached).

As part of the process, a preliminary audit was conducted to establish a "baseline" of environmental performance by Major Resins.

Major Resins has developed a comprehensive "Loss Point Analysis" program. It is their plan to make environmental awareness and environmental performance a key part of the newly developed program. They have incorporated many items of environmental importance into the daily shift reports in order to provide an on-going audit.

SHELL DEER PARK MANUFACTURING COMPLEX

ENVIRONMENTAL REQUIREMENTS
MAJOR RESINS

DECEMBER 1, 1989

The following is a summary of environmental expectations related to operation of Major Resins. These are to be complemented by procedures included in the DPMC and Departmental Order Systems. References are included to give direction to more detailed information should it be required.

If not addressed elsewhere, communications regarding environmental matters should be directed as follows:

Routine operations	Environmental Operations (66397 North - 67340 South)
Incidents	Environmental Supervisor (67212) or through Main Gate at 67402 or 66054) (ENV RADIO UNIT 1)
Regulations/permits	Environmental Compliance at 66480.

GENERAL

1. A copy of the Environmental Order Book should be available in each Control Room, the Operations & Maintenance Supervisor's office and the Field Team Manager's office. Employees should be familiar with those sections which are related to their job.

2. All spills and releases to the ground or the atmosphere, and spills or releases of "non-routine" material to the process or storm water sewer systems, must be promptly reported to the Environmental Supervisor (See also Environmental Order EC-1 and EC-50).

3. Report any unusual observations (i.e., odors, leaks, spills, etc.) which may be observed from within or outside normal work areas to the Environmental Supervisor.

4. An Environmental Impact Memorandum must be prepared for each planned turnaround. See Environmental Orders EC-50 (page 10) and EC-101 (page 3). This memorandum should address all expected impacts of environmental concern (i.e., air, water and solid waste).

5. Any changes, modifications or installation of new equipment which will alter capacity, emissions or characteristics of pollutants must be discussed with Environmental Compliance to determine applicability of regulations. This contact must be made as soon as practical because of the time required to obtain permits. Various permit requirements are listed in Environmental Order EC-50 (Also see Engineering Order E-10).

6. Training and recordkeeping requirements are summarized in Tables 1 and 2. Once each year a departmental audit will

be completed to ensure compliance with requirements outlined in this document (see Attachment I). Environmental will be consulted for information and support as may be appropriate, e.g., reviewing the audit checklist or ensuring that this document is up-to-date.

ENVIRONMENTAL INCIDENT REPORTING

1. Report promptly to the Environmental Supervisor any operational upset which has the potential for or is known to have resulted in a release to the environment (e.g., power outages, unscheduled shutdowns, major equipment failures, any malfunction or by-passing of pollution control equipment, etc.).

   Some materials have a regulatory reporting requirement as low as one pound; therefore, releases, which may have been regarded as minor in the past, should be reported to the Environmental Supervisor. Failure to properly report can result in significant penalties.

2. The Environmental Supervisor will: (a) provide support in implementing corrective actions to minimize environmental impacts; and (b) make necessary reports to federal, state and local agencies.

SUPERFUND/SARA REPORTING REQUIREMENTS

Several hundred compounds have been assigned a "reportable quantity" (RQ) under Federal regulations. The RQ varies from 1 pound to 5,000 pounds. If we release, to the environment (this means into the air, onto the ground or into public waters), an amount equal to or in excess of the RQ for a compound, then we must notify promptly, by phone, the National Response Center in Washington D.C., the Texas Emergency Response Center in Austin, the Texas Air Control Board (if an air release), Harris County Pollution Control Department, and in some cases the Local Emergency Response Committee (for us that means the Deer Park Police Dispatcher). **THE ENVIRONMENTAL SUPERVISOR WILL MAKE ALL CALLS TO THE AGENCIES!!** For a list of reportable compounds found in Major Resins, see TABLE 5.

SPILL PREVENTION AND CONTROL

The Spill Prevention, Control and Countermeasure (SPCC) Plan is included in the Environmental Order Book as EC-105. The SPCC plan is required by EPA regulations and is designed to prevent the release of oil to the environment. While the SPCC Plan is for oil only, the following guidelines apply to oil, other hydrocarbons, acid, caustic, hydrazine, etc.

1. All tanks/vessels within Major Resins should be visually inspected each shift for leaks.

2. Plug or blind flange openings, bleeders, etc. to minimize inadvertent releases. All spills or leaks must be cleaned up promptly. A surveillance checklist will be completed monthly for each operating area to insure that plugs/blinds are in place.

3. [illegible]

accordance with Operations Order O-101. Particular attention should be given to Class I service (includes hydrogen sulfide) lines. Operations have a responsibility for periodic visual inspections for leaks as a normal part of their unit surveillance.

4. There should be a general environmental audit once each month in one area of Major Resins.

WATER QUALITY

Also see Environmental Order EC-102 for further detail.

1. In general, efforts should be made to reduce any hydrocarbon {and other (caustic, acid, hydrazine, chromate solution, etc)} discharges to the sewer system, especially those involving soluble hydrocarbons.

2. The storm sewer is intended to collect only clean rainfall runoff. Precautions must be taken to prevent accidental spillage or the draining of any equipment to storm sewers.

3. {Routine pad washdown is acceptable without approval unless there has been a spill.} Nonroutine water discharges, e.g., equipment washout, spill washdown, etc., must have approval. The Operating Foreman can verbally approve those discharges below 100 gpm if there is minimal process contamination in the water. Otherwise, the Environmental Supervisor must be contacted for approval.

4. Hot condensate should not be discharged to the sewer system unless unavoidable. If such is necessary, the quantity must be minimized and quenched with other water and notify the Environmental Supervisor.

5. Water from the Cooling Water Tower contains chrome thus must be routed to a process sewer only. For planned maintenance on the CWT, chrome levels must be reduced to below 10 ppm (or possibly lower if large volumes will be discharged) prior to discharge to the chemical sewer (consult Environmental Operations).

6. Water drains from containment areas, e.g., tank dikes, are to be kept closed. Draining of the water is authorized by a Standing Permit unless the stormwater is contaminated with hydrocarbon, acid or caustic. The Environmental Supervisor must be contacted prior to draining contaminated water. The position of drain valves in any containment area shall be audited once per month.

AIR QUALITY

A. Air Emissions Controls

(Also see Environmental Order EC-50 for further details.)

Air emissions from Major Resins are regulated under general Texas Air Control Board (TACB) regulations, e.g., the fugitive emissions monitoring program, as well as several TACB permits. TACB Permit 3181 applies to ERU-5, Permit 3182 to ERU-6, and Permit 3177 to HRSP (Houston Resin Support Project)

1. The TACB requires operation consistent with representations in the permit application and provisions of the operating permit. For example:

   a. Operation of facilities must not cause or contribute to a condition of air pollution (i.e., must not adversely affect human health, animal life, vegetation or property, or interfere with the use and enjoyment of animal life, vegetation or property). For example, the TACB would be concerned about odors or dust emissions from operation of tanks, silos or the unit.

   b. Tank storage is outlined in the permit applications. Any change of service (or change in tanks themselves) must be reviewed by Environmental Compliance (6480) before such change can occur.

2. ERU-5 Requirements

   a. Production at ERU-5 is limited to 225 MM lb/yr unless reviewed by Environmental Compliance (6480).

   b. The vent recovery system (VRS) at ERU-5 must be operated as represented in the permit application, i.e., emissions from process vents, sumps and certain tanks are routed to the VRS. Permit limits are 98% efficiency, with an average emission of 2.1 lb/hr, and maximum of 65 lb/day.

3. ERU-6 Requirements

   a. Production at ERU-6 is limited to 60 MM lb/yr unless reviewed by Environmental Compliance.

   b. Dust from the crushing step must be water scrubbed in a Rotoclone dust scrubber. Scrubber efficiency must be equal to or greater than 95%, and dust emissions equal to or less than 1.5 lb/hr.

   c. Dust from packaging low melting point resin operations is water scrubbed in a Rotoclone dust scrubber. Scrubber efficiency must be equal to or greater than 99%, and dust emissions equal to or less than 1.0 lb/hr.

   d. The entire flake handling, storage and shipping operation must be equipped with a dust baghouse collection system prior to discharge to the atmosphere. The baghouse efficiency must be equal to or greater than 99%, and dust emissions equal to or less than 3 lb/hr.

4. HRSP Requirements

   These facilities include T/C, T/T and drumming facilities predominantly in support of ERU-5. These requirements to be added later.

B. Fugitive Emission Control

TACB regulations related to control of fugitive emissions

require periodic monitoring for equipment leaks and documentation of inspections and repairs.

The following requirements of these programs are specified in "Shell DPMC Fugitive Emissions Programs Training Manual".

1. A system will be in place to ensure implementation of all requirements of the fugitive emission program.

   a. Inspection and monitoring requirements include:

      (1) Immediately monitor any component after repair, or pump seals observed dripping.

      (2) Weekly visual inspection of pumps.

      (3) Quarterly monitoring of valves in gas service, including relief valves.

      (4) Yearly monitoring of pump seals and valves in liquid service.

   b. For equipment found to be leaking:

      (1) Repairs must begin within 5 days and be completed within 15 days.

      (2) Delays allowed with documentation, if not technically feasible to repair without shutting down the process unit.

C: Other Emissions Controls

1. Any changes in vapor pressure (i.e., caused by high temperatures, abnormal operation, or changes in service) of materials in storage tanks must be reported to Environmental Compliance (6480) or the Environmental Supervisor.

2. Any planned asbestos removal which will exceed 160 square feet must be reported to Environmental Compliance (6480). When required on an emergency basis, the Environmental Supervisor must be notified promptly, who will report the removal to the TACB.

   Failure to properly report to the TACB before removal begins can result in significant penalties. Handling, personnel protection and disposal procedures are specified in Safety Order S-125.

WASTE MINIMIZATION

Waste minimization is receiving increasing attention by the regulatory agencies, is part of the Shell Head Office Environmental Planning Premises, and is part of the DPMC Goal Setting Process. Emphasis is placed on source reduction through control of routine processes or upsets, and beneficial recycling or reclamation rather than treatment. Operations should be alert to opportunities to minimize waste generation. (SEE TABLE

WASTE HANDLING AND DISPOSAL

Waste procedures are specified in Environmental Order EC-2. The generator of waste is responsible for making arrangements for disposal. This is initiated by completing the "Waste Disposal Request Form", DPMC-6. The "Waste Data Sheet" (Attachment 2 of EC-2) provides information necessary for characterizing wastes as hazardous or nonhazardous.

A. GENERAL

1. See Table 3 for examples and proper method of disposal of wastes generated by Major Resins.

2. Any spill cleanup should be discussed with the Environmental Supervisor who will give guidance regarding disposal.

3. Tank residues are to be handled on a case-by-case basis. Refer to Operations Order O-31, "Cleaning of Storage Tanks".

4. Lugger pans are allowed in operating areas as part of maintenance activities, but should be marked as to purpose.

5. The use of vacuum trucks is addressed by Environmental Order EC-3. A "Waste Disposal Request Form", DPMC-6, must be prepared as part of the request for a vacuum truck. In addition, the appropriate WPA (and copy of Work Permit if one is issued) must accompany DPMC-6.

6. Idled equipment containing hazardous wastes must be emptied and decontaminated. Details of decontamination must be documented and records maintained to satisfy Federal and State regulations.

7. Any activity with contractors involving materials which will be left as waste on-site or removed off-site must be discussed with Environmental Operations (phone 7280). Additional responsibilities for use of contractors for cleaning process equipment are listed in Operations Order O-7.

B. CONTAMINATED WASTE

1. Waste materials contaminated with chemicals or hydrocarbons are likely regarded as hazardous waste, therefore, are controlled by very strict federal and state rules.

   Contaminated trash must be placed only in the dark green containers, i.e., drums or fork lift lugger pans.

2. Contact Environmental Operations (7280) if there is a question regarding the characterization of waste materials.

>12; ignitable (flash point <140°F); is toxic (contains certain metals or pesticides/herbicides); is reactive; (reacts with water, is pyrophoric etc.) or is on a list of "listed wastes".

3. Arrangements for disposal of hazardous wastes must be made promptly following its generation. We are required to dispose of hazardous wastes within 90 days from the first day of accumulation (e.g., following initial placement in a container).

4. Drums must not be allowed to accumulate in the units.

   Empty drums should be placed on a pallet, bungs closed and a DPMC-6 form completed. Pickup can be arranged by calling the Dispatcher at 6680. If drums are not empty, call Environmental Operations at 7280.

   Drums containing hazardous waste must be properly marked and labelled. Call Environmental at 7280 for assistance in obtaining labels and classification requirements.

C. UNCONTAMINATED WASTE MATERIALS

1. "Clean" (e.g., not contaminated by feedstocks, intermediates or products) waste must be kept separate from hazardous waste to minimize the amount of hazardous waste for disposal.

   Clean trash only is to be disposed of in trash cans, orange lugger pans, or the large "Western Waste" bins located in the area.

2. Stenciled lugger pans are to be used for collecting only clean scrap metal. Alloys should be accumulated separately.

3. Uncontaminated dirt, concrete, brick, gunnite, etc. will be used on-site for fill or rip-rap as directed by Environmental Operations. A DPMC-6 form is required for pickup.

Updating responsibility: Field Team Manager - Yearly

SHELL DEER PARK MANUFACTURING COMPLEX

MAJOR RESINS DECEMBER 01, 1989

TABLE 1 - TRAINING REQUIREMENTS

TYPE	WHEN	WHO	SOURCE
ENVIRONMENTAL REQUIREMENTS	BREAK-IN	ALL DEPT	T/C
SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN	BREAK-IN	ALL DEPT	T/C
FUGITIVE EMISSIONS CONTROL	AS/ASSIGNED	COORDINATOR	ENVR COM
WASTE MANAGEMENT/ MINIMIZATION	BREAK-IN	ALL DEPT	T/C ENVR OPER
SPECIAL TRAINING			
1. ASBESTOS	ANNUAL	ALL DEPT	T/C

SHELL DEER PARK MANUFACTURING COMPLEX

MAJOR RESINS DECEMBER 01, 1989

TABLE 2 - RECORD-KEEPING REQUIREMENTS

SUBJECT	DESCRIPTION	LOCATION	RETENTION
TRAINING	ENVIRONMENTAL REQUIREMENTS	RDO SAT	CY+3
	SPCC - DEPARTMENT SPECIFIC	"	CY+5
	ASBESTOS HAZCOM	"	CY+5
	FUGITIVE EMISSIONS	"	CY+5
ENVIRONMENTAL INCIDENTS	INCIDENT REPORT FORMS	"	CY
ENVIRONMENTAL AUDITS	UNIT AUDITS	"	CY+3
	ANNUAL ENVIRONMENTAL AUDIT	"	CY+5
ENVIRONMENTAL DRILLS	ENV DRILL PLANS & CRITIQUES	"	CY+5
FUGITIVE EMISSIONS	QUARTERLY INSPECTION LIST -	"	24 MOS
	ANNUAL MONITORING OF LIQUID SERVICE COMPONENTS	"	24 MOS
	LEAK REPAIR STATUS REPORT	"	24 MOS
	EQUIPMENT MASTER LIST	"	FACILITY

SHELL DEER PARK MANUFACTURING COMPLEX

MAJOR RESINS DECEMBER 01, 1989

TABLE 3 - WASTE DISPOSAL REQUIREMENTS

WASTE	CLASSIFICATION	DISPOSAL
Liquid Resins/ Solvents	TX Class I, Haz 913700	Off-Site Incineration
Containers Chemical Contam.	TX Class I, Non-Haz 179410	Off-Site Landfill
Resin Waste, Resin Manufac.	TX Class I, Non-Haz 179640	On-Site Landfill
Contaminated Dirt & Rubble	TX Class I, Non-Haz 177720	On-Site Landfill
Spent Catalyst (Desiccants,etc.)	TX Class I, Non-Haz 170210	On-Site Landfill
Asbestos	TX Class I 170750	Off-Site Landfill
Contam. Trash	TX Class I, Non-Haz 170770	Off-Site Landfill
Plant Trash	TX Class II, Non-Haz (Municipal Type Waste) (clean fiber drums) 279760	Off-Site Class II Landfill
Water, Contaminated	Misc /Sources, Non-Haz 500000	Effluent Treater Utility Tanks
Oil (Sumps/Drums Spills Etc)	Recovered Oil 550000 (Not a Waste)	Oil Recovery Tank
Oily Water	Water/oil 600000 (Not a Waste)	Oil Recovery Tank
Clean Dirt & Rubble	Fill Material 650000 (Not a Waste)	On-Site Clean Fill (Jones Lake)
Reclaim Drums (Empty, Closed)	Not a Waste 750000	Drum Reclaim Area (Off-Site Facility)

All movements of waste on-site are made using the DPMC-6 Form. Off-Site shipments are made using the Hazardous Waste Manifest for Class I Hazardous and Class I Non-Hazardous wastes. Reclaim drums are shipped on a Straight Bill-of-Lading. No shipping paper is required for "Plant Trash".

TABLE 4 - WASTE MINIMIZATION

WASTE MINIMIZATION DEFINITION:

A reduction of waste generation requiring treatment, storage or disposal. It includes any Source Reduction or Recycling activity that results in:

a. the reduction of total volume or quantity of hazardous waste, or;

b. the reduction of toxicity of hazardous waste.

SOURCE REDUCTION DEFINITION:

The reduction or elimination of hazardous waste at the source, usually within a process. Source reduction measures include:

a. process modification,

b. feedstock substitution,

c. improvements in feedstock purity,

d. housekeeping and management practices,

e. increases in the efficiency of machinery, or

f. recycling within a process.

Source reduction implies any action that reduces the amount of waste exiting a process.

RECYCLING DEFINITION:

Means the use or reuse of wastes:

a. as an effective substitute for a commercial product, or

b. as an ingredient or feedstock in an industrial process.

It also refers to:

c. the reclamation of useful constituent fractions within a waste material, or

d. the removal of contaminants from a waste to allow it to be reused.

Recycling implies use, reuse, or reclamation of a waste, either on-site or off-site, after it has been generated.

EXAMPLES:

SHELL DEER PARK MANUFACTURING COMPLEX

MAJOR RESINS DECEMBER 01, 1989

TABLE 5 - REPORTING REQUIREMENTS - SUPERFUND/SARA

COMPOUND	REPORTABLE QUANTITY LBS
EPICHLOROHYDRIN	10
CAUSTIC SODA (Sodium Hydroxide)	1000
CHLORINE	10
SULFURIC ACID	1000
CHROMATE SOLUTION (Na or K)	1000
DISODIUM PHOSPHATE	5000

THE ENVIRONMENTAL SUPERVISOR WILL REPORT TO THE AGENCIES LISTED BELOW WHEN THERE IS A RELEASE IN EXCESS OF THE REPORTABLE QUANTITY FOR ANY COMPOUND.

NATIONAL RESPONSE CENTER
TEXAS WATER COMMISSION EMERGENCY RESPONSE
TEXAS AIR CONTROL BOARD
HARRIS COUNTY POLLUTION CONTROL
LOCAL EMERGENCY RESPONSE (DP POLICE)

NOTE: The quantities listed are set by the Environmental Protection Agency as requiring agency reporting under the Superfund/Sara regulations. Other regulations (Federal and State) require different levels of reporting and clean-up actions and are too complex to be listed here. For example the State requires we prevent contamination of "Public Waters". Ground water is "Public Water", so any chemical spilled onto the ground, in any amount, must be cleaned up to prevent ground water contamination.

You should report all spills/releases (even small ones not approaching those listed above) to the ground, sewers or air to the Environmental Supervisor.

MAJOR RESINS
ENVIRONMENTAL AWARENESS
QUATERLY AUDIT

AUDIT DATE---------- AUDIT QTR ----------

NUMBER SPILLS FOR QUARTER ----------

NUMBER REALESES FOR QUARTER ----------

NUMBER ENVIRONMENTAL INCIDENTS REPORTED ----------

CURRENT PRODUCTION RATE, ERU-5 ----------

CURRENT PROCESS VENT RATE, ERU-5 ----------

TOTAL VTI VOLUME FROM ERU-5 ----------

TOTAL VTI VOLUME FROM ERU-6 ----------

TOTAL VTI VOLUME FROM LRDF ----------

TOTAL TONNAGE PRODUCED IN WASTE LUGGERS ----------

TOTAL TONNAGE HAZARDOUS WASTE PRODUCED ----------

AUDITOR----------

MAJOR RESINS
ENVIRONMENTAL AWARENESS
AUDIT SCHEDULE

TIME	RESPONSIBILITY
D = DAILY	O = OPERATOR
M = MONTHLY	T = T. C.
Q = QUATERLY	S.F. = SHIFT FOREMAN
Y = YEARLY	O.S. = OPERATING SUPERVISOR
P = PERMANENT	SP = SPECIAL ASSIGNMENT
	S = SAFETY
	I = INSPECTION
	M = MAINTENANCE
	C = CONTRACTOR

	AUDIT	RETENTION	SCH.	BY
1.	TANK FARM DRAINS	Y	M	O
2.	TANK AND EQUIP. SURVEILLANCE	Y	D	O
3.	ENVIRONMENTAL INCIDENTS	Y	Q	SF, OS
4.	CAR SEALED VALVES	Y	M	O
5.	E.O.M. TANK/VAREC	Y	M	O
6.	DRUM/LUGGER WASTE	Y	M	SF
7.	OPEN BLEEDERS	Y	Q	O
8.	HEARING ZONES	Y	Y	S
9.	RELEIF VALVES	P	Q	I
10.	TK CONSERVATION VENTS	P	Y	I
11.	ALARMS/S.D. SYSTEMS	Y	Y	M
12.	FUGUTIVE EMISSIONS	Y	Q	SP
13.	PROCESS VENTS	Y	Y	C
14.	ENV. COMPLIANCE	Y	Q	OS

MAJOR RESINS
ENVIRONMENTAL AWARENESS
QUATERLY AUDIT

SPILL PREVENTION

1. ARE DAILY VISUAL INSPECTIONS MADE OF EACH OPERATING UNIT BEING MADE FOR POTENTIAL/ACTUAL ENVIRONMENTAL REALESES?

2. ARE TANK FARM DRAINS MONITORED DAILY?
   ARE CONTENTS ANALYZED PER GUIDELINES PRIOR TO DRAINING?
   ARE TANK FARM DRAINS NORMALLY CAR SEALED CLOSED?
   IS THERE A TANK FARM DRAIN/CAR SEALED VALVE AUDIT IN PLACE?

3. IS AN AUDIT IN PLACE TO INSPECT AND CALLIBRATE TANK VAREC, DIGITAL AND HIGH LEVEL ALARMS?

4. IS THERE AN AUDIT IN PLACE THAT IDENTIFIES PROCESS OPEN PIPING, DRAINS BLEEDERS, ETC.?

5. ARE ALL POTENTIAL SPILL AREAS CURBED AND COLLECTED TO CONTAINMENT AREAS FOR CONTROL?

6. IS THERE EVIDENCE OF SPILLS WHICH HAVE NOT BEEN LOGGED IN THE DAILY SURVEILANCE LOGS?

7. IS A SPILL PREVENTION AND COUNTERMEASURE PLAN PROVIDED IN OPERATING ORDERS AND INCLUDED IN TRAINING MANUALS?
   ARE ALL SPILLS DOCUMENTED AND PREVENTATIVE MEASURES OUTLINED TO PREVENT REOCCURANCES?

8. IS A COPY OF THE ENVIRONMENTAL ORDER BOOK AVAILABLE AT: ERU5 C.R., ERU6 C.R., ERU6 DISTRIBUTION, LRDF OFFICE AND RESINS LIBRARY RDO 227?

8. ARE LOG SHEETS RECORDING TANK INVENTORIES PROPERLY FILLED OUT?

9. IN ACCORDANCE WITH OPERATIONS ORDER O-27, ARE CLASS 1 PIPING INSPECTIONS UP TO DATE?

10. DO OPERATING ORDERS INCLUDE GUIDELINES ON EFFLUENT LIMITS TO TREATMENT FACALITIES?
ARE RECORDS KEPT OF MATERIALS TRANSFERED TO TREATERS?

11. ARE REPORTING REQUIREMENTS UNDERSTOOD (WHAT, WHEN AND WHOM TO REPORT?)

EFFLUENTS

1. ARE THERE ANY ORGANICS ESCAPING FROM PUMP SEALS OR EQUIPMENT DRAINS?

2. LIST ANY WATER HOSES LEFT RUNNING TO THE SEWER OR SUMP SYSTEM AND REASONS.

3. ARE SEWER BOXES AND DRAIN PIPING MAINTAINED FOR EFFICIENT DRAINING?

4. ARE DRAWINGS OF SEWER SYSTEMS AVAILABLE IN EACH OPERATING AREA?
WHEN WAS THE LAST UPDATE?----------

5. LIST STREAMS THAT ARE DISCHARGING TO THE SEWER SYSTEM THAT MAY NOT COMPLY WITH ENVIRONMENTAL ORDER EC-102.
ERU-5 AREA
ERU-6 AREA
UTILITIES AREA
LRDF AREA

AIR QUALITY

1. IS THERE A FUGUTIVE EMISSIONS PROGRAM IN PLACE?
HAVE CORRECTIONS BEEN MADE WITHIN ESTABLISHED GUIDELINES?
IS DOCUMENTATION REAIDLY AVAILABLE AND UP TO DATE?

2. ARE LEAK TESTERS, OXYGEN ANALYZERS AND EXPLOSION METERS ROUTINELY CALLIBRATED?

3. ARE DECONTAMINATION PROCEDURES PROVIDED IN OPERATING ORDERS?
DOES EQUIPMENT DESIGN/CONDITION PREVENT EMISSIONS WHILE DECONTAMINATING?

4. ARE THERE ANY HYDROCARBONS OR CHEMICAL ODORS NOTICEABLE?

5. DOES THE R.V. INSPECTION LIST REFLECT ANY R.V. INSPECTIONS PAST DUE?
HAVE OVERDUE R.V. INSPECTIONS RECEIVED EXTENSION APPROVALS?

WASTE HANDLING

1. DESCRIBE ANY EMPTY DRUMS OR CONTAINERS STORED IN PROCESS OR TANK FARM AREAS INCLUDING LABEL DATE. EXPLAIN ANY OVER 30 DAYS.

2. DO PERSONNEL UNDERSTAND AND PROPERLY APPLY WASTE DISPOSAL FORM DPMC-6?

3. DO PERSONNEL UNDERSTAND WASTE CATEGORIES AND KEEP VARIOUS WASTES SEPARATED?

4. ARE MONTHLY WASTE AUDITS BEING PERFORMED?

5. USING DPMC-6 RETAINED COPIES, IDENTIFY HAZARDOUS WASTE MATERIAL SHIPED OUT OF THE DEPARTMENT FOR THE PAST 12 MONTHS.
ERU-5 # 20 GALLON FIBER DRUMS
ERU-6 # 20 GALLON FIBER DRUMS
LRDF # 20 GALLON FIBER DRUMS

DOCUMENTATION

1. ARE ENVIRONMENTAL RELATED QUESTIONS PART OF OPERATOR QUALIFICATIONS?

2. ARE ENVIRONMENTAL ISSUES ROUTINELY INCLUDED IN SAFETY DRILLS?

3. DO UNIT SHUTDOWN/START UP REPORTS SUBMITTED INCLUDE ENVIRONMENTAL IMPACT STATEMENTS?
ARE REPORTS SUBMITTED FOR EACH SHUTDOWN?

4. ARE ENVIRONMENTAL RELATED LOGS FILED PER RENTENTION REQUIREMENTS BY THE O.S. AND T.C.?

5. ARE THERE ANY OUSTANDING MUTS TICKITS RELATED TO ENVIRONMENTAL CONTROL SYSTEMS?

6. IS ANNUAL PERSONNEL TRAINING PROVIDED FOR ASBESTOS HANDLING AS OUTLINED IN SAFETY ORDER S-125?

7. ARE DECONTAMINATION DETAILS DOCUMENTED FOR IDLE EQUIPMENT?

8. WHAT WAS THE LAST ENVIRONMENTAL PERMIT DATE FOR:

ERU-5---------- ERU-6-------- LRDF---------

HAS ANY NEW EQUIPMENT BEEN ADDED?
IS A NEW PERMIT REQUIRED?

SHELL
DEER PARK MANUFACTURING COMPLEX
COMPLEX

ENVIRONMENTAL POLLUTION REPORTING

SUMMARY

All personnel should read page 1 and page 2 down to the heading: Air/Noise/Odor/Smoke/Light Problems and the underlined sentences thereafter. The remainder of the order gives specific instructions to the Environmental Supervisor and others having responsibility for reporting or cleanup.

All complaints or reports of emissions as well as spills of hydrocarbons or chemicals to a Complex sewer system, to the ground or directly to either the Ship Channel or Patrick's Bayou must be reported to the Environmental Supervisor, who can be reached any time as follows:

1. Direct By Telephone
   Call: Effluent Treater - South
   Control Room - 7340/7226

2. Relay Message By Radio
   Call Main Gate 7301 or 6054

Upon receiving a pollution report, the Environmental Supervisor has responsibility for investigating the report, ensuring that, in his judgment, the appropriate and adequate degree of action is extended by Complex personnel to finding and stopping source of the pollution. Additionally, the Environmental Supervisor is responsible for insuring proper clean up of spills reaching the Ship Channel or Patrick's Bayou except for the Dock area which is handled by the Dock Shift Foreman with assistance from the Environmental Supervisor if required. The Departmental Foreman in the area where the spill occurred is responsible for clean up of spills to the ground.

PROCEDURE FOR REPORTING AND HANDLING ENVIRONMENTAL POLLUTION

It is the policy of the Deer Park Manufacturing Complex to minimize adverse effects on our employees and our neighbors and to comply with all legal requirements designed to protect the environment. The procedure outlined below has been prepared to assist in carrying out this policy as efficiently as possible. Individual judgment should be exercised in an attempt to carry out this policy, should situations arise which are not covered in the procedure. In general, the course of action is to: (1) determine the source of pollution, (2) set up procedures to minimize or stop the pollution, (3) advise the person (in person if practical) making the complaint of the source of the

problem and what is being done to eliminate it, and (4) fill out the Environmental Incident Report form (see attached) and send to appropriate management. All environmental complaints will be handled on a priority basis.

To assist in implementing this policy it is the responsibility of every employee to report pollution problems observed by them. It should never be assumed that someone else will make the report.

ALL SPILLS TO THE GROUND OR SEWERS AND RELEASES TO THE ATMOSPHERE MUST BE REPORTED TO THE ENVIRONMENTAL SUPERVISOR BY CALLING 6397/7340 OR BY CALLING EITHER MAIN GATE.

Incident Reporting

The Environmental Supervisor will write an Incident Report for:

- Any spill which could impact the Effluent Treater or an outfall, or any incident requiring sewer diversion.
- All releases to the atmosphere and odor complaints (except minor ones). When smoke or plumes (above allowable opacity) from furnaces or stacks lasts more than about two minutes.
- All Superfund incidents and Dock spills.
- The bypassing of any emissions control device for which there is no back-up system. For example, the shutdown of the flare gas recovery compressor at Hydroprocessing would not be reportable unless the flare could not handle the added load without pluming.

Contents of the Report

The Incident Report should always name the person making the report to the Environmental Supervisor. It should identify the department where the problem occurred.

If a department makes a particularly timely report or does an especially good job of control or cleanup, it should be mentioned in the report. The Environmental Supervisor should avoid editorializing or attempting to place blame in the report. Enter all the facts known at the time.

AIR/NOISE/ODOR/SMOKE/LIGHT PROBLEMS

A. From Within Deer Park Manufacturing Complex

All complaints or reports of emissions from within the Complex should be reported to the Environmental Supervisor.

Upon receipt of a complaint or problem, the Environmental Supervisor will take the following action:

1. If the source of pollution is unknown or if additional details are required, the Environmental Supervisor will personally investigate the complaint (this may involve visiting the complainant) and proceed to determine the source. In all cases, the Environmental Supervisor should ensure that, in his judgment, the appropriate action is extended by the operating personnel to finding and stopping the source of the pollution. It is the responsibility of the operating foreman to initiate the action required to eliminate the environmental problem. This may include reducing rates or shutting units down in some instances.

2. After investigating and getting the pollution stopped, the Environmental Supervisor should attempt to contact the complainant (in person if appropriate) and report the action taken and the results.

3. The Environmental Supervisor will enter the complaint in the chronological log and then fill out an Incident Report, give one copy to the Foreman of the unit where the incident occurred, and turn a copy in to the Manager Environmental Operations.

4. If, in the judgment of the Environmental Supervisor, the severity of the situation warrants additional consideration or assistance, the supervisor will call or ask the Main Gate - North or South to call the people listed below.

   a. Weekdays (8:00 a.m. - 4:30 p.m.)

      (1) The appropriate process manager.

      (2) The Manager Environmental Operations - Ext. 7500.

   b. Other Shifts

      If necessary the Environmental Supervisor will call or have the Main Gate Guard call the Environmental Duty Man. It is the responsibility of the Environmental Duty Man to assist the supervisor in his effort to stop the problem.

5. If, in the judgment of the Environmental Supervisor, the problem is severe enough to be observed outside the Complex or exceed governmental regulations, the Supervisor will contact the regulatory agencies indicated below and apprise them of the upset. When reporting to regulatory agencies, it should be stated that "the report is being made under TACB Section 101.6".

   Harris County Pollution Control District 920-2831

Texas Air Control Board Regional Office (Recorder after hours)	666-4964
City of Houston Department of Health Pollution Control Division (Air Pollution) (Contact only for environmental problems with City jurisdiction (DPMC-North)	645-5316
From Friday Midnight to Sunday Midnight and on Holidays	222-3244
Deer Park Dispatcher (Contact if citizen complaints can be expected.)	479-1511

Prompt reporting of these conditions will assist the agencies in response to any complaints they may receive and maintain a good working relationship. Operating upsets which result in odors expected to result in nuisance complaints or in smoke generation by flares or process heaters should be reported. Whenever agencies are contacted the Manager Environmental Operations should be advised immediately on weekdays and the Environmental Duty Man during all other periods if the Environmental Supervisor feels the magnitude of the incident warrants it.

B. FROM OUTSIDE THE DEER PARK MANUFACTURING COMPLEX

Air/Noise/Odor/Smoke/Light complaints from outside the DPMC will come to the main switchboard or Community Relations Manager on weekdays and to the Main Gates on other shifts. Upon receipt of a complaint from an outside caller the following action should be taken:

1. The individual receiving the call should inform the complainant they will get someone to help and immediately connect the complainant to the Environmental Supervisor (see p. 1 of this order).

2. The Environmental Supervisor will then get the caller's name and the details of the complaint. If aware of the reason for the complaint he will discuss the cause of the problem and what is being done to stop the problem. If unaware of the source of the problem, he will assure the caller that he will investigate and call back.

3. If an investigation is required, the Environmental Supervisor will undertake the necessary investigation to determine the cause of the problem. He may choose to visit the complainant to get more information.

4. After investigation and, if possible, getting the problem solved, the Environmental Supervisor should then contact the complainant (in person if possible) and tell what action has been taken and what the effect should be.

5. If a governmental agency is involved the Environmental Supervisor will meet with the representative in person at the gate or discuss the problem by telephone.

6. After the problem is solved the Environmental Supervisor will enter the incident on the chronological log and fill out an Incident Report. This report should be provided to the Manager Environmental Operations on the next workday.

7. On off shifts the Environmental Supervisor may wish to contact the Environmental Duty Man for assistance. Additionally, if senior management should be apprised of the incident, the Environmental Duty Man will make these calls.

WATER POLLUTION

A. Oil or Hazardous Substance Spills Originating from Within the Deer Park Manufacturing Complex

1. Dock Spills - If oil or a hazardous substance is discharged into the dock slip, the Dock Shift Foreman should be notified immediately. He, in turn, has responsibility for initiating the follow actions:

   a. Take whatever steps are necessary to stop the loss of material if this has not already been accomplished.

   b. Initiate containment and cleanup. If containment creates a fire hazard at the spill site, the area should be isolated.

   c. The following governmental agencies should be contacted by the Dock Foreman.

      (1) Duty Officer, National Response Center, U.S. Coast Guard, 400 Seventh Street SW, Washington, D.C. 20590, phone number 800-424-8802.

      (2) Harris County Pollution Control Department - 920-2831.

      (3) City of Houston Department of Health - Pollution Control Division (Water Pollution) - 645-5316.

   d. Call the Environmental Supervisor. If the Dock Shift Foreman deems it necessary he may ask the Environmental Supervisor for assistance in cleaning up the spill. The Environmental Supervisor will enter the spill in the chronological environmental log, fill out an Incident Report and advise the Environmental Duty Man when he deems necessary during off hours, and Manager Environmental Operations during normal work hours.

e. Advise Dispatching - Docks management in accordance with departmental instructions.

2. Spills Outside Dock Area - If oil or hazardous substances are accidentally discharged into the Ship Channel, Patricks Bayou or onto the ground within the Complex, the Environmental Supervisor must be contacted immediately. He, in turn, has responsibility for taking the following actions.

a. Take whatever steps are necessary to stop the loss of material if this has not already been accomplished.

b. Initiate containment and cleanup if it has not been started. (Refer to SPCC Plans EC-105 and EC-106). If containment creates a fire hazard at the spill site, the area should be isolated.

c. Contact the governmental agencies listed in A-1-c above:

(1) For an oil or hazardous substance spill to the channel, outside the dock area, or to Patrick's Bayou.

(2) For a hazardous substance spill to the ground.

d. If the Environmental Supervisor requires assistance he should contact the Environmental Duty Man during off hours and the Manager Environmental Operations during normal work hours.

e. The Environmental Supervisor will record the spill on the chronological log and fill out an Incident Report with pertinent details. This will be passed on to the Manager Environmental Operations as soon as possible.

3. Notification of Texas Water Commission (TWC)

a. The Environmental Supervisor must notify the Texas Emergency Response Center immediately at 8-512-463-7727 when any of the following occur:

(1) A spill into coastal waters.

(2) Oil spills to the ground of more than five (5) barrels.

(3) A CERCLA (Superfund) reportable incident, or any other incident which might be harmful to the environment.

Notification of Shell's Marine Operations

Marine Operations should be notified by the Docks Personnel any time one of the following incidents occur at the dock:

1. Any spill which cannot be contained within the dock slip and reaches the Houston Ship Channel.

2. Any hull leak.

3. A major spill (greater than 240 bbls.) contained within the dock slip.

Marine Operations 241-2532

After hours and on weekends you will reach an answering service. First make it clear that an emergency exists. Ask to be connected with the Marine Operations Duty Man or for him to call you as soon as possible.

B. Other Spills or Equipment Failure

1. Any abnormal condition in any sewer system or equipment failures at the effluent treaters endanger the ability of the treaters to satisfactorily handle effluent. Whenever any abnormal situation occurs, the Environmental Supervisor should be notified immediately. If he decides that the situation warrants additional attention, the Manager Environmental Operations will be contacted, and in his absence the Environmental Duty Man, to determine whether any governmental agencies need to be contacted. The involved regulatory authorities are listed in A-1-c and A-3-a above.

In any case, upon notification, the Environmental Supervisor will:

a. Investigate the cause or source.

b. Call for assistance if warranted.

c. Try to stop the pollution.

d. Take additional steps as required to prevent pollution reaching Ship Channel. This may involve putting the Spill Contingency Plan into effect.

e. Log the actions taken, fill out an Incident Report, and get it to the Manager Environmental Operations on the next workday.

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ATTACHMENT 1

SHELL
DEER PARK MANUFACTURING COMPLEX
ENVIRONMENTAL INCIDENT REPORT

Date of Incident Time of Incident

Information Report Pollution Claim Pollution Complaint

Type of Incident Air Water Superfund Dock Spill

Location of Incident:

Department Unit Foreman

Person Making Report:

Address or Operating Area:

Phone No.: Other Information:

Weather Conditions: Cloudy , Partly Cloudy , Clear , Rain ,

Fog , Haze , Wind Direction , Velocity (mph).

Summary of Problem; Problem Source and Impact; Corrective Action Taken:

Agencies Notified:

Environmental Supervisor

Time	Name	Phone	Time	Name	Phone
TACB		666-4964	TDWR		479-5981
HCPC		920-2831	HOUS		645-5316
NRC		1-800-424-8802	USCG		672-6639

TACB Acct. Numbers: Refy. HG0659-W - Chem. HG0656-F

Operating Department Comments:

Shift Foreman

Process Manager

Distribution:

Supt. Complex/Supt. Facilities Support
Supt. HS&E - Environmental Advisor - Mgr. Env. Engineering
Mgr. Env. Oprns - Industrial Hygiene - Env. Oprns. File

Others:

DPMC-5' 3
(Rev. 9/21/78)

ATTACHMENT 2

DEER PARK MANUFACTURING COMPLEX

SAMPLES OBTAINED BY REGULATORY AGENCIES

NAME(S) OF VISITOR _____

AGENCY REPRESENTED _____

REASON FOR VISIT _____

_____

SAMPLES OBTAINED:

1. Outfall No. _____ Sample Size _____

   Flow _____ GPM; Temperature _____ °F

   pH _____. Residual chlorine _____ ppm

   Other Analysis Performed on Site: _____

   _____

   Appearance of Sample _____

   Comments by Visitor _____

   _____

2. Outfall No. _____ Sample Size _____

   Flow _____ GPM; Temperature _____ °F

   pH _____. Other analysis _____

   Appearance of Sample _____

   _____

   Comments By Visitor _____

   _____

3. Other Samples Obtained _____

   _____

   _____

Date: _____

Time: _____

Signed: _____

Distribution

Manager Env. Operations
Sr. Staff Eng. -Env. Regulatory
Supt. Env. Cons.-E.O. File

SHELL
DEER PARK MANUFACTURING COMPLEX
COMPLEX

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INTRODUCTION

The purpose of this order is to define Deer Park Manufacturing Complex operating guidelines as they relate to the Texas Air Control Board (TACB) Rules and Regulations which govern allowable emissions to the atmosphere. The text of this order includes visible emissions, hydrocarbon emissions, sulfur emissions, nuisance regulations and unit shutdown planning, etc. In the event any of the operating guidelines established in this order are exceeded,

immediate notification of the Environmental Supervisor is required as prescribed by Operations Order 0-9, Environmental Pollution.

The TACB is responsible for maintaining and improving the quality of air we live and work in. It is a requirement that we follow their rules and regulations and that we conduct our operations within the spirit of the Clean Air Act. No circumvention of the regulations are allowed and no nuisances are allowed. These are defined as follows:

(a) Circumvention

No person shall use any plan, activity, device or contrivance which will, without resulting in an actual reduction of air contaminants, conceal or appear to minimize the effects of an emission. Air introduced for dilution purposes only is considered a circumvention of the regulations.

(b) Nuisance

No person shall discharge from any source air contaminants in such concentration and of such duration as to be injurious to or to adversely affect human health or welfare, animal life, vegetation, or property, or as to interfere with the normal use and enjoyment of animal life, vegetation, or property.

I. REPORTING OF EXCEEDANCES

The Environmental Protection Agency (EPA), the Texas Air Control Board (TACB) and the Harris County Pollution Control Agency (HCPC) are to be notified when exceedances of the regulations occur or when there could possibly be nuisance complaints from our surrounding community. The reports given to the agencies are:

1. CERCLA - Notification Requirements For Spills/Releases

The Comprehensive Environmental Response, Compensation and Liability Act requires reporting of as little as one (1) pound of some materials to the environment. Since the requirements are too complex to include in this order, ALL leaks and releases must be reported to the Environmental Supervisor. He will make the necessary reports to the agencies.

2. SARA - Notification Requirements For Releases And Emergency Planning

The Superfund Amendment and Reauthorization Act requires preplanning for releases which may impact the local community as well as reporting requirements to Federal, State, and local agencies. Telephone notification is to be made by the Environmental Supervisor

immediately. ALL releases must be reported as soon as possible to the Environmental Supervisor.

3. Rule 7 - Notification Requirements For Major Upset

The (EPA), the (TACB) and the (HCPC) must be notified as soon as possible of any major upset condition which causes or may cause an excessive emission.[1] Written follow-up reports, when requested, are to be submitted to the agencies within 10 working days of an incident.

4. Rule 8 - Notification Requirements for Maintenance

The TACB and the HCPC shall be notified in writing at least 10 days prior to any planned maintenance, startup, or shutdown which will or may cause an excessive emission that contravenes the intent of the Texas Clean Air Act or the regulations of the Board. If 10 days notice cannot be given due to an unplanned occurrence, notice shall be given as soon as practical prior to the shutdown.

II. VISIBLE EMISSIONS

Visible emissions are defined in terms of percent opacity. Specific guidelines governing opacity limitations are categorized below. Opacity is defined as follows:

Opacity: The degree to which an emission of air contaminants (normally particulate matter) obstruct the transmission of light. Examples of particulates are catalyst fines (CCU) or ash from fuels (Utilities South - pyrolysis pitch fuel).

The guidelines for opacity are divided into three categories: outdoor burning, gas flares, and stationary flues.

1. Outdoor Burning

Outdoor burning is authorized for the purpose of training fire-fighting personnel when requested by certified mail and when authorized in writing by the local air pollution control agency or local health unit. A schedule of the training should be submitted to the Environmetal Regulatory Affairs (ERA) once a year (in January) and any significant revisions to that schedule should be submitted to ERA, also.

[1]"Excessive" is defined as an exceedance of an emission regulation.

2. Gas Flares

Visible emissions from a gas flare are not allowed for more than five minutes in any two-hour period. "Visible emissions" is interpreted to include smoke or plumes (such as SO_2 plumes).

3. Stationary Flues (Furnaces, Boilers)

It is in DPMC's best interest not to have (or minimize) visible emissions from stacks. This would preclude nuisance complaints from the surrounding community. The following are TACB's rules for maximum allowable opacity:

a. Visible emissions from any stationary flue are not to exceed an opacity of 30% averaged over a five-minute period.

b. Visible emissions from any stationary flue beginning construction after January 31, 1972, are not to exceed an opacity of 20% averaged over a five-minute period.

c. Visible emissions during the cleaning of a firebox or the building of a new fire, sootblowing, equipment changes, ash removal, and rapping of precipitators may exceed the limits set forth in this section for a period aggregating not more than 5 minutes in any 60 consecutive minutes, nor more than 6 hours in any 10-day period. Permitted units, such as CPS, must follow the EPA Regulations governing opacity which allows six minutes every hour. Opacity exceedances due to poor combustion or process upsets are not given any allowance over the stack limits.

d. Visible emissions from any stationary flue having a total flow rate of 100,000 acfm or more are not to exceed an opacity of 15% averaged over a five-minute period unless an optical instrument capable of measuring the opacity of emissions is installed in the flue.

Some of our major stacks have the limits below:

CCU CO Furnace	30% Maximum
FUT 130	20% Maximum
Utility South Boiler Stack	30% Maximum
CPS Boilers	20% Maximum
Clay Perc Furnace	30% Maximum
Power Plant #2, Boiler 2-4	15% Maximum

4. Allowable Particulate Emissions

The above major stacks normally have a visible opacity (except when burning only gaseous fuels), and therefore, they have higher particulate emissions. The TACB rules limit the amount of particulates based on the stack effluent rate, as follows:

Effluent Flow (acfm)	Rate of Particulates (lb/hr)
1000	3.5
2000	5.3
4000	8.2
10,000	14.5
20,000	22.3
40,000	34.2
80,000	52.6
100,000	60.4
200,000	92.9

$E = 0.048\ q^{0.62}$ where E = allowable particulate emission rate in lb/hr and q is the stack effluent flow rate in acfm.

The CPS permit has more restrictive requirements. Both stacks are limited to 82 #/hr, each.

III. SULFUR EMISSIONS

Sulfur emissions at DPMC generally take the form of sulfur dioxide (SO_2) or hydrogen sulfide (H_2S). The main sources of SO_2 emissions are the sulfur compounds present in the fuel systems and the three sulfur recovery plants. Each source of sulfur emission is regulated by the TACB as follows:

1. Hydrogen Sulfide in Fuel Gas

Since DPMC has had many furnace efficiency projects that required TACB permits, the fuel gas systems to those furnaces are required to meet the EPA New Source Performance Standards (NSPS). Refinery gaseous fuel systems have a limit of 160 ppmv hydrogen sulfide. The following furnaces have this NSPS requirement:

CPS Boilers	ACU Furnace
DU-1 Air Preheater Furnace	SHCU Furnaces
LHT-2 Furnace	NPRU Furnaces
MEK Furnaces	MVI Furnaces

The furnaces receive fuel gas from the East and West Blend Tank systems plus natural gas.

The NSPS regulations require quarterly reports of the exceedances of the H_2S limit. These reports are prepared by ERA and then sent to the TACB within 30 days after each quarter. Those responsible for the East and West Blend Tank must submit a report of the quarterly exceedances within 15 days after each quarter to ERA.

2. Liquid Fuel-Fired Generator or Furnace

Emissions of sulfur dioxide in the stack effluent from any liquid fuel-fired steam generator, furnace, or heater are not to exceed 440 ppm, by volume. For most furnaces this requires the liquid fuel to have less than 0.85% weight sulfur. Permitted units, such as CPS and DU-2 Furnace, have lower limits (0.5% weight sulfur). ACU furnace, LHT-2 furnace, and MEK furnaces have a limit of 0.6% weight sulfur.

3. Sulfur Recovery Plants

The three sulfur recovery plants have the following limits on SO_2 emissions based on their stack effluent rates:

Effluent Flow Rate scfm	Rate of SO_2 lb/hr	Equivalent Conc. ppmv
6,000	670	11,021
8,000	845	10,425
10,000	1,012	9,988
20,000	1,766	8,715
30,000	2,447	8,051

$E = 0.614\ q^{0.8042}$; where E is the allowable emission rate in lb/hr and q is the stack effluent flow rate in scfm, for q greater than 4000 scfm.

The SR-5 Unit is permitted by the TACB and when the SCOT Unit is in operation the emission limit is 980 ppmv (catalytic incinerator or 800 ppmv for the thermal incinerator) and a maximum of 210 lb/hr SO_2. Without the SCOT Unit, the SR-5 Unit has a maximum stack limit of 8500 ppmv and 4200 lb/hr maximum. The SCOT Unit is to be in operation unless down for maintenance (which should be minimal).

4. Net Ground Level Concentration - Galveston and Harris Counties

Emissions of sulfur dioxide from a source or sources are not to exceed a net ground level concentration of 0.28 ppm averaged over any 30-minute period and are not to exceed the EPA national ambient air quality standards of .14 ppm averaged over 24 hours or .03 ppm annual average, and the secondary standard of 0.5 ppm 3-hour concentration.

5. Hydrogen Sulfide

a. Residential, Business, or Commercial Property

Emissions of hydrogen sulfide from a source or sources are not to exceed a net ground level concentration of 0.08 ppm averaged over any 30-minute period if the downwind concentration of hydrogen sulfide affects a property used for residential, business, or commercial purposes.

b. Other Property

Emissions of hydrogen sulfide from a source or sources are not to exceed a net ground level concentration of 0.12 ppm averaged over any 30-minute period if the downwind concentration of hydrogen sulfide affects only property used for other than residential, recreational, business, or commercial purposes, such as industrial property and vacant tracts and range lands not normally occupied by people.

c. A spill of over 100 pounds or an emission of over 100 pounds of H_2S in any 24 hour period is reportable to the National Response Center. A spill or an emission of this rate amount should be reported to the Environmental Supervisor.

6. Control of Sulfuric Acid

Emissions of sulfuric acid from a source are not to cause net ground level concentrations greater than:

a. 15 μg per cubic meter of air averaged over any 24-hour period;

b. 50 μg per cubic meter of air averaged over a one-hour period of time more than once during any consecutive 24-hour period; or

c. one hundred μg per cubic meter of air maximum at any time.

IV. CONTROL OF VOC, TANKAGE

DPMC is located in Harris County and is considered to be in non-attainment for ozone levels. Ozone is an air contaminant which can cause respiratory problems, and ozone is created by hydrocarbons and nitrogen oxides reacting with oxygen. The EPA and TACB implement regulations to reduce the amount of VOC (hydrocarbons, except hydrogen, methane and ethane) emitted to ultimately reduce ground levels of ozone. New rules are constantly being evaluated for future VOC reductions.

There are currently five regulations covering tank emissions at DPMC. They are: DPMC Bubble Policy for 42 external floating roof tanks, NSPS Subpart K covering tanks constructed or modified after June 1973, NSPS Subpart Ka covering tanks constructed or modified after May 1978, NSPS Subpart Kb covering tanks constructed or modified after July 1984, and TACB regulations covering all existing (grandfathered) tankage in Harris County. This Section will summarize the requirements for the TACB regulations. More information is available on all tankage requirements in the recently published ERA's "DPMC Environmental Requirements for Tanks."

A. TACB STORAGE REQUIREMENTS

Any volatile organic compound (VOC) with a true vapor pressure equal to or greater than 1.5 psia shall be equipped with at least the control device specified in Table I (for VOC other than crude oil and condensate), or Table II (for crude oil and condensate), a vapor recovery system, or any other control device which provides substantially equivalent control.

1. Inspection Requirements

All external floating roof secondary seals shall be inspected annually to insure compliance.

2. Recordkeeping Requirements

The results of yearly inspections required for external floating roofs and tanks shall be recorded each year. All records shall be maintained for two years and be made available for review by authorized representatives of the Texas Air Control Board.

3. Change of Service

Prior approval from ERA is required before the service of a tank can be changed.

4. Reporting of Excessive Emissions

Excessive emissions from tanks are to be reported to the Enviromental Supervisor. Excessive emissions can occur when the floating roofs are set on their legs, or the floating roofs and seals are damaged or sunk, and when the stored material exceeds its TVP limit.

V. OTHER CONTROLS FOR HYDROCARBONS

A. FACILITIES FOR LOADING AND UNLOADING OF VOLATILE ORGANIC COMPOUNDS

1. Throughput and Control Requirements

Loading or unloading from any facility having 20,000 gallons or more throughput per day (averaged over any consecutive 30-day period) of volatile organic compounds with a true vapor pressure equal to or greater than 1.5 psia under actual storage conditions shall have emission controls (chilled condenser, water scrubber).

2. When loading or unloading is effected through the hatches of a tank truck or trailer or railroad tank car with a loading arm equipped with a vapor collection adapter, pneumatic, hydraulic, or other mechanical means shall be provided to force a vapor-tight seal between the adapter and the hatch. A means shall be provided to prevent liquid drainage from the loading device when it is removed from the hatch of any tank truck, trailer, or railroad tank car, or to accomplish complete drainage before such removal.

3. Those units applicable to this regulation include:

   a. Resin solutions loading racks.

   b. Intermediate and Solvent loading racks.

   c. EA denaturing facilities.

B. WATER SEPARATION

1. Chemical Plant Operations

Any compartment of any single or multiple compartments volatile organic compound water separator (such as API or CPI separators), separating 200 gallons or more a day of volatile organic compounds having a true vapor pressure equal to or greater than 1.5 psia shall be controlled (covered).

2. Petroleum Refineries

Any compartment of any single or multiple compartment volatile organic compound water separator (CPI separators), which separates 200 gallons or more a day of volatile organic

compounds having a true vapor pressure of 0.5 psia or greater shall be controlled (covered).

3. Those separators that are not covered should be periodically tested for RVP to prove they are not above the TVP limits.

C. PROCESS UNIT TURNAROUND

The probability of noncompliance with our air and water permits is magnified during operating unit shutdown unless detailed planning is done in advance. To facilitate this planning, an Environmental Impact Memorandum is required for each planned shutdown. One memorandum should encompass the impact of the shutdown on all areas of environmental concern--air, water and solids. The purpose of this advance planning is to be able to accomplish the shutdown, if at all possible, without exceeding any of our environmental regulations. Disposition of waste material and proper handling of atmospheric emissions must be coordinated with the Manager of Environmental Operations via the Environmental Impact Memorandum.

Volatile organic compound emissions from petroleum refineries shall be controlled during process unit shutdown or turnaround by: 1) recovering all pumpable drainable liquid to storage, and 2) reducing vessel gas pressure to 5 psig or less by recovery or combustion before venting to the atmosphere.

If shutdowns or maintenance will result in us exceeding an air emission limit, but the emission is foreseen as a probability and unavoidable, EPA should be notified. A rule 8 maintenance report will be prepared and sent to the TACB at least 10 working days prior to the incident.

D. VACUUM-PRODUCING SYSTEMS AND VENT GAS STREAMS

1. No more than 100 pounds in any consecutive 24-hour period of any volatile organic compound are allowed from a steam ejector, mechanical vacuum pump, a vent gas stream, or hotwell with a contact condenser.

2. A dilute vent that has combined weight of volatile organic compounds greater than 100 pounds in any consecutive 24-hour period but less than 250 pounds per hour averaged over any consecutive 24-hour period can be emitted if it has a true vapor pressure of volatile organic compounds less than 0.44 psia. The only vents which are presently regulated as a dilute vent are in the BA Unit and Phenol Acetone Plant (Oxidizer vent has more restrictive permit limitations).

3. Vents to the atmosphere above 100 pounds of VOC per day as a result of relief valves, equipment failures (such as holes in piping or compressors not able to get vents into the flare system), and spills are to be reported to the Environmental Supervisor and are then reported to the agencies under Rule 7 (Major Upsets).

E. COLD SOLVENT CLEANING

A system utilizing a volatile organic compound for the cold cleaning of objects shall have the following: a cover, a cleaned parts drainage facility, and a permanent label summarizing the operating requirements.

F. FUGITIVE EMISSIONS

There are five fugitive emissions programs existing that are required by the TACB or the EPA. Basically, they all require periodic monitoring of equipment leaks (fugitive emissions) from valves, pumps, and compressors and recordkeeping of the leaks and repairs. The following describes each program:

TACB Refinery Fugitive Emissions Program require quarterly monitoring of gaseous components and yearly monitoring of liquid components in all refinery process areas.

TACB Chemical Plant Fugitive Emissions programs require quarterly monitoring of gaseous components and yearly monitoring of liquid components in all chemical plants by December 31, 1987.

EPA NESHAP Fugitive Emissions Program requires a more detailed program than the TACB for process areas that have greater than 10 percent Benzene. Recordkeeping is extensive and frequently checked by regulatory agency inspectors. Semi-annual reports are also required.

EPA NSPS Fugitive Emissions Program for Refineries is required by those refinery units that have made major capital expenditures or have increased the capacity of the unit since 1983. A more detailed program than the TACB Refinery Fugitive Emissions Program is required. Recordkeeping and reporting to the TACB is required, also.

EPA NSPS Fugitive Emissions Program for Synthetic Organic Chemical Manufacturing Industries (SOCMI) is required by those chemical units that have made major capital expenditures or have increased the capacity of the unit since 1982. A more detailed program than the TACB Chemical Plant Fugitive Emissions Program is required. Recordkeeping and reporting are also required.

Environmental Regulatory Affairs has publications and video films to provide detailed information on each program.

VI. NITROGEN COMPOUNDS

Emissions of nitrogen oxides (NO_x) calculated as nitrogen dioxide, from any "front fired" steam generating unit of more than 600,000 lbs/hour maximum continuous steam capacity (only CPS) are not to exceed 0.5 lbs/million BTU heat input, maximum two-hour average, at maximum steam capacity. A "front fired" steam generating unit is defined as a unit having all burners installed in a geometric array of one vertical firebox surface. NO_x emissions are subject to EPA's NSPS regulations for Utilities South FUT-130 Boiler and CPS. The permit has specifications of 0.3 lbs/million BTU from liquid fuel burned and 0.2 lb/million Btu from gaseous fuel burned.

All new or modified furnaces are required to install burners which minimize the formation of NO_x, but there are currently no specific limits for furnaces.

VII. CARBON MONOXIDE

No facility shall emit into the atmosphere more than five tons of carbon monoxide per year in a vent gas stream from any catalyst regeneration of a petroleum or petrochemical process system unless the vent gas stream is properly burned.

VIII. FILING OF EMISSIONS DATA

Upon request by the TACB or EPA we shall file emissions data with the Board on forms supplied by the Board. This is probably going to occur more frequently than in the past, possibly every 2 to 3 years.

IX. COMPLIANCE WITH ENVIRONMENTAL PROTECTION AGENCY STANDARDS

Applicable sources (furnaces, tanks, etc.) with any new source performance standards (NSPS) and with any emissions standards for hazardous air pollutants (NESHAP) must comply with the standards. The following gives an overview of the regulations. For more information, contact ERA.

A. NESHAPS - Asbestos

The regulations for asbestos require reporting of demolition activities that remove asbestos and require the minimization of air-borne particles due to the demolition and disposal of asbestos.

B. NESHAP - Benzene

The regulations for Benzene require a detailed fugitive emissions program.

C. NSPS Regulations

The NSPS regulations apply to new sources or modified sources of air contaminants. The sources regulated include: boilers, furnace fuels, cat cracking units, sulfur recovery units, petroleum and other volatile organic liquid storage tanks, coal preparation, stationary gas turbines, and fugitive emissions.

X. THE NATIONAL PRIMARY AND SECONDARY AMBIENT AIR QUALITY STANDARDS

The National Primary and Secondary Ambient Air Quality Standards will be enforced throughout all parts of Texas. The standards are:

Sulfur Oxides

Primary: .03 ppm annual arithmetic mean
.14 ppm maximum 24 hour concentration

Particulates

Primary: 260 micrograms per cubic meter - maximum 24 hour concentration
75 micrograms per cubic meter - annual

Ozone

Primary: 0.12 ppm maximum hourly concentration

Carbon Monoxide

Primary: 9 ppm 8 hours average
35 ppm 1 hour average

Nitrogen Dioxide

Primary: .053 ppm annual arithmetic mean

Lead

Primary 1.5 micrograms per cubic meter maximum arithmetic mean averaged over a calendar quarter.

- -

Primary: to protect public health

In Harris County, many exceedances of the oxone standard occur per year. Therefore, the TACB is required by the Clean Air Act to promulgate tighter controls for VOC emissions.

XI. PARTICULATE EMISSIONS FROM ROADS AND PARKING LOTS

A. ROADS

Central Maintenance provides for routine watering of roads and parking lots to control dust. Environmental Engineering should be consulted before the use of any other dust suppressant.

Any public, industrial, commercial, or private road, is not to be used without taking at least the following precautions to prevent particulate matter from becoming airborne: application of asphalt, water, or suitable oil or chemicals on unpaved surfaces having more than 100 vehicle traversals daily.

B. PARKING LOTS

Vehicular parking surface having more than 20 parkings daily, averaged on a monthly basis, are to have dust control by the appropriate application of asphalt, water, or suitable oil or chemicals.

XII. ENVIRONMENTAL REQUIREMENTS FOR MOTOR VEHICLES

A. VISIBLE EMISSIONS

Visible emissions from motor vehicles are not allowed for more than 10 consecutive seconds.

B. MOTOR VEHICLES

Maintenance and Operation of Air Pollution Control Systems or Devices Used to Control Emissions from Motor Vehicles

1. Any motor vehicle which has installed a device used to control emissions from the motor vehicle in compliance with federal motor vehicle rules shall maintain the system or device in good

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NORTH

The quality and quantity of the Refinery effluent must be controlled in order to comply with our National Pollutant Discharge Elimination System (NPDES) waste-water permit. We must practice source control of contaminants and have effective shutdown planning and waste disposal. This order establishes an effluent monitoring system in order to improve source control and avoid upsets of the effluent treater. Contingency plans for non-routine streams, spills and cleanup procedures, and unit shutdown procedures are also covered by this order.

I. EFFLUENT DISCHARGES

An authorization is required to discharge waste-water to the environment. The two basic types of authorizations are (1) Standing Permit, and (2) Verbal Authorization. Standing Permits are issued for all waste-water discharges that are intentionally routed to the sewer continuously or intermittently with prior Department and Environmental Operations approvals. Verbal Authorizations are required for all non-routine waste-water discharges not covered by a Standing Permit. The verbal authorization is given by the Operations or Maintenance Foreman, and when contaminants are present, the Environmental Supervisor's authorization is required according to procedures outlined below.

A. Standing Permits

Standing Permits for permanent streams are listed in Section V of this order. This list, by operating department, includes both continuous and recurring intermittent streams which flow to the waste-water system. (Note: Draining of storm water only from tank firewalls is classified as a recurring intermittent stream and is authorized by a Standing Permit unless the storm water is contaminated with hydrocarbon, acid, or caustic; see Environmental Order EC-104.)

Whenever there is an increase in the amount of a stream or contaminants being discharged to the waste-water system due to an upset, abnormal operating conditions, or contamination of a tank firewall, the Environmental Supervisor must be notified immediately to evaluate the environmental impact. Additionally, every effort must be made to eliminate the problem.

B. Verbal Authorizations

Verbal authorization must be obtained by both operations and maintenance for all liquid discharges not sanctioned by a Standing Permit or covered by exception below. A verbal authorization is given by the responsible Maintenance or Operations Foreman providing the flow rate does not exceed approximately 100 gpm (i.e., the flow from two utility hoses), and the water is minimally contaminated. Minimally contaminated water originates from accepted Refinery practices such as use of a water hose for pump bearing cooling, backwashing a pump, routine pad washing etc. If the flow rate must exceed 100 gpm, the Environmental Supervisor must be advised and authorize the higher rate. In the event the water is contaminated, the responsible shift foreman is required to contact the Environmental Supervisor to coordinate the proper disposition of this material either by controlled draining to the waste-water system or utilizing vacuum trucks for disposal.

II. WASTE-WATER CONTROL

Waste-water control necessitates routine sampling and testing of sewers on a daily basis. Many tests are easily adaptable to field operations; i.e., pH, sulfides, ammonia, and phenol. Some tests, such as TOC, will require laboratory analysis.

Each operating department with responsibility for a sewer lateral, will assign an operator the responsibility for sampling and monitoring the quality of waste-water in that sewer. The assigned operator will be responsible for sampling and testing at least once per shift. The water phase of each sample will be checked for the parameters noted in Attachment I, Operator Analyses. The operator will check the sample taken with the previous sample for any obvious abnormalities, such as excessive oil, unusual color, excessive odor, etc. The operator should immediately notify his foreman and Environmental when the test results and/or the sample appearance are abnormal. Additionally, a 24 hour composite sample of the waste-water at each sampling header will be collected each day by adding approximately 1/4 of a quart of sample per shift to a 1 quart container. The composite sample will be retained in the unit for one week before discarding.

In addition to the sampling referred to in Attachment I, each operating unit must sample their own sewers to assure the quality of effluent is acceptable.

operable condition and shall use it at all times that the motor vehicle or motor vehicle engine is operated.

2. Any part or component of an air pollution control system or device of a motor vehicle or motor vehicle engine equipped with such air pollution control systems or device in compliance with federal motor vehicle rules shall not be replaced with a different part or component unless such part or component is designated as a replacement for the specific make and model of the vehicle or vehicle engine.

3. The introduction of leaded gasoline into a motor vehicle certified by the Environmental Protection Agency for use of unleaded gasoline is prohibited. This requirement shall be prominently displayed at all facilities in Harris County which dispense motor vehicle fuel. The notice shall be displayed in the immediate area of each gasoline pump island, and shall be posted in a prominent and conspicuous location. The notice shall read, "State law prohibits any person from introducing any gasoline containing lead into any motor vehicle certified for use of 'unleaded gasoline only.' Violators are subject to a penalty of up to $1,000 per violation." This notice shall be no smaller than 8 inches by 10 inches (20.32 cm by 25.4 cm) and shall be clearly visible from each refueling location.

4. <u>Inspection Requirements</u>

   a. All motor vehicles must comply with air pollution emission control related requirements included in the annual vehicle safety inspection requirements administered by the Texas Department of Public Safety.

   b. At the time of resale of a 1980 or newer model year motor vehicle to a resident of Harris County, the seller of the vehicle must, prior to transfer of ownership, provide to the purchaser of such vehicle, certification that the vehicle complies with the air pollution emission control related requirements included in the annual vehicle safety inspection requirements applicable to Harris County administered by the Texas Department of Public Safety under the provisions of Article XV of the Uniform Act Regulating Traffic on Highways, V.C.S. 6701d.

7. In Harris County, readings less than 100% of the lower explosive limit (LEL, measured as propane) at 1 inch (2.5 cm) from potential leak sources when measured with a combustible gas detector.

Attachments (2)

Updating Responsibility:
Superintendent Health, Safety & Environmental
Superintendent Logistics, Environmental & Utilities

TABLE I

Texas Air Control Board
Regulation V
Volatile Organic Compounds

REQUIRED CONTROL DEVICES FOR STORAGE TANKS FOR
VOC OTHER THAN CRUDE OIL AND CONDENSATE

True Vapor Pressure of Compound at Storage Conditions	Nominal Storage Capacity	Emission Control Requirements
<1.5 psia	Any	None
—	≦1,000 gal	None
	>1,000 gal ≦25,000 gal	Submerged fill pipe
≧1.5 psia and <11 psia	>25,000 gal ≦42,000 gal	Internal or external floating roof (any type) or vapor recovery system
	>42,000 gal	Internal floating roof or External floating roof with primary seal (any type) and secondary seal or vapor recovery system
≧11 psia	≦1,000 gal	None
	>1,000 gal ≦25,000 gal	Submerged fill pipe and vapor recovery system
	>25,000 gal	Submerged fill pipe and vapor recovery system

TABLE II

Texas Air Control Board
Regulation V
Volatile Organic Compounds

REQUIRED CONTROL DEVICES FOR STORAGE TANKS
FOR CRUDE OIL AND CONDENSATE

True Vapor Pressure of Compound at Storage Conditions	Nominal Storage Capacity	Emission Control Requirements
<1.5 psia	Any	None
≧1.5 psia and <11 psia	≦1,000 gal	None
	>1,000 gal ≦42,000 gal	Submerged fill pipe
	>42,000 gal	Internal floating roof or External floating roof with primary seal (any type) and secondary seal or vapor recovery system
≧11 psia	≦1,000 gal	None
	>1,000 gal ≦42,000 gal	Submerged fill pipe
	>42,000 gal	Submerged fill pipe and vapor recovery system

All operators are responsible for monitoring their operating areas for leaks and other non-routine flows (not-permitted) entering the sewers. Any abnormalities should be brought to the immediate attention of the shift foreman and an investigation initiated to locate and correct the abnormal condition as expeditiously as possible. In addition, the Environmental Supervisor should be notified and assistance requested if necessary.

III. SPILL HANDLING

All spills to the ground or releases to the atmosphere must be reported immediately to the Environmental Supervisor. Whenever there is an accidental spill to a sewer in excess of 5-10 gallons, the Environmental Supervisor must be immediately notified. Early detection followed by proper notification may result in avoiding a non-compliance with our NPDES permit by properly coordinating the disposition of the material. Every effort must be made to correct the source of a spill. After a spill incident occurs, the responsible department/Process Manager may be requested by Manager Environmental Operations to submit a memorandum to Environmental Operations. The causative factors as well as all corrective measures taken to preclude its recurrence should be summarized in the memorandum,

Slab cleaning using a hose and detergent does not require a permit; however, departments are encouraged to minimize the amount of detergent used since this is a high pH/TOC material.

IV. UNIT SHUTDOWN PROCEDURES

The probability of non-compliance with our air and water permits is magnified during operating unit shutdowns unless detailed planning is done in advance. To facilitate this planning, an Environmental Impact Statement is required for each planned shutdown. The statement should include a description of all solid and liquid wastes and the estimated quantity. Disposition of these wastes should be coordinated with the Supervisor Source Control, Environmental Operations. Special precautions taken, such as sealing of sewers, etc. to isolate and contain toxic material, should also be documented. Potential adverse impacts on air quality should be discussed with Environmental Regulatory.

V. PERMANENT STREAMS

The following streams flow permanently to the effluent system (an * denotes permanent intermittent streams). Any changes in these streams should be discussed with Environmental Operations Source Control at extension 7653.

		Flow (GPM)
A.	Alkylation	
1.	Neutralizer Caustic Dropout	4
2.	Water Wash Dropout	40
3.	Water from Partial Debutanizer Tops	0.25
4.	Water from Depropanizer Accumulator	0.05
B.	Aromatics	
1.	HDU-1	
(a)	Cooling H_2O from Charge Pump Bearings	10
(b)	Emergency Generator Turbine Condensate	0.5
*(c)	Test Sample Off Cold Product Separator	5
*(d)	Test Sample Off Warm Product Separator	5
2.	Plat. 2	
(a)	Sour Oil Trap Blowdown on C-103	2
(b)	Cooling Water from Pump Bearings	25
(c)	Condensate Collection Pot Overflow	2
*(d)	Product Separator Blowdown During Regen.	20
3.	Benzene Accumulator Boot Water (V-184)	0.5
4.	Tank Firewall Drains	
C.	Catalytic Cracking and Gas	
1.	CCU	
(a)	CWT #7 Blowdown	0-100
(b)	Offsite Cooler Boxes	0-100
(c)	P-923 Slurry Pump	2
(d)	Feed Pumps	2
(e)	Regen. Flue Gas Analyzer	10
(f)	Steam Drum Blowdown	5
(g)	Scrubber Water to Clay Pond	25
(h)	O_2 Analyzer	4
(i)	BFW Pumps	3
(j)	J-348 Heater Condensate	2
(k)	J-349 Heater Condensate	2
(l)	Naphtha Reflux Pump	
(m)	HGO Pump	1
(n)	Top Reflux Pump	2
*(m)	Sample Coolers	
*(o)	J-348 Water Draw	
*(p)	J-349 Water Draw	

	Flow (GPM)
*(q) Feed Pumps at Tanks	
*(r) Compressor Lube Oil	
*(s) Steam Tracing Condensate	
2. DHT	
(a) DHT Vacuum Dryer Water	8
3. SWS	
(a) SWS Bottoms	400-700
4. MISCELLANEOUS	
(a) Miscellaneous Pump Cooling Water Drains	-
D. Catalytic Reforming	
1. Caustic Water Wash	3
2. Caustic Water Wash Caustic	5
E. Dispatching	
*1. Firewall Drains	
*2. Storage Tank Valve Boxes	
*3. Main Oil Pit Drains	
F. Distilling	
1. DU-1 Brine (Oxidizer Btms)	64
2. DU-2 Brine (Oxidizer Btms)	300
G. Hydroprocessing	
1. Caustic Water Wash	5
H. Lube	
1. HVI Oily Condensate	15
2. DA Surface Condensate	3
3. NMP Swimming Pool	10
4. MEK Ketone Tower Bottoms	22
5. MEK Stratco Flash Evaporator (OVHD Condensate)	12
*6. Firewall Drains	

		Flow (GPM)
I.	Solvents & Treating	
1.	Treater 1 Wash-Water	9
2.	Treater 3 Wash-Water (V-158)	6
3.	Treater 3 Wash-Water (V-100)	1
4.	Sol 340 Treater Wash-Water	4
5.	Sol 140 Treater Wash-Water	4
J.	Thermal Cracking	
*1.	0-305 Water to X-321	3500 gal/mo
*2.	Dubbs Tank Farm Water Draws	2
K.	Utilities Distribution	
*1.	WT#1 Softeners (Backwash)	230 135 78

Attachment (1)

Updating Responsibility:
Superintendent Logistics, Environmental & Utilities

ATTACHMENT I

DEPARTMENTAL SAMPLING HEADERS AND PERMIT LIMITS

DEPARTMENT	Sx HEADERS	SAMPLES/TESTS REQUIRED OPERATOR	LABORATORY	PERMIT LIMITS (mg/l)
1. Aromatics	H H-1	Sulfolane		250-Sulfolane
2. Catalytic Cracking	J1	pH, Phenol	TOC	pH 6-9, 300 Phenol, 35 TOC
3. Catalytic Reforming	CPI-2	pH, NH_3, Sulfides	TOC	pH 8-11, 100 TOC
4. Dispatching	F	pH, Sulfides, NH_3	TOC	pH 6-9, 5 Sulfides 10 NH_3, 35 TOC
5. Distilling	E	pH, Sulfides NH_3, phenol	TOC	pH 6-9, 100 Sulfides, 100 NH_3 5 phenol, 300 TOC
6. Lube	A		NMP	
7. Solvents & Treating	D2	pH, Phenol		pH 6-11, Phenol 300,
8. Thermal Cracking	B	pH, Sulfides, NH_3	TOC	pH 6-9, 20 Sulfides, 20 NH_3, 150 TOC
9. Sour Water Stripper	Col Btms	Sulfides, NH_3	TOC	5 Sulfides, 50 NH_3, 100 TOC

NOTE: Each operator should visually check the appearance of samples taken and report any abnormalities (such as: excessive oil or wax, unusual color or odor, etc.) to his foreman and to Environmental.

SUMMARY OF ACTION DURING A POTENTIAL SPILL INCIDENT

This plan must be read in its entirety to fully understand the correct response to a potential spill incident. The following summary is to serve only as a reminder of direct actions to be taken during such an incident.

1. Responsibility - This plan applies to all Shell Complex personnel; the first employee who has knowledge of a spill or a potential spill is responsible for following this plan.

2. Stop the Potential Spill - The first observer must, either through his action or through his foreman or supervisor, initiate the action necessary to stop the loss of material. Personnel safety is our first priority during this action.

3. Notify the Environmental Supervisor - by calling either main gate. Tell the Environmental Supervisor of the potential spill, giving location, name of the material, severity, and actions taken. North - 66054 / South - 67402.

4. Contain the Spill - The effort here should be directed at keeping the material isolated from water so that it may more easily be recovered. If containment creates a fire hazard at the spill site, restrict entry to the spill area.

5. Initiate Spill Clean-Up - This will be accomplished by the Environmental Supervisor (the operating department involved will cooperate to the fullest extent). The circumstances and characteristics of the particular spill will determine how the clean-up will be handled.

6. Notification - The Environmental Supervisor and/or the Staff Duty Man will initiate the prompt notification of senior management when it appears that the material will reach or has reached public waters. The Environmental Supervisor or other management will promptly notify the appropriate regulatory agencies.

7. Record Details of Incident - The Environmental Supervisor will maintain a running written record of all pertinent details of the spill incident.

4. Drainage from Process Areas

5. Storm Water Drainage

B. Bulk Oil Storage Tanks

C. Intra-Facility Tank Car/Tank Truck Loading/Unloading

V. SHELL MANUFACTURING COMPLEX - SOUTH

A. Chemical Plant Drainage System

B. Handling Facilities for Lubrication Oil, Transformers, and Buried Tank Spills or Leaks

C. OP-II Plant Area

1. Oily Water Sewer System

2. Non-Oily Process Water System

3. Storm Sewer System

D. OP-III Plant Area

1. Oily Water Sewer System

2. Non-Oily Process Water Sewer System

3. Storm Sewer System

VI. POTENTIAL FOR A DISCHARGE

A. Bulk Storage Tanks

B. Intra-Facility Pipelines

C. Intra-Facility Loading and Unloading Facilities

VII. METHODS FOR ALLEVIATING THE IMPACT OF OIL SPILLS

A. Request for Aid from Contractors

B. Training Program

VIII. REVIEW AND UPDATING OF THE SPCC PLAN

IX. POLYCHLORINATED BIPHENYL (PCB) SPCC PLAN

A. Spills or Leaks

B. Storage

APPENDICES

A. Appendix A - Regulations

B. Appendix B - Definitions

C. Appendix C - List of Blanket Order Contractors

D. Appendix D - General Information, Certification, Management Approval

I. GENERAL BACKGROUND AND OVERVIEW OF PLAN

This Spill Prevention, Control, and Countermeasure Plan (SPCC) is written to comply with Section 311(j)(i)(c) of the Federal Water Pollution Control Act, Title 40 Code of Federal Regulations, Part 112 (for summary of regulations see Appendix A). This plan is primarily concerned with oil that might be spilled or lost from processes, lines, or tank farms in the Shell Deer Park Manufacturing Complex (DPMC). It is also applicable to spills or leaks of oil used for lubrication purposes throughout the Complex where such spills could drain either to the storm sewer or the process sewer system.

The Polychlorinated Biphenyls (PCB) SPCC Plan is located under Section IX of this plan.

Definitions pertinent to this SPCC plan are given in Appendix B.

A. Purpose of the Plan

The purpose of this SPCC plan is to acquaint all personnel with their duties and responsibilities should an oil spill occur. This plan will cover responsibilities from the initial notification of the Environmental Supervisor to the final phases of clean-up.

A copy of this plan is on file in the Environmental Supervisors' office and is subject to inspection by the Environmental Protection Agency (EPA), the Texas Water Commission (TWC) and Shell auditors.

This Spill Prevention and Countermeasures Plan specifically applies to non-transportation related onshore facilities and to prevention and containment of oil spills resulting from process operations.

B. General Information

This Spill Prevention Control and Countermeasures Plan has been prepared for Shell Oil Company, Deer Park Manufacturing Complex (DPMC). The area is classified as an onshore facility located in Harris County of the State of Texas on the south bank of the Houston Ship Channel, north of the City of Deer Park on Texas State Highway 225.

It should be noted that the Refinery Dock Operations Manual includes a transportation-related SPCC Plan which was prepared in accordance with U.S. Coast Guard

regulations as delegated by the Department of Transportation. Response actions to oil spills into the dock slip or Houston Ship Channel which are related to marine loading and/or unloading operations are covered in the Dock Operations Manual.

C. Policy

In planning for oil spill emergencies, in or associated with DPMC, the following policy will prevail.

1. Active Participation

We will actively protect the environment through this formalized plan and through periodic review and updating of this plan, taking advantage of the experiences of ourselves and others as well as advancement in technology and techniques. The review of this plan will occur no later than three years from the plan's effective date, and the updating will include more effective prevention and control technology if such technology will significantly reduce the likelihood of a spill event from the facility and if such technology has been field-proven at the time of the review. This updating will be accomplished no later than six months after the review. If there is a change in facility design, construction, operation, or maintenance which materially affects the plant's potential for discharge of oil into public waters, this plan will be amended no later than six months after such change occurs.

2. Design and Construction

In design and construction of operating facilities, Shell standards meet or exceed specifications set forth by OSHA standards, fire insurance regulations, ANSI (B31.3) piping codes. These standards are reviewed and updated by Shell Head Office Engineering Council as required by changes in the various regulations, standards, and codes. All changes are transmitted to the holders of the registered Shell Standard books.

3. Operations

Correct and up-to-date operational orders are an integral part of all operator training programs. A full set of departmental orders is in each control room. As operational changes are made and new orders written, spill prevention techniques applicable to that portion of the process will be included. In the training of new or transferred employees, the department will ensure that spill prevention techniques will be a part of the operator training program. Good housekeeping practices are included in departmental orders for both safety and spill prevention purposes.

4. Inspection

The inspection Department inspects equipment while units are running and/or during maintenance shutdowns to ensure that corrosion allowances are not exceeded. Shell inspection standards and procedures comply with or are more stringent than OSHA standards, fire insurance regulations, ASME pressure vessel codes, and ANSI (B31.3) piping codes. These standards are updated by the Inspection Department as required.

5. New Facilities

New facilities and expansions of existing facilities will consider spill prevention and control techniques as part of the original design function and will incorporate these in the construction plans.

6. Training

Operators and maintenance personnel, as part of their initial training when hired, are instructed on measures to be taken should an oil spill occur. Operating Departments will schedule and conduct spill prevention briefings for their operating personnel annually to assure adequate understanding of this plan for their unit. Such briefings will highlight and describe known spill events, failures, malfunctioning components, and recently developed precautionary measures. The training must be documented and the records must be kept in a readily accessible location. These records are subject to inspection by Governmental agencies and Shell auditors.

II. NOTIFICATION OF SPILL

Prompt notification of the appropriate regulatory agencies and authorities is required by law in any case where a spill reaches public waters. In our case, these public waters, by definition, include Patrick's Bayou and the Houston Ship Channel. If a spill occurs within the plant property and is handled by our facilities so that none of the material can reach public waters, by definition, no spill incident has occurred and no notification of the authorities is required by 40 CFR 112. All spills, including oil and chemical spills inside the complex, should be reported to the Environmental Supervisor who will determine if a Superfund, SARA, Texas Air Control Board, Texas Water Commission, or other notification should be made.

The first employee to recognize the occurrence of a spill must take the necessary steps to stop the spill or loss of material as soon as possible. This may take the form of direct action by the employee, such as closing a storm drain valve, shutting down a seriously leaking pump, etc. In all instances, the Environmental Supervisor must be advised immediately of the spill.

The first action of the Environmental Supervisor is to assist in stopping further loss of material if this has not already been accomplished. If, in his judgement alone or in cooperation with the Environmental Duty Person, the spill is of such magnitude that the wastewater treatment facilities will handle the material or that the material may be readily recovered through the use of a vacuum truck, no further notification to management is required other than the Environmental Supervisor's incident report.

If, however, either the Environmental Supervisor or the Environmental Duty Person feels that the material is already in or can reach public waters, either via the treatment unit or from a spill not involving the treatment unit (e.g., pipeline break, truck accident, etc.), the Environmental Supervisor or the Environmental Duty Person will notify the personnel listed below.

The Environmental Supervisor or the Environmental Duty Person should have the following information available prior to notifying the personnel as follows:

(1) Type or name of pollutant

(2) Location of entry into public water and location of spill

(3) Estimation of amount in gallons

(4) Corrective actions planned or being used in recovery

A. Internal Notification

Shell Deer Park Manufacturing Complex Manager:
R. M. Kingsbury
Plant Phone: 246-6888
Home Phone: 669-0454

OR

Shell Deer Park Manufacturing Complex Superintendent:
J. R. Nierman
Plant Phone: 246-7243
Home Phone: 538-3324

AND/OR

Duty Superintendent
Plant Phone: 246-7402 (Main Gate)

B. Outside Notification

Coast Guard (Washington) National Response Center	1-800-424-8802
Coast Guard (Houston)	672-6639
City of Houston (Pollution Control)	645-5316
Harris County Pollution Control	920-2831
Texas Water Commission	8-512-463-7727
Texas Air Control Board	666-4964

It must always be kept in mind that in stopping a spill, such as a leaking pump, etc., personnel safety is the highest priority. Full protection clothing and respiratory equipment, as required, must be used when stopping the spill or loss of material.

III. SHELL MANUFACTURING COMPLEX - GENERAL

A. Pipeline Spills

The on-going equipment inspection program on the individual process lines within the operating unit during maintenance shutdowns as well as on the interdepartmental overhead pipeways serves to prevent such losses by pointing out the need for replacement of sections of lines that may be corroding to failure. Certain lines may also be inspected while in service by the use of X-ray, or other techniques.

Idle pipelines and retired equipment are either removed or blinded to prevent inadvertent misuse and subsequent spills. Steam-out connections to lines and other equipment are plugged to prevent leakage or spills.

In the event of a pipeline spill, it will be contained for recovery and clean-up.

B. Tank Truck Spills

A tank truck accident in the Complex may spill oil, in which case the oil will drain into the process sewer or into the storm sewer system for recovery.

C. Tank Farm Areas

These areas are diked so that in the event of tank rupture or failure the capacity of the diked area will contain the volume of material held by the largest tank within the diked area. All of the tanks within the diked areas are above ground and are periodically inspected by the Inspection Department. Records of these inspections are kept in the Inspection Department files.

Tanks containing organics are enclosed with dikes. Liquid, (oil or water, or both) is retained within the diked areas until an operator has inspected the water to be drained from the tank farm areas. If oil is present, arrangements are made for a vacuum truck to recover the oil. The operator, in his normal course of duties, visually inspects the general over-all appearance of the tanks for deterioration, leaks, and spills.

All above-ground tanks are periodically inspected and complete records of the inspection (including comparison records of the thickness reduction) are maintained in the Engineering Services Office. The exterior surface of the tanks are frequently visually inspected by operating personnel for leaks or accumulation of oil inside the tank dikes.

A periodic inspection of each tank is conducted to examine seams, rivets, nozzle connections, valves and pipelines directly connected to the tank, and corrective action is taken as necessary.

The foundations and/or supports of all bulk storage tanks are examined periodically by personnel with technical competence to evaluate the condition of the foundations and/or supports.

To control leakage through defective integral heating coils, the following factors are considered and applied, if practicable.

An inspection program is followed when tanks are out of service for maintenance to determine the corrosion rate of the integral coils and a system of maintenance, and replacement is established so as not to exceed the anticipated life span.

The condensate return from integral heating coils is normally either collected for steam generation or sent to oil or storm sewers with oil containment facilities.

New tank installations are "fail-safe engineered" as much as possible and practical. Existing tank installations utilize "fail-safe" devices as follows:

1. High liquid-level alarms, which can be heard at constantly manned operating stations, are used on many tanks, especially tanks which are extremely active.

2. High liquid-level pump cutoff devices are not normally used due to multiple and remote pumping stations used to fill the tanks.

3. Radios and telephone communication are utilized between tank gauges and pumping stations for most tank installations.

4. Fast response liquid level gauges are used on practically all tanks.

   Tanks with heads and tops with a corroded-through condition are not used. Action is taken to drain such tanks and repair the defective member as promptly as possible.

   Small (500-gallon) portable lube oil storage vessels are stored in locations where downstream containment facilities exist.

   Each bulk storage tank is identified with a letter and number designation. Daily records are kept of the product storage and inventory in each tank as well as movement in to or out of the tank in the previous 24-hour period.

D. Intra-Facility Transfer Operation

All buried pipelines are properly coated and wrapped or cathodically protected for corrosion protection. Above ground pipelines and valves are regularly visually inspected by the operating department, and corrective action is taken as necessary.

Product pipelines in the pipeway are not marked to indicate the product transferred, because many of the pipelines are to transfer several products; however, each line is identified on pipeway views at periodic intervals so that rapid identification of a leaking line can be readily made.

Pipeline terminal connections are capped, blank-flanged, double blocked with bleed valve, or closed with a slip-on blind if the pipeline is not in service for long periods.

All insulated (hot) lines are provided with shoes or cutback insulation at the support points to avoid abrasion and corrosion of the pipe.

Check valves are not normally provided on tank product fill lines. As far as practical, pumps are located as close as possible to the storage tanks. Elevated pipelines are designed to ensure that vehicular traffic entering the Complex does not exceed the lowermost height of the elevated lines. Personnel involved with shipping are familiar with the height of elevated pipelines.

E. General

No continuous oil monitoring system is used on the plant effluent, but outfalls are observed and sampled frequently by operating personnel as part of routine job duties.

Fifty-five gallon oil drums are placed so that any rupture, leak, or valve failure will cause the oil to flow to the sewer collection system, whereby the oil can be contained and recovered.

IV. SHELL MANUFACTURING COMPLEX - NORTH

A. Refinery Drainage System (See Complex Order 0-132)

1. All diked storage areas for atmospheric oil storage tanks have storm drain valves. Valves used for drainage of diked storage areas are manual open-and-close design.

2. The condition of retained stormwater in diked storage areas is visually inspected before draining. If oil is present on the stormwater of those diked areas, a vacuum truck is used to remove the oil.

3. Refinery policy is that stormwater dike drain valves for tank storage are maintained in the closed position except for drainage of oil-free stormwater.

4. All of the oily-water drainage from the refinery processing unit areas is collected and routed to one of the five oil-water separator treating facilities. The recovered oil from these separators is re-processed and the de-oiled water is further treated in a two-stage biological treating facility.

   Cooling water tower blowdown, storage tank bottom drainage, and other miscellaneous contaminated waste water streams are also collected and processed into the biological treating facilities. No. -2 Power Plant and Central Power Station boiler blowdown receives primary treatment before discharging to outfall R001.

5. The Refinery surface water drainage consists of seven general drainage areas which flow by natural hydraulic flow into ponds, lagoons, or catchment basins which are designed to retain oil.

a) Area 1: The refinery west property drainage system drains stormwater from diked tank farm storage areas in addition to stormwater runoff from a processing unit area, a tank car loading and cleaning area, and stormwater accumulated inside tank dikes in the dock area.

The area drained by this system comprises approximately 570 acres. Water drainage flows through two floating oil skimmers and two baffles with the inlet of a two-acre impoundment pond upstream of the final baffle at the outlet. The stormwater from the drainage system discharges from the stormwater outfall R008 into the Houston Ship Channel by way of a large ditch (formerly Boggy Bayou now commonly called "The Big Ditch").

b) Area 2: The northwest-central drainage system in the refinery consists of drainage from approximately 300 acres, including tank diked storage areas, stormwater drainage from process unit areas, stormwater drainage from Complex solids waste disposal areas, water from a 45 - million-gallon stormwater impoundment basin, and water recovered from five oil-water separator treating facilities.

This drainage system terminates in a collection sump for process water and a pond for stormwater. The effluent from the sump is fed to a two-step biological treating facility and exits to the Houston Ship Channel via discharge R007. The pond contains excess stormwater not handled by the system, prior to pumping to a 45-million-gallon stormwater impoundment basin. Water from the impoundment basin is fed to the biological treating facility.

The capacity of the stormwater pond is 5 million gallons.

c) Area 3: Rainwater drainage from the north-central refinery area flows through an open ditch and sewer system to the Houston Ship Channel via stormwater discharge R006.

Approximately 27 acres are drained by this system.

Storm runoff from approximately 40 diked storage tanks drain to this system. Normal dry-weather flow drains to the effluent treatment facility. Stormwater flow that exceeds capacity of the drain-back system is diverted to stormwater outfall R006. An oil-retention baffle is provided at this discharge point (006), and accumulated oil on the pond is recovered by vacuum truck.

d) Area 4: A 56-acre area in the southeast portion of the refinery is drained to discharge R002 via a two-pond system. During dry weather and light rain, flow is rerouted to an inner 1/3 acre pond, from which it is pumped to our biological effluent treatment facility. When stormwater flow exceeds the diversion capability to the inner pond, stormwater runoff from surface and unit processing areas and rainwater from 50 diked storage tank areas flows to the outer 1/3 acre pond and out discharge R002 to Patrick's Bayou. There is an oil baffle in the outer pond to trap, and allow recovery of any oil that might reach this pond.

e) Area 5: The east-central refinery property drainage system drains an area of 105 acres containing processing unit areas and 19 diked storage tanks. Stormwater flows to Patrick's Bayou out discharge R003, and dry-weather flow is pumped to the effluent treatment facility.

The drainage flows into a one-acre pond, and the excess capacity of the system which can be used to contain an oil spill is estimated at 16,000 barrels. There is an oil baffle at the outlet of the pond, and any accumulation of oil on the pond is recovered by the use of vacuum trucks.

f) Area 6: One of two northeast property drainage systems drains stormwater from a lubricating oil processing complex and approximately 50 tank diked storage areas. Area 6 drains approximately 20 acres and discharges to Patrick's Bayou from stormwater discharge R009.

There is an oil baffle at the discharge point, and accumulated oil, if any, can be recovered by vacuum truck. Dry-weather flow is pumped to our biological treatment facility.

g) Area 7: The northeast-most drainage system drains storm water from a lubricating oil processing complex, a tank car and tank truck loading area, and approximately 170 tank diked storage areas. Area 4 drains approximately 35 acres and discharges to Patrick's Bayou from stormwater discharge R004. There is an oil baffle at the discharge point, and accumulated oil can be recovered by vacuum truck. Dry-weather flow is pumped to our biological treatment facility.

h) Stormwater run-off from a 29-acre area south of the Port Terminal Railroad flows out discharge R001 to Patrick's Bayou. This area includes Power Plant No. 2, which discharges boiler feedwater demineralizer regeneration wastes and boiler blowdown into this drainage system. No oil-containing water drains thorough this system, but the system does have capability to divert total dry-weather flow to an impoundment basin located near the outfall.

B. Bulk Oil Storage Tanks

1. All tanks used for storage of oil are of material and construction compatible with the material stored, and comply with API specifications.

2. The secondary containment capacity of the diked areas surrounding a tank, or group of tanks, is not less than the capacity of the largest tank within the diked areas including freeboard for rain water. Where tanks are grouped in a common diked area, the capacity of a single group does not exceed 600,000 barrels, except for a crude tank grouping of three 300M-bbl tanks which are enclosed in a single diked area.

3. Volatile storage vessels are enclosed in a diked area sized to retain at least 50 percent of the vessel capacity. In some cases, drainage pits are provided for fire protection and the tank dikes are drained through these pits to refinery drainage ditches.

4. There are two buried tanks for the storage of automotive fuels for use in Refinery automotive equipment. Total storage capacity of these tanks is 2,654 gallons. Records of inventory and gallonage pumped will allow a leak to be detected and checked.

5. There are three partially buried tanks (R-311, R-312, and R-313) in this refinery. The tanks are spheroids which have the bottom dish beneath the ground surface. These tanks are inspected periodically for corrosion at the earth/air interface. Modification and/or corrections are made when corrosion is present.

6. There are about 30 electrical transformers in the Refinery that contain at least 660 gallons of transformer oil. Containment facilities exist downstream of each transformer location whereby spilled oil can be contained for recovery.

C. Intra-Facility Tank Car and Tank Truck Loading/Unloading

1. The most active tank-truck loading facility is curbed with a valved drain line to the oil sewer. There are more than 20 other tank-truck and/or tank-car loading/unloading facilities that are located such that any spills would drain into oil or storm sewers with oil containment facilities capable of handling the contents of any single tank car or truck. There is one other loading rack at SR-5 which loads sulfur only. Sulfur Recovery Unit No. 5 Loading Rack is not connected to an oil sewer. There are several loading racks for chemical loading and unloading. All of these drain to collection sumps and/or process sewers.

2. In order to prevent vehicular departure before complete disconnect of transfer lines, a derail with warning sign and light is installed in the tank-car loading/unloading facilities. In addition, the tank-car wheels are blocked as necessary with chains during loading, and the truck loading procedure specifies installation of wheel chocks during the loading operation.

3. Drains and outlets on tank trucks and tank cars are checked for leakage before loading or unloading, and any loaded tank car or truck which is found to be leaking is unloaded before departure if repair cannot be accomplished by simple tightening or adjusting.

4. The electrical lighting at tank car and tank truck loading and unloading racks is adequate to detect spills at night.

V. SHELL MANUFACTURING COMPLEX - SOUTH

A. Chemical Plant Drainage System (See Chemical Order O-32)

Although oil is not generally used in most Chemical Plant processes directly (with the exception of the Olefins units which are discussed elsewhere), most areas of the Chemical Plant have oil in relatively small quantities. Because the Olefins units process oil differently from the rest of the Chemical Plant, the Olefins units' process sewer and storm sewer handling facilities will be discussed separately.

Lubricating oil is used in pumps, compressors, and automotive or mobile equipment.

Oil is used as a heat medium in enclosed systems.

Oil is used in electrical equipment such as transformers and capacitors.

Areas of high potential for spills are curbed or diked, and spills may be collected for recovery or disposal. Spills in the processing areas of the Chemical Plant are directed either to the chemical sewers or to the stormwater sewers. Spills in the non-process areas are directed to the stormwater sewers.

Spills which occur in the non-paved areas of the Chemical Plant are isolated if possible and physically removed for disposal.

Soil which has been contaminated from a spill is also removed for disposal.

Oil which enters the chemical sewers is sent to the Chemical Plant NPDES effluent treatment system. Oils which form a separate upper layer are removed from the effluent treater feed in the API separators and sent to the API separator skim tanks for disposal. Soluble oils continue to the effluent biotreatment system for removal prior to discharge of the treated effluent from Outfall C001.

If oil were to enter the stormwater sewers, it would flow to the Chemical Plant effluent treater during dry-weather conditions, or to a stormwater sump where it could be removed by vacuum truck. A description of our stormwater handling system follows:

The stormwater system consists of a collection sump where pumps are located to transfer stormwater into impoundment Cells A, B, and C. A fourth cell, D receives stormwater runoff (gravity flow) from the south area of the Chemical Plant which consists mainly of offices, parking and streets. The total impoundment capacity is 56 million gallons distributed 11, 20, 22, and 3.5 million gallons for Cells A through D, respectively.

The chemical sewer receives surface drainage from approximately 15 acres. Stormwater enters the chemical sewer and mixes with the normal chemical sewer contents. At the effluent treaters, the excess chemical sewer flow overflows a stationary weir, enters the chemical sewer sump, and is pumped to a surge tank (T-1318). The water impounded in T-1318 is returned to the effluent treater for workoff. Additional impoundment capacity is provided by a second tank (T-1319) if needed.

Another stormwater drainage system collects rainwater from 40 acres of parking lots and storage and shipping facilities. The first flush of potentially contaminated stormwater entering the diversion box is directed by gravity flow into Cell D for impoundment. The impounded stormwater in Cell D can be drained to the effluent treater or to Outfall C002 if it meets permit limitations.

In summarizing the design capability of all of these impoundment facilities, it should be noted that: (1) all uncontaminated stormwater of adequate quality for direct discharge is discharged from Outfall C002; (2) contaminated stormwater will be treated whenever possible

to ensure adequate impounding capacity for subsequent rainfalls; and (3) should the stormwater cells reach full capacity, and additional stormwater would be discharged directly to Outfalls C002 and C003.

B. Handling Facilities for Lubrication Oil, Transformers, and Buried Tank Spills or Leaks

Although the amount of oil that might be spilled or lost from lubrication oil drums (55-gallon) or small storage vessels is insignificant when compared to the amount of oil being processed in the Olefins Plants, the principle of prevention and control still applies. Such drums or storage vessels will be placed so that any loss of oil will drain into the chemical sewer and be routed directly to the primary wastewater treatment unit, where the oil will be recovered.

There are about 25 electrical transformers in the Chemical Plant that contain at least 660 gallons of transformer oil.

Containment facilities exist downstream of each transformer location whereby spilled oil can be contained for recovery and disposal.

C. OP-II Plant Area

1. Oily Water Sewer System

Oil-containing streams are collected and recycled for the recovery and reuse of oil. All aqueous streams which could contain oil are separately collected into the the oily water sewers. These sewers lead to one central collection sump.

OP-II process area drainage basins are equipped with overflow skimmers leading to the oily water sewers. They also contain larger overflows which take water from under a baffle near the bottom of the basin and lead to a storm sewer system. The levels of these two overflows are set so that all normal drainage is to the oily water sewer. Flow to the storm sewer occurs only if the capacity of the oily water sewer is exceeded. Catch basins in areas that contain oils heavier than water are valved off from both sewer systems and require operator selection of the drain outlet.

Normal flows are handled through the lift pump (central collection) by an electrically driven, level-controlled pump. This pump is backed up (spared) by a steam-turbine-driven pump for major spills or rainfall.

From the lift sump, the oily water is pumped into the oily water surge tank. The tank is equipped with facilities to permit skimmed oil to bypass the parallel plate interceptor (PPI) directly to the separated oil sump, thereby unloading the PPI of large oil slugs. The separation of oil from water is accomplished in the PPI, which effectively separates oil from water and requires a minimum of operator attention.

The separated oil from the PPI flows into an oil sump and is then pumped through a strainer, water-removal drum, and to a recovered-oil tank in the south tank farm (Appendix C). Product water from the PPI is routed to the effluent water surge pit north of the OP-II cooling water tower or directly to the main Chemical Plant wastewater treatment facility.

The system is also equipped to dispose of oils heavier than water. If such oils collect in either the lift sump or surge tank, a gas oil cutting stock can be used to lighten and float heavier oils. If oils heavier than water collect in the surge tank, they can be transferred with a heavy oil pump directly to the recovered-oil system.

A major oil spill in the process area can be handled through the oily water system with no loss to public waters. Depending on the exact location of the spill, there is low probability that the oily water catch basins could overflow to the storm sewer system. This will be discussed in the section dealing with storm sewers.

In the event of a power failure in the Olefins Plants, the lift pump in the oily water system is spared by a steam turbine-driven pump already in place.

In summary, the oily water sewer system will handle any foreseeable spill or loss within the process area.

2. Non-Oily Process Water System

Non-oily waters include those process water streams which normally contain very little oil. There are two streams involved: the continuous cooling water system blowdown and the intermittent backflush from the cooling water side-system filters. The greater part of this wastewater is cooling water blowdown, which is clarified water containing treating chemicals.

This system could be a source of a potential spill due to oil leak into the cooling water system. In the event such an oil leak develops, it would be contained. The oil and water in the effluent sump could either be pumped to the OP-II oily water system or to the main wastewater treatment facilities.

3. Storm Sewer System

The stormwater drainage system handles surface drainage from all areas that are not drained to the process sewer, including routine drainage from inside the diked tank farms, and skimmed surface drainage from oily areas in excess of the equivalent of 0.5 inches of rainfall per hour.

Open ditches are used to gather the surface drainage north of N30th Street and south of N19th Street. Between N30th and N19th Streets, a closed, buried storm sewer system is provided. The primary pipe headers lie outside the peripheral roads and graduate in size as they pick up laterals from the access roads and the process plots. The header on the east starts at 16 inches and increases 42 inches as it runs south. Two buried 42-inch headers run along the south side of N19th Street to carry off the water from the east header and from the west side of the Refinery entrance road. These two cross headers and the west header pass through a skimming sump into the east end of the east-west run of the Refinery lateral into the Refinery Big Ditch. The skimming sump has the capacity to retain oil that

finds its way into the storm sewer system, and such material is pumped into the oily water system for oil recovery. During heavy rains when the pumpback capacity is exceeded, there are existing floating booms and oil pick-up pumps to handle the oil, while the main flow of storm water goes to the Refinery Big Ditch. The Refinery operates an oil-removal facility near the north end of the Big Ditch not only to remove any oil that might find its way into the Big Ditch from their tank farm area but also to remove oil that might get into the Big Ditch from the Chemical Plant units. The Big Ditch is suitable for portable oil-boom emplacement to help segregate pools of spilled oil for removal and thereby unload the Refinery system in the event of a large spill.

During rains, the Olefins Plant personnel will be responsible for checking the oil-skimming sump to insure that no oil is being lost to the Big Ditch. In an event where oil is being lost to the Big Ditch, portable oil-skimming booms shall be used as described in the preceding paragraph to segregate the oil for removal and disposal. It is the responsibility of the Chemical Plant personnel to recover any oil lost to the east/west run of the ditch leading to the Big Ditch.

D. OP-III Plant Area

1. Oily Water Sewer System

The OP-III process water sewers, designated as process water light (PWL) and process water heavy (PWH) because of the specific gravity of the oil, collect the surface drainage from process areas where the potential for oil spills is greatest. During dry-weather conditions these sewers flow to separate but similar oil/water separation facilities (corrugated) plate interceptors). The separated water is pumped to the Chemical Plant effluent treater and the separated oil is pumped to oil recovery facilities. During storm conditions, the storm water and the normal process after sewer contents flow to the oil/water separators. Normal flow to the oil/water separators is maintained and the excess flow is impounded in designated tanks for processing after the storm surge. Therefore, oil spills in the drainage sewers are contained and oil is recovered during both dry-weather and storm conditions.

2. Non-Oily Process Water Sewer System

Non-oily process water is primarily cooling water tower blowdown. Any oil spill to the tower would be contained and directed to the effluent treaters.

3. Storm Sewer System

The OP-III storm sewers were designed to drain clean storm water to the Big Ditch drainage system which outfalls at R-008 to the Houston Ship Channel. Process areas within the stormwater drainage area, where a potential for oil spills exists, are segregated by sloping and curbing and then drained to one of two process water sewers. The dry-weather flow in the stormwater drainage system is not permitted to flow to the Big Ditch but is handled by a pumpback facility. This pumpback facility returns the dry-weather flow to the Chemical Plant effluent treater facility. Oil spills in the stormwater drainage area during dry-weather conditions are therefore contained and handled by the pumpback facility. During storm conditions, oil spills in the stormwater drainage area are contained by two permanent oil-skimming booms with oil pick-up facilities that are located downstream of the dry-weather pumpback facilities and prior to discharge into the Big Ditch. In addition, the Big Ditch contains two permanent oil skimming booms with oil pick-up facilities. The discharge of water from the Big Ditch can also be blocked by closing four large sluice gates.

VI. POTENTIAL FOR A DISCHARGE

A. Bulk Storage Tanks

1. Bulk storage tanks in the Complex present a potential for a spill, but the risk is substantially reduced by the integrity of equipment inspection and diked containment facilities.

2. All tanks are periodically inspected, and complete records of the inspection are maintained in the Engineering Services Office.

3. The secondary containment capacity of the diked areas surrounding a tank, or group of tanks, is not less than the capacity of the largest tank within the diked area (including freeboard for rainwater). In case of simultaneous failure of a tank and the containment dike, the drainage systems in the Refinery include additional containment volume or an oil-retention baffle at the outfall of the drainage system.

B. Intra-Facility Pipelines

Intra-facility transfer pipelines which traverse across open areas (such as parking lots) present a potential spill risk, because in some cases the drainage area flows to the Houston Ship Channel.

The potential risk in these cases is substantially reduced by (a) design and inspection of the pipelines, and (b) oil retention baffles and/or impoundment pumps which exist at all of the outfalls.

Three Lube loading lines are located in an overhead rack which is routed along the Houston Ship Channel shore line from the Lube Plant to the Docks. These are all-welded lines which are periodically inspected, the service is noncorrosive, and positive shutoff valves exist at each end of the line in case of line failure. These and other loading lines to the Docks are hydrostatically tested once each year. There are no oil lines adjacent to Patrick's Bayou in the Complex South.

C. Intra-Facility Loading and Unloading Facilities

Tank-car/tank-truck, loading/unloading facilities also present potential for a spill. Loading and unloading spill potential is minimized by equipment inspection and the use of derailing and wheel-locking devices to prevent moving equipment during loading/unloading operations. If a spill does occur, the loading/unloading facilities are located such that the spilled material would drain into oil or storm sewers with containment facilities capable of handling the contents of any single tank car or truck.

VII. METHODS FOR ALLEVIATING THE IMPACT OF OIL SPILLS

This section is concerned with those cases when, in spite of any and all prevention methods and techniques, oil has found its way into Patrick's Bayou or to the Houston Ship Channel. If the oil has been spilled into Patrick Bayou, every effort will be directed toward containment and recovery before it reaches the Channel. Spill booms will be used to contain the oil, and vacuum trucks or portable skim pumps will be used in the recovery effort. Depending on the point of entry into Patrick's Bayou, an initial booming can be accomplished in the bayou just north of the HB&T Railroad bridge. The existing roadway will allow for the approach of a vacuum truck. If additional booming is required, access will be available from other areas. This will also provide easy approach by a vacuum truck. Absorbent pads, absorbent booms or other material such as straw or sawdust can be spread on the oily banks of the bayou for oil adsorption and maximum recovery.

In the event that oil has reached the Houston Ship Channel from the west property, spill booms can be used to surround and contain the oil slick. In the deeper waters of the Channel, as compared to Patrick's Bayou, several options for recovery are open to the personnel charged with the recovery of the oil. Again, absorbent materials may be used on the banks of the Channel for recovery of oil from the land. In the Channel water, use of belt-skimming devices, boat-mounted skimming equipment, or boat-mounted vacuum equipment may be considered. Such facilities are available through local contractors with whom we have arranged blanket-order contracts for quick response whenever needed.

A. Request for Aid from Contractors

In certain cases, it may be desirable to get assistance for clean-up of oil spills. Either on-site or off-site contractors are available for that service. Vacuum trucks are available from our on-site vacuum truck contractor. Contracts have been signed with several other companies who may be called as needed for assistance. A list is attached of the companies under contract for oil spill response.

Prior to calling for outside assistance, the Environmental Supervisor should discuss his decision with the Environmental Duty Person. If he cannot be contacted quickly, the Environmental Supervisor should proceed without delay in the course of action he deems the most reasonable and expeditious in handling the situation.

B. Training Program

Operators and maintenance personnel, as part of their initial training when hired, are instructed on measures to be taken should an oil spill occur. Operating Departments will schedule and conduct spill prevention briefings for their operating personnel annually to assure adequate understanding of this plan for their unit. Such briefings will highlight and describe known spill events, failures, malfunctioning components, and recently developed precautionary measures. The training must be documented and the records must be kept in a readily accessible location. These records are subject to inspection by Governmental agencies and Shell auditors.

VIII. REVIEW AND UPDATING OF THE SPCC PLAN

As a minimum, this plan will be reviewed and updated every three years. If the Complex has changed through facility design, operation, construction, or maintenance which materially affects the plant's potential for the loss of oil into Patrick's Bayou or the Houston Ship Channel, amendments will be made to this plan that will delineate the prevention, control, and countermeasures necessary to handle the new situation. These amendments will be fully implemented as soon as possible but not later than six months after such a change occurs. No amendment to this plan (unless otherwise stated) will be effective or complete until it has been certified by a registered engineer.

The Appendices and the telephone listings will be reviewed and updated as necessary. It will not be necessary for certification for these changes.

IX. POLYCHLORINATED BIPHENYL (PCB) SPILL PREVENTION, CONTROL, AND COUNTERMEASURES PLAN (SEE ENVIRONMENTAL ORDER EC-10)

Polychlorinated biphenyl (PCB) or oil containing PCB's were used in the past as dielectric fluid in various transformers and capacitors used in the Complex. Although PCB-containing transformer oil or capacitor fluid is no longer purchased, we know of about 75 transformers which contain PCB or PCB contaminated oil and about 375 capacitors as of January 1, 1990, in the Complex. PCB-containing liquids and the capacitors, transformers, and/or other containers, such as

drums containing PCB capacitors or dirt, rags, etc. from PCB spill clean-up, which may contain PCB are strictly regulated. Known PCB capacitors and transformers are marked with a distinctive PCB label.

The purpose of this PCB section is not to detail all of the PCB regulations, but to provide information so that spills and storage of PCB items removed from service may be properly handled. Additional information on PCB regulations and requirements may be obtained from Environmental Compliance or from Engineering Services and Electrical personnel.

PCB's or oil containing PCB's are allowed to be used in enclosed devices such as capacitors or transformers. Inspection and control of these PCB items is handled by Engineering Services/Electrical personnel (ES/E). Leaks, spills, temporary storage of PCB items removed from service prior to disposal while under the supervision of ES/E may require action or assistance from other Complex groups when ES/E personnel are not immediately available. The purpose of this PCB Spill Prevention, Control, and Countermeasures Plan is to provide information to other groups for handling PCB incidents until further guidance is obtained from ES/E.

Transformer oil and capacitor fluid which contains PCB's can not be distinguished from non-PCB oil except by chemical analysis. Unless one of these electrical devices is marked with the distinctive PCB label, one should consider any transformer or capacitor may contain PCB. That is, if you are not sure, consider any transformer oil or capacitor fluid may contain PCB's.

A. <u>Spills or Leaks</u>

In the event of a spill or leak from a transformer, capacitor, or storage container of oil which may contain PCB's the required action is:

(NOTE: TIME IS CRITICAL. ACTION MUST BE IMMEDIATE)

1. Stop the leak as quickly as possible.

2. Notify your immediate supervisor.

3. Notify the Environmental Supervisor for leaks of PCB-containing items:

4. Isolate the spilled material. Unlike other oil spills, PCB-containing oil should not be directed to oil recovery processes.

   a) Put the recovered material into metal containers (use DOT Specification 5, 5b, or 17c drums if available since they are required for shipment).

   b) Put all material which came in contact with the spill in another metal container. Liquids should be segregated from solid material. Such other material which contacted the spill includes, but is not limited to: rags, tools, gloves, floor sweep, and dirt if the spill reached the ground. (Use DOT Specification 5, 5b, or 17c drums if available since they are required for shipment).

   c) Notify the Environmental Supervisor and Environmental personnel responsible for PCB handling. Depending on the nature of the spill, it may be necessary to call out Electrical people and/or a spill clean-up contractor to handle the problem. Consult with purchasing before bringing a contractor into the Complex and use a clean-up contractor that specializes in PCB clean-up.

B. Storage

DPMC does not routinely store PCB items. On occasion, it may be necessary to store PCB items temporarily prior to shipment to approved disposal facilities. PCB items which were generated as a result of a spill or planned removal from service may be stored for up to 30 days prior to disposal if several requirements are satisfied. The requirement which must be done immediately is: A notation is attached to the PCB items or a PCB container (such as a drum) containing the PCB item(s) which indicates the date the PCB item was removed from service.

Proper PCB labeling will be applied during normal working hours by ES/E. Engineering Services/Electrical personnel will handle the other aspects of PCB storage requirements. The PCB storage requirements are detailed in Federal Regulation 40 CFR 761.42(c).

Attachments (5)

Updating Responsibility:
Manager, Environmental Compliance

Approved By:

Superintendent Facilities
Support

APPENDIX A

SPILL PREVENTION, CONTROL, AND COUNTERMEASURE PLAN

OIL POLLUTION PREVENTION
REGULATION 40 CFR, PART 112J

1. The Federal Water Pollution Control Act Amendments of 1972 require the Administrator of the Environmental Protection Agency, with other federal, state, and interstate agencies, to enter into programs designed to prevent, reduce, or eliminate pollution of the navigable waters of the United States. On December 11, 1973, the EPA published regulations for the prevention of pollution of waters of the United States by oil emanating from nontransportation-related onshore and offshore facilities. The regulations are identified as Title 40, Code of Federal Regulations, Part 112 (40 CFR, Part 112), "Oil Pollution Prevention - Nontransportation Related Onshore and Offshore Facilities" and became effective on January 10, 1974.

   These regulations require the preparation and implementation of a Spill Prevention Control and Countermeasure (SPCC) Plan for all nontransportation related facilities which have discharged or could reasonably be expected to discharge oil into the navigable waters of the United States or the adjoining shorelines.

2. Preparation of the SPCC Plan was required by July 10, 1974, and implementation of the Plan was to be accomplished as soon as possible after preparation, but no later than January 10, 1975.

   A. When required by the EPA after review of the Plan, submitted because of a spill event.

   B. Whenever there is a change in facility design, construction, operation, or maintenance which materially affects the potential for an oil spill.

   C. The owner or operator is required to review the SPCC Plan at least once every three years, and an amendment is required is such review indicates more effective control and prevention technology will significantly reduce the likelihood of a spill event (and if technology has been field proven).

4. Commencing January 10, 1975, unless an extension of time has been granted by the EPA Regional Administrator, the operator must submit the SPCC Plan with any amendments to EPA and to the appropriate state agencies within 60 days of the occurrence of either of the following two conditions:

APPENDIX A (CONTINUED)

A. Discharge more than 1,000 U.S. gallons into navigable waters in a single spill event after January 10, 1975.

B. Discharge oil in harmful quantities as defined in 40 CFR, Part 110, into navigable waters in two reportable spill events within any 12-month period following January 10, 1975. Owners and operators of facilities who violate the requirements of the regulations relating to the preparation, implementation, and amendments to SPCC Plans are liable for a civil penalty of not more than $5,000 for each day that such violation continues.

APPENDIX B

DEFINITIONS

As outlined in the National Oil and Hazardous Materials Pollution Contingency Plan, dated March 1972, the following excerpted definitions will be used in this plan for DPMC:

105 Definitions (Within the Meaning of This Plan)

105.1 Discharge - includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying, or dumping.

105.8 Major Disaster - is any flood, tornado, fire, hurricane, earthquake, storm, or other catastrophe in any part of the United States which, in the determination of the President, is or threatens to become of sufficient severity and magnitude to warrant disaster assistance by the federal government to supplement the effort and available resources of state and local governments in alleviating the damage, hardship, or suffering.

105.9 Oil - oil of any kind or in any form, including, but not limited to, petroleum, fuel oil, sludge, oil refuge, and oil mixed with wastes other than dredged spoil.

105.11 Minor Spill - is a discharge of oil of less than 1,000 gallons in coastal waters, or a spill of small quantities of other substances. Discharges that: (1) occur in or endanger critical water areas; (2) generate critical public concerns; (3) become the focus of an enforcement action; or (4) pose threat to public health or welfare, should be classified as moderate or major spills depending on their degree of impact.

105.12 Medium Spill - is a discharge of oil of 1,000 to 10,000 gallons in the inland waters or 10,000 gallons to 100,000 gallons in coastal waters, or a discharge of any material of any size that poses a threat to the public health or welfare.

105.13 Major Spill - is a discharge of oil of more than 10,000 gallons in inland waters or more than 100,000 gallons in coastal waters, or a discharge of any size of such nature and quantity that human health or welfare is substantially threatened, or generates wide public interest.

APPENDIX B (CONTINUED)

105.14 Potential Spill - is any accident or other circumstance which threatens to result in the discharge of oil or other hazardous substance. A potential spill shall be classified as to severity based on the guidelines above.

105.17 Remove or Removal - is the removal from the water or shorelines or the taking of such other actions as may be necessary to minimize or mitigate damage to the public health or welfare.

APPENDIX C

BLANKET ORDER CONTRACTORS FOR OIL SPILL RESPONSE/CLEANUP

COMPANY NAME ADDRESS	TELEPHONE DAY/NIGHT
VACUUM TANKS, INC. 8410 HANSEN ROAD HOUSTON, TX	246-6706 947-7463
GARNER SERVICES 314 ALLEN GENOA ROAD HOUSTON, TX	920-1300
PETERSEN REIDEL 1110 HOWARD DRIVE DEER PARK, TX	479-5295
JONES FRAZIER, INC. 1019 BROADWAY PASADENA, TX	473-8835
ALLWASTE, INC. P. O. BOX 127 DEER PARK, TX	476-0291
CATALYST TECHNOLOGY 1905 JASMINE PASADENA, TX	472-4528

APPENDIX D

SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN
GENERAL INFORMATION

1. Name and Location of Facility

   Name: SHELL OIL COMPANY COMPANY
   Deer Park Manufacturing Complex

   Location: Direction and Distance to Nearest Town:

   Adjacent to and due North of Deer Park

   County: HARRIS
   State: Texas

2. Name, Address, and Telephone Number of Operator

   SHELL OIL COMPANY
   P. O. Box 100
   Deer Park, TX 77536
   (713) 246-4371

3. Name and Telephone Number of Person in Charge of Facility

   R. M. Kingsbury, Manager
   SHELL OIL COMPANY
   Deer Park Manufacturing Complex
   (713) 246-6888

4. Name and Telephone Number of Person Responsible for Spill Prevention at Facility

   A. F. Schmit, Manager Environmental Operations
   (713) 246-7500

APPENDIX D (CONTINUED)

CERTIFICATION

I hereby certify and attest that I am familiar with the facility and the information contained in this plan and that to the best of my knowledge and belief such information is true, complete, and accurate. Further, this plan has been prepared in accordance with good engineering practices and the provisions of 40 CFR, Part 112.

S. A. Weaver
Printed Name of
Registered Engineer
Date: March 21, 1990

S. A. Weaver
Signature of Registered Engineer
Registration Number: 40541
State: Texas

MANAGEMENT APPROVAL

This Spill Prevention, Control, and Countermeasure Plan will be implemented as herein described.

Signature:
Name: R. M. Kingsbury
Title: Manager, Deer Park Manufacturing Complex

SHELL
DEER PARK MANUFACTURING COMPLEX
CHEMICAL PLANT

I. GENERAL

The Deer Park Plant has three sewer systems: storm, chemical, and oily. The storm sewer receives uncontaminated storm water and domestic waste water. Absolutely no process waste streams or contaminated water is to be discharged to the storm sewer. The storm sewers can be routed directly to Patrick's Bayou or the ship channel depending on whether it is coming from the main chemical plant, OP-II or Phenol.

The chemical sewer receives all contaminated waste water and discharges to the Effluent Treater, where the contaminated water is treated before being discharged to Patrick's Bayou. The Effluent Treater is designed to provide an effluent water which meets the NPDES permit requirements established by the Texas Department of Water and Environmental Protection Agency (EPA) for the Deer Park Plant. In order to meet these requirements, it is of utmost importance to minimize the discharge of organics, acids, or bases to the chemical sewer.

The oily sewer receives oily water for eventual separation and recovery of the oil and discharge of the water to the Effluent Treater. OP-II and Phenol are the only areas of the Plant that have oily water sewer systems. Operation and monitoring of these systems are covered in separate orders. Monitoring of the storm sewer from OP-II is also covered in a separate OP-II order and for Phenol the storm sewer monitoring and control is included in a Refinery environmental order.

In any industrial process, there is always a definite amount of waste produced that must be discarded. Any amount of material above this "normal" amount of waste production not only represents an additional load on the Effluent Treater, but also, in most cases, is an actual loss of valuable product. This order will be concerned primarily with the control of organics, acids, or bases in the chemical and storm sewers.

II. CONTROL OF CHEMICAL AND STORM SEWERS

A. Chemical Sewer

Waste-water control necessitates routine sampling and testing of sewer laterals on a daily basis. To achieve better control of

the influent to the Effluent Treater, each operating department will assign an operator the responsibility for control of the chemical sewers in each of the department's operating areas. The assigned operator will be responsible for sampling the main laterals in his area (see attached drawings and Table I) at least once per shift. The pH of these samples should be checked with litmus paper or portable pH meter and compared with the historic average for "lined-out, no-spill" operation in that area. Additionally, the sample should be observed for any obvious deviations from normal, such as unusual color, excessive odors, floating materials or solid content. If none are observed, the grab sample should be retained until the next sampling period at which time the sample can be discarded. If abnormalities are observed, the operator is responsible for immediately apprising his shift foreman and the Effluent Treater Operator (7340) of the abnormalities. An investigation must be initiated to locate and correct the abnormal condition as expeditiously as possible. For areas that do not have a GLC, the GLC analyzers at the Effluent Treater are available for running samples to determine the concentration of most organic contaminants present in the samples.

Composite samples (1/2 gallon) are obtained by either continuous samplers or from part (1/4 quart) of the grab sample taken once per shift from laterals noted in Table I. These samples are to be sent to the Environmental Laboratory daily at 5:00 a.m. and analyzed for COD. A report will be issued daily Monday through Friday by the Environmental Laboratory presenting the COD's obtained and comparing them with the limit established (see Table I) for that lateral. Any time the measured value is in excess of the established limit, it is the responsibility of operating management to review their operations for the source of the higher than normal COD and correct it expeditiously.

Additionally, GLC's are provided in the following control rooms so that routine analyses of organics contained in lateral effluent streams can be obtained; C/Specialties; M, S, & H; VCM; ERU-2; and BA. Part of the grab sample taken once per shift will be analyzed on the GLC's to determine the concentration of organics in the waste water discharged from that operating area. Any time the concentration of organics exceeds the limits listed in Table II, the responsible operator will advise his shift foreman and the Effluent Treater. Additionally, the involved operating area will initiate an effort to locate and eliminate the source of higher than normal organic(s) as expeditiously as possible. Effluent Treater Operators are available to assist in tracing the source of the high organic(s).

Further monitoring of organics in the chemical is accomplished by routine GLC analysis at the Effluent Treater Control Room. A grab sample of the total influent to the treater is analyzed at

least once every four hours. The GLC analyses identifies the major portion of organics normally present in the chemical sewer. Any time the concentration of a chemical is in excess of the normal limits, the Effluent Treater Operator will alert the operating department(s) handling this particular chemical unless the source has already been reported by a particular department.

Any time an operating department is advised of an abnormally high amount of a chemical in the chemical sewers, the department(s) notified will undertake necessary steps to determine the source of the chemical and adjust the operation to correct the problem. Depending upon the nature of the source of the chemical, this determination may become quite time consuming. It is necessary however so that the Effluent Treater does not become overloaded and result in the effluent discharged to Patrick's Bayou failing to meet our permit requirements. During this search, if an operating department locates the source of the chemical, they must advise the Effluent Treater Operator (7340) who, in turn, advises other operating departments alerted.

When more than one operating department is involved, Environmental Operations will request the operating departments to sample the appropriate sewer laterals and run a GLC on the samples. Once the source is established, the responsible department will notify the Effluent Treater Operator (7340) so that other departments involved can be called by Environmental Operations and advised the search has been localized to one department and to discontinue their search.

Once the responsible department has been established, it is their responsibility to search until the source is pinpointed and eliminated. The Effluent Treater Operator is available to run GLC analyses on samples obtained from within a department to assist in tracking down the source.

To monitor the pH of the waste water, meters are provided to continuously monitor and record the pH of the influent to the treater and at several points in the waste-water treatment system. In addition, there are numerous other meters located in the chemical sewers throughout the Plant. These are invaluable in tracking down the source of high acid or base in the chemical sewer. Here again, once the responsible department(s) is determined, it is their responsibility to search until the source is pinpointed and eliminated. If at any point in the search the source is pinpointed, the responsible department must contact the Effluent Treater Operator so that all search efforts can be terminated.

B. Storm Sewer

In order to meet the NPDES quality requirements for storm water discharged directly to Patrick's Bayou, we must keep contaminants

out of the storm sewers. To achieve control of contaminants entering the storm sewer, operating departments have been assigned sampling points (see attached Table III) in the storm sewer system. Each department assigned a sampling point will designate an operator to sample the storm sewer at least once per shift. The analyses noted in the Table will be performed by the operator(s). Additionally, the sample should be observed for any obvious deviations from normal; such as unusual color, excessive odors, floating materials, or solid content. If none are observed, the grab sample should be retained until the next sampling period, at which time the same can be discarded.

Any time abnormalities are observed or determined by analysis, the operator is responsible for immediately apprising his shift foreman and the Effluent Treater Operator (7340) of the abnormalities. An investigation must be initiated to locate and eliminate the contaminants entering the storm sewer. For areas that do not have a GLC, the GLC analyzers at the Effluent Treater are available for running samples suspected of containing abnormal levels of organics.

After the source of contaminants has been determined and the flow entering the storm sewer stopped, the operating area where the contaminants originated will flush the storm sewer to displace any trapped contaminants. This will probably take 1-2 hours of flushing to adequately displace the trapped contaminants.

In addition to the above monitoring, a grab sample is taken at the Effluent Treater for GLC analysis once per shift and the pH is monitored and recorded continuously. Any time the pH or contaminant level is outside acceptable limits, the Effluent Treater Operator will alert the operating department(s) handling the particular materials contributing to the problem unless the source has already been reported by a particular department.

Any time an operating department is advised of an abnormal condition in the storm sewer, the department(s) notified will check their area for contaminants entering the storm sewer and eliminate if found. Depending upon the nature of the source of the contaminant(s), this determination may become quite time consuming. It is necessary however so that the Plant can meet the quality requirements for storm water discharged directly to Patrick's Bayou. During this search, if an operating department locates the source of the contaminants, they <u>must advise</u> the Effluent Treater Operator (7340) who, in turn, advises other operating departments alerted.

III. CHEMICAL AND STORM SEWER IDENTIFICATION

All chemical and storm sewer basins will be identified in all areas of the Plant to aid in excluding contaminant discharges to the storm sewer. Chemical sewer catch basins will be identified with a tag inscribed with "CS" and painted orange. The storm sewer catch basins will be identified with a tag inscribed with an "S".

Attachments

TABLE I

CHEMICAL SEWER LATERALS AND MONITORING

Sewer Point[1]	Responsible Department	Composite[2] Sample	Routine[3] GLC	COD Limit
1A	EPON-2	Yes	Yes	4,500[6]
2A	BA	Yes	Yes	3,000
3	EP	Yes	Yes	3,000
4	EP	Yes	No	1,400
5	A	Yes	Yes	4,800
6P	A	Yes	No	6,800
8A	Specialties	Yes	Yes	3,000
11	BA	Yes	Yes	50,000
12	G	Yes	No	1,000
16[5]	CA	No	No	--
VCM	VCM	Yes	Yes	3,500
OP-II	Env. Ops.	Yes	No	1,800
ECH Stripper	G	Yes	No	3,000
Primary Effluent	Env. Ops.	Yes	Yes	2,000
Storm Sewer	Env. Ops.	Yes	No	600
Phenol 2	Phenol-Acetone	Yes	No[4]	5,000

Notes:

1 See attached drawing.

2 24-hour composite obtained by either continuous samplers or composited from once-per-shift grab samples.

3 Once-per-shift GLC analysis on grab sample.

4 On-line TOD/TOC and pH analysers.

5 Analyze twice per shift for free caustic.

6 During conventional EPON-1001 production COD limit will be 6,000. Frequency is two (2) weeks every three (3) months.

TABLE II

ORGANIC LIMITS FOR SEWER POINTS

Sewer Point	Organic Limits	
I. 1A	MEK	- 200 PPM
	MIBK	- 200 PPM
	DMK	- 150 PPM
	ECH	- 20 PPM
II. 2A	NBA	- 500 PPM
	IBA	- 500 PPM
	NPA	- 50 PPM
III. 3	EA	- 500 PPM
IV. 5	IPA	- 400 PPM
	SBA	- 200 PPM
	DMK	- 300 PPM
	MIBK	- 200 PPM
	IPE	- 100 PPM
	MEK	- 200 PPM
	MIBC	- 100 PPM
	MO	- 100 PPM
	SBE	- 100 PPM
	ECH	- 100 PPM
	AA	- 100 PPM
	DAA	- 100 PPM
	HG	- 100 PPM
V. 8A	IPA	- 250 PPM
	DMK	- 350 PPM
	MIBK	- 250 PPM
	MEK	- 250 PPM
	ECH	- 125 PPM
	DCH	- 125 PPM
	AA	- 125 PPM
	CSA	- 125 PPM
	NBA	- 125 PPM
	TCP	- 125 PPM
	MCH	- 125 PPM
VI. 11	NBA	- 5000 PPM
	IBA	- 5000 PPM
	NPA	- 500 PPM
VII. VCM	EDC	- 40 PPM

TABLE II (Continued)

ORGANIC LIMITS FOR SEWER POINTS

Sewer Point	Organic Limits		
VIII. Effluent Treater	IPE	-	25 PPM
	SBE	-	25 PPM
	EDC	-	20 PPM
	DMK	-	75 PPM
	MEK	-	50 PPM
	MIBK	-	50 PPM
	TBA	-	25 PPM
	IPA	-	100 PPM
	EA	-	200 PPM
	MO	-	25 PPM
	SBA	-	50 PPM
	NPA	-	25 PPM
	IBA	-	25 PPM
	AA	-	25 PPM
	CSA	-	25 PPM
	MIBC	-	25 PPM
	NBA	-	25 PPM
	PHENOL	-	25 PPM
	MCH	-	25 PPM
	ECH	-	50 PPM
	DCH	-	50 PPM
	EHA	-	25 PPM
	DGE	-	100 PPM
	TCP	-	25 PPM
	HG	-	25 PPM
	DAA	-	25 PPM
	EG	-	25 PPM
	MHP	-	10 PPM
IX. Phenol	PHENOL	-	50 PPM
	CHP	-	500 PPM
	FORMIC ACID	-	800 PPM
	ACETOL	-	200 PPM
	ACETIC ACID	-	400 PPM
	IPE	-	100 PPM
	MHP	-	150 PPM
	DMK	-	100 PPM

TABLE III

STORM SEWER MONITORING

Sewer Point	Responsible Department	Analyses*
West 12th East of Insp./Mat Building	Specialties	pH GLC
West 10th and 30th Southwest Corner	A	pH GLC
West 12th and 36th	G	pH
West 10th - Southwest of Unit	CA	pH (% caustic)
East 1st and 30th Northwest Corner	EA/BA	pH GLC
East 5th - North of EPON-2 Control Room	Major Resins	pH GLC
End of 30th	Effluent Treater	pH (continuous) GLC

Notes: *pH will be checked with litmus paper or portable pH meter except as noted. pH must be between 6-9.

Total concentration of organics measured by GLC must not be greater than 100 PPM.

SHELL
DEER PARK MANUFACTURING COMPLEX
NORTH AND SOUTH

DISPOSAL OF PROCESS WASTES

SUMMARY

The purpose of this order is to define the proper management and disposition of all process wastes generated through day-to-day operations and shutdowns. Whenever possible these materials must be recovered and recycled or sold.

INTRODUCTION

The Resource Conservation and Recovery Act (RCRA) outlines specific requirements regarding handling and disposal of waste materials. We must routinely inspect our facilities and provide training to the personnel involved in hazardous waste management. Reports must be submitted to the Texas Water Commission and the Environmental Protection Agency summarizing the quantity and type of materials disposed of on-site or sent off-site for disposal. Due to the complexity of the rules governing handling and disposal of wastes, specific disposal instruction will not be given in this order. Each case must be discussed with Environmental Operations to determine the proper handling and disposal. To fulfill these requirements generators of waste must follow the procedures outlined in this order to dispose of the waste materials.

STORAGE, INSPECTION AND TRAINING

A. Storage

There are registered storage tanks at:

1. Environmental North and South
2. Solvents and Treating
3. V Operations
4. BPA
5. Thermal Cracking
6. Logistics Distribution
7. Utilities South
8. Phenol Acetone
9. Pyrolysis

Wastes may be stored indefinitely in the registered facilities if they are properly identified, marked and segregated. Wastes may be stored outside these areas for a maximum of 90 days and must be dated on the day they become hazardous wastes.

B. Inspections

All hazardous waste facilities must be inspected daily. Inspection forms are provided for each area. These forms must be completed, when the inspection is made, and forwarded to Environmental where they are filed as required by the regulations for a period of three years. All leaks, spills, upsets or equipment problems which could result in a release of hazardous waste must be reported to the Environmental Supervisor and noted on the inspection record sheet.

C. Training

The regulations require we provide training for each person having operating responsibility for a registered hazardous waste facility. The facilities are:

1. Recovered oil storage tanks at Thermal Cracking
2. Spent caustic storage at Solvents and Treating.
3. Environmental facilities, North and South.
4. Injection wells, storage tanks and filters at BPA.
5. HCIN incinerators and feed storage tanks at V Operations.
6. Heavy Ends tanks at Phenol Acetone.
7. Boiler feed storage tanks at Utilities South.
8. VCM/EDC Light Ends tank at Site 3.
9. Recovered oil tank at Pyrolysis.

Each operator and shift foreman must be trained before working the job. Each person transferring to one of the jobs must receive the hazardous waste training as part of the break-in training for the job. Each department, with waste facilities, has a copy of our hazardous waste training film and is responsible for training their personnel at least annually. Documentation of the training must be sent to Environmental Operations, Source Control to be included in our records.

ON-SITE DISPOSAL

Wastes transferred from the point of generation to the disposal site must always be accompanied by a "Waste Disposal Request Form", DPMC-6 (see attachment 1). The form provides a mechanism for effective coordination and proper handling of waste materials as well as a record of the type and quantity moved.

The generator must supply the information in Section A of the forms and contact Environmental Operations for approval. Environmental will give instructions for the disposal site and special precautions required. The dispatcher is requested to instruct the drivers to refuse pick-up of material improperly loaded, described or for which there is no approved DPMC-6 form.

OFF-SITE DISPOSAL

To assure timely disposal of wastes the generator must, as soon as possible:

1. Identify, describe and estimate the quantity of waste material (see attachment 2, "Waste Data Sheet", Chemical Composition).

2. Contact Environmental Operations at 7280 to make preliminary arrangements for disposal. Environmental will work with purchasing to schedule the disposal.

3. Provide representative samples of the waste material on request. In some cases these must be certified as true samples.

4. Give a charge number to Environmental to assure proper accounting.

After shipment is arranged the generator must:

1. Obtain shipping instructions from Environmental Operations.

2. See that the waste is properly loaded for transportation to the disposer.

3. Enter on the shipping paper (Hazardous Waste Manifest) the quantity of material loaded on the truck.

4. Sign and date the shipping paper and have the truck driver sign and date it.

5. Remove the green copy (in some cases our copy will be another color) from the shipping paper and send it to Environmental Operations, ECB 132, no later than the following day. Give all remaining copies of the paper to the truck driver.

Updating Responsibility:
Superintendent Environmental Operations and Utilities

DPMC-6 (Revised 6/84)

DPMC WASTE DISPOSAL REQUEST

A. Originator Completes This Section:

This form is to be filled out once you are satisfied the waste material can be handled and disposed of in a safe and environmentally sound way.

NOTE: It is the responsibility of the ORIGINATOR to find, if possible, a use for the material either in his department or another department in the Complex. Arrangements for disposition of the material should always be made (except in an emergency) and approval of Environmental obtained before pick-up is scheduled.

1. _____ MONTH/DAY/YEAR — _____ (JOB ORDER/ACCOUNT NUMBER)
2. _____ GENERATOR DEPT. CODE — _____ (DEPARTMENT NAME)
3. _____ WASTE CODE
4. _____ DISPOSAL SITE CODE — _____ (DISPOSAL SITE NAME)
5. _____ MATERIAL DESCRIPTION — _____ (ESTIMATED QUANTITY/UNITS-BBLS, YDS, ETC.
6. _____ SOURCE (VESSEL, TANK, ETC.)
7. _____ QUANTITY (LEAVE BLANK) — _____ (ESTIMATED TIME REQUIRED)
8. _____ COMMENTS (LEAVE BLANK)

SAFETY (Safety precautions must be indicated.)

EQUIPMENT REQUIRED: Gloves [ ], Goggles [ ],

Protective Clothing [ ] Type _____

Respirator [ ], Fresh Air [ ], Rubber Boots [ ]

Special Precautions: _____

NOTE: ALL ITEMS ABOVE MUST BE ENTERED BY ORIGINATOR. SEE BACK OF THIS SHEET FOR CODE TABLES.

_____
ISSUED BY (ORIGINATOR)

B. Complete Part A and then call Environmental for approval at: 6706, 7280, or 7653.
(Off Hours call 7340 or 6397)

APPROVAL (ENVIRONMENTAL)	BY (ORIGINATOR)	DATE	TIME

C. Driver Completes This Section:

_____	DATE	[ ]	BBLS,LIQUIDS	_____	TRUCK NUMBER
_____	QUANTITY	[ ]	BBLS, SOLIDS	_____	TIME STARTED
_____	DRIVER	[ ]	YDS	_____	TIME FINISHED

Note to Driver: Turn completed forms in to your supervisor daily. Mail to ECB-131.

DPMC-6
7/27/84

DISPOSAL SITES

CODE	DISPOSAL SITE NAME
01	PRI SOLIDS LAGOON 1
02	PRI SOLIDS LAGOON 2
03	PRI SOLIDS LAGOON 3
04	DIGESTER
05	OIL RECOVERY TANKS
06	DECANT TANKS
07	DECANT PIT
08	ACID NEUTRALIZER
09	RIP-RAP
10	JONES LAKE
11	BELTWAY WASTE PILE
12	BELTWAY CLEAN STORAGE
13	BIOSOLIDS LAGOON
14	LUGGER PAN SITE
15	OILY DIRT BINS
16	HCIN FEED TANKS
17	ET-SOUTH TANKS
18	DRUM RECLAIM
19	SITE 102/103
20	OTHER
21	PDU BLDG

WASTE CODES

CODE	WASTE CODE NAME
141520	CONTAMINATED DIRT/RUBBLE
179840	OILY DIRT
249890	BIOSOLIDS
400000	ACID SOLUTIONS
450000	BASE SOLUTIONS
500000	CONTAMINATED WATER/CHEMICAL SOLUTIONS
550000	RECOVERED OIL
600000	OIL/WATER
650000	CLEAN DIRT/RUBBLE
750000	RECLAIM DRUMS
909390	API SKIM
910590	LAB WASTES
914680	ORGANIC CHLORIDE WASTE
950430	OILY SLUDGE
970210	SPENT CATALYST
979640	SOLID RESIN
983050	BPA
800000	DRUMMED WASTES

DEPARTMENT CODES

CODE	DEPARTMENT NAME
01	A
02	G
03	V
04	CAT CRACKING
05	PURCHASING/MATERIALS
06	BA/SR
08	ENVIRONMENTAL
09	LABORATORIES
10	OP-2
11	DISTILLING/LOFU
14	TANK FARM
15	THERMAL CRACK/ALKY
16	MAINTENANCE
17	PHENOL ACETONE
18	BPA
19	LUBE LOGISTICS
20	OP-3
21	UTILITIES NORTH
22	UTILITIES SOUTH
23	UTILITIES CENTRAL
24	RESINS DISTRIBUTION
25	RESINS OPERATIONS
27	CONSTRUCTION
30	SAFETY
31	HYDROCRACKING/SR/CR
34	AROMATICS
35	GAS RECOVERY
36	LUBE A
37	LUBE B
46	BASE CHEM & SOL
47	DOCKS
50	UTILITIES DISTRIBUTION

DETAILED WASTE DESCRIPTION AND REGULATORY COMPLIANCE:

CRA Characterization Codes _____ _____ _____ _____

Reason for above characterization: _____

_____

State Waste Code No. _____

SHA: Contain listed compounds? _____ EPA: PCB conc > 50 ppm? _____

NCR: Radioactive? _____ PHS: Infectious Waste? _____

IFRA: Does this waste contain a pesticide for which the EPA has issued specific disposal requirements? _____

CHEMICAL COMPOSITION:

COMPOUND NAME (NO TRADE NAMES)	CONC. RANGE, Wt. %	CHEMICAL FORMULA

BORATORY ANALYSIS

EXCEPTIONS SE MUST COMPLETED	PHYSICAL STATE @ 25°C			
Pb _____ Mg/ℓ	GAS _____	LIQUID ____	Cd _____ Mg/ℓ	BTU _____ /lb.
Hg _____ Mg/ℓ	SOLID _____	SLUDGE ____	Be _____ Mg/ℓ	ASH _____ %
_____ % wt	SLURRY _____	PASTE ____	As _____ Mg/ℓ	VAPOR PRESS
_____ % wt	GRANULAR _____	CRYSTAL ____	Na/K _____ Mg/ℓ	_____ @
F _____ % wt	POLYMERIC _____	AMORPHOUS ____	OTHER _____ Mg/ℓ	
_____ % wt			_____ Mg/ℓ	MELTING PT. _____
S _____ % wt			_____ Mg/ℓ	BOILING PT. _____
_____	SINGLE PHASE _____		CN _____ Mg/ℓ	pH _____
_____	MULTI PHASE _____		TOC _____ Mg/ℓ	FLASH POINT _____
	OIL/WATER _____		COD _____ Mg/ℓ	OTHER _____
	VISCOSITY _____		BOD _____ Mg/ℓ	_____
			SS _____ Mg/ℓ	_____
			TDS _____ Mg/ℓ	_____

Is the waste reactive with water? _____ with air? _____

Is a respresentative sample provided? _____

Give any other additional information on the hazards of the waste: _____

NOTICE: THIS DATA SHEET WILL NOT BE ACCEPTED WITHOUT SIGNATURE AND DATE:

I hereby certify that the above information is complete and accurate.

CUSTOMER SIGNATURE	TITLE	DATE

REQUIREMENTS FOR MANAGEMENT OF TANK FARM DRAINAGE

PURPOSE

This establishes minimum requirements for the management of drainage from tank farm areas within the Products Organization. Each Location/Organization should review their facilities and existing operating procedures and establish new or revised written procedures to comply with these requirements. Locations shall establish management controls to assure compliance with written procedures. All must be consistent with and integrated as appropriate in the Location/Organization Spill Prevention Control and Countermeasure (SPCC) Plans.

The specific measures identified in these requirements must be incorporated in Location/Organization operating procedures. In some instances, these measures may be in addition to those required by local, state, and federal laws and regulations.

FACILITIES EVALUATION

Each Location/Organization shall conduct an indepth review of all its existing facilities associated with tank farm drainage to ensure that facilities have been designed, installed, and maintained to prevent contaminated water or hydrocarbon from being discharged from the Location. Results of this review should be documented, and a corrective action plan should be developed and implemented to resolve all concerns identified in the review.

For purposes of this review, the following definitions for containment systems will apply:

* Primary containment - Storage tank
* Secondary containment - Storage tank dike or curbs, or Location effluent processing facilities for undiked areas.
* Tertiary containment - Location effluent processing facilities, such as ponds, lagoons, recovery basins, or separators when dikes are provided for tanks.

The review should address the following:

I. Compliance with legal and regulatory requirements.
   A. EPA Regulations on Oil Spills - 40 CFR Part 112
   B. Effluent Discharge Permit Conditions
   C. NFPA 30
   D. Shell Engineering Guides & General Specifications
   E. Special State/Local Laws and Regulations

II. Visual inspection should be made of all equipment inside the secondary containment area for integrity, operability/operating convenience, process security, and environmental risk. Equipment included in the inspection would include roof drains, water draw piping/valves, sample connections, mixers, steam coils, steam tracing, dike valves, process sewers, and process equipment/piping. In addition, visual inspection of tank dikes should be made to ensure penetrations through dikes are properly sealed and that the dikes are sufficiently impervious and adequately maintained.

III. Evaluation should be made of Secondary containment for adequacy to contain all potential sources of contaminants (i.e., hydrocarbons or materials that could contaminate rain water) within the tank dike system. Potential sources of contaminants would include: sample connections, tank water draws, condensate from heating coils/steam tracing, tank cleaning, drips from pumps/mixers, leaking roof drains/oil on roof, tank overfills, tank failures, and leaking pipelines. Means of handling these contaminants as part of the dike area drainage should also be included in the Location procedures.

   Containment for tanks in areas without dikes must be reviewed for adequate containment in downstream separators, ponds, recovery basins, etc. considering the above potential releases.

IV. Evaluation should be made of Tertiary containment for adequacy to handle the type and quantity of materials drained from the tank yard. Physical piping arrangements for potential sources of contaminants inside the dike area will have to be reviewed to identify which effluent processing facility the source drains into.

   Some equipment from primary containment systems (i.e. water draws, roof drains, sample connections) at some locations are tied into an oil/water sewer system (process sewer) within the tank yard that drains to a separator or treatment facility separate from the dike drain system. Collection sumps or boxes

for these oil/water sewer systems are typically installed with only a small curb separating this system from the remainder of the dike area. Consequently, a major spill or high liquid level inside the dike area could result in the material flowing into the collection sumps and to effluent treating facilities. Therefore, Tertiary containment associated with these systems should be evaluated to ensure adequacy to contain a major spill. Isolation capability should be provided between secondary and tertiary containment systems in those cases where effluent treatment facilities are in-adequate.

OPERATING PRACTICES AND PROCEDURES

Following a thorough assessment of physical facilities, each Location/Organization will review their existing operating procedures and establish new or revised written procedures, consistent across the Location/Organization, for the management of drainage from tank farm areas. Each location/Organization should also review their drain system identification, training programs, and maintenance/inspection programs, and revise or establish as appropriate. The following minimum requirements shall be incorporated.

I. Written Operating Procedures:
(A Flow diagram for sources and containment devices should be provided.)

A. All tank dike drain valves are to remain in the CLOSED POSITION at all times, EXCEPT when it is necessary to drain water from the diked area.

B. All tank roof drain valves are to be CLOSED BEFORE the dike valves are opened and KEPT CLOSED during the entire time that the dike valves are in the open position draining water from the diked area.

The type of tank roof and the location of the tank will effect how the roof drain is operated during normal operation (i.e. when the dike valve is closed). Consideration should be given to climate conditions (rainfall, ice, snow), potential environmental impact, product temperature, etc. in determining how the roof drain system will be operated.

A separate operating procedure should be developed to address leaking roof drains. Until the drain can be repaired, handling of the material drained from a leaking roof drain should be specifically covered in this operating procedure.

C. Requirements that must be followed for draining any water from tank yards shall be established, including:

1) specific instructions for activities required prior to opening dike drain valves (i.e., visual inspection, quality testing of the water contained in the dike, closure of roof drain valves)

2) the level of surveillance required for the period that the dike valve is open, considering: a) the degree of vulnerability of the discharge point, i.e., no downstream recovery versus separators and holding basins; b) response time to emergencies; and c) remoteness of location of tanks;

3) specific instructions regarding documentation in the Foreman shift reports while the dike valves are open and controls to ensure valves are closed at the earliest possible time.

D. Specific communication and assurance systems shall be included the written procedures to indicate the status of all dike drains and roof drains.

1) An Operator Report (i.e., log book, etc.) should be established; exceptions to normal position of roof drain valves, dike drain valves and inter-dike valves should be noted in this Report by assigned operator.

2) A visual display (VALVE POSITION BOARD mounted in a Control Center or COMPUTER SYSTEM) shall be established that shows the current status or exceptions to normal position of roof and dike drain valves.

3) A dike and roof drain valve checklist should be developed for the assigned operator to visually inspect all valves periodically (at least quarterly) and record status of the valves.

E. Assignment of specific responsibility and accountability for knowing the status of tank roof and dike drain valves shall be covered in the written procedures. This should also include requirements in respect to routine surveillance/checks by operators and foremen to assure compliance.

II. In order to ensure valves are easily identified, a "field" identification system, such as, color coding or visible markings, for tank water draws, roof drains and dike drains shall be established. Additionally, consideration should be given to developing a system for identifying (i.e., flag, etc.) dike drain valves when they are open draining water from the diked area.

III. Properly trained personnel are an essential part of understanding and controlling surface water drainage from tank farm areas. Therefore, a training program, including initial training and annual refresher training, shall be implemented for all personnel associated with this operation. Training should be documented and auditable records maintained.

IV. In order to ensure operability of drainage facilities, inspection and maintenance should be routinely performed. This includes inspection and testing of roof drains when the tank is out of service, inspections of dikes for reliability, and inspections of dike drain valves to ensure tight shut off. In addition, procedures should be established for maintenance of equipment inside dike areas and for opening dikes for access to equipment for maintenance inside diked areas. Records of system testing, inspection, and maintenance should be maintained.

MANAGEMENT CONTROLS:

Location/Organization Management has the responsibility and accountability to ensure that written procedures are followed. The following management controls systems will be established at each Location/Organization to ensure compliance.

I. Assurance audits by Foreman.

II. Periodic Departmental audits to assure compliance with procedures.

III. Periodic Location/Organization (external to department) audits to assure compliance with Guidelines.

IV. Audit of facilities associated with tank farm drainage (excluding tank internals) every three years to ensure conformance to requirements.

V. Continuance

A. Periodic scheduled review of written Operating Procedures.

B. Management systems to ensure changes to physical facilities comply with Guidelines.

C. Update Spill Containment Procedures to reflect changes and incorporation into required SPCC plans if appropriate.

HEAD OFFICE AUDIT:

Independent assessment evaluating compliance with these requirements will be included as part of the Shell Environmental Compliance Assessment Review Program.

FACILITY REPORT FOR ADMINISTRATIVE REVIEW (AD)

****

* GENERAL FACILITY INFORMATION * PERMIT NUMBER: TX0004871
PAGE: 1

PERMIT NUMBER: TX0004871
FACILITY NAME: SHELL OIL CO-DEER PARK
(SEGMENT 2):
(SEGMENT 3): WILSON
(SEGMENT 4): RAMESH

CITY : 23350 DEER PARK
COUNTY: 201 HARRIS
STATE : TX REGION: 06 SUB-REGION:

MAJOR/MINOR : MAJOR
MAJORS RATING : 175
PREVIOUS RATING: NC CHG
ACTIVITY STATUS: ACTIVE
ACTIVITY DATE :
EPA HQ PRIORITY: 3
REGION PRIORITY:

TYPE OF OWNERSHIP: PRI PRIVATE
SIC CODE/DESCRIP : 2911 PETROLEUM REFINING
INDUSTRIAL CLASS : P PRIMARY ON ELG
CODE OF FED. REG. : 419A TOPPING
FED FACILITY ID :
CONSOLIDATED ID : TXD039053277
STATE PERMIT NO : 00403000

RIVER BASIN : 120300 WG/TRINITY-SAN JACIN
RIVER REACH : 1006
RECEIVING WATERS: HOUSTON SHIP CHANNEL
LATITUDE : LONGITUDE:
LON/LAT CODE OF ACCURACY:

AVERAGE DESIGN FLOW :
FEDERAL GRANT INDICATOR :
FINAL LIMIT INDICATOR :
WATER QUALITY LIMIT IND :
PRETREAT PGM REQUIRED :
ATTORNEY: ENGINEER:

CONTROL AUTHORITY ID :
RECEIVING POTW ID :
RDF1: RDF4: RDF7: MTATES
RDF2: RDF5: 506 RDF8: AD
RDF3: RDF6: RDF9: Y
RDF0 :

ARCHIVAL DESCRIPTOR: LAST ARCHIVAL DATE: 12/31/90 PERMIT DATE ISSUED: 09/29/89 PERMIT DATE EXPIRED: 11/06/94
NEW SOURCE CODE: ORIGINAL PERMIT ISSUE DATE: 07/02/73 REISSUED NUMBER:

****
* MAILING INFORMATION *
****

FACILITY LOCATION:
SHELL OIL COMPANY
DEER PARK MFG COMPLEX

HARRIS COUNTY
TEXAS

PRIMARY DMR MAILING ADDRESS:
SHELL OIL COMPANY
DEER PARK MFG COMPLEX
P O BOX 100
DEER PARK
TEXAS 77536

ALTERNATE DMR MAILING ADDRESS:

OWNER'S ADDRESS:

OPERATOR'S ADDRESS:

COGNIZANT OFFICIAL: J M SOWLE, MGR-ENV COMP
OFFICIAL'S PHONE: (713) 476-4371

PHONE:

PHONE:

FACILITY REPORT FOR ADMINISTRATIVE REVIEW (AD)

****

FACILITY: SHELL OIL CO-DEER PARK * INSPECTION DATA * PERMIT NUMBER: TX0004871
FACILITY TYPE: ********** PAGE: 2

INSPECTION DATE	INSPECTION TYPE CODE / DESCRIPTION	INSPECTOR CODE / DESCRIPTION	QA DMR	INSPECTION COMMENTS
10/06/77	C COMPLIANCE EVAL (NON-SAMPLING)	R EPA (REGIONAL)		
	FEVR:	RDI1: RDI2:		
	PRHR:	INHR: POHR:		
11/21/78	S COMPLIANCE SAMPLING	R EPA (REGIONAL)		
	FEVR:	RDI1: RDI2:		
	PRHR:	INHR: POHR:		
04/22/80	S COMPLIANCE SAMPLING	R EPA (REGIONAL)		
	FEVR:	RDI1: RDI2:		
	PRHR:	INHR: POHR:		
10/30/80	C COMPLIANCE EVAL (NON-SAMPLING)	R EPA (REGIONAL)		
	FEVR:	RDI1: RDI2:		
	PRHR:	INHR: POHR:		
09/24/81	C COMPLIANCE EVAL (NON-SAMPLING)	S STATE		
	FEVR:	RDI1: RDI2:		
	PRHR:	INHR: POHR:		
10/13/82	S COMPLIANCE SAMPLING	S STATE		
	FEVR:	RDI1: RDI2:		
	PRHR:	INHR: POHR:		
02/23/83	C COMPLIANCE EVAL (NON-SAMPLING)	R EPA (REGIONAL)		
	FEVR:	RDI1: RDI2:		
	PRHR:	INHR: POHR:		
06/20/84	C COMPLIANCE EVAL (NON-SAMPLING)	S STATE		
	FEVR:	RDI1: RDI2:		
	PRHR:	INHR: POHR:		
06/04/86	S COMPLIANCE SAMPLING	S STATE		
	FEVR:	RDI1: RDI2:		
	PRHR:	INHR: POHR:		
07/30/86	C COMPLIANCE EVAL (NON-SAMPLING)	R EPA (REGIONAL)		
	FEVR:	RDI1: RDI2:		
	PRHR:	INHR: POHR:		

FACILITY REPORT FOR ADMINISTRATIVE REVIEW (AD)

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FACILITY: SHELL OIL CO-DEER PARK * INSPECTION DATA * PERMIT NUMBER: TX0004871
FACILITY TYPE: 2 INDUSTRIAL ********** PAGE: 3
* CONTINUED *

INSPECTION DATE	INSPECTION TYPE CODE / DESCRIPTION	INSPECTOR CODE / DESCRIPTION	QA DMR	INSPECTION COMMENTS
07/31/86	B COMPLIANCE BIOMONITORING BIOM: D DISCRETE METHOD FEVR: PRHR:	R EPA (REGIONAL) RDI1: INHR:	RDI2: POHR:	
04/15/87	C COMPLIANCE EVAL (NON-SAMPLING) FEVR: PRHR:	R EPA (REGIONAL) RDI1: INHR:	RDI2: POHR:	
05/12/88	C COMPLIANCE EVAL (NON-SAMPLING) FEVR: PRHR:	R EPA (REGIONAL) RDI1: INHR:	RDI2: POHR:	
07/26/88	C COMPLIANCE EVAL (NON-SAMPLING) FEVR: PRHR:	S STATE RDI1: INHR:	RDI2: POHR:	
05/30/90	X TOXICS INSPECTION FEVR: PRHR:	R EPA (REGIONAL) RDI1: INHR:	RDI2: POHR:	
05/31/90	B COMPLIANCE BIOMONITORING BIOM: D DISCRETE METHOD FEVR: PRHR:	R EPA (REGIONAL) RDI1: INHR:	RDI2: POHR:	

FACILITY REPORT FOR ADMINISTRATIVE REVIEW (AD)

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FACILITY: SHELL OIL CO-DEER PARK * COMPLIANCE SCHEDULE INFORMATION * PERMIT NUMBER: TX0004871

****

PAGE: 4

SCHED NO.	DATA SOURCE	COMPLIANCE SCHEDULE EVENT CODE / DESCRIPTION	ACTUAL DATE	DATE SCHEDULED	DATE RECEIVED	COMPLIANCE SCHEDULE COMMENTS	RDC1	RDC2
01	0786	055-99 OPERATIONAL LEVEL ATTAINED	07/12/77	07/01/77	07/12/77			
		*VIOLATION: C2Q		VIO DATE: 07/01/77		VIO CMNT: COMPLIANCE TRACKING VIOLATION *		
		* RNC DETECTION CODE: S	SCH-COMPLIANCE SCHEDULE VIOL	* DETECTION DATE:		*		
		* RNC RESOLUTION CODE: 2	RE-BACK INTO COMPLIANCE	* RESOLUTION DATE: 07/12/77		*		
02	0786	055-99 OPERATIONAL LEVEL ATTAINED	02/04/79	02/04/79	02/04/79			

LIMITATION SUMMARY FOR ASSISTANTS/UNIT SUPERVISORS

*** FACILITY DATA *** PERMIT NUMBER: TX0004871
PAGE: 1

FACILITY NAME: SHELL OIL CO-DEER PARK
CITY : DEER PARK
COUNTY : HARRIS
REGION : 06 , SUB-REGION:

MAJOR/MINOR : MAJOR
ACTIVITY STATUS: ACTIVE
PERMIT ISSUED : 09/29/89
PERMIT EXPIRES : 11/06/94

SIC CODE : PETROLEUM REFINING
TYPE OWNERSHIP : PRIVATE
RIVER BASIN : WG/TRINITY-SAN JACIN
COGN. OFFICIAL : J M SOWLE, MGR-ENV COMP

*** OUTFALL DATA ***

OUT-FALL	OUTFALL DESCRIPTION	ACTIVITY STATUS	REPORTS START	REPORT FREQ	TOTAL RPTS	INITIAL LIMITS START	INITIAL LIMITS END	INTERIM LIMITS START	INTERIM LIMITS END	FINAL LIMITS START	FINAL LIMITS END
TX1A	TOXICITY REPORTING FOR 001	INACTIVE	12/01/89	001 MO	024					12/01/89	12/27/90

SEASONAL INDS: YYYYYYYYYYYY

TREATMENT TYPES:

PIPE COMMENTS:
(PASS = 0 FAIL = 1) REPORT PASS AS '0' REPORT FAIL AS '1' IN CONCENTRATION AVG ABOVE. A O 6-89-1785
EFF 12/01/89.

*** LIMITS DATA ***

OUT-FALL	LIMIT TYPE	PARAMETER / MONITORING LOCATION	SEASONAL IND./ MOD. NB/DATES	SAMPLE TYPE/FREQ	QUANTITY UNITS	QUANTITY AVERAGE	QUANTITY MAXIMUM	CONCENTRATION UNITS	CONCENTRATION MINIMUM	CONCENTRATION AVERAGE	CONCENTRATION MAXIMUM
TX1A	FINAL	TEM3E LF P/F STATRE 48HR A CU MYSIDOPIS BAHIA MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 12/01/89 - 12/27/90	COMP24 01/30 ONCE/ MONTH	NO UNITS NO UNITS	****** ****** DAILY AV	****** ****** DAILY MX	PASS/FAIL PASS/FAIL	DELMON ****** 	ACDMCN ****** DAILY AV	DELMON ****** DAILY MX
TX1A	FINAL	TEM6A LF P/F STATRE 48HR A CU CYPRINODON VARIEG MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 12/01/89 - 12/27/90	COMP24 01/30 ONCE/ MONTH	NO UNITS NO UNITS	****** ****** DAILY AV	****** ****** DAILY MX	PASS/FAIL PASS/FAIL	DELMON ****** 	ACDMCN ****** DAILY AV	DELMON ****** DAILY MX

LIMITATION SUMMARY FOR ASSISTANTS/UNIT SUPERVISORS

FACILITY NAME: SHELL OIL CO-DEER PARK *** OUTFALL DATA *** PERMIT NUMBER: TX0004871
PAGE: 2

OUT-FALL	OUTFALL DESCRIPTION	ACTIVITY STATUS	REPORTS START	REPORT FREQ	TOTAL RPTS	INITIAL START	LIMITS END	INTERIM START	LIMITS END	FINAL START	LIMITS END
TX7A	TOXICITY REPORTING FOR 007	INACTIVE	01/01/90	003 MO	009					01/01/90	12/27/90

SEASONAL INDS: YYYYYYYYYYYY

TREATMENT TYPES:

PIPE COMMENTS:
(PASS = 0 FAIL = 1) REPORT PASS AS '0' REPORT FAIL AS '1' IN CONCENTRATION AVG ABOVE. A C 6-89-1785
EFF 03/01/90.

*** LIMITS DATA ***

OUT-FALL	LIMIT TYPE	PARAMETER / MONITORING LOCATION	SEASONAL IND./ MOD. NB/DATES	SAMPLE TYPE/FREQ	QUANTITY UNITS	QUANTITY AVERAGE	QUANTITY MAXIMUM	CONCENTRATION UNITS	CONCENTRATION MINIMUM	CONCENTRATION AVERAGE	CONCENTRATION MAXIMUM
TX7A	FINAL	TEM3E LF P/F STATRE 48HR A CU MYSIDOPIS BAHIA MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 01/01/90 - 12/27/90	COMP24 01/90 QTRLY	NO UNITS NO UNITS	****** ****** DAILY AV	****** ****** DAILY MX	PASS/FAIL PASS/FAIL	DELMON ****** 	ADDMON ****** DAILY AV	DELMON ****** DAILY MX
TX7A	FINAL	TEM6A LF P/F STATRE 48HR A CU CYPRINODON VARIEG MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 01/01/90 - 12/27/90	COMP24 01/90 QTRLY	NO UNITS NO UNITS	****** ****** DAILY AV	****** ****** DAILY MX	PASS/FAIL PASS/FAIL	DELMON ****** 	ADDMON ****** DAILY AV	DELMON ****** DAILY MX

LIMITATION SUMMARY FOR ASSISTANTS/UNIT SUPERVISCRS

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FACILITY NAME: SHELL OIL CO-DEER PARK *** OUTFALL DATA *** PERMIT NUMBER: TX0004871
PAGE: 3

OUT-FALL	OUTFALL DESCRIPTION	ACTIVITY STATUS	REPORTS START	REPORT FREQ	TOTAL RPTS	INITIAL START	LIMITS END	INTERIM START	LIMITS END	FINAL START	LIMITS END
001A	REGENERATION WATER	ACTIVE	11/01/89	001 MO	060			11/01/89	10/31/90	11/01/90	11/06/94

SEASCNAL INDS: YYYYYYYYYYYY

TREATMENT TYPES:

4C REUSE/RECYCLE OF TREATED EFFLUENT
1U SEDIMENTATION (SETTLING)
1Y EQUALIZATION
2K NEUTRALIZATION
1U SEDIMENTATION (SETTLING)
4A DISCHARGE TO SURFACE WATER

PIPE COMMENTS:

*** LIMITS DATA ***

OUT-FALL	LIMIT TYPE	PARAMETER / MONITORING LOCATION	SEASCNAL IND./ MOD. NB/DATES	SAMPLE TYPE/FREQ	QUANTITY UNITS	QUANTITY AVERAGE	QUANTITY MAXIMUM	CONCENTRATION UNITS	CONCENTRATION MINIMUM	CONCENTRATION AVERAGE	CONCENTRATION MAXIMUM
001A	INTERIM	00011 TEMPERATURE, WATER DEG. FAHRENHEIT MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 99/99 11/01/89 - 10/31/90	RCORDR CONTIN UOUS	NO UNITS NO UNITS	****** ******	****** ******	DEG.F DEG.F	DELMON ******	DELMON ******	ADDMON ****** DLY MAX
001A	INTERIM	00340 OXYGEN DEMAND, CHEM. (HIGH LEVEL) (COD) MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 01/07 11/01/89 - 10/31/90	GRAB WEEKLY	NO UNITS KG/DAY	****** ****** DAILY AV	****** ****** DAILY MX	MG/L MG/L	****** ******	DELMON ****** DAILY AV	125 125.0 DAILY MX
001A	INTERIM	00400 PH MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 99/99 11/01/89 - 10/31/90	CONTIN UOUS	NO UNITS NO UNITS	****** ******	****** ******	SU SU	6.0 6.0 MINIMUM	****** ******	9.0 9.0 MAXIMUM
001A	INTERIM	00556 OIL AND GREASE FREON EXTR-GRAV METH MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 01/07 11/01/89 - 10/31/90	GRAB WEEKLY	NO UNITS KG/DAY	****** ****** DAILY AV	****** ****** DAILY MX	MG/L MG/L	****** ******	DELMON ****** DAILY AV	15 15.0 DAILY MX
001A	INTERIM	01042 COPPER, TOTAL (AS CU) MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 01/30 11/01/89 - 10/31/90	GRAB ONCE/ MONTH	NO UNITS KG/DAY	****** ****** DAILY AV	****** ****** DAILY MX	MG/L MG/L	****** ******	DELMON ****** DAILY AV	MON ONLY MON ONLY DAILY MX

LIMITATION SUMMARY FOR ASSISTANTS/UNIT SUPERVISORS

FACILITY NAME: SHELL OIL CO-DEER PARK *** LIMITS DATA *** PERMIT NUMBER: TX0004871
* CONTINUED * PAGE: 4

OUT-FALL	LIMIT TYPE	PARAMETER / MONITORING LOCATION	SEASONAL IND./ MOD. NB/DATES	SAMPLE TYPE/FREQ	QUANTITY UNITS	QUANTITY AVERAGE	QUANTITY MAXIMUM	CONCENTRATION UNITS	CONCENTRATION MINIMUM	CONCENTRATION AVERAGE	CONCENTRATION MAXIMUM
001A	INTERIM	01092 ZINC, TOTAL (AS ZN) MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 11/01/89 - 10/31/90	GRAB 01/30 ONCE/ MONTH	NO UNITS KG/DAY	****** ****** DAILY AV	****** ****** DAILY MX	MG/L MG/L	****** ******	MON ONLY MON ONLY DAILY AV	MON ONLY MON ONLY DAILY MX
001A	INTERIM	50050 FLOW, IN CONDUIT OR THRU TREATMENT PLANT MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 11/01/89 - 10/31/90	RCORDR 99/99 CONTIN UOUS	MGD MGD	ADDMON ****** DAILY AV	ADDMON ****** DAILY MX	NO UNITS MGD	****** ******	****** ****** DAILY AV	****** ****** DAILY MX
001A	FINAL	00011 TEMPERATURE, WATER DEG. FAHRENHEIT MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 11/01/90 - 11/06/94	RCORDR 99/99 CONTIN UOUS	NO UNITS NO UNITS	****** ******	****** ******	DEG.F DEG.F	DELMON ******	DELMON ******	ADDMON ****** DLY MAX
001A	FINAL	00340 OXYGEN DEMAND, CHEM. (HIGH LEVEL) (COD) MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 11/01/90 - 11/06/94	GRAB 01/07 WEEKLY	NO UNITS KG/DAY	****** ****** DAILY AV	****** ****** DAILY MX	MG/L MG/L	****** ******	DELMON ****** DAILY AV	125 125.0 DAILY MX
001A	FINAL	00400 PH MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 11/01/90 - 11/06/94	99/99 CONTIN UOUS	NO UNITS NO UNITS	****** ******	****** ******	SU SU	6.0 6.0 MINIMUM	****** ******	9.0 9.0 MAXIMUM
001A	FINAL	00556 OIL AND GREASE FREON EXTR-GRAV METH MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 11/01/90 - 11/06/94	GRAB 01/07 WEEKLY	NO UNITS KG/DAY	****** ****** DAILY AV	****** ****** DAILY MX	MG/L MG/L	****** ******	DELMON ****** DAILY AV	15 15.0 DAILY MX
001A	FINAL	01042 COPPER, TOTAL (AS CU) MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 11/01/90 - 11/06/94	GRAB 01/30 ONCE/ MONTH	NO UNITS KG/DAY	****** ****** DAILY AV	****** ****** DAILY MX	MG/L MG/L	****** ******	0.01 .01 DAILY AV	0.0145 .0145 DAILY MX
001A	FINAL	50050 FLOW, IN CONDUIT OR THRU TREATMENT PLANT MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 11/01/90 - 11/06/94	RCORDR 99/99 CONTIN UOUS	MGD MGD	ADDMON ****** DAILY AV	ADDMON ****** DAILY MX	NO UNITS MGD	****** ******	****** ****** DAILY AV	****** ****** DAILY MX

LIMITATION SUMMARY FOR ASSISTANTS/UNIT SUPERVISCRS

FACILITY NAME: SHELL OIL CO-DEER PARK *** OUTFALL DATA *** PERMIT NUMBER: TX0004871
PAGE: 5

OUT-FALL	OUTFALL DESCRIPTION	ACTIVITY STATUS	REPORTS START	REPORT FREQ	TOTAL RPTS	INITIAL START	LIMITS END	INTERIM START	LIMITS END	FINAL START	LIMITS END
002A	STORMWATER RUNOFF	ACTIVE	11/01/89	001 MO	060					11/01/89	11/06/94

SEASCNAL INDS: YYYYYYYYYYYY

TREATMENT TYPES:

4C REUSE/RECYCLE OF TREATED EFFLUENT 4A DISCHARGE TC SURFACE WATER

PIPE COMMENTS:

*** LIMITS DATA ***

OUT-FALL	LIMIT TYPE	PARAMETER / MONITORING LOCATION	SEASONAL IND./ MOD. NB/DATES	SAMPLE TYPE/FREQ	QUANTITY UNITS	QUANTITY AVERAGE	QUANTITY MAXIMUM	CONCENTRATION UNITS	CONCENTRATION MINIMUM	CONCENTRATION AVERAGE	CONCENTRATION MAXIMUM
002A	FINAL	00400	0 YYYYYYYYYYYY	GRAB	NO UNITS	******	******	SU	6.0	******	9.0
		PH	0 (MOD NUMBER)	01/01	NO UNITS	******	******	SU	6.0	******	9.0
			11/01/89	DAILY					MINIMUM		MAXIMUM
		MON LOC CODE: 1	11/06/94								
		EFFLUENT GROSS VALUE									
002A	FINAL	00556	0 YYYYYYYYYYYY	GRAB	NO UNITS	******	******	MG/L	******	DELMCN	15
		OIL AND GREASE	0 (MOD NUMBER)	01/01	KG/DAY	******	******	MG/L	******	******	15.0
		FREON EXTR GRAV METH	11/01/89	DAILY		DAILY AV	DAILY MX			DAILY AV	DAILY MX
		MON LOC CODE: 1	11/06/94								
		EFFLUENT GROSS VALUE									
002A	FINAL	00680	0 YYYYYYYYYYYY	GRAB	NO UNITS	******	******	MG/L	******	DELMCN	70
		CARBON, TOT ORGANIC	0 (MOD NUMBER)	01/01	KG/DAY	******	******	MG/L	******	******	70.0
		(TOC)	11/01/89	DAILY		DAILY AV	DAILY MX			DAILY AV	DAILY MX
		MON LOC CODE: 1	11/06/94								
		EFFLUENT GROSS VALUE									

LIMITATION SUMMARY FOR ASSISTANTS/UNIT SUPERVISORS

****

FACILITY NAME: SHELL OIL CO-DEER PARK *** OUTFALL DATA *** PERMIT NUMBER: TX0004871
PAGE: 6

OUT-FALL	OUTFALL DESCRIPTION	ACTIVITY STATUS	REPORTS START	REPORT FREQ	TOTAL RPTS	INITIAL START	LIMITS END	INTERIM START	LIMITS END	FINAL START	LIMITS END
003A	STORMWATER RUNOFF	ACTIVE	11/01/89	001 MO	060					11/01/89	11/06/94

SEASONAL INDS: YYYYYYYYYYYY

TREATMENT TYPES:

4C REUSE/RECYCLE OF TREATED EFFLUENT 4A DISCHARGE TO SURFACE WATER

PIPE COMMENTS:

*** LIMITS DATA ***

OUT-FALL	LIMIT TYPE	PARAMETER / MONITORING LOCATION	SEASONAL IND./ MOD. NB/DATES	SAMPLE TYPE/FREQ	QUANTITY UNITS	QUANTITY AVERAGE	QUANTITY MAXIMUM	CONCENTRATION UNITS	CONCENTRATION MINIMUM	CONCENTRATION AVERAGE	CONCENTRATION MAXIMUM
003A	FINAL	00400	0 YYYYYYYYYYYY	GRAB	NO UNITS	******	******	SU	6.0	******	9.0
		PH	0 (MOD NUMBER)	01/01	NO UNITS	******	******	SU	6.0	******	9.0
			11/01/89	DAILY					MINIMUM		MAXIMUM
		MON LOC CODE: 1	11/06/94								
		EFFLUENT GROSS VALUE									
003A	FINAL	00556	0 YYYYYYYYYYYY	GRAB	NO UNITS	******	******	MG/L	******	DELMON	15
		OIL AND GREASE	0 (MOD NUMBER)	01/01	KG/DAY	******	******	MG/L	******	******	15.0
		FREON EXTR-GRAV-METH	11/01/89	DAILY		DAILY AV	DAILY MX			DAILY AV	DAILY MX
		MON LOC CODE: 1	11/06/94								
		EFFLUENT GROSS VALUE									
003A	FINAL	00680	0 YYYYYYYYYYYY	GRAB	NO UNITS	******	******	MG/L	******	DELMON	70
		CARBON, TOT ORGANIC	0 (MOD NUMBER)	01/01	KG/DAY	******	******	MG/L	******	******	70.0
		(TOC)	11/01/89	DAILY		DAILY AV	DAILY MX			DAILY AV	DAILY MX
		MON LOC CODE: 1	11/06/94								
		EFFLUENT GROSS VALUE									

LIMITATION SUMMARY FOR ASSISTANTS/UNIT SUPERVISORS

FACILITY NAME: SHELL OIL CO-DEER PARK *** OUTFALL DATA *** PERMIT NUMBER: TX0004871
PAGE: 7

OUT-FALL	OUTFALL DESCRIPTION	ACTIVITY STATUS	REPORTS START	REPORT FREQ	TOTAL RPTS	INITIAL LIMITS START	INITIAL LIMITS END	INTERIM LIMITS START	INTERIM LIMITS END	FINAL LIMITS START	FINAL LIMITS END
004A	STORMWATER RUNOFF	ACTIVE	11/01/89	001 MO	060					11/01/89	11/06/94

SEASONAL INDS: YYYYYYYYYYYY

TREATMENT TYPES:

4C REUSE/RECYCLE OF TREATED EFFLUENT 4A DISCHARGE TO SURFACE WATER

PIPE COMMENTS:

*** LIMITS DATA ***

OUT-FALL	LIMIT TYPE	PARAMETER / MONITORING LOCATION	SEASONAL IND./ MOD. NB/DATES	SAMPLE TYPE/FREQ	QUANTITY UNITS	QUANTITY AVERAGE	QUANTITY MAXIMUM	CONCENTRATION UNITS	CONCENTRATION MINIMUM	CONCENTRATION AVERAGE	CONCENTRATION MAXIMUM
004A	FINAL	00400	0 YYYYYYYYYYYY	GRAB	NO UNITS	******	******	SU	6.0	******	9.0
		PH	0 (MOD NUMBER)	01/01	NO UNITS	******	******	SU	6.0	******	9.0
			11/01/89 -	DAILY					MINIMUM		MAXIMUM
		MON LOC CODE: 1	11/06/94								
		EFFLUENT GROSS VALUE									
004A	FINAL	00556	0 YYYYYYYYYYYY	GRAB	NO UNITS	******	******	MG/L	******	DELMCN	15
		OIL AND GREASE	0 (MOD NUMBER)	01/01	KG/DAY	******	******	MG/L	******	******	15.0
		FREON EXTR.-GRAV METH	11/01/89 -	DAILY		DAILY AV	DAILY MX			DAILY AV	DAILY MX
		MON LOC CODE: 1	11/06/94								
		EFFLUENT GROSS VALUE									
004A	FINAL	00680	0 YYYYYYYYYYYY	GRAB	NO UNITS	******	******	MG/L	******	DELMCN	70
		CARBON, TOT ORGANIC	0 (MOD NUMBER)	01/01	KG/DAY	******	******	MG/L	******	******	70.0
		(TOC)	11/01/89 -	DAILY		DAILY AV	DAILY MX			DAILY AV	DAILY MX
		MON LOC CODE: 1	11/06/94								
		EFFLUENT GROSS VALUE									

LIMITATION SUMMARY FOR ASSISTANTS/UNIT SUPERVISORS

FACILITY NAME: SHELL OIL CO-DEER PARK *** OUTFALL DATA *** PERMIT NUMBER: TX0004871
PAGE: 8

OUT-FALL	OUTFALL DESCRIPTION	ACTIVITY STATUS	REPORTS START	REPORT FREQ	TOTAL RPTS	INITIAL START	LIMITS END	INTERIM START	LIMITS END	FINAL START	LIMITS END
006A	STORMWATER RUNOFF	ACTIVE	11/01/89	001 MO	060					11/01/89	11/06/94

SEASONAL INDS: YYYYYYYYYYYY

TREATMENT TYPES:

4C REUSE/RECYCLE OF TREATED EFFLUENT 4A DISCHARGE TO SURFACE WATER

PIPE COMMENTS:

*** LIMITS DATA ***

OUT-FALL	LIMIT TYPE	PARAMETER / MONITORING LOCATION	SEASONAL IND./ MOD. NB/DATES	SAMPLE TYPE/FREQ	QUANTITY UNITS	QUANTITY AVERAGE	QUANTITY MAXIMUM	CONCENTRATION UNITS	CONCENTRATION MINIMUM	CONCENTRATION AVERAGE	CONCENTRATION MAXIMUM
006A	FINAL	00400	0 YYYYYYYYYYYY	GRAB	NO UNITS	******	******	SU	6.0	******	9.0
		PH	0 (MOD NUMBER)	Q1/Q1	NO UNITS	******	******	SU	6.0	******	9.0
			11/01/89	DAILY					MINIMUM		MAXIMUM
		MON LOC CODE: 1	11/06/94								
		EFFLUENT GROSS VALUE									
006A	FINAL	00556	0 YYYYYYYYYYYY	GRAB	NO UNITS	******	******	MG/L	******	DELMON	15
		OIL AND GREASE	0 (MOD NUMBER)	Q1/Q1	KG/DAY	******	******	MG/L	******	******	15.0
		FREON EXTR-GRAV METH	11/01/89	DAILY		DAILY AV	DAILY MX			DAILY AV	DAILY MX
		MON LOC CODE: 1	11/06/94								
		EFFLUENT GROSS VALUE									
006A	FINAL	00680	0 YYYYYYYYYYYY	GRAB	NO UNITS	******	******	MG/L	******	DELMON	70
		CARBON, TOT ORGANIC	0 (MOD NUMBER)	Q1/Q1	KG/DAY	******	******	MG/L	******	******	70.0
		(TOC)	11/01/89	DAILY		DAILY AV	DAILY MX			DAILY AV	DAILY MX
		MON LOC CODE: 1	11/06/94								
		EFFLUENT GROSS VALUE									

LIMITATION SUMMARY FOR ASSISTANTS/UNIT SUPERVISORS

FACILITY NAME: SHELL OIL CO-DEER PARK *** OUTFALL DATA *** PERMIT NUMBER: TX0004871
PAGE: 9

OUT-FALL	OUTFALL DESCRIPTION	ACTIVITY STATUS	REPORTS START	REPORT FREQ	TOTAL RPTS	INITIAL LIMITS START	INITIAL LIMITS END	INTERIM LIMITS START	INTERIM LIMITS END	FINAL LIMITS START	FINAL LIMITS END
007A	TREATED PROCESS WASTEWATER	ACTIVE	11/01/89	001 MO	060					11/01/89	11/06/94

SEASONAL INDS: YYYYYYYYYYYY

TREATMENT TYPES:

4E REUSE OR SALE OF WASTE WATER
4C REUSE/RECYCLE OF TREATED EFFLUENT
2K NEUTRALIZATION
3H TRICKLING FILTRATION
3A ACTIVATED SLUDGE
4A DISCHARGE TO SURFACE WATER

PIPE COMMENTS:

*** LIMITS DATA ***

OUT-FALL	LIMIT TYPE	PARAMETER / MONITORING LOCATION	SEASONAL IND./ MOD. NB/DATES	SAMPLE TYPE/FREQ	QUANTITY UNITS	QUANTITY AVERAGE	QUANTITY MAXIMUM	CONCENTRATION UNITS	CONCENTRATION MINIMUM	CONCENTRATION AVERAGE	CONCENTRATION MAXIMUM
007A	FINAL	00011 TEMPERATURE, WATER DEG. FAHRENHEIT MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 11/01/89 11/06/94	RCORDR 99/99 CONTIN UOUS	NO UNITS NO UNITS	****** ******	****** ******	DEG.F DEG.F	DELMON ******	DELMON ******	105 105.0 DLY MAX
007A	FINAL	00310 BOD, 5-DAY (20 DEG. C) MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 11/01/89 11/06/94	COMP24 03/07 THREE/ WEEK	LBS/DAY KG/DAY	1410 639.576 DAILY AV	2820 1279.152 DAILY MX	NO UNITS MG/L	****** ******	****** ******	****** ****** DAILY AV DAILY MX
007A	FINAL	00400 PH MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 11/01/89 11/06/94	99/99 CONTIN UOUS	NO UNITS NO UNITS	****** ******	****** ******	SU SU	6.0 6.0 MINIMUM	****** ******	9.0 9.0 MAXIMUM
007A	FINAL	00530 SOLIDS, TOTAL SUSPENDED MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 11/01/89 11/06/94	COMP24 03/07 THREE/ WEEK	LBS/DAY KG/DAY	1980 898.128 DAILY AV	2970 1347.192 DAILY MX	NO UNITS MG/L	****** ******	****** ******	****** ****** DAILY AV DAILY MX
007A	FINAL	00556 OIL AND GREASE FREON EXTR-GRAV METH MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 11/01/89 11/06/94	GRAB 03/07 THREE/ WEEK	LBS/DAY KG/DAY	660 299.376 DAILY AV	990 449.064 DAILY MX	NO UNITS MG/L	****** ******	****** ******	****** ****** DAILY AV DAILY MX

LIMITATION SUMMARY FOR ASSISTANTS/UNIT SUPERVISORS

FACILITY NAME: SHELL OIL CO-DEER PARK *** LIMITS DATA *** * CONTINUED * PERMIT NUMBER: TX0004871 PAGE: 10

OUT-FALL	LIMIT TYPE	PARAMETER / MONITORING LOCATION	SEASONAL IND./ MOD. NB/DATES	SAMPLE TYPE/FREQ	QUANTITY UNITS	QUANTITY AVERAGE	QUANTITY MAXIMUM	CONCENTRATION UNITS	CONCENTRATION MINIMUM	CONCENTRATION AVERAGE	CONCENTRATION MAXIMUM
007A	FINAL	00610 NITROGEN, AMMONIA TOTAL (AS N) MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 11/01/89 11/06/94	COMP24 03/07 THREE/ WEEK	LBS/DAY KG/DAY	500 226.8 DAILY AV	1580 716.688 DAILY MX	NO UNITS MG/L	****** ******	****** ****** DAILY AV	****** ****** DAILY MX
007A	FINAL	00680 CARBON, TOT ORGANIC (TOC) MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 11/01/89 11/06/94	COMP24 03/07 THREE/ WEEK	LBS/DAY KG/DAY	3000 1360.8 DAILY AV	6000 2721.6 DAILY MX	NO UNITS MG/L	****** ******	****** ****** DAILY AV	****** ****** DAILY MX
007A	FINAL	00745 SULFIDE, TOTAL (AS S) MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 11/01/89 11/06/94	GRAB 03/07 THREE/ WEEK	LBS/DAY KG/DAY	10 4.536 DAILY AV	20 9.072 DAILY MX	NO UNITS MG/L	****** ******	****** ****** DAILY AV	****** ****** DAILY MX
007A	FINAL	01032 CHROMIUM, HEXAVALENT (AS CR) MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 11/01/89 11/06/94	COMP24 03/07 THREE/ WEEK	LBS/DAY KG/DAY	2.4 1.08864 DAILY AV	5.4 2.44944 DAILY MX	NO UNITS MG/L	****** ******	****** ****** DAILY AV	****** ****** DAILY MX
007A	FINAL	01034 CHROMIUM, TOTAL (AS CR) MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 11/01/89 11/06/94	COMP24 03/07 THREE/ WEEK	LBS/DAY KG/DAY	25 11.34 DAILY AV	50 22.68 DAILY MX	NO UNITS MG/L	****** ******	****** ****** DAILY AV	****** ****** DAILY MX
007A	FINAL	01042 COPPER, TOTAL (AS CU) MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 11/01/89 11/06/94	COMP24 01/30 ONCE/ MONTH	LBS/DAY KG/DAY	0.55 .24948 DAILY AV	0.8 .36288 DAILY MX	NO UNITS MG/L	****** ******	****** ****** DAILY AV	****** ****** DAILY MX
007A	FINAL	32730 PHENOLICS, TOTAL RECOVERABLE MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 11/01/89 11/06/94	GRAB 03/07 THREE/ WEEK	LBS/DAY KG/DAY	12 5.4432 DAILY AV	20 9.072 DAILY MX	NO UNITS MG/L	****** ******	****** ****** DAILY AV	****** ****** DAILY MX
007A	FINAL	50050 FLOW, IN CONDUIT OR THRU TREATMENT PLANT MON LOC CODE: 1 EFFLUENT GROSS VALUE	0 YYYYYYYYYYYY 0 (MOD NUMBER) 11/01/89 11/06/94	RCORDR 99/99 CONTIN UOUS	MGD MGD	ADDMON ****** DAILY AV	ADDMON ****** DAILY MX	NO UNITS MGD	****** ******	****** ****** DAILY AV	****** ****** DAILY MX

LIMITATION SUMMARY FOR ASSISTANTS/UNIT SUPERVISORS

FACILITY NAME: SHELL OIL CO-DEER PARK *** OUTFALL DATA *** PERMIT NUMBER: TX0004871
PAGE: 11

OUT-FALL	OUTFALL DESCRIPTION	ACTIVITY STATUS	REPORTS START	REPORT FREQ	TOTAL RPTS	INITIAL LIMITS START	INITIAL LIMITS END	INTERIM LIMITS START	INTERIM LIMITS END	FINAL LIMITS START	FINAL LIMITS END
008A	STORMWATER RUNOFF	ACTIVE	11/01/89	001 MO	060					11/01/89	11/06/94

SEASONAL INDS: YYYYYYYYYYYY

TREATMENT TYPES:

4C REUSE/RECYCLE OF TREATED EFFLUENT 4A DISCHARGE TO SURFACE WATER

PIPE COMMENTS:

*** LIMITS DATA ***

OUT-FALL	LIMIT TYPE	PARAMETER / MONITORING LOCATION	SEASONAL IND./ MOD. NB/DATES	SAMPLE TYPE/FREQ	QUANTITY UNITS	QUANTITY AVERAGE	QUANTITY MAXIMUM	CONCENTRATION UNITS	CONCENTRATION MINIMUM	CONCENTRATION AVERAGE	CONCENTRATION MAXIMUM
008A	FINAL	00400	0 YYYYYYYYYYYY	GRAB	NO UNITS	******	******	SU	6.0	******	9.0
		PH	0 (MOD NUMBER) 11/01/89	01/01 DAILY	NO UNITS	******	******	SU	6.0	******	9.0
									MINIMUM		MAXIMUM
		PH	0 (MOD NUMBER) 11/01/89	01/01 DAILY	NO UNITS	******	******	SU	6.0	******	9.0
									MINIMUM		MAXIMUM
		MON LOC CODE: 1	11/06/94								
		EFFLUENT GROSS VALUE									
008A	FINAL	00556	0 YYYYYYYYYYYY	GRAB	NO UNITS	******	******	MG/L	******	DELMON	15
		OIL AND GREASE	0 (MOD NUMBER) 11/01/89	01/01 DAILY	KG/DAY	******	******	MG/L	******	******	15.0
		FREON EXTR GRAV METH				DAILY AV	DAILY MX			DAILY AV	DAILY MX
		MON LOC CODE: 1	11/06/94								
		EFFLUENT GROSS VALUE									
008A	FINAL	00680	0 YYYYYYYYYYYY	GRAB	NO UNITS	******	******	MG/L	******	DELMON	70
		CARBON, TOT ORGANIC (TOC)	0 (MOD NUMBER) 11/01/89	01/01 DAILY	KG/DAY	******	******	MG/L	******	******	70.0
						DAILY AV	DAILY MX			DAILY AV	DAILY MX
		MON LOC CODE: 1	11/06/94								
		EFFLUENT GROSS VALUE									

LIMITATION SUMMARY FCR ASSISTANTS/UNIT SUPERVISCRS

FACILITY NAME: SHELL OIL CO-DEER PARK *** OUTFALL DATA *** PERMIT NUMBER: TX0004871
PAGE: 12

OUT-FALL	OUTFALL DESCRIPTION	ACTIVITY STATUS	REPORTS START	REPCRT FREQ	TOTAL RPTS	INITIAL START	LIMITS END	INTERIM START	LIMITS END	FINAL START	LIMITS END
009A	STORMWATER RUNOFF	ACTIVE	11/01/89	001 MO	060					11/01/89	11/06/94

SEASCNAL INDS: YYYYYYYYYYYY

TREATMENT TYPES:

4C REUSE/RECYCLE OF TREATED EFFLUENT 4A DISCHARGE TC SURFACE WATER

PIPE COMMENTS:

*** LIMITS DATA ***

OUT-FALL	LIMIT TYPE	PARAMETER / MONITORING LOCATION	SEASCNAL IND./ MOD. NB/DATES	SAMPLE TYPE/FREQ	QUANTITY UNITS	QUANTITY AVERAGE	QUANTITY MAXIMUM	CONCENTRATION UNITS	CONCENTRATION MINIMUM	CONCENTRATION AVERAGE	CONCENTRATION MAXIMUM
009A	FINAL	00400	0 YYYYYYYYYYYY	GRAB	NO UNITS	******	******	SU	6.0	******	9.0
		PH	0 (MOD NUMBER)	01/01	NO UNITS	******	******	SU	6.0	******	9.0
			11/01/89	DAILY					MINIMUM		MAXIMUM
		MON LOC CODE: 1	11/06/94								
		EFFLUENT GROSS VALUE									
009A	FINAL	00556	0 YYYYYYYYYYYY	GRAB	NO UNITS	******	******	MG/L	******	DELMON	15
		OIL AND GREASE	0 (MOD NUMBER)	01/01	KG/DAY	******	******	MG/L	******	******	15.0
		FREON EXTR GRAV METH	11/01/89	DAILY		DAILY AV	DAILY MX			DAILY AV	DAILY MX
		MON LOC CODE: 1	11/06/94								
		EFFLUENT GROSS VALUE									
009A	FINAL	00680	0 YYYYYYYYYYYY	GRAB	NO UNITS	******	******	MG/L	******	DELMON	70
		CARBON, TOT ORGANIC	0 (MOD NUMBER)	01/01	KG/DAY	******	******	MG/L	******	******	70.0
		(TOC)	11/01/89	DAILY		DAILY AV	DAILY MX			DAILY AV	DAILY MX
		MON LOC CODE: 1	11/06/94								
		EFFLUENT GROSS VALUE									

DMR DATA FOR ADMINISTRATIVE REVIEW (AD)

QL ********** QL

NPID FNMS RDF7 RDF8 MACI

MVDT

VDSG	VLIM	VPRM	VMLO	VSEA	VMOD	MQAV	MQMX	MCMN	MCAV	MCMX	MVIC	NODI	SNCE	SRCE
TX0004871 SHELL OIL CO-DEER PARK							MTATES AD		M					
01/31/89														
001N	5	00011	1	0	0					76	E00			
001N	5	00340	1	0	0					78	E00			
001N	5	00556	1	0	0					1.9	E00			
001N	5	50050	1	0	0	0.782	3.600				E00			
002N	5	00556	1	0	0					10.8	E00			
002N	5	00680	1	0	0					7	E00			
003N	5	00400	1	0	0			7.0		7.9	E00			
003N	5	00680	1	0	0					9	E00			
004N	5	00400	1	0	0			6.5		8.3	E00			
004N	5	00556	1	0	0					12.9	E00			
004N	5	00680	1	0	0					23	E00			
006N	5	00400	1	0	0			6.7		8.1	E00			
006N	5	00680	1	0	0					15	E00			
007N	5	00011	1	0	0					84	E00			
007N	5	00310	1	0	0	173	274				E00			
007N	5	00400	1	0	0			6.7		7.6	E00			
007N	5	00530	1	0	0	256	455				E00			
007N	5	00556	1	0	0	< 136	309				E00			
007N	5	00610	1	0	0	< 6.8	53.2				E00			
007N	5	00680	1	0	0	471	1137				E00			
007N	5	00745	1	0	0	2.37	4.2				E00			
007N	5	01032	1	0	0	< 0.16	< 0.23				E00			
007N	5	01034	1	0	0	< 1.6	< 2.3				E00			
007N	5	32730	1	0	0	< 0.3	0.5				E00			
007N	5	50050	1	0	0	3.885	5.452				E00			
008N	5	00400	1	0	0			7.0		8.6	E00			
008N	5	00680	1	0	0					35	E00			
009N	5	00400	1	0	0			6.3		8.1	E00			
009N	5	00680	1	0	0					8	E00			
001N	5	00400	1	0	0			5.5		9.4	E90			
002N	5	00400	1	0	0			11.0		11.0	E90			
003N	5	00556	1	0	0					21.5	E90			
006N	5	00556	1	0	0					22.2	E90			
008N	5	00556	1	0	0					78.8	E90			
009N	5	00556	1	0	0					21.5	E90			
02/28/89														
001N	5	00011	1	0	0					77	E00			
001N	5	00340	1	0	0					70	E00			
001N	5	00400	1	0	0			6.3		8.8	E00			
001N	5	00556	1	0	0					3.5	E00			
001N	5	50050	1	0	0	0.706	1.041				E00			

DMR DATA FOR ADMINISTRATIVE REVIEW (AD)

QL ********** QL

NPID	FNMS						RDF7	RDF8	MADI					
	MVDT													
VDSG	VLIM	VPRM	VMLO	VSEA	VMOD	MQAV	MQMX	MCMN	MCAV	MCMX	MVIO	NODI	SNCE	SRCE
002N	5										E00	8		
003N	5	00400	1	0	0				7.1	7.4	E00			
003N	5	00556	1	0	0					10.1	E00			
003N	5	00680	1	0	0					54	E00			
004N	5	00400	1	0	0				6.6	7.5	E00			
004N	5	00680	1	0	0					29	E00			
006N	5	00400	1	0	0				7.1	7.1	E00			
006N	5	00556	1	0	0					1.3	E00			
006N	5	00680	1	0	0					5	E00			
007N	5	00011	1	0	0					83	E00			
007N	5	00310	1	0	0		132	425			E00			
007N	5	00400	1	0	0				6.8	8.3	E00			
007N	5	00530	1	0	0		147	462			E00			
007N	5	00556	1	0	0	<	104	204			E00			
007N	5	00610	1	0	0	<	2.3	3.5			E00			
007N	5	00680	1	0	0		406	587			E00			
007N	5	00745	1	0	0	<	2.69	3.7			E00			
007N	5	01032	1	0	0	<	0.24	0.60			E00			
007N	5	01034	1	0	0	<	1.9 <	2.1			E00			
007N	5	32730	1	0	0	<	0.5	2.1			E00			
007N	5	50050	1	0	0		4.552	6.034			E00			
008N	5	00400	1	0	0				7.4	8.6	E00			
009N	5	00400	1	0	0				7.3	7.8	E00			
009N	5	00556	1	0	0					2.8	E00			
009N	5	00680	1	0	0					6	E00			
004N	5	00556	1	0	0					16.4	E90			
008N	5	00556	1	0	0					111.0	E90			
008N	5	00680	1	0	0					81	E90			
	03/31/89													
001N	5	00011	1	0	0					81	E00			
001N	5	00340	1	0	0					58	E00			
001N	5	00400	1	0	0				6.9	8.8	E00			
001N	5	00556	1	0	0					3.4	E00			
001N	5	50050	1	0	0		0.676	1.104			E00			
002N	5										E00	8		
003N	5	00556	1	0	0					< 1.0	E00			
003N	5	00680	1	0	0					16	E00			
004N	5	00400	1	0	0				7.2	8.0	E00			
004N	5	00556	1	0	0					7.0	E00			
004N	5	00680	1	0	0					19	E00			
006N	5	00556	1	0	0					7.3	E00			
006N	5	00680	1	0	0					8	E00			
007N	5	00011	1	0	0					89	E00			

DMR DATA FOR ADMINISTRATIVE REVIEW (AD)

QL ********** QL

NPID	FNMS	RDF7	RDF8	MADI
	MVDT			

VDSG	VLIM	VPRM	VMLO	VSEA	VMOD	MQAV	MQMX	MCMN	MCAV	MCMX	MVIO	NODI	SNCE	SRCE
007N	5	00310	1	0	0	134	268				E00			
007N	5	00400	1	0	0				6.0	7.6	E00			
007N	5	00530	1	0	0	262	857				E00			
007N	5	00556	1	0	0	< 97	230				E00			
007N	5	00610	1	0	0	< 56.3	330.9				E00			
007N	5	00680	1	0	0	606	1529				E00			
007N	5	00745	1	0	0	< 2.24	3.5				E00			
007N	5	01032	1	0	0	< 0.18	< 0.20				E00			
007N	5	01034	1	0	0	< 2.0	2.8				E00			
007N	5	32730	1	0	0	< 0.4	0.8				E00			
007N	5	50050	1	0	0	4.299	4.925				E00			
008N	5	00400	1	0	0				7.5	8.2	E00			
008N	5	00556	1	0	0					1.2	E00			
008N	5	00680	1	0	0					20	E00			
009N	5	00400	1	0	0				8.1	8.1	E00			
009N	5	00556	1	0	0					5.5	E00			
009N	5	00680	1	0	0					13	E00			
003N	5	00400	1	0	0				10.4	11.0	E90			
006N	5	00400	1	0	0				7.5	9.1	E90			
	04/30/89													
001N	5	00011	1	0	0					95	E00			
001N	5	00340	1	0	0					67	E00			
001N	5	00400	1	0	0				6.7	8.9	E00			
001N	5	00556	1	0	0					2.8	E00			
001N	5	50050	1	0	0	0.567	0.865				E00			
002N	5										E00	8		
003N	5	00400	1	0	0				8.9	8.9	E00			
003N	5	00556	1	0	0					< 1.0	E00			
003N	5	00680	1	0	0					25	E00			
004N	5	00400	1	0	0				8.4	8.5	E00			
004N	5	00556	1	0	0					10.2	E00			
004N	5	00680	1	0	0					14	E00			
006N	5	00400	1	0	0				8.5	8.6	E00			
006N	5	00556	1	0	0					9.7	E00			
006N	5	00680	1	0	0					16	E00			
007N	5	00011	1	0	0					91	E00			
007N	5	00310	1	0	0	52	106				E00			
007N	5	00400	1	0	0				7.2	8.1	E00			
007N	5	00530	1	0	0	199	429				E00			
007N	5	00556	1	0	0	< 47	112				E00			
007N	5	00610	1	0	0	< 9.3	105.2				E00			
007N	5	00680	1	0	0	568	725				E00			
007N	5	00745	1	0	0	< 1.63	2.0				E00			

QL ** QL

NPID FNMS RDF7 RDF8 MADI

MVDT

VDSG	VLIM	VPRM	VMLO	VSEA	VMOD	MQAV	MQMX	MCMN	MCAV	MCMX	MVIO	NODI	SNCE	SRCE
007N	5	01032	1	0	0	< 0.16	0.33				E00			
007N	5	01034	1	0	0	< 1.5	< 1.8				E00			
007N	5	32730	1	0	0	< 0.4	0.7				E00			
007N	5	50050	1	0	0	3.781	5.010				E00			
008N	5	00400	1	0	0			7.7		8.6	E00			
008N	5	00556	1	0	0					2.4	E00			
008N	5	00680	1	0	0					17	E00			
009N	5	00400	1	0	0			7.5		8.6	E00			
009N	5	00556	1	0	0					4.4	E00			
009N	5	00680	1	0	0					16	E00			
05/31/89														
001N	5	00011	1	0	0					94	E00			
001N	5	00340	1	0	0					75	E00			
001N	5	00400	1	0	0			7.0		8.9	E00			
001N	5	00556	1	0	0					1.9	E00			
001N	5	50050	1	0	0	0.481	1.237				E00			
002N	5	00400	1	0	0			7.4		7.4	E00			
002N	5	00556	1	0	0					< 1.0	E00			
002N	5	00680	1	0	0					10	E00			
003N	5	00400	1	0	0			7.8		7.9	E00			
003N	5	00556	1	0	0					4.9	E00			
003N	5	00680	1	0	0					13	E00			
004N	5	00400	1	0	0			6.9		8.3	E00			
004N	5	00556	1	0	0					9.8	E00			
004N	5	00680	1	0	0					26	E00			
006N	5	00400	1	0	0			7.4		8.0	E00			
006N	5	00556	1	0	0					2.8	E00			
006N	5	00680	1	0	0					10	E00			
007N	5	00011	1	0	0					9.7	E00			
007N	5	00310	1	0	0	122	324				E00			
007N	5	00400	1	0	0			6.7		8.0	E00			
007N	5	00530	1	0	0	129	386				E00			
007N	5	00556	1	0	0	< 45	125				E00			
007N	5	00610	1	0	0	< 1.9	3.4				E00			
007N	5	00680	1	0	0	450	677				E00			
007N	5	00745	1	0	0	< 1.73	2.1				E00			
007N	5	01032	1	0	0	< 0.20	0.26				E00			
007N	5	01034	1	0	0	< 1.6	< 2.3				E00			
007N	5	32730	1	0	0	< 0.3	0.5				E00			
007N	5	50050	1	0	0	4.081	5.435				E00			
008N	5	00400	1	0	0			7.2		8.6	E00			
008N	5	00556	1	0	0					2.1	E00			
008N	5	00680	1	0	0					13	E00			

DMR DATA FOR ADMINISTRATIVE REVIEW (AD)

QL ********** QL

NPID	FNMS	RDF7	RDF8	MACI
	MVDT			

VDSG	VLIM	VPRM	VMLO	VSEA	VMOD	MQAV	MQMX	MCMN	MCAV	MCMX	MVIO	NODI	SNCE	SRCE
009N	5	00400	1	0	0				7.3		8.2 E00			
009N	5	00556	1	0	0						4.2 E00			
009N	5	00680	1	0	0						10 E00			
		06/30/89												
001N	5	00011	1	0	0						94 E00			
001N	5	00340	1	0	0						97 E00			
001N	5	00400	1	0	0				6.2		9.0 E00			
001N	5	00556	1	0	0					<	1.0 E00			
001N	5	50050	1	0	0	0.604	3.100				E00			
002N	5	00400	1	0	0				7.4		7.4 E00			
002N	5	00556	1	0	0					<	1.0 E00			
002N	5	00680	1	0	0						3 E00			
003N	5	00400	1	0	0				7.0		7.8 E00			
003N	5	00556	1	0	0						13.8 E00			
003N	5	00680	1	0	0						26 E00			
004N	5	00400	1	0	0				6.8		8.6 E00			
004N	5	00680	1	0	0						20 E00			
006N	5	00400	1	0	0				6.6		8.2 E00			
006N	5	00556	1	0	0						8.0 E00			
006N	5	00680	1	0	0						12 E00			
007N	5	00011	1	0	0						96 E00			
007N	5	00310	1	0	0		114	211			E00			
007N	5	00400	1	0	0				6.3		7.9 E00			
007N	5	00530	1	0	0		114	204			E00			
007N	5	00556	1	0	0	<	59	188			E00			
007N	5	00610	1	0	0	<	2.2	7.1			E00			
007N	5	00680	1	0	0		480	682			E00			
007N	5	00745	1	0	0	<	1.72	2.2			E00			
007N	5	01032	1	0	0	<	0.16	0.20			E00			
007N	5	01034	1	0	0	<	1.3 <	2.0			E00			
007N	5	32730	1	0	0	<	0.3	0.4			E00			
007N	5	50050	1	0	0		3.875	5.465			E00			
008N	5	00400	1	0	0				7.2		7.9 E00			
008N	5	00556	1	0	0						7.4 E00			
008N	5	00680	1	0	0						18 E00			
009N	5	00400	1	0	0				6.8		8.4 E00			
009N	5	00556	1	0	0						3.7 E00			
009N	5	00680	1	0	0						12 E00			
004N	5	00556	1	0	0						19 E90			
		07/31/89												
001N	5	00011	1	0	0						102 E00			
001N	5	00340	1	0	0						83 E00			
001N	5	00400	1	0	0				6.1		8.0 E00			

QL ********** QL

NPID	FNMS							RDF7	RDF8	MADI				
	MVDT													
VDSG	VLIM	VPRM	VMLO	VSEA	VMOD	MQAV	MQMX	MCMN	MCAV	MCMX	MVIC	NODI	SNCE	SRCE
001N	5	00556	1	0	0					1.2	E00			
001N	5	50050	1	0	0	0.570	1.169				E00			
002N	5										E00	8		
003N	5	00400	1	0	0				6.9	8.2	E00			
003N	5	00680	1	0	0					12	E00			
004N	5	00400	1	0	0				6.9	9.0	E00			
004N	5	00680	1	0	0					20	E00			
006N	5	00400	1	0	0				7.8	8.2	E00			
006N	5	00556	1	0	0					9.4	E00			
006N	5	00680	1	0	0					13	E00			
007N	5	00011	1	0	0					94	E00			
007N	5	00310	1	0	0	< 82	208				E00			
007N	5	00400	1	0	0				6.9	8.7	E00			
007N	5	00530	1	0	0	151	451				E00			
007N	5	00556	1	0	0	< 68	122				E00			
007N	5	00610	1	0	0	< 1.8	2.5				E00			
007N	5	00680	1	0	0	505	736				E00			
007N	5	00745	1	0	0	< 1.87	2.0				E00			
007N	5	01032	1	0	0	< 0.18	0.31				E00			
007N	5	01034	1	0	0	< 1.7	< 1.9				E00			
007N	5	32730	1	0	0	< 0.3	< 0.4				E00			
007N	5	50050	1	0	0	4.084	5.219				E00			
008N	5	00400	1	0	0				7.1	8.8	E00			
008N	5	00556	1	0	0					9.7	E00			
008N	5	00680	1	0	0					19	E00			
009N	5	00400	1	0	0				7.1	8.7	E00			
009N	5	00556	1	0	0					6.3	E00			
009N	5	00680	1	0	0					8	E00			
003N	5	00556	1	0	0					18.6	E90			
004N	5	00556	1	0	0					16.1	E90			
	08/31/89													
001N	5	00011	1	0	0					97	E00			
001N	5	00400	1	0	0				6.5	8.8	E00			
001N	5	00556	1	0	0					3.3	E00			
001N	5	50050	1	0	0	0.529	1.862				E00			
002N	5										E00	8		
003N	5	00400	1	0	0				7.2	7.5	E00			
003N	5	00556	1	0	0					1.8	E00			
003N	5	00680	1	0	0					7	E00			
004N	5	00400	1	0	0				7.6	8.2	E00			
004N	5	00556	1	0	0					< 1.0	E00			
004N	5	00680	1	0	0					11	E00			
006N	5	00400	1	0	0				7.9	8.0	E00			

DMR DATA FOR ADMINISTRATIVE REVIEW (AD)

QL ********** QL

NPID	FNMS							RDF7	RDF8	MACI				
	MVDT													
VDSG	VLIM	VPRM	VMLO	VSEA	VMOD	MQAV	MQMX	MCMN	MCAV	MCMX	MVIO	NODI	SNCE	SRCE
006N	5	00556	1	0	0					3.4	E00			
006N	5	00680	1	0	0					10	E00			
007N	5	00011	1	0	0					103	E00			
007N	5	00310	1	0	0	55	110				E00			
007N	5	00400	1	0	0			7.3		8.5	E00			
007N	5	00530	1	0	0	205	426				E00			
007N	5	00556	1	0	0	< 72	147				E00			
007N	5	00610	1	0	0	< 1.7	2.6				E00			
007N	5	00680	1	0	0	516	661				E00			
007N	5	00745	1	0	0	< 2.19	3.2				E00			
007N	5	01032	1	0	0	< 0.17	0.26				E00			
007N	5	01034	1	0	0	< 1.6	< 1.8				E00			
007N	5	32730	1	0	0	< 0.3	< 0.4				E00			
007N	5	50050	1	0	0	3.817	4.671				E00			
008N	5	00400	1	0	0			7.3		8.0	E00			
008N	5	00556	1	0	0					< 1.0	E00			
008N	5	00680	1	0	0					8	E00			
009N	5	00400	1	0	0			7.3		8.3	E00			
009N	5	00556	1	0	0					< 1.0	E00			
009N	5	00680	1	0	0					7	E00			
001N	5	00340	1	0	0					134	E90			
	09/30/89													
001N	5	00011	1	0	0	1				96	E00			
001N	5	00340	1	0	0					119	E00			
001N	5	00400	1	0	0			6.9		8.9	E00			
001N	5	00556	1	0	0					2.3	E00			
001N	5	50050	1	0	0	0.471	0.922				E00			
002N	5										E00	8		
003N	5	00400	1	0	0			7.2		7.3	E00			
003N	5	00556	1	0	0					6.2	E00			
003N	5	00680	1	0	0					15	E00			
004N	5	00400	1	0	0			7.8		8.3	E00			
004N	5	00556	1	0	0					7.7	E00			
004N	5	00680	1	0	0					18	E00			
006N	5	00556	1	0	0					6.4	E00			
006N	5	00680	1	0	0					17	E00			
007N	5	00011	1	0	0					96	E00			
007N	5	00310	1	0	0	81	180				E00			
007N	5	00400	1	0	0			7.4		8.1	E00			
007N	5	00530	1	0	0	205	398				E00			
007N	5	00556	1	0	0	< 50	84				E00			
007N	5	00610	1	0	0	< 1.9	3.3				E00			
007N	5	00680	1	0	0	409	814				E00			

DMR DATA FOR ADMINISTRATIVE REVIEW (AD)

QL ********** QL

NPID	FNMS							RDF7	RDF8	MADI					
	MVDT														
VDSG	VLIM	VPRM	VMLO	VSEA	VMOD	MQAV	MQMX	MCMN	MCAV	MCMX	MVIO	NCDI	SNCE	SRCE	
007N	5	00745	1	0	0	< 1.70	2.1				E00				
007N	5	01032	1	0	0	< 0.23	0.40				E00				
007N	5	01034	1	0	0	< 1.5	1.8				E00				
007N	5	32730	1	0	0	< 0.3	0.4				E00				
007N	5	50050	1	0	0	3.701	4.565				E00				
008N	5	00400	1	0	0				6.9	7.7	E00				
008N	5	00556	1	0	0					3.9	E00				
008N	5	00680	1	0	0					7	E00				
009N	5	00400	1	0	0				7.8	8.4	E00				
009N	5	00556	1	0	0					< 4.0	E00				
009N	5	00680	1	0	0					8	E00				
006N	5	00400	1	0	0				5.8	8.0	E90				
	10/31/89														
001N	5	00011	1	0	0					87	E00				
001N	5	00340	1	0	0					100	E00				
001N	5	00400	1	0	0				6.9	8.8	E00				
001N	5	00556	1	0	0					3.2	E00				
001N	5	50050	1	0	0	0.412	0.708				E00				
002N	5	00400	1	0	0				8.0	8.1	E00				
002N	5	00556	1	0	0					1.0	E00				
002N	5	00680	1	0	0					12	E00				
003N	5	00400	1	0	0				7.0	7.3	E00				
003N	5	00680	1	0	0					4	E00				
004N	5	00400	1	0	0				7.2	8.6	E00				
004N	5	00680	1	0	0					15	E00				
006N	5	00400	1	0	0				7.5	8.1	E00				
006N	5	00680	1	0	0					13	E00				
007N	5	00011	1	0	0					89	E00				
007N	5	00310	1	0	0	50	148				E00				
007N	5	00400	1	0	0				7.5	8.2	E00				
007N	5	00530	1	0	0	220	770				E00				
007N	5	00556	1	0	0	< 84	436				E00				
007N	5	00610	1	0	0	< 1.8	2.7				E00				
007N	5	00680	1	0	0	327	988				E00				
007N	5	00745	1	0	0	< 2.19	5.3				E00				
007N	5	01032	1	0	0	< 0.39	0.60				E00				
007N	5	01034	1	0	0	< 1.7	2.7				E00				
007N	5	32730	1	0	0	< 0.3	0.4				E00				
007N	5	50050	1	0	0	3.750	4.942				E00				
008N	5	00400	1	0	0				6.9	8.3	E00				
008N	5	00680	1	0	0					4	E00				
009N	5	00400	1	0	0				6.3	8.0	E00				
009N	5	00556	1	0	0					14.8	E00				

DMR DATA FOR ADMINISTRATIVE REVIEW (AD)

QL ********** QL

NPID	FNMS	RDF7	RDF8	MADI
	MVDT			

VDSG	VLIM	VPRM	VMLO	VSEA	VMOD	MQAV	MQMX	MCMN	MCAV	MCMX	MVIO	NODI	SNCE	SRCE
009N	5	00680	1	0	0					8	E00			
003N	5	00556	1	0	0					136.9	E90			
004N	5	00556	1	0	0					19.8	E90			
006N	5	00556	1	0	0					23.3	E90			
008N	5	00556	1	0	0					24.1	E90			
	11/30/89													
001A	3	00011	1	0	0					77	E00			
001A	3	00340	1	0	0					75	E00			
001A	3	00400	1	0	0			7.2		8.8	E00			
001A	3	00556	1	0	0					5.6	E00			
001A	3	01042	1	0	0					0.16	E00			
001A	3	50050	1	0	0	0.104	0.660				E00			
002A	5										E00	8		
003A	5	00400	1	0	0			7.8		8.5	E00			
003A	5	00556	1	0	0					8.2	E00			
003A	5	00680	1	0	0					10	E00			
004A	5	00400	1	0	0			7.7		8.1	E00			
004A	5	00556	1	0	0					7.4	E00			
004A	5	00680	1	0	0					27	E00			
006A	5	00400	1	0	0			8.1		8.1	E00			
006A	5	00556	1	0	0					3.6	E00			
006A	5	00680	1	0	0					12	E00			
007A	5	00011	1	0	0					86	E00			
007A	5	00310	1	0	0		92	184			E00			
007A	5	00400	1	0	0				7.2	7.8	E00			
007A	5	00530	1	0	0		284	1068			E00			
007A	5	00556	1	0	0	<	81	214			E00			
007A	5	00610	1	0	0	<	1.6	2.2			E00			
007A	5	00680	1	0	0		408	605			E00			
007A	5	00745	1	0	0	<	1.75	3.3			E00			
007A	5	01032	1	0	0	<	0.48	0.97			E00			
007A	5	01034	1	0	0	<	1.8	3.8			E00			
007A	5	01042	1	0	0		0.008	0.27			E00			
007A	5	32730	1	0	0	<	0.4	1.0			E00			
007A	5	50050	1	0	0		3.616	4.139			E00			
008A	5	00400	1	0	0				6.9	8.3	E00			
008A	5	00556	1	0	0					5.8	E00			
008A	5	00680	1	0	0					15	E00			
009A	5	00400	1	0	0				7.6	8.9	E00			
009A	5	00556	1	0	0					4.2	E00			
009A	5	00680	1	0	0					20	E00			
001A	3	01092	1	0	0						E11 - Not Required			
	12/31/89													

DMR DATA FOR ADMINISTRATIVE REVIEW (AD)

QL ********** QL

NPID	FNMS	RDF7	RDF8	MADI
	MVDT			

VDSG	VLIM	VPRM	VMLO	VSEA	VMOD	MQAV	MQMX	MCMN	MCAV	MCMX	MVIC	NCDI	SNCE	SRCE
TX1A	5	TEM3E	1	0	0				0		E00			
TX1A	5	TEM6A	1	0	0				0		E00			
001A	3	00011	1	0	0					89	E00			
001A	3	00340	1	0	0					74	E00			
001A	3	00556	1	0	0					1.2	E00			
001A	3	01042	1	0	0					0.02	E00			
001A	3	50050	1	0	0	0.307	2.137				E00			
002A	5										E00	8		
003A	5	00400	1	0	0			7.8		8.7	E00			
003A	5	00680	1	0	0					32	E00			
004A	5	00400	1	0	0			8.0		8.4	E00			
004A	5	00556	1	0	0					3.2	E00			
004A	5	00680	1	0	0					9	E00			
006A	5										E00	8		
007A	5	00011	1	0	0					78	E00			
007A	5	00310	1	0	0	63	173				E00			
007A	5	00400	1	0	0			7.2		7.6	E00			
007A	5	00530	1	0	0	87	154				E00			
007A	5	00556	1	0	0	< 94	332				E00			
007A	5	00610	1	0	0	< 57.3	288				E00			
007A	5	00680	1	0	0	265	524				E00			
007A	5	00745	1	0	0	< 1.68	3.3				E00			
007A	5	01032	1	0	0	< 0.66	2.44				E00			
007A	5	01034	1	0	0	< 1.8	3.5				E00			
007A	5	01042	1	0	0	0.006	0.12				E00			
007A	5	32730	1	0	0	< 0.6	1.4				E00			
007A	5	50050	1	0	0	3.679	4.720				E00			
008A	5	00400	1	0	0			7.6		7.9	E00			
008A	5	00556	1	0	0					8.1	E00			
008A	5	00680	1	0	0					22	E00			
009A	5	00400	1	0	0			7.1		7.4	E00			
009A	5	00556	1	0	0					3.3	E00			
009A	5	00680	1	0	0					51	E00			
001A	3	01092	1	0	0						E11			
001A	3	00400	1	0	0			2.4		10.6	E90			
003A	5	00556	1	0	0					17.9	E90			
	01/31/90													
TX1A	5	TEM3E	1	0	0				0		E00			
TX1A	5	TEM6A	1	0	0				0		E00			
001A	3	00011	1	0	0					73	E00			
001A	3	00340	1	0	0					93	E00			
001A	3	00400	1	0	0			6.8		8.9	E00			
001A	3	00556	1	0	0					5.6	E00			

DMR DATA FOR ADMINISTRATIVE REVIEW (AD)

QL ********** QL

NPID	FNMS							RDF7	RDF8	MADI				
	MVDT													
VDSG	VLIM	VPRM	VMLO	VSEA	VMOD	MQAV	MQMX	MCMN	MCAV	MCMX	MVIO	NCDI	SNCE	SRCE
001A	3	01042	1	0	0					0.009	E00			
001A	3	50050	1	0	0	0.463	0.811				E00			
002A	5										E00	8		
003A	5	00400	1	0	0				7.1	8.3	E00			
003A	5	00556	1	0	0					3.3	E00			
003A	5	00680	1	0	0					27	E00			
004A	5	00400	1	0	0				7.0	8.8	E00			
004A	5	00556	1	0	0					9.63	E00			
004A	5	00680	1	0	0					17	E00			
006A	5	00400	1	0	0				7.1	8.4	E00			
006A	5	00556	1	0	0					6.8	E00			
006A	5	00680	1	0	0					12	E00			
007A	5	00011	1	0	0					83	E00			
007A	5	00310	1	0	0	115	305				E00			
007A	5	00400	1	0	0				6.8	7.6	E00			
007A	5	00530	1	0	0	122	313				E00			
007A	5	00556	1	0	0	< 117	193				E00			
007A	5	00610	1	0	0	< 126.6	613.9				E00			
007A	5	00680	1	0	0	472	955				E00			
007A	5	00745	1	0	0	< 2.14	4.5				E00			
007A	5	01032	1	0	0	< 0.71	1.74				E00			
007A	5	01034	1	0	0	< 1.6	2.0				E00			
007A	5	01042	1	0	0	0.28	0.58				E00			
007A	5	32730	1	0	0	< 0.4	0.6				E00			
007A	5	50050	1	0	0	3.688	4.375				E00			
008A	5	00400	1	0	0				7.1	8.1	E00			
008A	5	00556	1	0	0					10.12	E00			
008A	5	00680	1	0	0					30	E00			
009A	5	00400	1	0	0				7.1	7.8	E00			
009A	5	00556	1	0	0					8.4	E00			
009A	5	00680	1	0	0					17	E00			
001A	3	01092	1	0	0						E11 — Not Required			
	02/28/90													
TX1A	5	TEM3E	1	0	0			0			E00			
TX1A	5	TEM6A	1	0	0			0			E00			
001A	3	00011	1	0	0					78	E00			
001A	3	00340	1	0	0					92	E00			
001A	3	00400	1	0	0				6.3	8.9	E00			
001A	3	00556	1	0	0					2.3	E00			
001A	3	01042	1	0	0					0.011	E00			
001A	3	50050	1	0	0	0.414	1.041				E00			
002A	5										E00	8		
003A	5	00400	1	0	0				7.6	8.1	E00			

QL ********** QL

NPID	FNMS							RDF7	RDF8	MACI						
	MVDT															
VDSG	VLIM	VPRM	VMLO	VSEA	VMOD	MQAV	MQMX	MCMN	MCAV	MCMX	MVIO	NODI	SNCE	SRCE		
003A	5	00556	1	0	0					1.0	E00					
003A	5	00680	1	0	0					17	E00					
004A	5	00400	1	0	0			7.4		8.1	E00					
004A	5	00556	1	0	0					11.1	E00					
004A	5	00680	1	0	0					13	E00					
006A	5	00400	1	0	0			7.2		8.0	E00					
006A	5	00556	1	0	0					8.4	E00					
006A	5	00680	1	0	0					8	E00					
007A	5	00011	1	0	0					85	E00					
007A	5	00310	1	0	0		77	165			E00					
007A	5	00400	1	0	0			6.8		7.6	E00					
007A	5	00530	1	0	0		93	165			E00					
007A	5	00556	1	0	0	<	88	326			E00					
007A	5	00610	1	0	0	<	7.9	49.6			E00					
007A	5	00680	1	0	0		404	478			E00					
007A	5	00745	1	0	0	<	1.54	2.1			E00					
007A	5	01032	1	0	0	<	0.18	0.23			E00					
007A	5	01034	1	0	0	<	1.7 <	1.9			E00					
007A	5	01042	1	0	0		0.28	0.55		0.28	0.55	E00		N	2	
007A	5	32730	1	0	0	<	0.3	0.4			E00					
007A	5	50050	1	0	0		4.119	4.851			E00					
008A	5	00400	1	0	0				7.3	8.4	E00					
008A	5	00556	1	0	0					4.9	E00					
008A	5	00680	1	0	0					18	E00					
009A	5	00400	1	0	0				7.4	8.2	E00					
009A	5	00556	1	0	0					< 1.0	E00					
009A	5	00680	1	0	0					8	E00					
	03/31/90															
001A	3	01092	1	0	0						030					
TX1A	5	TEM3E	1	0	0				0		E00					
TX1A	5	TEM6A	1	0	0				0		E00					
TX7A	5	TEM3E	1	0	0				0		E00					
TX7A	5	TEM6A	1	0	0				0		E00					
001A	3	00011	1	0	0					79	E00					
001A	3	00340	1	0	0					121	E00					
001A	3	00400	1	0	0				6.2	8.9	E00					
001A	3	00556	1	0	0					3.0	E00					
001A	3	01042	1	0	0					0.016	E00					
001A	3	50050	1	0	0		0.462	0.811			E00					
002A	5										E00	8				
003A	5	00400	1	0	0				7.3	7.8	E00					
003A	5	00556	1	0	0					5.44	E00					
003A	5	00680	1	0	0					15	E00					

Q/L Date Removing Data

— Not Required

DMR DATA FOR ADMINISTRATIVE REVIEW (AD)

QL ********** QL

NPID	FNMS							RDF7	RDF8	MADI				
	MVOT													
VDSG	VLIM	VPRM	VMLO	VSEA	VMOD	MQAV	MQMX	MCMN	MCAV	MCMX	MVIC	NCDI	SNCE	SRCE
004A	5	00400	1	0	0			7.3		7.9	E00			
004A	5	00556	1	0	0					10.58	E00			
004A	5	00680	1	0	0					13	E00			
006A	5	00400	1	0	0			7.3		7.9	E00			
006A	5	00556	1	0	0					7.84	E00			
006A	5	00680	1	0	0					26	E00			
007A	5	00011	1	0	0					87	E00			
007A	5	00310	1	0	0		47	126			E00			
007A	5	00400	1	0	0			6.8		7.3	E00			
007A	5	00530	1	0	0		104	208			E00			
007A	5	00556	1	0	0	<	49	84			E00			
007A	5	00610	1	0	0	<	2.4	5.9			E00			
007A	5	00680	1	0	0		511	647			E00			
007A	5	00745	1	0	0	<	1.52	2.1			E00			
007A	5	01032	1	0	0	<	0.27	0.50			E00			
007A	5	01034	1	0	0	<	1.8 <	2.1			E00			
007A	5	01042	1	0	0		0.29	0.45			E00			
007A	5	32730	1	0	0	<	0.5	1.5			E00			
007A	5	50050	1	0	0		4.252	5.018			E00			
008A	5	00400	1	0	0				7.4	8.1	E00			
008A	5	00556	1	0	0					2.3	E00			
008A	5	00680	1	0	0					20	E00			
009A	5	00400	1	0	0				7.4	7.7	E00			
009A	5	00556	1	0	0					5.82	E00			
009A	5	00680	1	0	0					9	E00			
	04/30/90													
001A	3	01092	1	0	0						D30			
TX1A	5	TEM3E	1	0	0				0		E00	N	2	
TX1A	5	TEM6A	1	0	0				0		E00	N	2	
001A	3	00011	1	0	0					88	E00			
001A	3	00340	1	0	0					86	E00			
001A	3	00400	1	0	0				6.1	8.9	E00			
001A	3	00556	1	0	0					2.8	E00			
001A	3	01042	1	0	0					0.021	E00			
001A	3	50058	1	0	0		0.419	0.922			E00			
002A	5										E00	8		
003A	5	00400	1	0	0				7.1	8.1	E00			
003A	5	00556	1	0	0					5.77	E00			
003A	5	00680	1	0	0					20	E00			
004A	5	00400	1	0	0				7.5	8.1	E00			
004A	5	00556	1	0	0					4.0	E00			
004A	5	00680	1	0	0					30	E00			
006A	5	00400	1	0	0				7.3	7.6	E00			

Not Reqd

DMR DATA FOR ADMINISTRATIVE REVIEW (AD)

QL ********** QL

NPID	FNMS					RDF7	RDF8	MADI						
	MVDT													
VDSG	VLIM	VPRM	VMLO	VSEA	VMOD	MQAV	MQMX	MCMN	MCAV	MCMX	MVIC	NCDI	SNCE	SRCE
D06A	5	00556	1	0	0					3.4	E00			
D06A	5	00680	1	0	0					14	E00			
D07A	5	00011	1	0	0					89	E00			
D07A	5	00310	1	0	0	66	113				E00			
D07A	5	00400	1	0	0			6.9		7.6	E00			
D07A	5	00530	1	0	0	154	338				E00			
D07A	5	00556	1	0	0	< 75	194				E00			
D07A	5	00610	1	0	0	< 3.0	10.3				E00			
D07A	5	00680	1	0	0	741	1361				E00			
D07A	5	00745	1	0	0	< 2.39	3.3				E00			
D07A	5	01032	1	0	0	< 0.60	1.52				E00			
D07A	5	01034	1	0	0	< 2.3	3.0				E00			
D07A	5	01042	1	0	0	0.52	0.70				E00			
D07A	5	32730	1	0	0	< 0.5	1.1				E00			
D07A	5	50050	1	0	0	5.340	7.098				E00			
D08A	5	00400	1	0	0			7.2		8.2	E00			
D08A	5	00556	1	0	0					12.51	E00			
D08A	5	00680	1	0	0					57	E00			
D09A	5	00400	1	0	0			7.4		7.7	E00			
D09A	5	00556	1	0	0					2.4	E00			
D09A	5	00680	1	0	0					10	E00			
	05/31/90													
D01A	3	01092	1	0	0						D30			
TX1A	5	TEM3E	1	0	0				0		E00	N	2	
TX1A	5	TEM6A	1	0	0				0		E00	N	2	
D01A	3	00011	1	0	0					95	E00			
D01A	3	00340	1	0	0					120	E00			
D01A	3	00400	1	0	0			6.2		8.9	E00			
D01A	3	00556	1	0	0					2.8	E00			
D01A	3	01042	1	0	0					0.021	E00			
D01A	3	50050	1	0	0	0.448	0.864				E00			
D02A	5										E00	8		
D03A	5	00400	1	0	0			7.1		8.0	E00			
D03A	5	00556	1	0	0					9.0	E00			
D03A	5	00680	1	0	0					15	E00			
D04A	5	00400	1	0	0			7.1		8.2	E00			
D04A	5	00556	1	0	0					2.4	E00			
D04A	5	00680	1	0	0					22	E00			
D06A	5	00400	1	0	0			6.8		8.8	E00			
D06A	5	00556	1	0	0					5.4	E00			
D06A	5	00680	1	0	0					28	E00			
D07A	5	00011	1	0	0					96	E00			
D07A	5	00310	1	0	0	102	199				E00			

Not Required

DMR DATA FOR ADMINISTRATIVE REVIEW (AD)

QL ********** QL

NPID	FNMS							RDF7	RDF8	MADI				
	MVDT													
VDSG	VLIM	VPRM	VMLO	VSEA	VMOD	MQAV	MQMX	MCMN	MCAV	MCMX	MVIO	NODI	SNCE	SRCE
D07A	5	00400	1	0	0			7.2		7.7	E00			
D07A	5	00530	1	0	0	204	451				E00			
D07A	5	00556	1	0	0	< 61	124				E00			
D07A	5	00610	1	0	0	< 3.8	17.5				E00			
D07A	5	00680	1	0	0	1039	1742				E00			
D07A	5	00745	1	0	0	< 3.28	9.5				E00			
D07A	5	01032	1	0	0	< 0.35	0.90				E00			
D07A	5	01034	1	0	0	< 2.5	3.3				E00			
D07A	5	01042	1	0	0	0.45	0.68				E00			
D07A	5	32730	1	0	0	< 0.6	1.3				E00			
D07A	5	50050	1	0	0	6.128	7.966				E00			
D08A	5	00400	1	0	0			7.3		8.6	E00			
D08A	5	00556	1	0	0					8.27	E00			
D08A	5	00680	1	0	0					29	E00			
D09A	5	00400	1	0	0			7.0		7.9	E00			
D09A	5	00556	1	0	0					4.0	E00			
D09A	5	00680	1	0	0					12	E00			
	06/30/90													
D01A	3	01092	1	0	0						D30	Not Required		
TX1A	5	TEM3E	1	0	0				0		E00			
TX1A	5	TEM6A	1	0	0				0		E00			
TX7A	5	TEM3E	1	0	0				0		E00			
TX7A	5	TEM6A	1	0	0				0		E00			
D01A	3	00011	1	0	0					98	E00			
D01A	3	00340	1	0	0					90	E00			
D01A	3	00400	1	0	0			7.1		8.9	E00			
D01A	3	00556	1	0	0					1.8	E00			
D01A	3	01042	1	0	0					0.026	E00			
D01A	3	50050	1	0	0	0.382	0.708				E00			
D02A	5										E00	8		
D03A	5	00400	1	0	0			7.2		8.9	E00			
D03A	5	00556	1	0	0					1.86	E00			
D03A	5	00680	1	0	0					18	E00			
D04A	5	00400	1	0	0			7.4		8.2	E00			
D04A	5	00556	1	0	0					3.2	E00			
D04A	5	00680	1	0	0					14	E00			
D06A	5	00400	1	0	0			7.2		8.6	E00			
D06A	5	00556	1	0	0					12.7	E00			
D06A	5	00680	1	0	0					27	E00			
D07A	5	00011	1	0	0					95	E00			
D07A	5	00310	1	0	0	54	95				E00			
D07A	5	00400	1	0	0			7.0		8.0	E00			
D07A	5	00530	1	0	0	120	271				E00			

DMR DATA FOR ADMINISTRATIVE REVIEW (AD)

QL ********** QL

NPID	FNMS	RDF7	RDF8	MADI
	MVDT			

VDSG	VLIM	VPRM	VMLO	VSEA	VMOD	MQAV	MQMX	MCMN	MCAV	MCMX	MVIO	NODI	SNCE	SRCE
007A	5	00556	1	0	0	< 72	130				E00			
007A	5	00610	1	0	0	< 2.8	6.1				E00			
007A	5	00680	1	0	0	924	1194				E00			
007A	5	00745	1	0	0	< 2.80	4.1				E00			
007A	5	01034	1	0	0	< 3.5	8.7				E00			
007A	5	32730	1	0	0	< 0.5	0.9				E00			
007A	5	50050	1	0	0	6.045	7.070				E00			
008A	5	00400	1	0	0			8.0		8.0	E00			
008A	5	00556	1	0	0					< 1.0	E00			
008A	5	00680	1	0	0					8	E00			
009A	5	00400	1	0	0			7.4		7.8	E00			
009A	5	00556	1	0	0					1.2	E00			
009A	5	00680	1	0	0					16	E00			
007A	5	01032	1	0	0	< 1.72	7.83				E90			
007A	5	01042	1	0	0	0.40	1.02				E90			
	07/30/90													
007A	5	00011	1	0	0					89	E00			
007A	5	00310	1	0	0	66	113				E00			
007A	5	00400	1	0	0			6.9		7.6	E00			
007A	5	00530	1	0	0	143	338				E00			
	07/31/90													
TX1A	5	TEM3E	1	0	0				0		E00	N	2	
TX1A	5	TEM6A	1	0	0				0		E00	N	2	
001A	3	00011	1	0	0					98	E00			
001A	3	00340	1	0	0					104	E00			
001A	3	00400	1	0	0			6.5		8.9	E00			
001A	3	00556	1	0	0					2.7	E00			
001A	3	01042	1	0	0					0.016	E00			
001A	3	50050	1	0	0	0.503	0.922				E00			
002A	5										E00	8		
003A	5	00400	1	0	0			6.9		7.8	E00			
003A	5	00680	1	0	0					12	E00			
004A	5	00400	1	0	0			7.0		8.1	E00			
004A	5	00556	1	0	0					4.36	E00			
004A	5	00680	1	0	0					14	E00			
006A	5	00400	1	0	0			7.2		8.0	E00			
006A	5	00556	1	0	0					3.2	E00			
006A	5	00680	1	0	0					10	E00			
007A	5	00011	1	0	0					96	E00			
007A	5	00310	1	0	0	103	385				E00			
007A	5	00400	1	0	0			6.3		8.8	E00			
007A	5	00530	1	0	0	454	2500				E00			
007A	5	00556	1	0	0	< 84	183				E00			

DMR DATA FOR ADMINISTRATIVE REVIEW (AD)

QL ********** QL

NPID FNMS RDF7 RDF8 MACI

MVDT

VDSG	VLIM	VPRM	VMLO	VSEA	VMOD	MQAV	MQMX	MCMN	MCAV	MCMX	MVIO	NODI	SNCE	SRCE
007A	5	00610	1	0	0	< 12.9	116.3				E00			
007A	5	00680	1	0	0	513	762				E00			
007A	5	00745	1	0	0	3.42	8.6				E00			
007A	5	01032	1	0	0	< 0.39	1.92				E00			
007A	5	01034	1	0	0	< 2.9	5.8				E00			
007A	5	01042	1	0	0	0.26	0.44				E00			
007A	5	32730	1	0	0	< 0.5	1.0				E00			
007A	5	50050	1	0	0	5.559	6.926				E00			
008A	5	00400	1	0	0			7.3		8.0	E00			
008A	5	00556	1	0	0					6.8	E00			
008A	5	00680	1	0	0					23	E00			
009A	5	00400	1	0	0			7.0		8.1	E00			
009A	5	00556	1	0	0					10.5	E00			
009A	5	00680	1	0	0					10	E00			
003A	5	00556	1	0	0					22.8	E90			
		08/31/90												
001A	3	00011	1	0	0						D30	N	1	
001A	3	00340	1	0	0						D30	N	1	
001A	3	00400	1	0	0						D30	N	1	
001A	3	00556	1	0	0						D30	N	1	
001A	3	01042	1	0	0						D30	N	1	
001A	3	01092	1	0	0						D30	N	1	
001A	3	50050	1	0	0						D30	N	1	
002A	5	00400	1	0	0						D30	N	1	
002A	5	00556	1	0	0						D30	N	1	
002A	5	00680	1	0	0						D30	N	1	
003A	5	00400	1	0	0						D30	N	1	
003A	5	00556	1	0	0						D30	N	1	
003A	5	00680	1	0	0						D30	N	1	
004A	5	00400	1	0	0						D30	N	1	
004A	5	00556	1	0	0						D30	N	1	
004A	5	00680	1	0	0						D30	N	1	
006A	5	00400	1	0	0						D30	N	1	
006A	5	00556	1	0	0						D30	N	1	
006A	5	00680	1	0	0						D30	N	1	
007A	5	00011	1	0	0						D30	N	1	
007A	5	00310	1	0	0						D30	N	1	
007A	5	00400	1	0	0						D30	N	1	
007A	5	00530	1	0	0						D30	N	1	
007A	5	00556	1	0	0						D30	N	1	
007A	5	00610	1	0	0						D30	N	1	
007A	5	00680	1	0	0						D30	N	1	
007A	5	00745	1	0	0						D30	N	1	

NO DATA

DMR DATA FOR ADMINISTRATIVE REVIEW (AD)

QL ********** QL

NPID	FNMS						RDF7	RDF8	MADI					
	MVDT													
VDSG	VLIM	VPRM	VMLO	VSEA	VMOD	MQAV	MQMX	MCMN	MCAV	MCMX	MVIO	NCDI	SNCE	SRCE
007A	5	01032	1	0	0						D30		N	1
007A	5	01034	1	0	0						D30		N	1
007A	5	01042	1	0	0						D30		N	1
007A	5	32730	1	0	0						D30		N	1
007A	5	50050	1	0	0						D30		N	1
008A	5	00400	1	0	0						D30		N	1
008A	5	00556	1	0	0						D30		N	1
008A	5	00680	1	0	0						D30		N	1
009A	5	00400	1	0	0						D30		N	1
009A	5	00556	1	0	0						D30		N	1
009A	5	00680	1	0	0						D30		N	1
TX1A	5	TEM3E	1	0	0				0		E00			
TX1A	5	TEM6A	1	0	0				0		E00			
	09/30/90													
001A	3	01092	1	0	0						D30		N	1
TX1A	5	TEM3E	1	0	0				0		E00			
TX1A	5	TEM6A	1	0	0				0		E00			
TX7A	5	TEM3E	1	0	0				0		E00			
TX7A	5	TEM6A	1	0	0				0		E00			
001A	3	00011	1	0	0					95	E00			
001A	3	00340	1	0	0					68.0	E00			
001A	3	00400	1	0	0			6.2		8.9	E00			
001A	3	00556	1	0	0					1.0	E00			
001A	3	01042	1	0	0					0.022	E00			
001A	3	50050	1	0	0	0.305	0.811				E00			
002A	5										E00	8		
003A	5	00400	1	0	0			7.3		9.0	E00			
003A	5	00556	1	0	0					3.1	E00			
003A	5	00680	1	0	0					16	E00			
004A	5	00400	1	0	0			7.4		8.5	E00			
004A	5	00556	1	0	0					7.1	E00			
004A	5	00680	1	0	0					19	E00			
006A	5	00400	1	0	0			7.5		8.0	E00			
006A	5	00556	1	0	0					3.9	E00			
006A	5	00680	1	0	0					13	E00			
007A	5	00011	1	0	0					98	E00			
007A	5	00310	1	0	0	44	60				E00			
007A	5	00400	1	0	0			7.2		8.2	E00			
007A	5	00530	1	0	0	92	308				E00			
007A	5	00556	1	0	0	< 62	189				E00			
007A	5	00610	1	0	0	< 5.6	22.0				E00			
007A	5	00680	1	0	0	606	1621				E00			
007A	5	00745	1	0	0	< 3.43	5.9				E00			

AD Drafted

Not aquired

DMR DATA FOR ADMINISTRATIVE REVIEW (AD)

QL ********** QL

NPID	FNMS							RDF7	RDF8	MADI					
	MVDT														
VDSG	VLIM	VPRM	VMLO	VSEA	VMOD	MQAV	MQMX	MCMN	MCAV	MCMX	MVIO	NODI	SNCE	SRCE	
007A	5	01032	1	0	0	< .33	0.61				E00				
007A	5	01034	1	0	0	< 1.1	< 2.4				E00				
007A	5	01042	1	0	0	0.38	0.65				E00				
007A	5	32730	1	0	0	< 0.5	0.9				E00				
007A	5	50050	1	0	0	5.198	7.140				E00				
008A	5	00400	1	0	0			7.1		7.9	E00				
008A	5	00556	1	0	0					5.3	E00				
008A	5	00680	1	0	0					17	E00				
009A	5	00400	1	0	0			7.3		8.3	E00				
009A	5	00556	1	0	0					2.7	E00				
009A	5	00680	1	0	0					15	E00				
	10/31/90														
TX1A	5	TEM3E	1	0	0						D30		N	1	Terminated
TX1A	5	TEM6A	1	0	0						D30		N	1	
001A	3	01092	1	0	0						D30		N	1	
001A	3	00011	1	0	0					96	E00				Not Required
001A	3	00340	1	0	0					91.0	E00				
001A	3	00400	1	0	0			6.4		8.7	E00				
001A	3	00556	1	0	0					2.0	E00				
001A	3	01042	1	0	0					0.022	E00				
001A	3	50050	1	0	0	0.405	0.757				E00				
002A	5										E00	8			
003A	5	00400	1	0	0			7.1		7.6	E00				
003A	5	00680	1	0	0					30	E00				
004A	5	00400	1	0	0			7.2		8.4	E00				
004A	5	00556	1	0	0					7.0	E00				
004A	5	00680	1	0	0					13	E00				
006A	5	00400	1	0	0			7.7		8.0	E00				
006A	5	00556	1	0	0					3.3	E00				
006A	5	00680	1	0	0					10	E00				
007A	5	00011	1	0	0					93	E00				
007A	5	00310	1	0	0	44	56				E00				
007A	5	00400	1	0	0			7.2		8.2	E00				
007A	5	00530	1	0	0	61	92				E00				
007A	5	00556	1	0	0	< 85	256				E00				
007A	5	00610	1	0	0	< 16.9	138.1				E00				
007A	5	00680	1	0	0	615	769				E00				
007A	5	00745	1	0	0	< 3.06	9.4				E00				
007A	5	01032	1	0	0	< 0.39	1.20				E00				
007A	5	01034	1	0	0	< 2.2	< 2.7				E00				
007A	5	01042	1	0	0	0.26	0.40				E00				
007A	5	32730	1	0	0	< 0.4	0.5				E00				
007A	5	50050	1	0	0	5.082	6.765				E00				

DMR DATA FOR ADMINISTRATIVE REVIEW (AD)

QL ********** QL

NPID	FNMS	RDF7	RDF8	MADI
	MVDT			

VDSG	VLIM	VPRM	VMLO	VSEA	VMOD	MQAV	MQMX	MCMN	MCAV	MCMX	MVIO	NCDI	SNCE	SRCE
008A	5	00400	1	0	0			7.5		7.8	E00			
008A	5	00556	1	0	0					4.0	E00			
008A	5	00680	1	0	0					14	E00			
009A	5	00400	1	0	0			7.2		7.9	E00			
009A	5	00556	1	0	0					4.0	E00			
009A	5	00680	1	0	0					9	E00			
003A	5	00556	1	0	0					20.8	E90			
	11/30/90													
001A	5	00011	1	0	0					80	E00			
001A	5	00340	1	0	0					60	E00			
001A	5	00400	1	0	0			7.0		8.9	E00			
001A	5	00556	1	0	0					1.0	E00			
001A	5	50050	1	0	0	0.054	0.346				E00			
002A	5										E00	8		
003A	5	00400	1	0	0			7.0		8.1	E00			
003A	5	00556	1	0	0					9.6	E00			
003A	5	00680	1	0	0					10	E00			
004A	5	00400	1	0	0			7.8		8.0	E00			
004A	5	00556	1	0	0					2.3	E00			
004A	5	00680	1	0	0					8	E00			
006A	5	00400	1	0	0			6.7		7.8	E00			
006A	5	00556	1	0	0					1.2	E00			
006A	5	00680	1	0	0					13	E00			
007A	5	00011	1	0	0					88	E00			
007A	5	00310	1	0	0		54	105			E00			
007A	5	00400	1	0	0				7.2	8.0	E00			
007A	5	00530	1	0	0		214	627			E00			
007A	5	00556	1	0	0	<	114	513			E00			
007A	5	00610	1	0	0	<	5.9	27.4			E00			
007A	5	00680	1	0	0		874	1252			E00			
007A	5	00745	1	0	0	<	2.55	3.6			E00			
007A	5	01032	1	0	0	<	0.25	0.30			E00			
007A	5	01034	1	0	0	<	2.5	3.0			E00			
007A	5	01042	1	0	0		0.34	0.60			E00			
007A	5	32730	1	0	0	<	0.6	2.1			E00			
007A	5	50050	1	0	0		5.807	7.154			E00			
008A	5	00400	1	0	0				7.6	8.6	E00			
008A	5	00556	1	0	0					< 1.0	E00			
008A	5	00680	1	0	0					10	E00			
009A	5	00400	1	0	0				7.8	8.0	E00			
009A	5	00556	1	0	0					1.3	E00			
009A	5	00680	1	0	0					8	E00			
001A	5	01042	1	0	0				0.025	0.058	E90			

DMR DATA FOR ADMINISTRATIVE REVIEW (AD)

QL ********** QL

NPID		FNMS					RDF7	RDF8	MADI						
	MVDT														
VDSG	VLIM	VPRM	VMLO	VSEA	VMOD	MQAV	MQMX	MCMN	MCAV	MCMX	MVIO	NODI	SNCE	SRCE	
	12/31/90														
001A	5	00011	1	0	0						75	E00			
001A	5	00340	1	0	0						35	E00			
001A	5	00400	1	0	0			6.2			8.9	E00			
001A	5	00556	1	0	0						1.7	E00			
001A	5	01042	1	0	0				0.007	0.011		E00			
001A	5	50050	1	0	0	0.062	0.449					E00			
002A	5											E00	8		
003A	5	00400	1	0	0			7.2			8.1	E00			
003A	5	00556	1	0	0						8.0	E00			
003A	5	00680	1	0	0						11	E00			
004A	5	00400	1	0	0			7.4			7.9	E00			
004A	5	00556	1	0	0						5.0	E00			
004A	5	00680	1	0	0						11	E00			
006A	5	00400	1	0	0			7.3			7.8	E00			
006A	5	00556	1	0	0						8.0	E00			
006A	5	00680	1	0	0						17	E00			
007A	5	00011	1	0	0						85	E00			
007A	5	00310	1	0	0	68	151					E00			
007A	5	00400	1	0	0			7.3			8.0	E00			
007A	5	00530	1	0	0	143	312					E00			
007A	5	00556	1	0	0	< 80	341					E00			
007A	5	00610	1	0	0	< 10.1	44.1					E00			
007A	5	00680	1	0	0	831	1253					E00			
007A	5	00745	1	0	0	< 2.96	5.02					E00			
007A	5	01032	1	0	0	< 0.25	< 0.31					E00			
007A	5	01034	1	0	0	< 2.5	< 3.1					E00			
007A	5	01042	1	0	0	0.26	0.35					E00			
007A	5	32730	1	0	0	< 0.7	1.7					E00			
007A	5	50050	1	0	0	5.889	7.517					E00			
008A	5	00400	1	0	0			7.5			8.5	E00			
008A	5	00556	1	0	0						6.4	E00			
008A	5	00680	1	0	0						22	E00			
009A	5	00400	1	0	0			7.2			7.9	E00			
009A	5	00556	1	0	0						7.0	E00			
009A	5	00680	1	0	0						13	E00			

SUB-TOTAL QUICK LOOK PRINT LINES: 896