

# REPORTS

# **DATE:** 1995

**Shell Oil Products Company** 



Two Shell Plaza P. O. Box 2099 Houston, TX 77252-2099

HAND DELIVERED

December 6, 1995

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DEC 08 1995

Environmental Bureau Oil Conservation Division

William Olson State of New Mexico Oil Conservation Division Environmental Bureau 2040 S. Pacheco St. Santa Fe, New Mexico 87504

SUBJECT: QUARTERLY REPORTS, DENTON AND LEA STATIONS, LEA COUNTY NEW MEXICO

Dear Mr. Olson,

Enclosed are the fourth quarter 1995 groundwater monitoring reports for Lea and Denton Stations. Product recovery continues at both locations and there were no significant changes in water quality or groundwater elevations during the report period. No additional wells developed phase separated hydrocarbon. We can discuss this further on the 8th.

Sincerely

Neal Stidham Staff Engineer Shell Oil Products Company Representing Shell Pipe Line Corporation

cc: Paul Newman (w/copy) EOTT Energy Corp.

> Jerry Sexton (w/copy) OCD-Hobbs



November 27, 1995

Mr. Neal D. Stidham

777 Walker Street Houston, Texas 77002

Shell Oil Products Company

Two Shell Plaza, Room 1452

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DEC 081995

Environmental Bureau Oil Conservation Division

#### RE: QUARTERLY GROUNDWATER MONITORING REPORT FOURTH QUARTER, 1995 DENTON STATION LEA COUNTY, NEW MEXICO

CURA PROJECT NO. 24-93678

#### Mr. Stidham:

CURA, Inc., has completed the groundwater monitoring and sampling operations at the abovereferenced site. The work was performed in accordance with the scope of services requested by Shell Oil Products Company in your letter dated January 25, 1995.

Monitoring wells MW-1 through MW-12 were gauged and checked for phase-separated hydrocarbons (PSH) on October 12 and 13, 1995. Following gauging operations, monitoring wells MW-2, MW-6 and MW-9 were developed and sampled. In accordance with water quality monitoring requirements set forth by the New Mexico Oil Conservation Division (NMOCD), the groundwater samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) and dissolved oxygen content (DO). The New Mexico Water Quality Control Commission (WQCC) regulations do not contain a groundwater standard for total petroleum hydrocarbons (TPH). Therefore, the NMOCD does not require that groundwater samples be analyzed for TPH. Monitoring wells MW-1, MW-3, MW-5, MW-7, and water well WW-1 were not sampled due to the presence of PSH.

#### Groundwater Sampling and PSH Recovery

The monitoring wells were gauged on October 12 and 13, 1995, to determine the depth to groundwater and PSH thickness (if any). A summary of groundwater elevations and PSH thicknesses is presented in Table 1, Appendix B.

PSH was initially discovered on site in water well WW-1 in February of 1993, and recovery operations were initiated immediately. In September, 1993, additional on-site monitoring wells

HOUSTON

Mr. Neal D. Stidham November 27, 1995 Page 2

MW-1, MW-2, and MW-3 were installed. No PSH was observed in these wells during drilling or sampling operations. In March of 1994 measurable thicknesses of PSH were identified in monitoring wells MW-1 and MW-3 during routine gauging operations. CURA installed on-site monitoring wells MW-4 through MW-9 in May, 1994. PSH was observed in monitoring wells MW-5 and MW-7 following installation and site-wide PSH recovery operations were initiated. In July, 1995, on-site well MW-10 and off-site wells MW-11 and MW-12 were installed by Environmental Spill Control of Hobbs, New Mexico. No PSH was observed in these wells during drilling or sampling operations.

A remediation system was installed on-site in May, 1995, in order to provide automated oil recovery. The system is designed with product-only pumps that remove crude oil from the wells to a temporary holding tank. Once sufficient volumes of oil have accumulated in the tank, the oil is then transferred to an on-site sump for return to the pipeline. During the Fourth Quarter of 1995, the remediation system recovered approximately 22 gallons of oil. To date, a cumulative total of approximately 738 gallons of oil has been recovered from Denton Station by the recovery system (57 gallons) and prior hand bailing operations (681 gallons). Cumulative and quarterly PSH thicknesses and volumes recovered are summarized in Table 3 of this report.

The performance of the remediation system continues to be adversely affected by the viscosity of the oil and flow rate through the subsurface. Pump inlets are positioned to remove oil from the top of the water column in each well. Once pumped off, the oil must again accumulate in the wells to sufficient thicknesses to activate the pumps. As such, the limiting factor to oil removal at this site remains a function of the natural oil inflow to the wells.

Monitoring well gauging data obtained on October 12 and 13, 1995, indicates that the apparent direction of groundwater flow is toward the southeast which is consistent with previous measurements. During gauging operations, PSH was observed in monitoring well MW-1, in pumping wells MW-3, MW-5, MW-7, and in water well WW-1.

The monitoring wells were purged by removing approximately three well volumes of water or bailing the wells dry. The purged groundwater is stored on site in labelled 55-gallon drums pending analysis and proper disposal. After development, dissolved oxygen (DO) measurements were performed on site and groundwater samples were obtained from the monitoring wells using a disposable bailer. The groundwater samples were preserved at 4°C in accordance with EPA protocol for transportation to SPL Laboratories in Houston, Texas, for analysis of BTEX using EPA Method 8020. Quality Assurance/Quality Control information is included in Appendix D.

Mr. Neal D. Stidham November 27, 1995 Page 3

#### Analytical Results

The groundwater samples obtained on October 12 and 13, 1995, indicate no significant change in dissolved hydrocarbon concentrations or in the distribution of PSH thicknesses across the site since the last sampling event in July, 1995. Consistent low to non-detectable hydrocarbon concentrations in downgradient monitoring wells MW-2 and MW-9 continue to indicate that southern (downgradient) delineation of the plume has been achieved.

Dissolved oxygen concentrations were obtained as a possible indicator of the natural biological activity of hydrocarbon degrading microorganisms in the groundwater. Microbial and mineral oxidation reactions within a dissolved hydrocarbon plume typically result in depletion of DO so that an inverse relationship between DO and BTEX will be found where natural attenuation of the contaminant plume has occurred. DO levels recorded during the 1995 Fourth Quarter Sampling suggest that sufficient DO is present in the groundwater to encourage biological degradation of dissolved hydrocarbon. CURA will continue to monitor DO levels as a means of documenting the occurrence of natural attenuation. A summary of groundwater analytical results is presented in Table 2, Appendix B. The laboratory reports and chain-of-custody are included in Appendix C.

CURA appreciates the opportunity to provide you with our professional consulting services. If you have any questions or concerns, please do not hesitate to contact Brad Smith at (713) 686-0050.

Respectfully, CURA, Inc.

Fred.

James W. Leach Environmental Geologist

Bradley S. Smith Project Manager

JWL/chs

Attachments

**APPENDICES** 

## APPENDIX A FIGURES





APPENDIX B TABLES

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#### **DENTON STATION**

SUMMARY OF RELATIVE GROUNDWATER LEVEL ELEVATIONS AND

#### PHASE-SEPARATED HYDROCARBON THICKNESSES

Monitoring	Date	Relative Ground Surface Elevation	Relative Top of Casing Elevation	Depth to Water Below Top of Casing	Corrected Relative Groundwater Elevation	Phase-Separated Hydrocarbon Thickness
Well	Gauged	(feet)	(feet)*	(feet)	(feet)**	(feet)
MW-1	02/08/95	101.07	103.47	56.17	47.88	0.71
	04/25/95	101.07	103.47	57.84	46.29	0.80
	07/18/95	101.07	103.47	58.31	45.81	0.80
	08/28/95	101.07	103.47			
	10/12/95	101.07	103.47	55.24	48.83	0.73
MW-2	02/08/95	99.17	101.35	54.03	47.32	0.00
	04/25/95	99.17	101.35	54.05	47.30	0.00
	07/18/95	99.17	101.35	54.12	47.23	0.00
	08/28/95	99.17	101.35	54.15	47.20	0.00
	10/12/95	99.17	101.35	53.82	47.53	0.00
MW-3	02/08/95	101.01	102.68	60.79	48.12	7.60
	03/28/95	101.01	102.68	61.35	48.01	8.15
	04/25/95	101.01	102.68	61.30	46.64	6.42
	07/18/95	101.01	102.68			
	08/28/95	101.01	101.00			
	10/12/95	101.01	101.00	60.17	45.66	5.82
MW-4	02/08/95	99.98	101.46	53.78	47.68	0.00
	04/25/94	99.98	101.46	54.21	47.25	0.00
	07/18/95	99.98	101.46	54.82	46.64	0.00
	08/28/95	99.98	101.46	54.03	47.43	0.00
	10/12/95	99.96	101.40	53.97	47.49	0.00
MW-5	02/08/95	101.71	103.54	61.91	48.31	8.15
	03/28/95	101.71	103.54	61.42	47.99	7.16
	04/25/95	101.71	103.54	61.50	46.84	5.86
	07/18/95	101.71	103.54			
	08/28/95	101.71	103.54			
	10/12/95	101./1		58./4	4/.20	4.92
MW-6	02/08/95	101.52	103.41	55.26	48.16	0.00
	04/25/95	101.52	103.41	56.57	46.84	0.00
	07/18/95	101.52	103.41	55.90	47.71	0.00
	08/28/95	101.52	103.41	55.71	47.70	0.00
	10/12/95	101.52	103.41	54.//	48.64	0.00
MW-7	02/08/95	100.82	102.66	61.16	48.08	8.02
	03/28/95	100.82	102.66	60.86	48.06	7.64
	04/25/95	100.82	102.66	59.13	48.86	6.51
	0//18/95	100.82	102.66			
	VO/28/93 10/13/05	100.82	102.00	 E0 1 4		
	10/14/73	100.82	100.09	39.14	40.92	0.47

#### **DENTON STATION**

#### SUMMARY OF RELATIVE GROUNDWATER LEVEL ELEVATIONS AND

#### PHASE-SEPARATED HYDROCARBON THICKNESSES

Monitoring Well	Date Gauged	Relative Ground Surface Elevation (feet)	Relative Top of Casing Elevation (feet)*	Depth to Water Below Top of Casing (feet)	Corrected Relative Groundwater Elevation (feet)**	Phase-Separated Hydrocarbon Thickness (feet)
MW-8	02/08/95	101.56	103.49	54.59	48.90	0.00
	04/25/95	101.56	103.49	54.63	48.86	0.00
	07/18/95	101.56	103.49	55.00	48.49	0.00
	08/28/95	101.50	103.49	55.02	48.47	0.00
	10/12/95	101.50	103.49	54.43	49.06	0.00
MW-9	02/08/95	99.66	101.71	53.96	47.75	0.00
	04/25/95	99.66	101.71	64.86	46.85	0.00
	07/18/95	99.66	101.71	54.06	47.65	0.00
	08/28/95	99.66	101.71	54.13	47.58	0.00
	10/12/95	99.66	101.71	53.76	47.95	0.00
MW-10	08/28/95	99.66	99.79	52.11	47.48	0.00
	10/12/95	99.66	99.79	52.04	47.75	0.00
MW-11	08/28/95	100.98	100.97	53.83	47.14	0.00
	10/12/95	100.98	100.97	53.40	47.57	0.00
MW-12	08/28/95	98.50	98.39	51.49	46.90	0.00
	10/12/95	98.50	98.39	52.15	46.24	0.00
WW-1	02/08/95	100.55	102.21	57.40	47.93	3.80
	04/25/95	100.55	102.21	59.43	47.36	5.58
	07/18/95	100.55	102.21			
	08/28/95	100.55	102.21			
	10/12/95	100.55	102.21			;

\* Measured from a relative datum (benchmark = 100.00 feet) located at the northeast corner of the concrete sump pad. The monitor well casings were marked to provide consistent reference points for future gauging operations.

\*\* Correction Equation for Phase-Separated Hydrocarbons: Corrected Groundwater Elevation =

Top of Casing Elevation - (Depth to Water Below Top of Casing - [SG] [PSH Thickness])

Specific Gravity (SG) = 0.73 for gasoline, 0.85 for diesel, 0.82 for crude oil.

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#### **DENTON STATION**

WATER SAMPLE ANALYTICAL RESULTS

Monitoring Well	Date Sampled	Benzene	Toluene	Ethyl- benzene	Xylenes	Total BTEX	ТРН	Dissolved Oxygen
MW-1	02/08/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	04/25/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	07/18/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	10/12/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
MW-2	02/08/95	0.048	<0.001	<0.001	<0.001	0.048		0.8
	04/25/95	0.084	< 0.001	< 0.001	< 0.001	0.084		4.0
	07/18/95	0.110	<0.001	< 0.001	<0.001	0.110		3.2
	10/12/95	0.002	<0.001	<0.001	<0.001	0.002		3.8
MW-3	02/08/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	04/25/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	07/18/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	10/12/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
MW-4	02/08/95							
	04/25/95							_~-
	07/18/95							
	10/12/95							
MW-5	02/08/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	04/25/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	07/18/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	10/12/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
MW-6	02/08/95	1.200	<0.005	0.031	0.090	1.321		1.0
	04/25/95	1.200	<0.005	0.033	0.120	1.353		2.6
	07/18/95	1.100	<0.001	0.046	0.209	1.356		2.6
	10/12/295	1.200	0.005	0.026	0.140	1.371		3.6
MW-7	02/08/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	04/25/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	07/18/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	10/12/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
MW-8	02/08/95						[	
	04/25/95							
	07/18/95							
	10/12/95	~						

		WATER	DENTO SAMPLE A	N STATIO ANALYTIC	ON CAL RESU	LTS		
Monitoring Well	Date Sampled	Benzene	Toluene	Ethyl- benzene	Xylenes	Total BTEX	ТРН	Dissolved Oxygen
MW-9	02/08/95 04/25/95 07/18/95 <b>10/12/95</b>	<0.001 <0.001 <0.001 <b>&lt;0.001</b>	<0.001 <0.001 <0.001 <b>&lt;0.001</b>	<0.001 <0.001 <0.001 < <b>0.001</b>	<0.001 <0.001 <0.001 < <b>0.001</b>	<0.001 <0.001 <0.001 < <b>0.001</b>	  	2.3 8.4 7.4 <b>6.4</b>
MW-10	08/28/95 <b>10/12/95</b>							
MW-11	08/28/95 <b>10/13/95</b>	 1.500	0.003	 <0.001	 0.005	 1.508		 4.7
MW-12	08/28/95 <b>10/13/95</b>	 <0.001	 <0.001	 <0.001	 <0.001	 <0.001		 4.0
A total dissol	ved solids (T	'DS) concen	stration of 5	15 ppm was	s reported f	or MW-2 o	n 09-27-9	93.
BTEV regulte lie	stad in m/l (nor	to nor million.	nnm) with m	othod dotootic	m limita listo	I on the conti	Footo of on	alaria

BTEX results listed in m/l (parts per million; ppm) with method detection limits listed on the certificate of analysis. TPH and TDS results listed in mg/l (parts per million; ppm) with a method detection limit of 1 ppm. Analyses were conducted using EPA Method 8020 (BTEX), EPA Method 418.1 (TPH), and EPA Method 160.1 (TDS) by SPL Environmental Laboratories.

--- Not sampled.

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# TABLE 2

#### **DENTON STATION**

#### PHASE-SEPARATED HYDROCARBON RECOVERY

Monitoring Well	Date	PSH Thickness (feet)	PSH Recovery (gallons)	PSH Cumulative Recovery (gallons)	Type of Recovery
WW-1	02/08/95 04/25/95 08/17/95 <b>10/1295</b>	3.80 5.58  -	8.0 6.0 7.0 5.0	309.0 315.0 322.0 <b>327.0</b>	Hand bailed Hand bailed Remediation system
MW-1	02/08/95 04/25/95 08/17/95 10/12/95	0.71 0.80 0.80 <b>0.73</b>	1.15 0.9 1.0 <b>1.0</b>	7.1 8.0 9.1 <b>10.1</b>	Hand bailed Hand bailed Hand bailed Hand bailed
MW-3	02/08/95 03/28/95 04/25/95 05/10/95 07/18/95 10/12/95	7.68 8.15 6.42  5.82	10.0 10./0 10.0 4.0 15.0 <b>8.0</b>	87.0 97.0 107.0 111.0 126.0 <b>134.0</b>	Hand bailed Hand bailed Hand bailed Hand bailed Remediation system Remediation system
MW-5	02/08/95 03/28/95 04/25/95 05/10/95 07/18/95 10/12/95	8.15 7.16 5.86   4.92	10.0 10.0 10.0 4.0 15.0 5.0	99.7 109.7 119.7 124.0 139.0 <b>144.0</b>	Hand bailed Hand bailed Hand bailed Remediation system Remediation system Remediation system
MW-7	02/08/95 03/28/95 04/25/95 05/10/95 07/18/95 <b>10/12/95</b>	8.02 7.64 6.51  6.47	12.0 10.0 10.0 4.0 15.0 4.0	80.0 90.0 100.0 104.0 104.0 <b>123.0</b>	Hand bailed Hand bailed Hand bailed Remediation system Remediation system Remediation system

- PSH thickness not measured because of equipment in well.

Total system recovery as of 10/12/95 = 57 gallons. Total cumulative recovery as of 10/12/95 = 738 gallons.

APPENDIX C ANALYTICAL RESULTS

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RETAIL ENVIRONMENTA	NL ENGIN	EERING	CHAIN (	DF CUST	ору ві	ECORD	NO.	T	23	47,	st I			Pag	e: 10-18-95
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Pers # 24-93/678504			SITE INVESTIGA	L] NOI	1 Mars		MINE MIHUM	) (st+) ;	(+52) C	O			YTUBA		
CONSULTANT NAME & ADDRESS: CURA	tuc		SOIL FOR DISPO	C SN	245			58N	S9N 019		333 C/ 310 POW	HEL	UNDI		
231 Willed 124, 6-2001.	Mallar	ed TK	WATER FOR DIS	POSAL	2443		PIOFEID	אר ם		0	S108		٥x		
CONSULTANT CONTACT: 200 200	· Fh (i	Bustan	AIR SAMPLER - S	N+O SX	SH S		SNOB	1)0 <b>2</b> 8	/0/28 C	EXISTS T	05	PESTIC	TINSOF		
PHONE: (11)570-840 8 6,	x (2/2) x	-70-8409	WATER SAMPLE	- NHO SAS-	S S S S S S S S S S S S S S S S S S S	əzis		D	שאר כ 	; (	NOI DO	05	нос		
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SAMPLE I.D. DATE TIME	COMP. GRAB	MATRIX 0	DTHER METHOD HCI HNO3	PRESERVED H2SO4 NONE	OTHER O. O	CONT	BIEXC	אסר פּ	A9\AN9 	ы∿нчт			REACTI		
MUV-9 10.295 1300	2		2		$\sum_{\infty}$	40.4								 	
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MU1-2 20.11-95/400	$\mathbf{\Sigma}$		7		V 3	40 McP 1	$\mathbf{A}$								
1114-11 10-13-75/1330	2	~	2		7	co									V
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Certificate of Analysis No. H9-9510810-03

Shell Pipe Line Corporation P.O. Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-131201-PX-4204-NS DATE: 11/27/95

**PROJECT:** 24-93678504 **SITE:** Denton Station **SAMPLED BY:** Cura, Inc. **SAMPLE ID:** MW-2 PROJECT NO: H 23474 MATRIX: WATER DATE SAMPLED: 10/12/95 14:00:00 DATE RECEIVED: 10/19/95

	ANALYTICAL	DATA		
PARAMETER		RESULTS	DETECTION LIMIT	UNITS
BENZENE		2	1 P	µg/L
TOLUENE		ND	1 P	µg/L
ETHYLBENZENE		ND	1 P	µg/L
TOTAL XYLENE		ND	1 P	µg/L
TOTAL BTEX		2		µg/L
Surrogate		% Recovery		
1,4-Difluorobenzene		98		
4-Bromofluorobenzene		77		
METHOD 5030/8020 ***				
Analyzed by: AA				
Date: 10/20/95				

(P) - Practical Quantitation Limit ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.





Certificate of Analysis No. H9-9510810-02

Shell Pipe Line Corporation P.O. Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-131201-PX-4204-NS DATE: 11/27/95

**PROJECT:** 24-93678504 **SITE:** Denton Station **SAMPLED BY:** Cura, Inc. **SAMPLE ID:** MW-6 PROJECT NO: H 23474 MATRIX: WATER DATE SAMPLED: 10/12/95 13:30:00 DATE RECEIVED: 10/19/95

	ANALYTICAL DATA		
PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	1200	5 P	µq/L
TOLUENE	5	5 P	μg/L
ETHYLBENZENE	26	5 P	μg/L
TOTAL XYLENE	140	5 P	μg/L
TOTAL BTEX	1371		μg/L
Surrogate	% Recovery		
1,4-Difluorobenzene	114		
4-Bromofluorobenzene	64		
METHOD 5030/8020 ***			
Analyzed by: AA			
Date: 10/22/95			

(P) - Practical Quantitation Limit

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.





Certificate of Analysis No. H9-9510810-01

Shell Pipe Line Corporation P.O. Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-131201-PX-4204-NS DATE: 11/27/95

**PROJECT:** 24-93678504 **SITE:** Denton Station **SAMPLED BY:** Cura, Inc. **SAMPLE ID:** MW-9 PROJECT NO: H 23474 MATRIX: WATER DATE SAMPLED: 10/12/95 13:00:00 DATE RECEIVED: 10/19/95

	ANALYTICAL	DATA		
PARAMETER		RESULTS	DETECTION LIMIT	UNITS
BENZENE		ND	1 P	µg/L
TOLUENE		ND	1 P	µg/L
ETHYLBENZENE		ND	1 P	μg/L
TOTAL XYLENE		ND	1 P	µg/L
TOTAL BTEX		ND		μg/L
Surrogate		<pre>% Recovery</pre>		
1,4-Difluorobenzene		99		
4-Bromofluorobenzene		83		
METHOD 5030/8020 ***				
Analyzed by: AA				
Date: 10/20/95				

ND - Not detected.

(P) - Practical Quantitation Limit

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.





Certificate of Analysis No. H9-9510810-04

Shell Pipe Line Corporation P.O. Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-131201-PX-4204-NS DATE: 11/27/95

**PROJECT:** 24-93678504 **SITE:** Denton Station **SAMPLED BY:** Cura, Inc. **SAMPLE ID:** MW-11 PROJECT NO: H 23474 MATRIX: WATER DATE SAMPLED: 10/13/95 13:30:00 DATE RECEIVED: 10/19/95

	ANALYTICAL	DATA		
PARAMETER		RESULTS	DETECTION LIMIT	UNITS
BENZENE		1500	25 P	µg/L
TOLUENE		3	1 P	µg/L
ETHYLBENZENE		ND	1 P	µg/L
TOTAL XYLENE		5	1 P	μg/L
TOTAL BTEX		1508		µg/L
Surrogate		% Recovery		
1,4-Difluorobenzene		96		
4-Bromofluorobenzene		75		
METHOD 5030/8020 ***				
Analyzed by: AA				
Date: 10/22/95				

(P) - Practical Quantitation Limit ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for guality assurance.





Certificate of Analysis No. H9-9510810-05

Shell Pipe Line Corporation P.O. Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-131201-PX-4204-NS DATE: 11/27/95

**PROJECT:** 24-93678504 **SITE:** Denton Station **SAMPLED BY:** Cura, Inc. **SAMPLE ID:** MW-12 PROJECT NO: H 23474 MATRIX: WATER DATE SAMPLED: 10/13/95 14:00:00 DATE RECEIVED: 10/19/95

	ANALYTICAL	DATA		
PARAMETER		RESULTS	DETECTION LIMIT	UNITS
BENZENE		ND	1 P	µg/L
TOLUENE		ND	1 P	µg/L
ETHYLBENZENE		ND	1 P	μg/L
TOTAL XYLENE		ND	1 P	µg/L
TOTAL BTEX		ND		µg/L
Surrogate		<pre>% Recovery</pre>		
1,4-Difluorobenzene		98		
4-Bromofluorobenzene		82		
METHOD 5030/8020 ***				
Analyzed by: AA				
Date: 10/20/95				

ND - Not detected.

(P) - Practical Quantitation Limit

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

# QUALITY CONTROL DOCUMENTATION



Units:

μg/L

LABORATORY CONTROL SAMPLE

Batch Id: HP\_U951017215900

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Result <1>	Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Benzene	ND	50	60	120	61 - 123
Toluene	ND	50	58	116	62 - 122
EthylBenzene	ND	50	54	108	56 - 119
0 Xylene	ND	50	65	130	32 - 160
M & P Xylene	ND	100	120	120	32 - 160

#### <u>MATRIX SPIKES</u>

S P I K E C O M P O U N D S	Sample Results	Spike Added	Matrix	Spike	Matrix	Spike	MS/MSD Relative <b>%</b>	QCI	/imits(***) (Advisory)
			Result	Recovery	Result	Recovery	Difference	RPD	
	<2>	<3>	<1>	<4>	<1>	<5>		Max.	Recovery Range
BENZENE	ND	20	22	110	22	110	0	25	39 - 150
TOLUENE	ND	20	20	100	21	105	4.88	26	56 - 134
ETHYLBENZENE	ND	20	19	95.0	19	95.0	0	38	61 ~ 128
O XYLENE	ND	20	22	110	22	110	0	20	40 - 130
M & P XYLENE	ND	40	39	97.5	39	97.5	0	20	43 - 152

Analyst: AA \* = Values Outside QC Range Sequence Date: 10/21/95 NC = Not Calculated (Sample exceeds spike by factor of 4 or more) SPL ID of sample spiked: 9510810-01A ND = Not Detected/Below Detection Limit Sample File ID: U\_\_\_538A.TX0 % Recovery = [( <1> - <2> ) / <3> ] x 100 Method Blank File ID: LCS  $\$  Recovery = (<1> / <3> ) x 100 Blank Spike File ID: U\_\_\_552.TX0 Relative Percent Difference = |(<4> - <5> | / [(<4> + <5> ) x 0.5] x 100Matrix Spike File ID: U\_\_\_549.TX0 (\*\*) = Source: Matrix Spike Duplicate File ID: U\_\_\_550.TX0 (\*\*\*) = Source: SPL-Houston Historical Data SAMPLES IN BATCH (SPL ID) : 9510677-05A 9510677-06A 9510810-01A 9510810-03A

9510810-05A 9510810-04A 9510813-02A 9510813-04A 9510807-01A 9510807-02A 9510813-03A 9510677-04A 9510677-03A 9510677-01A

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QC Officer



. BATCH QUALITY CONTROL REPORT \*\* METHOD 8020 PAGE HOUSTON LABORATORY 8880 INTERCHANGE DRIVE HOUSTON, TEXAS 77054 PHONE (713) 660-0901

Batch Id: HP\_U951021234000

Units:

μg/L

#### LABORATORY CONTROL SAMPLE

S P I K B C O M P O U N D S	Method Blank Result <2>	Spike Added <3>	Blank Result <1>	Spike Recovery ¥	QC Limits(**) (Mandatory) % Recovery Range
Benzene	ND	50	52	104	61 - 123
Toluene	ND	50	49	98.0	62 - 122
EthylBenzene	ND	50	50	100	56 - 119
O Xylene	ND	50	56	112	32 - 160
M & P Xylene	ND	100	99	99.0	32 - 160

#### MATRIX SPIKES

S P I K E C O M P O U N D S	Sample Results	Spike Added	Matrix	Spike	Matrix	Spike	MS/MSD Relative %	QC I	Limits (***) (Advisory)
			Result	Recovery	Result	Recovery	Difference	RPD	
	<2>	<3>	<1>	<4>	<1>	<5>		Max.	Recovery Range
BENZENE	ND	20	20	100	20	100	0	25	39 - 150
TOLUENE	ND	20	20	100	20	100	0	26	56 - 134
ETHYLBENZENE	ND	20	18	90.0	17	85.0	5.71	38	61 - 128
O XYLENE	ND	20	21	105	22	110	4.65	20	40 - 130
M & P XYLENE	ND	40	37	92.5	38	95.0	2.67	20	43 - 152

Analyst: AA Sequence Date: 10/23/95 SPL ID of sample spiked: 9510854-04A Sample File ID: U\_\_\_587.TX0 Method Blank File ID: Blank Spike File ID: U\_\_\_628.TX0 Matrix Spike File ID: U\_\_\_603.TX0 Matrix Spike Duplicate File ID: U\_\_\_604.TX0

SAMPLES IN BATCH (SPL ID) :

9510810-04A 9510807-03A 9510854-10A 9510854-12A 9510854-13A 9510854-15A 9510854-16A 9510855-01A 9510855-02A 9510807-02A 9510854-06A 9510854-04A 9510948-03A 9510854-05A 9510854-08A 9510854-11A

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QC Officer

# APPENDIX D QUALITY ASSURANCE/QUALITY CONTROL SAFETY PLAN AND LIMITATIONS

#### QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

A strict Quality Assurance Plan was incorporated throughout all phases of the on-site operations and sampling procedures. Soil or solid material samples were collected using new disposable or properly decontaminated reusable stainless steel equipment. Water or liquid samples were collected with new disposable bailers or decontaminated pump equipment. All non-reusable equipment was disposed of and reusable equipment was decontaminated between sampling stations to eliminate the potential of cross-contamination. The water samples were transferred from the bailers into airtight septum-sealed 40-ml glass VOA vials, one-liter amber glass jars with Teflon-lined lids, or other sample containers appropriate for the required analyses.

The samples were sealed with QA/QC seals, preserved with acid (if required), and maintained at 4°C in accordance with Environmental Protection Agency (EPA) requirements (EPA 600/4-82-029) for shipment to the laboratory. A chain-of-custody (COC) which documents sample collection times and delivery times to the laboratory was completed for each set of samples. The COC is included with the analytical results in the Appendix.

CURA utilizes laboratories that maintain strict quality controls, i.e. equipment calibration and standardization, appropriate analytical methods, preparation of quality control samples, and complete chains-of-custody. Analyses were performed on all samples using the EPA-, state-, or local agency-directed methods. The maximum recommended holding times were not exceeded unless noted in the text.

#### SAFETY PLAN

The sampling operations were performed at level D personal protection. CURA personnel involved in on-site activities have completed the Occupational Safety and Health for Hazardous Waste Field Operation training course (OSHA 29 CFR 1910.120). Applicable safety equipment was on site to CURA personnel.

#### LIMITATIONS

It should be noted that all subsurface investigations are inherently limited in the sense that conclusions are drawn and recommendations are developed from samples which depict subsurface conditions at representative locations over relatively short periods of time. Subsurface conditions elsewhere may differ from those at the sampling locations. In addition, subsurface conditions at sampling locations may vary over longer periods of time than can be observed in a study of this type. The passage of time, manifestation of latent conditions, or occurrence of future events may require further site exploration, data collection and analysis, and reevaluation of the findings, observations, conclusions, and recommendation expressed in this report.





Certificate of Analysis No. H9-9508705-01

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 11/27/95

**PROJECT:** Denton Station SITE: Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control SAMPLE ID: MW-10

PROJECT NO: H 16156 MATRIX: WATER DATE SAMPLED: 08/17/95 08:30:00 **DATE RECEIVED:** 08/18/95

	ANALYTICAL DATA			
PARAMETER		RESULTS	DETECTION LIMIT	UNITS
BENZENE		ND	1 P	µg/L
TOLUENE		ND	1 P	μg/L
ETHYLBENZENE		ND	1 P	μg/L
TOTAL XYLENE		ND	1 P	μg/L
TOTAL VOLATILE AROMATIC	HYDROCARBONS	ND		μg/L
Surrogate	*	Recovery		
1,4-Difluorobenzene		99		
4-Bromofluorobenzene		93		
METHOD 8020***				
Analyzed by: VHZ				
Date: 08/21/95				
Silver, Total	RECEIVED	ND	0.005	mg/L
METHOD 6010 ***				
Analyzed by: DQ	DEC 0 8 1995			
Date: 08/22/95	DF6 6 6 1000			
Arconic Total	Environmental Bureau	ND	0 01	ma/T.
METHOD 7060 ***	Oil Conservation Division		0.01	m9/11
Analyzed by: WFL			•	
Date: 08/23/95				
Barium, Total		0.088	0.005	mg/L
METHOD 6010 ***				
Analyzed by: DQ				
Date: 08/22/95				
ND - Not detected.	(P) -	Practical	Ouantitation	Limit

(P) - Practical Quantitation Limit

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.





Certificate of Analysis No. H9-9508705-01

ANALYTICAL DA PARAMETER	TA RESULTS DE	TECTION	UNITS
SITE: Lea County, New Mexico SAMPLED BY: Environmental Spill Control SAMPLE ID: MW-10	MATRIX: DATE SAMPLED: DATE RECEIVED:	WATER 08/17/95 08/18/95	08:30:00
<b>PROJECT:</b> Denton Station	PROJECT NO:	H 16156	
Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham	MESA-CAO-B-	1312-01-P DATE:	P.O.# X-4204-NS 11/27/95

Cadmium, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95	ND	<b>LIMIT</b> 0.005	mg/L
Chromium, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95	ND	0.01	mg/L
Mercury, Total METHOD 7470 *** Analyzed by: PB Date: 08/22/95	ND	0.0002	mg/L
Acid Digestion-Aqueous, ICP METHOD 3010 *** Analyzed by: AM Date: 08/21/95	08/21/95		
Acid Digestion-Aqueous, GF METHOD 3020 *** Analyzed by: AM Date: 08/21/95	08/21/95		

ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.





Certificate of Analysis No. H9-9508705-01

Shell Pipeline Corporation	
P.O.Box 2648	P.O.#
Houston, TX 77252	MESA-CAO-B-1312-01-PX-4204-NS
ATTN: Neal Stidham	DATE: 11/27/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-10 PROJECT NO: H 16156 MATRIX: WATER DATE SAMPLED: 08/17/95 08:30:00 DATE RECEIVED: 08/18/95

	ANALYTICAL DAT	A		
PARAMETER		RESULTS	DETECTION LIMIT	UNITS
Lead, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95		ND	0.05	mg/L
Selenium, Total METHOD 7740 *** Analyzed by: WFL Date: 08/23/95		ND	0.008	mg/L
Calcium, Dissolved METHOD 6010 *** Analyzed by: DQ Date: 08/24/95		73.6	0.5	mg/L
Chloride METHOD 325.3 * Analyzed by: ET Date: 08/20/95		28	1	mg/L
Carbonate, as CaCO3 METHOD SM 4500-CO2D ** Analyzed by: DSE Date: 08/21/95		ND	1	mg/L
Specific Conductance METHOD 120.1 * Analyzed by: DSE Date: 08/21/95		626	1	umhos/cm

ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.





Certificate of Analysis No. H9-9508705-01

Shell Pipeline Corporation	
P.O.Box 2648	P.O.#
Houston, TX 77252	MESA-CAO-B-1312-01-PX-4204-NS
ATTN: Neal Stidham	DATE: 11/27/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-10 PROJECT NO: H 16156 MATRIX: WATER DATE SAMPLED: 08/17/95 08:30:00 DATE RECEIVED: 08/18/95

	ANALYTICAL	DATA			
PARAMETER			Results	DETECTION LIMIT	UNITS
Bicarbonate, as CaCO3 METHOD SM 4500-CO2D ** Analyzed by: DSE Date: 08/21/95			288	1	mg/L
Potassium, Dissolved METHOD 6010 Analyzed by: DQ Date: 08/24/95			ND	5	mg/L
Magnesium, Dissolved METHOD 6010 Analyzed by: DQ Date: 08/24/95			17.5	0.5	mg/L
Sodium, Dissolved METHOD 6010 Analyzed by: DQ Date: 08/24/95			37.4 👦	0.5	mg/L
Nitrate nitrogen(as N) METHOD 353.3 Analyzed by: ET Date: 08/20/95			0.5	0.05	mg/L
pH METHOD 150.1 * Analyzed by: DSE Date: 08/21/95			7.66		pH units

ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.





Certificate of Analysis No. H9-9508705-01

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 11/27/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-10 **PROJECT NO:** H 16156 **MATRIX:** WATER **DATE SAMPLED:** 08/17/95 08:30:00 **DATE RECEIVED:** 08/18/95

	ANALYTICAL DATA		
PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Sulfate METHOD 375.4 * Analyzed by: ST Date: 08/21/95	54	8	mg/L
Total Dissolved Solids METHOD 160.1 * Analyzed by: JS Date: 08/21/95	314	4	mg/L

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.





Certificate of Analysis No. H9-9508705-01

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS 11/27/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-10 **PROJECT NO:** H 16156 **MATRIX:** WATER **DATE SAMPLED:** 08/17/95 08:30:00 **DATE RECEIVED:** 08/18/95

ANALYTI	CAL DATA		
PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	5	1.4	µg/L
1-Methylnaphthalene	ND	1.4	μg/L
2-Methylnaphthalene	ND	1.4	µg/L
Acenaphthylene	ND	1.2	μq/L
Acenaphthene	ND	1.2	μg/L
Fluorene	ND	1.0	$\mu q/L$
Phenanthrene	ND	0.84	μg/L
Anthracene	ND	1.4	μg/L
Fluoranthene	ND	0.72	μg/L
Pyrene	ND	0.68	μg/L
Benzo (a) anthracene	ND	0.62	μg/L
Chrysene	ND	0.79	μg/L
Benzo (b) fluoranthene	ND	1.4	μg/L
Benzo (k) fluoranthene	ND	1.9	μg/L
Benzo (a) pyrene	ND	1.1	μg/L
Dibenzo (a,h) anthracene	ND	1.6	μg/L
Benzo (g,h,i) perylene	ND	1.3	μg/L
Indeno (1,2,3-cd) pyrene	ND	1.2	μg/L
SURROGATES	% RECOVI	ERY	
2-Fluorobiphenyl	78		

ANALYZED BY: APMDATE/TIME: 08/22/95 12:45:00EXTRACTED BY: VMDATE/TIME: 08/20/95 15:00:00METHOD: 8100 - Polynuclear Aromatic HydrocarbonsNOTES: \* - Practical Quantitation LimitND - Not DetectedNA - Not Analyzed

COMMENTS:





Certificate of Analysis No. H9-9508705-02

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 11/27/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-11

**PROJECT NO:** H 16156 **MATRIX:** WATER **DATE SAMPLED:** 08/17/95 09:00:00 **DATE RECEIVED:** 08/18/95

ANALYTICAL DATA						
PARAMETER		RESULTS	DETECTION	UNITS		
BENZENE		630	LIMIT 5 P	μα/L		
TOLUENE		ND	5 P	μα/L		
ETHYLBENZENE		ND	5 P	μg/L		
TOTAL XYLENE		ND	5 P	μg/L		
TOTAL VOLATILE AROMATIC	HYDROCARBONS	630		μg/L		
Surrogate		% Recovery				
1,4-Difluorobenzene		97				
4-Bromofluorobenzen	9	88				
METHOD 8020***						
Analyzed by: VHZ						
Date: 08/23/95						
Silver. Total		ND	0.005	ma/L		
METHOD 6010 ***						
Analyzed by: DQ						
Date: 08/22/95						
Jungan in Matal		ND	0.01			
Arsenic, Total		ND	0.01	mg/г		
METHOD /000 ***						
$\frac{1}{23}$						
Date: 00/25/55						
Barium, Total		0.244	0.005	mg/L		
METHOD 6010 ***						
Analyzed by: DQ						
Date: 08/22/95						

(P) - Practical Quantitation Limit ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.





Certificate of Analysis No. H9-9508705-02

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 11/27/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-11 **PROJECT NO:** H 16156 **MATRIX:** WATER **DATE SAMPLED:** 08/17/95 09:00:00 **DATE RECEIVED:** 08/18/95

	ANALYTICAL	DATA		
PARAMETER		RESULTS	DETECTION LIMIT	UNITS
Cadmium, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95		ND	0.005	mg/L
Chromium, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95		ND	0.01	mg/L
Mercury, Total METHOD 7470 *** Analyzed by: PB Date: 08/22/95		ND	0.0002	mg/L
Acid Digestion-Aqueous, METHOD 3010 *** Analyzed by: AM Date: 08/21/95	ICP	08/21/95		
Acid Digestion-Aqueous, METHOD 3020 *** Analyzed by: AM Date: 08/21/95	GF	08/21/95		

ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.





Certificate of Analysis No. H9-9508705-02

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 11/27/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-11 PROJECT NO: H 16156 MATRIX: WATER DATE SAMPLED: 08/17/95 09:00:00 DATE RECEIVED: 08/18/95

	ANALYTICAL DATA		
PARAMETER	RESU	LTS DETEC LIMIT	TION UNITS
Lead, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95		ND 0.05	mg/L
Selenium, Total METHOD 7740 *** Analyzed by: WFL Date: 08/23/95		ND 0.008	mg/L
Calcium, Dissolved METHOD 6010 *** Analyzed by: DQ Date: 08/24/95	-	113 0.5	mg/L
Chloride METHOD 325.3 * Analyzed by: ET Date: 08/20/95		58 1	mg/L
Carbonate, as CaCO3 METHOD SM 4500-CO2D ** Analyzed by: DSE Date: 08/21/95		ND 1	mg/L
Specific Conductance METHOD 120.1 * Analyzed by: DSE Date: 08/21/95	1	882 1	umhos/cm

ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.




Certificate of Analysis No. H9-9508705-02

<b>PROJECT:</b> Denton Station	PROJECT NO: H 16156
Houston, TX 77252 ATTN: Neal Stidham	MESA-CAO-B-1312-01-PX-4204-NS DATE: 11/27/95
P.O.Box 2648	P.O.#
Shell Pipeline Corporation	

SITE: Lea County, New Mexico SAMPLED BY: Environmental Spill Control SAMPLE ID: MW-11 PROJECT NO: H 16156 MATRIX: WATER DATE SAMPLED: 08/17/95 09:00:00 DATE RECEIVED: 08/18/95

	ANALYTICAL DATA		
PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Bicarbonate, as CaCO3 METHOD SM 4500-CO2D ** Analyzed by: DSE Date: 08/21/95	414	1	mg/L
Potassium, Dissolved METHOD 6010 Analyzed by: DQ Date: 08/24/95	ND	5	mg/L
Magnesium, Dissolved METHOD 6010 Analyzed by: DQ Date: 08/24/95	26.0	0.5	mg/L
Sodium, Dissolved METHOD 6010 Analyzed by: DQ Date: 08/24/95	42.2	0.5	mg/L
Nitrate nitrogen(as N) METHOD 353.3 Analyzed by: ET Date: 08/20/95	ND	0.05	mg/L
pH METHOD 150.1 * Analyzed by: DSE Date: 08/21/95	8.10		pH units

ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.





Certificate of Analysis No. H9-9508705-02

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 11/27/95

PROJECT: Denton StationPROJECT NO: H 16156SITE: Lea County, New MexicoMATRIX: WATERSAMPLED BY: Environmental Spill ControlDATE SAMPLED: 08/17/95 09:00:00SAMPLE ID: MW-11DATE RECEIVED: 08/18/95

	ANALYTICAL DATA		
PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Sulfate METHOD 375.4 * Analyzed by: ST Date: 08/21/95	73	5	mg/L
Total Dissolved Solids METHOD 160.1 * Analyzed by: JS Date: 08/21/95	312	4	mg/L

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.





Certificate of Analysis No. H9-9508705-02

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS 11/27/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-11 **PROJECT NO:** H 16156 **MATRIX:** WATER **DATE SAMPLED:** 08/17/95 09:00:00 **DATE RECEIVED:** 08/18/95

ANALYT	ICAL DATA		
PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	ND	1.4	µg/L
1-Methylnaphthalene	ND	1.4	$\mu g/L$
2-Methylnaphthalene	ND	1.4	μg/L
Acenaphthylene	ND	1.2	μg/L
Acenaphthene	ND	1.2	$\mu g/L$
Fluorene	ND	1.0	µg/L
Phenanthrene	ND	0.84	μg/L
Anthracene	ND	1.4	μg/L
Fluoranthene	ND	0.72	µg/L
Pyrene	ND	0.68	μg/L
Benzo (a) anthracene	ND	0.62	μg/L
Chrysene	ND	0.79	μg/L
Benzo (b) fluoranthene	ND	1.4	μg/L
Benzo (k) fluoranthene	ND	1.9	μg/L
Benzo (a) pyrene	ND	1.1	μg/L
Dibenzo (a,h) anthracene	ND	1.6	μg/L
Benzo (g,h,i) perylene	ND ·	1.3	μg/L
Indeno (1,2,3-cd) pyrene	ND	1.2	μg/L
SURROGATES	% RECOVI	ERY	
2-Fluorobiphenyl	102		

ANALYZED BY: APM DATE/TIME: 08/22/95 01:46:00 EXTRACTED BY: VM DATE/TIME: 08/20/95 15:00:00 METHOD: 8100 - Polynuclear Aromatic Hydrocarbons NOTES: \* - Practical Quantitation Limit ND - Not Detected NA - Not Analyzed

COMMENTS:





### Certificate of Analysis No. H9-9508705-03

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 11/27/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-12 **PROJECT NO:** H 16156 **MATRIX:** WATER **DATE SAMPLED:** 08/17/95 09:30:00 **DATE RECEIVED:** 08/18/95

PARAMETERRESULTSDETECTION LIMITUNITSBENZENEND1 P $\mu g/L$ TOLUENEND1 P $\mu g/L$ ETHYLBENZENEND1 P $\mu g/L$ TOTAL XYLENEND1 P $\mu g/L$ TOTAL VOLATILE AROMATIC HYDROCARBONSND1 P $\mu g/L$ Surrogate* Recovery1,4-Difluorobenzene1024-Bromofluorobenzene92METHOD 8020***102Analyzed by: VHZDate: 08/22/95ND0.005mg/LMETHOD 6010 ***ND0.01mg/LArsenic, TotalND0.01mg/LMETHOD 7060 ***0.0880.005mg/LMathod by: WFL Date: 08/23/950.0880.005mg/L		ANALYTICAL	DATA		
BENZENEND1Pµg/LTOLUENEND1Pµg/LETHYLBENZENEND1Pµg/LTOTAL XYLENEND1Pµg/LTOTAL VOLATILE AROMATIC HYDROCARBONSND1Pgurrogate% Recovery1,4-Difluorobenzene1024-Bromofluorobenzene9292METHOD 8020***Analyzed by: VHZ Date: 08/22/95ND0.005mg/LSilver, TotalND0.005mg/LMETHOD 6010 *** Analyzed by: DQ Date: 08/22/95ND0.01mg/LMETHOD 7060 *** Analyzed by: WFL Date: 08/23/950.0880.005mg/L	PARAMETER		RESULTS	DETECTION LIMIT	UNITS
TOLUENEND1P $\mu g/L$ ETHYLBENZENEND1P $\mu g/L$ TOTAL XYLENEND1P $\mu g/L$ TOTAL VOLATILE AROMATIC HYDROCARBONSND1PSurrogate% Recovery1,4-Difluorobenzene1024-Bromofluorobenzene9292METHOD 8020***3020***Analyzed by: VHZDate: 08/22/95Silver, TotalND0.005METHOD 6010 ***Analyzed by: DQDate: 08/22/95NDArsenic, TotalND0.01METHOD 7060 ***Analyzed by: WFLDate: 08/23/950.0880.005Barium, Total0.0880.005METHOD 6010 ***ND	BENZENE		ND	1 P	μg/L
ETHYLBENZENEND1 Pµg/LTOTAL XYLENEND1 Pµg/LTOTAL VOLATILE AROMATIC HYDROCARBONSND1 PSurrogate% Recovery1,4-Difluorobenzene1024-Bromofluorobenzene92METHOD 8020***Analyzed by: VHZDate: 08/22/95NDSilver, TotalNDMETHOD 6010 ***Analyzed by: DQDate: 08/22/95Arsenic, TotalNDMETHOD 7060 ***Analyzed by: WFLDate: 08/23/95Barium, Total0.088METHOD 6010 ****Notal0.0880.005mg/L	TOLUENE		ND	1 P	μg/L
TOTAL XYLENEND1 Pµg/LTOTAL VOLATILE AROMATIC HYDROCARBONSNDµg/LSurrogate% Recovery1,4-Difluorobenzene1024-Bromofluorobenzene92METHOD 8020***32Analyzed by: VHZDate: 08/22/95Silver, TotalNDMETHOD 6010 ***NDAnalyzed by: DQDate: 08/22/95Arsenic, TotalNDMETHOD 7060 ***Analyzed by: WFLDate: 08/23/95Barium, Total0.088METHOD 6010 ***Not 100 *** </td <td>ETHYLBENZENE</td> <td></td> <td>ND</td> <td>1 P</td> <td>μg/L</td>	ETHYLBENZENE		ND	1 P	μg/L
TOTAL VOLATILE AROMATIC HYDROCARBONSNDμg/LSurrogate% Recovery1,4-Difluorobenzene1024-Bromofluorobenzene92METHOD 8020***92Analyzed by: VHZDate: 08/22/95Silver, TotalNDMETHOD 6010 ***NDAnalyzed by: DQDate: 08/22/95Arsenic, TotalNDMETHOD 7060 ***Analyzed by: WFLDate: 08/23/95Barium, Total0.088METHOD 6010 ***hertHOD 6010 ***	TOTAL XYLENE		ND	1 P	µg/L
Surrogate 1,4-Difluorobenzene 4-Bromofluorobenzene METHOD 8020*** 	TOTAL VOLATILE AROMATIC H	IYDROCARBONS	ND		µg/L
1,4-Difluorobenzene1024-Bromofluorobenzene92METHOD 8020***92Analyzed by: VHZDate: 08/22/95Silver, TotalND0.005METHOD 6010 ***ND0.005Analyzed by: DQDate: 08/22/95Arsenic, TotalND0.01METHOD 7060 ***ND0.01Analyzed by: WFLDate: 08/23/95Barium, Total0.0880.005METHOD 6010 ***ND0.015	Surrogate		% Recovery		
4-Bromofluorobenzene92METHOD 8020***Analyzed by: VHZ Date: 08/22/9592Silver, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95ND 0.005mg/LArsenic, Total METHOD 7060 *** Analyzed by: WFL Date: 08/23/95ND 0.01mg/LBarium, Total METHOD 6010 *** brate by: DQ0.0880.005mg/L	1,4-Difluorobenzene		102		
METHOD 8020*** Analyzed by: VHZ Date: 08/22/95 Silver, Total ND 0.005 mg/L METHOD 6010 *** Analyzed by: DQ Date: 08/22/95 Arsenic, Total ND 0.01 mg/L METHOD 7060 *** Analyzed by: WFL Date: 08/23/95 Barium, Total 0.088 0.005 mg/L METHOD 6010 ***	4-Bromofluorobenzene		92		
Analyzed by: VHZ Date: 08/22/95 Silver, Total ND 0.005 mg/L METHOD 6010 *** Analyzed by: DQ Date: 08/22/95 Arsenic, Total ND 0.01 mg/L METHOD 7060 *** Analyzed by: WFL Date: 08/23/95 Barium, Total 0.088 0.005 mg/L METHOD 6010 ***	METHOD 8020***				
Date:08/22/95Silver, TotalND0.005mg/LMETHOD 6010.***Analyzed by: DQ Date:08/22/95ND0.01mg/LArsenic, TotalND0.01mg/LMETHOD 7060*** Date:08/23/950.0880.005mg/LBarium, Total0.0880.005mg/LMETHOD 6010*** Date:0.0880.005mg/L	Analyzed by: VHZ				
Silver, TotalND0.005mg/LMETHOD 6010 ***Analyzed by: DQ Date: 08/22/95ND0.01mg/LArsenic, TotalND0.01mg/LMETHOD 7060 *** Analyzed by: WFL Date: 08/23/950.0880.005mg/LBarium, Total METHOD 6010 *** Date doi: 00.0880.005mg/L	Date: 08/22/95				
METHOD 6010. *** Analyzed by: DQ Date: 08/22/95 Arsenic, Total ND 0.01 mg/L METHOD 7060 *** Analyzed by: WFL Date: 08/23/95 Barium, Total 0.088 0.005 mg/L METHOD 6010 ***	Silver, Total		ND	0.005	mg/L
Analyzed by: DQ Date: 08/22/95 Arsenic, Total ND 0.01 mg/L METHOD 7060 *** Analyzed by: WFL Date: 08/23/95 Barium, Total 0.088 0.005 mg/L METHOD 6010 ***	METHOD 6010 ***				
Date: 08/22/95         Arsenic, Total       ND 0.01       mg/L         METHOD 7060 ***       Analyzed by: WFL       Date: 08/23/95         Barium, Total       0.088       0.005       mg/L         METHOD 6010 ***       Date: D2       0.088       0.005       mg/L	Analyzed by: DQ				
Arsenic, TotalND0.01mg/LMETHOD 7060***Analyzed by: WFL Date: 08/23/950.0880.005mg/LBarium, Total0.0880.005mg/LMETHOD 6010*** Dealwood how DODO0.005mg/L	Date: 08/22/95				
METHOD 7060 *** Analyzed by: WFL Date: 08/23/95 Barium, Total 0.088 0.005 mg/L METHOD 6010 ***	Arsenic. Total		ND	0.01	mq/L
Analyzed by: WFL Date: 08/23/95 Barium, Total 0.088 0.005 mg/L METHOD 6010 ***	METHOD 7060 ***				
Date: 08/23/95         Barium, Total       0.088       0.005       mg/L         METHOD 6010 ***         Maralward hum DO	Analyzed by: WFL				
Barium, Total 0.088 0.005 mg/L METHOD 6010 ***	Date: 08/23/95				
METHOD 6010 ***	Barium, Total		0.088	0.005	mq/L
And long of the DO	METHOD 6010 ***				21 -
Analyzed by: DQ	Analyzed by: DQ				
Date: 08/22/95	Date: 08/22/95				

ND - Not detected.

(P) - Practical Quantitation Limit

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.





Certificate of Analysis No. H9-9508705-03

DROTECTA Denten Station	BROIRON NO. IL 16156
ATTN: Neal Stidham	DATE: 11/27/95
Houston, TX 77252	MESA-CAO-B-1312-01-PX-4204-NS
P.O.Box 2648	P.O.#
Shell Pipeline Corporation	

**PROJECT:** Denton Station SITE: Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control SAMPLE ID: MW-12

PROJECT NO: H 16156 MATRIX: WATER DATE SAMPLED: 08/17/95 09:30:00 DATE RECEIVED: 08/18/95

	ANALYTICAL	DATA		
PARAMETER		RESULTS	DETECTION LIMIT	UNITS
Cadmium, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95		ND	0.005	mg/L
Chromium, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95		ND	0.01	mg/L
Mercury, Total METHOD 7470 *** Analyzed by: PB Date: 08/22/95		ND	0.0002	mg/L
Acid Digestion-Aqueous, METHOD 3010 *** Analyzed by: AM Date: 08/21/95	ICP	08/21/95		
Acid Digestion-Aqueous, METHOD 3020 *** Analyzed by: AM Date: 08/21/95	GF	08/21/95		

ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.





Certificate of Analysis No. H9-9508705-03

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 11/27/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-12 **PROJECT NO:** H 16156 **MATRIX:** WATER **DATE SAMPLED:** 08/17/95 09:30:00 **DATE RECEIVED:** 08/18/95

	ANALYTICAL	DATA		
PARAMETER		RESULTS	DETECTION LIMIT	UNITS
Lead, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95		ND	0.05	mg/L
Selenium, Total METHOD 7740 *** Analyzed by: WFL Date: 08/23/95		ND	0.008	mg/L
Calcium, Dissolved METHOD 6010 *** Analyzed by: DQ Date: 08/24/95		75.2	0.5	mg/L
Chloride METHOD 325.3 * Analyzed by: ET Date: 08/20/95		45	1	mg/L
Carbonate, as CaCO3 METHOD SM 4500-CO2D ** Analyzed by: DSE Date: 08/21/95		ND	1	mg/L
Specific Conductance METHOD 120.1 * Analyzed by: DSE Date: 08/21/95		670	1	umhos/cm

ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.





Certificate of Analysis No. H9-9508705-03

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 11/27/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-12 PROJECT NO: H 16156 MATRIX: WATER DATE SAMPLED: 08/17/95 09:30:00 DATE RECEIVED: 08/18/95

	ANALYTICAL DATA		
PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Bicarbonate, as CaCO3 METHOD SM 4500-CO2D ** Analyzed by: DSE Date: 08/21/95	228	1	mg/L
Potassium, Dissolved METHOD 6010 Analyzed by: DQ Date: 08/24/95	ND	5	mg/L
Magnesium, Dissolved METHOD 6010 Analyzed by: DQ Date: 08/24/95	17.4	0.5	mg/L
Sodium, Dissolved METHOD 6010 Analyzed by: DQ Date: 08/24/95	37.1	0.5	mg/L
Nitrate nitrogen(as N) METHOD 353.3 Analyzed by: ET Date: 08/20/95	1.6	0.1	mg/L
pH METHOD 150.1 * Analyzed by: DSE Date: 08/21/95	8.12		pH units

ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.





Certificate of Analysis No. H9-9508705-03

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 11/27/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-12 PROJECT NO: H 16156 MATRIX: WATER DATE SAMPLED: 08/17/95 09:30:00 DATE RECEIVED: 08/18/95

	ANALYTICAL	DATA		
PARAMETER		RESULTS	DETECTION LIMIT	UNITS
Sulfate METHOD 375.4 * Analyzed by: ST Date: 08/21/95		. 62	5	mg/L
Total Dissolved Solids METHOD 160.1 * Analyzed by: JS Date: 08/21/95		468	4	mg/L

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.





Certificate of Analysis No. H9-9508705-03

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 MESA-CAO-B-131 ATTN: Neal Stidham

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-12 P.O.# MESA-CAO-B-1312-01-PX-4204-NS 11/27/95

**PROJECT NO:** H 16156 **MATRIX:** WATER **DATE SAMPLED:** 08/17/95 09:30:00 **DATE RECEIVED:** 08/18/95

ANALYTICAL DATA					
PARAMETER	RESULTS	PQL*	<b>UNITS</b>		
Naphthalene	ND	1.4	µg/L		
1-Methylnaphthalene	ND	1.4	μg/L		
2-Methylnaphthalene	ND	1.4	μg/L		
Acenaphthylene	ND	1.2	μg/L		
Acenaphthene	ND	1.2	μg/L		
Fluorene	ND	1.0	μg/L		
Phenanthrene	ND	0.84	μg/L		
Anthracene	ND	1.4	μg/L		
Fluoranthene	ND	0.72	$\mu q/L$		
Pyrene	ND	0.68	μq/L		
Benzo (a) anthracene	ND	0.62	μg/L		
Chrysene	ND	0.79	μg/L		
Benzo (b) fluoranthene	ND	1.4	μg/L		
Benzo (k) fluoranthene	ND	1.9	μg/L		
Benzo (a) pyrene	ND	1.1	$\mu g/L$		
Dibenzo (a,h) anthracene	ND	1.6	μg/L		
Benzo (g,h,i) perylene	ND	1.3	μg/L		
Indeno (1,2,3-cd) pyrene	ND	1.2	μg/L		
SURROGATES	% RECOVI	ERY			
2-Fluorobiphenyl	83				

ANALYZED BY: APM DATE/TIME: 08/22/95 02:48:00 EXTRACTED BY: VM DATE/TIME: 08/20/95 15:00:00 METHOD: 8100 - Polynuclear Aromatic Hydrocarbons NOTES: \* - Practical Quantitation Limit ND - Not Detected NA - Not Analyzed

COMMENTS:





Certificate of Analysis No. H9-9508705-04

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 11/27/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Provided by SPL **SAMPLE ID:** Trip Blank PROJECT NO: H 16156 MATRIX: WATER DATE SAMPLED: 08/03/95 DATE RECEIVED: 08/18/95

ANALYTICAL	DATA		
PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1 P	µg/L
TOLUENE	ND	1 P	µg/L
ETHYLBENZENE	ND	1 P	µg/L
TOTAL XYLENE	ND	1 P	μg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		µg/L
Surrogate	% Recovery		
1,4-Difluorobenzene	102		
4-Bromofluorobenzene	95		
METHOD 8020***			
Analyzed by: VHZ			
Date: 08/21/95			

ND - Not detected.

(P) - Practical Quantitation Limit

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

NEW MEXICO ENERGY, MINERALS AND NATURAL REFOURCES DEPARTMENT

#### OIL CONSERVATION DIVISION

2040 S. Pacheco Santa Fe, New Mexico 87505

November 7, 1995

CERTIFIED MAIL RETURN RECEIPT NO. 2-765-962-509

Mr. Neal Stidham Shell Pipe Line Corporation Two Shell Plaza P.O. Box 2099 Houston, Texas 77252-2099

RE: GROUND WATER DEVELOPMENT WATER DENTON AND LEA CRUDE PUMP STATIONS LEA COUNTY, NEW MEXICO

Dear Mr. Stidham:

The New Mexico Oil Conservation Division (OCD) has completed a review of Shell Oil Products Company's (SOPC) October 23, 1995 "DEVELOPMENT WATER, DENTON STATION AND LEA STATIONS". This document contains SOPC's request to dispose of monitor well development and purge water on the surface at each station. The request is based upon the analytical results of the waters generated during development and purging.

The above referenced request is approved.

If you have any questions, please call me at (505) 827-7154.

Sincerely/

William C. Olson Hydrogeologist Environmental Bureau

xc: Jerry Sexton, OCD Hobbs District Supervisor Wayne Price , OCD Hobbs Office

> OFFICE OF THE SECRETARY - P. O. BOX 6429 - SANTA FE, NM 87505-6429 - (505) 827-5950 ADMINISTRATIVE SERVICES DIVISION - P. O. BOX 6429 - SANTA FE, NM 87505-6429 - (505) 827-5925 ENERCY CONSERVATION AND MANAGEMENT DIVISION - P. O. BOX 6429 - SANTA FE, NM 87505-6429 - (505) 827-5900 FORESTRY AND RESOURCES CONSERVATION DIVISION - P. O. BOX 6429 - SANTA FE, NM 87505-6429 - (505) 827-5830 MINING AND MINERALS DIVISION - P. O. BOX 6429 - SANTA FE, NM 87505-6429 - (505) 827-5830 OIL CONSERVATION DIVISION - P. O. BOX 6429 - SANTA FE, NM 87505-6429 - (505) 827-5870 OIL CONSERVATION DIVISION - P. O. BOX 6429 - SANTA FE, NM 87505-6429 - (505) 827-7131 PARK AND RECREATION DIVISION - P. O. BOX 1447 - SANTA FE, NM 87504-1147 - (505) 827-7465

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NEW MEXICO ENERGY, M'MERALS AND NATURAL REMOUNCES DEPARTMENT

#### OIL CONSERVATION DIVISION

2040 S. Pacheco Santa Fe, New Mexico 87505

November 7, 1995

CERTIFIED MAIL RETURN RECEIPT NO. Z-765-962-509

Mr. Neal Stidham Shell Pipe Line Corporation Two Shell Plaza P.O. Box 2099 Houston, Texas 77252-2099

#### RE: GROUND WATER INVESTIGATION REPORT DENTON CRUDE PUMP STATION LEA COUNTY, NEW MEXICO

Dear Mr. Stidham:

The New Mexico Oil Conservation Division (OCD) has completed a review of Shell Oil Products Company's (SOPC) October 25, 1995 "ADDITIONAL DELINEATION, DENTON STATION". This document contains the results of SOPC's recent investigation of the extent of ground water contamination related to SOPC's Denton Crude Station in Lea County, New Mexico.

The investigation activities as contained in the above referenced document are satisfactory. However, the extent of contamination of contamination was apparently not completely defined since the concentrations of benzene in the eastern downgradient monitor well MW-11 are well in excess of New Mexico Water Quality Control Commission (WQCC) ground water standards. Therefore, the OCD requests that SOPC submit a work plan to the OCD for completing the definition of the extent of contamination to the OCD by January 12, 1996.

If you have any questions, please call me at (505) 827-7154.

Sincerely,

William C. Olson Hydrogeologist Environmental Bureau

xc: Jerry Sexton, OCD Hobbs District Supervisor Wayne Price , OCD Hobbs Office

> OFFICE OF THE SECRETARY - P. O. BOX 6429 - SANTA FE, NM 87505-6429 - (505) 827-5950 ADMINISTRATIVE SERVICES DIVISION - P. O. BOX 6429 - SANTA FE, NM 87505-6429 - (505) 827-5925 ENERGY CONSERVATION AND MANAGEMENT DIVISION - P. O. BOX 6429 - SANTA FE, NM 87505-6429 - (505) 827-5900 FORESTRY AND RESOURCES CONSERVATION DIVISION - P. O. BOX 6429 - SANTA FE, NM 87505-6429 - (505) 827-5930 MINING AND MINERALS DIVISION - P. O. BOX 6429 - SANTA FE, NM 87505-6429 - (505) 827-5970 OIL CONSERVATION DIVISION - P. O. BOX 6429 - SANTA FE, NM 87505-6429 - (505) 827-5970 OIL CONSERVATION DIVISION - P. O. BOX 6429 - SANTA FE, NM 87505-6429 - (505) 827-7131 PARK AND RECREATION DIVISION - P. O. BOX 1147 - SANTA FE, NM 87504-1147 - (505) 827-7465



Shell Oil Products Company

Two Shell Plaza P. O. Box 2099 Houston, TX 77252-2099

1 14 Hel B 52

October 25, 1995

William Olson State of New Mexico Oil Conservation Division Environmental Bureau 2040 S. Pacheco St. Santa Fe, New Mexico 87504

### SUBJECT: ADDITIONAL DELINEATION, DENTON STATION

Dear Mr. Olson,

Enclosed is the report for the additinal groundwater investigation at Denton Station. The purpose of the investigation was to establish monitoring wells down gradient of the subsurface plume. This work was conducted to fulfill the conditions of your authorization letter of July 24, 1995. With the exception of benzene in MW-11, all other parameters tested were either below detection or below the State standards for a domestic water supply. Due to a lack of either odor or evidence of contamination during well installation or sampling, MW-11 was resampled on September 18 to confirm the presence or absence of benzene. The September sample was .45 ppm. All wells will be sampled during October and the results provided in the quarterly report. We will review the data collected to date and will contact you with our proposal. If you have any questions please call me at 713-241-2961.

Sincerely,

Stick

Neal Stidham Staff Engineer Shell Oil Company Representing Shell Pipe Line Corporation

cc: Paul Newman-EOTT Energy Corp. Jerry Sexton-OCD Hobbs

### Soil Boring and Monitor Well Installation Operations

On July 6, 1995 and July 7, 1995, ESC drilled three soil borings to total depths ranging from 67 to 70 feet below ground surface using an air rotary drilling rig. Monitor well placement was specifically designed to evaluate the hydrogeologic conditions and delineate the extent of hydrocarbon impact. Monitoring wells MW-11 and MW-12 were placed down gradient from MW-1, MW-2, and MW-6 to complete the delineation of the dissolved hydrocarbon plume and to determine if off-site migration of petroleum hydrocarbons has occurred along the eastern property boundary. Monitor well MW-10 was located in a cross gradient position relative to the impacted area to determine the horizontal extent and magnitude of the free-floating crude oil layer previously identified in wells MW-3 and MW-7.

The drill cuttings and soil samples obtained during the drilling operations were monitored for indications of hydrocarbon impact. Soil samples were collected at five foot intervals and immediately above groundwater using a split spoon sampler. The samples were field screened with a Century 128 organic vapor analyzer (OVA). The soil samples collected during drilling registered no OVA readings greater than 1 ppm and exhibited no hydrocarbon odors or staining. Because no indication of any hydrocarbon contaminants were observed, no soil samples were submitted for laboratory analysis. A complete listing of the OVA readings is provided on the drilling logs in Appendix B.

After drilling and logging the borings, the borings were converted to groundwater monitoring wells. The screened interval in each of the wells extends from approximately 50 feet below ground surface to a total depth between 63 to 70 feet and was designed to set the screen approximately 5 feet above the top of the water table and penetrate at least 10 feet of the aquifer.

The monitoring wells were constructed of 2-inch diameter schedule 40 PVC well casing and 0.02-inch factory slotted screen. The screened portion of the monitoring wells was surrounded by a sand pack of clean silica sand with a grain size large than the well screen slots. The sand pack extends from the bottom of the boring to one foot above the top of the screen. Above the sand pack, a 4 foot thick bentonite plug was installed in the annular space of the bore hole to provide a watertight seal. The annular space above the bentonite seal was then grouted to surface with portland cement containing 5% bentonite. Locking well caps and a steel flush-mount well cover surrounded by a 2.5 foot by 2.5 foot concrete pad were installed at each well. Well construction diagrams are included in Appendix B.

### Site Hydrogeology

The soils encountered during the drilling operations consisted of approximately 47 feet of light brown to white calcareous silty fine-grained sand (caliche) which overlays a 4 foot thick layer of

red-brown indurated sandstone. The sandstone is underlain by a pink non-calcareous to calcareous fine-grained to medium grained sand (SM). This sand extends from approximately 51 feet to a depth of 70 feet below ground surface (maximum boring depth). The drilling logs are included in Appendix B and provide a more detailed description of the subsurface conditions encountered at the site.

After the additional monitor wells were installed and surveyed, monitor wells MW-1, MW-2, MW-4, MW-6, MW-8, MW-9, MW-10, MW-11, and MW-12 were gauged on July 22, 1995 and August 17, 1995 to determine the presence of free-floating crude, groundwater elevation, and direction of groundwater flow. Depth to the water table ranged from approximately 52 feet to 56 feet below ground surface with the apparent direction of groundwater flow toward the southeast. A hydraulic gradient of 0.00197 was calculated for the eastern half of the site based on the groundwater elevation map (Appendix A).

No free-floating hydrocarbons were observed in the monitoring wells during gauging operations with the exception of a 0.8 foot thick layer in MW-1. Monitor wells MW-3, MW-5, MW-7 and the abandoned water well (WW-1) each contain a hydrocabon-only recovery pump and were not gauged during this investigation. A summary of groundwater elevation measurements and light non-aqueous petroleum liquids (LNAPL) thickness is listed in Table 1 (Appendix C).

### **Groundwater Sampling and Analytical Results**

Monitor wells MW-10, MW-11, and MW-12 were gauged prior to sampling in order to determine the depth to groundwater and calculate the volume of water in the well bore.

The monitor wells were developed on August 17, 1995 by surge bailing using a manual bailer to remove fines. Approximately 21 gallons, 26 gallons, and 24 gallons of water was removed from monitor wells MW-10, MW-11, and MW-12, respectively, during development operations. The purged groundwater was stored on-site in labeled drums pending water analytical results to determine disposal methods in accordance with NMOCD regulations.

After development, dissolved oxygen (DO) measurements were performed on-site and groundwater samples were obtained from the monitoring wells using a dedicated disposable bailer. The groundwater samples were transported on ice to the laboratory for benzene, toluene, ethylbenzene, and total xylenes (BTEX), polynuclear aromatic hydrocarbons (PAH), total dissolved solids (TDS), major cations / anions, and heavy metals analysis using EPA approved methods.

SO1R128.SAM

Analytical results from the samples collected by ESC on August 17, 1995 recorded PAH, major cations/anions, TDS and heavy metal concentrations well below the New Mexico Water Quality Control Commission standards for use as a domestic water supply.

Total dissolved BTEX levels ranged from less than the method detection limit of 0.001 mg/l (parts per million; ppm) in monitor wells MW-10 and MW-12 to 0.63 ppm in MW-11. The BTEX concentration recorded for MW-11 was composed entirely of benzene. A second sample collected on September 18, 1995 to confirm the presence of benzene in MW-11 recorded a benzene level of 0.45 ppm.

The elevated dissolved BTEX concentrations exhibited in MW-11 indicate the dissolved hydrocarbon plume extends off-site along the facility's east boundary.

A summary of the water analytical results is presented in Tables 2 and 3 (Appendix C). A dissolved hydrocarbon concentration map is illustrated in Appendix A. The laboratory reports and chains-of-custody are included in Appendix D.

#### **Conclusions**

Based on the findings of this subsurface investigation, the free-floating crude oil plume is restricted to an area near the center of the site with the downgradient edge of the plume ending near MW-1. The groundwater analytical results indicate the dissolved hydrocarbon plume is primarily restricted to an on-site area in the southeast corner of the site with the downgradient edge of the plume extending off-site along the facility's east boundary in the vicinity of MW-11.

ESC appreciates the opportunity to provide you with our professional services. If you have any questions, please do not hesitate to contact us.

Respectively, Environmental Spill Control, Inc.

F. Wesley Root

F. Wesley Root Division Manager Geology/Hydrology

FWR/fwr

Attachments

SO1R128.SAM

### APPENDIX A

### FIGURES





# APPENDIX B

DRILLING LOGS

Company S Location: [	Drilled for: Shell Pipeline ( Denton Station	Corporation	SPILL CC FIONE (SC) FAX (SC)	NMENT DNTROL, I 5) 392-6167 5) 397-5085	AL Drill	ing	Log	•
	SW4 Sec 15, T Lea Co., New I	19S, R37E Mexico	Well/Bore Number: MW-10	Dote D	Drilled: Driller: 7-6-95 AH		Logged By: F. Wes	ly Root
Drilling Me	thod: Air Rotary	Depth of Boring: 70 Feet	Depth of Well: 67	Feet	Length of Cosing: 52 Feet	Length	of Screen: 15	Feet
Bore Diam	eter: 6 Inch	Cosing Diameter: 2 Inch	Screen Diometer: 2	Inch	Slot Size: 0.02 Inch	Well Mat	<sup>terial:</sup> SCH 40 P	vc
Depth		Lilhology	Sample Type	OVA (PPM)	Remarks		Well	Depth
	Ground Surface			10.07	<u>1.224.2%()***()*)*****************************</u>		Coalgit	
	Fractured caliche cu	overed with a thin	0					
<u> </u>	Light argy inducator	t limestone (egliebe)						5_
E	Light gray indurated	imesione (caliche).	Split-Spoon	<1				
E_ 10			Split-Spoon	- 21				10
			Cuttings	<1				
<u> </u>	Red-brown slightly	colcareous fine-grained sand	Split-Spoon	<1				15
F	(caliche).		Cuttings	<1				
<b>−</b> <sup>20</sup>	Light brown and wh	nite calcareous fine-grained	Split-Spoon	<1				
	caliche lenses.	uning scattered indurated	Cuttings	<1		ſ		
25			Split-Spoon	<1				
E 30	Hard Streak		Cuttings	<1				
			Split-Spoon	<1				
E 35			Cuttings	<1				35 _
F			Split-Spoon	<1				
E 40			Split=Speep					40
E			Cuttings	<1				
45	Hard Streak		Split-Spoon	<1				45
-			Cuttings	<1				
<u> </u>	Red-brown indurate	d sandstone.	Split-Spoon					50
- 55	Pink fine to modium		Cuttings	<1				
	containing scattered	indurated calcareous lenses.	Split-Spoon	_<1	.Water encountered during			55
60					oming @ 56 fr.			60 -
F			Cuttings	<i>c</i> 1				
<u> </u>			ouningo					65
<u> </u>	Pottom of hard of	70/	Split-Spoon	<1				70 _
E	BOTTOM OF BORING @	/0						
<b>75</b>								75
E								
					Grout			80
85					Bentonite			
F								
E 90					Sand			90 _
E					Casing			
<u> </u>								95 _
E I					Screen			
100								100
- 105								105

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Company ( S Location:	Drilled for: Shell Pipeline C Denton Station	Corporation	SPILL CO FILL CO FX (50	NMENT, DNTROL, 5) 392-6167 5) 397-5085	AL_ Inc.	Drilli	ng	Log	r
	W4 Sec 15, I .ea Co., New M	19S, R37E Mexico	Well/Bore Number: MW-11	Dote [	Drilled: 7-7-95	Driller: AH		Logged By: F. We	sly Root
Drilling Me	Air Rotary	Depth of Boring: 70 Feet	Depth of Well: 70	Feet	Length of Casing:	50 Feet	Length	of Screen: 2	0 Feet
Bore Diam	eter: 6 Inch	Casing Diameter: 2 Inch	Screen Diameter: 2	Inch	Slot Size: 0.	02 Inch	Well Ma	teriol: SCH 40	PVC
Depth		Lifhology	Sample Type	OVA (PPM)		Remarks		Well Design	Depth
0	Ground Surface								0
	Fractured caliche co layer of sandy loar	overed with a thin n.	Cuttings	<1					
5	Light gray indurated	l limestone (caliche).	Split-Spoon	<u>र</u> 1	4				5
F 10	Red-brown slightly	calcareous fine-arained sand	Cuttings	<1					
-	(SM).	•	Split-Spoon	<1			ĺ		
E_ 15	Light brown and wh sand (caliche) conto	ite calcareous fine-grained aining scattered indurated	Split-Spoon	<1 <1	}				15
	Cullente lenses.		Cuttings	<1					_ ]
20 E			Split-Spoon	বা					
25			Cuttings	<1					25
			Cuttings	<1					
30			Split-Spoon	<1			ļ		30
- 75			Cuttings	<1					75
	Pink slightly calcore	ous to calcareous sand (SM).	Split-Spoon	<1					
E_ 40			Cuttings	<1					40
Ē			Cuttings	<1					
<u> </u>			Split-Spoon	<1					45
E 50	Red-brown indurated	d sandstone.	Cuttings	<1					50
E	Pink fine to medium	grained sand (SM)	Split-Spoon	<u></u>					
55	containing scattered	indurated calcareous lenses.	Split-Spoon	<1	.Water encounter drilling @ 54 ft.	red during			55
			Cuttings	-1	-				60
<u> </u>			Cuttings	<1 					65
E 70	Bottom of boring @	70'	Split-Spoon	<1					70
E 75	-								75 -
80					•••••	Grout			80 _
					U.M.D.	Bentonite			
						See. 4			85
E_ 90						Sand			90 _
E I						Casing			
95						Screen			95
L 100					L				
105									105

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SW4 Sec 15, 1195, 837E         Ref Corr         New Max Co         <	Company D S Location: D	brilled for: hell Pipeline ( Denton Station	Corporation	SPILL CO PHONE (SO FX (SO	ONTROL, 1 5) 392-6167 6) 397-5085	AL Inc.	Drilli	ng	Log	
Design of Vetter       Dask of Vetter       Display of Vetter       Displa	SW4 Sec 15, T19S, R37E Lea Co., New Mexico			Well/Bore Number: MW-12	Date C	Drilled: 7-7-95	Driller: AH	Logged By: F. Wesly Root		y Root
Dec Gurrietr:     Clong Dometer:     2 Inch     Som Size:     0.02 Inch     Well Malanet:       0     Creand Surface     Inch     Son Size:     0.02 Inch     Well Malanet:       0     Creand Surface     Inch     Son Size:     0.02 Inch     Well Malanet:       0     Creand Surface     Inch     Curlings     Cl       10     Creand Surface     Inch     Curlings     Cl       10     Def Grave deline caved with a thin     Curlings     Cl       10     Sill Socan     Cl       10     Sill Socan     Cl       11     Curlings     Cl       10     Sill Socan     Cl       11     Sill Socan     Cl       11     Sill Socan     Cl       11     Sill Socan     Cl       12     Uph Innews and while colorescus fire-grained     Curlings     Cl       13     Sill Socan     Cl       14     Sill Socan     Cl       15     Pick fires is medium grained scad (SM)       15     Pick fires is medium grained scad (SM)       165     Pick fires is medium grained scad (SM)       165     Split Spocen     Cl       165     Pick fires is medium grained scad (SM)       165     Split Spocen     Cl	Drilling Met	<sup>hod:</sup> Air Rotary	Depth of Boring: 70 Feet	Depth of Well: 63	Feet	Length of Casing	: 48 Feet	Length of	Screen: 15	Feet
Imple         Density         Density <thdensity< th=""> <thdensity< th=""> <thden< td=""><td>Bore Diame</td><td>eter: 6 Inch</td><td>Casing Diameter: 2 Inch</td><td>Screen Diometer: 2</td><td>Inch</td><td>Slot Size: 0.</td><td>.02 Inch</td><td>Well Mate</td><td>riol: SCH 40 P</td><td>VC</td></thden<></thdensity<></thdensity<>	Bore Diame	eter: 6 Inch	Casing Diameter: 2 Inch	Screen Diometer: 2	Inch	Slot Size: 0.	.02 Inch	Well Mate	riol: SCH 40 P	VC
0         Grand Surface         0         Grand Surface         0         0           1         Freedrad califies evered with a thin         0	Depth		Lilhology	Sample Type	OVA (PPM)		Remarks		.Well Design	Depth
Fradured colories adverse with a him       Cutlings       <1	•	Ground Surface	<u> Antonio (n</u>	<u>&gt; 27492 (1971) (1981) (1987) (</u>		<u> Alley, dar Milling, di</u>	<u>, 1994 - 1997 - 1997 - 1997 - 1997 - 1997</u>	<u>A' '''''' (</u>		0
5         Light grey induroted limestene (cellche),         Split-Spoon	Ē	Fractured catiche ca laver of sandy loan	overed with a thin n.	Cuttings	<1				••.	
10     Liph breen ord while colorinus fine-grained solutings     <1	5	Light gray indurated	d limestone (caliche).	Split-Spoon		-				5_
10       Self-Secon          15       Self-Secon          20       Light brown and white colouraous fine-grained collings          21       Self-Secon          20       Light brown and white colouraous fine-grained collin-scoor          21       Self-Secon          22       Cuttings           23       Cuttings           34       Self-Secon           24       Cuttings           35       Cuttings           36       Self-Secon           37       Self-Secon           38       Cuttings           40       Cuttings           50       Red-brown Induroind sendstone.       Solf-Secon          51       Prix fine to medium grained send (SM) ecoleraous lennes.       Cuttings          52       Prix fine to medium grained send (SM) ecoleraous lennes.       Cuttings          53       Prix fine to medium grained send (SM) ecoleraous lennes.           54       Prix fine to medium grai	Ē			Cuttings	<1					
15       Cuttings       <1	10			Split-Spoon	<1	-				10
15       3500       Cuttings       C1         20       Light brown and while colocraous fine-grained inducated send (colicite) containing scattered inducated Cuttings       Cuttings       C1         20       Sold Space       Cuttings       C1         30       Sold Space       C1         31       Sold Space       C1         32       Sold Space       C1         33       Sold Space       C1         34       Space       C1         35       Sold Space       C1         36       Space       C1         36       Space       C1         35       Sold Space       C1         36       Space       C1         36       Space       C1         36       Space       C1         36       <	E			Cuttings	<1					
20         Cuttings         <1           21         Light brown and while colorerous fine-grained collins isness.         SDIII-Sp6an         SCI           25         Solins isness.         Solins isness.         Solins isness.         20           30         Solins isness.         Solins isness.         Solins isness.         21           30         Solins isness.         Solins isness.         Solins isness.         22           30         Solins isness.         Solins isness.         Solins isness.         23           30         Solins isness.         Solins isness.         Solins isness.         30           30         Solins isness.         Solins isness.         Solins isness.         Solins isness.           50         Red-brown indurated sandstone.         Solins isness.	15			Splif-Spoon	<1	 -} -				15
20       Upth brown and while solarneys fine-proined scalered indurated calche lenses.       Soll::Solor:       C         30       Cuttings       <1	E I			Cuttings	<1	ţ.				
some celleney containing scattered indurated         Cuttings         <1	20	Light brown and wh	hite calcareous fine-grained	Split-Spoon	<1	4				20
25       SBIII - Seean       <1		caliche lenses.	aining scattered indurated	Cuttings	<1			ļ		
30       Cuttings       <1	- 25			Split-Spoon	<1	4				
30       SBHT-Sboon       <1				Cuttings	<1					
35       Cuttings       <1	30			Split-Spoon	<1	4				
33       Salit-Spean       <1	- 75			Cuttings	<1					75
40       Cuttings       <1	E 33			Split-Spoon	<1					
45       Split-Spoon       <1	- 40			Cuttings	<1	,				40 =
45       Cuttings       <1	E			Split-Spoon	<1	1				
50       Split-Space       <1	E 45			Cuttings	<1	j				45
50     Red-brown inducated sandstone.     Split-Spoon     <1				Split-Spoon	<1	]				
Split-Speen       <1	E_ 50	Dad kasun tadunaka		Cuttings	<1					50
55     Pink fine to medium grained sand (SM) containing scattered indurated calcareous lenses.     Split-Spoon     <1		Red-brown indurate	a sanasione.	Split-Spoon	<1	.Water encounte	red during			
containing scattered indurated colcareous lenses.       Split=Speen       <1	55	Pink fine to medium	m grained sand (SM)	Cuttings	<1	drilling @ 52 fi	•			55
60       Cuttings       <1	E I	containing scattered	l indurated calcareous lenses.	Spin_Spoon						
65       Cuttings       <1	E 60			2						60
65       5       65       70         70       Bottom of boring @ 70'       70       70         80       Grout       80       80         83       Grout       80       80         90       Grout       85       90         91       Casing       95       95         100       Screen       100				Cuttings	<1					
70       Split-Spoon       <1	65									65
70       Split-Spoon       <1	E			]						
75	<u> </u>	Pattern of baring @	. 70'	Split-Spoon	<1					70
75       80       Grout       80         85       85       80       80         90       Sand       90       90         91       Casing       95         100       Screen       100		bollom of boring w	70							-
80 85 90 90 95 100 80 80 80 80 80 80 80 80 80	E_ 75			t i i i i i i i i i i i i i i i i i i i	ĺ					75
80     Grout     80       85     Bentonite     85       90     Sand     90       20     Casing     95       100     Screen     100						لعتيا				
85 90 90 - 100 - 100	80						Grout			80
- 63     Sand     90       - 90     - 63     Sand       - 90     - 63     - 63       - 90     - 63     - 63       - 90     - 63     - 63       - 90     - 63     - 63       - 90     - 63     - 63       - 90     - 63     - 63       - 90     - 63     - 63       - 90     - 63     - 63       - 90     - 63     - 63       - 95     - 63     - 63       - 95     - 63     - 63       - 100     - 100     - 100				}			Bentonite			
90 90 - 95 - 100 - 100	85 									85
95 95 100							Sand			an 1
95 	- 30						Casina			06
Screen Screen 100	= <sub>95</sub>									95
							Screen			
	100									100 _
	=									
	105									105





TABLES

TABLE 1												
SUMMARY OF GROUNDWATER MEASUREMENTS												
DENTON STATION												
Well	Date	Depth to	Water	Casing	Surface	LNAPL						
Name	Gauged	Water*	Elevation**	Elevation**	Elevation**	Thickness						
MW-1	07/22/95	56.68	47.45	103.47	101.07	0.80						
MW-1	08/15/95	56.69	47.44	103.47	101.07	0.81						
MW-2	07/22/95	54.12	47.23	101.35	99.17	0.00						
MW-2	08/15/95	54.14	47.21	101.35	99.17	0.00						
MW-4	07/22/95	54.02	47.44	101.46	99.98	0.00						
MW-4	08/15/95	54.03	47.43	101.46	99.98	0.00						
MW-6	07/22/95	55.70	47.71	103.41	101.52	0.00						
MW-6	08/15/95	55.71	47.70	103.41	101.52	0.00						
MW-8	07/22/95	55.00	48.49	103.49	101.56	0.00						
MW-8	08/15/95	55.01	48.48	103.49	101.56	0.00						
MW-9	07/22/95	54.06	47.65	101.71	99.66	0.00						
MW-9	08/15/95	54.09	47.62	101.71	99.66	0.00						
MW-10	07/22/95	52.24	47.55	99.79	100.12	0.00						
MW-10	08/15/95	52.15	47.64	99.79	100.12	0.00						
MW-11	07/22/95	53.79	47.18	100.97	101.31	0.00						
MW-11	08/15/95	53.81	47.16	100.97	101.31	0.00						
MW-12	07/22/95	51.43	46.96	98.39	98.45	0.00						
MW-12	08/15/95	51.44	46.95	98.39	98.45	0.00						

\* Well casings are marked to provide consistent reference points for gauging operations.

\*\* Calculated from a relative datum using a benchmark = 100.00 feet.

Correction equation for the water elevation suppression effect caused by the presence of LNAPLs.

Corrected water elevation = Elevation - (Depth to water - (Specific gravity \* LNAPL thickness))

where specific gravity = 0.82 for crude oil (measured).

All measurements are in feet.

WA	T DENTO TER SAMPLE	ABLE 2 ON STATION ANALYTICAL RE	SULTS	
The second second	MW-10	MW-11	MW-11	MW-12
Date Sampled	8-17-95	8-17-95	9-18-95	8-17-95
Volatile Organic Compo	unds (VOCs)		1.10.0.00	
Benzene	< 0.001	0.63	0.45	< 0.001
Toluene	<0.001	< 0.005		<0.001
Ethylbenzene	< 0.001	< 0.005		< 0.001
Total Xylenes	<0.001	< 0.005		<0.001
Polynuclear Aromatic Hy	drocarbons (PAH	s)		
Naphthalene	0.005	<0.0014		< 0.0014
Acenaphthylene	< 0.0012	<0.0012		< 0.0012
Acenaphthene	< 0.0012	<0.0012		< 0.0012
Fluorene	< 0.001	< 0.001		< 0.001
Phenanthrene	<0.00084	<0.00084		<0.00084
Anthracene	< 0.0014	<0.0014		< 0.0014
Fluoranthene	<0.00072	<0.00072		< 0.00072
Pyrene	<0.00068	<0.00068		<0.00068
Benzo(a)anthracene	< 0.00062	< 0.00062		< 0.00062
Chrysene	<0.00079	< 0.00079		< 0.00079
Benzo(b)fluoranthene	< 0.0014	<0.0014		< 0.0014
Benzo(k)fluoranthene	< 0.0019	<0.0019	1. S. 6. 19	< 0.0019
Benzo(a)pyrene	< 0.0011	<0.0011		< 0.0011
Indeno(1,2,3-cd)pyrene	< 0.0012	<0.0012		< 0.0012
Dibenz(a,h)anthracene	< 0.0016	<0.0016		< 0.0016
Benzo(g,h,i)perylene	<0.0013	<0.0013		<0.0013

VOC, and PAH results reported in mg/l (parts per million (ppm). Analyses were conducted using EPA Method 8020 (VOCs) and EPA Method 8100 (PAH) by Southern Petroleum Laboratories. The sample collected on September 19, 1995 from MW-11 was analyzed for benzene only.

TABLE 3										
WATER SAMPLE ANALYTICAL RESULTS										
Analytical Parameter	MW-10	MW-11	MW-12	EPA Analytical Method						
Major Cation/Anions										
Silver	<0.005	<0.005	<0.005	6010.000						
Arsenic	<0.010	<0.01	<0.01	7060.000						
Barium	0.088	0.244	0.088	6010.000						
Cadmium	<0.005	<0.005	< 0.005	6010.000						
Chromium	<0.01	<0.01	<0.01	6010.000						
Mercury	<0.0002	<0.0002	<0.0002	7470.000						
Lead	<0.05	<0.05	<0.05	6010.000						
Selenium	<0.008	<0.008	<0.008	7740.000						
Calcium	73.600	113.000	75.200	6010.000						
Chloride	28.000	58.000	45.000	325.300						
Carbonate	<1.0	<1.0	<1.0	SM4500-C02D						
Specific Conductance	626.000	882.000	670.000	120.100						
Bicarbonate	288.000	414.000	228.000	SM4500-C02D						
Potassium	<5	<5	<5	6010.000						
Magnesium	17.500	26.000	17.400	6010.000						
Sodium	37.400	42.200	37.100	6010.000						
Nitrate	0.500	<0.05	1.600	353.300						
Additional Param	neters Measure	d	· · · · · · · · · · · · · · · · · · ·							
Dissolved Oxygen (DO)	4.800	3.400	4.800							
рН	7.660	8.100	8.120	150.100						
Sulfate	54.000	73.000	62.000	375.400						
TDS	314.000	312.000	468.000	160.100						
Analytical results reported in mg/l (parts per million (ppm). Specific conductance results										

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reported in umhos/cm. Analyses were conducted using the listed EPA Methods by Southern Petroleum Laboratories. Samples were collected on August 17, 1995.

# APPENDIX D

### ANALYTICAL RESULTS



SPL, INC.

### **REPORT APPROVAL SHEET**

### WORK ORDER NUMBER: <u>95 - 09 - 681</u>

Approved for release by:

de-

M. Scott Sample, Laboratory Director

Brent Barron, Project Manager

Date: <u>9/25/95</u> Date: <u>9/23/95</u> Date: <u></u>



Certificate of Analysis No. H9-9509681-01

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 09/22/95

PROJECT: ESC Job No. 128
SITE: Lea County, NM
SAMPLED BY: Shell Oil Company
SAMPLE ID: MW-11

**PROJECT NO:** H16159 **MATRIX:** WATER **DATE SAMPLED:** 09/18/95 17:15:00 **DATE RECEIVED:** 09/19/95

	ANALYTICAL DATA		
PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Benzene	450	10 P	µg/L
Surrogate 1,4-Difluorobenzene 4-Bromofluorobenzene METHOD 8020*** Analyzed by: YN Date: 09/21/95	<b>% Recovery</b> 106 77		

(P) - Practical Quantitation Limit

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

Project Manager Inc., -

# QUALITY CONTROL DOCUMENTATION



BATCH QUALITY CONTROL REPORT \*\* METHOD 8020

PAGE HOUSTON LABORATORY 8880 INTERCHANGE DRIVE HOUSTON, TEXAS 77054 PHONE (713) 660-0901

Matrix: μg/L Units:

LABORATORY CONTROL SAMPLE

Batch Id:

HP\_J950921101300

S P I K B C O M P O U N D S	Method Blank Result <2>	Spike Added <3>	Blank Spike Result Recovery <1> %		QC Limits(**) (Mandatory) % Recovery Range
Benzene	ND	50	59	118	61 - 123
Toluene	ND	50	56	112	62 - 122
EthylBenzene	ND	50	57	114	56 - 119
O Xylene	ND	50	57	114	32 - 160
M & P Xylene	ND	100	120	120	32 - 160

#### MATRIX SPIKES

S P I K E C O M P O U N D S	Sample Results	Spike Added	Matrix	Spike	Matrix Dupli	Spike	MS/MSD Relative %	QC 1	Limits (***) (Advisory)
			Result	Recovery	Result	Recovery	Difference	RPD	
	<2>	<3>	<1>	<4>	<1>	<5>		Max.	Recovery Range
BENZENE	ND	20	25	125	25	125	0	25	39 - 150
TOLUENE	ND	20	22	110	21	105	4.65	26	56 - 134
ETHYLBENZENE	ND	20	21	105	19	95.0	10.0	38	61 - 128
O XYLENE	ND	20	17	85.0	15	75.0	12.5	20	40 - 130
M & P XYLENE	DM	40	32	80.0	28	70.0	13.3	20	43 - 152

Analyst: YN Sequence Date: 09/21/95 SPL ID of sample spiked: 9509715-05A Sample File ID: J\_\_\_123.TX0 Method Blank File ID: Blank Spike File ID: J\_\_106.TX0 Matrix Spike File ID: J\_\_\_136.TX0 Matrix Spike Duplicate File ID: J\_\_\_137.TX0

SAMPLES IN BATCH (SPL ID) :

\* = Values Outside QC Range NC = Not Calculated (Sample exceeds spike by factor of 4 or more) ND = Not Detected/Below Detection Limit % Recovery = [( <1> - <2> ) / <3> ] x 100 LCS % Recovery =  $(<1> / <3>) \times 100$ Relative Percent Difference = |(<4> - <5>) / [(<4> + <5>) x 0.5] x 100(\*\*) = Source: (\*\*\*) = Source: SPL-Houston Historical Data

9509708-03A 9509681-01A 9509635-09A 9509702-03A 9509715-05A 9509715-06A 9509715-04A 9509692-01A 9509672-01A

OC Officer
# CHAIN OF CUSTODY

# AND

## SAMPLE RECEIPT CHECKLIST

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Shell Pip	e Line	Cort			CHECK ONE	BOX ONLY	ст/от				ANA (CHEC	LYSIS K APPR	REQUE	ST: BOX)			Б	ĒR		MARKS	
SITE ADDRESS: URNTON WIC #: ESC JOB NO. CONSULTANT NAME & ADDRESS: ENV.	5+2+10 v4,1N 128 128	k cw M Mal S	exico ipil Con	the of	OUARTERLY MO		5461 5442				(CI+) SBN	NBS (+52)	00				0				
P.0, Bex 5890, 120 He DAS, NEW MC CONSULTANT CONTACT: F. W	3 West Xice 25/ey	8824 8824	VAM		NATER FOR DI	HHO SAS	5443	 	0208	ARBONS PID/FID	0018		D ROSWS				208				
PHONE: <u>505-392-6167</u> SAMPLED BY: <u>7 Шил</u>	For Tony	202	305-68	<u>ה</u>	NATER SAMPL	I NHO SAS -:	5453	NIATNOO FO	905 🗆			VOL 625/PPL	D 1.814 F	D. DOM 2708 Di	D SJATAM XC		ANJEN			•	
SAMPLE I.D. DATE	TIME	OMP. GRAB	MATRIX H2O SOIL AIR		ER METHO	PRESERVED	отнея	CON.	хэта	BTEX	PNAP	REMI	аунат	TCLP	EP TC	REAC	<mark>eð</mark>				
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RELINQUISHED BY: ( SIGMATURE)	DATE	TIME	RECEIVED	SIG .	MATURE)	OATE/	Jan 1	1 0 H	YS a	NORM	AL)		1	<b>₹</b> 0	DAYS HER 3	- Nor	mak	Per	5020	contro.	13
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# SPL Houston Environmental Laboratory

# Sample Login Checklist

Time: Date: 9/19/95 1150

SPL Sample ID:

# 9509681

			Yes	No
1	Chain-of-Custody (COC) form is pre	esent.		
2	COC is properly completed.			
3	If no, Non-Conformance Worksheet	has been completed.		
4	Custody seals are present on the ship	oping container.		
5	If yes, custody seals are intact.			
6	All samples are tagged or labeled.			
7	If no, Non-Conformance Worksheet	has been completed.		
8	Sample containers arrived intact			
9	Temperature of samples upon arrival	: INTACT	~ ~ ~	° C
10	Method of sample delivery to SPL:	SPL Delivery		
		Client Delivery		
		FedEx Delivery (airbill #)		
		Other:		
11	Method of sample disposal:	SPL Disposal	_	
		HOLD		
		Return to Client		

Name:	9'Bgt	Date: 9/19/95
		, , ,



SPL, INC.

## REPORT APPROVAL SHEET

## WORK ORDER NUMBER: <u>95 - 08 - 705</u>

Approved for release by:

angle Date: \$130/95

M. Scott Sample, Laboratory Director

Brent Barron, Project Manager

Date: 8/30/95



Certificate of Analysis No. H9-9508705-01

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 08/29/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-10 PROJECT NO: H 16156 MATRIX: WATER DATE SAMPLED: 08/17/95 08:30:00 DATE RECEIVED: 08/18/95

ANALYTIC	AL DATA		
PARAMETER	RESULTS	DETECTION	UNITS
BENZENE TOLUENE ETHYLBENZENE TOTAL XYLENE TOTAL VOLATILE AROMATIC HYDROCARBO	ND ND ND ND NS ND	1 P 1 P 1 P 1 P 1 P	μg/L μg/L μg/L μg/L μg/L
Surrogate 1,4-Difluorobenzene 4-Bromofluorobenzene METHOD 8020*** Analyzed by: VHZ Date: 08/21/95	<b>% Recovery</b> 99 93		
Silver, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95	ND	0.005	mg/L
Arsenic, Total METHOD 7060 *** Analyzed by: WFL Date: 08/23/95	ND	0.01	mg/L
Barium, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95	0.088	0.005	mg/L

ND - Not detected.

(P) - Practical Quantitation Limit

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.



Certificate of Analysis No. H9-9508705-01

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 08/29/95

PROJECT: Denton Station
SITE: Lea County, New Mexico
SAMPLED BY: Environmental Spill Control
SAMPLE ID: MW-10

PROJECT NO: H 16156 MATRIX: WATER DATE SAMPLED: 08/17/95 08:30:00 DATE RECEIVED: 08/18/95

	ANALYTICAL	DATA		
PARAMETER		RESULTS	DETECTION	UNITS
Cadmium, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95		ND	0.005	mg/L
Chromium, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95		ND	0.01	mg/L
Mercury, Total METHOD 7470 *** Analyzed by: PB Date: 08/22/95		ND	0.0002	mg/L
Acid Digestion-Aqueous, METHOD 3010 *** Analyzed by: AM Date: 08/21/95	ICP	08/21/95		
Acid Digestion-Aqueous, METHOD 3020 *** Analyzed by: AM Date: 08/21/95	GF	08/21/95		

ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.



Certificate of Analysis No. H9-9508705-01

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 08/29/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-10 PROJECT NO: H 16156 MATRIX: WATER DATE SAMPLED: 08/17/95 08:30:00 DATE RECEIVED: 08/18/95

PARAMETER	ANALYTICAL DATA RESULTS	DETECTION	UNITS
Lead, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95	ND	<b>LIMIT</b> 0.05	mg/L
Selenium, Total METHOD 7740 *** Analyzed by: WFL Date: 08/23/95	ND	0.008	mg/L
Calcium, Dissolved METHOD 6010 *** Analyzed by: DQ Date: 08/24/95	73.6	0.5	mg/L
Chloride METHOD 325.3 * Analyzed by: ET Date: 08/20/95	28	1	mg/L
Carbonate, as CaCO3 METHOD SM 4500-CO2D ** Analyzed by: DSE Date: 08/21/95	ND	1	mg/L
Specific Conductance METHOD 120.1 * Analyzed by: DSE Date: 08/21/95	626	1	umhos/cm

ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.



Certificate of Analysis No. H9-9508705-01

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 08/29/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-10 PROJECT NO: H 16156 MATRIX: WATER DATE SAMPLED: 08/17/95 08:30:00 DATE RECEIVED: 08/18/95

	ANALYTICAL DATA	
PARAMETER	RESULTS	DETECTION UNITS LIMIT
Bicarbonate, as CaCO3 METHOD SM 4500-CO2D ** Analyzed by: DSE Date: 08/21/95	288	l mg∕L
Potassium, Dissolved METHOD 6010 Analyzed by: DQ Date: 08/24/95	ND	5 mg/L
Magnesium, Dissolved METHOD 6010 Analyzed by: DQ Date: 08/24/95	17.5	0.5 mg/L
Sodium, Dissolved METHOD 6010 Analyzed by: DQ Date: 08/24/95	37.4	0.5 mg/L
Nitrate nitrogen(as N) METHOD 353.3 Analyzed by: ET Date: 08/20/95	0.5	0.05 mg/L
pH METHOD 150.1 * Analyzed by: DSE Date: 08/21/95	7.66	pH units

ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.



Certificate of Analysis No. H9-9508705-01

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 08/29/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-10 **PROJECT NO:** H 16156 **MATRIX:** WATER **DATE SAMPLED:** 08/17/95 08:30:00 **DATE RECEIVED:** 08/18/95

	ANALYTICAL DATA		
PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Sulfate METHOD 375.4 * Analyzed by: ST Date: 08/21/95	54	8	mg/L
Total Dissolved Solids METHOD 160.1 * Analyzed by: JS Date: 08/21/95	314	4	mg/L

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.



Certificate of Analysis No. H9-9508705-01

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS 08/29/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-10 PROJECT NO: H 16156 MATRIX: WATER DATE SAMPLED: 08/17/95 08:30:00 DATE RECEIVED: 08/18/95

ANALYTIC	CAL DATA		
PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	5	1.4	µg/L
Acenaphthylene	ND	1.2	μg/L
Acenaphthene	ND	1.2	μg/L
Fluorene	ND	1.0	µg/L
Phenanthrene	ND	0.84	μg/L
Anthracene	ND	1.4	µg/L
Fluoranthene	ND	0.72	μg/L
Pyrene	ND	0.68	µg/L
Benzo (a) anthracene	ND	0.62	μg/L
Chrysene	ND	0.79	μg/L
Benzo (b) fluoranthene	ND	1.4	µg/L
Benzo (k) fluoranthene	ND	1.9	µg/L
Benzo (a) pyrene	ND	1.1	µg/L
Dibenzo (a,h) anthracene	ND	1.6	µg/L
Benzo (g,h,i) perylene	ND	1.3	μg/L
Indeno (1,2,3-cd) pyrene	ND	1.2	µg/L
SURROGATES	% RECOVE	RY	
2-Fluorobiphenyl	78		

ANALYZED BY: APM DATE/TIME: 08/22/95 12:45:00 EXTRACTED BY: VM DATE/TIME: 08/20/95 15:00:00 METHOD: 8100 - Polynuclear Aromatic Hydrocarbons NOTES: \* - Practical Quantitation Limit ND - Not Detected NA - Not Analyzed

COMMENTS:



Certificate of Analysis No. H9-9508705-02

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 08/29/95

PROJECT: Denton Station
SITE: Lea County, New Mexico
SAMPLED BY: Environmental Spill Control
SAMPLE ID: MW-11

PROJECT NO: H 16156 MATRIX: WATER DATE SAMPLED: 08/17/95 09:00:00 DATE RECEIVED: 08/18/95

ANALYTICAL	DATA		
PARAMETER	RESULTS	DETECTION	UNITS
BENZENE TOLUENE ETHYLBENZENE TOTAL XYLENE TOTAL VOLATILE AROMATIC HYDROCARBONS	630 ND ND 630	5 P 5 P 5 P 5 P	μg/L μg/L μg/L μg/L
Surrogate 1,4-Difluorobenzene 4-Bromofluorobenzene METHOD 8020*** Analyzed by: VHZ Date: 08/23/95	<b>% Recovery</b> 97 88		
Silver, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95	ND	0.005	mg/L
Arsenic, Total METHOD 7060 *** Analyzed by: WFL Date: 08/23/95	ND	0.01	mg/L
Barium, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95	0.244	0.005	∽ mg/L

(P) - Practical Quantitation Limit ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.



Certificate of Analysis No. H9-9508705-02

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 08/29/95

PROJECT: Denton Station
SITE: Lea County, New Mexico
SAMPLED BY: Environmental Spill Control
SAMPLE ID: MW-11

PROJECT NO: H 16156 MATRIX: WATER DATE SAMPLED: 08/17/95 09:00:00 DATE RECEIVED: 08/18/95

	ANALYTICAL	DATA		
PARAMETER		RESULTS	DETECTION	UNITS
Cadmium, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95		ND	0.005	mg/L
Chromium, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95		ND	0.01	mg/L
Mercury, Total METHOD 7470 *** Analyzed by: PB Date: 08/22/95		ND	0.0002	mg/L
Acid Digestion-Aqueous, METHOD 3010 *** Analyzed by: AM Date: 08/21/95	ICP	08/21/95		
Acid Digestion-Aqueous, METHOD 3020 *** Analyzed by: AM Date: 08/21/95	GF	08/21/95		

ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.



Certificate of Analysis No. H9-9508705-02

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 08/29/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-11 **PROJECT NO:** H 16156 **MATRIX:** WATER **DATE SAMPLED:** 08/17/95 09:00:00 **DATE RECEIVED:** 08/18/95

	ANALYTICAL DATA		
PARAMETER	RESULTS	DETECTION	UNITS
Lead, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95	ND	0.05	mg/L
Selenium, Total METHOD 7740 *** Analyzed by: WFL Date: 08/23/95	ND	0.008	mg/L
Calcium, Dissolved METHOD 6010 *** Analyzed by: DQ Date: 08/24/95	113	0.5	mg/L
Chloride METHOD 325.3 * Analyzed by: ET Date: 08/20/95	58	1	mg/L
Carbonate, as CaCO3 METHOD SM 4500-CO2D ** Analyzed by: DSE Date: 08/21/95	ND	1	mg/L
Specific Conductance METHOD 120.1 * Analyzed by: DSE Date: 08/21/95	882	1	umhos/cm

ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.



Certificate of Analysis No. H9-9508705-02

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 08/29/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-11 **PROJECT NO:** H 16156 **MATRIX:** WATER **DATE SAMPLED:** 08/17/95 09:00:00 **DATE RECEIVED:** 08/18/95

	ANALYTICAL DATA	
PARAMETER	RESULTS	DETECTION UNITS LIMIT
Bicarbonate, as CaCO3 METHOD SM 4500-CO2D ** Analyzed by: DSE Date: 08/21/95	414	1 mg/L
Potassium, Dissolved METHOD 6010 Analyzed by: DQ Date: 08/24/95	ND	5 mg/L
Magnesium, Dissolved METHOD 6010 Analyzed by: DQ Date: 08/24/95	26.0	0.5 mg/L
Sodium, Dissolved METHOD 6010 Analyzed by: DQ Date: 08/24/95	42.2	0.5 mg/L
Nitrate nitrogen(as N) METHOD 353.3 Analyzed by: ET Date: 08/20/95	ND	0.05 mg/L
pH METHOD 150.1 * Analyzed by: DSE Date: 08/21/95	8.10	pH units

ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.



Certificate of Analysis No. H9-9508705-02

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 08/29/95

PROJECT: Denton Station
SITE: Lea County, New Mexico
SAMPLED BY: Environmental Spill Control
SAMPLE ID: MW-11

**PROJECT NO:** H 16156 **MATRIX:** WATER **DATE SAMPLED:** 08/17/95 09:00:00 **DATE RECEIVED:** 08/18/95

	ANALYTICAL	DATA			
PARAMETER			RESULTS	DETECTION LIMIT	UNITS
Sulfate METHOD 375.4 * Analyzed by: ST Date: 08/21/95			73	5	mg/L
Total Dissolved Solids METHOD 160.1 * Analyzed by: JS Date: 08/21/95			312	4	mg/L

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.



Certificate of Analysis No. H9-9508705-02

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS 08/29/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-11 **PROJECT NO:** H 16156 **MATRIX:** WATER **DATE SAMPLED:** 08/17/95 09:00:00 **DATE RECEIVED:** 08/18/95

ANALYTICAL DATA						
PARAMETER	RESULTS	PQL*	UNITS			
Naphthalene	ND	1.4	μg/L			
Acenaphthylene	ND	1.2	µg/L			
Acenaphthene	ND	1.2	μg/L			
Fluorene	ND	1.0	µg/L			
Phenanthrene	ND	0.84	μg/L			
Anthracene	ND	1.4	µg/L			
Fluoranthene	ND	0.72	μg/L			
Pyrene	ND	0.68	µg/L			
Benzo (a) anthracene	ND	0.62	μg/L			
Chrysene	ND	0.79	µg/L			
Benzo (b) fluoranthene	ND	1.4	µg/L			
Benzo (k) fluoranthene	ND	1.9	μg/L			
Benzo (a) pyrene	ND	1.1	μg/L			
Dibenzo (a,h) anthracene	ND	1.6	μg/L			
Benzo (g,h,i) perylene	ND	1.3	μg/L			
Indeno (1,2,3-cd) pyrene	ND	1.2	μg/L			
SURROGATES	<b>% RECOV</b>	ERY				
2-Fluorobiphenyl	102					

ANALYZED BY: APM DATE/TIME: 08/22/95 01:46:00 EXTRACTED BY: VM DATE/TIME: 08/20/95 15:00:00 METHOD: 8100 - Polynuclear Aromatic Hydrocarbons NOTES: \* - Practical Quantitation Limit ND - Not Detected NA - Not Analyzed

COMMENTS:



Certificate of Analysis No. H9-9508705-03

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 08/29/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-12 **PROJECT NO:** H 16156 **MATRIX:** WATER **DATE SAMPLED:** 08/17/95 09:30:00 **DATE RECEIVED:** 08/18/95

ANALYTICAL	DATA		
PARAMETER	RESULTS	DETECTION	UNITS
BENZENE TOLUENE ETHYLBENZENE TOTAL XYLENE TOTAL VOLATILE AROMATIC HYDROCARBONS	ND ND ND ND	1 P 1 P 1 P 1 P 1 P 1 P	μg/L μg/L μg/L μg/L μg/L
Surrogate 1,4-Difluorobenzene 4-Bromofluorobenzene METHOD 8020*** Analyzed by: VHZ Date: 08/22/95	<b>% Recovery</b> 102 92		
Silver, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95	ND	0.005	mg/L
Arsenic, Total METHOD 7060 *** Analyzed by: WFL Date: 08/23/95	ND	0.01	mg/L
Barium, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95	0.088	0.005	mg/L

ND - Not detected.

(P) - Practical Quantitation Limit

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.



Certificate of Analysis No. H9-9508705-03

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 08/29/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-12 **PROJECT NO:** H 16156 **MATRIX:** WATER **DATE SAMPLED:** 08/17/95 09:30:00 **DATE RECEIVED:** 08/18/95

	ANALYTICAL	DATA		
PARAMETER		RESULTS	DETECTION	UNITS
Cadmium, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95		ND	0.005	mg/L
Chromium, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95		ND	0.01	mg/L
Mercury, Total METHOD 7470 *** Analyzed by: PB Date: 08/22/95		ND	0.0002	mg/L
Acid Digestion-Aqueous, METHOD 3010 *** Analyzed by: AM Date: 08/21/95	ICP	08/21/95		
Acid Digestion-Aqueous, METHOD 3020 *** Analyzed by: AM Date: 08/21/95	GF	08/21/95		

ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.



Certificate of Analysis No. H9-9508705-03

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 08/29/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-12 PROJECT NO: H 16156 MATRIX: WATER DATE SAMPLED: 08/17/95 09:30:00 DATE RECEIVED: 08/18/95

	ANALYTICAL DATA		
PARAMETER	RESULTS	DETECTION	UNITS
Lead, Total METHOD 6010 *** Analyzed by: DQ Date: 08/22/95	ND	0.05	mg/L
Selenium, Total METHOD 7740 *** Analyzed by: WFL Date: 08/23/95	ND .	0.008	mg/L
Calcium, Dissolved METHOD 6010 *** Analyzed by: DQ Date: 08/24/95	75.2	0.5	mg/L
Chloride METHOD 325.3 * Analyzed by: ET Date: 08/20/95	45	1	mg/L
Carbonate, as CaCO3 METHOD SM 4500-CO2D ** Analyzed by: DSE Date: 08/21/95	ND	1	mg/L
Specific Conductance METHOD 120.1 * Analyzed by: DSE Date: 08/21/95	670	1	umhos/cm

ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.



ertificate of Analysis No. H9-9508705-03

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 08/29/95

PROJECT: Denton Station
SITE: Lea County, New Mexico
SAMPLED BY: Environmental Spill Control
SAMPLE ID: MW-12

**PROJECT NO:** H 16156 **MATRIX:** WATER **DATE SAMPLED:** 08/17/95 09:30:00 **DATE RECEIVED:** 08/18/95

	ANALYTICAL DATA		
PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Bicarbonate, as CaCO3 METHOD SM 4500-CO2D ** Analyzed by: DSE Date: 08/21/95	228	1	mg/L
Potassium, Dissolved METHOD 6010 Analyzed by: DQ Date: 08/24/95	ND	5	mg/L
Magnesium, Dissolved METHOD 6010 Analyzed by: DQ Date: 08/24/95	17.4	0.5	mg/L
Sodium, Dissolved METHOD 6010 Analyzed by: DQ Date: 08/24/95	37.1	0.5	mg/L
Nitrate nitrogen(as N) METHOD 353.3 Analyzed by: ET Date: 08/20/95	1.6	0.1	mg/L
pH METHOD 150.1 * Analyzed by: DSE Date: 08/21/95	8.12		pH units

ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.



Certificate of Analysis No. H9-9508705-03

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 08/29/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-12 **PROJECT NO:** H 16156 **MATRIX:** WATER **DATE SAMPLED:** 08/17/95 09:30:00 **DATE RECEIVED:** 08/18/95

	ANALYTICAL	DATA		
PARAMETER		RESULTS	DETECTION LIMIT	UNITS
Sulfate METHOD 375.4 * Analyzed by: ST Date: 08/21/95		62	5	mg/L
Total Dissolved Solids METHOD 160.1 * Analyzed by: JS Date: 08/21/95		468	4	mg/L

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.



Certificate of Analysis No. H9-9508705-03

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS 08/29/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Environmental Spill Control **SAMPLE ID:** MW-12 **PROJECT NO:** H 16156 **MATRIX:** WATER **DATE SAMPLED:** 08/17/95 09:30:00 **DATE RECEIVED:** 08/18/95

ANALYTICAL DATA					
PARAMETER	RESULTS	PQL*	UNITS		
Naphthalene	ND	1.4	µg/L		
Acenaphthylene	ND	1.2	μg/L		
Acenaphthene	ND	1.2	μg/L		
Fluorene	ND	1.0	μg/L		
Phenanthrene	ND	0.84	μg/L		
Anthracene	ND	1.4	μg/L		
Fluoranthene	ND	0.72	μg/L		
Pyrene	ND	0.68	μg/L		
Benzo (a) anthracene	ND	0.62	μg/L		
Chrysene	ND	0.79	μg/L		
Benzo (b) fluoranthene	ND	1.4	μg/L		
Benzo (k) fluoranthene	ND	1.9	µg/L		
Benzo (a) pyrene	ND	1.1	μg/L		
Dibenzo (a,h) anthracene	ND	1.6	μg/L		
Benzo (g,h,i) perylene	ND	1.3	μg/L		
Indeno (1,2,3-cd) pyrene	ND	1.2	µg/L		
SURROGATES	% RECOVE	RY			
2-Fluorobiphenyl	83				

ANALYZED BY: APM DATE/TIME: 08/22/95 02:48:00 EXTRACTED BY: VM DATE/TIME: 08/20/95 15:00:00 METHOD: 8100 - Polynuclear Aromatic Hydrocarbons NOTES: \* - Practical Quantitation Limit ND - Not Detected NA - Not Analyzed

COMMENTS:





Certificate of Analysis No. H9-9508705-04

Shell Pipeline Corporation P.O.Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-1312-01-PX-4204-NS DATE: 08/29/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Provided by SPL **SAMPLE ID:** Trip Blank PROJECT NO: H 16156 MATRIX: WATER DATE SAMPLED: 08/03/95 DATE RECEIVED: 08/18/95

ANALYTICAL	DATA		
PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1 P	μg/L
TOLUENE	ND	1 P	μg/L
ETHYLBENZENE	ND	1 P	μg/L
TOTAL XYLENE	ND	1 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		μg/L
Surrogate	<pre>% Recovery</pre>		
1,4-Difluorobenzene	102		
4-Bromofluorobenzene	95		
METHOD 8020***			
Analyzed by: VHZ			
Date: 08/21/95			

ND - Not detected.

(P) - Practical Quantitation Limit

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

# QUALITY CONTROL DOCUMENTATION

## \*\* SPL BATCH QUALITY CONTROL REPORT \*\* METHOD 8020

Matrix: Units:

Benzene

Toluene

O Xylene

EthylBenzene

M & P Xylene

Aqueous µg/L

### Batch Id: HP\_R950821104600

¥

102

102

106

106

110

	<u>L</u>	ABORAT	ORY CONT	ROL SAMPL	B
SPIKE	Method	Spike	Blank	Spike	QC Limits(**)
COMPOUNDS	Blank Result	Added	Result	Recovery	(Mandatory)

<1>

51

51

53

53

110

<3>

50

50

50

50

100

<2>

ND

ND

ND

ND

ND

			<u>M A</u>	TRIX	SPIKB	<u>s</u>			
S P I K B C O M P O U N D S	Sample Results	Spike Added	Matrix	Spike	Matrix Dupli	Spike cate	MS/MSD Relative %	QC 1	Limits (***) (Advisory)
	<2>	<3>	Result <1>	Recovery <4>	Result <1>	Recovery <5>	Difference	RPD Max.	Recovery Range
BENZENE	4	20	25	105	25	105	0	25	39 - 150
TOLUENE	ND	20	23	115	23	115	0	26	56 - 134
ETHYLBENZENE	ND	20	22	110	22	110	0	38	61 - 128
O XYLENE	ND	20	23	115	23	115	0	20	40 - 130
M & P XYLENE	ND	40	46	115	45	112	2.64	20	43 - 152

Analyst: VHZ Sequence Date: 08/21/95 SPL ID of sample spiked: 9508702-01A Sample File ID: R\_\_\_963.TX0 Method Blank File ID: B\_\_950.TX0 Matrix Spike File ID: R\_\_\_951.TX0 Matrix Spike Duplicate File ID: R\_\_\_952.TX0

SAMPLES IN BATCH (SPL ID) :

\* = Values Outside QC Range NC = Not Calculated (Sample exceeds spike by factor of 4 or more) ND = Not Detected/Below Detection Limit % Recovery = [( <1> - <2> ) / <3> ] x 100 LCS % Recovery = (<1> / <3> ) x 100 Relative Percent Difference = |(<4> - <5> [ / [(<4> + <5> ) x 0.5] x 100 (\*\*) = Source: (\*\*\*) = Source: SPL-Houston Historical Data

 9508693-05A
 9508693-01A
 9508693-02A
 9508693-03A

 9508739-04A
 9508702-01A
 9508705-01A
 9508707-01A

 9508707-02A
 9508707-03A
 9508707-04A
 9508705-03A

 9508707-06A
 9508707-07A
 9508707-08A
 9508705-04A

 9508707-09A
 9507A34-10C
 5508707-08A
 9508705-04A

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Cynthia Schreiner, QC Officer

PAGE

\* Recovery Range

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123

122

119

160

160

61

62 -

56

32

32

## \*\* SPL BATCH QUALITY CONTROL REPORT \*\* METHOD 8020/602

PAGE

Aqueous Units: µg/L

Batch Id: HP\_J950822194500

SPIKE	Method	Spike	Blank	Spike	QC Limits (**)								
COMPOUNDS	Blank Result <2>	Added <3>	Result Recovery <1> *		(Mandatory) % Recovery Range								
MTBE	ND	50	44	88.0	56 - 135								
Benzene	ND	50	49	98.0	61 - 123								
Toluene	ND	50	50	100	62 - 122								
EthylBenzene	ND	50	46	92.0	56 - 119								
O Xylene	ND	50	53	106	32 - 160								
M & P Xylene	ND	100	100	100	32 - 160								

#### CONTROL CAMPLE

## MATRIX SPIKES

S P I K B C O M P O U N D S	Sample Results	Spike Added	Matrix	Spike	Matrix Duplic	Spike	MS/MSD Relative <b>%</b>	QCI	Limits(***) (Advisory)
	<2>	<3>	Result <1>	Recovery <4>	Result <1>	Recovery <5>	Difference	RPD Max.	Recovery Range
мтве	4	20	29	125	26	110	12.8	20	39 - 150
BENZENE	2	20	21	95.0	22	100	5.13	25	39 - 150
TOLUENE	ND	20	16	80.0	17	85.0	6.06	26	56 - 134
ETHYLBENZENE	ND	20	17	85.0	18	90.0	5.71	38	61 - 128
O XYLENE	1	20	19	90.0	18	85.0	5.71	29	40 - 130
M & P XYLENE	1	40	34	82.5	34	82.5	0	20	43 - 152

Analyst: VHZ Sequence Date: 08/22/95 SPL ID of sample spiked: 9508763-01A Sample File ID: J\_\_\_068.TX0 Method Blank File ID: Blank Spike File ID: J\_\_\_060.TX0 Matrix Spike File ID: J\_\_\_063.TX0 Matrix Spike Duplicate File ID: J\_\_\_064.TX0 \* = Values Outside QC Range

NC = Not Calculated (Sample exceeds spike by factor of 4 or more) ND = Not Detected/Below Detection Limit % Recovery = [( <1> - <2> ) / <3> ] x 100 LCS & Recovery = (<1> / <3> ) x 100 Relative Percent Difference = | (<4> - <5> | / [(<4> + <5> ) x 0.5] x 100 (\*\*) = Source: SPL-Houston Historical Data (\*\*\*) = Source:

SAMPLES IN BATCH (SPL ID) :

9508763-03A 9508763-02A 9508763-04A 9508763-07A 9508763-05A 9508634-03A 9508634-01A 9508754-12A 9508707-05A 9508705-02A 9508762-03A 9508763-08A 9508763-06A 9508763-01A

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Cynthia Schreiner, QC Officer

Matrix:

## \*\* SPL BATCH QUALITY CONTROL REPORT \*\* METHOD 8100\*\*\*

PAGE

Matrix: Units:

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Aqueous µg/L Batch Id: VARH950821053500

S P I K B	Method Blank Regult	Spike	Blank	Spike	QC Limits(**)
	<2>	<3>	<1>	*	<pre>% Recovery Range</pre>
Naphthalene	ND	25	23.0654	92.3	1 - 122
1-Methylnaphthalene	ND	25	21.5136	86.1	1 - 122
2-Methylnaphthalene	ND	25	21.3783	85.5	1 - 122
Acenaphthylene	ND	25	19.6551	78.6	1 - 139
Acenaphthene	ND	25	22.1652	88.7	1 - 124
Fluorene	ND	25	22.5102	90.0	1 - 142
Phenanthrene	ND	25	20.2542	81.0	1 - 155
Anthracene	ND	25	23.5470	94.2	1 - 126
Fluoranthene	ND	25	21.7276	86.9	1 - 142
Pyrene	ND	25	21.0484	84.2	1 - 140
Chrysene	ND	25	21.5292	86.1	1 - 199
Benzo (a) anthracene	ND	25	18.8380	75.4	12 - 135
Benzo (b) fluoranthene	ND	25	21.2077	84.8	6 - 150
Benzo (k) fluoranthene	ND	25	18.6155	74.5	1 - 159
Benzo (a) pyrene	ND	25	15.2472	61.0	1 - 128
Dibenzo (a,h) anthracene	ND	25	15.6523	62.6	1 - 110
Benzo (g,h,i) perylene	ND	25	17.5240	70.1	1 - 116
Indeno (1,2,3-cd) pyrene	ND	25	18.3448	73.4	1 - 116

## LABORATORY CONTROL SAMPLE

## MATRIX SPIKES

S P I K E C O M P O U N D S	Sample Results	Spike Added	Matrix Spike		Matrix Spike Duplicate		MS/MSD Relative %	QC Limits(***) (Advisory)		
,			Result	Recovery	Result	Recovery	Difference	RPD		
	<2>	<3>	<1>	<4>	<1>	<5>		Max.	Recovery Range	
NAPHTHALENE	ND	12.5	11.0097	88.1	11.2710	90.2	2.36	30	1 - 122	
1-METHYLNAPHTHALENE	ND	12.5	10.3742	83.0	10.7511	86.0	3.55	30	1 - 122	
2-METHYLNAPHTHALENE	ND	12.5	9.4670	75.7	9.7469	78.0	2.99	30	1 - 122	
ACENAPHTHYLENE	ND	12.5	8.7932	70.3	8.7802	70.2	0.142	30	1 - 139	
ACENAPHTHENE	ND	12.5	10.5174	84.1	10.5372	84.3	0.238	30	1 - 124	
FLUORENE	ND	12.5	11.5845	92.7	11.5931	92.7	0	30	1 - 142	
PHENANTHRENE	ND	12.5	11.2467	90.0	10.6712	85.4	5.25	30	1 - 155	
ANTHRACENE	ND	12.5	11.0395	88.3	11.9653	95.7	8.04	30	1 - 126	
FLUORANTHENE	ND	12.5	10.7287	85.8	11.2554	90.0	4.78	30	1 - 142	
PYRENE	ND	12.5	10.3152	82.5	10.8240	86.6	4.85	30	1 - 140	
CHRYSENE	ND	12.5	10.0235	80.2	10.9880	87.9	9.16	30	1 - 199	
BENZO (A) ANTHRACENE	ND	12.5	8.6662	69.3	9.5454	76.4	9.75	30	12 - 135	
BENZO (B) FLUORANTHENE	ND	12.5	10.6108	84.9	11.6126	92.9	9.00	30	6 - 150	
BENZO (K) FLUORANTHENE	ND	12.5	8.0262	64.2	8.9136	71.3	10.5	30	1 - 159	
BENZO (A) PYRENE	ND	12.5	6.3176	50.5	7.5300	60.2	17.5	30	1 - 128	
DIBENZO (A,H) ANTHRACENE	ND	12.5	6.5721	52.6	7.0242	56.2	6.62	30	1 - 110	

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Cynthia Schreiner, QC Officer

## \*\* SPL BATCH QUALITY CONTROL REPORT \*\* METHOD 8100\*\*\*

PAGE 0

Matrix: Aqueous Units: μg/L Batch Id: VARH950821053500

### MATRIX SPIKES

S P I K B C O M P O U N D S	Sample Results	Spike Added	Matrix	Spike	Matrix Dupli	Spike	Spike MS/MSD ate Relative %		Limits (***) (Advisory)
	<2>	<3>	Result <1>	Recovery <4>	Result <1>	Recovery <5>	Difference	RPD Max.	Recovery Range
BENZO (G,H,I) PERYLENE INDENO (1,2,3-CD) PYRENE	ND ND	12.5 12.5	7.3734 7.2706	59.0 58.2	7.9551 7.5114	63.6 60.1	7.50 3.21	30 30	1 - 116 1 - 116

Analyst: APM

Sequence Date: 08/21/95 SPL ID of sample spiked: 9508596-02B Sample File ID: H\_\_\_892.TX0 Method Blank File ID: Blank Spike File ID: H\_\_\_914.TX0 Matrix Spike File ID: H\_\_\_894.TX0 Matrix Spike Duplicate File ID: H\_\_\_895.TX0 \* = Values Outside QC Range NC = Not Calculated (Sample exceeds spike by factor of 4 or more) ND = Not Detected/Below Detection Limit \* Recovery = [( <1> - <2> ) / <3> ] x 100 LCS \* Recovery = (<1> / <3> ) x 100 Relative Percent Difference = |(<4> - <5> | / [(<4> + <5> ) x 0.5] x 100 (\*\*) = Source: SPL-Historical Data (\*\*\*) = Source: Temporary Limits

SAMPLES IN BATCH (SPL ID) :

9508705-01B 9508705-02B 9508705-03B 9508735-01A 9508735-02A 9508735-04A 9508735-03A

Cynthia Schreiner, QC Officer

## ICP Spectroscopy Method 6010 Quality Control Report



Matrix: Water

Units: mg/L

Analyst: DOUSTON LABORATORY 8880 INTERCHANGE DRIVE HOUSTON Checkedio

Laboratory Control Sample

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver	ND	2.00	1.943	97	1.60	2.40
Aluminum						
Arsenic						
Barium	ND	2.00	1.958	98	1.60	2.40
Beryllium	ND	2.00	1.997	100	1.60	2.40
Calcium						
Cadmium	ND	2.00	1.928	96	1.60	2.40
Cobalt						
Chromium	ND	2.00	1.986	99	1.60	2.40
Copper						
Iron	ND	2.00	1.984	99	1.60	2.40
Potassium						
Magnesium						
Manganese						
Sodium						
Nickel	ND	2.00	1.940	97	1.60	2.40
Lead	ND	2.00	1.948	97	1.60	2.40
Antimony	ND	4.00	3.926	98	3.20	4.80
Selenium						
Thallium						
Vanadium	ND	2.00	1.852	93	1.60	2.40
Zinc			L	<u> </u>		

Work Orders in Batch Work Order Fractions 95-08-690 01C 95-08-691 01C 95-08-705 01C-3C 95-08-770 01C, 02C 95-08-649 02F 95-08-660 01A

Matrix Spike - Spike Duplicate Results

Work Order Spiked: 95-08-690 01C

	Sample	Spike	Matr	ix Spike	Matrix Spi	ke Duplicate	QC Limits		Spike	QC
Element	Result	Added	Result	Recovery	Result	Recovery	% Red	covery	RPD %	Limits %
Silver	ND	1.0	0.9779	98	0.9561	96	80	120	2.3	20.0
Aluminum										
Arsenic										
Barium	0.1051	1.0	1.108	100	1.086	98	80	120	2.2	20.0
Beryllium	ND	1.0	0.9977	100	0.987	99	80	120	1.1	20.0
Calcium										
Cadmium	ND	1.0	0.9832	98	0.9622	96	80	120	2.2	20.0
Cobalt										
Chromium	ND	1.0	0.9992	100	0.981	98	80	120	1.8	20.0
Copper										
Iron	2.746	1.0	3.814	107	3.682	94	80	120	13.2	20.0
Potassium										
Magnesium										
Manganese										
Sodium										
Nickel	ND	1.0	0.994	99	0.9631	96	80	120	3.2	20.0
Lead	ND	1.0	1.011	101	0.973	97	80	120	3.8	20.0
Antimony	ND	2.0	1.978	99	1.958	98	80	120	1.0	20.0
Selenium										
Thallium										
Vanadium	ND	1.0	0.9447	94	0.9243	92	80	120	2.2	20.0
Zinc										

8/23/95 vene1 Idelis Williams, QC Officer

		ICP Spec	tros	py Method	1 6010 QU	ality Contro	orepo	π		
		-	/	Matrix: Diss	solved	Units: mg/L		Analy		
			®	Date:082495	Time:0850	File Name: 82	2495DQ2		HOUS Checked	TON. TILYAS 7
	La	boratory Co	ntrol Sam	ple			•			x salag
Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit	Worl	k Orde	rs in Batch	UATI 13
Silver	ND	1.00	0.994	99	0.90	1.10	Work C	Order	Fractions	
Aluminum							95-08-	792	01B, 02B	
Arsenic							95-08-	793	01A, 02A	
3arium	ND	5.00	4.904	98	4.50	5.50	95-08-	794	01A	
Beryllium							95-08-	705	01D-03D	
Calcium	ND	5.00	4.942	99	4.50	5.50				
Cadmium	ND	5.00	4.948	99	4.50	5.50				
Cobalt										
Chromium	ND	5.00	4.923	98	4.50	5.50				
Copper	ļ				ļ	ļ				
ron				ļ	ļ	<u> </u>		•		
Potassium	ND	25.00	24.520	98	22.50	27.50				محيم المحديق فا
Magnesiùm	ND	5.00	4.916	98	4.50	5.50			• • • • • •	
Manganese	· ·	· · .	ŀ	· · ·	ļ	ĮÌ	•		•	• •
Sodium	ND	5.00	4.907	98	4.50	5.50				
Nickel										
ead	ND	5.00	4.952	99	4.50	5.50				
Antimony					<b></b>					
Selenium				1						
<u> Thallium</u>						ļ				
anadium/			<u> </u>			L				
			l							
Matrix Spik	e - Spike D	uplicate Re	sults		Work Orde	er Spiked: 95	-08-792	02B		
	Sample	Spike	Mat	rix Spike	Matrix Sp	ike Duplicate	QC Li	imits	Spike	QC
Element	Result	Added	Result	Recovery	Result	Recovery	% Rec	overy	RPD %	Limits %
Silver	ND	1.0	0.927	93	0.9111	91	80	120	1.7	20.0
Aluminum					<u> </u>				<u> </u>	
Arsenic					L					
Barium	0.4659	1.0	1.405	94	1.395	93	80	120	1.1	20.0
Beryllium										
Calcium	17.02	10.0	26.01	90	25.85	88	80	120	1.8	20.0
Cadmium	ND	1.0	0.9813	98	0.9825	98	80	120	0.1	20.0
Cobalt					ļ					
Chromium	ND	1.0	0.9797	98	0.976	98	80	120	0.4	20.0
Copper					<u> </u>					
ron										
Potassium	6.94	10.0	16.08	91	15.88	89	80	120	2.2	20.0
Magnesium	7.015	10.0	16.6	96	16.51	95	80	120	0.9	20.0
Manganese										
Sodium	7.198	10.0	16.53	93	16.43	92	80	120	1.1	20.0
Vickel										
_ead	ND	1.0	0.9752	98	0.9567	96	80	120	1.9	20.0
Antimony										
Selenium										
Thallium										
/anadium										
Zinc										

Elements Bench Spiked: All

h Idolis Williams, QC Officer lenel

8/25/95



•	· •			<b>1</b> [			ç 1	5 X	Т		X
000		3649 - IF	Sample ID			507705-1C-	male #'s in Batch	ethod: 77	cst Code:	lement: H	
Son LCS 70 F Sample used   See Case Nar	<ul> <li>= Values ( MS or MSD of RPD out of C</li> </ul>	#3 ND	Dians and Check Method Dlank			30		2)7	Hall		
for QA/QC onl rative	Outside QC Ra out of QA/QC I QA/QC Limits (	2.00	LCS Cone. Theoretical	Charles		GCB/dala.					
ÿ	nge Jimits (% Rec. (20 %)	#3 74.0	LCS % Recovery			- <i> A</i>		File #: UX	Time: 7	Dale: 8/2	SPL
	75-125)	ND	Sample Conc.	-		DF FEDDA		LCH	52.	Alomic Abs $2/95$	QUALIT
the Idelis	Analyst	2.00	Spike Added			)-10, <del>č</del> e		ł	I	orption Ana	Y CONTH
Williams, QC	In Tan	2.01	Spike Conc.	Malrie Chile and		950% 49			Matrix:	Analyst	ROL SUM
Officer	Anna -	2.08	Spike Dup. Conc.	Chike Dunlicate F		- JE		Leachate:	Soll 🔲	.97	IMARY
	J. T	100.5	Spike % Rec.				í S		Water	<b>\</b>	
Date 8/2	Date 8/22	104.0	Spike Dup. % Rec					Other	]	Units_NN	
20/2	2/95	Ŵ	% RPD							2	R.c. 494



# Wet Chemistry QA/QC Validation Report

Test Code: <u>CLD</u> # Samples in Batch:_ (Sample #'s Listed Be	Test Name <u>CH</u> Date: <u>8-3</u> <u>17</u> Matrix: <u>L1</u> elow)	<u>LORIDE</u> 20-95 T RUID L	īme <u>/2:<i>00 PI</i></u> Inits: <u>M9/L</u>	Method:	= T 325·3	
9508737-1A	9.50 8657-1A,2A				1	
9508464-IE	9508672-IF					
9508734-1A,2A	9508673-IF					
7508705-1D->3D	9508674-1F					
2508630-1B→4B	9508777-IE			···		المراقع المراجع
ويربق والمستعد فالشاف المستعد المتعاد والتبع						

				QC Lin	tits (**)
Standards	Actual Concentration	Theoretical Concentration	% Recovery	Upper	Lower Limit
Blank	ND	ND	\$	NA	NA
Check Std. 1	100.97	100.00	100.97	102-8	99.3
Check Std. 2			<u> </u>		
Check Std. 3					
LCS	12.49	12.06	E00 103.5.6	110.00	90.00

						1	MS/MSD	QC Limit	LS (**)
	Sampie	Spike	Matrix	Spike	Matrix Soil	ke Ouplicate	Relative	(Advisc	лгу)
Spike	Result	Added	Results	% Recovery	Results	% Recovery	Percent		Recovery
Sample ID	<2>	<2>	<1>	<4>	<1>	<5>	Difference	RPD Max.	Range
8705-1D	27.99	50.00	77.98	99.98	77.98	99.98	¢	2.7	109.3.2
8630-1B	30.99	50.00	81.97	101.96	80.97	99.96	1.98	2.7	109:33.2
	ĺ	<u> </u>							
	<u></u>								
·				<u></u>					
	<u></u>	·	1	<u> </u>	·				
Soike Boon	inne Calmularia	<u></u>				Relative Per	ent Nifferenc	a Calculation	

% Rec. = <1> - <2> X 100

\* = Values Outside of QC Range (\*\*) = Source: SPL Houston Historical

X 100 <4> - <5> <4> + <5> X 0.5

8/22/95 **Reviewed By** Date: 8/22/95 Date: Approved By:

Uluel Ideli's Williams, OC Officer

% RPD =

Date: 8

Wet Chemistry QA/	QC Validation Report
-------------------	----------------------

Test	Name: C	DUCTIVITY	
A Test Code: COND.	Date:	8-21-95	AnalystDSĘ
hod 120.1	Time:	8:30 m	Matrix Miquid Soil Other
f Samples in Batch: 4			Reporting Units: <u>umhos/cm</u> .

\_ Sample #'s in Batch:

	9508705 -10,20 \$ 30	
	9508777 -19	
· · · · · · · · · · · · · · · · · · ·		
		,

				QC Lir	nits (**)
				(Mand	atory)
	· Actual	Theoretical		Upper	Lower
Standards	Concentration	Concentration	Percent Recovery	Limit	· -Limit
ink	0.58	21.0	DND	NA	NA
eck Standard 1	102	102	100.0	100.5	99.3
eck Standard 2	994	994	100.0		
eck Standard 3	10150	10175	99.8		
S (Outside Source)	1409	1409	100.0	II	

## PLICATES

A/QC Duplicate	Sample Result <1>	Sample Result <2>	Relative Percent Difference	CC LIMITS (**) (Advisory) Relative Percent Difference Max.
508705-1D	625	628	2:0	2.7
- 2D	880	884	0.4	- 2.7
- 3D	669	671	0.3	
508777-1G	549	552	0:5	
			· · · · · · · · · · · · · · · · · · ·	

ive Percent Difference (RPD) Calculation:



(\*\*) = Source: SPL Houston Historical Data

WETDUPCARC Rev. 4/94

\* = Indicates Value Outside CA/OC Range Auleak 2 Approved B Date: 1une Oate:

faldelis Williams, CC Officer

(B)	

WEIDUPCARC Rev. 4/84

Wet Chemistry QA/QC Validation Report

lest Na	me: <u>(A</u>	RBONNIE	
AM Test Code: <u>C03</u>	Date:	8-21-95	_ AnalystDSE
ethod 4500D-(02	Time:	9:00 Am	_ Matrix Cliquid Soil Other
of Samples in Batch: 5			Reporting Units: Mg/L

PL Sample #'s in Batch:

	9508705-10-73D	
	950 <b>8</b> 657 - IA, ZA	
·		

				QC Lin	nits (**)
				(Mand	atory)
	* Actual	Theoretical		Upper	Lower
Standards	Concentration	Concentration	Percent Recovery	Limit	-Limit
ank					
heck Standard 1					
neck Standard 2					
neck Standard 3					
CS (Outside Source)	14.0	11.85	//8./	16.65	9.21

JPLICATES

QA/QC Dupi SPL Sampi	licate e ID	Sample Result <1>	Sample Result <2>	Relative Percent Difference	QC LIMITS (**) (Advisory) Relative Percent Difference Max.
9508657	-/A	20	20	Ð	2.2
	-ZA	ND	ND	Ø	- 2.2.
1					

sative Percent Difference (RPD) Calculation:

8PD = <1> - <2> X 100 (<1> + <=>) x 0.5



(\*\*) - Source: SPL Houston Historical Data

• = Indicates Value Outside OA/OC Range

'Olula ( Approved E Date: line Date: B

Idells Williams, OC Officer


WETDUPCARC Rev. 4/94

Wet Chemistry QA/QC Validation Report

Test Na	me: <u> </u>	CMEBONATE	
Test Code: HO3	Date:	8-21-95	Analyst:DSE
10d 4500-D COL	Time:	9:00 Am	Matrix Liquid Soil Other
Samples in Batch: 5			Reporting Units: Mg/L

Sample #'s in Batch:

508705 -10->3D	9508657-1A, 2A	

				QC Lir (Mand	nits (**) atory)
Standards	· Actual Concentration	Tneoretical Concentratión	Percent Recovery	Upper Limit	Lower -Limit
<u>×</u>					
k Standard 1					
:k Standard 2					
x Standard 3					
(Outside Source)	14.0	11.85	118.1	16.65	9.21

LICATES

/QC Duplicate <sup>-</sup> L Sample ID	Sample Result <1>	Sample Result <2>	Relative Percent Dífference	QC LIMITS (**) (Advisory) Relative Percent Difference Max.
8657- 1A	36	36	Ø	3.0
- 2A	520	520	0	- 3.0 .
			1	
	-			

· Porcent Difference (RPD) Calculation:

APD = (<1> + <2>) x 0.5

ed Bv N Date: 8/

X 100

(\*\*) - Sourca: SPL Houston Historical Data

• = Indicatas Value Ouraide QAQC Range

Aula Approved By: 1 Il ine Oate:

for Idelit's Williams, CC Officer



## Wet Chemistry QA/QC Validation Report

Test Code:_ <u>N03</u> # Samples in Batch: <u>4</u> (Sample #'s Listed Below)	Date: <u>8-20-95</u> Matrix: <u>2/8/UID</u>	Time <u>9:00 A M</u> Units: <u>M9/L</u>	Analyst <u>E7</u> Method: <u>353-3</u>
9508705-10-23D			
9508777-IE			· · · · · · · · · · · · · · · · · · ·
		<u> </u>	

				QC Lin (Mand	nits (**) atory)
Standards	Actual Concentration	Theoretical Concentration	% Recovery	Upper Limit	Lower
Blank	ND	- ND	Ø	NA	NA
Check Std. 1 "A"	0.51	0.50	102.00	110.00	90.00
Check Std. 2 "E"	0.51	0.50	102.00 .		
Check Std. 3 "D"	0.50	0.50	100-00		
LCS	051	0.50	102.00		

	Sampie	Spike	Matrix	Spike	Matrix Spil	ke Duplicate	MS/MSD Relative	QC Limi (Adviso	ts (**) ary)
Spike Sample ID	Result <2>	Added <3>	Results <1>	% Recovery <4>	Results <1>	% Recovery <5>	Percent Difference	RPD Max.	Recovery Range
<u>87<i>6</i>5-</u> 2D	ND	0.5	0-53	106.00	0.54	108.00	1.86	20.00	1217 77.3
	·····								
									<u> </u>
Spike Recove	ery Calculatio	n				Relative Perc	ent Difference	Calculation	
% Rec. =	<1> - <2>	X 100	• = Values C	Jutside of QC	Range	% RPD =	<4> -	<5>	X 100

(\*\*) = Source: SPL Houston Historical

<3> Reviewed By:\_ Julic Approved By:

foldelie Williams, QC Officer

95

<4> + <5> X 0.5

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<u>JPL</u>		WEIDUPCARC Rev. 4/0
W	let Chemistry QA/QC Vali	dation Report
Test Na SAM Test Code: <u>PH</u> Method_ <u>۱۹۵۱</u> # of Samples in Batch: <u>6</u>	ame: <u>pH Hydrogen</u> Date: <u>8-21-95</u> Time: <u>8:45 Am</u>	Analyst: <u>DSE</u> Matrix DLiquid DSoil Other Reporting Units: <u>pH units</u>

SPL Sample #'s in Batch:

9508712 10-20	
9508205 10-30	
4608777 16 ···	

				QC Lir	nits (**)
				(Mand	atory)
	Actual	Theoretical		Upper	Lower
Standards	Concentration	Concentration	Percent Recovery	Limit	Limit
Blank	Teno: 23.50	Shoe > 99.5%	<u> </u>		
Check Standard 1	4.00	4.00	100.0%	4.05	3.95
Check Standard 2	7.05	0.00	1007%	17.05	6.95
Check Standard 3	10.00	10.00	100.0%	10.05	9.95
LCS (Outside Source)	}				

#### DUPLICATES

QC LIMITS (**)       Relative     (Advisory)       Iple Result     Percent-       <2>     Difference       Difference     Difference Max.
54 0.01 ± 0.05 pH Unit

Relative Percent Difference (RPD) Calculation:

RPD = <1> - <2> X 100 (<1> + <2>) x 0.5

Date: 8 2195 Reviewed B

(\*\*) - Source: SPL Houston Historical Data

\* = Indicates Value Outside OA/OC Range

Date:\_\_\_\_\_\_

Approved By: / Cluball nenel Date: 8/21/95

Idelis Williams, QC Officer

TPT -	
Wet Chemistry QA/QC Validation Rep	ort
est Code: SOY       Test Name       Sulfate         Samples in Batch:       I/o       Matrix:       Matrix:         Matrix:       Liguid       Units:       Mag	Analyst ST Method: <u>375, U</u>
508464-1E 19508672-1F	
508734-1A =2A9508673-1F	F
508703.4C.6C.8C.9608674-1F	
508705-1D-732) 9508737-1A	
508657-1A-72A9508777-1E	

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· · · · · · · · · · · · · · · · · · ·				(Mand	nts (**) atory)
Standards	Actual Concentration	Theoretical Concentration	% Recovery	Upper Limit	Lower Limit
Blank	IND	I ND	NA	<u> </u>	
Check Std. 1	9.01	10,00	901	1110	90
Check Std. 2	1 19.09	20.00	95,5	1110	90
Check Std. 3					
LCS	12,75	1 13.80	92.4	110	90

	Sampie	Soike	Matrix	Soike	Marrix Soik	e Duplicate	MS/MSD Relative	QC Limit (Adviso	IS (**) ITY)	
Spike	Result	· Added	Results	% Recovery	Results	% Recovery	Percant		Recovery	
ampie ID	<2>	<3>	<1>	<4>	<1>	<5>	Difference	RPD Max.	Range	
508705 ·10	6.44	10,00	16.05	96.1	15.75	93,1	3.2	17.0	121.7/19.6	
3087371A	8,12	10,00	18,32	102.0	18.04	199,2	2,8			
		1	<u>'</u>							
								ļ		
		<u> </u>								
sike Recov	ery Calculatio	n		·		<b>Relative</b> Per	cant Oifferenc			
Rec. =	<1> - <2>	X 100	• = Values (	Outside of QC	; Range	% RPD =	<4>	- <5>	X 100	
	<u>7</u> 37	1	(**) = Sour	ce: SPL Hous	ton Historical		<4> ÷	<5> X 0.5	]	
eviewed By: 1 Date: 8/21/9/6										
:proved By	r. KOU	lul	-Bate: 8/	1/95	Light,	1/11/20	Allnes	_ Cate: <u>8</u>	21/95	
				f	Idelis Willia	ms, CC Office	r 、	/	1	

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	i	
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WEIDUPCARC Rev. 4/94

Wet Chemistry QA/QC Validation Report

Test Nan	ne: Total Dissolved Johas	
SAM Test Code: TDS	Date: 8/2//95	Analyst: <u>JS</u>
Method /60./	Time: 2:30PM	Matrix Muliquid Soil Other
# of Samples in Batch: //		Reporting Units: <u>mg/L</u>

SPL Sample #'s in Batch:

9508705-1D-73D	
9508712 -1D→2D	
95D8 738-7B-712B	

				QC Lir	nits (**)
				(Mand	latory)
	· Actual	Tneoretical		Upper	Lower
Standards	Concentration	Concentration	Percent Recovery	Limit	· -Limit
Blank	ND	</td <td>NA</td> <td></td> <td></td>	NA		
Check Standard 1	262	267.0	98.1	110	90
Check Standard 2				<u> </u>	
Check Standard 3				<u> </u>	<u> </u>
LCS (Outside Source)					

#### DUPLICATES

			Relative	QC LIMITS (**) (Adivisory)
QA/QC Duplicate	Sample Result	Sample Result	Percent	Relative Percent
SPL Sample ID	<1>	<2>	Difference	Difference Max.
9508705-10	314	312	1.3	5
9508738-78	1032	1004	2.8	· 4 ·
}				
<u> </u>				
	1		1	

Relative Percent Difference (RPD) Calculation:

RPD = X 100 <1> - <2> (<1> + <2>) x 0.5

Reviewed By Date:

(\*\*) - Source: SPL Houston Historical Data

• = Indicates Value Outside OAOC Range lus Date: Approved By h Idelie Williams, QC Officer Oate:

# CHAIN OF CUSTODY

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# AND

SAMPLE RECEIPT CHECKLIST

DISTRIBUTION: PINK Sampling Coordinator · WHITE & YELLOW Accompanies Shipment · WHITE Returned with Report

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Г			<u> </u>	1	<del>.</del>		2	>	5				5	5		1		1	T	
		RELINQUISHED BY:		RELINQUISHED BY:	7. adoley 1	RELINQUISHED BY:	NW-12	2 - WV	NW-12	MW-12	Mw-11	MW-11	MW-11	mw-11	MW-10	MW-10	MW-10	MW-10	SAMPLE I.D.	RETAIL Sh RETAIL Sh ITE ADDRESS U Le Le CONSULTANT NAME AN P.O. BOX 58 203 W. Du MA CONSULTANT CONTACT CONSULTANT CONTACT CONSULTANT CONTACT
		(SIGNATURE)		(SIGNATURE)	la Y	(SIGNATURE)	8-17-95	8-1295	8-17-55	8-17-95	8-1295	8-12-75	8-17-95	56-61-8	8-17-75	8-17-95	8-17-75	8-17-95	DATE	OIL COMPA ENVIRONN enter 5. enter 5. enter 5. enter 5. Envir goores: Envir goores: Env
		DATE		DATE	8-12-95	DATE	9:30	9:30	9:30	9:30	9:20	00:19	9:00	00:0	8:30	8;30	8;30	9;30	TIME	IENTAL IENTAL Internation In
HE LABO		TIME		TIME	15:30	TIME	7	2	4	2	7	2	2	N N	5	र र	5	र	MP. GRAB	ENGINE ENGINE Mexica L Spill 505-30
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OPY OF T	Sjisk	DATE/		DATE		DATE	7		7		7		7		5		5		D PRESERVED	OF CUS E BOX ONLY IONITORING ATION ATION ATION ATION E - SYS O+M
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TODY W	ם SAC ער		AROUND T	CONTAC	IATORY:	<u></u>													BTEX BTEX	GAS HYDROCARBONS PID/FID () WITH MTBE ()
THINV	(C)	MAL)	IME (CH	1: Nea	SPL		2	-			7				<				VOL PNA/	624/PPL 0 8240/TAL 0 NBS (+15) 0 AH 8310 0 8100 X 610 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
OICE A	5		ECK ON	c st.	1								1						SEMI	VOL 625/PPL 0 8270/TAL 0 NBS (+25) 0 H
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	per			161 FAX:						 		<u> </u>			<u> </u>				Cat B	ANION / ANION Page Date
	Centract	-		241-1124																REMARKS

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#### **Shell Oil Products Company**



Two Shell Plaza P. O. Box 2099 Houston, TX 77252-2099



October 23, 1995

William Olson State of New Mexico Oil Conservation Division Environmental Bureau 2040 S. Pacheco St. Santa Fe, New Mexico 87504

#### SUBJECT: DEVELOPMENT WATER, DENTON AND LEA STATIONS

Dear Mr. Olson,

Enclosed are copies of the laboratory results from sampling the development water at the subject stations. All samples were non-detect for benzene. With your concurrence we will surface discharge this water. If I do not hear from you within 30 days I will assume concurrence and we will proceed. If you have any questions please call me at 713-241-2961.

Sincerely,

Neal Stidham Staff Engineer Shell Oil Company Representing Shell Pipe Line Corporation

cc: Paul Newman-EOTT Energy Corp. Jerry Sexton-OCD Hobbs



Certificate of Analysis No. H9-9509366-01

Cura Inc.P.O.#6049 South Loop EastP.O.#Houston, TX 77033MESA-1312-HOEATTN: Brad SmithDATE: 09/18/95PROJECT: 24-93677S04PROJECT NO: H 13835SITE: Lea StationMATRIX: WATERSAMPLED BY: CURA, Inc.DATE SAMPLED: 09/06/95 13:00:00SAMPLE ID: D.W.DATE RECEIVED: 09/12/95

	ANALYTICAL DATA		
PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Benzene	ND	1 P	µg/L
Surrogate	% Recovery		
1,4-Difluorobenzene	102		
4-Bromofluorobenzene	83		
METHOD 8020***			
Analyzed by: RR			
Date: 09/14/95			

ND - Not detected.

(P) - Practical Quantitation Limit

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Project Manager



Certificate of Analysis No. H9-9509368-01

Cura Inc. 6049 South Loop East Houston, TX 77033 ATTN: Brad Smith

PROJECT: 24-93678S04 SITE: Denton Station SAMPLED BY: CURA, Inc. SAMPLE ID: D.W. P.O.# MESA-1312-HOE DATE: 09/18/95

PROJECT NO:	H 15784	
MATRIX:	WATER	
DATE SAMPLED:	09/06/95	16:00:00
DATE RECEIVED:	09/12/95	

	ANALYTICAL I	DATA		
PARAMETER		RESULTS	DETECTION LIMIT	UNITS
Benzene		ND	1 P	µg/L
Surrogate		<pre>% Recovery</pre>		
1,4-Difluorobenzene		102		
4-Bromofluorobenzene		87		
METHOD 8020***				
Analyzed by: RR				
Date: 09/14/95				

ND - Not detected.

(P) - Practical Quantitation Limit

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 18th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.



ON CONDERVISION DIVISION

Shell Oil Products Company



Two Shell Plaza P. O. Box 2099 Houston, TX 77252-2099

MCC 017 to Hill 8 52

August 31, 1995

# RECEIVED

William Olson State of New Mexico Oil Conservation Division Environmental Bureau 2040 S. Pacheco St. Santa Fe, New Mexico 87504 SEP 0 5 1995

Environmental Bureau Oil Conservation Division

# SUBJECT: QUARTERLY REPORTS, DENTON AND LEA STATIONS, LEA COUNTY NEW MEXICO

Dear Mr. Olson,

Enclosed are the third quarter 1995 groundwater monitoring reports for Lea and Denton Stations. The product recovery systems at both stations are now operational. Groundwater analyses show essentially no change from the previous sampling events and phase separated hydrocarbon did not develop in any additonal wells during the report period. I will be submitting the report on the additional subsurface delineation at Denton by mid-September. If you have any questions please call me at 713-241-2961.

Sincerely

Neal Stidham Staff Engineer Shell Oil Products Company Representing Shell Pipe Line Corporation

cc: Paul Newman (w/copy) EOTT Energy Corp.

> Jerry Sexton (w/copy) OCD-Hobbs



6049 South Loop East • Houston, Texas 77033 • 713/640-1490 • FAX 640-2593

August 30, 1995

Mr. Neal D. Stidham Shell Oil Products Company Two Shell Plaza, Room 1452 777 Walker Street Houston, Texas 77002

#### RE: QUARTERLY GROUNDWATER MONITORING REPORT THIRD QUARTER, 1995 DENTON STATION LEA COUNTY, NEW MEXICO

CURA PROJECT NO. 24-93678

Mr. Stidham:

CURA, Inc. has completed the groundwater monitoring and sampling operations at the above-referenced site. The work was performed in accordance with the scope of services requested by Shell Oil Products Company (SPLC) in their letter dated January 25, 1995.

Monitoring wells MW-1 through MW-9 and water well WW-1 were gauged and checked for phase-separated hydrocarbons (PSH) during sampling operations on July 18, 1995. Monitoring wells MW-2, MW-6 and MW-9 were developed and sampled by CURA on July 18, 1995. In accordance with water quality monitoring requirements set forth by the New Mexico Oil Conservation Division (NMOCD) the groundwater samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) and dissolved oxygen content (DO). The New Mexico Water Quality Control Commission (WQCC) regulations do not contain a ground water standard for total petroleum hydrocarbons (TPH). Therefore, the OCD does not require that groundwater samples be analyzed for TPH. Monitoring wells MW-1, MW-3, MW-5, MW-7, and WW-1 were not sampled due to the presence of PSH.

Groundwater Sampling and PSH Recovery

The monitoring wells were gauged on July 18, 1995 to determine the depth to groundwater and PSH thickness (if any). A summary of groundwater elevations and

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Mr. Neal D. Stidham August 30, 1995 Page 2

PSH thicknesses is presented in Table 1, Appendix B.

PSH was initially discovered on site in water well WW-1 in February of 1993, and recovery operations were initiated immediately. In September, 1993 additional onsite monitoring wells MW-1, MW-2, and MW-3 were installed. No PSH was observed in these wells during drilling or sampling operations. In March of 1994 measurable thicknesses of PSH were identified in monitoring wells MW-1 and MW-3 during routine gauging and product recovery operations at water well WW-1. CURA installed on-site monitoring wells MW-4 through MW-9 in May 1994. PSH was observed in monitoring wells MW-5 and MW-7 following installation and site-wide PSH recovery operations were initiated at that time. In July, 1995 on-site well MW-10 and off-site wells MW-11 and MW-12 were installed by Environmental Spill Control of Hobbs, New Mexico. No PSH was observed in these wells during drilling or sampling operations. During the 1995 Third Quarter, approximately 60 gallons of crude oil were removed from the site. To date, a cumulative total of approximately 715 gallons of oil has been recovered from Denton Station. Cumulative and quarterly PSH thicknesses and volumes recovered are summarized in Table 3 of this report.

In order to improve oil recovery operations, a remediation system was installed in May, 1995. The system is designed with product-only pumps that remove crude oil from the wells to a temporary holding tank. Once sufficient volumes of oil have accumulated in the tank, the oil is then transferred to an on-site sump for return to the pipeline. During the Third Quarter of 1995, the remediation system recovered approximately 59 gallons of oil.

The performance of the system is affected predominately by the viscosity of the oil and flow rate through the subsurface. Pump inlets are positioned to remove oil from the top of the water column in each well. Once pumped off, the oil must again accumulate in the wells to sufficient thicknesses to activate the pumps. As such, the limiting factor to oil removal at this site remains a function of the natural oil inflow to the wells. Mr. Neal D. Stidham August 30, 1995 Page 3

including monitoring wells MW-10, MW-11, and MW-12 was conducted on August 28, 1995 and also indicates a consistent southeastern gradient direction. PSH was observed in monitoring wells MW-1, MW-3, MW-5, MW-7, and WW-1 during gauging operations.

The monitoring wells were purged by removing approximately three well volumes of water or bailing the wells dry. The purged groundwater was stored on-site in labelled 55-gallon drums pending analysis and proper disposal. After development, DO measurements were performed on-site and groundwater samples were obtained from the monitoring wells using a disposable bailer. The groundwater samples were transported on ice to SPL Laboratories in Houston, Texas for analysis of BTEX using EPA Method 8020. Quality Assurance/Quality Control information is included in Appendix D.

#### Analytical Results

The groundwater samples obtained on July 18, 1995 indicate no significant change in dissolved hydrocarbon concentrations or in the distribution of PSH thicknesses across the site since the last sampling event in April 1995. In order to further investigate dissolved hydrocarbon impact and accumulations of crude oil along the eastern site boundary, two off-site wells (MW-11 and MW-12) were drilled on the adjacent property in July 1995. A third additional on-site well (MW-10) was installed to provide additional downgradient delineation for oil observed in monitoring well MW-7. No crude oil was observed in any of the three new wells during drilling operations or during subsequent gauging operations conducted on August 28, 1995. Analytical results from groundwater sampling of the three additional wells is not yet available, but will be included in the 1995 Fourth Quarter report. Consistent low to non-detectable hydrocarbon concentrations in downgradient monitoring wells MW-9 and MW-2 continue to indicate that southern (downgradient) delineation of the plume has been achieved.

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Mr. Neal D. Stidham August 30, 1995 Page 4

Dissolved oxygen concentrations (DO) were obtained as a possible indicator of the natural biological activity of hydrocarbon degrading microorganisms in the groundwater. Microbial and mineral oxidation reactions within the dissolved hydrocarbon plume typically result in depletion of DO so that an inverse relationship between DO and BTEX will be found where natural attenuation of the contaminant plume has occurred. DO levels recorded during 1995 Third Quarter sampling suggest that sufficient DO is present in the groundwater to encourage biological degradation of dissolved hydrocarbon. CURA will continue to monitor DO levels as a means of documenting the occurrence of natural attenuation. A summary of groundwater analytical results is presented in Table 2, Appendix B. The laboratory reports and chain-of-custody are included in Appendix C.

CURA appreciates the opportunity to provide you with our professional consulting services. If you have any questions or concerns, please do not hesitate to contact Brad Smith at (713) 640-1490.

Respectfully, CURA, Inc.

James W. Leach Environmental Geologist

Fred AL

Bradley S. Smith Project Manager

Kevin Van Hook Senior Project Manager

JWL/chs

Attachments

# APPENDICES

APPENDIX A FIGURES





APPENDIX B TABLES

#### DENTON STATION

SUMMARY OF RELATIVE GROUNDWATER LEVEL ELEVATIONS AND

	PHASE-SEPARATED HYDROCARBON THICKNESSES												
Monitoring Well	Date Gauged	Relative Ground Surface Elevation (feet)	Relative Top of Casing Elevation (feet)*	Depth to Water Below Top of Casing (feet)	Corrected Relative Groundwater Elevation (feet)**	Phase- Separated Hydrocarbon Thickness (feet)							
MW-1	09/27/93 03/29/94 05/10/94 02/08/95 04/25/95 07/18/95 08/28/95	101.07 101.07 101.07 101.07 101.07 101.07 <b>101.07</b>	103.47 103.47 103.47 103.47 103.47 103.47 103.47 <b>103.47</b>	55.41 55.71 55.77 56.17 57.84 58.31 	48.06 48.02 47.83 47.88 46.29 45.81 	0.00 0.32 0.16 0.71 0.80 0.80 							
MW-2	09/27/93 03/29/94 05/10/94 02/08/95 04/25/95 07/18/95 08/28/95	99.17 99.17 99.17 99.17 99.17 99.17 <b>99.17</b> <b>99.17</b>	101.35 101.35 101.35 101.35 101.35 101.35 <b>101.35</b>	53.48 53.64 53.70 54.03 54.05 54.12 <b>54.15</b>	47.87 47.71 47.65 47.32 47.30 47.23 <b>47.20</b>	0.00 0.00 0.00 0.00 0.00 0.00 <b>0.00</b>							
MW-3	09/27/93 03/29/94 05/10/94 02/08/95 03/28/95 03/28/95 04/25/95 07/18/95 08/28/95	101.01 101.01 101.01 101.01 101.01 101.01 101.01 101.01	102.68 102.68 102.68 102.68 102.68 102.68 102.68 102.68 101.00	54.32 61.27 55.68 60.79 61.35 61.30 	48.36 48.13 48.10 48.12 48.01 46.64 	8.20 0.00 1.34 7.60 81,5 6.42							
MW-4	05/10/94 02/08/95 04/25/94 07/18/95 <b>08/28/95</b>	99.98 99.98 99.98 99.98 99.98 <b>99.98</b>	101.46 101.46 101.46 101.46 101.46	53.63 53.78 54.21 54.82 <b>54.03</b>	47.83 47.68 47.25 46.64 <b>47.43</b>	0.00 0.00 0.00 0.00 <b>0.00</b>							
MW-5	05/10/94 02/08/95 03/28/95 04/25/95 07/18/95 08/28/95	101.71 101.71 101.71 101.71 101.71 101.71 101.71	103.54 103.54 103.54 103.54 103.54 103.54 101.86	57.77 61.91 61.42 61.50 	48.31 48.31 47.99 46.84 	3.10 8.15 7.16 5.86 							

103.41

103.41

103.41

103.41

103.41

55.25

55.26

56.57

55.90

55.71

0.00

0.00

0.00

0.00

0.00

48.16

48.16

46.84

47.71

47.70

MW-6

05/10/94

02/08/95

04/25/95

07/18/95

08/28/95

101.52

101.52

101.52

101.52

101.52

#### DENTON STATION

SUMMARY OF RELATIVE GROUNDWATER LEVEL ELEVATIONS AND PHASE-SEPARATED HYDROCARBON THICKNESSES

Monitoring Well	Date Gauged	Relative Ground Surface Elevation (feet)	Relative Top of Casing Elevation (feet)*	Depth to Water Below Top of Casing (feet)	Corrected Relative Groundwater Elevation (feet)**	Phase- Separated Hydrocarbon Thickness (feet)
MW-7	05/10/94 02/08/95 03/28/95 04/25/95 07/18/95 <b>08/28/95</b>	100.82 100.82 100.82 100.82 100.82 100.82 100.82	102.66 102.66 102.66 102.66 102.66 100.69	54.71 61.16 60.86 59.13  	48.14 48.08 48.06 48.86 	0.23 8.02 7.64 6.51 
MW-8	05/10/94 02/08/95 04/25/95 07/18/95 <b>08/28/95</b>	101.56 101.56 101.56 101.56 <b>101.56</b>	103.49 103.49 103.49 103.49 <b>103.49</b>	54.53 54.59 54.63 55.00 <b>55.02</b>	48.96 48.90 48.86 48.49 <b>48.4</b> 7	0.00 0.00 0.00 0.00 <b>0.00</b>
MW-9	05/10/94 02/08/95 04/25/95 07/18/95 <b>08/28/95</b>	99.66 99.66 99.66 99.66 <b>99.66</b>	101.71 101.71 101.71 101.71 <b>101.71</b>	53.71 53.96 64.86 54.06 <b>54.13</b>	48.00 47.75 46.85 47.65 <b>47.58</b>	0.00 0.00 0.00 0.00 <b>0.00</b>
MW-10	08/28/95	99.66	<b>99.79</b>	52.11	47.48	0.00
MW-11	08/28/95	100.98	100.97	53.83	47.14	0.00
MW-12	08/28/95	98.50	98.39	51.49	46.90	0.00

#### DENTON STATION

#### SUMMARY OF RELATIVE GROUNDWATER LEVEL ELEVATIONS AND PHASE-SEPARATED HYDROCARBON THICKNESSES

Monitoring Well	Date Gauged	Relative Ground Surface Elevation (feet)	Relative Top of Casing Elevation (feet)*	Depth to Water Below Top of Casing (feet)	Corrected Relative Groundwater Elevation (feet)**	Phase- Separated Hydrocarbon Thickness (feet)
WW-1	02/26/93	100.55	102.21	60.23	48.52	7.97
	03/05/93	100.55	102.21	56.54	48.50	3.45
	03/12/93	100.55	102.21	55.39	48.39	1.91
	03/17/93	100.55	102.21	55.19	48.46	1.76
	03/22/93	100.55	102.21	54.44	48.45	0.83
	03/31/93	100.55	102.21	55.81	48.46	2.51
l	04/08/93	100.55	102.21	57.74	48.50	4.92
	04/15/93	100.55	102.21	55.60	48.42	2.21
	04/27/93	100.55	102.21	56.08	48.43	2.81
	05/06/93	100.55	102.21	55.61	48.46	2.27
	05/13/93	100.55	102.21	55.49	48.47	2.13
1	05/21/93	100.55	102.21	55.70	48.45	2.36
	05/26/93	100.55	102.21	55.74	48.45	2.41
	05/28/93	100.55	102.21	55.23	48.46	1.80
	06/04/93	100.55	102.21	55.46	48.51	2.15
	06/11/93	100.55	102.21	55.28	48.52	1.94
	06/16/93	100.55	102.21	55.18	48.52	1.82
	03/18/94	100.55	102.21	60.70	48.03	7.96
	03/29/94	100.55	102.21	55.89	48.01	2.06
	05/06/94	100.55	102.21	58.20	47.95	4.80
	05/10/94	100.55	102.21	57.40	47.93	3.80
	05/25/94	100.55	102.21	57.18	47.91	3.51
	06/14/94	100.55	102.21	57.30	48.02	3.78
	07/13/94	100.55	102.21	57.07	48.11	3.62
	09/14/94	100.55	102.21	57.76	48.16	4.53
	10/03/94	100.55	102.21	56.71	49.97	5.45
	10/28/94	100.55	102.21	56.84	50.13	5.80
	11/28/94	100.55	102.21	59.53	47.90	6.31
	12/21/94	100.55	102.21	59.63	47.84	6.42
	02/08/95	100.55	102.21	57.40	47.93	3.80
	04/25/95	100.55	102.21	59.43	47.36	5.58
	07/18/95	100.55	102.21			
	08/28/95	100.55	102.21			

\* Measured from a relative datum (benchmark = 100.00 feet) located at the northeast corner of the concrete sump pad. The monitor well casings were marked to provide consistent reference points for future gauging operations.

\*\* Correction Equation for Phase-Separated Hydrocarbons: Corrected Groundwater Elevation = Top of Casing Elevation - (Depth to Water Below Top of Casing - [SG] [PSH Thickness]) Specific Gravity (SG) = 0.73 for gasoline, 0.85 for diesel, 0.82 for crude oil.

			T/	ABLE 2				
			DENTC	N STATIC	ON			
		WATER S	SAMPLE A	ANALYTIC	AL RESU	Л <b>TS</b>		
		<u></u>	<b></b>	Etherl	<u> </u>			Discoluted
Monitoring Well	Date Sampled	Benzene	Toluene	benzene	Xylenes	BTEX	TPH	Oxygen
MW-1	09/27/93	0.85	0.067	0.077	0.34	1.334	3	
	05/10/94	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	02/08/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	04/25/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	07/18/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
MW-2	09/27/93	0.017	< 0.001	< 0.001	<0.001	0.017	<1	
	05/10/94	0.010	< 0.001	<0.001	<0.001	0.010	<1	6.4
	02/08/95	0.048	< 0.001	<0.001	<0.001	0.048		0.8
	04/25/95	0.084	<0.001	<0.001	<0.001	0.084		4.0
	07/18/95	0.110	<0.001	<0.001	<0.001	0.110		3.2
MW-3	09/27/93	1.1	1.7	0.44	0.98	4.22	25	
	05/10/94	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	02/08/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	04/25/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	07/18/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
MW-4	05/10/94	0.041	<0.001	<0.001	0.004	0.045	2	8.4
	02/08/95	·						
	04/25/95							
	07/18/95							
MW-5	05/10/94	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	02/08/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	04/25/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	07/18/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
MW-6	05/10/94	0.680	0.001	0.001	0.083	0.765	1	4.1
ĺ	02/08/95	1.200	<0.005	0.031	0.090	1.321		1.0
	04/25/95	1.200	<0.005	0.033	0.120	1.353		2.6
	07/18/95	1.100	<0.001	0.046	0.209	1.356		2.6
MW-7	05/10/94	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	02/08/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	04/25/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH
	07/18/95	PSH	PSH	PSH	PSH	PSH	PSH	PSH

		WATER S	TA DENTO SAMPLE A	NBLE 2 N STATIC	)N !AL RESU	īLTS		
Monitoring Well	Date Sampled	Benzene	Toluene	Ethyl- benzene	Xylenes	Total BTEX	TPH	Dissolved Oxygen
MW-8	05-11-94	<0.001	<0.001	<0.001	<0.001	<0.001	<1	8.2
	02/08/95							
	04/25/95							
	07/18/95							
MW-9	05/11/94	<0.001	<0.001	<0.001	<0.001	<0.001	<1	8.2
	02/08/95	<0.001	<0.001	<0.001	<0.001	<0.001		2.3
	04/25/95	<0.001	<0.001	<0.001	<0.001	<0.001		8.4
	07/18/95	<0.001	<0.001	<0.001	<0.001	<0.001		7.4
A total disso	olved solids	(TDS) con	centration	of 515 ppr	n was rep	orted for I	MW-2 on	09-27-93.
BTEX results	listed in m/l	(narts per n	nillion: ppm)	with metho	d detection	limits liste	d on the (	certificate of

BTEX results listed in m/l (parts per million; ppm) with method detection limits listed on the certificate of analysis.

TPH and TDS results listed in mg/l (parts per million; ppm) with a method detection limit of 1 ppm. Analyses were conducted using EPA Method 8020 (BTEX), EPA Method 418.1 (TPH), and EPA Method 160.1 (TDS) by SPL Environmental Laboratories.

--- Not sampled.

#### DENTON STATION

Date	Monitoring Well	PSH Thickness (feet)	PSH Recovery (gallons)	PSH Cumulative Recovery (gallons)	Type of Recovery
02/26/93	WW-1	7.97	35.0	35.0	Hand bailed
03/05/93	WW-1	3.45	25.0	60.0	Hand bailed
03/12/93	WW-1	1.91	20.0	80.0	Hand bailed
03/17/93	WW-1	1.76	4.0	84.0	Hand bailed
03/22/93	WW-1	0.83	3.5	87.5	Hand bailed
03/31/93	WW-1	2.51	8.0	95.5	Hand bailed
04/08/93	WW-1	4.92	13.0	108.5	Hand bailed
04/15/93	WW-1	2.21	8.0	116.5	Hand bailed
04/27/93	WW-1	2.81	9.0	125.5	Hand bailed
05/06/93	WW-1	2.27	7.0	132.5	Hand bailed
05/13/93	WW-1	2.13	6.0	138.5	Hand bailed
05/21/93	WW-1	2.36	6.0	144.5	Hand bailed
05/26/93	WW-1	2.41	8.0	152.5	Hand bailed
05/28/93	WW-1	1.80	5.0	157.5	Hand bailed
06/04/93	WW-1	2.15	6.0	163.5	Hand bailed
06/11/93	WW-1	1.94	5.0	168.5	Hand bailed
06/16/93	WW-1	1.82	5.5	174.0	Hand bailed
03/18/94	WW-1	7.63	20.0	194.0	Hand bailed
03/29/94	<b>WW-1</b>	2.06	5.5	199.5	Hand bailed
05/06/94	WW-1	4.80	12.0	211.5	Hand bailed
05/10/94	WW-1	3.80	8.0	219.5	Hand bailed
05/25/94	WW-1	4.51	15.0	234.5	Hand bailed
06/14/94	WW-1	3.78	8.0	242.5	Hand bailed
07/13/94	WW-1	3.62	6.5	249.0	Hand bailed

#### DENTON STATION

Date	Monitoring Well	PSH Thickness (feet)	PSH Recovery (gallons)	PSH Cumulative Recovery (gallons)	Type of Recovery
09/14/94	WW-1	4.53	8.0	257.0	Hand bailed
10/03/94	WW-1	5.45	10.0	267.0	Hand bailed
10/28/94	WW-1	5.80	9.0	276.0	Hand bailed
11/22/94	WW-1	2.24	5.0	281.0	Hand bailed
11/28/94	WW-1	6.31	10.0	291.0	Hand bailed
12/21/94	WW-1	6.42	10.0	301.0	Hand bailed
02/08/95	WW-1	3.80	8.0	309.0	Hand bailed
04/25/95	WW-1	5.58	6.0	315.0	Hand bailed
08/17/95	WW-1		7	322	Remediation system
03/17/94	MW-1	0.32	0.2	0.2	Hand bailed
05/10/94	MW-1	0.16	<0.01	0.2	Hand bailed
06/14/94	MW-1	0.21	<.01	0.2	Hand bailed
07/13/94	MW-1	0.24	0.1	0.3	Hand bailed
08/22/94	MW-1	0.24	0.7	1.0	Hand bailed
09/14/94	MW-1	0.24	0.8	1.8	Hand bailed
10/03/94	MW-1	0.03	.2	2.0	Hand bailed
10/28/94	MW-1	0.44	1.1	3.1	Hand bailed
11/22/94	MW-1	0.37	1.0	4.1	Hand bailed
12/31/94	MW-1	0.67	1.5	5.6	Hand bailed
02/08/95	MW-1	0.71	1.5	7.1	Hand bailed
04/25/95	MW-1	0.80	0.9	8.0	Hand bailed
08/17/95	MW-1	0.80	1.0	9.1	Hand bailed
03/17/94	MW-3	8.25	7.5	7.5	Hand bailed
05/10/94	MW-3	1.34	7.0	14.5	Hand bailed

#### DENTON STATION

Date	Monitoring Well	PSH Thickness (feet)	PSH Recovery (gallons)	PSH Cumulative Recovery (gallons)	Type of Recovery
05/25/94	MW-3	3.92	4.5	19.0	Hand bailed
06/14/94	MW-3	1.88	3.0	22.0	Hand bailed
07/13/94	MW-3	2.27	4.0	26.0	Hand bailed
09/14/94	MW-3	8.48	12.0	38.0	Hand bailed
10/03/94	MW-3	8.54	12.0	50.0	Hand bailed
10/28/94	MW-3	6.87	10.0	60.0	Hand bailed
11/22/94	MW-3	3.41	8.0	68.0	Hand bailed
12/21/94	MW-3	6.20	9.0	77.0	Hand bailed
02/08/95	MW-3	7.68	10.0	87.0	Hand bailed
03/28/95	MW-3	8.15	10.0	97.0	Hand bailed
04/25/95	MW-3	6.42	10.0	107.0	Hand bailed
05/10/95	MW-3		4.0	111.0	Hand bailed
07/18/95	MW-3		15.0	126.0	Remediation system
05/10/94	MW-5	3.10	5.0	5.0	Hand bailed
05/25/94	MW-5	6.80	11.0	16.0	Hand bailed
06/14/94	MW-5	5.70	8.5	24.5	Hand bailed
07/13/94	MW-5	5.67	8.0	32.5	Hand bailed
09/14/94	MW-5	7.20	11.0	39.7	Hand bailed
10/03/94	MW-5	7.17	11.0	50.7	Hand bailed
10/28/94	MW-5	7.56	12.0	62.7	Hand bailed
11/22/94	MW-5	7.37	15.0	77.7	Hand bailed
12/21/94	MW-5	9.12	12.0	89.7	Hand bailed
02/08/95	MW-5	8.15	10.0	99.7	Hand bailed
03/28/95	MW-5	7.16	10.0	109.7	Hand bailed

### DENTON STATION

Date	Monitoring Well	PSH Thickness (feet)	PSH Recovery (gallons)	PSH Cumulative Recovery (gallons)	Type of Recovery
04/25/95	MW-5	5.86	10.0	119.7	Hand bailed
05/10/95	MW-5		4.0	124.0	Remediation system
07/18/95	MW-5		15.0	139.0	Remediation system
05/10/94	MW-7	0.23	1.0	1.0	Hand bailed
05/25/94	MW-7	1.95	2.5	3.5	Hand bailed
06/14/94	MW-7	1.65	1.5	5.0	Hand bailed
07/13/94	MW-7	1.30	1.0	6.0	Hand bailed
08/19/94	MW-7	0.17	1.0	7.0	Hand bailed
09/14/94	MW-7	9.08	15.0	22.0	Hand bailed
10/03/94	MW-7	9.15	15.0	37.0	Hand bailed
10/28/94	MW-7	7.56	12.0	49.0	Hand bailed
12/21/94	MW-7	7.93	11.0	68.0	Hand bailed
02/28/95	MW-7	8.02	12.0	80.0	Hand bailed
03/28/95	MW-7	7.64	10.0	90.0	Hand bailed
04/25/95	MW-7	6.51	10.0	100.0	Hand bailed
05/25/95	MW-7		4.0	104.0	Remediation system
07/18/95	MW-7		15.0	119.0	Remediation system
Indicates p	roduct recovery	pumps in well.			

APPENDIX C ANALYTICAL RESULTS

							5	) C	とく	$\langle  $	7						
SHELL OIL COMP. RETAIL ENVIRONI	ANY MENTAL	ENGIN	EERING	CHAIN (	DF CUST	ору н	ECOR	D NO	I		023	8				Date: 7.20 Page of	->5
				CHECK ONE	BOX ONLY C	т/от			Q	ANALYS HECK AF	PROPRI	UEST: NTE BOX			OTHEF	REMA	RKS
SITE ABDRESS: DU GU TUDE	FION	90		OUARTERLY MO	UITORING (	Sec.					0	C	0853 0860	O			
100 + 34-9367	8 504			SITE INVESTIGA	D No	17		INTBE	) (g1+) g	0		J 1955	H DTZ	YTU8A			
CONSULTANT NAME & ADDRESS:	24	TWC		SOIL FOR DISPO	C IVS	₩.		нтти 	SBN	019	(	ic pow	I HEI	IGNIT		47	
Z3i WeWadley,	1.200	Mid	land TX	WATER FOR DIS	POSAL	¥.				0	ואר ח	S108	U SBOK	۵X			
CONSULTANT CONTACT: B'AC	5	init	4 (HOUSTRY)	AIR SAMPLER - S	M+O SV	58 35		208	8240/1	0018	099WS	۵s	35 (D .	TIMSOF			
PHONE (9/5) 570- 8408	FAX:	(415)	8048-065	WATER SAMPLE	H+O SAS.	SE S	JZIS	37308	0	0	3 6 	AÐ.bo		COR	·		- (
	WIEL			OTHER			RINER		54hbbr	0168 H	D 1'817	W 9108 C	RIATEN IATEMIX				
SAMPLE I.D. DATE	TIME	WP. GRAB	MATRIX C	THER METHOD HCI HNO3	PRESERVED H2SO4 NONE	OTHER / C &	CONT	BTEX6		Aq\ANq	TPH/IR	DD/HAT		ТЭАЗЯ			
MW-2 7-1895	SHL!	Ž		7		<u> </u>	tome VA 4	$\mathbf{k}$									
MW - 6 7-1845	1700	2		>		<u> </u>	VO4	7									
MW-9 7-18-95	1600	<u>r</u> 7		7		7 3	104	7									
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (S	IGNATURE)	DATE	TIME		ġ									
Fill & Annes	7-20-95	2830						RATOR	[W خ	77	16	22	2				
RELINQUISHED BY: ( SIGNATURE )	DATE	TIME	RECEIVED BY: (S	IGNA TURE )	DATE	TIME	SHEL			12/20	alla	7	HONE			FAX:	
					Ì		TURN	AROUN	<b>JD TIME</b>	(CHEC)	K ONE)						
Relinquished BY: ( Signature)	DATE	TIME	RECEIVED BY: US	IGNATURE)	DATE/ 7/249	TIME - <i>1030</i>	7 DAY 48 HC	o () D URS ()	IORMAL	~			14 DAY	₽¥2	Sid	Contract	
	<b>⊢</b> S	<b>HE LABO</b> TRIBUTIO	RATORY MUST PF N: PINK Sampling Co	OVIDE A CO	DPY OF THI WHITE & YE	IS CHAII	4 OF CU companie	STODY s Shipr	NITH ent	NVOIO MHITHW	E ANG	BESU ed with	LTS Report				

9507767-K



Certificate of Analysis No. H9-9507762-01

Shell Pipe Line Corporation P.O. Box 2648 Houston, TX 77252 ATTN: Neal Stidham

**PROJECT:** 24-93678504 **SITE:** Denton Station **SAMPLED BY:** Cura, Inc. **SAMPLE ID:** MW-2 P.O.# MESA-CAO-B-131201-PX-4204-NS DATE: 07/24/95

PROJECT NO: H 10238 MATRIX: WATER DATE SAMPLED: 07/18/95 17:45:00 DATE RECEIVED: 07/21/95

	ANALYTICAL	DATA		······
PARAMETER		RESULTS	DETECTION LIMIT	UNITS
BENZENE		110	1 P	μg/L
TOLUENE		ND	1 P	μg/L
ETHYLBENZENE		ND	1 P	μg/L
TOTAL XYLENE		ND	1 P	µg/L
TOTAL BTEX		110		μg/L
Surrogate		% Recovery		
1,4-Difluorobenzene		98		
4-Bromofluorobenzene		53		
METHOD 5030/8020 ***				
Analyzed by: LFD				
Date: 07/21/95				

(P) - Practical Quantitation Limit ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

SPL, Inc., - Project Manager



Certificate of Analysis No. H9-9507762-02

Shell Pipe Line Corporation P.O. Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-131201-PX-4204-NS DATE: 07/24/95

PROJECT: 24-93678504
SITE: Denton Station
SAMPLED BY: Cura, Inc.
SAMPLE ID: MW-6

PROJECT NO: H 10238 MATRIX: WATER DATE SAMPLED: 07/18/95 17:00:00 DATE RECEIVED: 07/21/95

	ANALYTICAL DATA		
PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	1100	10 P	μg/L
TOLUENE	1	1 P	μg/L
ETHYLBENZENE	46	1 P	µg/L
TOTAL XYLENE	209	1 P	μg/L
TOTAL BTEX	1356		µg/L
Surrogate	% Recovery		
1,4-Difluorobenzene	116		
4-Bromofluorobenzene	115		
METHOD 5030/8020 ***			
Analyzed by: LFD			
Date: 07/22/95			

(P) - Practical Quantitation Limit

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

SPL, Inc., - Project Manager



Certificate of Analysis No. H9-9507762-03

Shell Pipe Line Corporation P.O. Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-131201-PX-4204-NS DATE: 07/24/95

**PROJECT:** 24-93678504 **SITE:** Denton Station **SAMPLED BY:** Cura, Inc. **SAMPLE ID:** MW-9 PROJECT NO: H 10238 MATRIX: WATER DATE SAMPLED: 07/18/95 16:00:00 DATE RECEIVED: 07/21/95

	ANALYTICAL DAT	'A		
PARAMETER		RESULTS	DETECTION LIMIT	UNITS
BENZENE		ND	1 P	μg/L
TOLUENE		ND	1 P	μg/L
ETHYLBENZENE		ND	1 P	μg/L
TOTAL XYLENE		ND	1 P	µg/L
TOTAL BTEX		ND		μg/L
Surrogate	१	Recovery		
1,4-Difluorobenzene		93		
4-Bromofluorobenzene		53		
METHOD 5030/8020 ***				
Analyzed by: LFD				
Date: 07/21/95				

ND - Not detected.

(P) - Practical Quantitation Limit

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

SPL, Inc., - Project Manager

# QUALITY CONTROL DOCUMENTATION

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#### \*\* SPL BATCH QUALITY CONTROL REPORT \*\* METHOD 8020

Matrix: Units:

Aqueous µg/L Batch Id: HP\_J950722113900

LABORATORY CONTROL SAMPLE

S P I K B C O M P O U N D S	Method Blank Result <2>	Spike Added <3>	Blank Result <1>	Spike Recovery	QC Limits(**) (Mandatory) % Recovery Range		
Benzene	ND	50	43	86.0	61 - 123		
Toluene	ND	150	130	86.7	62 - 122		
EthylBenzene	ND	50	44	88.0	56 - 119		
O Xylene	ND	100	89	89.0	32 - 160		
M & P Xylene	ND	200	180	90.0	32 - 160		

#### MATRIX SPIKES

S P I K E C O M P O U N D S	Sample Results	Spike Added	Matrix Spike		Matrix Spike Duplicate		MS/MSD Relative %	QC Limits(***) (Advisory)	
			Result	Recovery	Result	Recovery	Difference	RPD	,
	<2>	<3>	<1>	<4>	<1>	<5>		Max.	Recovery Range
Benzene	ND	50	44	88.0	44	88.0	0	25	39 - 150
Toluene	ND	150	120	80.0	120	80.0	0	26	56 - 134
EthylBenzene	ND	50	42	84.0	41	82.0	2.41	38	61 - 128
O Xylene	ND	100	78	78.0	72	72.0	8.00	20	40 - 130
M & P Xylene	ND	100	88	88.0	80	80.0	9.52	20	43 - 152

Analyst: LFD

Sequence Date: 07/22/95 SPL ID of sample spiked: 9507768-01A Sample File ID: J\_\_\_563.TX0 Method Blank File ID: Blank Spike File ID: J\_\_\_560.TX0 Matrix Spike File ID: J\_\_\_586.TX0 Matrix Spike Duplicate File ID: J\_\_\_587.TX0 \* = Values Outside QC Range

NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

ND = Not Detected/Below Detection Limit

% Recovery = [( <1> - <2> ) / <3> ] x 100

LCS  $\$  Recovery = (<1> / <3> ) x 100

Relative Percent Difference = |(<4> - <5> | / [(<4> + <5> ) x 0.5] x 100

(\*\*) = Source: SPL-Houston Historical Data

(\*\*\*) = Source: SPL-Houston Historical Data

SAMPLES IN BATCH (SPL ID) :

9507775-01A 9507765-02A 9507757-04A 9507762-02A 9507757-06A 9507765-01A 9507765-04A 9507756-01A 9507756-02A 9507756-03A 9507795-03A 9507795-02A 9507795-01A 9507795-04A

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Cynthia Schreiner, QC Officer

PAGE 1
#### \*\* SPL BATCH QUALITY CONTRCL REPORT \*\* METHOD 8020/602

PAGE 1

Matrix: A Units: A

Aqueous µg/L

#### Batch Id: HP\_J950721130300

#### LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	<u>Blank</u> Result <1>	Spike Recovery ¥	QC Limits(**) (Mandatory) % Recovery Range
MTBE	ND	50	33.0	66.0	56 - 135
Benzene	ND	50	45.0	90.0	61 - 123
Toluene	ND	50	44.0	88.0	62 - 122
EthylBenzene	ND	50	45.0	90.0	56 - 119
O Xylene	ND	50	47.0	94.0	32 - 160
M & P Xylene	ND	100	101.0	101	32 - 160

#### MATRIX SPIKES

S P I K B C O M P O U N D S	Sample Results	Spike Added	Matrix	Spike	Matrix Duplie	Spike	MS/MSD Relative %	QC I	Limits (***) (Advisory)
	<2>	<3>	Result <1>	Recovery <4>	Result <1>	Recovery <5>	Difference	RPD Max.	Recovery Range
мтве	ND	20	17.0	85.0	17.0	85.0	0	20	39 - 150
Benzene	ND	20	16.0	75.0	16.0	75.0	0	33	39 - 150
Toluene	ND	20	15.0	75.0	15.0	75.0	0	35	56 - 134
EthylBenzene	ND	20	14.0	70.0	14.0	70.0	o	40	61 - 128
O Xylene	ND	20	15.0	75.0	15.0	75.0	0	29	40 - 130
M & P Xylene	ND	40	30.0	75.0	30.0	75.0	0	20	43 - 152

Analyst: LFD

Sequence Date: 07/21/95 SPL ID of sample spiked: 9507649-01A Sample File ID: J\_\_\_526.TX0 Method Blank File ID: Blank Spike File ID: J\_\_\_524.TX0 Matrix Spike File ID: J\_\_\_548.TX0 Matrix Spike Duplicate File ID: J\_\_\_549.TX0 \* = Values Outside QC Range

NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

ND = Not Detected/Below Detection Limit

Recovery = [( <1> - <2> ) / <3> ] x 100

LCS % Recovery =  $(<1> / <3> ) \times 100$ 

Relative Percent Difference = |(<4> - <5>) | / [(<4> + <5>) x 0.5] x 100

(\*\*) = Source: SPL-Houston Historical Data

(\*\*\*) = Source: SPL-Houston Historical Data

SAMPLES IN BATCH (SPL ID) :

9507711-01A 9507711-02A 9507765-03A 9507765-04A 9507762-02A 9507507-12A 9507762-01A 9507762-03A 9507757-07A 9507757-06A 9507765-01A 9507649-01A 9507483-08A 9507483-01A 9507483-06A 9507483-07A 9507649-04A

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Cynthia Schreiner, QC Officer

# APPENDIX D QUALITY ASSURANCE/QUALITY CONTROL SAFETY PLAN AND LIMITATIONS

## QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

A strict Quality Assurance Plan was incorporated throughout all phases of the on-site operations and sampling procedures. Soil or solid material samples were collected using new disposable or properly decontaminated reusable stainless steel equipment. Water or liquid samples were collected with new disposable bailers or decontaminated pump equipment. All non-reusable equipment was disposed of and reusable equipment was decontaminated between sampling stations to eliminate the potential of cross-contamination. The water samples were transferred from the bailers into airtight septum-sealed 40-ml glass VOA vials, one-liter amber glass jars with Teflonlined lids, or other sample containers appropriate for the required analyses.

The samples were sealed with QA/QC seals, preserved with acid (if required), and maintained at  $4^{\circ}$ C in accordance with Environmental Protection Agency (EPA) requirements (EPA 600/4-82-029) for shipment to the laboratory. A chain-of-custody (COC) which documents sample collection times and delivery times to the laboratory was completed for each set of samples. The COC is included with the analytical results in the Appendix.

CURA utilizes laboratories that maintain strict quality controls, i.e. equipment calibration and standardization, appropriate analytical methods, preparation of quality control samples, and complete chains-of-custody. Analyses were performed on all samples using the EPA-, state-, or local agency-directed methods. The maximum recommended holding times were not exceeded unless noted in the text.

### SAFETY PLAN

The sampling operations were performed at level D personal protection. CURA personnel involved in on-site activities have completed the Occupational Safety and Health for Hazardous Waste Field Operation training course (OSHA 29 CFR 1910.120). Applicable safety equipment was on site to CURA personnel.

#### LIMITATIONS

It should be noted that all subsurface investigations are inherently limited in the sense that conclusions are drawn and recommendations are developed from samples which depict subsurface conditions at representative locations over relatively short periods of time. Subsurface conditions elsewhere may differ from those at the sampling locations. In addition, subsurface conditions at sampling locations may vary over longer periods of time than can be observed in a study of this type. The passage of time, manifestation of latent conditions, or occurrence of future events may require further site exploration, data collection and analysis, and reevaluation of the findings, observations, conclusions, and recommendation expressed in this report.

NEW MEXICO ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

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#### OIL CONSERVATION DIVISION 2040 S. Pacheco Santa Fe, New Mexico 87505

July 24, 1995

CERTIFIED MAIL RETURN RECEIPT NO. 2-765-962-379

Mr. Neal Stidham Shell Pipe Line Corporation Two Shell Plaza P.O. Box 2099 Houston, Texas 77252-2099

RE: GROUND WATER INVESTIGATION3 DENTON CRUDE PUMP STATION LEA COUNTY, NEW MEXICO

Dear Mr. Stidham:

The New Mexico Oil Conservation Division (OCD) has completed a review of Shell Oil Products Company's (SOPC) June 6, 1995 "SUBSURFACE INVESTIGATION PLAN, DENTON STATION, LEA COUNTY, NEW MEXICO". This document contains SOPC's work plan for investigating the extent of ground water contamination related to SOPC's Denton Crude Station in Lea County, New Mexico.

The above work plan is approved with the following conditions:

- 1. All monitor wells will be constructed as set out below:
  - a. A minimum of 15 feet of well screen will be installed with at least 10 feet of well screen below the water table and 5 feet of well screen above the water table.
  - b. An appropriately sized gravel pack will be set around the well screen from the bottom of the hole to 2-3 feet above the top of the well screen.
  - c. A 2-3 foot bentonite plug will be placed above the gravel pack.
  - d. The remainder of the hole will be sealed with cement containing 3-5 % bentonite.
- 2. SOPC will develop each well upon completion using EPA approved procedures.

OFFICE OF THE SECRETARY - P. O. BOX 6429 - SANTA FE, NM 87505-6429 - (505) 827-5950 ADMINISTRATIVE SERVICES DIVISION - P. O. BOX 6429 - SANTA FE, NM 87505-6429 - (505) 827-5925 ENERGY CONSERVATION AND MANAGEMENT DIVISION - P. O. BOX 6429 - SANTA FE, NM 87505-6429 - (505) 827-5900 FORESTRY AND RESOURCES CONSERVATION DIVISION - P. O. BOX 6429 - SANTA FE, NM 87504-1948 - (505) 827-5830 MINING AND MINERALS DIVISION - P. O. BOX 6429 - SANTA FE, NM 87505-6429 - (505) 827-5870 OIL CONSERVATION DIVISION - P. O. BOX 6429 - SANTA FE, NM 87505-6429 - (505) 827-7131 PARK AND RECREATION DIVISION - P. O. BOX 1147 - SANTA FE, NM 87504-1147 - (505) 827-7465 Mr. Neal Stidham July 24, 1995 Page 2

- 3. SOPC will sample ground water from all monitor wells. Ground water from these monitor wells will be sampled and analyzed for concentrations of benzene, toluene, ethylbenzene, xylene (BTEX), major cations and anions, heavy metals and polynuclear aromatic hydrocarbons using EPA approved methods.
- 4. SOPC will submit a report on the investigation to the OCD by October 27, 1995. The report will contain:
  - a. A description of all activities which occurred during the investigation, conclusions and recommendations.
  - b. A summary of the laboratory analytic results of water quality sampling of the monitor wells.
  - c. A water table elevation map using the water table elevation of the ground water in all monitor wells.
  - d. A geologic log and as built well completion diagram for each well.
- 5. SOPC will notify the OCD at least one week in advance of all scheduled activities such that the OCD has the opportunity to witness the events and or split samples.
- 6. All original documents submitted for approval will be submitted to the OCD Santa Fe Office with copies provided to the OCD Hobbs District Office.

Please be advised that OCD approval does not relieve SOPC of liability should the investigation activities determine that contamination exists which is beyond the scope of the work plan, or, if the activities fail to adequately determine the extent of contamination related to SOPC's activities. In addition, OCD approval does not relieve SOPC of responsibility for compliance with any other federal, state or local laws and/or regulations.

If you have any questions, please call me at (505) 827-7154.

Sincerely,

William C. Olson Hydrogeologist Environmental Bureau

xc: Jerry Sexton, OCD Hobbs District Supervisor Wayne Price , OCD Hobbs Office

## Z 765 962 379



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Shell Oil Products Company<sup>ChickTon Collection</sup>

∴ Two:\$hell Plaza <sup>©</sup> P. Ó:Box 2099 Houston, Texas 77252-2099

June 14, 1995

RECEVED

JUN 2 1 1995

Environmental Bureau Oil Conservation Division

William Olson State of New Mexico Oil Conservation Division Environmental Bureau 2040 S. Pacheco St. Santa Fe, New Mexico 87504

### SUBJECT: DEVELOPMENT WATER, DUBLIN, DENTON, AND LEA STATIONS

Dear Mr. Olson,

Enclosed are copies of the laboratory results from sampling the development water at the subject stations. This water was form the last sampling event. The water was analyzed for benzene and was non-detect at Dublin and Denton and 0.35ppm at Lea. With your concurrence we will surface discharge this water. If you have any questions please call me at 713-241-2961.

Sincerely

Neàl Stidham Staff Engineer Shell Oil Products Company Representing Shell Pipe Line Corporation

cc: Paul Newman-EOTT Energy Corp. Jerry Sexton-OCD Hobbs

Neal Stidham on Neal Stidham on 7/24/95



HOUSTON LABORATORY 8880 INTERCHANGE DRIVE HOUSTON, TEXAS 77054 PHONE (713) 660-0901

SPL, INC.

LeA

## **REPORT APPROVAL SHEET**

WORK ORDER NUMBER: <u>95 - 05 - 815</u>

Approved for release by:

Date: 611 195

Brent Barron, Project Manager

Le Date: 612 195

S. Sample, Laboratory Director



HOUSTON LABORATORY 8880 INTERCHANGE DRIVE HOUSTON, TEXAS 77054 PHONE (713) 660-0901

Certificate of Analysis No. H9-9505815-01

Shell Pipe Line Corporation P.O. Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-131201-PX-4204-NS DATE: 05/31/95

**PROJECT:** 24-93677504.03 SITE: Lea Station SAMPLED BY: Cura, Inc. SAMPLE ID: Dev. Water

PROJECT NO: H 13360 MATRIX: WATER DATE SAMPLED: 05/19/95 15:00:00 DATE RECEIVED: 05/23/95

	ANALYTICAL	DATA		
PARAMETER		RESULTS	DETECTION LIMIT	UNITS
Benzene		350	1 P	μg/L
Surrogate 1,4-Difluorobenzene 4-Bromofluorobenzene METHOD 8020*** Analyzed by: SLB		<b>% Recovery</b> 153 118		
Date: 05/30/95				<i>،</i>

(P) - Practical Quantitation Limit

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for guality assurance.

Project Manager

# **QUALITY CONTROL DOCUMENTATION**

#### \*\* SPL BATCH QUALITY CONTROL REPORT \*\* METHOD 8020/602

Matrix: Units:

Aqueous µg/L Batch Id: HP\_J950528200900

L	Α	в	0	R	Α	т	0	R	Y	C	0	N	т	R	о	г	S	Α	м	Ρ	L	Е	
_										-				_					_		_		

SPIKE	Method	Spike	Blank	Spike	QC Limits(**)
сомроимдз	Blank Result <2>	Added <3>	Result <1>	Recovery *	(Mandatory) % Recovery Range
MTBE	ND	50	44	88.0	56 - 135
Benzene	ND	50	39	78.0	61 - 123
Toluene	ND	50	40	80.0	62 - 122
EthylBenzene	ND	50	40	80.0	56 - 119
0 Xylene	ND	50	42	84.0	32 - 160
M & P Xylene	ND	100	88	88.0	32 - 160

#### MATRIX SPIKES

S P I K E C O M P O U N D S	Sample Results	Spike Added	Matrix	Spike	Matrix Duplie	Spike	MS/MSD Relative %	QC I	Limits(***) (Advisory)
	<2>	<3>	Result	Recovery <4>	Result <1>	Recovery <5>	Difference	RPD Max.	Recovery Range
MTBE	7	20	29	110	29	110	0	20	39 - 150
Benzene	ND	20	23	115	23	115	0	33	39 - 150
Toluene	ND	20	21	105	22	110	4.65	35	56 - 134
EthylBenzene	ND	20	21	105	21	105	0	40	61 - 128
O Xylene	ND	20	21	105	20	100	4.88	29	40 - 130
M & P Xylene	ND	40	43	108	43	108	0	20	43 - 152

Analyst: YN

Sequence Date: 05/28/95 SPL ID of sample spiked: 9505884-07A Sample File ID: J\_\_\_434.TX0 Method Blank File ID: Blank Spike File ID: J\_\_\_426.TX0 Matrix Spike File ID: J\_\_\_429.TX0 Matrix Spike Duplicate File ID: J\_\_\_430.TX0 \* = Values Outside QC Range

NC = Not Calculated (Sample exceeds spike by factor of 4 or more) ND = Not Detected/Below Detection Limit % Recovery = [( <1> - <2> ) / <3> ] x 100 LCS % Recovery = (<1> / <3> ) x 100 Relative Percent Difference = |(<4> - <5> | / [(<4> + <5> ) x 0.5] x 100 (\*\*) = Source: SPL-Houston Historical Data

(\*\*\*) = Source: SPL-Houston Historical Data

SAMPLES IN BATCH (SPL ID):

 9505A50-01A
 9505816-01A
 9505815-01A
 9505814-01A

 9505A50-02A
 9505813-01A
 9505813-03A
 9505899-05A

 9505715-09A
 9505834-01A
 9505844-05A
 9505690-01B

 9505884-03A
 9505884-02A
 9505884-08A
 9505884-09A

 9505884-07A
 9505844-10A
 9505884-10A

Idelis Williams, QC Officer

PAGE 1

CHAIN OF CUSTODY AND SAMPLE RECEIPT CHECKLIST

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		Relinquished by: ( Signature )		RELINQUISHED BY: ( SIGNATURE )	Low formed	RELINQUISHED BY: (SIGNATURE)											Dev. Water 5-17-85	SAMPLE I.D. DATE	SAMPLED BY: Sice Su	HONE (975) 570- 81108	CONSULTANT CONTACT: Brad 5	231 Willedley, C.Z	CONSULTANT NAME & ADDRESS	101 # 24-9367	LEA Station	SITE ADDRESS: Shall Lips		- SHELL OIL COMP	
2 -1		DATE		DATE	5-22-8	DATE											1500	TIME	hirk	FAX	in the	$\infty$ , M	RA	750		47 d		MENTAL	
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ATE: 123 B TIME: 1025 CLIENT NO. CONTRACT NO		SAMPLE LOGIN CHECKLI	ST		
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PL SAMPLE NOS.:       YES         YES       YES         . Is a Chain-of-Custody form present?					
YES       NK         . Is a Chain-of-Custody form present?	PL	SAMPLE NOS.: 9505815			
<ul> <li>Is a Chain-of-Cüstody form present?</li> <li>Is the COC properly completed?</li> <li>If no, describe what is incomplete:</li> <li>If no, has the client been contacted about it? (Attach subsequent documentation from client about the situation)</li> <li>Is airbill/packing ligt/bill of lading with shipment?</li> <li>If yes, ID#:</li> <li>Is a USEPA Traffic Report present?</li> <li>Is a USEPA Traffic Report present?</li> <li>Is a USEPA Traffic Report present?</li> <li>Are custody seals present on the package?</li> <li>If yes, were they intact upon receipt?</li> <li>Are all samples tagged or labeled?</li> <li>Do the sample tags/labels match the COC?</li> <li>If no, describe what is in nonconformity:</li> <li>Condition/temperature of shipping container: <u>SMMMCT</u></li> <li>Condition/temperature of sample bottles:</li> <li>Sample Disposal?:</li> <li>SPL disposal</li> <li>Return to client_</li> </ul>				YES	<u>NO</u>
<ul> <li>Is the COC properly completed? If no, describe what is incomplete: If no, has the client been contacted about it? (Attach subsequent documentation from client about the situation) </li> <li>Is airbill/packing list/bill of lading with shipment?</li> <li>If yes, ID#:</li> <li>Is a USEPA Traffic Report present?</li> <li>Is a USEPA SAS Packing List present?</li> <li>Are custody seals present on the package?</li> <li>If yes, were they intact upon receipt?</li> <li>Are all samples tagged or labeled?</li> <li>Do the sample tags/labels match the COC?</li> <li>If no, has the client been contacted about it?</li> <li>(Attach subsequent documents agree?</li> <li>If no, describe what is in nonconformity:</li> <li>Condition/temperature of shipping container: <i>B. MMMM</i></li> <li>Sample Disposal?:</li> <li>SPL disposal</li> <li>Return to client_</li> </ul>	•	Is a Chain-of-Custody form present?		$\leq$	
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HOUSTON LABORATORY 8880 INTERCHANGE DRIVE HOUSTON, TEXAS 77054 PHONE (713) 660-0901

SPL, INC.

## **REPORT APPROVAL SHEET**

WORK ORDER NUMBER: <u>95 - 05 - 816</u>

Approved for release by:

Date: 611 195 Brent Barron, Project Manager

Date: 612 195 nde

S. Sample, Laboratory Director



HOUSTON LABORATORY 8880 INTERCHANGE DRIVE HOUSTON, TEXAS 77054 PHONE (713) 660-0901

Certificate of Analysis No. H9-9505816-01

Shell Pipe Line Corporation P.O. Box 2648 Houston, TX 77252 ATTN: Neal Stidham

PROJECT: 24-93676504.03
SITE: Dublin Station
SAMPLED BY: Cura, Inc.
SAMPLE ID: Dev. Water

P.O.# MESA-CAO-B-131201-PX-4204-NS DATE: 05/31/95

PROJECT NO: H 13358 MATRIX: WATER DATE SAMPLED: 05/19/95 16:00:00 DATE RECEIVED: 05/23/95

ANALYTICAL DATA		
RESULTS	DETECTION LIMIT	UNITS
ND	1 P	μg/L
% Recovery		
109		
94		
		`
	ANALYTICAL DATA RESULTS ND % Recovery 109 94	ANALYTICAL DATA RESULTS DETECTION LIMIT ND 1 P % Recovery 109 94

ND - Not detected.

(P) - Practical Quantitation Limit

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Project Manager

# **QUALITY CONTROL DOCUMENTATION**

#### \*\* SPL BATCH QUALITY CONTROL REPORT \*\* METHOD 8020/602

PAGE 1

Matrix: Units:

Aqueous µq/L

Batch Id: HP\_J950528200900

#### LABORATORY CONTROL SAMPLE

SPIKE	Method	Spike	Blank	Spike	QC Limits(**)
COMPOUNDS	Blank Result <2>	Added <3>	Result <1>	Recovery ¥	(Mandatory) % Recovery Range
мтве	ND	50	44	88.0	56 - 135
Benzene	ND	50	39	78.0	61 - 123
Toluene	ND	50	40	80.0	62 - 122
EthylBenzene	ND	50	40	80.0	56 - 119
O Xylene	ND	50	42	84.0	32 - 160
M & P Xylene	ND	100	88	88.0	32 - 160

#### MATRIX SPIKES

S P I K E C O M P O U N D S	Sample Results	Spike Added	Matrix	Spike	Matrix Dupli	Spike cate	MS/MSD Relative %	QCI	Limits (***) (Advisory)
	<2>	<3>	Result <1>	Recovery <4>	Result <1>	Recovery <5>	Difference	RPD Max.	Recovery Range
MTBE	7	20	29	110	29	110	0	20	39 - 150
Benzene	ND	20	23	115	23	115	0	33	39 - 150
Toluene	ND	20	21	105	22	110	4.65	35	56 - 134
EthylBenzene	ND	20	21	105	21	105	0	40	61 - 128
O Xylene	ND	20	21	105	20	100	4.88	29	40 - 130
M & P Xylene	ND	40	43	108	43	108	0	20	43 - 152

Analyst: YN

Sequence Date: 05/28/95 SPL ID of sample spiked: 9505884-07A Sample File ID: J\_\_\_434.TX0 Method Blank File ID: Blank Spike File ID: J\_\_\_426.TX0 Matrix Spike File ID: J\_\_\_429.TX0 Matrix Spike Duplicate File ID: J\_\_\_430.TX0 \* = Values Outside QC Range

NC = Not Calculated (Sample exceeds spike by factor of 4 or more) ND = Not Detected/Below Detection Limit % Recovery = [( <1> - <2> ) / <3> ] x 100 LCS % Recovery =  $(<1> / <3> ) \times 100$ Relative Percent Difference = | (<4> - <5> | / {(<4> + <5> ) x 0.5} x 100 (\*\*) = Source: SPL-Houston Historical Data

(\*\*\*) = Source: SPL-Houston Historical Data

SAMPLES IN BATCH(SPL ID):

9505A50-01A 9505816-01A 9505815-01A 9505814-01A 9505A50-02A 9505813-01A 9505813-03A 9505899-05A 9505715-09A 9505A34-01A 9505844-05A 9505690-01B 9505844-03A 9505884-02A 9505884-08A 9505884-09A 9505884-07A 9505844-10A 9505884-10A

QC Officer Idelis W&llia

CHAIN OF CUSTODY AND SAMPLE RECEIPT CHECKLIST

_		•						<del>~~</del>
- Lal Kyt 403072		RELINQUISHED BY: (SIGNATURE)		RELINQUISHED BY: (SIGNATURE)	fill S. huis	RELINQUISHED BY: (SIGNATURE)	SHELL OIL COMPA SITE ADDRESS: Shell ENVIRONMI DUALA ADDRESS: Shell AL CONSULTANT NAME & ADDRESS: CL CONSULTANT CONTACT: J24-9367 PHONE: (945)570-9409 SAMPLED BY: J24 D. 5 SAMPLED BY: J24 D. 5 SAMPLED BY: J24 D. 5 SAMPLED BY: SYR-95 	
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	Contract						REMARKS	26.26.2

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	SPL HOUSTON ENVIRONMENTAL LABORATORY	
	SAMPLE LOGIN CHECKLIST	
DATE JOT	: <u>5/23/95</u> TIME: 1025 CLIENT NO NO	
LIE	NT SAMPLE NOS	
SPL	SAMPLE NOS.:9505616	
	YES	NO
· •	Is a Chain-of-Custody form present? Is the COC properly completed? If no, describe what is incomplete:	
	If no, has the client been contacted about it? (Attach subsequent documentation from client about the sit	uation)
•	If yes, ID#:	
•	Is a USEPA Traffic Report present? Is a USEPA SAS Packing List present? Are custody seals present on the package?	
•	Are all samples tagged or labeled? Do the sample tags/labels match the COC? If no, has the client been contacted about it? (Attach subsequent documentation from client about the sit	 uation)
•	Do all shipping documents agree? If no, describe what is in nonconformity:	
• Ø. 1.	Condition/temperature of shipping container: 20 100 Condition/temperature of sample bottles: 20 20 Sample Disposal?: SPL disposal Return to S (reference item number if applicable):	Client
OTE:		



HOUSTON LABORATORY 8880 INTERCHANGE DRIVE HOUSTON, TEXAS 77054 PHONE (713) 660-0901

SPL, INC.

## REPORT APPROVAL SHEET

WORK ORDER NUMBER: <u>95 - 05 - 817</u>

Approved for release by:

Date: 6/1/95 Brent Barron, Project Manager

- Date: 612 15

S. Sample, Laboratory Director



HOUSTON LABORATORY 8880 INTERCHANGE DRIVE HOUSTON, TEXAS 77054 PHONE (713) 660-0901

Certificate of Analysis No. H9-9505817-01

Shell Pipe Line Corporation P.O. Box 2648 Houston, TX 77252 ATTN: Neal Stidham

**PROJECT:** 24-93678504.03 **SITE:** Denton Station **SAMPLED BY:** Cura, Inc. **SAMPLE ID:** Dev. Water P.O.# MESA-CAO-B-131201-PX-4204-NS DATE: 05/31/95

PROJECT NO: H 13359 MATRIX: WATER DATE SAMPLED: 05/19/95 14:00:00 DATE RECEIVED: 05/23/95

	ANALYTICAL DATA			
PARAMETER	RESULTS	DETECTION LIMIT	UNITS	
Benzene	ND	l P	μg/I	
Surrogate	% Recovery			
1,4-Difluorobenzene	109			
4-Bromofluorobenzene	92			
METHOD 8020***				
Analyzed by: SLB				
Date: 05/31/95			٠	
ND - Not detected.	(P) - Practical	l Quantitation	Limit	

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

<u>piect Manager</u>

# **QUALITY CONTROL DOCUMENTATION**

#### \*\* SPL BATCH QUALITY CONTROL REPORT \*\* METHOD 8020/602

PAGE 1

Matrix: Units: Batch Id: HP\_J950530210700

.s: μg/L

Aqueous

#### LABORATORY CONTROL SAMPLE

SPIKE	Method	Spike	Blank	Spike	QC Limits(**)		
COMPOUNDS	Blank Result <2>	Added <3>	Result <1>	Recovery *	(Mandatory) % Recovery Range		
мтве	ND	50	50	100	56 - 135		
Benzene	ND	50	52	104	61 - 123		
Toluene	ND	50	51	102	62 - 122		
EthylBenzene	ND	50	52	104	56 - 119		
O Xylene	ND	50	55	110	32 - 160		
M & P Xylene	ND	100	120	120	32 - 160		

#### MATRIX SPIKES

S P I K E C O M P O U N D S	Sample Results	Spike Added	Matrix	Spike	Matrix Dupli	Spike	MS/MSD Relative %	QC 1	Limits (***) (Advisory)
	<2>	<3>	Result <1>	Recovery <4>	Result <1>	Recovery <5>	Difference	RPD Max.	Recovery Range
MTBE	23	20	46	115	43	100	14.0	20	39 - 150
Benzene	ND	20	21	105	21	105	0	33	39 - 150
Toluene	ND	20	22	110	20	100	9.52	35	56 - 134
EthylBenzene	ND	20	21	105	21	105	o	40	61 - 128
O Xylene	ND	20	21	105	20	100	4.88	29	40 - 130
M & P Xylene	ND	40	44	110	42	105	4.65	20	43 - 152

Analyst: SLB

Sequence Date: 05/31/95 SPL ID of sample spiked: 9505A20-01A Sample File ID: J\_\_\_462.TX0 Method Blank File ID: J\_\_\_487.TX0 Matrix Spike File ID: J\_\_\_460.TX0 Matrix Spike Duplicate File ID: J\_\_\_461.TX0 \* = Values Outside QC Range

NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

ND = Not Detected/Below Detection Limit

% Recovery = [{ <1> - <2> ) / <3> ] x 100

LCS % Recovery = (<1> / <3> ) x 100

Relative Percent Difference = |(<4> - <5> | / [(<4> + <5> ) x 0.5] x 100

(\*\*) = Source: SPL-Houston Historical Data

(\*\*\*) = Source: SPL-Houston Historical Data

SAMPLES IN BATCH (SPL ID) :

 9505894-02B
 9505894-01B
 9505844-08A
 9505994-07A

 9505994-06A
 9505994-04A
 9505994-08A
 9505994-03A

 9505994-02A
 9505994-01A
 9505973-02A
 9505973-01A

 9505884-06A
 9505884-04A
 9505884-01A
 9505817-01A

 9505942-01A
 9505942-03A
 9505A20-01A

Officer Idelis

CHAIN OF CUSTODY AND SAMPLE RECEIPT CHECKLIST

Fea	-	<b>.</b> .			
W#45307233	Relinquished by: ( <i>Signature</i> )	HELINGUISHED BY: (SIGNATUHE)	Sill D. Sund	RELINQUISHED BY: (SIGNATURE)	RETAIL ENVIRONN RETAIL ENVIRONN SITE ADDRESS CONSULTANT NAME & ADDRESS CONSULTANT CONTACT: Stadley CONSULTANT CONTACT: Stadley CONTECT STADLEY CONSULTANT CONTACT: Stadley CONTECT STADLEY CONSULTANT CONTACT: Stadley CONTECT STADLEY CONTACT STADLEY CONTECT STADLEY CONTACT STADLEY CONTACT STADLEY CONTACT STADLEY CONTECT STATUTES CONTECT ST
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## SPL HOUSTON ENVIRONMENTAL LABORATORY

2

## SAMPLE LOGIN CHECKLIST

DATE LOT CLIE	: <u>5/23/95</u> TIME: <u>1025</u> CLIENT NO NO NT SAMPLE NOS		
SPL	SAMPLE NOS.: 9505617-		
		YES	<u>NO</u>
1. 2.	Is a Chain-of-Custody form present? Is the COC properly completed? If no, describe what is incomplete:	4	
	If no, has the client been contacted about it? (Attach subsequent documentation from client about the	- - situatic	, ,
3.	Is airbill/packing list/bill of lading with shipment? If yes, ID#:		- <u></u>
4. 5. 6.	Is a USEPA Traffic Report present? Is a USEPA SAS Packing List present? Are custody seals present on the package? If yes, were they intact upon receipt?		
7.	Are all samples tagged or labeled? Do the sample tags/labels match the COC? If no, has the client been contacted about it? (Attach subsequent documentation from client about the		
8.	Do all shipping documents agree? If no, describe what is in nonconformity:	<u> </u>	
9. 10. 11.	Condition/temperature of shipping container: 2. J. J. J. Condition/temperature of sample bottles: Sample Disposal?: SPL disposal Return	HCT COV to clien	t
NOTE	S (reference item number if applicable):		<u> </u>
ATTE: DELIV RESO	ST: REVERED FOR RESOLUTION: REC'D DATE: 5/2 LVED: DATE:	23/95	

## Shell Oil Products Company

Two Sheil Plaza P. O. Box 2099 Houston, Texas 77252-2099

June 6, 1995

## RECEIVED

William Olson State of New Mexico Oil Conservation Division Environmental Bureau 2040 S. Pacheco St. Santa Fe, New Mexico 87504 JUN 07 1995

Environmental Bureau Oil Conservation Division

## SUBJECT: SUBSURFACE INVESTIGATION PLAN, DENTON STATION, LEA COUNTY NEW MEXICO.

Dear Mr. Olson,

Enclosed is a figure showing the location of our proposed drilling locations at Denton Station. We plan to drill holes B,C, and F and depending upon the findings may drill D and E. Based upon the past monitoring data, the depth to groundwater is approximately 50 feet below the land surface(Table 1). We plan to install 2" PVC monitoring wells which will be screened with 0.020 slotted pipe from approximately 45 feet below land surface to a depth of 60. If conditions warrant we may install 4" wells. The interval between 45 and 60 feet will be continuously cored in order to evaluate hydrocarbon contamination. The core will be screened with an flame ionization detector organic vapor analyzer. Each boring will be logged. Boring will be converted to wells immediately, developed and sampled. Wells will be surveyed and tied to the existing site survey. A report will be prepared including boring logs, analytical results and findings and submitted to the OCD. If you have any questions please call me at 713-241-2961.

Sincerely

Neal Stidham Staff Engineer Shell Oil Products Company Representing Shell Pipe Line Corporation

cc: Paul Newman-EOTT Energy Corp. Jerry Sexton-OCD Hobbs



## TABLE 1

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## **DENTON STATION**

## SUMMARY OF RELATIVE GROUNDWATER LEVEL ELEVATIONS AND

## PHASE-SEPARATED HYDROCARBON THICKNESSES

Monitor Well	Date Gauged	Relative Ground Surface Elevation (feet)	Relative Top of Casing Elevation (feet)*	Depth to Water Below Top of Casing (feet)	Corrected Relative Groundwater Elevation (feet)**	Phase- Separated Hydrocarbon Thickness (feet)
MW-1	09/27/93 03/29/94 05/10/94 02/08/95 04/25/95	101.07 101.07 101.07 101.07 101.07 101.07	103.47 103.47 103.47 103.47 103.47 103.47	55.41 55.71 55.77 56.17 57.84	48.06 48.02 47.83 47.88 46.29	0.00 0.32 0.16 0.71 0.80
MW-2	09/27/93 03/29/94 05/10/94 02/08/95 04/25/95	99.17 99.17 99.17 99.17 99.17 99.17	101.35 101.35 101.35 101.35 101.35	53.48 53.64 53.70 54.03 54.05	47.87 47.71 47.65 47.32 47.30	0.00 0.00 0.00 0.00 0.00
MW-3	09/27/93	101.01	102.68	54.32	48.36	8.20
	03/29/94	101.01	102.68	61.27	48.13	0.00
	05/10/94	101.01	102.68	55.68	48.10	1.34
	02/08/95	101.01	102.68	60.79	48.12	7.60
	03/28/95	101.01	102.68	61.35	48.01	81.5
	04/25/95	101.01	102.68	61.30	46.64	6.42
MW-4	05/10/94	99.98	101.46	53.63	47.83	0.00
	02/08/95	99.98	101.46	53.78	47.68	0.00
	04/25/94	99.98	101.46	54.21	47.25	0.00
MW-5	05/10/94	101.71	103.54	57.77	48.31	3.10
	02/08/95	101.71	103.54	61.91	48.31	8.15
	03/28/95	101.71	103.54	61.42	47.99	7.16
	04/25/95	101.71	103.54	61.50	46.84	5.86
MW-6	05/10/94	101.52	103.41	55.25	48.16	0.00
	02/08/95	101.52	103.41	55.26	48.16	0.00
	04/25/95	101.52	103.41	56.57	46.84	0.00
MW-7	05/10/94	100.82	102.66	54.71	48.14	0.23
	02/08/95	100.82	102.66	61.16	48.08	8.02
	03/28/95	100.82	102.66	60.86	48.06	7.64
	04/25/95	100.82	102.66	59.13	48.86	6.51
MW-8	05/10/94	101.56	103.49	54.53	48.96	0.00
	02/08/95	101.56	103.49	54.59	48.90	0.00
	04/25/95	101.56	103.49	54.63	48.86	0.00
MW-9	05/10/94	99.66	101.71	53.71	48.00	0.00
	02/08/95	99.66	101.71	53.96	47.75	0.00
	04/25/95	99.66	101.71	64.86	46.85	0.00

## TABLE 1

## **DENTON STATION**

## SUMMARY OF RELATIVE GROUNDWATER LEVEL ELEVATIONS AND

## PHASE-SEPARATED HYDROCARBON THICKNESSES

Monitor Well	Date Gauged	Relative Ground Surface Elevation (feet)	Relative Top of Casing Elevation (feet)*	Depth to Water Below Top of Casing (feet)	Corrected Relative Groundwater Elevation (feet)**	Phase- Separated Hydrocarbon Thickness (feet)
WW-1	02/26/93	100 55	102 21	60.23	48.52	7.97
<b>44 44 - T</b>	03/05/93	100.55	102.21	56.54	48.50	3.45
	03/12/93	100.55	102.21	55.39	48.39	1.91
	03/17/93	100.55	102.21	55.19	48.46	1.76
	03/22/93	100.55	102.21	54.44	48.45	0.83
	03/31/93	100.55	102.21	55.81	48.46	2.51
	04/08/93	100.55	102.21	57.74	48.50	4.92
	04/15/93	100.55	102.21	55.60	48.42	2.21
	04/27/93	100.55	102.21	56.08	48.43	2.81
	05/06/93	100.55	102.21	55.61	48.46	2.27
	05/13/93	100.55	102.21	55.49	48.47	2.13
	05/21/93	100.55	102.21	55.70	48.45	2.36
	05/26/93	100.55	102.21	55.74 55.22	48.45	2.41
	05/28/93	100.55		55.23 55.46	40.40	1.00
	06/04/93	100.55	102.21	55.40	40.51	2.13
	06/16/93	100.55	102.21	55.18	48.52	1.24
	03/18/94	100.55	102.21	60 70	48.03	7 96
	03/29/94	100.55	102.21	55.89	48.01	2.06
	05/06/94	100.55	102.21	58.20	47.95	4.80
	05/10/94	100.55	102.21	57.40	47.93	3.80
1	05/25/94	100.55	102.21	57.18	47.91	3.51
	06/14/94	100.55	102.21	57.30	48.02	3.78
	07/13/94	100.55	102.21	57.07	48.11	3.62
	09/14/94	100.55	102.21	57.76	48.16	4.53
	10/03/94	100.55	102.21	56.71	49.97	5.45
	10/28/94	100.55	102.21	56.84	50.13	5.80
	11/28/94	100.55	102.21	59.53	47.90	6.31
	12/21/94	100.55	102.21	59.63	47.84	6.42
[	02/08/95	100.55	102.21	57.40	47.93	3.80
	04/25/95	100.55	102.21	59.43	47.36	5.58

\* Measured from a relative datum (benchmark = 100.00 feet) located at the northeast corner of the concrete sump pad. The monitor well casings were marked to provide consistent reference points for future gauging operations.
 \*\* Correction Equation for Phase-Separated Hydrocarbons: Corrected Groundwater Elevation = Top of Casing Elevation - (Depth to Water Below Top of Casing - [SG] [PSH Thickness]) Specific Gravity (SG) = 0.73 for gasoline, 0.85 for diesel, 0.82 for crude oil.

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## Shell Oil Products Company

Two Shell Plaza P. O. Box 2099 Houston, Texas 77252-2099

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June 1, 1995

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## RECEIVED

JUN 06 1995

Environmental Bureau Oil Conservation Division

William Olson State of New Mexico Oil Conservation Division Environmental Bureau 2040 S. Pacheco St. Santa Fe, New Mexico 87504

# SUBJECT: QUARTERLY REPORTS, LEA AND DENTON STATIONS, LEA COUNTY NEW MEXICO.

Dear Mr. Olson,

Enclosed are copies of the second quarter, 1995, monitoring reports for Lea and Denton Stations. This information is in response to the approval conditions set forth in your letters of January 10, 1995 and December 5, 1994 respectively. As authorized by your letters of April 28, quarterly sampling for polynuclear aromatic hydrocarbons (PAH) was discontinued but will be done annually, for MW-4, MW-5, MW-6, MW-7, MW-9, and MW-10 at Lea Station and at Denton Station, MW-2, MW-6, and MW-9. Wells containing Phase-Separated Hydrocarbon were not sampled but were measured and reported. If you have any questions please call me at 713-241-2961.

Sincerely

H.H.

Neal Stidham Staff Engineer Shell Oil Products Company Representing Shell Pipe Line Corporation

cc: Paul Newman-EOTT Energy Corp. Jerry Sexton-OCD Hobbs



6049 South Loop East • Houston, Texas 77033 • 713/640-1490 • FAX 640-2593

May 30, 1995

Mr. Neal D. Stidham Shell Oil Company Two Shell Plaza, Room 1452 777 Walker Street Houston, Texas 77002

## RE: QUARTERLY GROUNDWATER MONITORING REPORT SECOND QUARTER, 1995 DENTON STATION LEA COUNTY, NEW MEXICO

CURA PROJECT NO. 24-93678

#### Mr. Stidham:

CURA, Inc., has completed the groundwater monitoring and sampling operations at the abovereferenced site. The work was performed in accordance with the scope of services requested by Shell Oil Company in their letter dated January 25, 1995.

Monitoring wells MW-1 through MW-9 and water well WW-1 were gauged and checked for phase-separated hydrocarbons (PSH) during sampling operations on April 25, 1995. Monitoring wells MW-2, MW-6, and MW-9 were developed, and sampled by CURA on April 25, 1995. In accordance with water quality monitoring requirements set forth by the New Mexico Oil Conservation Division (NMOCD) the groundwater samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) and dissolved oxygen content (DO). The New Mexico Water Quality Control Commission (WQCC) regulations do not contain a ground water standard for total petroleum hydrocarbons (TPH). Therefore, the NMOCD does not require that groundwater samples be analyzed for TPH. In addition to laboratory analysis for BTEX, dissolved oxygen (DO) levels for each sampled well were measured during field operations. Monitoring wells MW-1, MW-3, MW-5, MW-7, and WW-1 were not sampled due to the presence of PSH.

#### Groundwater Sampling and PSH Recovery

The monitoring wells were gauged on April 25, 1995 to determine the depth to groundwater and PSH thickness (if any). A summary of groundwater elevations and PSH thicknesses is presented in Table 1, Appendix B.

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Mr. Neal D. Stidham May 30, 1995 Page 2

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PSH was initially identified on-site in water well WW-1 in February of 1993. PSH recovery at water well WW-1 was initiated immediately following identification of the product release. In September, 1993 additional on-site monitoring wells MW-1, MW-2, and MW-3 were installed. No PSH was observed in these wells during drilling or sampling operations. In March of 1994, measurable thicknesses of PSH were identified in monitoring wells MW-1 and MW-3 during routine site gauging and product recovery operations at water well WW-1. CURA installed on-site monitoring wells MW-4 through MW-9 in May 1994. PSH was observed in monitoring wells MW-1, MW-3, MW-5 and MW-7 following well installation, and site-wide PSH recovery operations were initiated. During the 1995 Second Quarter PSH recovery has yielded approximately 49 gallons of crude oil from the site. To date, a cumulative total of approximately 675 gallons of PSH have been recovered from Denton Station. Cumulative and quarterly PSH thicknesses and volumes recovered are summarized in Table 3 of this report.

In order to enhance PSH recovery operations at the site, construction of a remedial action system was initiated on May 3, 1995. Recovered crude oil will be pumped into an on-site sump and returned to the pipeline. Approximately 12 gallons of oil were recovered by the product-only pumps in monitoring wells MW-3, MW-5, and MW-7 during the trial run on May 10, 1995. The remedial action system is anticipated to be fully operational in June, 1995.

Monitoring well gauging data obtained during the April 25, 1995 sampling event was indeterminant, and the site was regauged on May 25, 1995. May gauging data indicates that the apparent direction of groundwater flow is toward the south-southeast which is consistent with previous measurements. PSH was observed in monitoring wells MW-1, MW-3, MW-5, MW-7, and WW-1 during gauging operations.

The monitoring wells were purged by removing approximately three well volumes of water or bailing the wells dry. Approximately 25 gallons of water was removed from each of monitoring wells MW-2, MW-6, and MW-9 during development operations. The purged groundwater was stored on-site in labelled 55-gallon drums pending analysis and proper disposal.

After development, DO measurements were performed on-site and groundwater samples were obtained from the monitoring wells using a dedicated disposable bailer. The groundwater samples were transported on ice to the laboratory for analysis of BTEX using EPA Method 8020. Quality Assurance/Quality Control information is included in Appendix D.

#### **Results and Discussion**

The groundwater samples obtained on April 25, 1995 indicate no significant change in dissolved hydrocarbon concentrations or in the distribution of PSH thicknesses across the site since the last sampling event in February 1995. Dissolved hydrocarbon impact to monitoring well MW-6 and accumulations of crude oil in water well WW-1 and monitoring well MW-1 along the eastern site boundary continue to suggest the need for additional delineation east of the site. During the
Mr. Neal D. Stidham May 30, 1995 Page 3

Second Quarter of 1995, Shell Pipe Line Company (SPLC) obtained off-site access from the adjacent landowner, and installation of off-site wells is scheduled for the Third Quarter, 1995. Consistent low to non-detectable hydrocarbon concentrations in downgradient monitoring wells MW-9 and MW-2 continue to indicate that southern (downgradient) delineation of the plume has been achieved.

Dissolved oxygen concentrations (DO) were obtained as a possible indicator of the natural biological activity of hydrocarbon degrading microorganisms in the groundwater. Microbial and mineral oxidation reactions within the dissolved hydrocarbon plume typically result in depletion of DO so that an inverse relationship between DO and BTEX will be found where natural attenuation of the contaminant plume has occurred. DO levels recorded during 1995 Second Quarter sampling suggest that sufficient DO is present in the groundwater to encourage biological degradation of hydrocarbons. CURA will continue to monitor DO levels as a means of documenting the occurrence of natural attenuation. A summary of groundwater analytical results is presented in Table 2, Appendix B. The laboratory reports and chain-of-custody are included in Appendix C.

CURA appreciates the opportunity to provide you with our professional consulting services. If you have any questions or concerns, please do not hesitate to contact Brad Smith at (713) 640-1490.

Respectfully, CURA, Inc.

Feedfl

fr James W. Leach Environmental Geologist

Bradley S. Smith Project Manger

Richard G. Burbidge, Ph.Ø. Vice President

JWL/chs

Attachments

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APPENDICES

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APPENDIX A FIGURES





APPENDIX B TABLES

# TABLE 1

# **DENTON STATION**

# SUMMARY OF RELATIVE GROUNDWATER LEVEL ELEVATIONS AND

# PHASE-SEPARATED HYDROCARBON THICKNESSES

Monitor Well	Date Gauged	Relative Ground Surface Elevation (feet)	Relative Top of Casing Elevation (feet)*	Depth to Water Below Top of Casing (feet)	Corrected Relative Groundwater Elevation (feet)**	Phase- Separated Hydrocarbon Thickness (feet)
MW-1	09/27/93 03/29/94 05/10/94 02/08/95 04/25/95	101.07 101.07 101.07 101.07 101.07	103.47 103.47 103.47 103.47 103.47 103.47	55.41 55.71 55.77 56.17 57.84	48.06 48.02 47.83 47.88 46.29	0.00 0.32 0.16 0.71 0.80
MW-2	09/27/93 03/29/94 05/10/94 02/08/95 04/25/95	99.17 99.17 99.17 99.17 99.17 99.17	101.35 101.35 101.35 101.35 101.35	53.48 53.64 53.70 54.03 54.05	47.87 47.71 47.65 47.32 47.30	0.00 0.00 0.00 0.00 0.00
MW-3	09/27/93	101.01	102.68	54.32	48.36	8.20
	03/29/94	101.01	102.68	61.27	48.13	0.00
	05/10/94	101.01	102.68	55.68	48.10	1.34
	02/08/95	101.01	102.68	60.79	48.12	7.60
	03/28/95	101.01	102.68	61.35	48.01	81.5
	04/25/95	101.01	102.68	61.30	46.64	6.42
MW-4	05/10/94	99.98	101.46	53.63	47.83	0.00
	02/08/95	99.98	101.46	53.78	47.68	0.00
	04/25/94	99.98	101.46	54.21	47.25	0.00
MW-5	05/10/94	101.71	103.54	57.77	48.31	3.10
	02/08/95	101.71	103.54	61.91	48.31	8.15
	03/28/95	101.71	103.54	61.42	47.99	7.16
	04/25/95	101.71	103.54	61.50	46.84	5.86
MW-6	05/10/94	101.52	103.41	55.25	48.16	0.00
	02/08/95	101.52	103.41	55.26	48.16	0.00
	04/25/95	101.52	103.41	56.57	46.84	0.00
MW-7	05/10/94	100.82	102.66	54.71	48.14	0.23
	02/08/95	100.82	102.66	61.16	48.08	8.02
	03/28/95	100.82	102.66	60.86	48.06	7.64
	04/25/95	100.82	102.66	59.13	48.86	6.51
MW-8	05/10/94	101.56	103.49	54.53	48.96	0.00
	02/08/95	101.56	103.49	54.59	48.90	0.00
	04/25/95	101.56	103.49	54.63	48.86	0.00
MW-9	05/10/94	99.66	101.71	53.71	48.00	0.00
	02/08/95	99.66	101.71	53.96	47.75	0.00
	04/25/95	99.66	101.71	64.86	46.85	0.00

#### TABLE 1

#### **DENTON STATION**

### SUMMARY OF RELATIVE GROUNDWATER LEVEL ELEVATIONS AND

#### PHASE-SEPARATED HYDROCARBON THICKNESSES

Monitor Well	Date Gauged	Relative Ground Surface Elevation (feet)	Relative Top of Casing Elevation (feet)*	Depth to Water Below Top of Casing (feet)	Corrected Relative Groundwater Elevation (feet)**	Phase- Separated Hydrocarbon Thickness (feet)
WW-1	02/26/93 03/05/93 03/12/93 03/12/93 03/17/93 03/22/93 03/31/93 04/08/93 04/15/93 04/27/93 05/06/93 05/13/93 05/21/93 05/26/93 05/28/93 05/28/93 06/04/93 06/14/93 06/16/93 03/18/94 05/06/94 05/25/94 06/14/94 05/25/94 06/14/94 05/25/94 06/14/94 07/13/94 09/14/94 10/03/94 10/28/94 11/28/94 12/21/94 02/08/95	$\begin{array}{c} 100.55\\$	$\begin{array}{c} 102.21\\ 102.22\\ 102.22\\ 102.22\\ 102.22\\ 102.22\\ 102.22\\ 102.22\\ 102.22\\ 102.22\\$	$\begin{array}{c} 60.23\\ 56.54\\ 55.39\\ 55.19\\ 54.44\\ 55.81\\ 57.74\\ 55.60\\ 56.08\\ 55.61\\ 55.49\\ 55.70\\ 55.74\\ 55.23\\ 55.74\\ 55.23\\ 55.74\\ 55.23\\ 55.74\\ 55.28\\ 55.18\\ 60.70\\ 55.78\\ 55.18\\ 60.70\\ 55.89\\ 58.20\\ 57.40\\ 57.18\\ 57.30\\ 57.76\\ 56.71\\ 56.84\\ 59.53\\ 59.63\\ 57.40\\ 57.40\\ 57.40\\ 57.40\\ 57.76\\ 56.71\\ 56.84\\ 59.53\\ 59.63\\ 57.40\\ 57$	$\begin{array}{c} 48.52\\ 48.50\\ 48.39\\ 48.46\\ 48.45\\ 48.46\\ 48.45\\ 48.46\\ 48.50\\ 48.42\\ 48.43\\ 48.45\\ 48.45\\ 48.45\\ 48.45\\ 48.45\\ 48.45\\ 48.45\\ 48.52\\ 48.52\\ 48.52\\ 48.52\\ 48.52\\ 48.03\\ 48.01\\ 47.95\\ 47.93\\ 47.91\\ 48.02\\ 48.11\\ 48.16\\ 49.97\\ 50.13\\ 47.90\\ 47.84\\ 47.93\end{array}$	$\begin{array}{c} 7.97\\ 3.45\\ 1.91\\ 1.76\\ 0.83\\ 2.51\\ 4.92\\ 2.21\\ 2.81\\ 2.27\\ 2.13\\ 2.36\\ 2.41\\ 1.80\\ 2.15\\ 1.94\\ 1.82\\ 7.96\\ 2.06\\ 4.80\\ 3.80\\ 3.51\\ 3.78\\ 3.62\\ 4.53\\ 5.45\\ 5.80\\ 6.31\\ 6.42\\ 3.80\end{array}$
	04/25/95	100.55	102.21	59.43	47.93	5.58

\* Measured from a relative datum (benchmark = 100.00 feet) located at the northeast corner of the concrete sump pad. The monitor well casings were marked to provide consistent reference points for future gauging operations.
 \*\* Correction Equation for Phase-Separated Hydrocarbons: Corrected Groundwater Elevation = Top of Casing Elevation - (Depth to Water Below Top of Casing - [SG] [PSH Thickness])
 Specific Gravity (SG) = 0.73 for gasoline, 0.85 for diesel, 0.82 for crude oil.

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	TABLE 2 DENTON STATION WATER SAMPLE ANALYTICAL RESULTS												
Monitoring Well	Date Sampled	Benzene	Toluene	Ethyl- benzene	Xylenes	Total BTEX	ТРН	Dissolved Oxygen					
MW-1	09/27/93 05/10/94 02/08/95 04/25/95	0.85 PSH PSH PSH	0.067 PSH PSH PSH	0.077 PSH PSH PSH	0.34 PSH PSH PSH	1.334 PSH PSH PSH	3 PSH PSH PSH	PSH PSH PSH					
MW-2	09/27/93 05/10/94 02/08/95 04/25/95	0.017 0.010 0.048 0.084	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	<0.001 <0.001 <0.001 <0.001	$\begin{array}{c} 0.017 \\ 0.010 \\ 0.048 \\ 0.084 \end{array}$	<1 <1 	6.4 0.8 4.0					
MW-3	09/27/93 05/10/94 02/08/95 04/25/95	1.1 PSH PSH PSH	1.7 PSH PSH PSH	0.44 PSH PSH PSH	0.98 PSH PSH PSH	4.22 PSH PSH PSH	25 PSH PSH PSH	PSH PSH PSH PSH					
MW-4	05/10/94 02/08/95 04/25/95	0.041	<0.001 	<0.001	0.004	0.045	2	8.4 					
MW-5	05/10/94 02/08/95 04/25/95	PSH PSH PSH	PSH PSH PSH	PSH PSH PSH	PSH PSH PSH	PSH PSH PSH	PSH PSH PSH	PSH PSH PSH					
MW-6 MW-6	05/10/94 05/10/94	0.680 0.920	0.001 0.002	0.001 0.002	0.083 0.100	0.765 1.024	1	4.1 4.1					
(Duplicate)	02/08/95 04/25/95	1.200 1.200	<0.005 <0.005	0.031 0.033	0.090 0.120	1.321 1.353		1.0 2.6					
MW-7	05/10/94 02/08/95 04/25/95	PSH PSH PSH	PSH PSH PSH	PSH PSH PSH	PSH PSH PSH	PSH PSH PSH	PSH PSH PSH	PSH PSH PSH					
MW-8	05-11-94 02/08/95 04/25/95	<0.001 	<0.001	<0.001	<0.001  	<0.001	<1 	8.2  					
MW-9	05/11/94 02/08/95 04/25/95	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<1  	8.2 2.3 8.4					
A total dissol	ved solids (T	DS) concer	itration of 5	15 ppm was	s reported f	or MW-2 c	on 09-27-9	<del>)</del> 3.					

BTEX results listed in m/l (parts per million; ppm) with method detection limits listed on the certificate of analysis. TPH and TDS results listed in mg/l (parts per million; ppm) with a method detection limit of 1 ppm. Analyses were conducted using EPA Method 8020 (BTEX), EPA Method 418.1 (TPH), and EPA Method 160.1 (TDS) by

SPL Environmental Laboratories.

--- Not sampled.

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	TABLE 3 DENTON STATION PHASE-SEPARATED HYDROCARBON RECOVERY												
Date	Monitor Well	PSH Thickness (feet)	PSH Recovery (gallons)	PSH Cumulative Recovery (gallons)	Type of Recovery								
02/26/93	WW-1	7.97	35.0	35.0	Hand bailed								
03/05/93	WW-1	3.45	25.0	60.0	Hand bailed								
03/12/93	WW-1	1.91	20.0	80.0	Hand bailed								
03/17/93	WW-1	1.76	4.0	84.0	Hand bailed								
03/22/93		0.83	3.5	87.5	Hand bailed								
03/31/93	WW-1	2.51	8.0	95.5	Hand bailed								
04/08/93	WW-1	4.92	13.0	108.5	Hand bailed								
04/15/93	WW-1	2.21	8.0	116.5	Hand bailed								
04/27/93	WW-1	2.81	9.0	125.5	Hand bailed								
05/06/93	WW-1	2.27	7.0	132.5	Hand bailed								
05/13/93	WW-1	2.13	6.0	138.5	Hand bailed								
05/21/93	WW-1	2.36	6.0	144.5	Hand bailed								
05/26/93	WW-1	2.41	8.0	152.5	Hand bailed								
05/28/93	WW-1	1.80	5.0	157.5	Hand bailed								
06/04/93	WW-1	2.15	6.0	163.5	Hand bailed								
06/11/93	WW-1	1.94	5.0	168.5	Hand bailed								
06/16/93	WW-1	1.82	5.5	174.0	Hand bailed								
03/18/94	 WW-1	7.63	20.0	194.0	Hand bailed								
03/29/94	WW-1	2.06	5.5	199.5	Hand bailed								
05/06/94	WW-1	4.80	12.0	211.5	Hand bailed								
05/10/94	WW-1	3.80	8.0	219.5	Hand bailed								
05/25/94	WW-1	4.51	15.0	234.5	Hand bailed								
06/14/94	WW-1	3.78	8.0	242.5	Hand bailed								
07/13/94	WW-1	3.62	6.5	249.0	Hand bailed								
09/14/94	WW-1	4.53	8.0	257.0	Hand bailed								
10/03/94	WW-1	5.45	10.0	267.0	Hand bailed								
10/28/94	WW-1	5.80	9.0	276.0	Hand bailed								
11/22/94	<b>WW-1</b>	2.24	5.0	281.0	Hand bailed								
11/28/94	WW-1	6.31	10.0	291.0	Hand bailed								
12/21/95	<b>WW-</b> 1	6.42	10.0	301.0	Hand bailed								

	TABLE 3 DENTON STATION PHASE-SEPARATED HYDROCARBON RECOVERY												
Date	Monitor Well	PSH Thickness (feet)	PSH Recovery (gallons)	PSH Cumulative Recovery (gallons)	Type of Recovery								
02/08/95	WW-1	3.80	8.0	309.0	Hand bailed								
03/28/95	WW-1	4.62	10.0	319.0	Hand bailed								
04/25/95	WW-1	5.58	6.0	326.0	Hand bailed								
03/17/94	MW-1	0.32	0.2	0.2	Hand bailed								
05/10/94	MW-1	0.16	<0.01	0.2	Hand bailed								
06/14/94	MW-1	0.21	<.01	0.2	Hand bailed								
07/13/94	MW-1	0.24	0.1	0.3	Hand bailed								
08/22/94	MW-1	0.24	0.7	1.0	Hand bailed								
09/14/94	MW-1	0.24	0.8	1.8	Hand bailed								
10/03/94	MW-1	0.03	.2	2.0	Hand bailed								
10/28/94	MW-1	0.44	1.1	3.1	Hand bailed								
11/22/94	MW-1	0.37	1.0	4.1	Hand bailed								
12/31/94	MW-1	0.67	1.5	5.6	Hand bailed								
02/08/95	MW-1	0.71	1.5	7.1	Hand bailed								
03/28/95	MW-1	0.64	1.0	8.1	Hand bailed								
04/25/95	MW-1	0.80	1.0	9.1	Hand bailed								
03/17/94	MW-3	8.25	7.5	7.5	Hand bailed								
05/10/94	MW-3	1.34	7.0	14.5	Hand bailed								
05/25/94	MW-3	3.92	4.5	19.0	Hand bailed								
06/14/94	MW-3	1.88	3.0	22.0	Hand bailed								
07/13/94	MW-3	2.27	4.0	26.0	Hand bailed								
09/14/94	MW-3	8.48	12.0	38.0	Hand bailed								
10/03/94	MW-3	8.54	12.0	50.0	Hand bailed								
10/28/94	MW-3	6.87	10.0	60.0	Hand bailed								
11/22/94	MW-3	3.41	8.0	68.0	Hand bailed								
12/21/94	MW-3	6.20	9.0	77.0	Hand bailed								
02/08/95	MW-3	7.68	10.0	87.0	Hand bailed								
03/28/95	MW-3	8.15	10.0	97.0	Hand bailed								
04/25/95	MW-3	6.42	10.0	107.0	Hand bailed								
05/10/95	MW-3		4.0	111.0	Remediation System								

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TABLE 3     DENTON STATION     PHASE-SEPARATED HYDROCARBON RECOVERY												
Date	Monitor Well	PSH Thickness (feet)	PSH Recovery (gallons)	PSH Cumulative Recovery (gallons)	Type of Recovery							
05/10/94	MW-5	3.10	5.0	5.0	Hand bailed							
05/25/94	MW-5	6.80	11.0	16.0	Hand bailed							
06/14/94	MW-5	5.70	8.5	24.5	Hand bailed							
07/13/94	MW-5	5.67	8.0	32.5	Hand bailed							
09/14/94	MW-5	7.20	11.0	39.7	Hand bailed							
10/03/94	MW-5	7.17	11.0	50.7	Hand bailed							
10/28/94	MW-5	7.56	12.0	62.7	Hand bailed							
11/22/94	MW-5	7.37	15.0	77.7	Hand bailed							
12/21/94	MW-5	9.12	12.0	89.7	Hand bailed							
02/08/95	MW-5	8.15	10.0	99.7	Hand bailed							
03/28/95	MW-5	7.16	10.0	109.7	Hand bailed							
04/25/95	MW-5	5.86	10.0	119.7	Hand bailed							
05/10/95	MW-5		4.0	124.0	Remediation system							
05/10/94	MW-7	0.23	1.0	1.0	Hand bailed							
05/25/94	MW-7	1.95	2.5	3.5	Hand bailed							
06/14/94	MW-7	1.65	1.5	5.0	Hand bailed							
07/13/94	MW-7	1.30	1.0	6.0	Hand bailed							
08/19/94	MW-7	0.17	1.0	7.0	Hand bailed							
09/14/94	MW-7	9.08	15.0	22.0	Hand bailed							
10/03/94	MW-7	9.15	15.0	37.0	Hand bailed							
10/28/94	MW-7	7.56	12.0	49.0	Hand bailed							
12/21/94	MW-7	7.93	11.0	68.0	Hand bailed							
02/28/95	MW-7	8.02	12.0	80.0	Hand bailed							
03/28/95	MW-7	7.64	10.0	90.0	Hand bailed							
04/25/95	MW-7	6.51	10.0	100.0	Hand bailed							
05/25/95	MW-7		4.0	104.0	Remediation system							

APPENDIX C ANALYTICAL RESULTS

	Date: 4-26-75 Page 4 of 1	HER REMARKS															FAX:		With Outract	
11 U T Y YY S	<u> и тесояр но. Н 13653</u>	ANALYSIS REQUEST: (CHECK APPROPRIATE BOX) OTH														LABORATORY: 5/2 HOUSTON	NE SHELL CONTACT: Usi Stid La LAPHONE:	TURN AROUND TIME (CHECK ONE) 2 7 DAYS (1 (NORMAL) 14 DAYS (1)		AIN OF CUSTODY WITH INVOICE AND RESULTS
	CHAIN OF CUSTODY	CHECK ONE BOX ONLY CT/DT	OLARTERLY MONITORING 2 5461 SITE INVESTIGATION 25441	SOIL FOR DISPOSAL 5442 WATER FOR DISPOSAL 3443	AIR SAMPLER - SYS OHN 🔲 5452	WATER SAMPLE - SYS OHM 5463	UTHEN	HCI HNO3 H2504 NONE / CE							INATURE) DATE TIN		NATURE) DATE TIN		Done 21 21 10.	OVIDE A COPY OF THIS CH dinator WHITE & YELLOW
	ENGINEERING		-41.6	Two Michaud	uitl Housen	<u>frsjsro-8404</u> 1		H20 SOIL AIR SLUDGE							TIME RECEIVED BY: (SK	1000	TIME RECEIVED BY: ( SK	about ou for	TIME HELEWED BT. A UN	IE LABORATORY MUSCPR
	COMPANY	11 11-	140 1 542 + 101	Cukt	Shad Su	HOY IN		-2595 MW	-25-45/200	25-95 1100			 		TURE) DATE	4.26-34	TURE) DATE	TIDE1 DATE		
	SHELL OIL (	1	srr Looness Duel	CONSULTANT NAME & ADDRESS:	CONSULTANT CONTACT:	PHONE 415 220.5	SAMPLED BY:	W/11/- >	MU11-60 9	-H					RELINQUISHED BY: (SIGMA	Jen mus	RELINQUISHED BY: (SIGN		RELINQUISHEU BT: 1 0000	

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Certificate of Analysis No. H9-9504999-01

Shell Pipe Line Corporation P.O. Box 2648 Houston, TX 77252 ATTN: Neal Stidham

PROJECT: Proj # 24-93678
SITE: Denton, TX
SAMPLED BY: Cura, Inc.
SAMPLE ID: MW-2

P.O.# MESA-CAO-B-131201-PX-4204-NS DATE: 05/15/95

PROJECT NO: 24-93678 MATRIX: LIQUID DATE SAMPLED: 04/25/95 12:40:00 DATE RECEIVED: 04/27/95

	ANALYTICAL DATA			· · · · · · · · · · · · · · · · · · ·
PARAMETER		RESULTS	DETECTION LIMIT	UNITS
BENZENE		84	1 P	μg/L
TOLUENE		ND	1 P	μg/L
ETHYLBENZENE		ND	1 P	µg/L
TOTAL XYLENE		ND	1 P	μg/L
TOTAL BTEX		84		μg/L
Surrogate	સ્ટ	Recovery		
1,4-Difluorobenzene		98		
4-Bromofluorobenzene METHOD 5030/8020 *** Analyzed by: SLB Date: 05/06/95		89		

(P) - Practical Quantitation Limit ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

**QUALITY ASSURANCE:** These analyses are performed in accordance with EPA guidelines for quality assurance.



HOUSTON LABORATORY 8880 INTERCHANGE DRIVE HOUSTON, TEXAS 77054 PHONE (713) 660-0901

Certificate of Analysis No. H9-9504999-02

Shell Pipe Line Corporation P.O. Box 2648 Houston, TX 77252 ATTN: Neal Stidham

PROJECT: Proj # 24-93678
SITE: Denton, TX
SAMPLED BY: Cura, Inc.
SAMPLE ID: MW-6

P.O.# MESA-CAO-B-131201-PX-4204-NS DATE: 05/15/95

PROJECT NO: 24-93678 MATRIX: LIQUID DATE SAMPLED: 04/25/95 12:00:00 DATE RECEIVED: 04/27/95

	ANALYTICAL DATA		
PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	1200	5 P	μg/L
TOLUENE	ND	5 P	μg/L
ETHYLBENZENE	33	5 P	μg/L
TOTAL XYLENE	120	5 P	μg/L
TOTAL BTEX	1353	·	µg/L
Surrogate	% Recovery		
1,4-Difluorobenzene	101		
4-Bromofluorobenzene	94		
METHOD 5030/8020 ***			
Analyzed by: AA			
Date: 05/07/95			

(P) - Practical Quantitation Limit ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

**QUALITY ASSURANCE:** These analyses are performed in accordance with EPA guidelines for quality assurance.



Certificate of Analysis No. H9-9504999-03

Shell Pipe Line Corporation P.O. Box 2648 Houston, TX 77252 ATTN: Neal Stidham

PROJECT: Proj # 24-93678
SITE: Denton, TX
SAMPLED BY: Cura, Inc.
SAMPLE ID: MW-9

P.O.# MESA-CAO-B-131201-PX-4204-NS DATE: 05/15/95

**PROJECT NO:** 24-93678 **MATRIX:** LIQUID **DATE SAMPLED:** 04/25/95 11:00:00 **DATE RECEIVED:** 04/27/95

	ANALYTICAL I	DATA		
PARAMETER		RESULTS	DETECTION LIMIT	UNITS
BENZENE		ND	1 P	µg/L
TOLUENE		ND	1 P	μg/L
ETHYLBENZENE		ND	1 P	µg/L
TOTAL XYLENE		ND	1 P	μg/L
TOTAL BTEX		ND		μg/L
Surrogate		% Recovery		
1,4-Difluorobenzene		93		
4-Bromofluorobenzene		82		
METHOD 5030/8020 ***				
Analyzed by: AA				
Date: 05/06/95				

ND - Not detected.

(P) - Practical Quantitation Limit

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

# **QUALITY CONTROL DOCUMENTATION**



BATCH QUALITY CONTROL REPORT \*\* METHOD 8020



Matrix: Aqueo Units: µg/L

Aqueous

Batch Id: HP\_R950506021900

LABORATORY CONTROL SAMPLE

SPIKE	Method	Spike	Blank	Spike	QC Limits (**)			
COMPOUNDS	Blank Result <2>	Added <3>	Result <1>	Recovery ¥	(Mandatory) % Recovery Range			
Benzene	ND	50	49	98.0	61 - 123			
Toluene	ND	150	161	107	62 - 122			
EthylBenzene	ND	50	48	96.0	56 - 119			
O Xylene	ND	100	102	102	32 - 160			
M & P Xylene	ND	200	214	107	32 - 160			

#### MATRIX SPIKES

S P I K E C O M P O U N D S	Sample Results	Spike Added	Matrix Spike		Matrix Spike Duplicate		MS/MSD QC Relative <b>%</b>		Limits(***) (Advisory)	
	(2)	(3)	Result	Recovery	Result	Recovery	Difference	RPD Max	Recovery Bange	
								·an.	keeovery kange	
Benzene	ND	50	43	86.0	41	82.0	4.76	25	39 - 150	
Toluene	ND	150	140	93.3	130	86.7	7.33	26	56 - 134	
EthylBenzene	ND	50	41	82.0	38	76.0	7.59	38	61 - 128	
0 Xy`ene	ND	100	84	84.0	78	78.0	7.41	20	40 - 130	
M & P Xylene	ND	100	95	95.0	88	88.0	7.65	20	43 - 152	
1										

Analyst: AA

Sequence Date: 05/06/95 SPL ID of sample spiked: 9504A90-01A Sample File ID: R\_\_\_914.TX0 Method Blank File ID: Blank Spile File ID: R\_\_\_907.TX0 Matrix Spike File ID: R\_\_\_908.TX0 Matrix Spike Duplicate File ID: R\_\_\_909.TX0 \* = Values Outside QC Range

NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

ND = Not Detected/Below Detection Limit

% Recovery = [( <1> - <2> ) / <3> ] x 100

LCS % Recovery =  $(<1> / <3>) \times 100$ 

Relative Percent Difference = | (<4> - <5> | / [(<4> + <5> ) x 0.5] x 100

(\*\*) = Source: SPL-Houston Historical Data

(\*\*\*) = Source: SPL-Houston Historical Data

SAMPLES IN BATCH (SPL ID) :

 9504999-02A
 9504A48-01A
 9504A47-01A
 9504A08-04A

 9504A08-03A
 9504A08-02A
 9504A08-01A
 9504999-03A

 9505039-02A
 9504A92-04A
 9505041-03A
 9504A90-01A

 9505039-01A
 9504A97-03A

Idelis Williams, QC Officer



BATCH QUALITY CONTROL REPORT \*\* METHOD 8020

PAGE HOUSTON LABORATORY 8880 INTERCHANGE DRIVE HOUSTON, TEXAS 77054 PHONE (713) 660-0901

Matrix Units:

μg/L

Aqueous

HP R950505101000 Batch Id:

LABORATORY CONTROL SAMPLE

SPIKE	Method	Spike	Blank Spike		QC Limits(**)	
COMPOUNDS	Blank Result	Added	Result	Recovery	(Mandatory)	
	<2>	<3>	<1>	*	* Recovery Range	
Benzene	ND	50	31	62.0	61 - 123	
Toluene	ND	150	129	86.0	62 - 122	
EthylBenzene	ND	50	43	86.0	56 - 119	
O Xylene	ND	100	92	92.0	32 - 160	
M & P Xylene	ND	200	179	89.5	32 - 160	

#### MATRIX SPIKES

S P I K E C O M P O U N D S	Sample Results	Spike Added	Matrix	rix Spike Matrix Spike M Duplicate Rela		MS/MSD Relative ¥	QC Limits(***) (Advisory)		
			Result	Recovery	Result	Recovery	Difference	RPD	
	<2>	<3>	<1>	<4>	<1>	<5>		Max.	Recovery Range
Benzene	2	50	60	116	64	124	6.67	25	39 - 150
Toluene	ND	150	200	133	200	133	0	26	56 - 134
EthylBenzene	ND	50	59	118	59	118	0	38	61 - 128
O Xylene	ND	100	120	120	120	120	o	20	40 - 130
M & P Xylene	ND	100	130	130	130	130	0	20	43 ~ 152

Analyst: SLB

Sequence Date: 05/05/95 SPL ID of sample spiked: 9504954-11A Sample File ID: R\_\_\_879.TX0 Method Blank File ID: Blank Spike File ID: R\_\_\_875.TX0

Matrix Spike File ID: R\_\_\_877.TX0

Matrix Spike Duplicate File ID: R\_\_\_878.TX0

\* = Values Outside QC Range

NC = Not Calculated (Sample exceeds spike by factor of 4 or more) ND = Not Detected/Below Detection Limit

% Recovery = [( <1> - <2> ) / <3> ] x 100

LCS % Recovery =  $(<1> / <3> ) \times 100$ 

Relative Percent Difference = |(<4> - <5>) | / [(<4> + <5>) x 0.5] x 100

(\*\*) = Source: SPL-Houston Historical Data

(\*\*\*) = Source: SPL-Houston Historical Data

SAMPLES IN BATCH (SPL ID) :

9504999-01A 9505027-01A 9504A88-06A 9504A88-09A 9504A88-08A 9504A88-05A 9504A88-10A 9504A88-04A 9504A88-03A 9504A88-02A 9504A88-01A 9504A87-01A 9504A87-03A 9504987-01A 9504987-02A 9504987-03A 9504954-04A 9504954-12A 9504954-11A

Idelis Williams ( QC Officer

# APPENDIX D QUALITY ASSURANCE/QUALITY CONTROL SAFETY PLAN AND LIMITATIONS

#### QUALITY ASSURANCE/QUALITY CONTROL

A strict Quality Assurance Plan was incorporated throughout all phases of the on-site operations and sampling procedures. Soil or solid material samples were collected using new disposable or properly decontaminated reusable stainless steel equipment. Water or liquid samples were collected with new disposable bailers or decontaminated pump equipment. All non-reusable equipment was disposed of and reusable equipment was decontaminated between sampling stations to eliminate the potential of cross-contamination. The water samples were transferred from the bailers into airtight septum-sealed 40-ml glass VOA vials, one-liter amber glass jars with Teflon-lined lids, or other sample containers appropriate for the required analyses.

The samples were sealed with QA/QC seals, preserved with acid (if required), and maintained at 4°C in accordance with Environmental Protection Agency (EPA) requirements (EPA 600/4-82-029) for shipment to the laboratory. A chain-of-custody (COC) which documents sample collection times and delivery times to the laboratory was completed for each set of samples. The COC is included with the analytical results in the Appendix.

CURA utilizes laboratories that maintain strict quality controls, i.e. equipment calibration and standardization, appropriate analytical methods, preparation of quality control samples, and complete chains-of-custody. Analyses were performed on all samples using the EPA-, state-, or local agency-directed methods. The maximum recommended holding times were not exceeded unless noted in the text.

#### SAFETY PLAN

The sampling operations were performed at level D personal protection. CURA personnel involved in on-site activities have completed the Occupational Safety and health for Hazardous Waste Field Operation training course (OSHA 29 CFR 1910.120). Applicable safety equipment was on site to CURA personnel.

#### LIMITATIONS

It should be noted that all subsurface investigations are inherently limited in the sense that conclusions are drawn and recommendations are developed from samples which depict subsurface conditions at representative locations over relatively short periods of time. Subsurface conditions elsewhere may differ from those at the sampling locations. In addition, subsurface conditions at sampling locations may vary over longer periods of time than can be observed in a study of this type. The passage of time, manifestation of latent conditions, or occurrence of future events may require further site exploration, data collection and analysis, and reevaluation of the findings, observations, conclusions, and recommendation expressed in this report.



OIL CONSERVATION DIVISION 2040 S. PACHECO SANTA FE, NEW MEXICO 87505 (505) 827-7131

April 28, 1995

CERTIFIED MAIL RETURN RECEIPT NO. P-667-242-249

Mr. Neal Stidham Shell Pipe Line Corporation Two Shell Plaza P.O. Box 2099 Houston, Texas 77252-2099

#### RE: GROUND WATER MONITORING DENTON CRUDE PUMP STATION LEA COUNTY, NEW MEXICO

Dear Mr. Stidham:

The New Mexico Oil Conservation Division (OCD) has completed a review of the following Shell Oil Products Company (SOPC) documents:

- March 2, 1995 "QUARTERLY REPORTS, LEA AND DENTON STATIONS, LEA COUNTY, NEW MEXICO".
- March 2, 1995 "QUARTERLY GROUNDWATER MONITORING REPORT, FIRST QUARTER, 1995, DENTON STATION, LEA COUNTY, NEW MEXICO".

These documents contain the results of SOPC's first quarter 1995 ground water monitoring at the Denton Crude Pump Station. The documents also contain a request to discontinue polynuclear aromatic hydrocarbon (PAH) sampling of monitor wells MW-2 and MW-9.

The OCD agrees that the monitor wells MW-2 and MW-9 do not need to be monitored frequently for PAH's due to the limited mobility of these constituents. However, since PAH's are present in excess of New Mexico Water Quality Control Commission (WQCC) ground water standards, the OCD believes that PAH concentrations in downgradient ground water need to be monitored at some interval. Therefore, the OCD modifies their December 5, 1994 PAH monitoring requirements as follows:

1. SOPC will sample and analyze ground water from monitor wells MW-2, MW-6 and MW-9 for PAH's on an annual basis.

Mr. Neal Stidham April 28, 1995 Page 2

Please be advised that OCD approval does not limit SOPC to the above monitoring requirements should future monitoring determine that contamination exists which is beyond the scope of the work plan or should the actions fail to adequately monitor contamination related to SOPC's activities. In addition, OCD approval does not relieve SOPC of responsibility for compliance with any other federal, state or local laws and/or regulations.

If you have any questions, please call me at (505) 827-7154.

Sincerely,

William C. Olson Hydrogeologist Environmental Bureau

xc:	Jerry	Sexton,	OCD	Hobbs	District	Supervisor
	Wayne	Price,	OCD 1	Hobbs	Office	

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#### **Bill Olson**

From:Bill OlsonTo:Jerry SextonCc:Wayne PriceSubject:Shell Denton StationDate:Tuesday, April 25, 1995 2:11PMPriority:High

Attached is a draft letter modifying the sampling plan for the Shell Denton Station. Please provide me with any comments in writing by 2:00pm on 4/27/95. Thanks!

<<File Attachment: MONITOR1.MOD>>
Bill Olson

From:POSTOFFICETo:Bill OlsonSubject:Registered: Wayne PriceDate:Wednesday, April 26, 1995 7:08AM

[013] \*\*\*\*\* CONFIRMATION OF REGISTERED MAIL \*\*\*\*\* Your message:

TO: Wayne Price SUBJECT: Shell Denton Station DATE: 04-25-95 TIME: 14:05

Was accessed on 04-26-95 07:08

#### **Bill Olson**

From:Jerry SextonDate sent:Thursday, April 27, 1995 3:47PMTo:Bill OlsonSubject:Registered: Jerry Sexton

Your message	
To:	Jerry Sexton
Subject:	Shell Denton Station
Date:	Tuesday, April 25, 1995 2:11PM
was accessed on	
Date:	Thursday, April 27, 1995 3:47PM

## **Shell Oil Products Company**



Two Shell Plaza P. O. Box 2099 Houston, Texas 77252-2099

RECEIVED

MAR \_ 6 1995

William Olson State of New Mexico Oil Conservation Division Environmental Bureau 2040 S. Pacheco St. Santa Fe, New Mexico 87504

#### SUBJECT: QUARTERLY REPORTS, LEA AND DENTON STATIONS, LEA COUNTY NEW MEXICO.

Dear Mr. Olson,

March 2, 1995

Enclosed are copies of the first quarter, 1995, monitoring reports for Lea and Denton Stations. This information is in response to the approval conditions set forth in your letters of January 10, 1995 and December 5, 1994 respectively. I have accelerated the Lea Station report period due to the economics of sampling all locations in one outing. You had requested MW-5 at Lea to be sampled, however due to the presence of free phase hydrocarbon, we did not. If you feel a water sample from this well is needed, we can work around this issue next quarter. If I do not hear from you we will not sample MW-5 if PSH is present. We are finishing our plan for additional subsurface investigation at Denton Station and will submit it soon. Based upon the results of the PAH analyses I request to discontinue PAH sampling for MW-4, MW-6, MW-7, MW-9 at Lea Station and MW-2 and MW-9 at Denton Station.

If you have any questions please call me at 713-241-2961.

Sincerely

Neàl Stidham Shell Oil Products Company For Itself and as agent for Shell Oil Company

cc: Paul Newman-EOTT Energy Corp. Jerry Sexton-OCD Hobbs Oil Conservation Division



6049 South Loop East • Houston, Texas 77033 • 713/640-1490 • FAX 640-2593

March 2, 1995

Mr. Neal D. Stidham Shell Pipe Line Corporation Two Shell Plaza, Room 1452 777 Walker Street Houston, Texas 77002

### RE: QUARTERLY GROUNDWATER MONITORING REPORT FIRST QUARTER, 1995 DENTON STATION LEA COUNTY, NEW MEXICO

CURA PROJECT NO. 15-93678

Mr. Stidham:

CURA, Inc. has completed the groundwater monitoring and sampling operations at the abovereferenced site. The work was performed in accordance with the scope of services requested by Shell Pipe Line Corporation (SPLC).

Monitoring wells MW-1 through MW-9 and water well WW-1 were gauged prior to sampling operations on February 8, 1995. Monitoring wells MW-2, MW-6, and MW-9 were developed, and sampled by CURA on February 8, 1995. In accordance with water quality monitoring requirements set forth in the New Mexico Oil Conservation Division (NMOCD) letter dated December 5, 1994, the groundwater samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) and polynuclear aromatic hydrocarbons (PAH). The New Mexico Water Quality Control Commission (WQCC) regulations do not contain a ground water standard for total petroleum hydrocarbons (TPH). Therefore, the OCD does not require that groundwater samples be analyzed for TPH. In addition to laboratory analysis for BTEX and PAH, dissolved oxygen (DO) levels for each well were measured during field operations. Monitoring wells MW-1, MW-3, MW-5, MW-7, and WW-1 were not sampled due to the presence of phase-separated hydrocarbons (PSH).

#### Groundwater Sampling and PSH Recovery

The monitoring wells were gauged on February 8, 1995 to determine the depth to groundwater and PSH thickness (if any). A summary of groundwater elevations and PSH thicknesses is presented in Table 1, Appendix B.

PSH was initially identified on-site in water well WW-1 in February of 1993. PSH recovery at water well WW-1 was initiated immediately following identification of the product release. In September, 1993 additional on-site monitoring wells MW-1, MW-2, and MW-3 were installed. No PSH was observed in these wells during drilling or sampling operations. In March of 1994 measurable thicknesses of PSH were identified in monitoring wells MW-1 and MW-3 during gauging and product recovery operations at water well WW-1. CURA installed on-site monitoring wells MW-4 through MW-9 in May 1994. PSH was observed in monitoring wells MW-1, MW-3, MW-5 and MW-7 following monitoring well installation and site-wide PSH recovery operations were initiated at that time. During the 1995 first quarter monitoring event, approximately 41.5 gallons of PSH were recovered from the site. A cumulative total of approximately 582.8 cumulative gallons of PSH have been recovered from Denton Station. Cumulative and quarterly PSH thicknesses and volumes recovered are summarized in Table 4 of this report. In order to enhance PSH recovery operations, a remedial action system has been designed, ordered, and is being constructed on-site. The product-only recovery system will be fully installed pending landowner approval.

Monitoring well gauging data indicates that the apparent direction of groundwater flow is toward the south-southeast which is consistent with previous measurements. PSH was observed in monitoring wells MW-1, MW-3, MW-5, MW-7, and WW-1 during gauging operations.

The monitoring wells were developed by removing approximately three well volumes of water or bailing the wells dry. Approximately 8 gallons of water was removed from MW-2, and 20 gallons of water each was removed from MW-6 and MW-9 during development operations. The purged groundwater was stored on-site in a labelled 55-gallon drum pending disposal.

After development, DO measurements were performed on-site and groundwater samples were obtained from the monitoring wells using a dedicated disposable bailer. The groundwater samples were transported on ice to the laboratory for analysis of BTEX and PAH using EPA Method 8020

and EPA Method 8100, respectively. Quality Assurance/Quality Control information is included in Appendix D.

#### Results and Discussion

The groundwater samples obtained on February 9, 1995 indicate no significant change in dissolved hydrocarbon concentrations or in the distribution of PSH thicknesses across the site since the last sampling event in September, 1994. Dissolved oxygen concentrations (DO) were obtained as a possible indicator of the natural biological activity of hydrocarbon degrading microorganisms in the groundwater. Microbial and mineral oxidation reactions within the dissolved hydrocarbon plume typically result in depletion of DO so that an inverse relationship between DO and BTEX will be found where natural attenuation of the contaminant plume has occurred. A summary of groundwater analytical results is presented in Table 2, Appendix B. The laboratory reports and chain-of-custody are included in Appendix C.

CURA appreciates the opportunity to provide you with our professional consulting services. If you have any questions or concerns, please do not hesitate to contact us at (713) 640-1490.

Respectfully, CURA, Inc.

F. Wesley Root

F. wesley Root Environmental Geologist

Bradley S. Smith Project Manager

I h Uh

Michael A. Clark, P.E. Vice President

FWR/chs

Attachments

APPENDIX A FIGURES





APPENDIX B TABLES

TABLE 1 DENTON STATION SUMMARY OF RELATIVE GROUNDWATER LEVEL ELEVATIONS AND PHASE-SEPARATED HYDROCARBON THICKNESSES									
Monitor Well	Date Gauged	Relative Ground Surface Elevation (feet)	Relative Top of Casing Elevation (feet)*	Depth to Water Below Top of Casing (feet)	Corrected Relative Groundwater Elevation (feet)**	Phase- Separated Hydrocarbon Thickness (feet)			
MW-1	09/27/93	101.07	103.47	55.41	48.06	0.00			
	03/29/94	101.07	103.47	55.71	48.02	0.32			
	05/10/94	101.07	103.47	55.77	47.83	0.16			
	02/08/95	101.07	103.47	56.17	47.88	0.71			
MW-2	09/27/93 03/29/94 05/10/94 02/08/95	99.17 99.17 99.17 99.17 99.17	101.35 101.35 101.35 101.35	53.48 53.64 53.70 54.03	47.87 47.71 47.65 47.32	0.00 0.00 0.00 0.00			
MW-3	09/27/93	101.01	102.68	54.32	48.36	8.20			
	03/29/94	101.01	102.68	61.27	48.13	0.00			
	05/10/94	101.01	102.68	55.68	48.10	1.34			
	02/08/95	101.01	102.68	60.79	48.12	7.60			
MW-4	05/10/94 02/08/95		101.46 101.46	53.63 53.78	47.83 47.68	0.00 0.00			
MW-5	05/10/94	101.71	103.54	57.77	48.31	3.10			
	02/08/95	101.71	103.54	61.91	48.31	8.15			
MW-6	05/10/94	101.52	103.41	55.25	48.16	0.00			
	02/08/95	101.52	103.41	55.26	48.16	0.00			
MW-7	05/10/94	100.82	102.66	54.71	48.14	· 0.23			
	02/08/95	100.82	102.66	61.16	48.08	8.02			
MW-8	05/10/94	101.56	103.49	54.53	48.96	0.00			
	02/08/95	101.56	103.49	54.59	48.90	0.00			
MW-9	05/10/94	99.66	101.71	53.71	48.00	0.00			
	02/08/95	99.66	101.71	53.96	47.75	0.00			

TABLE 1 DENTON STATION SUMMARY OF RELATIVE GROUNDWATER LEVEL ELEVATIONS AND PHASE-SEPARATED HYDROCARBON THICKNESSES									
Monitor Well	Date Gauged	Relative Ground Surface Elevation (feet)	Relative Top of Casing Elevation (feet)*	Depth to Water Below Top of Casing (feet)	Corrected Relative Groundwater Elevation (feet)**	Phase- Separated Hydrocarbon Thickness (feet)			
	03/05/93 03/12/93 03/17/93 03/22/93 03/31/93 04/08/93 04/08/93 04/15/93 05/06/93 05/13/93 05/26/93 05/26/93 05/26/93 05/26/93 05/28/93 06/04/93 06/11/93 06/16/93 03/18/94 03/29/94	$100.55 \\ 1$	$102.21 \\ 1$	56.54 55.39 55.19 54.44 55.81 57.74 55.60 56.08 55.61 55.49 55.70 55.74 55.23 55.74 55.23 55.46 55.28 55.18 60.70 55.89 55.89	48.50 48.39 48.46 48.45 48.46 48.45 48.42 48.43 48.42 48.43 48.46 48.47 48.45 48.45 48.45 48.45 48.45 48.51 48.52 48.52 48.03 48.01	$\begin{array}{c} 3.45\\ 1.91\\ 1.76\\ 0.83\\ 2.51\\ 4.92\\ 2.21\\ 2.81\\ 2.27\\ 2.13\\ 2.36\\ 2.41\\ 1.80\\ 2.15\\ 1.94\\ 1.82\\ 7.96\\ 2.06\\ \end{array}$			
	05/06/94 05/10/94 05/25/94 06/14/94 07/13/94 09/14/94 10/03/94 10/28/94 11/28/94 12/21/94 02/08/95	100.55 $100.55$ $100.55$ $100.55$ $100.55$ $100.55$ $100.55$ $100.55$ $100.55$ $100.55$ $100.55$ $100.55$	102.21 102.21 102.21 102.21 102.21 102.21 102.21 102.21 102.21 102.21 102.21	58.20 57.40 57.18 57.30 57.07 57.76 56.71 56.84 59.53 59.63 57.40	47.95 47.93 47.91 48.02 48.11 48.16 49.97 50.13 47.90 47.84 47.93	4.80 3.80 3.51 3.78 3.62 4.53 5.45 5.80 6.31 6.42 3.80			

\* Measured from a relative datum (benchmark = 100.00 feet) located at the northeast corner of the concrete sump pad. The monitor well casings were marked to provide consistent reference points for future gauging operations.

\*\* Correction Equation for Phase-Separated Hydrocarbons: Corrected Groundwater Elevation =

Top of Casing Elevation - (Depth to Water Below Top of Casing - [SG] [PSH Thickness])

Specific Gravity (SG) = 0.73 for gasoline, 0.85 for diesel, 0.82 for crude oil.

TABLE 2 DENTON STATION WATER SAMPLE ANALYTICAL RESULTS									
Monitor Well	Date Sampled	Benzene	Toluene	Ethyl- benzene	Xylenes	Total BTEX	ТРН	Dissolved Oxygen	
MW-1	09/27/93 05/10/94 02/08/95	0.85 PSH PSH	0.067 PSH PSH	0.077 PSH PSH	0.34 PSH PSH	1.334 PSH PSH	3 PSH PSH	 PSH PSH	
MW-2	09/27/93 05/10/94 02/08/95	0.017 0.010 0.048	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	<0.001 <0.001 <0.001	0.017 0.010 0.048	<1 <1	 6.4 0.8	
MW-3	09/27/93 05/10/94 02/08/95	1.1 PSH PSH	1.7 PSH PSH	0.44 PSH PSH	0.98 PSH PSH	4.22 PSH PSH	25 PSH PSH	 PSH PSH	
MW-4	05/10/94 02/08/95	0.041	<0.001	<0.001	0.004	0.045	2	8.4	
MW-5	05/10/94 02/08/95	PSH PSH	PSH PSH	PSH PSH	PSH PSH	PSH PSH	PSH PSH	PSH PSH	
MW-6	05/10/94	0.680	0.001	0.001	0.083	0.765	1	4.1	
MW-6 (Duplicate)	05/10/94	0.920	0.002	0.002	0.100	1.024	1	4.1	
	02/08/95	1.200	< 0.005	0.031	0.090	1.321		1.0	
MW-7	05/10/94 02/08/95	PSH PSH	PSH PSH	PSH PSH	PSH PSH	PSH PSH	PSH PSH	PSH PSH	
MW-8	05-11-94 02/08/95	<0.001 	<0.001	<0.001	<0.001 	<0.001	<1 	8.2	
MW-9	05/11/94 02/08/95	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<0.001 <0.001	<1 	8.2 2.3	
A total dissol	ved solids (T	DS) concen	tration of 5	15 ppm was	s reported for	or MW-2 o	n 09-27-9	93.	

BTEX results listed in m/l (parts per million; ppm) with a method detection limit of 0.001 ppm.

TPH and TDS results listed in mg/l (parts per million; ppm) with a method detection limit of 1 ppm.

Analyses were conducted using EPA Method 8020 (BTEX), EPA Method 418.1 (TPH), and EPA Method 160.1 (TDS) by SPL Environmental Laboratories.

--- Not sampled.
D WATER SAM POLYNUCLEAR AF Monitor	TABLE 3         DENTON STATION         WATER SAMPLE ANALYTICAL RESULTS         POLYNUCLEAR AROMATIC HYDROCARBONS (PAH)         Monitor wells sampled on 02/08/95							
	Mon	itor Wells Sampled						
Parameter	MW-2	MW-6	MW-9					
Naphthalene	<0.0002	0.085	<0.0002					
1-Methylnaphthalene	0.001	0.044	< 0.0002					
2-Methylnaphthalene	0.002	0.032	< 0.0002					
Acenaphthylene	<0.0001	<0.0001	< 0.0001					
Acenaphthene	<0.0004	<0.0004	< 0.0004					
Fluorene	<0.0008	<0.0008	<0.0008					
Phenanthrene	<0.0012	< 0.0012	<0.0012					
Anthracene	<0.001	< 0.001	<0.001					
Fluoranthene	<0.0008	0.001	<0.0008					
Pyrene	<0.0006	<0.0006	<0.0006					
Benzo (a) anthracene	< 0.004	< 0.004	<0.004					
Chrysene	<0.0016	<0.0016	<0.0016					
Benzo (b) fluoranthene	<0.004	< 0.004	<0.004					
Benzo (k) fluoranthene	< 0.004	< 0.004	<0.004					
Benzo (a) pyrene	<0.0056	< 0.0056	< 0.0056					
Dibenzo (a,h) anthracene	<0.004	< 0.004	< 0.004					
Benzo (g,h,i) perylene	<0.004	< 0.004	< 0.004					
Indeno (1,2,3-cd) pyrene	< 0.004	< 0.004	< 0.004					

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	TABLE 4DENTON STATIONPHASE-SEPARATED HYDROCARBON RECOVERY						
Date	Monitor Well	PSH Thickness (feet)	PSH Recovery (gallons)	PSH Cumulative Recovery (gallons)	Type of Recovery		
02/26/93	WW-1	<sup>.</sup> 7.97	35.0	35.0	Hand bailed		
03/05/93	WW-1	3.45	25.0	60.0	Hand bailed		
03/12/93	WW-1	1.91	20.0	80.0	Hand bailed		
03/17/93	WW-1	1.76	4.0	84.0	Hand bailed		
03/22/93	<b>WW-</b> 1	0.83	3.5	87.5	Hand bailed		
03/31/93	WW-1	2.51	8.0	95.5	Hand bailed		
04/08/93	WW-1	4.92	13.0	108.5	Hand bailed		
04/15/93	WW-1	2.21	8.0	116.5	Hand bailed		
04/27/93	WW-1	2.81	9.0	125.5	Hand bailed		
05/06/93	WW-1	2.27	7.0	132.5	Hand bailed		
05/13/93	WW-1	2.13	6.0	138.5	Hand bailed		
05/21/93	WW-1	2.36	6.0	144.5	Hand bailed		
05/26/93	WW-1	2.41	8.0	152.5	Hand bailed		
05/28/93	WW-1	1.80	5.0	157.5	Hand bailed		
06/04/93	WW-1	2.15	6.0	163.5	Hand bailed		
06/11/93	WW-1	1.94	5.0	168.5	Hand bailed		
06/16/93	WW-1	1.82	5.5	174.0	Hand bailed		
03/18/94	WW-1	7.63	20.0	194.0	Hand bailed		
03/29/94	WW-1	2.06	5.5	199.5	Hand bailed		
05/06/94	WW-1	4.80	12.0	211.5	Hand bailed		
05/10/94	WW-1	3.80	8.0	219.5	Hand bailed		
05/25/94	<b>WW-1</b>	4.51	15.0	234.5	Hand bailed		
06/14/94	WW-1	3.78	8.0	242.5	Hand bailed		
07/13/94	WW-1	3.62	6.5	249.0	Hand bailed		
09/14/94	WW-1	4.53	8.0	257.0	Hand bailed		
10/03/94	WW-1	5.45	10.0	267.0	Hand bailed		

	TABLE 4DENTON STATIONPHASE-SEPARATED HYDROCARBON RECOVERY							
Date	Monitor Well	PSH Thickness (feet)	PSH Recovery (gallons)	PSH Cumulative Recovery (gallons)	Type of Recovery			
10/28/94	WW-1	5.80	9.0	276.0	Hand bailed			
11/22/94	WW-1	2.24	5.0	281.0	Hand bailed			
11/28/94	WW-1	6.31	10.0	291.0	Hand bailed			
12/21/94	WW-1	6.42	10.0	301.0	Hand bailed			
02/08/95	WW-1	3.80	8.0	309.0	Hand bailed			
03/17/94	<b>MW-</b> 1	0.32	0.2	0.2	Hand bailed			
05/10/94	MW-1	0.16	<0.01	0.2	Hand bailed			
06/14/94	MW-1	0.21	<.01	0.2	Hand bailed			
07/13/94	MW-1	0.24	0.1	0.3	Hand bailed			
08/22/94	MW-1	0.24	0.7	1.0	Hand bailed			
09/14/94	MW-1	0.24	0.8	1.8	Hand bailed			
10/03/94	MW-1	0.03	.2	2.0	Hand bailed			
10/28/94	MW-1	0.44	1.1	3.1	Hand bailed			
11/22/94	MW-1	0.37	1.0	4.1	Hand bailed			
12/21/94	MW-1	0.67	1.5	5.6	Hand bailed			
02/08/95	MW-1	0.71	1.5	7.1	Hand bailed			
03/17/94	MW-3	8.25	7.5	7.5	Hand bailed			
05/10/94	MW-3	1.34	7.0	14.5	Hand bailed			
05/25/94	MW-3	3.92	4.5	19.0	Hand bailed			
06/14/94	MW-3	1.88	3.0	22.0	Hand bailed			
07/13/94	MW-3	2.27	4.0	26.0	Hand bailed			
09/14/94	MW-3	8.48	12.0	38.0	Hand bailed			
10/03/94	MW-3	8.54	12.0	50.0	Hand bailed			
10/28/94	MW-3	6.87	10.0	60.0	Hand bailed			
11/22/94	MW-3	3.41	8.0	68.0	Hand bailed			
12/21/94	MW-3	6.20	9.0	77.0	Hand bailed			

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	TABLE 4 DENTON STATION PHASE-SEPARATED HYDROCARBON RECOVERY							
Date	Monitor Well	PSH Thickness (feet)	PSH Recovery (gallons)	PSH Cumulative Recovery (gallons)	Type of Recovery			
02/08/95	MW-3	7.68	10.0	87.0	Hand bailed			
05/10/94	MW-5	3.10	5.0	5.0	Hand bailed			
05/25/94	MW-5	6.80	11.0	16.0	Hand bailed			
06/14/94	MW-5	5.70	8.5	24.5	Hand bailed			
07/13/94	MW-5	5.67	8.0	32.5	Hand bailed			
09/14/94	MW-5	7.20	11.0	39.7	Hand bailed			
10/03/94	MW-5	7.17	11.0	50.7	Hand bailed			
10/28/94	MW-5	7.56	12.0	62.7	Hand bailed			
11/22/94	MW-5	7.37	15.0	77.7	Hand bailed			
12/21/94	MW-5	9.12	12.0	89.7	Hand bailed			
02/08/95	MW-5	8.15	10.0	99.7	Hand bailed			
05/10/94	MW-7	0.23	1.0	1.0	Hand bailed			
05/25/94	MW-7	1.95	2.5	3.5	Hand bailed			
06/14/94	MW-7	1.65	1.5	5.0	Hand bailed			
07/13/94	MW-7	1.30	1.0	6.0	Hand bailed			
08/19/94	MW-7	0.17	1.0	7.0	Hand bailed			
09/14/94	MW-7	9.08	15.0	22.0	Hand bailed			
10/03/94	MW-7	9.15	15.0	37.0	Hand bailed			
10/28/94	MW-7	7.56	12.0	49.0	Hand bailed			
12/21/94	MW-7	7.93	11.0	68.0	Hand bailed			
02/28/95	MW-7	8.02	12.0	80.0	Hand bailed			

APPENDIX C ANALYTICAL RESULTS

						}					<b>1</b>					
RETAIL OIL COMP	ANY MENTAL	ENGINE	ERING	CHAIN	OF CUST	ropy F	RECOR	D NO.	т	13	650	<b>—</b>			Dat Pag	e: 2-75-75
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CONSULTANT CONTACT: Brad	N	144	Houston)	AIR SAMPLER -	I NHO SAS	3452	0	SNO81	1704-58	0018	EOSMS	35 D '	PESTIC	тмгог 18		
PHONE (97)5708408	Š	(1)5	20-8409	WATER SAMPLE	WHO SAS -	SAS	JZIS	HADOR	O	667 C	6 (		٥٢	ng 3800		
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MUJ-2 2-8-95	1830	7				$\sum$	,							>		
MW -6 2-8.95	1900	7		>		7	40									
MW-6 28-95	1800	7 7			>		19							7		
MU1-9 2-8-95	222/	7		>		$\sum_{i}$	Jun	7							,	
WW - 9 2-8-95	222/	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			>		12							7		
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							TURN	AROUNI	D TIME (	CHECK (	<u>NE)</u>					
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Shell Pipe Line Corporation P.O. Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-131201-PX-4204-NS DATE: 02/27/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Cura, Inc. **SAMPLE ID:** MW-2 PROJECT NO: H 13650 MATRIX: WATER DATE SAMPLED: 02/08/95 18:30:00 DATE RECEIVED: 02/15/95

ANALYTICAL	DATA		
PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	48	1 P	μg/L
TOLUENE	ND	1 P	μg/L
ETHYLBENZENE	ND	1 P	μg/L
TOTAL XYLENE	ND	1 P	μg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	48		µg/L
Surrogate	% Recovery		
1,4-Difluorobenzene	95		
4-Bromofluorobenzene	97		
METHOD 8020***			
Analyzed by: AF			
Date: 02/16/95			

(P) - Practical Quantitation Limit ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Project Manager





Shell Pipe Line Corporation P.O. Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-131201-PX-4204-NS 03/01/95

PROJECT: Denton Station	PROJECT NO: H 136	50
SITE: Lea County, New Mexico	MATRIX: WATER	↓ ▶
SAMPLED BY: Cura, Inc.	DATE SAMPLED: 02/08	/95 18:30:00
SAMPLE ID: MW-2	DATE RECEIVED: 02/15	/95

ANALYTICAL DATA							
PARAMETER	RESULTS	MDL*	UNITS				
Naphthalene	ND	0.20	$\mu q/L$				
1-Methylnaphthalene	1	0.20	μg/L				
2-Methylnaphthalene	2	0.20	μg/L				
Acenaphthylene	ND	0.10	μg/L				
Acenaphthene	ND	0.40	μg/L				
Fluorene	ND	0.80	μg/L				
Phenanthrene	ND	1.2	μg/L				
Anthracene	ND	1.0	μg/L				
Fluoranthene	ND	0.8	μg/L				
Pyrene	ND	0.60	μg/L				
Benzo (a) anthracene	ND	4.0	μg/L				
Chrysene	ND	1.6	μg/L				
Benzo (b) fluoranthene	ND	4.0	μg/L				
Benzo (k) fluoranthene	ND	4.0	μg/L				
Benzo (a) pyrene	ND	5.6	μg/L				
Dibenzo (a,h) anthracene	ND	4.0	μg/L				
Benzo (g,h,i) perylene	ND	4.0	μg/L				
Indeno (1,2,3-cd) pyrene	ND	4.0	μg/L				
SURROGATES	* RECOVI	RY					
2-Fluorobiphenyl	93						

ANALYZED BY: LT DATE/TIME: 02/16/95 10:57:00 DATE/TIME: 02/15/95 EXTRACTED BY: LJ METHOD: 8100 - Polynuclear Aromatic Hydrocarbons \* - Method Detection Limit NOTES: ND - Not Detected NA - Not Analyzed

COMMENTS:

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

SPL Project Manager Inc.





Shell Pipe Line Corporation P.O. Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-131201-PX-4204-NS DATE: 02/27/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Cura, Inc. **SAMPLE ID:** MW-6 **PROJECT NO:** H 13650 **MATRIX:** WATER **DATE SAMPLED:** 02/08/95 18:00:00 **DATE RECEIVED:** 02/15/95

ANALYTICAL	DATA		
PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	1200	5 P	µg/L
TOLUENE	ND	5 P	μg/L
ETHYLBENZENE	31	5 P	μg/L
TOTAL XYLENE	90	5 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	1321		µg/L
Surrogate	% Recovery		
1,4-Difluorobenzene	104		
4-Bromofluorobenzene	100		
METHOD 8020***			
Analyzed by: AF			
Date: 02/18/95			

(P) - Practical Quantitation Limit ND - Not detected.

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

**QUALITY ASSURANCE:** These analyses are performed in accordance with EPA guidelines for quality assurance.

Project Manager





Shell Pipe Line Corporation P.O. Box 2648 Houston, TX 77252 ATTN: Neal Stidham

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Cura, Inc. **SAMPLE ID:** MW-6 P.O.# MESA-CAO-B-131201-PX-4204-NS 03/01/95

PROJECT NO: H 13650 MATRIX: WATER DATE SAMPLED: 02/08/95 18:00:00 DATE RECEIVED: 02/15/95

ANALYTICAL DATA							
Parameter	RESULTS	MDL *	UNITS				
Naphthalene	85	0.20	μg/L				
1-Methylnaphthalene	44	0.20	μg/L				
2-Methylnaphthalene	32	0.20	µg/L				
Acenaphthylene	ND	0.10	µg/L				
Acenaphthene	ND	0.40	μg/L				
Fluorene	ND	0.80	μg/L				
Phenanthrene	ND	1.2	μg/Ъ.				
Anthracene	ND	1.0	μg/L				
Fluoranthene	l	0.8	<i>µ</i> g/Ъ				
Pyrene	ND	0.60	μg/L				
Benzo (a) anthracene	ND	4.0	μg/L				
Chrysene	ND	1.6	μg/L				
Benzo (b) fluoranthene	ND	4.0	μg/L				
Benzo (k) fluoranthene	ND	4.0	μg/L				
Benzo (a) pyrene	ND	5.6	μg/L				
Dibenzo (a,h) anthracene	ND	4.0	µg/L				
Benzo (g,h,i) pervlene	ND	4.0	μg/L				
Indeno (1,2,3-cd) pyrene	ND	4.0	μg/L				
SURROGATES	* RECOV	ery					
2-Fluorobiphenyl	100						

ANALYZED BY: LTDATE/TIME: 02/16/95 10:57:00EXTRACTED BY: LJDATE/TIME: 02/15/95METHOD: 8100 - Polynuclear Aromatic HydrocarbonsNOTES: \* - Method Detection LimitND - Not DetectedNA - Not Analyzed

COMMENTS:

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Inc., - Project Manager SPL,





Shell Pipe Line Corporation P.O. Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-131201-PX-4204-NS DATE: 02/27/95

<b>PROJECT:</b> Denton Station	PROJECT NO:	H 13650	
SITE: Lea County, New Mexico	MATRIX:	WATER	
SAMPLED BY: Cura, Inc.	DATE SAMPLED:	02/08/95	17:00:00
SAMPLE ID: MW-9	DATE RECEIVED:	02/15/95	

	ANALYTICAL	DATA		
PARAMETER		RESULTS	DETECTION LIMIT	UNITS
BENZENE		ND	1 P	µg/L
TOLUENE		ND	1 P	μg/L
ETHYLBENZENE		ND	1 P	μg/L
TOTAL XYLENE		ND	1 P	μg/L
TOTAL VOLATILE AROMATIC HY	YDROCARBONS	ND		μg/L
Surrogate		<pre>% Recovery</pre>		
1,4-Difluorobenzene		96		
4-Bromofluorobenzene		97		
METHOD 8020***				
Analyzed by: AF				
Date: 02/16/95				

ND - Not detected.

(P) - Practical Quantitation Limit

Notes: \*Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA \*\*Ref: Standard Methods for Examination of Water & Wastewater, 17th ed. \*\*\*Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Project Manager





Shell Pipe Line Corporation P.O. Box 2648 Houston, TX 77252 ATTN: Neal Stidham

P.O.# MESA-CAO-B-131201-PX-4204-NS 03/01/95

**PROJECT:** Denton Station **SITE:** Lea County, New Mexico **SAMPLED BY:** Cura, Inc. **SAMPLE ID:** MW-9 **FROJECT NO:** H 13650 **MATRIX:** WATER **DATE SAMPLED:** 02/08/95 17:00:00 **DATE RECEIVED:** 02/15/95

ANALYTIC	AL DATA		
PARAMETER	RESULTS	MDL*	UNITS
Naphthalene	ND	0.20	μg/L
1-Methylnaphthalene	ND	0.20	μg/L
2-Methylnaphthalene	ND	0.20	μg/L
Acenaphthylene	ND	0.10	µg/L
Acenaphthene	ND	0-40	μg/L
Fluorene	ND	0.80	μg/L
Phenanthrene	ND	1.2	μg/L
Anthracene	ND	1.0	µg/L
Fluoranthene	ND	0.8	μg/L
Pyrene	ND	0.60	μg/L
Benzo (a) anthracene	ND	4.0	µg/L
Chrysene	ND	1.6	μg/L
Benzo (b) fluoranthene	ND	4.0	µg/L
Benzo (k) fluoranthene	ND	4.0	μg/L
Benzo (a) pyrene	ND	5.6	µg/L
Dibenzo (a,h) anthracene	ND	4.0	μg/L
Benzo (g,h,i) perylene	ND	4.0	μg/L
Indeno (1,2,3-cd) pyrene	ND	4.0	μg/L
SURROGATES	* RECOV	ery	
2-Fluorobiphenyl	92		

ANALYZED BY: LT DATE/TIME: 02/16/95 10:57:00 EXTRACTED BY: LJ DATE/TIME: 02/15/95 METHOD: 8100 - Polynuclear Aromatic Hydrocarbons NOTES: \* - Method Detection Limit ND - Not Detected NA - Not Analyzed

COMMENTS:

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

SPL, Inc., - Project Manager

# QUALITY CONTROL DOCUMENTATION



Aqueous

µg/L

\* SPL BATCH QUALITY CONTROL REPORT \*\* METHOD 8020 PAGE 1

Matrix: Units: Batch Id: HP\_R950216190800

LABORATORY CONTROL SAMPLE

SPIKE	Method	Spike	Blank	Spike	QC Limits(**)				
COMPOUNDS	Blank Result <2>	Added <3>	Result <1>	Recovery X	(Mandatory) % Recovery Range				
Benzene	ND	50	48	96.0	61 - 123				
Toluene	ND	50	46	92.0	62 - 122				
EthylBenzene	ND	50	50	100	56 - 119				
0 Xylene	ND	50	52	104	32 - 160				
M & P Xylene	ND	100	120	120	32 - 160				

#### MATRIX SPIKES

S P I K E C O M P O U N D S	Sample Results	Spike Added	Matrix Spike		Matrix Spike Duplicate		ix Spike MS/MSD <u>plicate</u> Relative X		QC Limits(***) (Advisory)		
			Result	Recovery	Result	Recovery	Difference	RPD			
	<2>	<3>	<1>	<4>	<1>	<5>		Max.	Recovery Range		
Benzene	ND	20	19	95.0	19	95.0	0	25	39 - 150		
Toluene	ND	20	19	95.0	19	95.0	0	26	56 - 134		
EthylBenzene	ND	20	20	100	19	95.0	5.13	38	61 - 128		
0 Xylene	ND	20	21	105	20	100	4.88	20	40 - 130		
M & P Xylene	ND	40	45	112	43	108	3.64	20	43 - 152		

Analyst: AF

Sequence Date: 02/16/95 SPL ID of sample spiked: 9502522-01A Sample File ID: R\_\_\_073.TX0 Method Blank File ID: Blank Spike File ID: R\_\_\_067.TX0 Matrix Spike File ID: R\_\_\_070.TX0 Matrix Spike Duplicate File ID: R\_\_\_071.TX0 \* = Values Outside QC Range

NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

ND = Not Detected/Below Detection Limit

% Recovery = [( <1> - <2> ) / <3> ] x 100

LCS % Recovery = (<1> / <3> ) x 100

Relative Percent Difference = |(<4> - <5> | / [(<4> + <5> ) x 0.5] x 100

(\*\*) = Source: SPL-Houston Historical Data

(\*\*\*) = Source: SPL-Houston Historical Data

SAMPLES IN BATCH(SPL ID):

 9502514-07A
 9502514-06A
 9502493-03A
 9502493-02A

 9502520-01A
 9502525-01A
 9502502-06A
 9502502-03A

 9502502-03A
 9502502-02A
 9502502-01A
 9502502-02A

 9502502-03A
 9502516-01A
 9502522-01A
 9502522-01A

 9502516-03A
 9502516-01A
 9502522-01A
 9502522-01A

Idelis Wil)iams, QC Officer



SPL BATCH QUALITY CONTROL REPORT \*\* METHOD 8020 PAGE 1

Matrix: Aqueous Units: µg/L Batch Id: HP\_R950218045700

LABORATORY CONTROL SAMPLE

SPIKE	Method	Spike	Blank	Spike	QC Limits(**)				
COMPOUNDS	Blank Result <2>	Added <3>	Result <1>	Recovery X	(Mandatory) % Recovery Range				
Benzene	ND	50	47	94.0	61 - 123				
Toluene	ND	50	46	92.0	62 - 122				
EthylBenzene	ND	50	49	98.0	56 - 119				
0 Xylene	ND	50	52	104	32 - 160				
M & P Xylene	ND	100	120	120	32 - 160				

#### MATRIX SPIKES

S P I K E C O M P O U N D S	Sample Results	Spike Added	Matrix Spike		Matrix Spike Duplicate		MS/MSD Relative %	QC Limits(***) (Advisory)			
	<2>	<3>	Result	Recovery	Result	Recovery	Difference	RPD Max	Recovery Rande		
Benzene	ND	20	19	95.0	19	95.0	0	25	39 - 150		
Toluene	ND	20	18	90.0	18	90.0	0	26	56 - 134		
EthylBenzene	ND	20	18	90.0	19	95.0	5.41	38	61 - 128		
0 Xylene	ND	20	19	95.0	19	95.0	0	20	40 - 130		
M & P Xylene	ND	40	41	102	42	105	2.90	20	43 - 152		

Analyst: AF

Sequence Date: 02/18/95 SPL ID of sample spiked: 9502613-10A Sample File ID: R\_\_\_132.TX0 Method Blank File ID: Blank Spike File ID: R\_\_\_126.TX0 Matrix Spike File ID: R\_\_\_129.TX0 Matrix Spike Duplicate File ID: R\_\_\_130.TX0 \* = Values Outside QC Range

NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

ND = Not Detected/Below Detection Limit

% Recovery = [( <1> - <2> ) / <3> ] x 100

LCS % Recovery =  $(<1> / <3>) \times 100$ 

Relative Percent Difference = |(<4> - <5> | / [(<4> + <5> ) x 0.5] x 100

(\*\*) = Source: SPL-Houston Historical Data

(\*\*\*) = Source: SPL-Houston Historical Data

SAMPLES IN BATCH(SPL ID):

9502613-03A9502396-08A9502396-02A9502503-03A9502503-02A9502613-05A9502516-02A9502493-01A9502503-01A9502514-01A9502613-11A9502613-09A9502613-08A9502613-10A9502613-10A

Idelis Will)ams, QC Officer



\* SPL BATCH QUALITY CONTROL REPORT \*\*

PNA's by GC

PAGE 1

Matrix: Units:

: Aqueous µg/L Batch Id: VARH950216105700

LABORATORY CONTROL SAMPLE

SPIKE	Method	Spike	Blank	Spike	QC Limits(**)				
COMPOUNDS	Blank Result	Added	Result	Recovery	(Mandatory)				
	<2>	<3>	<1>	x	% Recove	ery f	lange		
NAPHTHALENE	ND	25	21.0587	84.2	1	-	122		
ACENAPHTHYLENE	ND	25	20.7778	83.1	1	-	139		
ACENAPHTHENE	ND	25	23.3962	93.6	1	-	124		
FLUORENE	ND	25	24.2413	97.0	1	-	142		
PHENANTHRENE	ND	25	27.0000	108	1 1	-	155		
ANTHRACENE	ND	25	23.000	92.0	1 1	-	126		
FLUORANTHENE	ND	25	31.0349	124	1	-	142		
PYRENE	ND	25	31.3821	126	1 1	-	140		
CHRYSENE	ND	25	33.3290	133	1	-	199		
BENZO (A) ANTHRACENE	ND	25	30.8053	123	12	-	135		
BENZO (B) FLUORANTHENE	ND	25	28.720	115	6	-	150		
BENZO (K) FLUORANTHENE	ND	25	26.940	108	1 1	-	159		
BENZO (A) PYRENE	ND	25	23.7800	95.1	1	-	128		
DIBENZO (A,H) ANTHRACENE	ND	25	27.1614	109	1	-	110		
BENZO (G,H,I) PERYLENE	ND	25	26.8621	107	1	-	116		
INDENO (1,2,3-CD) PYRENE	ND	25	25.3634	101	1	-	116		

#### MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results	Spike Added	Matrix	Spike	Matrix Dupli	Spike cate	MS/MSD Relative %	QC I	.imits(***) (Advisory)
		.7.	Result	Recovery	Result	Recovery	Difference	RPD	
	< <u> </u>	<>>	<1>	<4>	<1>	<>>		Max.	kecovery kange
NAPHTHALENE	ND	25.00	22.4992	90.0	21.4106	85.6	5.01	30	1 - 122
ACENAPHTHYLENE	ND	25.00	17.5528	70.2	17.0339	68.1	3.04	30	1 - 139
ACENAPHTHENE	ND	25.00	24.3965	97.6	22.0794	88.3	10.0	30	1 - 124
FLUORENE	ND	25.00	24.6257	98.5	23.8591	95.4	3.20	30	1 - 142
PHENANTHRENE	ND	25.0	24.278	97.1	24.088	96.4	0.724	30	1 - 155
ANTHRACENE	ND	25.0	23.0170	92.1	23.3947	93.6	1.62	30	1 - 126
FLUORANTHENE	ND	25.0	28.0754	112	24.0206	96.1	15.3	30	1 - 142
PYRENE	ND	25.00	28.6653	115	28.0485	112	2.64	30	1 - 140
CHRYSENE	ND	25.0	32.0018	128	31.0467	124	3.17	30	1 - 199
BENZO (A) ANTHRACENE	ND	25.0	29.0624	116	28.0126	112	3.51	30	12 - 135
BENZO (B) FLUORANTHENE	ND	25.0	26.0	104	24.0	96.0	8.00	30	6 - 150
BENZO (K) FLUORANTHENE	ND	25.0	29.0166	116	28.0272	112	3.51	30	1 - 159
BENZO (A) PYRENE	ND	25.0	19.3546	77.4	21.7230	86.9	11.6	30	1 - 128
DIBENZO (A,H) ANTHRACENE	ND	25.0	25.9820	104	25.0470	100	3.92	30	1 - 110

SAMPLES IN BATCH(SPL ID):

9502516-028 9502516-01B 9502516-03B 9502514-05B 9502514-04B 9502514-02B 9502453-01C 9502453-03C 9502453-02C

Idelis Williams/ QC Officer



\* SPL BATCH QUALITY CONTROL REPORT \*\*

PNA's by GC

PAGE 1

Matrix: Aqueous Units: µg/L

MATRIX SPIKES

Batch Id:

S P I K E	Sample	Spike	Matrix Spike		Matrix Spike		MS/MSD	QC Limits(***)			
C O M P O U N D S	Results	Added			Duplicate		Relative %	(Advisory)			
	<2>	<3>	Result <1>	Recovery <4>	Result <1>	Recovery <5>	Difference	RPD Max.	Recovery Range		
BENZO (G,H,I) PERYLENE	ND	25.0	26.3812	106	24.3651	97.5	8.35	30	1 - 116		
INDENO (1,2,3-CD) PYRENE	ND	25.0	26.1334	105	23.326	93.3	11.8	30	1 - 116		

Analyst: LT

Sequence Date: 02/16/95 SPL ID of sample spiked: 950209CXBI Sample File ID: H\_\_\_\_842.raw Method Blank File ID:

Blank Spike File ID: H\_\_\_906.raw Matrix Spike File ID: H\_\_\_848.raw

Matrix Spike Duplicate File ID: H\_\_\_849.raw

\* = Values Outside QC Range

NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

ND = Not Detected/Below Detection Limit

% Recovery = [( <1> - <2> ) / <3> ] x 100

LCS % Recovery = (<1> / <3> ) x 100

Relative Percent Difference = |(<4> - <5> | / [(<4> + <5> ) x 0.5] x 100

VARH950216105700

(\*\*) = Source: 8100, Table 2

(\*\*\*) = Source: Temporary Limits

SAMPLES IN BATCH(SPL ID):

9502516-02B 9502516-01B 9502516-03B 9502514-05B 9502514-04B 9502514-02B 9502453-01C 9502453-03C 9502453-02C

Idelis Williams, QC Officer

### APPENDIX D

## QUALITY ASSURANCE/QUALITY CONTROL

#### QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

A strict Quality Assurance Plan was incorporated throughout all phases of the monitoring and sampling operations. The samples were collected with new disposable Teflon bailers. The bailers were disposed of between sampling stations to eliminate the potential of crosscontamination. The water samples were transferred from the bailers into airtight septumsealed 40-ml glass VOA vials with zero head space for BTEX analysis and one-liter amber glass jars with Teflon-lined lids for TPH analysis.

The samples were preserved with hydrochloric acid, sealed with QA/QC seals and maintained at 4°C in accordance with Environmental Protection Agency (EPA) requirements (EPA 600/4-82-029) for shipment to the laboratory. A chain-of-custody (COC) which documents sample collection times and delivery times to the laboratory was completed for each set of samples. The COC is included with the analytical results in the appropriate appendices.

Analyses were performed on all samples using the following TNRCCrecommended analytical methods: EPA Method 8020/5030 (BTEX) and EPA Method 8100 (PAH). The maximum recommended holding time for BTEX analysis is 14 days; the maximum recommended holding time for TPH analysis is 28 days.

**CURA** maintains the highest quality standards with direct assurance supervision of operations (sample handling and storage). CURA utilizes equipment laboratories that maintain strict quality control: i.e., **TNRCC-recommended** calibration and standardization, analytical methods, preparation of quality control samples, and complete chains-of-custody. bailed



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