

1R - 463

REPORTS

DATE:

6-19-13



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MOBILE DUAL PHASE EXTRACTION REPORT
D.S. HUGH GATHERING 4 INCH PIPELINE RELEASE
LEA COUNTY, NEW MEXICO

RECEIVED OGD
2013 SEP 20 12:02

SRS # 2000-10807
NMOCD# 1R-0463

PREPARED FOR:

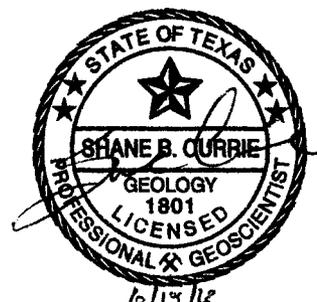
PLAINS MARKETING, L.P.
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PREPARED BY:

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JUNE 19, 2013

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I. MDPE SUMMARY REPORT AND WASTE DISPOSITION

A. MDPE Results

The following report summarizes data collected during the 12-hour High Vacuum Multi-Phase Extraction (MDPE) event conducted on March 12 -13, 2013 at the D.S. Hugh Gathering 4 Inch Pipeline release site, located in Lea County, New Mexico. The objective of the MDPE treatment was to remove both vapor and liquid phase separated hydrocarbons (PSH) from onsite groundwater wells. Talon/LPE utilized an MDPE unit which consisted of an SVE extraction pump capable of generating vacuum up to 25” hg. Off gas vapors extracted from the extraction wells were destroyed using a propane-fired 1000-SCFM thermal oxidizer capable of processing 172.96 lbs/hr of gasoline.

A total of 12 hours (0.5 days) of PSH recovery was performed on MW-1 for 12 hours.

Prior to and immediately following the event, the groundwater wells were gauged for groundwater elevation and PSH. Depth to groundwater ranges were measured in feet below the top of casing. Refer to Attachment 1 for a summary of data collected during the MDPE event.

The volume of PSH removed during the MDPE event is shown to reflect the portions of PSH in the liquid phase and as off-gas vapor. Air removal rates were calculated from velocity measurements recorded at the influent manifold prior to entry into the MDPE unit. PSH recovery and air flow data has been detailed and is contained in Table 1. Two influent air samples were collected over the course of the event. These samples were submitted for laboratory testing in order to compare the predicted vapor concentrations (based on field-screening or calculated based on fuel consumption) to the actual vapor concentrations. Both influent samples were tested for Total-Gas Analysis (Hydrocarbon Composition) by GPA 2261-C6+. Laboratory analytical results can be found in Attachment 2.

Based on a combination of field vapor screening and collected laboratory samples, a combined estimated total of **19.94 equivalent gallons of PSH (Total)** were removed during the event. The combined volume of PSH was comprised of approximately **3 gallons of PSH (liquid phase)** and approximately **16.94 gallons as off-gas vapor**.

The cumulative air flow measurements for the MDPE event were calculated using a combination of field data measurements and Preso® B+ manufacturer provided formulas. **Air flow rates extracted from the recovery well averaged 29.97 SCFM** during the event.

A portion of the extracted air flow rates measured is attributable to compressed air, which was “injected” into the extraction wells. This “injected” air is introduced into the extraction wells for the purpose of enhancing liquid recovery rates.

B. Air Quality

Two influent air samples were collected during the event. These samples were submitted for laboratory testing in order to compare the predicted vapor concentrations (based on field-screening or calculated based on fuel consumption) to the actual vapor concentrations. The maximum concentration in air influent was recorded as 90,950 ppmv for Hydrocarbon Composition. Laboratory analytical results can be found in Attachment 2.

C. Waste Management and Disposition

A cumulative total of 1,321 gallons of fluid were generated during this event. The fluids were temporarily transferred to an on-site storage tank prior to being transferred to an authorized disposal facility. A copy of the waste ticket can be found in Attachment 4.

II. SYSTEM OPERATION DATA AND MASS RECOVERY CALCULATIONS

Formulae:

$$\text{Concentration (C_mg/l)} = \frac{\text{C_ppmv} \times \text{Mol. wt. in mg(estimated)} \times 1000 \times 0.000001}{0.0821 \times \text{Temp (K)}}$$

$$\text{Recovery Rate (lbs/hr)} = \frac{(\text{C_mg/l}) \times 2.2 \times (\text{Flowrate}) \times 60 \times 28.32}{1,000,000}$$

$$\text{Recovery (lbs)} = (\text{lbs/hr}) \times (\text{hrs})$$

$$\text{Correction Factor (CF)} = \frac{\text{FID Reading(ppmv)}}{\text{FID Reading at Time of Laboratory Analysis}}$$

$$\frac{8.34 \text{ lbs}}{\text{gallon water}} \times 0.66 \text{ average specific gravity of light crude (estimated)} = \frac{5.5 \text{ lbs light crude}}{\text{gallon}}$$

Table 1
System Operation Data and Mass Recovery Calculations

Time	Period (hours)	Influent Temp. (°F)	Vacuum (in. hg)	Vacuum (in. h2O)	Differential pressure (in. h2O)	Flow (SCFM)	FID Readings (ppmv)	Lab Result (ppmv)	Assigned Lab Result (ppmv)	Correction Factor (CF)	Adjusted Lab Result (ppmv)	Adjusted Lab Result (mg/L)	Recovery (lbs/hr)	Recovery in Period (lbs)	Total Recovery (lbs)
17:00	0.5	70	21	285.79	1.3	21.79	387.3	-	90950.00	0.88	62070	79.04	6.44	3.22	3.22
17:30	0.5	68	19	258.57	1.6	26.79	567.5	90950.00	90950.00	1.00	90950	116.25	11.64	5.82	9.04
18:30	1	67	19	258.57	1.7	27.64	487.6	-	90950.00	0.86	78145	100.08	10.34	10.34	19.38
19:30	1	65	19	258.57	1.2	23.27	2617	-	90950.00	4.61	419412	539.17	46.90	46.90	66.28
20:30	1	58	18.5	251.77	1.4	25.87	775.1	-	90950.00	1.37	124221	161.85	15.85	15.85	81.84
21:30	1	54	18	244.96	1.5	27.47	347.1	-	90950.00	0.61	55628	73.04	7.50	7.50	89.44
22:30	1	52	19	258.57	1.9	29.65	1059	-	90950.00	1.87	169720	223.73	24.80	24.80	114.23
23:30	1	50	19.5	265.36	2.8	35.23	338.2	-	1400.00	0.31	433	0.53	0.07	0.07	114.30
0:30	1	48	19	258.57	2.5	34.14	1531	-	1400.00	1.40	1981	2.39	0.30	0.30	114.81
1:30	1	48	18.5	251.77	2.2	32.75	2772	-	1400.00	2.54	3551	4.32	0.53	0.53	115.13
2:30	1	48	18	244.96	2.4	35.01	1612	-	1400.00	1.47	2065	2.52	0.33	0.33	115.47
3:30	1	48	18	244.96	2.5	35.74	1093	1400.00	1400.00	1.00	1400	1.71	0.23	0.23	115.69
4:30	1	46	18	244.96	2.3	34.28	975.2	-	1400.00	0.89	1249	1.53	0.20	0.20	115.89
Averages:		55.23	18.61	255.95	1.95	29.97	1120.15						Total	115.89	

PSH Mass Recovered in Vapor Phase = **16.94** gallons

FID maximum Concentration = 50,000 PPM

Ex: Conversion from ppmv to mg/L (Influent 1)

Measured Conc.	Molecular Wt.	Pressure	Gas Constant	Temp.	Temp.	Conc.
(C_ppmv)	(Grams)	(atm)	(atm.liter/K.mole)	(F)	(K)	(C_mg/l)
62070	30.7481	1	0.0821	70	294.1111111	79.04014266

Inputs are the green values.

Calculated values are yellow.

Constants are purple values.

Output are the blue values.

Liquid-phase Hydrocarbon Recovery

(assumes gasoline product)

$[l] \cdot r^2 \cdot h = \text{volume}$

Total Hydrocarbon Recovery

PSH Mass Recovered in Vapor Phase = **115.89** lbs

PSH Mass Recovered in Liquid Phase = **20.62** lbs

TOTAL = 136.41 lbs

19.94 gallons

Gallons removed determined at time of pick up	
PSH Volume in Gallons=	3
PSH Mass in Pounds=	20.52

SG = 0.82

% Vol. (Wt. %) Hydrocarbon to ppmv - Influent 1				
Compound	Molecular Weight (g/mol)	Wt. %	=	ppmv
Methane (CH4)	16.04	7.371		73710.00
Ethane (C2H6)	30.07	0.379		3790.00
Propane (C3H8)	44.10	0.208		2080.00
Iso-Butane (C4H10)	58.12	0.11		1100.00
N-Butane (C4H10)	58.12	0.151		1510.00
Iso-Pentane (C5H12)	72.15	0.099		990.00
N-Pentane (C5H12)	72.15	0.092		920.00
Hexane+ (C6H14)	97.40	0.685		6850.00
Total				90950.00

*Hexane+ is treated as 60% hexanes, 30% heptanes, and 10% octanes, as such its
(0.6*93.1887)+(0.3*100.2019)+(0.1*114.2285) = 97.3966

Molecular Weight Calculations		
component	Molecular Weight (g/mol)	mol%
Nitrogen (N2)	28.016	58.9080
Methane (CH4)	16.0425	14.1230
Carbon Dioxide (CO2)	44.011	25.9940
Ethane (C2H6)	30.069	0.3870
Propane (C3H8)	44.0956	0.1450
Iso-Butane (C4H10)	58.1222	0.0580
N-Butane (C4H10)	58.1222	0.0800
Iso-Pentane (C4H12)	72.1488	0.0420
N-Pentane (C5H12)	72.1488	0.0390
Hexane+	97.3966	0.2280
Total	100	
Calculated MW	30.7481	

% Vol. (Wt. %) Hydrocarbon to ppmv - Influent 2				
Compound	Molecular Weight (g/mol)	Wt. %	=	ppmv
Methane (CH4)	16.04	0		0.00
Ethane (C2H6)	30.07	0.007		70.00
Propane (C3H8)	44.10	0.003		30.00
Iso-Butane (C4H10)	58.12	0.004		40.00
N-Butane (C4H10)	58.12	0.004		40.00
Iso-Pentane (C4H12)	72.15	0		0.00
N-Pentane (C5H12)	72.15	0		0.00
Hexane+ (C6H14)	97.40	0.122		1220.00
Total				1400.00

*Hexane+ is treated as 60% hexanes, 30% heptanes, and 10% octanes, as such its
(0.6*93.1887)+(0.3*100.2019)+(0.1*114.2285) = 97.3966

Molecular Weight Calculations		
component	Molecular Weight (g/mol)	mol%
Nitrogen (N2)	28.016	99.1380
Methane (CH4)	16.0425	0.0000
Carbon Dioxide (CO2)	44.011	0.8120
Ethane (C2H6)	30.069	0.0070
Propane (C3H8)	44.0956	0.0020
Iso-Butane (C4H10)	58.1222	0.0020
N-Butane (C4H10)	58.1222	0.0020
Iso-Pentane (C4H12)	72.1488	0.0000
N-Pentane (C5H12)	72.1488	0.0000
Hexane+	97.3966	0.0370
Total	100	
Calculated MW	28.1732	

Calculated MW= $\frac{\text{sum (individual component MW x their reported mol\%)}}{100}$

ppmv= % Vol x 10,000

D.S. Hugh Gathering 4 Inch Line – 700376.129.02 - SRS# 2000-10807 – Event 2 – 12 Hour

ATTACHMENT 1
MDPE Field Logs

Start Date: 3/12/2013

MDPE FIELD DATA

TIME	SAMPLE TAKEN	Well Flow			Well Flow			Well Data					
		Inflent temp. (°f)	Diff. Pressure (INH2O) 2" Preso	Vac (In. hg)	Composite FID (ppm)	Propane Tank (%-size) 90%	EXHAUST TEMP F	COMMENTS:					
								MW-1	VAC (INH2O)	VAC (INH2O)	VAC (INH2O)	VAC (INH2O)	
17:00		70	1.3	21	387.5	89	1411	2					
17:30	*	68	1.6	19	567.5	88	1412	2.5					
18:30		67	1.7	19	487.6	87	1406	2.7					
19:30		65	1.2	19	2617	86	1414	3.1					
20:30		58	1.4	18.5	775.1	85	1406	2.9					
21:30		54	1.5	18	347.1	82	1405	3.9					
22:30		52	1.9	19	1059	80	1406	4					
23:30		50	2.8	19.5	338.2	77	1408	5					
0:30		48	2.5	19	1531	74	1410	4.6					
1:30		48	2.2	18.5	2772	71	1409	3.8					
2:30		46	2.4	18	1612	68	1409	3.9					
3:30	**	46	2.5	18	1093	65	1407	4					
4:30		46	2.3	18	975.2	62	1406	3.8					

D.S. Hugh Gathering 4 Inch Line – 700376.129.02 - SRS# 2000-10807 – Event 2 – 12 Hour

ATTACHMENT 2
Laboratory Analytical Results



HOUSTON LABORATORIES
 3820 INTERCHANGE DRIVE
 HOUSTON, TEXAS 77054
 PHONE (713) 660-0901

Certificate of Analysis

Number: 1030-2013030374-001A

Simon I. Walshe, CAPM
 Talon/LPE
 921 N. Bivins St.
 Amarillo Texas 79107

March 15, 2013

Sample ID:		Sampled By:	LB
Station Name :	Influent #1	Sample Of:	Gas Spot
Station Number :		Sample Date:	03/12/2013 17:30
Station Location :	Amarillo, TX	Sample Conditions:	N.G. Pres. , N.G. Temp.
Sample Point:		PO / Ref. No:	

ANALYTICAL DATA

Components	Mol %	Wt %	GPM at 14.650 psia	Method	Lab Tech.	Date Analyzed
				GPA-2261 M	DK	3/15/2013 3:27:01 AM
Nitrogen	58.906	53.686				
Carbon Dioxide	25.994	37.219				
Methane	14.123	7.371				
Ethane	0.387	0.379	0.103			
Propane	0.145	0.208	0.040			
Iso Butane	0.058	0.110	0.019			
n-Butane	0.080	0.151	0.025			
Iso Pentane	0.042	0.099	0.015			
n-Pentane	0.039	0.092	0.014			
Hexanes Plus	0.226	0.685	0.098			
	100.000	100.000	0.314			
	C2 +	C3 +	iC5 +			
GPM TOTAL :	0.314	0.211	0.127			
Relative Density	Real Gas			1.0622		
Calculated Molecular Weight				30.74		
Compressibility Factor				0.9986		
GPA 2172-09 Calculation :						
Calculated Gross BTU per ft³ @14.650 psia & 60°F						
Real Gas:	Dry BTU:		172			
	Water Sat. Gas_Base BTU:		169			
Comments :	H2O Mol% - 1.75_Wt% - 1.033					

Hydrocarbon Laboratory Manager

Quality Assurance:

The above analyses are performed in accordance with ASTM, UOP or GPA guidelines for quality assurance, unless otherwise stated



HOUSTON LABORATORIES
 9920 INTERCHANGE DRIVE
 HOUSTON, TEXAS 77051
 PHONE (713) 660-0901

Certificate of Analysis

Number: 1030-2013030374-002A

Simon I. Walshe, CAPM
 Talon/LPE
 921 N. Bivins St.
 Amarillo Texas 79107

March 15, 2013

Sample ID:		Sampled By:	LB
Station Name :	Influent #2	Sample Of:	Gas Spot
Station Number :		Sample Date:	03/13/2013 03:30
Station Location :	Amarillo, TX	Sample Conditions:	N.G. Pres. , N.G. Temp.
Sample Point:		PO / Ref. No:	

ANALYTICAL DATA

Components	Mol %	Wt %	GPM at 14.650 psia	Method	Lab Tech.	Date Analyzed
				GPA-2261 M	DK	3/15/2013 3:44:01 AM
Nitrogen	99.138	98.591				
Carbon Dioxide	0.812	1.269				
Ethane	0.007	0.007	0.002			
Propane	0.002	0.003	0.001			
Iso Butane	0.002	0.004	0.001			
n-Butane	0.002	0.004	0.001			
Hexanes Plus	0.037	0.122	0.016			
	<u>100.000</u>	<u>100.000</u>	<u>0.021</u>			
	C2 +	C3 +	IC5 +			
GPM TOTAL :	0.021	0.019	0.016			
Relative Density	Real Gas			0.9725		
Calculated Molecular Weight				28.17		
Compressibility Factor				0.9997		
GPA 2172-09 Calculation :						
Calculated Gross BTU per ft³ @14.650 psia & 60°F						
Real Gas: Dry BTU:						2
Water Sat. Gas_Base BTU:						2
Comments :	H2O Mol% - 1.75_Wt% - 1.126					

Simon I. Walshe

Hydrocarbon Laboratory Manager

Quality Assurance: The above analyses are performed in accordance with ASTM, UOP or GPA guidelines for quality assurance, unless otherwise stated

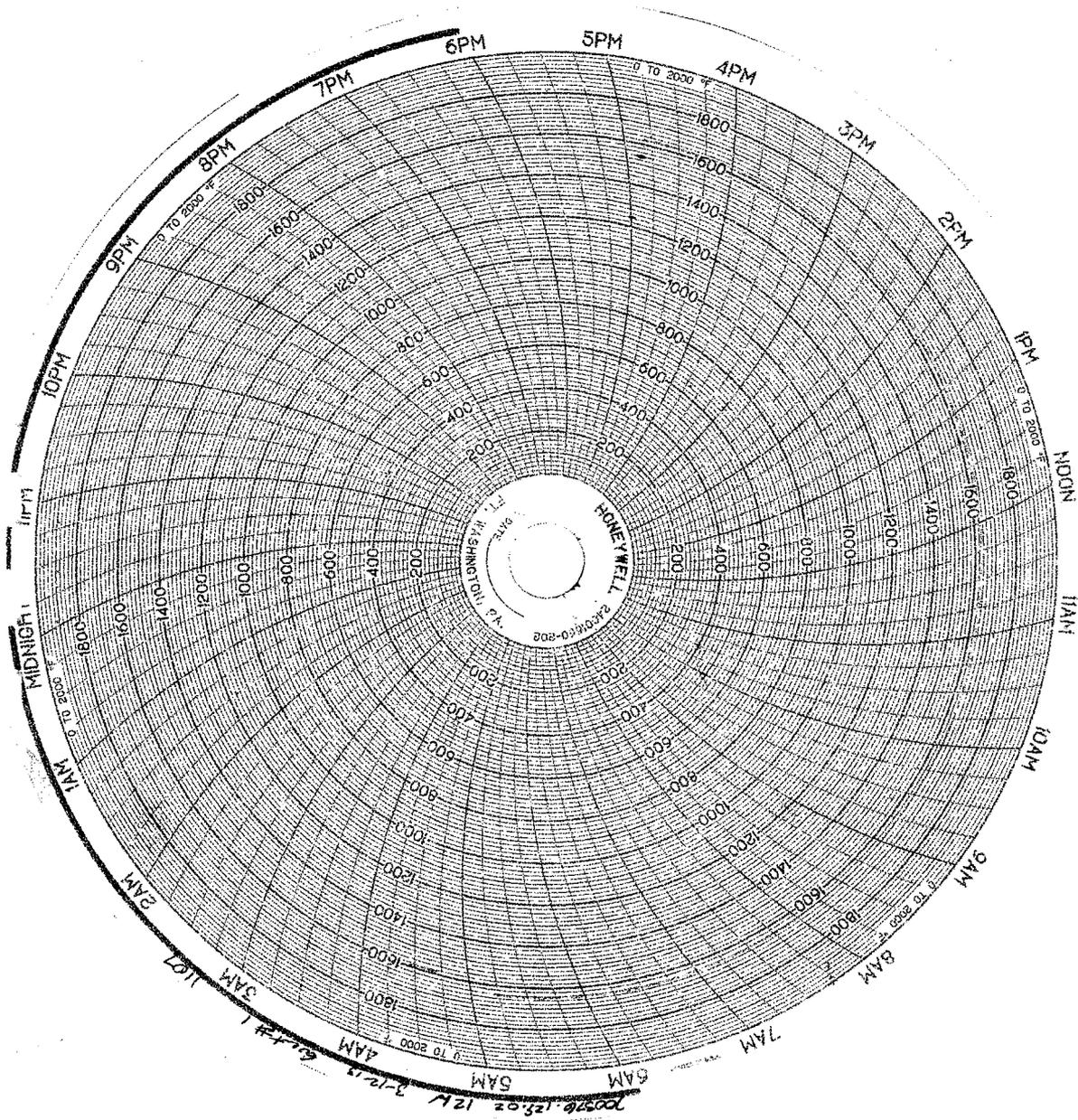
SPL, Inc.
Analysis Request Chain of Custody Record

			SPL Work Order No.:			Acct. Mate Code:			Dept. Code			SPL Page <u>1</u> of <u>1</u>		
Report To: (Company Name): Talon/LPE, Ltd.			Project/Station Name:			Project/Station Number:			Project/Station Location:			Requested TAT*		
Address: 921 N. Bivins St.			Influent Soil Vapor			20576.129.02			Eunice, LA			10 business days		
City/State/Zip: Amarillo TX 79107			Special Instructions: <i>DS High Gathering</i>											
Contact: Simon I. Walshe, CAPM Phone: 806-350-8872			swalshe@talonlpe.com Fax: 806-467-0622			Indicate Billing Type: (Place "X", where appropriate)			Net 30 day Acct. Credit Card			Check # <<<Contact SPL, Inc for CC payment arrangements.		
Invoice To: (Company Name): Talon/LPE, Ltd.			Address: 921 N. Bivins St.			Terms: Cylinders will be rented for \$10/cyl. All cylinders checked out are to be returned within 21 days, whether they contain sample or not. Cylinders not returned after 30 days will be considered lost and will be billed at current replacement cost.			Requested Analysis (Place an "X" next to Sample ID below)			* Surcharges May Apply (See quote for details)		
City/State/Zip: Amarillo TX 79107			Contact: Talon - Accounts Payable Phone: 806-467-0607			acctpayables@talonlpe.com Fax: 806-372-6603			Client PO# or Ref. No.: N/A			Contract/Proposal #: SPLQ5270 (i.e. SPLQ####)		
Sample ID (used to log/track sample)			Sample Date	Sample Time	Sample Type (Gas/Liq./Solid)	Duplicate	Composite	Spot	Cylinder Tracking Info [†]			Comments		
									Cylinder #	Date Out	Date In			
<i>Influent #1</i>			<i>2-12-13</i>	<i>1730</i>	<i>GAS</i>									
<i>Influent #2</i>			<i>2-13-13</i>	<i>0830</i>	<i>"</i>									
Sampled By-Print Name: <i>L. Brider</i>			Signature: <i>[Signature]</i>			Received By-Company:			Date: <i>3/3/13</i>			Time: <i>3:14</i>		
Relinquished By-Print Name: <i>L. Brider</i>			Signature: <i>[Signature]</i>			Received By-Print Name: <i>[Signature]</i>			Date: <i>3/14/13</i>			Time:		
Relinquished By-Print Name:			Signature:			Received By-Print Name:			Date:			Time:		
Relinquished By-Print Name:			Signature:			Received By-Print Name:			Date:			Time:		

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D.S. Hugh Gathering 4 Inch Line – 700376.129.02 - SRS# 2000-10807 – Event 2 – 12 Hour

ATTACHMENT 3
Oxidizer Charts



D.S. Hugh Gathering 4 Inch Line – 700376.129.02 - SRS# 2000-10807 – Event 2 – 12 Hour

ATTACHMENT 4
Waste Ticket

24 HOUR SERVICE CALL
 WASHINGTON 385-4000
 WILMINGTON 486-1880

GANDY CORPORATION
 MILL TRUCKS VACUUM TRUCKS WINCH TRUCKS
 TANK CLEANING - ROUSTABOUTING
 PPG #14225

P.O. BOX 25-40
 WASHINGTON, NEW MEXICO 88280

477922

Date: 3/1/79
 Company: [Handwritten]
 Truck No.: 3-1
 Purchase Order No.:
 Rig No.:
 Well No.:
 Location:
 Location:

Time Out	Time In	A.M.	P.M.	Rate	Amount
Driver, Operator or Pusher	8:00	8:00			
Helper					
Helper					
Other Charge					
Description of Work					Sub Total
					Sub Total
					TOTAL

Authorized by: