

# WELL WORKOVER REQUESTS (G-103)

# DATE: 2010

# Chavez, Carl J, EMNRD

From:	Chavez, Carl J, EMNRD
Sent:	Thursday, July 01, 2010 7:55 AM
То:	'Ben Barker'
Cc:	Jamie Robinson; Del Fortner; Layne Ashton; VonGonten, Glenn, EMNRD;
	'Mike_Smith@blm.gov'; Phillips, Haddy L., OSE; Jackson, Charles L., OSE
Subject:	RE: Lightning Dock TDS and Fluoride (GTHT-1)

Ben:

Approved.

I notice you refer to "surface discharge" in your submittal. Please be advised under the discharge permit no discharges are allowed to "Waters of the State." A National Pollutant Discharge Elimination System (NPDES) Permit would be required to allow this.

You may share your submittal with Bureau of Land Management and Office of State Engineer. Please contact me if you have questions. Thank you.

Please be advised that NMOCD approval of this plan does not relieve Raser Technologies of responsibility should their operations pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve Raser Technologies of responsibility for compliance with any other federal, state, or local laws and/or regulations.

File: OCD Online GTHT-1 (Thumbnail: "Well Workover Requests (G-103) 2010")

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 E-mail: <u>CarlJ.Chavez@state.nm.us</u> Website: <u>http://www.emnrd.state.nm.us/ocd/</u>index.htm (Pollution Prevention Guidance is under "Publications")

From: Ben Barker [mailto:Ben.Barker@rasertech.com]
Sent: Thursday, July 01, 2010 3:09 AM
To: Chavez, Carl J, EMNRD
Cc: Jamie Robinson; Del Fortner; Layne Ashton
Subject: Lightning Dock TDS and Fluoride

Hello Carl,

Attached is our new data submittal from well TFD 55-7 and a request for approval to proceed.

Please allow me to call your attention to the maps of Attachment B, which could easily be lost behind the voluminous Analytical and QC report in Attachment A.

I think Jamie's maps display very nicely the close relationship of the group of 11 wells we nominate as defining the relevant background.

As we discussed, we will refrain from passing this on to OSE or BLM until you've had a chance to evaluate it.

Thanks, Ben VP Resource Management Raser Technologies 5152 N. Edgewood Drive Provo, UT 84604 801-765-1200 office 801-850-5904 direct 707-508-9963 mobile

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June 30, 2010

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Mr. Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr. Santa Fe, New Mexico 87505

RE: Fluoride and TDS Values at the Lightning Dock Geothermal Area

Dear Mr. Chavez:

This is a follow up report to our letter of June 17, 2010. At that time we sent you lab reports showing that 46 of 49 water quality parameter values specified in Condition 3 of the approved G-103 were met by water produced from well TFD 55-7 during testing on June 8. We have since added radium to the list of satisfactory results under 20.6.2.3103 NMAC.

Continuing operations in the well allowed us to collect significantly cleaner water samples than in our first report. We received the analyses of those samples for F and TDS today and have included the laboratory report as Attachment A. They show somewhat lower values of both concentrations, which we attribute to less contamination by residual drilling mud and better sampling conditions.

We made reference in our initial report to a substantial body of prior work indicating that the values for Fluoride (F) and total dissolved solids (TDS) were within the normal background for the area. An attachment to the June 17 letter included a data base of 199 analyses from the Animas Valley. That document is unwieldy and we have extracted from it the population of neighboring wells in the thermal anomaly for inclusion in this letter as Attachment B. That attachment also displays the spatial relationship of the measurements on maps.

Raser personnel have also located important additions to the data base, including a lab report for the closest analog of TFD 55-7. That well is the 2220-ft deep TG 52-7, drilled in 2003, and whose water quality results are included as Attachment C.

The geochemical data base for Section 7 and the adjoining sections includes twenty wells, for which seventeen have recorded values of F and/or TDS concentration. Among those seventeen wells, thirteen are within Section 7 and eleven may properly be regarded as neighbors on the thermal anomaly. Among those neighbors, the average value of [F] is 11.83 mg/l. The latest average sample value for TFD 55-7 is 9.53 mg/l. The same group of neighbors has an average [TDS] of 2096 mg/l, compared with a value of 1180 mg/l for TFD 55-7. A fuller discussion follows, but we conclude that the data shows the water from TFD 55-7 meets the background standard of G-103 Condition 3 for surface discharge.

A great many wells have been drilled in the Lightning Dock area for a variety of commercial and domestic purposes. Chemical data is unavailable for the majority. We are fortunate that the scientific interest over several decades in Lightning Dock has resulted in enough analyses in the thermal area to define a background water quality with reasonable certainty. The table below lists all the wells within a section of well 55-7 for which [F] and/or [TDS] are available.

				All We	lls (17)	Section	n 7 (13)	Thermal (1	
ID	Section No. T25S, R19W	Data Base Reference	SOURCE description	Fluorid e mg/l	TDS mg/l	Fluorid e mg/l	TDS mg/l	Fluoride mg/l	TDS mg/l
C	12	4	Well	7.3	1608				
D	13	37	Well	3.5	1184				
Е	12	131, 138	Beall water well, OCD-2	2.0	443				
F	12	5	Well	3.6	1660				
G	7	62, 183	Folk well	7.80	539	7.80	457		
Р	7	95,96	Well	-	385	-	385		
Н	7	135	Burgett grnhouse discharge	11.70	1115	11.70	1115	11.70	1115
I	7	133	Burgett geowell	12.50	1195	12.50	1195	12.50	1195
j	7	136	Beali grnhouse well	-	1092	-	1092	-	1092
К	7	2, 89, 93, 94	Burgett well	-	1341	-	1452	12.60	1341
L	7	90, 178, 179	Burgett well	10.45	1130	10.45	1130	10.45	1108
N	7	3, 63, 88, 137	McCants grnhouse well	12.50	1076	12.50	1076	12.50	1076
0	7	91, 92, 181	Well	12.00	10985	12.00	10985	12.00	10985
-	7	Raser 2008	Burgett discharge	9.95	1110	9.95	1110	9.95	1110
-	7	Raser 2008	Burgett well	13.20	1320	13.20	1320	13.20	1320
-	7	Raser 2008	Burgett well	11.60	1140	11.60	1140	11.60	1140
-	7	LDG 2003	TG 52-7 (~100' W of well J)	11.82	1572	11.82	1572	11.82	1572
			Average Concentration	9.27	1700	11.35	1848	11.83	2096
			(avg. excluding	well "O")					1207
	· · · · · · · · · · · · · · · · · · ·	Lab ID	Sample point						
Well sam	55-7 ples:	236041- 163	Flow line port					9.68	1230
colle 6/26		236042- 164	Collection tank					9.38	1130
			Average Concentration					9.53	1180

Looking down the columns headed "All Wells" we find a [F] value only slightly below that of TDF 55-7 and a [TDS] that is 44% higher. The nearest well to TDF 55-7, of those in Sections 12 and 13, is nearly three-fourths of a mile. Although the group includes wells with strikingly high [TDS] they are well away from the center of the thermal anomaly, indicated by the contour lines.

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Considering all the wells in Section 7, their average [F] and [TDS] exceeds those of TDF 55-7 by a substantial margin. However, we suggest that your calculation of the applicable background standard should exclude two Section 7 wells on geologic grounds.

Local residents report that well "G" is only a "few" hundred feet deep. Combined with its location outside the core thermal area the shallow depth makes it unlikely that this well is an indicator of background concentrations in the thermal area. Similarly, well "P" is even farther off the side of the thermal anomaly and is actually on the opposite side of the major fault zone running through the area. The Animas Valley fault is not visible on the surface at this point but several geologists have mapped its probable course to the west of "P" between "P" and the wells around TFD 55-7.

The eleven wells that are clearly within the thermal area are sufficient to define background [F] and [TDS] values. Those averages are shown in bold face type in the table above as 11.83 mg/l for [F] and 2096 mg/l for [TDS]. We do not have access to enough of the researcher's original notes to pass judgment on the relative quality of the various samplers and labs, but we note that correct sampling procedures have been well understood for the entire period of Lightning Dock study covered in this data table.

The one [TDS] that may arouse concern is found in well "O." The high values in this well were measured on two different occasions by the New Mexico State University laboratory, which has extensive experience in this work. We have found nothing in the record to suggest these are not valid measurements. Even if there were a scientific reason to exclude those measurements, the remaining ten wells would still have an average [TDS] of 1207 mg/l, higher than the TFD 55-7 average of 1180 mg/l.

Raser requests OCD-EB approval to proceed with surface discharge during the test period of TFD 55-7 on the basis that the sample analyzed to date meet the "background" standard of Condition 3. Raser further requests that OCD adopt the background values displayed for the core thermal area in the table above as an interim standard for the purposes of continued monitoring according to the approved plan of operations.

Thank you for your consideration.

Very truly yours, Raser Technologies

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Benjamin J. Barker VP Resource Management

# Attachment A

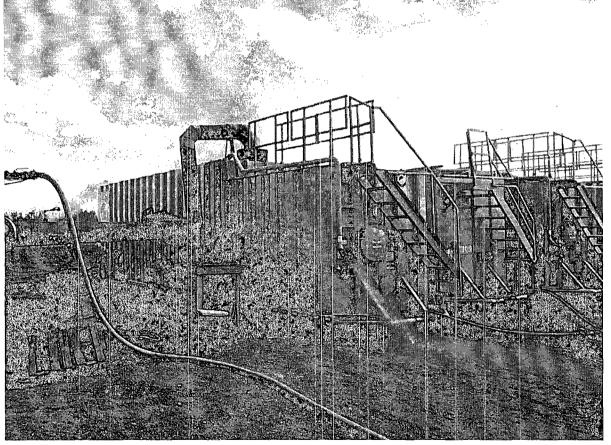
# Reports from TraceAnalysis, Inc. of samples collected on June 26, 2010

- 1. Summary Report 6/29/10
- 2. Analytical and Quality Control Report 6/29/10

Six samples are included in the reports. The two relevant to this analysis are

- 236041-163, collected from the flow line via a sampling port at the 4 o'clock position while holding back pressure with a throttle valve. The sample tube was submerged in a cold water bath to obtain a whole-fluid sample without flashing.
- 236041-164 collected from the final-stage collection tank after fluid flashed in the tank. This is more representative of the system of production that will be in use during the test.

The air injection line, pressure and temperature gauges, sample port and cooling tank are all visible on the left side of the photo below. Note the capped valve directly beneath the steam vent in the center right. This was used to obtain the tank sample immediately after flow was stopped.



The other samples in the report are:

#162 – Lightning Dock domestic water (used to mix drilling fluids)

#165 - Lordsburg municipal water (hotel tap water)

# 166 and #167 - samples extracted from rig tanks (after significant evaporation) as controls

5152 North Edgewood Drive Phone 1-801-765-1200 Suite 200 Toll Free 1-888-81-POWER Provo, UT 84604 Fax 1-801-374-3314

# **Summary Report**

Jamie Robinson Raser Technologies 5152 North Edgewood Dr. Suite 200 Provo, UT 84604

Report Date: June 29, 2010

Work Order: 10062902

Project Location:Lighting Dock, NMProject Name:Lighting Dock 55-7Project Number:TFD557B

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
236040	162	water	2010-06-26	09:00	2010-06-28
236041	163	water	2010-06-26	17:40	2010-06-28
236042	164	water	2010-06-26	19:00	2010-06-28
236043	165	water	2010-06-26	22:00	2010-06-28
236044	166	water	2010-06-26	11:00	2010-06-28
236045	167	water	2010-06-26	11:05	2010-06-28

### Sample: 236040 - 162

Param	Flag	$\operatorname{Result}$	Units	$\mathbf{RL}$
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1.00
Bicarbonate Alkalinity		130	mg/L as CaCo3	4.00
Total Alkalinity		130	mg/L as CaCo3	4.00
Chloride		33.7	mg/L	2.50
Fluoride		1.05	mg/L	0.500
Sulfate		122	mg/L	2.50
Total Dissolved Solids		410	m mg/L	5.00

### Sample: 236041 - 163

Param	Flag	$\mathbf{Result}$	Units	$\operatorname{RL}$
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1.00
Carbonate Alkalinity		52.0	mg/L as CaCo3	1.00

continued ...

TraceAnalysis, Inc. • 6701 Aberdeen Ave., Suite 9 • Lubbock, TX 79424-1515 • (806) 794-1296 This is only a summary. Please, refer to the complete report package for quality control data. sample 236041 continued ...

Param	$\mathbf{Flag}$	Result	Units	$\operatorname{RL}$
Bicarbonate Alkalinity		136	mg/L as CaCo3	4.00
Total Alkalinity		188	mg/L as CaCo3	4.00
Chloride		84.2	mg/L	2.50
Fluoride		9.68	mg/L	0.500
Sulfate		441	mg/L	2.50
Total Dissolved Solids		1230	mg/L	5.00

# Sample: 236042 - 164

Param	$\operatorname{Flag}$	Result	Units	$\operatorname{RL}$
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1.00
Carbonate Alkalinity		44.0	mg/L as CaCo3	1.00
Bicarbonate Alkalinity		152	mg/L as CaCo3	4.00
Total Alkalinity		196	mg/L as CaCo3	4.00
Chloride		83.8	mg/L	2.50
Fluoride		9.38	mg/L	0.500
Sulfate		436	mg/L	2.50
Total Dissolved Solids		1130	mg/L	5.00

# Sample: 236043 - 165

Param	Flag	Result	Units	$\operatorname{RL}$
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1.00
Carbonate Alkalinity		12.0	mg/L as CaCo3	1.00
<b>B</b> icarbonate Alkalinity		330	mg/L as CaCo3	4.00
Total Alkalinity		342	mg/L as CaCo3	4.00
Chloride		91.2	mg/L	2.50
Fluoride		4.84	mg/L	0.500
Sulfate		327	mg/L	2.50
Total Dissolved Solids		992	mg/L	5.00

### Sample: 236044 - 166

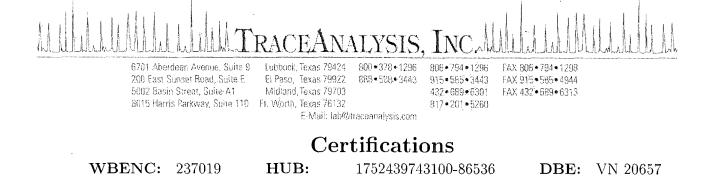
Param	Flag	Result	Units	$\operatorname{RL}$
Hydroxide Alkalinity	···	<1.00	mg/L as CaCo3	1.00
Carbonate Alkalinity		<b>28.0</b>	mg/L as CaCo3	1.00
Bicarbonate Alkalinity		110	mg/L as CaCo3	4.00
Total Alkalinity		138	mg/L as CaCo3	4.00
Chloride		<b>79.6</b>		2.50
Fluoride		11.2	mg/L	0.500
Sulfate		471	mg/L	2.50
Total Dissolved Solids		1350	mg/L	5.00

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Work Order: 10062902

# Sample: 236045 - 167

Param	Flag	Result	Units	$\operatorname{RL}$
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1.00
Bicarbonate Alkalinity		134	mg/L as CaCo3	4.00
Total Alkalinity		134	mg/L as CaCo3	4.00
Chloride		81.7	mg/L	2.50
Fluoride		11.6	mg/L	0.500
Sulfate		483	mg/L	2.50
Total Dissolved Solids		1340	mg/L	5.00



**NELAP** Certifications

NCTRCA WFWB38444Y0909

Lubbock: T104704219-08-TX LELAP-02003 Kansas E-10317 El Paso: T104704221-08-TX LELAP-02002 Midland: T104704392-08-TX

# Analytical and Quality Control Report

Jamie Robinson Raser Technologies 5152 North Edgewood Dr. Suite 200 Provo, UT, 84604

Report Date: June 29, 2010

Work Order: 10062902

Project Location:Lighting Dock, NMProject Name:Lighting Dock 55-7Project Number:TFD557B

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
236040	162	water	2010-06-26	09:00	2010-06-28
236041	163	water	2010-06-26	17:40	2010-06-28
236042	164	water	2010-06-26	19:00	2010-06-28
236043	165	water	2010-06-26	22:00	2010-06-28
236044	166	water	2010-06-26	11:00	2010-06-28
236045	167	water	2010-06-26	11:05	2010-06-28

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 26 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Michael abel

Dr. Blair Leftwich, Director Dr. Michael Abel, Project Manager

### Standard Flags

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 $\,B\,$  - The sample contains less than ten times the concentration found in the method blank.

# Case Narrative

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Samples for project Lighting Dock 55-7 were received by TraceAnalysis, Inc. on 2010-06-28 and assigned to work order 10062902. Samples for work order 10062902 were received intact at a temperature of 3.0 C.

Samples were analyzed for the following tests using their respective methods.

		$\mathbf{Prep}$	$\mathbf{Prep}$	$\rm QC$	Analysis
Test	Method	$\operatorname{Batch}$	Date	Batch	Date
Alkalinity	SM 2320B	61067	2010-06-28 at 11:00	71280	2010-06-28 at 11:00
Chloride (IC)	E 300.0	61068	2010-06-28 at $12:47$	71281	2010-06-28 at $12:47$
Chloride (IC)	E 300.0	61070	2010-06-28 at $16:46$	71284	2010-06-28 at 16:46
Chloride (IC)	E 300.0	61071	2010-06-28 at $20:45$	71285	2010-06-28 at $20:45$
Fluoride (IC)	$\to 300.0$	61068	2010-06-28 at $12:47$	71281	2010-06-28 at 12:47
Fluoride (IC)	E 300.0	61070	2010-06-28 at $16:46$	71284	2010-06-28 at $16:46$
Fluoride (IC)	E 300.0	61071	2010-06-28 at $20:45$	71285	2010-06-28 at $20:45$
SO4 (IC)	$\to 300.0$	61068	2010-06-28 at $12:47$	71281	2010-06-28 at $12:47$
SO4 (IC)	E 300.0	61070	2010-06-28 at $16:46$	71284	2010-06-28 at 16:46
SO4 (IC)	E 300.0	61071	2010-06-28 at $20:45$	71285	2010-06-28 at $20:45$
TDS	SM 2540C	61083	2010-06-28 at 10:30	71296	2010-06-28 at 10:30

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 10062902 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

Report Date: June 29, 2010 TFD557B

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# **Analytical Report**

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# Sample: 236040 - 162

Laboratory:El PasoAnalysis:AlkalinityQC Batch:71280Prep Batch:61067		Analytical Method: Date Analyzed: Sample Preparation:	SM 2320B 2010-06-28	Prep Method: Analyzed By: Prepared By:	N/A JG JG
		RL			
Parameter	$\mathbf{Flag}$	$\operatorname{Result}$	Units	Dilution	$\mathbf{RL}$
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Bicarbonate Alkalinity		<b>130</b>	mg/L as CaCo3	1	4.00
Total Alkalinity		130	mg/L as CaCo3	1	4.00

# Sample: 236040 - 162

Laboratory:					
Analysis:	Chloride (IC)	Analytical Method:	$\to 300.0$	Prep Method:	N/A
QC Batch:	71281	Date Analyzed:	2010-06-28	Analyzed By:	$_{ m JR}$
Prep Batch:	61068	Sample Preparation:	2010-06-28	Prepared By:	$_{\rm JR}$
		$\operatorname{RL}$			
Parameter	$\operatorname{Flag}$	$\mathbf{Result}$	$\mathbf{Units}$	Dilution	$\operatorname{RL}$
Chloride		33.7	mg/L	1	2.50

# Sample: 236040 - 162

Laboratory:	El Paso				
Analysis:	Fluoride (IC)	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	71281	Date Analyzed:	2010-06-28	Analyzed By:	$_{ m JR}$
Prep Batch:	61068	Sample Preparation:	2010-06-28	Prepared By:	$_{\rm JR}$
		$\operatorname{RL}$			
_					
Parameter	Flag	Result	Units	Dilution	$\operatorname{RL}$
Fluoride		1.05	mg/L	1	0.500

# Sample: 236040 - 162

Laboratory:	El Paso				
Analysis:	SO4 (IC)	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	71281	Date Analyzed:	2010-06-28	Analyzed By:	$\mathbf{JR}$
Prep Batch:	61068	Sample Preparation:	2010-06-28	Prepared By:	$_{\rm JR}$

Report Date: June 29, 20 TFD557B	)10	Work Order: 10062902 Lighting Dock 55-7		Page Number: 5 of 26 Lighting Dock, NM	
		RL			
Parameter	Flag	Result	Units	Dilution	RL
Sulfate		122	mg/L	5	2.50
Sample: 236040 - 162					
Laboratory: El Paso Analysis: TDS		Analytical Method:	SM 2540C	Prep Method:	N/A
QC Batch: 71296		Date Analyzed:	2010-06-28	Analyzed By:	MD
Prep Batch: 61083		Sample Preparation:	2010-06-28	Prepared By:	MD
riep Daten. 01000		Sample Preparation.	2010 00 20	riepared by:	
2		RL	<b>TT</b> . 1.		DI
Parameter Total Dissolved Solids	Flag	Result 410	Units mg/L	Dilution	$\frac{\text{RL}}{5.00}$
Sample: 236041 - 163					
Laboratory: El Paso					/ .
Analysis: Alkalinity		Analytical Method:	SM 2320B	Prep Method:	N/A
QC Batch: 71280		Date Analyzed:	2010-06-28	Analyzed By:	JG
Prep Batch: 61067		Sample Preparation:		Prepared By:	JG
		$\operatorname{RL}$			
Parameter	$\operatorname{Flag}$	Result	Units	Dilution	$\operatorname{RL}$
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1	1.00
		52.0	mg/L as CaCo3	1	1.00
Carbonate Alkalinity			mg/L as CaCo3	1	4.00
		136 188	mg/L as CaCo3	L	4.00

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Analysis:	Chloride (IC)	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	71281	Date Analyzed:	2010-06-28	Analyzed By:	$_{\rm JR}$
Prep Batch:	61068	Sample Preparation:	2010-06-28	Prepared By:	$_{\rm JR}$
		$\operatorname{RL}$			
Parameter	$\operatorname{Flag}$	$\operatorname{Result}$	Units	Dilution	$\operatorname{RL}$
Chloride		84.2	mg/L	5	2.50

Report Date: June 29, 2010 TFD557B			Work Order: 10062902 Lighting Dock 55-7		Page Number: 6 of 2 Lighting Dock, NM		
Sample: 23	6041 - 163						
Laboratory: Analysis: QC Batch: Prep Batch:	El Paso Fluoride (IC 71281 61068	C)		Analytical Method: Date Analyzed: Sample Preparation	2010-06-28	Prep Method: Analyzed By: Prepared By:	N/A JR JR
				$\operatorname{RL}$			
Parameter		Flag		Result	Units	Dilution	$\operatorname{RL}$
Fluoride				9.68	mg/L	2	0.500
Sample: 23	6041 - 163						
Laboratory:	El Paso						
Analysis:	SO4 (IC)			Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	71281			Date Analyzed:	2010-06-28	Analyzed By:	$_{\rm JR}$
Prep Batch:	61068			Sample Preparation:	2010-06-28	Prepared By:	JR .
				$\operatorname{RL}$			
Parameter		Flag		Result	Units	Dilution	RL
Sulfate				441	mg/L	10	2.50
Sample: 23	6041 - 163						
Laboratory:	El Paso						
Analysis:	TDS			Analytical Method:	SM 2540C	Prep Method:	N/A
QC Batch:	71296			Date Analyzed:	2010-06-28	Analyzed By:	MD
Prep Batch:	61083			Sample Preparation:	2010-06-28	Prepared By:	MD
D			171	RL	<b>TT 1</b>		DI
$\frac{\text{Parameter}}{\text{Total Dissolv}}$			Flag	Result	Units	Dilution	RL
Total Dissolv	ved Solids			1230	mg/L	1	5.00
Sample: 23	6042 - 164						
Laboratory:	El Paso						
Analysis:	Alkalinity			Analytical Method:	SM 2320B	Prep Method:	N/A
QC Batch:	71280			Date Analyzed:	2010-06-28	Analyzed By:	$\mathbf{JG}$
Prep Batch:	61067			Sample Preparation:		Prepared By:	JG
				$\operatorname{RL}$			
_						_	_
Parameter	<u></u>		Flag	Result	Units	Dilution	RL
Parameter Hydroxide A Carbonate A			Flag		Units mg/L as CaCo3 mg/L as CaCo3	Dilution 1 1	RL 1.00 1.00

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Report Date: June 29, 2010	Work Order: 10062902	Page Number: 7 of 26
TFD557B	Lighting Dock 55-7	Lighting Dock, NM
sample 236042 continued		

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		$\operatorname{RL}$			
Parameter	$\operatorname{Flag}$	$\operatorname{Result}$	Units	Dilution	$\mathbf{RL}$
Bicarbonate Alkalinity		152	mg/L as CaCo3	1	4.00
Total Alkalinity		196	mg/L as CaCo3	1	4.00

# Sample: 236042 - 164

Laboratory: Analysis: QC Batch: Prep Batch:	El Paso Chloride (IC) 71284 61070	Analytical Method: Date Analyzed: Sample Preparation:	E 300.0 2010-06-28 2010-06-28	Prep Method: Analyzed By: Prepared By:	$\mathbf{JR}$
		$\operatorname{RL}$			
Parameter	$\operatorname{Flag}$	$\mathbf{Result}$	Units	Dilution	RL
Chloride		83.8	mg/L	5	2.50

# Sample: 236042 - 164

Laboratory: Analysis: QC Batch: Prep Batch:	El Paso Fluoride (IC) 71284 61070	Analytical Method: Date Analyzed: Sample Preparation:	E 300.0 2010-06-28 2010-06-28	Prep Method: Analyzed By: Prepared By:	$\mathbf{JR}$
		$\operatorname{RL}$			
Parameter	$\mathbf{Flag}$	Result	Units	Dilution	$\operatorname{RL}$
Fluoride		9.38	mg/L	2	0.500

# Sample: 236042 - 164

Sulfate			436	m mg/L	10	2.50
Parameter		Flag	RL Result	Units	Dilution	RL
Prep Batch:	61070		Sample Preparation:	2010-06-28	Prepared By:	$_{\rm JR}$
QC Batch:	71284		Date Analyzed:	2010-06-28	Analyzed By:	$\mathbf{JR}$
Laboratory: Analysis:	El Paso SO4 (IC)		Analytical Method:	E 300.0	Prep Method:	N/A

Report Date: June 29, 2010 TFD557B		Work Order: 10062902 Lighting Dock 55-7		Page Number: 8 of 26 Lighting Dock, NM	
Sample: 236042 - 164					
Laboratory: El Paso					
Analysis: TDS		Analytical Method:	SM 2540C	Prep Method:	N/A
QC Batch: 71296		Date Analyzed:	2010-06-28	Analyzed By:	MD
Prep Batch: 61083		Sample Preparation:	2010-06-28	Prepared By:	MD
		$\operatorname{RL}$			
Parameter	Flag	$\operatorname{Result}$	Units	Dilution	$\operatorname{RL}$
Total Dissolved Solids		1130	mg/L	1	5.00

# Sample: 236043 - 165

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Laboratory: El Paso Analysis: Alkalinity QC Batch: 71280 Prep Batch: 61067		Analytical Method: Date Analyzed: Sample Preparation:	SM 2320B 2010-06-28	Prep Method: Analyzed By: Prepared By:	
		$\operatorname{RL}$			
Parameter	$\operatorname{Flag}$	Result	Units	Dilution	$\operatorname{RL}$
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Carbonate Alkalinity		12.0	mg/L as CaCo3	1	1.00
Bicarbonate Alkalinity		330	mg/L as CaCo3	1	4.00
Total Alkalinity		342	mg/L as CaCo3	1	4.00

# Sample: 236043 - 165

Chloride	<u></u>	91.2	mg/L	5	2.50
Parameter	Flag	RL Result	Units	Dilution	$\mathbf{RL}$
Prep Batch:	61070	Sample Preparation:	2010-06-28	Prepared By:	JR
QC Batch:	71284	Date Analyzed:	2010-06-28	Analyzed By:	•
Laboratory: Analysis:	El Paso Chloride (IC)	Analytical Method:	E 300.0	Prep Method:	N/A

# Sample: 236043 - 165

Laboratory:	El Paso				
Analysis:	Fluoride (IC)	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	71284	Date Analyzed:	2010-06-28	Analyzed By:	JR
Prep Batch:	61070	Sample Preparation:	2010-06-28	Prepared By:	$_{\rm JR}$

Report Date: June 29, 2010 TFD557B			Work Order: 10062902 Lighting Dock 55-7		9 of 26 k, NM
D		RL	TT 1.		DI
Parameter Fluoride	Flag	Result 4.84	Units	Dilution	RL
Fluoride		4.84	mg/L	1	0.500
Sample: 236043 - 165					
Laboratory:El PasoAnalysis:SO4 (IC)QC Batch:71284Prep Batch:61070		Analytical Method: Date Analyzed: Sample Preparation:	E 300.0 2010-06-28 2010-06-28	Prep Method: Analyzed By: Prepared By:	N/A JR JR
		$\operatorname{RL}$			
Parameter	Flag	Result	Units	Dilution	RL
Sulfate		327	mg/L	10	2.50
Sample: 236043 - 165					
Laboratory: El Paso					
Analysis: TDS		Analytical Method:	SM 2540C	Prep Method:	N/A
QC Batch: 71296		Date Analyzed:	2010-06-28	Analyzed By:	MD
Prep Batch: 61083		Sample Preparation:	2010-06-28	Prepared By:	MD
D		RL	<b>T</b> T 1.		DI
Parameter	Flag	Result	Units	Dilution	RL
Total Dissolved Solids		992	mg/L	1	5.00
Sample: 236044 - 166					
Laboratory: El Paso					
Analysis: Alkalinity		Analytical Method:	SM 2320B	Prep Method:	N/A
QC Batch: 71280		Date Analyzed:	2010-06-28	Analyzed By:	JG
Prep Batch: 61067		Sample Preparation:		Prepared By:	JG
		$\mathbf{RL}$			
Parameter	Flag	Result	Units	Dilution	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Carbonate Alkalinity		28.0	mg/L as CaCo3	1	1.00
Bicarbonate Alkalinity		110	mg/L as CaCo3	1	4.00
Total Alkalinity		138	mg/L as $CaCo3$	1	4.00

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Report Date TFD557B	e: June 29, 2010	2010 Work Order: 10062902 Lighting Dock 55-7		Page Number: 10 of 2 Lighting Dock, N	
Sample: 23	86044 - 166				
Laboratory:	El Paso				
Analysis:	Chloride (IC)	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	71285	Date Analyzed:	2010-06-28	Analyzed By:	$\mathbf{JR}$
Prep Batch:	61071	Sample Preparation:	2010-06-28	Prepared By:	$_{\rm JR}$
		$\mathbf{RL}$			
Parameter	Flag	$\mathbf{Result}$	Units	Dilution	RL
Chloride		79.6	mg/L	5	2.50
Sample: 23	36044 - 166				
-					
Laboratory:			<b>D</b> 000 0		NT / A
Analysis: QC Batch:	Fluoride (IC) 71285	Analytical Method: Date Analyzed:	E 300.0 2010-06-28	Prep Method:	N/A JR
Prep Batch:		Sample Preparation:		Analyzed By: Prepared By:	JR
r rep baten:	01071	Sample Freparation:	2010-06-28	r repared by:	JK
D (		RL	TT 1/		DT
Parameter Fluoride	Flag	Result 11.2	Units mg/L	Dilution2	$\frac{\text{RL}}{0.500}$
Sample: 23	36044 - 166				
Laboratory:	El Paso				
Analysis:	SO4 (IC)	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	71285	Date Analyzed:	2010-06-28	Analyzed By:	$_{\rm JR}$
Prep Batch:	61071	Sample Preparation:	2010-06-28	Prepared By:	$_{\rm JR}$
		$\operatorname{RL}$			
Parameter	Flag	Result	Units	Dilution	$\operatorname{RL}$
Sulfate		471	mg/L	10	2.50
Sample: 23	36044 - 166				
Laboratory:					
		λ	SM 2540C	Prep Method:	N/A
	TDS				
Analysis: QC Batch: Prep Batch:	71296	Date Analyzed:	2010-06-28 2010-06-28	Analyzed By: Prepared By:	MD MD

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		$\operatorname{RL}$			
Parameter	$\mathbf{Flag}$	$\operatorname{Result}$	Units	Dilution	$\operatorname{RL}$
Total Dissolved Solids		1350	mg/L	1	5.00

Report Date: June 29, 2010 TFD557B		Work Order: 10062902 Lighting Dock 55-7		1 of 26 k, NM
Sample: 236045 - 167				
Laboratory: El Paso Analysis: Alkalinity QC Batch: 71280 Prep Batch: 61067	5	SM 2320B 2010-06-28	Prep Method: Analyzed By: Prepared By:	N/A JG JG
Parameter Flag	$\operatorname{RL}$ Result	Units	Dilution	$\mathbf{RL}$
Hydroxide Alkalinity	<1.00	mg/L as CaCo3	1	1.00
Carbonate Alkalinity	<1.00	mg/L as CaCo3	1	1.00
Bicarbonate Alkalinity	<b>134</b>	mg/L as CaCo3	1	4.00
Total Alkalinity	134	mg/L as CaCo3	1	4.00
Laboratory: El Paso Analysis: Chloride (IC) QC Batch: 71285 Prep Batch: 61071 Parameter Flag	Analytical Method: Date Analyzed: Sample Preparation: RL Result	E 300.0 2010-06-28 2010-06-28 Units	Prep Method: Analyzed By: Prepared By: Dilution	N/A JR JR RL
Chloride	81.7	mg/L	5	2.50
Sample: 236045 - 167Laboratory:El PasoAnalysis:Fluoride (IC)QC Batch:71285Prep Batch:61071	Analytical Method: Date Analyzed: Sample Preparation:	E 300.0 2010-06-28 2010-06-28	Prep Method: Analyzed By: Prepared By:	N/A JR JR
	RL	<b>T</b> T <b>1</b> .		DT
Parameter Flag Fluoride	Result	Units mg/L	Dilution 2	$\frac{\text{RL}}{0.500}$
T TUOTINE	11.0		۵	0.000

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Laboratory:	El Paso				
Analysis:	SO4 (IC)	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	71285	Date Analyzed:	2010-06-28	Analyzed By:	$_{\rm JR}$
Prep Batch:	61071	Sample Preparation:	2010-06-28	Prepared By:	$_{\rm JR}$

Report Date: June 29, 2010 TFD557B		Work Order: 10062902 Lighting Dock 55-7		Page Number: 12 of 26 Lighting Dock, NM	
Parameter	Flag	RL Result 483	Units mg/L	Dilution 10	RL 2.50
Sample: 236045 - 167					
Laboratory: El Paso Analysis: TDS QC Batch: 71296 Prep Batch: 61083		Analytical Method: Date Analyzed: Sample Preparation:	SM 2540C 2010-06-28 2010-06-28	Prep Method: Analyzed By: Prepared By:	N/A MD MD
Parameter	$\operatorname{Flag}$	${ m RL} { m Result}$	Units	Dilution	$\operatorname{RL}$
Total Dissolved Solids		1340	mg/L	1	5.00
QC Batch: 71280 Prep Batch: 61067		QC Preparation:		Analyzed By: Prepared By:	JG
Parameter Hydroxide Alkalinity	Flag	g Res		Units mg/L as CaCo3	$\frac{\text{RL}}{1}$
Carbonate Alkalinity Bicarbonate Alkalinity Total Alkalinity		<1.<<1.<<4.	.00 .00	mg/L as CaCo3 mg/L as CaCo3 mg/L as CaCo3 mg/L as CaCo3	1 4 4
Method Blank (1)	QC Batch: 71281				
QC Batch: 71281 Prep Batch: 61068		Date Analyzed: QC Preparation:	2010-06-28 2010-06-28	Analyzed By Prepared By:	
<b>D</b>	171	ME			DI
Parameter Chloride	Flag	Resu <0.50		Units mg/L	 2.5
Method Blank (1)	QC Batch: 71281	<0.0			

QC Batch:	71281	Date Analyzed:	2010-06-28	Analyzed By:	$_{\rm JR}$
Prep Batch:	61068	QC Preparation:	2010-06-28	Prepared By:	$_{\rm JR}$

Report Date: June 29, 2010 TFD557B		Work Order: 10062902 Lighting Dock 55-7		Page Number: 13 Lighting Dock	
Parameter	Flor	${ m MDL}$ Result	TT		Dr
Fluoride	Flag	<0.100	Units mg/L		$\frac{\text{RL}}{0.5}$
Method Blank (1)	QC Batch: 71281				
QC Batch: 71281 Prep Batch: 61068		Date Analyzed: 2010-06-28 QC Preparation: 2010-06-28		Analyzed By: Prepared By:	JR JR
Parameter	Flag	${ m MDL}$ Result	Units	·	$\operatorname{RL}$
Sulfate	riag	<0.500	mg/L		$\frac{RL}{2.5}$
Method Blank (1)	QC Batch: 71284				
QC Batch: 71284		Date Analyzed: 2010-06-28	3	Analyzed By:	$_{\rm JR}$
Prep Batch: 61070		QC Preparation: 2010-06-28		Prepared By:	JR
		MDL			
Parameter	Flag	Result	Units		$\mathbf{RL}$
Chloride		< 0.500	mg/L		2.5
Method Blank (1)	QC Batch: 71284				
QC Batch: 71284 Prep Batch: 61070		Date Analyzed:         2010-06-28           QC Preparation:         2010-06-28		Analyzed By: Prepared By:	JR JR
		MDL			
Parameter	Flag	Result	Units	······	RL
Fluoride		<0.100	mg/L		0.5
Method Blank (1)	QC Batch: 71284				
QC Batch: 71284		Date Analyzed: 2010-06-28		Analyzed By:	$_{\rm JR}$
Prep Batch: 61070		QC Preparation: 2010-06-28	8	Prepared By:	$_{\rm JR}$
				continue	-d

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Report Date: June 29, TFD557B	2010	Work Order: 10062902 Lighting Dock 55-7		Page Number: 14 Lighting Dock	
method blank continued					
Parameter	Flag	MDL Result	Units		RL
Parameter	Flag	${ m MDL} { m Result}$	Units		$\operatorname{RL}$
Sulfate	I 105	<0.500	mg/L		2.5
Method Blank (1)	QC Batch: 71285				
QC Batch: 71285 Prep Batch: 61071		Date Analyzed: 2010-06-28 QC Preparation: 2010-06-28		Analyzed By: Prepared By:	JR JR
2		MDL			DI
Parameter Chloride	Flag	Result           <0.500	Units mg/L		RL 2.5
Method Blank (1) QC Batch: 71285	QC Batch: 71285	Date Analyzed: 2010-06-28		Analyzed By:	JR IB
Prep Batch: 61071		QC Preparation: 2010-06-28		Prepared By:	JR
Parameter Fluoride	Flag	MDL <u>Result</u> <0.100	Units mg/L		RL 0.5
Method Blank (1)	QC Batch: 71285				
QC Batch: 71285 Prep Batch: 61071		Date Analyzed: 2010-06-28 QC Preparation: 2010-06-28		Analyzed By: Prepared By:	JR JR
Parameter Sulfate	Flag	MDL Result <0.500	Units mg/L		RL 2.5
Method Blank (1)	QC Batch: 71296				
QC Batch: 71296 Prep Batch: 61083	QO Банні, (1290	Date Analyzed: 2010-06-28 QC Preparation: 2010-06-28		Analyzed By: Prepared By:	MD MD

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Report Date: June 29, 2010 TFD557B		Work Order Lighting D		2		15 of 26 ock, NM		
Parameter	Flag		MDL Result		T	Jnits		RL
Total Dissolved Solids			<5.00		n	ng/L		5
Duplicates (1) Duplicated S	Sample: 236045							
QC Batch: 71280		te Analyzed:	2010-06-2				Analyzed E	
Prep Batch: 61067	QC	Preparation:	2010-06-2	:8			Prepared B	By: JG
D	Duplicate	Sample					000	RPD
Param Hydroxide Alkalinity	Result	Result		nits	Dilu			Limit
Carbonate Alkalinity	<1.00 <1.00	<1.00 <1.00		is CaCo3 is CaCo3	1		0 0	20 20
Bicarbonate Alkalinity	134	134		is CaCo3	1		0	$\frac{20}{20}$
Total Alkalinity	134	134	01	is CaCo3	1		0	$\frac{20}{20}$
QC Batch: 71296 Prep Batch: 61083		e Analyzed: Preparation:	2010-06-2 2010-06-2				Analyzed B Prepared B	-
	Duplicate	Sample	د					
		Dampic	-					RPD
Param	Result	Result	U	nits	Dilution	n	RPD	$\operatorname{Limit}$
Param Total Dissolved Solids	Result 1240	-	U	nits 1g/L	Dilution 1	n	RPD1	
	1240	Result	U			n		$\operatorname{Limit}$
Total Dissolved Solids	1240 LCS-1) Da	Result	U	ng/L 28		n		Limit 10 By: JR
Total Dissolved Solids Laboratory Control Spike (1 QC Batch: 71281 Prep Batch: 61068	1240 LCS-1) Da QC LCS	Result 1230 te Analyzed: Preparation:	U m 2010-06-2 2010-06-2	ng/L 28 28 Spike	1	trix	1 Analyzed F Prepared E	Limit 10 By: JR By: JR Rec.
Total Dissolved Solids Laboratory Control Spike (J QC Batch: 71281 Prep Batch: 61068 Param	1240 LCS-1) Da QC LCS Result	Result 1230 te Analyzed: Preparation: Units	U m 2010-06-2 2010-06-2 Dil.	ng/L 28 28 Spike Amount	1 Mat Res	trix sult	1 Analyzed I Prepared E Rec.	Limit 10 By: JR By: JR Rec. Limit
Total Dissolved Solids Laboratory Control Spike (1 QC Batch: 71281 Prep Batch: 61068 Param Chloride	1240 LCS-1) Da QC LCS Result 24.6	Result 1230 te Analyzed: Preparation: Units mg/L	U m 2010-06-2 2010-06-2 Dil. 1	ng/L 28 28 28 Spike Amount 25.0	1 Mat Res <0.	trix sult 500	1 Analyzed F Prepared E	Limit 10 By: JR By: JR Rec.
Total Dissolved Solids Laboratory Control Spike (J QC Batch: 71281 Prep Batch: 61068 Param	1240 LCS-1) Da QC LCS Result 24.6	Result 1230 te Analyzed: Preparation: Units mg/L	U m 2010-06-2 2010-06-2 Dil. 1	ng/L 28 28 28 Spike Amount 25.0	1 Mat Res <0.	trix sult 500	1 Analyzed I Prepared E Rec.	Limit 10 By: JR By: JR Rec. Limit
Total Dissolved Solids Laboratory Control Spike (1 QC Batch: 71281 Prep Batch: 61068 Param Chloride	1240 LCS-1) Da QC LCS Result 24.6 e spike result. RPI	Result 1230 te Analyzed: Preparation: Units mg/L	U 2010-06-2 2010-06-2 Dil. 1 the spike a	ng/L 28 28 Amount 25.0 nd spike du	1 Mat Res <0.	trix sult 500 result.	1 Analyzed H Prepared E Rec. 98	Limit 10 By: JR By: JR Rec. Limit 90 - 110
Total Dissolved Solids Laboratory Control Spike (1 QC Batch: 71281 Prep Batch: 61068 Param Chloride	1240 LCS-1) Da QC LCS Result 24.6 e spike result. RPI LCSD	Result 1230 te Analyzed: Preparation: Units mg/L	U m 2010-06-2 2010-06-2 Dil. 1	ng/L 28 28 28 Spike Amount 25.0	1 Mat Res <0.	trix sult 500	1 Analyzed H Prepared E Rec. 98	Limit 10 By: JR By: JR Rec. Limit

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Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Report Date: June 29, 2010 TFD557B		V	Vork Orden Lighting I	r: 10062902 Dock 55-7	2				16 of 26 lock, NM
Laboratory Control Spike (L	CS-1)								
QC Batch: 71281 Prep Batch: 61068			nalyzed: eparation:	2010-06-2 2010-06-2				nalyzed H repared H	
	LC				Spike	Mat			Rec.
Param	Res		Units		Amount	Res		lec.	Limit
Fluoride	5.0		mg/L	1	5.00	<0.		102	90 - 110
Percent recovery is based on the	spike result.	RPD is	based on t	the spike at	nd spike du	plicate r	esult.		
	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	$\operatorname{Limit}$
Fluoride	5.00	mg/L	1	5.00	< 0.100	100	90 - 110	2	20
Percent recovery is based on the	spike result.	RPD is	based on t	the spike a	nd spike du	plicate r	esult.		
Laboratory Control Spike (L QC Batch: 71281 Prep Batch: 61068	CS-1)		nalyzed: eparation:	2010-06-2 2010-06-2				nalyzed I repared E	v
	LC	cs			Spike	Mat	trix		Rec.
Param	Res		Units	Dil.	Amount	Res		lec.	$\operatorname{Limit}$
ParamSulfate			Units mg/L	Dil. 1	Amount 25.0	Res < 0.		Rec. 96	Limit 90 - 110
Sulfate	Res 24	.1	mg/L	1	25.0	<0.	500		
Sulfate	Res 24 spike result.	.1	mg/L	1 the spike as	25.0 nd spike du	<0.	500 esult.		90 - 110
Sulfate Percent recovery is based on the	Res 24	.1	mg/L based on t	1 the spike a Spike	25.0 nd spike du Matrix	<0. plicate r	500 esult. Rec.	96	90 - 110 RPD
Sulfate	Res 24 spike result. LCSD	. <u>1</u> RPD is Units	mg/L based on t Dil.	1 the spike as	25.0 nd spike du	<0.	500 esult.		90 - 110
Sulfate Percent recovery is based on the Param	Res 24 spike result. LCSD Result 23.6	.1 RPD is Units mg/L	mg/L based on t Dil. 1	1 the spike a Spike Amount 25.0	25.0 nd spike du Matrix Result <0.500	<0. plicate r Rec. 94	500 esult. Rec. Limit 90 - 110	96 RPD	90 - 110 RPD Limit
Sulfate Percent recovery is based on the Param Sulfate	Res 24 spike result. LCSD Result 23.6 spike result.	.1 RPD is Units mg/L	mg/L based on t Dil. 1	1 the spike a Spike Amount 25.0	25.0 nd spike du Matrix Result <0.500	<0. plicate r Rec. 94	500 esult. Rec. Limit 90 - 110	96 RPD	90 - 110 RPD Limit
Sulfate Percent recovery is based on the Param Sulfate Percent recovery is based on the	Res 24 spike result. LCSD Result 23.6 spike result.	.1 RPD is Units mg/L RPD is Date A	mg/L based on t Dil. 1 based on t .nalyzed:	1         the spike at         Spike         Amount         25.0         the spike at	25.0 nd spike du Matrix Result <0.500 nd spike du	<0. plicate r Rec. 94	500 esult. Rec. Limit 90 - 110 esult.	96 RPD	90 - 110 RPD Limit 20 By: JR
Sulfate Percent recovery is based on the Param Sulfate Percent recovery is based on the Laboratory Control Spike (L QC Batch: 71284 Prep Batch: 61070	Res 24 spike result. LCSD Result 23.6 spike result. CS-1)	.1 RPD is <u>Units</u> mg/L RPD is Date A QC Pro	mg/L based on t Dil. 1 based on t nalyzed: eparation:	1           the spike at           Amount           25.0           the spike at           2010-06-2           2010-06-2	25.0 nd spike du Matrix Result <0.500 nd spike du 28 28 28 Spike	<0. plicate r <u>94</u> plicate r	500 esult. Rec. Limit 90 - 110 esult. A P trix	96 RPD 2 nalyzed H repared H	90 - 110 RPD Limit 20 By: JR By: JR Rec.
Sulfate Percent recovery is based on the Param Sulfate Percent recovery is based on the Laboratory Control Spike (L QC Batch: 71284	Res 24 spike result. LCSD Result 23.6 spike result. CS-1)	.1 RPD is Units mg/L RPD is Date A QC Pro	mg/L based on t Dil. 1 based on t .nalyzed:	1         the spike as         Amount         25.0         the spike as         2010-06-2	25.0 nd spike du Matrix Result <0.500 nd spike du 28 28	<0. plicate r 94 plicate r Mat Res	500 esult. Rec. Limit 90 - 110 esult. A P trix sult I	96 RPD 2 nalyzed I	90 - 110 RPD Limit 20 By: JR By: JR
Sulfate Percent recovery is based on the Param Sulfate Percent recovery is based on the Laboratory Control Spike (L QC Batch: 71284 Prep Batch: 61070 Param	Res 24 spike result. LCSD Result 23.6 spike result. CS-1) LC Res 25	.1 RPD is Units mg/L RPD is Date A QC Pro	mg/L based on t Dil. 1 based on t nalyzed: eparation: Units mg/L	1           the spike as           Spike           Amount           25.0           the spike as           2010-06-2           2010-06-2           Dil.           1	25.0 nd spike du Matrix Result <0.500 nd spike du 28 28 28 28 28 28 28 28 28 28 28 28 28	<0. plicate r 94 plicate r Mat Res <0.	500 esult. Rec. Limit 90 - 110 esult. A P trix sult I 500	96 RPD 2 nalyzed H repared H Rec.	90 - 110 RPD Limit 20 By: JR By: JR Rec. Limit
Sulfate Percent recovery is based on the Param Sulfate Percent recovery is based on the Laboratory Control Spike (L QC Batch: 71284 Prep Batch: 61070 Param Chloride	Res 24 spike result. LCSD Result 23.6 spike result. CS-1) LC Res 25 spike result.	.1 RPD is Units mg/L RPD is Date A QC Pro	mg/L based on t Dil. 1 based on t nalyzed: eparation: Units mg/L	1the spike asSpikeAmount25.0the spike as2010-06-22010-06-2Dil.1the spike as	25.0 nd spike du Matrix Result <0.500 nd spike du 28 28 28 28 28 28 28 28 28 28 28 28 28	<0. plicate r 94 plicate r Mat Res <0.	500 esult. Rec. Limit 90 - 110 esult. A P trix sult I 500 esult.	96 RPD 2 nalyzed H repared H Rec.	90 - 110 RPD Limit 20 By: JR By: JR Rec. Limit 90 - 110
Sulfate Percent recovery is based on the Param Sulfate Percent recovery is based on the Laboratory Control Spike (L QC Batch: 71284 Prep Batch: 61070 Param Chloride	Res 24 spike result. LCSD Result 23.6 spike result. CS-1) LC Res 25	.1 RPD is Units mg/L RPD is Date A QC Pro	mg/L based on t Dil. 1 based on t nalyzed: eparation: Units mg/L based on t	1           the spike as           Spike           Amount           25.0           the spike as           2010-06-2           2010-06-2           Dil.           1	25.0 nd spike du Matrix Result <0.500 nd spike du 28 28 28 28 28 28 28 28 28 28 28 28 28	<0. plicate r 94 plicate r Mat Res <0.	500 esult. Rec. Limit 90 - 110 esult. A P trix sult I 500	96 RPD 2 nalyzed H repared H Rec.	90 - 110 RPD Limit 20 By: JR By: JR Rec. Limit

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Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Report Date: June 29, 2010 TFD557B			Vork Orden Lighting I		2		Pa		r: 17 of 26 Dock, NM
Laboratory Control Spike (I	LCS-1)								
QC Batch: 71284 Prep Batch: 61070			nalyzed: eparation:	2010-06-2 2010-06-2	-			Analyzed Prepared	•
	LC				Spike	Mat			Rec.
Param	Resu		Units	Dil.	Amount	Res		Rec.	Limit
Fluoride	5.1		mg/L	1	5.00	<0.		103	90 - 110
Percent recovery is based on the	spike result.	RPD is	based on t	he spike a	nd spike du	plicate r	esult.		
	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit		
Fluoride	5.16	mg/L	1	5.00	< 0.100	103	90 - 11	10 0	20
Laboratory Control Spike (1	LCS-1)								
QC Batch: 71284 Prep Batch: 61070			nalyzed: eparation:	2010-06-2 2010-06-2				Analyzed Prepared	
Param	LC Rest		Units	Dil.	Spike Amount	Ma Res	trix sult	Rec.	${ m Rec.}\ { m Limit}$
Sulfate	24.		mg/L	1	25.0		500	98	90 - 110
Percent recovery is based on the	e spike result.	RPD is	based on t	he spike a	nd spike du	plicate r	esult.		
	LCSD			Spike	Matrix	-	Dee		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	Rec. Limi		
Sulfate	24.5	mg/L		25.0	<0.500	98	90 - 1		20
Percent recovery is based on the				the spike a	nd spike du	plicate r	esult.	, att 1	
Laboratory Control Coll- 1	LCS-1)								
Laboratory Control Spike (1								A	1 D ID
QC Batch: 71285 Prep Batch: 61071			analyzed: eparation:	2010-06-3 2010-06-3				Analyzec Preparec	By: JR
QC Batch: 71285 Prep Batch: 61071	LC	QC Pro	eparation:	2010-06-9	28 Spike		trix	Prepared	By: JR Rec.
QC Batch: 71285 Prep Batch: 61071 Param	Res	QC Pro	eparation: Units	2010-06-: Dil.	28 Spike Amount	Res	sult	Preparec	By: JR Rec. Limit
QC Batch: 71285 Prep Batch: 61071 Param Chloride	Res 25.	QC Pro	eparation: Units mg/L	2010-06-3 Dil.	28 Spike Amount 25.0	Res <0.	sult .500	Prepared	By: JR Rec. Limit
QC Batch: 71285	Res 25.	QC Pro	eparation: Units mg/L	2010-06-3 Dil.	28 Spike Amount 25.0	Res <0.	sult .500	Preparec	By: JR Rec. Limit
QC Batch: 71285 Prep Batch: 61071 Param Chloride Percent recovery is based on the	Res <sup>.</sup> 25. e spike result. LCSD	QC Pro	Units mg/L based on	2010-06-3 Dil. 1 the spike a Spike	28 Spike Amount 25.0 nd spike du Matrix	Res <0. plicate r	sult 500 result. Rec.	Preparec Rec. 101	By: JR Rec. Limit 90 - 110 RPD
QC Batch: 71285 Prep Batch: 61071 Param Chloride	Res 25. e spike result.	QC Pro	Units mg/L based on Dil.	2010-06-3 Dil. 1 the spike a	Spike Amount 25.0 nd spike du	Res <0.	sult .500 result.	Prepared Rec. 101	By: JR Rec. Limit 90 - 110 RPD

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Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Report Date: June 29, TFD557B	2010 .	V	Vork Order Lighting I	r: 10062902 Dock 55-7	2			e Number: Lighting D	
Laboratory Control	Spike (LCS-1)								
QC Batch: 71285 Prep Batch: 61071			nalyzed: eparation:	2010-06-2 2010-06-2				Analyzed I Prepared E	•
	L	$\mathbf{CS}$			Spike	Mat	trix		Rec.
Param		sult	Units	Dil.	Amount	Res		Rec.	Limit
Fluoride		.23	mg/L	1	5.00	<0.		105	90 - 110
Percent recovery is base	d on the spike result	. RPD is	based on t	the spike a	nd spike du	plicate r	esult.		
	LCSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Fluoride	5.23	$\mathrm{mg/L}$	1	5.00	< 0.100	105	90 - 110	) 0	20
Percent recovery is base		. RPD 15	based on t	the spike a	nd spike du	plicate r	esult.		
Laboratory Control QC Batch: 71285	<b>5ріке (LC5-1)</b>	Date A	nalyzed:	2010-06-2	28		Δ	Analyzed H	Bv: JR
Prep Batch: 61071			eparation:	2010-06-2				Prepared E	
2		CS	<b>.</b>		Spike	Ma		<b>n</b>	Rec.
Param		esult	Units	Dil.	Amount	Res		Rec.	Limit
Sulfate Percent recovery is base		4.8 . RPD is	mg/L based on t	he spike a	25.0 nd spike du		500 esult.	99	90 - 11
	LCSD			Spike	Matrix		Rec.		RPI
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limi
Sulfate	24.8	mg/L	1	25.0	< 0.500	99	90 - 110		20
Percent recovery is base	ed on the spike result		based on t	he spike a	nd spike du	plicate r	esult.		
Laboratory Control	Spike (LCS-1)								
LaboratoryControlQC Batch:71296Prep Batch:61083	Spike (LCS-1)		nalyzed: paration:	2010-06-2 2010-06-2				nalyzed B repared B	•
QC Batch: 71296 Prep Batch: 61083	L	QC Pre CS	paration:	2010-06-2	8 Spike	Ma	Pitrix	repared B	y: MD Rec.
QC Batch: 71296 Prep Batch: 61083 Param	L Re	QC Pre CS esult	paration: Units	2010-06-2 Dil.	8 Spike Amount	Res	Pr trix sult	repared B	y: MD Rec. Limit
QC Batch: 71296 Prep Batch: 61083 Param Total Dissolved Solids	L Re 10	QC Pre CS esult 070	Units mg/L	2010-06-2 Dil. 1	8 Spike Amount 1000	Res <5	P: trix sult .00	repared B	y: MD Rec. Limit
QC Batch: 71296	L Re 10 ed on the spike result	QC Pre CS esult 070	Units mg/L	2010-06-2 Dil. 1 the spike an	8 Spike Amount 1000 nd spike du	Res <5	Pr trix sult .00 esult.	repared B	y: MD Rec. Limit 90 - 11
QC Batch: 71296 Prep Batch: 61083 Param Total Dissolved Solids Percent recovery is base	L Re 21 22 24 on the spike result LCSD	QC Pre CS ssult 070 . RPD is	Units mg/L based on t	2010-06-2 Dil. 1 the spike as Spike	8 Spike Amount 1000 nd spike du Matrix	Res <5 plicate r	Pr trix sult .00 esult. Rec.	Rec.	y: MD Rec. Limit 90 - 11 RPI
QC Batch: 71296 Prep Batch: 61083 Param Total Dissolved Solids	L Re 10 ed on the spike result	QC Pre CS esult 070	Units mg/L based on t	2010-06-2 Dil. 1 the spike an	8 Spike Amount 1000 nd spike du	Res <5	Pr trix sult .00 esult.	Rec. 107 RPD	y: MD

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

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Report Date: June 29, 2010 TFD557B		Work Order Lighting I			Number: Jighting D			
Matrix Spike (MS-1) Spik	ed Sample: 236040	)						
QC Batch: 71281 Prep Batch: 61068		te Analyzed: Preparation:	2010-06-2 2010-06-2			Analyzed By: JR Prepared By: JR		
	MS			Spike	Ma	trix		Rec.
Param	Result	Units	Dil.	Amount	Res		Rec.	Limit
Chloride	168	mg/L	5.56	139	33		97	90 - 110
Percent recovery is based on the	spike result. RPI	D is based on t	the spike a	nd spike du	plicate r	esult.		
	MSD		Spike	Matrix		Rec.		RPD
Param	Result Ur	nitsDil.	Amount	Result	Rec.	Limit	RPD	Limit
Chloride	170 mg	g/L 5.56	139	33.7	98	90 - 110	1	20
Matrix Spike (MS-1) Spik	ed Sample: 23604	0						
		te Analyzed: Preparation:	2010-06-2 2010-06-2				nalyzed I repared I	
Prep Batch: 61068	QC MS	Preparation:	2010-06-2	28 Spike		P trix	repared I	By: JR Rec.
Prep Batch: 61068 Param	QC MS Result	Preparation: Units	2010-06-2 Dil.	28 Spike Amount	Re	P trix sult	repared I	By: JR Rec. Limit
Prep Batch: 61068 Param Fluoride	MS Result 29.1	Preparation: Units mg/L	2010-06-2 Dil. 5.56	28 Spike Amount 27.8	Re:	P trix sult 1 05	repared I	By: JR Rec. Limit
Prep Batch: 61068 Param Fluoride	QC MS Result 29.1 spike result. RPI	Preparation: Units mg/L	2010-06-2 Dil. 5.56 the spike a	Spike Amount 27.8 nd spike du	Re:	P trix sult 05 esult.	repared I	By: JR Rec. Limit 90 - 110
Prep Batch: 61068 Param Fluoride Percent recovery is based on the	QC MS Result 29.1 spike result. RPI MSD	2 Preparation: Units mg/L D is based on	2010-06-2 Dil. 5.56 the spike a Spike	Spike Amount 27.8 nd spike du Matrix	$\frac{\text{Res}}{1.}$ plicate r	P trix sult 05 result. Rec.	repared I Rec. 101	By: JR Rec. Limit 90 - 110 RPD
Prep Batch: 61068 Param Fluoride Percent recovery is based on the Param	QC MS Result 29.1 spike result. RPI MSD Result Un	Preparation: Units mg/L D is based on nits Dil.	2010-06-2 Dil. 5.56 the spike a	Spike Amount 27.8 nd spike du	Re:	P trix sult 05 esult.	repared H Rec. 101 RPD	By: JR Rec. Limit 90 - 110 RPD
Prep Batch: 61068 Param Fluoride Percent recovery is based on the Param Fluoride	QC MS Result 29.1 spike result. RPI MSD Result Un 29.4 m	Units mg/L D is based on nits Dil. g/L 5.56	2010-06-2 Dil. 5.56 the spike a Spike Amount 27.8	Spike Amount 27.8 nd spike du Matrix Result 1.05	Res 1. plicate r <u>Rec.</u> 102	P trix sult 05 esult. Rec. Limit 90 - 110	repared H Rec. 101 RPD	By: JR Rec. Limit 90 - 110 RPD Limit
Prep Batch: 61068 Param Fluoride Percent recovery is based on the Param Fluoride Percent recovery is based on the	QC MS Result 29.1 spike result. RPI MSD Result Un 29.4 m	Units <u>Units</u> <u>mg/L</u> D is based on mits <u>Dil.</u> <u>g/L</u> 5.56 D is based on mits	2010-06-2 Dil. 5.56 the spike a Spike Amount 27.8	Spike Amount 27.8 nd spike du Matrix Result 1.05	Res 1. plicate r <u>Rec.</u> 102	P trix sult 05 esult. Rec. Limit 90 - 110	repared H Rec. 101 RPD	By: JR Rec. Limit 90 - 110 RPD Limit
Prep Batch: 61068  Param Fluoride Percent recovery is based on the Param Fluoride Percent recovery is based on the Matrix Spike (MS-1) Spik QC Batch: 71281	QC MS Result 29.1 spike result. RPI MSD Result Un 29.4 mi spike result. RPI ed Sample: 23604 Da	Units <u>Units</u> <u>mg/L</u> D is based on mits <u>Dil.</u> <u>g/L</u> 5.56 D is based on mits	2010-06-2 Dil. 5.56 the spike a: Spike Amount 27.8 the spike a: 2010-06-2	Spike Amount 27.8 nd spike du Matrix Result 1.05 nd spike du	Res 1. plicate r <u>Rec.</u> 102	P trix sult 05 esult. Rec. Limit 90 - 110 esult.	repared H Rec. 101 RPD	By: JR Rec. Limit 90 - 110 RPD Limit 20 By: JR
Prep Batch: 61068  Param Fluoride Percent recovery is based on the Param Fluoride Percent recovery is based on the Matrix Spike (MS-1) Spik QC Batch: 71281 Prep Batch: 61068	QC MS Result 29.1 spike result. RPI MSD Result Un 29.4 ma spike result. RPI ed Sample: 23604 Da QC MS	Preparation: Units mg/L D is based on nits Dil. g/L 5.56 D is based on 0 te Analyzed: Preparation:	2010-06-2 Dil. 5.56 the spike a: Spike Amount 27.8 the spike a: 2010-06-2 2010-06-2	Spike Amount 27.8 nd spike du Matrix Result 1.05 nd spike du 28 28 28 Spike	Rec. 102 plicate r	P trix sult 05 esult. Rec. Limit 90 - 110 esult. A F	Rec. 101 RPD 1 nalyzed 1 Prepared 1	By: JR Rec. Limit 90 - 110 RPD Limit 20 By: JR By: JR By: JR Rec.
Prep Batch: 61068  Param Fluoride Percent recovery is based on the Param Fluoride Percent recovery is based on the Matrix Spike (MS-1) Spik QC Batch: 71281	QC MS Result 29.1 spike result. RPI MSD Result Un 29.4 m spike result. RPI ed Sample: 23604 Da QC	Units <u>Units</u> <u>mg/L</u> D is based on <u>nits</u> <u>Dil.</u> <u>g/L</u> <u>5.56</u> D is based on 0 te Analyzed:	2010-06-2 Dil. 5.56 the spike a: Spike Amount 27.8 the spike a: 2010-06-2	Spike Amount 27.8 nd spike du Matrix Result 1.05 nd spike du	Rec. 102 plicate r Ma Re	P trix sult 05 esult. Rec. Limit 90 - 110 esult. A F	Rec. 101 RPD 1 Analyzed 1	By: JR Rec. Limit 90 - 110 RPD Limit 20 By: JR By: JR By: JR

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<sup>1</sup>Matrix spike recovery out of control limits due to matrix interference. Use LCS/LCSD to demonstrate analysis is under control.

Report Date: June 29, 2010 TFD557B							Number: ghting D		
matrix spikes continued							_		
Param	$egin{array}{c} \mathrm{MSD} \ \mathrm{Result} \end{array}$	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	$\begin{array}{c} \operatorname{RPD} \\ \operatorname{Limit} \end{array}$
								_	
Param	$egin{array}{c} \mathrm{MSD} \ \mathrm{Result} \end{array}$	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Sulfate	1000000000000000000000000000000000000	mg/L	-5.56	139	122	112	90 - 110	<u>1</u>	20
Percent recovery is based on t									
Matrix Spike (MS-1) Sp	piked Sample: 2	36042							
QC Batch: 71284		Date A	nalyzed:	2010-06-2	28		Ar	nalyzed E	y: JR
Prep Batch: 61070			eparation:	2010-06-2				epared B	-
	М	S			Spike	Ma	trix		Rec.
Param	Res		Units	Dil.	Amount			.ec.	Limit
Chloride	23		mg/L	5.56	139				90 - 110
Percent recovery is based on t	he spike result.	RPD is	based on t	the spike a	nd spike du	plicate r	result.		
				Spike	Matrix		Rec.		RPD
	MSD			-					
	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	
Chloride	Result 236	mg/L	5.56	Amount 139	83.8	109	90 - 110	RPD 0	Limit 20
Chloride Percent recovery is based on t <b>Matrix Spike (MS-1)</b> Sp QC Batch: 71284	Result 236	mg/L RPD is 36042 Date A	5.56	Amount 139	83.8 nd spike du 28	109	90 - 110 esult. Ar		20 By: JR
QC Batch: 71284	Result 236 the spike result.	mg/L RPD is 36042 Date A QC Pre	5.56 based on t nalyzed:	Amount 139 the spike an 2010-06-2	83.8 nd spike du 28 28	109 plicate r	90 - 110 esult. Ar	0 nalyzed E	20 By: JR
Chloride Percent recovery is based on t Matrix Spike (MS-1) Sp QC Batch: 71284 Prep Batch: 61070	Result 236 the spike result. piked Sample: 2.	mg/L RPD is 36042 Date A: QC Pre	5.56 based on t nalyzed:	Amount 139 the spike an 2010-06-2	83.8 nd spike du 28	109 plicate r Ma	90 - 110 result. Ar Pr	0 nalyzed E	20 By: JR by: JR
Chloride Percent recovery is based on t <b>Matrix Spike (MS-1)</b> Sp QC Batch: 71284 Prep Batch: 61070 Param	Result 236 the spike result. piked Sample: 2. M	mg/L RPD is 36042 Date A: QC Pre	5.56 based on t nalyzed: eparation:	Amount 139 the spike an 2010-06-2 2010-06-2	83.8 nd spike du 28 28 Spike	109 plicate r Ma Res	90 - 110 result. Ar Pr trix sult R	0 nalyzed E epared B	20 By: JR by: JR Rec. Limit
Chloride Percent recovery is based on t <b>Matrix Spike (MS-1)</b> S <sub>I</sub> QC Batch: 71284 Prep Batch: 61070 Param Fluoride	Result 236 the spike result. piked Sample: 2. M Res 38	mg/L RPD is 36042 Date A: QC Pre	5.56 based on t nalyzed: eparation: Units mg/L	Amount 139 the spike an 2010-06-2 2010-06-2 Dil. 5.56	83.8 nd spike du 28 28 Spike Amount 27.8	109 plicate r Ma Res 9.	90 - 110 result. An Pr trix sult R 38 1	0 nalyzed E epared B .ec.	20 By: JR by: JR Rec. Limit
Chloride Percent recovery is based on t <b>Matrix Spike (MS-1)</b> Sp QC Batch: 71284 Prep Batch: 61070 Param Fluoride Percent recovery is based on t	Result 236 the spike result. piked Sample: 2. M Res 38	mg/L RPD is 36042 Date A: QC Pre Sult .4 RPD is	5.56 based on t nalyzed: eparation: Units mg/L	Amount 139 the spike an 2010-06-2 2010-06-2 Dil. 5.56	83.8 nd spike du 28 28 28 Amount 27.8 nd spike du Matrix	109 plicate r Ma Res 9.	90 - 110 result. An Pr trix sult R 38 1 result. Rec.	0 nalyzed E epared B .ec. 04	20 By: JR By: JR Rec. Limit 90 - 110 RPD
Chloride Percent recovery is based on t Matrix Spike (MS-1) Sr QC Batch: 71284 Prep Batch: 61070 Param Fluoride Percent recovery is based on t Param	Result 236 the spike result. piked Sample: 2. MRes 38 the spike result. MSD Result	mg/L RPD is 36042 Date A QC Pre S sult .4 RPD is Units	5.56 based on t nalyzed: eparation: Units mg/L based on t Dil.	$\begin{array}{r} \text{Amount} \\ \hline 139 \\ \hline 130 \\ \hline 130 \\ \hline 2010-06-2 \\ \hline 130 \\$	83.8 nd spike du 28 28 28 28 28 28 28 28 28 28 28 28 28	109 plicate r Ma Rec 9. plicate r Rec.	90 - 110 result. Ar Pr trix sult R 38 1 result. Rec. Limit	0 nalyzed E epared B .ec.	20 By: JR Ty: JR Rec. Limit 90 - 110 RPD Limit
Chloride Percent recovery is based on t Matrix Spike (MS-1) Sp QC Batch: 71284 Prep Batch: 61070 Param Fluoride Percent recovery is based on t Param Fluoride	Result 236 the spike result. piked Sample: 2. MR 88 the spike result. MSD Result 38.4	mg/L RPD is 36042 Date A: QC Pre S sult .4 RPD is Units mg/L	5.56 based on t nalyzed: eparation: Units mg/L based on t Dil. 5.56	Amount 139 the spike an 2010-06-2 2010-06-2 2010-06-2 Dil. 5.56 the spike an Spike Amount 27.8	83.8 nd spike du 28 28 28 28 28 28 28 28 28 28 28 28 28	109 plicate r Ma Res 9. plicate r Rec. 104	90 - 110 result. Ar Pr trix sult R 38 1 result. Rec. Limit 90 - 110	0 nalyzed E epared B .ec. 04	20 By: JR by: JR Rec.
Chloride         Percent recovery is based on t         Matrix Spike (MS-1)       Spike         QC Batch:       71284         Prep Batch:       61070         Param       Fluoride         Percent recovery is based on t       Param         Fluoride       Percent recovery is based on t         Param       Fluoride         Percent recovery is based on t       Param	Result 236 the spike result. piked Sample: 2. MR 8 the spike result. MSD Result 38.4 the spike result.	mg/L RPD is 36042 Date A: QC Press Sult .4 RPD is Mg/L RPD is	5.56 based on t nalyzed: eparation: Units mg/L based on t Dil. 5.56	Amount 139 the spike an 2010-06-2 2010-06-2 2010-06-2 Dil. 5.56 the spike an Spike Amount 27.8	83.8 nd spike du 28 28 28 28 28 28 28 28 28 28 28 28 28	109 plicate r Ma Res 9. plicate r Rec. 104	90 - 110 result. Ar Pr trix sult R 38 1 result. Rec. Limit 90 - 110	0 nalyzed E epared B .ec. 04 RPD	20 By: JR Ty: JR Rec. Limit 90 - 110 RPD Limit
Chloride         Percent recovery is based on t         Matrix Spike (MS-1)       Spike         QC Batch:       71284         Prep Batch:       61070         Param       Fluoride         Percent recovery is based on t       Param         Fluoride       Percent recovery is based on t         Param       Fluoride         Percent recovery is based on t       Param	Result 236 the spike result. piked Sample: 2. MR 88 the spike result. MSD Result 38.4	mg/L RPD is 36042 Date A: QC Press Sult .4 RPD is Mg/L RPD is	5.56 based on t nalyzed: eparation: Units mg/L based on t Dil. 5.56	Amount 139 the spike an 2010-06-2 2010-06-2 2010-06-2 Dil. 5.56 the spike an Spike Amount 27.8	83.8 nd spike du 28 28 28 28 28 28 28 28 28 28 28 28 28	109 plicate r Ma Res 9. plicate r Rec. 104	90 - 110 result. Ar Pr trix sult R 38 1 result. Rec. Limit 90 - 110	0 nalyzed E epared B .ec. 04 RPD	20 By: JR Ty: JR Rec. Limit 90 - 110 RPD Limit
Chloride         Percent recovery is based on t         Matrix Spike (MS-1)       Spike         QC Batch:       71284         Prep Batch:       61070         Param       Fluoride         Percent recovery is based on t       Param         Fluoride       Percent recovery is based on t	Result 236 the spike result. piked Sample: 2. MR 8 the spike result. MSD Result 38.4 the spike result.	mg/L RPD is 36042 Date A: QC Pre S sult .4 RPD is Mg/L RPD is 36042 Date A	5.56 based on t nalyzed: eparation: Units mg/L based on t Dil. 5.56	Amount 139 the spike and 2010-06-2 2010-06-2 Dil. 5.56 the spike and Spike Amount 27.8 the spike and 2010-06-2	83.8 nd spike du 28 28 28 28 28 28 28 28 28 28 28 28 28	109 plicate r Ma Res 9. plicate r Rec. 104	90 - 110 result. An Pr trix sult R 38 1 result. Rec. Limit 90 - 110 result.	0 nalyzed E epared B .ec. 04 RPD	20 By: JR ty: JR Rec. Limit 90 - 110 Limit 20 By: JR

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Report Date: June 29, 2010 TFD557B		Work Order: 10062902 Lighting Dock 55-7						Page Number: 21 of 26 Lighting Dock, NM			
	М	IS			Spike	Ma	trix		Rec.		
Param	Res	sult	Units	Dil.	Amount		sult	Rec.	Limit		
Sulfate	3 64	15	mg/L	5.56	139	4	36	150	90 - 110		
Percent recovery is based on the	e spike result.	RPD is	based on t	he spike a	nd spike du	plicate r	esult.				
	MSD			Spike	Matrix		Rec.		RPD		
Param	$\operatorname{Result}$	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	Limit	$\operatorname{RPD}$	Limit		
Sulfate	<sup>4</sup> 645	mg/L	5.56	139	436	150	90 - 110	0 0	20		
Percent recovery is based on the Matrix Spike (MS-1) Spik	ked Sample: 2		based on t	ine spike af	ia spike au	piicate r	esun.		. •		
QC Batch: 71285		Date A	nalyzed:	2010-06-2	18			Analyzed	By: JR		
Prep Batch: 61071			eparation:	2010-06-28				Prepared By: JR			
-			-						5		
	М	-			Spike	Ma	trix		Rec.		
Param	Res		Units	Dil.	Amount		sult	Rec.	Limit		
Chloride	23	33	mg/L	5.56	139	79	).6	110	90 - 110		
Percent recovery is based on the	e spike result.	RPD is	based on t	the spike a	nd spike du	plicate r	esult.				
	MSD			Spike	Matrix		Rec.		RPD		
Param	Result	Units	Dil.	Amount	Result	Rec.	Limit	RPD	Limit		
Chloride	233	mg/L	5.56	139	79.6	110	90 - 11	0 0	20		
Percent recovery is based on the Matrix Spike (MS-1) Spil QC Batch: 71285 Prep Batch: 61071	e spike result. ked Sample: 2	36044 Date A	based on t analyzed: eparation:	the spike at 2010-06-2 2010-06-2	28	plicate r		Analyzed Prepared 1	•		
r		-	1								
Param	M Res		Units	Dil.	Spike Amount		trix sult	Rec.	${ m Rec.}\ { m Limit}$		
Fluoride		).4	mg/L	5.56	27.8		1.2	105	90 - 110		
Percent recovery is based on the		• • • •						100	30 - 110		
I GIGENT TECOVELY IS DASED ON UN	-	10 0 15	Dascu UII		-	pheater			_		
	MSD			Spike	Matrix		Rec.		$\operatorname{RPD}$		
_						_			_		
Param Fluoride	Result 40.5	Units mg/L		Amount 27.8	Result 11.2	Rec. 105	Limit 90 - 11	$\frac{\text{RPD}}{0}$	Limit 20		

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

 $^{3}$ Matrix spike recovery out of control limits due to matrix interference. Use LCS/LCSD to demonstrate analysis is under control.  $^{4}$ Matrix spike recovery out of control limits due to matrix interference. Use LCS/LCSD to demonstrate analysis is under control.

Report Date: June 29, 20	010 Work Order: 10062902	Page Number: 22 of 26			
TFD557B	Lighting Dock 55-7	Lighting Dock, NM			
Matrix Spike (MS-1)	Spiked Sample: 236044				
QC Batch: 71285	Date Analyzed: 2010-06-28	Analyzed By: JR			
Prep Batch: 61071	QC Preparation: 2010-06-28	Prepared By: JR			

		$\mathbf{MS}$			Spike	$\operatorname{Matrix}$		$\operatorname{Rec.}$
Param		$\operatorname{Result}$	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	$\operatorname{Limit}$
Sulfate	5	688	mg/L	5.56	139	471	156	90 - 110

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

		MSD			Spike	Matrix		Rec.		RPD
Param		$\operatorname{Result}$	Units	Dil.	$\operatorname{Amount}$	Result	Rec.	$\operatorname{Limit}$	RPD	Limit
Sulfate	6	689	$\mathrm{mg/L}$	5.56	139	471	157	90 - 110	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

# Standard (ICV-1)

QC Batch: 71280		Date Anal	Analyzed By: JG				
			ICVs True	ICVs Found	$\operatorname{ICVs}$	Percent	Date
P	171	<b>TT T</b>		Found		Recovery	
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Hydroxide Alkalinity		mg/L as CaCo3	0.00	<1.00		90 - 110	2010-06-28
Carbonate Alkalinity		mg/L as $CaCo3$	0.00	236		90 - 110	2010-06-28
Bicarbonate Alkalinity		mg/L as CaCo3	0.00	8.00		90 - 110	2010-06-28
Total Alkalinity		mg/L as CaCo3	250	244	98	90 - 110	2010-06-28

# Standard (CCV-1)

QC Batch: 71280		Date Anal	Analyzed By: JG				
			CCVs True	CCVs Found	$\operatorname{CCVs}$	Percent Recovery	Date
			Itue	round	rercent	necovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Hydroxide Alkalinity		mg/L as CaCo3	0.00	<1.00		90 - 110	2010-06-28
Carbonate Alkalinity		mg/L as CaCo3	0.00	240		90 - 110	2010-06-28
Bicarbonate Alkalinity		mg/L as CaCo3	0.00	8.00		90 - 110	2010-06-28
Total Alkalinity		mg/L as CaCo3	250	248	99	90 - 110	2010-06-28

# Standard (CCV-1)

QC Batch: 71281

Date Analyzed: 2010-06-28

Analyzed By: JR

<sup>5</sup>Matrix spike recovery out of control limits due to matrix interference. Use LCS/LCSD to demonstrate analysis is under control. <sup>6</sup>Matrix spike recovery out of control limits due to matrix interference. Use LCS/LCSD to demonstrate analysis is under control.

Report Date: June 29, 2010 TFD557B				rk Order: 1006 ighting Dock 53	Page Number: 23 of 26 Lighting Dock, NM		
	Flag	Units	CCVs True Conc. 25.0	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	25.0	23.5	94	90 - 110	2010-06-28
Standard (CCV	/-1)						
QC Batch: 7128	31		Date Ana	alyzed: 2010-0	Analyzed By: JR		
Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Fluoride		mg/L	5.00	4.81	96	90 - 110	2010-06-28
Standard (CCV	,						
QC Batch: 7128	31		Date Ana	alyzed: 2010-0	Analyzed By: JR		
Param I	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Sulfate		mg/L	25.0	23.1	92	90 - 110	2010-06-28
Standard (CC QC Batch: 712 Param Chloride	,	Units mg/L	Date And CCVs True Conc. 25.0	alyzed: 2010-0 CCVs Found Conc. 24.5	6-28 CCVs Percent Recovery 98	Ana Percent Recovery Limits 90 - 110	lyzed By: JR Date Analyzed 2010-06-28
Standard (CC) QC Batch: 712	,		Date An	alyzed: 2010-0	16-28	Ana	lyzed By: JR
			CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Param Fluoride	Flag	Units mg/L	Conc. 5.00	Conc. 5.02	Recovery 100	Limits 90 - 110	Analyzed 2010-06-28

Report Date: June 29, 2010 TFD557B				ork Order: 1006 Lighting Dock 5	Page Number: 24 of 26 Lighting Dock, NM		
Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Sulfate	T lag	mg/L	25.0	24.1	<u>96</u>	90 - 110	2010-06-28
Standard (	CCV-1)						
QC Batch:	71284		Date An	alyzed: 2010-0	Analyzed By: JR		
			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride		mg/L	25.0	24.5	98	90 - 110	2010-06-28
Standard (	(CCV-1)						
QC Batch:	71284		Date An	alyzed: 2010-0	Analyzed By: JR		
			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Fluoride		mg/L	5.00	5.02	100	90 - 110	2010-06-28
Standard (	(CCV-1)						
QC Batch: 71284			Date Analyzed: 2010-06-28			Ana	lyzed By: JR
			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Sulfate		mg/L	25.0	24.1	96	90 - 110	2010-06-28
Standard (	(CCV-2)						
QC Batch: 71284			Date An	alyzed: 2010-0	Analyzed By: JR		
			$\mathrm{CCVs}$	CCVs	$\operatorname{CCVs}$	Percent	
			True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride		mg/L	25.0	24.9	100	90 - 110	2010-06-28
Standard (	(CCV-2)						
QC Batch:	71284		Date An	alyzed: 2010-0	)6-28	Ana	lyzed By: JR
a condition.	11401		Date All			A116	uyzou by. Jit

Report Date: June 29, 2010 TFD557B				ork Order: 1006 Jighting Dock 5	Page Number: 25 of 26 Lighting Dock, NM			
Param Fluoride	Flag	Units mg/L	CCVs True Conc. 5.00	CCVs Found Conc. 5.09	CCVs Percent Recovery 102	Percent Recovery Limits 90 - 110	Date Analyzed 2010-06-28	
				0.00			2010-00-20	
Standard	(CCV-2)							
QC Batch: 71284			Date An	alyzed: 2010-0	Analyzed By: JR			
Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed	
Sulfate		mg/L	25.0	24.4	98	90 - 110	2010-06-28	
Standard QC Batch:			Date An	alyzed: 2010-0	06-28	Ana	lyzed By: JR	
Ū							0 0	
Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	$\begin{array}{c} \mathrm{CCVs} \\ \mathrm{Percent} \\ \mathrm{Recovery} \end{array}$	Percent Recovery Limits	Date Analyzed	
Chloride		mg/L	25.0	24.9	100	90 - 110	2010-06-28	
<b>Standard</b> QC Batch:	. ,		Date An	alyzed: 2010-(	06-28	Ana	lyzed By: JR	
_	_		CCVs True	CCVs Found	CCVs Percent	Percent Recovery	Date	
Param Fluoride	Flag	Units mg/L	<u>Conc.</u> 5.00	<u> </u>	Recovery 102	Limits 90 - 110	Analyzed 2010-06-28	
Standard	<b>`</b>							
QC Batch: 71285			Date Analyzed: 2010-06-28 CCVs CCVs CCVs			Analyzed By: JR		
ParamSulfate	Flag	Units mg/L	True Conc. 25.0	Found Conc. 24.4	CCVs Percent <u>Recovery</u> 98	Percent Recovery Limits 90 - 110	Date Analyzed 2010-06-28	
Standard QC Batch:			Date An	alyzed: 2010-(	06-28		lyzed By: JR	

Report Date: June 29, 2010 TFD557B				ork Order: 1006 Jighting Dock 5	Page Number: 26 of 26 Lighting Dock, NM		
			CCVs True	CCVs Found	CCVs	Percent Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Chloride		mg/L	25.0	25.3	101	90 - 110	2010-06-28
Standard (	CCV-2)						
QC Batch: 71285			Date Ana	alyzed: 2010-0	Analyzed By: JR		
			CCVs	CCVs	CCVs	Percent	
			True	Found	Percent	Recovery	Date
Param	$\mathbf{F}$ lag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Fluoride		mg/L	5.00	5.16	103	90 - 110	2010-06-28
Standard (	CCV-2)						
QC Batch:	71285		Date An	alyzed: 2010-0	Analyzed By: JR		
			CCVs	CCVs	CCVs	Percent	
			$\operatorname{True}$	Found	Percent	Recovery	Date
Param	$\mathbf{Flag}$	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Sulfate		mg/L	25.0	24.8	99	90 - 110	2010-06-28

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Attachment B

Maps and Data Table Showing Lightning Dock [TDS] and [F] Distributions ٠

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Animas Valley Geochemical Data Base Extract: TDS and Fluoride values for Wells in Sections 7, 12 and 13, T25S, R19W

REFERENCE	DATUM REFERENCE	SOURCE	SAMPLE	DATE	WATER SOURCE	W LONGITUDE	N LATITUDE 27	TEMP °F	TDS mg/l	F mg/l
A	165	Norman	N-39	1	Well	-108.85263	32.14987		1	-
8	167	Norman	N-41		Well	-108.85520	32.13586	1	•	•
ပ	4	Logsdon	P-4	1981	Well	-108.85188	32.14678	1	1608	7.25
D	37	rogsdon	AN-5	1981	Well	-108.85141	32.13749	1	1184	3.48
ц Ш	131	OCD	0CD-2	01/28/86	Beall water well	-108.84682	32.14992	63.5	443	2.00
Ш	138	Cunniff	r C	11/07/85	Beall water well, OCD-2	-108.84682	32.14992	I	1	r
L.	ۍ ا	Logsdon	P-5	1981	Well	-108.84665	32.13973	I	1660	3.55
ڻ ۲	183	Summers	Sum-5	04/04/60	Folk well	-108.83698	32.14122		620	•
ڻ ۴	62	AMAX	AMAX-7	01/27/75	Foik well	-108.83698	32.14122	149.0	457	7.80
Т	135	OCD	0CD-6	01/28/86	Burgett grnhouse discharge	-108.83612	32.14534	116.6	1115	11.70
	133	OCD	OCD-4	01/28/86	Burgett geowell	-108.83528	32.14681	118.4	1195	12.50
<b>ر</b>	136	Cunniff	C-1	11/07/85	Beall grnhouse weil	-108.83501	32.15117	1	1092	,
*	93	NWSU	NMSU-20	08/07/80	Burgett well	-108.83405	32.14549	159.8	1628	•
*	0	Logsdon	P-2	1981	Burgett hot well	-108.83405	32.14549	I	1116	12.60
¥	89	NSMN	NMSU-16	03/27/81	Burgett well	-108.83405	32.14549	183.2	1167	,
*	94	NMSU	NMSU-21	01/06/81	Burgett well	-108.83405	32.14549	149.0	1452	1
<b>_</b>	06	NMSU	NMSU-17	01/06/81	Burgett well	-108.83288	32.14599		1034	1
	178	Summers	Sum-1B	04/28/49	Well	-108.83288	32.14599	1	1130	11.00
M	166	Norman	N-40	ı	Well	-108.83282	32.14589	I	ı	•
N*	63	AMAX	AMAX-8	01/26/75	McCants well	-108.83272	32.14997	185.0	1132	13.00
N*	3	Logsdon	P-3	1981	McCants well	-108.83272	32.14997	1	8	12.00
N*	88	NMSU	NMSU-15	08/06/80	McCants well	-108.83272	32.14997	192.0	982	
N*	137	Cunniff	C-2	11/07/85	McCants grnhouse well	-108.83272	32.14997	1	1114	1
Ŷ	91	NMSU	NMSU-18	08/07/80	Burgett well	-108.83233	32.14563	192.9	16281	1
۰ ۲	92	NMSU	NMSU-19	01/06/81	Burgett well	-108.83233	32.14563	201.2	15604	
0,	181	Summers	Sum-2B	04/30/66	Well	-108.83233	32.14563	ì	1070	12.00
¢.	95	NMSU	NMSU-22	08/01/80	Well	-108.82916	32.14227	76.1	352	ı
<b>с.</b>	96	NMSU	NMSU-23	01/06/81	Well	-108.82916	32.14227	75.2	418	
Ö**	,	Raser	153440	05/13/08	Burgett discharge	1	I	1	1110	9.95
*	E	Raser	Geo well 1	6/9/2008	Burgett well	-	1		1320	13.2
S**	-	Raser	Geo well D	6/9/2008	Burgett well	1	1	I	1140	11.6
L **	-	Cunniff	AB53998	11/5/2003	TG 52-7	1	,	1	1572	11.82

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## Attachment C

Report from Soil, Water and Air Testing Laboratory New Mexico State University 12/23/2003 Well TG 52-7

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S <sup>oil</sup> W <sup>ater and</sup> A <sup>ir</sup> T <sup>esting</sup> Lab New Mexico State University BOX 30003 Las Cruces, NM 88003 (505)646-4422 Page 1 of 9 Report #0312921246

Date: 12/22/03

### ANALYTICAL REPORT

To: Lightning Dock Geothermal, In 523-7908 Attn: Roy A. Cunniff 224 W. Greening Ave. Las Cruces, NM 88005 Purchase Order #

Below are the results for submitted sample(s).

(MDL=Method detection limit)

15:00

15:18

Sample I.D. AB53998

Sample Description:Animas NM Well TG 52-7 DSTSample collection date:11/05/03SampleSubmittal date:11/07/03Submit

3 Sample collection time: 3 Submittal time:

WSS# Request ID No. Sample Purpose: Collector: ROY CUNNIFF Sampling Information:

pH of water         150.1         9.26         11/11/03         LJG           Electrical Conductivity         2510B         2310         micromhos/em         1         11/11/03         LJG           Total Dissolved Solids         160.2         1572         mg/L         1         11/11/03         BJR           Magnessiam (for SAR)-         200.7         0.54         msq/L         0.01         11/21/03         BJR           Sodium (for SAR)-         200.7         19.40         msq/L         0.01         11/21/03         BJR           Sodium (for SAR)-         200.7         8.4         mg/L         0.1         11/21/03         BJR           Sodium Adsorption Ratio (SAR)         Handbook 60         35.99         0.01         11/21/03         BJR           Sodium Adsorption Ratio (SAR)         Handbook 60         35.5         mg/L         0.1         11/12/03         LJG           Bicatoonate         310.1         1.62         msq/L         0.01         11/12/03         LJG           Albelinity (as CaCO3)         2320B         315.5         mg/L         0.1         11/12/03         BJR           Residual Sodium Carbonate (RSC)         576         msq/L         0.1         11/21/03         B	Element	Method	Result	Units	MDL	Date of Analysis	Analyst
Total Dissolved Solids       160.2       1572       mg/L       1       1/1/103       BJH         Magnesitun (for SAR)-       200.7       0.04       meq/L       0.01       11/21/03       BJH         Sodium (for SAR)-       200.7       0.51       meq/L       0.01       11/21/03       BJH         Sodium (for SAR)-       200.7       8.4       mg/L       0.1       11/21/03       BJH         Sodium Adsorption Ratio (SAR)       Handbook 60       36.99       0.01       11/21/03       BJH         Carbonate       310.1       1.62       mcq/L       0.01       11/12/03       LJG         Bicarbonate       310.1       4.69       mcq/L       0.1       11/12/03       LJG         Alkelinity (as CaCO3)       2320B       315.5       mg/L       1       11/22/03       LJG         Hardness as CaCO3-       130.2       28       mg/L       1       11/22/03       BJH         Residual Sodium Carbonate (RSC)       5.76       meq/L       0.01       11/12/03       BJH         Automalyzer       4500-504_E       545       mg/L       1.0       11/26/03       JH         Automaty ICP-       20.7       0.78       mg/L       0.05	pH of water	150.1	9.26			11/11/03	LJG
Magnesitm (for SAR)- Calcium (for SAR)- 200.7200.70.04meq/L meq/L0.0111/21/03BH 	Electrical Conductivity	2510B	2310	micromhos/cm	1	11/11/03	LJG
$\begin{array}{ccc} Calcium (for SAR)- 200.7 0.51 meq/L 0.01 11/21/03 BJH Sodium (for SAR)- 200.7 19.40 meq/L 0.01 11/21/03 BJH Sodium (for SAR)- 200.7 8.4 mg/L 0.1 11/21/03 BJH Sodium Adsorption Ratio (SAR) Handbook 60 36.99 0.01 11/21/03 BJH Sodium Adsorption Ratio (SAR) Handbook 60 36.99 0.01 11/21/03 LJG Birle Statum Structure Stru$	Total Dissolved Solids	160.2	1572	mg/L	1	11/11/03	BJH
Sodium (for SAR)-200.719.40meq/L0.0111/21/03BJHPotassium by ICP-200.78.4mg/L0.111/21/03BJHSodium Adsorption Ratio (SAR)Handbook 6036.990.0111/21/03BJHCathonate310.11.62meq/L0.0111/12/03LIGBitarbonate310.14.69meq/L0.0111/12/03LIGAlkalinity (as CaCO3)2320B315.5mg/L0.111/12/03BJHResidual Sodium Carbonate (RSC)5.76meq/L0.0111/12/03BJHChloride by Automalyzer4500-Cl_D11.0mg/L2.511/19/03BJHChloride by Automalyzer4500-SO4_E545mg/L1011/26/03JHFluoride by electrode4500-F_C11.82mg/L0.0511/26/03BJHAutimony by ICPEPA 200.7Not detectedmg/L0.0512/05/03BJHAutimony by ICPEPA 200.70.07mg/L0.0512/05/03BJHBeryllium200.8S3.1ug/L0.111/26/03MBLBeryllium200.8S3.1ug/L0.112/05/03BJHCadeium by ICPEPA 200.7Not detectedmg/L0.0112/05/03BJHCadeium by ICP.200.7Not detectedmg/L0.112/05/03BJHCadeium by ICP.200.7Not detectedmg/L0.112/05/03BJHCade	Magnesium (for SAR)-	200.7	0.04	meq/L	0.01	11/21/03	BJH
Potassium by ICP-200.78.4mg/L0.111/21/03BJHSodium Adsorption Ratio (SAR)Handbook 6036.990.0111/21/03BJHCarbonate310.11.62mcq/L0.0111/12/03LJGBicarbonate310.14.69mcq/L0.0111/12/03LJGAlkalinity (as CaCO3)2320B315.5mg/L0.111/12/03BJHCarbonate130.228mg/L111/21/03BJHChoride by Autoanalyzer4500-C1_D11.0mg/L2.511/19/03CAWSulfate4500-S04_E545mg/L1011/26/03JHPluoride by electrode4500-70.78mg/L0.0512/26/03BJHAnteniony by ICPEPA 200.70.78mg/L0.0512/05/03BJHArsenic by ICP-20.853.1ug/L0.111/26/03MBLBismuth by ICPEPA 200.7Not detectedmg/L0.111/26/03BJHCadenium by ICPEPA 200.7Not detectedmg/L0.111/26/03BJHChronium by ICP (EPA 200.7)-EPA 200.7Not detectedmg/L0.111/26/03BJHCadeium by ICP200.853.1ug/L0.112/05/03BJHCadeium by ICP (EPA 200.7)-EPA 200.7Not detectedmg/L0.0112/05/03BJHCadeium by ICP (EPA 200.7)-EPA 200.7Not detectedmg/L0.0112/05/03 <td>Calcium (for SAR)-</td> <td>200.7</td> <td>0.51</td> <td>meq/L</td> <td>0.01</td> <td>11/21/03</td> <td>BJH</td>	Calcium (for SAR)-	200.7	0.51	meq/L	0.01	11/21/03	BJH
Sodium Adsorption Ratio (SAR)Handbook 60 $36.99$ 0.01 $11/21/03$ BIHCarbonate $310.1$ $1.62$ meq/L $0.01$ $11/12/03$ LIGBicarbonate $310.1$ $4.69$ meq/L $0.01$ $11/12/03$ LIGBicarbonate $310.1$ $4.69$ meq/L $0.11$ $11/12/03$ LIGAlkalinity (as CaCO3) $2320B$ $315.5$ mg/L $0.11$ $11/12/03$ BJHResidual Sodium Carbonate (RSC) $5.76$ meq/L $0.01$ $11/21/03$ BJHChloride by Autoanalyzer $4500$ -C1 D $111.0$ mg/L $2.5$ $11/19/03$ CAWSulfate $4500$ -SC4 E $545$ mg/L $10$ $11/26/03$ JHPlouride by electrode $4500$ -F, C $11.82$ mg/L $0.05$ $1126/03$ BJHAutimony by ICPEPA 200.7Not detectedmg/L $0.05$ $12/05/03$ BJHAutimony by ICPEPA 200.7Not detectedmg/L $0.2$ $11/26/03$ MBLBarium200.8 $53.1$ $wg/L$ $0.1$ $11/26/03$ MBLBarium200.8Not detectedmg/L $0.01$ $12/05/03$ BJHCadriam by ICPEPA 200.7Not detectedmg/L $0.1$ $11/26/03$ MBLBeryllian $200.8$ $53.1$ $wg/L$ $0.1$ $11/26/03$ MBLBeryllian $0.07$ Not detectedmg/L $0.01$ $12/05/03$ BJHCadriam by ICP $200.7$ Not d	Sodium (for SAR)-	200.7	19.40	meq/L	0.01	11/21/03	BJH
Carbonate310.11.62 $meq/L$ 0.01 $11/12/03$ LJGBicarbonate310.14.69 $meq/L$ 0.01 $11/12/03$ LJGAlkalinity (as CaCO3)2320B315.5 $mg/L$ 0.1 $11/12/03$ LJGAlkalinity (as CaCO3)2320B315.5 $mg/L$ 1 $11/12/03$ BJHResidual Sodium Carbonate (RSC)5.76 $meq/L$ 0.01 $11/21/03$ BJHChloride by Automalyzer4500-Cl_D111.0 $mg/L$ 2.5 $11/19/03$ CAWSulfate4500-SOA_E545 $mg/L$ 10 $11/26/03$ DIGAluminum by ICP-200.70.78 $mg/L$ 0.05 $12/05/03$ BJHAntimony by ICP-EPA 200.7Not detected $mg/L$ 0.05 $12/05/03$ BJHArsenic by ICP-EPA 200.70.07 $mg/L$ 0.05 $12/05/03$ BJHBarium200.853.1 $ug/L$ 0.2 $11/26/03$ MBLBeryllium200.8Not detected $mg/L$ 0.1 $11/26/03$ MBLBeryllium200.8Not detected $mg/L$ 0.1 $12/05/03$ BJHCadminn by ICPEPA 200.7Not detected $mg/L$ 0.1 $12/05/03$ BJHCadeium by ICP-200.7Not detected $mg/L$ 0.1 $12/05/03$ BJHCadeium by ICP-200.7Not detected $mg/L$ 0.01 $12/05/03$ BJHCadeium by ICP-200.7Not detected $mg/L$ 0.01<	Potassium by ICP-	200.7	8.4	mg/L	0.1	11/21/03	BJH
Bicarbonate         310.1         4.69         mcq/L         0.01         11/12/03         LJG           Alkalinity (as CaCO3)         2320B         315.5         mg/L         0.1         11/12/03         LJG           Hardness as CaCO3-         130.2         28         mg/L         1         11/21/03         BJH           Residual Sodium Carbonate (RSC)         5.76         mcq/L         0.01         11/1/2/03         BJH           Chloride by Autoanalyzer         4500-SC L D         111.0         mg/L         2.5         11/19/03         CAW           Sulfate         4500-SC L E         545         mg/L         0.05         11/26/03         DIG           Aluminum by ICP-         200.7         0.78         mg/L         0.05         12/05/03         BJH           Arsenic by ICP-         EPA 200.7         Not detected         mg/L         0.1         11/26/03         MBL           Barium         200.8         S3.1         ug/L         0.1         11/26/03         MBL           Cadmium by ICP         200.7         Not detected         ug/L         0.2         11/26/03         MBL           Cadmium by ICP         EPA 200.7         Not detected         ug/L         0.1	Sodium Adsorption Ratio (SAR)	Handbook 60	36.99	÷	0.01	11/21/03	BJH
Alkalinity (as CaCO3)2320B315.5mg/L0.111/12/03LJGHardness as CaCO3-130.228mg/L111/21/03BJHResidual Sodium Carbonate (RSC)5.76mcq/L0.0111/21/03BJHChloride by Autoanalyzer4500-SC LD111.0mg/L2.511/19/03CAWSulfate4500-SC 4 B545mg/L1011/26/03JHFluoride by electrode4500-F C11.82mg/L0.0512/26/03BJHAntimony by ICP200.70.78mg/L0.0512/05/03BJHArsenic by ICP-EPA 200.70.07mg/L0.0512/05/03BJHBarium200.853.1ug/L0.111/26/03MBLBismuth by ICP200.70.07mg/L0.211/26/03MBLBismuth by ICP-200.8S3.1ug/L0.111/26/03BJHCadmium by ICP (EPA 200.7)EPA 200.7Not detectedmg/L0.112/05/03BJHCadeium by ICP-200.7Not detectedmg/L0.0112/05/03BJHCadeium by ICP-200.7Not detectedmg/L0.0112/05/03BJHCadeium by ICP-200.7Not detectedmg/L0.0112/05/03BJHChadinium by ICP (EPA 200.7)-EPA 200.7Not detectedmg/L0.0112/05/03BJHChadinium by ICP-200.7Not detectedmg/L0.0512/05/03<	Carbonate	310.1	1.62	mcq/L	0.01	11/12/03	LJG
Hardness as CaCO3-130.228mg/L111/21/03BJHResidual Sodium Carbonate (RSC)5.76meq/L0.0111/21/03BJHChloride by Autoanalyzer4500-Cl D111.0mg/L2.511/19/03CAWSulfate4500-SO4 E545mg/L1011/26/03JHFluoride by electrode4500-FC11.82mg/L0.0511/26/03BJHAntimony by ICPEPA 200.70.78mg/L0.0512/05/03BJHArsenic by ICP-200.853.1ug/L0.111/26/03MBLBirnuth by ICPEPA 200.70.07mg/L0.0512/05/03BJHArsenic by ICP-EPA 200.7Not detectedmg/L0.111/26/03MBLBirnuth by ICPNot detectedmg/L112/19/03BJHCadeium by ICP (EPA 200.7)-EPA 200.7Not detectedmg/L0.112/05/03BJHCadeium by ICP (EPA 200.7)-EPA 200.7Not detectedmg/L0.112/05/03BJHCadeium by ICP (EPA 200.7)-EPA 200.7Not detectedmg/L0.0112/05/03BJHCadeium by ICP (EPA 200.7)-EPA 200.7Not detectedmg/L0.0112/05/03BJHCadeium by ICP (EPA 200.7)-EPA 200.7Not detectedmg/L0.0112/05/03BJHCadeium by ICP (EPA 200.7)-EPA 200.7Not detectedmg/L0.0112/05/03BJHCoper by ICP (EPA 200.7)	Bicarbonate	310.1	4.69	mcq/L	0.01	11/12/03	LJG
Residual Sodium Carbonate (RSC)5.76 $meq/L$ 0.0111/21/03BJHChloride by Autoanalyzer4500-Cl_D111.0 $mg/L$ 2.511/19/03CAWSulfate4500-SO4_E545 $mg/L$ 1011/26/03JHFluoride by electrode4500-F_C11.82 $mg/L$ 0.0511/26/03BJHAluminum by ICP200.70.78 $mg/L$ 0.0512/05/03BJHAntimony by ICPEPA 200.70.07 $mg/L$ 0.0512/05/03BJHBarium200.853.1 $wg/L$ 0.111/26/03MBLBeryllium200.853.1 $wg/L$ 0.111/26/03MBLBismuth by ICPEPA 200.7Not detected $mg/L$ 0.211/26/03BJHCadenium by ICP (EPA 200.7)-EPA 200.7Not detected $mg/L$ 0.112/05/03BJHCadenium by ICP (EPA 200.7)-EPA 200.7Not detected $mg/L$ 0.112/05/03BJHCadenium by ICP (EPA 200.7)-EPA 200.7Not detected $mg/L$ 0.0112/05/03BJHChronium by ICP200.7Not detected $mg/L$ 0.0512/05/03BJH <td>Alkalinity (as CaCO3)</td> <td>2320B</td> <td>315.5</td> <td>mg/L</td> <td>0.1</td> <td>11/12/03</td> <td>IJG</td>	Alkalinity (as CaCO3)	2320B	315.5	mg/L	0.1	11/12/03	IJG
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Hardness as CaCO3-	130.2	28	mg/L	1	11/21/03	BJH
Chloride by Autoanalyzer         4500-Cl_D         111.0         mg/L         2.5         11/19/03         CAW           Sulfate         4500-SO4_E         545         mg/L         10         11/26/03         JH           Fluoride by electrode         4500-SO4_E         545         mg/L         0.05         11/26/03         JH           Aluminum by ICP         200.7         0.78         mg/L         0.05         12/05/03         BJH           Artimony by ICP         EPA 200.7         Not detected         mg/L         0.05         12/05/03         BJH           Arsenic by ICP-         EPA 200.7         0.07         mg/L         0.05         12/05/03         BJH           Barium         200.8         S3.1         ug/L         0.1         11/26/03         MBL           Bismuth by ICP         EPA 200.7         Not detected         mg/L         0.1         12/05/03         BJH           Cadeium by ICP         EPA 200.7         Not detected         mg/L         0.01         12/05/03         BJH           Cadeium by ICP (EPA 200.7)-         EPA 200.7         Not detected         mg/L         0.01         12/05/03         BJH           Cadeium by ICP (EPA 200.7)-         EPA 200.7         Not d	Residual Sodium Carbonate (RSC)		5.76	meq/L	0.01	11/21/03	BJH
Sulfate4500-SO4_E545 $mg/L$ 10 $11/26/03$ JHFluoride by electrode4500-FC11.82 $mg/L$ 0.05 $11/26/03$ DIGAluminum by ICP200.70.78 $mg/L$ 0.05 $12/05/03$ BJHAntimony by ICPEPA 200.70.07 $mg/L$ 0.05 $12/05/03$ BJHArsenic by ICP-BPA 200.70.07 $mg/L$ 0.05 $12/05/03$ BJHBarium200.853.1 $ug/L$ 0.1 $11/26/03$ MBLBeryllium200.8Not detected $ug/L$ 0.2 $11/26/03$ MBLCadmium by ICPNot detected $mg/L$ 0.1 $12/05/03$ BJHCadmium by ICP (EPA 200.7)-EPA 200.7Not detected $mg/L$ 0.1 $12/05/03$ BJHCadeium by ICP (EPA 200.7)-EPA 200.7Not detected $mg/L$ 0.01 $12/05/03$ BJHCadeium by ICP (EPA 200.7)-EPA 200.7Not detected $mg/L$ 0.01 $12/05/03$ BJHCobalt by ICP200.7Not detected $mg/L$ 0.01 $12/05/03$ BJHCoper by ICP (EPA 200.7)-EPA 200.7Not detected $mg/L$ 0.01 $12/05/03$ BJHIron by ICP-200.726.80 $mg/L$ 0.05 $12/05/03$ BJHLead by ICP (EPA 200.7)EPA 200.7Not detected $mg/L$ 0.05 $12/05/03$ BJHMagnesium by ICP-200.70.5 $mg/L$ 0.05 $12/05/03$ BJHMagne	Chloride by Autoanalyzer	4500-C1 D	111.0	•	2.5	11/19/03	CAW
Fluoride by electrode         4500-F_C         11.82         mg/L         0.05         11/26/03         DIG           Altminum by ICP         200.7         0.78         mg/L         0.05         12/05/03         BJH           Antimony by ICP         EPA 200.7         Not detected         mg/L         0.05         12/05/03         BJH           Arsenic by ICP-         EPA 200.7         0.07         mg/L         0.05         12/05/03         BJH           Barium         200.8         53.1         ug/L         0.1         11/26/03         MBL           Beryllium         200.8         Not detected         mg/L         0.2         11/26/03         MBL           Bismuth by ICP-         EPA 200.7         Not detected         mg/L         1         12/05/03         BJH           Cadmium by ICP (EPA 200.7)-         EPA 200.7         Not detected         mg/L         0.01         12/05/03         BJH           Cadeium by ICP (EPA 200.7)-         EPA 200.7         Not detected         mg/L         0.01         12/05/03         BJH           Cobalt by ICP (EPA 200.7)-         EPA 200.7         Not detected         mg/L         0.04         12/05/03         BJH           Coper by ICP (EPA 200.7)-         EPA		4500-SO4 E	545	•.	10	11/26/03	JH
Aluminum by ICP-         200.7         0.78         mg/L         0.05         12/05/03         BJH           Antimony by ICP         EPA 200.7         Not detected         mg/L         0.05         12/05/03         BJH           Arsenic by ICP-         EPA 200.7         0.07         mg/L         0.05         12/05/03         BJH           Barium         200.8         53.1         ug/L         0.1         11/26/03         MBL           Beryllium         200.8         Not detected         mg/L         0.2         11/26/03         MBL           Bismuth by ICP-         Not detected         mg/L         0.1         12/05/03         BJH           Cadmium by ICP (EPA 200.7)-         EPA 200.7         Not detected         mg/L         0.01         12/05/03         BJH           Catcium by ICP (EPA 200.7)-         EPA 200.7         Not detected         mg/L         0.01         12/05/03         BJH           Chronium by ICP (EPA 200.7)-         EPA 200.7         Not detected         mg/L         0.01         12/05/03         BJH           Cobalt by ICP (EPA 200.7)-         EPA 200.7         Not detected         mg/L         0.05         12/05/03         BJH           Iron by ICP (EPA 200.7)-         EPA 200.7 <td>Fluoride by electrode</td> <td>4500-F C</td> <td>11.82</td> <td></td> <td>0.05</td> <td></td> <td>DIG</td>	Fluoride by electrode	4500-F C	11.82		0.05		DIG
Antimony by ICP         EPA 200.7         Not detected         mg/L         0.05         12/05/03         BJH           Arsenic by ICP-         EPA 200.7         0.07         mg/L         0.05         12/05/03         BJH           Barium         200.8         53.1         ug/L         0.1         11/26/03         MBL           Beryllium         200.8         Not detected         mg/L         0.2         11/26/03         MBL           Bismuth by ICP         Not detected         mg/L         0.01         12/05/03         BJH           Cadmium by ICP (EPA 200.7)-         EPA 200.7         Not detected         mg/L         0.01         12/05/03         BJH           Calcium by ICP (EPA 200.7)-         EPA 200.7         Not detected         mg/L         0.01         12/05/03         BJH           Chromium by ICP (EPA 200.7)-         EPA 200.7         Not detected         mg/L         0.01         12/05/03         BJH           Cobalt by ICP (EPA 200.7)-         EPA 200.7         Not detected         mg/L         0.04         12/05/03         BJH           Iron by ICP (EPA 200.7)-         EPA 200.7         Not detected         mg/L         0.05         12/05/03         BJH           Magnesium by ICP.	Aluminum by ICP-	200.7	0.78		0.05	12/05/03	BJH
Barium200.8 $53.1$ $ug/L$ $0.1$ $11/26/03$ MBLBeryllium200.8Not detected $ug/L$ $0.2$ $11/26/03$ MBLBismuth by ICP.Not detected $mg/L$ $1$ $12/19/03$ BJHCadmium by ICP (EPA 200.7)EPA 200.7Not detected $mg/L$ $0.01$ $12/05/03$ BJHCalcium by ICP (EPA 200.7)EPA 200.7Not detected $mg/L$ $0.01$ $12/05/03$ BJHChromium by ICP (EPA 200.7)EPA 200.7Not detected $mg/L$ $0.01$ $12/05/03$ BJHCobat by ICP (EPA 200.7)EPA 200.7Not detected $mg/L$ $0.01$ $12/05/03$ BJHCoper by ICP (EPA 200.7)EPA 200.7Not detected $mg/L$ $0.01$ $12/05/03$ BJHIron by ICP200.7Not detected $mg/L$ $0.01$ $12/05/03$ BJHIron by ICP200.7Not detected $mg/L$ $0.05$ $12/05/03$ BJHMagnesium by ICP200.70.5 $mg/L$ $0.1$ $12/05/03$ BJHManganese by ICP-200.7 $0.474$ $mg/L$ $0.05$ $12/05/03$ BJHMolybdenum by ICP-MS200.8 $3.2$ $ug/L$ $1$ $11/26/03$ MBLMolybdenum by ICPEPA 200.7 $0.01$ $mg/L$ $0.01$ $12/05/03$ BJHSelenium by ICP200.8 $71.1$ $ug/L$ $0.05$ $12/05/03$ BJHSelenium by ICPEPA 200.7 $0.01$ $mg/L$ $0.05$ $12/05$	Antimony by ICP	EPA 200.7	Not detected		0.05	12/05/03	BJH
Beryllium         200.8         Not detected         ug/L         0.2         11/26/03         MBL           Bismuth by ICP.         Not detected         mg/L         1         12/19/03         BJH           Cadmium by ICP (EPA 200.7)-         EPA 200.7         Not detected         mg/L         0.01         12/05/03         BJH           Calcium by ICP (EPA 200.7)-         EPA 200.7         Not detected         mg/L         0.1         12/05/03         BJH           Calcium by ICP (EPA 200.7)-         EPA 200.7         Not detected         mg/L         0.1         12/05/03         BJH           Chromium by ICP (EPA 200.7)-         EPA 200.7         Not detected         mg/L         0.01         12/05/03         BJH           Cobalt by ICP-         200.7         Not detected         mg/L         0.01         12/05/03         BJH           Copper by ICP (EPA 200.7)-         EPA 200.7         Not detected         mg/L         0.04         12/05/03         BJH           Iron by ICP-         200.7         Not detected         mg/L         0.05         12/05/03         BJH           Magnesium by ICP-         200.7         0.5         mg/L         0.1         12/05/03         BJH           Magneseium by ICP-	Arsenic by ICP-	EPA 200.7	0.07	mg/L	0.05	12/05/03	BJH
Bismuth by ICP.Not detected $mg/L$ 1 $12/19/03$ BJHCadmium by ICP (EPA 200.7)-EPA 200.7Not detected $mg/L$ 0.01 $12/05/03$ BJHCalcium by ICP.200.710.9 $mg/L$ 0.1 $12/05/03$ BJHChromium by ICP (EPA 200.7)-EPA 200.7Not detected $mg/L$ 0.01 $12/05/03$ BJHChromium by ICP (EPA 200.7)-EPA 200.7Not detected $mg/L$ 0.01 $12/05/03$ BJHCobalt by ICP.200.7Not detected $mg/L$ 0.01 $12/05/03$ BJHCopper by ICP (EPA 200.7)-EPA 200.7Not detected $mg/L$ 0.04 $12/05/03$ BJHIron by ICP.200.726.80 $mg/L$ 0.05 $12/05/03$ BJHLead by ICP (EPA 200.7)EPA 200.7Not detected $mg/L$ 0.05 $12/05/03$ BJHMagnessium by ICP.200.70.5 $mg/L$ 0.1 $12/05/03$ BJHMagnesse by ICP.200.70.474 $mg/L$ 0.05 $12/05/03$ BJHMolybdenum by ICP-MS200.83.2 $ug/L$ 0.2 $11/26/03$ MBLMolybdenum by ICP (EPA 200.7)EPA 200.70.01 $mg/L$ 0.05 $12/05/03$ BJHSelenium by ICP (EPA 200.7)EPA 200.70.01 $mg/L$ 0.2 $11/26/03$ MBLMolybdenum by ICP-MS200.871.1 $ug/L$ 1 $11/26/03$ MBLSilver by ICPEPA 200.7Not detected $mg/L$ 0.05 $1$	Barium	200.8	53.1	ug/L	0.1	11/26/03	MBL
Cadmium by ICP (EPA 200.7)-         EPA 200.7         Not detected         mg/L         0.01         12/05/03         BJH           Calcium by ICP         200.7         10.9         mg/L         0.1         12/05/03         BJH           Chromium by ICP (EPA 200.7)-         EPA 200.7         Not detected         mg/L         0.01         12/05/03         BJH           Chromium by ICP (EPA 200.7)-         EPA 200.7         Not detected         mg/L         0.01         12/05/03         BJH           Cobalt by ICP-         200.7         Not detected         mg/L         0.01         12/05/03         BJH           Copper by ICP (EPA 200.7)-         EPA 200.7         Not detected         mg/L         0.04         12/05/03         BJH           Iron by ICP-         200.7         Not detected         mg/L         0.05         12/05/03         BJH           Lead by ICP (EPA 200.7)         EPA 200.7         Not detected         mg/L         0.05         12/05/03         BJH           Magnessium by ICP-         200.7         0.5         mg/L         0.1         12/05/03         BJH           Magnessium by ICP-         200.7         0.47         mg/L         0.05         12/05/03         BJH           Molybdenum b	Beryllium	200.8	Not detected	ug/L	0.2	11/26/03	MBL
Calcium by ICP-       200.7       10.9       mg/L       0.1       12/05/03       BJH         Chromium by ICP (EPA 200.7)-       EPA 200.7       Not detected       mg/L       0.01       12/05/03       BJH         Cobalt by ICP-       200.7       Not detected       mg/L       0.01       12/05/03       BJH         Cobalt by ICP-       200.7       Not detected       mg/L       0.01       12/05/03       BJH         Copper by ICP (EPA 200.7)-       EPA 200.7       Not detected       mg/L       0.04       12/05/03       BJH         Iron by ICP-       200.7       26.80       mg/L       0.05       12/05/03       BJH         Lead by ICP (EPA 200.7)       EPA 200.7       Not detected       mg/L       0.05       12/05/03       BJH         Magnessium by ICP-       200.7       0.5       mg/L       0.1       12/05/03       BJH         Magnesse by ICP-       200.7       0.5       mg/L       0.05       12/05/03       BJH         Manganese by ICP-       200.7       0.474       mg/L       0.05       12/05/03       BJH         Molybdenum by ICP-MS       200.8       71.1       ug/L       1       11/26/03       MBL         Molybdenum by IC	Bismuth by ICP-		Not detected	mg/L	1	12/19/03	BJH
Calcium by ICP-       200.7       10.9       mg/L       0.1       12/05/03       BJH         Chromium by ICP (EPA 200.7)-       EPA 200.7       Not detected       mg/L       0.01       12/05/03       BJH         Cobalt by ICP-       200.7       Not detected       mg/L       0.01       12/05/03       BJH         Cobalt by ICP       200.7       Not detected       mg/L       0.01       12/05/03       BJH         Copper by ICP (EPA 200.7)-       EPA 200.7       Not detected       mg/L       0.04       12/05/03       BJH         Iron by ICP-       200.7       26.80       mg/L       0.05       12/05/03       BJH         Lead by ICP (EPA 200.7)       EPA 200.7       Not detected       mg/L       0.05       12/05/03       BJH         Magnessium by ICP-       200.7       0.5       mg/L       0.1       12/05/03       BJH         Magnesse by ICP-       200.7       0.5       mg/L       0.05       12/05/03       BJH         Magnesse by ICP-       200.7       0.474       mg/L       0.005       12/05/03       BJH         Molybdenum by ICP-MS       200.8       3.2       ug/L       0.2       11/26/03       MBL         Molybdenum by IC	Cadmium by ICP (EPA 200.7)-	EPA 200.7	Not detected	mg/L	0.01	12/05/03	BJH
Chromium by ICP (EPA 200.7)-       EPA 200.7       Not detected       mg/L       0.01       12/05/03       BJH         Cobalt by ICP-       200.7       Not detected       mg/L       0.01       12/05/03       BJH         Copper by ICP (EPA 200.7)-       EPA 200.7       Not detected       mg/L       0.04       12/05/03       BJH         Iron by ICP-       200.7       Not detected       mg/L       0.04       12/05/03       BJH         Lead by ICP (EPA 200.7)-       EPA 200.7       Not detected       mg/L       0.05       12/05/03       BJH         Magnessium by ICP-       200.7       0.5       mg/L       0.1       12/05/03       BJH         Manganese by ICP-       200.7       0.5       mg/L       0.1       12/05/03       BJH         Manganese by ICP-       200.7       0.474       mg/L       0.05       12/05/03       BJH         Molybdenum by ICP-MS       200.8       3.2       ug/L       0.2       11/26/03       MBL         Nickel by ICP (EPA 200.7)       EPA 200.7       0.01       mg/L       0.01       12/05/03       BJH         Selenium by ICP MS       200.8       71.1       ug/L       1       11/26/03       MBL <td< td=""><td>Calcium by ICP-</td><td>200.7</td><td>10.9</td><td></td><td>0.1</td><td>12/05/03</td><td>BJH</td></td<>	Calcium by ICP-	200.7	10.9		0.1	12/05/03	BJH
Cobalt by ICP-         200.7         Not detected         mg/L         0.01         12/05/03         BJH           Copper by ICP (EPA 200.7)-         EPA 200.7         Not detected         mg/L         0.04         12/05/03         BJH           Iron by ICP.         200.7         26.80         mg/L         0.05         12/05/03         BJH           Lead by ICP (EPA 200.7)         EPA 200.7         Not detected         mg/L         0.05         12/05/03         BJH           Magnesium by ICP-         200.7         0.5         mg/L         0.1         12/05/03         BJH           Manganese by ICP.         200.7         0.5         mg/L         0.1         12/05/03         BJH           Manganese by ICP-         200.7         0.5         mg/L         0.1         12/05/03         BJH           Manganese by ICP-         200.7         0.474         mg/L         0.05         12/05/03         BJH           Molybdenum by ICP-MS         200.8         3.2         ug/L         1         11/26/03         MBL           Nickel by ICP (EPA 200.7)         BPA 200.7         0.01         mg/L         0.01         12/05/03         BJH           Selenium by ICP         EPA 200.7         Not detected	Chromium by ICP (EPA 200.7)-	EPA 200.7	Not detected		0.01	12/05/03	BJH
Copper by ICP (EPA 200.7)         EPA 200.7         Not detected         mg/L         0.04         12/05/03         BJH           Iron by ICP         200.7         26.80         mg/L         0.05         12/05/03         BJH           Lead by ICP (EPA 200.7)         EPA 200.7         Not detected         mg/L         0.05         12/05/03         BJH           Magnesium by ICP-         200.7         0.5         mg/L         0.1         12/05/03         BJH           Manganese by ICP-         200.7         0.5         mg/L         0.1         12/05/03         BJH           Manganese by ICP-         200.7         0.474         mg/L         0.005         12/05/03         BJH           Mercury         200.8         3.2         ug/L         0.2         11/26/03         MBL           Molybdenum by ICP-MS         200.8         71.1         ug/L         1         11/26/03         MBL           Nickel by ICP (EPA 200.7)         EPA 200.7         0.01         mg/L         0.01         12/05/03         BJH           Selenium by ICP         EPA 200.7         Not detected         mg/L         0.05         12/05/03         BJH           Silver by ICP         200.7         Not detected <t< td=""><td>Cobalt by ICP-</td><td>200.7</td><td>Not detected</td><td>mg/L</td><td>0.01</td><td>12/05/03</td><td>BJH</td></t<>	Cobalt by ICP-	200.7	Not detected	mg/L	0.01	12/05/03	BJH
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Magnesium by ICP-         200.7         0.5         mg/L         0.1         12/05/03         BJH           Manganese by ICP-         200.7         0.474         mg/L         0.005         12/05/03         BJH           Mercury         200.8         3.2         ug/L         0.2         11/26/03         MBL           Molybdenum by ICP-MS         200.8         71.1         ug/L         1         11/26/03         MBL           Nickel by ICP (EPA 200.7)         BPA 200.7         0.01         mg/L         0.01         12/05/03         BJH           Selenium by ICP         BPA 200.7         0.01         mg/L         0.01         12/05/03         BJH           Silver by ICP         200.7         Not detected         mg/L         0.05         12/05/03         BJH           Sodium by ICP-         200.7         Not detected         mg/L         0.05         12/05/03         BJH           Sodium by ICP-         200.7         473.6         mg/L         0.1         12/05/03         BJH           Thallium by ICP         200.7         Not detected         mg/L         0.1         12/05/03         BJH	,	EPA 200.7	Not detected		0.05	12/05/03	BJH
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Molybdenum by ICP-MS         200.8         71.1         ug/L         1         11/26/03         MBL           Nickel by ICP (EPA 200.7)         BPA 200.7         0.01         mg/L         0.01         12/05/03         BJH           Selenium by ICP         BPA 200.7         Not detected         mg/L         0.05         12/05/03         BJH           Silver by ICP-         200.7         Not detected         mg/L         0.02         12/05/03         BJH           Sodium by ICP-         200.7         473.6         mg/L         0.1         12/05/03         BJH           Thatlium by ICP         200.7         Not detected         mg/L         0.02         12/05/03         BJH	÷ •		3.2				MBL
Nickel by ICP (EPA 200.7)         EPA 200.7         0.01         mg/L         0.01         12/05/03         BJH           Selenium by ICP         EPA 200.7         Not detected         mg/L         0.05         12/05/03         BJH           Silver by ICP-         200.7         Not detected         mg/L         0.02         12/05/03         BJH           Sodium by ICP-         200.7         Not detected         mg/L         0.02         12/05/03         BJH           Sodium by ICP-         200.7         473.6         mg/L         0.1         12/05/03         BJH           Thallium by ICP         200.7         Not detected         mg/L         0.1         12/05/03         BJH	,						
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Silver by ICP-         200.7         Not detected         mg/L         0.02         12/05/03         BJH           Sodium by ICP-         200.7         473.6         mg/L         0.1         12/05/03         BJH           Thatlium by ICP         200.7         Not detected         mg/L         0.1         12/05/03         BJH							
Sodium by ICP-         200.7         473.6         mg/L         0.1         12/05/03         BJH           Thatlium by ICP         200.7         Not detected         mg/L         0.05         12/05/03         BJH	,			· ·			
Thatlium by ICP 200.7 Not detected mg/L 0.05 12/05/03 BJH	•			<b>~</b> ,		-	
	,						
	Uranium by ICP-MS	200.8	1.77	ug/L	0.05	11/26/03	MBL

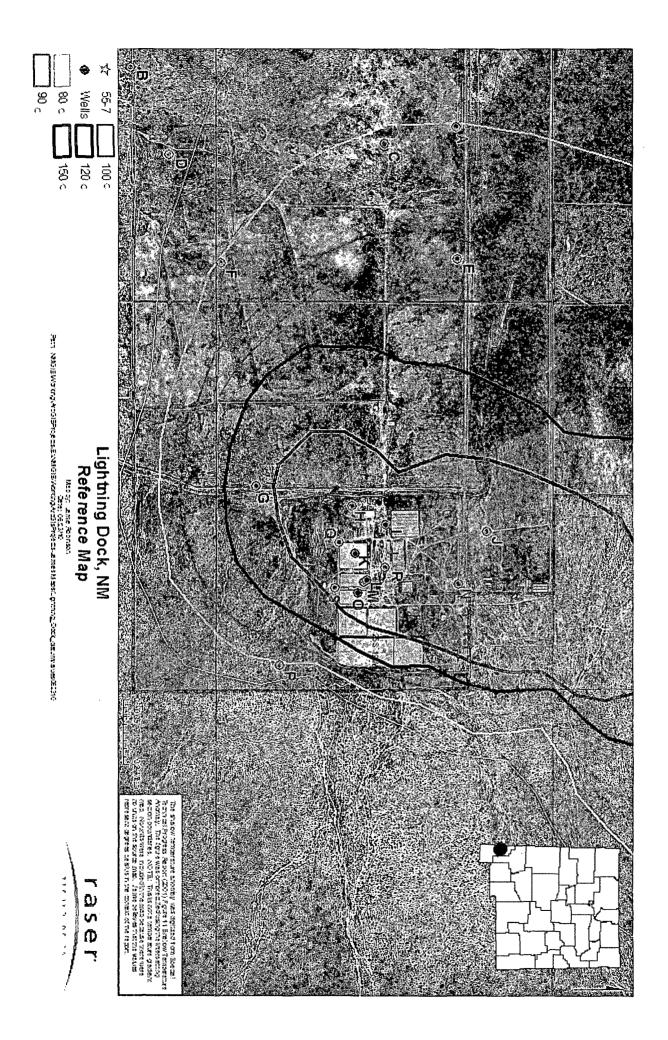
## Page 2 of 2 Report #0312221246

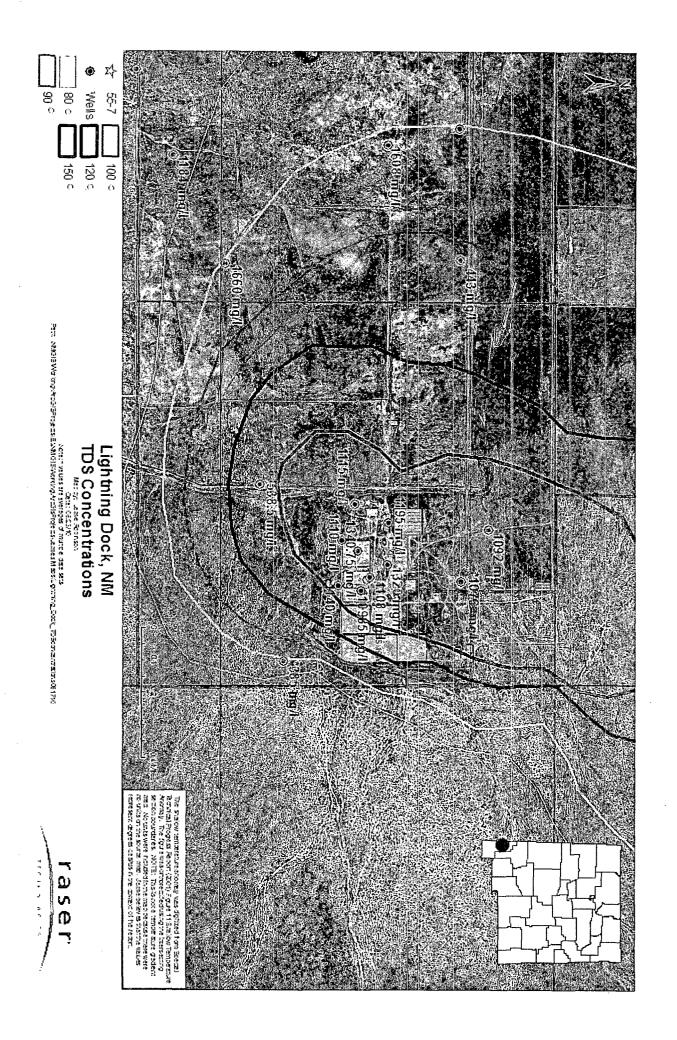
Sample I.D. AB53998						
Sample Description:	Animas NM W	ell TG 52-7 DST				
Sample collection date:	11/05/03	Sample	e collection	time: 15	:00	
Submittal date:	11/07/03	Submit	tal time:	15	:18	
WSS# R	equest ID No.		Collec	tor: ROY	CUNNIFF	
Sample Purpose:	Sampling Information:					
Element	Method	Result	Units	MDL	Date of	Analyst
					Analysis	
Vanadium by ICP	200.7	Not detected	mg/L	0.05	12/05/03	BJH
Zinc by ICP-	200.7	0.30	mg/L	0.01	12/05/03	ВЈН
Boron by ICP-	200.7	10.10	mg/L	0.01	12/05/03	ВЈН

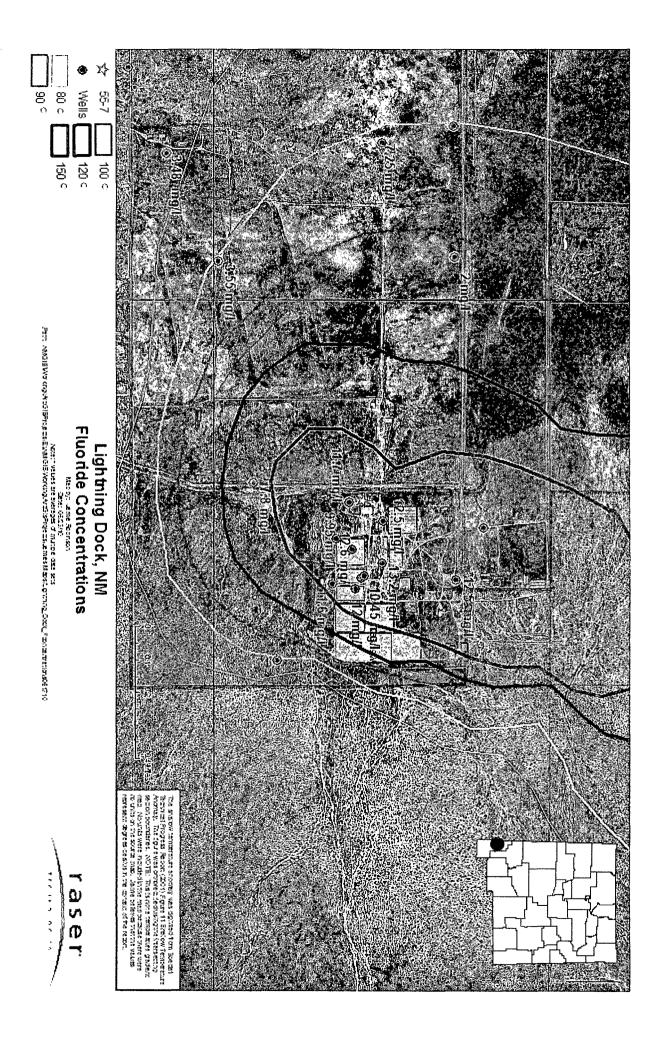
Results relate only to the items tested. This report shall not be reproduced except in full, without the written approval of the laboratory. This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this report have been determined in accordance with the laboratory's terms of accreditation unless stated otherwise in the report. Those tests not presently accredited are noted by a hyphen.

Please advise should you have questions concerning these data.

Respectfully submitted, Manager Laborator (505)646-4422







# **Fluoride Fact Sheet**

David C. Kennedy, D.D.S.

FACT #1 Fluoride is more toxic than lead, and just like lead, even in minute doses, accumulates in and is damaging to brain/mind development of children, i.e. produces abnormal behavior in animals and reduces IQ in humans.

FACT #2 Fluoridation is cancer-causing, cancer-promoting, and is linked to increased cancer rates in rats, mice, and humans . Dr. William Marcus, Senior Science Advisor at the Office of Drinking Water, stated unequivocally in his May Day Memo that fluoride is a carcinogen. Full text of the memo available 800-728-3833

FACT #3 Numerous studies, including four published in the Journal of the American Medical Association since 1990, have found that hip fracture rates are substantially higher in people residing in fluoridated communities.

FACT #4 Dental fluorosis, the first visible sign of fluoride poisoning, affects from 8% to 51% of the children drinking fluoridated water and has substantially increased over the last 40 years. Dental fluorosis is more than cosmetic damage with psychological harm. It is also indicative of neurological impairment (See ref. C 3 Dr. Li)

FACT #5 All of the recent large-scale studies on fluoridation and tooth decay show that fluoridation does not reduce tooth decay. Studies from New Zealand, Canada, Europe, and the US have confirmed no difference in decay rates for permanent teeth of residents of fluoridated vs. non-fluoridated communities.

FACT #6 Fluoride drops and tablets are not approved by the U.S. Food and Drug Administration as safe or effective . Ingested fluoride has no detectable effect on decay rates. Fluoride tablets and drops have been shown to be ineffective in reducing tooth decay and to cause skin eruptions, gastric distress, headache, and weakness - which disappear when fluoride use is discontinued - as well as dental fluorosis, a permanent disfigurement.

FACT #7 Fluoride causes iodine deficiency which can result in hypothyroidism and frequently in hyperthyroidism. Fluorides were prescribed to patients suffering from hyperthyroidism as anti-thyroid medication prior to 1950. Fluoride exposure may exacerbate iodine deficiency. During pregnancy, when iodine requirements are at their peak, the fetus is especially vulnerable.

Even a slightly underfunctioning thyroid gland can result in loss of IQ in the newborn.

The following warning is required an all fluoridated toothpaste by the FDA since April of 1997 due to the large number of calls to the Poison Control Centers for children who became acutely ill from ingested fluoride. There is approximately 1 milligram of fluoride in a pea sized drop of toothpaste.

"WARNING: Keep out of reach of children under 6 years of age. In case of accidental overdose, seek professional assistance or contact a poison control center immediately."

From:	Chavez, Carl J, EMNRD
Sent:	Friday, June 25, 2010 9:52 AM
То:	'Jamie Robinson'
Cc:	Ben Barker
Subject:	RE: Radium Samples

OCD will accept based on the one sample submittal. Generally the QA/QC will document the sample collection, date and time, analysis date and time with Laboratory Method and the information submitted in the letter in a laboratory table.

I have confirmed that this laboratory is indeed legitimate and the information is satisfactory or approved for OCD's needs.

Thank you.

Please be advised that NMOCD approval of this plan does not relieve the operator of responsibility should their operations pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 E-mail: <u>CarlJ.Chavez@state.nm.us</u> Website: <u>http://www.emnrd.state.nm.us/ocd/</u>index.htm (Pollution Prevention Guidance is under "Publications")

From: Jamie Robinson [mailto:Jamie.Robinson@rasertech.com] Sent: Friday, June 25, 2010 9:04 AM To: Chavez, Carl J, EMNRD Cc: Ben Barker Subject: FW: Radium Samples

Carl, Here is what the lab sent to me for the QA/QC. Will it work? Thanks, Jamie

Jamie Robinson Geologist Raser Technologies, Inc. 5152 N. Edgewood Drive, Provo UT. 84604 Office: 801.765.1200 Cell: 801.717.5563

From: Robert.Rosson@gtri.gatech.edu [mailto:Robert.Rosson@gtri.gatech.edu] Sent: Friday, June 25, 2010 8:45 AM To: Jamie Robinson Subject: RE: Radium Samples See if this is what you need

From: Jamie Robinson [mailto:Jamie.Robinson@rasertech.com]
Sent: Thursday, June 24, 2010 6:19 PM
To: Rosson, Robert
Subject: FW: Radium Samples

Robert, Looks like I need the QA/QC for our regulators. Can I get that from you? Thanks, Jamie

-----Original Message-----From: Chavez, Carl J, EMNRD [<u>mailto:CarlJ.Chavez@state.nm.us</u>] Sent: Thu 6/24/2010 4:15 PM To: Jamie Robinson; Ben Barker; mike\_smith@blm.gov; Dade, Randy, EMNRD Subject: RE: Radium Samples

Jamie:

Please have the lab submit the QA/QC Report to support the letter to me for verification purposes. Thank you.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Dept.

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490

Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/index.htm

(Pollution Prevention Guidance is under "Publications")

From: Jamie Robinson [<u>mailto:Jamie.Robinson@rasertech.com</u>] Sent: Thursday, June 24, 2010 12:53 PM To: Ben Barker; <u>mike\_smith@blm.gov</u>; Chavez, Carl J, EMNRD Subject: FW: Radium Samples

Gentlemen,

We received the results back from our Radium test, so I'm forwarding the results on to you. If you have any questions, please feel free to contact me.

Jamie

-----Original Message-----From: Robert.Rosson@gtri.gatech.edu [mailto:Robert.Rosson@gtri.gatech.edu] Sent: Thu 6/24/2010 11:56 AM To: Jamie Robinson Subject: RE: Radium Samples

Jamie attached is a letter with your results if you need anything else please feel free to call or contact me. 404 407-6339

From: Jamie Robinson [<u>mailto:Jamie.Robinson@rasertech.com</u>] Sent: Wednesday, June 23, 2010 1:49 PM To: Rosson, Robert Subject: Radium Samples

Hi Robert, Does it look like you will have results to us today on the Radium analysis? Thanks,

Jamie

Jamie Robinson Geologist Raser Technologies, Inc. 5152 N. Edgewood Drive, Provo UT. 84604 Office: 801.765.1200 Cell: 801.717.5563

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June 23, 2010

Jamie Robinson Geologist Raser Technologies, Inc. 5152 N. Edgewood Drive Provo, Utah 84604

Dear Ms. Robinson:

The water sample you submitted on June 14, 2010 for measurement of Ra-226 and Ra-228 concentration was found to have the following radionuclide concentrations:

Sample S9574	Ra-226 Ra-228	< 1 picocurie/liter < 1 picocurie/liter
Reagent blank Ra-226 < .4222 pCi/l Ra-228 < .7513		
	( . I.	

Ra-226 14.7  $\pm$  1.5 pCi/l (expected 14.6 101%) Ra-228 13.9  $\pm$  1.9 pCi/l (expected 13.6 102%)

Matrix spike Ra-226 12.6 ± 1.3 pCi/l (86%) Ra-228 11.9 ± 1.8 pCi/l (88%)

Matrix spike duplicate Ra-226 13.9  $\pm$  1.4 pCi/l (95%) Ra-228 15.6  $\pm$  2.1 pCi/l (115%)

The Radium concentration was measured by Gamma-ray spectroscopy

Please let me know if we can be of further service.

Sincerely yours,

Robert Rosson

**Environmental Radiation Center** 

Electro-Optical Systems Laboratory Georgia Tech Research Institute Georgia Institute of Technology Atlanta, Georgia 30332 U.S.A. PHONE 404•407•6776 • FAX 404•407•6828

# Electro-Optical Systems Laboratory (EOSL)

EOSL conducts research in broad areas in electro-optical systems, including:

- Remote Sensing
- Modeling and analysis
- Integrated sensing systems
- Optical device technology
- LIDAR system design and measurement
- Microelectronics
- Nanotechnology
- Solid state lighting
- Performance support systems
- Sensor data collection
- Analysis

Technology areas of pre-eminence include:

- LIDAR systems development
- Multispectral imaging
- EO countermeasures technology and analysis
- Wide band-gap semiconductors
- Advanced packaging for transmit/receive modules used in active phased array radars.

The lab performs applied research in the growth and application of carbon nanotubes, multifunctional materials, RFID and optical tagging, chem-bio sensors, and has the leading Medical Device Test Center, which examines the interactions between medical devices and security and logistical systems.

EOSL has the following specially configured research centers:

- Sensors and Sensing Systems Information and Analysis Center (SENSIAC), serving the military sensor community as a repository of information
- LandMARC Research Center, formed to provide solutions for mobile, wireless and performance based tasks
- Environmental Radiation Center performing radiation monitoring
- Environmental Health and Occupational Safety Center for compliance oversight for environmental emergency response, and occupational safety and health issues
- Phosphor Technology Center of Excellence
- The Center for Optimization of Simulated Multiple Objective Systems

Visit EOSL's lab-maintained web page for more information.



CONTACT INFORMATION

**Gisele Bennett** Laboratory Director 404-407-6100

From: Sent: To: Cc: Subject: Jamie Robinson [Jamie.Robinson@rasertech.com] Thursday, June 24, 2010 4:20 PM Chavez, Carl J, EMNRD Ben Barker RE: Radium Samples

Carl,

I've submitted that request to the lab, and will get it to you as soon as I can. Thanks, Jamie

-----Original Message-----

From: Chavez, Carl J, EMNRD [<u>mailto:CarlJ.Chavez@state.nm.us</u>] Sent: Thu 6/24/2010 4:15 PM To: Jamie Robinson; Ben Barker; mike\_smith@blm.gov; Dade, Randy, EMNRD Subject: RE: Radium Samples

Jamie:

Please have the lab submit the QA/QC Report to support the letter to me for verification purposes. Thank you.

Carl J. Chavez, CHMM

New Mexico Energy, Minerals & Natural Resources Dept.

Oil Conservation Division, Environmental Bureau

1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490

Fax: (505) 476-3462

E-mail: CarlJ.Chavez@state.nm.us

Website: http://www.emnrd.state.nm.us/ocd/index.htm

(Pollution Prevention Guidance is under "Publications")

From: Jamie Robinson [<u>mailto:Jamie.Robinson@rasertech.com</u>] Sent: Thursday, June 24, 2010 12:53 PM To: Ben Barker; <u>mike\_smith@blm.gov</u>; Chavez, Carl J, EMNRD Subject: FW: Radium Samples

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Jamie

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Jamie

Jamie Robinson Geologist Raser Technologies, Inc. 5152 N. Edgewood Drive, Provo UT. 84604 Office: 801.765.1200 Cell: 801.717.5563

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June 23, 2010

Jamie Robinson Geologist Raser Technologies, Inc. 5152 N. Edgewood Drive Provo, Utah 84604

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Sample S9574	Ra-226	< 1 picocurie/liter
	Ra-228	< 1 picocurie/liter

The Radium concentration was measured by Gamma-ray spectroscopy

Please let me know if we can be of further service.

Sincerely yours,

Robert Rosson

Environmental Radiation Center Electro-Optical Systems Laboratory Georgia Tech Research Institute Georgia Institute of Technology Atlanta, Georgia 30332 U.S.A. PHONE 404•407•6776 • FAX 404•407•6828

A Unit of the University System of Georgia

From: Sent: To: Subject: Ben Barker [Ben.Barker@rasertech.com] Tuesday, June 22, 2010 11:16 PM Chavez, Carl J, EMNRD; Mike\_Smith@blm.gov conference call

Gentlemen,

Thank you for the invitation to discuss progress on 55-7. I haven't figured out how to originate a conference call from my office phone, but Raser has a toll-free conference system. May I respectfully ask you to use the following numbers? I'll open the conference host line at 0830.

1-888-296-6500 guest code 584297#

Here are a few items to get started.

I expected to send you both maps and tables of the background fluoride and TDS data yesterday but I discovered problems with our GIS-generated maps that are beyond me to cure. They will be fixed tomorrow by brighter folks than I.

In the meantime, we have been changing out equipment at the well site so as to get better water samples and do eventual pump installation more efficiently. The rig limitations Raser encountered while conducting small-scale production for fluid sampling are not readily cured and the drilling contractor has another contract to fulfill soon, so I released the rig. Raser is bringing in one that is better suited to continuing the plan laid out in the approved G-103. We also brought in 2 additional tanks, a move made possible by switching to a rig with a smaller footprint. We now have 2500 bbl of storage in metal tanks at the well. The original rig completed moving off the well site today and its replacement will arrive later this week.

We stored all the cuttings on plastic for drying and later disposal. We have produced no water, hot or cold, directly to the pit. We decanted the cold water from the rig tanks after several days' settling and ran it slowly into the pit so as to avoid creating any pond. I understand the pit is dry. The rig crews shoveled the settled solids into a loader and added them to the cuttings.

We anticipate being able to flow the well longer and collect better water samples by June 28. The new analytical results should be reported by the end of June 30.

The Radium test results are now 2 days past due and we are following up with the lab in Georgia. The backup test report is due about July 1 from Texas.

Thanks, Ben

VP Resource Management Raser Technologies 5152 N. Edgewood Drive Provo, UT 84604 801-765-1200 office 801-850-5904 direct 707-508-9963 mobile

From:	Jamie Robinson [Jamie.Robinson@rasertech.com]
Sent:	Monday, June 21, 2010 11:16 AM
То:	Ben Barker; auldandy@hotmail.com; Phillips, Haddy L., OSE; Jackson, Charles L., OSE; mike_smith@blm.gov; Chavez, Carl J, EMNRD
Cc:	Layne Ashton; Michael Hayter; rbageo@sbcglobal.net; Nick Goodman; delfortner@charter.net
Subject:	6/21 Drilling and COA's update for Lightning Dock 55-7

Good morning everyone,

Just an update on how operations are going at Lightning Dock, and COA's...

The rig we are currently using at Lightning Dock has been discharged for another job, and we are moving forward to prepare for our pump test.

#### **COA** milestones

**BLM #10** (*water quality analysis*): Water quality analysis were received and approved by OCD on June 17<sup>th</sup>, 2010. **BLM #12** (*pit construction*): The pit has been constructed in a manner consistent to the BLM Gold Book standards. Jay Peterson will be constructing the fence.

**BLM #13** (*biology survey*): The biology survey has been completed. Layne will be sending Mike Smith a copy of the report.

**OCD #3** (*water quality analysis*): Carl Chavez received and approved the analysis results from 55-7 on June 17<sup>th</sup>, 2010. All standards were met except fluoride, TDS and Radium. Background values for Fluoride and TDS are high, and are comparable to our most recent results. Radium results are pending, and should be received Tuesday or Wednesday of this week. We believe that they will be well within the standard limits.

#### COA's coming up

**BLM #12** (*construction of pit*): The pit has been constructed in a manner consistent to the BLM Gold Book standards. Jay Peterson will be constructing the fence.

**BLM #14** (*safety grating or bird balls*): We are currently working with our purchasing agent to identify the most cost efficient safety grating option.

**BLM #15** (*2ft freeboard in pit*): The pond will be monitored to assure that 2ft freeboard COA standard will be met and observed during pump test operations.

**OSE #4** (totalizing meter): Layne is working to identify acceptable totalizing meters.

OSE #6 (inspection prior to diversion of water): I will send a separate email to Haddy and Tink on this COA.

Please feel free to contact me with any questions or concerns you might have,

Jamie

Jamie Robinson Geologist Raser Technologies, Inc. 5152 N. Edgewood Drive, Provo UT. 84604 Office: 801.765.1200 Cell: 801.717.5563

From: Sent:	Chavez, Carl J, EMNRD Thursday, June 17, 2010 2:26 PM
To:	'Ben Barker'
Cc:	Nick Goodman; Jamie Robinson; Michael Hayter; Dade, Randy, EMNRD; VonGonten, Glenn, EMNRD
Subject:	RE: Lightning Dock Request Permission to Discharge into the TFD 55-7 Unlined Pit

Mr. Barker:

The Oil Conservation Division (OCD) is in receipt of your e-mail and attached letter dated June 17, 2010 with water quality information requesting permission to discharge into the TFD 55-7 Unlined Pit based on the water quality sample collected from the TFD 55-7 borehole. The OCD is aware of the difficulty in obtaining a representative sample from the borehole after discovering the borehole was filled (Mudstone?) between plugs during well workover operations.

After a review of the borehole water quality data results and historical water quality information provided in your submittal, and after conducting a review of the project area, the OCD is aware of the USGS "Basin and Range" maps that indicate granitic and volcanic rocks in basins filled with alluvium may contain moderate to high radioactivity. In a USGS Radioactivity Map of SW New Mexico in the vicinity of the project area in question, the area is designated as "moderate." The data provided indicates that radioactivity is not a problem.

Obtaining a clean representative sample from the borehole was difficult. Based on the analytical laborartory data results, the OCD notes the following:

- 1) The well Fluoride level appears to be significantly above the WQCC Standard of 1.6 mg/L. From the historical data provided, the majority of samples were within the standard with only a couple that exceeded. The OCD is aware that this may be explained by an anomalous upwelling geothermal "hydrogeologic window" in the project area.
- 2) The total dissolved solid (TDS) is marginally elevated above the WQCC Standard of 1000 mg/L and may be elevated due to the method of sample procurement from a geothermal well.
- 3) The radioactivity sample was not provided pending receipt of analytical lab results next week.

The operator would like to proceed in advance of receipt of the radioactivity analytical data results due to rig scheduling and field worker logistics. Also, the operator believes from a telephone conversation that the elevated Fluoride level in the well may be attributable to the aforementioned "hydrogeologic window" in the project area while the TDS is believed to be from turbidity in the borehole.

The operator is requesting to collect a cleaner borehole sample for reanalysis, and to facilitate this, fluids from a couple of holding tanks will be discharged into the pit and a cleaner sample will be obtained from discharge water into the emptied tanks. The OCD has determined that Raser Technologies would be proceeding under its own risk if it proceeds according to its plan.

Please contact me if you have questions. Thank you.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 E-mail: <u>CarlJ.Chavez@state.nm.us</u> Website: <u>http://www.emnrd.state.nm.us/ocd/</u>index.htm (Pollution Prevention Guidance is under "Publications")

From: Ben Barker [mailto:Ben.Barker@rasertech.com] Sent: Thursday, June 17, 2010 3:38 AM To: Chavez, Carl J, EMNRD

# **Cc:** Nick Goodman; Jamie Robinson; Michael Hayter **Subject:** Lightning Dock request for discharge permission

Good Morning Carl,

Attached is the letter request and supporting data for OCD-EB clearance to use the unlined pit at TDF 55-7. Please call my cell phone any time if you have questions or would like an expanded version of any of the tables or data.

We will be picking up tomorrow where we left off last week at the well. We have experienced some delivery problems with the test pump and so we plan to expand the air-lift activities in the drilling plan to clean the hole up and get clearer water samples for the laboratories. We will release Barbour for another job while we take care of plumbing.

Thanks, Ben

VP Resource Management Raser Technologies 5152 N. Edgewood Drive Provo, UT 84604 801-765-1200 office 801-850-5904 direct 707-508-9963 mobile



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June 17, 2010

Mr. Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr. Santa Fe, New Mexico 87505

RE: Request for Permission to Discharge to TFD 55-7 Pit

Dear Mr. Chavez:

Raser technologies has cleaned out well TFD 55-7 according to the OCD G-103 approved on May 26, 2010. On June 8, 2010 Raser drilling personnel succeeded in collecting samples of produced water from the well with the entire interval from 1050 ft to 1348 ft open. As required by Condition of Approval No. 3, Raser herewith presents the results of laboratory analysis of those samples. We believe the results demonstrate the produced water meets the applicable water quality standards for surface discharge and hereby requests OCD-EB approval to discharge produced fluid to the unlined pit adjacent to the well.

20.6.2.3103 NMAC sets forth standards for forty seven concentration and pH values in ground water. The concentrations measured in the samples from well TFD 55-7 are within the allowable standard in 44 of 46 tests for which results have been received. In the two other tests, for TDS and Fluoride, we present data showing the TDF 55-7 values are within the background limit. The final test, for which results are still pending, is for Radium. Those test results will not be available for another week, but we present available data indicating the likelihood of a positive result is extremely small. Nevertheless, we propose to confine produced water to the well-site pit until the Radium test result is obtained. We will seek your further approval of the surface application plan after the analytical data set is complete.

The standards of 20.6.2.3103 NMAC are listed in Attachment 1, along with the results for the June 8, 2010 samples from TDF 55-7. Additional columns list for comparison (1) the results of analysis by the same laboratory of samples obtained during a 2008 air-assisted flow test of the same well, and (2) selected historical background examples from the Animas data base.

The certified report from TraceAnalysis, Inc. is reproduced as Attachment 2. Direct transmittal from TraceAnalysis to OCD-EB is available upon request.

Raser's project geologist and permit compliance officer, Jamie Robinson, assembled the Animas water chemistry data base referred to above. Attachment 3 presents her comparison of the TDS and Fluoride measurements from TDF 55-7 to the measurements from 188 wells that have been sampled over several decades. Her results show that TDF 55-7 is within the range of wells in the

area that have been discharging to the surface for many years, thus meeting the background standard of COA No. 3.

The data base assembled by Jamie is reproduced in condensed form as Attachment 4. The entire data set is contained in the table but extracting data for your examination may not be convenient. We will supply the data in an Excel spreadsheet upon your request.

The final element test, Radium, is incomplete because of the long exposure time needed to accurately measure very low levels of radiation. Although the test will not be completed for another week we are confident it poses little risk. We can find no record of Radium occurrences in the Animas area. Attachments 5 and 6 contain excepts from USGS and NMBMMR papers which support this conclusion.

Please do not hesitate to let me know if any additional detail or documentation will facilitate your examination. Thank you for your consideration.

Very truly yours, Raser Technologies

Benjaming Barke

Benjamin J. Barker VP Resource Management

Attachments:

Attachment 1: Table of 20.6.2.3103 NMAC Standards and TFD 55-7 Analytical Values.

Attachment 2: Analytical and Quality Control Report, TraceAnalysis, Inc., June 16, 2010.

**Attachment 3:** Memo From Jamie Robinson to Ben Barker Comparing TDF 55-7 TDS and Fluoride to Historical Data.

Attachment 4: Summary of Historical Water Chemistry Data, Animas Valley, New Mexico.

Attachment 5: USGS paper excerpt describing available data for water radioactivity in the Lightning Dock area.

Scott, R.C. and Barker, F.B., 1962, Data on uranium and radium in ground water in the United States 1954 to 1957. Geological Survey Professional Paper 426, p.79.

Attachment 6: NMBMMR paper excerpt describing available data for water radioactivity in the Lightning Dock area.

Summers W.K., 1976, Catalog of thermal waters in New Mexico. Hydrological Report 4, New Mexico Bureau of Mines and Mineral Resources, pp. 15-18.

Attachment 1

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Table of 20.6.2.3103 NMAC Standards and TFD 55-7 Analytical Values

		NMAC	TFD 55-7	TFD 55-7	Animas Valley
1.	Analysis	Standard	2010 Results	2008 Results	Example
Α					
1	Arsenic (As)	0.1 mg/l	0.0210 mg/l	<0.00500 mg/l	
2	Barium (Ba)	1.0 mg/l	0.278 mg/l	0.0510 mg/l	
3	Cadmium (Cd)	0.01 mg/l	<0.00500 mg/l	<0.00100 mg/l	
4	Chromium (Cr)	0.05 mg/l	<0.00100 mg/l	<0.00100 mg/l	
5	Cyanide (CN)	0.2 mg/l	<0.0150 mg/l	<0.0150 mg/l	
6	Fluoride (F)	1.6 mg/l	11.6 mg/l	13.9 mg/l	15 mg/l
7	Lead (Pb)	0.05 mg/l	0.0420 mg/l	<0.00500 mg/l	
			<0.000200	<0.000200	
8	Total Mercury (Hg)	0.002 mg/l	mg/l	mg/l	
9	Nitrate (NO3 as N)	10.0 mg/l	<0.500 mg/l	<0.100 mg/l	
10	Selenium (Se)	0.05 mg/l	<0.0200 mg/l	<0.0100 mg/l	
11	Silver (Ag)	0.05 mg/l	<0.00500 mg/l	<0.00500 mg/l	
12	Uranium (U)	0.03 mg/l	<0.0300 mg/l		
	Radioactivity: Radium (Ra 226-	0/*			
13	228)	30 pCi/l			0.3 pCi/l
14	Benzene	0.01 mg/l	<0.001 mg/l	<0.005 mg/l	• • • • • • • • • • • • • • • • • • • •
	Polychlorinated biphenyls		<0.000500		
15	(PCB's)	0.001 mg/l	mg/l		
16	Toluene	0.75 mg/l	<0.001 mg/l	<0.005 mg/l	
17	Carbon Tetrachloride	0.01 mg/l	<0.001 mg/l	<0.005 mg/l	
18	1,2-dichloroethane (EDC)	0.01 mg/l	<0.001 mg/l	<0.005 mg/l	
19	1,1-dichloroethylene (1,1-DCE)	0.005 mg/l			
	1,1,2,2-tetrachloroethylene				
20	(PCE)	0.02 mg/l	<0.001 mg/l	<0.005 mg/l	
21	1,1,2-trichloroethylene (TCE)	0.1 mg/l	<0.001 mg/l	<0.005 mg/l	
22	ethylbenze	0.75 mg/l	<0.001 mg/l	<0.005 mg/l	
23	total xylenes	0.62 mg/l	<0.001 mg/l	<0.005 mg/l	
24	methylene chloride	0.1 mg/l	<0.005 mg/l	<0.025 mg/l	
25	chloroform	0.1 mg/l	<0.001 mg/l	<0.005 mg/l	
26	1,1-dichloroethane	0.025 mg/l	<0.001 mg/l	<0.005 mg/l	
	· · · ·	0.0001			
27	ethlene dibromide (EDB)	mg/l	<0.001 mg/l	<0.005 mg/l	
28	1,1,1-trichloroethane	0.06 mg/l	<0.001 mg/l	<0.005 mg/l	
29	1,1,2-trichloroethane	0.01 mg/l	<0.001 mg/l	<0.005 mg/l	
30	1,1,2,2-tetrachloroethane	0.01 mg/l	<0.001 mg/l	<0.005 mg/l	
31	vinyl chloride	0.001 mg/l	<0.001 mg/l	<0.005 mg/l	
	PAH's: total naphthalene +			<u>.</u>	
32	monomethyInaphthalenes	0.03 mg/l	<0.005 mg/l	<0.025 mg/l	
33		0.0007	<0.000183		
33	benzo-a-pyrene	mg/l	mg/l		

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	Analysis	Standard	2010 Results	2008 Results	Historical Results
В	-				
1	Chloride (Cl)	250.0 mg/l	80 mg/l	99.8 mg/l	
2	Copper (Cu)	1.0 mg/l	0.0520 mg/l	<0.00500 mg/l	
3	Iron (Fe)	1.0 mg/l	0.0180 mg/l	0.148 mg/l	
4	Manganese (Mn)	0.2 mg/l	0.00800 mg/l	0.00400 mg/l	
5	Phenols	0.005 mg/l	<0.00458 mg/l		
6	Sulfate (SO4)	600.0 mg/l	500 mg/l	566 mg/l	
		1000.0			
7	Total Dissolved Solids (TDS)	mg/l	1440 mg/l	1450 mg/l	1628 mg/l
8.	Zinc (Zn)	10.0 mg/l	0.131 mg/l	0.00900 mg/l	
9	pH	6-9	8.69	9.35	
C					
1	Aluminum (Al)	5.0 mg/l	<0.0500 mg/l	0.243 mg/l	
2	Boron (B)	0.75 mg/l	0.465 mg/l	0.496 mg/l	
3	Cobalt (Co)	0.05 mg/l	<0.00500 mg/l		
4	Molybdenum (Mo)	1.0 mg/l	0.0460 mg/l	0.0340 mg/l	
5	Nickel (Ni)	0.2 mg/l	<0.00500 mg/l	<0.00500 mg/l	

## Attachment 2

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# Analytical and Quality Control Report

# TraceAnalysis, Inc.

# June 16, 2010



 6701 Aberdeen Avenue, Suite 9
 Lubbock, Texas 79424

 200 East Sunset Road, Suite E
 El Paso, Texas 79922

 5002 Basin Street, Suite A1
 Midland, Texas 79703

 6015 Harris Parkway, Suite 110
 Ft. Worth, Texas 76132

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WFWB38444Y0909

96 FAX 806+794+1298 43 FAX 915+585+4944 01 FAX 432+689+6313 60

**DBE:** VN 20657

# **NELAP** Certifications

Certifications

Lubbock: T104704219-08-TX LELAP-02003 Kansas E-10317

**WBENC:** 237019

El Paso: T104704221-08-TX LELAP-02002 Midland: T104704392-08-TX

# Analytical and Quality Control Report

Jamie Robinson Raser Technologies 5152 North Edgewood Dr. Suite 200 Provo, UT, 84604

Report Date: June 16, 2010

Work Order: 10061011

Project Name: Ground Water Monitoring Project Number: Ground Water Monitoring

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

			Date	Time	Date
Sample	Description	Matrix	Taken	Taken	Received
234175	LLRP	water	2010-06-08	17:00	2010-06-08

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 10 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Blain Lepturch

Dr. Blair Leftwich, Director Dr. Michael Abel, Project Manager

#### Standard Flags

 $\,B\,$  - The sample contains less than ten times the concentration found in the method blank.

# **Case Narrative**

Samples for project Ground Water Monitoring were received by TraceAnalysis, Inc. on 2010-06-08 and assigned to work order 10061011. Samples for work order 10061011 were received intact at a temperature of 3.0 C.

Samples were analyzed for the following tests using their respective methods.

		$\operatorname{Prep}$	$\mathbf{Prep}$	$\rm QC$	Analysis
Test	Method	$\operatorname{Batch}$	Date	Batch	Date
Al, Dissolved	S 6010C	60764	2010-06-16 at 11:18	70934	2010-06-16 at 11:19
Cr, Dissolved	S 6010C	60764	2010-06-16 at 11:18	70934	2010-06-16 at 11:19
Fe, Dissolved	S 6010C	60764	2010-06-16 at 11:18	70934	2010-06-16 at 11:19
Mn, Dissolved	S 6010C	60764	2010-06-16 at 11:18	70934	2010-06-16 at 11:19

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 10061011 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

# **Analytical Report**

#### Sample: 234175 - LLRP

Laboratory:	Lubbock					
Analysis:	Al, Dissolved		Analytical Method:	S 6010C	Prep Method:	S 3005A
QC Batch:	Batch: 70934		Date Analyzed:	2010-06-16	Analyzed By:	$\mathbf{RR}$
Prep Batch:	60764		Sample Preparation:	2010-06-16	Prepared By:	$\mathbf{RR}$
			RL			
Parameter		$\mathbf{Flag}$	Result	Units	Dilution	$\operatorname{RL}$
Dissolved Al	ıminum		< 0.0500	mg/L	1	0.0500

#### Sample: 234175 - LLRP

Laboratory: Analysis: QC Batch: Prep Batch:	Lubbock Cr, Dissolved 70934 60764	۰. ب	Analytical Method: Date Analyzed: Sample Preparation:	S 6010C 2010-06-16 2010-06-16	Prep Method: Analyzed By: Prepared By:	
			$\operatorname{RL}$			
Parameter		$\operatorname{Flag}$	Result	$\mathbf{Units}$	Dilution	$\operatorname{RL}$
Dissolved Ch	romium		< 0.00100	mg/L	. 1	0.00100

#### Sample: 234175 - LLRP

Laboratory: Analysis: QC Batch: Prep Batch:	Lubbock Fe, Dissolved 70934 60764	Analytical Method: Date Analyzed: Sample Preparation:	S 6010C 2010-06-16 2010-06-16	Prep Method: Analyzed By: Prepared By:	S 3005A RR RR
		$\operatorname{RL}$			
Parameter	Flag	$\operatorname{Result}$	Units	Dilution	$\operatorname{RL}$
Dissolved Iro	n	0.0180	mg/L	1	0.0100

#### Sample: 234175 - LLRP

Laboratory:	Lubbock				
Analysis:	Mn, Dissolved	Analytical Method:	S 6010C	Prep Method:	S 3005A
QC Batch:	70934	Date Analyzed:	2010-06-16	Analyzed By:	$\mathbf{RR}$
Prep Batch:	60764	Sample Preparation:	2010-06-16	Prepared By:	$\mathbf{RR}$

continued ...

Report Date: June 16, 2010 Ground Water Monitoring		Work Order: 10061011     Page Numb       Ground Water Monitoring				
sample 234175 continue	ed					
Parameter	Flag	$\operatorname{RL}$ Result	Units	Dilution		RI
	1 lag	<u> </u>		Diation		
Parameter	Flor	$\operatorname{RL}$ Result	Units	Dilution		R
Dissolved Manganese	Flag	0.00800	mg/L	1	0.	$\frac{10}{0025}$
Method Blank (1)	QC Batch: 70934					
QC Batch: 70934		Date Analyzed:	2010-06-16		Analyzed By:	RI
Prep Batch: 60764		QC Preparation:	2010-06-16		Prepared By:	RI
			MDL			
Parameter Dissolved Aluminum	Flag		Result <0.00404	Units mg/L		$\frac{R}{0.0}$
Method Blank (1)	QC Batch: 70934					
QC Batch: 70934 Prep Batch: 60764	•	Date Analyzed: QC Preparation:	2010-06-16 2010-06-16		Analyzed By: Prepared By:	
QC Batch: 70934 Prep Batch: 60764			2010-06-16 MDL			RI
QC Batch: 70934	Flag	QC Preparation:	2010-06-16			RI RI
QC Batch: 70934 Prep Batch: 60764 Parameter Dissolved Chromium Method Blank (1) QC Batch: 70934		QC Preparation:	2010-06-16 MDL Result <0.000873 2010-06-16	Units mg/L	Prepared By: Analyzed By:	
QC Batch: 70934 Prep Batch: 60764 Parameter Dissolved Chromium Method Blank (1)	Flag	QC Preparation:	2010-06-16 MDL Result <0.000873 2010-06-16	Units mg/L	Prepared By:	RI 0.00
QC Batch: 70934 Prep Batch: 60764 Parameter Dissolved Chromium Method Blank (1) QC Batch: 70934	Flag	QC Preparation: Date Analyzed: QC Preparation:	2010-06-16 MDL Result <0.000873 2010-06-16	Units mg/L	Prepared By: Analyzed By:	RI 0.00

QC Batch:	70934	Date Analyzed:	2010-06-16	Analyzed By:	$\mathbf{RR}$
Prep Batch:	60764	QC Preparation:	2010-06-16	Prepared By:	$\mathbf{R}\mathbf{R}$

Report Date: June 16, 2010 Ground Water Monitoring		Work Ord Ground Wa				Page	Number:	6 of 10
Parameter	Flag		MDL Result		Uni			RL
Dissolved Manganese			< 0.00170		mg,	/L	<u> </u>	0.0025
Laboratory Control Spike (L	CS-1)							
QC Batch: 70934 Prep Batch: 60764		Analyzed: Preparation:	2010-06 2010-06				lyzed By pared By	
Param	$\mathcal{LCS}$ Result	Units	Dil.	Spike Amount	Matr Resu		ec.	Rec. Limit
Dissolved Aluminum	0.921	mg/L	1	1.00	< 0.00	404 9	2 8	85 - 115
Percent recovery is based on the	spike result. RPD	is based on	the spike	and spike dup	licate re	esult.		
Param	LCSD Result Unit		Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Dissolved Aluminum Percent recovery is based on the	0.942 mg/		1.00	< 0.00404	94	85 - 115	2	20
Laboratory Control Spike (L QC Batch: 70934 Prep Batch: 60764	Date	Analyzed: Preparation	2010-06 : 2010-06				lyzed By pared By	
Param	$\begin{array}{c} \mathrm{LCS} \\ \mathrm{Result} \end{array}$	Units	Dil.	${ m Spike} \ { m Amount}$	Matr Resu		ec.	Rec. Limit
Dissolved Chromium	0.0960	mg/L	1	0.100	< 0.000	)873 9	6	85 - 115
Percent recovery is based on the	spike result. RPD	is based on	the spike	and spike dup	olicate re	esult.		
Param	LCSD Result Unit		Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Dissolved Chromium	0.0970 mg/		0.100	<0.000873	97	85 - 115	1	20
Percent recovery is based on the	spike result. RPD	is based on	the spike	and spike dup	olicate re	esult.		
Laboratory Control Spike (L	CS-1)							
QC Batch: 70934 Prep Batch: 60764		Analyzed: Preparation	2010-00 : 2010-00				alyzed B pared B	

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	$\operatorname{Limit}$
Dissolved Iron	0.486	mg/L	1	0.500	< 0.00300	97	85 - 115

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### Report Date: June 16, 2010 Ground Water Monitoring

### Work Order: 10061011 Ground Water Monitoring

Page Number: 7 of 10

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	Matrix		Rec.		$\operatorname{RPD}$
Param	$\operatorname{Result}$	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	Limit	RPD	Limit
Dissolved Iron	0.492	$\mathrm{mg/L}$	1	0.500	< 0.00300	98	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Laboratory Control Spike (LCS-1)

QC Batch:	70934	Date Analyzed:	2010-06-16	Analyzed By:	$\mathbf{RR}$
Prep Batch:	60764	QC Preparation:	2010-06-16	Prepared By:	$\mathbf{RR}$

	LCS			Spike	Matrix		Rec.
Param	Result	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	$\operatorname{Limit}$
Dissolved Manganese	0.248	mg/L	1	0.250	< 0.00170	99	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	LCSD			Spike	$\operatorname{Matrix}$		$\operatorname{Rec.}$		$\operatorname{RPD}$
Param	$\operatorname{Result}$	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	Limit	RPD	Limit
Dissolved Manganese	0.251	mg/L	1	0.250	< 0.00170	100	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Matrix Spike (MS-1) Spiked Sample: 234175

QC Batch:	70934	Date Analyzed:	2010-06-16	Analyzed By:	$\mathbf{RR}$
Prep Batch:	60764	QC Preparation:	2010-06-16	Prepared By:	$\mathbf{RR}$

	MS			Spike	Matrix		Rec.
Param	$\operatorname{Result}$	Units	Dil.	Amount	Result	Rec.	Limit
Dissolved Aluminum	0.882	mg/L	1	1.00	< 0.00404	88	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

	MSD			Spike	Matrix		Rec.		RPD
Param	Result	Units	Dil.	Amount	$\mathbf{Result}$	Rec.	Limit	$\operatorname{RPD}$	Limit
Dissolved Aluminum	0.921	mg/L	1	1.00	< 0.00404	92	75 - 125	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

### Matrix Spike (MS-1) Spiked Sample: 234175

QC Batch:	70934	Date Analyzed:	2010-06-16	Analyzed By:	$\mathbf{R}\mathbf{R}$
Prep Batch:	60764	QC Preparation:	2010-06-16	Prepared By:	$\mathbf{R}\mathbf{R}$

Report Date: June 16, 201 Ground Water Monitoring		Work Order: 10061011 Ground Water Monitoring						Numbe	r: 8 of 10
Param	MS Resu	ılt	Units	Dil.	Spike Amount	Mati Resu	ıltR	lec.	Rec. Limit
Dissolved Chromium	0.08	90	mg/L	1	0.100	< 0.000	0873	89	75 - 125
Percent recovery is based o	on the spike result.	RPD is	based of	n the spike a	and spike du	plicate r	esult.		
	MSD			Spike	Matrix		Rec.		RPD
Param	$\operatorname{Result}$	Units	Dil.	Amount	$\operatorname{Result}$	Rec.	Limit	RPD	Limit
Dissolved Chromium	0.0940	mg/L	1	0.100	< 0.000873	94	75 - 125	6	20
Percent recovery is based o	on the spike result.	RPD is	s based o	n the spike .	and spike du	plicate r	esult.		
Matrix Spike (MS-1)	Spiked Sample: 23	34175							
QC Batch: 70934		Date A	analyzed:	2010-06-	-16		An	alyzed E	y: RR
Prep Batch: 60764			eparation		-16		$\Pr$	epared E	y: RR
	М	IS			Spike	Ma	trix		Rec.
Param	. Res		Units	Dil.	Amount	Res		ec.	Limit
Dissolved Iron	0.5	512	mg/L	1	0.500	0.0	18	99	75 - 12
Percent recovery is based of	on the spike result.	RPD is	s based o	n the spike	and spike du	plicate r	esult.		
v	-			-	-	•			חחח
D	$egin{array}{c} \mathrm{MSD} \ \mathrm{Result} \end{array}$	Units	B Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPI Limi
Param		Q III UL	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	mututo	recourt	$\frac{100}{100}$	75 - 125		1211111
Param Dissolved Iron	0.516	mg/I		0.500	0.018			1	20
Dissolved Iron Percent recovery is based o <b>Matrix Spike (MS-1)</b> QC Batch: 70934	0.516	RPD is 34175 Date A		n the spike : 2010-06	and spike du -16		esult. Ar	1 alyzed H epared H	By: RR
Dissolved Iron Percent recovery is based o <b>Matrix Spike (MS-1)</b> QC Batch: 70934 Prep Batch: 60764	0.516 on the spike result. .Spiked Sample: 2	RPD is 34175 Date A QC Pr	s based o Analyzed reparatio	n the spike : 2010-06 n: 2010-06	and spike du -16 -16 Spike	plicate r	esult. An Pr trix	alyzed I epared I	By: RR By: RR Rec.
Dissolved Iron Percent recovery is based o <b>Matrix Spike (MS-1)</b> QC Batch: 70934 Prep Batch: 60764 Param	0.516 on the spike result. .Spiked Sample: 2 M Res	RPD is 34175 Date A QC Pr IS sult	s based o Analyzed reparatio Units	n the spike : 2010-06 n: 2010-06 Dil.	and spike du -16 -16 Spike Amount	plicate r Ma Re:	esult. An Pr trix sult R	alyzed I epared I ec.	By: RR By: RR Rec. Limit
Dissolved Iron Percent recovery is based o <b>Matrix Spike (MS-1)</b> QC Batch: 70934 Prep Batch: 60764 Param Dissolved Manganese	0.516 on the spike result. .Spiked Sample: 2	RPD is 34175 Date A QC Pr IS sult 259	Analyzed eparation Units mg/L	n the spike : 2010-06 n: 2010-06 Dil. 1	and spike du -16 -16 Spike Amount 0.250	Ma Res	esult. Ar Pr trix sult R 108 1	alyzed I epared I	By: RR By: RR Rec. Limit
Dissolved Iron Percent recovery is based of <b>Matrix Spike (MS-1)</b> QC Batch: 70934 Prep Batch: 60764 Param	0.516 on the spike result. .Spiked Sample: 2	RPD is 34175 Date A QC Pr IS sult 259	Analyzed eparation Units mg/L	n the spike : 2010-06 n: 2010-06 Dil. 1 m the spike	and spike du -16 -16 <u>Spike</u> <u>Amount</u> 0.250 and spike du	Ma Res	esult. Ar Pr trix sult R 108 1	alyzed I epared I ec.	By: RR By: RR Rec. Limit 75 - 12
Dissolved Iron Percent recovery is based of <b>Matrix Spike (MS-1)</b> QC Batch: 70934 Prep Batch: 60764 Param Dissolved Manganese Percent recovery is based of	0.516 on the spike result. .Spiked Sample: 2	RPD is 34175 Date A QC Pr IS sult 259 RPD is	Analyzed reparation Units mg/L s based o	n the spike : 2010-06 n: 2010-06 Dil. 1 n the spike Spike	and spike du -16 -16 <u>Spike</u> <u>Amount</u> 0.250 and spike du Matrix	Ma Res 0.0 plicate r	esult. Ar Pr trix <u>sult R</u> <u>108 1</u> result. Rec.	alyzed I epared I lec. 00	By: RR By: RR Rec. Limit 75 - 12 RPI
Dissolved Iron Percent recovery is based o <b>Matrix Spike (MS-1)</b> QC Batch: 70934 Prep Batch: 60764 Param Dissolved Manganese	0.516 on the spike result. .Spiked Sample: 2	RPD is 34175 Date A QC Pr IS sult 259	Analyzed reparation Units mg/L s based o s Dil.	n the spike : 2010-06 n: 2010-06 Dil. 1 m the spike	and spike du -16 -16 <u>Amount</u> 0.250 and spike du Matrix	Ma Res	esult. An Pr trix sult R 108 1 result.	alyzed I epared I ec.	By: RR By: RR Rec. Limit 75 - 12

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### Standard (ICV-1)

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QC Batch: 70934

Date Analyzed: 2010-06-16

Analyzed By: RR

Report Date: June 16 Ground Water Monit				der: 10061011 ater Monitorin		Page N	umber: 9 of 10
Param Dissolved Aluminum	Flag	Units mg/L	ICVs True <u>Conc.</u> 1.00	ICVs Found Conc. 1.05	ICVs Percent Recovery 105	Percent Recovery Limits 90 - 110	Date Analyzed 2010-06-16
		<u>IIIB/ II</u>		1.00			2010 00 10
Standard (ICV-1)							
QC Batch: 70934			Date Analyzed:	2010-06-16		Analy	vzed By: RR
Param Dissolved Chromium	Flag	Units mg/L	ICVs True Conc. 1.00	ICVs Found Conc. 0.985	ICVs Percent Recovery 98	Percent Recovery Limits 90 - 110	Date Analyzed 2010-06-16
Standard (ICV-1)							
QC Batch: 70934			Date Analyzed:	2010-06-16		Analy	vzed By: RR
		<b>TT</b>	ICVs True	ICVs Found	ICVs Percent	Percent Recovery	Date
Param Dissolved Iron	Flag	Units mg/L	<u>Conc.</u> 1.00	Conc. 0.966	Recovery 97	Limits 90 - 110	Analyzed 2010-06-16
Standard (ICV-1) QC Batch: 70934			Date Analyzed:	2010-06-16		Analy	vzed By: RR
Ъ.		<b>T</b> T •	ICVs True	ICVs Found	ICVs Percent	Percent Recovery	Date
Param Dissolved Manganese	Flag	Units mg/L		<u>Conc.</u> 0.994	Recovery 99	Limits 90 - 110	Analyzed 2010-06-16
Standard (CCV-1) QC Batch: 70934			Date Analyzed:	2010-06-16		Analy	vzed By: RR
Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Aluminum		mg/L	1.00	1.06	106	90 - 110	2010-06-16
Standard (CCV-1) QC Batch: 70934			Date Analyzed:	2010-06-16		Anal	yzed By: RR

Report Date: June 1 Ground Water Monit		Work Order: 10061011 Ground Water Monitoring			Page Number: 10 of 10		
Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Chromium		$\rm mg/L$	1.00	0.978	98	90 - 110	2010-06-16
Standard (CCV-1) QC Batch: 70934			Date Analyzed:	2010-06-16		Analyz	ed By: RR
QC Datch. 70954			Date Analyzeu.	2010-00-10		Anaryz	eu by. nn
			CCVs	CCVs	CCVs	Percent	
_	-		True	Found	Percent	Recovery	Date
Param	Flag	Units	Conc.	Conc.	Recovery	Limits	Analyzed
Dissolved Iron		mg/L	1.00	0.971	97	90 - 110	2010-06-16
Standard (CCV-1)							:
QC Batch: 70934			Date Analyzed:	2010-06-16		Analyz	ed By: RR
			CCVs True	CCVs Farmed	CCVs	Percent	Data
Param	Flag	Units	Conc.	Found Conc.	Percent	Recovery Limits	Date Analyzed
Dissolved Manganese		mg/L	1.00	0.980	Recovery 98	<u>90 - 110</u>	2010-06-16
Disouved manganese		<u> </u>	1.00	0.000	50	50 - 110	2010-00-10

### Attachment 3:

### Memo From Jamie Robinson to Ben Barker

### **Comparing TDF 55-7 TDS and Fluoride to Historical Data**

June 16, 2010

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## raser

TECHNOLOGIES

June 16, 2010

To: Ben BarkerFrom: Jamie RobinsonRe: Fluoride and TDS Concentrations in TFD 55-7 Samples

We have collected the published water quality analyses from the Lightning Dock area and found 200 sample records from 188 different wells. I compared this body of data with the recent analytical results from TFD 55-7 and conclude that the water produced in our June 8, 2010 test has fluoride and TDS concentrations that are common in the well waters of the Lightning Dock area.

### **Fluoride**

Of the 188 wells in the data base, 97 were tested for fluoride, yielding 99 sample values. The concentration of fluoride ranged from 0.35 to 15 mg/l with a mean of 3.59 mg/l.

NM standard: 1.6 mg/l Well TFD 55-7 values: 11.6 mg/l (2010) 13.7 mg/l (2008)

- Fifty-six of the tested wells (58%) showed fluoride concentrations in excess of the standard, with a mean of 5.3 mg/l.
- Nine wells showed fluoride levels greater than 10 mg/l.

### **Dissolved Solids (TDS)**

The data base contains 160 TDS values from 126 wells. The measurements ranged from 8 mg/l to 16,281 mg/l, with a mean of 833 mg/l.

NM standard:	1000 mg/l
Well TFD 55-7 values:	1440 mg/l (2010)
	1450 mg/l (2008)

- Thirty-eight of the wells (30%) exceeded the NM standard, with a group mean of 1270 mg/l.
- Twelve wells had TDS values greater than those of TFD 55-7.

Attachment 4:

### Summary of Historical Water Chemistry Data

Animas Valley, New Mexico

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### Attachment 5:

USGS paper excerpt describing available data for water radioactivity in the Lightning Dock area.

Scott, R.C. and Barker, F.B., 1962, Data on uranium and radium in ground water in the United States 1954 to 1957.

Geological Survey Professional Paper 426, p.79.

# Data on Uranium and Radium in Ground Water in the United States 1954 to 1957

Highlighted text shows uranium and radium values for the Lightning Dock area.

By R. C. SCOTT and F. B. BARKER

GEOLOGICAL SURVEY PROFESSIONAL PAPER 426

A compilation of data collected as part of a survey of radioelements in the water resources of the conterminous United States



UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON ; 1962

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GEOLOGIC, HYDROLOGIC, AND CHEMICAL DATA

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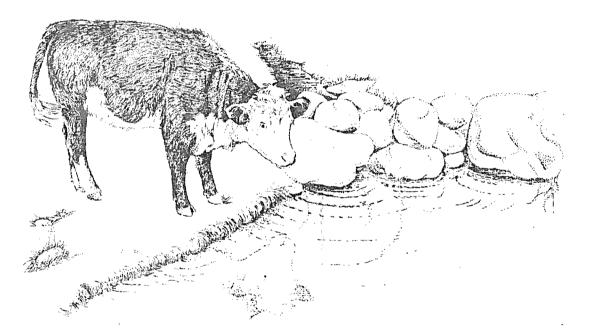
### Attachment 6:

NMBMMR paper excerpt describing available data for water radioactivity in the Lightning Dock area.

Summers W.K., 1976, Catalog of thermal waters in New Mexico. Hydrological Report 4 New Mexico Bureau of Mines and Mineral Resources pp. 15-18.

# Catalog of Thermal Waters in New Mexico

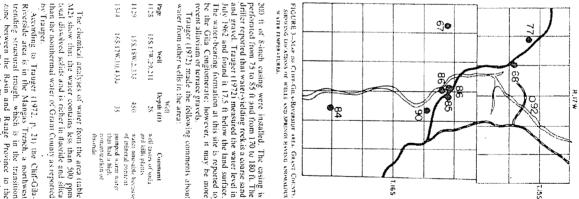
Highlighted text shows uranium and radium values for the Lightning Dock area.



HYDROLOGIC REPORT 4 New Mexico Bureau of Mines & Mineral Resources 1976 A DIVISION OF NEW MEXICO INSTITUTE OF MINING & TECHNOLOGY

sample collected at the tap in the 2-inch line, about a fi from the natural outlet. The measurements given in table 2 were also made at the tap. The temperature of the water in each cascude was more than 90° F. Trauger (1972) collected a water sample from the Swimming Pool Spring on June 23, 1957; table M1 contains an analysis of this sample. LYONS HUNTING LODGE HOT SPRINGS (135,13W,10,121) About 60 gpm are taken from the spring and delivered to Campbell's ratch and trading post. The water Gila River and probably correspond to those mentioned by Stearns, Stearns, and Waring (1937, p. 169), and Waring (1965, p. 38) as being in sec. 3, T. 13 S., R. 13 W. 5 010000 Congosta 0.4440 Sar tak 1.2014 post, and several mobile homes provides both heat and water to the ranch, the trading location: locations and, if reports are correct, at a possible fourth Seru and Analysis by the C. A. Annisconscial Sconection Annaly ig Luner and Society of Hadoo-22 fracture to a small swimming pool. This spring is named in this report the Swimming Pool Spring. Table M1 contains the chemical analysis of a water Lyons Hunting Lodge-A pipe, set into a fracture in basalt and cemented in, conducts water from the Thermal water discharges in about three distinct These springs are in Grant County on the East Fork 3) Approximately one quarter mile up a narrow canyon from the East Fork Spring, water discharging from fractures in basali -A collection system con-1) Upstream approximately 100 yards from the 2) About 100 yards downstream from the Lodge in the bed of the East Fork Gila River-This spring is Lyons Hunting Lodge. These springs are named in this report the Water-Supply Springs. The water named in this report East Fork Spring. caseades into view at 3 ducts the water to a central pipe that delivers it to the Bela-parere activity Radium Usunitum twotw 3 + #worp could's and the new Culta Runch comes primalay alian Antonio Antonio 11-21-22 \$ 曹武 2 ue C \* (212 npC)1 (pictoruice/liter) <.1 npC)1 (pictoruice/liter) 1,4: .81 np?) and so way represents distinct points from vertical Seattle school of Han disting out int 3325 8 8 post. 1920 101200 39915 88641. 1901-\$2001 5+2-5-58 4 1 E R 9,95 10373

The chemical analyses of waters which range in temperature from  $96^{\circ}$  to  $126^{\circ}F$  show only superficial differences and that the water contains about 400-500 temperatures range from 85° to 90°F. Fig. 3, a map showing the location of some springs and wells, gives the temperature of the various sources (Trauger, 1972). The only well sampled during the 1965-1966 inventory was well 155,17W-27,11. The temperature was 95°F (March 3, 1966). This well was drilled to 300 ft, but only by the communities of Cliff, Gila, and Riverside, springs and wells yield water with temperatures ranging from 68° to 92°F. In the immediate area of Riverside This spring was noted by Stearns. Stearns, and Waring (1937, p. 169), and Waring (1965, p. 38). It is on the east bank of the main stem of the Gila River in the chemical analyses (table M1) show that this water contains less than 400 ppm total dissolved solids Because of the inadequacy of the existing maps, the location of this pring can only be approximated to half a mile east of the Lyons Huming Lodge. The spring discharges about 31 gpm at 106°F from fractures in a discharges about 31 gpm at 106°F from fractures in the second se contains the measurements made at the spring; the rhyolite tuff. The outlets for the discharging water occur over an elevation range above the river. Table 2 in a complex fault zone (13S.13W.10.200) ppm total dissolved solids It above the elevation of the river, cascading to the river Gila Wilderness. Grant County. The spring discharges 20 gpm at 112.5°F from beneath a talus cover 20 to 40 No NAME SPRING (13S.13W.20.430) NO NAME SPRING, EAST FORK GILA RIVER In T. 15 and 16 S., R. 17 W., an area roughly bounded a coscade point, because the cascade begins at an altitude well above that which could be reached of the canyon. The uppermost discharge may be as These springs are 20 to 30 ft above a small stream that rans in the carsion floor. The collection pipe is about 50 ft above the East Fork Spring at the mouch cia. Andesite and basalt also occur in the steep-walled canyon. A fourth outlet is not a cascade but a -ŝuuds much as 100 ft above the East Fork Gila River. seep from a gravel cover at the base of the fractures fractures in phyolite, phyolite tuff, and phyolite bree The talus covers a rhyolite-one rock among several Spring, about one quarter of a mile north of the East Fork Gila River. No effort was made to locate this According to D. A. Campbell, another spring lies most accessible level. easily; in some instances, as much as 20 it above the necessity for water at the central collection point or at taius a partial chemical analysis of these samples upstream, midway, and downstream. Table M1 con in a small canyon upstream from the Swimming Pool The observations reported in table 2 are of a Water-Supply Springs were sampled at 3 points. CLIFF-GILA-RIVERSIDE AREA



than the nonthermal water of Grant County as reported

later in the same paragraph, he says:

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Water from well 25,19,7,143, which is half a mile to the west of the well 25,19,7,334, that a competation of 88-16 Water from well 25,19,7,334, depth 34 feet, about 06 in the west ow well 35,19,7,334 has a temperature of 83-27. Other areas may exist is which hat

Strangway and Holmer (1966) made an airbome

water occurs relatively near the surface.

trending structural trough, which is in the transition zone between the Basin and Range Province to the south and the Colorado Plateau Province to the north. According to Trauger (1972, p. 21) the Cliff-Gla-Riverside area is in the Mangas Trench, a northwest

ANIMAS VALLEY

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WELL (22S.21W.3.312

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and that the temperature of the discharging water was 95° F. This well was reported by Reeder (1957, p. 73), Howd and Kister (1961, p. 46 and 58) cited it as one of those that produce saline water. They gave the tempera-ture as \$8° F on July & 1955. An attempt was made on June 20, 1966, to measure, the temperature and to This well was drilled in 1946 for stock use. Records in the files of the State Engineer indicate that on June 14. und 80°F, so the water temperature at depth must be 88.5°F. However, the air temperature was between collect a water sample. The discharge rate was slow, less than 10 gallons per hour, and only a token sample could he collected. The maximum temperature observed was 1955, the water level was 445,65 ft below land surface somewhat greater. . Öć

Hood and Kister reported the following Spe

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рH	adde condectance	the star CaCO <sub>3</sub>	0	HCO,	
7.8	1,590 millios tar 23°C	128 ppm	102 pp:s	431 ppm	

The sample collected in June 1966 produced the

Animas Valley as a cotton-producing region. Several wells were drilled in the valley. In 1948, one well struck steam (fig. 4) at 88 ft. One report in the State Engineer's files says the temperature of the discharging water was

HOT WELLS (25S, 19W, 7,000)

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6.9 ppm 2.1 ppm 2.5 ppm

In 1948, irrigutors began developing the Lower

of this well also produced steam at a shallow depth.

240° F. By 1955, two other wells drilled within 100 yards

around these wells. He drilled a series of holes to a

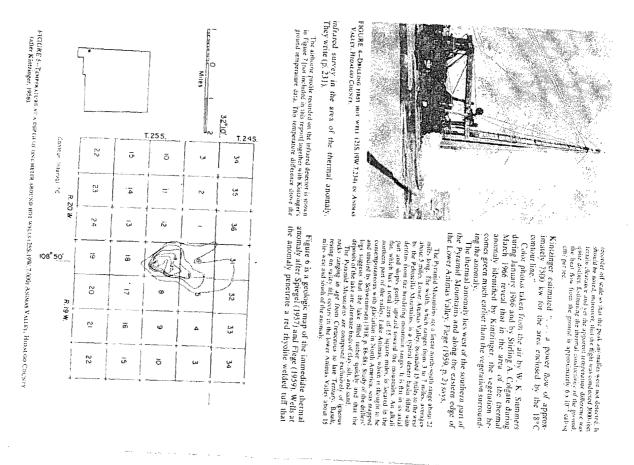
In 1955 Kintzinger (1956) made a study of the area

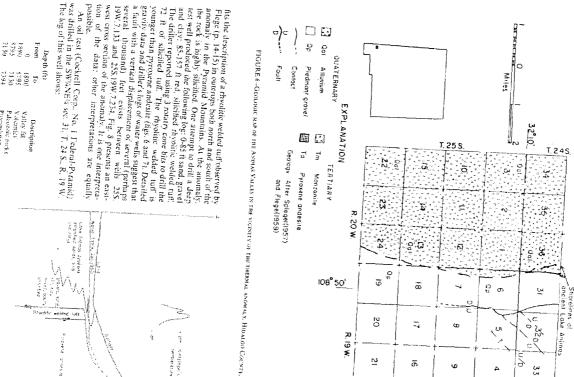
depth of one meter, filled them with sand, shoved a thermistor probe through the sand, permitted it to stabilize, and then recorded the temperature at the one-meter depth. His work (fig. 3) shows that the maximum anomaly is located in the center of NW/SE/3 see, 7, T. 25 S., R. 19 W.

Recier (1957, p. 26), as part of a thorough discussion of ground water in the Animas Valley, said:

Water of about 210°F was encounced in avel 25 19.7.234, which is 95 next deep. Water in this well is a few degrees there the booling points four this antitude and and theres, is turbated and appears as low. This is preciaily so when the water is the well is

following results:





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1662 2625 2628 2628 Valley jig V.4conics Paleetoric met.s Précardorian

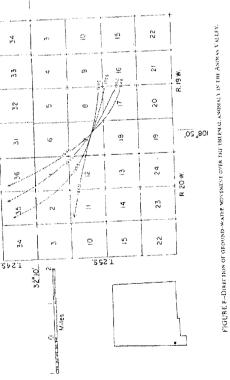
FIGURE 2...CROW RETERN OF THERMSE ANOMALY, ANDMAS VALLAY,

a) initaria entrestante Sentrationie proprie Мраление **\$**\$3 2005 22.22 0.546 **\$**200 4800

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The hottom-hele temperature recorded on the gamma-

review and 250°F. Before 1948, ground-water movement in the valley Before 1948, ground-water movement 1948, irrigation was essentially south to north: during 1948, irrigation began. A center of pumpage developed south and west of the anomaly. As a consequence, the direction of of the anomaly. As a consequence, the direction of of the anomaly. As a consequence, the direction of the anomaly. Research as altered, as indicated by fig. U 8, which shows the direction of ground-water movement over the anomaly for several yate.

The ground-water discharge has been taken from storage, and water levels are falling. The water-table decline at the anomaly amounts to approximately 25 ft from 1948 to 1948 to 1946. Figs. 9 and 10 are water-table maps

sculture ion concentration reflects the an-maly. Fig. 12 shows the distribution of temperatures of discharging water and the locations of the wells in which temperature profiles were obtained. Table 4 gives the temperature profiles for these wells. The only analyses for a heavy metal in the Animus Valley are for copper, as follows: tained for water from secretal wells around the anomaly. Table M3 gives the chemical analyses obtained for both the thermal waters and the nonthermal waters in the immediate area of the thormal anomaly. Fig. 11 not only shows the wells sampled but also shows that the Since 1948, many chemical analyses have been obfur 1948 and 1960.

Copper (ppb) 20 USCS 59532 6 USCS 59535
Date 4-30-66 4-30-65
Wei 255.19W.7.2345 255.29W.1.2433

Scott and Barker (1962, p.29) report the radioactivity in water (rom/well/2558)9W 7234 as:

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UPPER FRISCO HOT SPRINGS (5S.19W.35.100)

The upper Frisco Hot Springs are on the San particle River in the Apache National Forest. Cation in Farrisco River in the Apache National Forest. Cation County, approximately 158 miles east of the U.S. Forest Researce Rauger Station at Luwa, and approximately 150 in Service Rauger Station at Luwa, and approximately 150 miles approximately from the deep cargon through the San primation Monutating stress from the advites are the springs discharge from headuh a talks cover at an experime diportimately 40 th above the total of the river discriming that rules into an otherwise flaitly steep h and a flat beach that virts into an otherwise flaitly steep

Athough the local residents and some geologists have said that the discharge is from the Gila Conglomerate. Weber and Willand (1959) mapped the bedrock of the area as a volga me condistruction of unithin the Datil Formation. They described this formation as: slope.

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The ratus have consists of andesite and thytolite tulf with samidine, quarte, and biotic. Welver and Willard mored that both these recks overlie the voltenist con-geometrate, so a tailus slope cover mode up of such tocks is not surprising.

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Subject: 6/4 Drilling and COA updates for Lightning Dock 55-7

Good afternoon to everyone!

And update on drilling operations and COA milestones at Lightning Dock:

Drilling Plan

-Drilled through 1st plug-

-Currently are continued running into the hole, and drilling out

cement plugs as outlined in the drilling plan.

-During an attempted airlift this morning, due to a mechanical failure, a small release of fresh water was released within the containment area. The amount of fluid released was less than 5 barrels and appropriate actions were taken to clean up the release. BLM was at the location this morning and did not observe anything to be out of place. We believe that there is no need for concern.

**COA** Milestones

-We note that the pump test is coming up within the next few weeks, and are working to closely track all COA's associated with that event.

I will be returning to Provo tomorrow, where I will continue to track our COA progress. John Escabel will be the local contact in my absence from the site. I will forward his contact information to everyone on Monday. Please feel free to contact either of us with questions or concerns.

Thanks,

Jamie

Jamie Robinson Geologist Raser Technologies 5152 N. Edgewood Drive Provo, UT 84606 Office: 801.765.1200 Cell: 801.717.5563 jamie.robinson@rasertech.com

From: Sent: To: Cc: Subject: Chavez, Carl J, EMNRD Thursday, June 03, 2010 11:05 AM Ben Barker 'Layne Ashton'; Dade, Randy, EMNRD; Michael Hayter Unlined Pit and Plans to Line it

Ben:

Sorry for not getting back sooner. Send me a basic work plan on what you want to do (nothing fancy).

OCD regulations on temporary pits is available from Part 17.

OCD regulations on permanent pits is available from Part 36.

See OCD regulations at <u>http://www.emnrd.state.nm.us/ocd/documents/20098-5currentrules-new17and39.pdf</u>.

OCD recommends at least a 40-mil thermally sealed temperature resistant (EPDM/CSPE-R) liner or other liner as proposed and approved by OCD.

Please contact me if you have questions. Thank you.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 E-mail: <u>CarlJ.Chavez@state.nm.us</u> Website: <u>http://www.emnrd.state.nm.us/ocd/</u>index.htm (Pollution Prevention Guidance is under "Publications")

To: Ben Ba mike_s Cc: Michae	ay, June 01, 2010 1:53 PM arker; auldandy@hotmail.com; Phillips, Haddy L., OSE; Jackson, Charles L., OSE; smith@blm.gov; Chavez, Carl J, EMNRD el Hayter; Layne Ashton; rbageo@sbcglobal.net; Nick Goodman; delfortner@charter.net illing and COA updates for Lightning Dock 55-7

Good afternoon to everyone!

My name is Jamie Robinson, and I'm the geologist with Raser Technologies. I've also been tasked with being the compliance officer on the Lightning Dock 55-7 re-entry project. I'll be emailing you a brief update, highlighting where we are at COA's milestones we have reached.

If you have any questions, please don't hesitate to contact me. You can reach me by email jamie.robinson@rasertech.com, or by cell 801.717.5563

Drilling Plan

-Successful BOP test -Ran into the hole, tagged at 1378 ft -Circulated the hole -Currently [are continued running into the hole, and] drilling out cement plug{s} as outlined in the drilling plan.

**COA** Milestones

-BLM #1 (well sign) has been met. Required information has been posted at a conspicuous location at the well site 5/27/10.

-BLM #8 (dust control) is being monitored daily. The crew is very conscious of dust control, and has utilized the water truck for onsite dust control as necessary.

-BLM #9 (notification) for notification 5 days prior to beginning of operations has been met. Del Fortner contacted the LCDO on the 5/21/10 and a pre-spud meeting was held the 05/27/10.

-BLM #11 (limited light noise) is being monitored nightly. Light noise has been to those required to safely conduct operations in immediate work area.

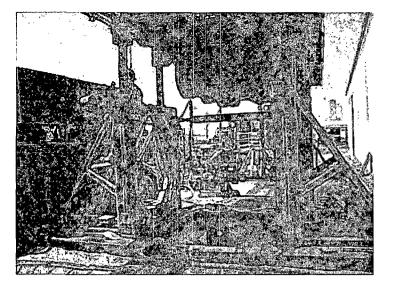
-OSE #1 (licensure) has been met. Barbour is licensed in the State of New Mexico in accordance with N.M. State. Ann. 72-12-12 (1998 Repl.).

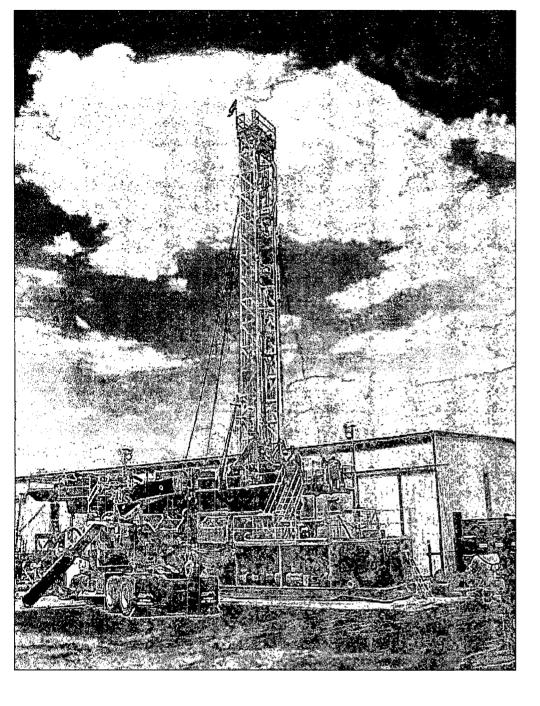
Thanks,

Jamie

Jamie Robinson Geologist Raser Technologies







From:	Gray, Darold, EMNRD
Sent:	Tuesday, June 01, 2010 8:24 AM
То:	Sanchez, Daniel J., EMNRD; Chavez, Carl J, EMNRD
Subject:	FW: BOPE test chart
Attachments:	scan0001.jpg
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Friday, I spoke to Andy Auld. He said they had the go-ahead from BLM to start some work on the well. They were going to put the well head on, and flange up the BOP and get that tested. He has sent me a copy of the chart from the BOP test. The only reason he called me is because he felt that he should let someone know what they were doing, and I was the only one that would answer my phone.

If you need more info, I can contact him, or I can provide you with his phone number. Andy is the onsite representative for Razer.

From: andy auld [mailto:auldandy@hotmail.com]
Sent: Saturday, May 29, 2010 9:13 PM
To: Gray, Darold, EMNRD; mike-smith@blm.gov; Ben Barker; Steve Harman
Subject: RE: BOPE test chart

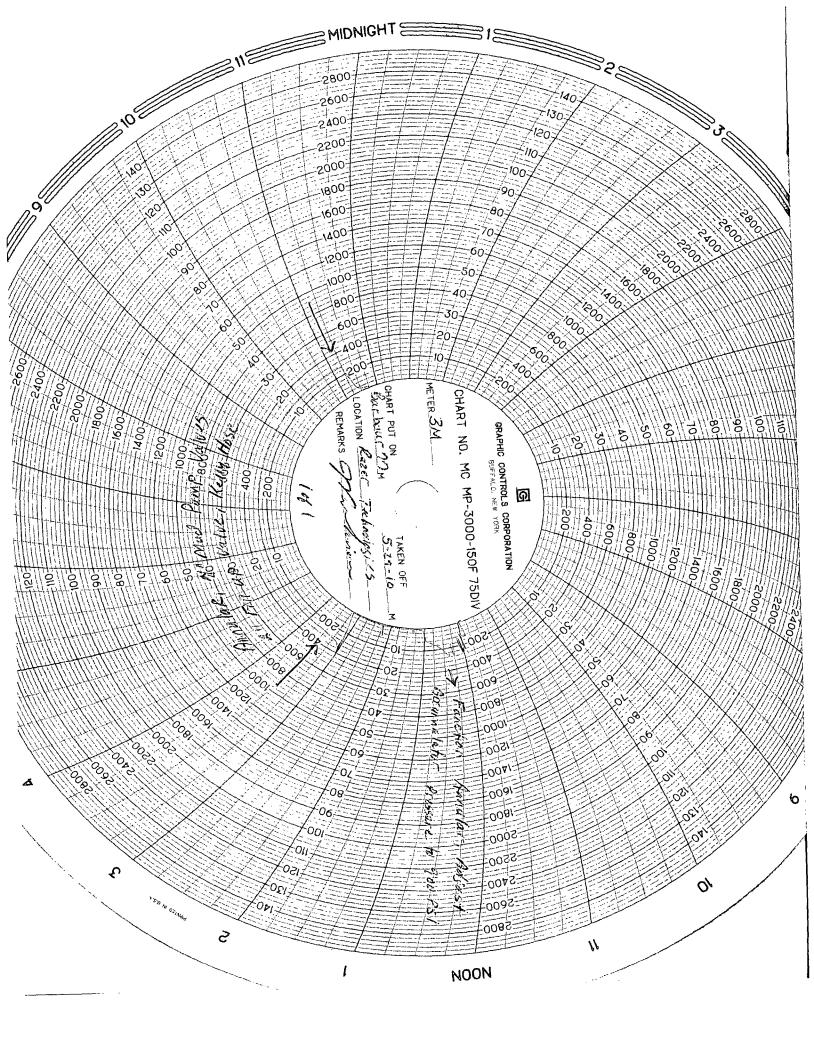
Sorry, this time attached. Thanks Andy

From: auldandy@hotmail.com To: darold.gray@state.nm.us; mike-smith@blm.gov; ben.barker@rasertech.com; steve.harman@rasertech.com Subject: BOPE test chart Date: Sat, 29 May 2010 20:06:41 -0700

HI everyone, here is scan of test chart for Lighting dock TFD 55-7. Tested annular to 250psi for 30min. tested O.K. Thanks Andy Auld/ Co. site representative.

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The New Busy is not the old busy. Search, chat and e-mail from your inbox. Get started.



From:Chavez, Carl J, EMNRDSent:Tuesday, May 04, 2010 3:03 PMTo:Reeves, Jacqueta, EMNRD; Dade, Randy, EMNRD; VonGonten, Glenn, EMNRDCc:Fesmire, Mark, EMNRDSubject:FW: Raser Project & API# (GTHT-001) TFD 55-7 G-101, 102 & 103 Forms

FYI.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 E-mail: CarlJ.Chavez@state.nm.us Website: http://www.emnrd.state.nm.us/ocd/index.htm (Pollution Prevention Guidance is under "Publications")

-----Original Message-----From: Mike\_Smith@blm.gov [mailto:Mike\_Smith@blm.gov] Sent: Tuesday, May 04, 2010 12:50 PM To: Chavez, Carl J, EMNRD Subject: RE: Raser Project & API# (GTHT-001) TFD 55-7 G-101, 102 & 103 Forms

Thanks Carl - this answers my questions regarding water quality.

Regarding wildlife - we will be requiring fencing too. Our Biologist is not going to allow netting, he claims it traps birds and bats. We are thinking of requiring streamers (which our bio says will break up the bird's view so they don't recognize the pit as a body of water) or the commercial "bird balls". I have talked to Layne Ashton about this, and Raser Tech is researching bird balls to see if they are sufficiently dense HDPE to withstand the expected temperatures. I am working with the BLM biologist on final avian protection measures. Once these are done, I will finalize the Federal COA.

Regards,

Michael Smith Geologist - BLM Las Cruces District Office 1800 Marquess Street Las Cruces, NM 88005 575-525-4421 Mike Smith@blm.gov

> "Chavez, Carl J. EMNRD" <CarlJ.Chavez@sta То te.nm.us> <Mike\_Smith@blm.gov>, "Reeves, Jacqueta, EMNRD" 05/04/2010 07:49 <Jacqueta.Reeves@state.nm.us> AM СС "Dade, Randy, EMNRD" <Randy.Dade@state.nm.us>, "VonGonten, Glenn, EMNRD" <Glenn.VonGonten@state.nm.us> Subject RE: Raser Project & API# (GTHT-001)

Re:

2) Closed-loop system work over wastes must not be discharged into the unlined pit. [drill cuttings and associated fluids must not be discharged into the unlined pit]

3) All water quality sampling and laboratory methods must be in accordance with the terms and conditions of the discharge permit (GTHT-001) and any discharge from the well to the unlined 170' x 170' x 12' pit must be approved by OCD-EB in advance of any discharge to the pit. OCD will approve the discharge of formation fluids that meets the greater of background and/or 20.6.2.3102 NMAC. Raser must document the back annulus quality of the ground water to OCD's satisfaction. [Yes, if the conditions are not met in this provision, the operator must cease operations and propose another solution to the problem for OCD consideration. OCD requires sampling during the rework to determine the condition of the ground water before pumping can be approved.]

Please find OCD-EB's responses to BLM questions provided above.

As an FYI, OCD discharge permit condition 11(C) (Below-Grade Tanks/Sumps and Pits/Ponds) related to migratory birds states:

"The owner/operator shall ensure that all exposed pits, including lined pits and open top tanks (8 feet in diameter or larger) shall be fenced, screened, netted or otherwise rendered non-hazardous to wildlife, including migratory birds. Where netting is not feasible, routine witnessing and/or discovery of dead wildlife and migratory birds shall be reported by the owner/operator to the appropriate wildlife agency with notification also provided to OCD in order to assess and enact measures to prevent the above from reoccurring."

Please contact me if you have questions. Let me know if you need a copy of the discharge permit. Thank you.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 E-mail: CarlJ.Chavez@state.nm.us Website: http://www.emnrd.state.nm.us/ocd/index.htm (Pollution Prevention Guidance is under "Publications")

-----Original Message-----From: Mike\_Smith@blm.gov [mailto:Mike\_Smith@blm.gov] Sent: Monday, May 03, 2010 10:35 AM To: Reeves, Jacqueta, EMNRD Cc: Chavez, Carl J, EMNRD Subject: RE: Raser Project & API# (GTHT-001) TFD 55-7 G-101, 102 & 103 Forms

Jacqui:

I apologize for the delay in returning your message. I have reviewed the OCD's Conditions of Approval for the 55-7 well, and I just have one question regarding OCD COA 3#. This OCD COA states that "OCD will approve the discharge of formation fluids that meets the greater of background and/or 20.6.2.3102 NMAC ". During review of this project, questions came up from the BLM biologist as to what would happen applicable standards were exceeded. What exactly does this approval process mentioned in OCD stipulation #2 mean? Would OCD require shut-down of the pump test until mitigations are formulated?

The other major issue the BLM biologist bought up was migratory bird protection. We are formulating bird protection measures which will be included as a BLM COA.

Regards,

Michael Smith Geologist - BLM Las Cruces District Office 1800 Marquess Street Las Cruces, NM 88005 575-525-4421 Mike\_Smith@blm.gov

> "Chavez, Carl J, EMNRD" <CarlJ.Chavez@sta То te.nm.us> "Reeves, Jacqueta, EMNRD" <Jacqueta.Reeves@state.nm.us> 04/22/2010 10:32 сс AM "VonGonten, Glenn, EMNRD" <Glenn.VonGonten@state.nm.us>, "Dade, Randy, EMNRD" <Randy.Dade@state.nm.us>, "Sanchez, Daniel J., EMNRD" <daniel.sanchez@state.nm.us>, <mike\_smith@blm.gov> Subject RE: Raser Project & API# (GTHT-001) TFD 55-7 G-101, 102 & 103 Forms

(Embedded image moved to file: pic18813.gif) By receipt of this e-mail and with communication to the BLM on the OCD's approval with conditions for the proposed TFD 55-7 work, please find attached the OCD draft conditions for the BLM to consider for their approval or disapproval of the well workover, etc. Mike Smith is welcome to contact me directly for any input into the conditions by the OCD for our joint communication.

Thanks Jacqui.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 E-mail: CarlJ.Chavez@state.nm.us Website: http://www.emnrd.state.nm.us/ocd/index.htm (Pollution Prevention Guidance is under "Publications")

From: Reeves, Jacqueta, EMNRD

Sent: Thursday, April 22, 2010 9:44 AM To: Chavez, Carl J, EMNRD Cc: VonGonten, Glenn, EMNRD; Dade, Randy, EMNRD; Sanchez, Daniel J., EMNRD; mike\_smith@blm.gov Subject: RE: Raser Project & API# (GTHT-001) TFD 55-7 G-101, 102 & 103 Forms

Carl,

Since this is a federal well I need to have a BLM approval before I assign an API #. I talked to Mike Smith with the BLM and the GDP submitted is still being reviewed. Hopefully it will be signed off on sometime next week. It is this districts policy to have BLM wells approved by the BLM before an API # is assigned. Mr. Smith will let me know as soon as the GDP for this well is approved and then I will assign the API #.

From: Chavez, Carl J, EMNRD Sent: Thursday, April 22, 2010 7:01 AM To: Reeves, Jacqueta, EMNRD Cc: Ben Barker; Layne Ashton; Dade, Randy, EMNRD; VonGonten, Glenn, EMNRD Subject: Raser Project & API# (GTHT-001) TFD 55-7 G-101, 102 & 103 Forms

Jacqueta:

Can I expect to receive the new API# by tomorrow? Please share the API# with copied Ben Barker and Layne Ashton so they may move forward with the bond submittal. Once OCD-EB has reviewed the bond and issued an approval letter, OCD Artesia will need to sign the G-Forms for the Administrative Record and this will authorize Raser to begin the project under OCD requirements....

OCD-EB has conditions for approval of the TFD 55-7 work.

Please contact me if you have questions. Thanks.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 E-mail: CarlJ.Chavez@state.nm.us Website: http://www.emnrd.state.nm.us/ocd/index.htm (Pollution Prevention Guidance is under "Publications")

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[attachment "TFD 55-7 Well Workover 4-22-2010.doc" deleted by Mike Smith/LCFO/NM/BLM/DOI] Confidentiality Notice: This e-mail, including all attachments is for the sole use of the intended recipient(s) and may contain confidential and privileged information. Any unauthorized review, use, disclosure or distribution is prohibited unless specifically provided under the New Mexico Inspection of Public Records Act. If you are not the intended recipient, please contact the sender and destroy all copies of this message. -- This email has been scanned by the Sybari - Antigen Email System.



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### 707-508-9963 mobile

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Subject: Print jobs for delivery, message 1 of 2 Date: Mon, 12 Apr 2010 21:19:50 -0600 From: Ben Barker <Ben.Barker@rasertech.com> To: usa0463@fedex.com CC: Layne Ashton <lashton@rasertech.com>

This is the first of two email orders. This is for 4 copies each of 3 files.

Please print 4 copies each of the attached files for local delivery before 10:30 a.m. Tuesday, April 13.

No proof copies are needed.

Please-charge-this\_to\_our-corporate account, Raser Technologies, 2803-2084-6.

The recipient is:

Mr. Carl Chavez

New Mexico Energy, Minerals and Natural Resources Department

Oil Conservation Division

Wendell Chino Bldg.

1220 South St. Francis Drive, Third Floor

Santa Fe, NM 87505

Please call any time with questions.

Thanks,

Ben Barker

**VP** Resource Management

Raser Technologies

5152 N. Edgewood Drive

Provo, UT 84604

### 707-838-0238 home/office

707-508-9963 mobile

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Fed Ex Kinko's.

### Quality-Check Sign-Off CHNOLOGIES Phone: (707) 838-0238

Account:RASER TECHNOLOGIES

### Customer: Ben Barker

Order Number: 04630122B Order Date: 04/13/2010 Order Time: 06:36 Taken By: Justin F Order Due Date: 04/13/2010 Order Due Time: 12:00 Ship By: 04/13/2010 Originating Store: Store 0463 QC Approval Date: 84/13/2010

order was immediate We apprec future.

We have completed your order according to your instructions. In the event your order was not completed in accordance with your expectations, please notify us immediately.

We appreciate your business and look forward to meeting your needs in the future.

Center Manager

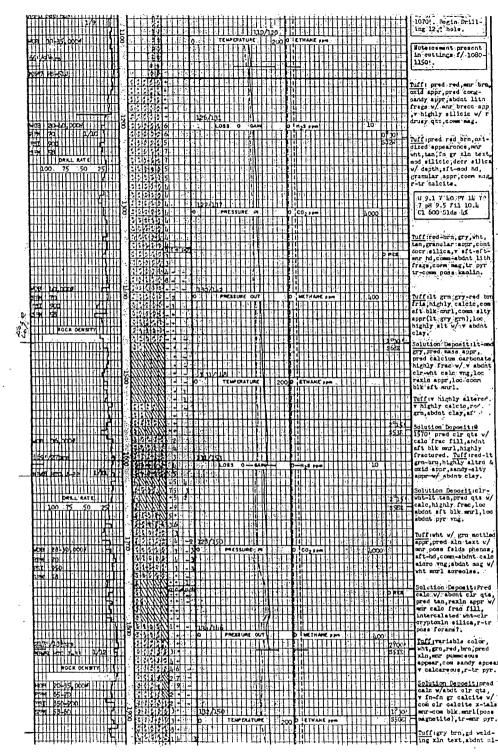
	Team Member Initials	Date/Timestamp					
Customer Consultant:	Justin F	04/13/2010 06:36					
I took your order and repeated back your instructions.							
Production Project 1 : 8.5x11							
BW Pages Operator:	Justin F	04/13/2010 06:43					
I checked all previous work a	I checked all previous work and produced your order according to the instructions.						
Color Pages Operator:	Justin F	04/13/2010 06:43					
l checked all previous work a	necked all previous work and produced your order according to the instructions.						
Final Quality Check:	Justin F	04/13/2010 06:43					
I checked all previous work and produced your order according to the instructions.							
To the best of my knowledge, this order meets your expectations.							
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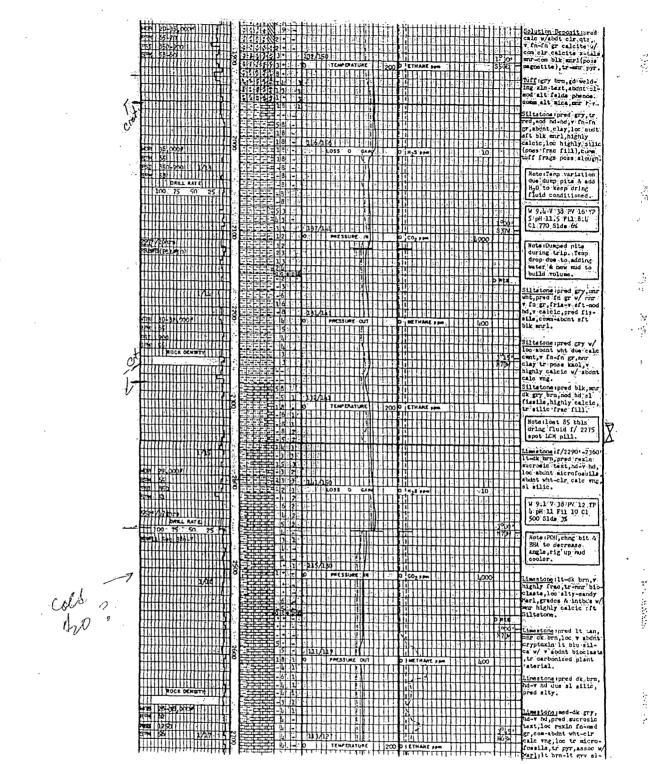


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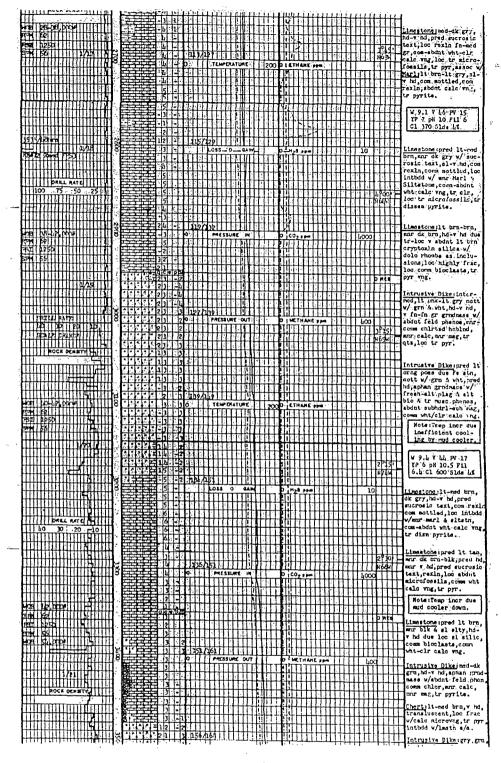


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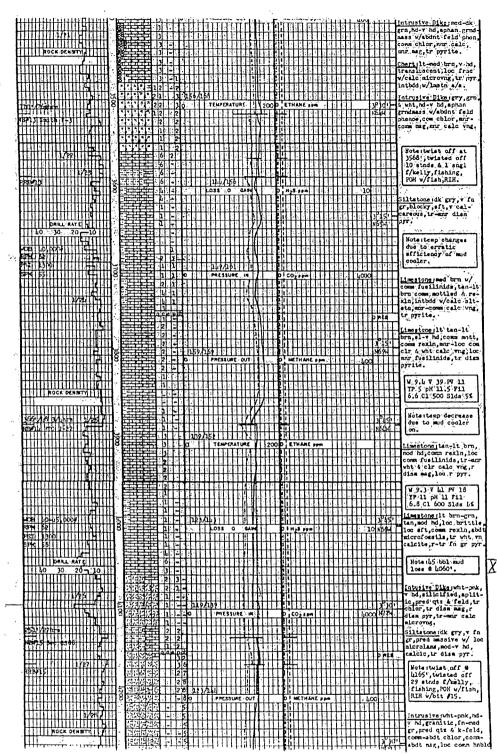
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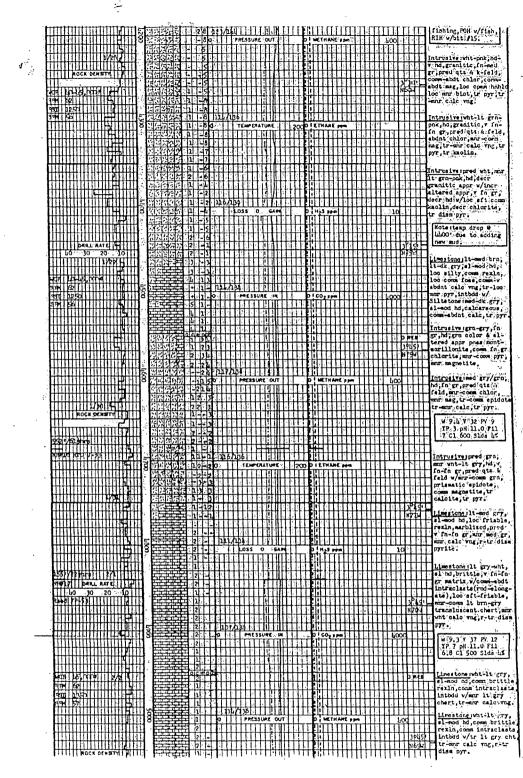
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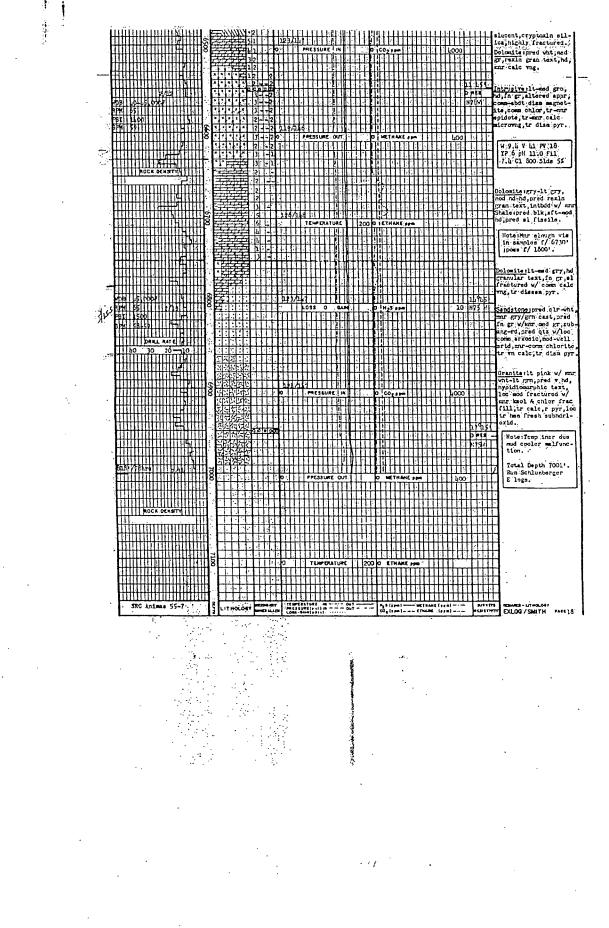
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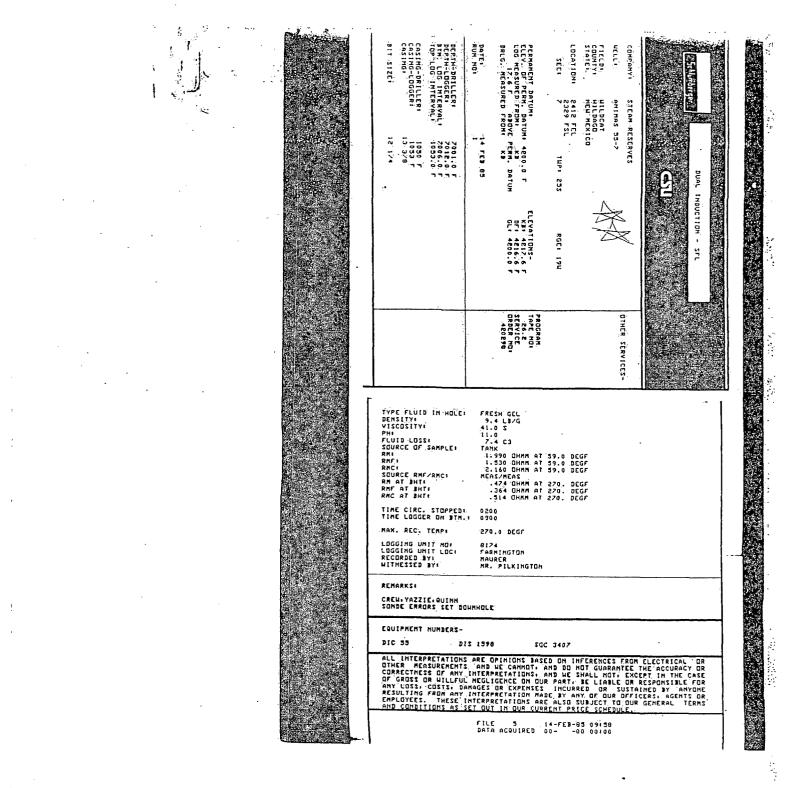
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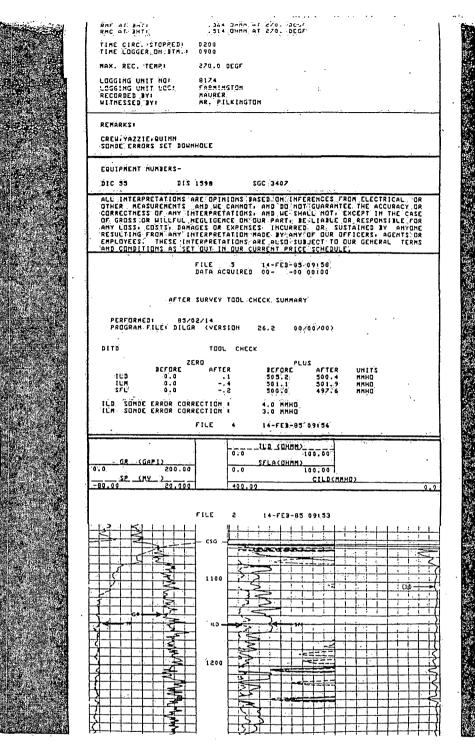
ABANDONMENT WORK ANIMAS 55-7 DECEMBER 20-23, 1985 John E. Deymonaz

12/20 Halliburton and American Well Servicing Co. move equipment to Lordsburg, N.M.

- 12/21 American moves workover nig to Animas 55-7 and sets up. Worked tubing for 2 hours, pulling up to 100,000 pounds, could not pullfree. Halliburton arrived about noon, hooked up pumps and circulated through tubing for 2 hours while American worked the tubing. Pulled free about 2 PM. Pulled tubing back to 5500 feet and set 70 sack (98 cubic feet) plug from 5500-5400 feet. Pulled 33 joints and circulated. After 30 minutes circulation hole began unassisted two-phase flow which lasted for about 30 minutes. Flow was through 3 inch flow line at bottom of wellhead. Leakage at top of wellhead was prevented by stripper assembly.
- 12/22 Circulate through tubing, well began unassisted two-phase falow for about 30 minutes. Pulled tubing to 2090 feet and set 170 sack plug (238 cubic feet) from 2090-1890 feet. Stood back six stands of tubing (600 feet) and WOC for three hours. RIH, tag cement at 1980 feet. Pull tubing to 1500 feet and set 100 sack plug (140 cubic feet) from 1500-1400 feet. Pull tubing to 1100 feet, set 80 sack plug (112 cubic feet) from 1100-1000 feet stand back six stands and WOC three hours. RIH, tag cement at 1050 feet. Pull tubing to 50 feet and plug from 50 feet to surface using 50 sacks (56 cubic feet). Flush out wellhead with water, shut down.
- 12/23 American and Halliburton rig down equipment and leave location. Dale Burgett crew dig out cellar below wellhead, out off wellhead and erect monument of 4 inch casing. Cellar will be filled in and monument will be approximately six feet above ground level.
- Equipment removed from well and laid down on drill pad includes: 213 joints (7189 feet) of J55 2-7/8 inch tubing. Includes 4 joints already on location.
  - 2-7/8 inch Baker Model L sliding sleeves.
  - 2-7/8 inch bull nosed check valve. 1
  - 3 inch Barton geothermal gate valves.
  - 13 5/8" x 7 1/16" adapter spool.
  - 7 1/16" x 2 7/8" 8 round 3M adapter spool. 1
  - 13 5/8" x 13 3/8" casing hear w/ 2 3" ext. flanges. 1
  - 3 inch companion flanges. 2
  - Misc studs and nuts.

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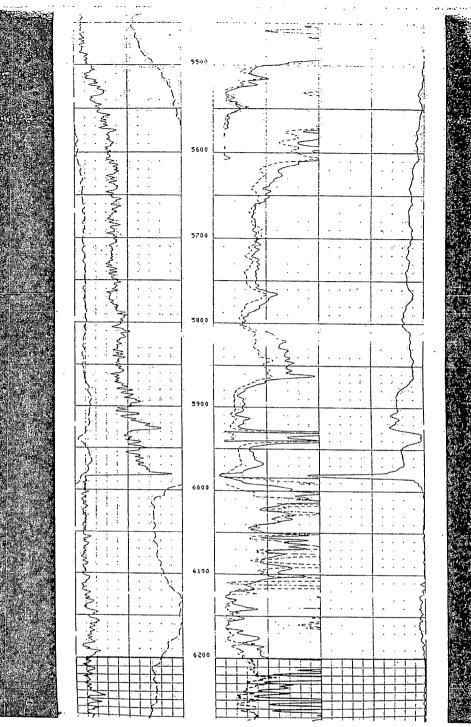
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Casing Record Size Surface String 13.375 Prot. String Production String Liner	Company     RASER TECHNOLOGIES       Company     Well       55-7     Field       County     Field       RASER TECHNOLOGIES     Field       County     Field       County     Field       Rosettre     County       Well     55-7       Rosettre     County       HiDALGO     County       Well     Sec       Date     County       Permanent Datum     Sec       Date     Drilling Measured From       Copen Hole Size     Drilling Measured From       Density / Viscosity     Interval       Density / Viscosity     Interval       Max. Recorded Temp     Interval       Density / Viscosity     Interval       Time Logger on Bottom     Interval       Recorded By     Interval       Witnessed By     M       Borehole Record     M       Borehole Record     M	Baker Atlas
ze Wat/Ft 375 54	RASER TECHNO 55-7 ROSETTE HIDALGO HIDALGO HIDALGO API# SEC TWP AIL I1-MARCH-2008 ONE N/A 1025 SURFACE N/A 1025 SURFACE N/A 1025 SURFACE N/A 1025 SURFACE N/A 1025 SURFACE N/A 1100 HRS 1100 HRS 1100 HRS SURFACE N/A SURFACE N/A SURFACE N/A SURFACE N/A SURFACE N/A SURFACE N/A SURFACE N/A SURFACE N/A SURFACE N/A SURFACE N/A SURFACE N/A SURFACE N/A SURFACE N/A SURFACE SURFACE N/A SURFACE SURFACE SURFACE N/A SURFACE SURFACE N/A SURFACE SURFA	<b>GHES</b> IM
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correctness of any in	ion LG es	the accuracy or le for any loss, costs,
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	LOG TO WIRELINE MESURMENTS. HAVE NO RECORD OF CASING WT. ONLY GOING BY CALIPER READING.	

BAKER HUGHES			MIT Re	MIT Report Overview	view	
Baker Atlas				P		
Well: Field: Company: Country:	Well # 55-7 ROSETTE RASER TECHNOLOGIES USA		Survey Date: Tool Type: Tool Size: No. of Fingers: Analyst:	3-1 8.0 01t	3-11-2008 Sondex Multifinger Imaging Tool 8.0″ /80-Artus 80 Oplando Laso	oot
Pipe: Non.OD 13.375 ins	Weight S4.52 ppf	Grade & Thread	Nom.HD 12.615 ins	Nom. Upset 14.351 ins	Upper len. 2.4 ins	Lower len. 2.4 ins
hese results were generated he data was acquired using :	These results were generated semi-automatically, using Sondex MITPro software Ver The data was acquired using a Sondex Multifinger Innging Tool. Sondex accepts no	Sion .	Analysis Overview 1,04,			
.If it cans in the string are refe loss-overs. Normal joints ar hort joints and completion it	All items in the string are referred to as 'Joints'. This includes completion items success-overs. Normal joints are identified by integer numbers, sequential in depth. Short joints and completion items are identified by numbers after the decimal point.	All items in the string are referred to as 'Joints'. This includes completion items such as cross-overs. Normal joints are identified by integer numbers, sequential in depth. Short joints and completion items are identified by numbers after the decimal point.				
Al penetrations and projectic ffective. The damage classif	ms are measured by local, su fication scheme is described :	All penetrations and projections are measured by local, surface shape analysis, where this is effective. The damage classification scheme is described at the end of the Joint Tabulations.				
, total of 28 joints were ana	A total of 28 joints were analysed, of which (0) have possible holes.	sible holes.				
The most deeply penetrated joints: pit depths to 0.097 ins in Joint 22 pit depths to 0.084 ins in Joint 21 pit depths to 0.065 ins in Joint 21 pit depths to 0.06 ins in Joint 10 pit depths to 0.06 ins in Joint 19 pit depths to 0.036 ins in Joint 1	joints in Joint 22 in Joint 21 in Joint 20 n Joint 19 in Joint 1 in Joint 3					
The most restricted joints: projections to 0.108 ins in Joint 2 projections to 0.083 ins in Joint 1 projections to 0.064 ins in Joint 27 projections to 0.058 ins in Joint 19	in Joint 2 in Joint 1 in Joint 27 in Joint 19					
Disclaimer All interpro or correctu	stations are opinions ba ess of any interpretation costs, dannages or ext	r All interpretations are opinious based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretations made by any of our officers.	rical or other measure the case of gross or y by anyone resulting fi	ments and we canne wilful negligence on onn any interpretatio	of and do not guarant our part, be liable or ous made by any of o	the accuracy responsible ur officers

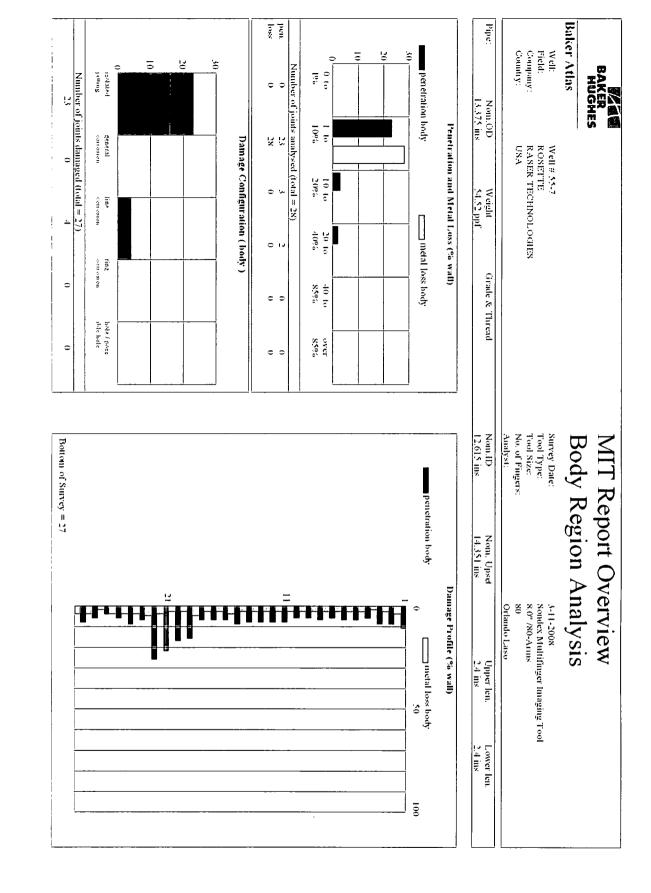
Analysis Overview page 1

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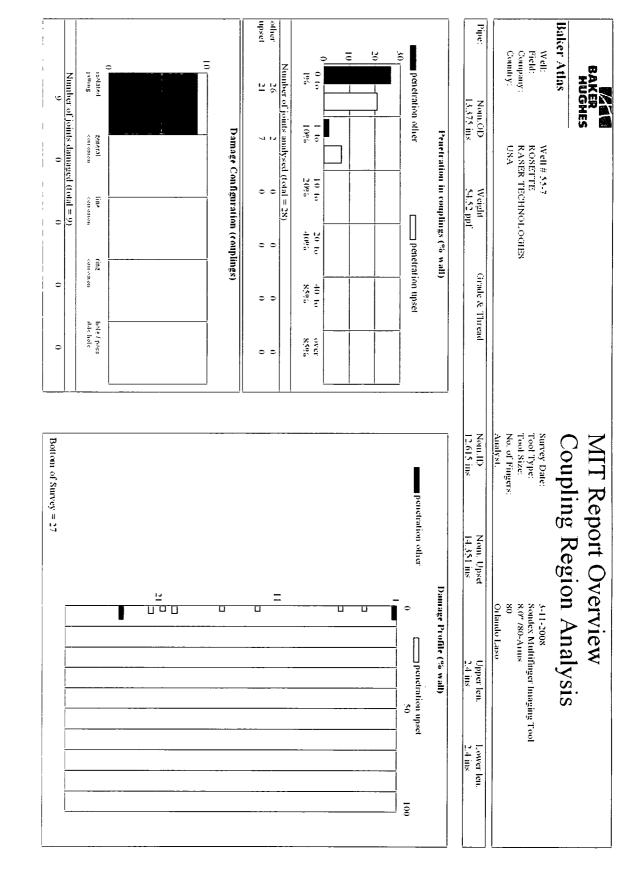
BAK	BAKER HUGHES			MIT Report Overview	port Ove	erview	
<b>Baker Atlas</b>	-				I		
Well:	\Vel	Well # 55-7		Survey Date:		3-11-2008	
Field:	ROS	ROSETTE		Tool Type:		Sondex Multifinger Imaging	Tool
Company		RASER TECHNOLOGIE	X	Tool Size:		8.0" /80-A1118	
Country:	USA	-		No. of Fingers:		08	
				Analyst.		Orlando Laso	
Pipe:	Nom.OD 13.375 ins	Weight S4.S2 ppf	Grade & Thread	Nom.ID 12.615 ins	Nom. Upset 14.351 ms	Upper len. 2.4 ins	Lower len. 2.4 ins

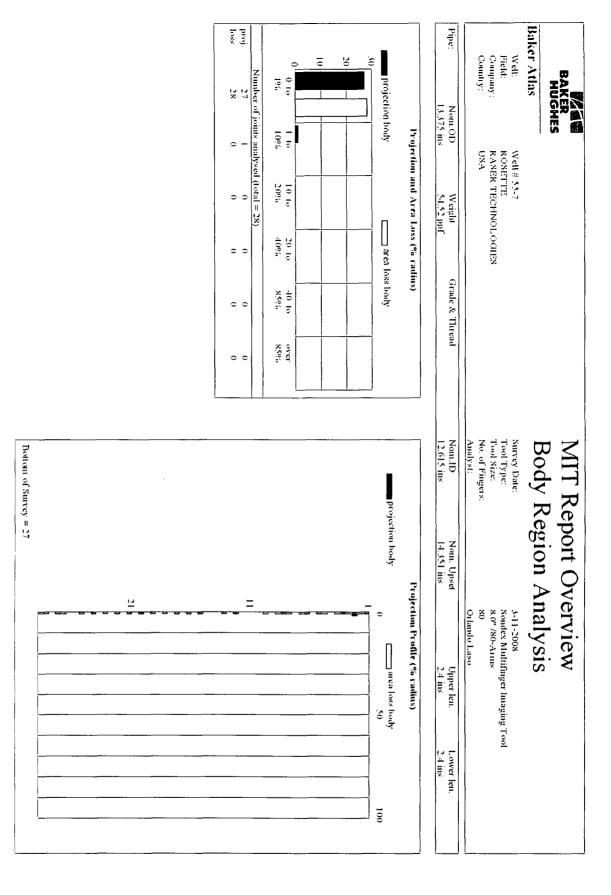
Nethally 2

This casing appears to be in good condition. A trace of metal loss associated to drill wear was detected from 680 ft to 825 ft (joints 19 through 22). The deepest wall penetration was detected at 814 ft (jt.22) where metal loss reached 26%. Joint 21 at 759 ft has a wall penetration of 22%. The rest of the drill wear trace graded within the Class 1 range (1 to 20%). Please review the "MIT REPORT JOINT TABULATION SHEEF" for more details. Hardware, a float collar, was detected at 950 ft. Minor accumutation of deposits were detected in joint 1.2 and 3.



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## MIT REPORT JOINT TALLY SHEET

: 13-375 ins - 54,52 ppf 1 thickness: Body = 0.380 ins - Upset = 0.868 ins tinal ID: 12.615 ins

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3.375	5	12.615	12,747	12.749	39.44	716.22	
3.375		12.615	12.726	12.728	38.43	677.80	
3.375	5	12.615	12.705	12.707	38.47	639.33	
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3.375	1.3	12.615	12.649	12.651	38.46	\$24.12	
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3.375	5	12.615	12,601	12.603	37.47	329.96	
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3.375	1.5	12.615	12.602	12.605	39.48	213.33	
3.375	5	12.615	12.604	12.609	39.51	173.82	
3.375	1.3	12.615	12.611	12.617	39.49	134.33	
3.375	1.3	12.615	12.599	12.604	38.01	96.33	
13.375	1.5	12.615	12.589	12.593	38.45	\$7.88	
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Well: Field: Company: Country: Survey Date:

> Welf # 55-7 ROSETTE RASER TECHNOLOGIES USA

3-11-2008

 Joint
 Depth
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Joint Tally page 1

# MIT REPORT JOINT TABULATION SHEET

	sits in body.	<u>Isolated shallow pitting with light deposits in body</u>	064 12.447		4 0	8	.032	0	¢	
	sus in body.	Isolated strainow printing with high deposits in body	12.04		4	0		6	0	ļ
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		FLOAT COLLAR Oval	12.468	•	0 0		210	0	•	<u>0</u>
	sits in body.	Isolated shallow pitting with light deposits in body	082 12.560		<u>+</u>	9	.024	C	c	
	sits.	Isolated shallow pitting with light deposits	036 12.576	.029 .0	-	9	.034	.026	C	
		Isolated shallow pitting with light deposits in body.	046 12.622		4 0	7	520.	0	e	
	Line corrosion with light deposits in body.	26% anomaly @ \$14', drill wear assoc. Line corrosion with light deposi	046 12.630		5 0	1.2	.097	0	9	
	Line corrosion with light deposits.	22% anomaly @ 759', drill wear assoc. Line corrosion with light depos	050 12.648		4	Ņ	.084	0	.036	[
	corrosion with light deposits.	Minor drill wear in joint. Line shallow corrosion with light deposits.	052 12.626		3 0	17	.065	0	.026	
	corrosion with light deposits.	Minor drill wear in joint. Line shallow corrosion with light deposits.	058 12.582		3	16	.060	0	.032	
	sits in body.	Isolated shallow pitting with light deposits in body	040 12.576		5 0	7	.027	0	0	
	sits in body.	Isolated shallow pitting with light deposits in body	.046 12.570		ω 0	-	.028	=	=	
	sits in body.	Isolated shallow pitting with light deposits in body	.044 12.552	 	3 0	7	.026	0	C	
	sits.	Isolated shallow pitting with light deposits	048 12.520		4	9	.034	•	026	
	sits in body.	Isolated shallow pitting with light deposits in body	030 12:204	030 0	<u>ب</u>	×	.030	6	C	
	sits in body.	isolated shallow pitting with light deposits in body	+			) ~	.030	=	=	ļ
	SHS.	Isolated shallow pitting with fight deposits				•	-02-		010	ļ
		Landard also have a define and the factor of the	-+		~	0	111	=	7.00	
	sits in body.	Isolated shallow pitting with light deposits in body			3 0	×	.031	0	=	
	t deposits in body.	Oval. Isolated shallow pitting with light deposits in body	022 12.451		3 0	6	.022	C	=	
	sits in body.	Isolated shallow pitting with hight deposits in body	026 12.480		3	9	.022	=	9	
	sits in body.	Isolated shallow pitting with light deposits in body	038 12.495	046 .0	~	7	.028	=	0	ļ
	sits in body.	Isolated shallow pitting with light deposits in body	024 12.506	.0	3 0	6	.024	0	C	
	sits in body.	Isolated shallow pitting with light deposits in body	036 12,499		3	7	.026	=	c	
	sits.	Isolated shallow pitting with light deposits	.044 12.492		3 0	7	.028	0	.026	ļ
	sits in body.	Isolated shallow pitting with light deposits in body	030 12.504	  .	3 0	6	.023	0	0	ļ
	sits.	Isolated shallow pitting with light deposits	050 12.470	.036 .0	.) 	9	.036	c	.028	ļ
	r body.	Isolated shallow pitting with deposits in body	108 12.465	.032 .1	ω	9	.0.53	С	c	ļ
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(% watt)		Comments	Body ID	Cplng B.	Loss C	-	Body	Other	Upset	
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metal loss body	USA	County:								
penetration body	RASER TECHNOLOGIES	Company:						mat 110° 12.618 ms	1 IOI II	11131
	RONETTE	Field:		ins.	= 0.868	Upset	thickness: $13$ ody = 0, 380 ms. Upset = 0.868 ms	Body =	tekness:	H
	Well # 55-7	Well:				:	ldd	add 7 Circles	13.377 ms	5
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Pipe Tabulations page 1

(ground sh netration: - 20% stal Joss: - 20%	age classi aration / p stration / p ng - damag me - damag meral - dan alated - dan alated - dan alated report lat line ten
geround shading percentage thresholds         10%6         20%6         21 + 40%6         41 - 50%6         51 + 100%6	rage classification scheme fration / projection class, in order of damage severity de - penetration exceeds 70% of nominal wall thickness ng - damage area exceeds 50% of circumference, but depth range does not exceed 2 * pipe ID ne - damage depth range exceeds 4 * pipe ID, but extends less than 30% of circumference, meral - damage depth range exceeds 2 * pipe ID and/or extends more than 30% of circumference. dated - damage depth range does not exceed 4 * pipe ID or extends more than 30% of circumference, age reporting threshold = 20 thou inches deviation in body, 25 thou in coupling, all line length = 1.667 feet.

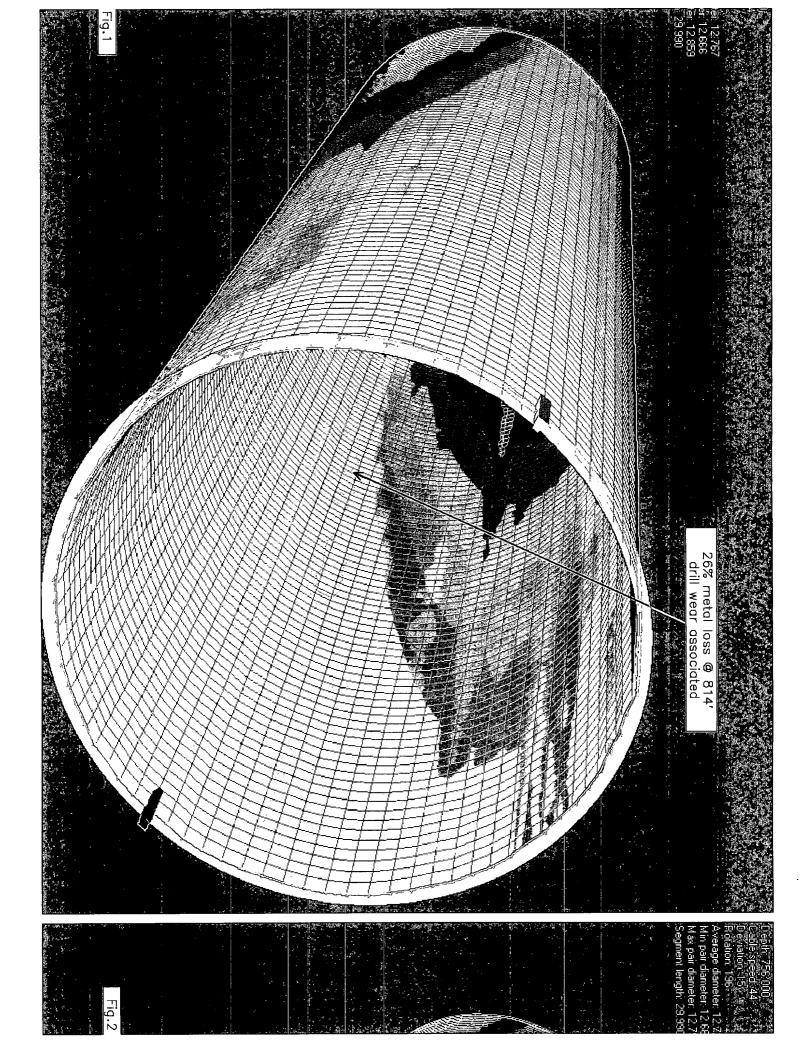
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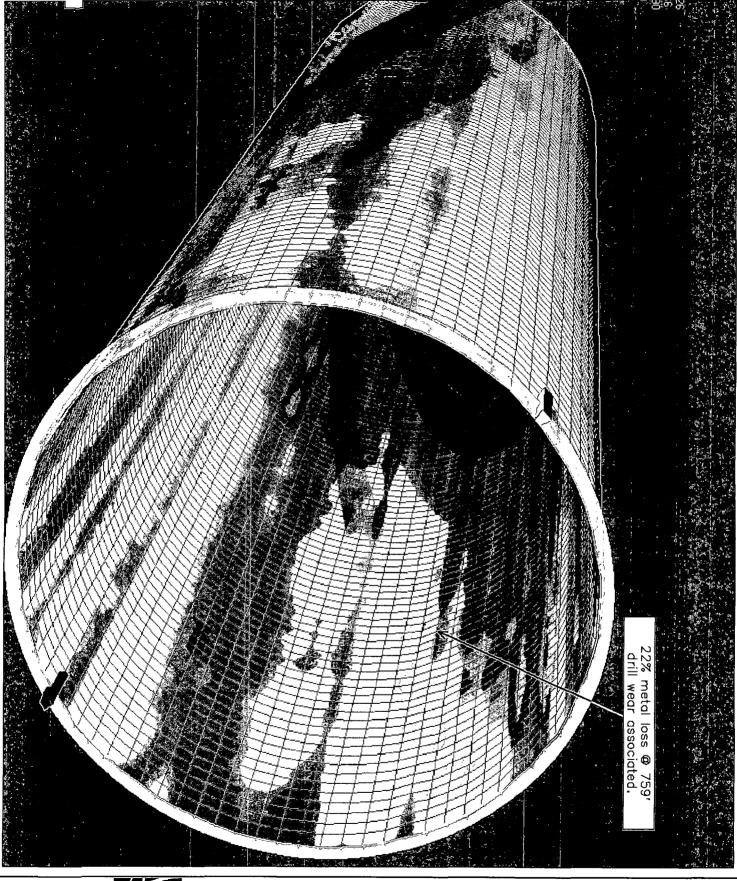
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Pipe Tabulations 2

A. A.S.

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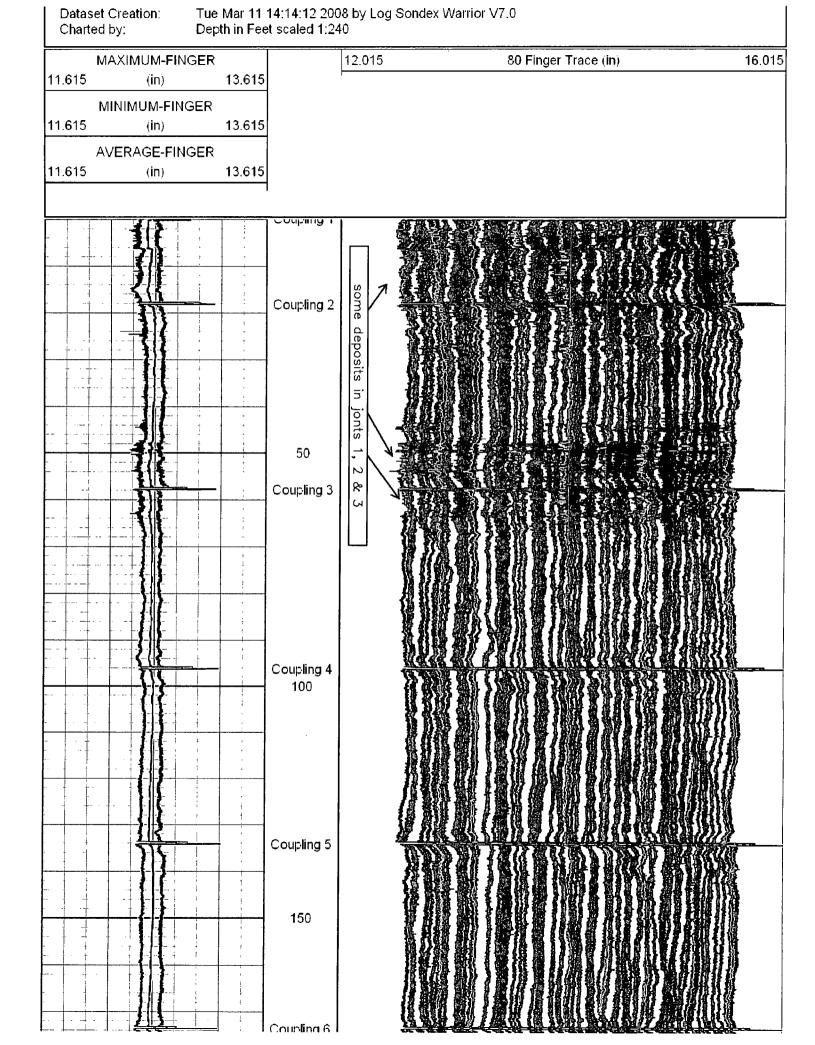




#### **MAIN PASS**

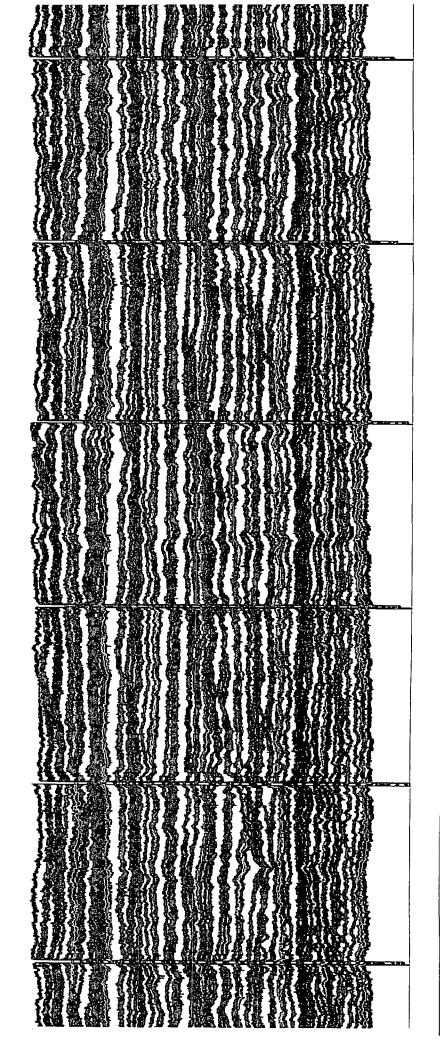
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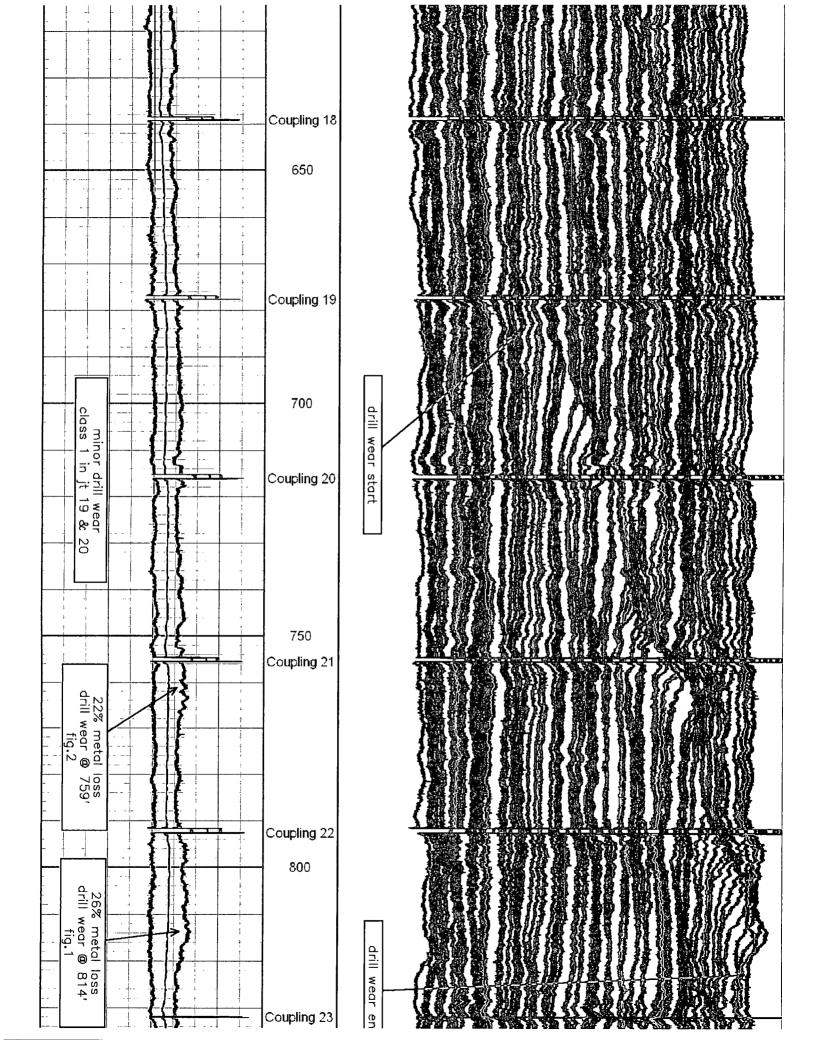
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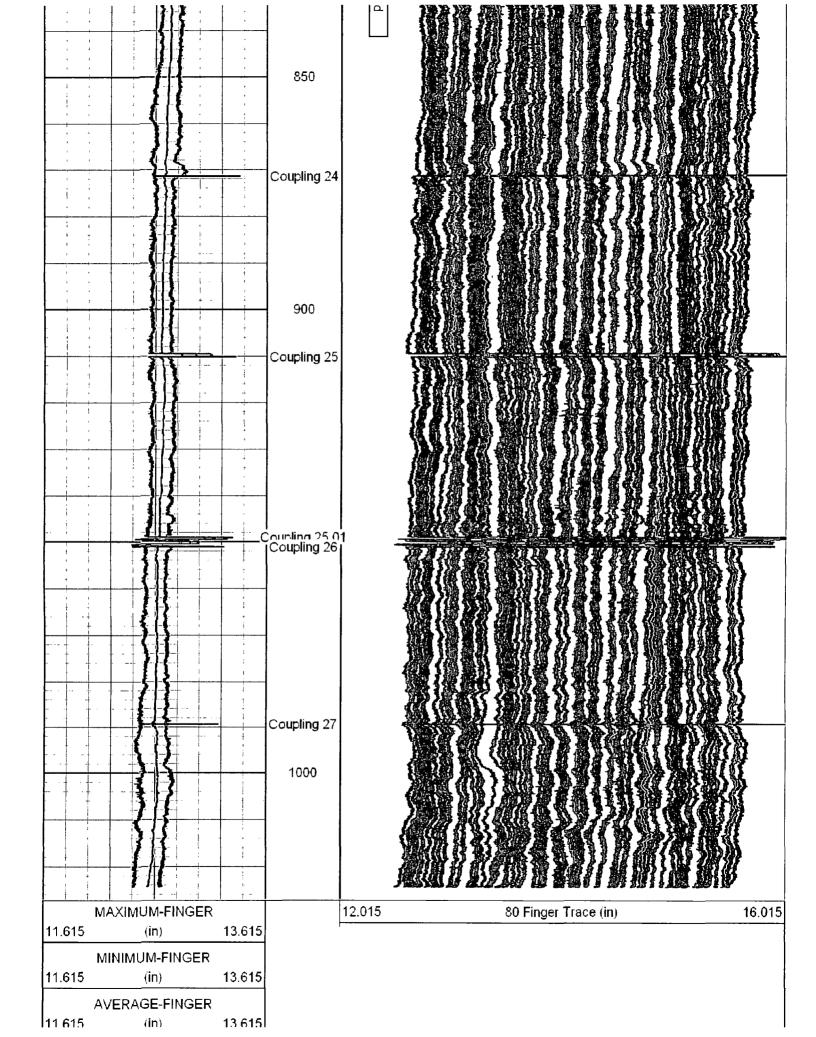


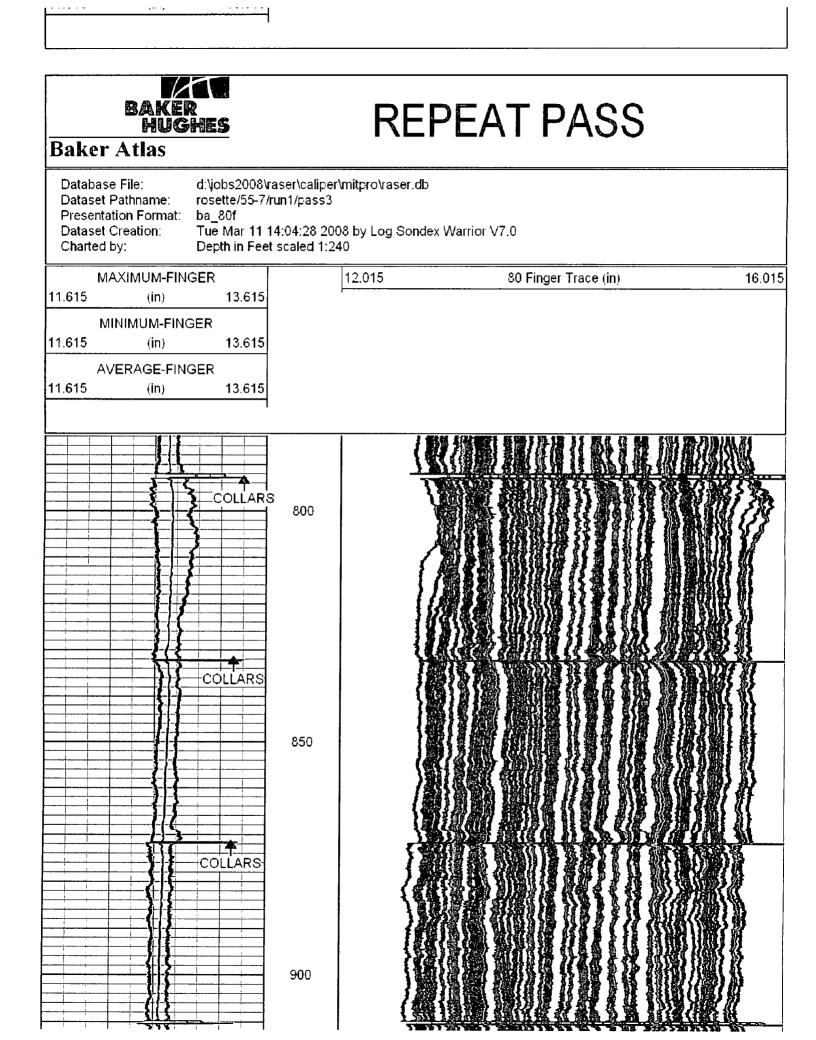
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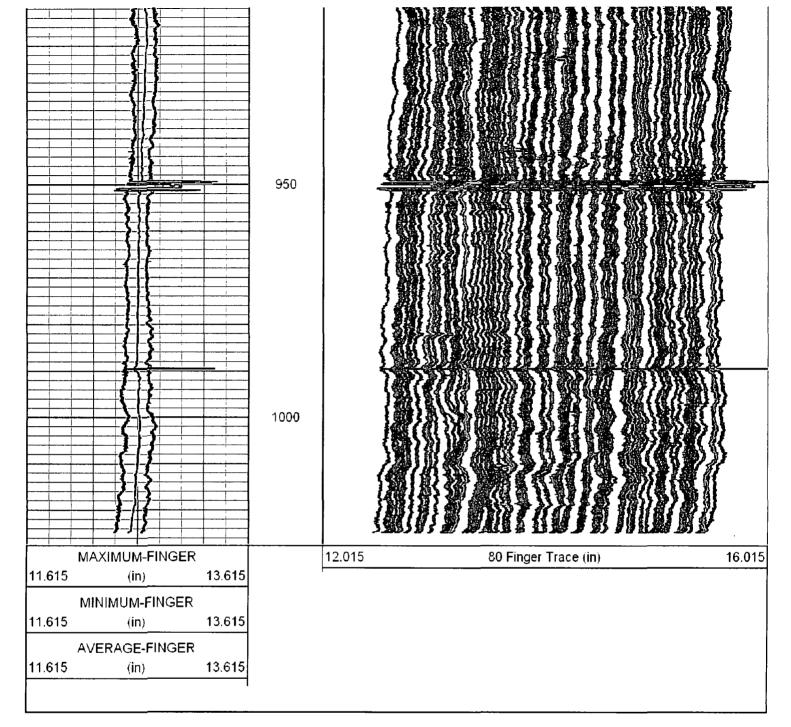
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	Coupling 17
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M	ulti-finger Imaging T	ool Calibration Rep	ort
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	Inclinometer Ca	alibration Report	
Perfor			5:06:51 2006
	ation Angle:	55	
		Inc X	Inc Y
∨ertical:		5 <b>4</b> 4	527
Finger 1 up:		532	501
Finger 61 up:		508	537
Finger 41 up:		556	554
Finger 21 up:		581	520
Sensitivity ratio:	1.3806		
X-axis angle:	162.008		

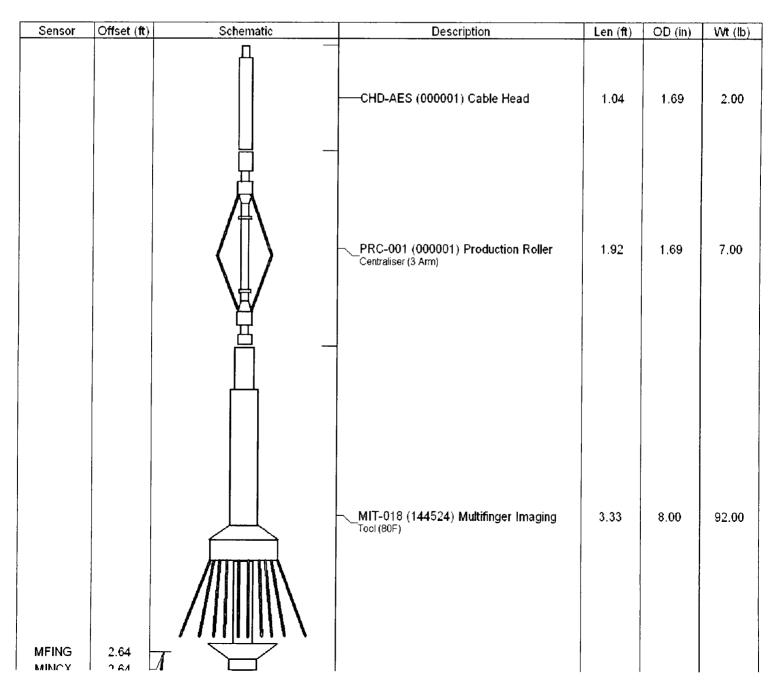
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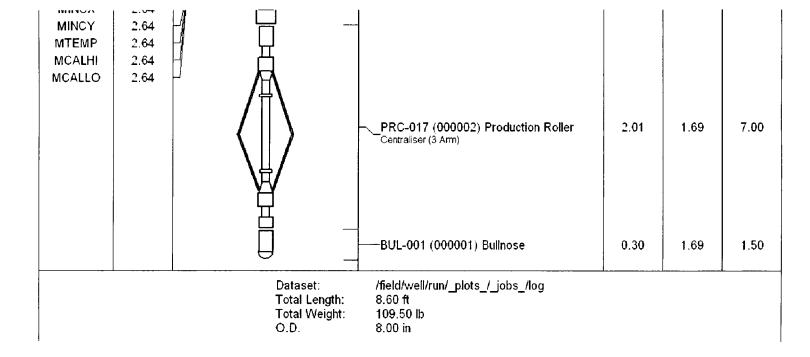
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Finder Calibration Report

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Finger 02:	214	89.0	303	95.0 100 0	398	102.0	500 570	93.0	593 669	101.0	694 770	
Finger 03:	252 254	104.0 111.0	356 365	106.0 118.0	462 483	110.0 123.0	572 6 <b>0</b> 6	97.0 111.0	669 717	103.0 110.0	772 827	
Finger 04: Finger 05:	204 185	101.0	286	108.0	403 394	123.0	508	106.0	614	116.0	730	
Finger 06:	133	95.0	228	103.0	331	111.0	<b>4</b> 42	105.0	547	117.0	664	
Finger 07:	118	96.0	214	111.0	325	115.0	440	115.0	555	127.0	682	
Finger 08:	161	95.0	256	105.0	361	109.0	470	104.0	574	114.0	688	
Finger 09:	233	107.0	340	1 <b>1</b> 3.0	453	116.0	569	108.0	677	115.0	7 <b>9</b> 2	
Finger 10:	247	110.0	357	114.0	471	115.0	586	106.0	692	111.0	803	
Finger 11:	194	96.0	290	102.0	392	104.0	496	103.0	599	116.0	715	
Finger 12:	233	107.0	340	110.0 107.0	450	113.0	563 467	112.0 109.0	675 576	118.0	793 608	
Finger 13: Finger 14:	152 205	99.0 101.0	251 306	107.0	358 409	109.0 104.0	467 513	109.0	619	122.0 116.0	698 735	
Finger 15:	139	97.0	236	103.0	338	104.0	442	110.0	· 552	117.0	669	
Finger 16:	207	102.0	309	105.0	414	105.0	519	110.0	629	115.0	744	
Finger 17:	102	0.88	190	93.0	283	95.0	378	104.0	482	113.0	595	
Finger 18:	272	112.0	384	1 <b>1</b> 6.0	500	109.0	609	120.0	729	110.0	839	
Finger 19:	182	98.0	280	10 <b>1.0</b>	381	97.0	478	106.0	584	100.0	684	
Finger 20:	332	117.0	449	117.0	566	109.0	675	114.0	789	96.0	885	
Finger 21:	163	100.0	263	99.0 101.0	362	96.0	458 555	108.0	566	107.0	673 702	
Finger 22:	247 178	104.0 101.0	351 279	104.0 105.0	455 384	100.0 101.0	555 485	114.0 116.0	669 601	113.0 117.0	782 718	
Finger 23: Finger 24:	197	101.0	275	103.0	400	99.0	405	113.0	612	117.0	726	
Finger 25:	249	101.0 1 <b>1</b> 1.0	360	113.0	473	108.0	<b>5</b> 81	115.0 115.0	696	117.0	813	
Finger 26:	249	110.0	359	111.0	470	105.0	575	116.0	691	114.0	805	
Finger 27:	2 <b>0</b> 2	105.0	307	107. <b>0</b>	414	103.0	517	122.0	63 <del>9</del>	11 <del>9</del> .0	758	
Finger 28:	128	100.0	228	102. <b>0</b>	330	102.0	<b>43</b> 2	121.0	553	122.0	675	
Finger 29:	167	103.0	270	107.0	377	101.0	478	120.0	598	115.0	713	
Finger 30:	128	103.0	231	107.0	338	104.0	442	127.0	569	125.0	694	
Finger 31:	197	111.0	308	112.0	420	107.0	527 462	125.0	652	116.0	768 602	
Finger 32: Finger 33:	158 195	102.0 102.0	260 297	104.0 103.0	364 400	99.0 98.0	463 498	118.0 113.0	581 611	112.0 106.0	693 717	
Finger 34:	184	102.0	284	103.0	386	98.0 98.0	484	1 <b>1</b> 7.0	601	112.0	713	
Finger 35:	173	107.0	280	111.0	391	110.0	501	131.0	632	121.0	753	
Finger 36:	195	101.0	296	101.0	397	95.0	<b>49</b> 2	111.0	603	107.0	710	
Finger 37:	178	100.0	278	104. <b>0</b>	382	101.0	483	119.0	602	112.0	71 <b>4</b>	
Finger 38:	88	91.0	179	99.0	278	100.0	378	119.0	497	115.0	612	
Finger 39:	182	109.0	291	110.0	401	110.0	511	127.0	638	116.0	754	
Finger 40:	191	105.0	296	113.0	409	116.0	525	128.0	653	112.0	765	
Finger 41:	217	105.0	322	108.0	430	108.0	538	120.0	658	109.0	767	
Finger 42:	195	106.0	301	110.0	41 <b>1</b>	111.0	522	123.0	645	112.0	757	
Finger 43:	172	103.0	275	107. <b>0</b>	382	109.0	<b>4</b> 91	121.0	612	116.0	728	
Finger 44:	134	97.0	231	104.0	335	107.0	442	123.0	565	112.0	677	
Finger 45:	164	97.0 107.0	261	101.0	362	102.0	464	118.0	582 567	110.0	692	
Finger 46:X Finger 47:	196 127	107.0 98.0	303 225	112.0 108.0	415 333	113.0 112.0	528 445	39.0 121.0	567 566	190.0 115.0	757 68 <b>1</b>	
Finger 47:	229	90.0 105.0	334	100.0 107.0	441	106.0	44J 547	108.0	655	105.0	760	
Finger 49:	43	83.0	126	98.0	224	108.0	332	117.0	449	118.0	567	
Finger 50:	165	107.0	272	115.0	387	124.0	511	120.0	631	114.0	745	
Finger 51:	140	96.0	236	105. <b>0</b>	341	114.0	<b>45</b> 5	116.0	571	110.0	681	
Finger 52:	271	1 <b>1</b> 1.0	382	116.0	498	<b>1</b> 18.0	616	118.0	734	102.0	836	
Finger 53:	80	93.0	173	101.0	274	114.0	388	106.0	494	108.0	602	
Finger 54:	194	107.0	301	114.0	415	123.0	538	123.0	661 605	110.0	771	
Finger 55: Finger 56:	161 160	100.0 98.0	261 258	110.0 110.0	371 368	116.0 119.0	487 487	118.0 117.0	605 604	109.0 111.0	71 <b>4</b> 715	
Finger 57:	265	90.0 108.0	250 373	113.0	300 486	122.0	407 608	106.0	714	99.0	813	
Finger 58:	148	97.0	245	109.0	354	119.0	473	117.0	590	109.0	699	
<b>•</b> • • • •							-		-			

Finger 60:         153         101.0         254         110.0         364         123.0         487         116.0         603         110           Finger 61:         268         106.0         374         113.0         487         121.0         608         106.0         714         94.0	808
Einder 61: 269 106 0 374 113 0 497 121 0 609 106 0 714 94 0	1
Fingerot. 200 100.0 574 115.0 407 121.0 000 100.0 714 34.0	
Finger 62: 186 110.0 296 119.0 415 139.0 554 115.0 669 112	0 781
Finger 63: 187 101.0 288 111.0 399 120.0 519 112.0 631 109	0 740
Finger 64: 244 104.0 348 109.0 457 120.0 577 100.0 677 101	0 778
Finger 65: 188 106.0 294 117.0 411 130.0 541 114.0 655 109	0 764
Finger 66: 107 89.0 196 101.0 297 116.0 413 106.0 519 107	0 626
Finger 67: 182 98.0 280 108.0 388 121.0 509 108.0 617 106	
Finger 68: 128 92.0 220 105.0 325 120.0 445 108.0 553 110	0 663
Finger 69: 188 98.0 286 109.0 395 120.0 515 107.0 622 108	0 730
Finger 70: 216 98.0 314 107.0 421 110.0 531 93.0 624 94.0	718
Finger 71: 196 101.0 297 111.0 408 124.0 532 108.0 640 110	0 750
Finger 72: 229 106.0 335 116.0 451 128.0 579 109.0 688 111	0 799
Finger 73:X 804 -1.0 803 -1.0 802 0.0 802 0.0 802 2.0	804
Finger 74: 161 93.0 254 99.0 353 108.0 461 97.0 558 100.	
Finger 75: 257 102.0 359 114.0 473 128.0 601 108.0 709 107.	
Finger 76: 173 100.0 273 111.0 384 124.0 508 108.0 616 110.	0 726
Finger 77: 265 105.0 370 112.0 482 124.0 606 108.0 714 109.	
Finger 78: 143 91.0 234 103.0 337 113.0 450 98.0 548 106.	
Finger 79: 139 92.0 231 103.0 334 114.0 448 102.0 550 112	
Finger 80: 176 96.0 272 108.0 380 118.0 498 109.0 607 116.	





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COUDER I COG		NW Other Services	Sondex Sondex SBT TEMP		Elevations KB N/A DF N/A GL N/A																					
3 ATTACT	RASER TECHNOLOGIES 55-7 ROSETTE INC LEASE	HIDALGO State		TWP N/A RGE N/A	Elevation <u>N/A</u> N/A Above P. D.		MARCH 11 2008															dagF l				HD P CICILIEDE
<b>KGC</b> NKER NUGHES	2	County Location	뷐	SEC NA	GROUND LEVEL 6.L K.B		INPCH	1 ONF	W/N	1367 11	1366 ft	SLIRFACE	1430	1	WATER	N/N	N/A 52 64	N/A	0 nsi	N/N		T	N/A			97
BAR Baker Atlas	File No: 550530 API No:	N/A			Permanent Datum Log Measured From Drill Measured From		Date	Service Order	Depth Driller	Depth Logger	Bottom Logged Interval	Top Logged Interval	Time Started Time Finished	Operator Rig Time	Type of Fluid in Hole	riula vensity Salimity	Fluid Level	Logged Cement Top	Wellhead Pressure	Maximum Hole Deviation	Nominal Logging Speed	Maximum Recorded Temperature	Reference Log Peference Log	Equipment No.   Location		Witnessed By

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1021 11	SURFACE		A/N	ni 275.21			
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		Casing Record				Borehole Record	

Remarks Thank you for choosing baker atlas wireline Services.		CALIPER RAN IN OPEN HOLE
<u>кешагка</u>		THANK YOU FOR CHOOSING BAKER ATLAS WIRELINE SERVICES.
	 Кетагка	

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		2324XA	001	ŀ	L L
noitizo9	Serial Numb <del>e</del> r	Series Number	looT	Trip	սոչլ
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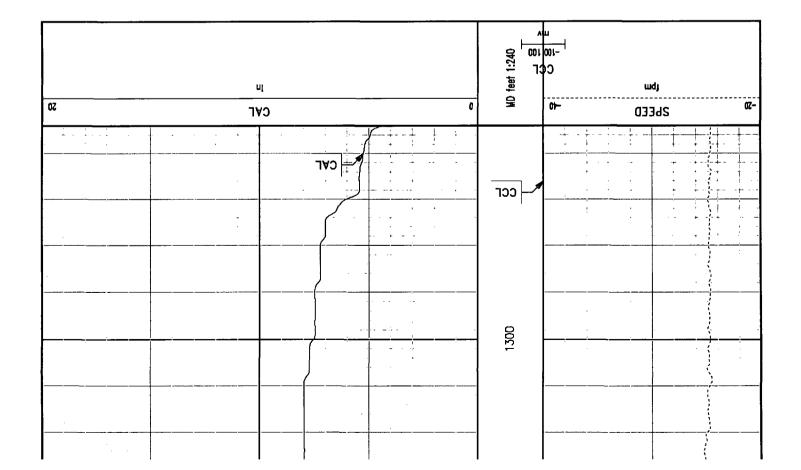
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	uired Curves)	for Acq		
S	OFFSET	DEPTH		

CASING										· · · · · · · · · · · · · · · · · · ·				
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Νϗνες	ACQUIRED C	DEPTH OFFSET	SERIES
3)	for Acquired Curve	)	
LS	EPTH OFFSE	٥	

]	Mode : Plotuge 5.4.504
	File Name : c:/welldata/031108/mp4.xtf
	: IIeW
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	Elevations KB N/A		3-2 <b>-84-3</b> 5-4	Location STATE WELL NAME	Y 27 1 1.2.
A/N	HN HN	etot2	HIDALGO	۲inoJ	Baker Atlas
:on 19A			BOSETTE INC LEASE	₽l <b>ə</b> i∃	Sihonh
220230			2-55	lləW	<b>BAKER</b>
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DF N/A							
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		Witnessed Rv
		Location
		Date
		N/A
	17 deaF	nperature 182
		Nominal Logging Speed
		viation
		ogged Cement Top
		Fluid Level 52 ft
		Salinity N/A
		Fluid Density
		Type of Fluid in Hole WATER
		top Logged Interval 43 ft
	11	d Interval
	ft	Depth Logger 1074 ft
		Depth Driller N/A
	30	Service Order 550530
		Run
	WARCH 11 2008	Date
1		
GL N/A		Urill Medsured From K.B
- KBN/A		Э ,
Elevations	Elevation N/A	Permanent Datum (2001)ND (FVF)
	TWP N/A RGE N/A	SEC N/.A
3 ARM		
TEMP		A-36-AB-S-6
SONDEX		STATE WELL NAME
Other Services		Location
NM	HIDALGO State	N/A County
	ROSETTE INC LEASE	No:
	55-7	
	BASKED TECHNOLOGIES	File No: Company
		Baker Atlas
	*****	
BondLog	Segmented Bond Log	

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	Borehole Record			Casing Record			
Bit Size	From	То	Size	Weight	Grade	From	То
		- Harrison and Same - Same -	13.375 in	N/A		SURFACE	1031 ft

Re	marks
CREW: J. HAUSEY, R. WARD,	
RIG: POS	
CASING HEIGHT AND GRADE UNKNOWN	n the second statement with the second statement of the second statement of the second statement of the second

#### MAIN PASS 5 INCH

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		SBT N		ATION RESU	JLTS	
CURVE	PARAMETER	VALUE	UNITS	тор	BOTTOM	COMMENT
ATC1	seg1 cnormf1	-0.346	db/ft	45.750	1019.543	
ATC2	seg2 cnormf2	0.307	db/ft	45.750	1019.543	
ATC3	seg3 cnormf3	0.153	db/ft	45.750	1019.543	
ATC4	seg4 cnormf4	-0.257	db/ft	45.750	1019.543	
ATC5	seg5 cnormf5	0.253	db/ft	45.750	1019.543	
ATC6	seg6 cnormf6	-0.110	db/ft	45.750	1019.543	
ATC1	seg1 dnormf1	-0.346	db/ft	45.750	1019.543	Good Confidence
ATC2	seg2 dnormf2	0.307	db/ft	45.750	1019.543	Good Confidence
ATC3	seg3 dnormf3	0.153	db/ft	45.750	1019.543	Good Confidence
ATC4	seg4 dnormf4	-0.257	db/ft	45.750	1019.543	Good Confidence
ATC5	seg5 dnormf5	0.253	db/ft	45.750	1019.543	Good Confidence
ATC6	seg6 dnormf6	-0.110	db/ft	45.750	1019.543	Good Confidence

SBT I	PROC	ESSING
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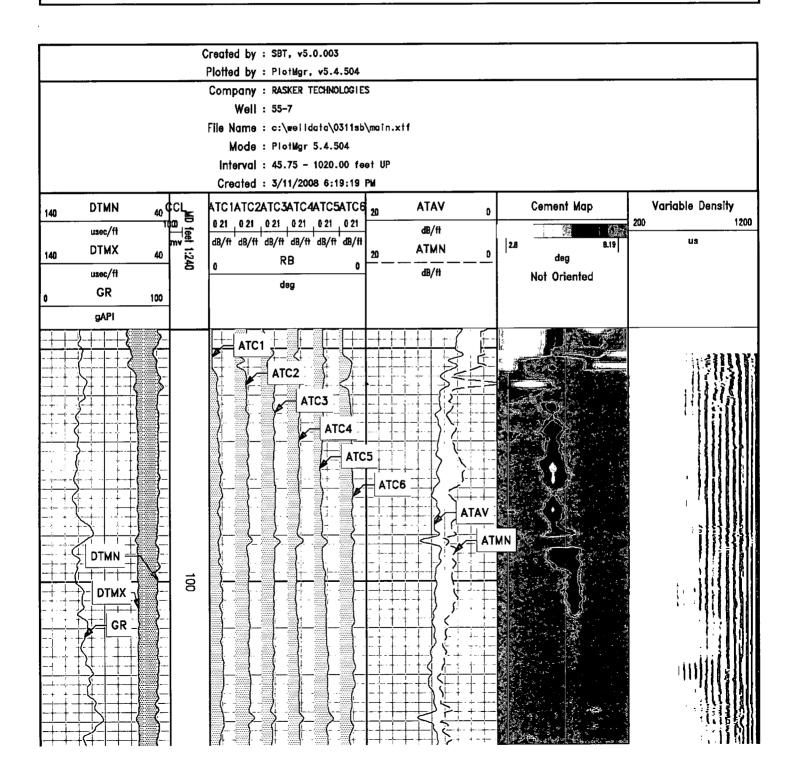
MEASUREMENT TYPE	PARAMETER	VALUE	UNITS	TOP	BOTTOM
amp	fpamp	47.123	mv	34.750	1019.000
amp	fpattn	1.008	dB/ft	34.750	1019.000
atc	dbspread	3.696	dB/ft	34.750	1019.000
atc	gn i soqa	0.812	feet	34.750	1019.000
cemr	casing od	13.375	inches	34.750	1019.000
cemr	casing wt	48.000	lbm/ft	34.750	1019.000
cemr	compress	1500.000	psi	34.750	1019.000
CN	Bit Size	7.875	í nches	45.750	1019.543
CN	Casing Thickness	0.340	i nches	34.750	1019.000
CN	Casing/Cement Correction	No		45.750	1019.543
CN	CN Chism	No		45.750	1019.543
CN	Matrix	Limestone		45.750	1019.543
CN	Salinity	0.000	ppm	45.750	1019.543

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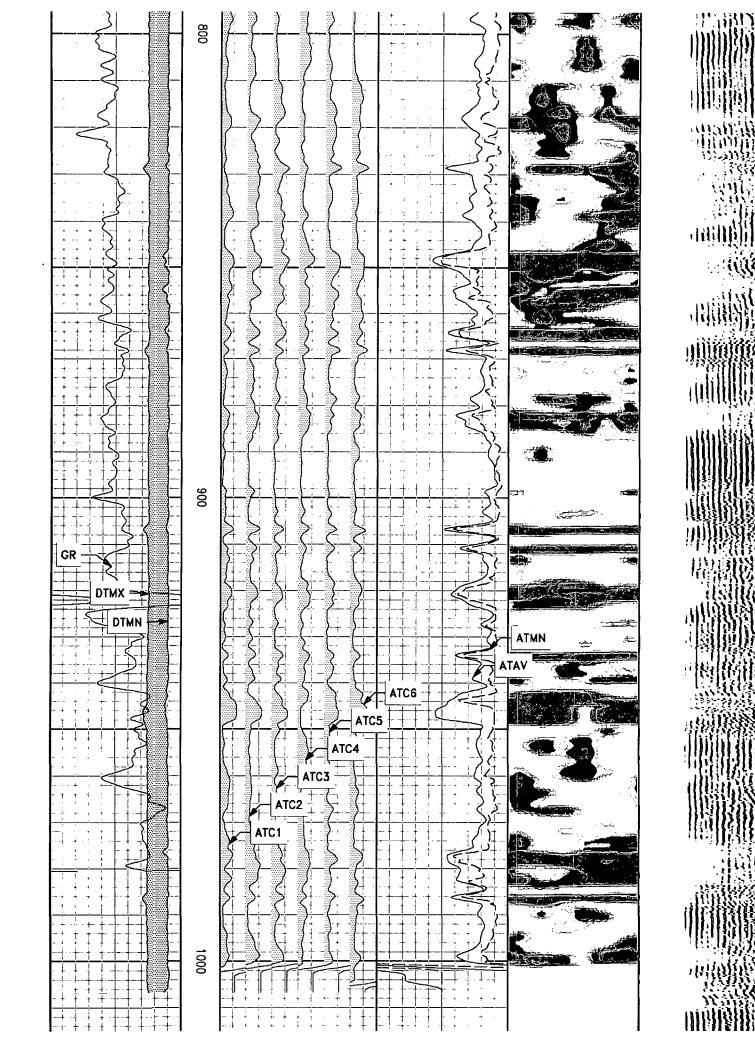
#### DEPTH OFFSETS

(for Acquired Curves)

SERIES	DEPTH OFFSET	ACOUI	ACQUIRED CURVES					
2346XA	-46.500	CCL						
1309XA	-36.750	GR						
2435XA	-30.250	LSN						
2435XA	-29.750	NEU	SSN					
1424XA	-11.000	ATC1	ATC2	ATC3	ATC4	ATC5	ATC6	
		ATAV	ATMN	ATMX	AMAV	DEV	DTMN	
		DTMX	RB	XATT	YATT			
1 <b>424PA</b>	0.000	CHV	CYQ	SIG				



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Ŀ					Ι.,					
140	DTMN			ATC1ATC2ATC3ATC4A		20	ΑΤΑΥ	0	Cement Map	Variable Density
	usec/ft	1		↓	21 0 21		dB/ft			200 1200
140	DTMX	40	nt 1:240 ₩	dB/ftˈdB/ftˈdB/ftˈdB/ftˈd	18/ft d8/ft	20		0	2.8 8.19   deg	US
	usec/ft		Ó	<u> </u>	0		dB/ft		Not Oriented	
0	GR	100		dəg						
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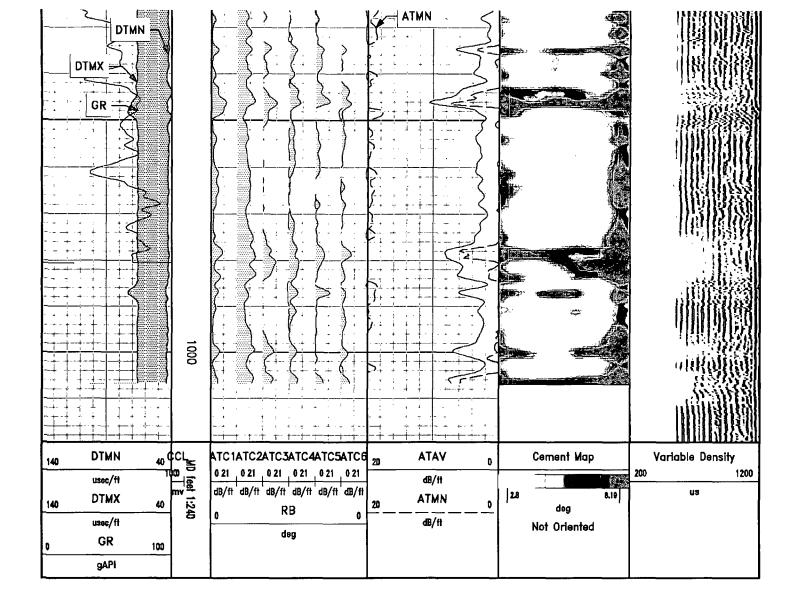
SBT NORMALIZATION RESULTS										
CURVE	PARAMETER	VALUE	UNITS	тор	BOTTOM	COMMENT				
ATC1	seg1 cnormf1	-0.346	db/ft	882.047	1019.367					
ATC2	seg2 cnormf2	0.307	db/ft	882.047	1019.367					
ATC3	seg3 cnormf3	0.153	db/ft	882.047	1019.367					
ATC4	seg4 cnormf4	-0.257	db/ft	882.047	1019.367					
ATC5	seg5 cnormf5	0.253	db/ft	882.047	1019.367					
ATC6	seg8 cnormf6	-0.110	db/ft	882.047	1019.367					
ATC1	seg1 dnormf1	-0.486	db/ft	882.047	1019.367	Good Confidence				
ATC2	seg2 dnormf2	-5.703	db/ft	882.047	1019.367	Warning Suspect				
ATC3	seg3 dnormf3	1.846	db/ft	882.047	1019.367	Good Confidence				
ATC4	seg4 dnormf4	0.764	db/ft	882.047	1019.367	Good Confidence				
ATC5	seg5 dnormf5	1.590	db/ft	882.047	1019.367	Good Confidence				
ATC6	seg6 dnormf6	1.989	db/ft	882.047	1019.367	Good Confidence				

	SBT PR	OCESSING			
MEASUREMENT TYPE	PARAMETER	VALUE	UNITS	тор	BOTTOM
amp	fpamp	47.123	mv	871.047	1019.000
amp	fpattn	1.008	dB/ft	871.047	1019.000
atc	dbspread	3.696	dB/ft	871.047	1019.000
atc	spacing	0.812	feet	871.047	1019.000
cemr	casing od	13.375	i nches	871.047	1019.000
centr	casing wt	48.000	lbm/ft	871.047	1019.000

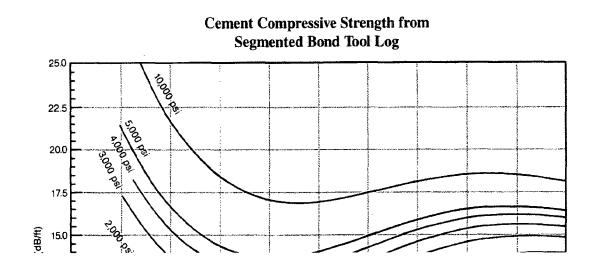
cemr         compress         1500.000         psi         871.047         1019.000           CN         Bit Size         7.875         inchess         882.047         1019.367           CN         Casing Thickness         0.340         inchess         871.047         1019.000           CN         Casing/Cement Correction         No         882.047         1019.367           CN         Casing/Cement Correction         No         882.047         1019.367           CN         CN Chism         No         882.047         1019.367           CN         Matrix         Limestone         882.047         1019.367           CN         Salinity         0.000         ppm         882.047         1019.367						
CN       Casing Thickness       0.340       inches       871.047       1019.000         CN       Casing/Cement Correction       No       882.047       1019.367         CN       CN Chism       No       882.047       1019.367         CN       Matrix       Limestone       882.047       1019.367         CN       Salinity       0.000       ppm       882.047       1019.367	cemr	compress	1500.000	рзі	871.047	1019.000
CN         Casing/Cement Correction         No         882.047         1019.367           CN         CN Chism         No         882.047         1019.367           CN         Matrix         Limestone         882.047         1019.367           CN         Matrix         Limestone         882.047         1019.367           CN         Salinity         0.000         ppm         882.047         1019.367	CN	Bit Size	7.875	i nches	882.047	1019.367
CN         CN Chism         No         882.047         1019.367           CN         Matrix         Limestone         882.047         1019.367           CN         Salinity         0.000         ppm         882.047         1019.367	CN	Casing Thickness	0.340	inches	871.047	1019.000
CN         Matrix         Limestone         882.047         1019.367           CN         Salinity         0.000         ppm         882.047         1019.367	CN	Casing/Cement Correction	No		882.047	1019.367
CN Salinity 0.000 ppm 882.047 1019.367	CN	CN Chism	No		882.047	1019.367
	CN	Matrix	Limestone		882.047	1019.367
· · · · ·	CN	Salinity	0.000	ppm	882.047	1019.367
				•		

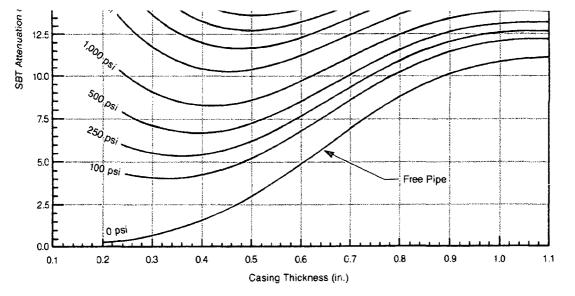
		DEPTH OI (for Acquired					
SERIES	DEPTH OFFSET	ACQUI	RED CUR	/ES			
2346XA	-46.500	CCL					
1309XA	-36.750	GR					
2435XA	-30.250	LSN					
2435XA	-29.750	NEU	SSN				
1424XA	-11.000	ATC1	ATC2	ATC3	ATC4	ATC5	ATC6
		ATAV	ATMN	ATMX	AMAV	DEV	DTMN
		DTMX	RB	XATT	YATT		
1424PA	0.000	CHV	CYQ	SIG			

			Created by : SBT, v5.0.003 Platted by : PlotMgr, v5.4.504 Company : RASKER TECHNOLOGIE Well : 55-7 File Name : c:\welldata\0311sb Mode : PlotMgr 5.4.504 Interval : 882.00 - 1019.50 for Created : 3/11/2008 6:18:46	∖re.xtt met UP PM	1			
140 140 0	DTMN 40 usec/ft DTMX 40 usec/ft GR 100 gAPI	D feet 1:240 ₽ Ĕ	ATC1ATC2ATC3ATC4ATC5ATC6 0 21 0 21 0 21 0 21 0 21 0 21 dB/ft dB/ft dB/	20	dB/fi	0 0   2.8	Cement Map 8.19 deg Not Oriented	Vartable Density 200 1200 us
		006	ATC1 ATC2 ATC3 ATC3 ATC4 ATC4 ATC4	<u>ילל י</u>				



# INTERPRETATION CHART



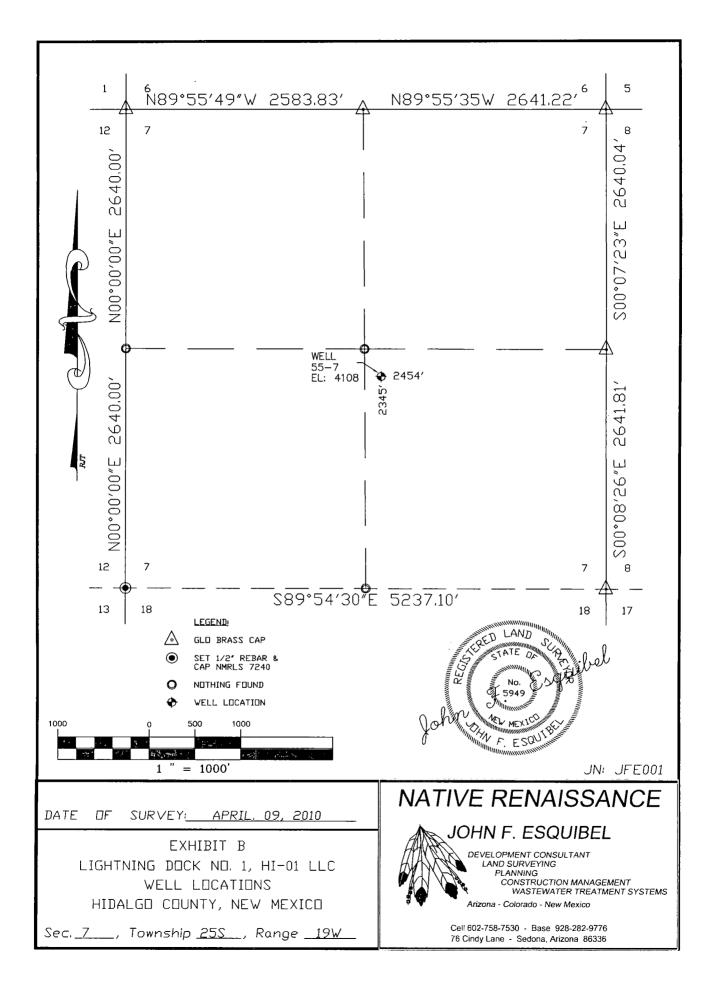


This chart is intended to provide an estimate of the compressive strength of bonded cement using the attenuation readings from the Segmented Bond Tool (SBT<sup>Tbl</sup>) log.

Enter the chart on the left with the attenuation in dB/ft, while at the same time entering the casing wall thickness (in.) from the bottom of the chart. The point at which the two lines intersect is the estimated compressive strength (psi) of the bonded cement.

BAKER HUGHES Baker Atlas	Well	RASKER TECHNOLOGIES 55-7 ROSETTE INC LEASE HIDALGO	State	NM	File No: 550530 API No: N/A
CASE	Location STATE WELL NAME A-3 <del>6 AB-S-6</del> SEC N/.A	twp N∕A Rge	N/A	Elevations KBN/A DFN/A GLN/A	

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STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT

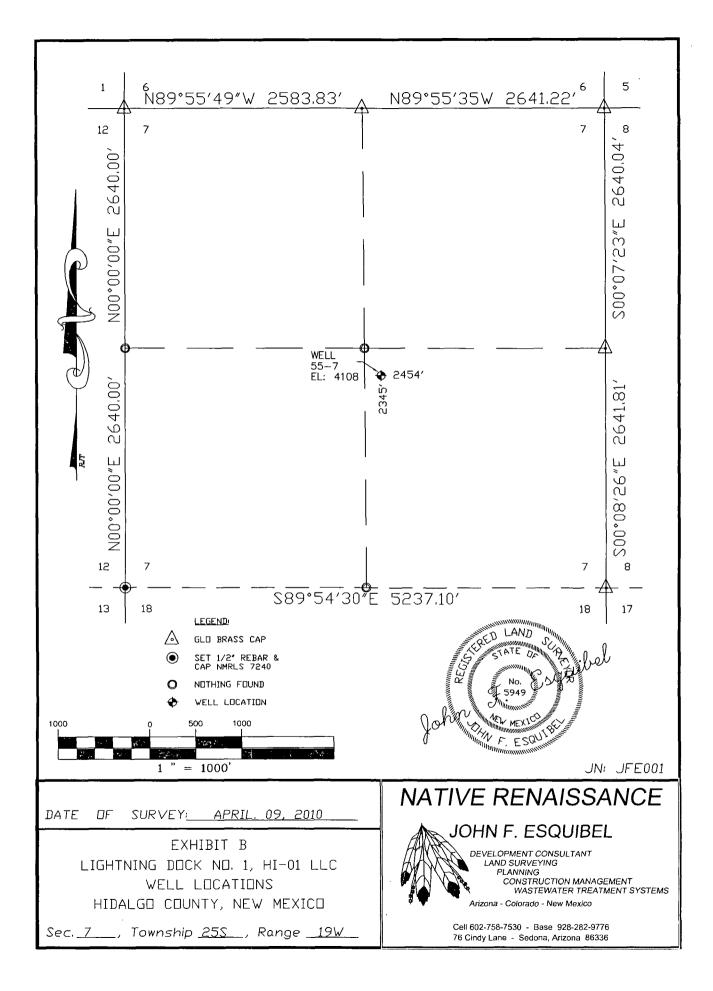
#### OIL CONSERVATION DIVISION P. O. UOX 2018 SANTA FE, NEW MEXICO 87501

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Form G-102 Adopted 10-1-74 Revised 10-1-78

GEOTHERMAL	RESOURCES WEL	L LOCATION AND	ACREAGE	<b>DEDICATION PLAT</b>
- UEUTRENMAL		L LOCATION AND	MUNILAUL	DEDIGATION LAT

peratur ightning Dock	Geothermal H	istances must be from the of Lease HI-01, LLC	Federal NM-34	Wall No.	- 7
	ion 7 Townshi		nge Count	, Hildalgo	
ctual Footage Location 2454	of Well: eet from the East	line and	345 feet from	m the South line	
4201 Elev.	Producing Formation open hole	Pool W	vildcat	Dedicated Acreage:	Acres
1. Outline the a	creage dedicated to the	e subject well by colore	d pencil or hachure m	narks on the plat below.	
2. If more than and royalty).		I to the well, outline e	ach and identify the c	ownership thereof (both as to working	g intere
	i one lease of differention, unitization, force-		to the well, have the	e interests of all owners been consolie	dated 1
🗆 Yes 🗔	No If answer is '	"yes," type of consolida	ition		
If answer is "no necessary.)	," list the owners and	tract descriptions whic	ch have actually been	consolidated. (Use reverse side of thi	s form
No allowable v				nsolidated (by communitization, un has been approved by the Division.	itizatio
Minerals -	- 'All section	7 - Federal L		CERTIFICATION	· ·
Surface	SE 1/4 - Arc	hie L. Green		I hereby certify that the info contained herein is true and com	oplete <b>t</b>
• · · ·	1 . 1		<b>t</b>	the best of my knowledge and be	lief.
	· · · · · · · · · · · ·		-	Benjamin J. Barke:	r
	1		1	Position V.P. Resource I	Dev.
				Company Raser Technolog	ies
			l .	Date April 12, 2010	
		x 2454 '		I hereby certify that the well shown on this plat was plotted h	
				notes of actual surveys made b	
			1	under my supervision, and that	the sam
	       		     		the sam t of m
	           	2345'		under my supervision, and that is true and correct to the bes knowledge and belief. see attached certi survey plat Date Surveyed	the sam t of π
	             	       2345'		under my supervision, and that is true and correct to the bes knowledge and belief. see attached certi survey plat Date Surveyed April 9, 2010 Registered Professional Engineer	the san t of η
		       2345'     		under my supervision, and that is true and correct to the bes knowledge and belief. see attached certi survey plat Date Surveyed April 9, 2010	the san t of η



STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT

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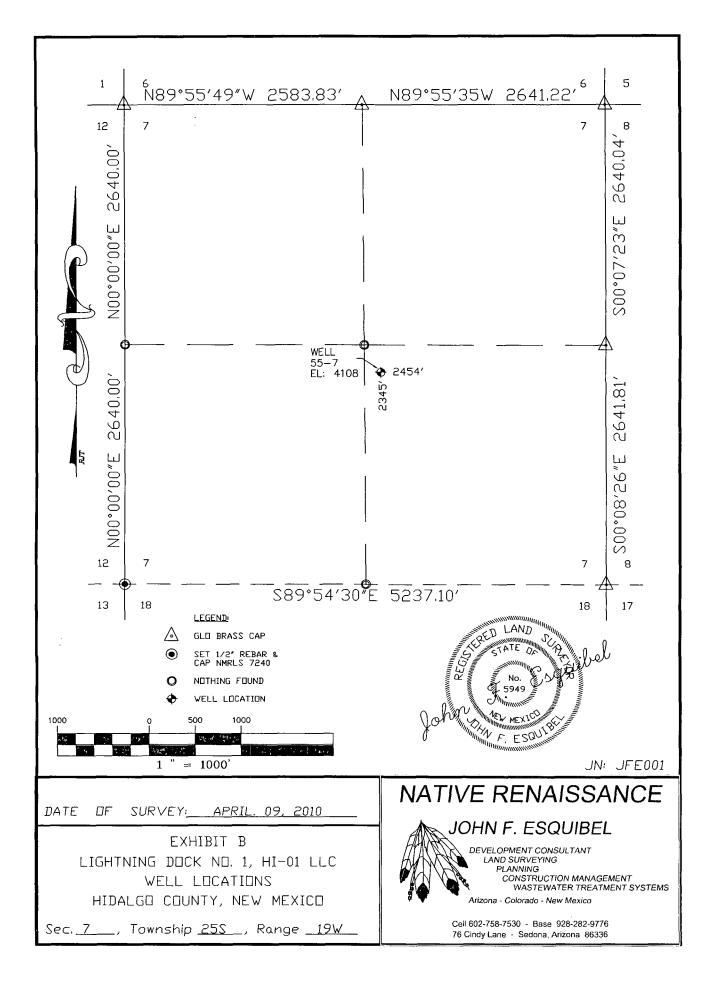
#### OIL CONSERVATION DIVISION P. O. BOX 2010 SANTA FE, NEW MEXICO 87501

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Form G-102 Adopted 10-1-74 Revised 10-1-78

GEOTHERMAL RESOURCES	WELL	LOCATION	AND	ACREAGE	DEDICATION	PLAT
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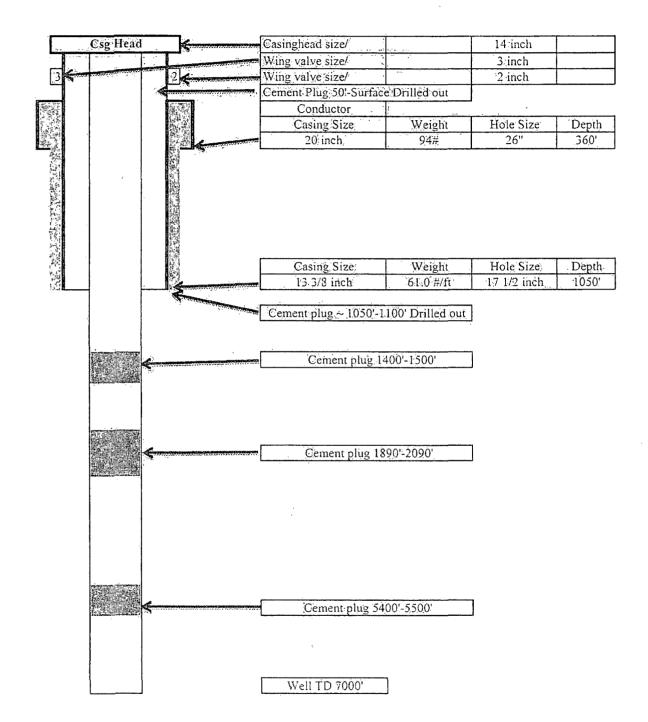
	All dista	nces must be from the outer bo	undaries of the Sectio	n.
Operator Lightning Doc	ck Geothermal HI	-01, LLO Fede	ral NM-3479	0 Well No. TFD 55-7
Unit Letter Se N/A	Township	25S Range	19W County H	ildalgo
Actual Footage Locatio 2454	n of Well: feet from the East	1ine and 2345	feet from the	South line
Ground Level Elev. 4201	Producing Formation open hole	Pool wildo	at	Dedicated Acreage: N/A Acres
1. Outline the	acreage dedicated to the s	ubject well by colored penc	il or hachure marks	on the plat below.
2. If more the and royalty		o the well, outline each an	d identify the own	ership thereof (both as to working interest
	an one lease of different c zation, unitization, force-po	-	e well, have the int	erests of all owners been consolidated by
🗌 Yes 🛛	No If answer is "ye	s," type of consolidation_		
If answer is "1 necessary.)	no," list the owners and tr	act descriptions which have	actually been con	solidated. (Use reverse side of this form if
				dated (by communitization, unitization, been approved by the Division.
Minerals	All section 7	- Federal Lease	NM-34790	CERTIFICATION
Surface -	SE 1/4 - Arch:	le L. Green i		I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief.
	1			Name
				Benjamin J. Barker
		) 		Position V.P. Resource Dev.
				Raser Technologies
		. <b>I</b>		April 12, 2010
		x + 2454''		I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my
	-+		•	knowledge and belief. see attached certified survey plat
		2345'		Date Surveyed April 9, 2010
				Registered Professional Engineer and/or Land Surveyor
	1			John F. Esquibel
(1. J.) No 00	32 Pitts neer 0001 0561	40 2000 1500 11	000 800 0	Certificate No. 5949



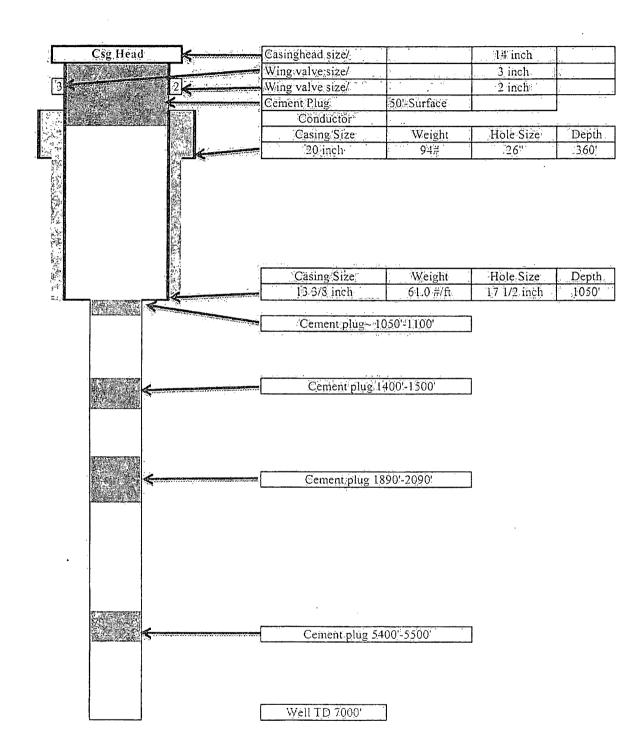
STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT	OIL CONSERVATION DIVISION P. O. BOX 2088	Form G-103 Adopted 10-1-7
NO. OF COPIES RECEIVED	SANTA FE, NEW MEXICO 87501	Revised 10-1-7
File	SUNDRY NOTICES AND REPORTS	
N. M. B. M.	ON	S. Indicate Type of Lease
U, S, G, S	GEOTHERMAL RESOURCES WELLS	State NA- Federal
Land Office		Federal NM 34790
For Permit		
1. Type of well Geothermal Producer	Temp. Observation	7. Unit Agreement Name N/A
2. Name of Operator Lightning Dock Geotherma	al HI-01, LLC	8. Farm or Lease Name N/A
3. Address of Operator 5152 Edgewood Drive, Pi	rovo, Utah 84604	9. Well No. TFD 55-7
4. Location of Well 2454	Feet From TheLine andFeet From	10. Field and Pool, or Wildcat Wildcat
The South Line, Section 7	TownshipRangeNMPM	
	15. Elevation (Show whether DF, RT, GR, etc.)	12. County
XIIIIIIIIIIIIIIIIIIIIIIIIII	4201' GR	Hidalgo
16. Check Appropr	riate Box To Indicate Nature of Notice, Report or Other Da	əta
NOTICE OF INTENTION TO	D: SUBSEQUE	ENT REPORT OF:
	AND ABANDON	ALTERING CASING
TEMPORARILY ABANDON	COMMENCE DRILLING OPNS.	
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CONDITIONS OF APPROVAL, IF ANY:

AS IS NOW







# Lightning Dock Geothermal HI-01, LLC

# Proposed Operations and Drilling Plan, Well TFD 55-7

April 12, 2010

Prepared For:

New Mexico Energy, Minerals and Natural Resources Department Oil Conservation Division, Environmental Bureau 1220 South St. Francis Drive, Santa Fe, NM 87505

> New Mexico Office of the State Engineer Water Rights District III Office 301 South Tin Street, Deming, NM 88030

U.S. Department of the Interior, Bureau of Land Management Las Cruces District Office 1800 Marquess Street, Las Cruces, NM 88005

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II.	Well Preparation	3
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V.	BLM Drilling Program, 43 CFR 3261.13	9
VI.	Attachments	
	A. Raser Technologies Corporate Structure	11
	B. Lightning Dock Aerial Photo Map	12
	C. Survey of Well 55-7 Location	13
	D. Down-Hole Test Pump Specifications	14
	E. Blowout Prevention Equipment Diagram	15
	F. Surface Access Agreement	16

# I. <u>Summary of Proposed Operations:</u>

Lightning Dock Geothermal HI-01, LLC, ("LDG") is a wholly owned subsidiary of Los Lobos Renewable Power, LLC, which is wholly owned by Raser Technologies, Inc. (See Attachment A, Raser Technologies Corporate Structure). LDG proposes to re-enter and test well TFD 55-7 for the purpose of determining its suitability as a geothermal production well. LDG intends to mobilize a drilling rig about April 21, 2010 and will commence operations according to the Plan in Section II, below, as soon as approved by BLM and upon receipt of requisite permits from NMOSE and NMOCD.

The operations for which Lightning Dock Geothermal seeks permission in the present application are comprised of three parts:

- Remove two of the three remaining cement abandonment plugs set in the wellbore by Steam Reserve Corp. in 1985. The deepest plug will remain in place. Rosette, Inc., removed the uppermost two of the five Steam Reserve plugs pursuant to an NMOSE irrigation well permit. LDG intends to test the upper 3,400 ft of the open hole. The water will be sampled and analyzed in accordance with WQCC standards as described below. Compliance with those standards will be verified before any water is discharged in a pump test.
- Install a down-hole production pump and conduct a well and reservoir test. The discharged water will be metered and conveyed to a planted field for irrigation purposes. This will be done using standard farm irrigation equipment such as a wheel line. The test will exercise water rights owned by Rosette, Inc. and already assigned to this well. Rosette, Inc. has agreed to provide the 2010 water rights to LDG for this test. LDG does not intend to use TFD 55-7 for injection in this operation. The existing unlined reserve pit may be used for cooling and water storage if approved by NMOCD upon receipt of produced water analyses.
- Install proper wellhead equipment and secure the well.

The water in well TFD 55-7 will be sampled and analyzed for dissolved fraction of all 26.2.3103 NMAC constituents, VOCs (8260B), SVOCs (8270C), PAHs (8310), TPH (418.1), metals – dissolved (6010B/6020) including Bromide, Lithium, Rubidium, and Tungsten (by approved EPA methods), Mercury (7470A/7471A), general chemistry (methods specified in 40 CFR 136.3), Uranium (6010B/6020), radioactivity (E903/E904), and Radon (EPA method approved by NMOCD). An EPA Methods, QA/QC, and DQOs-compliant laboratory will analyze samples.

If TFD 55-7 demonstrates adequate potential as a geothermal production well, LDG will proceed to obtain all approvals and permits (BLM, NMOCD, and NMOSE) required for further development.

## II. <u>Well Preparation</u>

The first part of the operation requires reopening TFD 55-7 to collect fluid samples, set a bridge plug and install a test pump. The following is the proposed plan for the drilling operation. This detail is incorporated by reference into the BLM Drilling Program, described in Section V of this document.

- 1) Inspect wellhead for dimensional consistency with ANSI series 400 standards.
- 2) Move in and rig up a rotary drilling rig with a rated capacity of at least 5000 ft and a mud system with a minimum volume of 500 barrels and a 500 hp circulating pump.
- 3) Install annular or rotating BOP on the wellhead above flow tee with gate valve on side outlet (see Attachment E).
- 4) Mix non-toxic gel-lime mud and fill hole.
- 5) Pick up slick bottom-hole assembly (BHA) #1: 8-1/2" insert bit, BS, 4x6" DC, jars, 1x6" DC, XO.
- 6) Test BOP for leakage by inflating around BHA and pumping in the side outlets to maximum working pressure of the surface piping, not to exceed 900 psig.
- 7) Run in hole and tag bottom, expected at about 1400 ft. Circulate bottoms up.
- 8) Airlift fluid in the wellbore if necessary to clean out well. Collect and analyze geochemical water samples and record volume of produced water. Water samples will be collected *in situ* (i.e., down hole) if possible but may be taken by sampling separator from the flow line. Airlift will be accomplished by injecting compressed air through the drilling assembly in sufficient quantity to stimulate flow to the surface. Discharging the flow line into a gauging tank will allow measurement of the produced liquid after its separation from the injected air. The volumes produced during the drilling operation will be recorded and will not exceed the storage capacity of the tank and reserve pit on site. No water will be discharged to "Waters of the State".
- 9) Pull out of hole and pick up 9-5/8" bit and stabilizers. Make up stiff BHA #2.
- 10) RIH and time drill cement plug #1. The plugs in well TFD 55-7 are of neat Portland cement. The plugs are reportedly each 50 - 400 ft in length and set in uncased open hole at about 1450 ft and 1850 ft. Time drilling and a "locked" (i.e., stiff and highly stabilized) BHA will be used to drill the plugs while staying in the original hole. Non-toxic, temperature-stable drilling mud will be used, composed of a bentonite clay-water or polymer-water mix to lubricate and cool the drill bit. The drilling fluids will bring the rock cuttings to the surface and then be cleaned and recirculated, preventing loss of drilling fluids into the rock and minimizing discharge into the reserve pit.
- 11) POH and stand back BHA #2.
- 12) Pick up BHA #3: float shoe, XO, 2x6" DC.
- 13) RIH and tag cement plug #2, expected at about 1800 ft.
- 14) Circulate hole clean.
- 15) Displace mud with water. POH to 1500 ft. Close BOP.
- 16) Pump water at 10-25 bbl/min and record stable casing head pressure.
- 17) Rig for air injection through drill pipe. Set up fluid sample collection point on flow line.
- 18) Airlift fluid in the wellbore if necessary to clean out well. Collect and analyze geochemical water samples and record volume of produced water. Water samples will be collected *in situ*

(i.e., down hole) if possible but may be taken by sampling separator from the flow line. The airlift, water sampling, and analysis will be performed as described in step 8 of this Section and in Section I, above. The volume of produced water will be recorded. No water will be discharged to "Waters of the State."

- 19) POH, stand back BHA #3.
- 20) Pick up BHA #2. RIH to cement plug #2.
- 21) Circulate mud and drill out plug #2.
- 22) POH, lay down BHA #2.
- 23) Pick up BHA #3, RIH and tag cement plug # 3, expected at about 5400 ft. Circulate hole clean.
- 24) POH, lay down BHA #3.
- 25) Run caliper log and select zone for bridge plug installation about 3400 ft.
- 26) Pick up bridge plug and BHA #4: setting tool and DCs as directed.
- 27) RIH and set bridge plug.
- 28) POH to 2800 ft, circulate hole clean.
- 29) POH to 1000 ft.
- 30) Airlift fluid in the wellbore if necessary to clean out well. Collect and analyze geochemical water samples and record volume of produced water. Water samples will be collected *in situ* (i.e., down hole) if possible but may be taken by sampling separator from the flow line. The airlift, water sampling, and analysis will be performed as described in step 8 of this Section and in Section I, above. The volume of produced water will be recorded. No water will be discharged to "Waters of the State."
- 31) POH laying down drill pipe; lay down BHA #4.
- 32) Make up 9-5/8" pump casing string and set test pump.
- 33) Release rig.

## III. <u>Resource Test</u>

- 34) The results of the analyses from steps 8, 18 and 30 of the preceding section will be compiled in a single report and delivered to NMOCD, NMOSE, and BLM. If the discharge meets WQCC standards, LDG will confer with the agencies to verify the conditions are met for permitted discharge into an unlined reserve pit and delivery to an irrigation system. Should the quality of water not meet the standards of 20.6.2.3103 NMAC for irrigation, LDG will suspend flow test operations, redesign the test and seek approval of subsequent applications to NMOCD, NMOSE, and BLM.
- 35) Connect flow line to irrigation system.

The flow line will discharge the water into a gauging tank and thence into the irrigation transfer pump or the reserve pit. The pit measures 170 ft x 170 ft x 12 ft deep (see Attachment B). If WQCC standards (20.6.2.3103 NMAC) are met, the reserve pit will be left unlined. The irrigation transfer pump (e.g., 25 hp centrifugal) will remove discharged water from the tank or pit and send it via a 10 inch Victaulic line to the irrigation system for application to a crop under an existing NMOSE permit. The designated crop area is the area directly south of the plant site on Attachment B. Flow will be metered using a totalizing ultrasonic or orifice meter to ensure volume does not exceed the NMOSE-permitted total.

36) Conduct pump test as directed. LDG will conduct the pump test in consultation with engineers representing the interests of potential investors in the Lightning Dock project. The operation of the test may therefore vary from day to day, but will at all times conform to the requirements of the applicable NMOCD, NMOSE and BLM permits and regulations.

LDG plans to use a 12-inch American-Marsh vertical shaft 10 stage turbine pump for this test. The pump is owned by Raser Technologies and has performance characteristics detailed in Attachment F. The power for the pump will be a 300 hp electric motor with a variable speed controller. The pump will be set at approximately 850 ft depth to allow a maximum drawdown from static water level of about 700 ft. Engineering analysis of Raser's airlift test in 2008 suggests a flow rate of 400 gpm is likely from the well in its present state, i.e., open from 1050 ft to 1450 ft. Since lost circulation occurred at greater depths (e.g., 2275 ft) during the drilling of TDF 55-7, LDG expects the reopened hole may be able to supply fluid up to the pump's maximum capacity, approaching 1500 gpm at this depth.

The pumping rate during the first week of the test will be programmed to gradually bring in flow and to establish the reservoir deliverability as a function of water level drawdown. Thereafter, the rate will be set so as not to exceed the landowner's NMOSEdesignated water rights. LDG expects to satisfy itself and its investors' engineers within a test pumping duration of four weeks.

Discharge water samples will be collected weekly and analyzed at an EPA Methods, QA/QC, DQOs-compliant laboratory. LDG will also monitor the discharge daily for standard field parameters including pH, turbidity, color, DO, and specific conductivity. If anomalous readings are detected that indicate a significant change in water source or properties, water samples will be collected immediately and discharge halted. Discharge will not be resumed until and unless laboratory analytical results confirm that the water meets the required criteria.

- 37) Move in and rig up well service rig.
- 38) Remove and lay down pump and casing.
- 39) Install master valve and survey flange.
- 40) Secure well and release rig.
- 41) File operations reports as required with NMOCD, NMOSE and BLM.

## IV. BLM Operations Plan, 43 CFR 3261.12

(a) The proposed project is on private land. Clearing and grubbing will be confined to the project area as approved by BLM in consultation with the landowner. No surface disturbance of BLM-managed public lands is proposed.

#### Well Pad Layout and Design

The well pad layout is approximately 150 ft x 150 ft with an existing reserve pit measuring 170 ft x170 ft x12 ft adjacent to the pad.

See Attachment B - Lightning Dock Aerial Map

See Attachment C - Survey of Well Location

#### (b) Description of Existing and Planned Roads

The well site is accessed via existing state, county and private roads. As such no new roads are necessary for this activity. The primary access roads to the site include: SR-338 (paved); CO98 Geothermal Road (paved), which extends to the surface owner's property. All roads and access at the well site on the surface owner's property are existing compacted dirt and/or graveled.

#### (c) Description of Ancillary Facilities

Sanitary Facilities – Portable chemical sanitary facilities will be available and used by all personnel during periods of well drilling and/or flow testing.

Mobile drilling office will be set upon on the site during drilling activities.

Existing water holding pond 170 ft x 170 ft x 12 ft.

Trash collection facilities e.g. roll-off container.

## (d) Source of Drill Pad and Road Building Materials

Drill pad building material will be derived from any necessary excavation of the existing reserve pit.

The pad will be graded to provide 2% grade to reserve pit.

Existing improved roads will be used.

Any additional material required for pad construction will be secured from a local contractor.

#### (e) Water Source

Water required for this operation will be secured from an established private owner.

Water derived from the operation will be discharged into a gauging tank and thence to an irrigation transfer pump or the reserve pit. The irrigation transfer pump (e.g., 25 hp centrifugal) will remove

discharged water from the tank or pit and send it via a 10 inch Victaulic line to the irrigation system for application to a crop under an existing NMOSE permit. The designated crop area is the area directly south of the plant site on Attachment B. Flow will be metered using a totalizing ultrasonic or orifice meter to ensure volume does not exceed the NMOSE-permitted total.

The water in well TFD 55-7 will be sampled and analyzed for dissolved fraction of all 26.2.3103 NMAC constituents, VOCs (8260B), SVOCs (8270C), PAHs (8310), TPH (418.1), metals – dissolved (6010B/6020) including Bromide, Lithium, Rubidium, and Tungsten (by approved EPA methods), Mercury (7470A/7471A), general chemistry (methods specified in 40 CFR 136.3), Uranium (6010B/6020), radioactivity (E903/E904), and Radon (EPA method approved by NMOCD). An EPA Methods, QA/QC, and DQOs-compliant laboratory will analyze samples.

Potable water for human consumption will be provided by bottled water.

#### (f) Statement Describing Surface Ownership

Surface of the well site is owned by Rosette, Inc. of Animas, NM. Lightning Dock Geothermal holds a Surface Access and Use Agreement, dated 10 January, 2008, with Rosette granting access to the well site.

See Attachment F – Surface Access Agreement.

#### (g) Description of Procedures to Protect the Environment and Other Relevant Sources

Air Quality: During drilling activities hydrogen sulfide will be monitored by instruments on the drill rig.

Hydrology and Water Quality Monitoring: Water samples will be collected during the cleanout operation and tested to assure compliance with WQCC standards for agricultural use.

Portable chemical toilets supplied by a licensed contractor shall be used for human waste. The waste shall not be buried on site.

Trash and debris will be contained on site, and then hauled to an approved landfill by a licensed contractor. Burial and or burning on site will not be permitted.

Clearing and grubbing will be confined to the project area as approved by BLM in consultation with the landowner.

#### (h) Plan of Surface Reclamation

Top soil excavated during the construction of the pad, as feasible, will be stockpiled for use during subsequent reclamation of the disturbed area.

#### (i) Any Other Information That BLM May Require

Will be provided upon request.

# V. BLM Drilling Program, 43 CFR 3261.13

#### (a) Description of Equipment, Materials and Procedures

A large portable rotary drill rig will be used to drill the well.

Equipment Specifications:

The availability of equipment and contractors changes from day to day. LDG will make its selection based on the best units available when the necessary permits are received. The rig will be functionally similar to the following: Drawworks – Taylor RT 5000; Mast – Taylor RT 5000 square set derrick; Substructure – Height 10 ft hydraulic w/ 15 ft K.B. elevation; Two (2) mud pumps; Rotary table; Swivel & Drilling Block; Tripping Block; Generators 235 kW, Air Compressor 500 SCFM.

Procedures will be as described in Section II, Well Preparation.

#### (b) Proposed / Anticipated Depth of the Well:

The well will be drilled and completed to the designed depth of 3,400 ft.

#### (c) Directional Drilling:

No directional drilling will be employed.

#### (d) Casing and Cementing Program:

This is a re-entry into an existing well that currently has cemented casing to approximately 1050 ft and approximately 400 ft of open hole to the first plug at a depth of approximately 1450 ft. The remainder of the well is open hole to the TD of 7000 ft. No additional casing or cement will be utilized in the operation to open this well to 3400 ft.

#### (e) Circulation Media (mud, air, foam, etc.)

The well will be drilled to a depth of 3,400 ft using non-toxic, temperature-stable drilling mud or aerated fluids. The drilling mud is composed of a bentonite clay-water or polymer-water mix to lubricate and cool the drill bit, bringing the rock cuttings to the surface discharged into the reserve pit, and preventing loss of drilling fluids into the rock.

#### (f) Description of Logs to be Run:

Caliper Logs

#### (g) Description and Diagram of Blowout Prevention Equipment:

Blowout prevention equipment (BOPE), which is typically inspected and approved by the BLM and/or the Oil Conservation Division (NMOCD) of the New Mexico Energy, Mining, and Natural Resources

Department (NMEMNRD), as applicable, would be installed, tested and ready for use while drilling to ensure that any geothermal fluid encountered does not flow uncontrolled to the surface.

See Attachment E.

#### (h) Expected Depth and Thickness of Fresh Water Zones:

N/A – existing casing is set to 1,000 ft hence no fresh, shallow water getting into well.

Static water depth is 71 ft. Total available water column of 1300 ft available

#### (i) Anticipated Lost Circulation Zones

None anticipated. The only instance of lost circulation recorded by Steam Reserve in the interval 1050 ft – 3400 ft was a minor episode at 2275 ft. That was successfully treated with a small batch of lost circulation material. This is below the deepest plug that LDG intends to drill out. LDG therefore anticipates that lost circulation will not be encountered in carrying out the proposed program.

#### (j) Anticipated Reservoir Temperatures and Pressures:

Temperature: Peak temperatures have been recorded at 307.4 F at a depth of 1263 ft remaining constant to 1400 ft.

Pressures: High pressure at the depth of 1365 ft is 549.66 psig.

## (k) Anticipated Temperature Gradient in the Area:

The regional heat flow is  $\sim 80-90 \text{mW/m}^2$  (Blackwell and Steele, 1992). This heat flow would yield a temperature gradient of about 35°C/km (1.9°F/100 ft) in igneous rocks and 60°C/km (3.3°F/100 ft) in valley fill clays. Most of the non-thermal wells have a gradient near 45°C/km (2.5°F/100 ft). Therefore, 45°C/km (2.5°F/100 ft) will be taken as the background temperature gradient value for the valley fill.

Thermal gradient conditions will range from 78°C/km (4.3°F/100 ft) (*well 672-225*) to 200C/km (11°F/100 ft) (*well 93-8 and AN-104*) and will be similar or higher in 55-7.

#### (I) Plat Certified by a Licensed Surveyor:

See Attachment C.

#### (m) Procedures and Duration of Well Testing

See Section II, Resource Test

## (n) Any Other Information That BLM May Require

Will be provided upon request.

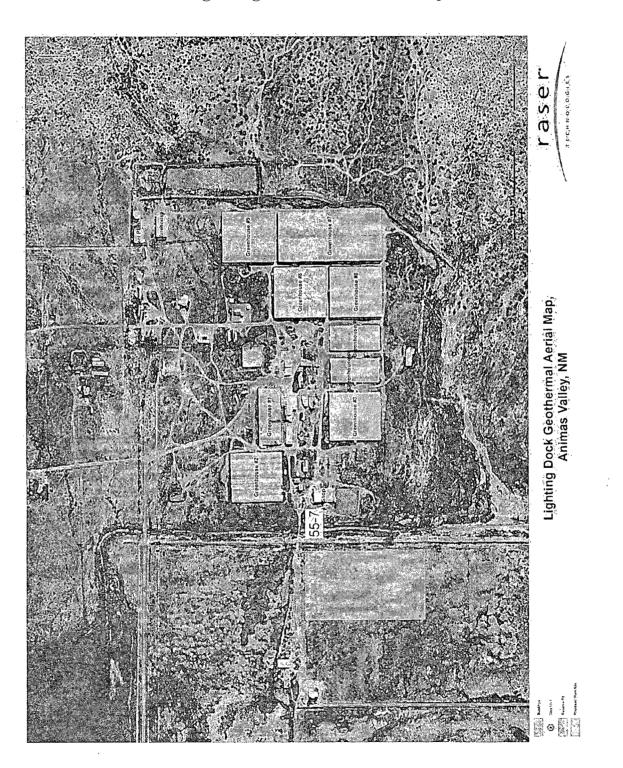
## Attachment A



# **Raser Technologies Corporate Structure**

Lightning Dock Geothermal, HI-01, ELC is the permit applicant and operator. The illustration above describes the corporate organization of which Lightning Dock Geothermal is a part as follows Raser Technologies. Inc is the parent company. Raser's geothermal development company is Raser Power Systems, EEC, the New Mexico entity is Los Lobos Renewable Power, LLC, and Lightning Dock Geothermal HI-01, LLC is the Animas, NM project entity.

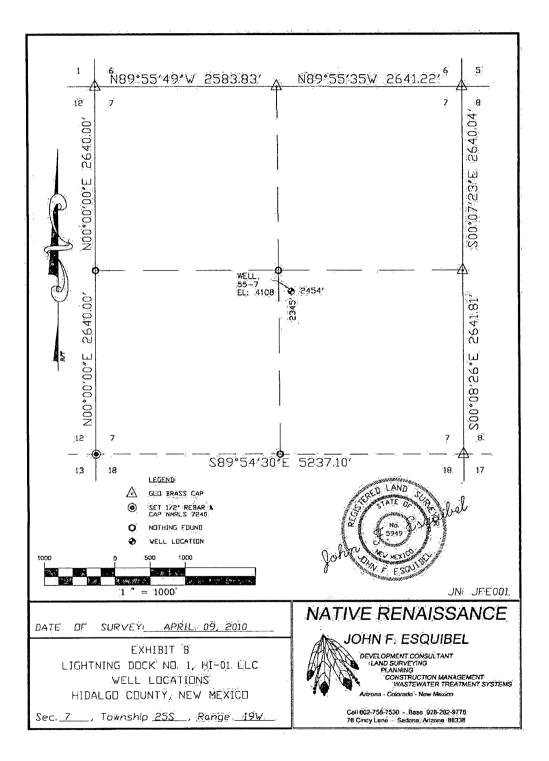
#### Attachment B



Lightning Dock Aerial Photo Map

#### Attachment C

# Survey of Well 55-7 Location



#### Attachment D

# **Down-Hole Test Pump Specifications**

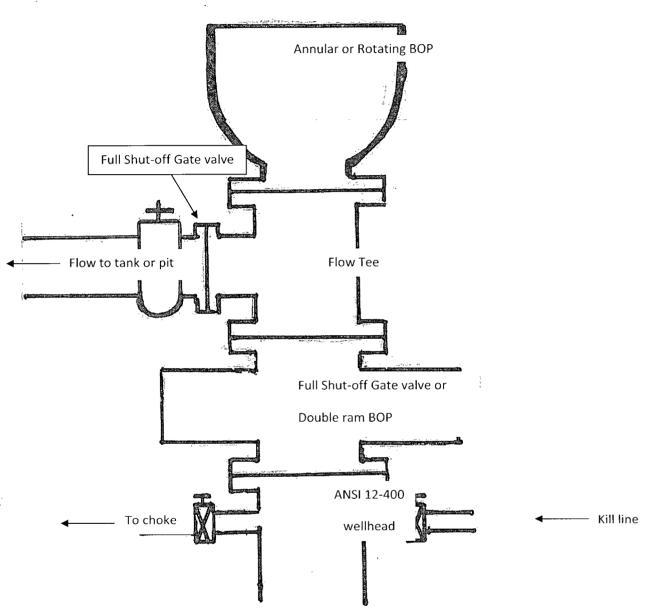
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PUMP-FLO 9

Selected from catalog: American-Marsh.60 Vers: 2009d

#### Attachment E





# Attachment F

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# Surface Use and Access Agreement

Between

# Rosette, Inc.

And

# Lightning Dock Geothermal HI01, LLC

January 10, 2008

#### SURFACE ACCESS AND USE AGREEMENT

This SURFACE ACCESS AND USE AGREENIENT ("Agreement") is executed effective January <u>10</u>, 2008, by and between ROSETTE, INC., with an address of 26 Rose Land, Animas, NM 88020 ("Owner"), and LIGHTNING DOCK GEOTHERMAL HI-01, LLC, with an address of 5152 North Edgewood Drive, Suite 375, Provo, Utah ("LDG").

#### **RECITALS**:

A. Owner owns record title to the surface estate of certain real property located in Hidalgo County, State of New Mexico, more particularly described on Exhibit A hereto (hereinafter the "Subject Lands"). The United States of America, though the Bureau of Land Management (the "BLM"), owns the reserved mineral estate, which includes the geothermal estate. Owner owns greenhouse operations which are warmed during the winter months by heat supplied by the utilization of geothermal resources near, on, or around the Subject Lands.

B. LDG is the current owner of a Federal Geothermal Lease NM-34790, issued February 1, 1979 ("Subject Lease"), wherein the BLM has granted the holder of the Subject Lease the right to explore for and develop the geothermal resources underlying the lands covered by the Subject Lease, which includes the Subject Lands. Amax Exploration, Inc. ("Amax"), a prior owner of the Subject Lease, and a predecessor of Owner entered into a letter agreement dated December 14, 1978 ("1978 Agreement"), whereby Amax was granted access to the Subject Lands to develop the Subject Lease. The 1978 Agreement granted Owner's predecessor the right to drill to a depth of 1000 feet below the surface and extract geothermal resources there from for use in its greenhouse operation. After litigation with the BLM, Owner abandoned use of the geothermal resources from the Subject Lease and Subject Lands, and, pursuant to the settlement agreement with the BLM, Owner has certain plugging and abandoning, and reclamation responsibilities.

LDG intends to utilize certain existing geothermal wells on the Subject Lands and to drill C. additional geothermal wells or reinjection wells (such existing and initially proposed wells, as depicted on Exhibit B, and all future wells that may be proposed and drilled by LDG are defined herein collectively as the "Subject Wells") on a portion of the Subject Lands (such initial proposed well-sites, as depicted on Exhibit B, and all future well-sites that may be required for future wells, are referred to herein collectively as the "Well-Sites"), which Well-Sites will include typical geothermal energy exploration production or reinjection equipment and facilities. In connection with accessing, drilling and operating the Subject Wells and access to power generation facilities, LDG requires a portion of the Subject Lands to construct and maintain access roads crossing the Subject Lands, including, without limitation, existing roads on the Subject Lands (an "Access Road ROW" and collectively the "Access Road ROWs"). In addition, LDG requires or may require a portion of the Subject Lands to construct and maintain power plants, utilities, transmission lines, water pipelines, water storage and other facilities related to the production, extraction, transportation and reinjection of geothermal resources and the generation and transportation of electricity therefrom (all such improvements constructed or to be constructed by LDG on the Subject Lands are referred to herein collectively as the "Improvements"). LDG shall attempt to locate all such Improvements that require linear rights-of-way within the boundaries of the Access Road ROWs when and where economically and operationally feasible, and Owner herein grants Access Road ROWs of sufficient length and width to accommodate any necessary or contemplated Improvements. Furthermore, it may become necessary for LDG to obtain other rights-of-way to accommodate Improvements that cannot be located within an Access Road ROW, including without limitation, the Power Plant ROW, defined below, water storage areas, temporary construction easements, and other nonlinear surface uses (an "Other ROW" and collectively the "Other ROWs"). The rights-of-way for the necessary Well-Sites (a "Well Site ROW" and collectively the "Well Site ROWs"), the Access Road ROWs and the Other ROWs, including the Power Plant ROW (defined below), are referred to herein individually as a "ROW" and all such rights-of-way granted or to be granted hereunder shall be collectively referred to as the "ROWs."

D. Given the changed circumstances recited above, LDG and Owner desire to cancel and terminate the 1978 Agreement and enter into a new surface use and access agreement that memorializes their discussions and agreements regarding LDG's access to and use of the surface estate of the Subject Lands, and consideration provided therefore, for the drilling of the Subject Wells, the construction of the ROWs and the development of the Improvements on the Subject Lands. The 1978 Agreement shall terminate upon the execution of this Agreement.

E. LDG and Owner have also agreed that LDG shall have access to and use of certain water rights that are owned by Owner, as more particularly described below.

#### AGREEMENT:

NOW THEREFORE, in consideration of the mutual promises set forth herein and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto incorporate the recitals above herein and agree as follows:

1. Term of Agreement. The rights, including all ROWs, granted by this Agreement shall continue until the rights of LDG, its successors or assigns, to explore for, develop, extract or produce geothermal energy from the Subject Lease, or from lands pooled with the Subject Lease, permanently and irrevocably terminates; provided that the rights granted to LDG herein shall survive the termination of the Subject Lease, so long as the power plant and related facilities on the Subject Lands are capable of producing electricity.

2. Existing Wells. Owner hereby grants LDG, its employees and designated agents, and its successors and assigns, the right to access, re-open, re-drill, utilize, deepen, or to plug and abandon, when and if LDG deems it necessary in furtherance of its operations on the Subject Lands, the following wells and any other geothermal wells which exist on the Subject Lands: TFD 55-77, EGS 12-7, GRED 52-7, GRED 36-7, GRED 57-7, and EGS 56-14 (collectively, the "Existing Wells"); provided however that the Existing Wells shall not include Well #16 on Exhibit B. which is a water well that is being used by Owner. Owner grants LDG access to and the right to conduct any necessary operations with respect to the Existing Wells, as and where depicted on Exhibit B. except for monitoring purposes, subject to modification by LDG upon a final inspection and survey of the Subject Lands. The Well-Site ROWs for the Existing Wells (and all future wells) shall be initially large enough to accommodate drilling operations, not to exceed 6 acres, but shall contract upon completion of the wells to area sufficient for operation and maintenance of the well, not to exceed 3 acres. One or more of the Existing Wells are close to existing structures or equipment that is stored on the Subject Lands, that may impede access, and LDG agrees to pay for the costs of repairing any damage caused by LDG's access or to pay the costs of removing or relocating any structures or equipment, in coordination with Owner. Owner hereby also grants LDG Access Road ROWs, with the right to use and expand existing roads, or construct and maintain new roads, as determined by LDG, to and for the development of the Existing Wells (the "Initial Access Road ROWs") as and where depicted on Exhibit B, subject to modification by LDG upon a final inspection and survey of the Subject Lands. Owner and LDG agree that the Initial Access Road ROWs, the centerline of which is approximately depicted on **Exhibit B**, subject to modification by LDG upon a final inspection and survey of the Subject Lands, shall initially be sixty (60) feet wide. LDG shall have the right to install additional pipelines, utilities, transmission lines and other Improvements along the Initial Access Road ROWs if it becomes necessary in its operations of the Existing Wells (or

future wells either on or adjacent to the Subject Lands). Owner grants to LDG certain Other ROWs that LDG may require for development of the Existing Wells, for other Improvements or uses that cannot be placed within the boundary of the Initial Access Road ROWs, including, without limitation, water storage areas, permanent or temporary construction areas, and the other rights-of-way needs and uses, as depicted on Exhibit B, or as requested by LDG subsequent to the execution of this Agreement. Once the Well-Sites for the Existing Wells, the Initial Access Road ROWS, and any other initial Other ROWs granted hereunder have been surveyed and precisely identified by legal description, Owner and LDG shall execute written rights-of-way, in form sufficient for recording in Hidalgo County, that conclusively identify the initial ROWs described herein.

3. Power Plant ROW. As noted above, LDG intends to construct a power plant and related facilities, including geothermal pipeline and utility connections to the plant and transmission facilities out of the plant (the "Power Plant"), which power plant site and connections shall require and constitute a "Power Plant ROW." The Owner hereby grants to LDG an exclusive Power Plant ROW to survey, inspect, construct, develop and operate the Power Plant and any related or necessary facilities or Improvements. The Power Plant ROW shall be evidenced by a recorded right-of-way, with a term that extends for as long as the power plant facilities are capable of production of electricity, and for a period of time thereafter for dismantling and remediation, as described below. LDG and Owner shall cooperate to locate the Power Plant ROW in a manner that minimizes the effect on Owner's existing surface uses: provided that, notwithstanding the foregoing, the Power Plant ROW shall be in a location on the Subject Lands that maximizes efficient access to and use of geothermal resources, and to electricity transmission infrastructure and markets. LDG has delivered to Owner a rough map of a possible Power Plant site, along with primary and alternate access roads for the Power Plant site, a copy of which is attached hereto as Exhibit C, and Owner and LDG mutually acknowledge and agree that the approximated rights-ofways and Power Plant site set out on that rough map would be an example of an acceptable location. LDG agrees to fence and secure the Power Plant ROW. If the Power Plant is no longer capable of production of electricity or if LDG otherwise elects to permanently shut down the Power Plant facilities for any reason, LDG shall provide Owner with written notice of its intent to shut down the facilities. After giving notice of intent to shut down and dismantle the plant, LDG shall have three (3) years to dismantle and remove all infrastructure and improvements pertaining to the Power Plant, including all utilities and transmission facilities, and to remediate the underlying property to its natural condition. Upon the request of LDG, Owner agrees to grant LDG a lease, in a recordable form, with a term that lasts for as long as the Power Plant is in existence and a reasonable time thereafter for dismantling, removal and remediation, of approximately twenty (20) acres (subject to the needs of the Power Plant and the activities of LDG in connection therewith), for the land necessary for the Power Plant and related facilities, at an annual rental rate of \$60 per acre.

4. Future Subject Wells, ROWS, and Improvements. LDG intends to develop future Subject Wells on the Subject Lands (in addition to the Existing Wells) ("Future Wells"). Additionally, LDG intends to construct and maintain related pipelines, utilities, transmission lines, production facilities, power generation facilities, water storage areas, access roads and other Improvements for such future Subject Wells. Prior to the development of any future Subject Well (not one of the Existing Wells) or Improvements on the Subject Lands in connection therewith, LDG shall provide Owner, in writing, notification of the proposed location of the desired Subject Well(s), Access Road ROW(s), or Other ROW(s) necessary for contemplated Improvements, and a description of the Subject Well(s), Access Road ROW(s) or Other ROW(s) to be constructed (individually and collectively, as the context requires, any "Future ROWs"). Within fifteen (15) days of such written notice, LDG and Owner shall discuss the location of the necessary Future ROWs, in an attempt to locate any such Future ROWs in locations that reasonably minimize the impact to the current surface uses of Owner but that do not result in an undue economic or operational burden to LDG. The parties acknowledge and agree that such Well-Site ROWs (for Future Wells) and other Future ROWs shall be located in areas that will maximize recovery and

efficient use of geothermal resources. LDG and Owner agree to meet on the Subject Lands, at the request of either party, in connection with the location of Future ROWs, to discuss such locations. Once Future ROWs have been identified and surveyed for a precise legal description, Owner and LDG shall execute written rights-of-way, in form sufficient for recording in Hidalgo County, that conclusively identify the Future ROWs.

5. **1978 Agreement.** Owner and LDG mutually agree to terminate and cancel the 1978 Agreement as of the execution date herewith, and replace the 1978 Agreement with this Agreement. Owner agrees to release LDG of any obligations or claims arising under the 1978 Agreement, and LDG agrees to release Owner of any obligations or claims arising under the 1978 Agreement. Owner and LDG understand that this Agreement is intended to replace and supersede the 1978 Agreement.

6. **Consideration for Agreement**. As consideration for the execution of this Agreement, LDG shall provide the following to Owner:

(a) Upon execution of this Agreement, LDG shall pay to Owner a one-time payment in the amount of Three Hundred Twenty Thousand and No/100 Dollars (\$320,000,00).

(b) LDG shall pay Owner a minimum annual fee of \$1,000.00 as consideration for use of or access to Owner's existing cold water delivery infrastructure. Thereafter, LDG shall pay the \$1,000.00 fee prior to the anniversary date of this Agreement, provided that failure to make such payment shall not constitute an event of breach or default under this Agreement, until Owner has provided LDG with written notice of the failure to make such payment, and LDG fails to make such annual payment within twenty (20) days of such written notice. Moreover, in the event LDG fails to make such payment after such 20-days written notice, LDG's right to access Owner's cold water delivery infrastructure shall terminate, but the remainder of this Agreement shall remain in full force and effect (including all ROWs granted or to be granted hereby).

(c) For the use of cold water (see Section 14(b)) provided by Owner to LDG for cooling and other purposes, LDG has agreed to pay an annual payment equal to \$50 per acre foot of water to be used by LDG during the next year, less the \$1000.00 minimum fee set forth above (in other words, the \$1000 fee set forth in Section 6(b) above shall be included as part of, and not in addition to, the annual payment described in this Section 6(c)). LDG shall provide to Owner an estimate of the amount of acre feet of water that LDG shall use for the following year, and shall pay the annual payment based on such estimated amount, prior to the anniversary date of this Agreement. At the end of such year, if LDG's use of water for the prior year exceeded the estimate, then LDG shall remit the payment for such acre feet used in excess of the estimate for the prior year with the payment for the next year's estimated water uses. The consideration set forth in Section 6(a) above includes the first year's payment for water use under this Agreement. In the event LDG fails to make such payment after such 20-days written notice, LDG's right to access Owner's cold water shall terminate, but the remainder of this Agreement shall remain in full force and effect (including all ROWs granted or to be granted hereby).

7. **Cessation of Development or Abandonment of Lease.** LDG intends to explore for geothermal resources on the Subject Lease for the purpose of generating electricity. If LDG fails to take reasonable actions to commence exploration for or development of geothermal resources on the Subject Lease within two (2) years of the date of this Agreement, or if LDG determines at any time, either before or after such two (2) year period, to abandon development of geothermal resources on the Subject Lease (and provides Owner with written notice of such intent to abandon the Subject Lease), then LDG agrees to take such reasonable steps necessary to designate Owner as an operator (with the BLM) for purposes of operating shallower formations under the Subject Lease (down to 1000 feet, consistent with the historical operations of Owner), or, if LDG determines it is in its interest, to assign operating rights in the Subject Lease to

Owner from the surface down to 1000 feet. Notwithstanding the foregoing, if LDG determines that it intends to completely abandon the Subject Lease, and provides written notice of such intent to Owner, then LDG shall assign the entire lease over to Owner, upon assumption by Owner of all rights and responsibilities under the Subject Lease. Moreover, LDG agrees that in connection with such designation of operator, it shall agree to turn over to Owner the following Existing Wells, as shown on Exhibit B, unplugged and accessible: Well #10, Well #11, and Well #25, provided however that Owner shall assume all plugging, abandoning, reclamation and other responsibilities for such wells and shall post any required bonds in connection with the assignment and assumption of such wells. The foregoing agreement of LDG to designate Owner as an operator (or assign operating rights or all of the Subject Lease) is subject to the approval of the BLM. LDG's commitment to commence exploration and development activities on the Subject Lease is also subject to delay or suspension as result of events of Force Majeure. "Force Majeure" shall include, without limitation, the following: strikes; lockouts; riots; action of the elements, including but not limited to fire, explosion, flood, volcanic activity, earthquakes, or tidal waves; accidents; delays in transportation; inability to secure labor or materials in the open market; laws, rules or regulations of any Federal, State, County, Municipal or other governmental agency, authority or representative having jurisdiction, including failure or delay in issuance of necessary permits or approvals; war (whether declared or undeclared including terrorist acts); acts of God; litigation or administrative proceedings affecting title to lands covered hereby or operations thereon; inability to secure or absence of a market for commercial sale of geothermal resources or electricity generated therefrom, produced from the Subject Lease or of derivatives developed by LDG therefrom; or by other matters or conditions beyond the reasonable control of LDG, whether or not similar to the conditions or matters in this definition specifically enumerated.

8. **Cooperation.** Owner agrees to reasonably cooperate with LDG, in good faith, to support and promote the successful development of geothermal resources and the generation of electricity from the Subject Lease.

9. **Pipelines, Utilities**. LDG hereby agrees to locate all pipelines and other linear utilities at all points along an applicable Access Road ROW or Other ROW where reasonable and practical. However, there may be instances where pipelines, transmission facilities and other Improvements cannot be placed along an Access Road ROW, in which case LDG shall be granted separate Other ROWs for such uses. LDG shall not be required to bury pipelines or other utilities.

10. Access Road ROWs. LDG agrees that it shall construct and/or improve all currently contemplated new roads and existing roads along the center line(s) approximately depicted on the attached Exhibit B, subject to modification by LDG upon a final inspection and survey of the Subject Lands. During the construction or improvement of any road, under an Access Road ROW, including the installation of pipelines and other utilities, the right of way shall be sixty (60) feet wide, and LDG shall have a temporary license to use other portions of the Subject Lands during the construction phase of such roads (including the installation of pipelines and other utilities) to park equipment or store gravel or other supplies, provided that LDG shall replant and restore any temporary use areas to their natural condition prior to construction. Upon completion of construction of the road (or expansion or improvement of existing roads) and installation of pipelines and other utilities, the Access Road ROWs shall be forty (40) feet wide. The roads shall be graded and improved with gravel. LDG agrees that it shall maintain the Access Road ROWs to industry standards as a gravel road during the term of this Agreement. LDG shall not be obligated to remove snow that may accumulate on the road, and shall not be responsible for paying the road, providing curb and gutter, or otherwise improving the road to accommodate increased traffic from Owner's lands. The same provisions of this Section 10 shall apply to all future roads and Access Road ROWs to be constructed and maintained by LDG on the Subject Lands, including Access Road ROWs or Other ROWs to the Power Plant ROW.

11. Owner's Right to Use the ROWs. LDG shall have the exclusive right to use and maintain the Well Site ROWs and any Other ROWs (including the Power Plant ROW). LDG shall have the nonexclusive right to use and maintain the Access Road ROWs during the term of this Agreement for its purposes. LDG hereby agrees that Owner, and its successors, assigns, employees, agents, invitees and licensees, shall have the right to use the Access Road ROWs for access to the remainder of Owner's property as currently owned and used. Owner, and its successors, assigns, employees, agents, invitees and licensees shall not interfere with LDG's operations on the Subject Lands or the use or maintenance of the Access Road ROWs (or the other ROWs), and Owner shall be responsible for any cost of repairing damage to any road caused by Owner, or its successors, assigns, employees, agents, invitees and licensees. Any proposed use of or modification to an Access Road ROW by Owner, or its successors, assigns, employees, agents, invitees and licensees, which would or may be likely to injure, damage or interfere with the Access Road ROW, shall require the prior written consent of LDG, an express agreement of Owner to assume all costs and damages, and shall require, at LDG's option, the presence of LDG's agent or employee to monitor the activity. Owner, and its successors, assigns, employees, agents invitees and licensees shall abide by all written safety and other instructions regarding use of the roads that are provided by LDG. When LDG no longer requires an Access Road ROW for its operations, LDG shall provide written notice of its intent to abandon use and Owner shall have the option to assume control and maintenance over the Access Road ROW by notifying LDG within thirty (30) days of receipt of such notice: otherwise, LDG shall remediate and restore the property covered by an Access Road ROW in accordance with applicable law.

#### 12. Indemnification.

(a) Owner, its successors and assigns, does hereby agree to relieve, release, indemnify and hold LDG, its managers, members, successors, assigns, employees, agents, invitees and licensees, harmless and agree to defend LDG, its managers, members, successors, assigns, employees, agents, invitees and licensees, from any claim of damage to any person or property arising out of use of any ROW or other activities on the Subject Lands for damages proximately caused by Owner, its successors, assigns, invitees, and licensees, which damages include specifically but without limitation, all damages sounding in tort (whether by way of nuisance, trespass, ultrahazardous activity or otherwise) and/or involving environmental contamination and its incident response, compensation or liability, and also including all expenses, reasonable attorneys' fees, court costs, and witness fees, and other monies expended by or incurred by LDG or its agents, in the event it shall become necessary for LDG or its agents to defend themselves from any claims made by anyone as a result of the use of any ROW or other activities on the Subject Lands, by Owner, its successors, assigns, invitees, and licensees, but not otherwise.

(b) LDG, its successors and assigns, hereby agree to relieve, release, indemnify, and hold harmless and agree to defend Owner, its successors, assigns, employees, agents, invitees and licensees from any and all claim of damage to any person or property arising out of use of the Subject Lands for operations by LDG or its agents for damages proximately caused by LDG or its agents, which damages include specifically but without limitation, all damages sounding in tort (whether by way of nuisance, trespass, ultrahazardous activity or otherwise) and/or involving environmental contamination and its incident response, compensation or liability, and also including all expenses, reasonable attorneys' fees, court costs, witness fees and other monies expended by or incurred by Owner, its successors, assigns, employees, agents, invitees and licensees in the event it shall become necessary for Owner, its successors, assigns, employees, agents, invitees and licensees to defend themselves from any claims made by anyone as a result of LDG's operations, on, across or over the Subject Lands, but not otherwise.

13. **Confidentiality**. Owner hereby agrees, unless compelled by court order or subpoena, that the terms and conditions of this Agreement, including but not limited to the payments referenced in Section 6

above, shall remain confidential and will not be disclosed or released to any other person(s) or third parties. LDG can disclose the existence and terms of this Agreement at its discretion.

14. Water Rights. Owner currently owns water rights that pertain to the Subject Lands, which are more particularly described in Exhibit D hereto. Owner is currently using a portion of its water rights for the operation of its commercial greenhouse business, for domestic consumption and some limited irrigation needs ("Current Water Usage"). Any water rights that Owner currently owns but is not currently using to satisfy the Current Water Usage shall be referred to herein as the "Excess Water Rights." LDG requires a minimum of approximately 600 acre-feet of water for the cooling and operational needs of the Power Plant, and Owner agrees that it shall make commercially reasonable efforts to meet those water requirements from the Excess Water Rights, and shall not lease or transfer any of its water rights until LDG's water requirements are being adequately met. Owner agrees to provide LDG access to and use of all Excess Water Rights as follows:

(a) Owner grants LDG the right to use Excess Water Rights for the drilling and testing of geothermal wells on the Subject Lands. LDG shall be responsible for all costs of connecting to Owner's water system.

(b) Owner hereby grants LDG the preferential right to the use of all Excess Water Rights for the development and operation of the Power Plant and the appurtenant geothermal resources. LDG shall install a metering system, at its own cost and expense, if necessary to comply with any requirements of any governmental agency or authority. LDG shall also bear the full cost of connections to Owner's water systems and infrastructure, and, if necessary, any upgrades to Owner's water system necessitated by LDG's use of the Excess Water Rights. LDG shall provide, free of cost, all electricity necessary for pumping any Excess Water Rights for LDG's use. LDG shall pay for any metering, studies or reports that may be required to establish a precise amount of Owner's available water rights, the amount of the Excess Water Rights and/or LDG's water needs for the Power Plant or geothermal resources development. Once the amount of LDG's water rights requirements are established, Owner and LDG agree to enter into a written water use agreement that evidences LDG's rights to the Excess Water Rights, which agreement shall be recorded in the county real property records ("Water Use Agreement"). Owner covenants and agrees not to transfer or sell any of the Excess Water Rights, until the Water Use Agreement is executed and recorded.

15. Drilling of Water Wells on the Subject Lands. LDG requires a certain amount of water to effectively produce geothermal energy from the Subject Wells. Owner understands that any drilling of water wells on the Subject Lands or land adjacent to the Subject Lands, under certain conditions, could significantly and adversely impact the ability of LDG to explore for and produce geothermal energy. Accordingly, Owner hereby agrees to not drill or construct any water wells on the Subject Lands or on adjacent property to the Subject Lands that Owner owns without first giving LDG written notice of its drilling plans to LDG. Owner agrees to use its best efforts to cooperate with LDG to obtain any additional water rights that LDG may need or apply for to drill the Subject Wells and/or generate electricity from the geothermal resources underlying or pooled with the Subject Lands.

16. Notices. Owner may give any notice or deliver any document hereunder to LDG by mailing the same by prepaid registered or certified mail addressed to LDG to the address set forth in the introductory paragraph above, attention General Counsel, or by delivering the same in person to the above-referenced address of LDG. LDG may give any notice or deliver any document hereunder to Owner by mailing the same by prepaid registered or certified mail addressed to Owner at the address set forth in the introductory paragraph above, attention Dale Burgett, or by delivering the same to Owner in person. For purposes of this paragraph, either party may change its address by written notice to the other. In case of any notice or document delivered by registered or certified mail, the same shall be deemed delivered when deposited in any U.S. Post Office, properly addressed as herein provided, with postage fully

prepaid. Notices shall be in writing and shall be given to LDG and Owner at the addresses set forth in the introductory paragraph hereto, or to such address as either party may designate to the other in writing not less than thirty (30) days before that event which triggers notices. Notices shall be effective the third day after the date of mailing, postage prepaid.

17. Rehabilitation and Restoration. Upon termination of this Agreement, LDG shall restore the Subject Lands near as possible to their original conditions prior to construction in accordance with acceptable industry practices and all applicable laws and regulations in effect at the time of restoration. To the extent there is any environmental remediation required for property surrounding any ROW, Owner grants LDG a temporary right-of-way to use as much of the Subject Lands as it may require for environmental remediation. LDG shall have the right to use necessary space outside of the right-of-way for repair of any roadway or facilities. If upon termination of this Agreement, or intended abandonment of an Access Road ROW or some other ROW hereunder, LDG agrees and Owner elects to assume ownership and use of any road, well, or other Improvements, then Owner shall expressly assume all liabilities or responsibilities, including without limitation all future reclamation (or plugging and abandoning, for wells) obligations, and shall hold harmless LDG upon assumption of responsibility for such road, well or other Improvements.

18. No Storage or Repair of Equipment. LDG shall not allow any construction equipment or materials to be stored on Owner's property outside the confines of the fenced Power Plant ROW beyond ninety (90) days after completion of construction of a ROW or Improvements, unless approved, in advance, by Owner. LDG shall endeavor to maintain clean, neat and orderly roads and facilities at all times. No construction equipment shall be repaired or maintained upon the property of the Owner outside the boundaries of the fenced Power Plant ROW, except in the case of emergencies to prevent damage to the Subject Lands or neighboring properties. No motor fluids will be disposed of on the property of Owner.

19. Taxes. Owner shall continue to be responsible for the payment of property taxes, if applicable. LDG agrees to pay all additional taxes that may be assessed against the Subject Lands by reason of improvements placed thereon by LDG. Owner shall provide LDG with written evidence that Owner has paid all property taxes on the Subject Lands at least thirty (30) days prior to when due. If Owner fails to pay property taxes on the Subject Lands, LDG shall have the right, but not the obligation, to pay such tax obligations on Owner's behalf, and such payment, with interest accruing at Eighteen Percent (18%) per annum, shall be due and payable by Owner to LDG within thirty (30) days of payment by LDG.

20. **Recorded Right-of-Way; ROW Map.** Upon the request of LDG or Owner, LDG shall prepare a written right-of-way, in recordable form, which can be recorded in Hidalgo County to provide constructive notice of the exact location of any right-of-way granted pursuant to this Agreement. Moreover, LDG shall maintain a map of the Subject Lands (starting with Exhibit B) which reflects all surface uses and ROWs used or required by LDG, and as new ROWs are obtained by LDG under this Agreement, LDG shall amend and maintain a current map and survey of ROWs, a copy of which shall be provided to Owner.

21. LDG Financing. Owner agrees to execute any documents reasonably required by any lender of LDG to permit LDG to obtain financing for LDG's activities on the Subject Lands. Such documents may include, without limitation, a certificate of Owner confirming the validity and enforceability of this Agreement, that there are no defaults under this Agreement, that this Agreement shall survive any foreclosure and may be assigned to subsequent purchasers at foreclosure, consent of Owner to the grant of LDG's rights in this Agreement to a lender for security purposes, and any other covenants and agreements that are typically required by institutional lenders. Moreover, if Owner has existing deeds of trust, mortgages, or other liens on the Subject Lands at the time of this Agreement, owner agrees to obtain subordinations from its lenders and lienholders with respect to this Agreement, on the form to be provided

by LDG, either prior to execution or within thirty (30) days after execution, as elected by LDG. The subordination agreement may be recorded with the Memorandum described in Exhibit C or recorded separately.

22. **Governing Law.** The laws of the State of New Mexico shall control the rights of the parties under this contract.

23. Waiver. By signing this Agreement, neither party waives its statutory and common law rights to occupancy and enjoyment of their respective estates, except as expressly provided in this Agreement.

24. Assignment of Rights. All rights and obligations under this Agreement shall run with the Subject Lands and shall inure to the benefit of and be binding upon the heirs, successors, or assigns of each party. LDG may assign its rights in this Agreement without the prior written consent of Owner, including, without limiting the foregoing, assignments for purposes of providing security for any loans. Moreover, LDG shall have the right to assign all or any portion of the ROWs to another entity or person, separate from ownership of the Subject Lease. The parties hereto agree to execute a memorandum of this Agreement, which shall be in form sufficient to record in the Hidalgo County real property records, in the form provided by LDG.

25. Amendment. This Agreement constitutes the entire Agreement between the parties pertaining to the subject matter contained in it and supersedes all prior and contemporaneous agreements, representations, and understandings of the parties with respect thereto. No supplement, modification, or amendment of this Agreement shall be binding unless executed in writing by all parties.

26: **Counterparts.** This Agreement may be executed in counterparts. Each counterpart shall constitute an original and all counterparts together shall constitute one and the same document. Receipt by party hereto of an executed copy of this Agreement by facsimile shall constitute conclusive evidence of execution and delivery of the Agreement by the signatory thereto.

[Signatures on the following page]

Dated effective as of the date first written above.

<u>OWNER</u>:

ROSETTE, INC.

By: Name: A Title: 🖉

<u>LDG</u>:

LIGHTNING DOCK GEOTHERMAL HI-01, ELC

By: 208 Name: vartin F Petersia Title: CFO

#### EXHIBIT A

#### Legal Description of the Subject Lands

A. LDG is the owner of Federal Geothermal Lease NM -34790 ("Subject Lease"), granting LDG the right to explore for and develop geothermal resources underlying the lands covered by the lease, described as follows:

1.

T255, R19W, NMLP.ML Sec. 6: Lots 3, 4, 5, 6, 7, SEL/4NW1/4 Sec. 6: El/2SW1/4 Sec. 7: Lots 1, 2, 3, 4, S1/2NE1/4, SEL/4NW1/4, E1/2SW1/4, SEL/4, NW1/4NE1/4, NE1/4NW1/4 Sec. 18: Lot 1, N1/2NE1/4, NE1/4NW1/4

and

T2SS, R2OW, N.M.P.M. Sec. 1: NW1/45W1/4, S1/2SW1/4, SW1/4SE1/4 Sec. 11: NE1/4, S1/2 Sec. 12: ALL Sec. 13: N1/2N1/2

#### Containing 2,500,96 acres, more or less

2. LDG has applied for Federal Geothermal Lease NM 108801, which is pending final approval by the BLM and will be included with the Subject Lease upon approval, granting LDG the right to explore for and develop geothermal resources underlying the lands covered by the Subject Lease, described as follows:

T258, R20W, N:M.P.M. Sec. 14: All

Containing 640.00 acres, more or less

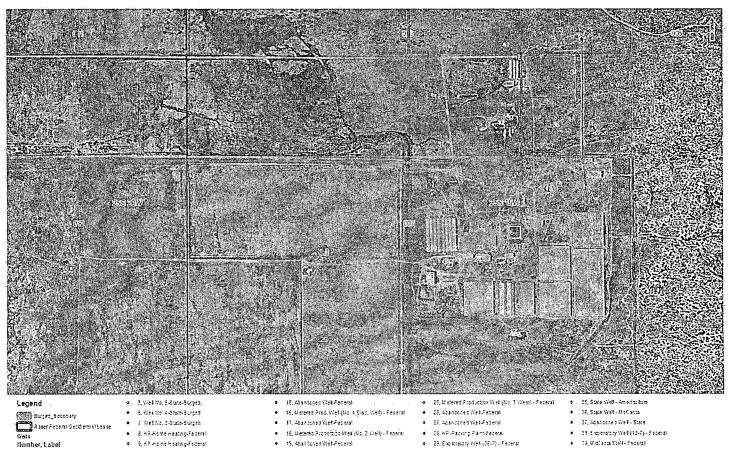
- B. Owner is the owner of the land ("Surface Lands") covering, in part, the Subject Lease, which is described as follows:
  - 1. Sections 7 and 18 T25 S, R19 W, N.M.P.M

And

Sections 11, 12, 13, 14, and 23 T25 S, R20 W, N.M.P.M Containing 2,592.473 acres, more or less

C. "Subject Lands" shall be the surface area wherein LDG's Subject Lease underlies Owners Surface Lands.

#### EXHIBIT B



#### Initial Inventory of Existing Wells and Location of Initial Contemplated ROWs

- 0, 99 Home Reating-Federal
- 1, Exploratory Well-Federal
- 2, Excloratory Well-Federal
- 3, 4-mericulture Well-Featral
- 4, Well No. 1-State-Burgett
- 9, RP Home heating-Federal
- 10, Metered Production Well (III), 4 (Well) Federal
- 11. W eteres Production Viel Ato. 3 East) Pederal
- 12, HP-Greenhouse Healing-Federal
- 13, HP-Rome Heating-Federal
  - tel Exploratory Web-Federal
- 15 Abanions i Weil-Federal

30, trigatos viet - Private

22, Wet No. 7-State - Burgett

34. State West-Americature

32. Vacant ٠

\$

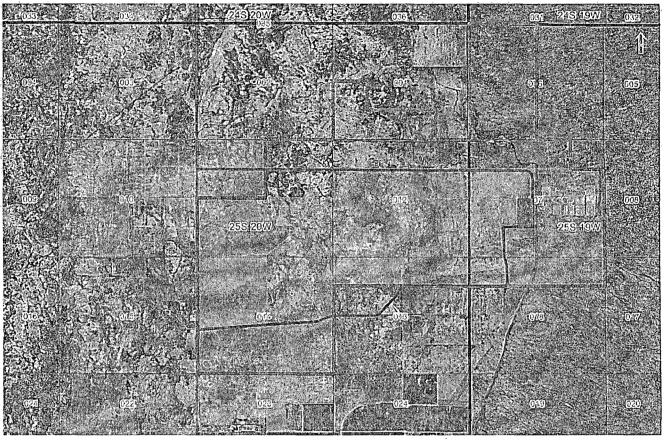
31, Exploratory Tiell (52-7) - Federal

- 20, Seep Elizioratory We3 (EE-7) Feceral
- 21. nP-home@estag=estad
- 22. Abangened Well-Potersi
- 23. Walstong WENF octaval
- 24, nP-nomeinteabog-Federal

- 19. U oʻlanda Welli- Federal
- 40, Miccianta Well Home Relating Peteral
- 41, Micliants WelHome Heating Feberat

#### EXHIBIT C

Sample Power Plant ROW and Access Roads for a Power Plant



#### Legend

 Secondary Access Route
 Raser Federal Geothermal Lease

 Primary Access Route
 Burgett\_Boundary

 Proposed Plant Location
 Proposed Plant Location

Lightning Dock Geothermal Power Plant and Access ROW Hildago County, Nevada

Lightning Dock Geothermal HI-01, LLC 5152 North Edgewood Drive Suite 375 Provo, UT 84604

#### EXHIBIT D

#### Water Rights Description

A. Owner represents and warrants ownership of the following Water Rights identified by New Mexico Office of the State Engineer Numbers:

A-13, with points of diversion located in Section 13, Township 25 South, Range 20 West, N.M.P.M.

A-36-A, with points of diversion located in Sections 6 and 7, Township 25 South, Range 19 West, N.M.P.M., and Sections 4 and 12, Township 25 South, Range 20 West, N.M.P.M.

A-35-D, with points of diversion located in Section 7, Township 25 South, Range 19 West, N.M.P.M., and Section 4, Township 25 South, Range 20 West, N.M.P.M.

A-51, with points of diversion located in Section 10, Township 25 South, Range 20 West, N.M.P.M.

A-64-A, with points of diversion in Section 7, Township 25 South, Range 19 West, N.M.P.M.

A-384, with points of diversion in Section 12, Township 25 South, Range 20 West, N.M.P.M.

A-385, with points of diversion in Section 7, Township 25 South, Range 19 West, N.M.P.M.

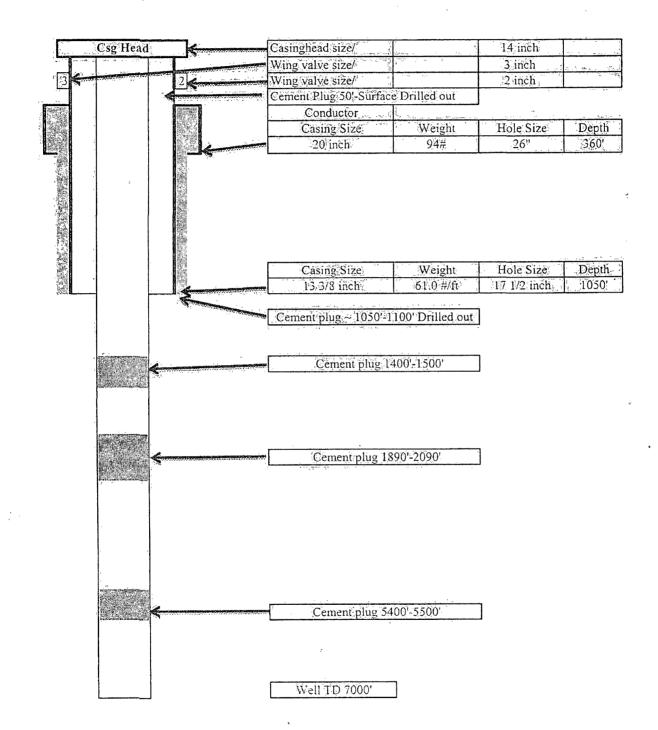
A-386, with points of diversion in Section 7, Township 25 South, Range 19 West, N.M.P.M.

STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT	OIL CONSERVATION DIVISION P. O. BOX 2088 SANTA FE, NEW MEXICO 87501	Form G-103 Adopted 10-1-74 Revised 10-1-78
NO. OF COPIES RECEIVED	SANTA FE, NEW MEXICO 87501	Refised 10-1-70
DIST RIBUTION	· · · · · · · · · · · · · · · · · · ·	
N, M, B, M.	SUNDRY NOTICES AND REPORTS	5. Indicate Type of Lease
U, S, G, S	GEOTHERMAL RESOURCES WELLS	State NA- Federal
Operator		5.a State Lease No. Federal NM 34790
	to Deepen or Plug Back to a Different Reservoir. Use "Applicati .)	•• ////////////////////////////////////
1. Type of well Geothermal Producer	Temp. Observation	7. Unit Agreement Name N/A
Low-Temp Thermal	Injection/Disposal	8. Farm or Lease Name
2. Name of Operator Lightning Dock Geotherm	al HI-01, LLC	N/A
3. Address of Operator 5152 Edgewood Drive, B	Provo, Utah 84604	9. Well No. TFD 55-7
4. Location of Well 2454 Unit Letter2454	_Feet From TheLine andFeet F	10. Field and Pool, or Wildcat Wildcat rom
The South Line, Section 7	TownshipRangeN	мрм. <b>())))))))</b> ))))))))))))))))))))))))))))
	15. Elevation (Show whether DF, RT, GR, etc.) 4201' GR	12. County Hidalgo
16. Check Appro-	priate Box To Indicate Nature of Notice, Report or Othe	er Data
NOTICE OF INTENTION T		QUENT REPORT OF:
PERFORM REMEDIAL WORK DUG	AND ABANDON	ALTERING CASING
	IGE PLANS CASING TEST AND CEMENT	
· · · ·	OTHER	
OTHER		
17. Describe Proposed or completed Operations	(Clearly state all pertinent details, and give pertinenet dates,	including estimated date of starting any
proposed work) SEE RULE 203.	•	
1. MIRU drill rig.		
2. Drill out cement pl	ug from 1450' to 1550' approx.	
3. Drill out cement pl	ug from 1890' to 2090' approx.	
4. RIH to locate cemer	it plug at 5400' approx.	
5. Set bridge plug in	3000 <sup>°</sup> '-3400' interval.	
6. Collect water sampl	es for geochemical and environmen	ntal analysis.
7. Set production pump	at 850' approx.	
8. Release rig.		
_	amp test to irrigation system.	
10. Run pump test for u		· · · · · · · · · · · · · · · · · · ·
11. Secure well.	-	
	oosed Operations and Drilling Plan	n for details.
18. Thereby certify that the information above b	s true and complete to the best of my knowledge and belief.	
NONED	TITLE VP Resource Managemen	nt April 12, 2010
Signed		
	TITLE	

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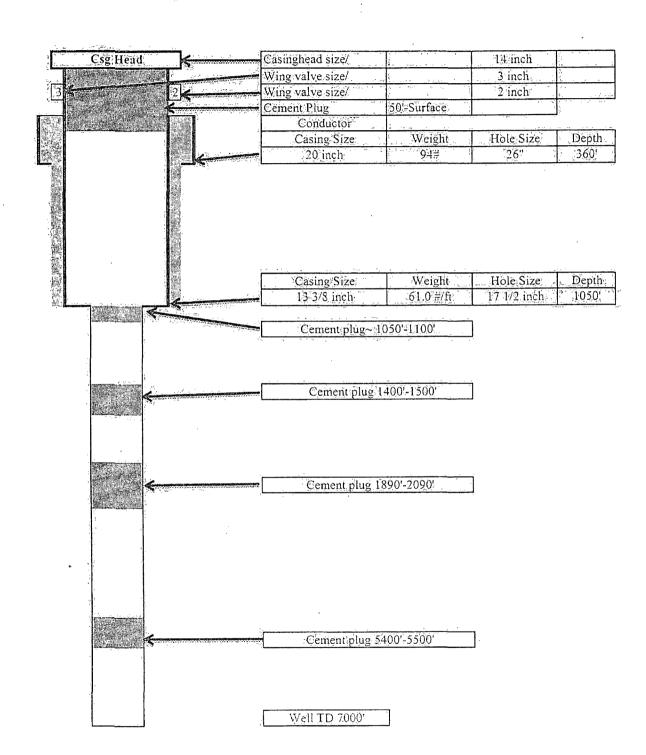
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### Lightning Dock Geothermal HI-01, LLC

## Proposed Operations and Drilling Plan, Well TFD 55-7

April 12, 2010

Prepared For:

New Mexico Energy, Minerals and Natural Resources Department Oil Conservation Division, Environmental Bureau 1220 South St. Francis Drive, Santa Fe, NM 87505

> New Mexico Office of the State Engineer Water Rights District III Office 301 South Tin Street, Deming, NM 88030

U.S. Department of the Interior, Bureau of Land Management Las Cruces District Office 1800 Marquess Street, Las Cruces, NM 88005

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#### I. <u>Summary of Proposed Operations:</u>

Lightning Dock Geothermal HI-01, LLC, ("LDG") is a wholly owned subsidiary of Los Lobos Renewable Power, LLC, which is wholly owned by Raser Technologies, Inc. (See Attachment A, Raser Technologies Corporate Structure). LDG proposes to re-enter and test well TFD 55-7 for the purpose of determining its suitability as a geothermal production well. LDG intends to mobilize a drilling rig about April 21, 2010 and will commence operations according to the Plan in Section II, below, as soon as approved by BLM and upon receipt of requisite permits from NMOSE and NMOCD.

The operations for which Lightning Dock Geothermal seeks permission in the present application are comprised of three parts:

- Remove two of the three remaining cement abandonment plugs set in the wellbore by Steam Reserve Corp. in 1985. The deepest plug will remain in place. Rosette, Inc., removed the uppermost two of the five Steam Reserve plugs pursuant to an NMOSE irrigation well permit. LDG intends to test the upper 3,400 ft of the open hole. The water will be sampled and analyzed in accordance with WQCC standards as described below. Compliance with those standards will be verified before any water is discharged in a pump test.
- Install a down-hole production pump and conduct a well and reservoir test. The discharged water will be metered and conveyed to a planted field for irrigation purposes. This will be done using standard farm irrigation equipment such as a wheel line. The test will exercise water rights owned by Rosette, Inc. and already assigned to this well. Rosette, Inc. has agreed to provide the 2010 water rights to LDG for this test. LDG does not intend to use TFD 55-7 for injection in this operation. The existing unlined reserve pit may be used for cooling and water storage if approved by NMOCD upon receipt of produced water analyses.
- Install proper wellhead equipment and secure the well.

The water in well TFD 55-7 will be sampled and analyzed for dissolved fraction of all 26.2.3103 NMAC constituents, VOCs (8260B), SVOCs (8270C), PAHs (8310), TPH (418.1), metals – dissolved (6010B/6020) including Bromide, Lithium, Rubidium, and Tungsten (by approved EPA methods), Mercury (7470A/7471A), general chemistry (methods specified in 40 CFR 136.3), Uranium (6010B/6020), radioactivity (E903/E904), and Radon (EPA method approved by NMOCD). An EPA Methods, QA/QC, and DQOs-compliant laboratory will analyze samples.

If TFD 55-7 demonstrates adequate potential as a geothermal production well, LDG will proceed to obtain all approvals and permits (BLM, NMOCD, and NMOSE) required for further development.

#### II. Well Preparation

The first part of the operation requires reopening TFD 55-7 to collect fluid samples, set a bridge plug and install a test pump. The following is the proposed plan for the drilling operation. This detail is incorporated by reference into the BLM Drilling Program, described in Section V of this document.

- 1) Inspect wellhead for dimensional consistency with ANSI series 400 standards.
- 2) Move in and rig up a rotary drilling rig with a rated capacity of at least 5000 ft and a mud system with a minimum volume of 500 barrels and a 500 hp circulating pump.
- 3) Install annular or rotating BOP on the wellhead above flow tee with gate valve on side outlet (see Attachment E).
- 4) Mix non-toxic gel-lime mud and fill hole.
- 5) Pick up slick bottom-hole assembly (BHA) #1: 8-1/2" insert bit, BS, 4x6" DC, jars, 1x6" DC, XO.
- 6) Test BOP for leakage by inflating around BHA and pumping in the side outlets to maximum working pressure of the surface piping, not to exceed 900 psig.
- 7) Run in hole and tag bottom, expected at about 1400 ft. Circulate bottoms up.
- 8) Airlift fluid in the wellbore if necessary to clean out well. Collect and analyze geochemical water samples and record volume of produced water. Water samples will be collected *in situ* (i.e., down hole) if possible but may be taken by sampling separator from the flow line. Airlift will be accomplished by injecting compressed air through the drilling assembly in sufficient quantity to stimulate flow to the surface. Discharging the flow line into a gauging tank will allow measurement of the produced liquid after its separation from the injected air. The volumes produced during the drilling operation will be recorded and will not exceed the storage capacity of the tank and reserve pit on site. No water will be discharged to "Waters of the State".
- 9) Pull out of hole and pick up 9-5/8" bit and stabilizers. Make up stiff BHA #2.
- 10) RIH and time drill cement plug #1. The plugs in well TFD 55-7 are of neat Portland cement. The plugs are reportedly each 50 400 ft in length and set in uncased open hole at about 1450 ft and 1850 ft. Time drilling and a "locked" (i.e., stiff and highly stabilized) BHA will be used to drill the plugs while staying in the original hole. Non-toxic, temperature-stable drilling mud will be used, composed of a bentonite clay-water or polymer-water mix to lubricate and cool the drill bit. The drilling fluids will bring the rock cuttings to the surface and then be cleaned and recirculated, preventing loss of drilling fluids into the rock and minimizing discharge into the reserve pit.
- 11) POH and stand back BHA #2.
- 12) Pick up BHA #3: float shoe, XO, 2x6" DC.
- 13) RIH and tag cement plug #2, expected at about 1800 ft.
- 14) Circulate hole clean.
- 15) Displace mud with water. POH to 1500 ft. Close BOP.
- 16) Pump water at 10-25 bbl/min and record stable casing head pressure.
- 17) Rig for air injection through drill pipe. Set up fluid sample collection point on flow line.
- 18) Airlift fluid in the wellbore if necessary to clean out well. Collect and analyze geochemical water samples and record volume of produced water. Water samples will be collected *in situ*

(i.e., down hole) if possible but may be taken by sampling separator from the flow line. The airlift, water sampling, and analysis will be performed as described in step 8 of this Section and in Section I, above. The volume of produced water will be recorded. No water will be discharged to "Waters of the State."

- 19) POH, stand back BHA #3.
- 20) Pick up BHA #2. RIH to cement plug.#2.
- 21) Circulate mud and drill out plug #2.
- 22) POH, lay down BHA #2.
- 23) Pick up BHA #3, RIH and tag cement plug # 3, expected at about 5400 ft. Circulate hole clean.
- 24) POH, lay down BHA #3.
- 25) Run caliper log and select zone for bridge plug installation about 3400 ft.
- 26) Pick up bridge plug and BHA #4: setting tool and DCs as directed.
- 27) RIH and set bridge plug.
- 28) POH to 2800 ft, circulate hole clean.
- 29) POH to 1000 ft.
- 30) Airlift fluid in the wellbore if necessary to clean out well. Collect and analyze geochemical water samples and record volume of produced water. Water samples will be collected *in situ* (i.e., down hole) if possible but may be taken by sampling separator from the flow line. The airlift, water sampling, and analysis will be performed as described in step 8 of this Section and in Section I, above. The volume of produced water will be recorded. No water will be discharged to "Waters of the State."
- 31) POH laying down drill pipe; lay down BHA #4.
- 32) Make up 9-5/8" pump casing string and set test pump.
- 33) Release rig.

#### III. <u>Resource Test</u>

- 34) The results of the analyses from steps 8, 18 and 30 of the preceding section will be compiled in a single report and delivered to NMOCD, NMOSE, and BLM. If the discharge meets WQCC standards, LDG will confer with the agencies to verify the conditions are met for permitted discharge into an unlined reserve pit and delivery to an irrigation system. Should the quality of water not meet the standards of 20.6.2.3103 NMAC for irrigation, LDG will suspend flow test operations, redesign the test and seek approval of subsequent applications to NMOCD, NMOSE, and BLM.
- 35) Connect flow line to irrigation system.

The flow line will discharge the water into a gauging tank and thence into the irrigation transfer pump or the reserve pit. The pit measures 170 ft x 170 ft x 12 ft deep (see Attachment B). If WQCC standards (20.6.2.3103 NMAC) are met, the reserve pit will be left unlined. The irrigation transfer pump (e.g., 25 hp centrifugal) will remove discharged water from the tank or pit and send it via a 10 inch Victaulic line to the irrigation system for application to a crop under an existing NMOSE permit. The designated crop area is the area directly south of the plant site on Attachment B. Flow will be metered using a totalizing ultrasonic or orifice meter to ensure volume does not exceed the NMOSE-permitted total.

36) Conduct pump test as directed. LDG will conduct the pump test in consultation with engineers representing the interests of potential investors in the Lightning Dock project. The operation of the test may therefore vary from day to day, but will at all times conform to the requirements of the applicable NMOCD, NMOSE and BLM permits and regulations.

LDG plans to use a 12-inch American-Marsh vertical shaft 10 stage turbine pump for this test. The pump is owned by Raser Technologies and has performance characteristics detailed in Attachment F. The power for the pump will be a 300 hp electric motor with a variable speed controller. The pump will be set at approximately 850 ft depth to allow a maximum drawdown from static water level of about 700 ft. Engineering analysis of Raser's airlift test in 2008 suggests a flow rate of 400 gpm is likely from the well in its present state, i.e., open from 1050 ft to 1450 ft. Since lost circulation occurred at greater depths (e.g., 2275 ft) during the drilling of TDF 55-7, LDG expects the reopened hole may be able to supply fluid up to the pump's maximum capacity, approaching 1500 gpm at this depth.

The pumping rate during the first week of the test will be programmed to gradually bring in flow and to establish the reservoir deliverability as a function of water level drawdown. Thereafter, the rate will be set so as not to exceed the landowner's NMOSEdesignated water rights. LDG expects to satisfy itself and its investors' engineers within a test pumping duration of four weeks.

Discharge water samples will be collected weekly and analyzed at an EPA Methods, QA/QC, DQOs-compliant laboratory. LDG will also monitor the discharge daily for standard field parameters including pH, turbidity, color, DO, and specific conductivity. If anomalous readings are detected that indicate a significant change in water source or properties, water samples will be collected immediately and discharge halted. Discharge will not be resumed until and unless laboratory analytical results confirm that the water meets the required criteria.

Lightning Dock Geothermal HI-01, LLC

Proposed Operations and Drilling Plan, Well TFD 55-7

Page 6

37) Move in and rig up well service rig.

38) Remove and lay down pump and casing.

39) Install master valve and survey flange.

40) Secure well and release rig.

41) File operations reports as required with NMOCD, NMOSE and BLM.

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#### IV. BLM Operations Plan, 43 CFR 3261.12

(a) The proposed project is on private land. Clearing and grubbing will be confined to the project area as approved by BLM in consultation with the landowner. No surface disturbance of BLM-managed public lands is proposed.

#### Well Pad Layout and Design

The well pad layout is approximately 150 ft x 150 ft with an existing reserve pit measuring 170 ft x 170 ft x 12 ft adjacent to the pad.

See Attachment B - Lightning Dock Aerial Map

See Attachment C – Survey of Well Location

#### (b) Description of Existing and Planned Roads

The well site is accessed via existing state, county and private roads. As such no new roads are necessary for this activity. The primary access roads to the site include: SR-338 (paved); CO98 Geothermal Road (paved), which extends to the surface owner's property. All roads and access at the well site on the surface owner's property are existing compacted dirt and/or graveled.

#### (c) Description of Ancillary Facilities

Sanitary Facilities – Portable chemical sanitary facilities will be available and used by all personnel during periods of well drilling and/or flow testing.

Mobile drilling office will be set upon on the site during drilling activities.

Existing water holding pond 170 ft x 170 ft x 12 ft.

Trash collection facilities e.g. roll-off container.

#### (d) Source of Drill Pad and Road Building Materials

Drill pad building material will be derived from any necessary excavation of the existing reserve pit.

The pad will be graded to provide 2% grade to reserve pit.

Existing improved roads will be used.

Any additional material required for pad construction will be secured from a local contractor.

#### (e) Water Source

Water required for this operation will be secured from an established private owner.

Water derived from the operation will be discharged into a gauging tank and thence to an irrigation transfer pump or the reserve pit. The irrigation transfer pump (e.g., 25 hp centrifugal) will remove

discharged water from the tank or pit and send it via a 10 inch Victaulic line to the irrigation system for application to a crop under an existing NMOSE permit. The designated crop area is the area directly south of the plant site on Attachment B. Flow will be metered using a totalizing ultrasonic or orifice meter to ensure volume does not exceed the NMOSE-permitted total.

The water in well TFD 55-7 will be sampled and analyzed for dissolved fraction of all 26.2.3103 NMAC constituents, VOCs (8260B), SVOCs (8270C), PAHs (8310), TPH (418.1), metals – dissolved (6010B/6020) including Bromide, Lithium, Rubidium, and Tungsten (by approved EPA methods), Mercury (7470A/7471A), general chemistry (methods specified in 40 CFR 136.3), Uranium (6010B/6020), radioactivity (E903/E904), and Radon (EPA method approved by NMOCD). An EPA Methods, QA/QC, and DQOs-compliant laboratory will analyze samples.

Potable water for human consumption will be provided by bottled water.

#### (f) Statement Describing Surface Ownership

Surface of the well site is owned by Rosette, Inc. of Animas, NM. Lightning Dock Geothermal holds a Surface Access and Use Agreement, dated 10 January, 2008, with Rosette granting access to the well site.

See Attachment F – Surface Access Agreement.

#### (g) Description of Procedures to Protect the Environment and Other Relevant Sources

Air Quality: During drilling activities hydrogen sulfide will be monitored by instruments on the drill rig.

Hydrology and Water Quality Monitoring: Water samples will be collected during the cleanout operation and tested to assure compliance with WQCC standards for agricultural use.

Portable chemical toilets supplied by a licensed contractor shall be used for human waste. The waste shall not be buried on site.

Trash and debris will be contained on site, and then hauled to an approved landfill by a licensed contractor. Burial and or burning on site will not be permitted.

Clearing and grubbing will be confined to the project area as approved by BLM in consultation with the landowner.

#### (h) Plan of Surface Reclamation

Top soil excavated during the construction of the pad, as feasible, will be stockpiled for use during subsequent reclamation of the disturbed area.

#### (i) Any Other Information That BLM May Require

Will be provided upon request.

#### V. <u>BLM Drilling Program, 43 CFR 3261.13</u>

#### (a) Description of Equipment, Materials and Procedures

A large portable rotary drill rig will be used to drill the well.

Equipment Specifications:

The availability of equipment and contractors changes from day to day. LDG will make its selection based on the best units available when the necessary permits are received. The rig will be functionally similar to the following: Drawworks – Taylor RT 5000; Mast – Taylor RT 5000 square set derrick; Substructure – Height 10 ft hydraulic w/ 15 ft K.B. elevation; Two (2) mud pumps; Rotary table; Swivel & Drilling Block; Tripping Block; Generators 235 kW, Air Compressor 500 SCFM.

Procedures will be as described in Section II, Well Preparation.

#### (b) Proposed / Anticipated Depth of the Well:

The well will be drilled and completed to the designed depth of 3,400 ft.

#### (c) Directional Drilling:

No directional drilling will be employed.

#### (d) Casing and Cementing Program:

This is a re-entry into an existing well that currently has cemented casing to approximately 1050 ft and approximately 400 ft of open hole to the first plug at a depth of approximately 1450 ft. The remainder of the well is open hole to the TD of 7000 ft. No additional casing or cement will be utilized in the operation to open this well to 3400 ft.

#### (e) Circulation Media (mud, air, foam, etc.)

The well will be drilled to a depth of 3,400 ft using non-toxic, temperature-stable drilling mud or aerated fluids. The drilling mud is composed of a bentonite clay-water or polymer-water mix to lubricate and cool the drill bit, bringing the rock cuttings to the surface discharged into the reserve pit, and preventing loss of drilling fluids into the rock.

#### (f) Description of Logs to be Run:

Caliper Logs

#### (g) Description and Diagram of Blowout Prevention Equipment:

Blowout prevention equipment (BOPE), which is typically inspected and approved by the BLM and/or the Oil Conservation Division (NMOCD) of the New Mexico Energy, Mining, and Natural Resources

Department (NMEMNRD), as applicable, would be installed, tested and ready for use while drilling to ensure that any geothermal fluid encountered does not flow uncontrolled to the surface.

See Attachment E.

#### (h) Expected Depth and Thickness of Fresh Water Zones:

N/A - existing casing is set to 1,000 ft hence no fresh, shallow water getting into well.

Static water depth is 71 ft. Total available water column of 1300 ft available

#### (i) Anticipated Lost Circulation Zones

None anticipated. The only instance of lost circulation recorded by Steam Reserve in the interval 1050 ft -3400 ft was a minor episode at 2275 ft. That was successfully treated with a small batch of lost circulation material. This is below the deepest plug that LDG intends to drill out. LDG therefore anticipates that lost circulation will not be encountered in carrying out the proposed program.

#### (j) Anticipated Reservoir Temperatures and Pressures:

Temperature: Peak temperatures have been recorded at 307.4 F at a depth of 1263 ft remaining constant to 1400 ft.

Pressures: High pressure at the depth of 1365 ft is 549.66 psig.

#### (k) Anticipated Temperature Gradient in the Area:

The regional heat flow is  $\sim 80-90$  mW/m<sup>2</sup> (Blackwell and Steele, 1992). This heat flow would yield a temperature gradient of about 35°C/km (1.9°F/100 ft) in igneous rocks and 60°C/km (3.3°F/100 ft) in valley fill clays. Most of the non-thermal wells have a gradient near 45°C/km (2.5°F/100 ft). Therefore, 45°C/km (2.5°F/100 ft) will be taken as the background temperature gradient value for the valley fill.

Thermal gradient conditions will range from 78°C/km (4.3°F/100 ft) (*well 672-225*) to 200C/km (11°F/100 ft) (*well 93-8 and AN-104*) and will be similar or higher in 55-7.

#### (l) Plat Certified by a Licensed Surveyor:

See Attachment C.

#### (m) Procedures and Duration of Well Testing

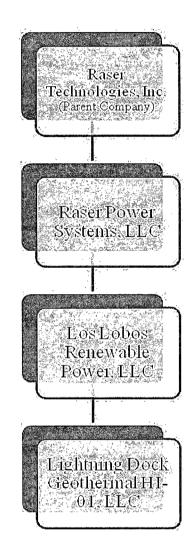
See Section II, Resource Test

#### (n) Any Other Information That BLM May Require

Will be provided upon request.

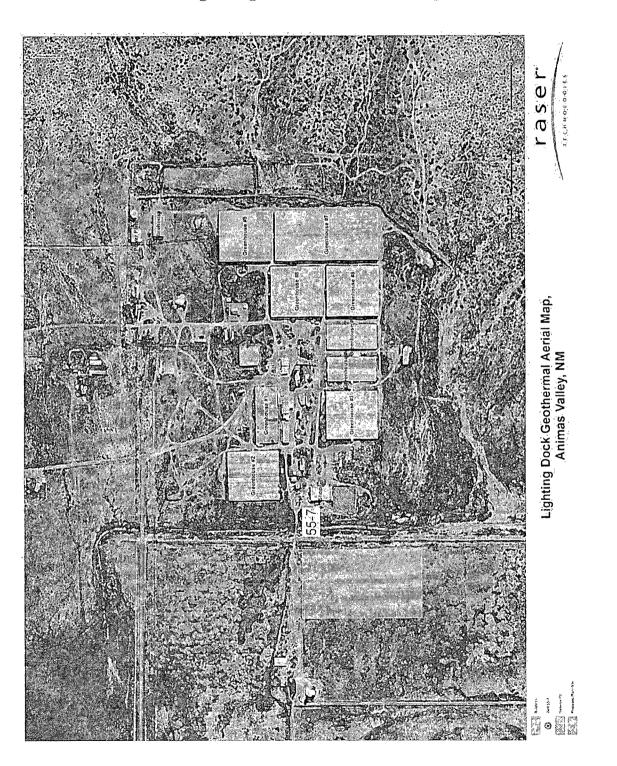
#### Attachment A

#### **Raser Technologies Corporate Structure**



Lightning Dock Geotherinal, HI-01, LLC is the permit applicant and operator. The illustration above describes the corporate organization of which Lightning Dock. Geothermal is a part as follows: Raser Technologies, Inc is the parent company? Raser's geothermal development company is Raser Power Systems, LLC, the New Mexico entity is Los Lobos Renewable Power, LLC, and Lightning Dock Geothermal HI-01, LLC is the Animas, NM project entity.

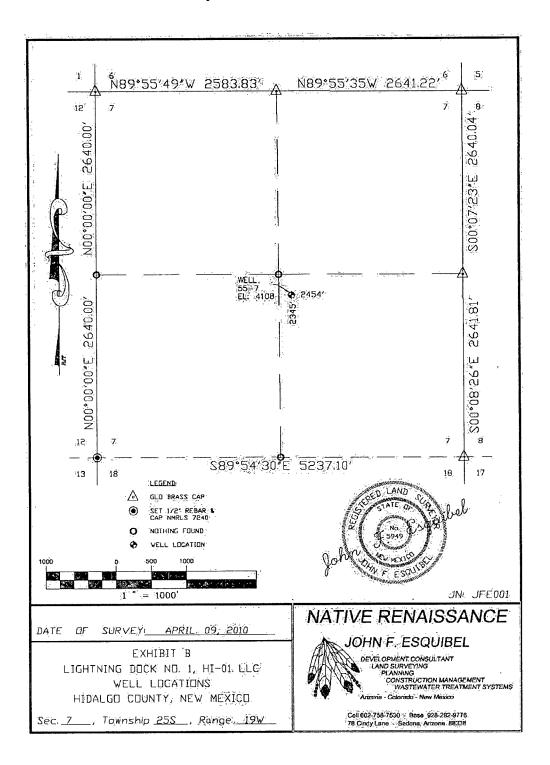
#### Attachment B



### Lightning Dock Aerial Photo Map

#### Attachment C

#### Survey of Well 55-7 Location



#### Attachment D

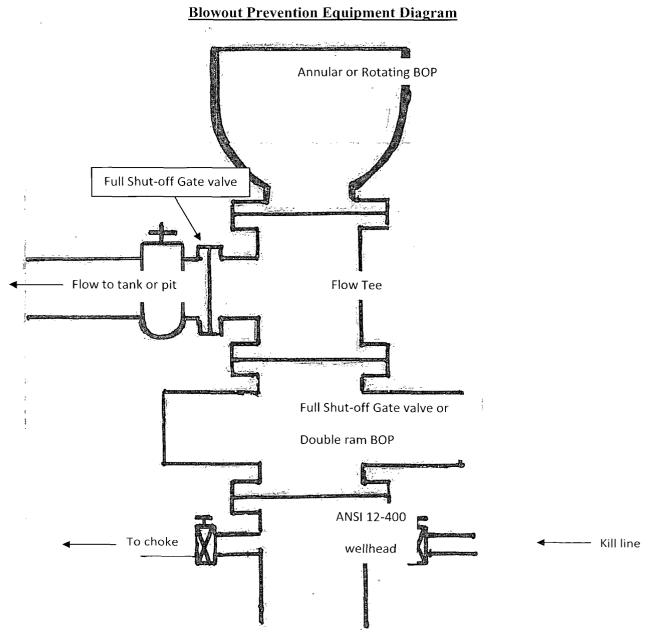
#### **Down-Hole Test Pump Specifications**

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PUMP-FLO 9

Selected from catalog: American-Marsh.60 Vers: 2009d

#### Attachment E



Attachment F

# Surface Use and Access Agreement

Between

# Rosette, Inc.

And

# Lightning Dock Geothermal HI01, LLC

January 10, 2008

#### SURFACE ACCESS AND USE AGREEMENT

This SURFACE ACCESS AND USE AGREEMENT ("Agreement") is executed effective January 10, 2008, by and between ROSETTE, INC., with an address of 26 Rose Land, Animas, NM 88020 ("Owner"), and LIGHTNING DOCK GEOTHERMAL HI-01, LLC, with an address of 5152 North Edgewood Drive, Suite 375, Provo, Utah ("LDG").

#### **RECITALS:**

A. Owner owns record title to the surface estate of certain real property located in Hidalgo County, State of New Mexico, more particularly described on Exhibit A hereto (hereinafter the "Subject Lands"). The United States of America, though the Bureau of Land Management (the "BLM"), owns the reserved mineral estate, which includes the geothermal estate. Owner owns greenhouse operations which are warmed during the winter months by heat supplied by the utilization of geothermal resources near, on, or around the Subject Lands.

B. LDG is the current owner of a Federal Geothermal Lease NM-34790, issued February 1, 1979 ("Subject Lease"), wherein the BLM has granted the holder of the Subject Lease the right to explore for and develop the geothermal resources underlying the lands covered by the Subject Lease, which includes the Subject Lands. Amax Exploration, Inc. ("Amax"), a prior owner of the Subject Lease, and a predecessor of Owner entered into a letter agreement dated December 14, 1978 ("1978 Agreement"), whereby Amax was granted access to the Subject Lands to develop the Subject Lease. The 1978 Agreement granted Owner's predecessor the right to drill to a depth of 1000 feet below the surface and extract geothermal resources there from for use in its greenhouse operation. After litigation with the BLM, Owner abandoned use of the geothermal resources from the Subject Lease and Subject Lands, and, pursuant to the settlement agreement with the BLM, Owner has certain plugging and abandoning, and reclamation responsibilities.

С. LDG intends to utilize certain existing geothermal wells on the Subject Lands and to drill additional geothermal wells or reinjection wells (such existing and initially proposed wells, as depicted on Exhibit B, and all future wells that may be proposed and drilled by LDG are defined herein collectively as the "Subject Wells") on a portion of the Subject Lands (such initial proposed well-sites, as depicted on Exhibit B, and all future well-sites that may be required for future wells, are referred to herein collectively as the "Well-Sites"), which Well-Sites will include typical geothermal energy exploration production or reinjection equipment and facilities. In connection with accessing, drilling and operating the Subject Wells and access to power generation facilities, LDG requires a portion of the Subject Lands to construct and maintain access roads crossing the Subject Lands, including, without limitation, existing roads on the Subject Lands (an "Access Road ROW" and collectively the "Access Road ROWs"). In addition, LDG requires or may require a portion of the Subject Lands to construct and maintain power plants, utilities, transmission lines, water pipelines, water storage and other facilities related to the production, extraction, transportation and reinjection of geothermal resources and the generation and transportation of electricity therefrom (all such improvements constructed or to be constructed by LDG on the Subject Lands are referred to herein collectively as the "Improvements"). LDG shall attempt to locate all such Improvements that require linear rights-of-way within the boundaries of the Access Road ROWs when and where economically and operationally feasible, and Owner herein grants Access Road ROWs of sufficient length and width to accommodate any necessary or contemplated Improvements. Furthermore, it may become necessary for LDG to obtain other rights-of-way to accommodate Improvements that cannot be located within an Access Road ROW, including without limitation, the Power Plant ROW, defined below, water storage areas, temporary construction easements, and other nonlinear surface uses (an "Other ROW" and collectively the "Other ROWs"). The rights-of-way for the necessary Well-Sites (a "Well Site ROW" and collectively the "Well Site ROWs"), the Access Road ROWs and the Other ROWs, including the Power Plant ROW (defined below), are referred to herein individually as a "ROW" and all such rights-of-way granted or to be granted hereunder shall be collectively referred to as the "ROWs."

D. Given the changed circumstances recited above, LDG and Owner desire to cancel and terminate the 1978 Agreement and enter into a new surface use and access agreement that memorializes their discussions and agreements regarding LDG's access to and use of the surface estate of the Subject Lands, and consideration provided therefore, for the drilling of the Subject Wells, the construction of the ROWs and the development of the Improvements on the Subject Lands. The 1978 Agreement shall terminate upon the execution of this Agreement.

E. LDG and Owner have also agreed that LDG shall have access to and use of certain water rights that are owned by Owner, as more particularly described below.

#### AGREEMENT:

NOW THEREFORE, in consideration of the mutual promises set forth herein and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto incorporate the recitals above herein and agree as follows:

1. Term of Agreement. The rights, including all ROWs, granted by this Agreement shall continue until the rights of LDG, its successors or assigns, to explore for, develop, extract or produce geothermal energy from the Subject Lease, or from lands pooled with the Subject Lease, permanently and irrevocably terminates; provided that the rights granted to LDG herein shall survive the termination of the Subject Lease, so long as the power plant and related facilities on the Subject Lands are capable of producing electricity.

2. Existing Wells. Owner hereby grants LDG, its employees and designated agents, and its successors and assigns, the right to access, re-open, re-drill, utilize, deepen, or to plug and abandon, when and if LDG deems it necessary in furtherance of its operations on the Subject Lands, the following wells and any other geothermal wells which exist on the Subject Lands: TED 55-77, EGS 12-7, GRED 52-7, GRED 36-7, GRED 57-7, and EGS 56-14 (collectively, the "Existing Wells"); provided however that the Existing Wells shall not include Well #16 on Exhibit B, which is a water well that is being used by Owner, Owner grants LDG access to and the right to conduct any necessary operations with respect to the Existing Wells, as and where depicted on Exhibit B, except for monitoring purposes, subject to modification by LDG upon a final inspection and survey of the Subject Lands. The Well-Site ROWs for the Existing Well's (and all future wells) shall be initially large enough to accommodate drilling operations, not to exceed 6 acres, but shall contract upon completion of the wells to area sufficient for operation and maintenance of the well, not to exceed 3 acres. One or more of the Existing Wells are close to existing structures or equipment that is stored on the Subject Lands, that may impede access, and LDG agrees to pay for the costs of repairing any damage caused by LDG's access or to pay the costs of removing or relocating any structures or equipment, in coordination with Owner. Owner hereby also grants LDG Access Road ROWs, with the right to use and expand existing roads, or construct and maintain new roads, as determined by LDG, to and for the development of the Existing Wells (the "Initial Access Road ROWs") as and where depicted on Exhibit B, subject to modification by LDG upon a final inspection and survey of the Subject Lands. Owner and LDG agree that the Initial Access Road ROWs, the centerline of which is approximately depicted on Exhibit B, subject to modification by LDG upon a final inspection and survey of the Subject Lands, shall initially be sixty (60) feet wide. LDG shall have the right to install additional pipelines, utilities, transmission lines and other Improvements along the Initial Access Road ROWs if it becomes necessary in its operations of the Existing Wells (or future wells either on or adjacent to the Subject Lands). Owner grants to LDG certain Other ROWs that LDG may require for development of the Existing Wells, for other Improvements or uses that cannot be placed within the boundary of the Initial Access Road ROWs, including, without limitation, water storage areas, permanent or temporary construction areas, and the other rights-of-way needs and uses, as depicted on Exhibit B, or as requested by LDG subsequent to the execution of this Agreement. Once the Well-Sites for the Existing Wells, the Initial Access Road ROWS, and any other initial Other ROWs granted hereunder have been surveyed and precisely identified by legal description, Owner and LDG shall execute written rights-of-way, in form sufficient for recording in Hidalgo County, that conclusively identify the initial ROWs described herein.

As noted above, LDG intends to construct a power plant and related 3. Power Plant ROW. facilities, including geothermal pipeline and utility connections to the plant and transmission facilities out of the plant (the "Power Plant"), which power plant site and connections shall require and constitute a "Power Plant ROW." The Owner hereby grants to LDG an exclusive Power Plant ROW to survey, inspect, construct, develop and operate the Power Plant and any related or necessary facilities or Improvements. The Power Plant ROW shall be evidenced by a recorded right-of-way, with a term that extends for as long as the power plant facilities are capable of production of electricity, and for a period of time thereafter for dismantling and remediation, as described below. LDG and Owner shall cooperate to locate the Power Plant ROW in a manner that minimizes the effect on Owner's existing surface uses; provided that, notwithstanding the foregoing, the Power Plant ROW shall be in a location on the Subject Lands that maximizes efficient access to and use of geothermal resources, and to electricity transmission infrastructure and markets. LDG has delivered to Owner a rough map of a possible Power Plant site, along with primary and alternate access roads for the Power Plant site, a copy of which is attached hereto as Exhibit C, and Owner and LDG mutually acknowledge and agree that the approximated rights-ofways and Power Plant site set out on that rough map would be an example of an acceptable location. LDG agrees to fence and secure the Power Plant ROW. If the Power Plant is no longer capable of production of electricity or if LDG otherwise elects to permanently shut down the Power Plant facilities for any reason, LDG shall provide Owner with written notice of its intent to shut down the facilities. After giving notice of intent to shut down and dismantle the plant, LDG shall have three (3) years to dismantle and remove all infrastructure and improvements pertaining to the Power Plant, including all utilities and transmission facilities, and to remediate the underlying property to its natural condition. Upon the request of LDG, Owner agrees to grant LDG a lease, in a recordable form, with a term that lasts for as long as the Power Plant is in existence and a reasonable time thereafter for dismantling, removal and remediation, of approximately twenty (20) acres (subject to the needs of the Power Plant and the activities of LDG in connection therewith), for the land necessary for the Power Plant and related facilities, at an annual rental rate of \$60 per acre.

4. Future Subject Wells, ROWS, and Improvements. LDG intends to develop future Subject Wells on the Subject Lands (in addition to the Existing Wells) ("Future Wells"). Additionally, LDG intends to construct and maintain related pipelines, utilities, transmission lines, production facilities, power generation facilities, water storage areas, access roads and other Improvements for such future Subject Wells. Prior to the development of any future Subject Well (not one of the Existing Wells) or Improvements on the Subject Lands in connection therewith, LDG shall provide Owner, in writing, notification of the proposed location of the desired Subject Well(s), Access Road ROW(s), or Other ROW(s) necessary for contemplated Improvements, and a description of the Subject Well(s), Access Road ROW(s) or Other ROW(s) to be constructed (individually and collectively, as the context requires, any "Future ROWs"). Within fifteen (15) days of such written notice, LDG and Owner shall discuss the location of the necessary Future ROWs, in an attempt to locate any such Future ROWs in locations that reasonably minimize the impact to the current surface uses of Owner but that do not result in an undue economic or operational burden to LDG. The parties acknowledge and agree that such Well-Site ROWs (for Future Wells) and other Future ROWs shall be located in areas that will maximize recovery and

efficient use of geothermal resources. LDG and Owner agree to meet on the Subject Lands, at the request of either party, in connection with the location of Future ROWs, to discuss such locations. Once Future ROWs have been identified and surveyed for a precise legal description, Owner and LDG shall execute written rights-of-way, in form sufficient for recording in Hidalgo County, that conclusively identify the Future ROWs.

5. **1978 Agreement.** Owner and LDG mutually agree to terminate and cancel the 1978 Agreement as of the execution date herewith, and replace the 1978 Agreement with this Agreement. Owner agrees to release LDG of any obligations or claims arising under the 1978 Agreement. Owner and LDG agrees to release Owner of any obligations or claims arising under the 1978 Agreement. Owner and LDG understand that this Agreement is intended to replace and supersede the 1978 Agreement.

6. **Consideration for Agreement**. As consideration for the execution of this Agreement, LDG shall provide the following to Owner:

(a) Upon execution of this Agreement, LDG shall pay to Owner a one-time payment in the amount of Three Hundred Twenty Thousand and No/100 Dollars (\$320,000.00).

(b) LDG shall pay Owner a minimum annual fee of \$1,000.00 as consideration for use of or access to Owner's existing cold water delivery infrastructure. Thereafter, LDG shall pay the \$1,000.00 fee prior to the anniversary date of this Agreement, provided that failure to make such payment shall not constitute an event of breach or default under this Agreement, until Owner has provided LDG with written notice of the failure to make such payment, and LDG fails to make such annual payment within, twenty (20) days of such written notice. Moreover, in the event LDG fails to make such payment after such 20-days written notice, LDG's right to access Owner's cold water delivery infrastructure shall terminate, but the remainder of this Agreement shall remain in full force and effect (including all ROWs granted or to be granted hereby).

(c) For the use of cold water (see Section 14(b)) provided by Owner to LDG for cooling and other purposes, LDG has agreed to pay an annual payment equal to \$50 per acre foot of water to be used by LDG during the next year, less the \$1000,00 minimum fee set forth above (in other words, the \$1000 fee set forth in Section 6(b) above shall be included as part of, and not in addition to, the annual payment described in this Section 6(c)). LDG shall provide to Owner an estimate of the amount of acre feet of water that LDG shall use for the following year, and shall pay the annual payment based on such estimated amount, prior to the anniversary date of this Agreement. At the end of such year, if LDG's use of water for the prior year exceeded the estimate, then LDG shall remit the payment for such acre feet used in excess of the estimate for the prior year with the payment for the next year's estimated water uses. The consideration set forth in Section 6(a) above includes the first year's payment for water use under this Agreement. In the event LDG fails to make such payment after such 20-days written notice, LDG's right' to access Owner's cold water shall terminate, but the remainder of this Agreement shall remain in full force and effect (including all ROWs granted or to be granted hereby).

7. Cessation of Development or Abandonment of Lease. LDG intends to explore for geothermal resources on the Subject Lease for the purpose of generating electricity. If LDG fails to take reasonable actions to commence exploration for or development of geothermal resources on the Subject Lease within two (2) years of the date of this Agreement, or if LDG determines at any time, either before or after such two (2) year period, to abandon development of geothermal resources on the Subject Lease (and provides Owner with written notice of such intent to abandon the Subject Lease), then LDG agrees to take such reasonable steps necessary to designate Owner as an operator (with the BLM) for purposes of operating shallower formations under the Subject Lease (down to 1000 feet, consistent with the historical operations of Owner), or, if LDG determines it is in its interest, to assign operating rights in the Subject Lease to

Owner from the surface down to 1000 feet. Notwithstanding the foregoing, if LDG determines that it intends to completely abandon the Subject Lease, and provides written notice of such intent to Owner, then LDG shall assign the entire lease over to Owner, upon assumption by Owner of all rights and responsibilities under the Subject Lease. Moreover, LDG agrees that in connection with such designation of operator, it shall agree to turn over to Owner the following Existing Wells, as shown on Exhibit B, unplugged and accessible: Well #10, Well #11, and Well #25, provided however that Owner shall assume all plugging, abandoning, reclamation and other responsibilities for such wells and shall post any required bonds in connection with the assignment and assumption of such wells. The foregoing agreement of LDG to designate Owner as an operator (or assign operating rights or all of the Subject Lease) is subject to the approval of the BLM. LDG's commitment to commence exploration and development activities on the Subject Lease is also subject to delay or suspension as result of events of Force Majeure. "Force Majeure" shall include, without limitation, the following: strikes; lockouts; riots; action of the elements, including but not limited to fire, explosion, flood, volcanic activity, earthquakes, or tidal waves; accidents; delays in transportation; inability to secure labor or materials in the open market; laws, rules or regulations of any Federal, State, County, Municipal or other governmental agency, authority or representative having jurisdiction, including failure or delay in issuance of necessary permits or approvals; war (whether declared or undeclared including terrorist acts); acts of God; litigation or administrative proceedings affecting title to lands covered hereby or operations thereon; inability to secure or absence of a market for commercial sale of geothermal resources or electricity generated therefrom, produced from the Subject Lease or of derivatives developed by LDG therefrom; or by other matters or conditions beyond the reasonable control of LDG, whether or not similar to the conditions or matters in this definition specifically enumerated.

8. **Cooperation.** Owner agrees to reasonably cooperate with LDG, in good faith, to support and promote the successful development of geothermal resources and the generation of electricity from the Subject Lease.

9. **Pipelines, Utilities**. LDG hereby agrees to locate all pipelines and other linear utilities at all points along an applicable Access Road ROW or Other ROW where reasonable and practical. However, there may be instances where pipelines, transmission facilities and other Improvements cannot be placed along an Access Road ROW, in which case LDG shall be granted separate Other ROWs for such uses. LDG shall not be required to bury pipelines or other utilities.

Access Road ROWs. LDG agrees that it shall construct and/or improve all currently 10. contemplated new roads and existing roads along the center line(s) approximately depicted on the attached Exhibit B, subject to modification by LDG upon a final inspection and survey of the Subject Lands. During the construction or improvement of any road, under an Access Road ROW, including the installation of pipelines and other utilities, the right of way shall be sixty (60) feet wide, and LDG shall have a temporary license to use other portions of the Subject Lands during the construction phase of such roads (including the installation of pipelines and other utilities) to park equipment or store gravel or other supplies, provided that LDG shall replant and restore any temporary use areas to their natural condition prior to construction. Upon completion of construction of the road (or expansion or improvement of existing roads) and installation of pipelines and other utilities, the Access Road ROWs shall be forty (40) feet wide. The roads shall be graded and improved with gravel. LDG agrees that it shall maintain the Access Road ROWs to industry standards as a gravel road during the term of this Agreement. LDG shall not be obligated to remove snow that may accumulate on the road, and shall not be responsible for paying the road, providing curb and gutter, or otherwise improving the road to accommodate increased traffic from Owner's lands. The same provisions of this Section 10 shall apply to all future roads and Access Road ROWs to be constructed and maintained by LDG on the Subject Lands, including Access Road ROWs or Other ROWs to the Power Plant ROW.

Owner's Right to Use the ROWs. LDG shall have the exclusive right to use and maintain the 11. Well Site ROWs and any Other ROWs (including the Power Plant ROW). LDG shall have the non--exclusive right to use and maintain the Access Road ROWs during the term of this Agreement for its purposes. LDG hereby agrees that Owner, and its successors, assigns, employees, agents, invitees and licensees, shall have the right to use the Access Road ROWs for access to the remainder of Owner's property as currently owned and used. Owner, and its successors, assigns, employees, agents, invitees and licensees shall not interfere with LDG's operations on the Subject Lands or the use or maintenance of the Access Road ROWs (or the other ROWs), and Owner shall be responsible for any cost of repairing damage to any road caused by Owner, or its successors, assigns, employees, agents, invitees and licensees. Any proposed use of or modification to an Access Road ROW by Owner, or its successors, assigns, employees, agents, invitees and licensees, which would or may be likely to injure, damage or interfere with the Access Road ROW, shall require the prior written consent of LDG, an express agreement of Owner to assume all costs and damages, and shall require, at EDG's option, the presence of LDG's agent or employee to monitor the activity. Owner, and its successors, assigns, employees, agents invitees and licensees shall abide by all written safety and other instructions regarding use of the roads that are provided by LDG. When LDG no longer requires an Access Road ROW for its operations, LDG shall provide written notice of its intent to abandon use and Owner shall have the option to assume control and maintenance over the Access Road ROW by notifying LDG within thirty (30) days of receipt of such notice; otherwise, LDG shall remediate and restore the property covered by an Access Road ROW in accordance with applicable law.

#### 12. Indemnification.

(a) Owner, its successors and assigns, does hereby agree to relieve, release, indemnify and hold LDG, its managers, members, successors, assigns, employees, agents, invitees and licensees, harmless and agree to defend LDG, its managers, members, successors, assigns, employees, agents, invitees and licensees, from any claim of damage to any person or property arising out-of use of any ROW or other activities on the Subject Lands for damages proximately caused by Owner, its successors, assigns, invitees, and licensees, which damages include specifically but without limitation, all damages sounding in tort (whether by way of nuisance, trespass, ultrahazardous activity or otherwise) and/or involving environmental contamination and its incident response, compensation or liability, and also including all expenses, reasonable attorneys' fees, court costs, and witness fees, and other monies expended by or incurred by LDG or its agents, in the event it shall become necessary for LDG or its agents to defend themselves from any claims made by anyone as a result of the use of any ROW or other activities on the Subject Lands, by Owner, its successors, assigns, invitees, and licensees, but not otherwise.

(b) LDG, its successors and assigns, hereby agree to relieve, release, indemnify, and hold harmless and agree to defend Owner, its successors, assigns, employees, agents, invitees and licensees from any and all claim of damage to any person or property arising out of use of the Subject Lands for operations by LDG or its agents for damages proximately caused by LDG or its agents, which damages include specifically but without limitation, all damages sounding in tort (whether by way of nuisance, trespass, ultrahazardous activity or otherwise) and/or involving environmental contamination and its incident response, compensation or liability, and also including all expenses, reasonable attorneys' fees, court costs, witness fees and other monies expended by or incurred by Owner, its successors, assigns, employees, agents, invitees and licensees in the event it shall become necessary for Owner, its successors, assigns, employees, agents, invitees and licensees to defend themselves from any claims made by anyone as a result of LDG's operations, on, across or over the Subject Lands, but not otherwise.

13. **Confidentiality**. Owner hereby agrees, unless compelled by court order or subpoena, that the terms and conditions of this Agreement, including but not limited to the payments referenced in Section 6

above, shall remain confidential and will not be disclosed or released to any other person(s) or third parties. LDG can disclose the existence and terms of this Agreement at its discretion.

14. Water Rights. Owner currently owns water rights that pertain to the Subject Lands, which are more particularly described in Exhibit D hereto. Owner is currently using a portion of its water rights for the operation of its commercial greenhouse business, for domestic consumption and some limited irrigation needs ("Current Water Usage"). Any water rights that Owner currently owns but is not currently using to satisfy the Current Water Usage shall be referred to herein as the "Excess Water Rights." LDG requires a minimum of approximately 600 acre-feet of water for the cooling and operational needs of the Power Plant, and Owner agrees that it shall make commercially reasonable efforts to meet those water requirements from the Excess Water Rights, and shall not lease or transfer any of its water rights until LDG's water requirements are being adequately met. Owner agrees to provide LDG access to and use of all Excess Water Rights as follows:

(a) Owner grants LDG the right to use Excess Water Rights for the drilling and testing of geothermal wells on the Subject Lands. LDG shall be responsible for all costs of connecting to Owner's water system.

(b) Owner hereby grants LDG the preferential right to the use of all Excess Water Rights for the development and operation of the Power Plant and the appurtenant geothernial resources. LDG shall install a metering system, at its own cost and expense, if necessary to comply with any requirements of any governmental agency or authority. LDG shall also bear the full cost of connections to Owner's water systems and infrastructure, and, if necessary, any upgrades to Owner's water system necessitated by LDG's use of the Excess Water Rights. LDG shall provide, free of cost, all electricity necessary for pumping any Excess Water Rights for LDG's use. LDG shall pay for any metering, studies or reports that may be required to establish a precise amount of Owner's available water rights, the amount of the Excess Water Rights and/or LDG's water needs for the Power Plant or geothermal resources development. Once the amount of LDG's water rights requirements are established, Owner and LDG agree to enter into a written water use agreement that evidences LDG's rights to the Excess Water Rights, which agreement shall be recorded in the county real property records ("Water Use Agreement"). Owner covenants and agrees not to transfer or sell any of the Excess Water Rights, until the Water Use Agreement is executed and recorded.

15. Drilling of Water Wells on the Subject Lands. LDG requires a certain amount of water to effectively produce geothermal energy from the Subject Wells. Owner understands that any drilling of water wells on the Subject Lands or land adjacent to the Subject Lands, under certain conditions, could significantly and adversely impact the ability of LDG to explore for and produce geothermal energy. Accordingly, Owner hereby agrees to not drill or construct any water wells on the Subject Lands or on adjacent property to the Subject Lands that Owner owns without first giving LDG written notice of its drilling plans to LDG. Owner agrees to use its best efforts to cooperate with LDG to obtain any additional water rights that LDG may need or apply for to drill the Subject Wells and/or generate electricity from the geothermal resources underlying or pooled with the Subject Lands.

16. Notices. Owner may give any notice or deliver any document hereunder to LDG by mailing the same by prepaid registered or certified mail addressed to LDG to the address set forth in the introductory paragraph above, attention General Counsel, or by delivering the same in person to the above-referenced address of LDG. LDG may give any notice or deliver any document hereunder to Owner by mailing the same by prepaid registered or certified mail addressed to Owner at the address set forth in the introductory paragraph above, attention Dale Burgett, or by delivering the same to Owner in person. For purposes of this paragraph, either party may change its address by written notice to the other. In case of any notice or document delivered by registered or certified mail, the same shall be deemed delivered when deposited in any U.S. Post Office, properly addressed as herein provided, with postage fully

prepaid. Notices shall be in writing and shall be given to LDG and Owner at the addresses set forth in the introductory paragraph hereto, or to such address as either party may designate to the other in writing not less than thirty (30) days before that event which triggers notices. Notices shall be effective the third day after the date of mailing, postage prepaid.

17. Rehabilitation and Restoration: Upon termination of this Agreement, LDG shall restore the Subject Lands near as possible to their original conditions prior to construction in accordance with acceptable industry practices and all applicable laws and regulations in effect at the time of restoration. To the extent there is any environmental remediation required for property surrounding any ROW, Owner grants LDG a temporary right-of-way to use as much of the Subject Lands as it may require for environmental remediation. LDG shall have the right to use necessary space outside of the right-of-way for repair of any roadway or facilities. If upon termination of this Agreement, or intended abandonment of an Access Road ROW or some other ROW hereunder, LDG agrees and Owner elects to assume ownership and use of any road, well, or other Improvements, then Owner shall expressly assume all liabilities or responsibilities, including without limitation all future reclamation (or plugging and abandoning, for wells) obligations, and shall hold harmless LDG upon assumption of responsibility for such road, well or other Improvements.

18. No Storage or Repair of Equipment. LDG shall not allow any construction equipment or materials to be stored on Owner's property outside the confines of the fenced Power Plant ROW beyond ninety (90) days after completion of construction of a ROW or Improvements, unless approved, in advance, by Owner. LDG shall endeavor to maintain clean, neat and orderly roads and facilities at all times. No construction equipment shall be repaired or maintained upon the property of the Owner outside the boundaries of the fenced Power Plant ROW, except in the case of emergencies to prevent damage to the Subject Lands or neighboring properties. No motor fluids will be disposed of on the property of Owner.

19. Taxes. Owner shall continue to be responsible for the payment of property taxes, if applicable. LDG agrees to pay all additional taxes that may be assessed against the Subject Lands by reason of improvements placed thereon by LDG. Owner shall provide LDG with written evidence that Owner has paid all property taxes on the Subject Lands at least thirty (30) days prior to when due. If Owner fails to pay property taxes on the Subject Lands, LDG shall have the right, but not the obligation, to pay such tax obligations on Owner's behalf, and such payment, with interest accruing at Eighteen Percent (18%) per annun, shall be due and payable by Owner to LDG within thirty (30) days of payment by LDG.

20. Recorded Right-of-Way; ROW Map. Upon the request of LDG or Owner, LDG shall prepare a written right-of-way, in recordable form, which can be recorded in Hidalgo County to provide constructive notice of the exact location of any right-of-way granted pursuant to this Agreement. Moreover, LDG shall maintain a map of the Subject Lands (starting with Exhibit B) which reflects all surface uses and ROWs used or required by LDG, and as new ROWs are obtained by LDG under this Agreement, LDG shall amend and maintain a current map and survey of ROWs, a copy of which shall be provided to Owner.

21. LDG Financing. Owner agrees to execute any documents reasonably required by any lender of LDG to permit LDG to obtain financing for LDG's activities on the Subject Lands. Such documents may include, without limitation, a certificate of Qwner confirming the validity and enforceability of this Agreement, that there are no defaults under this Agreement, that this Agreement shall survive any foreclosure and may be assigned to subsequent purchasers at foreclosure, consent of Owner to the grant of LDG's rights in this Agreement to a lender for security purposes, and any other covenants and agreements that are typically required by institutional lenders. Moreover, if Owner has existing deeds of trust, mortgages, or other liens on the Subject Lands at the time of this Agreement, owner agrees to obtain subordinations from its lenders and lienholders with respect to this Agreement, on the form to be provided

by LDG, either prior to execution or within thirty (30) days after execution, as elected by LDG. The subordination agreement may be recorded with the Memorandum described in Exhibit C or recorded separately.

22. Governing Law. The laws of the State of New Mexico shall control the rights of the parties under this contract.

23. Waiver. By signing this Agreement, neither party waives its statutory and common law rights to occupancy and enjoyment of their respective estates, except as expressly provided in this Agreement.

Assignment of Rights. All rights and obligations under this Agreement shall run with the Subject Lands and shall inure to the benefit of and be binding upon the heirs, successors, or assigns of each party. EDG may assign its rights in this Agreement without the prior written consent of Owner, including, without limiting the foregoing, assignments for purposes of providing security for any loans. Moreover, EDG shall have the right to assign all or any portion of the ROWs to another entity or person, separate from ownership of the Subject Lease. The parties hereto agree to execute a memorandum of this Agreement, which shall be in form sufficient to record in the Hidalgo County real property records, in the form provided by LDG.

25. Amendment. This Agreement constitutes the entire Agreement between the parties pertaining to the subject matter contained in it and supersedes all prior and contemporaneous agreements, representations, and understandings of the parties with respect thereto. No supplement, modification, or amendment of this Agreement shall be binding unless executed in writing by all parties.

26: **Counterparts**. This Agreement may be executed in counterparts. Each counterpart shall constitute an original and all counterparts together shall constitute one and the same document: Receipt by party hereto of an executed copy of this Agreement by facsimile shall constitute conclusive evidence of execution and delivery of the Agreement by the signatory thereto.

[Signatures on the following page]

Dated effective as of the date first written above.

# OWNER:

ROSETTE, INC. By: Name: Title: ¿

1

<u>LDG</u>:

# LIGHTNING DOCK GEOTHERMAL HI-01, LLC

By: 21 Name: Martin F. Peterson Title: CF 0

## EXHIBIT A

Legal Description of the Subject Lands

A. LDG is the owner of Federal Geothermal Lease NM -34790 ("Subject Lease"), granting LDG the right to explore for and develop geothermal resources underlying the lands covered by the lease, described as follows:

1.

T255, R19W, NMLP.ML Sec. 6: Lots 3, 4, 5, 6, 7, SEL/4NWL/4 Sec. 6: EL/2SW1/4 Sec. 7: Lots 1, 2, 3, 4, S1/2NEL/4, SEL/4NWL/4, EL/2SW1/4, SEL/6, NW1/4NEL/4, NEL/4NWL/4 Sec. 18: Lot 1, N1/2NEL/4, NEL/4NWL/4

and

T2SS, R20W, N.M.P.M. Sec. 1: NW1/45W1/4, S1/2SW1/4, SW1/4SE1/4 Sec. 11: NE1/4, S1/2 Sec. 12: ALL Sec. 13: N1/2N1/2

Containing 2,500,96 acres, more or less

2. LDG has applied for Federal Geothermal Lease NM 108801, which is pending final approval by the BLM and will be included with the Subject Lease upon approval, granting LDG the right to explore for and develop geothermal resources underlying the lands covered by the Subject Lease, described as follows:

T258, R20W, N.M.P.M. Sec. 14: All

Containing 640.00 acres, more or less

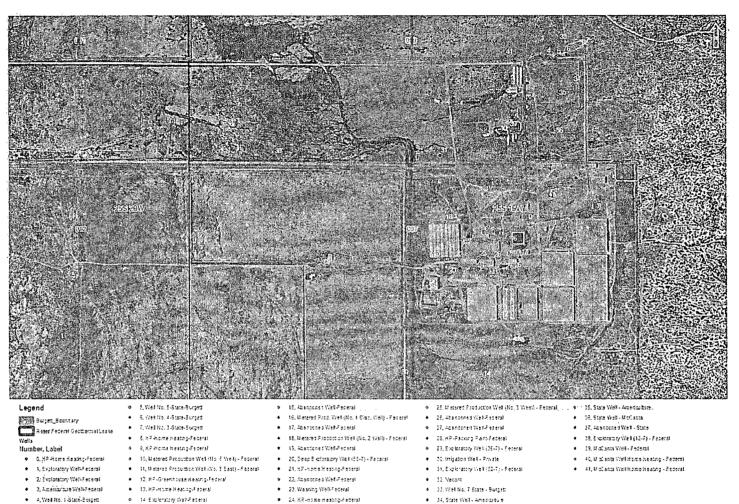
- B. Owner is the owner of the land ("Surface Lands") covering, in part, the Subject Lease, which is described as follows:
  - 1. Sections 7 and 18 T25 S, R19 W, N.M.P.M

And

Sections 11, 12, 13, 14, and 23 T25 S, R20 W, N.M.P.M Containing 2,592.473 acres, more or less

**C.** "Subject Lands" shall be the surface area wherein LDG's Subject Lease underlies Owners Surface Lands.

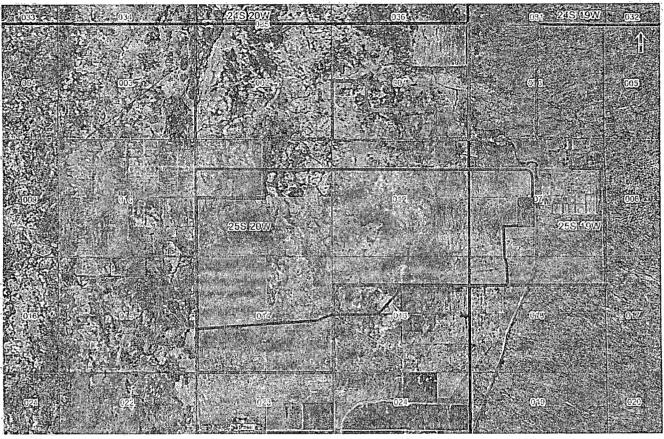
# EXHIBIT B



# Initial Inventory of Existing Wells and Location of Initial Contemplated ROWs

# EXHIBIT C

Sample Power Plant ROW and Access Roads for a Power Plant



#### Legend

Secondary Access Route Control Reser Federal Geothermal Lease Primary Access Route Burgett\_Boundary Proposed Plant Location Lightning Dock Geothermal Power Plant and Access ROW Hildago County, Nevada

Lightning Dock Geothermal HI-01, LLC 5152 North Edgewood Drive Suite 375 Provo, UT 84604

# EXHIBIT D

# Water Rights Description

A. Owner represents and warrants ownership of the following Water Rights identified by New Mexico Office of the State Engineer Numbers:

A-13, with points of diversion located in Section13, Township 25 South, Range 20 West, N.M.P.M.

A-36-A, with points of diversion located in Sections 6 and 7, Township 25 South, Range 19 West, N.M.P.M., and Sections 4 and 12, Township 25 South, Range 20 West, N.M.P.M.

A-35-D, with points of diversion located in Section 7, Township 25 South, Range 19 West, N.M.P.M., and Section 4, Township 25 South, Range 20 West, N.M.P.M.

A-51, with points of diversion located in Section 10, Township 25 South, Range 20 West, N.M.P.M.

A-64-A, with points of diversion in Section 7, Township 25 South, Range 19 West, N.M.P.M.

A-384, with points of diversion in Section 12, Township 25 South, Range 20 West, N.M.P.M.

A-385, with points of diversion in Section 7, Township 25 South, Range 19 West, N.M.P.M.

A-386, with points of diversion in Section 7, Township 25 South, Range 19 West, N.M.P.M.

T	TATE OF NEW MEXICO AND MINERALS DEPARTMENT	OIL CONSERVATION DIVISION P. O. BOX 2088	Form G-103 Adopted 10-1-74
	PIES RECEIVED	SANTA FE, NEW MEXICO 87501	Revised 10-1-78
DIST	RIBUTION	· · · ·	
File	·	SUNDRY NOTICES AND REPORTS	
N. M. B. M		ON	S. Indicate Type of Lease State NA- Fedral
Operator		GEOTHERMAL RESOURCES WELLS	5.a State Lease No. Federal NM 34790
Land Offic			
Do Not Us For Permit	-" (Form G-101) for Such Proposals.)	Deepen or Plug Back to a Different Reservoir. Use "Applic Temp. Observation	ation 7. Unit Agreement Name
-	Low-Temp Thermal	Injection/Disposal	N/A
2. Name o Ligh	of Operator Itning Dock Geotherma	l HI-01, LLC	8. Farm or Lease Name N/A
3. Addres: 51	52 Edgewood Drive, Pr	rovo, Utah 84604	9. Well No. TFD 55-7
4. Locatio Unit Le		Feet From TheLine andFeet	10. Field and Pool, or Wildcan Wildcat
		Township25S19W	
	<u>HIIIIIIIIIIIIIII</u>	5. Elevation (Show whether DF, RT, GR, etc.)	12. County
<u>IIIII</u>		4201' GR	Hidalgo
6.	Check Appropr	riate Box To Indicate Nature of Notice, Report or Ot	her Data
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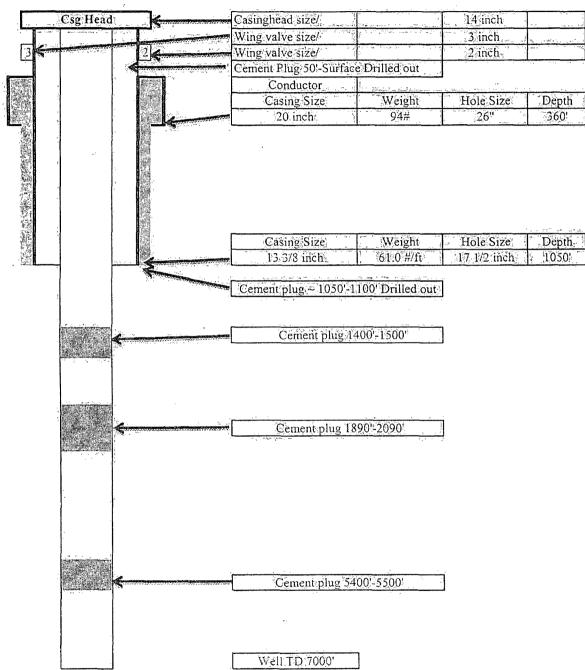
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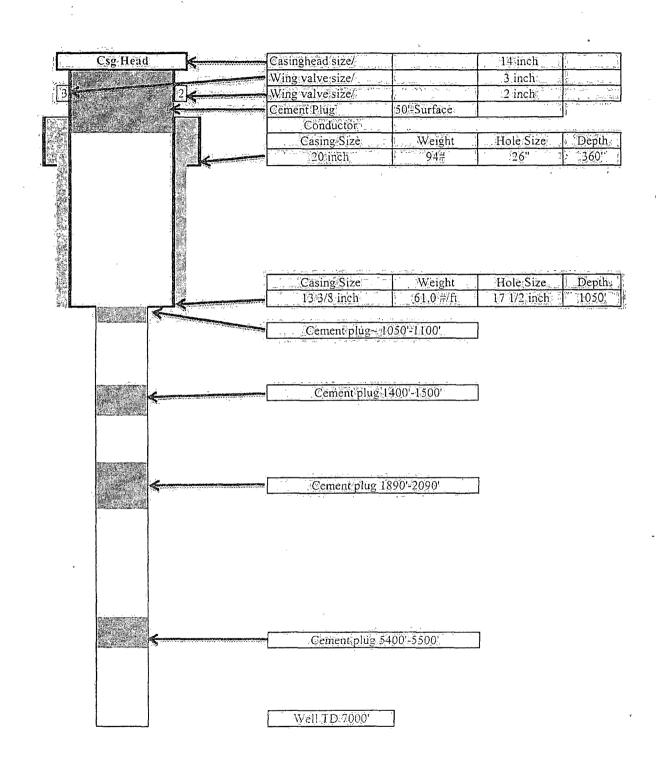
Lightning Dock



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# Field Name:

Lightning Dock



# Lightning Dock Geothermal HI-01, LLC

# Proposed Operations and Drilling Plan, Well TFD 55-7

April 12, 2010

Prepared For:

New Mexico Energy, Minerals and Natural Resources Department Oil Conservation Division, Environmental Bureau 1220 South St. Francis Drive, Santa Fe, NM 87505

> New Mexico Office of the State Engineer Water Rights District III Office 301 South Tin Street, Deming, NM 88030

U.S. Department of the Interior, Bureau of Land Management Las Cruces District Office 1800 Marquess Street, Las Cruces, NM 88005

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III.	Resource Test	5
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# I. <u>Summary of Proposed Operations:</u>

Lightning Dock Geothermal HI-01, LLC, ("LDG") is a wholly owned subsidiary of Los Lobos Renewable Power, LLC, which is wholly owned by Raser Technologies, Inc. (See Attachment A, Raser Technologies Corporate Structure). LDG proposes to re-enter and test well TFD 55-7 for the purpose of determining its suitability as a geothermal production well. LDG intends to mobilize a drilling rig about April 21, 2010 and will commence operations according to the Plan in Section II, below, as soon as approved by BLM and upon receipt of requisite permits from NMOSE and NMOCD.

The operations for which Lightning Dock Geothermal seeks permission in the present application are comprised of three parts:

- Remove two of the three remaining cement abandonment plugs set in the wellbore by Steam Reserve Corp. in 1985. The deepest plug will remain in place. Rosette, Inc., removed the uppermost two of the five Steam Reserve plugs pursuant to an NMOSE irrigation well permit. LDG intends to test the upper 3,400 ft of the open hole. The water will be sampled and analyzed in accordance with WQCC standards as described below. Compliance with those standards will be verified before any water is discharged in a pump test.
- Install a down-hole production pump and conduct a well and reservoir test. The discharged water will be metered and conveyed to a planted field for irrigation purposes. This will be done using standard farm irrigation equipment such as a wheel line. The test will exercise water rights owned by Rosette, Inc. and already assigned to this well. Rosette, Inc. has agreed to provide the 2010 water rights to LDG for this test. LDG does not intend to use TFD 55-7 for injection in this operation. The existing unlined reserve pit may be used for cooling and water storage if approved by NMOCD upon receipt of produced water analyses.
- Install proper wellhead equipment and secure the well.

The water in well TFD 55-7 will be sampled and analyzed for dissolved fraction of all 26.2.3103 NMAC constituents, VOCs (8260B), SVOCs (8270C), PAHs (8310), TPH (418.1), metals – dissolved (6010B/6020) including Bromide, Lithium, Rubidium, and Tungsten (by approved EPA methods), Mercury (7470A/7471A), general chemistry (methods specified in 40 CFR 136.3), Uranium (6010B/6020), radioactivity (E903/E904), and Radon (EPA method approved by NMOCD). An EPA Methods, QA/QC, and DQOs-compliant laboratory will analyze samples.

If TFD 55-7 demonstrates adequate potential as a geothermal production well, LDG will proceed to obtain all approvals and permits (BLM, NMOCD, and NMOSE) required for further development.

# II. Well Preparation

The first part of the operation requires reopening TFD 55-7 to collect fluid samples, set a bridge plug and install a test pump. The following is the proposed plan for the drilling operation. This detail is incorporated by reference into the BLM Drilling Program, described in Section V of this document.

- 1) Inspect wellhead for dimensional consistency with ANSI series 400 standards.
- 2) Move in and rig up a rotary drilling rig with a rated capacity of at least 5000 ft and a mud system with a minimum volume of 500 barrels and a 500 hp circulating pump.
- 3) Install annular or rotating BOP on the wellhead above flow tee with gate valve on side outlet (see Attachment E).
- 4) Mix non-toxic gel-lime mud and fill hole.
- 5) Pick up slick bottom-hole assembly (BHA) #1: 8-1/2" insert bit, BS, 4x6" DC, jars, 1x6" DC, XO.
- 6) Test BOP for leakage by inflating around BHA and pumping in the side outlets to maximum working pressure of the surface piping, not to exceed 900 psig.
- 7) Run in hole and tag bottom, expected at about 1400 ft. Circulate bottoms up.
- 8) Airlift fluid in the wellbore if necessary to clean out well. Collect and analyze geochemical water samples and record volume of produced water. Water samples will be collected *in situ* (i.e., down hole) if possible but may be taken by sampling separator from the flow line. Airlift will be accomplished by injecting compressed air through the drilling assembly in sufficient quantity to stimulate flow to the surface. Discharging the flow line into a gauging tank will allow measurement of the produced liquid after its separation from the injected air. The volumes produced during the drilling operation will be recorded and will not exceed the storage capacity of the tank and reserve pit on site. No water will be discharged to "Waters of the State".
- 9) Pull out of hole and pick up 9-5/8" bit and stabilizers. Make up stiff BHA #2.
- 10) RIH and time drill cement plug #1. The plugs in well TFD 55-7 are of neat Portland cement. The plugs are reportedly each 50 400 ft in length and set in uncased open hole at about 1450 ft and 1850 ft. Time drilling and a "locked" (i.e., stiff and highly stabilized) BHA will be used to drill the plugs while staying in the original hole. Non-toxic, temperature-stable drilling mud will be used, composed of a bentonite clay-water or polymer-water mix to lubricate and cool the drill bit. The drilling fluids will bring the rock cuttings to the surface and then be cleaned and recirculated, preventing loss of drilling fluids into the rock and minimizing discharge into the reserve pit.
- 11) POH and stand back BHA #2.
- 12) Pick up BHA #3: float shoe, XO, 2x6" DC.
- 13) RIH and tag cement plug #2, expected at about 1800 ft.
- 14) Circulate hole clean.
- 15) Displace mud with water. POH to 1500 ft. Close BOP.
- 16) Pump water at 10-25 bbl/min and record stable casing head pressure.
- 17) Rig for air injection through drill pipe. Set up fluid sample collection point on flow line.
- 18) Airlift fluid in the wellbore if necessary to clean out well. Collect and analyze geochemical water samples and record volume of produced water. Water samples will be collected *in situ*

Lightning Dock Geothermal HI-01, LLC

Proposed Operations and Drilling Plan, Well TFD 55-7 Page 4

(i.e., down hole) if possible but may be taken by sampling separator from the flow line. The airlift, water sampling, and analysis will be performed as described in step 8 of this Section and in Section I, above. The volume of produced water will be recorded. No water will be discharged to "Waters of the State."

- 19) POH, stand back BHA #3.
- 20) Pick up BHA #2. RIH to cement plug #2.
- 21) Circulate mud and drill out plug #2.
- 22) POH, lay down BHA #2.
- 23) Pick up BHA #3, RIH and tag cement plug # 3, expected at about 5400 ft. Circulate hole clean.
- 24) POH, lay down BHA #3.
- 25) Run caliper log and select zone for bridge plug installation about 3400 ft.
- 26) Pick up bridge plug and BHA #4: setting tool and DCs as directed.
- 27) RIH and set bridge plug.
- 28) POH to 2800 ft, circulate hole clean.
- 29) POH to 1000 ft.
- 30) Airlift fluid in the wellbore if necessary to clean out well. Collect and analyze geochemical water samples and record volume of produced water. Water samples will be collected *in situ* (i.e., down hole) if possible but may be taken by sampling separator from the flow line. The airlift, water sampling, and analysis will be performed as described in step 8 of this Section and in Section I, above. The volume of produced water will be recorded. No water will be discharged to "Waters of the State."
- 31) POH laying down drill pipe; lay down BHA #4.
- 32) Make up 9-5/8" pump casing string and set test pump.
- 33) Release rig.

#### III. <u>Resource Test</u>

- 34) The results of the analyses from steps 8, 18 and 30 of the preceding section will be compiled in a single report and delivered to NMOCD, NMOSE, and BLM. If the discharge meets WQCC standards, LDG will confer with the agencies to verify the conditions are met for permitted discharge into an unlined reserve pit and delivery to an irrigation system. Should the quality of water not meet the standards of 20.6.2.3103 NMAC for irrigation, LDG will suspend flow test operations, redesign the test and seek approval of subsequent applications to NMOCD, NMOSE, and BLM.
- 35) Connect flow line to irrigation system.

The flow line will discharge the water into a gauging tank and thence into the irrigation transfer pump or the reserve pit. The pit measures 170 ft x 170 ft x 12 ft deep (see Attachment B). If WQCC standards (20.6.2.3103 NMAC) are met, the reserve pit will be left unlined. The irrigation transfer pump (e.g., 25 hp centrifugal) will remove discharged water from the tank or pit and send it via a 10 inch Victaulic line to the irrigation system for application to a crop under an existing NMOSE permit. The designated crop area is the area directly south of the plant site on Attachment B. Flow will be metered using a totalizing ultrasonic or orifice meter to ensure volume does not exceed the NMOSE-permitted total.

36) Conduct pump test as directed. LDG will conduct the pump test in consultation with engineers representing the interests of potential investors in the Lightning Dock project. The operation of the test may therefore vary from day to day, but will at all times conform to the requirements of the applicable NMOCD, NMOSE and BLM permits and regulations.

LDG plans to use a 12-inch American-Marsh vertical shaft 10 stage turbine pump for this test. The pump is owned by Raser Technologies and has performance characteristics detailed in Attachment F. The power for the pump will be a 300 hp electric motor with a variable speed controller. The pump will be set at approximately 850 ft depth to allow a maximum drawdown from static water level of about 700 ft. Engineering analysis of Raser's airlift test in 2008 suggests a flow rate of 400 gpm is likely from the well in its present state, i.e., open from 1050 ft to 1450 ft. Since lost circulation occurred at greater depths (e.g., 2275 ft) during the drilling of TDF 55-7, LDG expects the reopened hole may be able to supply fluid up to the pump's maximum capacity, approaching 1500 gpm at this depth.

The pumping rate during the first week of the test will be programmed to gradually bring in flow and to establish the reservoir deliverability as a function of water level drawdown. Thereafter, the rate will be set so as not to exceed the landowner's NMOSEdesignated water rights. LDG expects to satisfy itself and its investors' engineers within a test pumping duration of four weeks.

Discharge water samples will be collected weekly and analyzed at an EPA Methods, QA/QC, DQOs-compliant laboratory. LDG will also monitor the discharge daily for standard field parameters including pH, turbidity, color, DO, and specific conductivity. If anomalous readings are detected that indicate a significant change in water source or properties, water samples will be collected immediately and discharge halted. Discharge will not be resumed until and unless laboratory analytical results confirm that the water meets the required criteria.

- 37) Move in and rig up well service rig.
- 38) Remove and lay down pump and casing.
- 39) Install master valve and survey flange.
- 40) Secure well and release rig.
- 41) File operations reports as required with NMOCD, NMOSE and BLM.

# IV. BLM Operations Plan, 43 CFR 3261.12

(a) The proposed project is on private land. Clearing and grubbing will be confined to the project area as approved by BLM in consultation with the landowner. No surface disturbance of BLM-managed public lands is proposed.

# Well Pad Layout and Design

The well pad layout is approximately 150 ft x 150 ft with an existing reserve pit measuring 170 ft x 170 ft x 12 ft adjacent to the pad.

See Attachment B – Lightning Dock Aerial Map

See Attachment C – Survey of Well Location

## (b) Description of Existing and Planned Roads

The well site is accessed via existing state, county and private roads. As such no new roads are necessary for this activity. The primary access roads to the site include: SR-338 (paved); CO98 Geothermal Road (paved), which extends to the surface owner's property. All roads and access at the well site on the surface owner's property are existing compacted dirt and/or graveled.

#### (c) Description of Ancillary Facilities

Sanitary Facilities – Portable chemical sanitary facilities will be available and used by all personnel during periods of well drilling and/or flow testing.

Mobile drilling office will be set upon on the site during drilling activities.

Existing water holding pond 170 ft x 170 ft x 12 ft.

Trash collection facilities e.g. roll-off container.

# (d) Source of Drill Pad and Road Building Materials

Drill pad building material will be derived from any necessary excavation of the existing reserve pit.

The pad will be graded to provide 2% grade to reserve pit.

Existing improved roads will be used.

Any additional material required for pad construction will be secured from a local contractor.

#### (e) Water Source

Water required for this operation will be secured from an established private owner.

Water derived from the operation will be discharged into a gauging tank and thence to an irrigation transfer pump or the reserve pit. The irrigation transfer pump (e.g., 25 hp centrifugal) will remove

discharged water from the tank or pit and send it via a 10 inch Victaulic line to the irrigation system for application to a crop under an existing NMOSE permit. The designated crop area is the area directly south of the plant site on Attachment B. Flow will be metered using a totalizing ultrasonic or orifice meter to ensure volume does not exceed the NMOSE-permitted total.

The water in well TFD 55-7 will be sampled and analyzed for dissolved fraction of all 26.2.3103 NMAC constituents, VOCs (8260B), SVOCs (8270C), PAHs (8310), TPH (418.1), metals – dissolved (6010B/6020) including Bromide, Lithium, Rubidium, and Tungsten (by approved EPA methods), Mercury (7470A/7471A), general chemistry (methods specified in 40 CFR 136.3), Uranium (6010B/6020), radioactivity (E903/E904), and Radon (EPA method approved by NMOCD). An EPA Methods, QA/QC, and DQOs-compliant laboratory will analyze samples.

Potable water for human consumption will be provided by bottled water.

## (f) Statement Describing Surface Ownership

Surface of the well site is owned by Rosette, Inc. of Animas, NM. Lightning Dock Geothermal holds a Surface Access and Use Agreement, dated 10 January, 2008, with Rosette granting access to the well site.

See Attachment F – Surface Access Agreement.

## (g) Description of Procedures to Protect the Environment and Other Relevant Sources

Air Quality: During drilling activities hydrogen sulfide will be monitored by instruments on the drill rig.

Hydrology and Water Quality Monitoring: Water samples will be collected during the cleanout operation and tested to assure compliance with WQCC standards for agricultural use.

Portable chemical toilets supplied by a licensed contractor shall be used for human waste. The waste shall not be buried on site.

Trash and debris will be contained on site, and then hauled to an approved landfill by a licensed contractor. Burial and or burning on site will not be permitted.

Clearing and grubbing will be confined to the project area as approved by BLM in consultation with the landowner.

#### (h) Plan of Surface Reclamation

Top soil excavated during the construction of the pad, as feasible, will be stockpiled for use during subsequent reclamation of the disturbed area.

#### (i) Any Other Information That BLM May Require

Will be provided upon request.

# V. <u>BLM Drilling Program, 43 CFR 3261.13</u>

# (a) Description of Equipment, Materials and Procedures

A large portable rotary drill rig will be used to drill the well.

Equipment Specifications:

The availability of equipment and contractors changes from day to day. LDG will make its selection based on the best units available when the necessary permits are received. The rig will be functionally similar to the following: Drawworks – Taylor RT 5000; Mast – Taylor RT 5000 square set derrick; Substructure – Height 10 ft hydraulic w/ 15 ft K.B. elevation; Two (2) mud pumps; Rotary table; Swivel & Drilling Block; Tripping Block; Generators 235 kW, Air Compressor 500 SCFM.

Procedures will be as described in Section II, Well Preparation.

## (b) Proposed / Anticipated Depth of the Well:

The well will be drilled and completed to the designed depth of 3,400 ft.

#### (c) Directional Drilling:

No directional drilling will be employed.

#### (d) Casing and Cementing Program:

This is a re-entry into an existing well that currently has cemented casing to approximately 1050 ft and approximately 400 ft of open hole to the first plug at a depth of approximately 1450 ft. The remainder of the well is open hole to the TD of 7000 ft. No additional casing or cement will be utilized in the operation to open this well to 3400 ft.

i

#### (e) Circulation Media (mud, air, foam, etc.)

The well will be drilled to a depth of 3,400 ft using non-toxic, temperature-stable drilling mud or aerated fluids. The drilling mud is composed of a bentonite clay-water or polymer-water mix to lubricate and cool the drill bit, bringing the rock cuttings to the surface discharged into the reserve pit, and preventing loss of drilling fluids into the rock.

#### (f) Description of Logs to be Run:

Caliper Logs

# (g) Description and Diagram of Blowout Prevention Equipment:

Blowout prevention equipment (BOPE), which is typically inspected and approved by the BLM and/or the Oil Conservation Division (NMOCD) of the New Mexico Energy, Mining, and Natural Resources

Department (NMEMNRD), as applicable, would be installed, tested and ready for use while drilling to ensure that any geothermal fluid encountered does not flow uncontrolled to the surface.

See Attachment E.

# (h) Expected Depth and Thickness of Fresh Water Zones:

N/A – existing casing is set to 1,000 ft hence no fresh, shallow water getting into well.

Static water depth is 71 ft. Total available water column of 1300 ft available

## (i) Anticipated Lost Circulation Zones

None anticipated. The only instance of lost circulation recorded by Steam Reserve in the interval 1050 ft -3400 ft was a minor episode at 2275 ft. That was successfully treated with a small batch of lost circulation material. This is below the deepest plug that LDG intends to drill out. LDG therefore anticipates that lost circulation will not be encountered in carrying out the proposed program.

## (j) Anticipated Reservoir Temperatures and Pressures:

Temperature: Peak temperatures have been recorded at 307.4 F at a depth of 1263 ft remaining constant to 1400 ft.

Pressures: High pressure at the depth of 1365 ft is 549.66 psig.

#### (k) Anticipated Temperature Gradient in the Area:

The regional heat flow is  $\sim 80-90$  mW/m<sup>2</sup> (Blackwell and Steele, 1992). This heat flow would yield a temperature gradient of about 35°C/km (1.9°F/100 ft) in igneous rocks and 60°C/km (3.3°F/100 ft) in valley fill clays. Most of the non-thermal wells have a gradient near 45°C/km (2.5°F/100 ft). Therefore, 45°C/km (2.5°F/100 ft) will be taken as the background temperature gradient value for the valley fill.

Thermal gradient conditions will range from 78°C/km (4.3°F/100 ft) (*well 672-225*) to 200C/km (11°F/100 ft) (*well 93-8 and AN-104*) and will be similar or higher in 55-7.

#### (l) Plat Certified by a Licensed Surveyor:

See Attachment C.

#### (m) Procedures and Duration of Well Testing

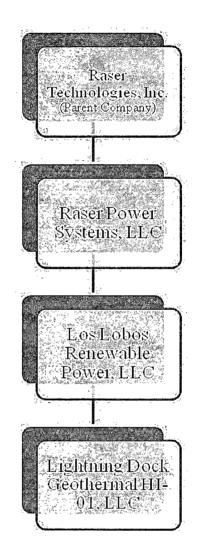
See Section II, Resource Test

#### (n) Any Other Information That BLM May Require

Will be provided upon request.

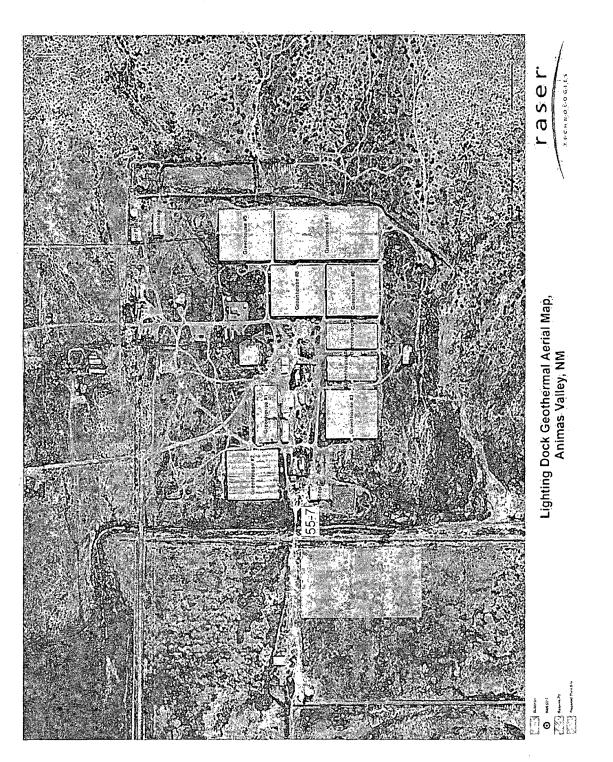
## Attachment A

# **Raser Technologies Corporate Structure**



Lightning Dock Geothermal HT 01, ELC is the permit applicant and operator. The illustration above describes the corporate organization of which Lightning Dock-Geothermal is a part as follows Raser Technologies, Inc. is the parent company? Raser's geothermal development company, is Raser Power Systems, LLC; the New Mexico entity is Los Lobos Renewable Power, LLC; and Lightning Dock Geothermal HI-01, LLC is the Animas, NM project entity.

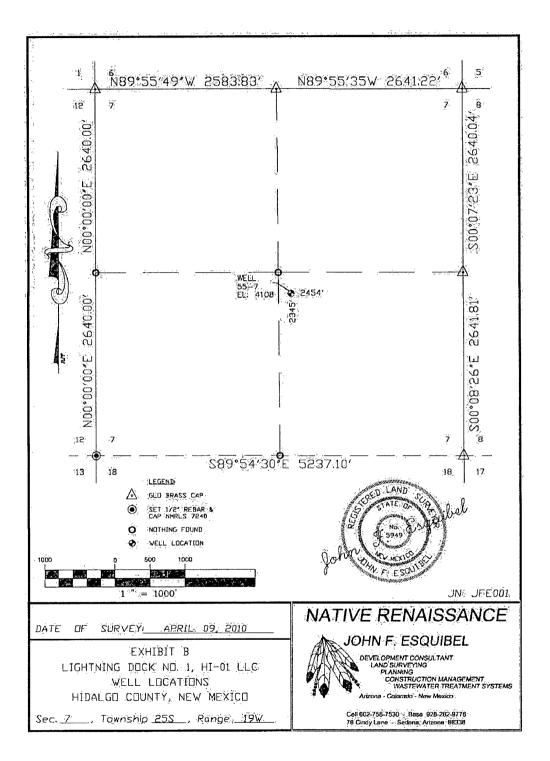
# Attachment B



# Lightning Dock Aerial Photo Map

## Attachment C





# Attachment D

# **Down-Hole Test Pump Specifications**

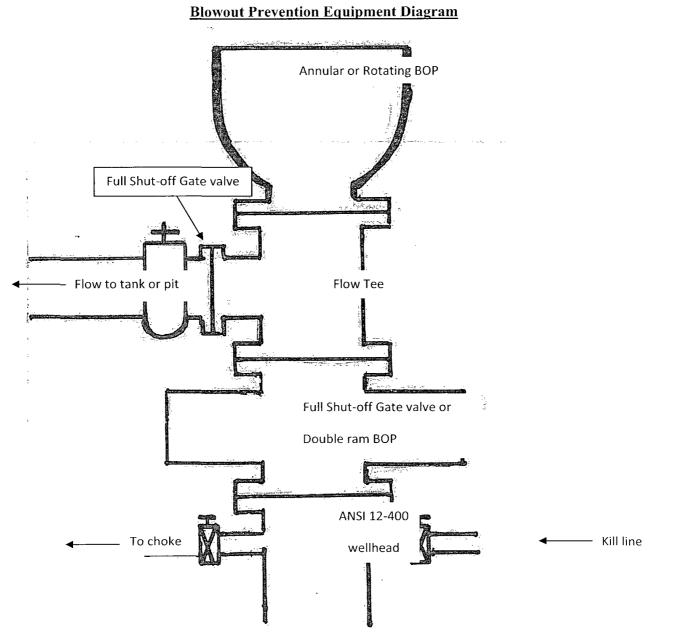
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Selected from catalog: American-Marsh.60 Vers: 2009d

# Attachment E



#### Attachment F

# Surface Use and Access Agreement

Between

# Rosette, Inc.

And

# Lightning Dock Geothermal HI01, LLC

January 10, 2008

#### SURFACE ACCESS AND USE AGREEMENT

This SURFACE ACCESS AND USE AGREEMENT ("Agreement") is executed effective January 10, 2008, by and between ROSETTE, INC., with an address of 26 Rose Land, Animas, NM 88020 ("Owner"), and LIGHTNING DOCK GEOTHERMAL HI-01, LLC, with an address of 5152 North-Edgewood Drive, Suite 375, Provo, Utah ("LDG").

#### **RECITALS**:

A. Owner owns record title to the surface estate of certain real property located in Hidalgo County, State of New Mexico, more particularly described on Exhibit A hereto (hereinafter the "Subject Lands"). The United States of America, though the Bureau of Land Management (the "BLM"), owns the reserved-mineral estate, which includes the geothermal estate. Owner owns greenhouse operations which are warmed during the winter months by heat supplied by the utilization of geothermal resources near, on, or around the Subject Lands.

B. LDG is the current owner of a Federal Geothermal Lease NM-34790, issued February 1, 1979 ("Subject Lease"), wherein the BLM has granted the holder of the Subject Lease the right to explore for and develop the geothermal resources underlying the lands covered by the Subject Lease, which includes the Subject Lands. Amax Exploration, Inc. ("Amax"), a prior owner of the Subject Lease, and a predecessor of Owner entered into a letter agreement dated December 14, 1978 ("1978 Agreement"), whereby Amax was granted access to the Subject Lands to develop the Subject Lease. The 1978 Agreement granted Owner's predecessor the right to drill to a depth of 1000 feet below the surface and extract geothermal resources there from for use in its greenhouse operation. After litigation with the BLM, Owner abandoned use of the geothermal resources from the Subject Lease and Subject Lands, and, pursuant to the settlement agreement with the BLM; Owner has certain plugging and abandoning, and reclamation responsibilities.

C. LDG intends to utilize certain existing geothermal wells on the Subject Lands and to drill additional geothermal wells or reinjection wells (such existing and initially proposed wells, as depicted on Exhibit B, and all future wells that may be proposed and drilled by LDG are defined herein collectively as the "Subject Wells") on a portion of the Subject Lands (such initial proposed well-sites, as depicted on Exhibit B, and all future well-sites that may be required for future wells, are referred to herein collectively as the "Well-Sites"), which Well-Sites will include typical geothermal energy exploration production or reinjection equipment and facilities. In connection with accessing, drilling and operating the Subject Wells and access to power generation facilities, LDG requires a portion of the Subject Lands to construct and maintain access roads crossing the Subject Lands, including, without limitation, existing roads on the Subject Lands (an "Access Road ROW" and collectively the "Access Road ROWs"). In addition. LDG requires or may require a portion of the Subject Lands to construct and maintain power plants, utilities, transmission lines, water pipelines, water storage and other facilities related to the production, extraction, transportation and reinjection of geothermal resources and the generation and transportation of electricity therefrom (all such improvements constructed or to be constructed by LDG on the Subject Lands are referred to herein collectively as the "Improvements"). LDG shall attempt to locate all such Improvements that require linear rights-of-way within the boundaries of the Access Road ROWs when and where economically and operationally feasible, and Owner herein grants Access Road ROWs of sufficient length and width to accommodate any necessary or contemplated Improvements. Furthermore, it may become necessary for LDG to obtain other rights-of-way to accommodate Improvements that cannot be located within an Access Road ROW, including without limitation, the Power Plant ROW, defined below, water storage areas, temporary construction easements, and other nonlinear surface uses (an "Other ROW" and collectively the "Other ROWs"). The rights-of-way for the necessary Well-Sites (a "Well Site ROW" and collectively the "Well Site ROWs"), the Access Road ROWs and the Other ROWs, including the Rower Plant ROW (defined below), are referred to herein individually as a "ROW" and all such rights-of-way granted or to be granted hereunder shall be collectively referred to as the "ROWs."

D. Given the changed circumstances recited above, LDG and Owner desire to cancel and terminate the 1978 Agreement and enter into a new surface use and access agreement that memorializes their discussions and agreements regarding EDG's access to and use of the surface estate of the Subject Eands, and consideration provided therefore, for the drilling of the Subject Wells, the construction of the ROWs and the development of the Improvements on the Subject Lands. The 1978 Agreement shall terminate upon the execution of this Agreement.

E. LDG and Owner have also agreed that LDG shall have access to and use of certain water rights that are owned by Owner, as more particularly described below.

#### AGREEMENT:

NOW THEREFORE, in consideration of the mutual promises set forth herein and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto incorporate the recitals above herein and agree as follows:

1. Term of Agreement. The rights, including all ROWs, granted by this Agreement shall continue until the rights of LDG, its successors or assigns, to explore for, dévelop, extract or produce geothermal energy from the Subject Lease, or from lands pooled with the Subject Lease, permanently and irrevocably terminates; provided that the rights granted to LDG herein shall survive the termination of the Subject Lease, so long as the power plant and related facilities on the Subject Lands are capable of producing electricity.

2. Existing Wells. Owner hereby grants LDG, its employees and designated agents, and its successors and assigns, the right to access, re-open, re-drill, utilize, deepen, or to plug and abandon, when and if LDG deems it necessary in furtherance of its operations on the Subject Lands, the following wells and any other geothermal wells which exist on the Subject Lands: TFD 55-77, EGS 12-7, GRED \$2-7; GRED 36-7, GRED 57-7, and EGS 56-14 (collectively, the "Existing Wells"); provided however that the Existing Wells shall not include Well #16 on Exhibit B. which is a water well that is being used by Owner, Owner grants LDG access to and the right to conduct any necessary operations with respect to the Existing Wells, as and where depicted on Exhibit B. except for monitoring purposes, subject to amodification by LDG upon a final inspection and survey of the Subject Lands. The Well-Site ROWs for the Existing Wells (and all future wells) shall be initially large enough to accommodate drilling operations, not to exceed 6 acres, but shall contract upon completion of the wells to area sufficient for operation and maintenance of the well, not to exceed 3 acres. One or more of the Existing Wells are close to existing structures or equipment that is stored on the Subject Lands, that may impede access, and LDG agrees to pay for the costs of repairing any damage caused by LDG's access or to pay the costs of removing or relocating any structures or equipment, in coordination with Owner. Owner hereby also grants LDG Access Road ROWs, with the right to use and expand existing roads, or construct and maintain new roads, as determined by LDG, to and for the development of the Existing Wells (the "Initial Access Road ROWs") as and where depicted on Exhibit B, subject to modification by EDG upon a final inspection and survey of the Subject Lands. Owner and LDG agree that the Initial Access Road ROWs, the centerline of which is approximately depicted on Exhibit **B**, subject to modification by LDG upon a final inspection and survey of the Subject Lands, shall initially be sixty (60) feet wide. LDG shall have the right to install additional pipelines, utilities, transmission lines and other Improvements along the Initial Access Road ROWs if it becomes necessary in its operations of the Existing Wells (or future wells either on or adjacent to the Subject Lands). Ownersgrants to LDG certain Other RØWs that LDG may require for development of the Existing Wells, for other Improvements or uses that cannot be placed within the boundary of the Initial Access Road RØWs; including, without limitation, water storage areas, permanent or temporary construction areas, and the other rights-of-way needs and uses, as depicted on Exhibit B, or as requested by LDG subsequent to the execution of this Agreement. Once the Well-Sites for the Existing Wells, the Initial Access Road ROWS, and any other initial Other ROWs granted hereunder have been surveyed and precisely identified by legal description, Owner and LDG shall execute written rights-of-way, in form sufficient for recording in Hidalgo County, that conclusively identify the initial ROWs described herein.

As noted above, LDG intends to construct a power plant and related Power Plant ROW. 3. facilities, including geothermal pipeline and utility connections to the plant and transmission facilities out of the plant (the "Power Plant"), which power plant site and connections shall require and constitute a "Power Plant ROW." The Owner hereby grants to LDG an exclusive Power Plant ROW to survey, inspect, construct, develop and operate the Power Plant and any related or necessary facilities or Improvements. The Power Plant ROW shall be evidenced by a recorded right-of-way, with a term that extends for as long as the power plant facilities are capable of production of electricity; and for a period of time thereafter for dismantling and remediation, as described below. EDG and Owner shall cooperate to locate the Power Plant ROW in a manner that minimizes the effect on Owner's existing surface uses; provided that, notwithstanding the foregoing, the Power Plant ROW shall be in a location on the Subject Lands that maximizes efficient access to and use of geothermal resources, and to electricity transmission infrastructure and markets. LDG has delivered to Owner a rough map of a possible Power Plant site, along with primary and alternate access roads for the Power Plant site, a copy of which is attached hereto as Exhibit C, and Owner and LDG mutually acknowledge and agree that the approximated rights-ofways and Power Plant site set out on that rough map would be an example of an acceptable location. LDG agrees to fence and secure the Power Plant ROW. If the Power Plant is no longer capable of production of electricity or if LDG otherwise elects to permanently shut down the Power Plant facilities for any reason, LDG shall provide Owner with written notice of its intent to shut down the facilities. After giving notice of intent to shut down and dismantle the plant, LDG shall have three (3) years to dismantle and remove all infrastructure and improvements pertaining to the Power Plant, including all utilities and transmission facilities, and to remediate the underlying property to its natural condition. Upon the request of LDG. Owner agrees to grant LDG a lease, in a recordable form, with a term that lasts for as long as the Power Plant is in existence and a reasonable time thereafter for dismantling, removal and remediation, of approximately twenty (20) acres (subject to the needs of the Power Plant and the activities of LDG in connection therewith), for the land necessary for the Power Plant and related facilities, at an annual rental rate of \$60 per acre.

4. Future Subject Wells, ROWS, and Improvements. LDG intends to develop future Subject Wells on the Subject Lands (in addition to the Existing Wells) ("Future Wells"). Additionally, LDG intends to construct and maintain related pipelines, utilities, transmission lines, production facilities, power generation facilities, water storage areas, access roads and other Improvements for such future Subject Wells. Prior to the development of any future Subject Well (not one of the Existing Wells) or Improvements on the Subject Lands in connection therewith, LDG shall provide Owner, in writing, notification of the proposed location of the desired Subject Well(s), Access Road ROW(s), or Other ROW(s) necessary for contemplated Improvements, and a description of the Subject Well(s), Access Road ROW(s) or Other ROW(s) to be constructed (individually and collectively, as the context requires, any "Future ROWs"). Within fifteen (15) days of such written notice, LDG and Owner shall discuss the location of the necessary Future ROWs, in an attempt to locate any such Future ROWs in locations that reasonably minimize the impact to the current surface uses of Owner but that do not result in an undue economic or operational burden to LDG. The parties acknowledge and agree that such Well-Site ROWs (for Future Wells) and other Future ROWs shall be located in areas that will maximize recovery and

efficient use of geothermal resources. LDG and Owner agree to meet on the Subject Lands, at the request of either party, in connection with the location of Future ROWs, to discuss such locations. Once Future ROWs have been identified and surveyed for a precise legal description, Owner and LDG shall execute written rights-of-way, in form sufficient for recording in Hidalgo County, that conclusively identify the Future ROWs.

5. **1978** Agreement. Owner and LDG mutually agree to terminate and cancel the 1978 Agreement as of the execution date herewith, and replace the 1978 Agreement with this Agreement. Owner agrees to release LDG of any obligations or claims arising under the 1978 Agreement, and LDG agrees to release Owner of any obligations or claims arising under the 1978 Agreement. Owner and LDG understand that this Agreement is intended to replace and supersede the 1978 Agreement.

6. **Consideration for Agreement**. As consideration for the execution of this Agreement, LDG shall provide the following to Owner:

(a) Upon execution of this Agreement, LDG shall pay to Owner a one-time payment in the amount of Three Hundred Twenty Thousand and No/100 Dollars (\$320,000.00).

(b) LDG shall pay Owner a minimum annual fee of \$1,000.00 as consideration for use of or access to Owner's existing cold water delivery infrastructure. Thereafter, LDG shall pay the \$1,000.00 fee prior to the anniversary date of this Agreement, provided that failure to make such payment shall not constitute an event of breach or default under this Agreement, until Owner has provided LDG with written notice of the failure to make such payment, and LDG fails to make such annual payment within twenty (20) days of such written notice. Moreover, in the event LDG fails to make such payment after such 20-days written notice, LDG's right to access Owner's cold water delivery infrastructure shall terminate, but the remainder of this Agreement shall remain in full force and effect (including all ROWs granted or to be granted hereby).

(c) For the use of cold water (see Section 14(b)) provided by Owner to LDG for cooling and other purposes, LDG has agreed to pay an annual payment equal to \$50 per acre foot of water to be used by LDG during the next year, less the \$1000.00 minimum fee set forth above (in other words, the \$1000 fee set forth in Section 6(b) above shall be included as part of, and not in addition to, the annual payment described in this Section 6(c)). LDG shall provide to Owner an estimate of the amount of acre feet of water that LDG shall use for the following year, and shall pay the annual payment based on such estimated amount, prior to the anniversary date of this Agreement. At the end of such year, if LDG's use of water for the prior year exceeded the estimate, then LDG shall remit the payment for such acre feet used in excess of the estimate for the prior year with the payment for the next year's estimated water uses. The consideration set forth in Section 6(a) above includes the first year's payment for water use under this Agreement. In the event LDG fails to make such payment after such 20-days written notice, LDG's right to access Owner's cold water shall terminate, but the remainder of this Agreement shall remain in full force and effect (including all ROWs granted or to be granted hereby).

7. Cessation of Development of Abandonment of Lease. LDG intends to explore for geothermal resources on the Subject Lease for the purpose of generating electricity. If LDG fails to take reasonable actions to commence exploration for or development of geothermal resources on the Subject Lease within two (2) years of the date of this Agreement, or if LDG determines at any time, either before or after such two (2) year period, to abandon development of geothermal resources on the Subject Lease (and provides Owner with written notice of such intent to abandon the Subject Lease), then LDG agrees to take such reasonable steps necessary to designate Owner as an operator (with the BLM) for purposes of operating shallower formations under the Subject Lease (down to 1000 feet, consistent with the historical operations of Owner), or, if LDG determines it is in its interest, to assign operating rights in the Subject Lease to

Owner, from the surface down to 1000 feet. Notwithstanding the foregoing, if LDG determines that it intends to completely abandon the Subject Lease, and provides written notice of such intent to Owner, then LDG shall assign the entire lease over to Owner, upon assumption by Owner of all rights and responsibilities under the Subject Lease. Moreover, LDG agrees that in connection with such designation of operator, it shall agree to turn over to Owner the following Existing Wells, as shown on Exhibit B. unplugged and accessible: Well #10, Well #11, and Well #25; provided however that Owner shall assume all plugging, abandoning, reclamation and other responsibilities for such wells and shall post any required bonds in connection with the assignment and assumption of such wells. The foregoing agreement of LDG to designate Owner as an operator (or assign operating rights or all of the Subject Lease) is subject to the approval of the BLM. LDG's commitment to commence exploration and development activities on the Subject Lease is also subject to delay or suspension as result of events of Force Majeure. "Force Majeure" shall include, without limitation, the following: strikes: lockouts: riots: action of the elements, including but not limited to fire, explosion, flood, volcanic activity, earthquakes, or tidal waves; accidents; delays in transportation; inability to secure labor or materials in the open. market; laws, rules or regulations of any Federal, State, County, Municipal or other governmental agency, authority or representative having jurisdiction, including failure or delay in issuance of necessary permits. or approvals; war (whether declared or undeclared including terrorist acts); acts of God; litigation or administrative proceedings affecting title to lands covered hereby or operations thereon; inability to secure or absence of a market for commercial sale of geothermal resources or electricity generated therefrom, produced from the Subject Lease or of derivatives developed by LDG therefrom; or by other matters or conditions beyond the reasonable control of LDG, whether or not similar to the conditions of matters in this definition specifically enumerated.

8. **Cooperation.** Owner agrees to reasonably cooperate with LDG, in good faith, to support and promote the successful development of geothermal resources and the generation of electricity from the Subject Lease.

9. **Pipelines, Utilities**. LDG hereby agrees to locate all pipelines and other linear utilities at all points along an applicable Access Road ROW or Other ROW where reasonable and practical. However, there may be instances where pipelines, transmission facilities and other Improvements cannot be placed along an Access Road ROW, in which case LDG shall be granted separate Other ROWs for such uses. LDG shall not be required to bury pipelines or other utilities.

10. Access Road ROWs. LDG agrees that it shall construct and/or improve all currently contemplated new roads and existing roads along the center line(s) approximately depicted on the attached Exhibit B, subject to modification by LDG upon a final inspection and survey of the Subject Lands. During the construction or improvement of any road, under an Access Road ROW, including the installation of pipelines and other utilities, the right of way shall be sixty (60) feet wide, and LDG shall have a temporary license to use other portions of the Subject Lands during the construction phase of such roads (including the installation of pipelines and other utilities) to park equipment or store gravel or other supplies, provided that LDG shall replant and restore any temporary use areas to their natural condition prior to construction. Upon completion of construction of the road (or expansion or improvement of existing roads) and installation of pipelines and other utilities, the Access Road ROWs shall be forty (40) feet wide. The roads shall be graded and improved with gravel. LDG agrees that it shall maintain the Access Road ROWs to industry standards as a gravel road during the term of this Agreement. LDG shall not be obligated to remove snow that may accumulate on the road, and shall not be responsible for paving the road, providing curb and gutter, or otherwise improving the road to accommodate increased traffic from Owner's lands. The same provisions of this Section 10 shall apply to all future roads and Access Road ROWs to be constructed and maintained by LDG on the Subject Lands, including Access Road ROWs or Other ROWs to the Power Plant ROW.

14. Owner's Right to Use the ROWs: LDG shall have the exclusive right to use and maintain the Well Site ROWs and any Other ROWs (including the Power Plant ROW). LDG shall have the nonexclusive right to use and maintain the Access Road ROWs during the term of this Agreement for its purposes. LDG hereby agrees that Owner, and its successors, assigns, employees, agents, invitees and licensees, shall have the right to use the Access Road ROWs for access to the remainder of Owner's property as currently owned and used. Owner, and its successors, assigns, employees, agents, invitees and licensees shall not interfere with LDG's operations on the Subject Lands or the use or maintenance of the Access Road ROWs (or the other ROWs), and Owner shall be responsible for any cost of repairing damage to any road caused by Owner, or its successors, assigns, employees, agents, invitees and licensees. Any proposed use of or modification to an Access Road ROW by Owner, or its successors. assigns, employees, agents, invitees and licensees, which would or may be likely to injure, damage or interfere with the Access Road ROW, shall require the prior written consent of LDG, an express agreement of Owner to assume all costs and damages, and shall require, at LDG's option, the presence of LDG's agent or employee to monitor the activity. Owner, and its successors; assigns, employees, agents invitees, and licensees, shall ablde by all written safety and other instructions regarding use of the roads that are provided by LDG. When LDG no longer requires an Access Road ROW for its operations, LDG shall provide written notice of its intent to abandon use and Owner shall have the option to assume control and maintenance over the Access Road ROW by notifying LDG within thirty (30) days of receipt of such notice; otherwise, LDG shall remediate and restore the property covered by an Access Road ROW in accordance with applicable law.

## 12. Indemnification.

(a) Owner, its successors and assigns, does hereby agree to relieve, release, indemnify and hold LDG, its managers, members, successors, assigns, employees, agents, invitees and licensees, harmless and agree to defend LDG, its managers, members, successors, assigns, employees, agents, invitees and licensees, from any claim of damage to any person or property arising out of use of any ROW or other activities on the Subject Lands for damages proximately caused by Owner, its successors, assigns, invitees, and licensees, which damages include specifically but without limitation, all damages sounding in tort (whether by way of nuisance, trespass, ultrahazardous activity or otherwise) and/or involving environmental contamination and its incident response, compensation or liability, and also including all expenses, reasonable attorneys' fees, court costs, and witness fees, and other monies expended by or incurred by LDG or its agents, in the event it shall become necessary for LDG or its agents to defend themselves from any claims made by anyone as a result of the use of any ROW or other activities on the Subject Lands, by Owner, its successors, assigns, invitees, and licensees, but not otherwise.

(b) LDG, its successors and assigns, hereby agree to relieve, release, indemnify, and hold harmless and agree to defend Owner, its successors, assigns, employees, agents, invitees and licensees from any and all claim of damage to any person or property arising out of use of the Subject Lands for operations by LDG or its agents for damages proximately caused by LDG or its agents, which damages include specifically but without limitation, all damages sounding in tort (whether by way of nuisance, trespass, ultrahazardous activity or otherwise) and/or involving environmental contamination and its incident response, compensation or liability, and also including all expenses, reasonable attorneys' fees, court costs, witness fees and other monies expended by or incurred by Owner, its successors, assigns, employees, agents, invitees and licensees in the event it shall become necessary for Owner, its successors, assigns, employees, agents, invitees and licensees to defend themselves from any claims made by anyone as a result of LDG's operations, on, across or over the Subject Lands, but not otherwise.

13. **Confidentiality**. Owner hereby agrees, unless compelled by court order or subpoena, that the terms and conditions of this Agreement, including but not limited to the payments referenced in Section 6

above, shall remain confidential and will not be disclosed or released to any other person(s) or third parties. LDG can disclose the existence and terms of this Agreement at its discretion.

14. Water Rights. Owner currently owns water rights that pertain to the Subject Lands, which are more particularly described in Exhibit D hereto. Owner is currently using a portion of its water rights for the operation of its commercial greenhouse business, for domestic consumption and some limited irrigation needs ("Current Water Usage"). Any water rights that Owner currently owns but is not currently using to satisfy the Current Water Usage shall be referred to herein as the "Excess Water Rights." LDG requires a minimum of approximately 600 acre-feet of water for the cooling and operational needs of the Power Plant, and Owner agrees that it shall make commercially reasonable efforts to meet those water requirements from the Excess Water Rights, and shall not lease or transfer any of its water rights until LDG's water requirements are being adequately met. Owner agrees to provide LDG access to and use of all Excess Water Rights as follows:

(a) Owner grants LDG the right to use Excess Water Rights for the drilling and testing of geothermal wells on the Subject Lands. LDG shall be responsible for all costs of connecting to Owner's water system.

(b) Owner hereby grants LDG the preferential right to the use of all Excess Water Rights for the development and operation of the Power Plant and the appurtenant geothermal resources. LDG shall install a metering system, at its own cost and expense, if necessary to comply with any requirements of any governmental agency or authority. LDG shall also bear the full cost of connections to Owner's water systems and infrastructure, and, if necessary, any upgrades to Owner's water system necessitated by LDG's use of the Excess Water Rights. LDG shall provide, free of cost, all electricity necessary for pumping any Excess Water Rights for LDG's use. LDG shall pay for any metering, studies or reports that may be required to establish a precise amount of Owner's available water rights, the amount of the Excess Water Rights and/or LDG's water needs for the Power Plant or geothermal resources development. Once the amount of LDG's water rights requirements are established, Owner and LDG agree to enter into a written water use agreement that evidences LDG's rights to the Excess Water Rights; which agreement shall be recorded in the county real property records ("Water Use Agreement"). Owner covenants and agrees not to transfer or sell any of the Excess Water Rights, until the Water Use Agreement is executed and recorded.

15. Drilling of Water Wells on the Subject Lands. LDG requires a certain amount of water to effectively produce geothermal energy from the Subject Wells. Owner understands that any drilling of water wells on the Subject Lands or land adjacent to the Subject Lands, under certain conditions, could significantly and adversely impact the ability of LDG to explore for and produce geothermal energy. Accordingly, Owner hereby agrees to not drill or construct any water wells on the Subject Lands or on adjacent property to the Subject Lands that Owner owns without first giving LDG written notice of its drilling plans to LDG. Owner agrees to use its best efforts to cooperate with LDG to obtain any additional water rights that LDG may need or apply for to drill the Subject Wells and/or generate electricity from the geothermal resources underlying or pooled with the Subject Lands.

16. Notices. Owner may give any notice or deliver any document hereunder to LDG by mailing the same by prepaid registered or certified mail addressed to LDG to the address set forth in the introductory paragraph above, attention General Counsel, or by delivering the same in person to the above-referenced address of LDG. LDG may give any notice or deliver any document hereunder to Owner by mailing the same by prepaid registered or certified mail addressed to Owner at the address set forth in the introductory paragraph above, attention Dale Burgett, or by delivering the same to Owner in person. For purposes of this paragraph, either party may change its address by written notice to the other. In case of any notice or document delivered by registered or certified mail, the same shall be deemed delivered when deposited in any U.S. Post Office, properly addressed as herein provided, with postage fully

prepaid. Notices shall be in writing and shall be given to LDG and Owner at the addresses set forth in the introductory paragraph hereto, or to such address as either party may designate to the other in writing not less than thirty (30) days before that event which triggers notices. Notices shall be effective the third day after the date of mailing, postage prepaid.

17. Rehabilitation and Restoration. Upon termination of this Agreement, LDG shall restore the Subject Lands near as possible to their original conditions prior to construction in accordance with, acceptable industry practices and all applicable laws and regulations in effect at the time of restoration. To the extent there is any environmental remediation required for property surrounding any ROW, Owner grants LDG a temporary right-of-way to use as much of the Subject Lands as it may require for environmental remediation. LDG shall have the right to use necessary space outside of the right-of-way for repair of any roadway or facilities. If upon termination of this Agreement, or intended abandonment of an Access Road ROW or some other ROW hereunder. LDG agrees and Owner elects to assume ownership and use of any road, well, or other Improvements, then Owner shall expressly assume all liabilities or responsibilities, including without limitation all future reclamation (or plugging and abandoning, for wells) obligations, and shall hold harmless LDG upon assumption of responsibility for such road, well-or other Improvements.

18. No Storage or Repair of Equipment. LDG shall not allow any construction equipment or materials to be stored on Owner's property outside the confines of the fenced Power Plant ROW beyond ninety (90) days after completion of construction of a ROW or Improvements, unless approved, in advance, by Owner. LDG shall endeavor to maintain clean, neat and orderly roads and facilities at all times. No construction equipment shall be repaired or maintained upon the property of the Owner outside the boundaries of the fenced Power Plant ROW, except in the case of emergencies to prevent damage to the Subject Lands or neighboring properties. No motor fluids will be disposed of on the property of Owner.

19. Taxes. Owner shall continue to be responsible for the payment of property taxes, if applicable. LDG agrees to pay all additional taxes that may be assessed against the Subject Lands by reason of improvements placed thereon by LDG. Owner shall provide LDG with written evidence that Owner has paid all property taxes on the Subject Lands at least thirty (30) days prior to when due. If Owner fails to pay property taxes on the Subject Lands, LDG shall have the right, but not the obligation, to pay such tax obligations on Owner's behalf, and such payment, with interest accruing at Eighteen Percent (18%) per annum, shall be due and payable by Owner to LDG within thirty (30) days of payment by LDG.

20. **Recorded Right-of-Way; ROW Map.** Upon the request of LDG or Owner, LDG shall prepare a written right-of-way, in recordable form, which can be recorded in Hidalgo County to provide constructive notice of the exact location of any right-of-way granted pursuant to this Agreement. Moreover, LDG shall maintain a map of the Subject Lands (starting with Exhibit B) which reflects all surface uses and ROWs used or required by LDG, and as new ROWs are obtained by LDG under this Agreement, LDG shall amend and maintain a current map and survey of ROWs, a copy of which shall be provided to Owner.

21. LDG Financing. Owner agrees to execute any documents reasonably required by any lender of LDG to permit LDG to obtain financing for LDG's activities on the Subject Lands. Such documents may include, without limitation, a certificate of Owner confirming the validity and enforceability of this Agreement, that there are no defaults under this Agreement, that this Agreement shall survive any foreclosure and may be assigned to subsequent purchasers at foreclosure, consent of Owner to the grant of LDG's rights in this Agreement to a lender for security purposes, and any other covenants and agreements that are typically required by institutional lenders. Moreover, if Owner has existing deeds of trust, mortgages, or other liens on the Subject Lands at the time of this Agreement, on the form to be provided

by LDG; either prior to execution or within thirty (30) days after execution, as elected by LDG. The subordination agreement may be recorded with the Memorandum described in Exhibit C or recorded separately.

22. Governing Law. The laws of the State of New Mexico shall control the rights of the parties under this contract.

23. Waiver. By signing this Agreement, neither party waives its statutory and common law rights to occupancy and enjoyment of their respective estates, except as expressly provided in this Agreement.

24: Assignment of Rights. All rights and obligations under this Agreement shall run with the Subject Lands and shall inure to the benefit of and be binding upon the heirs, successors, or assigns of each party. LDG may assign its rights in this Agreement without the prior written consent of Owner, including, without limiting the foregoing, assignments for purposes of providing security for any loans. Moreover, LDG shall have the right to assign all or any portion of the ROWs to another entity or person, separate from ownership of the Subject Lease. The parties hereto agree to execute a memorandum of this Agreement, which shall be in form sufficient to record in the Hidalgo County real property records, in the form provided by LDG.

25. Amendment. This Agreement constitutes the entire Agreement between the parties pertaining to the subject matter contained in it and supersedes all prior and contemporaneous agreements, representations, and understandings of the parties with respect thereto. No supplement, modification, or amendment of this Agreement shall be binding unless executed in writing by all parties.

26. **Counterparts.** This Agreement may be executed in counterparts. Each counterpart shall constitute an original and all counterparts together shall constitute one and the same document: Receipt by party hereto of an executed copy of this Agreement by facsimile shall constitute conclusive evidence of execution and delivery of the Agreement by the signatory thereto.

[Signatures on the following page]

Dated effective as of the date first written above.

#### OWNER:

ROSETTE, INC.

By: 'Name: Å Title: 6

a.

<u>LDG</u>:

## LIGHTNING DOCK GEOTHERMAL HI-01, LLC

By: Name: Vartin F. Peterson Title: CFO

#### EXHIBIT A

Legal Description of the Subject Lands

A. LDG is the owner of Federal Geothermal Lease NM -34790 ("Subject Lease"), granting LDG the right to explore for and develop geothermal resources underlying the lands covered by the lease, described as follows:

1.

T255, R19W, N.M.P.M. Sec. 6: Lots 3, 4, 5, 6, 7, SEL/4NW1/4 Sec. 6: EL/2SW1/4 Sec. 7: Lots 1, 2, 3, 4, S1/2NE1/4, SEL/4NW1/4, EL/2SW1/4, SEL/4, NW1/4NE1/4, NEL/4NW1/4 Sec. 18: Lot 1, N1/2NE1/4, NE1/4NW1/4

and

T25S, R20W, N.M.P.M. Sec. 1: NW1/45W1/4, S1/2SW1/4, SW1/4SE1/4 Sec. 11: NE1/4, S1/2 Sec. 12: ALL Sec. 13: N1/2N1/2

#### Containing 2,500,96 acres, more or less

2. LDG has applied for Federal Geothermal Lease NM 108801, which is pending final approval by the BLM and will be included with the Subject Lease upon approval, granting LDG the right to explore for and develop geothermal resources underlying the lands covered by the Subject Lease, described as follows:

T258, R20W, N.M.P.M. Sec. 14: All

Containing 640.00 acres, more or less

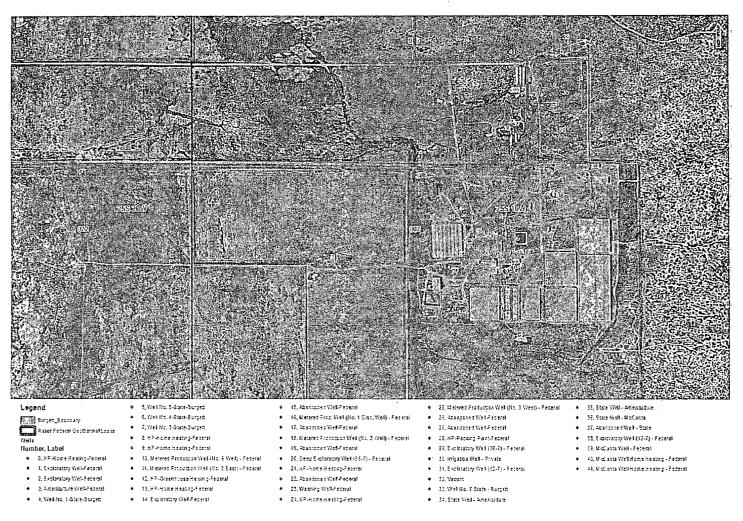
- B. Owner is the owner of the land ("Surface Lands") covering, in part, the Subject Lease, which is described as follows:
  - 1. Sections 7 and 18 T25 S, R19 W, N.M.P.M

And

Sections 11, 12, 13, 14, and 23 T25 S, R20 W, N.M.P.M Containing 2,592.473 acres, more or less

**C.** "**Subject Lands**" shall be the surface area wherein LDG's Subject Lease underlies Owners Surface Lands.

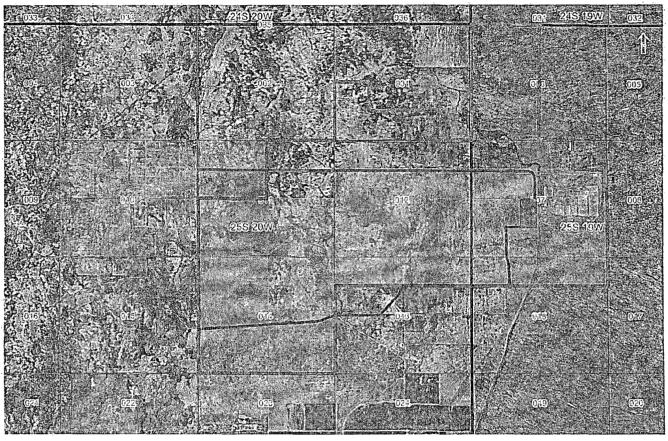
#### EXHIBIT B



#### Initial Inventory of Existing Wells and Location of Initial Contemplated ROWs

### EXHIBIT C

Sample Power Plant ROW and Access Roads for a Power Plant



#### Legend

Reser Federal Geothermal Lease Primary Access Route Proposed Plant Location Lightning Dock Geothermal Power Plant and Access ROW Hildago County, Nevada

Lightning Dock Geothermal HI-01, LLC 5152 North Edgewood Drive Suite 375 Provo, UT 84604

#### EXHIBIT D

#### Water Rights Description

A. Owner represents and warrants ownership of the following Water Rights identified by New Mexico Office of the State Engineer Numbers:

A-13, with points of diversion located in Section13, Township 25 South, Range 20 West, N.M.P.M.

A-36-A, with points of diversion located in Sections 6 and 7, Township 25 South, Range 19 West, N.M.P.M., and Sections 4 and 12, Township 25 South, Range 20 West, N.M.P.M.

A-35-D, with points of diversion located in Section 7, Township 25 South, Range 19 West, N.M.P.M., and Section 4, Township 25 South, Range 20 West, N.M.P.M.

A-51, with points of diversion located in Section 10, Township 25 South, Range 20 West, N.M.P.M.

A-64-A, with points of diversion in Section 7, Township 25 South, Range 19 West, N.M.P.M.

A-384, with points of diversion in Section 12, Township 25 South, Range 20 West, N.M.P.M.

A-385, with points of diversion in Section 7, Township 25 South, Range 19 West, N.M.P.M.

A-386, with points of diversion in Section 7, Township 25 South, Range 19 West, N.M.P.M.

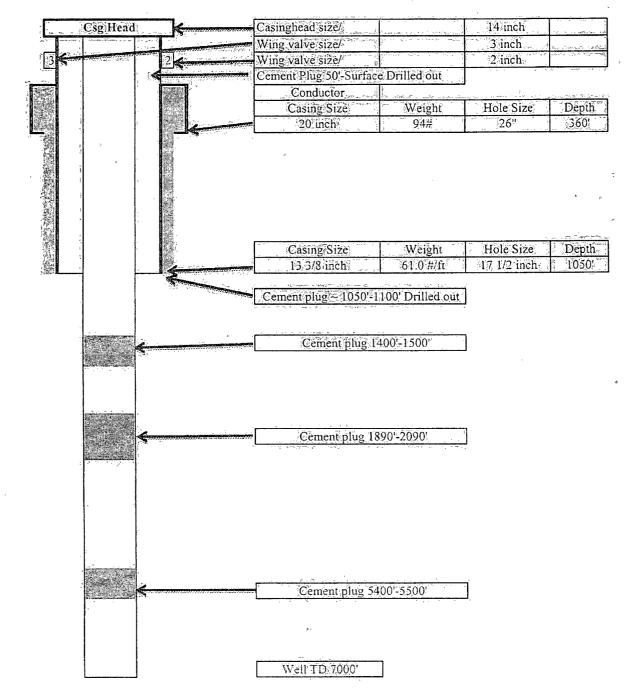
ENERGY AND MINERALS DEPARTMENT	OIL CONSERVATION DIVISION P. O. BOX 2088	Form G-103 Adopted 10-1-74
NO. OF COPIES RECEIVED	SANTA FE, NEW MEXICO 87501	Revised 10-1-78
DISTRIBUTION		
File	SUNDRY NOTICES AND REPORTS	
N. M. B. M.	ON	S. Indicate Type of Lease
U. S. G. S	GEOTHERMAL RESOURCES WELLS	State NA- Federal
Operator Land Office		5.a State Lease No. Federal NM 34790
Do Not Use This Form for Propasals to Drill or t For Permit —" (Form G-101) for Such Proposals.	to Deepen or Plug Back to a Different Reservoir. Use "Applicatio )	
1. Type of well Geothermal Producer LX	Temp. Observation	7. Unit Agreement Name N/A
Low-Temp Thermal	Injection/Disposal	·
2. Name of Operator Lightning Dock Geotherma	al HI-01, LLC	8. Farm or Lease Name N/A
3. Address of Operator 5152 Edgewood Drive, P	Provo, Utah 84604	9. Well No. TFD 55-7
4. Location of Well Unit Letter2454	_Feet From TheLine andFeet From	10. Field and Pool, or Wildcat Wildcat
The South Line, Section 7	Township 255 Range 19W NM	PM.
	15. Elevation <i>(Show whether DF, RT, GR, etc.)</i> 4201' GR	12. County Hidalgo
16. Check Approp	priate Box To Indicate Nature of Notice, Report or Other	Data
NOTICE OF INTENTION T	1	QUENT REPORT OF:
TEMPORARILY ABANDON	AND ABANDON AREMEDIAL WORK COMMENCE DRILLING OPNS	ALTERING CASING
отнёя		· · ·
	(Clearly state all pertinent details, and give pertinenet dates,	including estimated date of starting any
proposed work) SEE RULE 203.		
1. MIRU drill rig.		·
—	ug from 1450' to 1550' approx.	
3. Drill out cement pl	ug from 1890' to 2090' approx.	
4. RIH to locate cemen	t nlug at $5400!$ approx	
	c piug at 5400 appion.	
5. Set bridge plug in		
	3000''-3400' interval.	tal analysis.
6. Collect water sampl	3000''-3400' interval. es for geochemical and environmen	tal analysis.
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<ol> <li>Collect water sampl</li> <li>Set production pump</li> <li>Release rig.</li> </ol>	3000''-3400' interval. es for geochemical and environmen at 850' approx.	tal analysis.
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<ol> <li>Collect water sampl</li> <li>Set production pump</li> <li>Release rig.</li> <li>Hook up well for pu</li> <li>Run pump test for u</li> <li>Secure well.</li> </ol>	3000''-3400' interval. es for geochemical and environmen at 850' approx. mp test to irrigation system.	
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<ol> <li>Collect water sampl</li> <li>Set production pump</li> <li>Release rig.</li> <li>Hook up well for pu</li> <li>Run pump test for u</li> <li>Secure well.</li> <li>Please see attached Prop</li> </ol> 18. Thereby certify that the information above is	3000''-3400' interval. es for geochemical and environmen at 850' approx. mp test to irrigation system. p to four weeks. posed Operations and Drilling Plan	for details.
<ol> <li>Collect water sampl</li> <li>Set production pump</li> <li>Release rig.</li> <li>Hook up well for pu</li> <li>Run pump test for u</li> <li>Secure well.</li> <li>Please see attached Prop</li> </ol> 18. Thereby certify that the information above is	3000'-3400' interval. es for geochemical and environmen at 850' approx. mp test to irrigation system. p to four weeks. oosed Operations and Drilling Plan	for details.
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#### AS IS NOW

## Field Name:

## **Lightning Dock**

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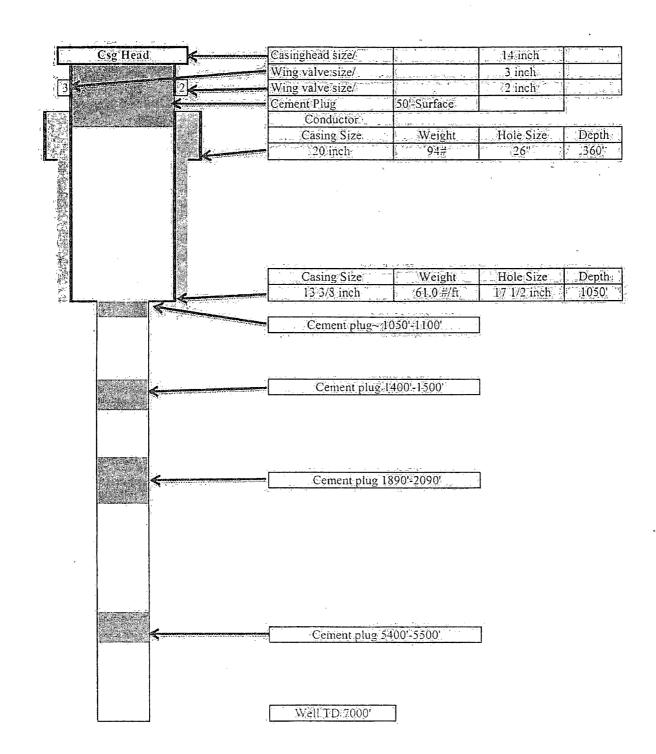


P&A 1985

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## Field Name:

Lightning Dock



April 12, 2010

Prepared For:

New Mexico Energy, Minerals and Natural Resources Department Oil Conservation Division, Environmental Bureau 1220 South St. Francis Drive, Santa Fe, NM 87505

> New Mexico Office of the State Engineer Water Rights District III Office 301 South Tin Street, Deming, NM 88030

U.S. Department of the Interior, Bureau of Land Management Las Cruces District Office 1800 Marquess Street, Las Cruces, NM 88005

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#### I. Summary of Proposed Operations:

Lightning Dock Geothermal HI-01, LLC, ("LDG") is a wholly owned subsidiary of Los Lobos Renewable Power, LLC, which is wholly owned by Raser Technologies, Inc. (See Attachment A, Raser Technologies Corporate Structure). LDG proposes to re-enter and test well TFD 55-7 for the purpose of determining its suitability as a geothermal production well. LDG intends to mobilize a drilling rig about April 21, 2010 and will commence operations according to the Plan in Section II, below, as soon as approved by BLM and upon receipt of requisite permits from NMOSE and NMOCD.

The operations for which Lightning Dock Geothermal seeks permission in the present application are comprised of three parts:

- Remove two of the three remaining cement abandonment plugs set in the wellbore by Steam Reserve Corp. in 1985. The deepest plug will remain in place. Rosette, Inc., removed the uppermost two of the five Steam Reserve plugs pursuant to an NMOSE irrigation well permit. LDG intends to test the upper 3,400 ft of the open hole. The water will be sampled and analyzed in accordance with WQCC standards as described below. Compliance with those standards will be verified before any water is discharged in a pump test.
- Install a down-hole production pump and conduct a well and reservoir test. The discharged water will be metered and conveyed to a planted field for irrigation purposes. This will be done using standard farm irrigation equipment such as a wheel line. The test will exercise water rights owned by Rosette, Inc. and already assigned to this well. Rosette, Inc. has agreed to provide the 2010 water rights to LDG for this test. LDG does not intend to use TFD 55-7 for injection in this operation. The existing unlined reserve pit may be used for cooling and water storage if approved by NMOCD upon receipt of produced water analyses.
- Install proper wellhead equipment and secure the well.

The water in well TFD 55-7 will be sampled and analyzed for dissolved fraction of all 26.2.3103 NMAC constituents, VOCs (8260B), SVOCs (8270C), PAHs (8310), TPH (418.1), metals – dissolved (6010B/6020) including Bromide, Lithium, Rubidium, and Tungsten (by approved EPA methods), Mercury (7470A/7471A), general chemistry (methods specified in 40 CFR 136.3), Uranium (6010B/6020), radioactivity (E903/E904), and Radon (EPA method approved by NMOCD). An EPA Methods, QA/QC, and DQOs-compliant laboratory will analyze samples.

If TFD 55-7 demonstrates adequate potential as a geothermal production well, LDG will proceed to obtain all approvals and permits (BLM, NMOCD, and NMOSE) required for further development.

#### II. Well Preparation

The first part of the operation requires reopening TFD 55-7 to collect fluid samples, set a bridge plug and install a test pump. The following is the proposed plan for the drilling operation. This detail is incorporated by reference into the BLM Drilling Program, described in Section V of this document.

- 1) Inspect wellhead for dimensional consistency with ANSI series 400 standards.
- 2) Move in and rig up a rotary drilling rig with a rated capacity of at least 5000 ft and a mud system with a minimum volume of 500 barrels and a 500 hp circulating pump.
- 3) Install annular or rotating BOP on the wellhead above flow tee with gate valve on side outlet (see Attachment E).
- 4) Mix non-toxic gel-lime mud and fill hole.
- 5) Pick up slick bottom-hole assembly (BHA) #1: 8-1/2" insert bit, BS, 4x6" DC, jars, 1x6" DC, XO.
- 6) Test BOP for leakage by inflating around BHA and pumping in the side outlets to maximum working pressure of the surface piping, not to exceed 900 psig.
- 7) Run in hole and tag bottom, expected at about 1400 ft. Circulate bottoms up.
- 8) Airlift fluid in the wellbore if necessary to clean out well. Collect and analyze geochemical water samples and record volume of produced water. Water samples will be collected *in situ* (i.e., down hole) if possible but may be taken by sampling separator from the flow line. Airlift will be accomplished by injecting compressed air through the drilling assembly in sufficient quantity to stimulate flow to the surface. Discharging the flow line into a gauging tank will allow measurement of the produced liquid after its separation from the injected air. The volumes produced during the drilling operation will be recorded and will not exceed the storage capacity of the tank and reserve pit on site. No water will be discharged to "Waters of the State".
- 9) Pull out of hole and pick up 9-5/8" bit and stabilizers. Make up stiff BHA #2.
- 10) RIH and time drill cement plug #1. The plugs in well TFD 55-7 are of neat Portland cement. The plugs are reportedly each 50 400 ft in length and set in uncased open hole at about 1450 ft and 1850 ft. Time drilling and a "locked" (i.e., stiff and highly stabilized) BHA will be used to drill the plugs while staying in the original hole. Non-toxic, temperature-stable drilling mud will be used, composed of a bentonite clay-water or polymer-water mix to lubricate and cool the drill bit. The drilling fluids will bring the rock cuttings to the surface and then be cleaned and recirculated, preventing loss of drilling fluids into the rock and minimizing discharge into the reserve pit.
- 11) POH and stand back BHA #2.
- 12) Pick up BHA #3: float shoe, XO, 2x6" DC.
- 13) RIH and tag cement plug #2, expected at about 1800 ft.
- 14) Circulate hole clean.
- 15) Displace mud with water. POH to 1500 ft. Close BOP.
- 16) Pump water at 10-25 bbl/min and record stable casing head pressure.
- 17) Rig for air injection through drill pipe. Set up fluid sample collection point on flow line.
- 18) Airlift fluid in the wellbore if necessary to clean out well. Collect and analyze geochemical water samples and record volume of produced water. Water samples will be collected *in situ*

(i.e., down hole) if possible but may be taken by sampling separator from the flow line. The airlift, water sampling, and analysis will be performed as described in step 8 of this Section and in Section I, above. The volume of produced water will be recorded. No water will be discharged to "Waters of the State."

- 19) POH, stand back BHA #3.
- 20) Pick up BHA #2. RIH to cement plug #2.
- 21) Circulate mud and drill out plug #2.
- 22) POH, lay down BHA #2.
- 23) Pick up BHA #3, RIH and tag cement plug # 3, expected at about 5400 ft. Circulate hole clean.
- 24) POH, lay down BHA #3.
- 25) Run caliper log and select zone for bridge plug installation about 3400 ft.
- 26) Pick up bridge plug and BHA #4: setting tool and DCs as directed.
- 27) RIH and set bridge plug.
- 28) POH to 2800 ft, circulate hole clean.
- 29) POH to 1000 ft.
- 30) Airlift fluid in the wellbore if necessary to clean out well. Collect and analyze geochemical water samples and record volume of produced water. Water samples will be collected *in situ* (i.e., down hole) if possible but may be taken by sampling separator from the flow line. The airlift, water sampling, and analysis will be performed as described in step 8 of this Section and in Section I, above. The volume of produced water will be recorded. No water will be discharged to "Waters of the State."
- 31) POH laying down drill pipe; lay down BHA #4.
- 32) Make up 9-5/8" pump casing string and set test pump.
- 33) Release rig.

#### III. <u>Resource Test</u>

- 34) The results of the analyses from steps 8, 18 and 30 of the preceding section will be compiled in a single report and delivered to NMOCD, NMOSE, and BLM. If the discharge meets WQCC standards, LDG will confer with the agencies to verify the conditions are met for permitted discharge into an unlined reserve pit and delivery to an irrigation system. Should the quality of water not meet the standards of 20.6.2.3103 NMAC for irrigation, LDG will suspend flow test operations, redesign the test and seek approval of subsequent applications to NMOCD, NMOSE, and BLM.
- 35) Connect flow line to irrigation system.

The flow line will discharge the water into a gauging tank and thence into the irrigation transfer pump or the reserve pit. The pit measures 170 ft x 170 ft x 12 ft deep (see Attachment B). If WQCC standards (20.6.2.3103 NMAC) are met, the reserve pit will be left unlined. The irrigation transfer pump (e.g., 25 hp centrifugal) will remove discharged water from the tank or pit and send it via a 10 inch Victaulic line to the irrigation system for application to a crop under an existing NMOSE permit. The designated crop area is the area directly south of the plant site on Attachment B. Flow will be metered using a totalizing ultrasonic or orifice meter to ensure volume does not exceed the NMOSE-permitted total.

36) Conduct pump test as directed. LDG will conduct the pump test in consultation with engineers representing the interests of potential investors in the Lightning Dock project. The operation of the test may therefore vary from day to day, but will at all times conform to the requirements of the applicable NMOCD, NMOSE and BLM permits and regulations.

LDG plans to use a 12-inch American-Marsh vertical shaft 10 stage turbine pump for this test. The pump is owned by Raser Technologies and has performance characteristics detailed in Attachment F. The power for the pump will be a 300 hp electric motor with a variable speed controller. The pump will be set at approximately 850 ft depth to allow a maximum drawdown from static water level of about 700 ft. Engineering analysis of Raser's airlift test in 2008 suggests a flow rate of 400 gpm is likely from the well in its present state, i.e., open from 1050 ft to 1450 ft. Since lost circulation occurred at greater depths (e.g., 2275 ft) during the drilling of TDF 55-7, LDG expects the reopened hole may be able to supply fluid up to the pump's maximum capacity, approaching 1500 gpm at this depth.

The pumping rate during the first week of the test will be programmed to gradually bring in flow and to establish the reservoir deliverability as a function of water level drawdown. Thereafter, the rate will be set so as not to exceed the landowner's NMOSEdesignated water rights. LDG expects to satisfy itself and its investors' engineers within a test pumping duration of four weeks.

Discharge water samples will be collected weekly and analyzed at an EPA Methods, QA/QC, DQOs-compliant laboratory. LDG will also monitor the discharge daily for standard field parameters including pH, turbidity, color, DO, and specific conductivity. If anomalous readings are detected that indicate a significant change in water source or properties, water samples will be collected immediately and discharge halted. Discharge will not be resumed until and unless laboratory analytical results confirm that the water meets the required criteria.

- 37) Move in and rig up well service rig.
- 38) Remove and lay down pump and casing.
- 39) Install master valve and survey flange.
- 40) Secure well and release rig.
- 41) File operations reports as required with NMOCD, NMOSE and BLM.

## IV. BLM Operations Plan, 43 CFR 3261.12

(a) The proposed project is on private land. Clearing and grubbing will be confined to the project area as approved by BLM in consultation with the landowner. No surface disturbance of BLM-managed public lands is proposed.

#### Well Pad Layout and Design

The well pad layout is approximately 150 ft x 150 ft with an existing reserve pit measuring 170 ft x170 ft x12 ft adjacent to the pad.

See Attachment B – Lightning Dock Aerial Map

See Attachment C – Survey of Well Location

#### (b) Description of Existing and Planned Roads

The well site is accessed via existing state, county and private roads. As such no new roads are necessary for this activity. The primary access roads to the site include: SR-338 (paved); CO98 Geothermal Road (paved), which extends to the surface owner's property. All roads and access at the well site on the surface owner's property are existing compacted dirt and/or graveled.

#### (c) Description of Ancillary Facilities

Sanitary Facilities – Portable chemical sanitary facilities will be available and used by all personnel during periods of well drilling and/or flow testing.

Mobile drilling office will be set upon on the site during drilling activities.

Existing water holding pond 170 ft x 170 ft x 12 ft.

Trash collection facilities e.g. roll-off container.

#### (d) Source of Drill Pad and Road Building Materials

Drill pad building material will be derived from any necessary excavation of the existing reserve pit.

The pad will be graded to provide 2% grade to reserve pit.

Existing improved roads will be used.

Any additional material required for pad construction will be secured from a local contractor.

#### (e) Water Source

Water required for this operation will be secured from an established private owner.

Water derived from the operation will be discharged into a gauging tank and thence to an irrigation transfer pump or the reserve pit. The irrigation transfer pump (e.g., 25 hp centrifugal) will remove

discharged water from the tank or pit and send it via a 10 inch Victaulic line to the irrigation system for application to a crop under an existing NMOSE permit. The designated crop area is the area directly south of the plant site on Attachment B. Flow will be metered using a totalizing ultrasonic or orifice meter to ensure volume does not exceed the NMOSE-permitted total.

The water in well TFD 55-7 will be sampled and analyzed for dissolved fraction of all 26.2.3103 NMAC constituents, VOCs (8260B), SVOCs (8270C), PAHs (8310), TPH (418.1), metals – dissolved (6010B/6020) including Bromide, Lithium, Rubidium, and Tungsten (by approved EPA methods), Mercury (7470A/7471A), general chemistry (methods specified in 40 CFR 136.3), Uranium (6010B/6020), radioactivity (E903/E904), and Radon (EPA method approved by NMOCD). An EPA Methods, QA/QC, and DQOs-compliant laboratory will analyze samples.

Potable water for human consumption will be provided by bottled water.

#### (f) Statement Describing Surface Ownership

Surface of the well site is owned by Rosette, Inc. of Animas, NM. Lightning Dock Geothermal holds a Surface Access and Use Agreement, dated 10 January, 2008, with Rosette granting access to the well site.

See Attachment F – Surface Access Agreement.

#### (g) Description of Procedures to Protect the Environment and Other Relevant Sources

Air Quality: During drilling activities hydrogen sulfide will be monitored by instruments on the drill rig.

Hydrology and Water Quality Monitoring: Water samples will be collected during the cleanout operation and tested to assure compliance with WQCC standards for agricultural use.

Portable chemical toilets supplied by a licensed contractor shall be used for human waste. The waste shall not be buried on site.

Trash and debris will be contained on site, and then hauled to an approved landfill by a licensed contractor. Burial and or burning on site will not be permitted.

Clearing and grubbing will be confined to the project area as approved by BLM in consultation with the landowner.

#### (h) Plan of Surface Reclamation

Top soil excavated during the construction of the pad, as feasible, will be stockpiled for use during subsequent reclamation of the disturbed area.

#### (i) Any Other Information That BLM May Require

Will be provided upon request.

### V. BLM Drilling Program, 43 CFR 3261.13

#### (a) Description of Equipment, Materials and Procedures

A large portable rotary drill rig will be used to drill the well.

Equipment Specifications:

The availability of equipment and contractors changes from day to day. LDG will make its selection based on the best units available when the necessary permits are received. The rig will be functionally similar to the following: Drawworks – Taylor RT 5000; Mast – Taylor RT 5000 square set derrick; Substructure – Height 10 ft hydraulic w/ 15 ft K.B. elevation; Two (2) mud pumps; Rotary table; Swivel & Drilling Block; Tripping Block; Generators 235 kW, Air Compressor 500 SCFM.

Procedures will be as described in Section II, Well Preparation.

#### (b) Proposed / Anticipated Depth of the Well:

The well will be drilled and completed to the designed depth of 3,400 ft.

#### (c) Directional Drilling:

No directional drilling will be employed.

#### (d) Casing and Cementing Program:

This is a re-entry into an existing well that currently has cemented casing to approximately 1050 ft and approximately 400 ft of open hole to the first plug at a depth of approximately 1450 ft. The remainder of the well is open hole to the TD of 7000 ft. No additional casing or cement will be utilized in the operation to open this well to 3400 ft.

#### (e) Circulation Media (mud, air, foam, etc.)

The well will be drilled to a depth of 3,400 ft using non-toxic, temperature-stable drilling mud or aerated fluids. The drilling mud is composed of a bentonite clay-water or polymer-water mix to lubricate and cool the drill bit, bringing the rock cuttings to the surface discharged into the reserve pit, and preventing loss of drilling fluids into the rock.

#### (f) Description of Logs to be Run:

Caliper Logs

#### (g) Description and Diagram of Blowout Prevention Equipment:

Blowout prevention equipment (BOPE), which is typically inspected and approved by the BLM and/or the Oil Conservation Division (NMOCD) of the New Mexico Energy, Mining, and Natural Resources

Department (NMEMNRD), as applicable, would be installed, tested and ready for use while drilling to ensure that any geothermal fluid encountered does not flow uncontrolled to the surface.

See Attachment E.

#### (h) Expected Depth and Thickness of Fresh Water Zones:

N/A – existing casing is set to 1,000 ft hence no fresh, shallow water getting into well.

Static water depth is 71 ft. Total available water column of 1300 ft available

#### (i) Anticipated Lost Circulation Zones

None anticipated. The only instance of lost circulation recorded by Steam Reserve in the interval 1050 ft – 3400 ft was a minor episode at 2275 ft. That was successfully treated with a small batch of lost circulation material. This is below the deepest plug that LDG intends to drill out. LDG therefore anticipates that lost circulation will not be encountered in carrying out the proposed program.

#### (j) Anticipated Reservoir Temperatures and Pressures:

Temperature: Peak temperatures have been recorded at 307.4 F at a depth of 1263 ft remaining constant to 1400 ft.

Pressures: High pressure at the depth of 1365 ft is 549.66 psig.

#### (k) Anticipated Temperature Gradient in the Area:

The regional heat flow is  $\sim 80-90$  mW/m<sup>2</sup> (Blackwell and Steele, 1992). This heat flow would yield a temperature gradient of about 35°C/km (1.9°F/100 ft) in igneous rocks and 60°C/km (3.3°F/100 ft) in valley fill clays. Most of the non-thermal wells have a gradient near 45°C/km (2.5°F/100 ft). Therefore, 45°C/km (2.5°F/100 ft) will be taken as the background temperature gradient value for the valley fill.

Thermal gradient conditions will range from 78°C/km (4.3°F/100 ft) (*well 672-225*) to 200C/km (11°F/100 ft) (*well 93-8 and AN-104*) and will be similar or higher in 55-7.

#### (I) Plat Certified by a Licensed Surveyor:

See Attachment C.

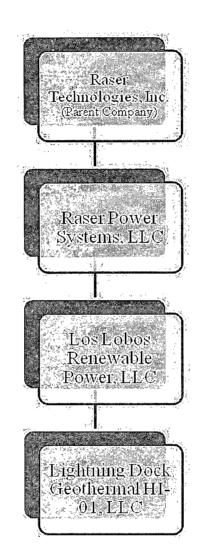
#### (m) Procedures and Duration of Well Testing

See Section II, Resource Test

#### (n) Any Other Information That BLM May Require

Will be provided upon request.

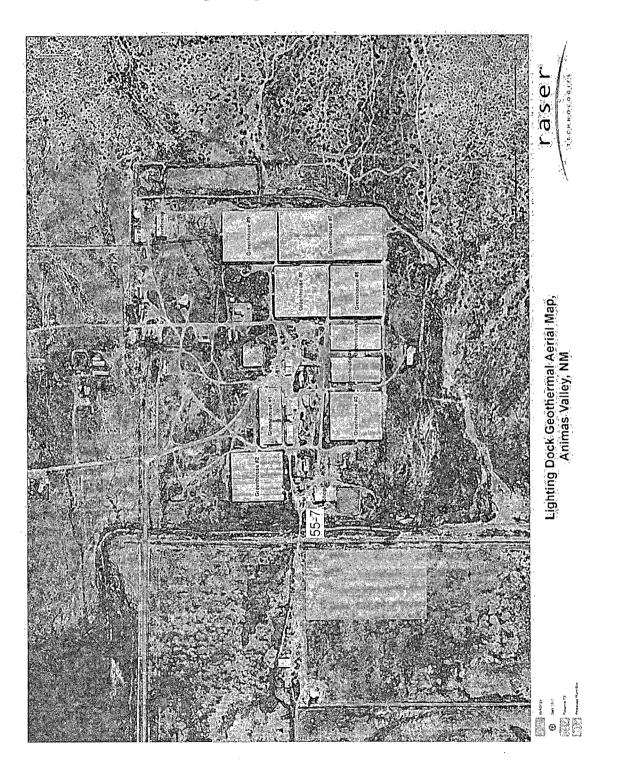
#### Attachment A



## **Raser Technologies Corporate Structure**

Lightning Dock Geothermal HI-01, LLC is the permit applicant and operator. The illustration above describes the corporate organization of which Lightning Dock Geothermal is a part as follows. Raser Technologies. Inc is the parent company. Raser's geothermal development company is Raser Power Systems, LLC, the New Mexico entity is Los Lobos Renewable Power, LLC, and Lightning Dock Geothermal HI-01, LLC is the Animas, NM project entity.

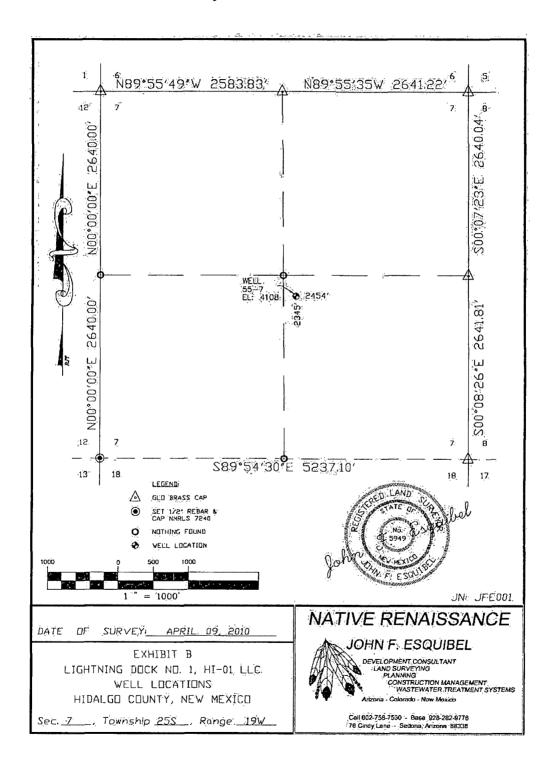
## Attachment B



## Lightning Dock Aerial Photo Map

#### Attachment C

## Survey of Well 55-7 Location



#### Attachment D

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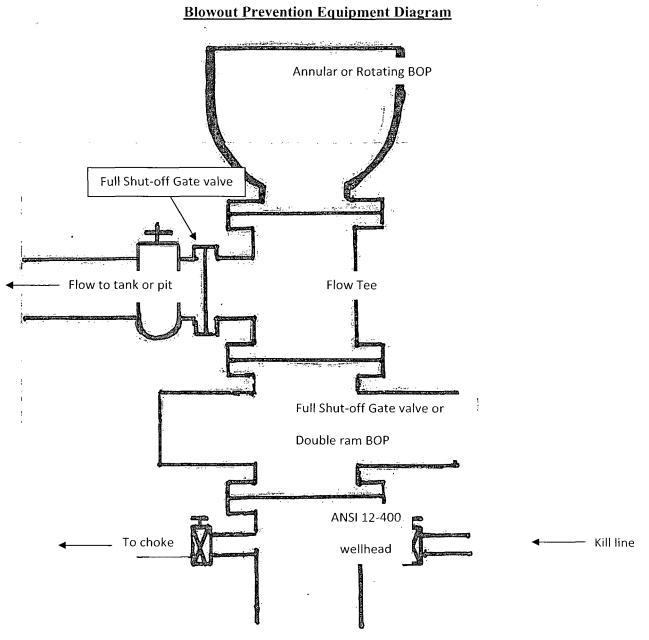
## **Down-Hole Test Pump Specifications**

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PUMP-FLO 9

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#### Attachment E



Attachment F

## Surface Use and Access Agreement

Between

## Rosette, Inc.

And

## Lightning Dock Geothermal HI01, LLC

January 10, 2008

#### SURFACE ACCESS AND USE AGREEMENT

This SURFACE ACCESS AND USE AGREEMENT ("Agreement") is executed effective January 10, 2008, by and between ROSETTE, INC., with an address of 26 Rose Land, Animas, MM 88020 ("Owner"), and LIGHTNING DOCK GEOTHERMAL HI-01, LLC, with an address of 5152 North-Edgewood Drive, Suite 375, Provo, Utah ("LDG").

#### **RECITALS**:

A. Owner owns record title to the surface estate of certain real property located in Hidalgo County, State of New Mexico, more particularly described on Exhibit A hereto (hereinafter the "Subject Lands"). The United States of America, though the Bureau of Land Management (the "BLM"), owns the reserved mineral estate, which includes the geothermal estate. Owner owns greenhouse operations which are warmed during the winter months by heat supplied by the utilization of geothermal resources near, on, or around the Subject Lands.

B. LDG is the current owner of a Federal Geothermal Lease NM-34790, issued February 1, 1979 ("Subject Lease"), wherein the BLM has granted the holder of the Subject Lease the right to explore for and develop the geothermal resources underlying the lands covered by the Subject Lease, which includes the Subject Lands. Amax Exploration, Inc. ("Amax"), a prior owner of the Subject Lease, and a predecessor of Owner entered into a letter agreement dated December 14, 1978 ("1978 Agreement"), whereby Amax was granted access to the Subject Lands to develop the Subject Lease. The 1978 Agreement granted Owner's predecessor the right to drill to a depth of 1000 feet below the surface and extract geothermal resources there from for use in its greenhouse operation. After litigation with the BLM, Owner abandoned use of the geothermal resources from the Subject Lease and Subject Leads, and, pursuant to the settlement agreement with the BLM, Owner has certain plugging and abandoning, and reclamation responsibilities.

C. LDG intends to utilize certain existing geothermal wells on the Subject Lands and to drill additional geothermal wells or reinjection wells (such existing and initially proposed wells, as depicted on Exhibit B, and all future wells that may be proposed and drilled by LDG are defined herein collectively as the "Subject Wells") on a portion of the Subject Lands (such initial proposed well-sites, as depicted on Exhibit B, and all future well-sites that may be required for future wells, are referred to herein collectively as the "Well-Sites"), which Well-Sites will include typical geothermal energy exploration production or reinjection equipment and facilities. In connection with accessing, drilling and operating the Subject Wells and access to power generation facilities, LDG requires a portion of the Subject Lands to construct and maintain access roads crossing the Subject Lands, including, without limitation, existing roads on the Subject Lands (an "Access Road ROW" and collectively the "Access Road ROWs"). In addition, LDG requires or may require a portion of the Subject Lands to construct and maintain power plants, utilities, transmission lines, water pipelines, water storage and other facilities related to the production, extraction, transportation and reinjection of geothermal resources and the generation and transportation of electricity therefrom (all such improvements constructed or to be constructed by LDG on the Subject Lands are referred to herein collectively as the "Improvements"). LDG shall attempt to locate all such Improvements that require linear rights-of-way within the boundaries of the Access Road ROWs when and where economically and operationally feasible, and Owner herein grants Access Road ROWs of sufficient length and width to accommodate any necessary or contemplated Improvements. Furthermore, it may become necessary for LDG to obtain other rights-of-way to accommodate Improvements that cannot be located within an Access Road ROW, including without limitation, the Power Plant ROW, defined below, water storage areas, temporary construction easements, and other nonlinear surface uses (an "Other ROW" and collectively the "Other ROWs"). The rights-of-way for the necessary Well-Sites (a "Well Site ROW" and collectively the "Well Site ROWs"), the Access Road ROWs and the Other ROWs, including the Power Plant ROW (defined below), are referred to herein individually as a "ROW" and all such rights-of-way granted or to be granted hereunder shall be collectively referred to as the "ROWs."

D. Given the changed circumstances recited above, LDG and Owner desire to cancel and terminate the 1978 Agreement and enter into a new surface use and access agreement that memorializes their discussions and agreements regarding LDG's access to and use of the surface estate of the Subject Lands, and consideration provided therefore, for the drilling of the Subject Wells, the construction of the ROWs and the development of the Improvements on the Subject Lands. The 1978 Agreement shall terminate upon the execution of this Agreement.

E. LDG and Owner have also agreed that LDG shall have access to and use of certain water rights that are owned by Owner, as more particularly described below.

#### AGREEMENT:

NOW THEREFORE, in consideration of the mutual promises set forth herein and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto incorporate the recitals above herein and agree as follows:

1. Term of Agreement. The rights, including all ROWs, granted by this Agreement shall continue until the rights of LDG, its successors or assigns, to explore for, develop, extract or produce geothermal energy from the Subject Lease, or from lands pooled with the Subject Lease, permanently and irrevocably terminates; provided that the rights granted to LDG herein shall survive the termination of the Subject Lease, so long as the power plant and related facilities on the Subject Lands are capable of producing electricity.

Existing Wells. Owner hereby grants LDG, its employees and designated agents, and its 2. successors and assigns, the right to access, re-open, re-drill, utilize, deepen, or to plug and abandon, when and if LDG deems it necessary in furtherance of its operations on the Subject Lands, the following wells, and any other geothermal wells which exist on the Subject Lands: TED 55-77, EGS 12-7, GRED 52-7, GRED 36-7, GRED 57-7, and EGS 56-14 (collectively, the "Existing Wells"); provided however that the Existing Wells shall not include Well #16 on Exhibit B, which is a water well that is being used by Owner, Owner grants LDG access to and the right to conduct any necessary operations with respect to the Existing Wells, as and where depicted on Exhibit B, except for monitoring purposes, subject to modification by LDG upon a final inspection and survey of the Subject Lands. The Well-Site ROWs for the Existing Wells (and all future wells) shall be initially large enough to accommodate drilling operations, not to exceed 6 acres, but shall contract upon completion of the wells to area sufficient for operation and maintenance of the well, not to exceed 3 acres. One or more of the Existing Wells are close to existing structures or equipment that is stored on the Subject Lands, that may impede access, and LDG agrees to pay for the costs of repairing any damage caused by LDG's access or to pay the costs of removing or relocating any structures or equipment, in coordination with Owner. Owner hereby also grants LDG Access Road ROWs, with the right to use and expand existing roads, or construct and maintain new roads, as determined by LDG, to and for the development of the Existing Wells (the "Initial Access Road ROWs") as and where depicted on Exhibit B, subject to modification by LDG upon a final inspection and survey of the Subject Lands. Owner and LDG agree that the Initial Access Road ROWs, the centerline of which is approximately depicted on Exhibit B, subject to modification by LDG upon a final inspection and survey of the Subject Lands, shall initially be sixty (60) feet wide. LDG shall have the right to install additional pipelines, utilities, transmission lines and other Improvements along the Initial Access Road ROWs if it becomes necessary in its operations of the Existing Wells (or future wells either on or adjacent to the Subject Lands). Owner grants to LDG certain Other ROWs that LDG may require for development of the Existing Wells, for other Improvements or uses that cannot be placed within the boundary of the Initial Access Road ROWs, including, without limitation, water storage areas, permanent or temporary construction areas, and the other rights-of-way needs and uses, as depicted on Exhibit B, or as requested by LDG subsequent to the execution of this Agreement. Once the Well-Sites for the Existing Wells, the Initial Access Road ROWS, and any other initial Other ROWs granted hereunder have been surveyed and precisely identified by legal description, Owner and LDG shall execute written rights-of-way, in form sufficient for recording in Hidalgo County, that conclusively identify the initial ROWs described herein.

As noted above, LDG intends to construct a power plant and related 3. Power Plant ROW. facilities, including geothermal pipeline and utility connections to the plant and transmission facilities out of the plant (the "Power Plant"), which power plant site and connections shall require and constitute a "Power Plant ROW." The Owner hereby grants to LDG an exclusive Power Plant ROW to survey, inspect, construct, develop and operate the Power Plant and any related or necessary facilities or Improvements. The Power Plant ROW shall be evidenced by a recorded right-of-way, with a term that extends for as long as the power plant facilities are capable of production of electricity, and for a period of time thereafter for dismantling and remediation, as described below. LDG and Owner shall-cooperate to locate the Power Plant ROW in a manner that minimizes the effect on Owner's existing surface uses; provided that, notwithstanding the foregoing, the Power Plant ROW shall be in a location on the Subject Lands that maximizes efficient access to and use of geothermal resources, and to electricity transmission infrastructure and markets. LDG has delivered to Owner a rough map of a possible Power Plant site. along with primary and alternate access roads for the Power Plant site, a copy of which is attached hereto as Exhibit C, and Owner and LDG mutually acknowledge and agree that the approximated rights-ofways and Power Plant site set out on that rough map would be an example of an acceptable location. LDG agrees to fence and secure the Power Plant ROW. If the Power Plant is no longer capable of production of electricity or if LDG otherwise elects to permanently shut down the Power Plant facilities for any reason, LDG shall provide Owner with written notice of its intent to shut down the facilities. After giving notice of intent to shut down and dismantle the plant, LDG shall have three (3) years to dismantle and remove all infrastructure and improvements pertaining to the Power Plant, including all utilities and transmission facilities, and to remediate the underlying property to its natural condition. Upon the request of LDG, Owner agrees to grant LDG a lease, in a recordable form, with a term that lasts for as long as the Power Plant is in existence and a reasonable time thereafter for dismantling, removal and remediation, of approximately twenty (20) acres (subject to the needs of the Power Plant and the activities of LDG in connection therewith), for the land necessary for the Power Plant and related facilities, at an annual rental rate of \$60 per acre.

4. Future Subject Wells, ROWS, and Improvements. LDG intends to develop future Subject Wells on the Subject Lands (in addition to the Existing Wells) ("Future Wells"). Additionally, LDG intends to construct and maintain related pipelines, utilities, transmission lines, production facilities, power generation facilities, water storage areas, access roads and other Improvements for such future Subject Wells. Prior to the development of any future Subject Well (not one of the Existing Wells) or Improvements on the Subject Lands in connection therewith, LDG shall provide Owner, in writing, notification of the proposed location of the desired Subject Well(s), Access Road ROW(s), or Other ROW(s) necessary for contemplated Improvements, and a description of the Subject Well(s), Access Road ROW(s) or Other ROW(s) to be constructed (individually and collectively, as the context requires, any "Future ROWs"). Within fifteen (15) days of such written notice, LDG and Owner shall discuss the location of the necessary Future ROWs, in an attempt to locate any such Future ROWs in locations that reasonably minimize the impact to the current surface uses of Owner but that do not result in an undue economic or operational burden to LDG. The parties acknowledge and agree that such Well-Site ROWs (for Future Wells) and other Future ROWs shall be located in areas that will maximize recovery and

efficient use of geothermal resources. LDG and Owner agree to meet on the Subject Lands, at the request of either party; in connection with the location of Future ROWs, to discuss such locations. Once Future ROWs have been identified and surveyed for a precise legal description, Owner and LDG shall execute written rights-of-way, in form sufficient for recording in Hidalgo County, that conclusively identify the Future ROWs.

5. **1978** Agreement. Owner and LDG mutually agree to terminate and cancel the 1978 Agreement as of the execution date herewith, and replace the 1978 Agreement with this Agreement. Owner agrees to release LDG of any obligations or claims arising under the 1978 Agreement. Owner and LDG agrees to release Owner of any obligations or claims arising under the 1978 Agreement. Owner and LDG understand that this Agreement is intended to replace and supersede the 1978 Agreement.

6. **Consideration for Agreement**. As consideration for the execution of this Agreement, LDG shall provide the following to Owner:

(a) Upon execution of this Agreement, LDG shall pay to Owner a one-time payment in the amount of Three Hundred Twenty Thousand and No/100 Dollars (\$320,000.00).

(b) LDG shall pay Owner a minimum annual fee of \$1,000.00 as consideration for use of or access to Owner's existing cold water delivery infrastructure. Thereafter, LDG shall pay the \$1,000.00 fee prior to the anniversary date of this Agreement, provided that failure to make such payment shall not constitute an event of breach or default under this Agreement, until Owner has provided LDG with written notice of the failure to make such payment, and LDG fails to make such annual payment within twenty (20) days of such written notice. Moreover, in the event LDG fails to make such payment after such 20-days written notice, LDG's right to access Owner's cold water delivery infrastructure shall terminate, but the remainder of this Agreement shall remain in full force and effect (including all ROWs granted or to be granted hereby).

(c) For the use of cold water (see Section 14(b)) provided by Owner to LDG for cooling and other purposes, LDG has agreed to pay an annual payment equal to \$50 per acre foot of water to be used by LDG during the next year, less the \$1000.00 minimum fee set forth above (in other words, the \$1000 fee set forth in Section 6(b) above shall be included as part of, and not in addition to, the annual payment described in this Section 6(c)). LDG shall provide to Owner an estimate of the amount of acre feet of water that LDG shall use for the following year, and shall pay the annual payment based on such estimated amount, prior to the anniversary date of this Agreement. At the end of such year, if LDG's use of water for the prior year exceeded the estimate, then LDG shall remit the payment for such acre feet used in excess of the estimate for the prior year with the payment for the next year's estimated water uses. The consideration set forth in Section 6(a) above includes the first year's payment for water use under this Agreement. In the event LDG fails to make such payment after such 20-days written notice, LDG's right to access Owner's cold water shall terminate, but the remainder of this Agreement shall remain in full force and effect (including all ROWs granted or to be granted hereby).

7. Cessation of Development or Abandonment of Lease. LDG intends to explore for geothermal resources on the Subject Lease for the purpose of generating electricity. If LDG fails to take reasonable actions to commence exploration for or development of geothermal resources on the Subject Lease within two (2) years of the date of this Agreement, or if LDG determines at any time, either before or after such two (2) year period, to abandon development of geothermal resources on the Subject Lease (and provides Owner with written notice of such intent to abandon the Subject Lease), then LDG agrees to take such reasonable steps necessary to designate Owner as an operator (with the BLM) for purposes of operating shallower formations under the Subject Lease (down to 1000 feet, consistent with the historical operations of Owner), or, if LDG determines it is in its interest, to assign operating rights in the Subject Lease to

Owner from the surface down to 1000 feet. Notwithstanding the foregoing, if LDG determines that it intends to completely abandon the Subject Lease, and provides written notice of such intent to Owner, then LDG shall assign the entire lease over to Owner, upon assumption by Owner of all rights and responsibilities under the Subject Lease. Moreover, LDG agrees that in connection with such designation of operator, it shall agree to turn over to Owner the following Existing Wells, as shown on Exhibit B, unplugged and accessible: Well #10, Well #11, and Well #25, provided however that Owner shall assume all plugging, abandoning, reclamation, and other responsibilities for such wells and shall post any required bonds in connection with the assignment and assumption of such wells. The foregoing agreement of LDG to designate Owner as an operator (or assign operating rights or all of the Subject Lease) is subject to the approval of the BLM. LDG's commitment to commence exploration and development activities on the Subject Lease is also subject to delay or suspension as result of events of Force Majeure. "Force Majeure" shall include, without limitation, the following: strikes; lockouts; riots; action of the elements, including but not limited to fire, explosion, flood, volcanic activity, earthquakes, or tidal waves; accidents; delays in transportation; inability to secure labor or materials in the open market; laws, rules or regulations of any Federal, State, County, Municipal or other governmental agency, authority or representative having jurisdiction, including failure or delay in issuance of necessary permits. or approvals; war (whether declared or undeclared including terrorist acts); acts of God; litigation or administrative proceedings affecting title to lands covered hereby or operations thereon; inability to secure or absence of a market for commercial sale of geothermal resources or electricity generated therefrom, produced from the Subject Lease or of derivatives developed by LDG therefrom; or by other matters or conditions beyond the reasonable control of LDG, whether or not similar to the conditions or matters in this definition specifically enumerated.

8. **Cooperation.** Owner agrees to reasonably cooperate with LDG, in good faith, to support and promote the successful development of geothermal resources and the generation of electricity from the Subject Lease.

9. **Pipelines, Utilities.** LDG hereby agrees to locate all pipelines and other linear utilities at all points along an applicable Access Road ROW or Other ROW where reasonable and practical. However, there may be instances where pipelines, transmission facilities and other Improvements cannot be placed along an Access Road ROW, in which case LDG shall be granted separate Other ROWs for such uses. LDG shall not be required to bury pipelines or other utilities.

10. Access Road ROWs. LDG agrees that it shall construct and/or improve all currently contemplated new roads and existing roads along the center line(s) approximately depicted on the attached Exhibit B, subject to modification by LDG upon a final inspection and survey of the Subject Lands. During the construction or improvement of any road, under an Access Road ROW, including the installation of pipelines and other utilities, the right of way shall be sixty (60) feet wide, and LDG shall have a temporary license to use other portions of the Subject Lands during the construction phase of such roads (including the installation of pipelines and other utilities) to park equipment or store gravel or other supplies, provided that LDG shall replant and restore any temporary use areas to their natural condition prior to construction. Upon completion of construction of the road (or expansion or improvement of existing roads) and installation of pipelines and other utilities, the Access Road ROWs shall be forty (40) feet wide. The roads shall be graded and improved with gravel. LDG agrees that it shall maintain the Access Road ROWs to industry standards as a gravel road during the term of this Agreement. LDG shall not be obligated to remove snow that may accumulate on the road, and shall not be responsible for paying the road, providing curb and gutter, or otherwise improving the road to accommodate increased traffic from Owner's lands. The same provisions of this Section 10 shall apply to all future roads and Access Road ROWs to be constructed and maintained by LDG on the Subject Lands, including Access Road ROWs or Other ROWs to the Power Plant ROW.

Owner's Right to Use the ROWs. LDG shall have the exclusive right to use and maintain the 11. Well Site ROWs and any Other ROWs (including the Power Plant ROW). LDG shall have the nonexclusive right to use and maintain the Access Road ROWs during the term of this Agreement for its: purposes. LDG hereby agrees that Owner, and its successors, assigns, employees, agents, invitees and licensees, shall have the right to use the Access Road ROWs for access to the remainder of Owner's, property as currently owned and used. Owner, and its successors, assigns, employees, agents, invitees and licensees shall not interfere with LDG's operations on the Subject Lands or the use or maintenance of the Access Road ROWs (or the other ROWs), and Owner shall be responsible for any cost of repairing damage to any road caused by Owner, or its successors, assigns, employees, agents, invitees and licensees: Any proposed use of or modification to an Access Road ROW by Owner, or its successors, assigns, employees, agents, invitees and licensees, which would or may be likely to injure, damage or interfere with the Access Road ROW, shall require the prior written consent of LDG, an express agreement of Owner to assume all costs and damages, and shall require, at LDG's option, the presence of LDG<sup>2</sup>s agent/or employee to monitor the activity. Owner, and its successors, assigns, employees, agents invitees and licensees shall abide by all written safety and other instructions regarding use of the roads that are provided by LDG. When LDG no longer requires an Access Road ROW for its operations, LDG shall provide written notice of its intent to abandon use and Owner shall have the option to assume control and maintenance over the Access Road ROW by notifying LDG within thirty (30) days of receipt of such notice; otherwise, LDG shall remediate and restore the property covered by an Access Road ROW in accordance with applicable law.

#### 12. Indemnification.

(a) Owner, its successors and assigns, does hereby agree to relieve, release, indemnify and hold LDG, its managers, members, successors, assigns, employees, agents, invitees and licensees, harmless and agree to defend LDG, its managers, members, successors, assigns, employees, agents, invitees and licensees, from any claim of damage to any person or property arising out of use of any ROW or other activities on the Subject Lands for damages proximately caused by Owner, its successors, assigns, invitees, and licensees, which damages include specifically but without limitation, all damages sounding in tort (whether by way of nuisance, trespass; ultrahazardous activity or otherwise) and/or involving environmental contamination and its incident response, compensation or liability, and also including all expenses, reasonable attorneys' fees, court costs, and witness fees, and other monies expended by or incurred by LDG or its agents, in the event it shall become necessary for LDG or its agents to defend themselves from any claims made by anyone as a result of the use of any ROW or other activities on the Subject Lands, by Owner, its successors, assigns, invitees, and licensees; but not otherwise.

(b) LDG, its successors and assigns, hereby agree to relieve, release, indemnify, and hold harmless and agree to defend Owner, its successors, assigns, employees, agents, invitees and licensees from any and all claim of damage to any person or property arising out of use of the Subject Lands for operations by LDG or its agents for damages proximately caused by LDG or its agents, which damages include specifically but without limitation, all damages sounding in tort (whether by way of nuisance, trespass, ultrahazardous activity or otherwise) and/or involving environmental contamination and its incident response, compensation or liability, and also including all expenses, reasonable attorneys' fees, court costs, witness fees and other monies expended by or incurred by Owner, its successors, assigns, employees, agents, invitees and licensees in the event it shall become necessary for Owner, its successors, assigns, employees, assigns, employees, agents, invitees and licensees to defend themselves from any claims made by anyone as a result of LDG's operations, on, across or over the Subject Lands, but not otherwise.

13. **Confidentiality**. Owner hereby agrees, unless compelled by court order or subpoena, that the terms and conditions of this Agreement, including but not limited to the payments referenced in Section 6

above, shall remain confidential and will not be disclosed or released to any other person(s) or third parties. LDG can disclose the existence and terms of this Agreement at its discretion.

14. Water Rights. Owner currently owns water rights that pertain to the Subject Lands, which are more particularly described in Exhibit D hereto. Owner is currently using a portion of its water rights for the operation of its commercial greenhouse business, for domestic consumption and some limited irrigation needs ("Current Water Usage"). Any water rights that Owner currently owns but is not currently using to satisfy the Current Water Usage shall be referred to herein as the "Excess Water Rights." LDG requires a minimum of approximately 600 acre-feet of water for the cooling and operational needs of the Power Plant, and Owner agrees that it shall make commercially reasonable efforts to meet those water requirements from the Excess Water Rights, and shall not lease or transfer any of its water rights until LDG's water requirements are being adequately met. Owner agrees to provide LDG access to and use of all Excess Water Rights as follows:

(a) Owner grants LDG the right to use Excess Water Rights for the drilling and testing of geothermal wells on the Subject Lands. LDG shall be responsible for all costs of connecting to Owner's water system.

(b) Owner hereby grants LDG the preferential right to the use of all Excess Water Rights for the development and operation of the Power Plant and the appurtenant geothermal resources. LDG-shall install a metering system, at its own cost and expense, if necessary to comply with any requirements of any governmental agency or authority. LDG shall also bear the full cost of connections to Owner's water systems and infrastructure, and, if necessary, any upgrades to Owner's water system necessitated by LDG's use of the Excess Water Rights. LDG shall provide, free of cost, all electricity necessary for pumping any Excess Water Rights for LDG's use. LDG shall pay for any metering, studies or reports that may be required to establish a precise amount of Owner's available water rights, the amount of the Excess Water Rights and/or LDG's water needs for the Power Plant or geothermal resources development. Once the amount of LDG's water rights requirements are established, Owner and LDG agree to enter into a written water use agreement that evidences LDG's rights to the Excess Water Rights, which agreement shall be recorded in the county real property records ("Water Use Agreement"). Owner covenants and agrees not to transfer or sell any of the Excess Water Rights, until the Water Use Agreement is executed and recorded.

15. Drilling of Water Wells on the Subject Lands. LDG requires a certain amount of water to effectively produce geothermal energy from the Subject Wells. Owner understands that any drilling of water wells on the Subject Lands or land adjacent to the Subject Lands, under certain conditions, could significantly and adversely impact the ability of LDG to explore for and produce geothermal energy. Accordingly, Owner hereby agrees to not drill or construct any water wells on the Subject Lands or on adjacent property to the Subject Lands that Owner owns without first giving LDG written notice of its drilling plans to LDG. Owner agrees to use its best efforts to cooperate with LDG to obtain any additional water rights that LDG may need or apply for to drill the Subject Wells and/or generate electricity from the geothermal resources underlying or pooled with the Subject Lands.

16. Notices. Owner may give any notice or deliver any document hereunder to LDG by mailing the same by prepaid registered or certified mail addressed to LDG to the address set forth in the introductory paragraph above, attention General Counsel, or by delivering the same in person to the above-referenced address of LDG. LDG may give any notice or deliver any document hereunder to Owner by mailing the same by prepaid registered or certified mail addressed to Owner at the address set forth in the introductory paragraph above, attention Dale Burgett, or by delivering the same to Owner in person. For purposes of this paragraph, either party may change its address by written notice to the other. In case of any notice or document delivered by registered or certified mail, the same shall be deemed delivered when deposited in any U.S. Post Office, properly addressed as herein provided, with postage fully

prepaid. Notices shall be in writing and shall be given to LDG and Owner at the addresses set forth in the introductory paragraph hereto, or to such address as either party may designate to the other in writing not less than thirty (30) days before that event which triggers notices. Notices shall be effective the third day after the date of mailing, postage prepaid.

17. Rehabilitation and Restoration: Upon termination of this Agreement, LDG shall restore the Subject Lands near as possible to their original conditions prior to construction in accordance with acceptable industry practices and all applicable laws and regulations in effect at the time of restoration. To the extent there is any environmental remediation required for property surrounding any ROW, Owner grants LDG a temporary right-of-way to use as much of the Subject Lands as it may require for environmental remediation. LDG shall have the right to use necessary space outside of the right-of-way for repair of any roadway or facilities. If upon termination of this Agreement, or intended abandonment of an Access Road ROW or some other ROW hereunder, LDG agrees and Owner elects to assume ownership and use of any road, well, or other Improvements, then Owner shall expressly assume all liabilities or responsibilities, including without limitation all future reclamation (or plugging and abandoning, for wells) obligations, and shall hold harmless LDG upon assumption of responsibility for such road, well or other Improvements.

18. No Storage or Repair of Equipment: LDG shall not allow any construction equipment or materials to be stored on Owner's property outside the confines of the fenced Power Plant ROW beyond ninety (90) days after completion of construction of a ROW or Improvements, unless approved, in advance, by Owner. LDG shall endeavor to maintain clean, neat and orderly roads and facilities at all times. No construction equipment shall be repaired or maintained upon the property of the Owner outside the boundaries of the fenced Power Plant ROW, except in the case of emergencies to prevent damage to the Subject Lands or neighboring properties. No motor fluids will be disposed of on the property of Owner.

19. Taxes. Owner shall continue to be responsible for the payment of property taxes, if applicable. LDG agrees to pay all additional taxes that may be assessed against the Subject Lands by reason of improvements placed thereon by LDG. Owner shall provide LDG with written evidence that Owner has paid all property taxes on the Subject Lands at least thirty (30) days prior to when due. If Owner fails to pay property taxes on the Subject Lands; LDG shall have the right, but not the obligation, to pay such tax obligations on Owner's behalf, and such payment, with interest accruing at Eighteen Percent (18%) per annum, shall be due and payable by Owner to EDG within thirty (30) days of payment by LDG.

20. Recorded Right-of-Way; ROW Map. Upon the request of LDG or Owner, LDG shall prepare a written right-of-way, in recordable form, which can be recorded in Hidalgo County to provide constructive notice of the exact location of any right-of-way granted pursuant to this Agreement. Moreover, LDG shall maintain a map of the Subject Lands (starting with Exhibit B) which reflects all surface uses and ROWs used or required by LDG, and as new ROWs are obtained by LDG under this Agreement, LDG shall amend and maintain a current map and survey of ROWs, a copy of which shall be provided to Owner.

21. LDG Financing. Owner agrees to execute any documents reasonably required by any lender of LDG to permit LDG to obtain financing for LDG's activities on the Subject Lands. Such documents may include, without limitation, a certificate of Owner confirming the validity and enforceability of this Agreement, that there are no defaults under this Agreement, that this Agreement shall survive any foreclosure and may be assigned to subsequent purchasers at foreclosure, consent of Owner to the grant of LDG's rights in this Agreement to a lender for security purposes, and any other covenants and agreements that are typically required by institutional lenders. Moreover, if Owner has existing deeds of trust, mortgages, or other liens on the Subject Lands at the time of this Agreement, on the form to be provided

by LDG; either prior to execution or within thirty (30) days after execution, as elected by LDG. The subordination agreement may be recorded with the Memorandum described in Exhibit C or recorded separately.

22. Governing Law. The laws of the State of New Mexico shall control the rights of the parties under this contract.

23. Waiver. By signing this Agreement, neither party waives its statutory and common law rights to occupancy and enjoyment of their respective estates, except as expressly provided in this Agreement.

Assignment of Rights. All rights and obligations under this Agreement shall run with the Subject Lands and shall inure to the benefit of and be binding upon the heirs, successors, or assigns of each party. LDG may assign its rights in this Agreement without the prior written consent of Owner, including, without limiting the foregoing, assignments for purposes of providing security for any loans. Moreover, LDG shall have the right to assign all or any portion of the ROWs to another entity of person, separate from ownership of the Subject Lease. The parties hereto agree to execute a memorandum of this Agreement, which shall be in form sufficient to record in the Hidalgo County real property records, in the form provided by LDG.

25. Amendment. This Agreement constitutes the entire Agreement between the parties pertaining to the subject matter contained in it and supersedes all prior and contemporaneous agreements, representations, and understandings of the parties with respect thereto. No supplement, modification, or amendment of this Agreement shall be binding unless executed in writing by all parties.

26: **Counterparts.** This Agreement may be executed in counterparts. Each counterpart shall constitute an original and all counterparts together shall constitute one and the same document. Receipt by party hereto of an executed copy of this Agreement by facsimile shall constitute conclusive evidence of execution and delivery of the Agreement by the signatory thereto.

[Signatures on the following page]

Dated effective as of the date first written above.

OWNER:

ROSETTE, INC. By: Name:

LDG:

Title: 6

LIGHTNING DOCK GEOTHERMAL HI-01, LLC

By: ` Name: Martin F Peterson Title: CFO

#### EXHIBIT A

#### Legal Description of the Subject Lands.

A. LDG is the owner of Federal Geothermal Lease NM -34790 ("Subject Lease"), granting LDG the right to explore for and develop geothermal resources underlying the lands covered by the lease, described as follows:

1.

T255, R19W, N.M.P.M. Sec. 6: Lots 3, 4, 5, 6, 7, SEL/4NW1/4 Sec. 6: El/2SW1/4 Sec. 7: Lots 1, 2, 3, 4, S1/2NE1/4, SE1/4NW1/4, EL/2SW1/4, SEL/4, NW1/4NE1/4, NEL/4NW1/4 Sec. 18: Lot 1, N1/2NE1/4, NE1/4NW1/4

and

T2SS, R20W, N.M.P.M. Sec. 1: NW1/4SW1/4, S1/2SW1/4, SW1/4SE1/4 Sec. 11: NE1/4, S1/2 Sec. 12: ALL Sec. 13: N1/2N1/2

#### Containing 2,500,96 acres, more or less

2. LDG has applied for Federal Geothermal Lease NM 108801, which is pending final approval by the BLM and will be included with the Subject Lease upon approval, granting LDG the right to explore for and develop geothermal resources underlying the lands covered by the Subject Lease, described as follows:

T25S, R20W, N.M.P.M. Sec. 14: All

Containing 640.00 acres, more or less

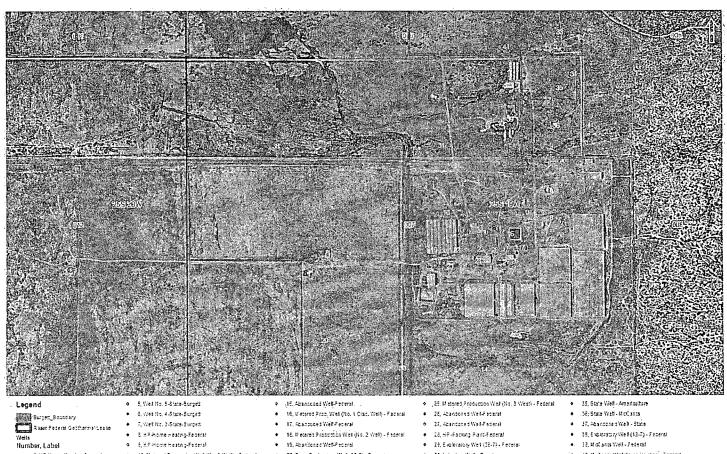
- B. Owner is the owner of the land ("Surface Lands") covering, in part, the Subject Lease, which is described as follows:
  - 1. Sections 7 and 18 T25 S, R19 W, N.M.P.M

And

Sections 11, 12, 13, 14, and 23 T25 S, R20 W, N.M.P.M Containing 2,592.473 acres, more or less

**C.** "Subject Lands" shall be the surface area wherein LDG's Subject Lease underlies Owners Surface Lands.

#### EXHIBIT B

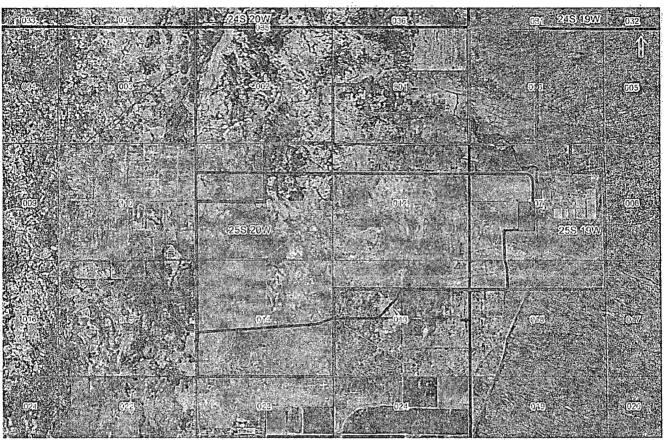


#### Initial Inventory of Existing Wells and Location of Initial Contemplated ROWs

- 0, HP Home Healing-Federal
- t, Sixploratory Web-Federal .
- 2, Exploratory Weil-Federal
- 3, Alzerraziazre Welt-Featral
- 4, Weil No. 1-Stale-Borgett
- 10, Metered Prosuction Weil (No. 6 Weil) Federal
- 11, Materez Propuszin Walisto, 3 East) Pacaraj
- 12. PP-Greenhouse Heating-Federal
- 13, HP-Home Heating-Federal
  - t4, Exploratory sile8.Federal
- 20, 2 eep E sclaratory Wet (35-7) Ferreral
- 21, nP-Hame Hessiag-Feseral
- 22.4cantenet Well-roard
- 23, Viastic ; Weilfesttal
- 24, НР Ноде жезого-Feseral
- 30, krigatos Viel Prvate 31, Exploratory Vielt (SC-7) - Federal
- 22. Vacant
- 32, Y/el No. 7 State Burgett
- 34, State Weil- Americature
- 40, Moltanta Well Home Reating Feceral
- 41, Molants WellHome Heating Federat

## EXHIBIT C

Sample Power Plant ROW and Access Roads for a Power Plant



#### Legend

Secondary Access Route
 Raser Federal Geothermal Lease
 Primary Access Route
 Lightning Dock Geothermal Power Plant and Access ROW Hildago County, Nevada

Lightning Dock Geothermal HI-01, LLC 5152 North Edgewood Drive Suite 375 Provo, UT 84604

## EXHIBIT D

### Water Rights Description

A. Owner represents and warrants ownership of the following Water Rights identified by New Mexico Office of the State Engineer Numbers:

A-13, with points of diversion located in Section 13, Township 25 South, Range 20 West, N.M.P.M.

A-36-A, with points of diversion located in Sections 6 and 7, Township 25 South, Range 19 West, N.M.P.M., and Sections 4 and 12, Township 25 South, Range 20 West, N.M.P.M.

A-35-D, with points of diversion located in Section 7, Township 25 South, Range 19 West, N.M.P.M., and Section 4, Township 25 South, Range 20 West, N.M.P.M.

A-51, with points of diversion located in Section 10, Township 25 South, Range 20 West, N.M.P.M.

A-64-A, with points of diversion in Section 7, Township 25 South, Range 19 West, N.M.P.M.

A-384, with points of diversion in Section 12, Township 25 South, Range 20 West, N.M.P.M.

A-385, with points of diversion in Section 7, Township 25 South, Range 19 West, N.M.P.M.

A-386, with points of diversion in Section 7, Township 25 South, Range 19 West, N.M.P.M.

STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT

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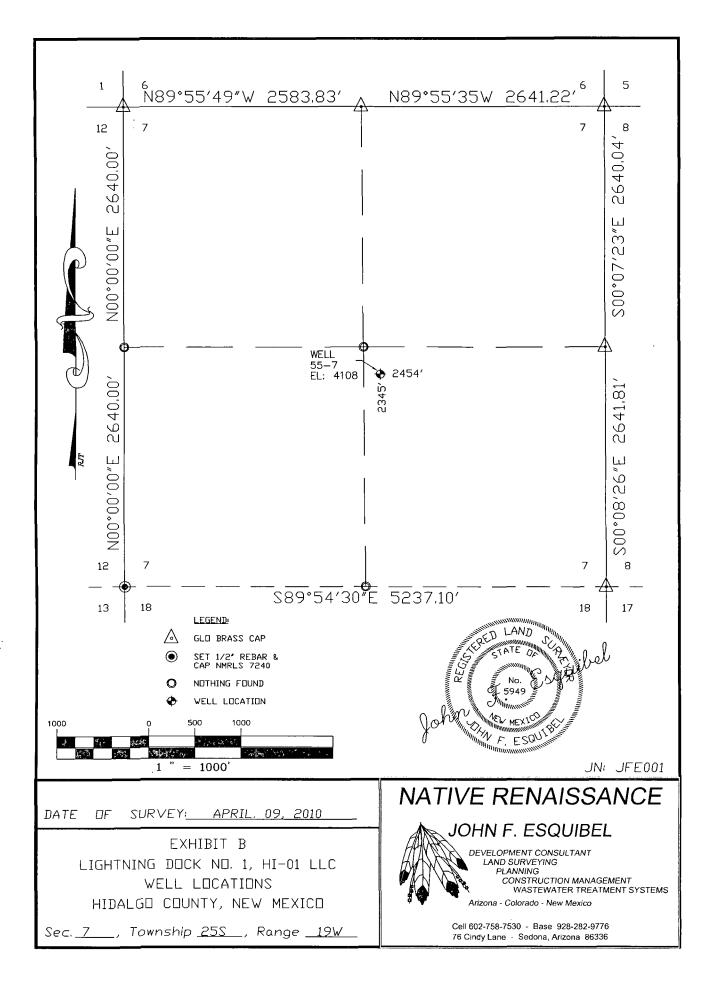
#### OIL CONSERVATION DIVISION P. O. BOX 2010 SANTA FE, NEW MEXICO 87501

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Form G-102 Adopted 10-1-74 Revised 10-1-78

GEOTHERMAL RESOURCES WI	ELL LOCATION AND	ACREAGE DEDICATION PLAT
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		All distances	must be from the	outer boundar	ies of the Section	on.	
perator ightning D	ock Geother	mal HI-0	1, LLC	Federal	NM-3479	0	Well No. TFD 55-7
N/A	Section 7	Township	255	19W	County	Hildalgo	· · · · ·
tual Footage Loca 2454	tion of Well: feet from the	East	tine and	2345	feet from th	. South	line
4201 Level Elev.	Producing For open		Poot	wildcat			cated Acreage: N/A Acres
1. Outline t	he acreage dedicat	ed to the subje	ct well by color	ed pencil or	hachure mark.	s on the plat below	<i>w.</i>
2. If more and roya		dedicated to th	ic well, outline	each and ide	ntify the own	tership thereof (bo	oth as to working inter
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🗌 Yes	🗋 No lf ar	iswer is "yes,"	type of consolid	lation			
If answer is necessary.) _		ners and tract	descriptions whe	ich have actu	ally been cor	nsolidated. (Use re	everse side of this form
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						Company Raser	Technologies
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STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT

# OIL CONSERVATION DIVISION

Form G-102 Adopted 10-1-74 Revised 10-1-78

GEOTHERMAL	RESOURCES	WELL	LOCATION	AND	ACREAGE	DEDICATION PLAT	

	ock Geothe	— <del></del>		Federal		, 	TFD 55-7
nit Letter N/A	Section 7	Towriship	25S	<sup>gr</sup> 19W	County H	ildalgo	
tual Footage Loca 2454	ation of Well: feet from the	East	line and	345	feet from the		line
ound Level Elev. 4201	Producing Fo	hole	Pool WI	ildcat	·····	Ded	licated Acreage: N/A Acres
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necessary.) . No allowat	ble will be assig	gned to the v		erests have t	een consolio	dated (by com	neverse side of this form munitization, unitization by the Division.
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STATE OF NEW N ENERGY AND MINERALS I			DIL CONSERVATI P. O. BOX 2 SANTA FE, NEW M	088	·		Form G-101 Adopted 10-1-74 Revised 10-1-78
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b. Type of Well Geoth	ermal Produc	er 🖄	Ter	np Observation		8. Farm or 1	ease Name
•••	emp Thermal		Inje	ction/Disposal			N/A
						9. Well No.	
2. Name of Operator Light	ning Doo	ck Geo	thermal HI-01	, LLC		TFD 5	5-7
Address of Operator	2 Edgowc	od Dr	ive, Provo, Ut			10. Field and	d Pool, or Wildcat
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AND 2329.1 FEET FRO			red <u>2411.</u> 9eet fr sec. 7 twp. 25				
						12. County Hidalg	•
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. MIRU drill	ria		<u>.</u>	I			]
	0		am 14501 to 11				
	_	-	om 1450' to 1				
			om 1890' to 20				

5. Set bridge plug in 3000'-3400' interval.

6. Collect water samples for geochemical and environmental analysis.

7. Set production pump at 850' approx.

8. Release rig.

9. Hook up well for pump test to irrigation system.

10. Run pump test for up to four weeks.

11. Secure well.

Please see attached Proposed Operations and Drilling Plan for details.

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: If proposal is to deepen or plug back, give data on present productive zone and proposed new productive azone. Give blowout preventer program, if any.

signed	Tille VP Resource	e Management	April 12	2, 2010
(This space for State U	se)			
APPROVED BY	TITI F		DATE	

CONDITIONS OF APPROVAL, IF ANY

STATE OF NEW MEX ENERGY AND MINERALS DEF		DIL CONSERVAT P. O. BOX SANTA FE, NEW M	2088			Form G-101 Adopted 10-1-74 Revised 10-1-78
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DISTRIBUTION		•	· · ·	[	5. Indicate	Type of Lease
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J.S.G.S.		G DACK-GEUTHEM	MAL RESOURCES WE			al NM-34790
Operator				k	, TTTTTT	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
and Office			•			
a. Type of Work Drill	<u> </u>	Deepon	Plug Back		7. Unit Agre	ement Name
e e e e e e e e e e e e e e e e e e e	nal Producer 🖄	То	mp Observation	Ļ	· · · ·	·
	p Thermal		ection/Disposal		8. Farm or L	
						N/A
2. Name of Operator Lightn:	ing Dock Geo	thermal HI-01	, LLC		9. Well No. TFD 59	5-7
3. Address of Operator 5152	Edgewood Dr	ive, Provo, U	tah 84604			Pool, or Wildcat Vildcat
I. Location of Well UNIT LETT		ер <u>2411.</u> 9еет гр sec. 7 <sub>тwp</sub> 25				
				<u>IIIIII</u>	12. County Hidalg	• //////
			9. Proposed Depth 1 3400'	9A. Formation Open Hol	le	20. Rotary or C.T. Rotary
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. MIRU drill ri 2. Drill out cem	nent plug fro nent plug fro	om 1890' to 2	090' approx.	· · ·		

7. Set production pump at 850' approx.

8. Release rig:

9. Hook up well for pump test to irrigation system.

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Please see attached Proposed Operations and Drilling Plan for details.

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: If proposal is to deepen or plug back, give data on present productive zone and proposed new productive azone. Give blowout preventer program, if any,

. I hereby certify that the information above is true and complete to the best of my knowledge and belief.

Signed		TitleVP Resource	Management	Date	12, 2010
	(This space for State Use)		and the second second second second second second second second second second second second second second secon		

CONDITIONS OF APPROVAL, IF ANY:

APPROVED BY

TITLE

STATE OF NEW MI ENERGY AND MINERALS D		OIL CONSERVAT P. O. BOX 2 SANTA FE, NEW M	2088		•	Form G-101 Adopted 10-1-74 Revised 10-1-78
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DISTRIBUTION		,				Type of Lease
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and Office						
a. Type of Work Drill	 [¥	Deepen	Plug Back	<u></u>	7. Unit Agree N	ement Name
of Type of Well	rmal Producer 凶 mp Thermal ロー		mp Observation		8. Farm or Lo N	ease Name I/A
2. Name of Operator Light:	ning Dock Geo	othermal HI-01	, LLC		9. Well No.	
		· · · · · · · · · · · · · · · · · · ·	·		TFD 55	
3. Address of Operator 5152	2 Edgewood Dr	cive, Provo, U	tah 84604			Pool, or Wildcat ildcat
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If proposal is to deepen or plug back, give data on present productive zone and proposed new productive A hereby certify that the information above is true and complete to the best of n v knowladen and haliat

. I hereby certify that the information above is true a	ind complete to the best of my knowledge and belief.	
Signed	TilleVP_Resource Management	April 12, 2010
(This space for State Use)		
APPROVED BY	TITLE	DATE
CONDITIONS OF APPROVAL, IF ANY		
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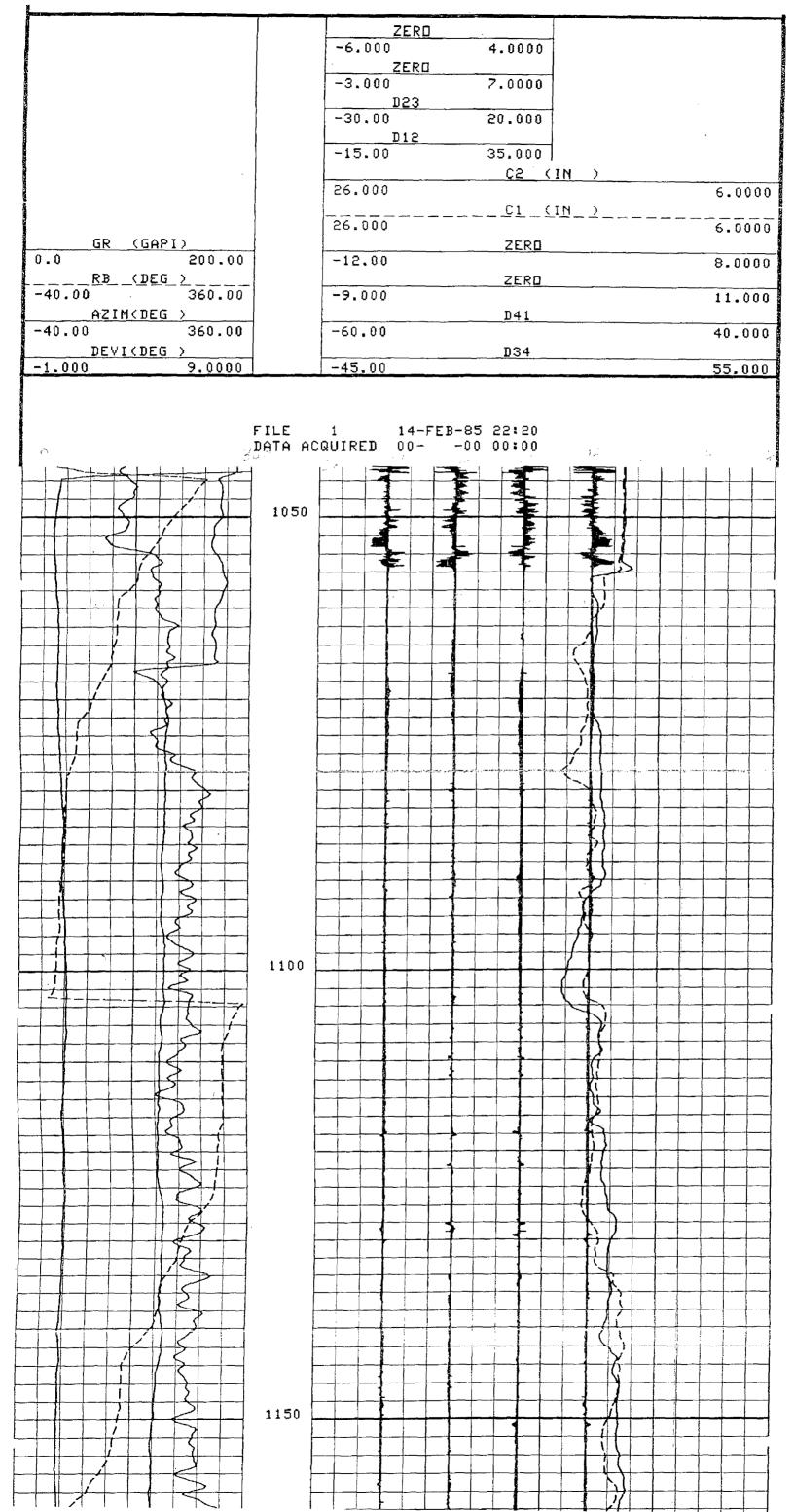
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Operator				k	, , , , , , , , , , , , , , , , , , ,	, , , , , , , , , , , , , , , , , , ,
Land Office				F		
1a. Type of Work Drill	۶ D	eepon	Plug Back		7. Unit Agree	ment Name
Caatharm	nal Producer 🛛 🖄	Tor	np Observation			
** · · / / · · · ·	p Thermal		ction/Disposal		8. Farm or Le N	ase Name
		·		·····	9. Well No.	
2. Name of Operator Lightni	∟ng Dock Geot	hermal HI-01	, LLC		TFD 55	
3. Address of Operator 5152	Edgewood Dri	ve, Provo, U	tah 84604			Pool, or Wildcat ildcat
4. Location of Well UNIT LETT	ERLOCAT	ED 2411. PEET FR	OM THE East	LINE	IIIIII	
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AND 2329.1 FEET FROM T	HE DULLENE OF S	EC. ' TWP. <sup>23</sup>	S <sub>rge.</sub> 19 W		12. County	
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7. Set productic						
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8. Release rig. 9. Hook up well			ion system.			· · · · · · · · · · · · · · · · · · ·
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8. Release rig. 9. Hook up well 10. Run pump test 11. Secure well.	for up to f	our weeks.	· · · ·	an for d	details	· · · · · · · · · · · · · · · · · · ·
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8. Release rig. 9. Hook up well 10. Run pump test 11. Secure well. Please see attache ABOVE SPACE DESCRIBE PRO One. Give blowout preventer program hereby certify that the information	ed Proposed Copposed Proposed Copposed Program: If any.	our weeks. Operations and proposal is to deepen or	d Drilling Pl plug back, give data on p nowledge and belief.	present produc	live zone and	proposed new productly
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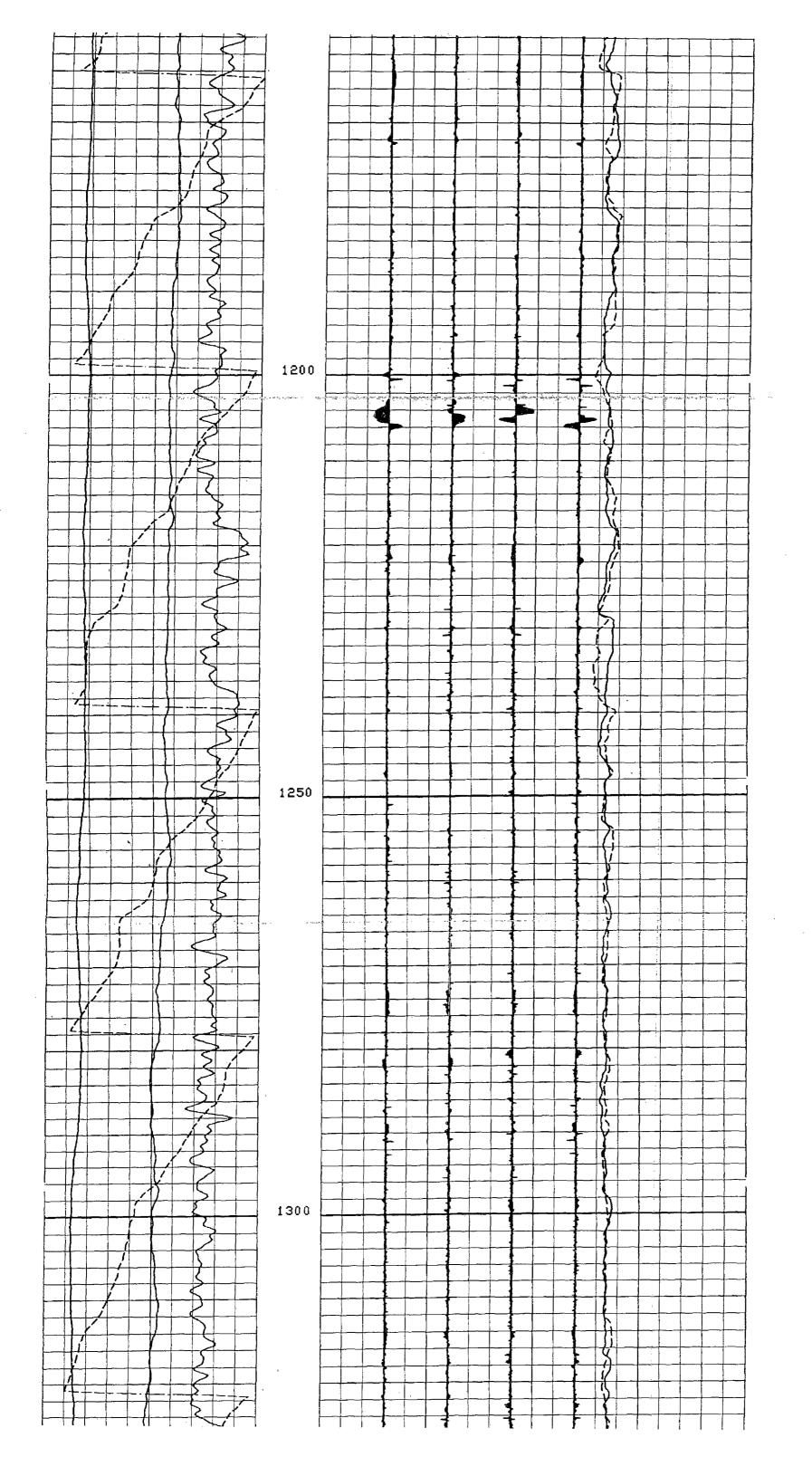
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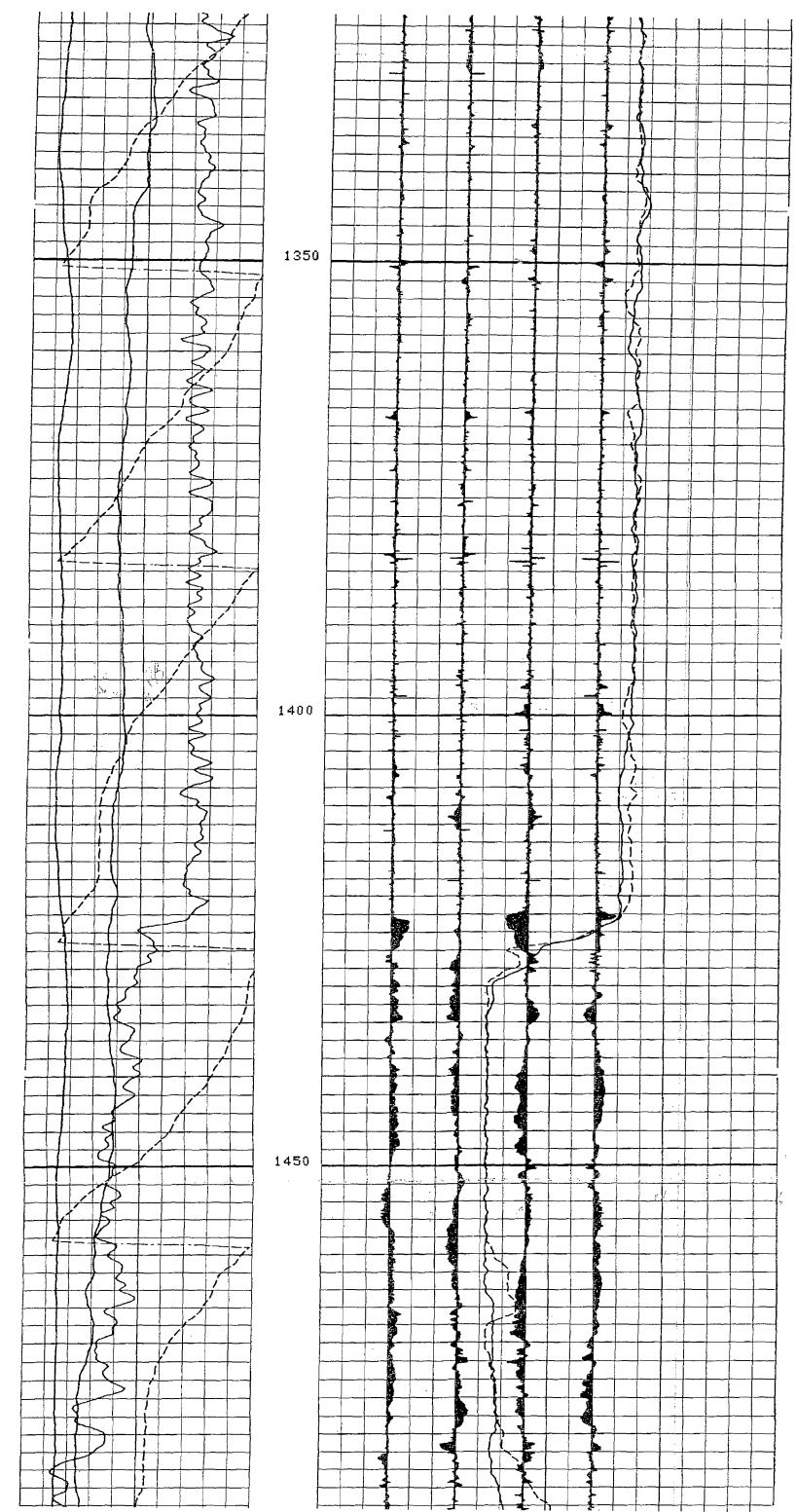
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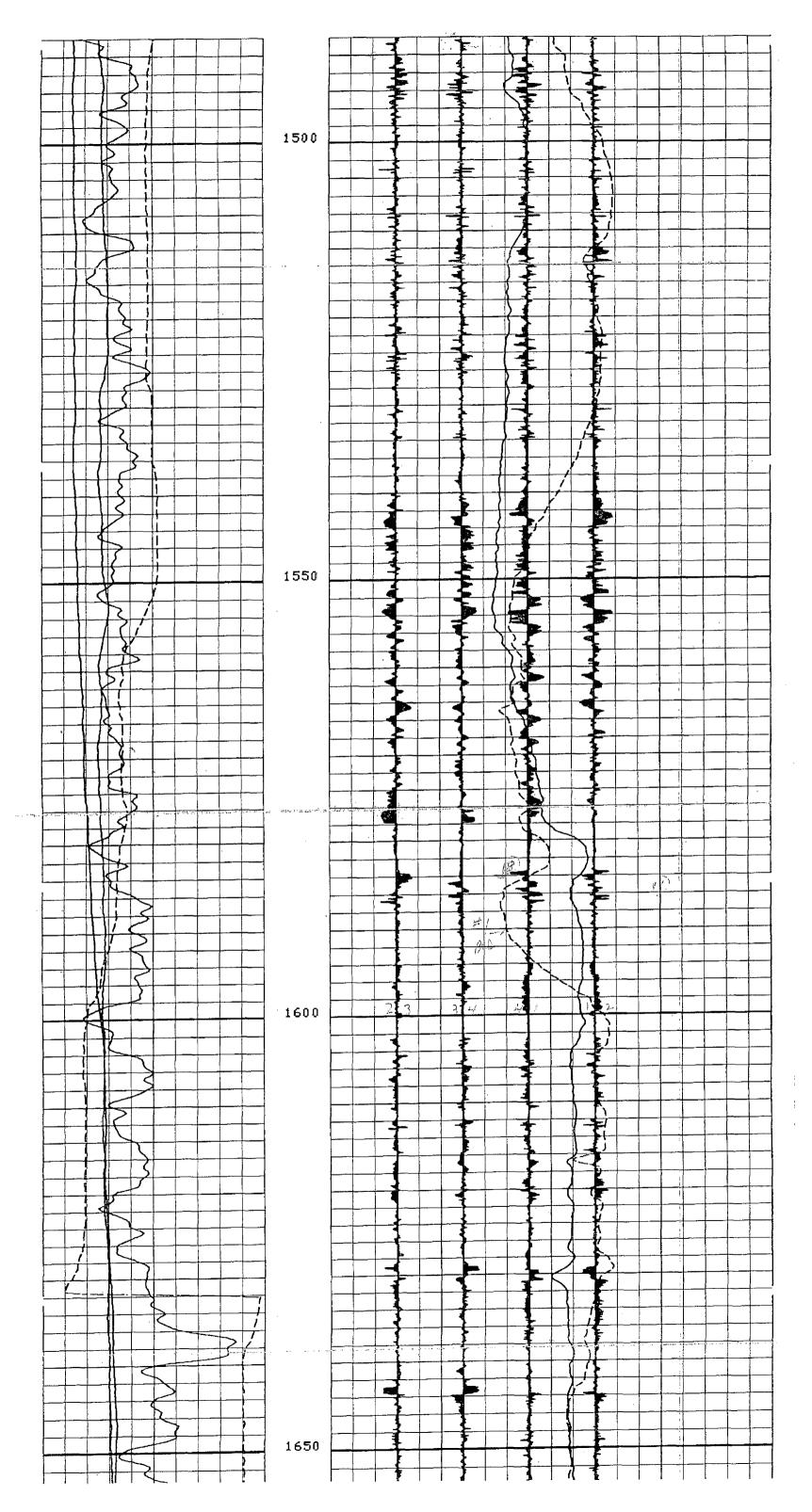
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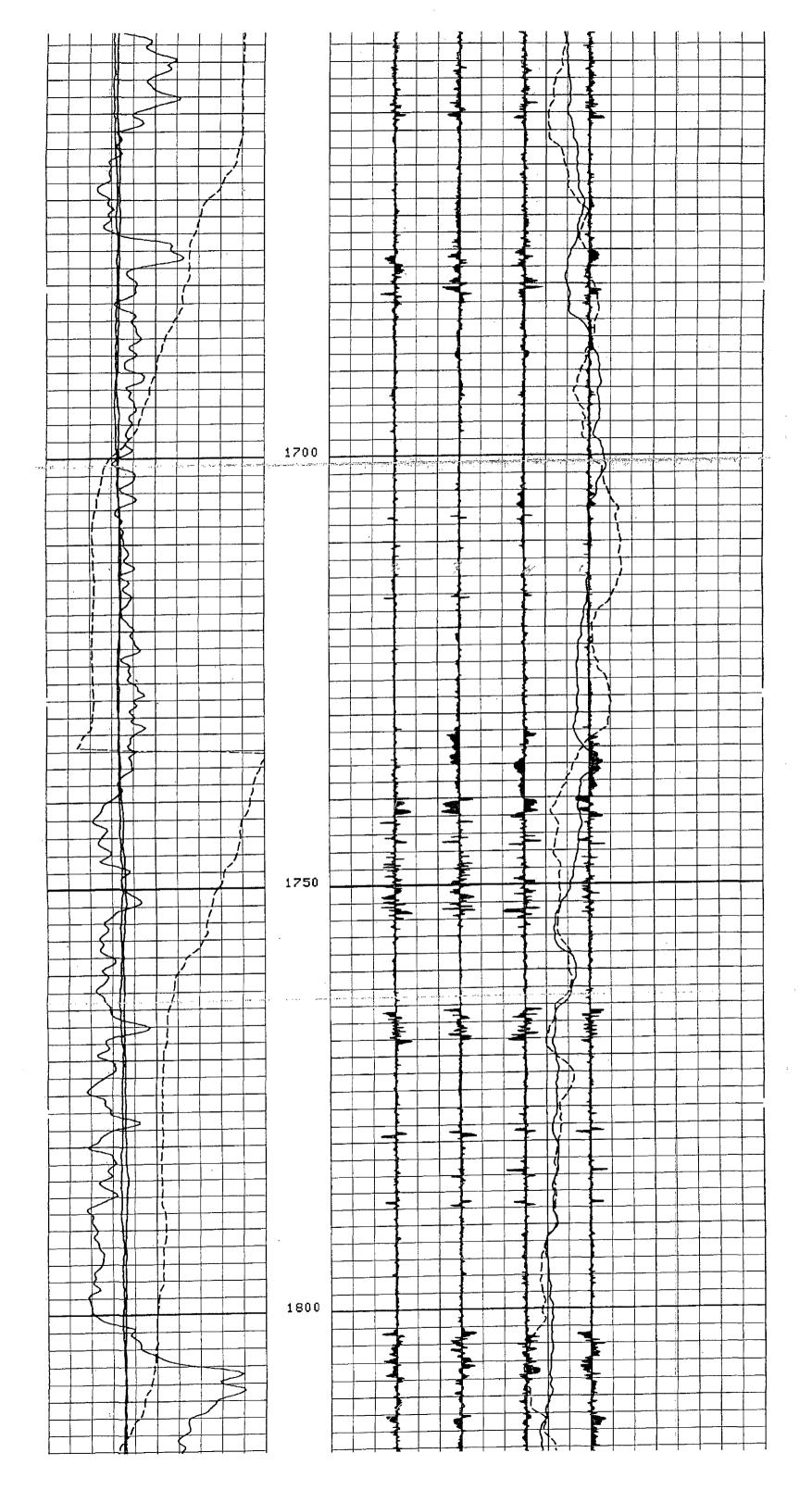


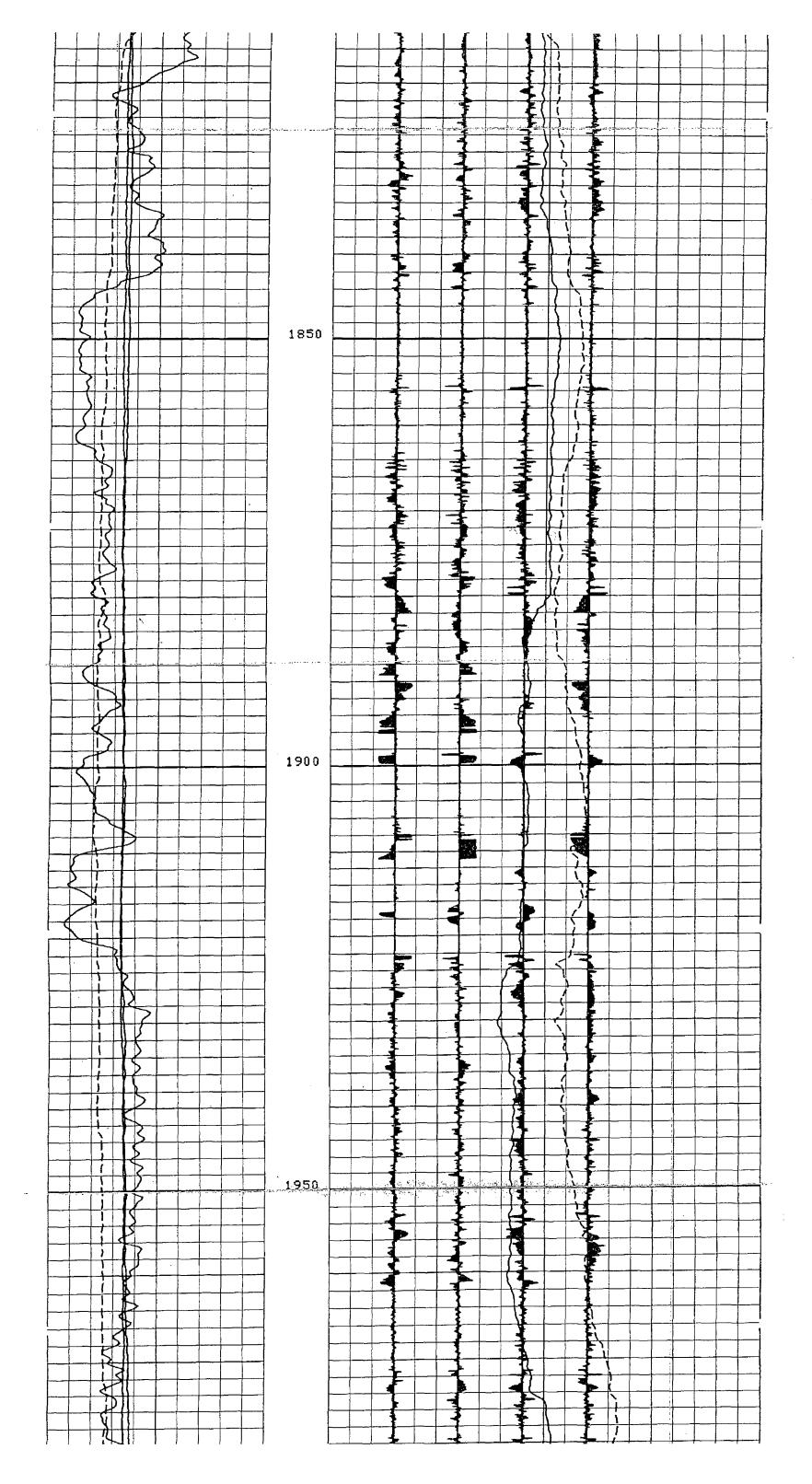


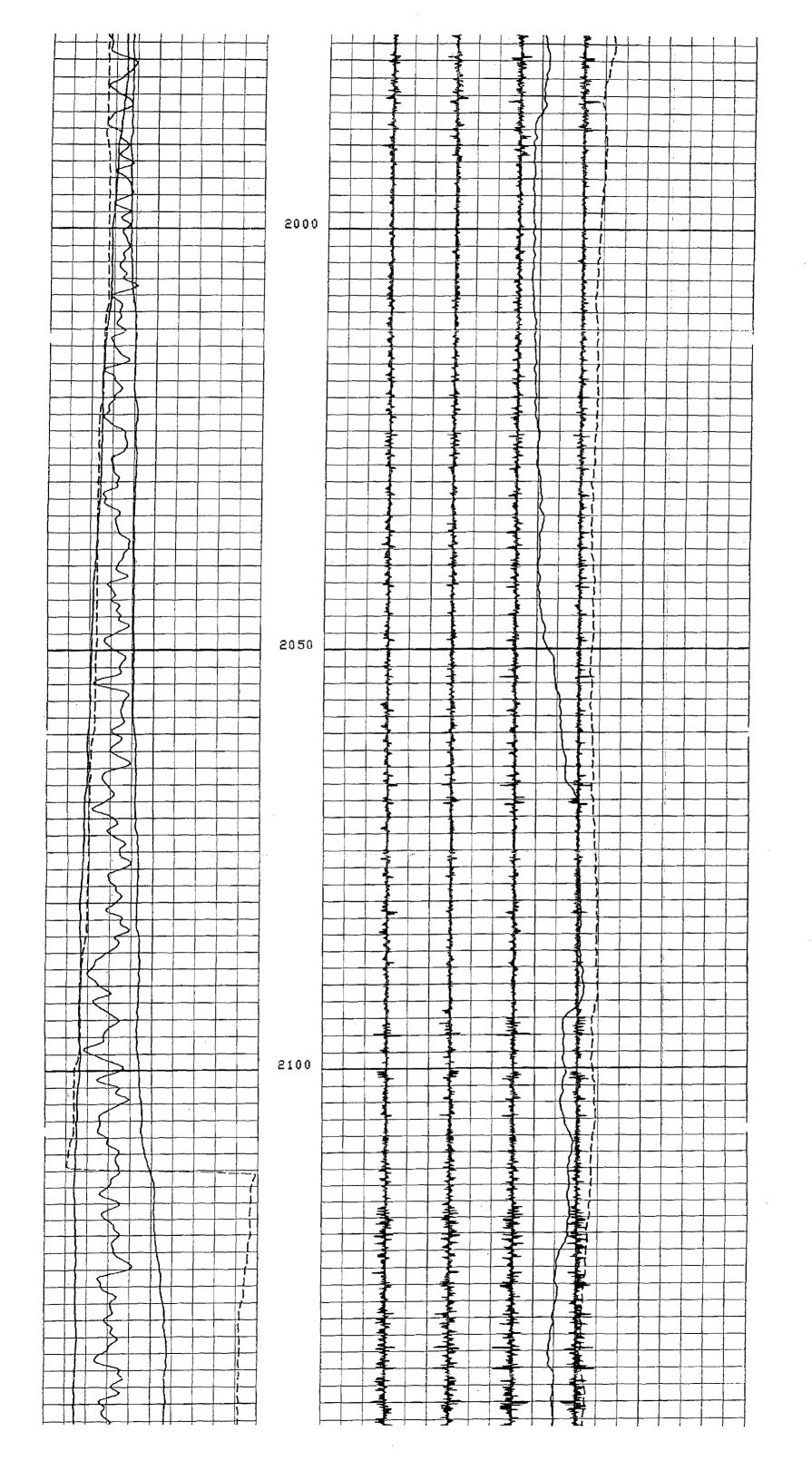
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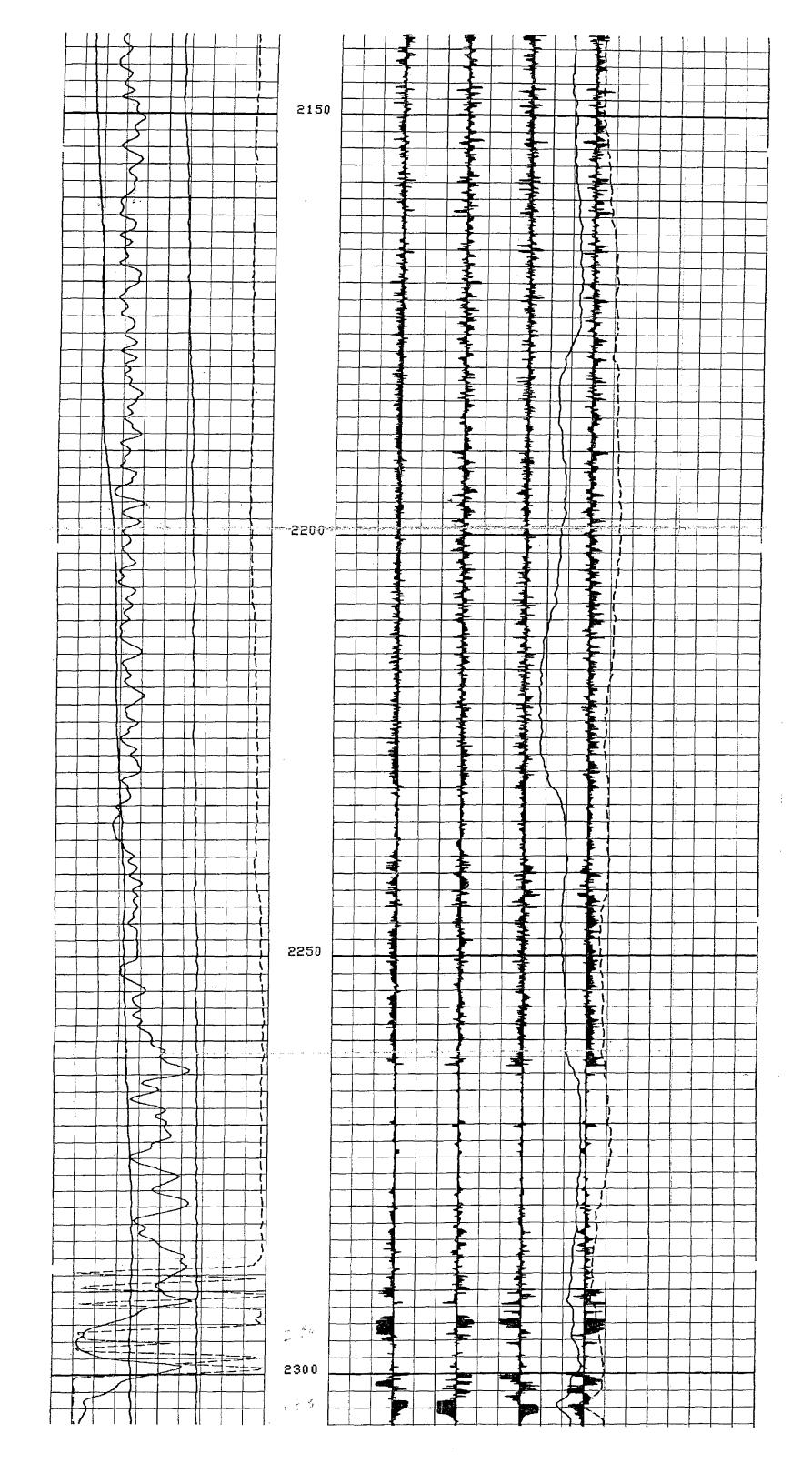
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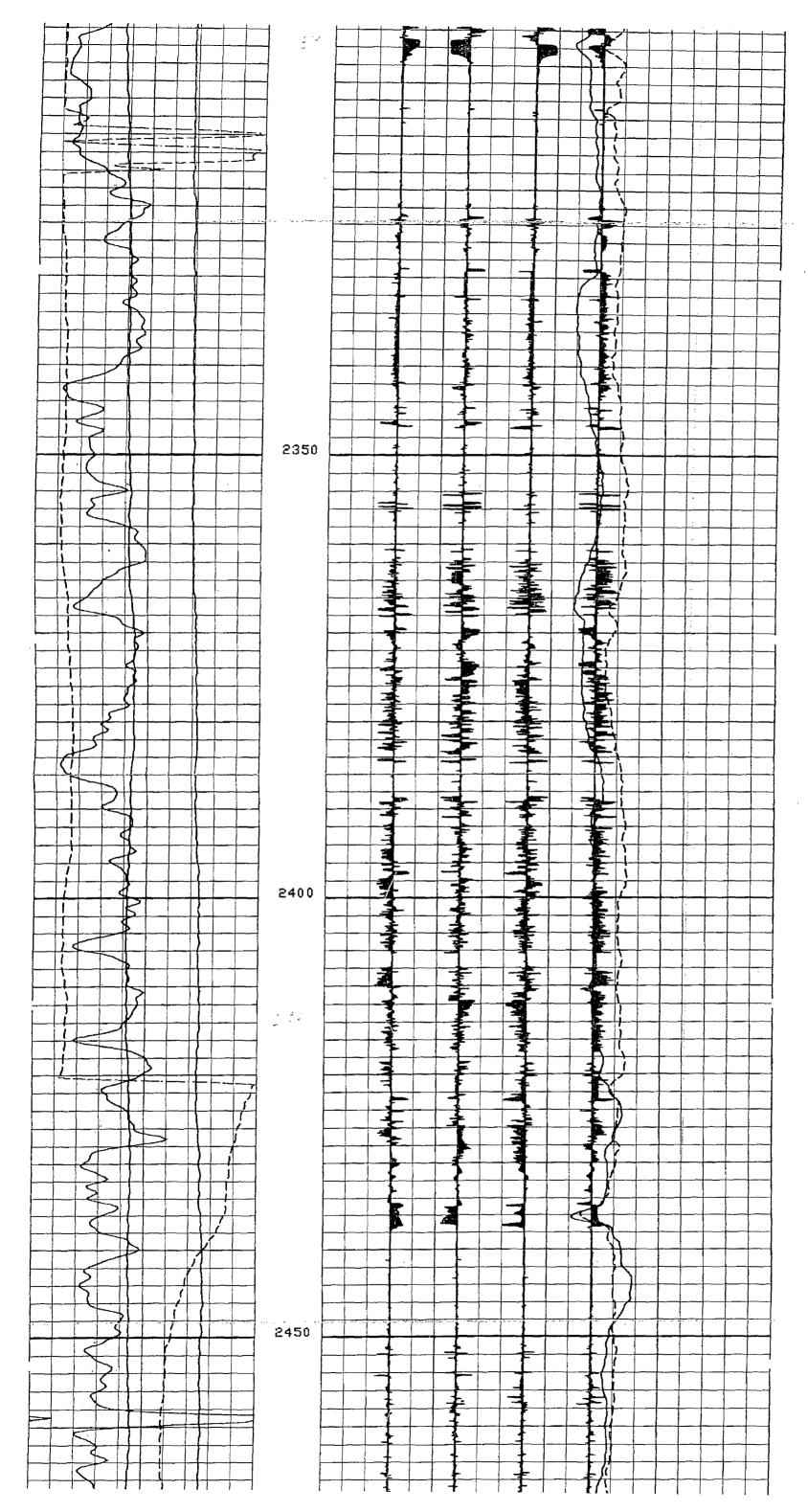








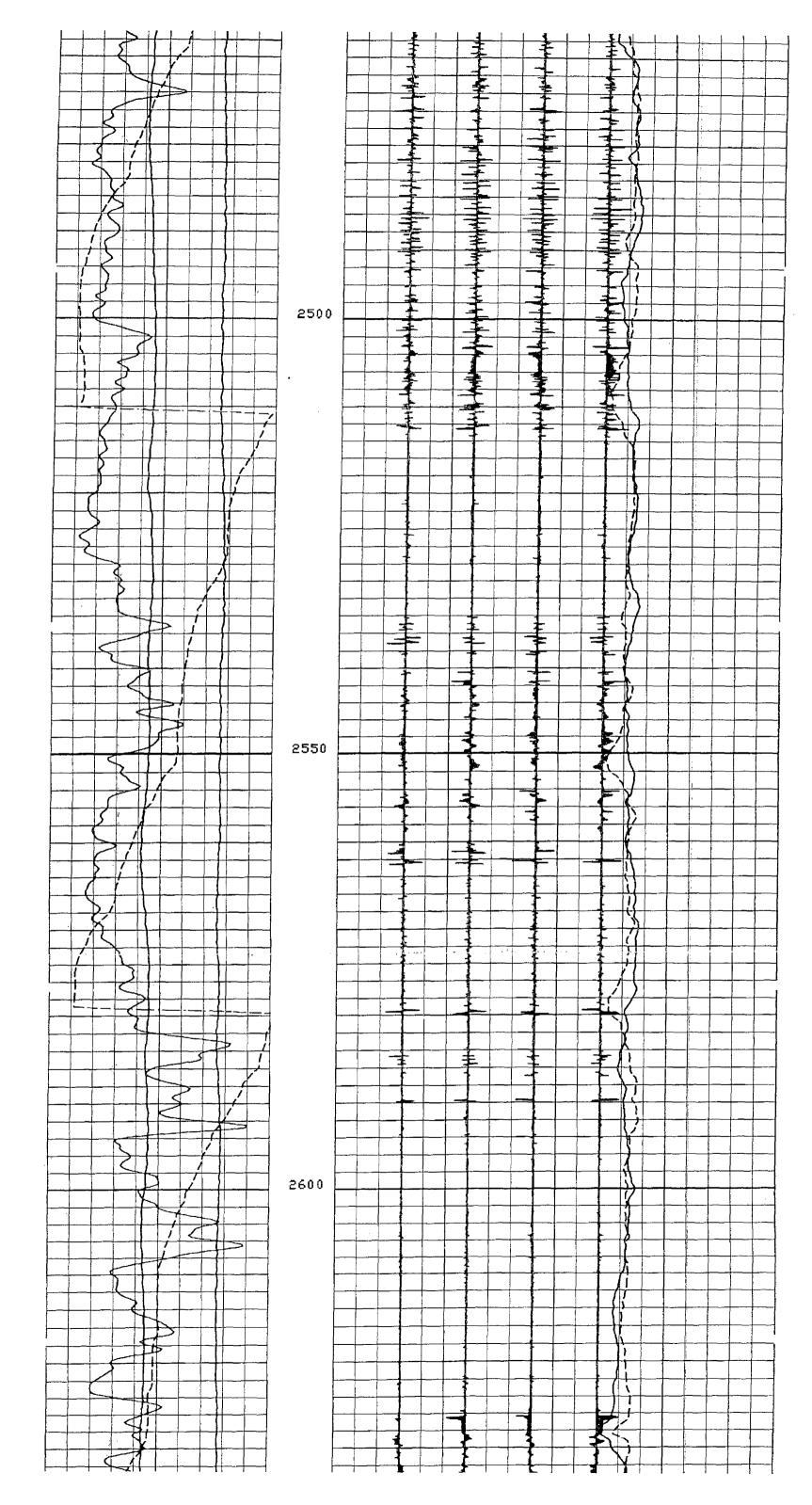
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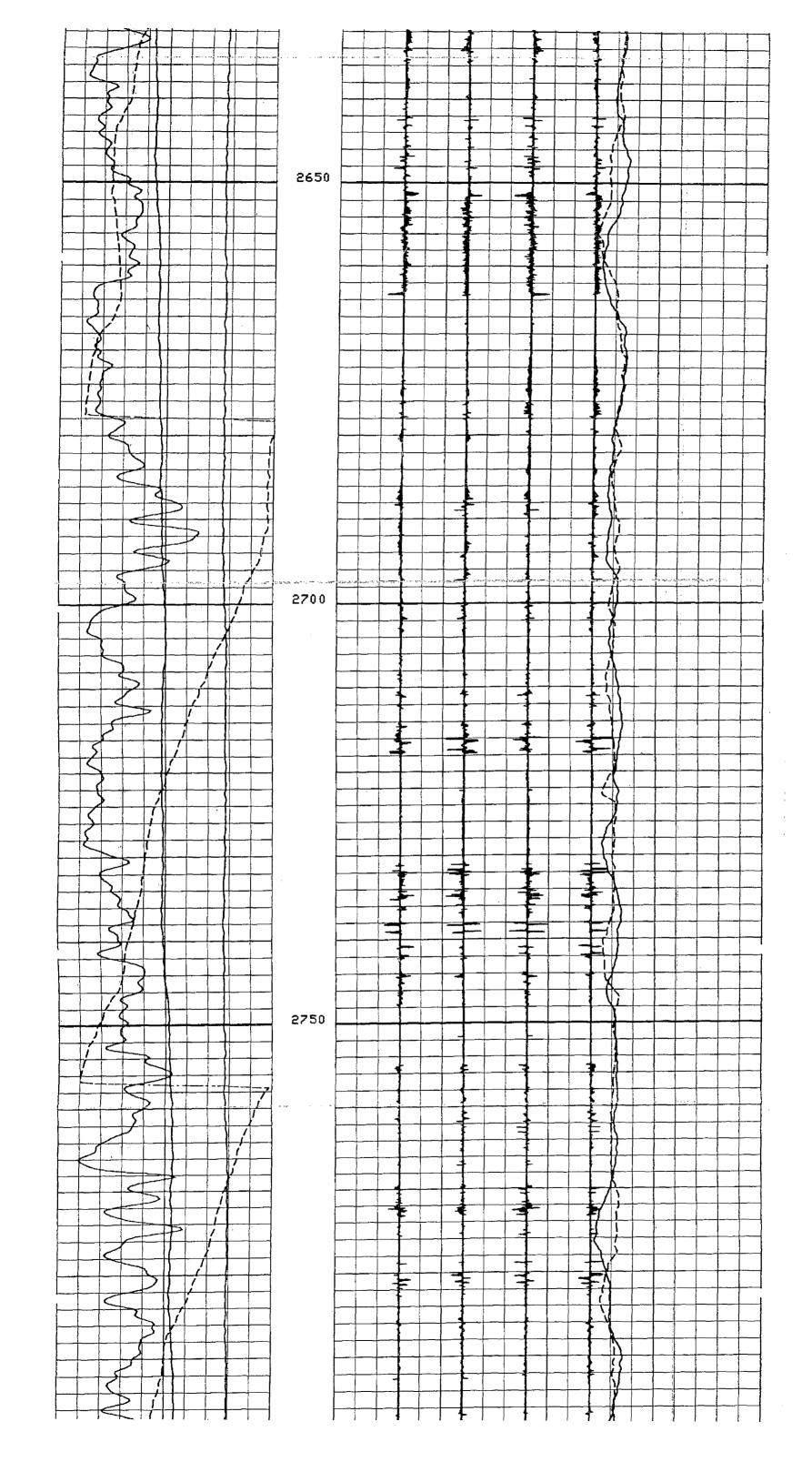
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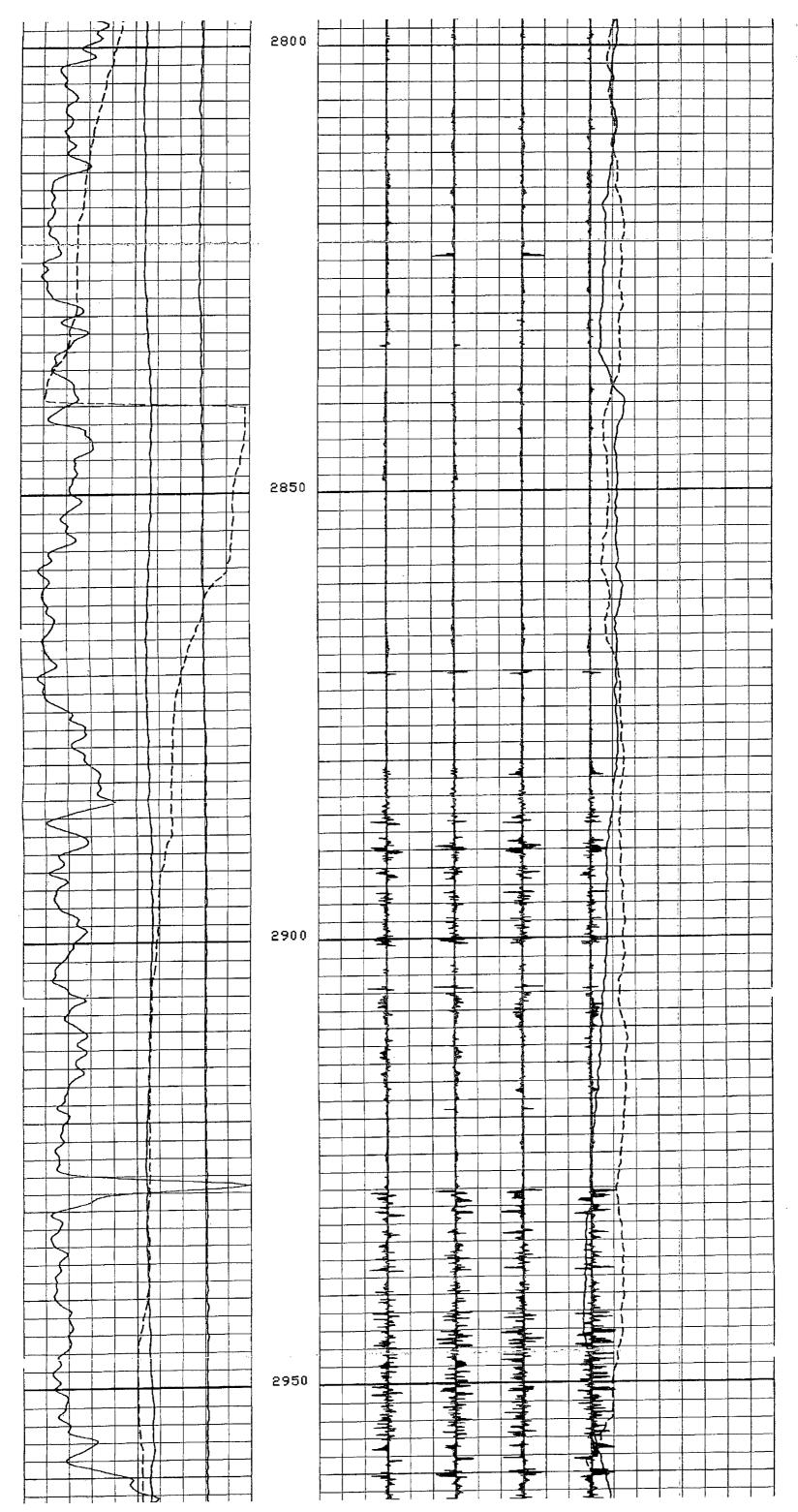
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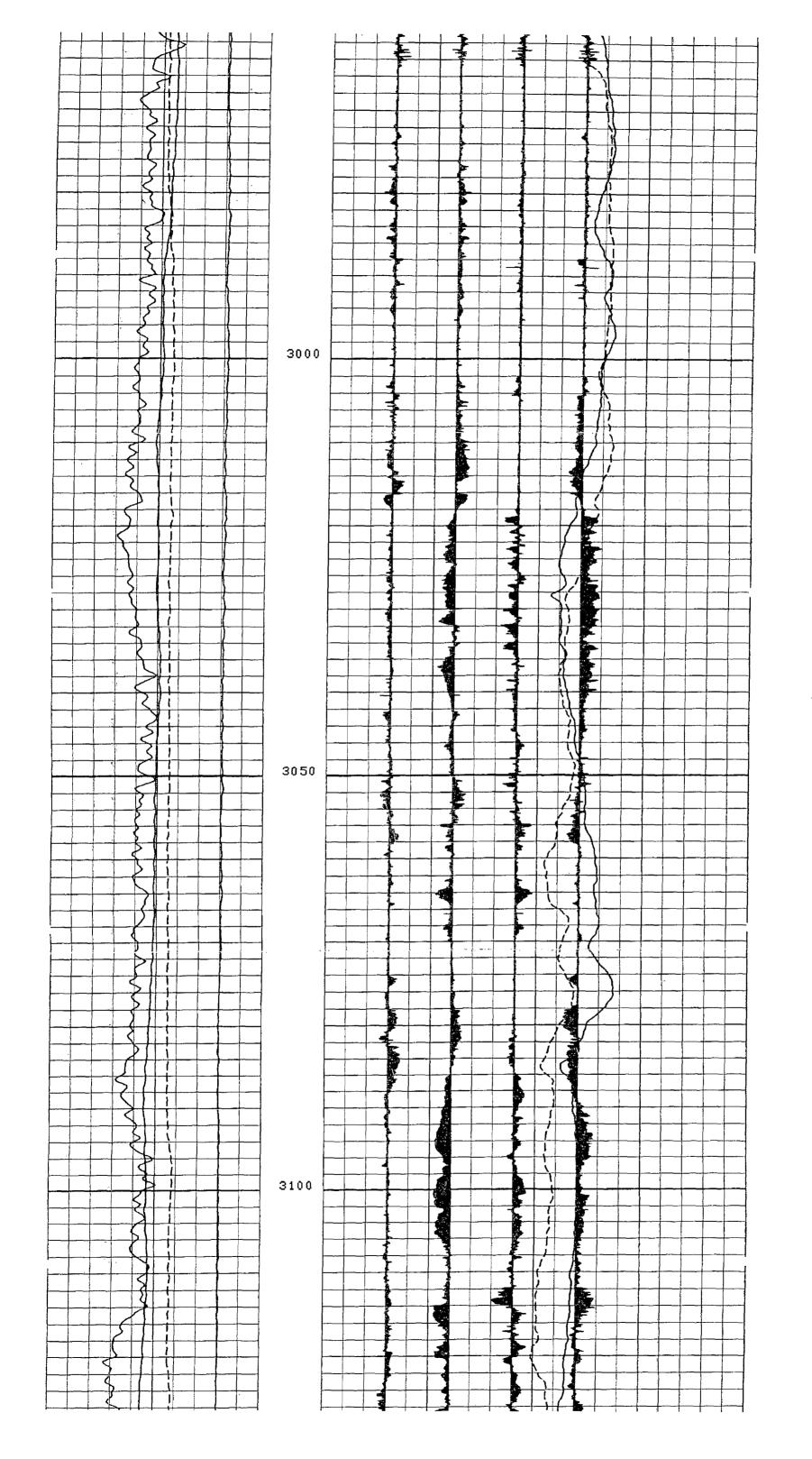
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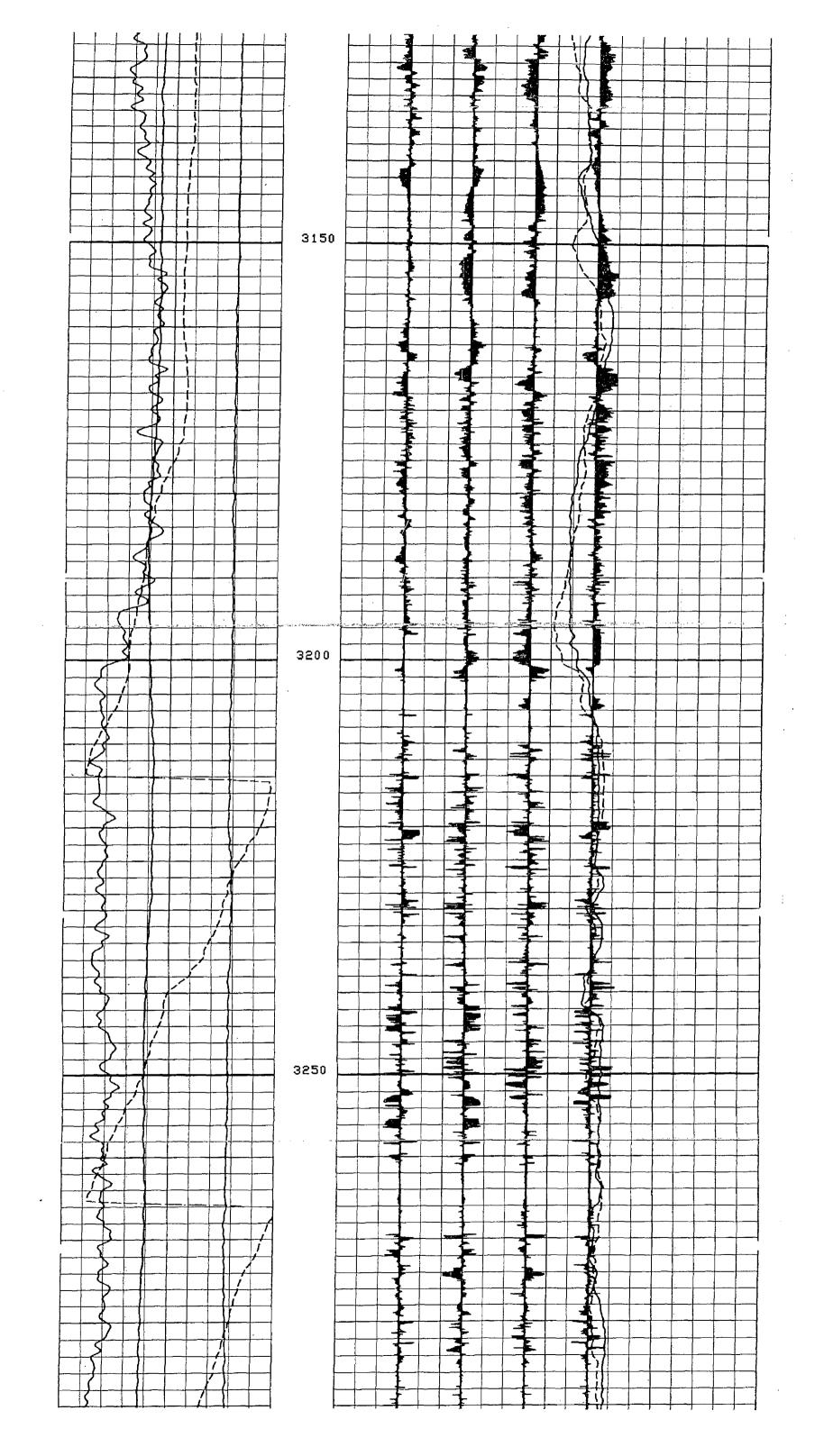


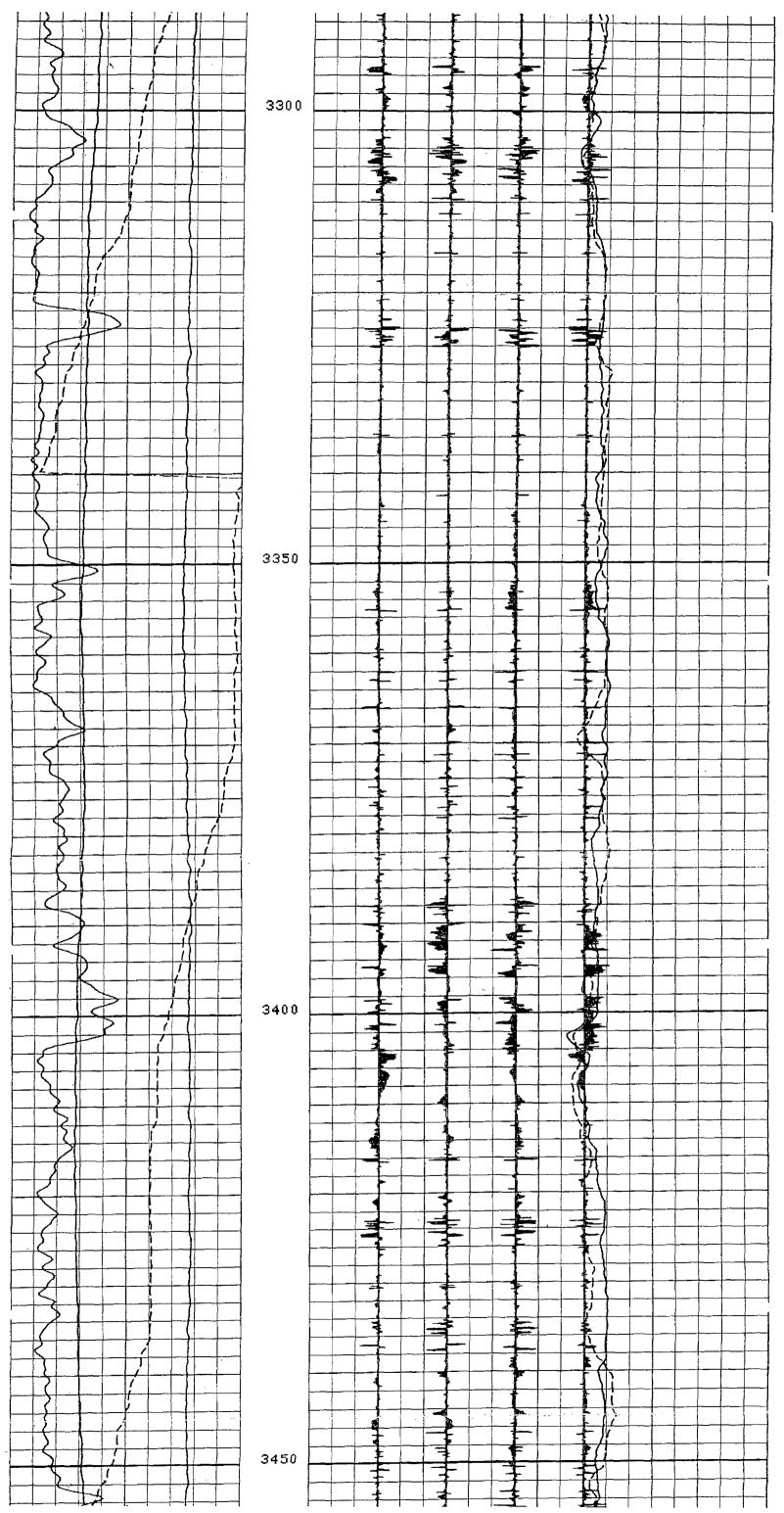
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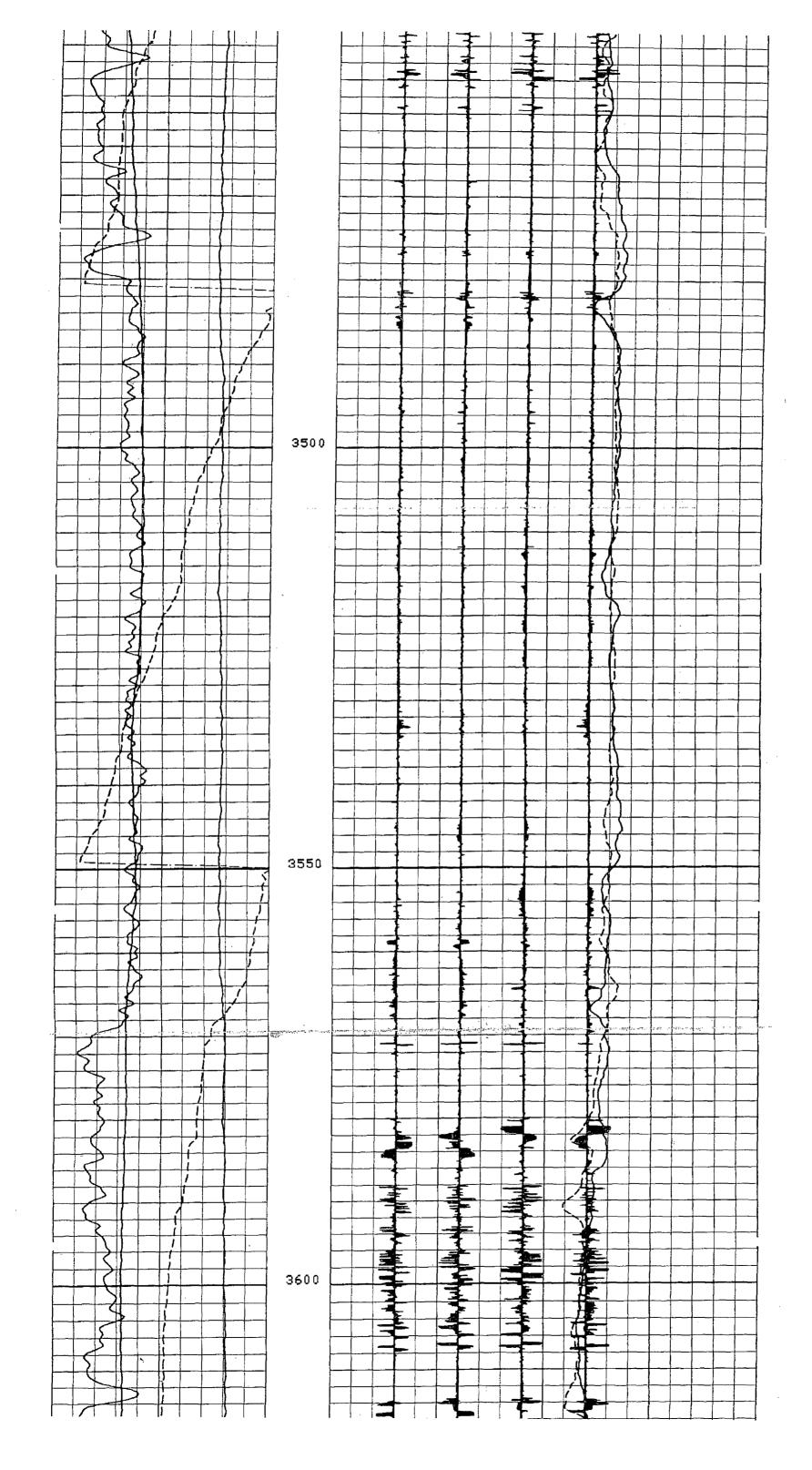


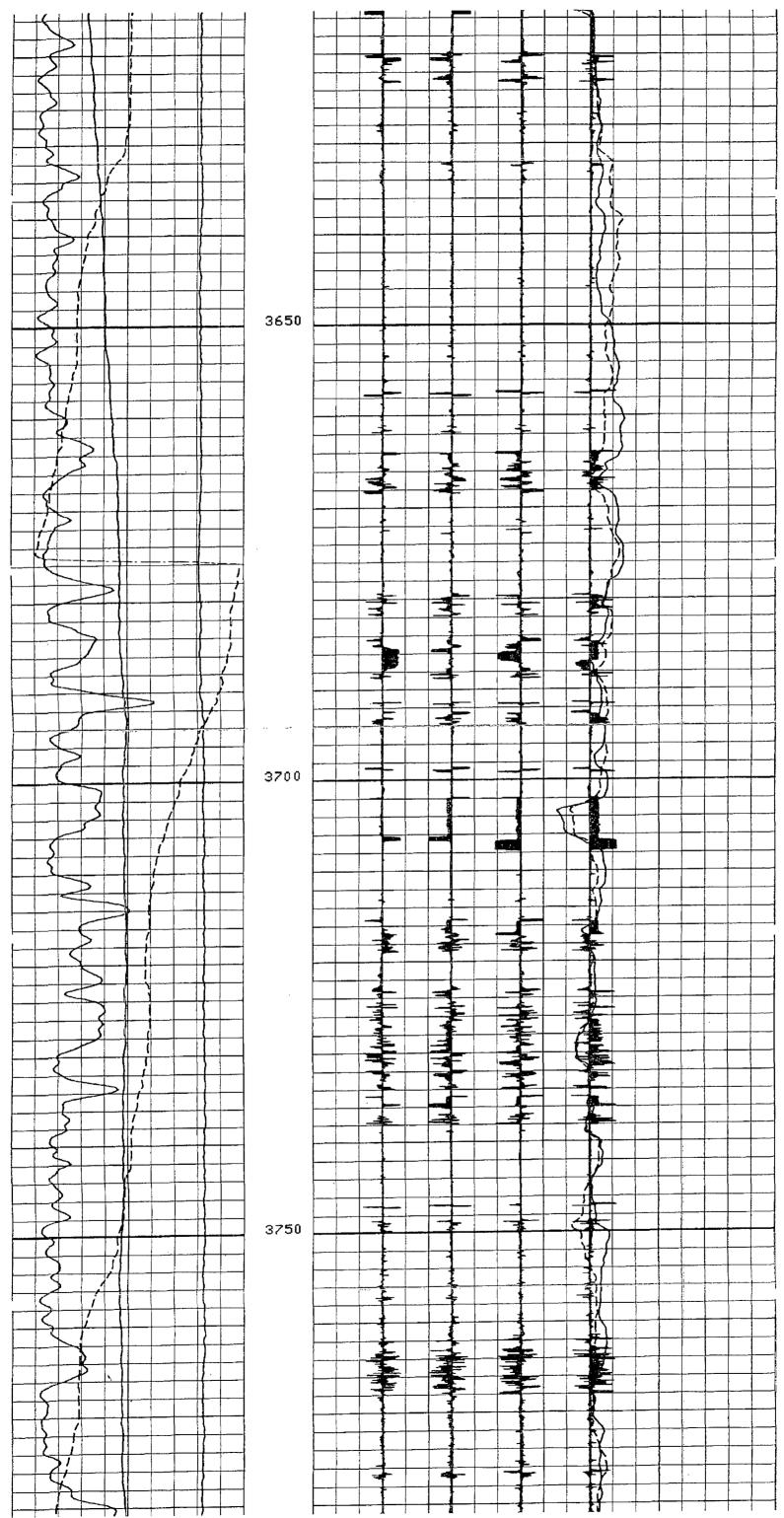


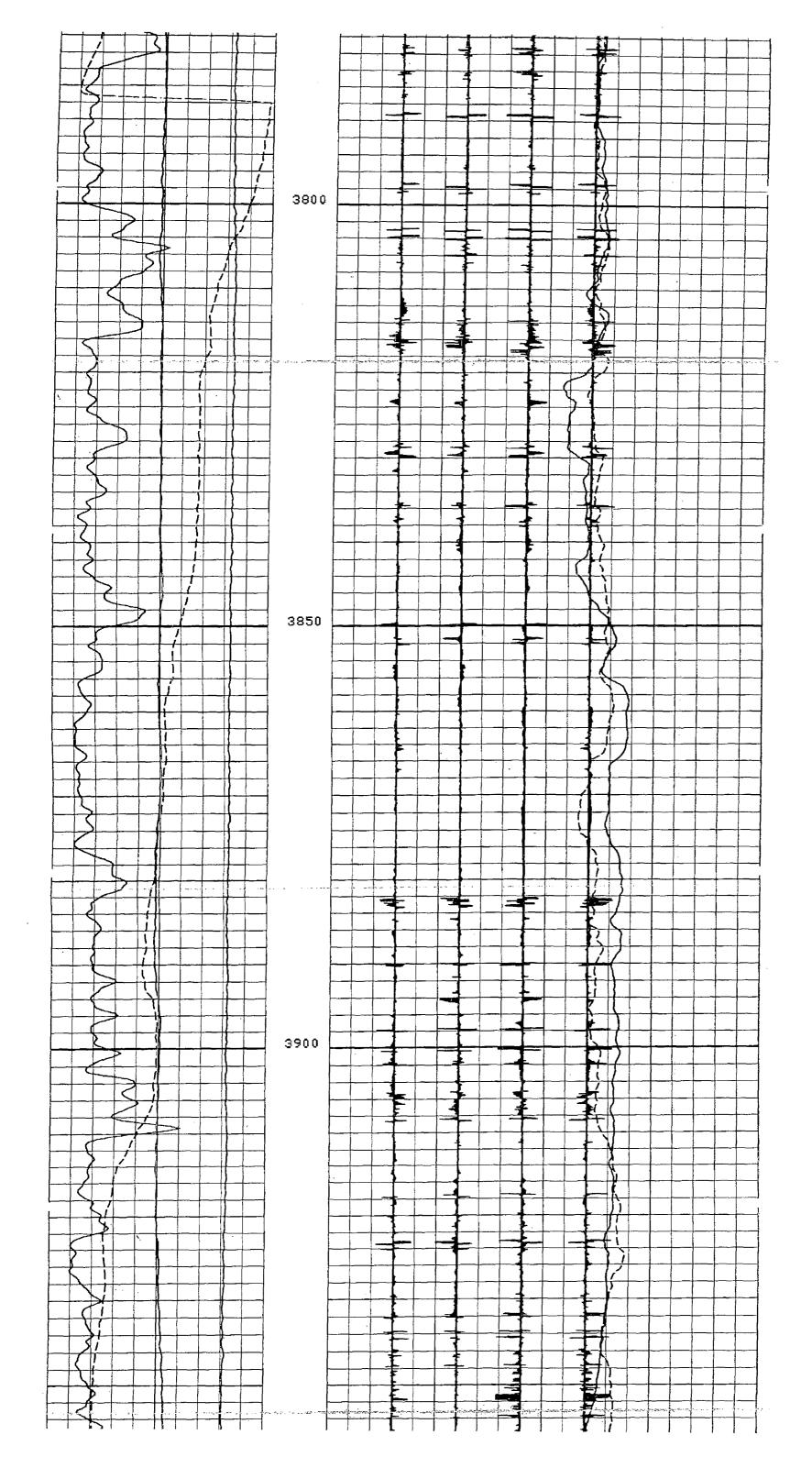


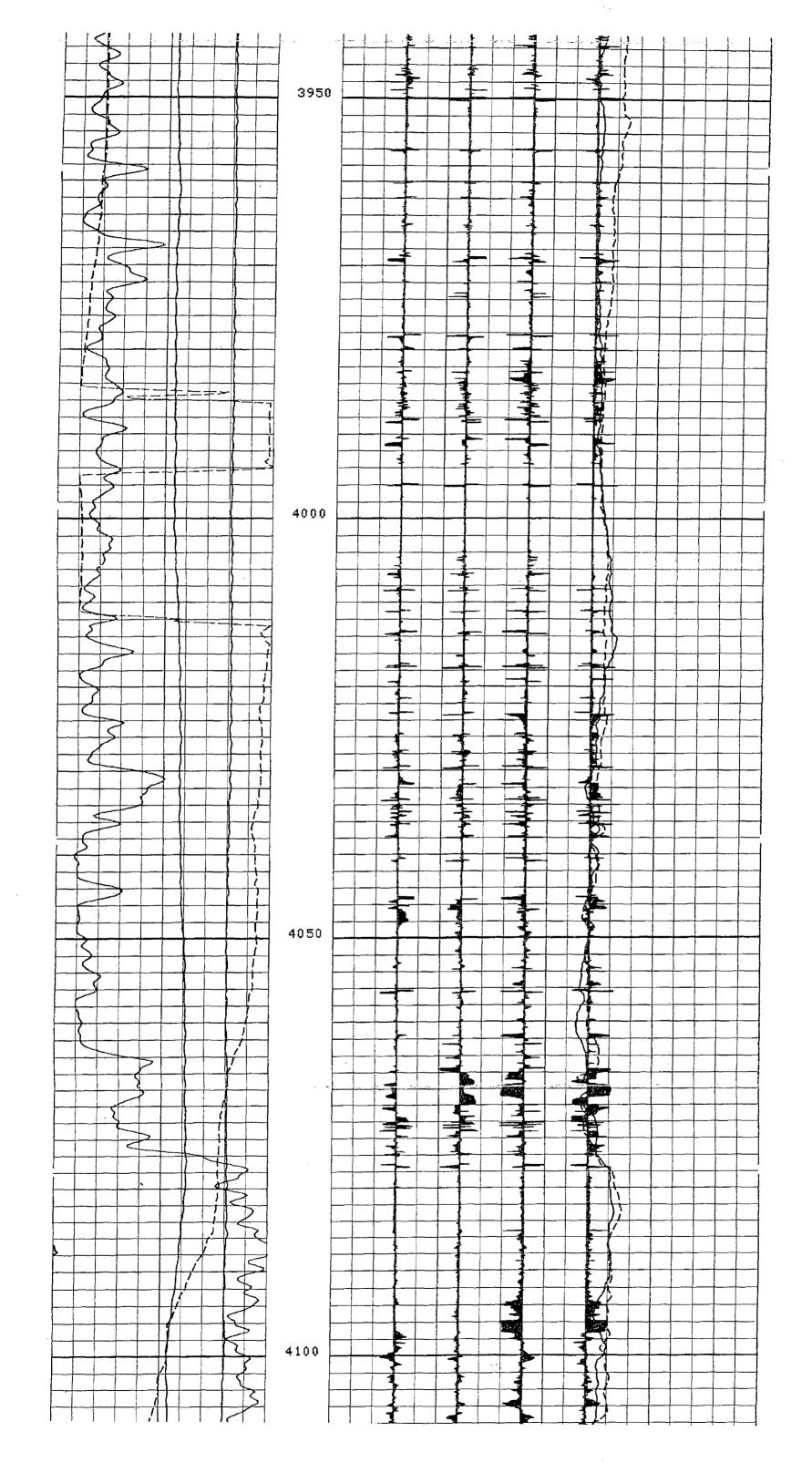


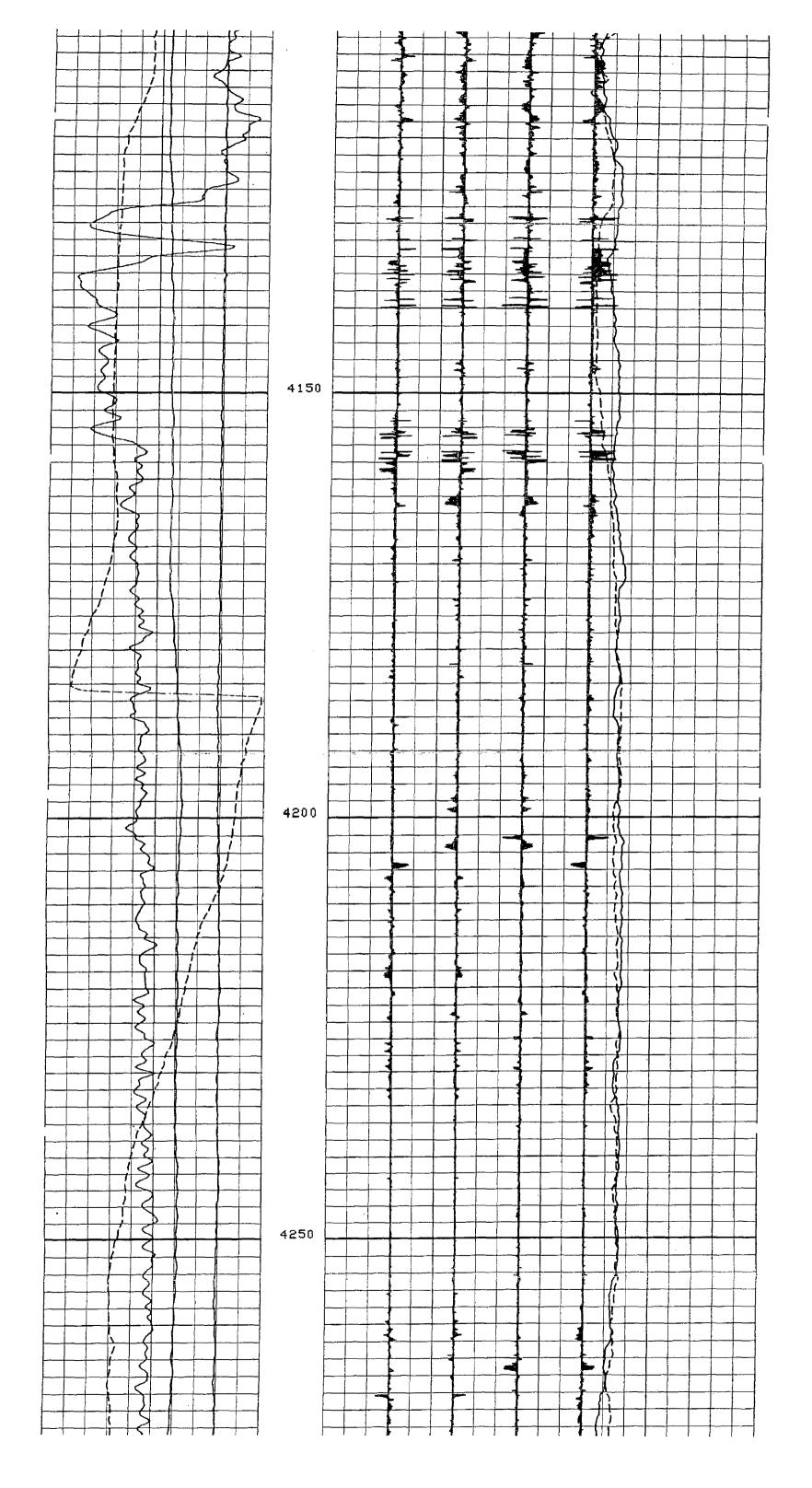


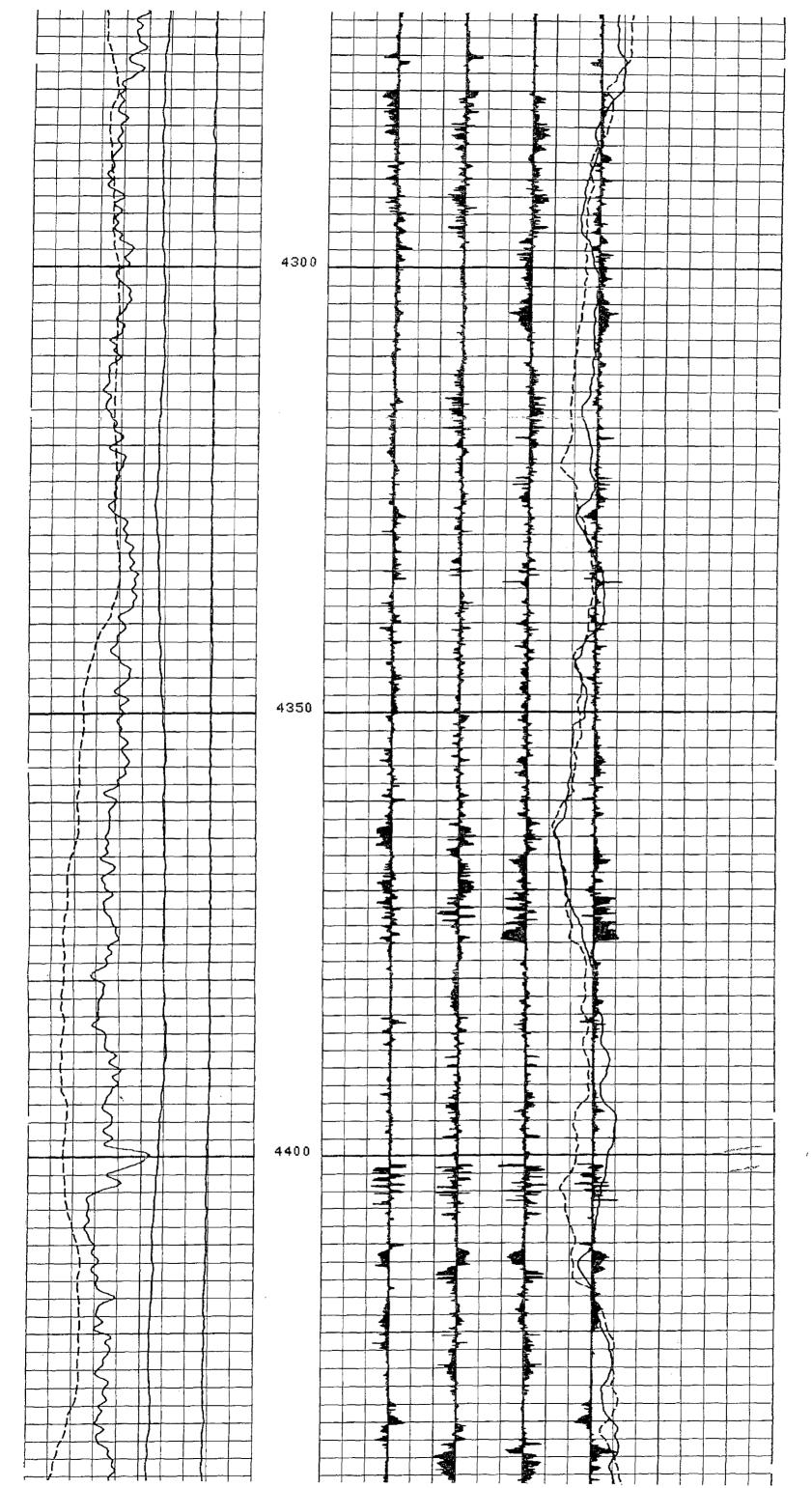






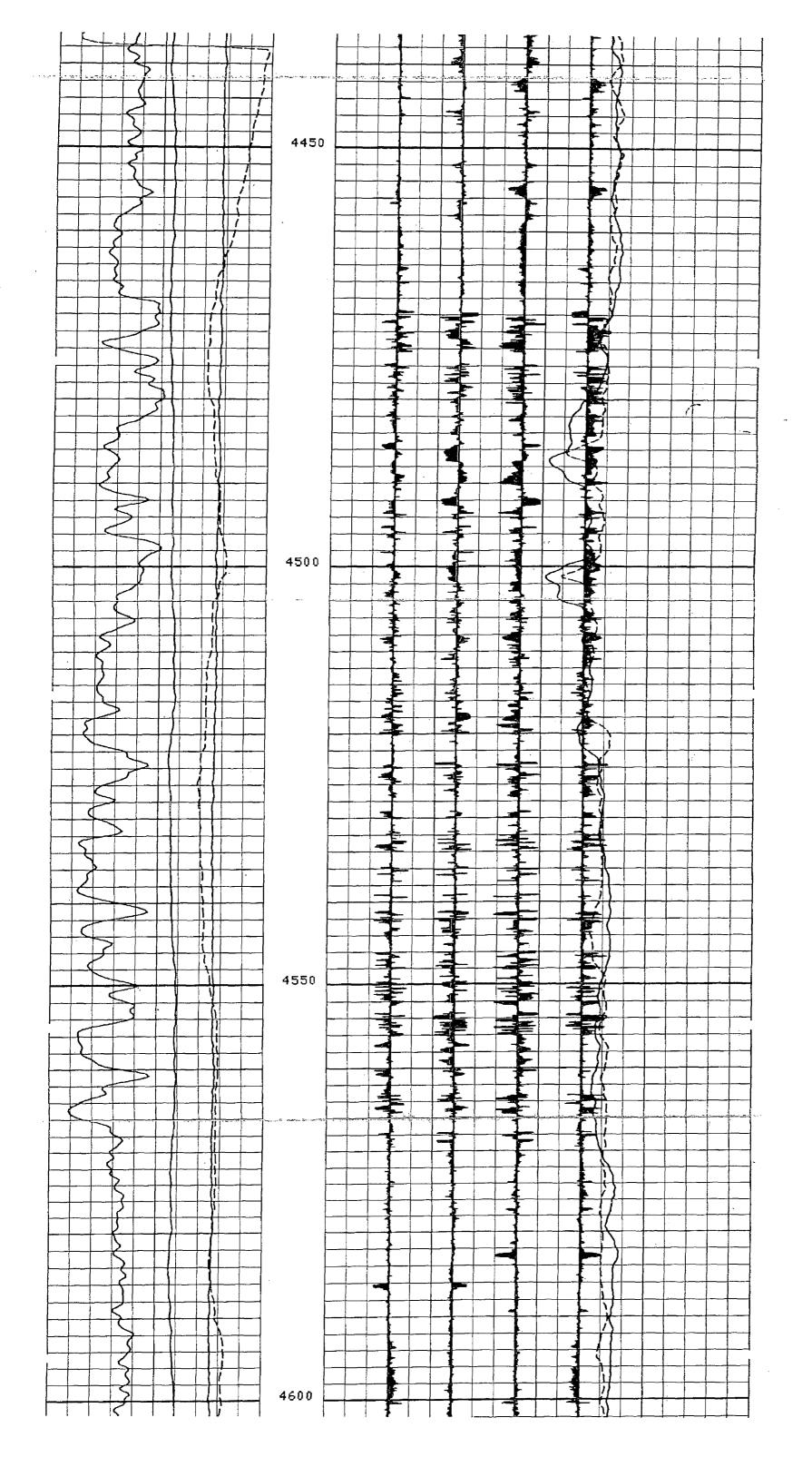


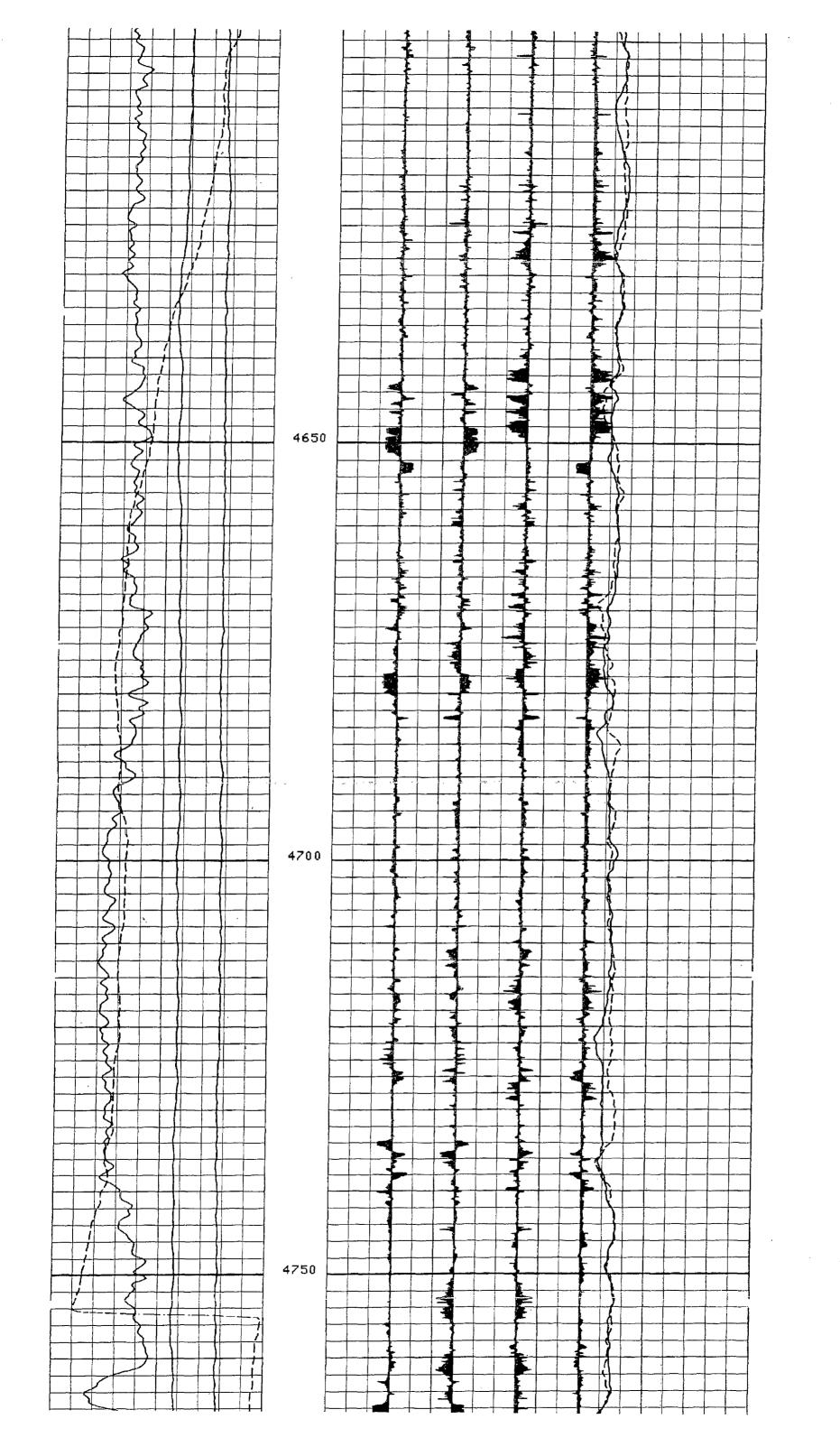


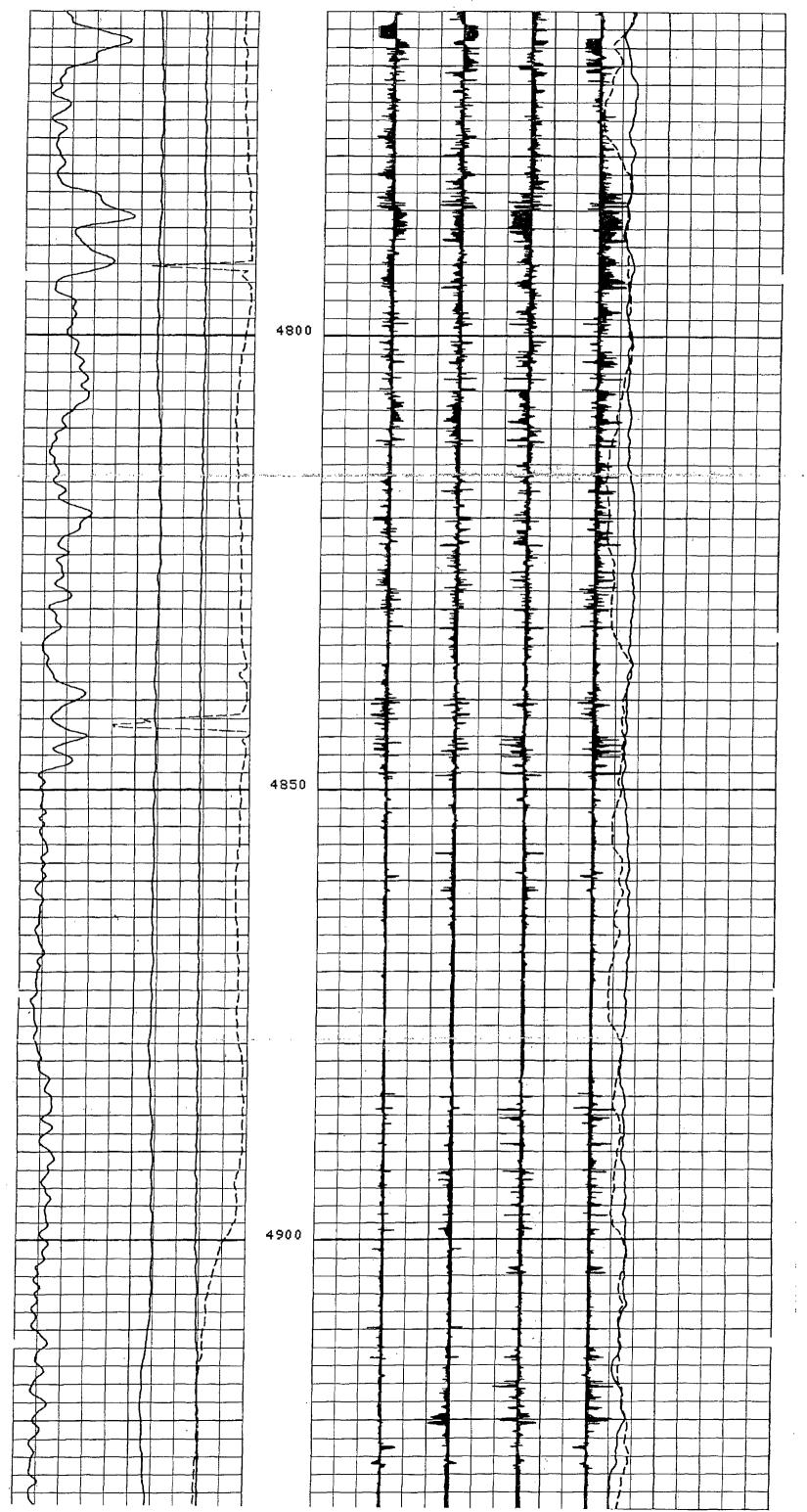


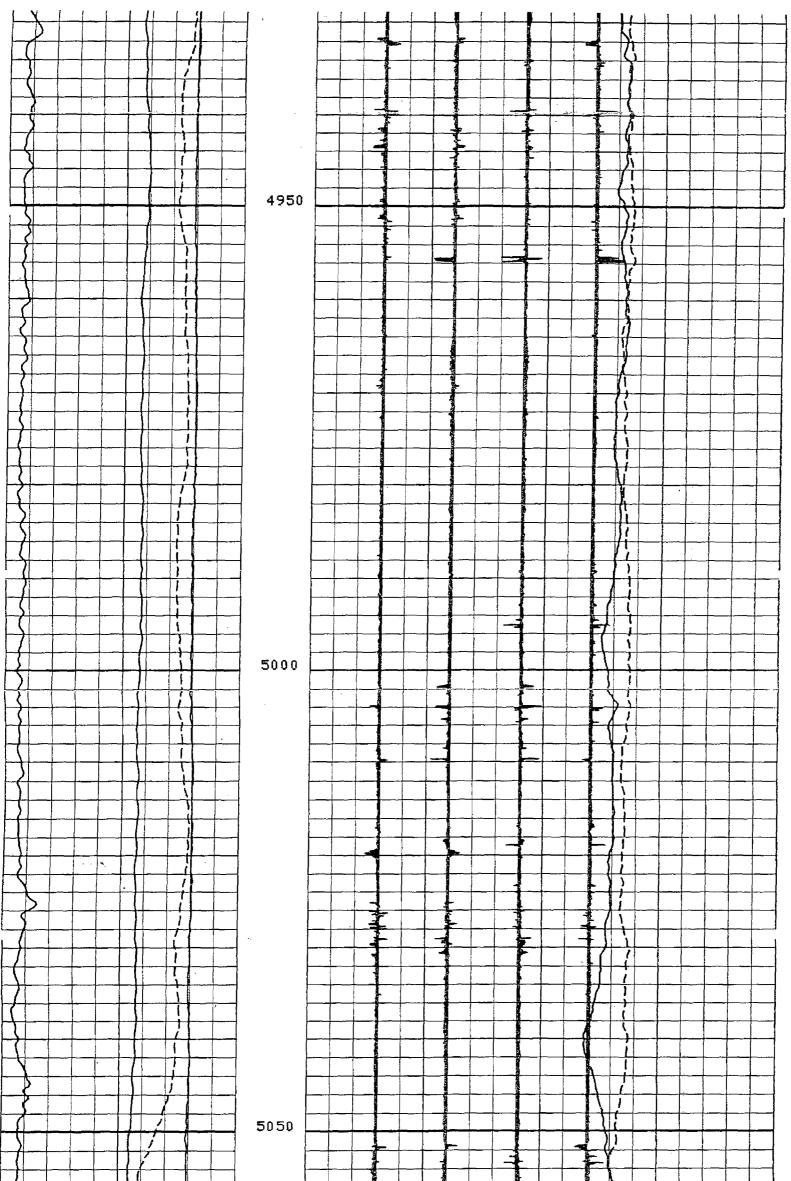
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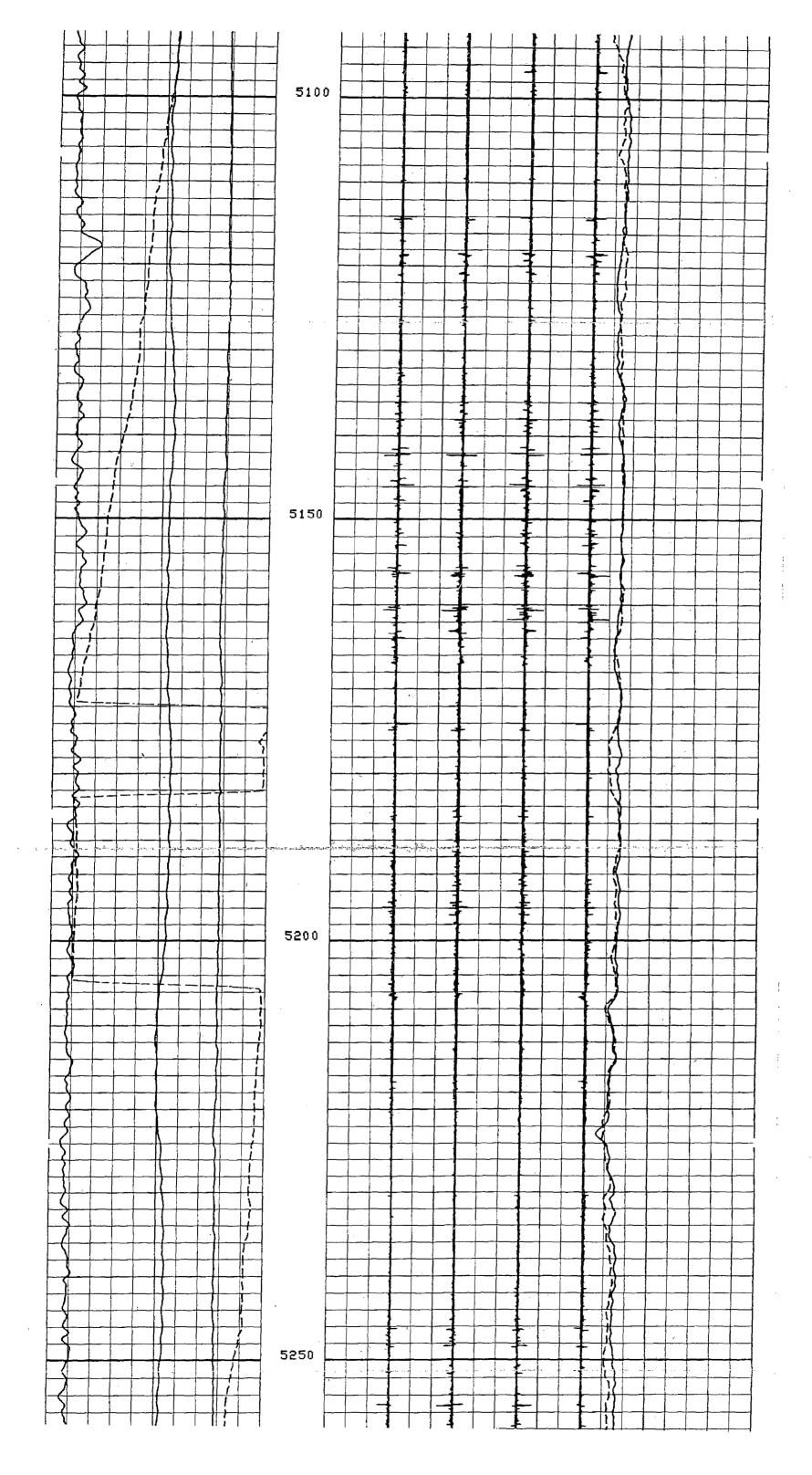


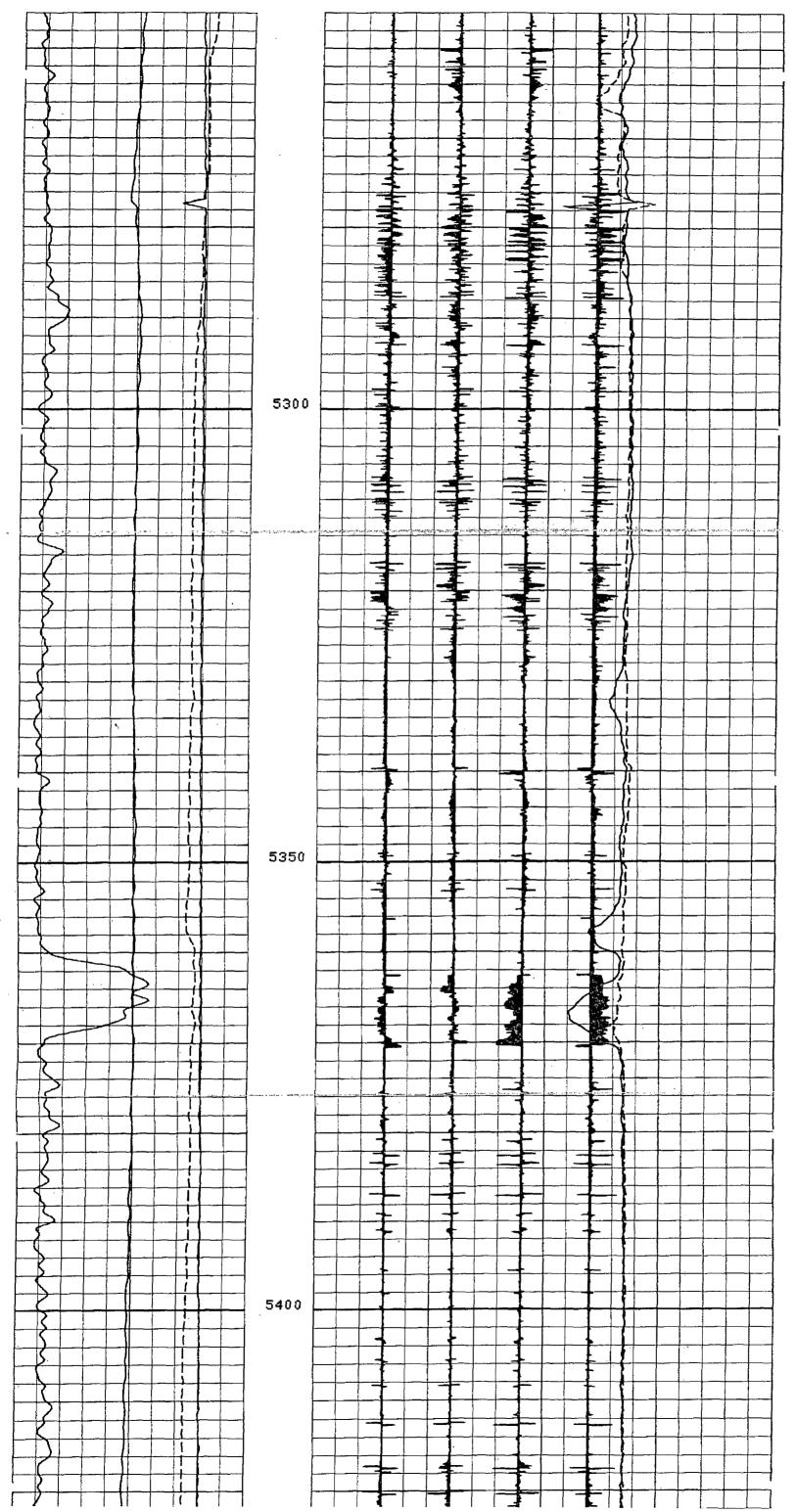




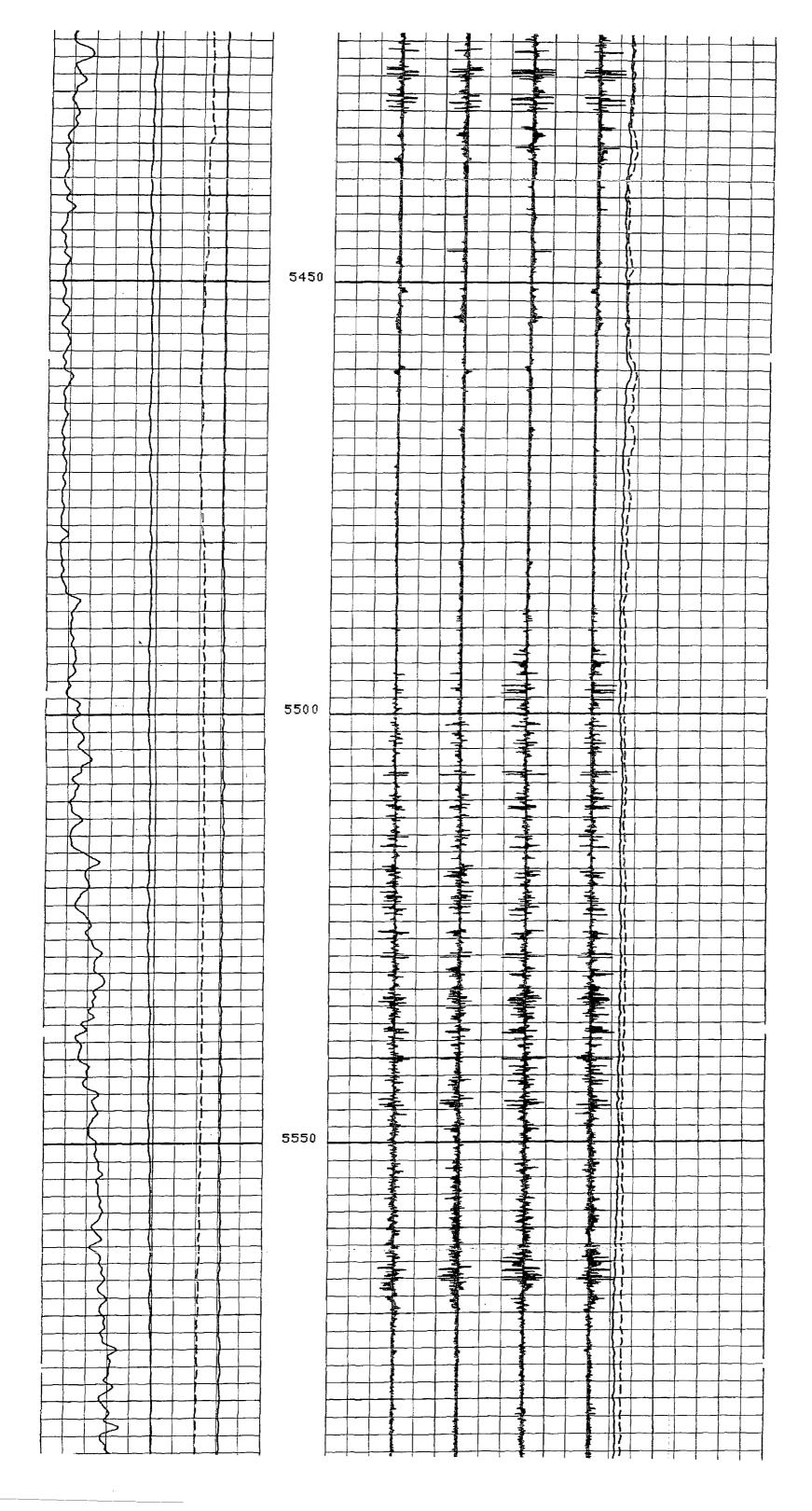


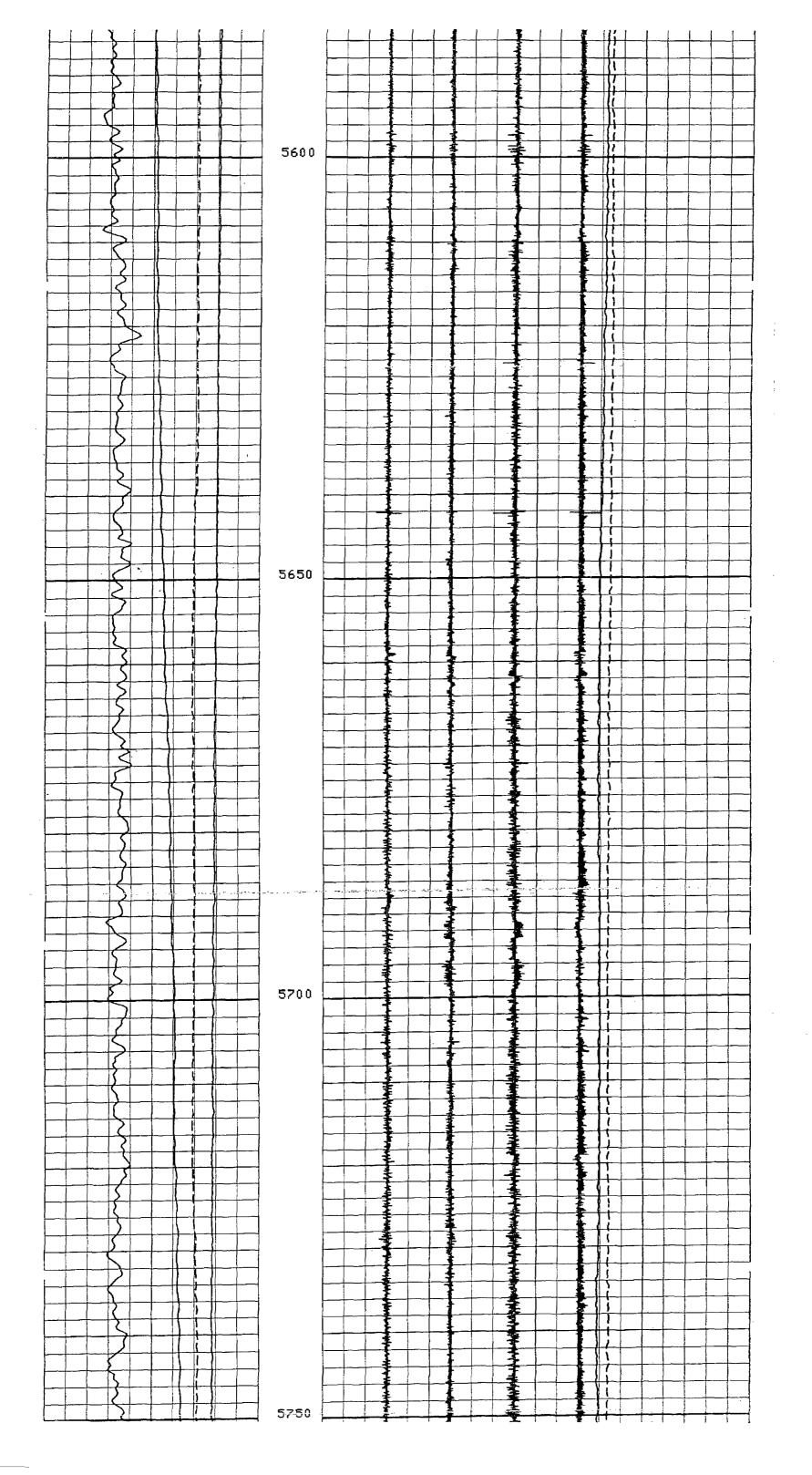
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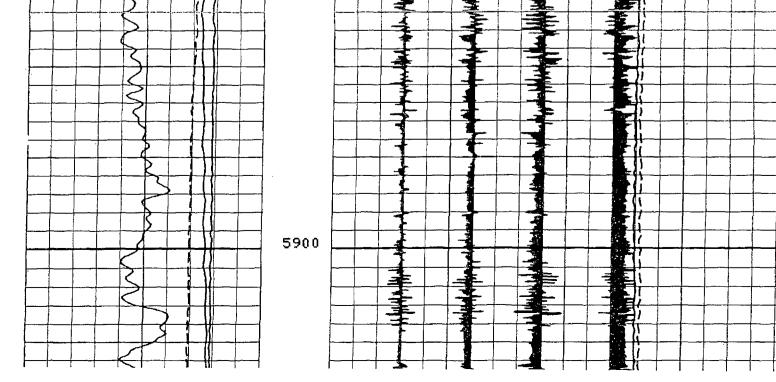
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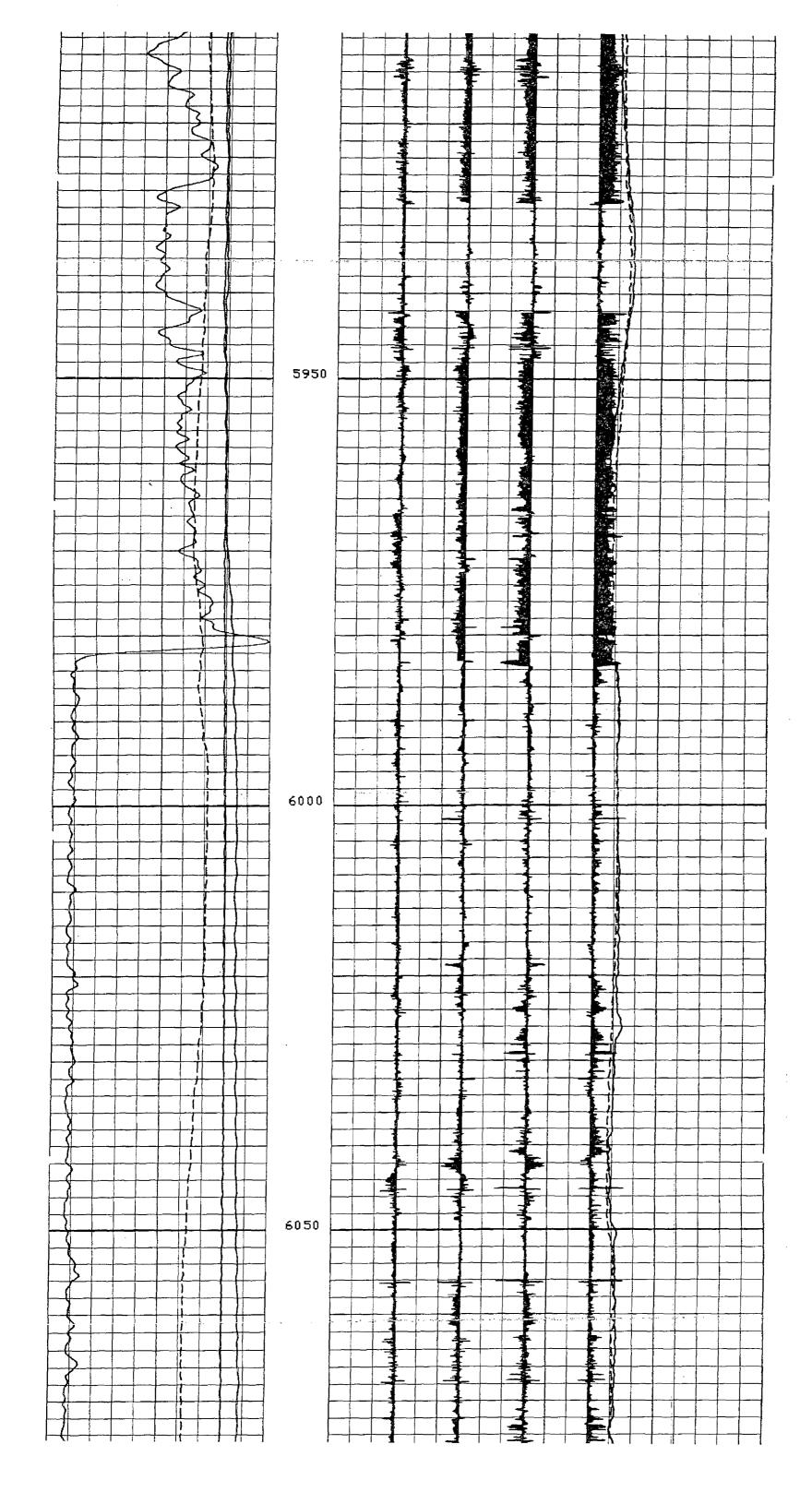


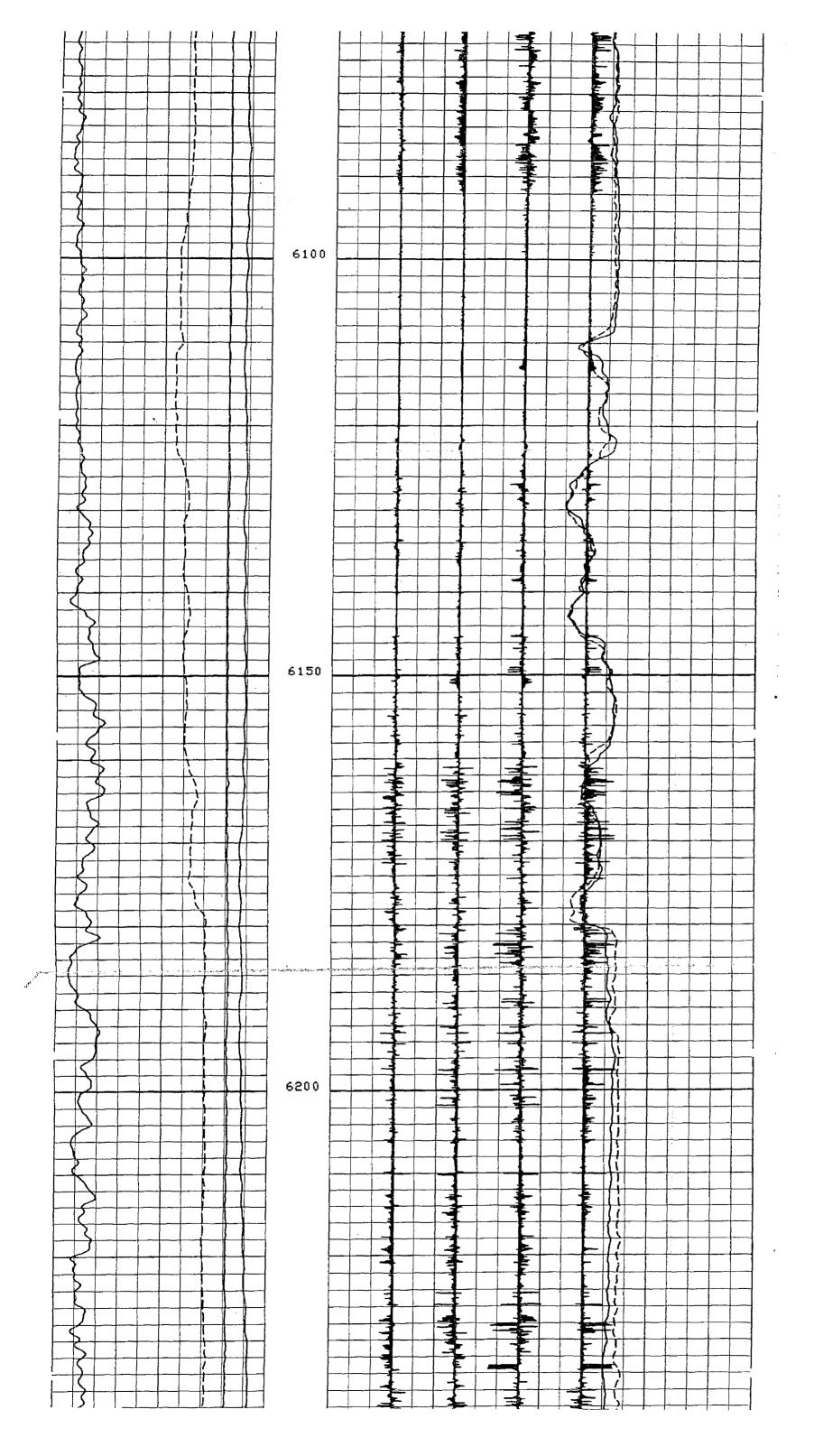


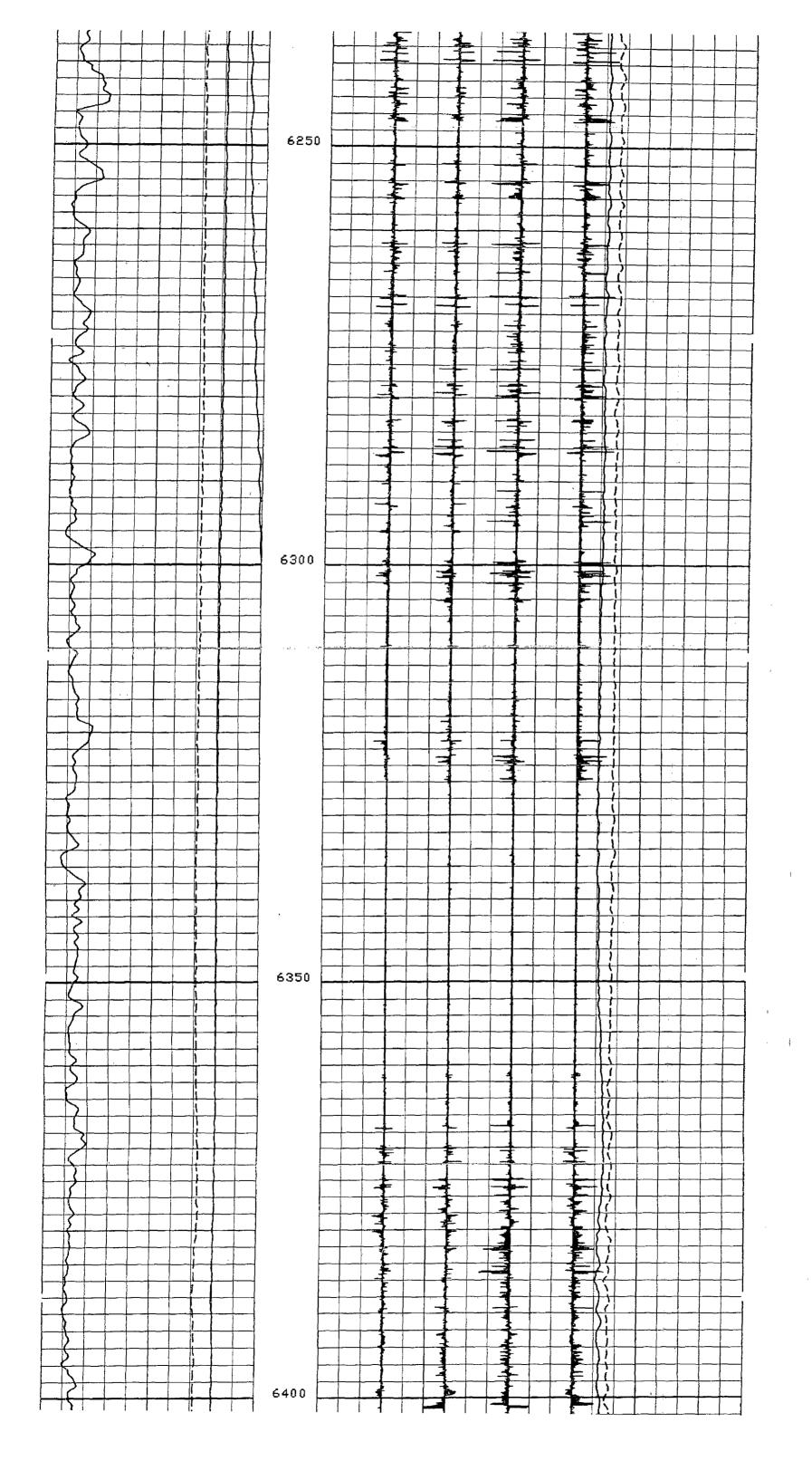
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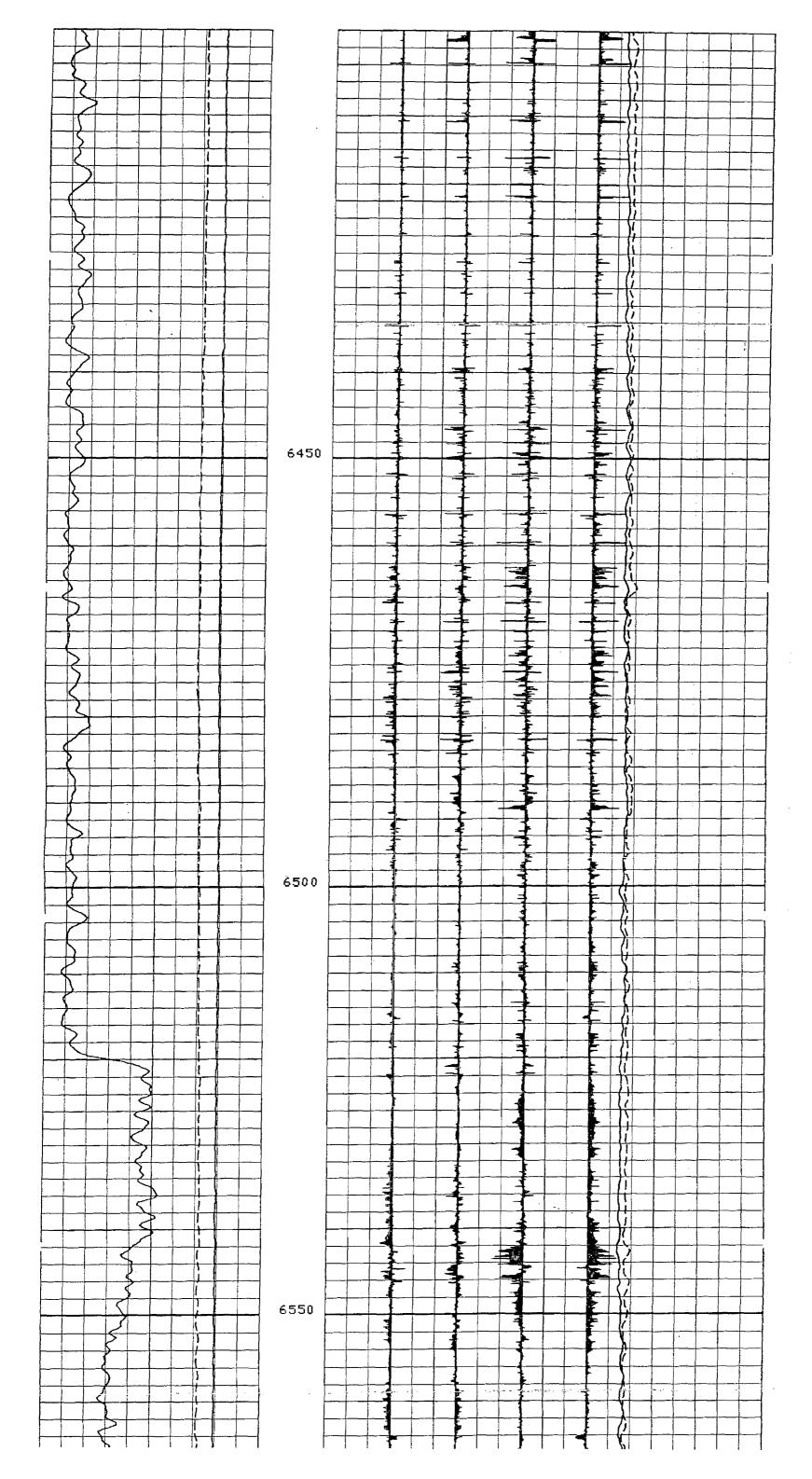
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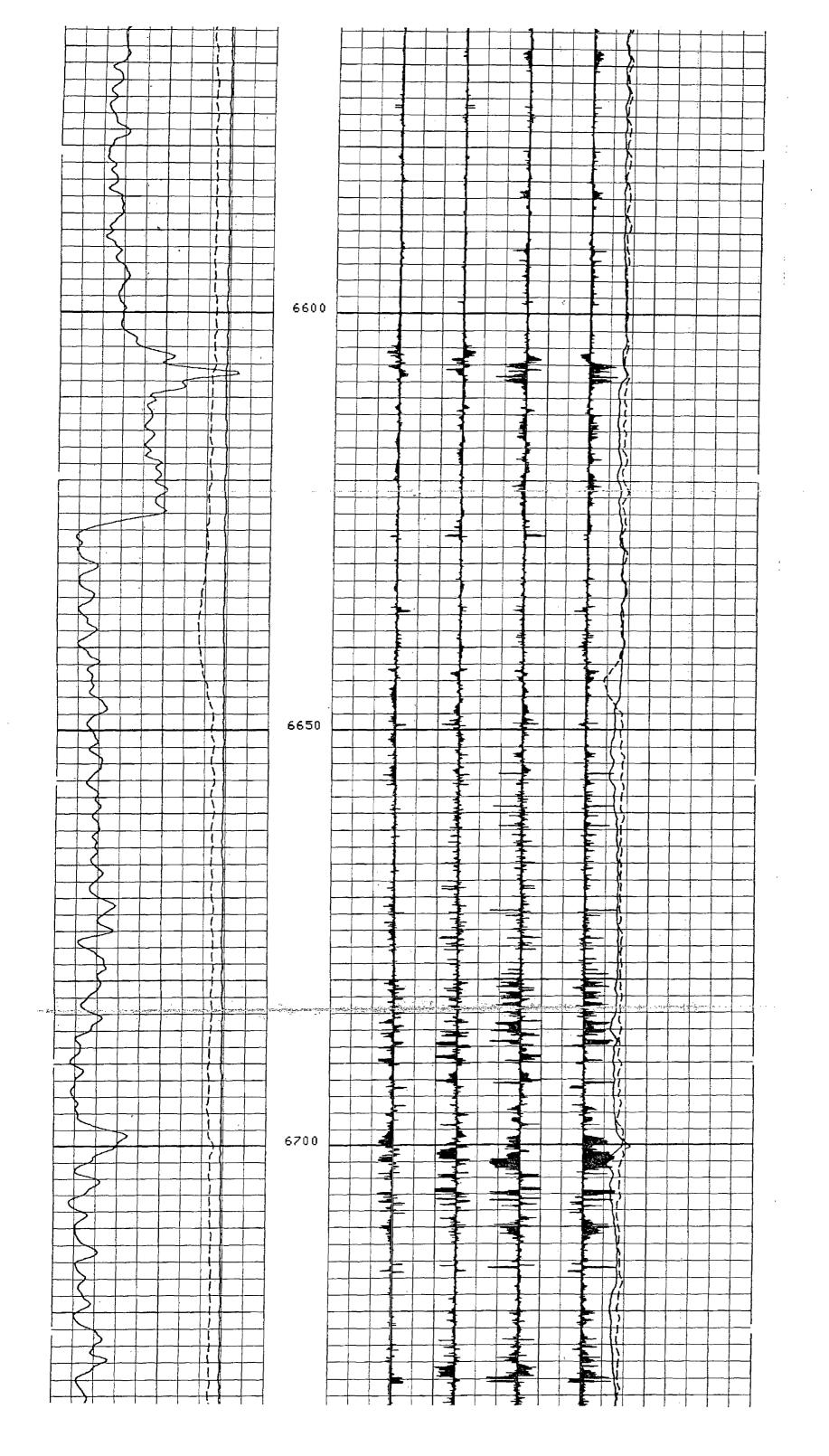


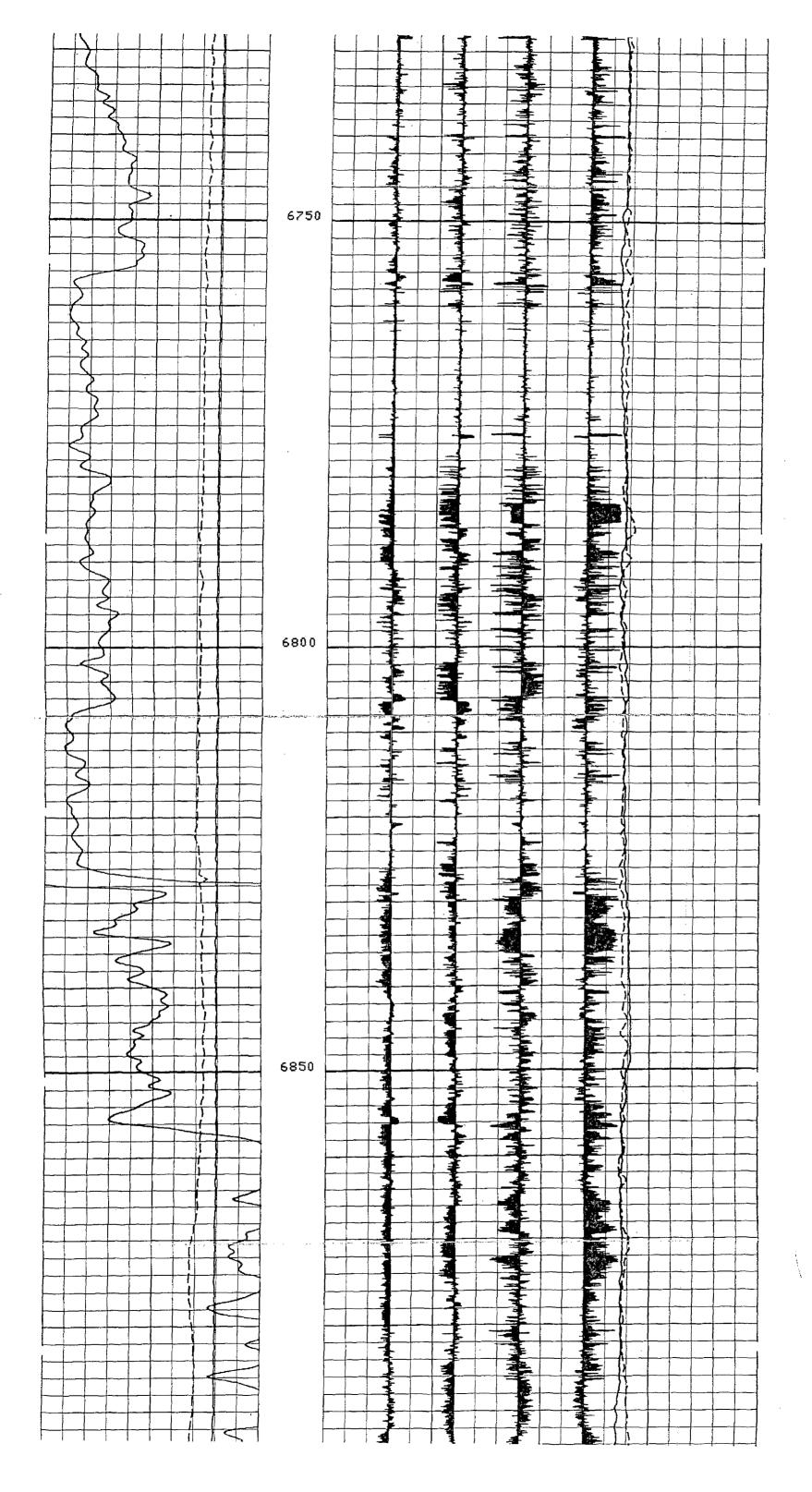


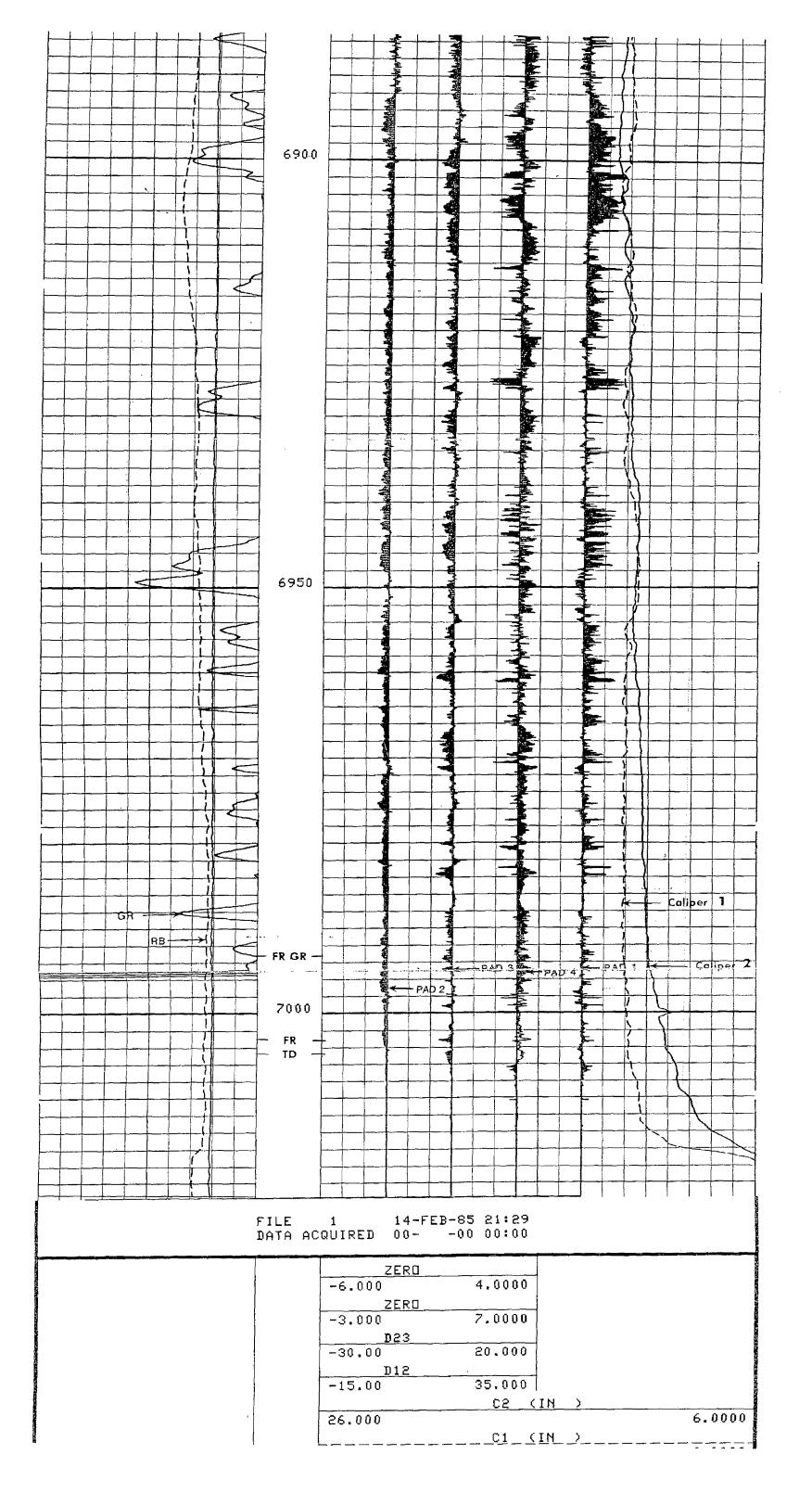










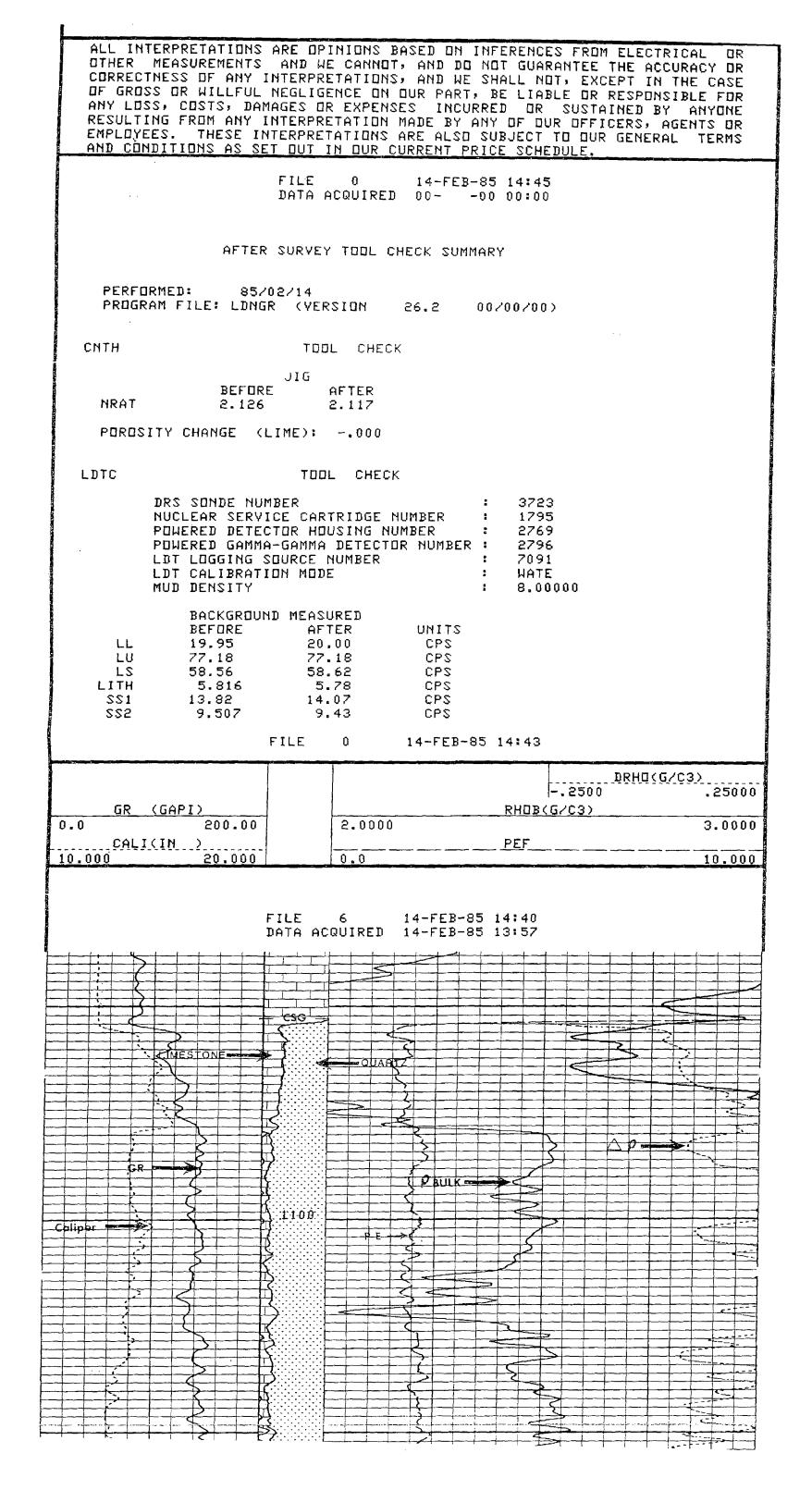


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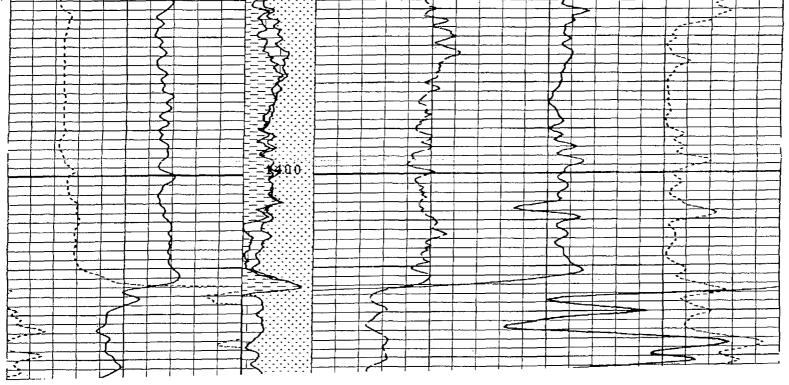
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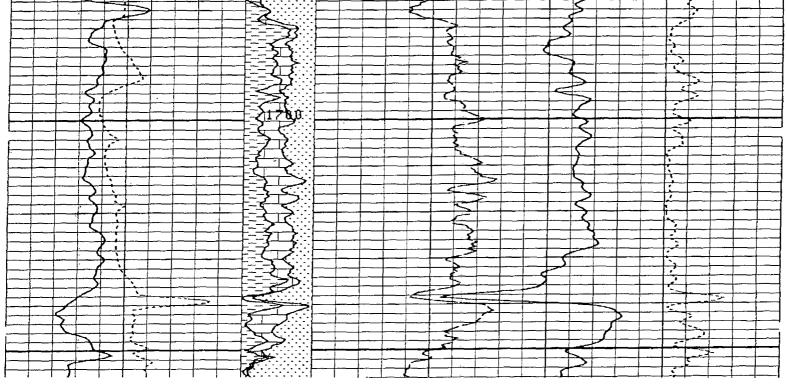
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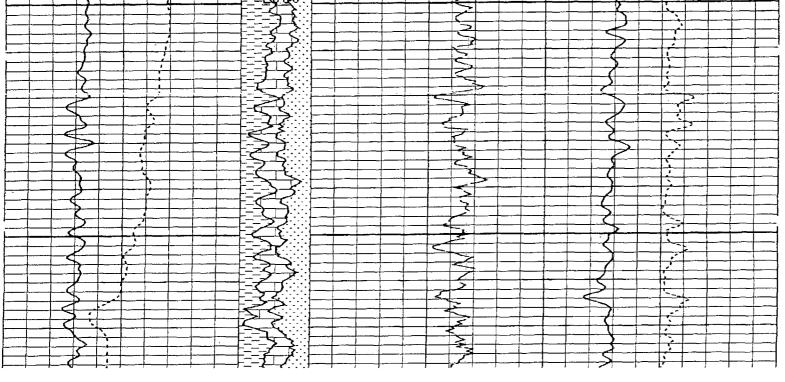
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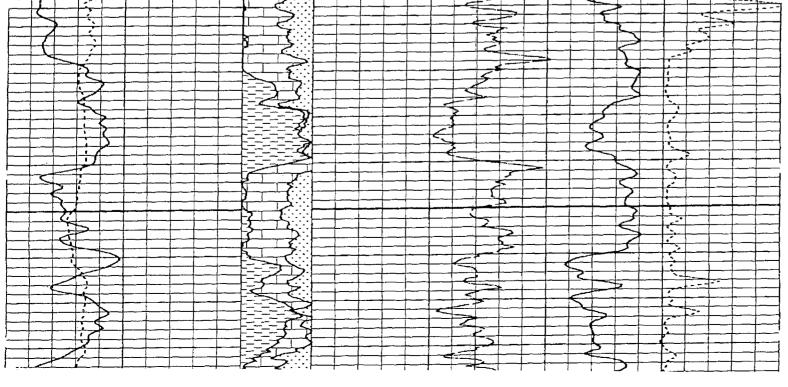
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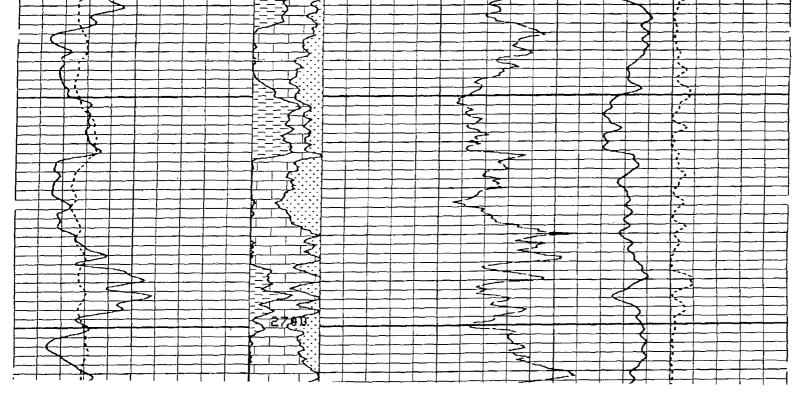
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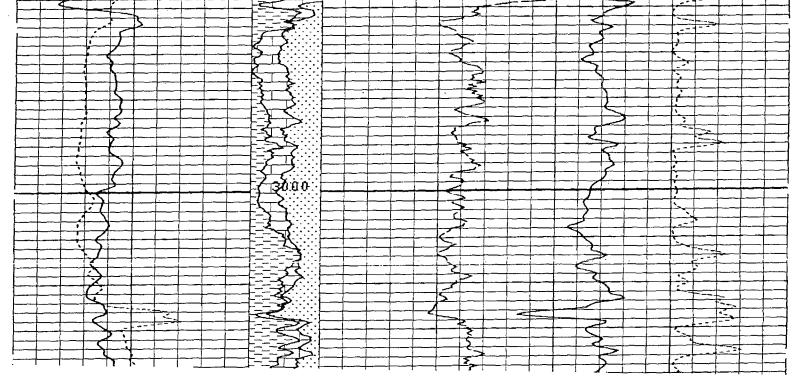
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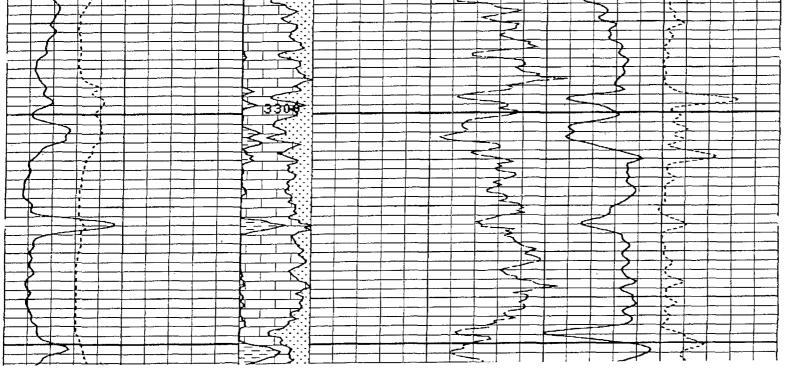
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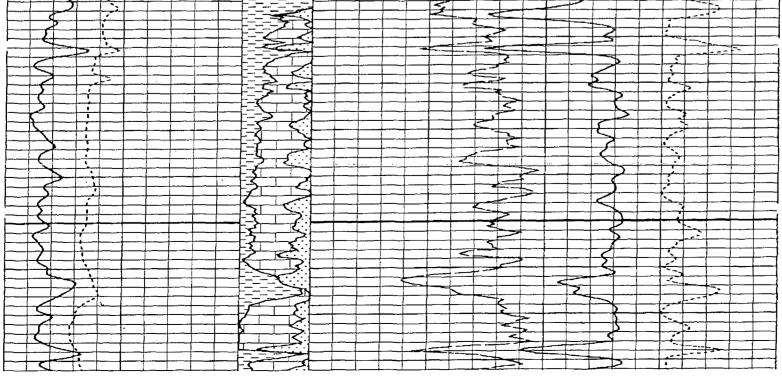


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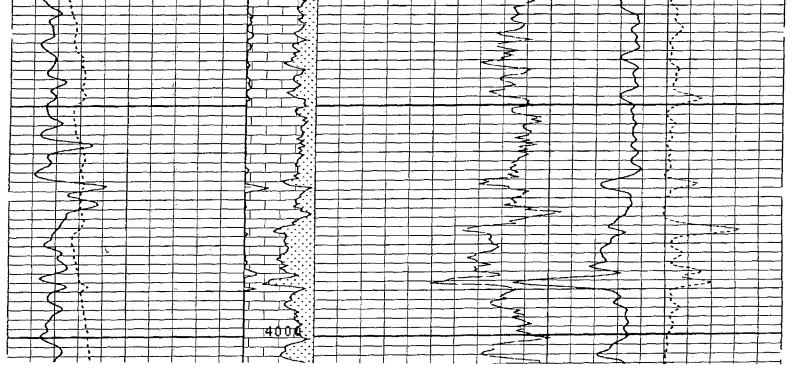


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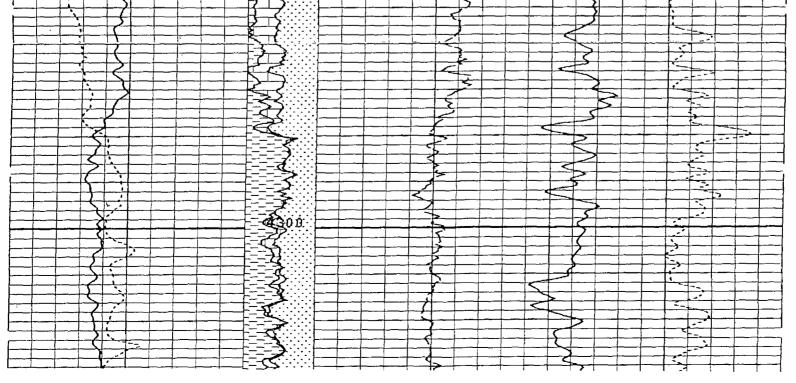
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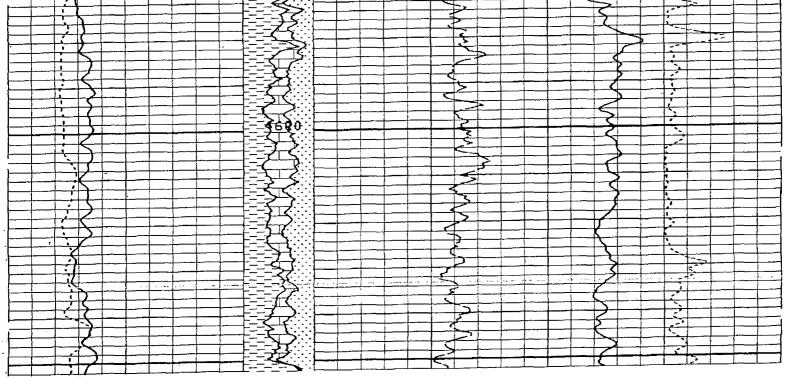
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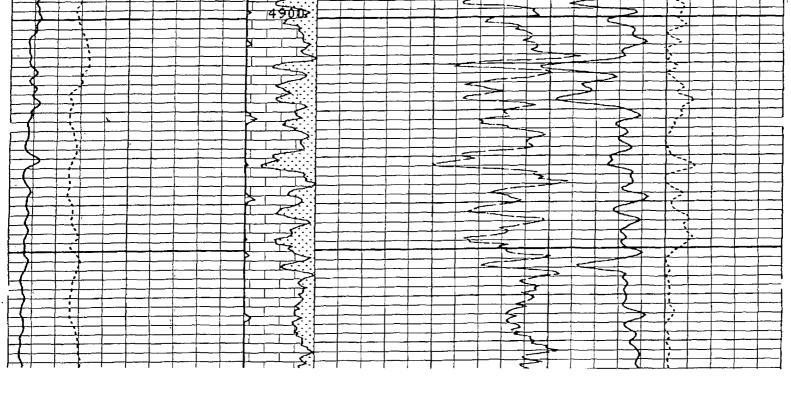
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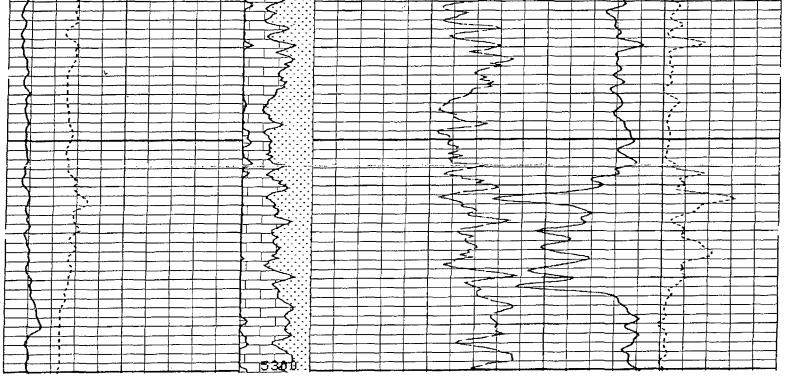
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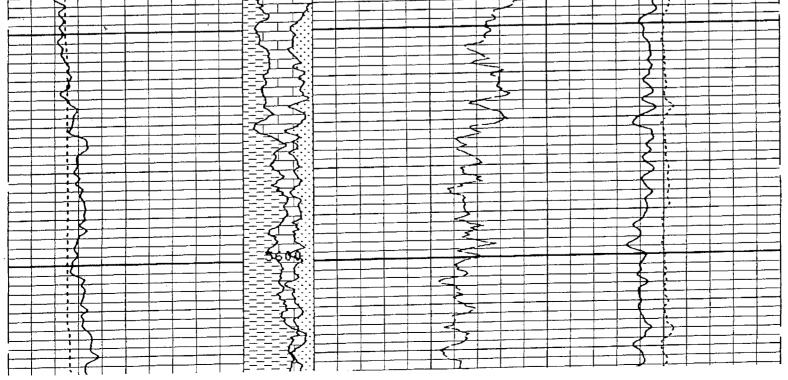
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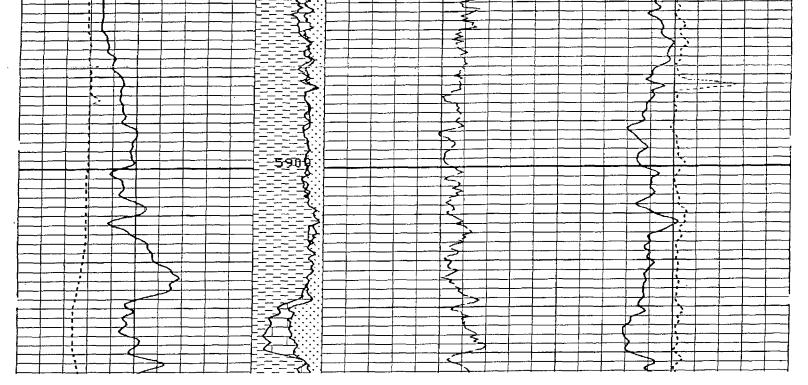
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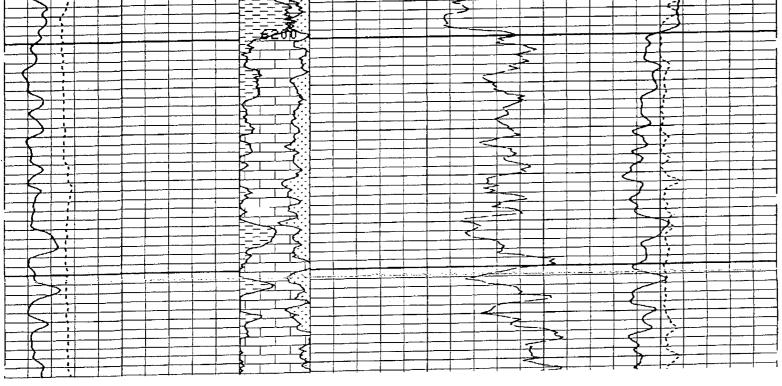
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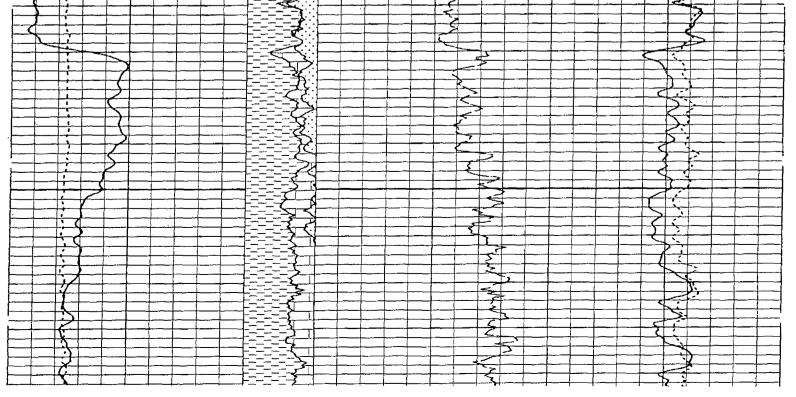
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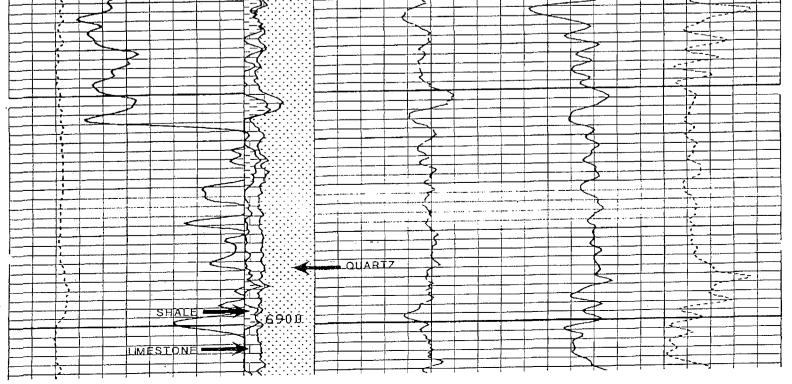
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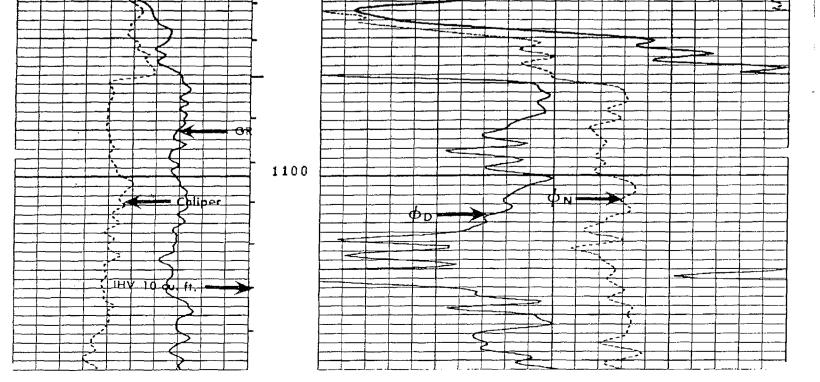
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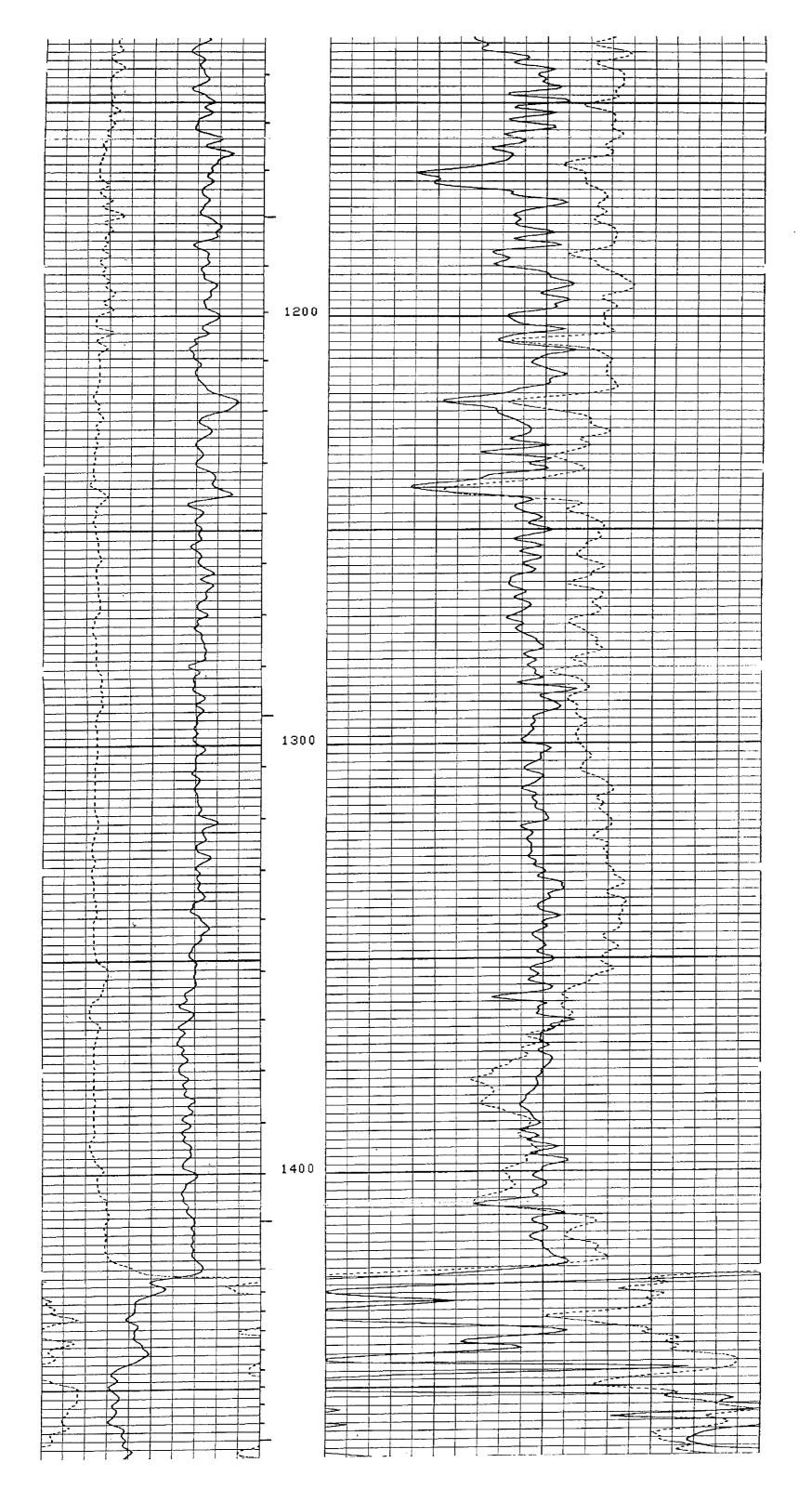
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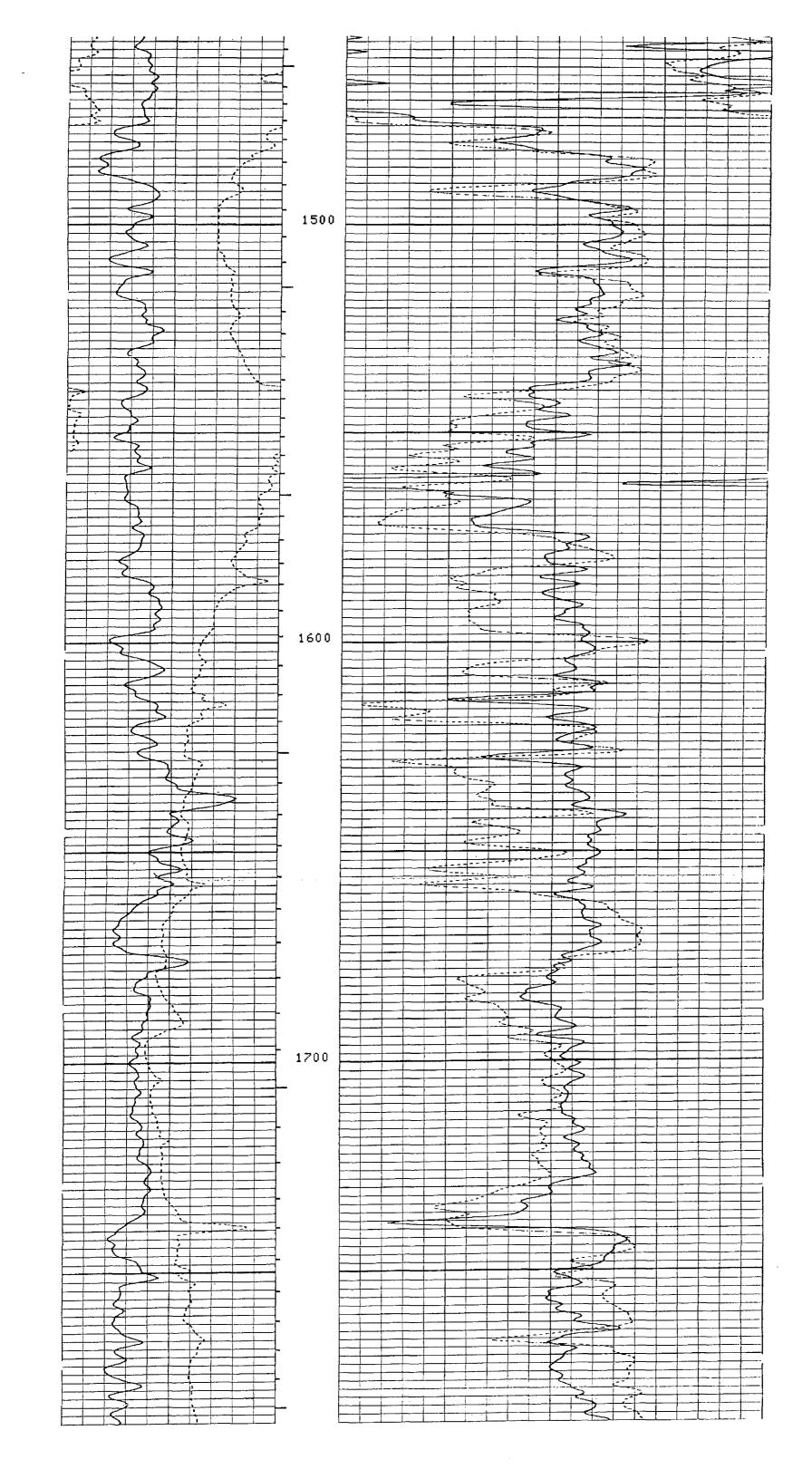


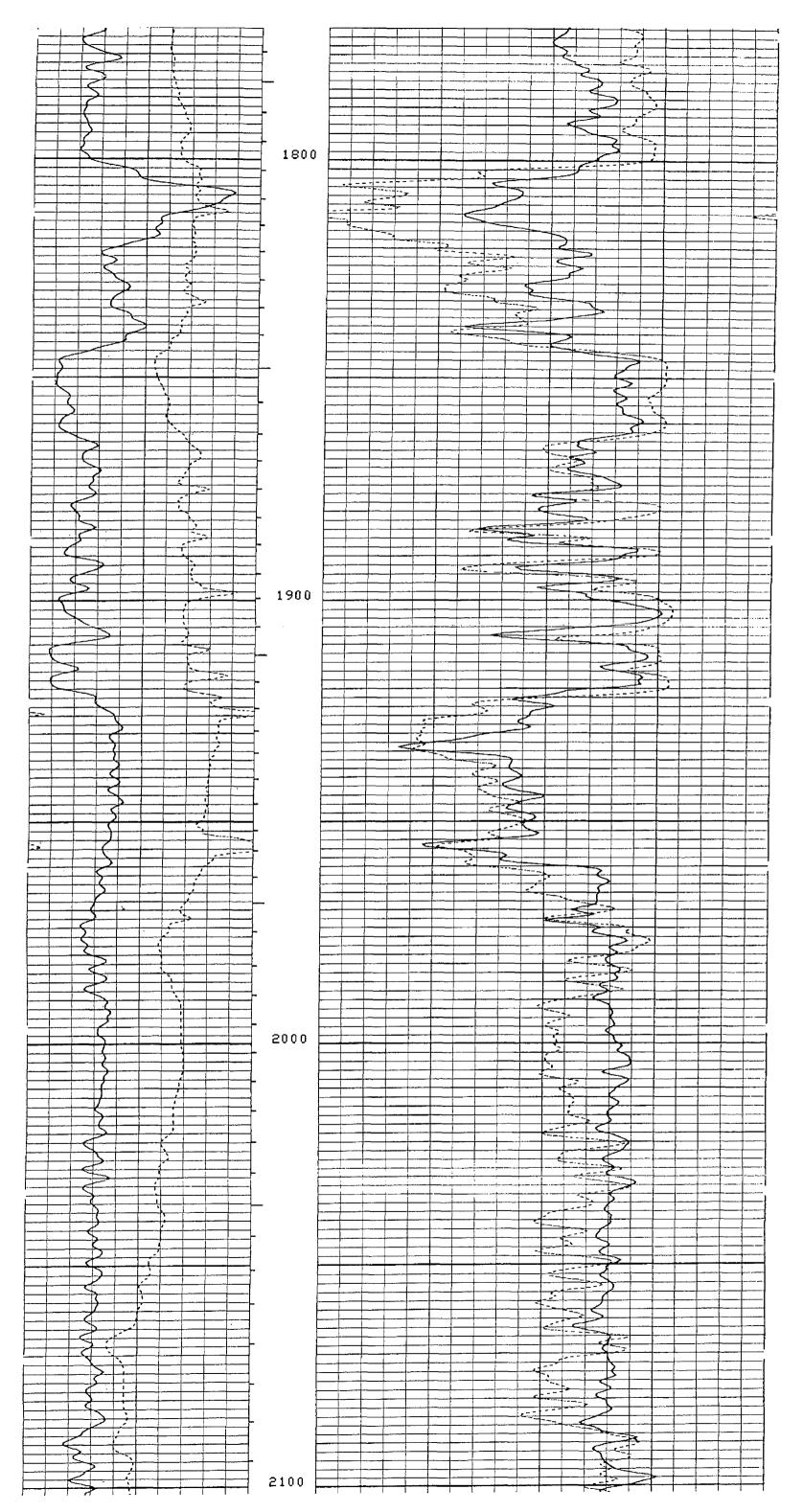
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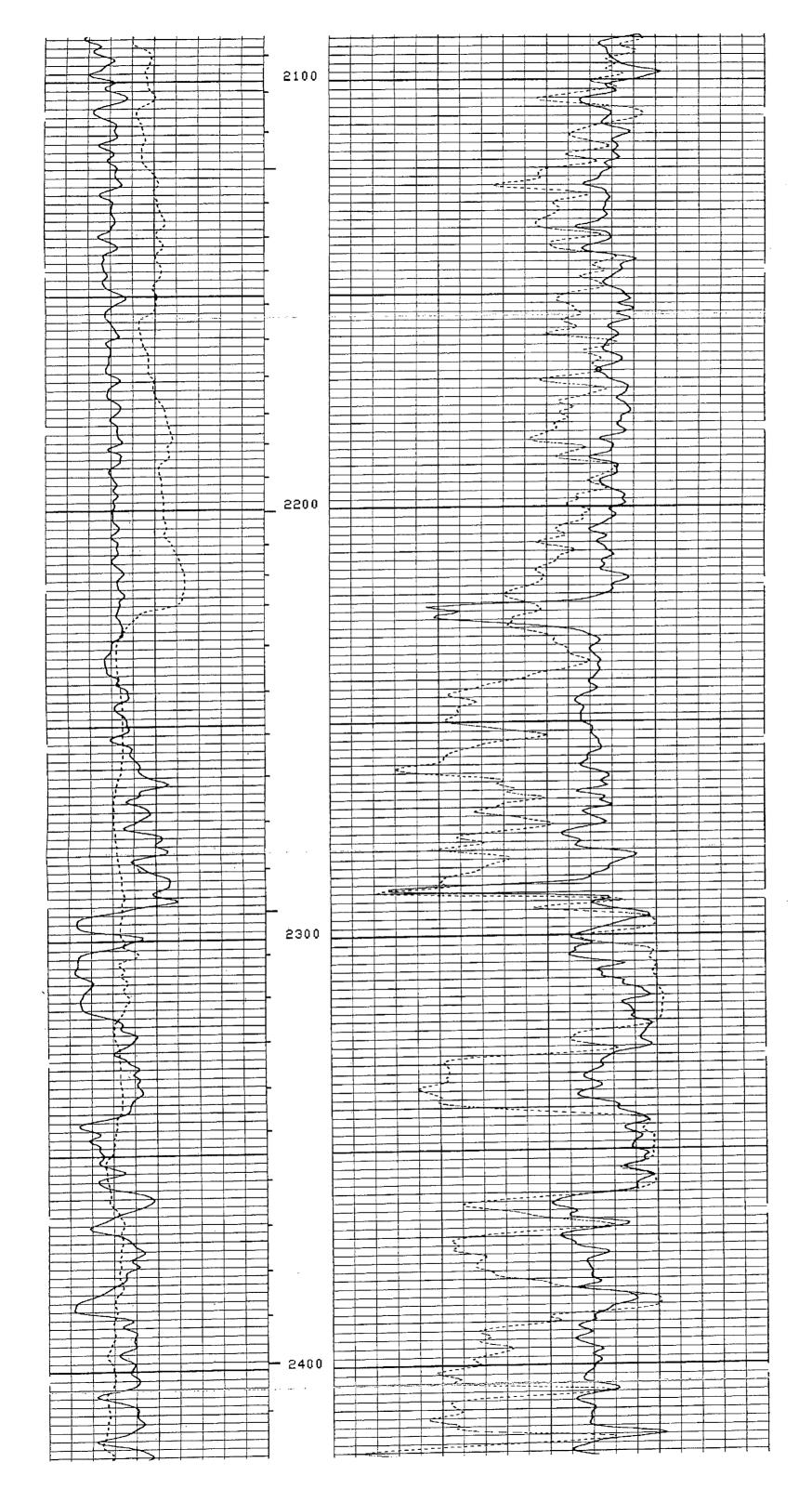


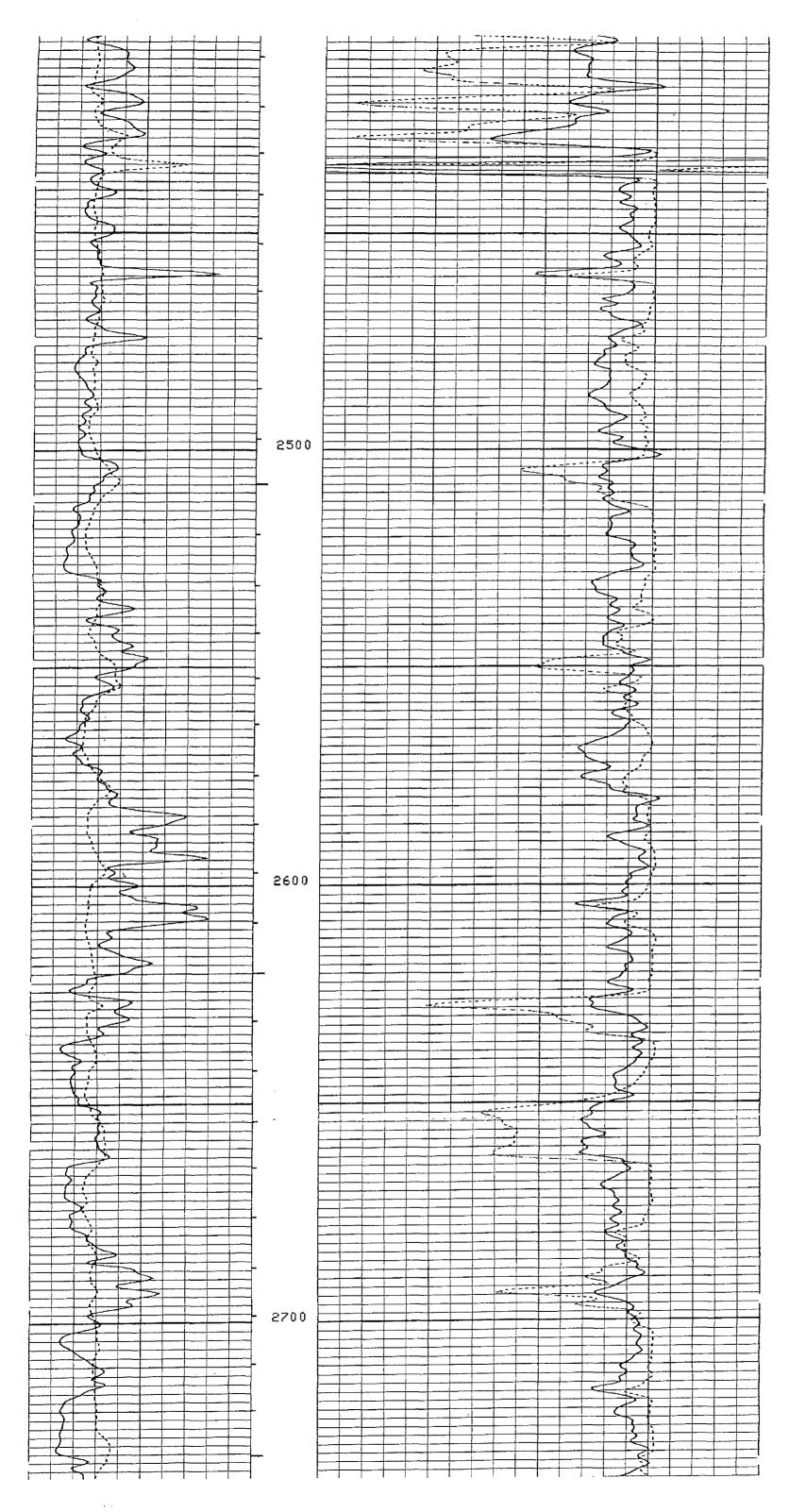
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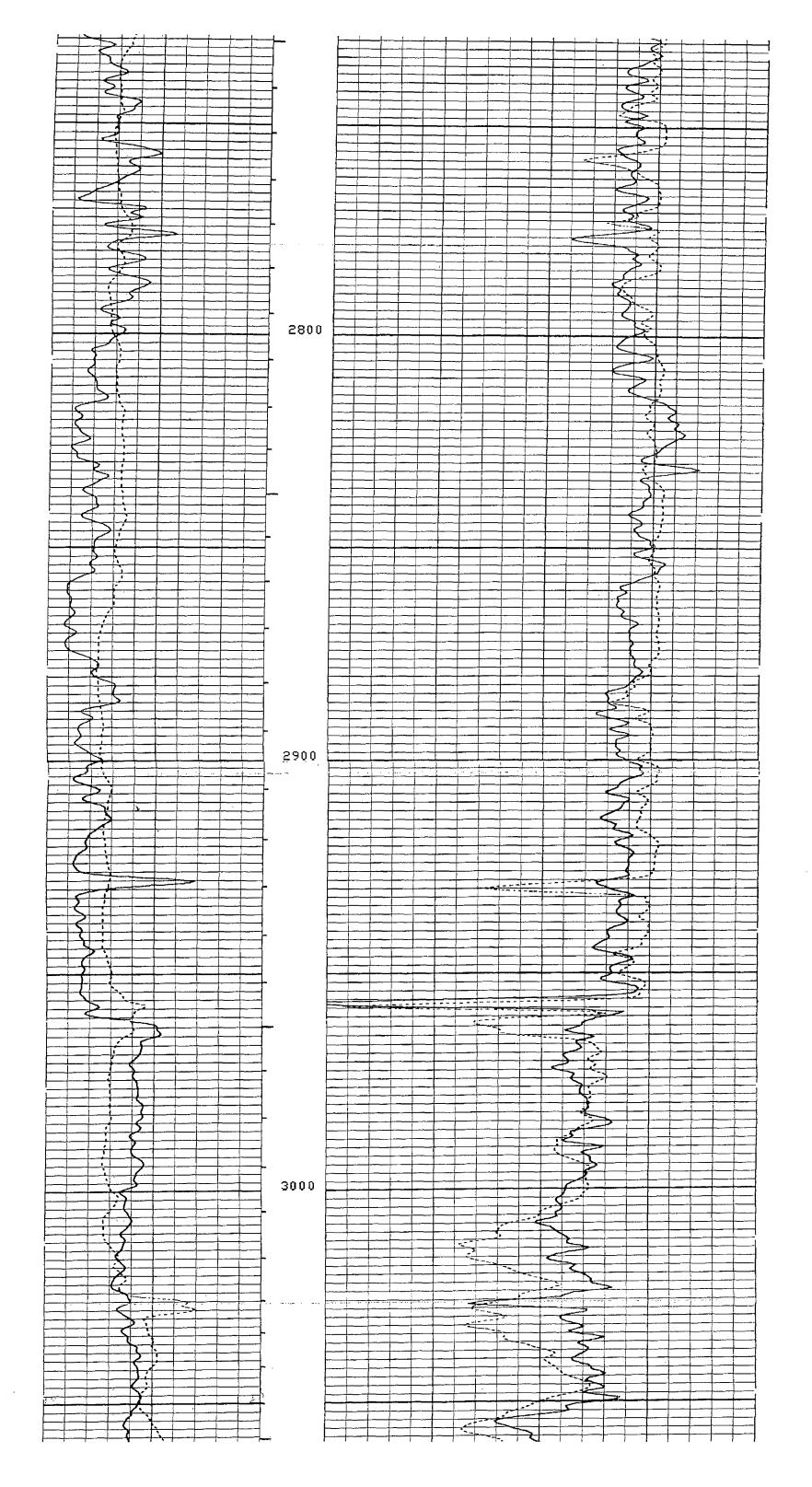


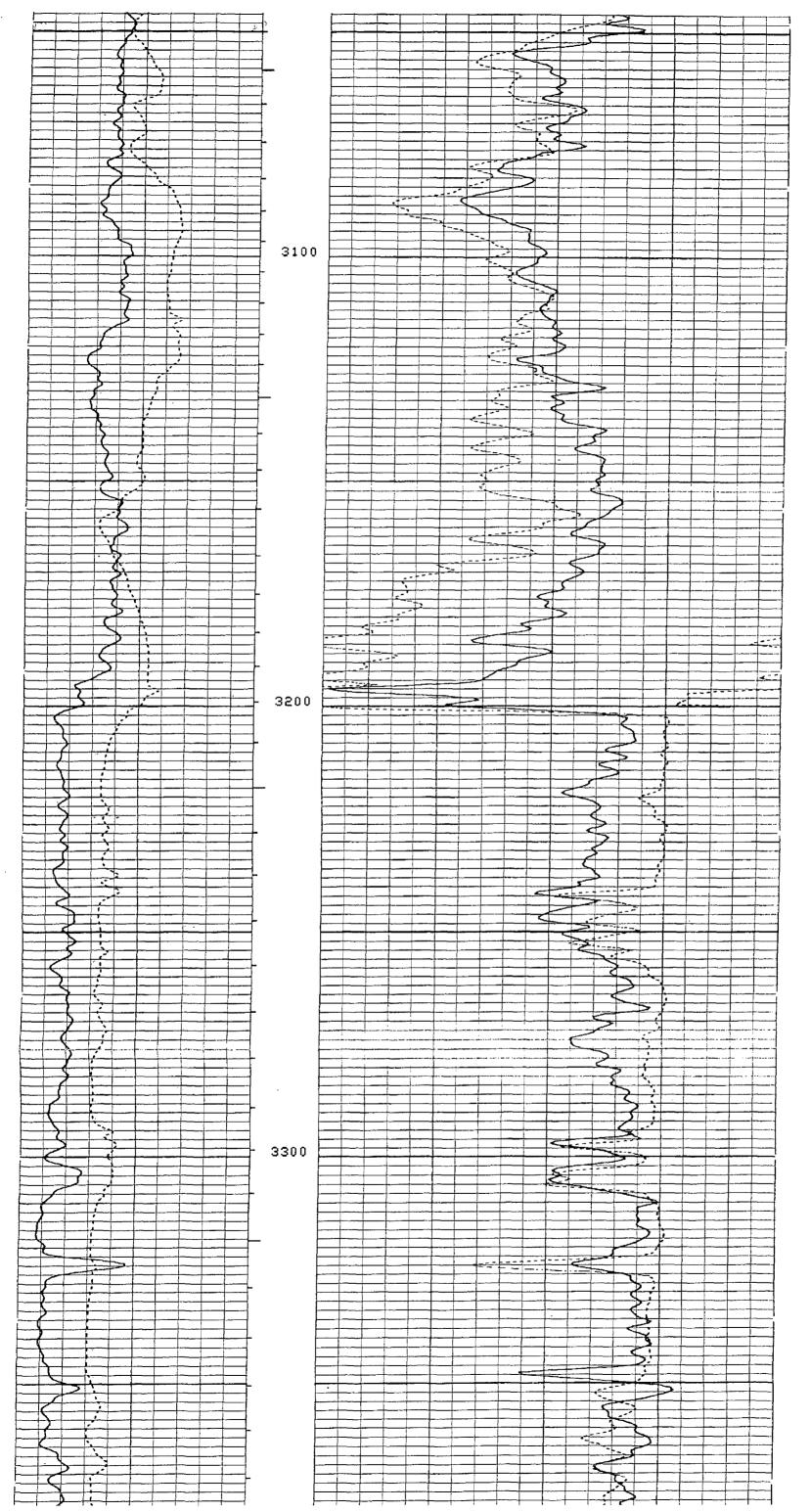


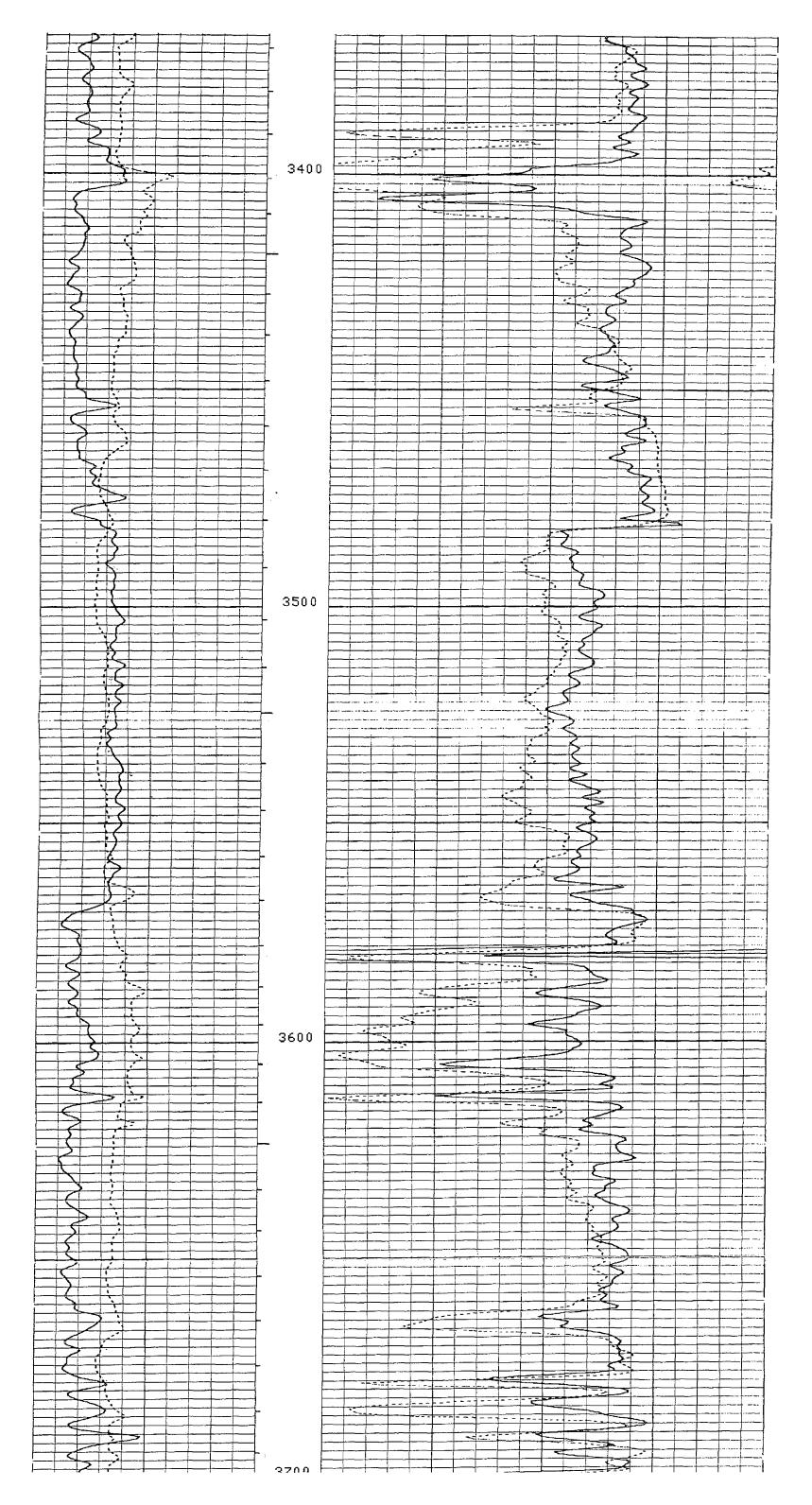


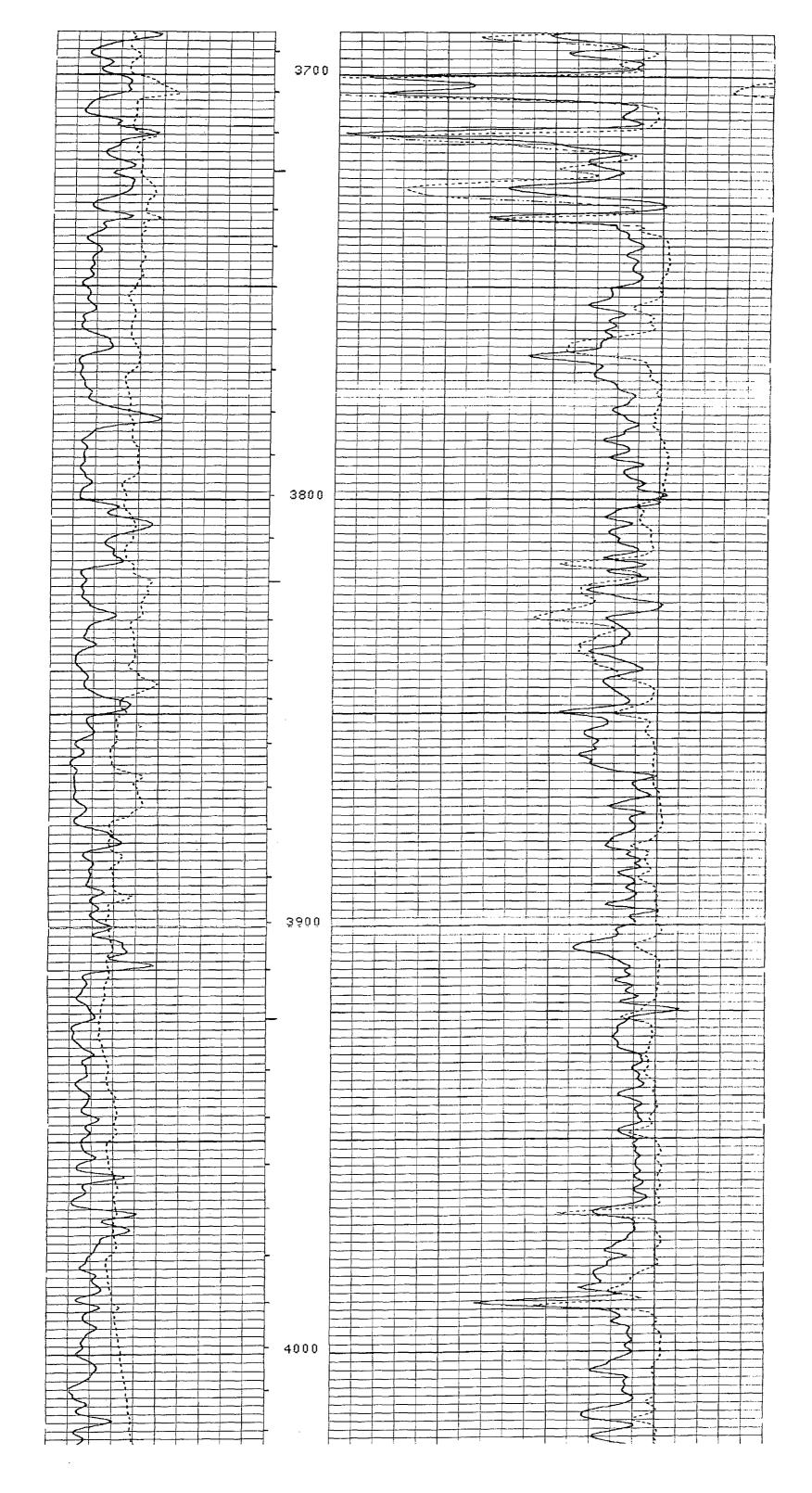


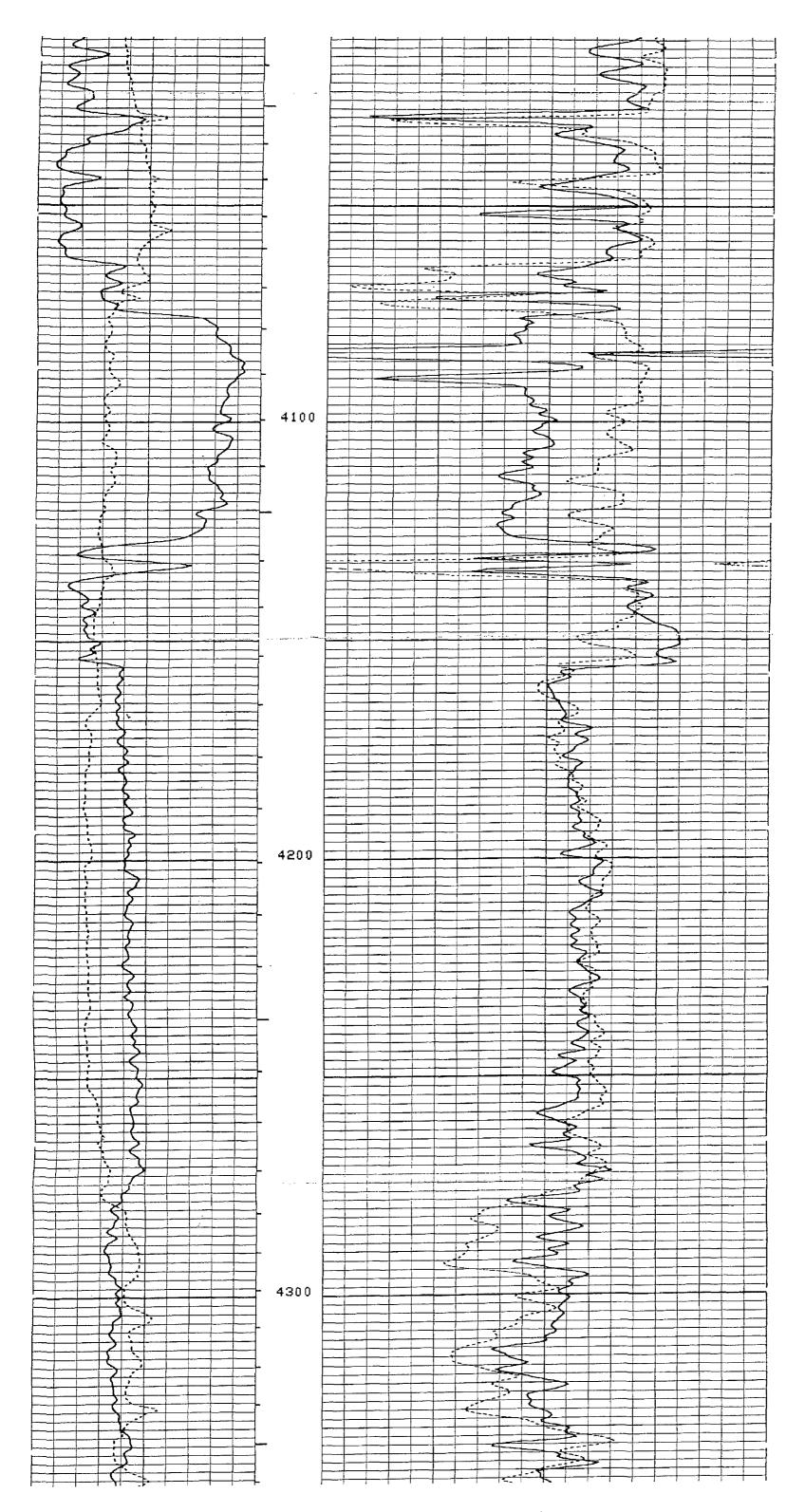




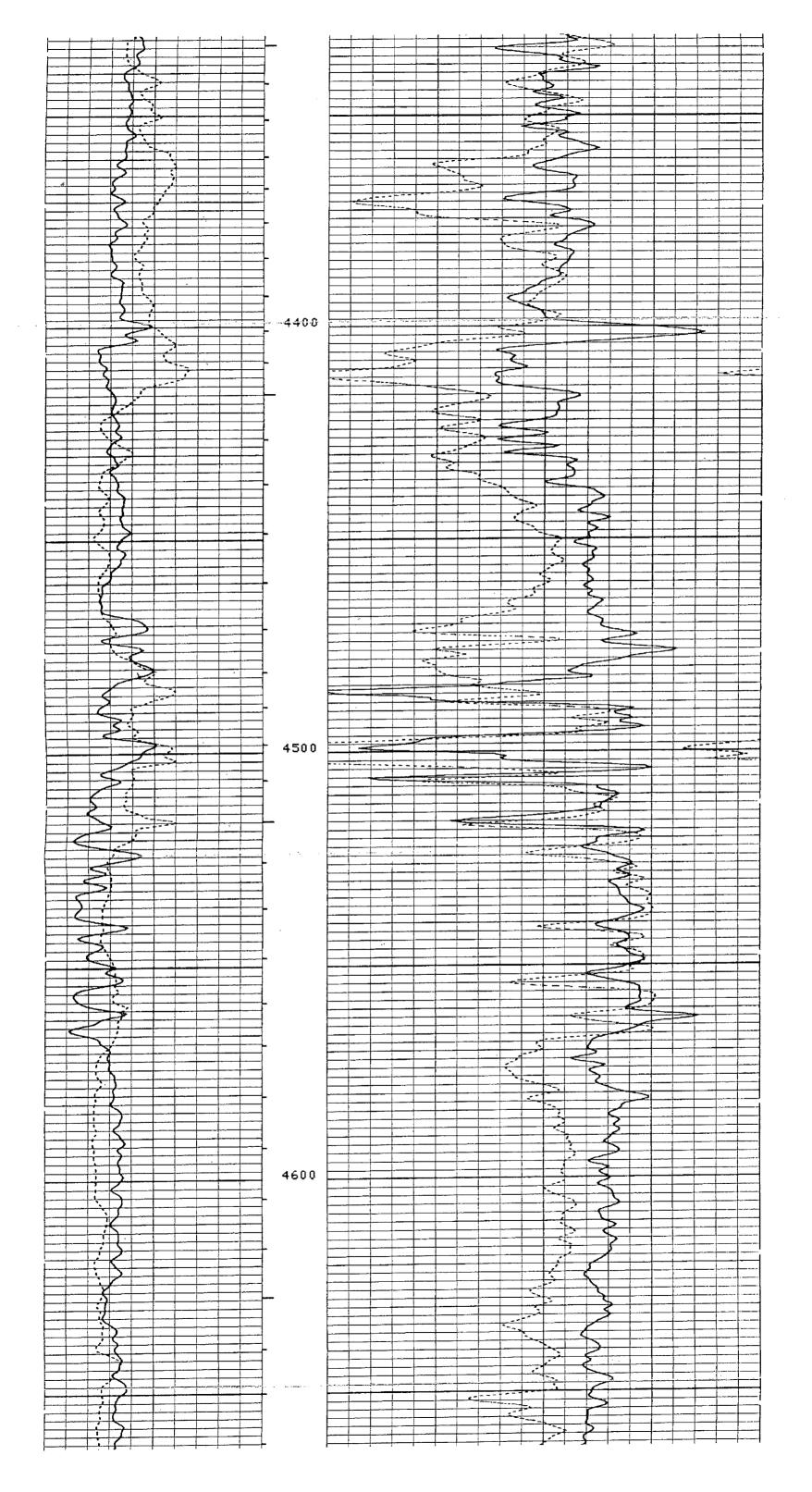


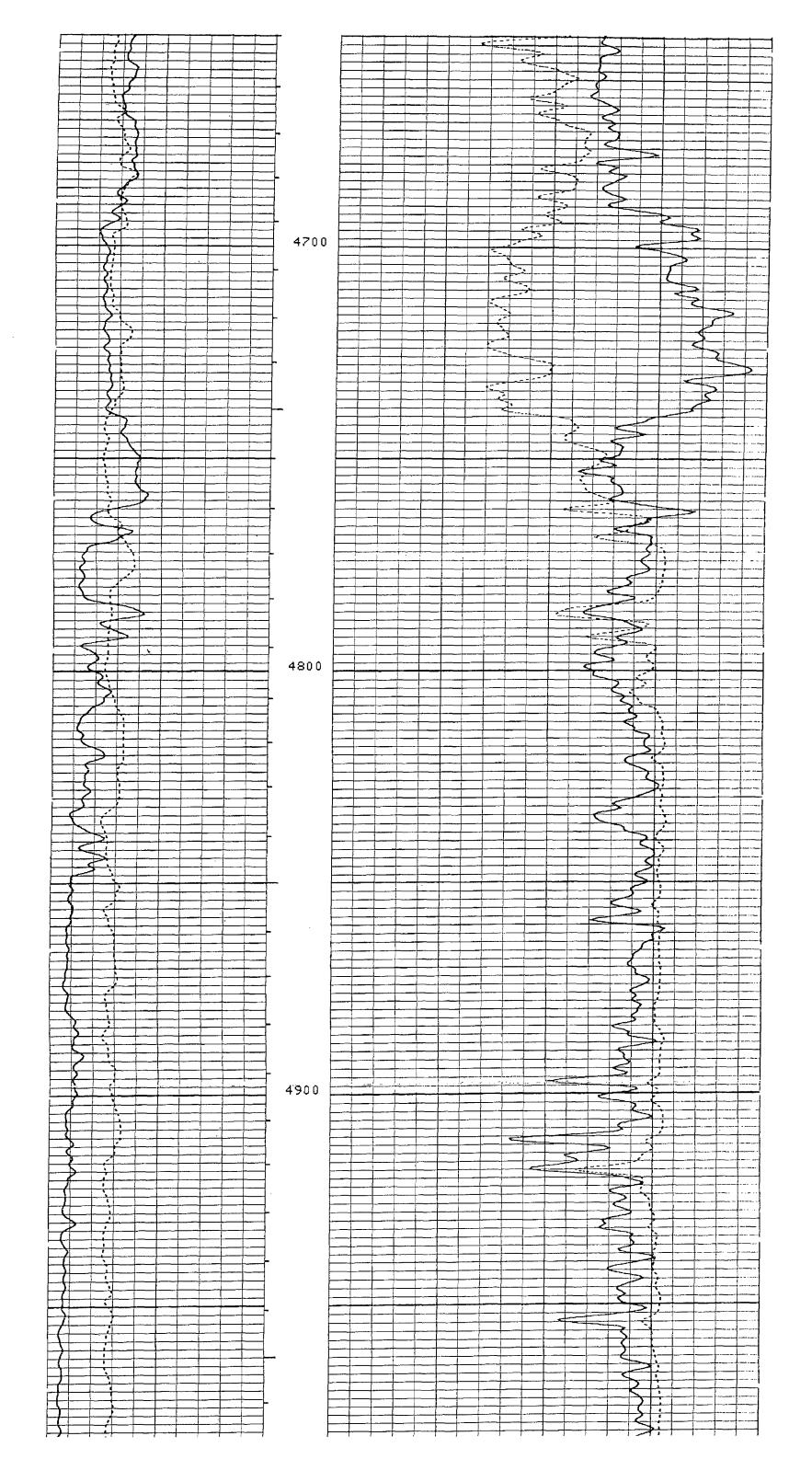


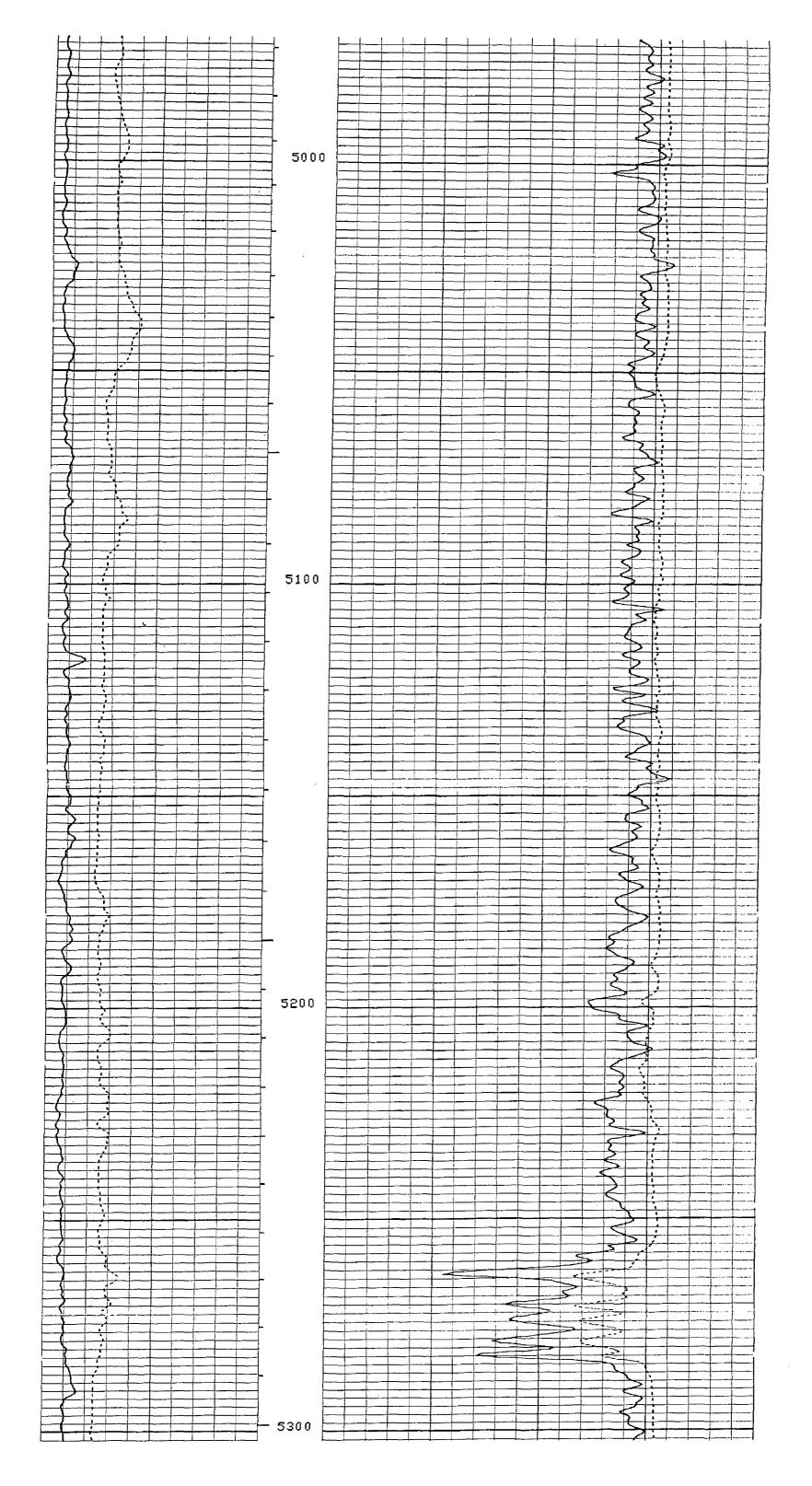


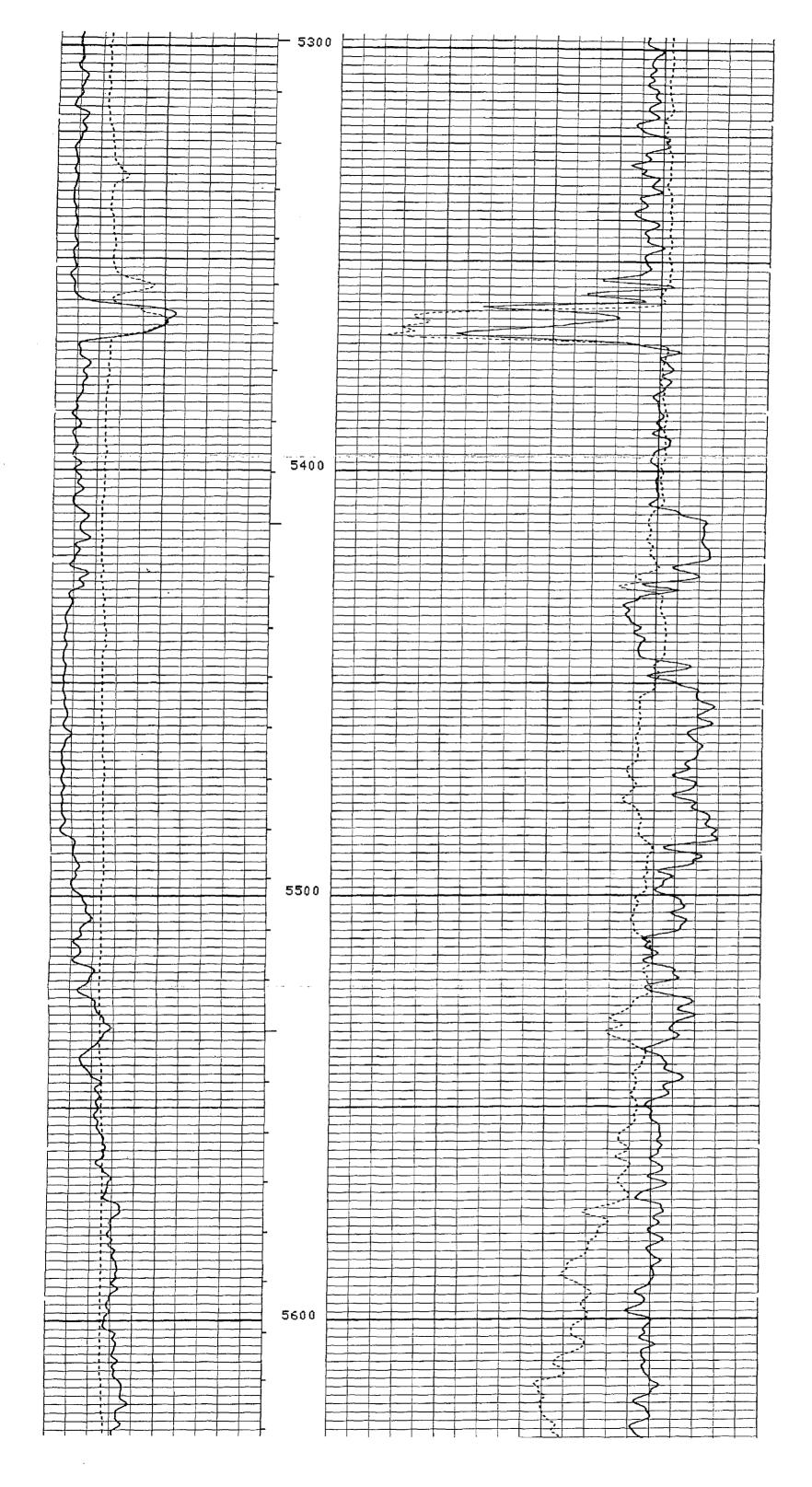


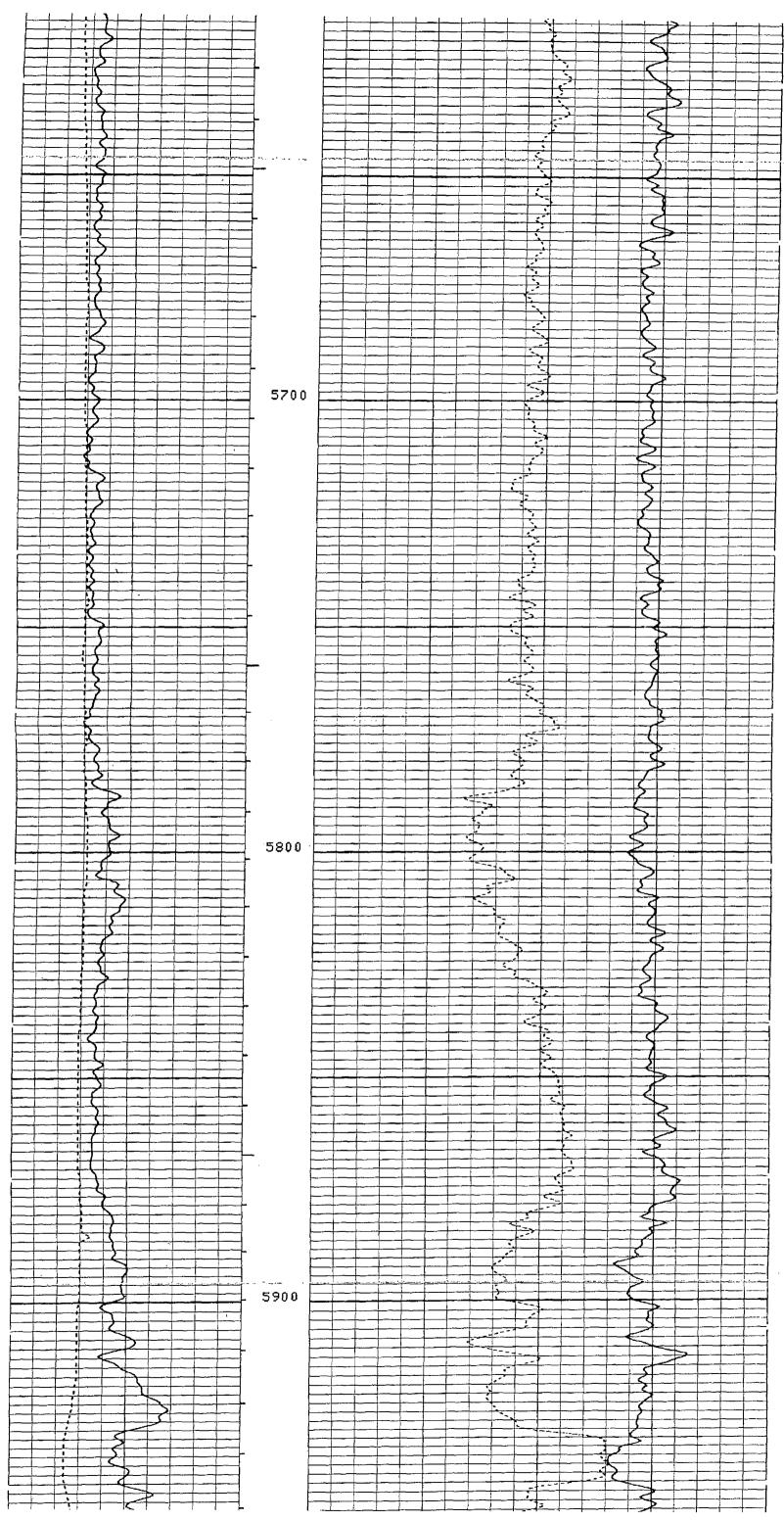
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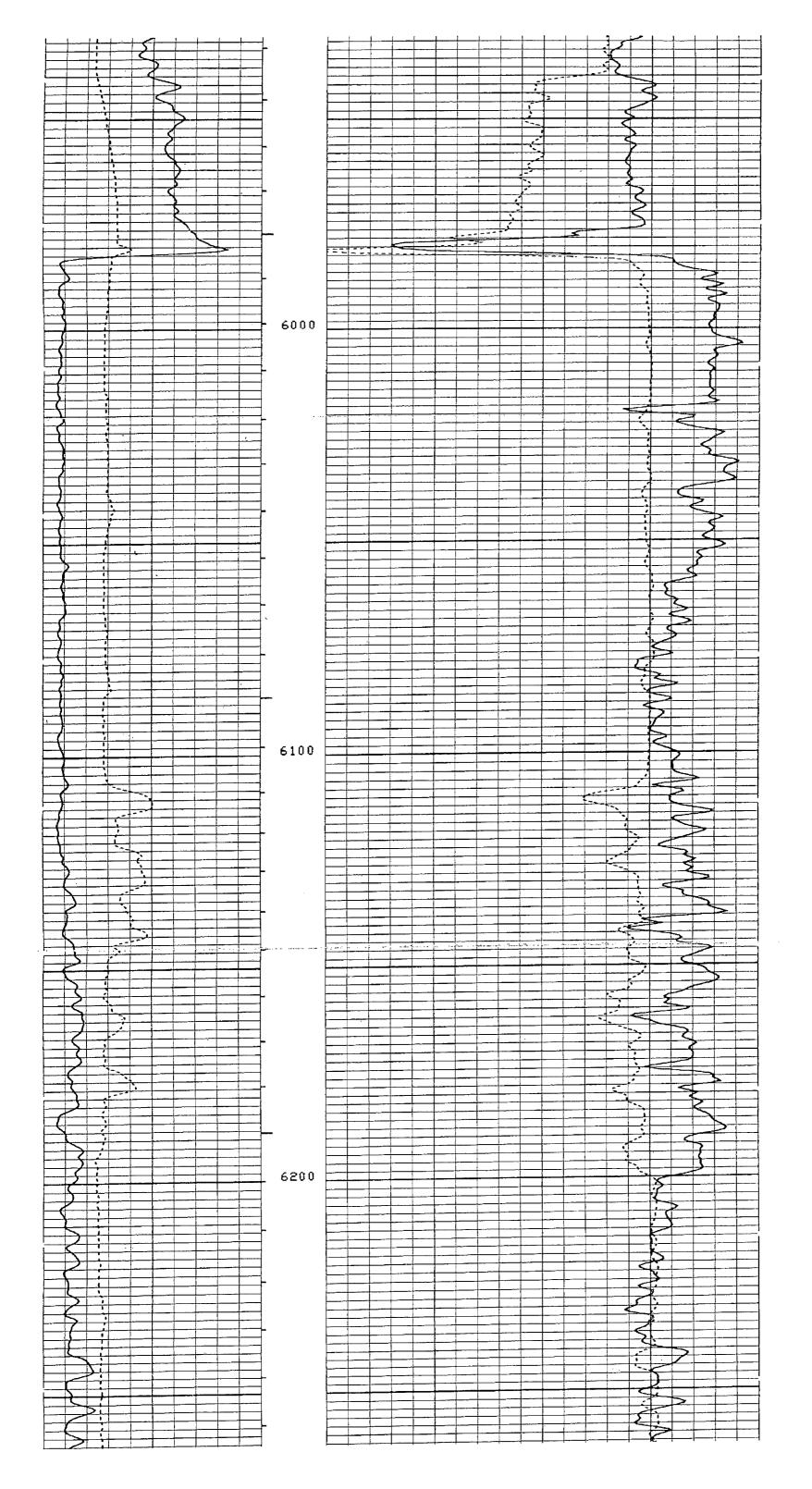


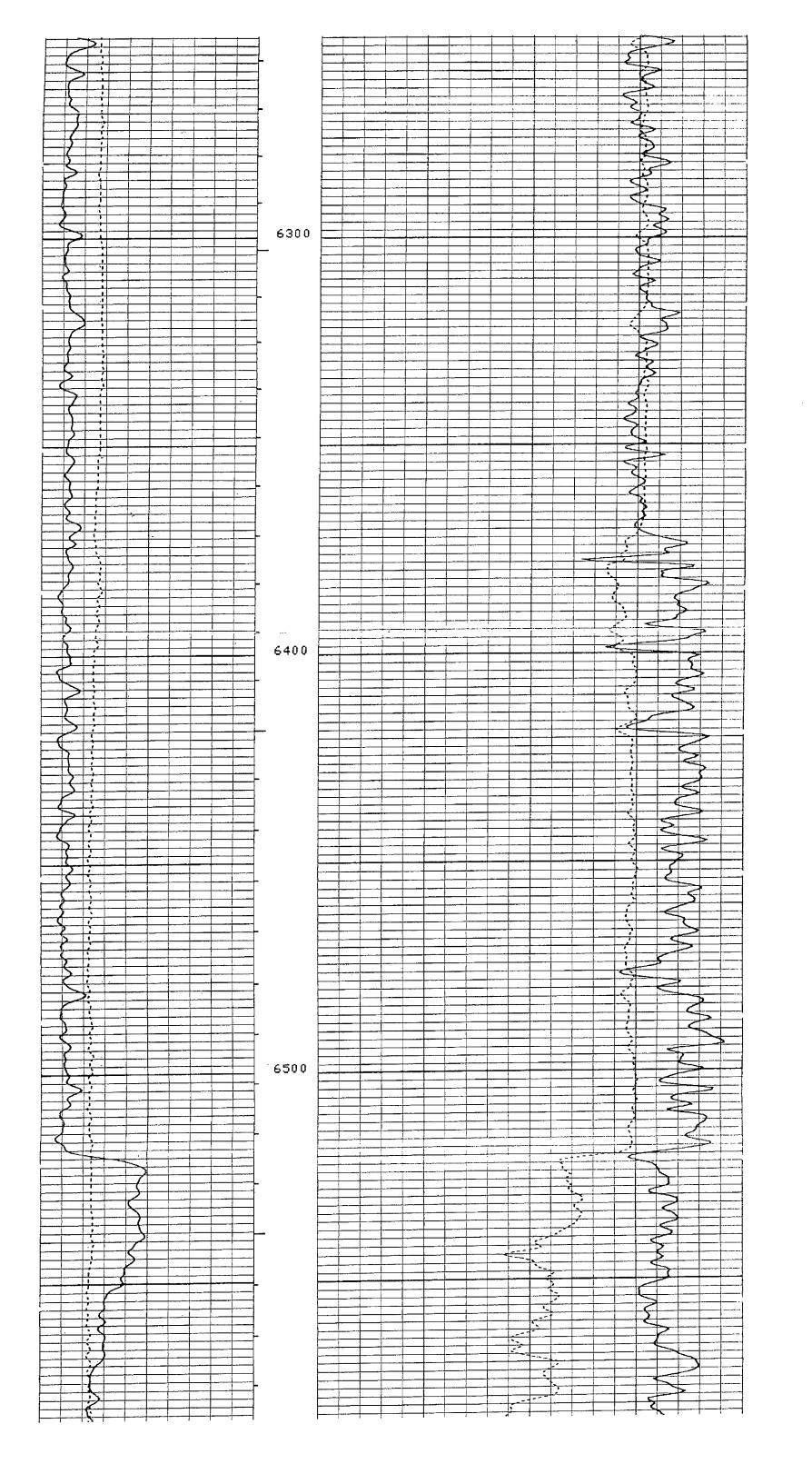


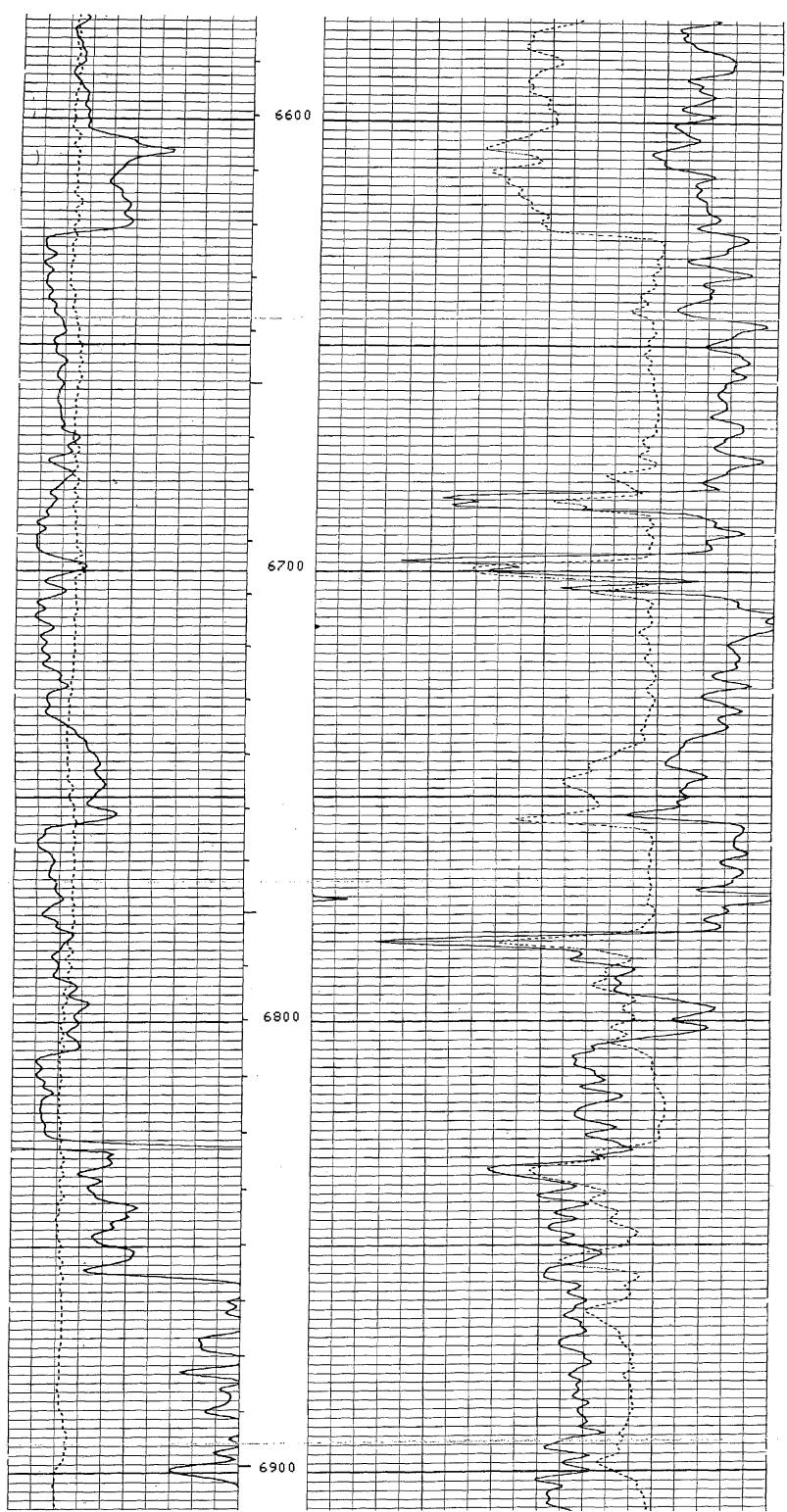


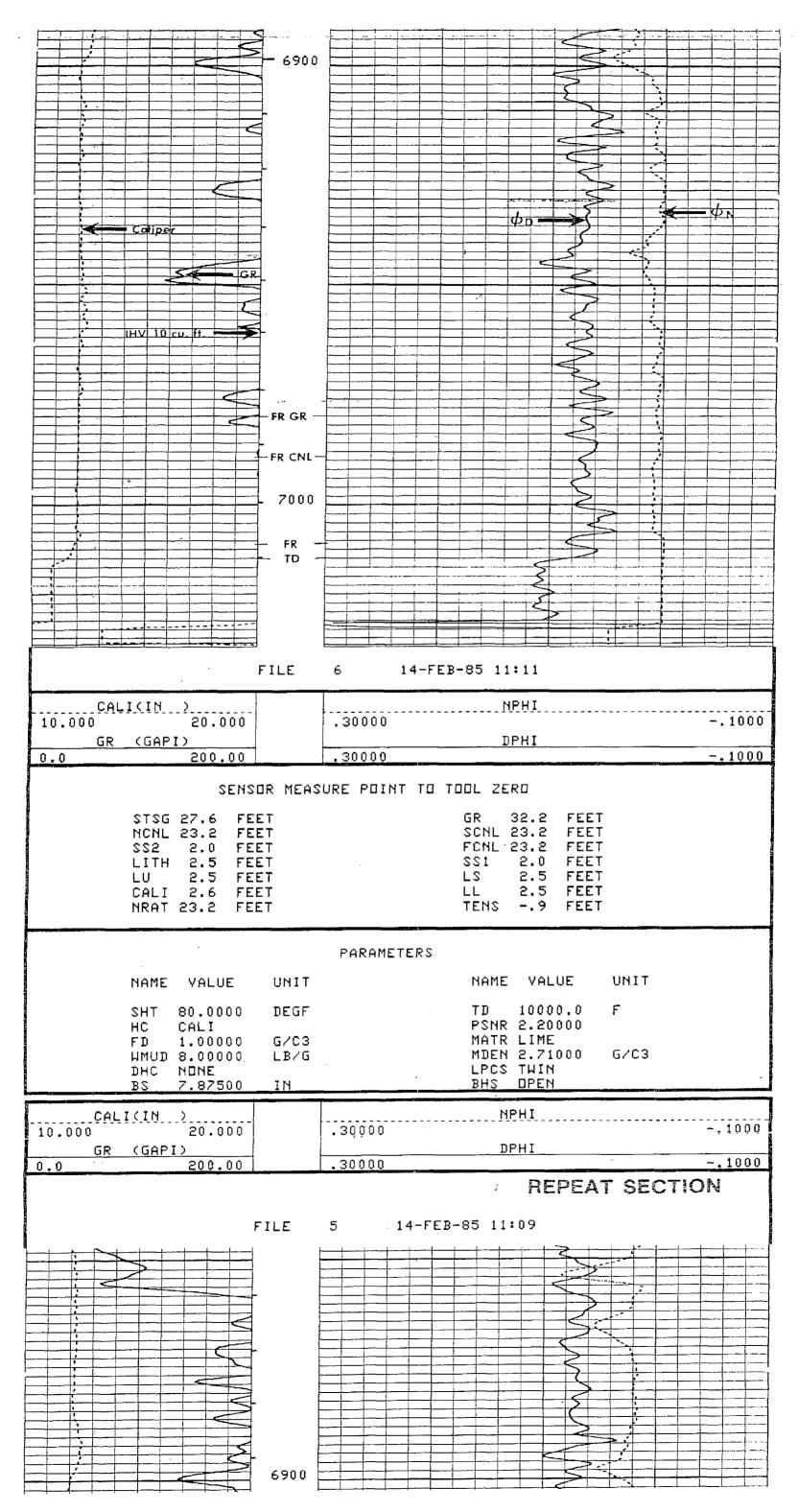


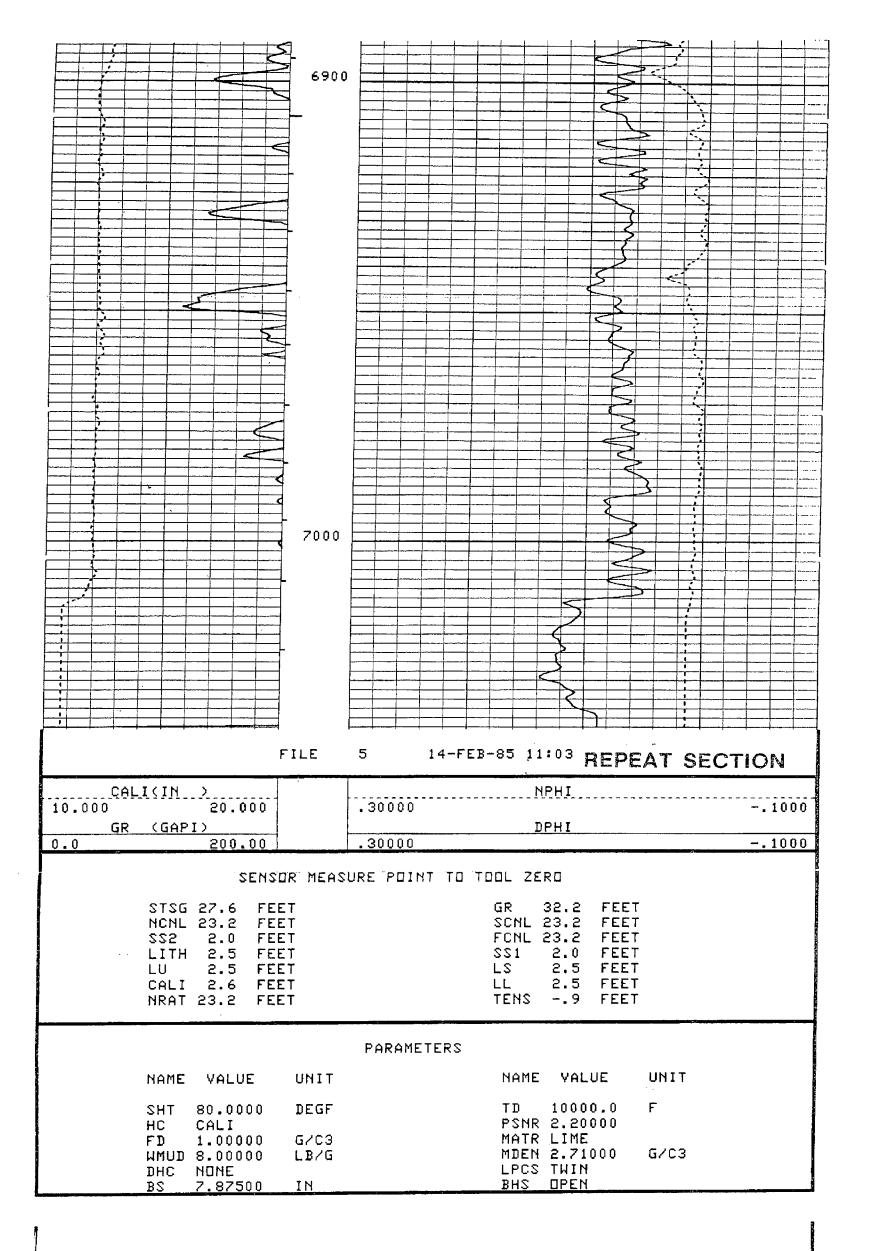
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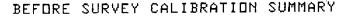


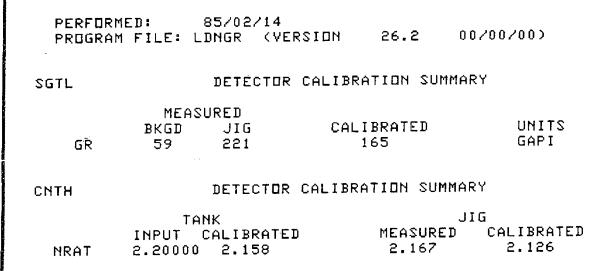












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COUNTYSTATE_NEW_MEXICO	GL4200.0

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#### Chavez, Carl J, EMNRD

From:	Chavez, Carl J, EMNRD
Sent:	Friday, March 19, 2010 4:27 PM
То:	Chavez, Carl J, EMNRD
Cc:	Lucero, Stephen A., EMNRD; VonGonten, Glenn, EMNRD
Subject:	Meeting Notes (3/19/2010) to "General Correspondence 2008 - Present" File (GTHT-1)

Ben Barker and Mike Hayter met with Carl Chavez, Glenn von Gonten and Mark Fesmire in Santa Fe on Friday 3/19/2010 at 1:00 p.m. to discuss the OSE Hearing date and any issues. Raser Technologies hand delivered G-101, 102 and 103 Forms for re-entry into PA'd Well 55-7. OCD will review and let Raser know about any deficiencies.

Carl Chavez discussed the regulations, forms, etc. associated with Forms G-101 through G-107; however, OCD is only now responsible for reviewing Forms G-101 – 103.

Glenn von Gonten discussed the drilling aspects.

Raser indicated that OSE is good with their Well 55-7 workover once OCD approves, and Raser provides a single well bond referencing a new OCD API# for the well, Raser is free to conduct its work on this well to determine if shareholders are interested in investment with Raser on the geothermal project.

The issues with OSE can play out in the interim with the first hearing scheduled for 10/26/2010 somewhere down south that could last for 3 -4 days. If OCD approves the G forms, Raser will cleanout the well in April of 2010. The 4 wk. well test with calculated results will be complete by 5/15/2010 and Raser will determine if the project is viable based on the well test. If Raser thinks it is a "go", it will give investors time to decide whether to invest \$15M in the project by 6/15/2010 will know if "yes" or "no". If yes, Raser could have well drilled and in place by 12/30/2010. The plant could be fully operational and transmitting by Q4 of 2011 and selling power by 1/2012. OSE issues would have to be resolved for the above to happen too.

Informed Raser that OCD may be responsible for low and high temperature geothermal regulations and it was currently coordinating with the other agencies about this matter.

OCD requested technical and policy recommendations for streamlining the process by 3/30/2010 in consideration of the Governor's recent Executive Order requiring EMNRD to complete a report w/ DB for deep source geothermal power resource areas, technical and policy recommendations for streamlining the permit process for commercial power companies to help make NM a leader in geothermal renewable power.

End.....

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 E-mail: <u>CarlJ.Chavez@state.nm.us</u> Website: <u>http://www.emnrd.state.nm.us/ocd/</u>index.htm (Pollution Prevention Guidance is under "Publications")

Friday 3/19/2010 Roser Muting. Name E-mail Company 5-5-476-3490 Corl Charer Carlj, Chaveze state.nm.us NMOFD unichael, hay terereserte in Hayfer \$01-765-1200 Poper ben, barker @rasertech.com 801-765-1200 Ben Barten Raser 476.3488 00 GLONN VONGANTEN

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Ben Barten	Raser	801-765-1200 ben. barker @rasertech.com
GLONN VONGINTON	OCS	476.3488

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	N.M.B.M.	OR PLUG BACKGEOTHE	-	•	5.a State Lease No.	24700
	U.S.G.S.	•			Federal NM	-34/90
	Operator Land Office		• •			
	1a. Type of Work Drill	Deepen	Plug Back		7. Unit Agreement Nat NA	ne
	b. Type of Well Geothermal Produc	er 🖄	Temp Observation	ŀ	8. Farm or Lease Name	3
	Low-Temp Thermal		njection/Disposal		Lightning Do	ock Geo.
	2. Name of Operator Los Lobos Renewable Pc	wer, LLC			9. Well No. TFD 55-7	
	3. Address of Operator 5152 Edgewo	ood Drive, Provo,	Utah 84604		10. Field and Pool, or Wildca	
	4. Location of Well UNIT LETTER	LOCATED 2411. PEET	FROM THE East	LINE		
	AND 2329.1 FEET FROM THE SOU	thne of sec. 7 TWP. 2	55 <sub>RGE.</sub> 19 W	NMPM		
					12. County Hidalgo	
			19. Proposed Depth 3000 '	19A. Formation Open Hol	e 20. Rotar Rota	
	21. Elevations (Show whether DF, RT, etc.) 4201 GR	21A. Kind & Status Plug. Bond. Irrev.Ltr Credi	21B Drilling Contractor Everett D.	Burgett	22. Approx. Date Wo Mobilize C	rk will start 4 01 2010

PROPOSED CASING AND CEMENT PROGRAM

Please see attached

CONDITIONS OF APPROVAL, IF ANY

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM	A: If proposal is to deepen o	or plug back, give data on presen	nt productive zone and proposed new pro	oductive
I hereby certify that the information above is true and	complete to the best of my	knowledge and belief.		
signed Bergan A Bartin	Tule	rce Management	Dure March 18, 2010	)
(This space for State Use)		and a second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the		
APPROVED BY	TITLE		DATE	

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#### Proposed Operations Plan for the Cleanout of TFD 55-7

#### I. <u>Description of Proposed Operations:</u>

Los Lobos Renewable Power, LLC ("Los Lobos") proposes to reenter well TFD 55-7 for the purpose of determining its suitability as a geothermal production well. Los Lobos intends to begin mobilizing a drilling rig about April 1, 2010 and will commence operations according to the Plan in Section II., below, as soon as permitted.

The operations for which Los Lobos seeks permission comprise three parts:

- Remove two of the three remaining cement abandonment plugs set in the wellbore by Steam Reserve Corp. in 1985. The deepest plug will remain in place. The two uppermost of five plugs were removed by Rosette, Inc. pursuant to an OSE irrigation well permit. Los Lobos intends to test approximately the upper third of the open hole.
- Install a production pump and conduct a well and reservoir test, delivering water directly to Rosette's existing green house system, which has been in use in for more than 10 years. The test will exercise water rights owned by Rosette, Inc. and already assigned to this well. Los Lobos does not intend to use TFD 55-7 for injection in this operation.
- Install proper wellhead equipment and secure the well.

If TFD 55-7 demonstrates adequate potential as a geothermal production well, Los Lobos will proceed with continued development according to the requirements of all permits, including the OCD discharge permit.

#### II. Cleanout and Testing Plan for Well TFD 55-7

- 1) Excavate casing to expose original weld area and inspect for exterior corrosion. Reinstall wellhead and casing if necessary.
- 2) Move in and rig up a rotary drilling rig with a rated capacity of at least 5000 ft and a mud system with a minimum volume of 500 barrels and a 500 hp pump.
- 3) Install annular BOP on the wellhead above flow tee with gate valve on side outlet.
- 4) Mix gel-lime mud and fill hole.
- 5) Pick up slick BHA #1: 8-1/2" insert bit, BS, 4x6" DC, jars, 1x6" DC, XO.
- 6) Test BOP for leakage by inflating around BHA and pumping in the side outlets to maximum working pressure of the surface piping, not to exceed 900 psig.
- 7) Run in hole and tag bottom, expected at about 1400'. Circulate bottoms up.
- 8) Pull out of hole and pick up 9-5/8" bit and stabilizers. Make up stiff BHA #2.
- 9) RIH and time drill cement plug #1.
- 10) POH and stand back BHA #2.
- 11) Pick up BHA #3: float shoe, XO, 2x6" DC.
- 12) RIH and tag cement plug #2, expected at about 1800 ft.

- 13) Circulate hole clean.
- 14) Displace mud with water. POH to 1500 ft. Close BOP.
- 15) Pump water at 10-25 bbl/min and record stable casing head pressure.
- 16) Rig for air injection through drill pipe. Set up fluid sample collection point on flow line.
- 17) Air lift well and record volume of produced water.
- 18) POH, stand back BHA #3.
- 19) Pick up BHA #2. RIH to cement plug #2.
- 20) Circulate mud and drill out plug #2.
- 21) POH, lay down BHA #2.
- 22) Pick up BHA #3, RIH and tag cement plug # 3, expected at about 5400 ft. Circulate hole clean.
- 23) POH, lay down BHA #3.
- 24) Run caliper log and select zone for bridge plug installation about 3000 ft.
- 25) Pick up bridge plug and BHA #4: setting tool, DCs as directed.
- 26) RIH and set bridge plug.
- 27) POH to 2800 ft, circulate hole clean.
- 28) POH to 1000 ft, air lift well as directed.
- 29) POH laying down drill pipe, lay down BHA #4.
- 30) Make up pump string and set test pump as directed.
- 31) Connect flow line to Rosette, Inc. greenhouse facility.
- 32) Release rig.
- 33) Conduct pump test as directed.
- 34) Move in and rig up well service rig.
- 35) Remove and lay down pump and casing.
- 36) Install master valve and survey flange.
- 37) Secure well and release rig.

STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT

Sec. 13 States (1)

#### OIL CONSERVATION DIVISION F. O. UOX 2010 SANTA PE, NEW MEXICO 87501

Form G-102 Adopted 10-1-74 Revised 10-1-78

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GEOTHERMAL RESOURCES WELL LOCATION AND ACREAGE DEDICATION PLAT

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Operator Los Lob	os Renewabl	le Power, I	LC	leral Lea	ase MM-34	4790	TFD 55-7
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STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT	OIL CONSERVATION DIVISION P. O. BOX 2088	Form G-103 Adopted 10-1-74
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J. S. G. S	GEOTHERMAL RESOURCES WELLS	
and Office		5.a State Lease No. Federal NM 34790
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· Type of well Geothermal Producer	Temp. Observation	7. Unit Agreement Name
Low-Temp Thermal	Injection/Disposal	( NA
. Name of Operator		8. Farm or Lease Name
Los Lobos Renewable Por		Lightning Dock Ge
Address of Operator 5152 Edgewood Drive, Pr	rovo, Utah 84604	9. Well No. TFD 55-7
Location of Well Unit Letter_2411.9	Feet From TheEastIne andFeet From	10. Field and Pool, or Wildcat Wildcat
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	15. Elevation (Show whether DF, RT, GR, etc.)	12. County
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<ol> <li>Describe Proposed or completed Operations ( proposed work) SEE RULE 203.</li> <li>See Attached</li> <li>8. Thereby certify that the information above is to inGNED Bayanue Baya</li> </ol>	(Clearly state all pertinent details, and give pertinenet dates,	itMarch 18, 2010
<ol> <li>Describe Proposed or completed Operations ( proposed work) SEE RULE 203.</li> <li>See Attached</li> <li>8. Thereby certify that the information above is to inGNED Bayanuel Baya</li> </ol>	(Clearly state all pertinent details, and give pertinenet dates, true and complete to the best of my knowledge and belief. VP Resource Managemen	

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#### Proposed Operations Plan for the Cleanout of TFD 55-7

#### I. <u>Description of Proposed Operations:</u>

Los Lobos Renewable Power, LLC ("Los Lobos") proposes to reenter well TFD 55-7 for the purpose of determining its suitability as a geothermal production well. Los Lobos intends to begin mobilizing a drilling rig about April 1, 2010 and will commence operations according to the Plan in Section II., below, as soon as permitted.

The operations for which Los Lobos seeks permission comprise three parts:

- Remove two of the three remaining cement abandonment plugs set in the wellbore by Steam Reserve Corp. in 1985. The deepest plug will remain in place. The two uppermost of five plugs were removed by Rosette, Inc. pursuant to an OSE irrigation well permit. Los Lobos intends to test approximately the upper third of the open hole.
- Install a production pump and conduct a well and reservoir test, delivering water directly to Rosette's existing green house system, which has been in use in for more than 10 years. The test will exercise water rights owned by Rosette, Inc. and already assigned to this well. Los Lobos does not intend to use TFD 55-7 for injection in this operation.
- Install proper wellhead equipment and secure the well.

If TFD 55-7 demonstrates adequate potential as a geothermal production well, Los Lobos will proceed with continued development according to the requirements of all permits, including the OCD discharge permit.

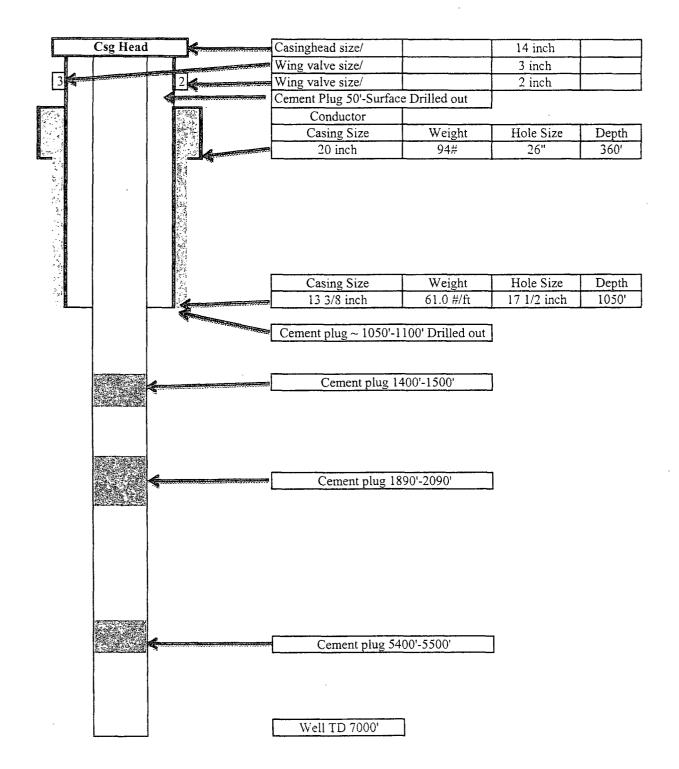
#### II. Cleanout and Testing Plan for Well TFD 55-7

- 1) Excavate casing to expose original weld area and inspect for exterior corrosion. Reinstall wellhead and casing if necessary.
- 2) Move in and rig up a rotary drilling rig with a rated capacity of at least 5000 ft and a mud system with a minimum volume of 500 barrels and a 500 hp pump.
- 3) Install annular BOP on the wellhead above flow tee with gate valve on side outlet.
- 4) Mix gel-lime mud and fill hole.
- 5) Pick up slick BHA #1: 8-1/2" insert bit, BS, 4x6" DC, jars, 1x6" DC, XO.
- 6) Test BOP for leakage by inflating around BHA and pumping in the side outlets to maximum working pressure of the surface piping, not to exceed 900 psig.
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- 32) Release rig.
- 33) Conduct pump test as directed.
- 34) Move in and rig up well service rig.
- 35) Remove and lay down pump and casing.
- 36) Install master valve and survey flange.
- 37) Secure well and release rig.

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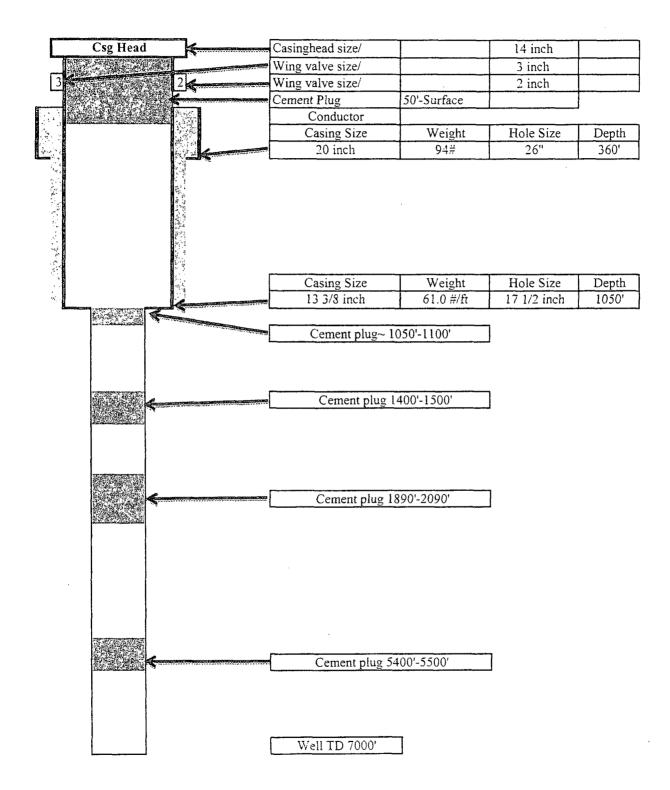
Field Name:



P&A 1985

Field Name:

Lightning Dock



ASANDONMENT WORK ANIMAS 55-7 DECEMBER 20-23, 1985 John E. Deymonaz

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12/20 Halliburton and American Well Servicing Co. move equipment to Lordsburg, N.M.

. . .. ...

- 12/21 American moves workover rig to Animas 55-7 and sets up. Worked tubing for 2 hours, pulling up to 100,000 pounds, could not pull free. Halliburton arrived about noon, hooked up pumps and circulated through tubing for 2 hours while American worked the tubing. Pulled free about 2 PM. Pulled tubing back to 5500 feet and set 70 sack (98 cubic feet) plug from 5500-5400 feet. Pulled 33 joints and circulated. After 30 minutes circulation hole began unassisted two-phase flow which lasted for about 30 minutes. Flow was through 3 inch flow line at bottom of wellhead. Leakage at top of wellhead was prevented by stripper assembly.
- 12/22 Circulate through tubing, well began unassisted two-phase flow for about 30 minutes. Pulled tubing to 2090 feet and set 170 sack plug (233 cubic feet) from 2050-1890 feet. Stood back six stands of tubing (500 feet) and WOC for three hours. RIH, tag cement at 1960 feet. Pull tubing to 1500 feet and set 100 sack plug (140 cubic feet) from 1500-1400 feet. Pull tubing to 1100 feet, set 80 sack plug (112 cubic feet) from 1100-1000 feet stand back six stands and WGC three hours. RIH, tag cement at 1050 feet. Pull tubing to 50 feet and plug from 50 feet to surface using 50 sacks (56 cubic feet). Flush out wellhead with water, shut down.
- 12/23 American and Halliburton rig down equipment and leave location. Dale Burgett crew dig out cellar below wellhead, out off wellhead and erect monument of 4 inch casing. Cellar will be filled in and monument will be approximately six feet above pround level.
- Equipment removed from well and laid down on drill pad includes: 213 joints (7169 feet) of J35 2-778 inch tubing. Includes 4 joints already on location.
  - 4 2-778 inch Baker Model L sliding sleaves.
  - 1 2-7/8 inch bull nosed check valve.
  - 3 3 inch Barton geothermal gate valves.
  - 1 13 5/8" x 7 1/15" adapter spool.
  - 1 7 1/16" x  $\ge$  7/8"  $\ge$  round  $\exists$ M adapter spool.
  - 1 13 5/8" x 13 3/8" casing hear W/ 2 3" ext. flanges.
  - 2 3 inch companion flanges. Misc studs and nuts.

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MULTI-FINGER IMAGING CALIPER	<b>JGIES</b>	Ctoto C	Oldic	щ	Elevation		SO# 550530 TI # 144524											Tubina Docord	Weight		Top 0	
AC				RGE	LEV														0		┠┼┼	┨┤┨╸
	UNHN DNHN		API #		G.L. G.L. GROUND LEVEL	38		1			-			1					Size		Ť.	
	RASER TECHNOLOGIES 55-7	ROSETTE		ЧМТ	E E	11-MARCH-2008	ONE	61/A	1025	SURFACE	WATER	N/A	183	1100 HRS.	6PCP	MIDLAND		MR.GIGUIERE	To		Wgt/Ft 54	
	RAS 55-7	RO LIN	Ē	SEC	d Fr	Ē												Σ				
CARER MUCHES Vtlas	Company Well	Field	Location:	5	Permanent Datum Log Measured From Drilling Measured From													Poreholo Perord	From		Size 13.375	
	Com Well	ш Ш	ē č		Per Log Drilli				Val				d	3	μo			hollo				
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				HIDYFCO	Qounty		5 -	ler	ged	Ci-o	A ZIO	scos	ded	Reac	Print Minu		2			+	pio Di	Strin
iker			3	56-7 503ETTE	Field Field		Number h Driller	h Logger	om Logged Interval	Log Interval	Fluid	sity / Viscosity	Recorded Temp.	Well Ready	<ul> <li>Logger on Bottom</li> </ul>	tion	orded By	essed B	Number		ng Record	uction String

LOG TO WIRELIME MESURMENTS.

### HAVE NO RECORD OF CASING WT. ONLY GOING BY CALIPER READING.

De74	BAKER HUGHES

ther Atlas

# MIT Report Overview

Well:	Well	Vell # 55-7		Survey Date:	<b>.</b>	3-11-2008	
Field:	ROM	UOSETTE		Tool Type:	x	Sondex Multilinger Imaging Tool	Fool
Company .	-	KASER TECHNOLOGIES		Tool Size:	x	8.0" /80-Atms	
Country.	VSD			No. of Pingers.	x	0	
An sum transmorter filters a train an ann ann an Anna an		ցուս առերել հեղենդերիները է մինդեստոների ենքն ենցուցիցի մեն հեղենք են	Analysis: Otlando Laso	Analyst:	0	Orlando Laso	
ле: 	Non.OD	Weight	te: Nom.O.D. Veight Grade & Thread Nom.I.D. Nom. Upset Upper Icn. Lower Icn.	CII.noN	Non. Upset	Upper len.	Lower fen.
	13.375 ins	5-1.52 ppf	13.375 its 54.52 ppf 2.4 its 2.4 its 2.4 its 2.4 its	12.615 ins	14.354 ins	2.4 ins	2.4 ins

### Analysis Overview

se results were generated semi-automatically, using Sondex MITPro software Verston 3.04, data was acquired using a Sondex Multifinger huaging Tool. Sondex accepts no ousibility for the accuracy of the results that are presented.

it curs in the string are referred to as 'Joints'. This mehndes completion items such as s-overs. Normal joints are identified by integer numbers, sequential in depth. It joints and completion items are identified by numbers after the decimal point. penetrations and projections are measured by local, surface shape analysts, where this is etive. The damage classification scheme is described at the end of the Joint Tabulations.

atal of 28 joints were analysed, of which 0 have possible holes.

most deeply penetrated joints: pit depths to 0.097 ins in Joint 22 pit depths to 0.085 ins in Joint 21 pit depths to 0.066 ins in Joint 19 pit depths to 0.016 ins in Joint 4 pit depths to 0.036 ins in Joint 3 pit depths to 0.036 ins in Joint 3

most restricted joints: projections to 0.108 ins m Joint 2 vrojections to 0.083 ms m Joint 1 projections to 0.064 ins in Joint 27 projections to 0.058 ins m Joint 19

usclanner

All interpretations are opinious based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or wilful negligence on our part, be finble or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretations made by any of our officers. agents or employces. These interpretations are also subject to our general terms and conditions.

Analysis Overview page 1

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# MIT Report Overview

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Well:	VV eH # 35-7		Survey Date:	÷.	8-11-2008		
Pickd:	ROSETTE		Tool Type:	N.	Sondex Multifuger Imaging Tool	Fool	
(goudank)	RASER TECHNOLOGIES	22	Tool Size:	8.0	8.0" /80-A1018		
Country .	USA		No. of Pingers.	20			
and beings the standard the static segment strength and the state of particular match	Audyst. Otlando Laso		Analyst.	0	Orlando Laso	a na basa ina garawana magaga ang juga na na tangkan pangang maga tangkan sa ka	
00: Noti	oc: Non.OD Weight Grade & Thread Non./D Non. Upset Upper len. Lower len. 13.375 ins 54.5 ins 54.5 ins 24 ins 24 ins	Grade & Thread	Olun, ID 843 Aug	Nom. Upset 1.1-351 inc	Upper len. 2.1 ins	Lower Icn. 2.4 ins	

anks,

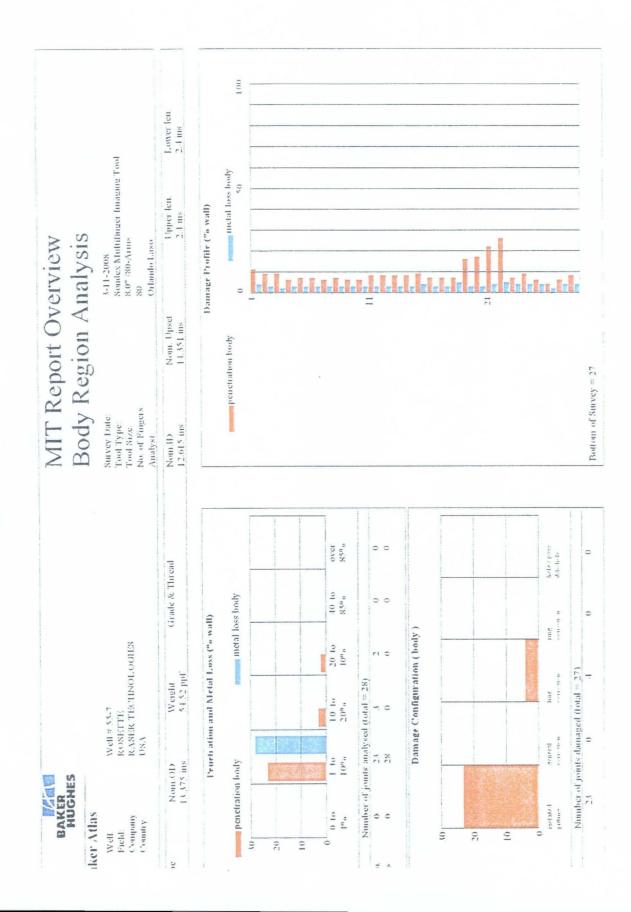
\* cashing appends to be in good condition. A trace of inetal loss associated to thill wear was detected from if to 825.0 (jourts 19 through 22). The deepest wall penetration was detected at 814.0 (j).22) where metal loss reached 26%. If 10 825.0 flass a wall penetration of 22%. The rest of the drift wear trace graded within the Class 4 at 11 at 750.0. Please review the "MITE RIFFORT JOINT TABULATION SIHJET" for more details. dware, a Boat collar, was detected at 950.0. Minor accumulation of deposits were detected in joint 1.2 and 3.

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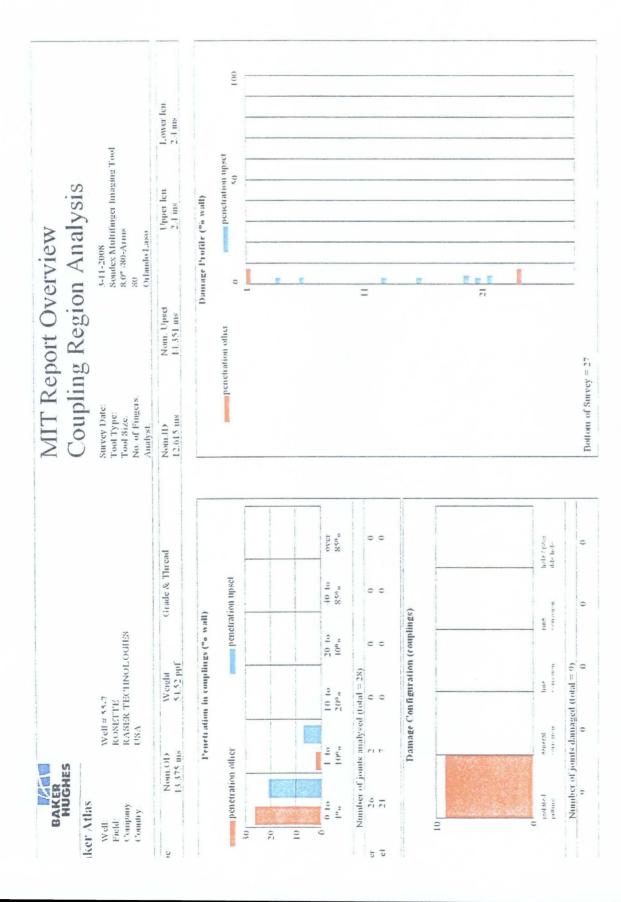
Analysis Overview page 2

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Analysis Overview page 3



Analysis Overview page 4



# dier Atlas

VV ell:	1Vell # 55-7
Field:	ROSETTE
Company	RASER TECHNO
Country	USA
Country	USA

SHOOLES

Grade & Thread

V creht 54.52 ppf

Nom.0D 13.375 ms

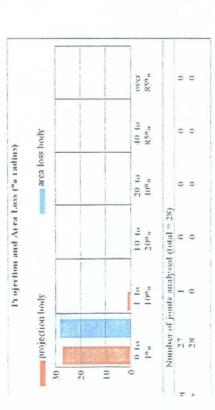
10.

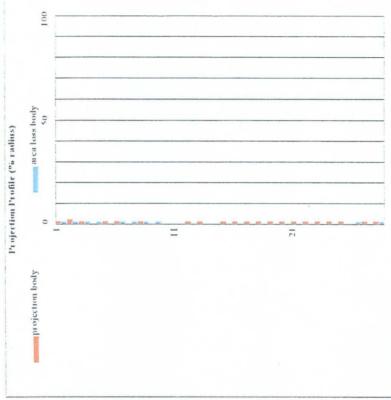
Lower len. 2.4 ms Upper len. 2.4 ms Orlando Laso 80 Nom. Upset 14.351 ms Shirvey Date: Tool Type: Tool Size: No. of Fingers. 12.615 ins Analyst. Vom.II.

3-11-2008 Sondex Multifinger Imaging Tool 8.0" /80-Anns

Body Region Analysis

MIT Report Overview





Boltom of Survey = 27

Analysis Overview page 5

# MIT REPORT JOINT TALLY SHEET

: 13, 375 ins - 54, 52 ppf 14hickness: Rody = 0, 80 ins - 14pset = 0.868 ins (ind 11) + 12.648 ins

																					;					1		collar		
1 Type																												Hoal C		
Nominal	0	inches	1.1.375	13.475	13.375	13.375	1.1.75	13, 375	13.375	13.375	13.475	13.475	13.475	13.375	13.375	11.175	13.375	13.375	13.375	13.375	1.1.75	1.4.475	13.375	13.475	13.375	13.375	1.1.75	1.1.17.5	1.1.75	11 175
Nominal	=	inches	12,615	12.615	12.615	12.615	12.615	12.615	12.615	12.615	12.615	12,615	12.615	12.015	12.615	12.615	12.615	12.615	12.615	12.615	12.615	12,615	12.615	12.615	12.615	12.615	12.615	12.615	12.615	12615
Mean	2	inches	12.562	12.599	12.5%9	12.509	17.611	12,601	12.662	12.597	12.593	12.601	12.615	12.613	12.638	12.623	12.649	12.66.4	12.67.1	12.705	12.726	12.7.17	12.756	12,762	12.736	12.689	12.680	12.811	12.6.40	019 11
Ζ	9	inches	12.568	12.608	12.545	12.601	12.617	12.600	12.605	12.(6)2		-i	-	12.616	12.612	12.627	12.651	12.665	12.677	12.707	12.728	12.749	12.755	12.765	12.741	12,689	12 685	12.615	12.645	17 633
l'eneth		feet	18.55	85.01	18.45	10.81	10,19	19.91	SF.05	10.02	181.51	17.17	10.05	19.50	18.58	19.54	38.46	18.27	35.49	18.47	21 N.	11-05	37.09	\$9.48	05.05	19.85	48.80	2.13	11 XI	
Depth		feet	\$2.5	18.30	NN 7 2	96.33	134.33	17.5.22	213.55	252.80	291.82	329.96	367.13	106.52	10.011	05 1 81	21.122	NY 795	\$N 009	639.33	677 ND	716.22	755.66	792.74	832.12	871.62	910.28	80.01-0	12156	020
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Well: Field: Company Company Company Survey Date:

Well # 54.7 ROBETTE RASER TJCHNOLOGHES USA 4.11-2008

I supply fully page 1

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ssification scheme / projection class, m order of damage severity ictration exceeds 70° of nominal wall thickness

Depth. 734, 810 Cable speed: 4 Deviation 13 Rotation: 186 Average diame Min pair diame Segment length

> refration exceeds  $70^{\circ}$  of nominal wall thickness mage area exceeds  $50^{\circ}$  of nominal wall thickness mage area exceeds  $50^{\circ}$  of circumference. but depth range depth range exceeds  $1^{\circ}$  pipe ID, but extends less than  $30^{\circ}$  of circumference. The damage depth range exceeds  $2^{\circ}$  pipe ID and/or extends more than  $30^{\circ}$  of circumference. damage depth range exceeds  $2^{\circ}$  pipe ID and/or extends more than  $30^{\circ}$  of circumference. damage depth range does not exceed  $4^{\circ}$  pipe ID or extend more than  $30^{\circ}$  of circumference. damage depth range does not exceed  $4^{\circ}$  pipe ID or extend more than  $30^{\circ}$  of circumference. dength = 1.667 feet

shading percentage thresholds



From: Sent: To: Subject: Chavez, Carl J, EMNRD Wednesday, March 17, 2010 7:38 AM 'Layne Ashton' RE: API number for existing Discharge permit

Layne:

API#s assigned to the project are well specific. The only well not having an assigned API# is Well 55-7, the well you have expressed interest in reworking and conducting tests on.

OCD needs your G forms to review for the well workover, and if approvable, Raser will be requested to submit a Geothermal Single Well Bond for it. Once we approve the bond, OCD will sign the G-forms and Raser may conduct its project work.

Please contact me if you have questions. Thank you.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 E-mail: <u>CarlJ.Chavez@state.nm.us</u> Website: <u>http://www.emnrd.state.nm.us/ocd/</u>index.htm (Pollution Prevention Guidance is under "Publications")

From: Layne Ashton [mailto:lashton@rasertech.com] Sent: Tuesday, March 16, 2010 2:59 PM To: Chavez, Carl J, EMNRD Subject: API number for existing Discharge permit

Carl,

I've just met with Mr. Patrick Barnes of Wells Fargo, who is helping me with the paperwork on the bonds associated with the existing discharge permit, dated July 1, 2009. I see on the *Form GTB-2 \$10,000 Multi-Well Geothermal Plugging Bond* that an API Number needs to be noted on the Form. However, I do not see an API Number on the aforementioned discharge permit, but GTHT-001 is noted in the "RE:" beneath the address. Is this the API No.? I would sincerely appreciate your help in clarifying this for me at your earliest possible convenience.

Thank you and best regards,

W. Layne Ashton Raser Technologies, Inc. 5152 Edgewood Drive, Suite 375 Provo, Utah 84604 Tel. (801) 765-1200 Fax (801) 374-3314 Cell (801) 473-6090 layne.ashton@rasertech.com

From: Sent: To: Subject: Chavez, Carl J, EMNRD Tuesday, March 16, 2010 11:27 AM 'Layne Ashton' RE: Licensed Driller

Layne:

Thnx. for clarification as I anticipate Raser will document in the G-103 exactly what it is planning to do.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 E-mail: <u>CarlJ.Chavez@state.nm.us</u> Website: <u>http://www.emnrd.state.nm.us/ocd/</u>index.htm (Pollution Prevention Guidance is under "Publications")

From: Layne Ashton [mailto:lashton@rasertech.com]
Sent: Tuesday, March 16, 2010 10:57 AM
To: Chavez, Carl J, EMNRD
Subject: RE: Licensed Driller

Carl,

By way of clarification Raser is <u>not</u> going to reinject water into 55-7. Rather, we are going to test pump 55-7 for a limited time and within Dale's water rights associated with the well. The water will be delivered directly to Dale Burgett's green house system.

W. Layne Ashton Raser Technologies, Inc. 5152 Edgewood Drive, Suite 375 Provo, Utah 84604 Tel. (801) 765-1200 Fax (801) 374-3314 Cell (801) 473-6090 layne.ashton@rasertech.com

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Tuesday, March 16, 2010 7:29 AM
To: Layne Ashton
Cc: Ben Barker; Michael Hayter; Brooks, David K., EMNRD; Dade, Randy, EMNRD; Reeves, Jacqueta, EMNRD
Subject: RE: Licensed Driller

Ashton:

OK, OCD will review the Raser's submittal. Regarding the bond for well 55-7, the bond must be received and approved prior to any work on the well. Once OCD has review your G-Forms, and if OCD approves, OCD will issue an API# for the well, and Raser must submit a well bond for OCD review and approval before any work can commence on the well.

Regarding Burgett's well and OCD confirming acceptability, I don't think this was discussed under the current context of your message. It is important to note that Raser's proposed work on well 55-7 has not been reviewed in its entirety by the OCD and until we approve, the implication is premature at best. This well was not discussed at the hearing for the project; however, OCD understands that Raser needs flexibility to conduct it exploration activities at the project location. Regarding re-injection of cold fluids into Well 55-7 after the test, OCD is still considering this as to introduce cold fluids

into the reservoir, this could result in a raise the temperature of the ground water to any downgradient geothermal users with geothermal rights. Again, the intention to inject well test water through Well 55-7 has not yet been approved, but OCD has told Raser that the Discharge Permit requires that injection wells inject at a depth of at least 100 feet below the deepest fresh water well in the project area.

Thank you.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 E-mail: <u>Carl J.Chavez@state.nm.us</u> Website: <u>http://www.emnrd.state.nm.us/ocd/</u>index.htm (Pollution Prevention Guidance is under "Publications")

From: Layne Ashton [mailto:lashton@rasertech.com]
Sent: Monday, March 15, 2010 3:38 PM
To: Chavez, Carl J, EMNRD
Cc: Ben Barker; Michael Hayter
Subject: RE: Licensed Driller

Carl,

Thank you for your message. We are finalizing the bond and the G-100/102/103 forms now, identifying Everett D. Burgett Drilling as the driller. We will be submitting those forms this week. On the bonding, we will add TFD 55-7 under an additional bond once we have the correct API number.

We inquired about the acceptability of Mr. Burgett because we are aware of his previous interaction with the State and BLM. We wanted to offer you an opportunity to express any reservations informally, as a courtesy. Thank you for confirming his acceptability.

Please allow me to clarify the testing and injection issues regarding TFD 55-7. Rosette, Inc. has operated this well under an OSE-issued irrigation well permit for the last decade. They have established water rights and a beneficial use for its output. Our initial operation will merely open more, but not all, of the obstructed wellbore to flow, and Rosette will continue to use the fluid in its operations. Our testing will consist of careful observation of the surrounding wells while TFD 55-7 is flowed into the Rosette, Inc. system as it has before.

We do not intend to use TFD 55-7 for injection in this operation, nor to make any other changes to the Rosette system. If the well demonstrates adequate potential, it will be deemed a "geothermal production well." At that point, Raser will proceed with development according to the requirements you have outlined and as specified in the OCD discharge permit.

Regards,

W. Layne Ashton Raser Technologies, Inc. 5152 Edgewood Drive, Suite 375 Provo, Utah 84604 Tel. (801) 765-1200 Fax (801) 374-3314 Cell (801) 473-6090 layne.ashton@rasertech.com

W. Layne Ashton Raser Technologies, Inc. 5152 Edgewood Drive, Suite 375 Provo, Utah 84604 Tel. (801) 765-1200 Fax (801) 374-3314 Cell (801) 473-6090 layne.ashton@rasertech.com

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Friday, March 12, 2010 3:09 PM
To: Layne Ashton
Cc: Ben Barker; Michael Hayter; Reeves, Jacqueta, EMNRD; VonGonten, Glenn, EMNRD
Subject: RE: Licensed Driller

Ashton:

OCD is awaiting your bond(s) for Well 55-7 along with G-101, 102 and 103 (attached schematic of existing well construction w/ proposed workover itemization for approval of the OCD.

Seems like Raser wants to just work on this well initially. You will note in the discharge permit that injection wells must be constructed at least 100 feet deeper than the deepest fresh water well in the project location; therefore, using Well 55-7 to injected the well test water may not be approvable, unless perhaps it is reconstructed to comply with the terms and conditions of the OCD Discharge Permit? Raser should determine whether there are any downgradient geothermal permit users with standing that could be adversely impacted by any cold water injection. The OCD will have to approve your planned work to see if it meets the terms and conditions of the discharge permit. Bonding must be approved before any G forms can be approved by the OCD allowing Raser to perform the work. Lastly, the construction of the temporary pits, permanent pits and/or evaporation ponds must have liners (capable of handling heat- EDPM, CSPE-R? of sufficient thickness to be approved for use at the project location. To read up on pit design and construction, please go to: <a href="http://www.emnrd.state.nm.us/ocd/documents/20098-5currentrules-new17and39.pdf">http://www.emnrd.state.nm.us/ocd/documents/20098-5currentrules-new17and39.pdf</a> (see Parts 17 and 36) for guidance. Please also be aware of Part 11 if hydrogen sulfide gas will exceed 100 ppm in a public area. There are also Geothermal Forms (<u>http://www.emnrd.state.nm.us/ocd/Forms.htm</u>) for well testing, etc. referenced in the regulations and they are available on the OCD Website at

http://www.emnrd.state.nm.us/ocd/documents/OilConservationDivisionGeothermalApplicationProcess8-18-2009.pdf. Raser must use Geothermal Forms to document everything and ultimately certain forms must be attached to individual forms requesting permission to produce and/or inject for each well Raser is planning to place into operation.

I look forward to receipt of you forms and bonding for what you are planning to do.

Please review the OCD discharge permit and contact me to discuss the discharge permit and any questions you may have on the project by Friday COB 3/19/2010. Thank you.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3490 Fax: (505) 476-3462 E-mail: <u>CarlJ.Chavez@state.nm.us</u> Website: <u>http://www.emnrd.state.nm.us/ocd/</u>index.htm (Pollution Prevention Guidance is under "Publications")

From: Layne Ashton [mailto:lashton@rasertech.com]
Sent: Friday, March 12, 2010 2:26 PM
To: Chavez, Carl J, EMNRD
Cc: Ben Barker; Michael Hayter
Subject: Licensed Driller

Carl,

I thought I'd let you know that Raser intends to use Everett D. Burgett Drilling, NM license no. 248 for going into 55-7. Burgett will bring in an appropriate rig, as well as a seasoned crew with extensive geothermal well drilling experience in

both NV and UT. Do you have any thoughts or comments? Raser is now in a position to submit the permit now that it has a licensed NM driller & supervisor selected.

Again, please let me know if you have any comments or questions. The best way to reach me is on my cell phone, which is (801) 473-6090. Thank you.

Best wishes,

W. Layne Ashton Raser Technologies, Inc. 5152 Edgewood Drive, Suite 375 Provo, Utah 84604 Tel. (801) 765-1200 Fax (801) 374-3314 Cell (801) 473-6090 layne.ashton@rasertech.com

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From: Sent: To: Cc: Subject: Chavez, Carl J, EMNRD Tuesday, March 16, 2010 7:44 AM Phillips, Haddy L., OSE Brooks, David K., EMNRD; 'Mike\_Smith@blm.gov' Lightning Dock Geothermal- Animas, NM

Haddy:

Good morning. OCD will be receiving a well work over request to re-enter the PA'd Burgett Well 55-7 in the geothermal project area. While there is no intent (as stated below by Raser in yellow highlight) to use this well as an injection well, for the purpose of Raser's well test, they are planning to run a well test where they will remove ground water and after the test, they will re-inject the ground water back into the reservoir.

As part of OCD's review of Raser's well work over request, and well test for the geothermal project, OCD would like to know if this presents any concerns by the OSE? Thank you.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 E-mail: <u>CarlJ.Chavez@state.nm.us</u> Website: <u>http://www.emnrd.state.nm.us/ocd/</u>index.htm (Pollution Prevention Guidance is under "Publications")

From: Chavez, Carl J, EMNRD
Sent: Tuesday, March 16, 2010 7:29 AM
To: 'Layne Ashton'
Cc: Ben Barker; Michael Hayter; Brooks, David K., EMNRD; Dade, Randy, EMNRD; Reeves, Jacqueta, EMNRD
Subject: RE: Licensed Driller

Ashton:

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Thank you.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 From: Layne Ashton [mailto:lashton@rasertech.com] Sent: Monday, March 15, 2010 3:38 PM To: Chavez, Carl J, EMNRD Cc: Ben Barker; Michael Hayter Subject: RE: Licensed Driller

Carl,

Thank you for your message. We are finalizing the bond and the G-100/102/103 forms now, identifying Everett D. Burgett Drilling as the driller. We will be submitting those forms this week. On the bonding, we will add TFD 55-7 under an additional bond once we have the correct API number.

We inquired about the acceptability of Mr. Burgett because we are aware of his previous interaction with the State and BLM. We wanted to offer you an opportunity to express any reservations informally, as a courtesy. Thank you for confirming his acceptability.

Please allow me to clarify the testing and injection issues regarding TFD 55-7. Rosette, Inc. has operated this well under an OSE-issued irrigation well permit for the last decade. They have established water rights and a beneficial use for its output. Our initial operation will merely open more, but not all, of the obstructed wellbore to flow, and Rosette will continue to use the fluid in its operations. Our testing will consist of careful observation of the surrounding wells while TFD 55-7 is flowed into the Rosette, Inc. system as it has before.

We do not intend to use TFD 55-7 for injection in this operation, nor to make any other changes to the Rosette system. If the well demonstrates adequate potential, it will be deemed a "geothermal production well." At that point, Raser will proceed with development according to the requirements you have outlined and as specified in the OCD discharge permit.

Regards,

W. Layne Ashton Raser Technologies, Inc. 5152 Edgewood Drive, Suite 375 Provo, Utah 84604 Tel. (801) 765-1200 Fax (801) 374-3314 Cell (801) 473-6090 layne.ashton@rasertech.com

W. Layne Ashton Raser Technologies, Inc. 5152 Edgewood Drive, Suite 375 Provo, Utah 84604 Tel. (801) 765-1200 Fax (801) 374-3314 Cell (801) 473-6090 Iayne.ashton@rasertech.com

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Friday, March 12, 2010 3:09 PM
To: Layne Ashton
Cc: Ben Barker; Michael Hayter; Reeves, Jacqueta, EMNRD; VonGonten, Glenn, EMNRD
Subject: RE: Licensed Driller

Ashton:

OCD is awaiting your bond(s) for Well 55-7 along with G-101, 102 and 103 (attached schematic of existing well construction w/ proposed workover itemization for approval of the OCD.

Seems like Raser wants to just work on this well initially. You will note in the discharge permit that injection wells must be constructed at least 100 feet deeper than the deepest fresh water well in the project location; therefore, using Well 55-7 to injected the well test water may not be approvable, unless perhaps it is reconstructed to comply with the terms and conditions of the OCD Discharge Permit? Raser should determine whether there are any downgradient geothermal permit users with standing that could be adversely impacted by any cold water injection. The OCD will have to approve your planned work to see if it meets the terms and conditions of the discharge permit. Bonding must be approved before any G forms can be approved by the OCD allowing Raser to perform the work. Lastly, the construction of the temporary pits, permanent pits and/or evaporation ponds must have liners (capable of handling heat- EDPM, CSPE-R? of sufficient thickness to be approved for use at the project location. To read up on pit design and construction, please go to: <a href="http://www.emnrd.state.nm.us/ocd/documents/20098-5currentrules-new17and39.pdf">http://www.emnrd.state.nm.us/ocd/documents/20098-5currentrules-new17and39.pdf</a> (see Parts 17 and 36) for guidance. Please also be aware of Part 11 if hydrogen sulfide gas will exceed 100 ppm in a public area. There are also Geothermal Forms (<a href="http://www.emnrd.state.nm.us/ocd/Forms.htm">http://www.emnrd.state.nm.us/ocd/Forms.htm</a>) for well testing, etc. referenced in the regulations and they are available on the OCD Website at

<u>http://www.emnrd.state.nm.us/ocd/documents/OilConservationDivisionGeothermalApplicationProcess8-18-2009.pdf</u>. Raser must use Geothermal Forms to document everything and ultimately certain forms must be attached to individual forms requesting permission to produce and/or inject for each well Raser is planning to place into operation.

I look forward to receipt of you forms and bonding for what you are planning to do.

Please review the OCD discharge permit and contact me to discuss the discharge permit and any questions you may have on the project by Friday COB 3/19/2010. Thank you.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 E-mail: <u>CarlJ.Chavez@state.nm.us</u> Website: <u>http://www.emnrd.state.nm.us/ocd/</u>index.htm (Pollution Prevention Guidance is under "Publications")

From: Layne Ashton [mailto:lashton@rasertech.com]
Sent: Friday, March 12, 2010 2:26 PM
To: Chavez, Carl J, EMNRD
Cc: Ben Barker; Michael Hayter
Subject: Licensed Driller

Carl,

I thought I'd let you know that Raser intends to use Everett D. Burgett Drilling, NM license no. 248 for going into 55-7. Burgett will bring in an appropriate rig, as well as a seasoned crew with extensive geothermal well drilling experience in both NV and UT. Do you have any thoughts or comments? Raser is now in a position to submit the permit now that it has a licensed NM driller & supervisor selected.

Again, please let me know if you have any comments or questions. The best way to reach me is on my cell phone, which is (801) 473-6090. Thank you.

Best wishes,

W. Layne Ashton Raser Technologies, Inc. 5152 Edgewood Drive, Suite 375 Provo, Utah 84604 Tel. (801) 765-1200 Fax (801) 374-3314 Cell (801) 473-6090 layne.ashton@rasertech.com

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From:Chavez, Carl J, EMNRDSent:Thursday, February 25, 2010 8:18 AMTo:'Mike\_Smith@blm.gov'Subject:RE: Otero County Oil Well PAs BLM Forms

Mike:

Could you please give me a call to communicate about this recent Well 55-7 well work when you get a chance. Thank you.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 E-mail: <u>CarlJ.Chavez@state.nm.us</u> Website: <u>http://www.emnrd.state.nm.us/ocd/index.htm</u> (Pollution Prevention Guidance is under "Publications")

-----Original Message-----From: Mike\_Smith@blm.gov [mailto:Mike\_Smith@blm.gov] Sent: Thursday, February 25, 2010 7:47 AM To: Chavez, Carl J, EMNRD Subject: Re: Otero County Oil Well PAs BLM Forms

Hi Carl:

Thanks for forwarding the FANs to OCD Artesia. I'll send copies of future FANs to the OCD district offices when they come in to BLM.

You probably spoke with the reps from Raser Technology last week. They informed me they want to re-open well 55-7, perform a flow-test, and possibly bring it into production. They have been informed that the will have to submit a Geothermal Permit to Drill to meet Federal requirements (c.f. 43 CFR 3260.10).

Regards,

Michael Smith Geologist - BLM Las Cruces District Office 1800 Marquess Street Las Cruces, NM 88005 575-525-4421 Mike\_Smith@blm.gov

> "Chavez, Carl J, EMNRD" <CarlJ.Chavez@sta To te.nm.us> <<u>Mike\_Smith@nm.blm.gov</u>> cc 02/24/2010 04:16 PM Subject

Subject Otero County Oil Well PAs BLM Forms (Embedded image moved to file: pic10200.gif) Hey Mike.

FYI, you may forward BLM forms like those O&G PA forms to the OCD District Office Supervisor based on the county the well work was performed in. I have forwarded the forms to the OCD Artesia District Office.

For example, go to <u>http://www.emnrd.state.nm.us/ocd/AboutUs.htm</u> and click on the map to obtain a mail address to the corresponding OCD District Office that the BLM forms may be sent to.

Please contact me if I may be of further assistance. Thank you.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 E-mail: <u>CarlJ.Chavez@state.nm.us</u> Website: <u>http://www.emnrd.state.nm.us/ocd/index.htm</u> (Pollution Prevention Guidance is under "Publications")

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2

From:Chavez, Carl J, EMNRDSent:Thursday, February 25, 2010 8:15 AMTo:'Mike\_Smith@blm.gov'Subject:RE: Otero County Oil Well PAs BLM Forms

Thanks for the communication Mike.

OCD will be receiving G-101, 102 and 103 Forms to re-enter the well. Raser will need to provide a diagram of the existing well construction conditions outlining their plans for the well for OCD approval.

Please note that all information going forward with this project may be found under the API# and/or the facility permit "GTHT-1" at OCD Online (http://ocdimage.emnrd.state.nm.us/imaging/AEOrderFileView.aspx?appNo=pCJC0813635742). The G-103 will be placed under the "Workover Requests" Thumbnail.

The OCD is involved with a Geothermal Working Group to identify deep source geothermal resources, make technical and policy recommendations for streamlining the commercial power generation process. You may monitor the issues and even become involved by going to OCD Online "UIC-999." Stephen Lucero of the EMNRD- ECMD is heading up the group and in charge of stimulus funding that New Mexico Tech will be funded to develop a geothermal resource database. In addition, the OCD has be re-evaluating its geothermal regulations and now believes that it may also be responsible for low-termperature geothermal resources where the intent is to extract the heat. I will forward the recent correspondence and meeting related to this new development. It comes at a time when the state is working to be the leader in inter-intrastate renewable energy programs, including geothermal power production.

Thanks for the communication.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 E-mail: CarlJ.Chavez@state.nm.us Website: http://www.emnrd.state.nm.us/ocd/index.htm (Pollution Prevention Guidance is under "Publications")

-----Original Message-----From: Mike\_Smith@blm.gov [mailto:Mike\_Smith@blm.gov] Sent: Thursday, February 25, 2010 7:47 AM To: Chavez, Carl J, EMNRD Subject: Re: Otero County Oil Well PAs BLM Forms

Hi Carl:

Thanks for forwarding the FANs to OCD Artesia. I'll send copies of future FANs to the OCD district offices when they come in to BLM.

You probably spoke with the reps from Raser Technology last week. They informed me they want to re-open well 55-7, perform a flow-test, and possibly bring it into production. They have been informed that the will have to submit a Geothermal Permit to Drill to meet Federal requirements (c.f. 43 CFR 3260.10).

Regards,

Michael Smith Geologist - BLM Las Cruces District Office 1800 Marquess Street Las Cruces, NM 88005 "Chavez, Carl J, EMNRD" <CarlJ.Chavez@sta To te.nm.us> <Mike\_Smith@nm.blm.gov> cc

02/24/2010 04:16 PM Subject Otero County Oil Well PAs BLM Forms

(Embedded image moved to file: pic10200.gif) Hey Mike.

FYI, you may forward BLM forms like those O&G PA forms to the OCD District Office Supervisor based on the county the well work was performed in. I have forwarded the forms to the OCD Artesia District Office.

For example, go to http://www.emnrd.state.nm.us/ocd/AboutUs.htm and click on the map to obtain a mail address to the corresponding OCD District Office that the BLM forms may be sent to.

Please contact me if I may be of further assistance. Thank you.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 E-mail: CarlJ.Chavez@state.nm.us Website: http://www.emnrd.state.nm.us/ocd/index.htm (Pollution Prevention Guidance is under "Publications")

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From:Chavez, Carl J, EMNRDSent:Wednesday, February 10, 2010 9:14 AMTo:'Mike\_Smith@blm.gov'Cc:'Michael Hayter'; Reeves, Jacqueta, EMNRDSubject:RE: Raser Technologies Bonding (GTHT-001) & Well 55-7 Info.

Mike:

Yeah, if the well was officially PA'd, then OCD would require a G-101, G-102 and G-103 for the well work over. Send the forms directly to me. OCD would need to issue an API# for it and make sure bonding is in place for any wells used in the geothermal project. Raser also knows there are Federal requirements as well. Thnx.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 E-mail: CarlJ.Chavez@state.nm.us Website: http://www.emnrd.state.nm.us/ocd/index.htm (Pollution Prevention Guidance is under "Publications")

-----Original Message-----From: Mike\_Smith@blm.gov [mailto:Mike\_Smith@blm.gov] Sent: Wednesday, February 10, 2010 7:46 AM To: Chavez, Carl J, EMNRD Subject: RE: Raser Technologies Bonding (GTHT-001) & Well 55-7 Info.

Carl:

Thanks for keeping me in the loop on these issues. Layne Ashton has asked me to call him, so it's probably about Well 55-7.

If this well has been plugged and abandoned, then Raser will most likely need to submit a geothermal drilling permit

Regards,

Michael Smith Geologist - BLM Las Cruces District Office 1800 Marquess Street Las Cruces, NM 88005 575-525-4421 Mike\_Smith@nm.blm.gov

> "Chavez, Carl J, EMNRD" <CarlJ.Chavez@sta To te.nm.us> "Chavez, Carl J, EMNRD" <CarlJ.Chavez@state.nm.us>, 02/09/2010 11:45 "Michael Hayter" AM <Michael.Hayter@rasertech.com> cc "Layne Ashton"

<lashton@rasertech.com>, "Ben Barker" <Ben.Barker@rasertech.com>, <Mike\_Smith@blm.gov>, "Brooks, David K., EMNRD" <david.brooks@state.nm.us>, "Dade, Randy, EMNRD" <Randy.Dade@state.nm.us>, "Reeves, Jacqueta, EMNRD" <Jacqueta.Reeves@state.nm.us>, "Sanchez, Daniel J., EMNRD" <daniel.sanchez@state.nm.us> Subject RE: Raser Technologies Bonding (GTHT-001) & Well 55-7 Info.

Mike:

David Brooks has replied with the following in relation to the new project production/development well in the above subject proposed to be re-worked by Raser.

Carl

I am not entirely clear on the facts. As I read the applicable bonding requirements, if they plan to drill four "deep" (=>2,000 feet) wells under their multi-well bonds, no additional wells can be covered under that bond, and an single-well bond in the applicable amount would be required for each additional well.

I do not know if the issue is involved here, but the references to BLM in the emails cause me to address it. I find nothing in the Geothermal Resources Act or the Geothermal rules that limits bonding requirements to non-federal lands. Thus, it would seem that a geothermal operator, unlike an oil and gas operator, would have to furnish a bond to OCD in the applicable amount for a geothermal well on federal land, the same as if it were on State or private land.

David

Consequently, further evaluation of OCD Geothermal Regulations (see yellow highlighted) indicates the following:

### 19.14.20.8 PLUGGING BOND:

Α.

Any person who has drilled or is drilling or

proposes to drill any geothermal resources well shall post with the division, and obtain approval thereof, a bond, in a form approved by the division, conditioned to plug such well, if non-productive or when abandoned, in such a way as to confine all fluids in their native strata.

Each such bond shall be executed by a responsible surety company authorized to transact business in the state of New Mexico and shall describe, or by subsequent rider describe, the name and exact location of the well, or wells, covered by the bond. Bonds may be either one-well bonds or multi-well bonds, in the amounts stated below in accordance with type of bond and depth of well(s):

(1) One-well bonds:	
Projected depth of proposed well or	
Actual depth of existing well	Amount of
bond	
Less than 500 feet deep ("shallow")	\$2,000
500 feet to 2,000 feet deep ("intermediate")	\$3,000
More than 2,000 feet deep ("deep")	\$5,000.

From:	Chavez, Carl J, EMNRD
Sent:	Tuesday, February 09, 2010 9:29 AM
То:	'Ben Barker'
Cc:	Mike_Smith@blm.gov
Subject:	RE: Raser Technologies Bonding (GTHT-001) & Well 55-7 Info.

Ben:

Interesting..... If you look through the Well 55-7 file link below I believe there is a PA form with associated info. Thanks.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 E-mail: <u>CarlJ.Chavez@state.nm.us</u> Website: <u>http://www.emnrd.state.nm.us/ocd/</u>index.htm (Pollution Prevention Guidance is under "Publications")

From: Ben Barker [mailto:Ben.Barker@rasertech.com]
Sent: Tuesday, February 09, 2010 8:57 AM
To: Chavez, Carl J, EMNRD
Subject: RE: Raser Technologies Bonding (GTHT-001) & Well 55-7 Info.

Mike,

The wellhead is still in place so I don't think it qualifies as a P&A. Was it reported to BLM as such? Ben

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Tuesday, February 09, 2010 8:52 AM
To: Michael Hayter
Cc: Layne Ashton; Ben Barker
Subject: RE: Raser Technologies Bonding (GTHT-001) & Well 55-7 Info.

Mike:

No problem. I'm coordinating with Mike Smith (Bureau of Land Management) on the above subject well. It appears to be an ancillary well to the OCD discharge permit and the OCD must coordinate with BLM on Federal wells. Wells that are plugged and abandoned revert back to the landowner, and in this case it is the BLM I believe? Thanks.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 E-mail: <u>CarlJ.Chavez@state.nm.us</u> Website: <u>http://www.emnrd.state.nm.us/ocd/</u>index.htm (Pollution Prevention Guidance is under "Publications")

**From:** Michael Hayter [mailto:Michael.Hayter@rasertech.com] **Sent:** Tuesday, February 09, 2010 8:44 AM **To:** Chavez, Carl J, EMNRD

### Cc: Layne Ashton; Ben Barker

Subject: RE: Raser Technologies Bonding (GTHT-001) & Well 55-7 Info.

Carl,

Thank you. Unfortunately, I must postpone today's meeting. Our equity partner, Evergreen who is funding drilling, called a last minute meeting to discuss the Lightning Dock project. I'll be in touch later today or tomorrow to reschedule. I'm sorry for the change, I hope it doesn't cause any problems.

Best, Mike

Director - Geothermal Business Development Raser Technologies, Inc. 5152 North Edgewood Drive Provo, Utah 84003 Office: +1.801.765.1200 x216 Mobile: +1.801.589.1872 www.rasertech.com

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Tuesday, February 09, 2010 7:50 AM
To: Michael Hayter
Subject: FW: Raser Technologies Bonding (GTHT-001) & Well 55-7 Info.

FYI. Please find below OCD's most recent bond contact from Well Fargo.

Also, regarding Well 55-7, I located Well 55-7 information and have provided the file location related to the well. I notice from my preliminary review of the file that it is a Federal well with some history, i.e., directionally drilled and/or whip stocked and it went through a couple of well owners. The well was PA'd as you had indicated.

AMAX (GTLT-005) First Row Last Column File http://ocdimage.emnrd.state.nm.us/imaging/AEOrderFileView.aspx?appNo=pCJC0912464638

I look forward to meeting with you today. Thank you.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 E-mail: <u>Carl J. Chavez@state.nm.us</u> Website: <u>http://www.emnrd.state.nm.us/ocd/</u>index.htm (Pollution Prevention Guidance is under "Publications")

From: Barnes, Patrick [mailto:Patrick\_Barnes@wellsfargois.com]
Sent: Thursday, February 05, 2009 8:55 AM
To: Chavez, Carl J, EMNRD
Subject: RE: Raser Technologies

Mr.. Chavez,

Thanks for your response to my inquiry. I have talked to Mr.. Brooks and he has cleared up the questions I had regarding the bond forms. One other question has developed as a result of my discussions with the risk. That is, is it possible to

bond the \$50,000 sum required for geothermal injection wells? The form we have is entitled "Cash Plugging Bond" but it appears to be an assignment of cash collateral. The account would rather handle this with a bond from a surety if that is acceptable to you. Please let me know if that is something you would accept. Thanks for your continued assistance on this matter.

Patrick Barnes CIC Sr. Account Executive Wells Fargo Insurance Services 1095 E. 2100 S. Ste 200 SLC, Utah 84106 Tel: (801) 246-4376 Fax: (801) 485-5217

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Friday, January 30, 2009 10:52 AM
To: Barnes, Patrick
Cc: Watson, Jason F.; Brooks, David K., EMNRD; Gum, Tim, EMNRD
Subject: RE: Raser Technologies

Mr. Patrick:

A couple of issues from your note that I request that you follow-up on:

- Please contact Mr. David Brooks at (505) 476-3450 about the outdated and penal sum of the bonds being incorrect. Attorney Brooks developed the bond documentation for Los Lobos or Raser Technologies. Please be advised that the bond documents must reference "Los Lobos Renewable Power, LLC. as the application was received under Los Lobos. The amounts of bonds are split between regulations, i.e., WQCC (\$50K multi-injection wells) vs. OCD geothermal (Amts. split for multi vs. single) production well bonding requirements.
- I have forwarded the draft discharge permit (see attachment) to Mr. Tim Gum of the OCD Artesia Office to crosscheck issued API#s from him to identify any incorrect API#s in the draft discharge permit page 1 and in Section 21 (see OCD draft discharge permit with references to API#s and the most recent discharge permit that I sent to Mr. Gum to double check). I will work with Mr. Gum to make sure you have the correct API#s for the bond.

You may also contact Mr. Gum of the OCD District 2 Office in Artesia at (575) 748-1283 (X 102). Please contact me if you have questions. Thank you.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3491 Fax: (505) 476-3462 E-mail: <u>CarlJ.Chavez@state.nm.us</u> Website: <u>http://www.emnrd.state.nm.us/ocd/</u>index.htm (Pollution Prevention Guidance is under "Publications")

From: Barnes, Patrick [mailto:Patrick\_Barnes@wellsfargois.com]
Sent: Friday, January 30, 2009 9:10 AM
To: Chavez, Carl J, EMNRD
Cc: Watson, Jason F.
Subject: Raser Technologies

Mr. Chavez, we are in the final stages of securing the bonds needed for this company to proceed with the geothermal projects planned in the state of New Mexico. The surety informs us that the bond forms we have referenced are outdated and the penal sum of the bonds is also incorrect. Could you please provide us with the proper bond forms and also the

penal sum of the bonds that are required. Could you also please confirm the API numbers for each of these bonds, as the surety also indicated that one of those was not correct.

Thanks you for your assistance. Please give me a call if you would like to discuss the matter further. We look forward to getting this matter resolved in the near future.

Patrick Barnes CIC Sr. Account Executive Wells Fargo Insurance Services 1095 E. 2100 S. Ste 200 SLC, Utah 84106 Tel: (801) 246-4376 Fax: (801) 485-5217

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From:	Chavez, Carl J, EMNRD
Sent:	Tuesday, February 09, 2010 9:25 AM
То:	'Michael Hayter'
Cc:	Layne Ashton; Ben Barker; Mike_Smith@blm.gov; Brooks, David K., EMNRD
Subject:	RE: Raser Technologies Bonding (GTHT-001) & Well 55-7 Info.

Good communication on this matter. I will confer with our Attorney Mr. Brooks and get back with you based on the situation (re-entry into a PA'd well).

The issue as I see it is whether OCD may require 2 multi-well bonds for the production/development wells under the OCD Geothermal Regulations that should cover Raser with any additional PA'd wells that it would like to re-enter. Stay tuned....

Regarding BLM, I see you have copied Mike Smith who can provide any Federal information based on your intent. Thank you.

Carl J. Chavez, CHMM New Mexico Energy, Minerals & Natural Resources Dept. Oil Conservation Division, Environmental Bureau 1220 South St. Francis Dr., Santa Fe, New Mexico 87505 Office: (505) 476-3490 Fax: (505) 476-3462 E-mail: <u>CarlJ.Chavez@state.nm.us</u> Website: <u>http://www.emnrd.state.nm.us/ocd/</u>index.htm (Pollution Prevention Guidance is under "Publications")

From: Michael Hayter [mailto:Michael.Hayter@rasertech.com]
Sent: Tuesday, February 09, 2010 9:17 AM
To: Chavez, Carl J, EMNRD
Cc: Layne Ashton; Ben Barker; Mike\_Smith@blm.gov
Subject: RE: Raser Technologies Bonding (GTHT-001) & Well 55-7 Info.

We understand regarding the well diagram. We will provide that and the plant for re-entry and testing. Regarding bonding, my understanding is that we are covered under the existing bond we have with BLM. As for the OCD bond which we will submit in the near future, please let us know how to proceed. We are submitting for 5 exploratory wells ( a single well bond and a deep multi-well bond for 4 wells, in addition to the injection well bond), so can we include 55-7 in these bonds or add it as a 6<sup>th</sup> well under a single well bond?

Thanks,

Mike

Director - Geothermal Business Development Raser Technologies, Inc. 5152 North Edgewood Drive Provo, Utah 84003 Office: +1.801.765.1200 x216 Mobile: +1.801.589.1872 www.rasertech.com

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I look forward to meeting with you today. Thank you.

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Sent: Thursday, February 05, 2009 8:55 AM
To: Chavez, Carl J, EMNRD
Subject: RE: Raser Technologies

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Sent: Friday, January 30, 2009 10:52 AM
To: Barnes, Patrick
Cc: Watson, Jason F.; Brooks, David K., EMNRD; Gum, Tim, EMNRD
Subject: RE: Raser Technologies

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From: Sent: To: Cc: Subject: Chavez, Carl J, EMNRD Tuesday, February 09, 2010 9:11 AM 'Michael Hayter' Layne Ashton; Ben Barker; 'Mike\_Smith@blm.gov' RE: Raser Technologies Bonding (GTHT-001) & Well 55-7 Info.

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#### Administrative/Environmental Order Search - Select Documents to View

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Clicking the "View All" button below will download a single file containing all documents. "View All" will select only those thumbnails shown in the currently selected API Number. If you wish to select a different API Number, please use the "Go Back" button. "View All" may take several minutes.

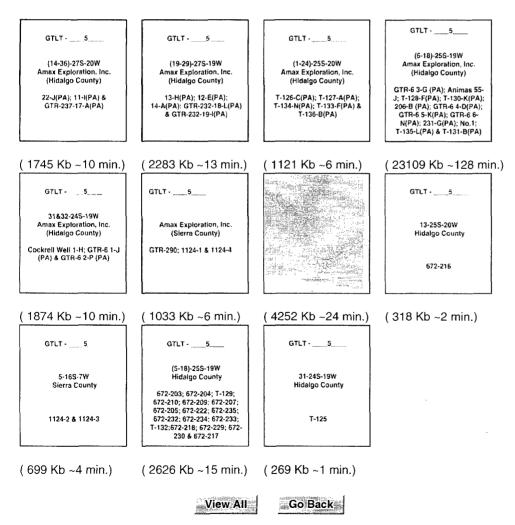
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Entity:

API Number(s):

**Operator:** AMAX Exploration Inc.

**Note:** If you are using Microsoft Internet Explorer and your system does not allow you to open TIFF images from the Internet without saving them first, please contact your administrator. You may be experiencing a problem with the Internet Explorer Cumulative Patch. Please refer to the Microsoft Knowledge Base Article, Q319829, "Cannot Open a Tagged Information File Format (TIFF) File in Internet Explorer", located <u>here</u>.



## GTLT - \_\_\_\_5\_\_\_\_

## (6-18)-25S-19W Amax Exploration, Inc. (Hidalgo County)

GTR-6 3-G (PA); Animas 55-J; T-128-F(PA); T-130-K(PA); 206-B (PA); GTR-6 4-D(PA); GTR-6 5-K(PA); GTR-6 6-N(PA); 231-G(PA); No.1; T-135-L(PA) & T-131-B(PA)

#### Chavez, Carl J, EMNRD

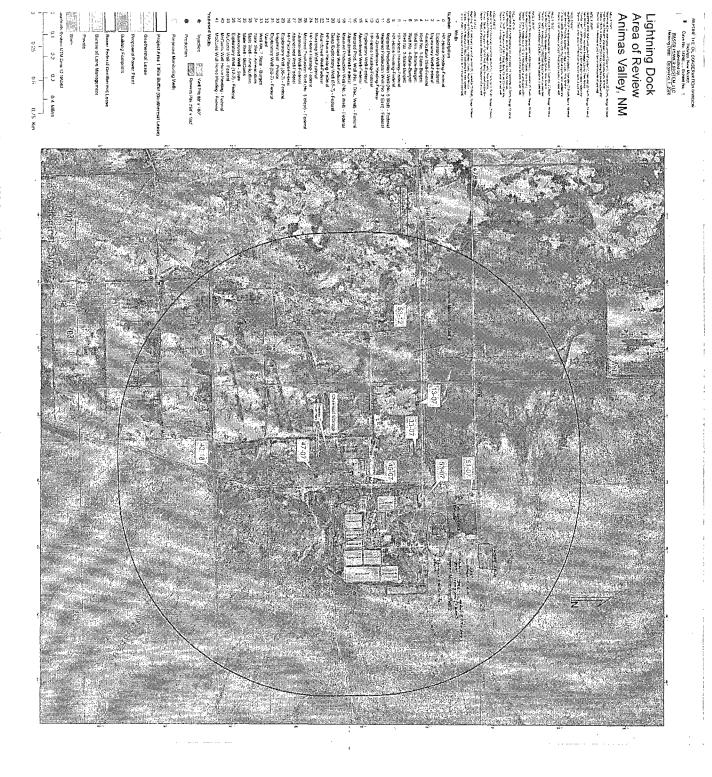
Subject: Location:	Raser Technologies Meeting (Lightning Dock Geothermal) TBD
Start: End:	Tue 2/9/2010 1:00 PM Tue 2/9/2010 3:00 PM
Recurrence:	(none)
Meeting Status:	Meeting organizer
Organizer: Required Attendees:	Chavez, Carl J, EMNRD Michael Hayter; Sanchez, Daniel J., EMNRD; Jones, William V., EMNRD; VonGonten, Glenn, EMNRD

FYI. Time is approximate.....

Mike Hayter of Raser Technologies may stop by with a few employees to discuss the above subject project, introduce employees, and deliver a G-103 Sundry Notice for well work on Burgett Well 55-7.

Mike Hayter Ben Ashton (1 yr. w/ Raser) Wayne Ashton (daily PM in Lordsburg, NM)

Well 55-7 Work Over w/ G-103 Form Plugged in 1984 Additional Capital received for more work in Lordsburg Sending well bonds for project soon OSE hearing in about 4 to 6 weeks Signed APDs will occur after OCD Bond approval letter(s) goes out. Correlative Rights: Only for permitted high temperature geothermal users (>250 F) under OCD NMSA and NMAC.

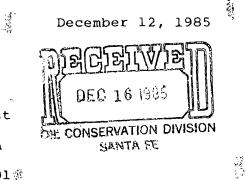


STHT .

## Public Meeting Map

# 12/01/2008

STEAM RESERVE CORPORATION STEAM RESERVE CORPORATION STEAM RESERVE CORPORATION STEAM RESE



Mr. Roy E. Johnson Senior Petroleum Geologist State of New Mexico Oil Conservation Division P.O. Box 2088 Santa Fe, New Mexico 87501#

> Re: Steam Reserve Corporation's Geothermal Well No. 55 Animas Project, Hidalgo County

Dear Mr. Johnson:

Pursuant to our phone conversation please find enclosed a Geothermal Sundry Notice which supplements the plugging work approved for Steam Reserve Corporation's deep geothermal well at Animas. The previous Sundry Notice provided that the well would be left open at the top and turned over to Mr. Burgett. SRC now plans to set two additonal cement plugs, one at the casing shoe and one at the surface as described on the attached Sundry Notice.

Work is planned to commence for plugging of the well on or about December 17, 1985. We look forward to receiving your approved Sundry Notice.

Very truly yours,

STEAM RESERVE CORPORATION

terita (lament

Anita Clement Permit Administrator

LC Zones 2275 4060 Gas Kicks 2600 -2800

6050 - 6130

holly owned subsidiary of AMAX Exploration, Inc.

1707 COLE BOULEVARD . GOLDEN, COLORADO 80401 . (303) 234-9020 . TELEX: 45-556

	Form G-103.
0. OF COPIES RECEIVED NEW MEXICO OIL CONSERVATION COMMISSION	Adopted 10/1/7
DISTRIBUTION P. O. Box 2088, Santa Fe. 87501	
File	
N. M. B. M. SUNDRY NOTICES AND REPORTS	
J. S. G. S ON	5. Indicate Type of Lease
Operator GEOTHERMAL RESOURCES WELLS	State Fed. & Fee X
Land Office	5.a State Lease No. N/A
Do Not Use This Form for Proposals to Drill or to Deepen or Plug Back to a Different Reservoir. Use "Application For Permit	
Type of well Geothermal Producer Comp. Observation Cother: Geothermal Cow-Temp Thermal Cov-Temp Injection/Disposal Coverage Exploration	7. Unit Agreement Name N/A
2. Name of Operator Steam Reserve Corporation	MM-34790 - Minerals Dale Burgett - Surface
3. Address of Operator 1707 Cole Blvd., Golden, CO 80401	9. Well No. 55
4. Location of Well Unit Letter	10. Field and Pool, or Wildeat Wildeat
The South Line, Section 7 25 South Range 19 West NMPM	(/////////////////////////////////////
TITLE Elevation (Show whether DF, RT, GR, etc.)	12. County
\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Hidalgo
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PULL OR ALTER CASING L. CHANGE PLANS L. CASING TEST AND CEMENT JOI	3 .
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17 Describe Proposed or completed Operations (Clearly state all pertinent details, and give pertinenet dates, ine	hading estimated date of starting any
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Mr. Roy E. Johnson Senior Petroleum Geologist State of New Mexico Oil Conservation Division P.O. Box 2088 Santa Fe, New Mexico 87501

> Re: Steam Reserve Corporation's Geothermal Well No. 55 - Animas Project, Hidalgo County

Dear Mr. Johnson:

Steam Reserve Corporation completed abandonment work at its geothermal exploration well No. 55 at the above-referenced project. Attached is a Sundry Notice with a detailed description of the work performed. Also included for your records are job logs and summary from Halliburton Services, and description of work from American Well Servicing Company.

Upon approval of the Sundry Notice please return one copy to me for completion of our files.

Very truly yours,

STEAM RESERVE CORPORATION

Arita Cloment

Anita Clement Permit Administrator

/ac

A wholly owned subsidiary of AMAX Exploration, Inc. 1707 COLE BOULEVARD • GOLDEN, COLORADO 80401 • (303) 234 9020 • TELEX: 45-556

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#### ABANDONMENT WORK ANIMAS 55-7 DECEMBER 20-23, 1985 John E. Deymonaz

12/20 Halliburton and American Well Servicing Co. move equipment to Lordsburg, N.M.

12/21 American moves workover rig to Animas 55-7 and sets up. Worked tubing for 2 hours, pulling up to 100,000 pounds, could not pull free. Halliburton arrived about noon, hooked up pumps and circulated through tubing for 2 hours while American worked the tubing. Pulled free about 2 PM. Pulled tubing back to 5500 feet and set 70 sack (98 cubic feet) plug from 5500-5400 feet. Pulled 33 joints and circulated. After 30 minutes circulation hole began unassisted two-phase flow which lasted for about 30 minutes. Flow was through 3 inch flow line at bottom of wellhead. Leakage at top of wellhead was prevented by stripper assembly.

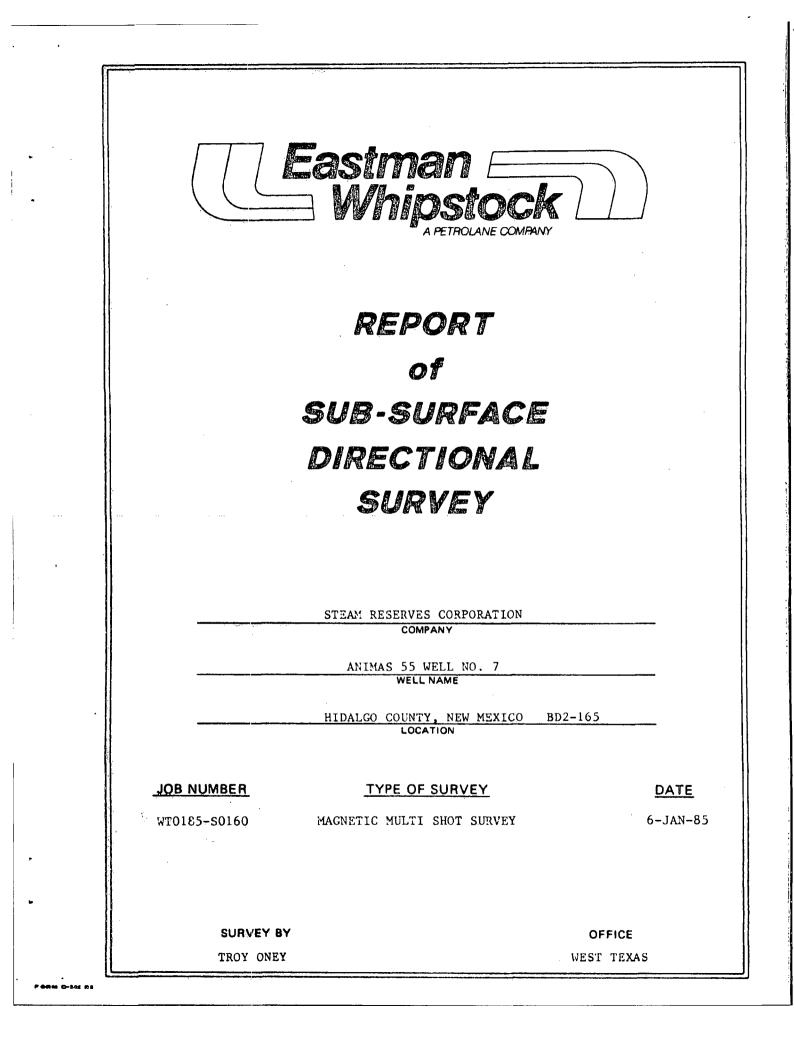
12/22 Circulate through tubing, well began unassisted two-phase flow for about 30 minutes. Pulled tubing to 2090 feet and set 170 sack plug (238 cubic feet) from 2090-1890 feet. Stood back six stands of tubing (600 feet) and WOC for three hours. RIH, tag cement at 1980 feet. Pull tubing to 1500 feet and set 100 sack plug (140 cubic feet) from 1500-1400 feet. Pull tubing to 1100 feet, set 80 sack plug (112 cubic feet) from 1100-1000 feet stand back six stands and WOC three hours. RIH, tag cement at 1050 feet. Pull tubing to 50 feet and plug from 50 feet to surface using 50 sacks (56 cubic feet). Flush out wellhead with water, shut down.

- 12/23 American and Halliburton rig down equipment and leave location. Dale Burgett crew dig out cellar below wellhead, cut off wellhead and erect monument of 4 inch casing. Cellar will be filled in and monument will be approximately six feet above ground level.
- Equipment removed from well and laid down on drill pad includes: 213 joints (7189 feet) of J55 2-7/8 inch tubing. Includes 4 joints already on location.
  - 4 2-7/8 inch Baker Model L sliding sleeves.
  - 1 2-7/B inch bull nosed check valve.
  - 3 3 inch Barton geothermal gate valves.
  - 1 13 5/8" x 7 1/16" adapter spool.
  - 1 7 1/16" x 2 7/8" 8 round 3M adapter spool.
  - 1 13 5/8" x 13 3/8" casing hear w/ 2 3" ext. flanges. 2 3 inch companion flanges.
  - Misc studs and nuts.

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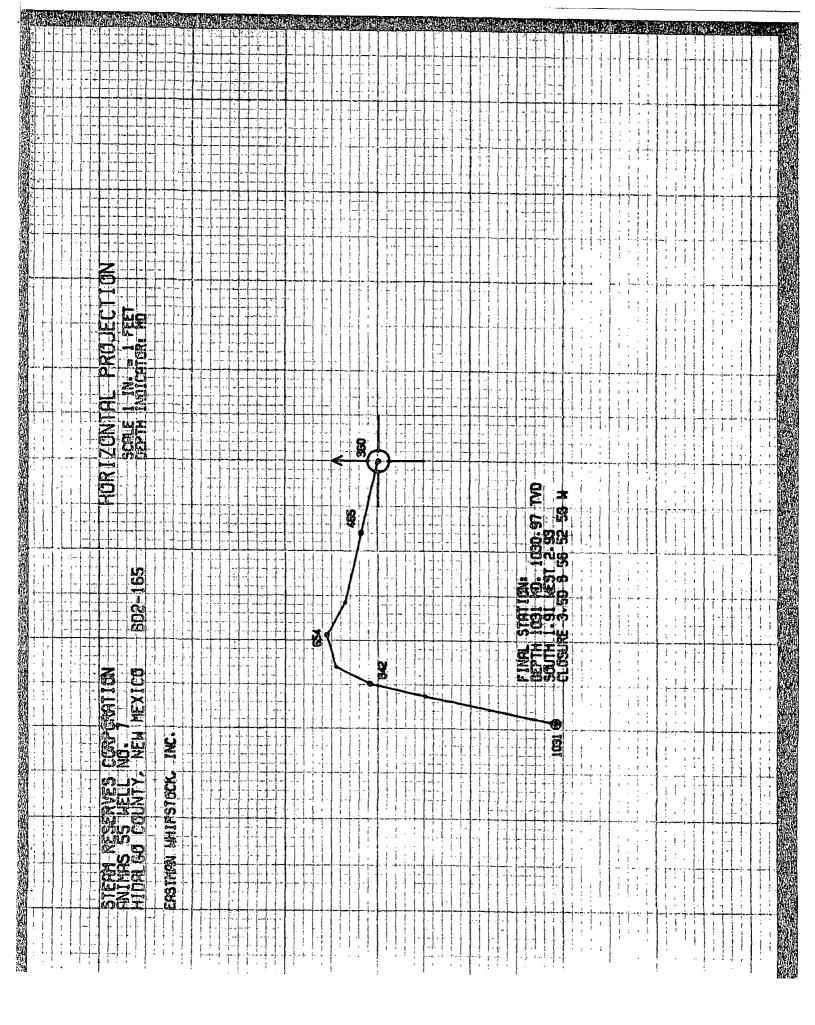
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P.O. Box 6341/Midland, Texas 79711-0341/(915) 563-0511

#### SURVEY CERTIFICATION SHEET

STATE OF TEXAS COUNTY OF MIDLAND

I, TROY ONEY , in the employ of Eastman Whipstock, Inc., did on the days of JAN. 6th ,1985 thru JAN. 6th , 1985 conduct or supervise the taking of a <u>MAGNETIC MULTI SHOT</u> survey by the method of magnetic orientation from a depth of <u>360</u> feet to <u>1031</u> feet, with recordings of inclination and direction being obtained at approximate intervals of <u>94</u> feet.

This survey was conducted	at the request of	STEAM RESERVES	CORP.
for their ANIMAS 55 WELL	NO. 7	HIDALGO	County,
State of <u>NEW MEXICO</u>	, in the		field.

This data for this survey and the calculation were obtained and performed by me according to standards and procedures as set forth by Eastman Whipstock, Inc. and is true and correct to the best of my knowledge.

Directional Supervisor/Surveyor

The data for this survey has been examined by me and confirms to principles and procedures set forth by Eastman whipstock. Inc.

Before me, the undersigned authority, on this day personally appeared <u>TROY ONEY</u>, known to me to be the person whose name is subscribed to this instrument, who after being by me duly sworn on oath, states that he has knowledge of all the facts stated above and that this information is a true statement of facts therein recited.

Subscribed and sworn to before me on this 10, 19 85.

day of

Notary Jublic In and for the County of Midland, Texas



Directional Drillers/Sub-Surface Surveyors/Instrument & Tool Rentals/Sales/Worldwide

			Form G-103 Adopted 10/1/74
NO. OF COPIES RECEIVED	NEW MEXICO OIL CONSER	RVATION COMMISSION	
DISTRIBUTION	P. O. Box 2088, S	anta Fe 87501	
File	-		
N. M. B. M.	SUNDRY NOTICES	AND REPORTS	
U, S, G, S	ON		5. Indicate Type of Lease
Operator	GEOTHERMAL RES	OURCES WELLS	State 🗌 Fed. & Fee 🗶
Land Office			5.a State Lease No.
			N/A
Do Not Use This Form for Proposals to For Permit —" (Form G-101) for Such I			
1. Type of well Geothermal Produ	ucer Temp. Observation	Other: Geothermal	7. Unit Agreement Name
Low-Temp Therm	nal 🔲 Injection/Disposal [	Exploration	·
2. Name of Operator			8. Farm or Lease Name
Steam Reserve Co	prporation		NM-34790 - Minerals
3. Address of Operator	· · · · ·		Archie Green - Surface
1707 Cole Blvd.,	, Golden, CO 80401		55
4. Location of Well			10. Field and Pool, or Wildcat
Unit Letter24	111.9 Feet From The East	Line andFeet From	Wildcat
The South Line, Section	7 Township 25 S		12. County
	GR 4201'		Hidalgo
16. Check	k Appropriate Box To Indicate Nat	ure of Notice, Report or Other Da	ita
NOTICE OF INTE	NTION TO:	SUBSEQUE	NT REPORT OF:
PERFORM REMEDIAL WORK	PLUG AND ABANDON	REMEDIAL WORK	
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OTHER <u>Change of Oper</u>	rator 🛛 🕅		
17. Describe Proposed or completed C proposed work) SEE RULE 203.	Operations (Clearly state all pertinent o	letails, and give pertinenet dates, incl	uding estimated date of starting any
	poration is the new Opera Subsidiary of AMAX Explor		

Note: Steam Reserve Corporation holds record title to all former AMAX Exploration, Inc. geothermal leases in New Mexico.

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OIL CONSERVATIO	
SANTA FE	

APPROVED BY LO PLANY:

So. of COP 65 BECLIVED       New VENCO DL CONSENTION COMMISSION         DISTINUUTON       P. 0. Bot 2005, seek re 2701         So. B. 2005, Seek re 2701       SUNDRY NOTICES AND REPORTS         So. B. 2007, Song 2007       SUNDRY NOTICES AND REPORTS         Song 2007       Seek report of products in Different of Plag Back to a Different Statement. Use "Analization"         Different for products in Different of Plag Back to a Different Statement. Use "Analization"       NA         Different for products in Different of Plag Back to a Different Statement. Use "Analization"       NA         Different for products in Different of Plag Back to a Different Statement. Use "Analization"       NA         Different for products in Different of Plag Back to a Different Statement. Use "Analization"       NA         Different for products in Different Statement Component ()       Others: Geothermall ()       Note of Nation ()         Different for products in Different Statement Component ()       Different for Nation ()       Note of Nation ()         Different for product in the Different Statement Component ()       Different for Nation ()       Note of Nation ()         Different for product in the Different for product in the Different Statement for on Nation ()       Different for Nation ()       Different for Nation ()         Different for product in the Different for product in the Different for Offerent Statement for on Nation ()       Different for Plag Page for Nation ()       Diff		Form G-103 Adopted 10/1/7
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for Barriel		N/A
Low-Termy Terms         Construction         NAMe           1 Name of Operation         Steam Reserve Corporation         Rel-19476f_straigs           1 Address of Operation         1707 Cole Blvd., Golden, CD 80401         % Well No. 55           1 Address of Operation         1707 Cole Blvd., Golden, CD 80401         % Well No. 55           1 Address of Operation         2129.1         Feet From         Feet From           1 Main Well         Vall Low         55         South         Feet From           1 Main Well         Vall Low         55         South         Feet From           1 Main Well         Vall Low         55         South         Feet From           1 Main Well         Vall Low         7         Towardow         212.0.1           1 Main Well         Vall Low         7         Towardow         212.0.1           1 Main Well         Pace Addition         South         12.0.0000           1 Monte Ministrian         South         7         Towardow         12.0.0000           1 Monte Ministrian         Pace Addition         South         12.0.00000         12.0.000000           1 Monte Ministrian         Pace Addition         South         12.0.00000000000         12.0.00000000000000         12.0.0000000000000000000000000000000000	Do Not Use This Form for Proposals to Drill or to Deepen or Plug Back to a Different Reservoir. Use "Application For Permit –" (Form G-101) for Such Proposals.)	
1       Name of Operator       Steam Reserve Corporation       Important Strain Reserve Corporation         1       Address of Operator       120 Purplet Strain Reserve Corporation       Important Strain Reserve Corporation         1       Address of Operator       1707 Cole Blvd., Colden, CO 80401       Vest Na. 55         4       Location at Well       9       Feet From The East Line and 2329.1 Feet From Wildcat       Wild Na. 55         1       Notice Corporation       Check Appropriate Dox To Indicate Nature of Notice, Report or Other Dats NOTICE OF INFERIOR TO COMPARE CONTINUES (Common Scheduler)       NOTICE OF INFERIOR TO FEET AND CEMENT JOB         1       NOTICE OF INFERIOR TO TO       Check Appropriate Dox To Indicate Nature of Notice, Report or Other Dats NOTICE OF INFERIOR TO FEET AND CEMENT JOB       Subscience To FEET AND CEMENT JOB         1       NOTICE OF INFERIOR TO TO       Revelate Work       Attention Cement Job from The Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Common Commo		7. Unit Agreement Name N/A
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PULL OR ALTER CASING       CHANGE PLANS       CASING TEST AND CEMENT JOB         OTHER       OTHER         11. Describe Proposed or completed Operations (Charly state all pertinent) details and give pertinent dates, including estimated date of starting any perspect work/SEE RULE 101.         Revised Plugging Plan for Well, No. 55         Bring in workover rig unto location, pull 2 7/8" tubing. Run in hole and set bridge plug at 2090 feet place cement plug from 5500 to 5400 feet. Pull up and set bridge plug at 2090 feet place cement plug from 2090 to 1890 feet (plug goes from 100" into the Paleozoics to 100" into the Tertiary Volcanics). Test location and strength of plug by tagging plug with drill string or tubing. Pull out of hole. The well will be turned over to Dale Burgett contingent upon BIM approval and Nr. Burgett meeting the necessary BIM requirements.         The modified plan has been proposed after reviewing your letter dated October 21, 1985.         SRC believes that the proposed plan will adequately protect the formation from possible contamination. Any potential hydrocarbon resources in the vicinity of Well No. 55 were driven off at the time of granitic intrusions into the Paleozoics section in Late Cretacous or Early Tertiary times.         18. Intreb. detty that the information above is true and complete to the best of my knowledge and hellef.         Sconep       Audta         19.       THLE         DATE       DATE	PERFORM REMEDIAL WORK	
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17. Describe Proposed or completed Operations (Clearly state all pertinent details and give pertinent; dates, including estimated date of starting any prepared works SEE RULE 203.         Revised Plugging Plan for Well, No. 55         Bring in workover rig unto location, pull 2 7/8" tubing. Run in hole and set bridge plug at 2500 feet. Place cement plug from 5500 to 5400 feet. Pull up and set bridge plug at 2000 feet place cement plug from 2090 to 1890 feet (plug goes from 100' into the Paleozoics to 100' into the Tertiary Volcanics). Test location and strength of plug by tagging plug with drill string or tubing, pull up and set bridge plug at 1500'. Place cement plug from 1500 to 1400'. Test location, and strength of plug by tagging plug with drill string or tubing. Pull will be turned over to Dale Burgett contingent upon BIM approval and Mr. Burgett meeting the necessary BIM requirements.         The modified plan has been proposed after reviewing your letter dated October '21, 1985. SRC believes that the proposed plan will adequately protect the formation from possible contamination. Any potential hydrocarbon resources in the vicinity of Well No. 55 were driven off at the time of granitic intrusions into the Paleozoics section in Late Cretacous or Early Tertiary times.         18. Intreby certify that the information above is true and complete to the best of my knowledge and belief.         score		
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APPROVED BY	APPROVED BY	18. Thereby certify that the information above is true and complete to the best of my knowledge and belief.	
		SIGNED <u>Acuta Clement</u> TITLE Attorney-in-Fact	DATE NOV. 1, 1985
			<u> </u>
		APPROVED BY	DATE

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		Form G-103
	NEW MEXICO OIL CONSERVATION COMMISSION	Adopted 10/1/74
NO. OF COPIES RECEIVED	P. O. Box 2088, Santa Fe 8750]	
File		
N. M. B. M.	SUNDRY NOTICES AND REPORTS	
( S. G. S	ON.	5. Indicate Type of Lease
Operator	GEOTHERMAL RESOURCES WELLS	State 🗌 Fed. & Fee 🕱
Land Office		5.3 State Lease No. N/A
For Permit -" (Form G-101) for Such Pr		
Type of well     Geothermal Produc     Low-Temp Therma		N/A
2. Name of Operator STEAM RESE	CRVE CORPORATION	8. Farm or Lease Name NM-34790 - Minerals Dale Burgett - Surface
3. Address of Operator 1707 Cole	Blvd., Golden, Colorado 80401-3293	9. Well No. 55
4. Encation of Well Unit Letter 2411.9	Feet From TheEastLine andFeet F	10. Field and Pool, or Wildcat Wildcat
	7 Township 25 South Range 19 West N	
	15. Elevation (Show whether DF, RT, GR, etc.) GR - 4201'	12. County Hidalgo
16. Check	Appropriate Box To Indicate Nature of Notice, Report or Othe	er Data
NOTICE OF INTEN	1	QUENT REPORT OF:
PERFORM REMEDIAL WORK	PLUG AND ABANDON	
TEMPORARILY ABANDON	COMMENCE DRILLING OPN	
PULL OR ALTER CASING	CHANGE PLANS CASING TEST AND CEMENT	
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OTHER	C	
17. Describe Proposed or completed Op	erations (Clearly state all pertinent details, and give pertinenet dates,	, including estimated date of starting any
Plugging and Abando	onment Well 55-7	
set bridge plug at Test location and s tubing with a minim 1412 feet. Place of strength of plug by minimum of 15,000 J	unto location, pull 2 7/8" tubing. 2090 feet. Place cement plug from 2 strength of plug by tagging plug with num of 15,000 lbs. Pull up and set b cement plug from 1412 to 900 feet. T y tagging plug with drill string or t lbs. Pull out of hole and set bridge at a depth of 50 feet. Cement to sur	090 to 1890 feet. drill string or ridge plug at est location and ubing with a plug or packer
Weld plate onto tor spoil from construc contour.	o of well head, back fill cellar and ction. Restore surface to the approx	reclaim sump with imate original
		<u></u>
18. I hereby certify that the information	above is true and complete to the best of my knowledge and belief.	
SIGNED Detta Clim	neut TITLE Attorney-in-Fact	DATE 10-11-85
APPROVED BY	TITLE	DATE
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CONDITIONS OF APPROVAL, IF ANY:		

No. 01 Corests inclusion       No. 80 to 2006, Saits Fr. 87301         No. 8. No. No.       Subpervision Conversation         No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No. 8. No.			Form G-103
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3. Addex of Gerster       107 Cole Blvd., Colden, Colorado 80401-3293       9. Well No.         10. Total 107 Cole Blvd., Colden, Colorado 80401-3293       10. Field and Pool. at Widen         0.11 Letter       2411.9       Feet From The East Line and 2329.1       10. Field and Pool. at Widen         11. The South Line section 7       Townsing 25 South Range 19 West Nummer       11. County         12. Conty       GR - 4201       11. County       11. County         13. Addition of Widen Line and Addition 25 South Range 19 West Nummer       11. County       11. County         14. Conty       GR - 4201       11. County       11. County         15. Office of internation 2000 whether DF RT GR, etc.       11. County       11. County         16. Contrection of Count Addition County       Pluce and Addition County       11. County         17. Describe Proposed or combined Derivation 70.       REMEDIAL WORK       Alternate Casing         17. Describe Proposed or combined Operations (Cherly Inter all periment deals, and give perimeret date, including etimated date of starting any         Plugging and Abandonment Well 55-7       Date County from 2090 to 1890 feet.         17. Describe Proposed or combined to Plug the plug trom 1412 to 900 feet. Test location and strength of plug by tagging plug with drill string or tubing with a minimum of 15,000 lbs. Pull up and set bridge plug at 1412 feet. Place cement plug from 1412 to 900 feet. Testin location and strength of 50 feet.	STEAM RESE	ERVE CORPORATION	
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15. Devalue (Show whene DF, RT, GR, etc.)       12. County         19. Check Appropriate Box To Indicate Nature of Notice, Report or Other Data         NOTICE OF INTENTION TO:       SUBSEQUENT REPORT OF:         PERFORM REMEDIAL WORK       PLUE AND ABANDON       REMEDIAL WORK       ALTERING CASING         PULL OR ALTER CASING       CHAINGE PLANS       REMEDIAL WORK       ALTERING CASING         OTHER       COMMENCE DRILLING ONS.       PLUG & ABANDONMENT IX         OTHER       COMMENCE DRILL OR ALTER CASING       Chaine of the Comment IX         OTHER       COMMENCE DRILLING ONS.       PLUG & ABANDONMENT IX         OTHER       COMMENCE DRILLING ONS.       PLUG & ABANDONMENT IX         CASING TEST AND CHEMENT JOB       OTHER       PLUG & ABANDONMENT IX         The comment of Drive of wormpleted Operations (Cheme) tables and goe pertiment duals, enclosing attention and strength of plug by tagging plug with drill string or tubing with a minimum of 15,000 lbs. Pull out of hole and set bridge plug or packer in 13 3/8" casing at a depth of 50 feet. Cement to Surface with local ready-mix truck.	South	7 to any 25 South - 19 West	
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•	DRILLING	PROGRAM		Sheet	No. 1 of	2
STEAM RESERVE CORPORATION	<b>Preparsd B</b> Otis L. D	•	<u> </u>	Date: Sept. 11	1, 1984	
Lease and Well Number Animas - 55-7		) FC F		AFE NO.		
Field, County and State Lighting Dock KGRA - Hidalg		L OCT 29	1584 JU	Division Geothern		
Location NW-SE SEC. 7, T25S R19W		SANTA	ΥĒ			
Datum and Elevation	K.B. Pro	op. Total De	pth Est.	Drīg Tīme	Est. Total	Time
	14' Ft.	6000'	Ft.	45 Days	60	Days

SEQUENCE OF OPERATIONS:

- 1. On the existing location have a company specializing in conductor and rat hole drilling, drill a 36" hole to a depth of 25' to 30'. Install a joint of 30" lapweld, plainended casing. Level the casing and cement using local ready-mix. Construct a 10'x 10'x 6' cellar around the existing conductor pipe with a cement floor and buried 8"fiberglass drain to the sump. It is recommended that the rat and mouse holes be dug at the same time as the conductor pipe hole.
- 2. Move in the rotary tools and rig up over the conductor pipe. Weld on a 30"riser of the same casing as the conductor pipe and install the flow line and fill up line.
- 3. Mix Spud Mud as recommended by the mud company . ( See mud program. )
- 4. Spud-in with a 17-112"bit on a 26"hole opener and center punch hole inside the conductor pipe. Drill 26"hole to 60'. Pick up 17-112" BHA and drill to 300' as indicated by lithology. Survey at 150' and 300'. Open hole to 26" to 300'.
- 5. Run and cement 20", 941b., H-40 Buttress casing. Tack weld or Bakerlok all couplings. Cement using a stab-in float shoe. Cement to surface.(See cement program ). W.O.C. 6 hours.
- 6. Cut off 20"casing and weld on 20"flange. Install Blow Out Preventer on 20" flange as in attached Drawing OOl. Test preventer with 200 psi. Connect picture nipple and flow line.
- 7. Drill a 17-1/2" hole to 1000' using mud as the circulating medium. Run a wire

- 1 -

AFE No.

Animas - 55-7

Lease and Well Number

#### SEQUENCE OF OPERATIONS:

- 7. ( cont. ) line deviation survey every 150' or as necessary. Run a locked-in BHA to prevent exessive hole deviation and to stabilize the bit and drill collars in the large diameter hole. Circulate and condition mud and hole and run an Eastman Multi-shot directional survey on the trip out of the hole to run the 13-3|8" casing.
- 8. Run and cement the 13-3/8", 54.501b., K-55, Buttress Casing. Tack weld or Baker-lok the bottom 4 joints. Cement to surface and W.O.C. 12 hours.

Install 13-3|8"wellhead and nipple up blow out preventers as in attached Drawing
 002. Test casing and preventers to 500 psi.

- 10. Drill out 13-3|8" casing with a 12-1|4" bit to 6000' or the first entry or loss circulation zone that is determined to be of sufficient temperature to run 9-5|8" casing. A sand plug would be set across this zone and a cement plug set on top of the sand plug. Circulation would be established and the hole conditioned to run the 9-5|8" casing. A minimum of 200' of lap will be used into the 13-3|8" surface casing. Totally cement the annulus of the 9-5|8" liner as per the cement program. W.O.C. 12 hours.
- 11. Make changes to the BOPE stack to drill with air if necessary. Retest the stack if changes are made. If no changes are made to the stack then clean out to the top of the liner and test the liner lap. Squeeze if necessary until lap will hold a pressure test. Drill out the 9-5[8"liner using a 8-1]2"bit to the top of the float collar and test the casing with 500 psi. Drill out the cement and float collars and displace mud with fresh water or brine.
- 12. Drill the 8-1/2"hole with fresh water or brine as hole conditions dictate. Clean out cement and sand plugs and continue drilling if necessary. Test or temperature survey as required by the Geologic and Engineering staff at significant entrys or loss circulation zones. It may be deemed advantageous to install a rotating head and air drilling equipment during the drilling of this section of hole. If commerical temperatures and fluid volumes are attained the hole will be completed as outlined in the casing and cementing programs.

MUD PROGRAM

Mud, Logging, Wellhead and BHA Programs Fluid Loss Solids Weight PV-YP PH Interval Type 0' - 300' Gel and Water -lime 8.4 10-15 20-30 10-12cc 5 10 300' - 1000' Gel and Water-low solids 8.5-8.8 15-20[10-15 4-5 8.5-9.5 10cc 1000' - 6000' 8.5-8.8 6-10|4-8 -TD polymer-low solids 10cc 4-5 10-11 Remarks A Gel and Water, low solids system with fluid loss kept at locc or less -= As temperatures become elevated the treatment with polymer thinners will become necessary to control fluid loss and rheological properties. PH should be maintained above 10 WELLHEAD PROGRAM Working Pressure AF Type Remarks Nominal Size PSI 20" 600 API (2000 psi) Weld on Flange 211 "Bore Rental 13-3/8" x 12" 400 ANSI(960 psi) 13-3/8" SOW x 12" 400 ANSI WKM or CWH 10-3/4" x 10" 400 ANSI(960 psi) 10-3/4" SOW x 10" 400 ANSI WKM or CWH 10" x 10" 10" 400 ANSI x 10" 400 ANSI WKM or CWH 400 ANSI(960 psi) WKM Power Seal Gate Valve or CWH Rotary Disc Valve LOGGING PROGRAM Log Type and Scale Remarks Interval 0' - 300' No Wireline logs 300'- 1000 Electric and temperature 1000' - 6000' and others as required by the Geologic and Engineering staffs. BHA PROGRAM Hole sizes-Depths As determined by the Drilling Consultant or Dridilging Manager DIRECTIONAL Drill hole as straight as possible

CASING PROGRAM	Size	20''	epth <b>300'</b>		Meli Animas	55-7	
Interval	Weight Ib-ft	Grade	Jt. Type	Top Burst	Calculated Sa  Bot. Burst	fety Factors Collapse	Tension
0' - 300'	94	H - 40	Buttress	4.22	4.09	3.47	49.72(jt.)
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			DESIGN C PSI	ONDITIONS			
	Surface Burst Pressure - 500			<u>}</u>	ud Wt. (colla		- 9.6 PPG
Inside Mud Wt. (		- 9.6	PPG		d Wt. (collap		0- PPG
Outside Mud Wt.		- 8.6	PPG	1	ss. Grad. at		
Frac. Grad. at S	Shoe (Burst)	به درونط سروی در از در مار سر	PPG		oad, (coll.)[	$\mathbf{x}$ Burst $\mathbf{x}$	Bouy No -,
		SLURRY	DESCRIPTIO	N AND PROPE	RTIES		
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Slurry Vol Cu	.Ft ( S1	urry No.)	900	• · ·	surface	1	0 per cent
Slurry Yield - (	Cubic Ft	Sack	<u> </u>	<b>4.</b>		·	
Slurry Density	- PPG		118	· · · · · · · · · · · · · · · · · · ·			
Thickening Time	- Depth -	HrsMin.	4 hours	+ 		······································	
Compressive Stre	ength - PSI	- Hours	1870psi at	100 <sup>0</sup> F in 8	hours - 3885	psi at 100 <sup>0</sup>	F in 24 hrs.
		RUNNI	NG AND CEMEN				
Shoe, Collar's		-	ing				
	ottom 4 jo	ints and F	loat Equip.		HOWCO FS with	drill pipe	stab-in Assy
		und bottom	r, Type and 1 two collar				
Preflush, Displ I. Cement thr 2. Run Min. c	acement Rat ough drill of 100 cu. 1	e, Plugs, pipe from ft. of wat	er ahead as	preflush			
Pressure Testin 1. Maximum di 2. Test casin	fferential	pressure	will be app ment to 200	roximately	150 psi		
<b>L</b> ,		·	BOP PF	OGRAM	79 x ' <del>bes</del>		
API Stack Wo	rking Min ssure in	. Bore ches	Туре	2	Ram Type	t Pressures   Annular	- PSI   Rot. Head
see drawing 300	· · · ·	21	Hydr	1]	200 psi		

	· · ·	Size		Depth		Weil	
CASING PROGRAM			3-3/8"	1000 '		and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second se	mas 55-7
Interval	Weight 10-ft	Grade	Jt. Type	Top Burst	alculated Sat Bot. Burst	Collapse	Tension
0' - 1000'	61#	K-55	Buttress	6.18	4.90	1.23	5.56
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			DESIGN C	ONDITIONS			
Surface Burst Pr	ressure	- 500	PSI	Outside mu	d Wt. (colla	pse)	-8.8 PI
Inside Mud Wt. (	(Burst)	- 8.8	PPG	Inside Mud	Wt. (collap	se)	0- PI
Outside Mud Wt.	(Burst	- 8.6	PPG	Form. Pres	s. Grad. at	Shoe (coll.	)- P
Frac. Grad. at S	Shoe (Burst	)-	PPG	Biaxial Lo	ad, (coll.)[	x Burst [	Bouy No
		SLURR	Y DESCRIPTIO	N AND PROPER	TIES		
Class "G" ceme	nt blended	with 1:1	perlite + 40	D% silica flo	our + 3% gel	+ 0.5% CFR-	2
Slurry retarde			· · · · · · · · · · · · · · · · · · ·				
					Desired Top	Exc	ess
	<b>F</b> t ( <b>C</b> 1		···· ···	· ···	Surface	······	100%
Slurry Vol Cu				; ; ;			
Slurry Yield -	· ····································	- 5dCK	2.12				
Slurry Density			÷	& 116 @ Btm.			
Thickening Time		······································					
Compressive Str	ength - PSI	[ - Hours	<u>+</u> 1100 /24	hrs.		; 	
				ITING INSTRUC	CTIONS		
Shoe, Collar's 1. Use HOWCO s				<pre>c bottom 4 jt</pre>	ts. & Tack we	ld bottom o	f collars
2. Position Fl	oat Collar	2 jts. ab	ove Guide SI	noe.			
Centralizers an I.Use I centra	d Scratcher lizer in t	rs – Numbe he middle	r, Type and of the botto	Spacing om it. & over	the collar	of every th	ird it.
to the shoe				0			
Preflush, Displ	acement Rat	te, Plugs,	Reciprocat	ion, Etc.			
1. As needed.							
2. Displace w	fferential ith Mud.	pressure	• •	approximate	•		iod
<u>J. 1830 (asjii</u>	iy anu sur I	RAE EARTHI		ROGRAM	e_Reprensent	al IVP not 15	.1911
API Stack   Wo	rking Min ssure ii	n. Bore nches	Тур	2	Test	Pressures	- PSI   Rot. He
			ارین میراند ورونیسیور از وار می		Ram Type	Annular	
see Draw Dno n	066 051 129	<b>,</b> .	Annular & (	<i>,</i> 30	500 nsi	500 nci	500psi

CASING PROGRAM	· · · ·	Size	9-5/8"	Depth 6000'		Well Animas 5	5-7
Interval	Weight 1b-ft	Grade	Jt. Type	Top Burst	Calculated Sa Bot. Burst	fety Factor Collapse	S
800' - 6000'	43.50 <sup>#</sup>	N-80	Buttress	<u>1.75</u>	1.57	1.25	Tension 2.31
		· · · · · · · · · · · · · · · · · · ·					······································
		\$ ; •				     	
				ONDITIONS	` 	an an an an an an an an an an an an an a	: 
Surface Burst Pr	ressure	- 1727	PSI		ud Wt. (colla	 pse)	- 8.8 PPG
Inside Mud Wt. (		- 8.8	PPG	f 	d Wt. (collap	·	0- PPG
Outside Mud Wt.		- 8.6	PPG	1	ss. Grad. at		
Frac. Grad. at S	Shoe (Burst)	) -	PPG		oad, (coll.)[		Bouy No -
			Y DESCRIPTIO				<u></u>
Tailed - in with for temperature.		- +0% -55		<u>K-2, - DU</u>	ich sturrys re		
			-1-	-2-	Desired Top 800'	Exc	ess <b>±</b> 50%
Slurry Vol Cu	.Ft ( S1	urry No.	)				
Slurry Yield -	Cubic Ft	Sack	3.45	1.62			
Slurry Density	- PPG		12.0	15.6		1	
Thickening Time	- Depth - I	HrsMin	312 -412 hr	s. 2-3 hrs			
Compressive Str	ength - PSI	- Hours	750-24 hr	s. 2300-8	hrs.		
			ING AND CEMEN	TING INSTRU			
Shoe, Collar's 1. Run Float Shoe 2. Run Midway cir	e and Float	Collar d	on top of sec	ond jt.			
Centralizers an 1.Run 2 centrali:					m jts.		
Preflush, Displ 1. Circulate at					<u></u>		
Pressure Testin 1. WOC 12 hours.	Clean out	to the 1					
Squeeze lap it	f necessary	. Clean		The design and tables set of a set of	test is obtai	ned.	
	ge in BOPE (			ما بيديندو دريندر المحيد ومعاد	TPS	t-Pressures	
	rking Min ssure in		Туре		Ram Type	Annular	T Rot. Head
see Draw. 002 96	50 psi 123	1 H	Annular a	nd CSO	500 PSI	500 PSI	500 PSJ

in reply refer to: NMNM 34790 3260 (03000)

Mr. Roy Cuniff President Lightning Dock Geothermal, Inc. 224 West Greening Las Cruces, NM 88005 2000 × 1 2000

Dear Mr. Cuniff:

We received your appeal of the amended Sundry Notice you submitted on May 25, 2000. We have also received the appeal withdrawal letter. We reviewed your reasons and hereby extend the time to February 1, 2001. We will also notify and modify Mr. Burgett's Sundry Notice so the dates do not conflict with your proposed testing. Please advice us as soon as you have acquired the necessary equipment for the testing operation and have completed a surface owner agreement. As before, we need at least a 3-day advance notice so that a qualified engineering technician can be present to witness commencement of the operations and, specifically, removal of the BLM seal that will be placed on the well casing. Once your operations are nearing completion, please advice this office so we can have Mr. Burgett proceed with the plugging operations. Be advised that the plugging operations have been directed by the Courts and will have to be completed in a timely manner to avoid any potential contamination that could result because of Well 55-7 being left open. Please furnish this office with any results that may affect the plugging of Well 55-7. Modifications of Mr. Burgett's Sundry Notice could occur as a result of your investigations. As previously agreed, variations to the agreed upon dates will be reviewed as necessary.

United States Department of the Interior

BUREAU OF LAND MANAGEMENT Las Cruces Field Office 1800 Marquess Las Cruces, NM 38005 www.nm.blm.gov

If at anytime the testing program is not in compliance with the prior approved Sundry Notice, this letter, or with the PET directions, he/she will order a shutdown to your operations and you will be directed to take whatever corrective action is needed. Any questions should be directed to Joe Torrez at (505) 525-4374.

Sincerely,

Field Manager

cc: Mr. Dale Burgett Mr. John Zavitz Mr. Grant Vaughn

n 3260-3 nerty 9-1958) e 1988)		UNITED STATES DEPARTMENT OF THE IN JREAU OF LAND MANA	NTERIOR.		FORM APP OMB NO. 1 Expires: Septem	004-0132
	G	EOTHERMAL SUNDRY	NOTICE		6. Lease Serial No.	
Bureau of Land Manageme	ent (BLM) r	equests this form or other Bl	LM-approved form	ns to be prepared	NM · 34790	
I filed in triplicate with requ	uisite attact	hments with the authorized o	officer. The autho	rized officer must	7. Surface Manager:	ST BLM OFS
prove this permit prior to an	y lease ope	erations.			K Other	
					8. Unit Agreement	Name
		🗆 Heat Exchange 🗀 Observatio	on: 28 Other	20	N/A	
THET FOR PISCOUS	ey Work	. 55-7			9. Well No.	10. Permit No.
	AND TO A				55-7	
IN TRESIANS ( Name of Lessee/Operator	0,000				11. Field or Area	
LIGHTNING DOOR G	do - mad	nor Int			AUIMAS 12. Sec., T., R., B.	& M Jus 1/4 SE
Address of Lessee/Operator	ED TREE					
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			6729. OR	J.LINE	14. State	·
OP SEE. 7, T	258	RIGW			Lieu Mexico	2
Type of Work					<u>.</u>	
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New Mexico Oil Conservation Division 2040 S. Pacheco UNITED STATES Form 3260-3 Santa Fe, NM 87504 (formerly 9-1958) DEPARTMENT OF THE INTEL (June 1988) Attention: Roy Johnson BUREAU OF LAND MANAGEN GEOTHERMAL SUNDRY NOTICE 6. Lease Serial No. The Bureau of Land Management (BLM) requests this form or other BLM approved forms to be prepared NM. 34790 and filed in triplicate with requisite attachments with the authorized officer. The authorized officer must 7. Surface Manager: XBLM DFS approve this permit prior to any lease operations. **R**i Other LAS Ia. Well Type: [] Production [] Injection [] Heat Exchange [] Observation (SMOther]]. 8. Unit Agreement Name N/A THEF FOR PISCOUPLY WELL 55-7 9. Well No. 10. Permit No. 1b. Well Status 55-7 IN TRESPASS CONDITION 11. Field or Area 2. Name of Lessee/Operator AUIMAS 12. Sec., T., R., B. & M. Nw 14 SE 14 LIGHTWING DOCK GEOTHERMAL, INC Address of Lessee/Operator 3 Sec. 7, 525.5 RI9W 124 W. GREENING AVE, LAS (RUCES, NM BB005 4. Location of Well or Facility 2411.9 ' OF THE E. LINE AND 2329. OF THE S.LINE 13. County HIDALGO 14 State 04 Sec. 7, T25.S, RIAW Now MEXICO Type of Work Change Plans Convert to Injection D Pull or Alter Casing [] Multiple Complete Site and Road Construction 🗌 Fracture Test Construct New Production Facilities Shoot or Acidize 🗌 Abandon D Alter Existing Production Facilities 🗆 Repair Well X Other 15. Describe Proposed Operations (Use this space for well activities only. See instructions for current well conditions on reverse) The current configuration of the well, as reported to us by the Federal Government, is that the well is open from surface to approximately 1,500 feet of depth, more or less, with the current plugs originally set from 1500 to 1400 feet, from 1100 to 1050 feet, and from 50 feet to surface reportedly having been drilled out by Dale Burgett. In addition, Mr. Burgett reportedly has introduced a large quantity of strong acid into the well, and has performed drill stem and pumping tests on the well. These actions call into question the possible integrity of the surface casing set to 1050 feet of depth using 13 3/8-inch steel pipe which was then cemented to the surrounding formations, and also of the integrity of the well bore below the bottom of the surface casing. We have been advised that the BLM has set into motion a requirement that Mr. Burgett re-establish the cement pluge at their original horizons. The lessee who concurrently is also the Designated Operator on this well by ownership thru legal succession thru AMAX, SRC, and GPI, plans to reenter Well 55-7 to conduct a series of scientific tests and measurements on this well prior to permitting the BLM to require Mr. Burgett to re-establish the cement plugs at their origin: I horizons. The proposed work includes a series of temperature measurements of the well, a suite of geophysical logs to be run into the surface casing and open well bore below 1050 feet, and a series of controlled flow tests to acquire water samples for analyses and to determine reservoir characteristics. It is anticipated that the controlled flow tests might be conducted by use of a series of tests conducted over time, with pressure monitoring equipment used to evaluate hydraulic properties within the well bore zone of influence. Produced geothermal water would be directed into the existing reserve pit located adjacent to the well. Moreover, depending on the amount of water produced, this geothermal water would be allowed to cool and then used to circulate and condition the well before temperature and other geophysical logs are acquired. Since the work outlined herein will be conducted in a sequential step-wise manner, with intervening periods of data review and analyses, the entire program could take considerable time to complete. We will submit a Plan Of Operations prior to the start of the scientific testing programs Contraction and a strength of a second strength a new and have been a set of the set of the set of the A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR O 16. Describe Proposed Operations (Use this space for all activities other than well work) 17. I hereby certify that the foregoing is true and correct Title RESIDENT, LIGHT WITH DOLE GED PHOLMAN, Date 24 APRIL 2000 Signed (This space for Federal use \_ Date 5/22/00 Approved by ( LCEO, Field alle mgr. Conditions of Approval, if an Title 18 U.S.C Scenife (18) any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or thin its jurisdiction Instructure Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Ma

Form 3260-3 (formerly 9-1958) (June 1988)

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#### New Mexico Oil Conservation Division 2040 S. Pacheco

#### DEPARTMENT OF THE INTERIOR. Santa Fe, NM 87504 BUREAU OF LAND MANAGEMENT Attention: Roy Johnson

UNITED STATES

C C	BEOTHERMAL SUNDRY N	OTICE	6. Lease Serial No.	
The Bureau of Land Management (BLM) and filed in triplicate with requisite attac approve this permit prior to any lease op	hments with the authorized offi		0. Lease Serial No. <i>NM</i> - 34790      7. Surface Manager: ⊠ BLM □ FS     ⊠ Other	
	1	$\Lambda < - \omega \in \{1, \dots, n\}$		
		AS ************************************	8. Unit Agreement Name N/A	
TET FOR PISCOUPLY WELL 1b. Well Status:	- 23-1		9. Well No. 10. Permit No.	
			55-7	
IN TRESIASS CONDITION 2. Name of Lessee/Operator	<u> </u>		11. Field or Arca	
			ANIMAS	
LIGHTDING DOCK GED FACE. 3. Address of Lessee/Operator	nac, Int		12. Sec., T., R., B. & M. Nw 44 56 1	4
		~	Sec7, T25.5, R19W	-
124 W. GREENAG AVE, LAS 4. Location of Well or Facility 2411.9	Clubby And Cours	2100		
		1329. OF THE SLINE	HIDALGO 14. State	•
OF SEL. 7, T25S,	RIAW	······································	Alau MExico	-
5. Type of Work	Convert to Injection	□ Pull or Alter Casing		
Site and Road Construction	Fracture Test	Multiple Complete		
Construct New Production Facilities	Shoot or Acidize	□ Abandon		
· C Alter Existing Production Facilities	🗋 Repair Well	🔀 Other		
plans to reenter Well 55-7 to conduct a se re-establish the cement plugs at their orig geophysical logs to be run into the surface analyses and to determine reservoir chara conducted over time, with pressure monit geothermal water would be directed into this geothermal water would be allowed t acquired. Since the work outlined herei	rics of scientific tests and measurements in al horizons. The proposed work include e casing and open well bore below 1050 acteristics. It is anticipated that the contra- oring equipment used to evaluate hydrau the existing reserve pit located adjacent t to cool and then used to circulate and con n will be conducted in a sequential step- le time to complete. We will submit a Pl	ell by ownership thru legal succession thru on this well prior to permitting the BLM to es a series of temperature measurements of feet, and a series of controlled flow tests to olled flow tests might be conducted by use thic properties within the well bore zone of o the well. Moreover, depending on the au edition the well before temperature and oth wise manner, with intervening periods of d an Of Operations prior to the start of the s measurementary processors are server or the start.	o require Mr. Burgett to the well, a cuito of acquire water samples for of a series of tests influence. Produced mount of water produced, er geophysical logs are lata review and analyses, scientific testing programs.	8
<ul> <li>16. Describe Proposed Operations (Use this spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial spatial sp</li></ul>	-			=
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Signed	Tille RESID	ENT LIGHTNING DOLL GED THERE	Date 21 APRIL 2000	=
(This space for Federal use) Approved by Conditions of Approval, if any: Conditions of Approval, if any: CONFE ATT PAPER Title 18 U.S.C. Section From For Section of Section fraudulent Sciences of Forescinations of the		D, Field USA ce Mg		- 
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NO. OF COPIES RECEIVED		MEXICO OIL CONSE P. O. Box 2088, S	RVATION COMMISSION		SERVATION	
File /	<u> </u>			OIL CUN	SANTA FE	
N.M.B.M. / U.S.G.S. / Operator /			AIT TO DRILL, DEEPEN		5. Indicate T STATE	
Land Office						
1a. Type of Work Drill X	] [	Deepen 🗌	Plug Back		7. Unit Agree	ment Name
of type of the	nal Producer 🔲 p Thermal 🗌 🗄		Temp Observation			ase Name - Minerals een - Surface
2. Name of Operator AMAX	Explorátion	, Inc.			9. Well No. 55 <b>6</b>	
3. Address of Operator			00 80401			Pool, or Wildcat
		vard, Golden ED 2411.9 FEET F	· · · · · · · · · · · · · · · · · · ·	LINE	Wildca	
	HE SouthLINE OF					
					12. County Hidalgo	
			19. Proposed Depth 7000'	9A. Formatio	on	20. Rotary or C.T. Mud
21. Elevations (Show whether DF, GR 4201		& Status Plug. Bond 24-45-94	21B. Drilling Contractor Unknown	<u>.</u>	22. Approx. May 1	Date Work will start , 1983
			ND CEMENT PROGRAM	· · · · · · · · · · · · · · · · · · ·		<u> </u>
SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	SACKS O	CEMENT	EST. TOP
20"12-1/4"	<u>13-3/8"</u> 9-5/8"		50' 700'			
12=1/4	<u> </u>		/00			
See attached "Prop		-		PROVAL \ PERMIT E UNLESS	ALID FOR XPIRES <u>7</u> DRILLING U	70 DAYS -4-83 INDERWAY
OIL CONSER WITHIN 2	AVATION COMM	ISSION TO BE EGINNING OPER	NOTIFIED RATIONS <u>PER</u>	MIT EXTI	ENDED TO ]	<u>11-1-83</u>
IN ABOVE SPACE DESCRIBE PRO zone. Give blowout preventer program	POSED PROGRAM: In m, if any.	proposal is to deepen	or plug back, give data on p	resent produ	ctive zone and	proposed new productive
I hereby certify that the information	<b>~</b>	plete to the best of my	knowledge and belief.	· ,		/
Signed Tore / Me	hr		er, boit life	ting,	5a1eZ	8/83
APPROVED BY Carl	llog		NCT SUPERVIS	OR	DATE 4/	5/83
CONDITIONS OF APPROVAL, IF A	.NY:			· ,		<i>·</i>

•				NM OI	L CONS	з. сом	MISSION		
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Form: USG5 9-1957		D STATES DEPARTMEN GICAL SUPVEY, CONS					40 101	m Approved get Bureau No.	
		GEOTHEPHAL DRILL	ING PERMIT				- F	SERIAL NO.	
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1a. TYPE OF WORK:	DRILL NEW WELL (X RE	DRILL ( ) DEEPEN	() PLUG BACK () DI	RECTIONALLY	DRILL ( )	OTHER (	) G. UNIT	ACREEMENT NAME	
LD. WELL TYPE: PR	ODUCTION X) INJECTION	() HEAT EXCHANC	E ( ) OBSERVATION ( )			THER () -		NO. 8. PERMI	I NO.
1c. WELL STATUS: 2. NAME OF LESSEE	New Voperator				L.B.			OR AREA	
AM/	AX Explorati	on, Inc.		N. S.			- DOLLOFF	Idcat	
17(	17 Cole Blvd	Golden	CO 80401	lig C	iee 1	-		WNB Sec. 7	•
15. LOCATION OF WE At surface	SWSWNE Sec	. 7, T25S	R19W NMPM	215	NEFRVA	TION [	IVISION 11. COM	S, R19W	
At proposed pr	od. zone Same				SANT	FA FE	11. COUN		
16. DISTANCE FROM	PROPOSED LOCATION TO NE	AREST PROPERTY OR	LEASE LINE				12. STAT	Hidalgo	<u> </u>
	West of Lin PROPOSED LOCATION TO NE		INC COMPLETED OF APPI	TED FOR ON T	WIE IFASE		Ne	W Mexico	
	ft. from $\Delta T$						aS	ring 1983	. •
1.20 1		Well 0/2	-221				14. ACRE	S ASSIGNED (WELL SPACING	)
	AND CRARACTERISTICS: (X) POAM () Other (		REASURED: 5-7000	20.	ELEVATI	ONS: EST	X) DETAMI	FINAL () 4201	· · ·
-1126 ( 7 1100	X, TOXI ( ) OULET (		TRUE VERTICAL: 5-70		REFEREN	CE DATUM	GR (X MA	T ( ) DF ( ) XB ( ) R	т ()
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12¼"	9-5/8"					0	700	Cement to	Surface
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22. PROPOSED WORK	SIMMARY	J			1	<u> </u>	<u> </u>	]	······································
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1. I	Drill 20" ho	le to 50	feet			,	· · .		
2. 8	Set 13-3/8"	conductor	casing - ce	ement					
з. п	Drill 12-%"	hole to 7	00 feet						• •
4. I	Run 9-5/8" c	asing - c	ement to sur	face	•	· ·			
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APPROVED BY UTI	g. Sgd.' Earl R. Cu	nningham	TITLE DIBUT	ict Mana	eor		DA1		
CONDITIONS OF APPRO	WAL. IF ANY:								
fhis permit is requ	ired by law (30 U.S.C.	1023); regulations	30 CFR 270,71; 7ede	ral Geothers	al Lesse	Terms and	1 Stipulation	and other regulatory i	equire-
ents. The United	States Criminal Code (1 ited States as to any m	8 U.S.C. 1001) mai	es it a criminal offen	se to make a	villful)	y false :	statement or	representation to any De	partment .
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			(See instructions on :	reverse side				HED FOR	
* . •					С	ONDI	TIONS C	OF APPROVAL	
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	Explorati L STATUS: New	.on				
NAM	New				<u>7. well no.</u> 55-7	8. PERMIT BO.
	E OF LESSEE/OPERATOR			·		<b>J</b>
	AMAX Explorati	on, Inc.			10. BEC. T., R., I	NW4NV4SE
ADD	RESS OF LESSEE/OPERATOR 1707 Cole Blvd	. Golden, Co	olorado 804	01	Sec. 7. T2	5 <u>S, R19</u> W
100	ATION OF WELL OR PACILITY			<u></u>	Hidalgo	
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CEU 517 CON	E OF NORK INGE PLANS E AND ROAD CONSTRUCTION ISTRUCT NEW PRODUCTION FACILITIE TER EXISTING PRODUCTION FACILITIE		5 <b>T</b> Idi <b>28</b>	• • • • • • • • •	R ALTER CASING LE COMPLETE 1	( ) ( ) ( )
DES	CRIBE PROPOSED OF STATIONS (Use )	this space for well activ.	ities only. See instru	ctions for current w	all conditions on reverse	. <u> </u>
(	1) Construction of	a drill pad for	rwell No. 55-	7		
	The pad dimension				CITUD.	
	150' X 100' X 10	o'.	n soo and w	LIT THETHER A		
	2) Access (see map)	h				
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					BS DIST. 6 N. M	9.
					FLL NEW P	NEX 10
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This permit is required by law (30 U.S.C. 2023); regulations: 30 CFR 270.34, 30 CFR 270.35, 30 CFR 270.45, 30 CFR 270.71-1, 30 CFR 270.72; Federal Geothermal Lease Terms and Stipulations and other regulatory requirements. The United States Criminal Code (18 U.S.C. 2001) makes it a criminal offense to make a willfully false statement or representation to any Department or Agency of the United States as to any matter within its jurisdiction.

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