UIC - I - 9

EPA FALL-OFF TEST PLAN

DATE:

2008 - Present

Chavez, Carl J, EMNRD

From: Robinson, Kelly [Kelly.Robinson@wnr.com]
Sent: Friday, September 16, 2011 10:24 AM
To: Chavez, Carl J, EMNRD
Cc: Kuehling, Monica, EMNRD; Powell, Brandon, EMNRD; Roberts, Kelly G, EMNRD; Schmaltz, Randy; McDaniel, Vic
Subject: RE: UICI-009 Bloomfield Refinery Injection Well Fall Off Test_2011

Importance: High

Mr. Chavez,

Thank you for talking with me this morning. As we discussed, Western has identified scaling inside the injection well that has minimize the capacity of the Bloomfield Refinery injection well. The result of these findings have made it necessary to post-pone the acid work on the well, and thus the scheduling of the Fall-Off Test.

As of this morning, Western is in the process of contracting with a Coil Tubing company to be able to coil the Bloomfield Refinery injection well. Coiling the well will allow us to remove the scale in the bottom 80 ft, and thus allow us to resume injection into the Menefee Formation. At this time, the earliest the Coil Tubing Contractor could be on-site is Monday, September 26th, 2011. We will have a more firm schedule next week, and at that time we will provide OCD with an up-dated schedule.

Following the coiling activities, we would like to proceed in conducting the well stimulization/acidization to ensure any scale within the perforations of the well has been removed. We are confident that these two activities will return the well to is normal production capacity.

Once the coiling process and acidization activities are completed, we will then be able to schedule the Fall- Off Test.

We appreciate OCD's understanding on these issues. Western will send out a confirmed schedule of events once they are know next week. At that time, we will make sure that we coordinate these activity with OCD so as to provide the opportunity to witness any or all of these activities.

Thank you again for your time, and have a great weekend!

Sincerely,

Kelly R. Robinson
Environmental Supervisor

Western Refining Southwest, Inc.
111 County Road 4990
Bloomfield, NM87413

(o) 505-632-4166
(c) 505-801-5616
(f) 505-632-4024
(e) kelly.robinson@wnr.com

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Friday, September 16, 2011 8:37 AM
To: Robinson, Kelly
Cc: Kuehling, Monica, EMNRD; Powell, Brandon, EMNRD; Roberts, Kelly G, EMNRD
Subject: RE: UICI-009 Bloomfield Refinery Injection Well Fall Off Test_2011

Ms. Robinson:

The OCD is in receipt of your Fall-Off Test (FOT) request and OCD- EB will respond by COB today.

Please inform the OCD District (Ms. Kuehling and me) of the planned date and time for installation of the bottom hole gauges in advance of shutting off injection to the well for the FOT; and also in advance of shutting off injection after achieving a pseudo steady-state injection condition into the well to allow the OCD to witness pressure fall-off at that time.

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/
"Why not Prevent Pollution; Minimize Waste; Reduce the Cost of Operations; & Move Forward with the Rest of the Nation?" To see how, go to "Pollution Prevention & Waste Minimization" at:
http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental)

From: Robinson, Kelly [mailto:Kelly.Robinson@wnr.com]
Sent: Friday, September 16, 2011 8:18 AM
To: Chavez, Carl J, EMNRD
Cc: Kuehling, Monica, EMNRD; Powell, Brandon, EMNRD; Roberts, Kelly G, EMNRD
Subject: UICI-009 Bloomfield Refinery Injection Well Fall Off Test_2011

Good Morning Sir,

Western Refining Southwest Inc. – Bloomfield Refinery (Western) is requesting OCD's approval to conduct the Annual Fall-Off Test on the Refinery's injection well. Attached is the completed C-103 notification for this event, and a written summary of the proposed activities.

Pending OCD approval, Western would like to initiate the Fall-Off Test following completion of the Acidizing that is scheduled to commence on Monday, September 19th. With this said, it is anticipated that the memory gauges would be installed in the well on Friday, September 23rd, and the well would be shut-in on Monday, September 26th, 2011 (thus starting the fall-off portion of the testing).

If you have any questions or need any additional information, please do not hesitate to contact me at your convenience.

Thank you for your time!

Sincerely,

Kelly R. Robinson
Environmental Supervisor

Western Refining Southwest, Inc.
111 County Road 4990
Bloomfield, NM87413

(o) 505-632-4166
(c) 505-801-5616
(f) 505-632-4024
(e) kelly.robinson@wnr.com

Submit 1 Copy To Appropriate District Office
District I – (575) 393-6161
1625 N. French Dr., Hobbs, NM 88240
District II – (575) 748-1283
811 S. First St., Artesia, NM 88210
District III – (505) 334-6178
1000 Rio Brazos Rd., Aztec, NM 87410
District IV – (505) 476-3460
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
Revised August 1, 2011

WELL API NO. 30-045-29002-00	
5. Indicate Type of Lease STATE ☐ FEE ☒	
6. State Oil & Gas Lease No. N/A	
SUNDRY NOTICES AND REPORTS ON WELLS (DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)	7. Lease Name or Unit Agreement Name Disposal
1. Type of Well: Oil Well ☐ Gas Well ☒ Other – (Disposal Well)	8. Well Number: #001
2. Name of Operator San Juan Refining Co. / Western Refining Southwest, Inc. – Bloomfield Refinery	9. OGRID Number: 037218
3. Address of Operator # 50 Road 4990, Bloomfield, NM, 87413	10. Pool name or Wildcat: Blanco/Mesa Verde
4. Well Location Unit Letter I : 2442 feet from the south line and 1250 feet from the east line Section 27 Township 29 S Range 11 E NMPM County San Juan	
	11. Elevation *(Show whether DR, RKB, RT, GR, etc.)*

12. Check Appropriate Box to Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:		SUBSEQUENT REPORT OF:	
PERFORM REMEDIAL WORK ☐	PLUG AND ABANDON ☐	REMEDIAL WORK ☐	ALTERING CASING ☐
TEMPORARILY ABANDON ☐	CHANGE PLANS ☐	COMMENCE DRILLING OPNS. ☐	P AND A ☐
PULL OR ALTER CASING ☐	MULTIPLE COMPL ☐	CASING/CEMENT JOB ☐	
DOWNHOLE COMMINGLE ☐			
OTHER: Annual Fall-Off Test ☒		OTHER: ☐	

13. Describe proposed or completed operations. (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work). SEE RULE 19.15.7.14 NMAC. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

Western Refining Southwest, Inc. – Bloomfield Refinery requests permission to perform the annual Fall-Off Test on the Class I injection well referenced above. The injection build-up period will begin following the Acid Stimulation work, which is schedule to being on Monday, September 29th. Following a minimum of 24 hours of stable injection down-hole, the bottom hole pressure memory gauges will be lowered into the well (two memory gauges) and allowed to stabilize. Pending OCD approval, Western anticipates installing the memory gauges on Friday, September 23, 2011. The gauges will be allowed to stabilize and the well will be shut-in on Monday, September 26th. The well will be shut in for a minimum of 72 hours.

A more detailed outline of the proposed procedure is attached.

Spud Date: Rig Release Date:

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE Kelly Robinson TITLE Environmental Supervisor DATE 9/16/2011

Type or print name Kelly Robinson E-mail address: kelly.robinson@wnr.com PHONE: 505-632-4166

For State Use Only

APPROVED BY: TITLE DATE

Conditions of Approval (if any):

2011 WELL BUILDUP/FALLOFF TEST PLAN
WESTERN REFINERY - BLOOMFIELD, NM
WASTE DISPOSAL WELL NO. 1

1.0 INTRODUCTION

The following procedure describes the proposed activities to be conducted to perform the annual bottom-hole pressure survey and pressure fall-off test on Waste Disposal Well (WDW) #1, located at the Bloomfield Refinery in Bloomfield, New Mexico. The proposed procedures are in accordance with the United States Environmental Protection Agency (USEPA) 40 FCR 146.13 and the State of New Mexico Fall-Off Guidelines.

1.1 Well Information

Well Name & No.	OCD UIC or Discharge Permit #	Well Classification	API Number
WDW #1	UIC-CL1-009 GW-130	Class I Non-Hazardous	30-045-29002

2.0 BACKGROUND

2.1 Previous Fall-Off Testing

Western Refining (formally Giant Refining) has conducted fall-off tests annually on WDW-1 using quartz crystal bottom-hole memory gauges. The tests followed EPA guidelines and complied with OCD directives for UIC non-hazardous Class I injection wells.

In July 2006, a build-up/fall-off test was conducted after the well stimulation. The 72 hour build-up portion of the testing was done at a constant injection rate of 70 gallons per minute (gpm). The fall-off portion of the testing was terminated after 84 hours.

In August 2008, an additional test was conducted with a final flowing rate of 80 gpm prior to shutting in the well for a fall-off monitoring duration of 189 hours.

The results of the previous fall-off tests produced measureable results with all flow skin, storage, and linear flow regimes present. The WDW-1 had linear flow at the end of these fall-off tests. Radial flow was not observed. As a result, the calculated permeability based on radial flow equations is not a reliable estimate of injection zone permeability.

2.2 Geology

The injection zones arc porous sandstones of the lower portion of the Cliff House formation and the carbonate section of the Menefee formation. These formations occur in Waste Disposal Well #1 at the depths shows in the table below. The injection zones are shown in the attached well log for Waste Disposal Well #1.

Injection Zone Formation	Waste Disposal Well #1	
	KB Elevation = 5545 feet	
	MD below KB (ft)	SS Depth (ft)
Cliff House	3,276	2,269
Menefee	3,435	2,110

The WDW-1 is in a confined low permeability sand interval and historically is not capable of producing a bottom-hole 100 psi differential pressure drop between the final injection and shut-in pressures. Records show that WDW-1 was hydraulically fractured after it was drilled. The 2006, 2008, 2009, and 2010 Fall-Off Test data confirm this with a linear flow regime observed after the end of storage effects.

3.0 SUMMARY OF PROPOSED TESTING ACTIVITES

3.1 Data Research

Before performing the 2011 Fall-Off Test, a one-mile Area of Review (AOR) will be conducted to determine the status of any off-set wells that may be injecting into or producing from the WDW-1 injection interval. If any are found, arrangements will be made with the owners of the wells to monitor the well(s) during the build-up/fall-off test period. Historically there has not been any production or injection in the current injection interval within a one mile radius of WDW-1.

3.2 Summary of Field Activities

The proposed Fall-Off Test is similar to the procedures conducted in years prior. The initial three days of testing activities are considered the "build-up" phase of the test. The Bloomfield Refinery injection well (WDW-1) will be operated at a constant rate for a minimum of 72 hours.

After 24 hours of stable injection, bottom-hole pressure memory gauges will be lowered into the well (two gauges total) and allowed to equalize for a minimum of 48 hours, during which time down-hole pressure readings will be recorded. The memory gauges that will be used are SP-2000 hybrid-quartz gauges provided by Tefteller, Inc. These gauges will have a resolution of 0.01 psi and an accuracy of $\pm$ 0.05% of full scale. The pressure range of the gauges will be from 0-5,000 psi, minimum.

After installation and equalization of the down-hole gauges, the injection well will be blocked-in and the pressure down-hole will be monitored using bottom-hole pressure memory gauges. The recording period will be set to record pressures at a minimum of every 5 minutes, with more frequent readings collected during the early part of the fall-off test period.

The amount of time anticipated to monitor down-hole pressures will be approximately three to eight days. After such time as elapsed, the bottom-hole pressure gauges will be pulled from the well, making gradient stops every 1,000 feet. A more detailed listing of activities to be completed is described below.

The fluid that will be used for the injection test is the refinery's brine waste water (effluent). A current waste analysis of the fluid will be included in the final report.

Attachment 1 (Figure 1 from the 2008 fall-off test report) is the well schematic for WDW-1 which is the same as submitted in 2010. Table 1 is a summary of the injection intervals for the well. Table 2 is a summary of the injection fluid analysis. Table 3 is a summary of the formation fluid analysis. A connate water analysis prior to injection was not found in any of the records, therefore the original formation water properties will have to be estimated from offset wells. The majority of the background information can also be found in the permit

application that was submitted to the State of New Mexico Oil Conservation Division for the well on September 10, 1992.

3.3 Chronology of Field Activities

The following is a day-to-day summary of the activities proposed to fulfill the annual Fall-Off Testing requirement for the Bloomfield Refinery injection well (WDW-1).

During the Initial 72-hours of Testing (Build-up Phase):

1. A stabilized injection rate (approximately 40 gallons per minute) will be established using the Refinery pumps. The optimal injection rate for the three day period will be equivalent to the average injection rate for the prior 30 days of operation. A stable injection rate will be maintained for a minimum of 24-hours before the memory gauges are installed.
2. The injection well is equipped with a crown valve. Using a slick-line unit, the tandem memory gauges will be run down-hole through the crown valve and lubricator to 3,250 feet, the top of the injection interval.
3. Stable injection of the Refinery's effluent will continue into the well for a minimum of 48 hours following placement of the tandem memory gauges to allow the tandem memory gauges to stabilize. During this time, down-hole pressure readings will be recorded.
4. Once the stabilization time for the memory gauges has elapsed, the injection pump will be shut down and the well blocked-in by closing wing valve on the wellhead and in the pump room.

Pressure Fall-Off Monitoring:

5. While the well is isolated from service, bottom hole pressure readings will be recorded for a minimum of three days and up to eight days. The recording period will be set to record pressures at a minimum of every 5 minutes, with more frequent readings recorded during the early part of the fall-off test period.

Following Down-Hole Monitoring:

6. Once the appropriate fall-off monitoring time has elapsed, the memory gauges will be pulled making five minute gradient stops at 3250 ft, 3000 ft, 2000 ft, 1000 ft.
7. After the gradient interval pressure readings are collected, the fall-off test is considered complete. The slick line unit will rig down and the well will return to normal operation.

4.0 TESTING REPORT

All background information will be included in the final report, which will include a log of the events (Chronology of Field Activity), a overview of the geology, a current Area-of-Review (AOR) update, fall-off analysis including previous injection data (rate and volume history), gauge calibration certificates, bottom hole pressure analysis, well schematic, electric logs, reservoir fluid description, and injection fluid analysis. The procedure to do the fall-off test will also be included in the final report. If necessary, an AOR update will be included prior to the build-up/fall-off testing to ascertain the offset injection wells current condition.

Historically there has not been any production or injection in the current injection interval within a one mile radius of WDW-1.

4.1 Evaluation of the Test Results

The fall-off and other analysis will be completed by a geologist and/or qualified engineer. The Reservoir Engineer will utilize the standard transient pressure analysis methods and the results will be reviewed for accuracy by a licensed professional engineer (PE). The fall-off analysis will include the following;

- A log-log plot with a derivative diagnostic plot used to identify flow regimes.
- A wellbore storage portion and infinite acting portion of the plot.
- A linear flow plot with wellbore storage, P*, and slope.
- An expanded portion of the linear flow plot showing the infinite acting pressure portion (linear flow).
- The height of the injection interval used for the calculations will be 106 feet (average of 27 feet and 185 feet) unless test data indicate a different interval should be used.
- The viscosity of the formation fluid used for the calculations will be based on historical data.
- A summary of all the equations used for the analysis.
- An explanation of any temperature or pressure anomalous.

The injection records for one year prior to the testing will be included in the analysis.

Well Data Table 1

	WDW – 1
Tubing	2.875", 7.55 lb/ft, Fluoroline Cement Lined, 3221'
Packer	5.5"x 2.875", Guiberson Tools, Uni-6, ID 1.87", 3221'
Perforations	Top of the Cliff House at 3276' 3276' – 3408', 4SPF 0.5 EHD Top of the Menefee at 3400' 3435' – 3460', 4SPF 0.5 EHD
Protection Casing	5.5", 15.5 lb/ft, 3600'
Cement Top Protection Casing	Surface
PBTD / TD	RBP at 3520', Fill Tagged on 4/20/06 at 3325' & cleaned out
Formation	Cliff House / Menefee

Injected Brine Waste Water Table 2

Chemical Date	Refinery Waste Water March 10, 1998	Refinery Waste Water Sept 27, 2005
Arsenic (mg/L)	0.014	-
Calcium (mg/L)	120	68
Magnesium (mg/L)	39	33
Potassium (mg/L)	27	-
Sodium (mg/L)	920	1659
Chloride (mg/L)	1200	2200
Sulfate (mg/L)	400	708
Alkalinity (CaCO3) (mg/L)	330	100
pH (s.u.)	7.7	8.0
Specific Gravity (g/L)	1.00 – 1.01	1.00 – 1.01

Formation Brine Waste Water Table 3

Chemical Date	Formation Water May 22, 1995
Arsenic (mg/L)	0.023
Cadmium (mg/L)	0.003
Calcium (mg/L)	375
Lead (mg/L)	0.063
Magnesium (mg/L)	99
Potassium (mg/L)	69
Selenium (mg/L)	0.006
Sodium (mg/L)	3610
Chloride (mg/L)	5370
Sulfate (mg/L)	1620
Alkalinity (CaCO3) (mg/L)	306
pH (s.u.)	8.5
Specific Gravity (g/L)	-

July 15, 2011

Mr. Randy Schmaltz:
Environmental Manager
Western Refining Southwest- Bloomfield Refinery
P.O. Box 159
Bloomfield, New Mexico 87413

RE: **Fall-Off Test (FOT) Scheduling**

Dear Mr. Schmaltz:

On June 14, 2011 the Oil Conservation Division (OCD) sent out an e-mail reminder requesting that you schedule your well(s) for the 2011 FOT by June 30, 2011.

The OCD has not received a response to the e-mail. Please contact Mr. Carl Chavez of my staff at (505) 476-3490 or via E-mail: CarlJ.Chavez@state.nm.us to schedule your FOT by COB Friday July 22, 2011. Thank you for your cooperation in this matter.

Sincerely,

Daniel Sanchez
UIC Program Director

DS/cjc
Attachment

xc: OCD District Offices

File: FOT

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Tuesday, June 14, 2011 10:53 AM
To: 'Patterson, Bob'; 'Dan Gibson'; 'Moore, Darrell'; 'Lackey, Johnny'; 'Schmaltz, Randy'
Cc: Dade, Randy, EMNRD; Perrin, Charlie, EMNRD; VonGonten, Glenn, EMNRD
Subject: New Mexico UIC Class I (non-hazardous) Well MIT & Annual Fall-Off Test Scheduling with Completion by September 30, 2011

Gentlemen:

Re:

Key Energy Services: UICI-005
Navajo Refining Company: UICI-008; UICI-008-0 & UICI-008-1
Western Refining Southwest, Inc.: UICI-009

Good morning. It is that time of year again to remind operators that their annual MITs and Fall-Off Tests (FOT) for this season must be completed by 9/30/2011. The list of operator names w/ associated UIC Class I (non-hazardous) Wells are provided above.

Operators are aware of the MIT (30 min @ 300 psig or more w/ Bradenhead) requirement(s) that are typically run concurrently (usually before the FOT) with the FOT and more frequent where required.

The FOTs span several days with a couple of important notes to operators from past testing, please install your bottom hole gauge(s) with recorder(s) at least 48-hours in advance of the pump shut-off during the steady-state injection period. Also, you are accountable for your OCD approved FOT Test Plan and the requirements in the UIC Test Guidance.at http://www.emnrd.state.nm.us/ocd/documents/UICGuidance.pdf.

You may access your well information on OCD Online either by API# and/or Permit Number at http://ocdimage.emnrd.state.nm.us/imaging/AEOrderCriteria.aspx and http://www.emnrd.state.nm.us/OCD/OCDPermitting/Data/Wells.aspx. For information on New Mexico's UIC Program and training information, please go to: http://www.emnrd.state.nm.us/ocd/Publications.htm.

Please contact me at (505) 476-3490 on or before June 30, 2011 to schedule your preferred MIT and FOT date and time. I will work to finalize the witness schedule with each of you. Thank you in advance for your cooperation.

File: Class I (non-hazardous) Well Files UICI- 5, 8, 8-0, 8-1 & 9

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
"Why not Prevent Pollution; Minimize Waste; Reduce the Cost of Operations; & Move Forward with the Rest of the Nation?" To see how, go to "Pollution Prevention & Waste Minimization" at:
http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental)

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Tuesday, June 14, 2011 10:53 AM
To: 'Patterson, Bob'; 'Dan Gibson'; 'Moore, Darrell'; 'Lackey, Johnny'; 'Schmaltz, Randy'
Cc: Dade, Randy, EMNRD; Perrin, Charlie, EMNRD; VonGonten, Glenn, EMNRD
Subject: New Mexico UIC Class I (non-hazardous) Well MIT & Annual Fall-Off Test Scheduling with Completion by September 30, 2011

Gentlemen:

Re:

Key Energy Services: UICI-005
Navajo Refining Company: UICI-008; UICI-008-0 & UICI-008-1
Western Refining Southwest, Inc.: UICI-009

Good morning. It is that time of year again to remind operators that their annual MITs and Fall-Off Tests (FOT) for this season must be completed by 9/30/2011. The list of operator names w/ associated UIC Class I (non-hazardous) Wells are provided above.

Operators are aware of the MIT (30 min @ 300 psig or more w/ Bradenhead) requirement(s) that are typically run concurrently (usually before the FOT) with the FOT and more frequent where required.

The FOTs span several days with a couple of important notes to operators from past testing, please install your bottom hole gauge(s) with recorder(s) at least 48-hours in advance of the pump shut-off during the steady-state injection period. Also, you are accountable for your OCD approved FOT Test Plan and the requirements in the UIC Test Guidance at http://www.emnrd.state.nm.us/ocd/documents/UICGuidance.pdf.

You may access your well information on OCD Online either by API# and/or Permit Number at http://ocdimage.emnrd.state.nm.us/imaging/AEOrderCriteria.aspx and http://www.emnrd.state.nm.us/OCD/OCDPermitting/Data/Wells.aspx. For information on New Mexico's UIC Program and training information, please go to: http://www.emnrd.state.nm.us/ocd/Publications.htm.

Please contact me at (505) 476-3490 on or before June 30, 2011 to schedule your preferred MIT and FOT date and time. I will work to finalize the witness schedule with each of you. Thank you in advance for your cooperation.

File: Class I (non-hazardous) Well Files UICI- 5, 8, 8-0, 8-1 & 9

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
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E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
"Why not Prevent Pollution; Minimize Waste; Reduce the Cost of Operations; & Move Forward with the Rest of the Nation?" To see how, go to "Pollution Prevention & Waste Minimization" at:
http://www.emnrd.state.nm.us/ocd/environmental.htm#environmental)

New Mexico Energy, Minerals and Natural Resources Department

March 22, 2011

Mr. Randy Schmaltz
Environmental Manager
Western Refining Southwest, Inc. - Bloomfield Refinery
P.O. Box 159
Bloomfield, New Mexico 87413

Re: Termination of Discharge Permit UICI-009
Disposal Well No. 1 (API# 30-045-29002) 2010 Fall-Off Test Report and
Annual Class I Well Waste Report (UICI-009) January 2011
Western Refining Southwest, Inc. - Bloomfield Refinery

Dear Mr. Schmaltz:

Staff of the Oil Conservation Division's (OCD) Environmental Bureau (EB) and the Engineering and Geological Services Bureau have completed a review of the "2010 Annual Bottom hole Pressure Surveys and Pressure Fall-Off Test (FOT) for the Western Refining Southwest, Inc. (Western) Waste Disposal Well #1" (Report) at the Bloomfield Refinery dated October 12, 2010. In addition, OCD reviewed Western's Annual Report.

The Annual Report indicates that Western believes the disposal well has about 10 more years of life subsequent to two well stimulations and the recent installation of a filtration system. OCD has documented its concerns about Western's Class I Injection Well in discussions with Western. Water Quality Control Commission (WQCC) regulations specify the operating requirements for UIC Class I Non-Hazardous Waste Injection Wells (see 20.6.2.5206(A)(1) NMAC and 20.6.2.5206(B)(1) NMAC). Western's recent FOT Report did not resolve OCD's concerns; therefore, OCD is now considering requiring Western to terminate its discharge permit pursuant to 20.6.2.3109 NMAC and/or 20.6.2.5101(I) NMAC. This letter is to inform Western of OCD's tentative decision and to allow it one final opportunity to resolve OCD's concerns in a technical meeting.

One of OCD's primary responsibilities under the Underground Injection Control (UIC) Program is to ensure that the well fractures are not continuing to grow in the injection zone(s) under permitted operating conditions. OCD's letter of April 9, 2010 (see attachment) documented OCD's reasons for requiring a reduction in the maximum surface injection pressure (MSIP) specified in Western's discharge permit, which is pending renewal.

OCD issued a draft discharge permit to Western on February 25, 2010. However, Western objected to the reduced MSIP of 600 psig from 1150 psi. Subsequently, Western requested a hearing in its April 19, 2010 letter to OCD Division Director Mark Fesmire.
Director Fesmire was unable to act on Western's hearing request before leaving OCD.

Western conducted another FOT in 2010 which documents, as did the 2008 and 2009 FOTs, that the injection zones are over-pressured. In fact, the formations appear to have achieved maximum capacity with formation(s) pressure build-up observed even at reduced injection rates.

OCD has determined that the 2010 FOT was unsuccessful, as were the 2008 and 2009 FOTs because the minimum pressure differential of 100 psig were not achieved (see FOT Figure 3 "Pressure vs. Time" Chart) as required under the "New Mexico Oil Conservation Division UIC Class I Fall Off Test Guidance" dated December 3, 2007. The requirement to achieve a minimum pressure differential of 100 psig is specified in Western's UIC Class I (non-hazardous) Test Plan, which was approved on June 11, 2008. Also, there has been a steady deterioration of differential pressure, since 2007 that indicates that the reservoir has reached maximum capacity. Consequently, the calculations in the FOT do not reflect the true characteristics of the injection zone(s) or formation(s). OCD hereby concludes that any existing formation fractures will continue to grow as the over-pressured injection intervals continue to propagate or grow even at the current reduced injection rate (see FOT Figure 11 Average Injection Pressure vs. Total Flow).

OCD also has two other issues concerning the Bloomfield Refinery Discharge Permit (GW-001); the nature of the remediation wastes that are disposed of in this Class I (NH) well and whether contaminated and/or treated ground water meets the UIC oilfield disposal criteria now that the facility is idle.

Therefore, in order to evaluate these issues, the OCD requests that Western provide the following information:

1. Western should identify the source(s) of fluids (*i.e.*, waste stream, daily injection volumes for each waste type, and percentage of total daily injection volume) injected into the Class I injection well. Please specify the volume from the refinery operations; oilfield "exempt vs. non-exempt" or neither; and the volume from "ground water remediation" in barrels per day.

2. Western should identify other RCRA remediation derived waste water treatment and disposition options, *i.e.*, surface treatment of waste water followed by Class V Injection , land

New Mexico Energy, Minerals and Natural Resources Department

Bill Richardson
Governor

Jon Goldstein
Cabinet Secretary
Jim Noel
Deputy Cabinet Secretary

Mark Fesmire
Division Director
Oil Conservation Division

April 9, 2010

EDMUND H. KENDRICK
Montgomery & Andrews PA
P.O. Box 2307
Santa Fe, NM 87504-2307
Also via email: ekendrick@montand.com

Re: WESTERN REFINING SOUTHWEST, INC. – *(OGRID 037218)*
Class I Waste Disposal Well No. 1, API No. 30-045-29002
Discharge Plan Permit Renewal Application for UIC-I-9

Dear Mr. Kendrick,

This is in response to your correspondence dated March 25, 2010 regarding the request made by your client, Western Refining Southwest Inc. (WRSW), that the OCD withdraw public notice issued relating to the proposed Discharge Plan Permit Renewal of UIC-I-9.

In the OCD's view, there are two separate issues raised by the March 25, 2010 letter: the procedural issue of WRSW's notice obligations pursuant to WQCC Rules, and the substantive issue relating to what the appropriate maximum surface injection pressure is for this well should the permit be renewed by the OCD under WQCC Regulations. Vague reference was made to "other" substantive issues with the permit, but these were not specifically identified and are therefore not being addressed at this time. Each of the two issues specified in the March 25th letter is addressed in further detail, below.

PUBLIC NOTICE ISSUE:

As WRSW notes in its March 25th letter, WQCC Regulations require operators to provide public notice within 30 days of the OCD deeming an application for discharge permit renewal "administratively complete." 20.6.2.3108(C) NMAC. As you are aware, the OCD deemed WRSW's application for renewal of UIC-I-9 "administratively complete" on February 25, 2010, meaning WRSW's deadline to provide public notice was March 27, 2010. The OCD notes that WRSW waited until two days prior to its deadline to raise concerns regarding the notice.

WRSW's statement that it would be "impossible" to provide public notice in this case is incorrect. Despite WRSR's assertion to the contrary, WRSW is not required to specify a maximum surface injection pressure in the public notice made pursuant to WQCC Rules 20.6.2.3108(C) and (F). The Rules require only that it include the following:

(1) the name and address of the proposed discharger;

(2) the location of the discharge, including a street address, if available, and sufficient information to locate the facility with respect to surrounding landmarks;

discharge, and/or other proposed remedial processes need to be considered and proposed by the operator.

OCD has discussed the possibility of Western installing a new well since 2008 when the Environmental Protection Agency reviewed the 2008 FOT and also determined that the injection zones were over-pressured. Western may wish to consider the feasibility of a replacement Class I Injection Well? Western should also consider the two other issues specified above to ensure that its RCRA corrective action program is not disrupted by an alternative disposition than use of the Class I well at the facility.

To schedule a meeting (Tuesdays/Wednesdays), please contact Carl Chavez by COB April 1, 2011. If Western chooses not to meet with OCD, then OCD will move forward with the termination of Western's Class I Injection Well discharge permit. Please contact Mr. Carl Chavez of my staff at (505) 476-3490 or CarlJ.Chavez@state.nm.us to schedule a meeting or if you have questions.

Sincerely,

Daniel Sanchez
UIC Director & Acting OCD Division Director

DJS/cjc

Attachment: OCD Letter of April 9, 2010

xc: Carl Chavez, UIC Quality Assurance Officer
Richard Ezeanyim, Engineering and Geological Services Bureau Chief
Will Jones, Engineering and Geological Services Bureau
Glenn von Gonten, Acting Environmental Bureau Chief
Charlie Perrin, Aztec District Supervisor
David Cobrain, NMED- Hazardous Waste Bureau

(3) a brief description of the activities that produce the discharge described in the application;

(4) a brief description of the expected quality and volume of the discharge;

(5) the depth to and total dissolved solids concentration of the ground water most likely to be affected by the discharge;

(6) the address and phone number within the department by which interested persons may obtain information, submit comments, and request to be placed on a facility-specific mailing list for future notices; and

(7) a statement that the department will accept comments and statements of interest regarding the application and will create a facility-specific mailing list for persons who wish to receive future notices.

See 20.6.2.3108(F) NMAC. Public notice made by the applicant does not need to "match" that made by the department. Indeed, the notice provided by the department is required by the WQCC Regulations to be more detailed as, when it is made in the way it was in this case, it constitutes *combined public notice* for purposes of Subsections "E" and "H" as provided by 20.6.2.3108(J) NMAC. While Subsection "E" only requires the department to provide the same above-enumerated information that the applicant is required to provide in its notice (as set out in Subsection "F"), Subsection "H" imposes an additional obligation on the department to provide more detailed and technically specific public notice than that required by Subsection "E" (or that which is required of the applicant) because the department must also make available a draft of the proposed permit. In this context, the department chooses to make the substance of its notice more technically detailed and specific than the minimum required by Subsection "F," and therefore, the public notice provided in this case by the department for WRSW's waste disposal well was technically detailed and included specifications such as the maximum surface injection pressure. In contrast, WRSW can (and could have) issue(d) public notice in this case <u>without</u> specifying the maximum surface injection pressure and will still meet the requirements of 20.6.2.3108(C) and (F) NMAC.

<u>SUBSTANTIVE PERMIT ISSUES:</u>

The March 25, 2010 correspondence goes into great detail regarding WRSW's objection to the reduction of the pressure limit for this well. As you know, the increased pressure of the reservoir is an issue of which WRSW has been aware since before the 2007 fall-off test (FOT), and which was specifically brought to the attention of WRSW by the OCD after the 2007 FOT. The OCD was assisted in the FOT data software evaluation by the EPA at the OCD's request in October of 2008. Further discussions continued into 2009 between the WRSW and OCD with the OCD discussing with WRSW the concerns of the OCD and the EPA regarding propagation of existing fractures and potential for new fractures at the current discharge permit limit. WRSW will recall that in June of 2009 a telephone conference call was conducted between WRSW and the OCD at which time this issue was specifically discussed. At that time WRSW informed the OCD that it felt that the pressure increase was due to a well bore "skin effect" problem and that it would like an opportunity to attempt stimulation of the well to address and overcome the "skin effect." The OCD advised WRSW at that time that neither it nor the EPA felt the problem was attributable to a wellbore "skin effect" as the FOT results were representative of the formation outward, away from the wellbore. However, the OCD agreed to give WRSW an opportunity to at least try the acid stimulation approach to see if it would be successful in remedying the situation. Also, during the June 2009 conference call with the OCD, WRSW acknowledged that if the acid stimulation was not successful it would then have to consider drilling another well for disposal.

In an email on June 18, 2009, the OCD further informed WRSW regarding additional concerns it had discussed with the EPA, and options for addressing those concerns. Also at that time the OCD informed WRSW that it appeared that WRSW was operating in violation of the conditions of its permit because, by continuing to inject at 1150 psig, WRSW was causing existing fractures to increase or actively inducing new fractures to grow or develop (a violation of the permit).

It appears that WRSW first attempted an acid stimulation in July 2009, which WRSW deemed unsuccessful, and that a second acid stimulation was then performed in September 2009. Our understanding is that the acid stimulation(s) yielded at best a short-lived and/or marginal improvement in the reduction of pressure and increase in injection rate, and that as of early February 2010, even at a reduced 50% rate of injection due to what WRSW has referred to as "idling of the facility," (which occurred in December of 2009) the well was again operating at a pressure approaching the maximum discharge permit limit. In fact, OCD reviewed the pressure, flow rate v. time chart from 1995 to 2010 and noticed that the operating pressure was approaching the 1150 psig discharge permit limit regardless of what the injection rate into the well was, indicating the formation was over-pressured or filled up. The radioactive survey and fall-off testing were conducted in September and October, 2009 with the FOT report being completed on November 18, 2009. An annual report was provided to the OCD by WRSW on January 29, 2010.

The OCD reviewed the FOT report results and annual report and concluded that the concerns regarding pressure were not assuaged by the data presented therein. On February 3, 2010 the OCD advised WRSW by email that it would be calculating the maximum allowable surface injection pressure for this well for purposes of the permit renewal by using the *pressure, flow rate v. time chart* from 1995 to 2010 for the history of the well operations and the FOT data completed in 2009, and requested some additional data from WRSW for purposes of performing these calculations. At that time, the OCD specifically informed WRSW that the new limit was likely to be significantly less than the current assigned limit. WRSW responded to the email by providing some of the requested materials for the calculations (the OCD was able to obtain the rest from OCD files), but at no time did WRSW comment regarding either the OCD's means for calculating the new maximum surface injection pressure limit or the fact that it was anticipated to be significantly less than before.

On February 22, 2010 the OCD informed WRSW via email that the OCD anticipated having a draft permit ready for dissemination later in the week and that it had completed the calculations for the maximum allowable surface injection pressure. The OCD advised that the new injection pressure limit for the UIC-I-9 renewal "...has been reduced to 600 psig in the discharge permit in order to prevent the half-fractures from growing in the present injection formation." On February 23, 2010, the OCD spoke with WRSW by telephone to further discuss the reduction in maximum surface injection pressure limit. The OCD advised WRSW regarding how the OCD arrived at the 600 psig figure and referred to and discussed a previously issued order under which WRSW was required to monitor and report fracturing, a step-rate test and a historical flow-rate, pressure v. time chart for the well, as well as the OCD's persisting concerns (including the concerns regarding fracturing). The OCD advised WRSW that the 600 psig was a final determination and that if WRSW disagreed, it could request a hearing on the matter.

Discharge permits for Class I nonhazardous waste disposal wells are issued and, when appropriate, renewed pursuant to Sections 20.6.2.3000-3999 (addressing discharge permits, generally) as well as

Sections 20.6.2.5000-5299 (addressing underground injection wells, specifically) of the WQCC Regulations, and must comply with both. Section 20.6.2.3109 NMAC sets out the basic framework for the approval, disapproval, renewal, modification and termination of discharge permits, and provides that "[t]he secretary shall, within 30 days after the administrative record is complete and all required information is available, approve, approve with conditions or disapprove the proposed discharge permit, modification or renewal based on the administrative record." *Emphasis added.* In order to be approved, in addition to meeting all other requirements, an operator seeking renewal of a Class I permit must establish in its application for renewal that "neither a hazard to public health nor undue risk to property will result" if approved. *Id.* at (C). *Emphasis added.* Subsection "H" specifically prohibits the approval of a discharge plan renewal which "may result in a hazard to public health." *Id.* at (H).

Indeed, even where an operator's permit is not on review for renewal, the department has the authority – and the duty – to require a modification of the permit (or if that is not adequate, to *terminate* that permit), where data submitted to the department reveals that the WQCC discharge permit regulations are being violated, or that continued operation under the current permit conditions may result in a hazard to public health or undue risk to property. Subsection "E" of Section 20.6.2.3109 NMAC provides in relevant part:

> If data submitted pursuant to any monitoring requirements specified in the discharge permit or other information available to the secretary indicates that this part is being or may be violated ....
>
> (3) The secretary may require modification, or may terminate a discharge permit for a class I non-hazardous waste injection well, ...pursuant to the requirements of Subsection I of 20.6.2.5101 NMAC.

20.6.2.3109(E) NMAC. *Emphasis added.*

Subsection I of 20.6.2.5101, referenced above, provides in relevant part:

> If data submitted pursuant to any monitoring requirements specified in the discharge permit or other information available to the secretary indicate that this Part are being or may be violated, the secretary may require modification or, if it is determined by the secretary that the modification may not be adequate, may terminate a discharge permit for a Class I non-hazardous waste injection Well, or Class III well or well field, that was approved pursuant to the requirements of this under Sections 20.6.2.5000 through 20.6.2.5299 NMAC for the following causes:
>
> (1) Noncompliance by the discharger with any condition of the discharge permit; or
>
> (2) The discharger's failure in the discharge permit application or during the discharge permit review process to disclose fully all relevant facts, or the discharger's misrepresentation of any relevant facts at any time; or
>
> (3) A determination that the permitted activity may cause a hazard to public health or undue risk to property and can only be regulated to acceptable levels by discharge permit modification or termination.

20.6.2.5101(I) NMAC. *Emphasis added.* Section 20.6.2.5206(A)(1) provides that "the maximum injection pressure at the wellhead shall not initiate new fractures or propagate existing fractures in the confining zone...," and Section 20.6.2.5206(B)(1) provides that "[e]xcept during well stimulation, the maximum

injection pressure shall not initiate new fractures or propagate existing fractures in the injection zone." Section 20.6.2.5206(A)(1) and (B)(1) NMAC.

The regulatory duties of the department include ensuring that any discharge permit issued or renewed meets the specific requirements set out in the WQCC regulations. This includes ensuring that any permit issued or renewed will not create a hazard to public health or an undue risk to property. If such circumstances exist with regard to a currently in-force permit, these duties include the duty to impose modifications – or if appropriate, to terminate the permitted activity - in order to "regulate the risk to acceptable levels." *Id.*

In this case, with regard to the application for renewal of UIC-I-9, the record reflects that WRSW is in fact violating Part 2 of the WQCC regulations. Specifically, the maximum injection pressure being used at the wellhead at this well (the 1150 psig for which it is currently permitted) is initiating new fractures and/or propagating existing fractures in the confining and/or injection zones at this location. Further, this poses a concern to all wells within one mile of the injection well that lack cement in the injection zone(s). WRSW was advised long ago that this was an issue and of concern for both the EPA and the OCD, and WRSW was given an opportunity to see if could remedy the pressure issue through well stimulation. The OCD has reviewed the most recent FOT data and has concluded that continued surface injection pressure greater than 637 psig may create a hazard to public health and/or an undue risk to property because continued injection at a rate above this parameter will result in continued fracturing, fracture growth, and possibly vertical fracturing to occur upward into regional aquifer systems, protectable ground water, and possibly even surface water discharges along the San Juan River. This continued fracturing will also constitute an ongoing violation of WQCC Section 20.6.2.5206 NMAC, as well as of the conditions of the discharge permit (which also prohibit injection at a rate that results in fracture creation or propagation).

The OCD has reviewed the current and historical data for this well and, applying a reasonable safety factor range to the upper-threshold determination of 637 psig as noted above, has determined that a safe surface injection pressure for this well would 600 psig or less, such that the risk of fracture propagation/creation would be cease if maintained at or below this level, but would be unacceptable above this pressure limit. This modification to the permit draft was made pursuant to the OCD's regulatory obligations and authority, and WRSW's request for a renewal of its permit was approved with conditions pursuant to Section 20.6.2.3109 NMAC. The OCD notes that based upon the most recent data for this well and the fact that WRSW is currently operating in violation of Section 20.6.2.5206 NMAC, even if the permit were not on review for renewal at this time, the department would be requiring a permit modification or termination pursuant to Sections 20.6.2.3109(E) and 20.6.2.5101(I) for the purpose of regulating this well to acceptable levels (such that the growth/creation of new fractures has ceased and the potential for a hazard to public health and/or undue risk to property has been minimized).

WRSW has proposed that the OCD withdraw the notice issued on February 25, 2010 so that it and the OCD can "meet and discuss any issues concerning an appropriate maximum injection pressure." However, it is important to recognize that, as discussed above, discharge permits are issued pursuant to this agency's regulatory authority and obligations. Permits are not contractual agreements between operators and the department, and do not represent the memorialization of a compromise between two parties. Rather, the OCD is obliged to review data and information submitted by parties within very specifically defined

parameters, to apply specific standards to that information, and to issue, decline to issue or issue modified versions of permits or even terminate the permit accordingly. Thus we respectfully decline WRSW's suggestion to meet to further discuss this matter.

That being said, the OCD feels that the matter has already been discussed in full between it and WRSW over the course of the past year, that it understands WRSW's position with regard to its perception that a higher injection pressure is justified, and, as the OCD has already advised WRSW, the OCD disagrees with the findings and conclusions of WRSW regarding this well. As you know, the OCD issued public notice regarding the draft permit. The public notice not only invited comments from interested parties, but also included a statement that interested parties could request a hearing regarding the proposed permit, and specification that such requests should be submitted in writing and should specify the basis for the request.

At this time, if WRSW feels that it would like to further address the contents of the proposed permit renewal for UIC-I-9, the appropriate course of action would be for WRSW to submit a written request for hearing as provided in the OCD's public notice. If WRSW has data or expert testimony it feels that the OCD has not considered or has failed to consider adequately in its review of the application for permit renewal, it can present such evidence at the hearing. WRSW also mentioned in the 3/25/10 letter, although not with any specificity, that there are "other" issues of concern with the permit draft. A hearing would also allow WRSW to address those concerns. Of course, WRSW will be required to take immediate steps to provide the public notice for which it has already technically missed the deadline.

If upon further reflection WRSW opts not to request a hearing, and prefers to simply allow the permit renewal process to proceed, if WRSW immediately remedies the applicant notice issue, the OCD will recalculate the public notice time period accordingly and proceed with issuance of the final permit thereafter. Conversely, if WRSW does not request a hearing and continues to refuse to fulfill its obligations for public notice, and if no public notice has been provided by WRSW by **Friday April 16, 2010**, the OCD will consider the application for renewal **withdrawn**, and the current permit, UIC-I-9, **expired**.

If WRSW is still concerned regarding meeting its obligations under the notice regulations and would like the OCD to review its public notice prior to publication, the OCD would be happy to review a draft and provide feedback regarding whether it appears to meet the requirements of the WQCC regulations. Please let us know if this is something with which WRSW would like assistance.

Sincerely,

Mikal Altomare
OCD Attorney

EC:
Carl Chavez, carl.chavez@state.nm.us
William Jones, William.v.jones@state.nm.us
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2010 ANNUAL

BOTTOMHOLE PRESSURE SURVEYS

AND

PRESSURE FALLOFF TESTS

FOR

WASTE DISPOSAL WELL # 1

PREPARED FOR

WESTERN REFINING SOUTHWEST, INC.

OCTOBER 12, 2010

WILLIAM M. COBB & ASSOCIATES, INC.
Worldwide Petroleum Consultants

WILLIAM M. COBB & ASSOCIATES, INC.

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October 12, 2010

Mr. James (Randy) Schmaltz
Western Refining Southwest, Inc.
50 County Road 4990
Bloomfield, New Mexico 87413

Re: Waste Disposal Well #1
Subsurface Project No. 70G6193

Dear Mr. Schmaltz:

Western Refining Southwest, Inc. (Western) retained William M Cobb & Associates, Inc. (Cobb & Associates) to perform the annual bottom-hole pressure survey and pressure falloff test on Waste Disposal Well #1. A falloff pressure test (FOPT) and bottom-hole pressure survey was conducted on the well at the Western facility near Bloomfield, New Mexico. The well tests were conducted in accordance with United States Environmental Protection Agency (USEPA) 40 CFR 146.13 and the State of New Mexico Falloff Test Guidelines, December 3, 2007. The 2010 pressure falloff test procedure was conducted in accordance with the USEPA's Region 6 "Pressure Falloff Testing Guidelines, Third Revision", dated August 8, 2002, and required by the State of New Mexico as of December 3, 2007. The pressure falloff test and bottomhole pressure survey performed on Waste Disposal Well # 1 also met the New Mexico Oil Conservation Division's (NMOCD) requirements for such testing. Note: There are references made in this report to the permit document on file with the NMOCD for Western in Bloomfield, New Mexico.

FACILITY INFORMATION

Name: Western Refining Southwest, Inc. – Bloomfield Refinery
Location: 50 County Road 4990 (PO Box 159),
Bloomfield, New Mexico 87413

WELL INFORMATION

Well Name & No.	OCD UIC or Discharge Plan Permit Number	Well Classification	API Number	Legal Location
WDW #1	UIC-CL1-009 GW-130	Class I Non-hazardous	30-045-29002	1250 FEL, 2442 FSL, I Sec 27 T29S R11E

All depths in this report are referenced to ground level (GL) from the drilling rig rotary kelly bushing (RKB), unless the depth is specified as RKB or GL within this document. Appendix A contains the well schematic for WDW #1. Appendix B is a summary of the injection intervals for the well.

The fluid used for the injection test is the refinery's brine waste water (effluent). A current waste analysis of the fluid is included in the final report. A summary of the brine waste water is in Appendix C. A connate water analysis prior to injection was not found in any of the records; therefore, the original formation water properties are estimated from offset wells.

Appendix D is a Dual Induction log and a Neutron Density log. The majority of the background information can also be found in the permit application that was submitted to the State of New Mexico Oil Conservation Division for the well on September 10, 1992.

REPORT OF EVENTS

August 29, 2010 8:44 AM – Tefteller, Inc. runs tandem bottomhole pressure gauges in the well to monitor the falloff portion of the test.

August 29, 2010 9:28 AM – 72-hour pre-flow period begins.

September 1, 2010 9:28 AM – well is flowing at 21.5 GPM with an average rate of 29.5 GPM for the 72-hour period. Well is shut-in for falloff test.

September 9, 2010 8:02 AM - falloff test ends after 190.6 hours. A pressure gradient survey is conducted as pressure gauges are retrieved from well.

GENERAL TEST OPERATIONAL CONSIDERATIONS

The falloff testing for Western's Waste Disposal Well # 1 (WDW #1) was conducted with tandem bottom hole pressure memory gauges with a pre-flow period beginning at 9:28 AM on August 29, 2010 and ending at 8:52 AM on September 9, 2010. The average flow rate for the 72-hour period prior to the beginning of the falloff test was 29.5 GPM with a final flowing rate of 21.5 GPM. On the morning of August 29, 2010, tandem bottom hole pressure memory gauges were lowered into the well and allowed to stabilize. The well was shut-in for 191 hours ending at 8:02 AM on September 9, 2010. Field data and charts are included in Appendix E.

At the end of the falloff test, the bottomhole pressure gauges were pulled from the well making gradient stops every 1,000 feet. Key test data are summarized as follows:

Event	Flow Rate – GPM	Surface PSIG	Bottomhole PSIG	Date/Time
		990	2294.50	9/29/2010 8:44 AM
Final flow rate	21.5	886	2292.357	10/01/2010 9:28 AM
Final falloff pressure	0.0	877	2281.357	10/09/2010 8:02 AM
Final surface pressure	0.0	876	N.A.	10/09/2010 8:52 AM
* pressure from surface pressure gauge				

A 72-hour build-up/falloff period was established when a falloff test procedure was performed in July, 2006 and is backed by historical data. WDW #1 injects into the Menefee and Cliff House formations. In April, 2006 a build-up/falloff test was performed after a well cleanout and acid stimulation. The buildup/falloff test produced measurable results with all flow skin, storage and linear flow regimes present. Radial flow was not observed. The flow regimes during previous tests on this well included storage, skin, and infinite acting linear flow. Because of the low permeability of the injection interval, testing was not of sufficient length to establish radial flow. Because of this, the falloff test period was extended to 238 hours to better document the flow systems during the test.

The memory gauges used are SP-2000 hybrid-quartz gauges provided by Tefteller, Inc. that have a resolution of 0.01 psi and an accuracy of ±0.05% of full scale. The pressure range of the gauges will be from 0 – 5,000 psi minimum. The gauges were lowered to the top of the injection interval at 3,250 feet. The recording period was set to record pressures at a minimum of every five minutes and more frequently during the early part of the falloff test period. Calibration certificates are included in Appendix F.

A crown valve has been installed on WDW #-1. The lubricator was installed onto the crown valve before running into the wellbore with the memory gauges. The well was shut-in through two inline gate valves, one located at the wellhead and another located in the pump house. The pump house is located about 30 feet from the wellhead.

GEOLOGY

The injection zones arc porous sandstones of the lower portion of the Cliff House formation and the carbonate sections of the Menefee formation. These Formations occur in Waste Disposal Well # 1 at the depths shown in the table below. The injection zone is shown in Waste Disposal Well #1 logs in Appendix D.

Injection Zone Formation	Waste Disposal Well #1 (KB Elev = 5545 Feet)	
	MD below KB (ft)	SS Depth (ft)
Cliff House	3,276	2,269
Menefee	3,435	2,110

The Cliff House formation is a carbonate sandstone unit belonging to the Mesaverde Group and is sometimes referred to as the Chacra, although the Chacra is part of the La Ventana formation. The Cliff House sandstones were deposited during a transgressive cycle and contain regressive deposits. The Cliff House sandstones are overlaid by Huerfanito Bentonite beds.

The Menefee formation is composed of paludal carbonaceous, shales, coals, fluvial sandstones, and flood plain shales. The Menefee is part of the middle unit of the Mesaverde Group. In general, the Menefee has a low permeability as compared to the Cliff House.

The WDW #1 is in a confined low permeability sand interval and historically is not capable of producing a bottomhole 100 psi differential pressure drop between the final injection and shut-in pressures. The logs included in Appendix D show a tight low porosity injection interval that

contains no known commercial hydrocarbons. Records show that WDW #1 was hydraulically fractured after it was drilled. The 2006, 2008 and 2009 falloff test data confirm this with a linear flow regime observed after the end of storage effects.

Permeability values in the Mesaverde Group are generally low and represent tight gas reservoirs. In associated gas wells producing in the Cliff House formation permeability is generally less than 10 md. The permeability of the current injection interval is reported from 40 md to 200 md in previous falloff testing reports done on the Western Waste Disposal Well # 1 and offset wells. Because of the linear flow exhibited during these tests, the reported permeability is a maximum permeability with the actual permeability not known from the test data.

The Atlas of Major Rocky Mountain Gas Reservoirs, New Mexico Bureau of Mines and Mineral Resources 1993, reports "Porosity of the Cliff House Sandstone ranges from 3.0 to 17.2% (average, 10.3%) and porosity of the Point Lookout ranges from 2.7 to 18.4% (average, 10.0%) (Reneau and Harris, 1957)." The Mesaverde Group reservoirs have low permeability, and fracture stimulation is required for commercial production. In-situ permeability data are limited. A permeability of 0.25 md was calculated from a pre-stimulation pressure buildup from a well in the tight gas sand area NM-33 (Fig. SJ-3.1) along the margin of the Blanco Mesaverde reservoir (Conoco, 1992). Otero Chacra reservoir core data across perforated intervals show an average permeability to air of 1.06 md. Average in-situ permeability calculated by the Thomas and Ward (1972) method is 0.038 md (3.6% of laboratory permeability) (Curtis J. Little 1982)."[1] In 1979, Masters also comments on Mesaverde permeability stating "Mesaverde sandstones grade from an updip water-wet zone, where they are thick, porous (20%) and permeable (15 md) to a gas zone, down-dip, where they are thinner, shalier and less porous (10%) and permeable (1 - 2 md)."[2] Performance of Waste Disposal Well #1 is consistent with Master's concept that permeability in the water bearing sands may be significantly higher than that expected in gas bearing sands.

PREVIOUS FALL-OFF TESTS

Western Refining Southwest, Inc. (formally Giant Refining) conducted a falloff test on WDW #1 using quartz crystal bottomhole memory gauges. The tests followed EPA guidelines and were performed to comply with OCD directives for UIC non-hazardous Class I injection wells. In July of 2006 a build-up/fall-off test was conducted after the well stimulation. The 72-hour build-up portion of the testing was done at a constant injection rate of 70 gallons per minute. The falloff portion of the testing was terminated after 84 hours. In August 2008, an additional test was conducted with final flowing rate 80 gpm prior to shutting in the well for a falloff of 189 hours. The WDW #1 had linear flow at the end of these fall-off tests. As a result, the calculated permeability based on radial flow equations is not a reliable estimate of injection zone permeability.

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[1] The Atlas of Major Rocky Mountain Gas Reservoirs, New Mexico Bureau of Mines and Mineral Resources 1993, pages 127-131

[2] Masters, J.A., 1979, Deep Basin gas trap. Western Canada: Am. Assoc, Petroleum Geologists Bull., v, 63, p. 156

ANNULUS PRESSURE TESTING

On May 19, 2010, an Annulus Pressure Test (APT) was conducted. The annulus was pressured up to 580 psig and held for 30 minutes. The test was witnessed by the NMOCD and by the operator. The test report and chart recording of the pressure in included in Appendix G and has been reported to the NMOCD using form C103.

RADIOACTIVE TRACER TEST

Western Refining Southwest, Inc. Bloomfield Refinery performed a Radioactive Tracer test on September 23, 2009 The NMOCD witnessed all proceedings pertaining to this test. Two millicuries of Scandium (Sc 46) was injected down hole and flushed with 5,000 gallons of water. A Gamma Ray correlation log was run from 3,506 feet to the surface. Two passes (up and down) were logged. The logs indicate that most of the perforated intervals are taking fluid. There were spurious spikes above the packer which are usually associated with tubing collars. These spikes indicated that there was still some radioactive material hung up in the tubing. The log is attached in Appendix H.

EVALUATION OF THE TEST RESULTS

The raw test data from the test are included in Appendix E with an injection history in Appendix J. This includes details of the build-up portion of the September 2010 test. These falloff data are presented in Figure 1 showing pressure and temperature during the falloff test. The falloff data show no unexpected pressure changes. The pressure drops quickly during the first few minutes of the test due to wellbore storage effects and then continues to decline as the pressure in the reservoir adjusts to the no flow period. Moon tide effects are seen in the pressure data because of the low pressure changes and are noted as waves in the pressure data at approximately 12-hour intervals.

A log-log plot, Figure 2, with a derivative diagnostic plot is used to identify flow regimes. From shut-in to 0.1 hours the pressure decline is related to wellbore storage effects. This plot shows a slope of near to 0.50 from 0.1 hours to the end of the test indicating linear flow. Near the end of the test, the slope is impacted by moon tide effects when viewed in detail. Other than this effect, the fall-off data show linear flow for the duration of the test with no indication of end of linear flow or of reservoir boundary effects.

The wellbore storage portion of the test is shown in detail in Figure 3. A one-half pound pressure drop is seen within the first hour after which pressure falloff is dominated by the injection zone.

Figure 4 shows the linear characteristics of the falloff test in some detail. It is a plot of falloff pressure versus $\sqrt{t+\Delta t}-\sqrt{\Delta t}$ where t is flow time in hours and Δt is fall-off time in hours. Flow time is derived from the total fluid injected and the final flow rate as follows:

Cumulative injection:	576,924,786 gallons
Final flowing rate:	29.5 GPM
Equivalent flowing time (hours):	Gallons/(GPM X 60) = 576924786/(29.5*60)
Equivalent flowing time (hours):	325,946 hours

The pressure data, Figure 4, are linear beginning at 568 on the y axis which is nine hours after the beginning of the falloff. Projection of the data to estimated reservoir pressure is shown in Figure 5. This trend extrapolated to 1,810 psig. The straight line to the end of the falloff test confirms that the derivative slope seen in Figure 2 is linear flow. It also shows no indication of ending of linear flow or of reservoir boundaries when the falloff test ended after 191 hours.

Reservoir damage is seen on Figure 4 at $\Delta t = 0$ or at a value of 570.929 and is 2292.15 psig – 2292.36 psig or 0.21 psi. This damage is significantly less than observed in the 2009 test as was expected after the cleanup work and the installation of an improved water filtration system in 2009.

A traditional Horner plot, Figure 6, shows an increasing slope throughout the fall-off test. Because of the increasing slope at the end of the test, permeability cannot be directly measured from the test data. The slope measured on Figure 6 is a minimum slope which yields a maximum possible permeability. Figure 7 shows increased detail of the Horner plot data at the end of the falloff test.

MOONTIDES

Figure 8 gives some detail of the impact the moon tides have on the final pressure readings. The data was adjusted for the linear decline trend so that the moon tide variances can be more clearly seen. The pressure change is small, but predictable and is noticeable in the pressure data as seen by the rough slope of the pressure data observed in Figure 2.

LONG TERM PERFORMANCE

Figures 9 and 10 show long-term performance for Disposal Well #1. Figure 9 is calculated bottomhole pressure over time as taken from the monthly injection reports. A second curve shows the expected pressure changes, which result from an increasingly large volume of injected fluid which must be moved farther from the well as additional water is injected. P*, or projected formation pressure, is taken from the last four falloff tests and is shown on the plot. These estimated formation pressures are comparable to the pressures seen early in the life of the well and are all in the 1,800 psig to 2,100 psig range. The increase in calculated average bottomhole disposal pressure seen at 400,000,000 gallons injected appears to be related to formation damage near the wellbore. This was partially reversed by the well cleanout during early 2006 and again by work done during the summer of 2009.

The Hall Plot, Figure 10, shows increasing delta psi-minute values from 250,000,000 gallons to 400,000,000 gallons injected. The trend has not increased since that time. There was a reduction in delta psi-minutes from 400,000,000 to 525,000,000 gallons injected which relates to the coiled tubing cleanout of wellbore in 2006. There is an additional reduction seen at 550,000,000 gallons injected due to the acid treatment and the coil tubing cleanout during the summer of 2009.

Figure 11 is a history of pressures and injection rates. The injection rates are based on fluid injected and show steady pressure and increasing rates through 2003. From 2005 to 2007, rates increased significantly with no increase in pressure. The rapid drop in injection rates in early

2008 appears to be related to formation damage. Since the summer 2009 acid jobs and coiled tubing cleanout, pressures have declined as expected.

With pressures steady and rates increasing over most of the last four years, there does not appear to be any reservoir response to injection other than that which would be expected from normal growth of the injected volume as impacted by near wellbore damage seen as noted.

Calculations:

Calculations for permeability with an assumed Horner plot straight line, for time for a pressure transient to reach the edge of the injected water, traditional skin factor and for fracture half length are included.

1. **Permeability:**

$$\frac{kh}{\mu} = \frac{162.6qB}{m}$$ where:

q = final flowing rate
B = formation volume factor
m = slope from Horner plot of pressure vs log((t+dt)/dt)
k = permeability – md
h = net pay – feet
μ = viscosity - cp

q = 29.5 GPM
q = 1011 BWPD
B = 1.0
m = 5.1103 or more (stabilized slope not observed on test)

$$\frac{kh}{\mu} = \frac{162.6qB}{m} = (162.6)(29.5)(24)(60/42)(1.0)/5.1103 = 32{,}182 \text{ md-ft/cp or less}$$

kh = (32,182*0.67409) = 21,693 md-ft or less
k = 21,693/106 = 205 md or less

2. Radius to edge of injected fluid:

$$r_{waste} = \sqrt{\frac{0.13368V}{\pi\phi h}}$$

V = total volume injected, gallons
ϕ = porosity of injection zone
h = net pay of injection zone in feet
μ = viscosity in cp

V = 576,924,786 gallons
ϕ = 0.15
H = 106 feet
μ = 0.67409 cp
c_t = 0.00000671

$$r_{waste} = \sqrt{\frac{(0.13368)(576{,}924{,}786)}{\pi(0.15)(106)}} = 1243 \text{ feet}$$

3. Time to reach edge of injected fluid:

$$t_{waste} = \frac{948 c_t \mu r_{waste}^2}{k}$$

$$t_{waste} = \frac{(948)(0.00000671)(0.67409)(1243^2)}{205} = 32.3 \text{ hours or more}$$

4. Skin factor (with radial flow)

$$S = 1.151\left[\frac{p_{wf} - p_{1hr}}{m} - \log\left(\frac{k}{\phi\mu c_t r_w^2}\right) + 3.23\right]$$

p_{wf} = final flowing pressure, psi
p_{1hr} = projected pressure at 1 hour using radial flow straight line, psi
r_w = wellbore radius - feet
p_{wf} = 2292.4 psig
p_{1hr} = 2308 psig
r_w =0.3281 feet

$$S = 1.151\left[\frac{2292.4 - 2308}{5.1103} - \log\left(\frac{205}{(0.15)(0.67409)(0.00000671)(0.3281)^2}\right) + 3.23\right]$$

S = -10.68 or less

5. Fracture half length

$$X_f\sqrt{k} = \frac{4.064 qB}{m_L h}\sqrt{\left(\frac{\mu}{\phi c_t}\right)}$$

m_L = slope from linear flow chart of pressure vs $\sqrt{t + \Delta t} - \sqrt{\Delta t}$
m_L = 0.8449

$$X_f\sqrt{k} = \frac{4.064(1011)(1.0)}{(0.8449)(106)}\sqrt{\left(\frac{0.67409}{(0.15)(0.00000671)}\right)} = 37{,}560 \text{ ft}\sqrt{md}$$

$$X_f = \frac{37{,}560}{\sqrt{205}} = 2{,}626 \text{ feet or more}$$

AREA OF REVIEW (AOR) UPDATE

The area of review data from the 2008 Fall-off test report was reviewed and updated. Fifty-eight wells were found within a one-mile radius of Disposal Well #1 which injects water into the Mesaverde formation and are listed in Appendix H. Of these wells, 15 have been plugged and abandoned. Four are classified as dry holes and believed to be plugged and abandoned. Twenty-four wells produce from shallow zones. One well is an Entrada injection well. Fourteen wells produce from the Dakota and Gallup zones, which are deeper than the Mesaverde interval used

for injection purposes. No wells are producing from the injection interval within a one-mile radius of Disposal Well #1.

Twenty-four of the 59 wells have penetrated the injection zone. Of these, three have been plugged. Five are currently producing from shallow zones and 14 produce from deep zones. There are two injection wells including Disposal Well #1 and Ashcroft SWD #1 well. The wells and status are spotted on an area map, Figure 12, with a well number listed with the well data in Appendix H.

No wells are currently producing form the Mesaverde injection zone within the AOR.

CONCLUSIONS

All testing was successful and meets both the NMOCD and EPA requirements. Western fulfills all analysis and reporting requirement of the USEPA's "Pressure Falloff Testing Guideline, Third Revision", issued by Region 6, dated August 8, 2002, with the submittal of this report. Pressure falloff and bottomhole pressure testing were conducted according to these guidelines.

OTHER

In evaluating available information concerning this appraisal, we have excluded from our consideration all matters as to which legal or accounting interpretation, rather than engineering, may be controlling. As in all aspects of oil and gas evaluation, there are uncertainties inherent in the interpretation of engineering data and conclusions necessarily represent only informed professional judgments.

William M. Cobb & Associates, Inc. is an independent consulting firm. Our compensation is not contingent on the results obtained or reported. This report was prepared by a licensed professional engineer with more than 30 years of experience in the estimation, assessment, and evaluation of oil and gas production rates and related reservoir properties.

We appreciate the opportunity to be of service to you. If you have questions regarding this report, please contact us.

Sincerely,

WILLIAM M. COBB & ASSOCIATES, INC.
Texas Registered Engineering Firm F-84

Brent W. Hale

Brent W. Hale, P.E.
Senior Engineering Advisor

BWH:jf
Attachments
M\Western\Rpt101210.doc

Figure 1

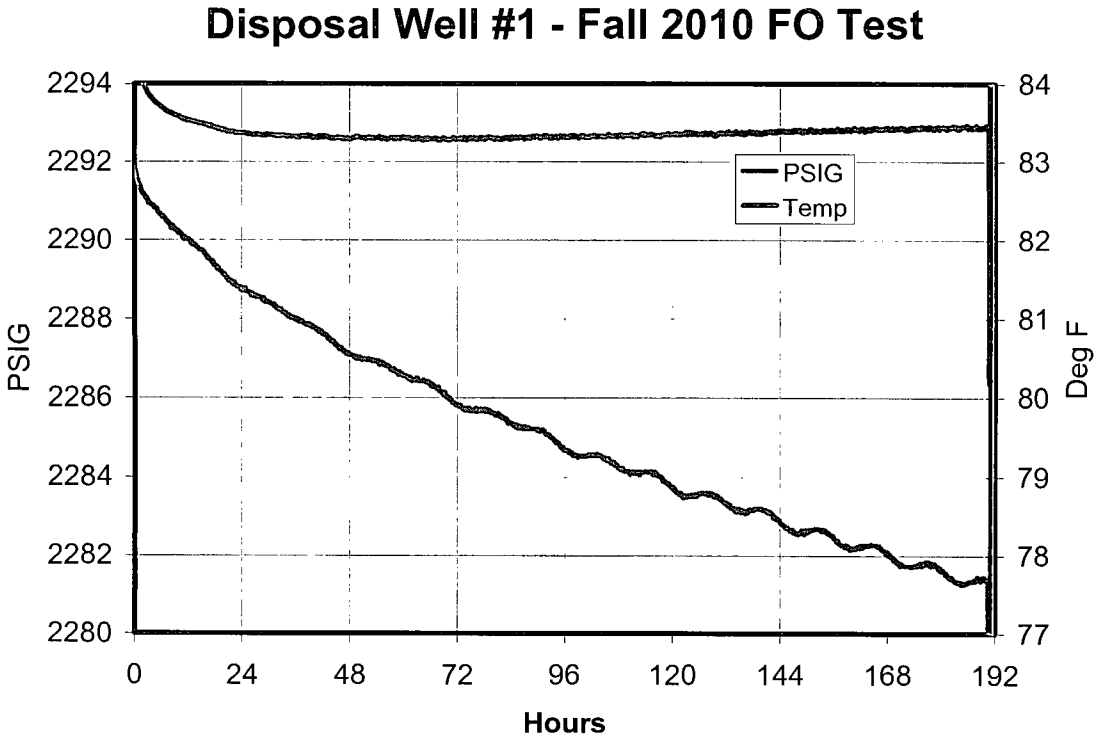
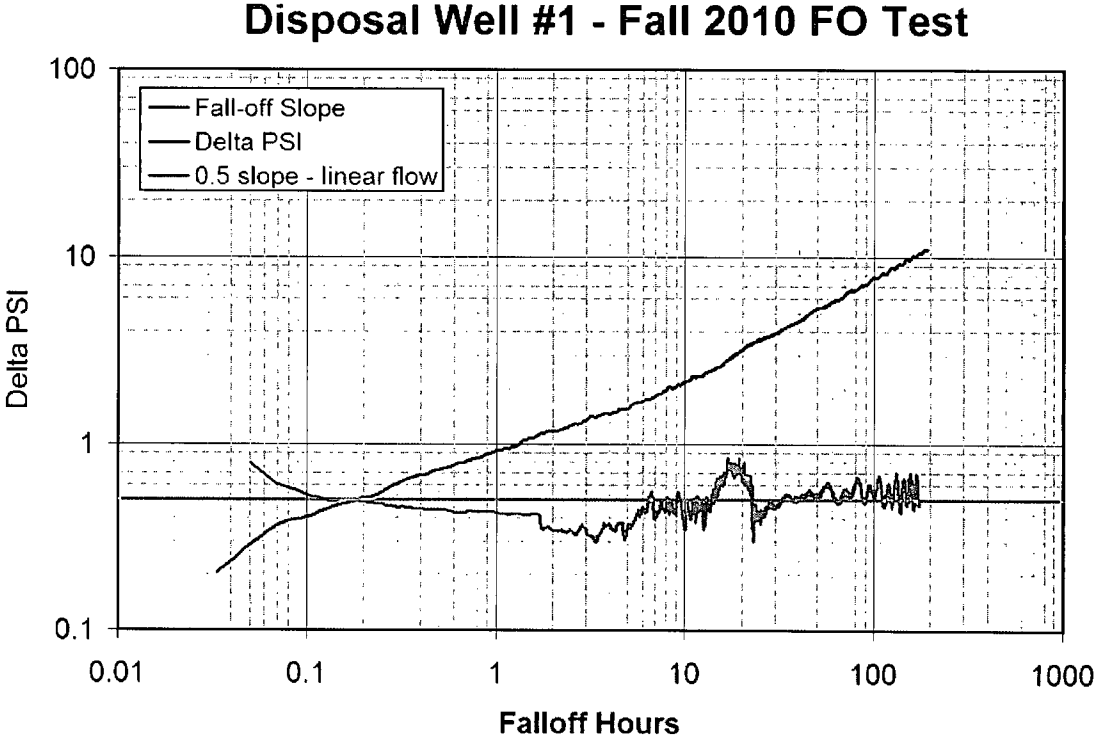


Figure 2



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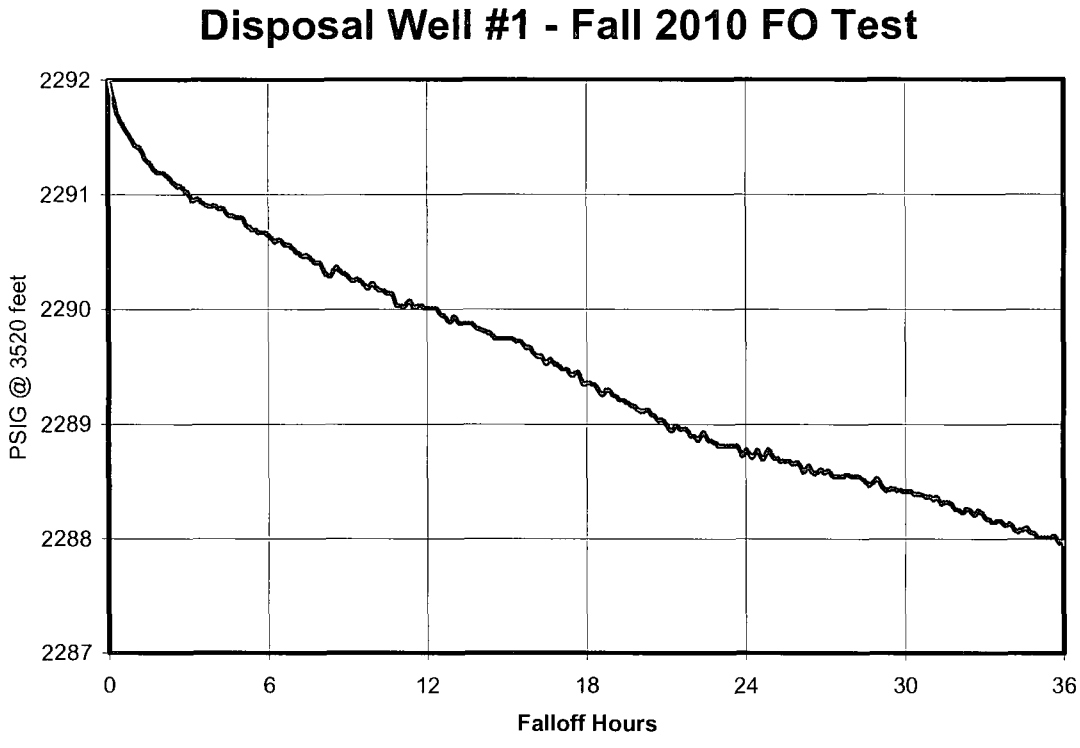


Figure 4

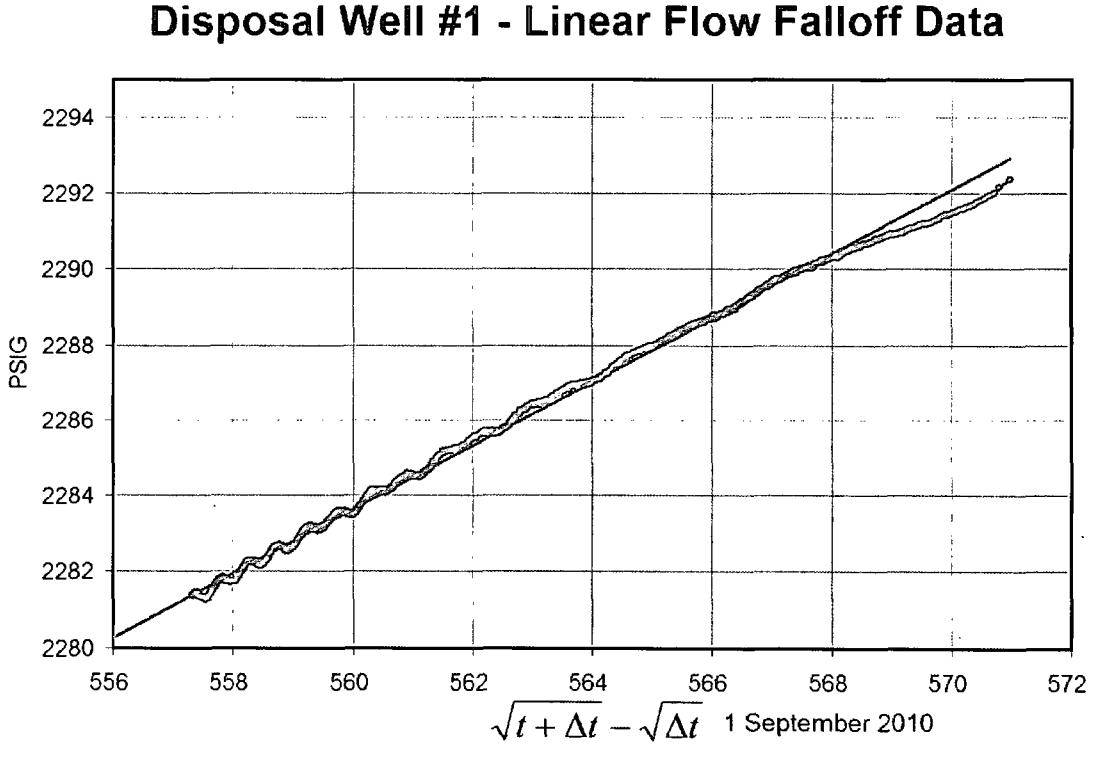
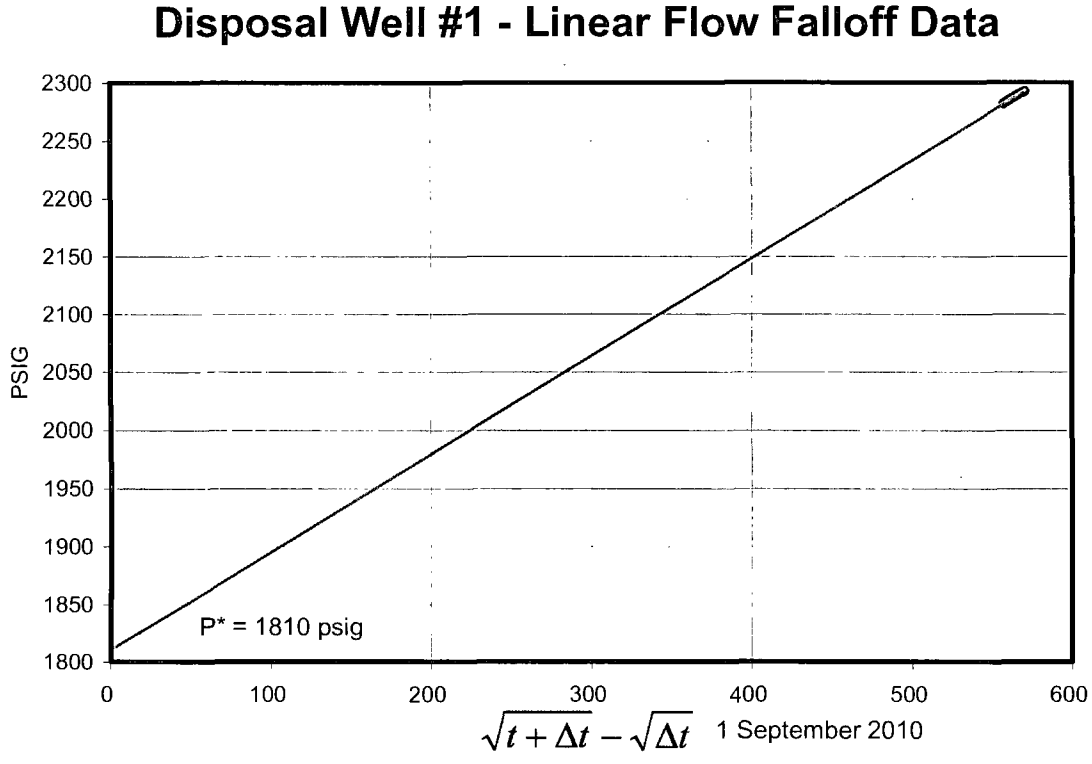


Figure 5



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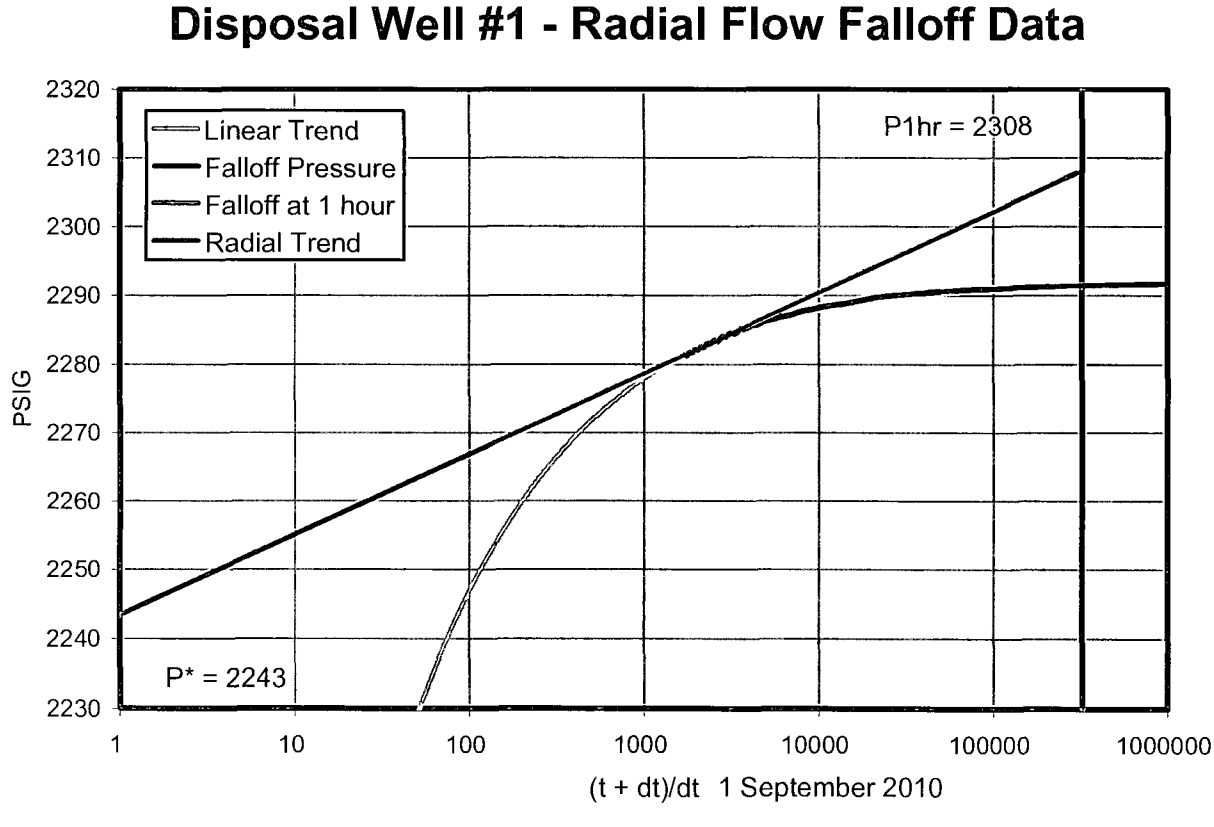


Figure 7

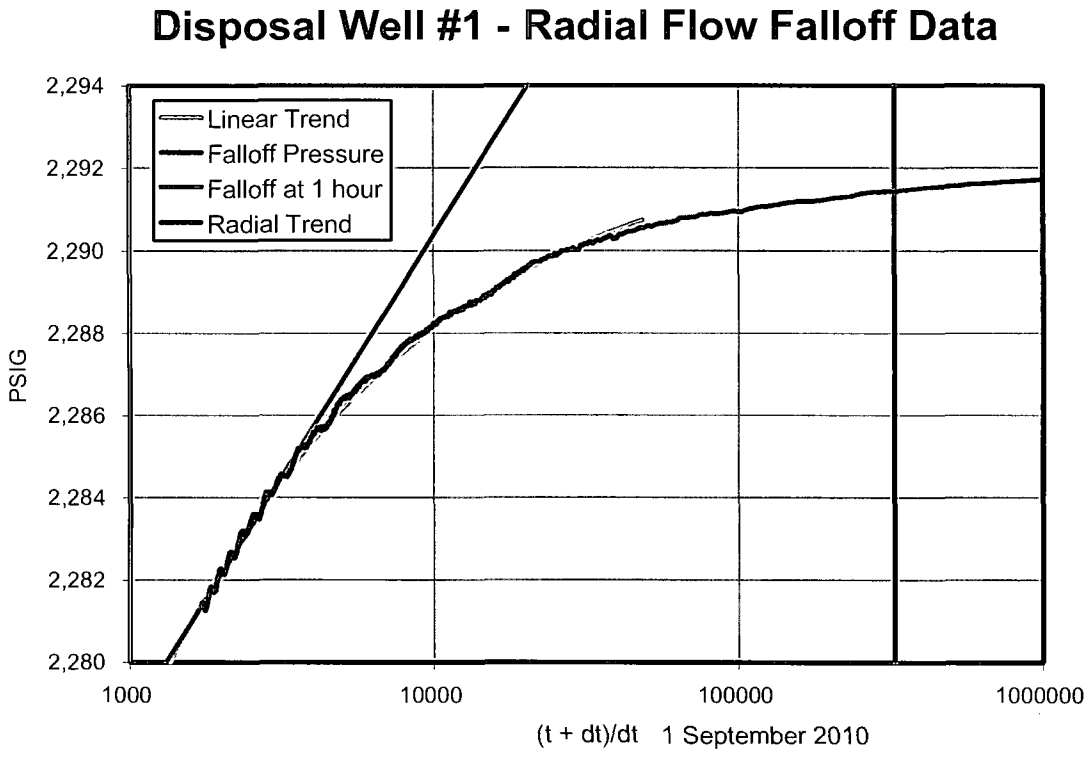


Figure 8

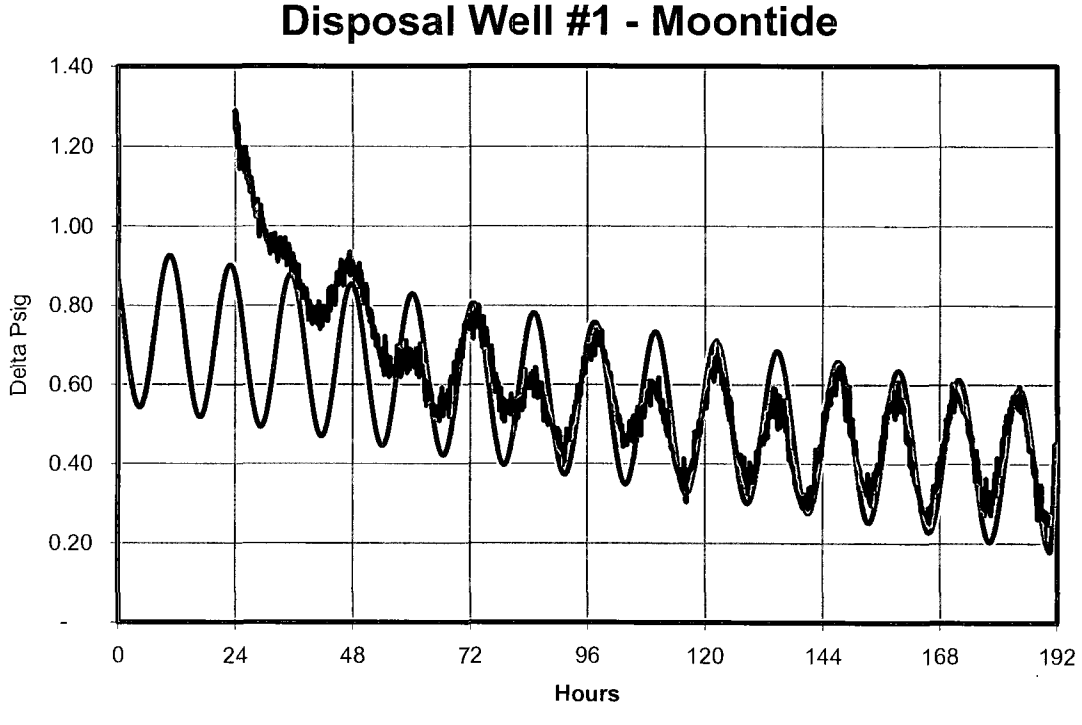


Figure 9

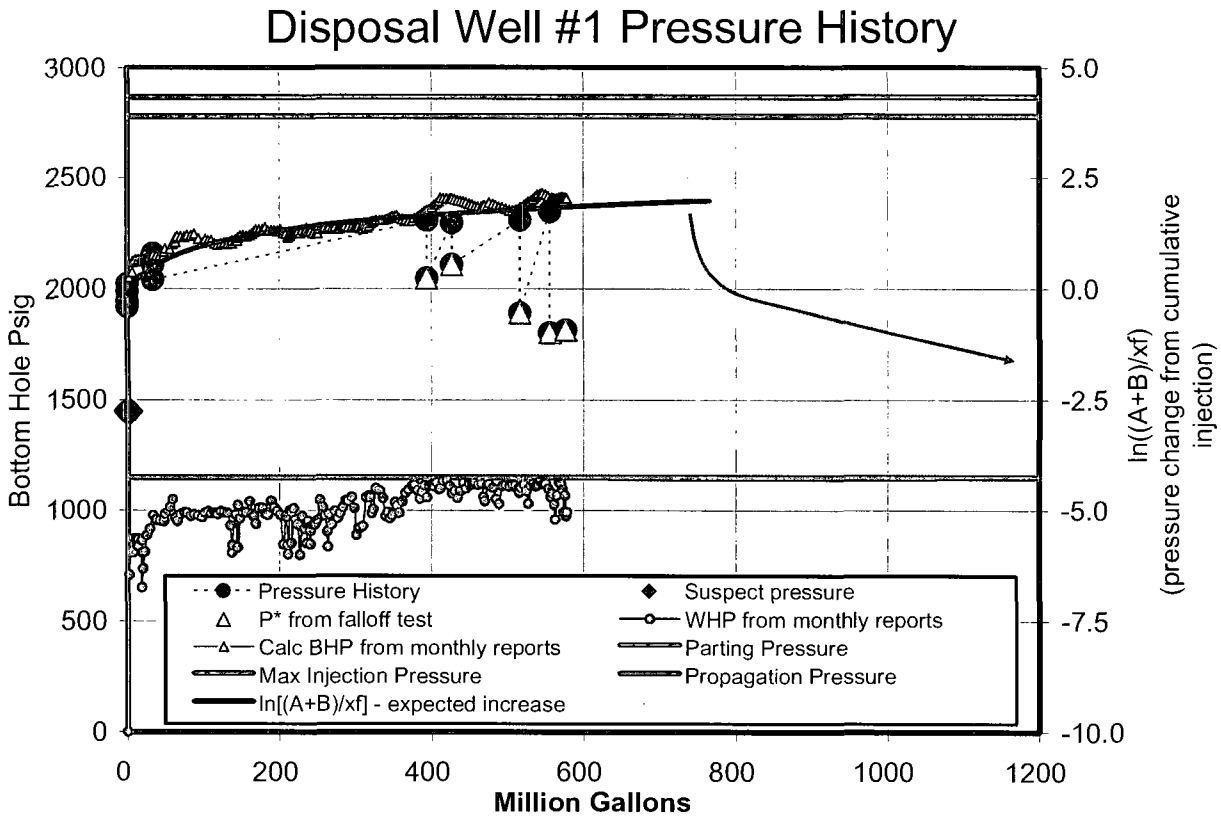

Disposal Well #1 Pressure History
Bottom Hole Psig
3000
2500
2000
1500
1000
500
0
5.0
2.5
0.0
-2.5
-5.0
-7.5
-10.0
ln((A+B)/xf)
(pressure change from cumulative injection)
0
200
400
600
800
1000
1200
Million Gallons
Pressure History
Suspect pressure
P* from falloff test
WHP from monthly reports
Calc BHP from monthly reports
Parting Pressure
Max Injection Pressure
Propagation Pressure
ln[(A+B)/xf] - expected increase

Figure 10

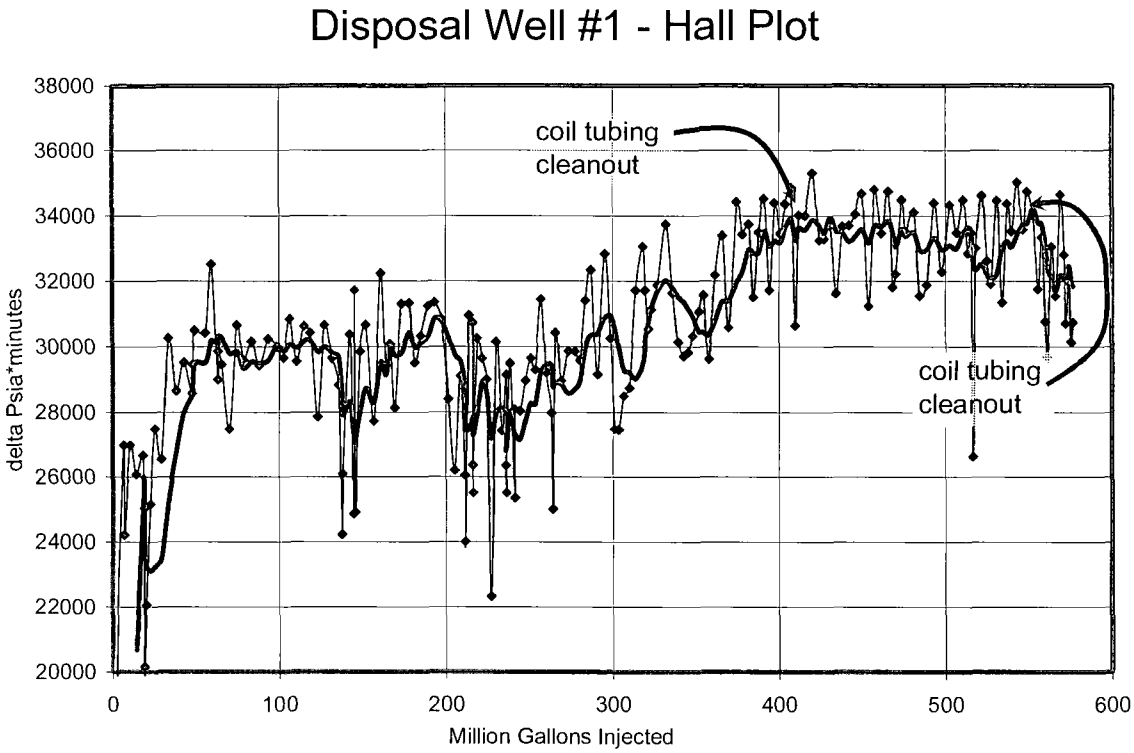


Figure 11

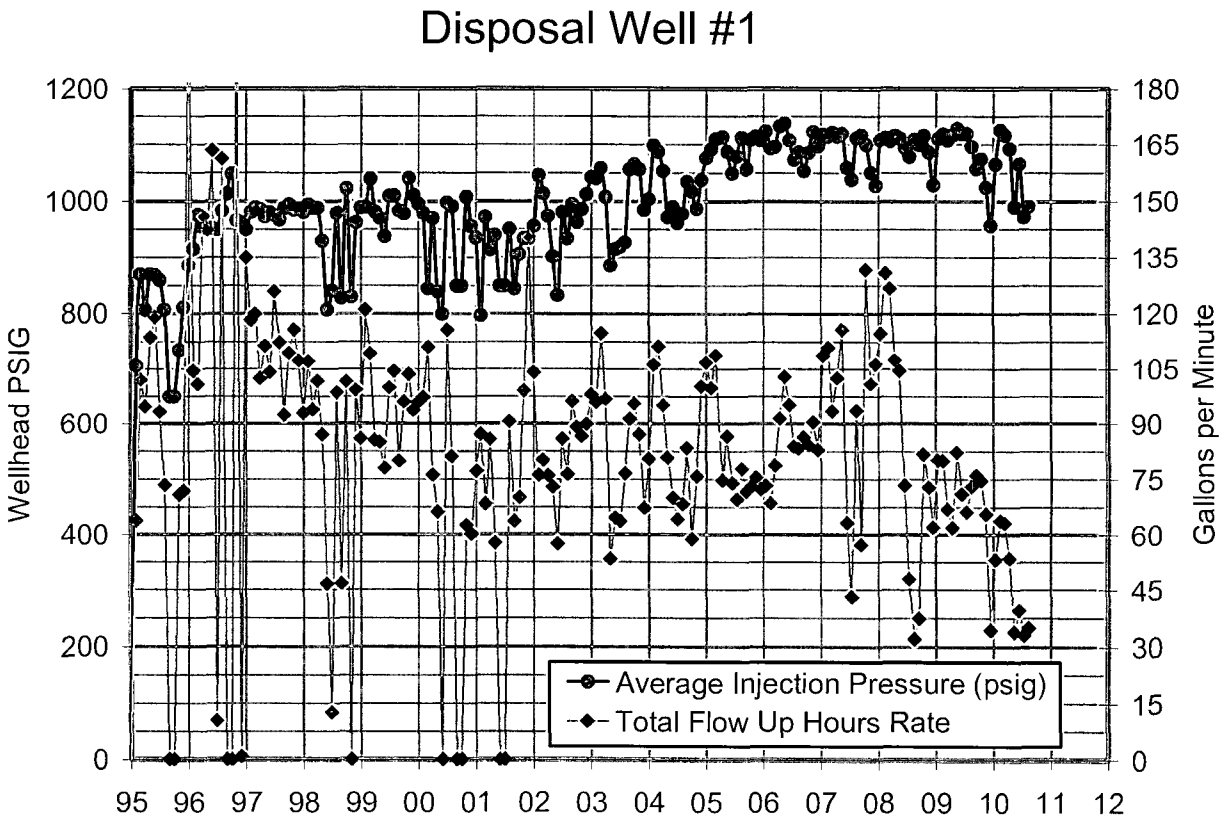
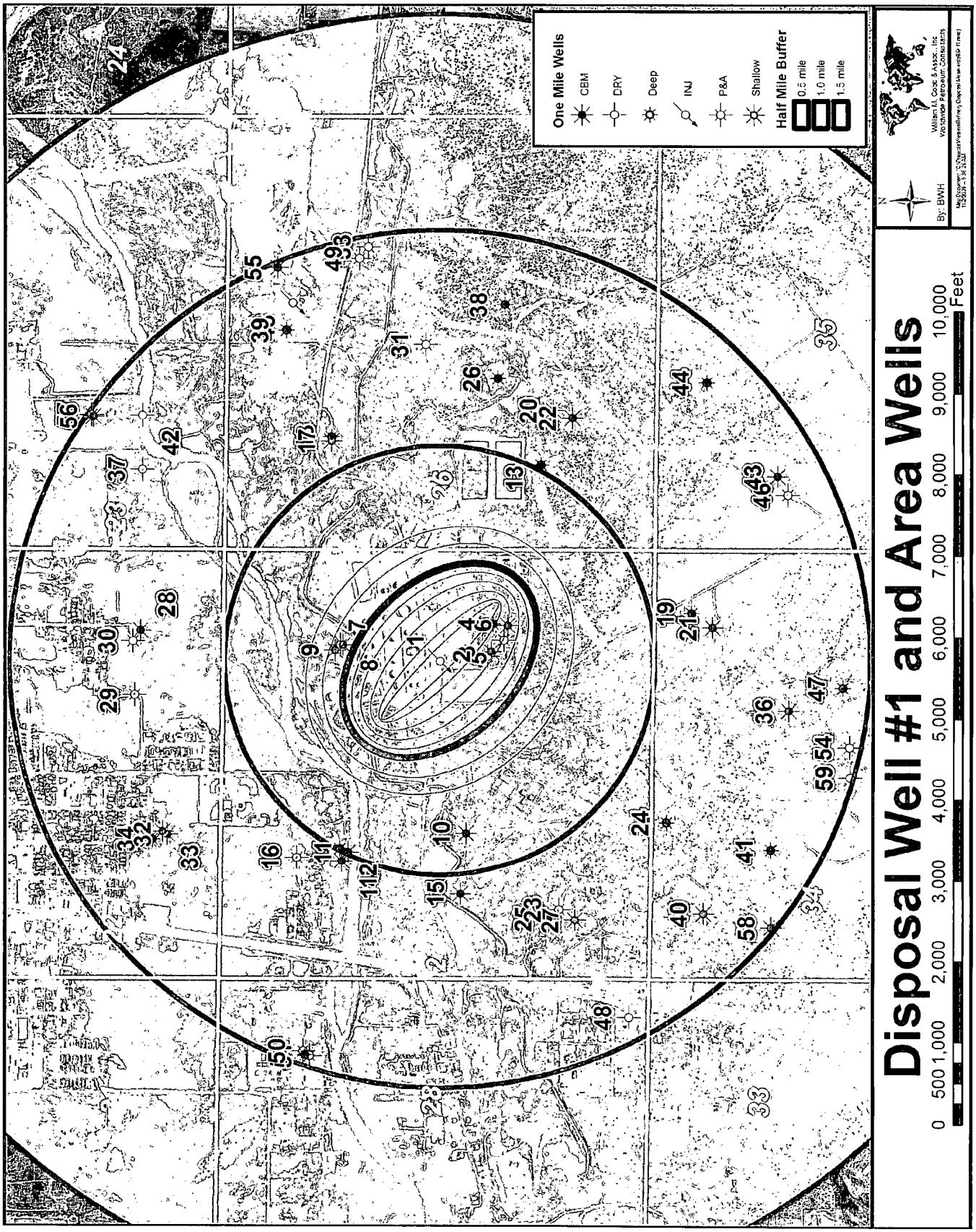


Figure 12


Disposal Well #1 and Area Wells
0 500 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000 10,000 Feet
One Mile Wells
CBM
DRY
Deep
INJ
P&A
Shallow
Half Mile Buffer
0.5 mile
1.0 mile
1.5 mile
By: BWH
William M. Cobb & Assoc., Inc.
Worldwide Petroleum Consultants

List of Appendices

APPENDIX A

Appendix A

WESTERN REFINING DISPOSAL WELL #1

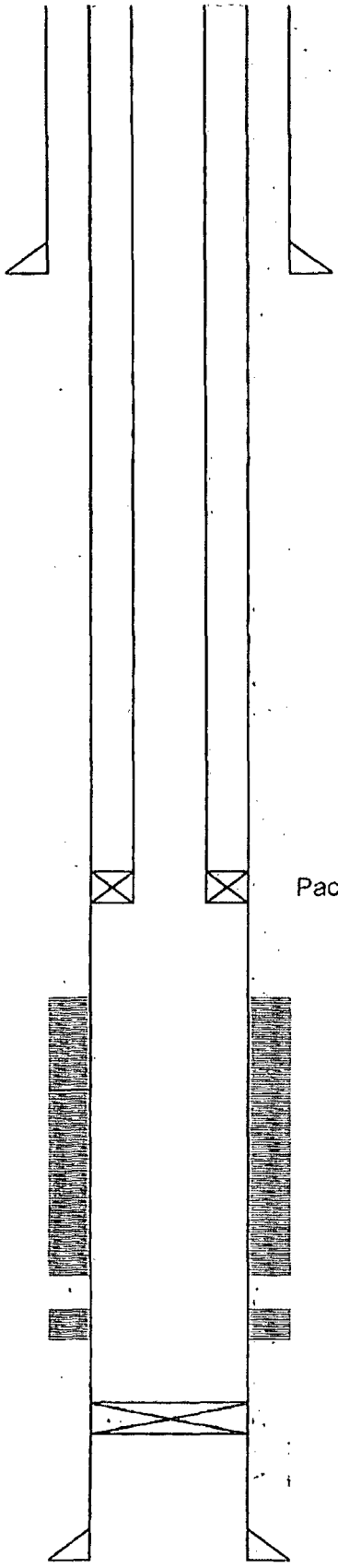
NW, SW SECTION 26, T29N, R11W

API NO.: 30-045-29002

SUBSURFACE
HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

FIGURE 1
DISPOSAL WELL #1 WELL SCHEMATIC
Western Refining Inc.
Bloomfield, NM

Date:	4/26/2006	Approved By:	rls	Job No.:	70F5830
Drawn By:	rls	Checked By:		Scale:	N/A



8-5/8", 48#/ft, Surface Casing @ 830'
TOC: Surface
Hole Size: 11.0"

Tubing: 2-7/8", Acid Resistant Fluoroline Cement Lined
Wt of Tubing: 6.5 #/ft
Wt of Tubing Lined: 7.55 #/ft
Tubing ID: 2.128"
Tubing Drift ID: 2.000"
Minimum ID @ Packer: ~1.87" estimated

Packer: Unknown Packer Type @ 3221'
Could be a Guiberson or similar model Uni-6

Perforations: 3276' - 3408' 4JSPF 0.5 EHD
Top of the Cliff House Formation: 3276'

Fill was cleaned out of well on 4/20/06
Fill was orginally tagged at 3325'

Perforations: 3435' - 3460' 4JSPF 0.5 EHD
Top of the Menefee Formation: 3400'

RBP: 3520'

5-1/2", 15.5#/ft, Production Casing @3600'
TOC: Surface
Hole Size: 7-7/8"

APPENDIX B

Appendix B

	WDW – 1
Tubing	2.875", 7.55 lb/ft, Fluoroline Cement Lined, 3221'
Packer	5.5"x 2.875", Guiberson Tools, Uni-6, ID 1.87", 3221'
Perforations	Top of the Cliff House at 3276' 3276' – 3408', 4SPF 0.5 EHD Top of the Menefee at 3400' 3435' – 3460', 4SPF 0.5 EHD
Protection Casing	5.5", 15.5 lb/ft, 3600'
Cement Top Protection Casing	Surface
PBTD / TD	RBP at 3520', Fill Tagged on 4/20/06 at 3325' & cleaned out
Formation	Cliff House / Menefee

APPENDIX C

Appendix C

Injected Brine Waste Water Table C-1

Chemical Date	Refinery Waste Water March 10, 1998	Refinery Waste Water Sept 27, 2005
Arsenic (mg/L)	0.014	-
Calcium (mg/L)	120	68
Magnesium (mg/L)	39	33
Potassium (mg/L)	27	-
Sodium (mg/L)	920	1659
Chloride (mg/L)	1200	2200
Sulfate (mg/L)	400	708
Alkalinity (CaCO3) (mg/L)	330	100
pH (s.u.)	7.7	8.0
Specific Gravity (g/L)	1.00 – 1.01	1.00 – 1.01

Formation Brine Waste Water Table C-2

Chemical Date	Formation Water May 22, 1995
Arsenic (mg/L)	0.023
Cadmium (mg/L)	0.003
Calcium (mg/L)	375
Lead (mg/L)	0.063
Magnesium (mg/L)	99
Potassium (mg/L)	69
Selenium (mg/L)	0.006
Sodium (mg/L)	3610
Chloride (mg/L)	5370
Sulfate (mg/L)	1620
Alkalinity (CaCO3) (mg/L)	306
pH (s.u.)	8.5
Specific Gravity (g/L)	-

APPENDIX D

NW-410861

27-29N-11W

FINAL PRINT

Schlumberger

COMPANY BLOOMFIELD REFINING CO.

WELL BLOOMFIELD REFINING WD #1

FIELD BLANCO MESA VERDE

COUNTY SAN JUAN STATE NEW MEXICO

COMPENSATED NEUTRON-LITHO-DENSITY

Permanent Datum	GROUND LEVEL
Log Measured From	KELLY BUSHING 15.0 ft Above Perm. Datum
Drilling Measured From	KELLY BUSHING
API Serial No.	N/A
Location	1520' FEL & 790' FNL
Sect	27
Twp	29 N
Range	11 W
Elev.	K.B. 5545.0 F, D.F. 5544.0 F, G.L. 5530.0 F
Other Services	DITE GR, CNL/LDT GR
Date	6-OCT-1993
Run No.	ONE
Depth Driller	3800 ft
Depth Logger	3796 ft
Bottom Log Interval	3796 ft
Top Log Interval	1250 ft
Casing Driller	9.625 in @ 1250 ft
Casing Logger	1250 ft
Bit Size	8.75 in
Type Fluid in Hole	GEL CHEM
Density	9.0 LB/G
Viscosity	60 S
PH	9.5
Fluid Loss	6.0 C3
Source of Sample	FLOWLINE
Rm @ Meas. Temp.	2.04 OHMM @ 65.0 DEGF
Rmf @ Meas. Temp.	1.023 OHMM @ 65.0 DEGF
Rmc @ Meas. Temp.	2.800 OHMM @ 65.0 DEGF
Source Rmf / Rmc	MEASURED / CALCULATED
Rm @ BHT	1.360 OHMM @ 119 DEGF
Circulation Ended	0615 28 DEC 1993
Logger on Bottom	0930 28 DEC 1993
Maximum Recorded Temp.	119 DEGF
Equipment Number	3705
Location	FARMINGTON, NEW MEXICO
Recorded By	ANNON & REID
Witnessed By	

The well name, location and borehole record data were furnished by the customer.

All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful 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, agents or employees. These interpretations are also subject to Clause 4 of our General Terms and Conditions as set out in our current Price Schedule.

Run No.	ONE
Depth Driller	3800 ft
Depth Logger	3796 ft
Bottom Log Interval	3796 ft
Top Log Interval	1250 ft
Casing Driller	9.625 in @ 1250 ft
Casing Logger	1250 ft
Bit Size	8.75 in
Type Fluid in Hole	GEL CHEM
Density	9.0 LB/G
Viscosity	60 S
PH	9.5
Fluid Loss	6.0 C3
Source of Sample	FLOWLINE
Rm @ Meas. Temp.	2.04 OHMM @ 65.0 DEGF
Rmf @ Meas. Temp.	1.023 OHMM @ 65.0 DEGF
Rmc @ Meas. Temp.	2.800 OHMM @ 65.0 DEGF
Source Rmf / Rmc	MEASURED / CALCULATED
Rm @ BHT	1.360 OHMM @ 119 DEGF
Circulation Ended	0615 28 DEC 1993
Logger on Bottom	0930 28 DEC 1993
Maximum Recorded Temp.	119 DEGF
Equipment Number	3705
Location	FARMINGTON, NEW MEXICO
Recorded By	ANNON & REID
Witnessed By	

Run No. ONE
Depth Driller No. 609586
Bottom Log Interval 0.0 F
Top Log Interval
Casing Driller 2.04 OHMM @ 65.0 DEGF
Casing Logger 1.023 OHMM @ 65.0 DEGF
Bit Size 2800 OHMM @ 65.0 DEGF
Type Fluid in Hole
Density
Viscosity
PH
Fluid Loss
Source of Sample
Rm @ Meas. Temp.
Rmf @ Meas. Temp.
Rmc @ Meas. Temp.
Source Rmf / Rmc
Rm @ BHT
Circulation Ended
Logger on Bottom
Maximum Recorded Temp.
Equipment Number
Location
Recorded By
Witnessed By

TOOL DATA

Number 1	DPS 3716
Number 2	NSC 2999
Number 3	PGD 2781
Number 4	CNC 375
Number 5	DIC 469
Number 6	DIS 485
Number 7	SGT 8206
Number 8	TCCB 8206
Number 9	TCM 1272
Number 10	
Number 11	
Number 12	

REMARKS:
LOG RUN ON SAND MATRIX @ 65 G/CC
CNL BOWSPRING RUN FOR ECCENTRALIZER
5" STANDOFF IGNITION DATE
PSHOT AT 3350

CREW: ANNON & REID

LOGGING TOOL STRING SKETCH

PEH-A LOGGING HEAD

64.4 F

61.6 F

GR

60.5 F

55.9 F

BOWSPRING

NPHI

51.0 F

48.7 F

CALIPER DETECTOR

CALI

34.0 F

DPHI DRHO RHOB PEF

33.9 F

31.3 F

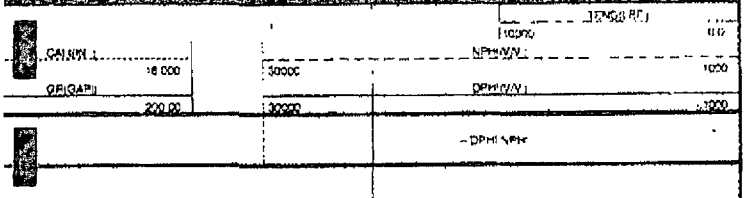
8 TO 9 1399.0 F

ATED INTEGRATION VALUES SUMMARY:

egrated Hole Volume: 1014.71 F3 FROM 3600.00 F TO 1250.00 F
egrated Cement Volume: 626.972 F3 FROM 3600.00 F TO 1250.00 F
MING 5.50000 IN O.D. CASING)

NT MARK SUMMARY:

	INTERVAL BETWEEN PIPS	DEPTH TRACK EDGE
ated Hole Volume	10.0000 F3	LEFT EDGE
egrated Cement Volume	10.0000 F3	RIGHT EDGE



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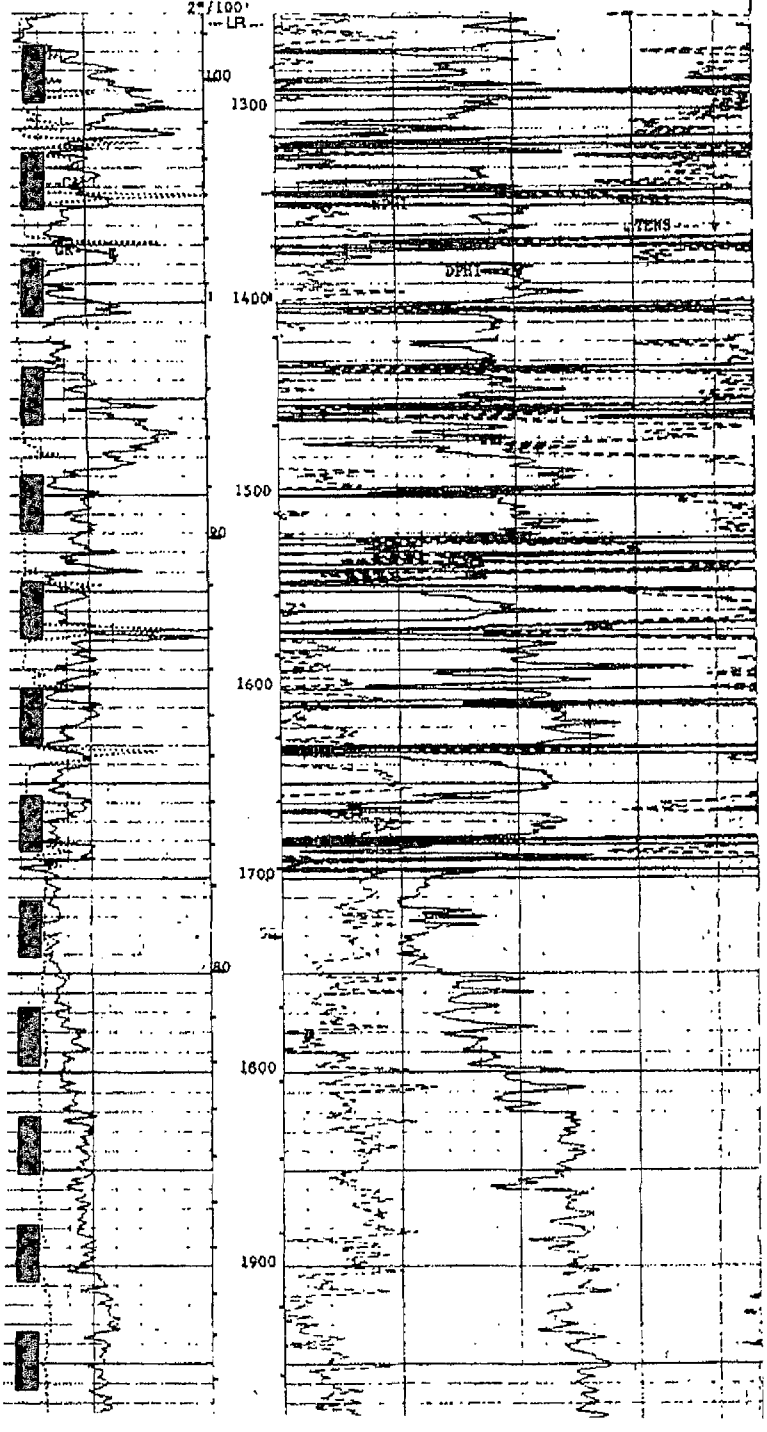
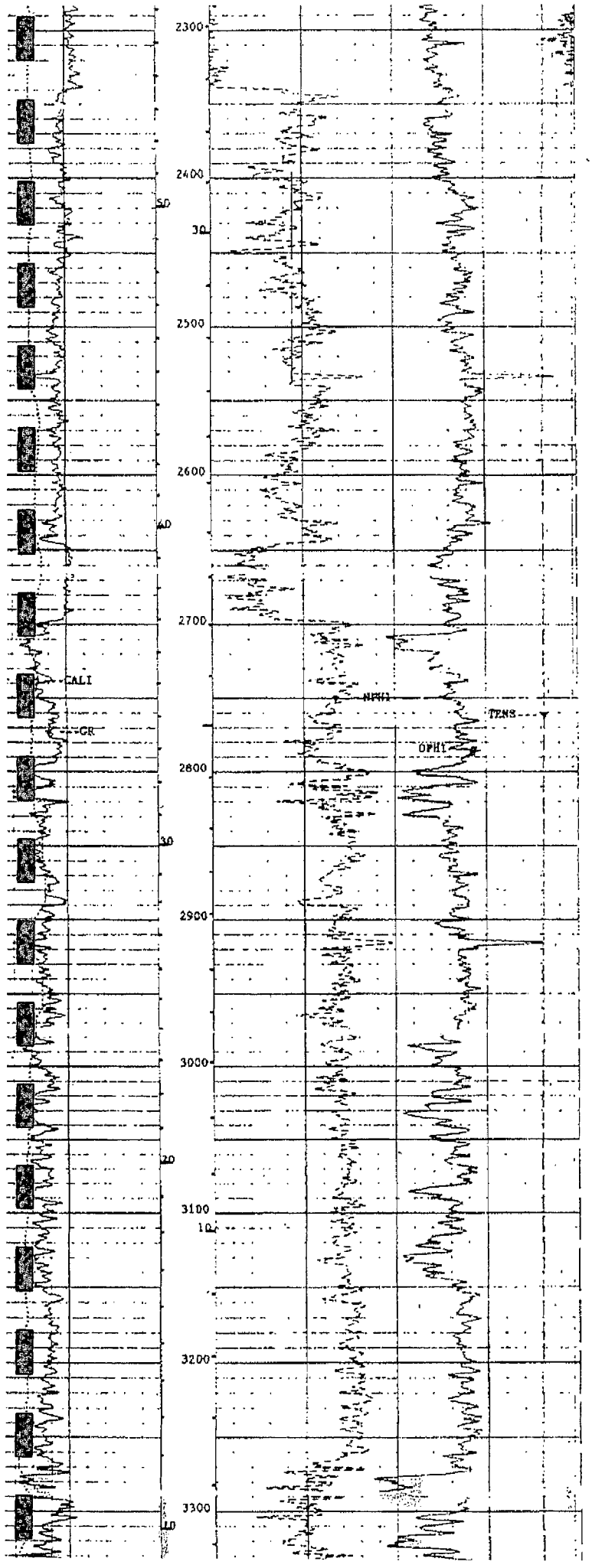
INPUT FILE(S) CREATION DATE
9 23-DEC-1993 10:56

SANDSTONE




2300
2400
2500
2600
2700
2800
2900
3000
3100
3200
3300
CALI
GR
NPHI
TPNS
DPHI
60
30
60
30
20
10
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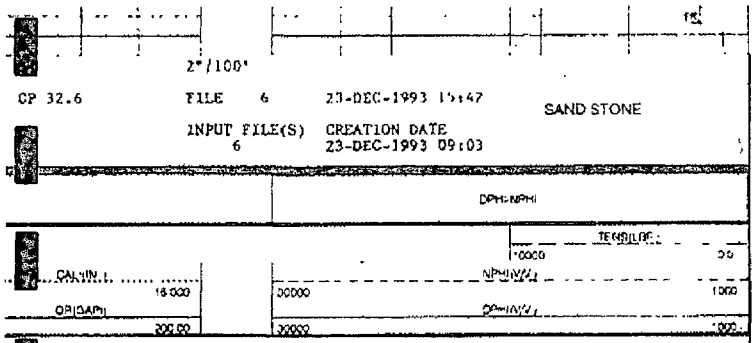
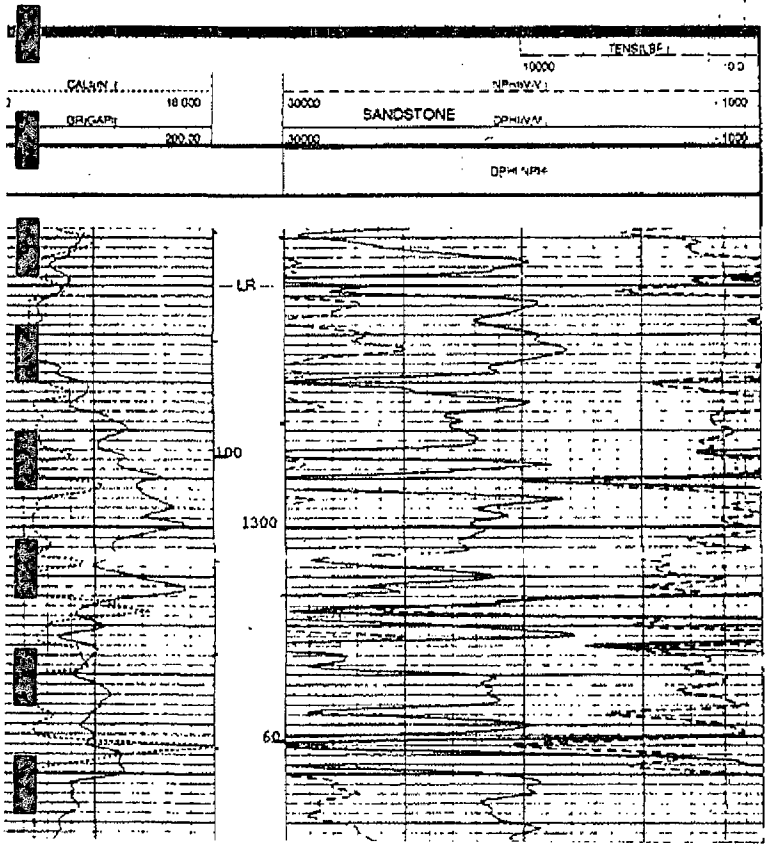


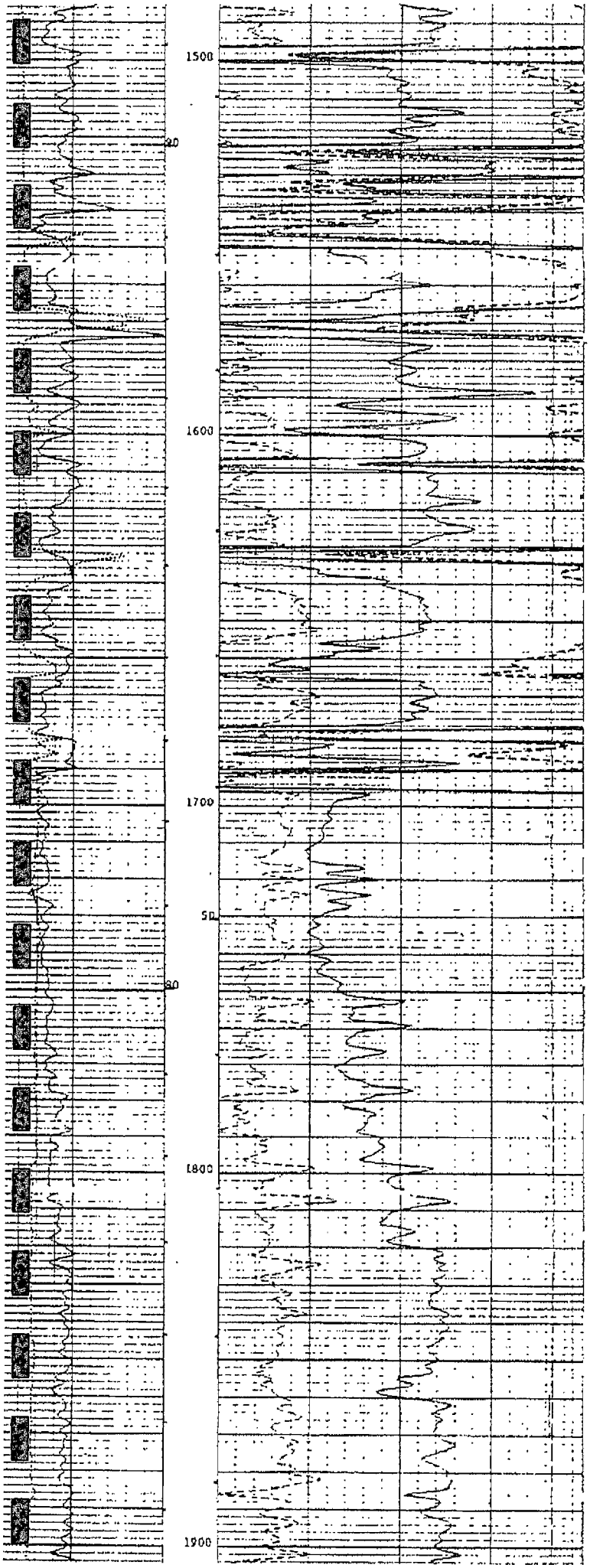
SENSOR MEASURE POINT TO TOOL ZERO

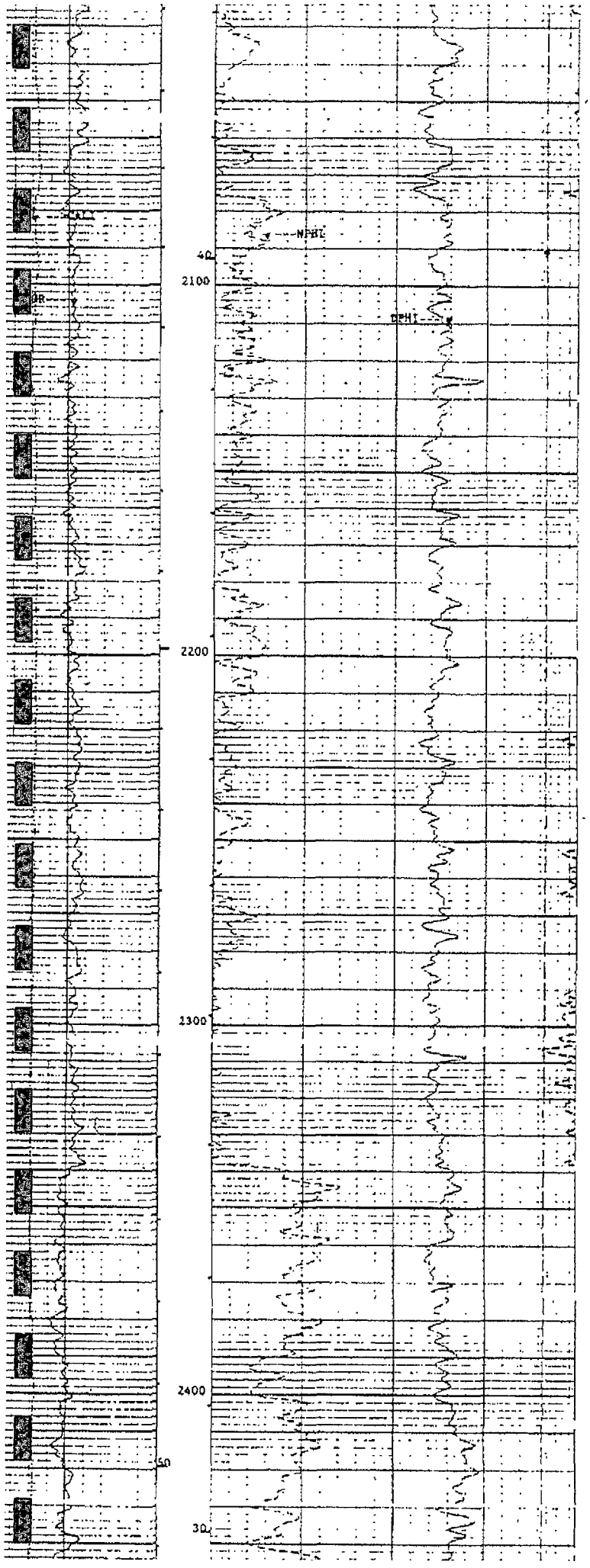
GR	60.5	FEET	SP	10.3	FEET
IRM	6.0	FEET	IXM	6.0	FEET
ITEM	6.5	FEET	IXD	9.5	FEET
SFB	6.5	FEET	SPA	10.3	FEET
SPV	6.5	FEET	SPC	6.5	FEET
CFIC	51.5	FEET	IRD	9.5	FEET
LITH	33.9	FEET	CNTC	51.0	FEET
LS	33.9	FEET	LL	33.9	FEET
PARI	33.4	FEET	LU	33.9	FEET
SS2	33.9	FEET	SS1	33.4	FEET
TENS	-44.0	FEET	CALI	34.0	FEET
TNRA	52.0	FEET			

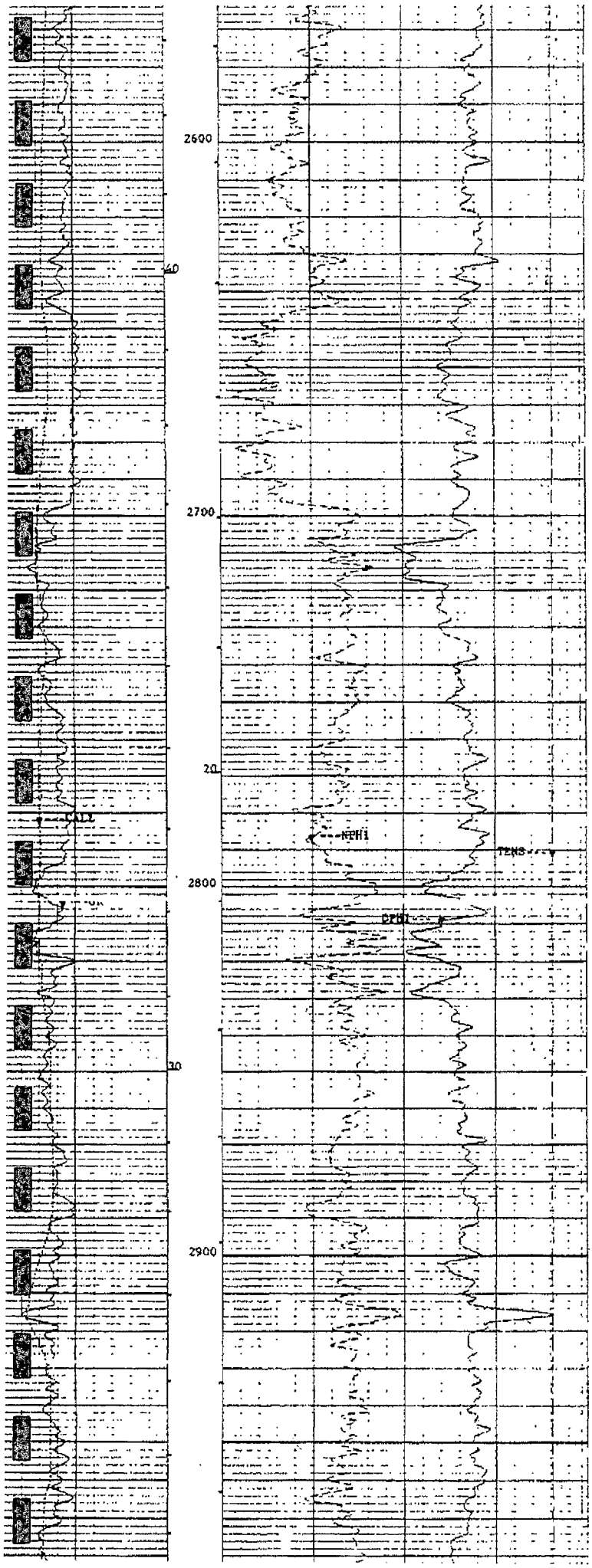
PARAMETERS

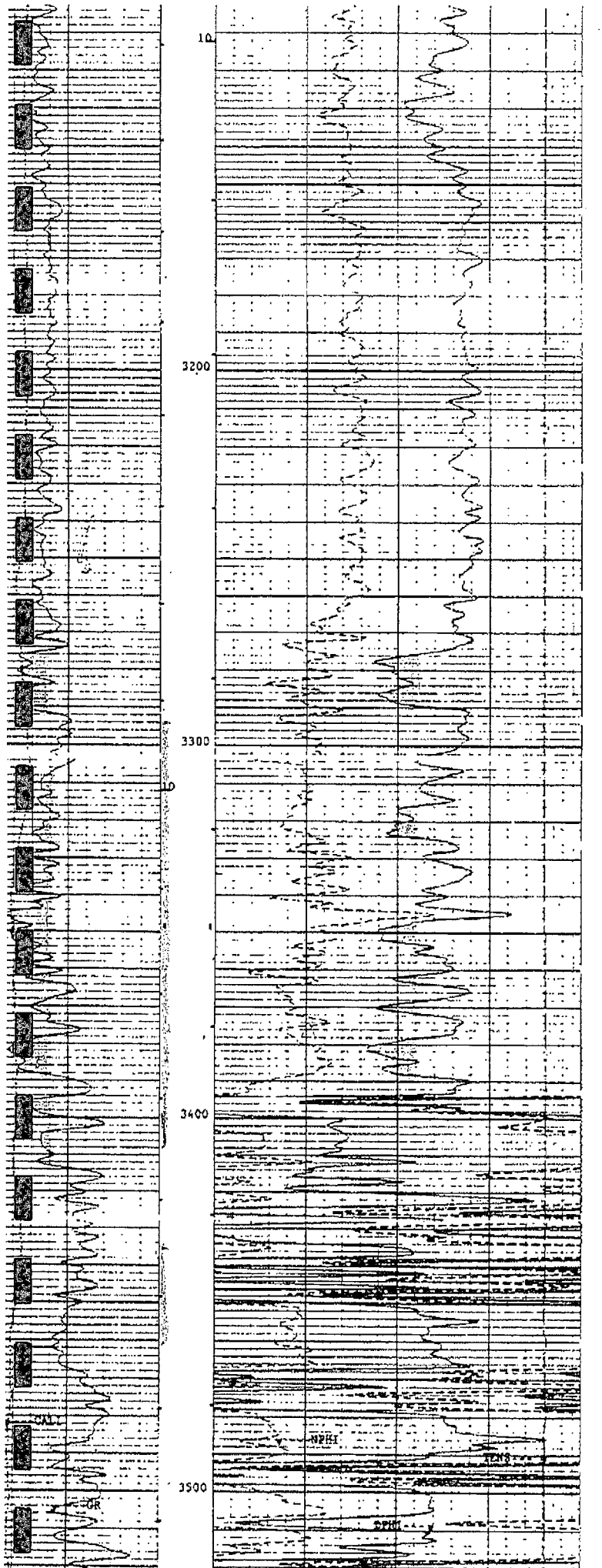
NAME	VALUE	UNIT	NAME	VALUE	UNIT
PP	NORM		DO	0.0	F
WMUD	8.00000	LB/G	TD	3600.00	F
FCD	5.50000	IN	DNC	CALI	
BFM	LIQU		MDEN	2.65000	G/C3
FD	1.00000	G/C3	DPPN	STAN	
MATR	SAND		HC	CALI	
NPDC	0		HSCO	YES	
SOCO	NO		MCCO	NO	
BSCO	NO		FSCO	NO	
MWCO	NO		PTCO	NO	
CCCO	NO		SDAT	SOCN	
MCOR	MATU		SOCN	.500000	IN
FSAL	-50000.0	PPM	ANGL	0.0	DEG
GGRD	.0100000	DF/F	BHFL	WATE	
IFRS	20	KHZ	SBR	1.00000	OHMM
MXE2	19.4210	MM/M	DXE2	98.6781	MM/M
MRE2	7.93488	MM/M	DRE2	14.5594	MM/M
MPH2	-.865799	DEG	DPH2	-.061766	DEG
MGF2	1.02359		DGF2	1.00535	
DZSP	DISA		SFLZ	ALLO	
DCAS	656.000	F	ITEN	ALLO	
DEVI	0.0	DEG	DSES	SING	
IPRO	PHAS		IPHA	NORM	
CWPS	NPBI		CDSE	RHOB	
NCJT	GSRY		CTSE	TEMP	
SHT	80.0000	DEGF	BHT	119.000	DEGF
SPAE	ALLO		TDL	3600.00	F
MRT	119.000	DEGF	DFD	9.50000	LB/G
RMFS	2.89000	OHMM	RMS	5.09000	OHMM
MST	82.0000	DEGF	MFST	82.0000	DEGF
BS	7.87500	IN	BHS	OPEN	

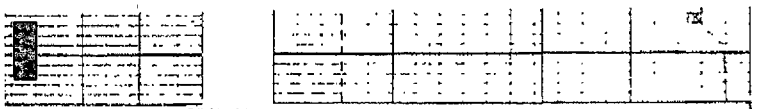



1500
20
1600
1700
50
80
1800
1900


NPHI
40
2100
DPHI
2200
2300
2400
30


2600
40
2700
20
CALI
NPHI
TENS
2800
DPHI
30
2900

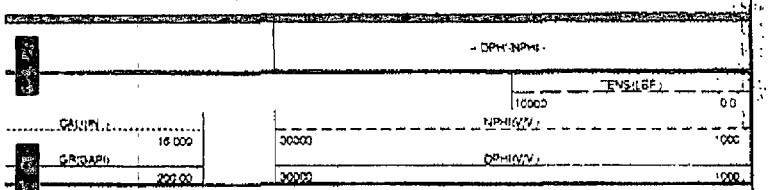

10
3200
3300
3400
3500
CAL
GR
NPHI
RHOB



5"/100'

32.6 FILE 3 23-DEC-1993 14:33 SANDSTONE

INPUT FILE(S) CREATION DATE
6 23-DEC-1993 09:05

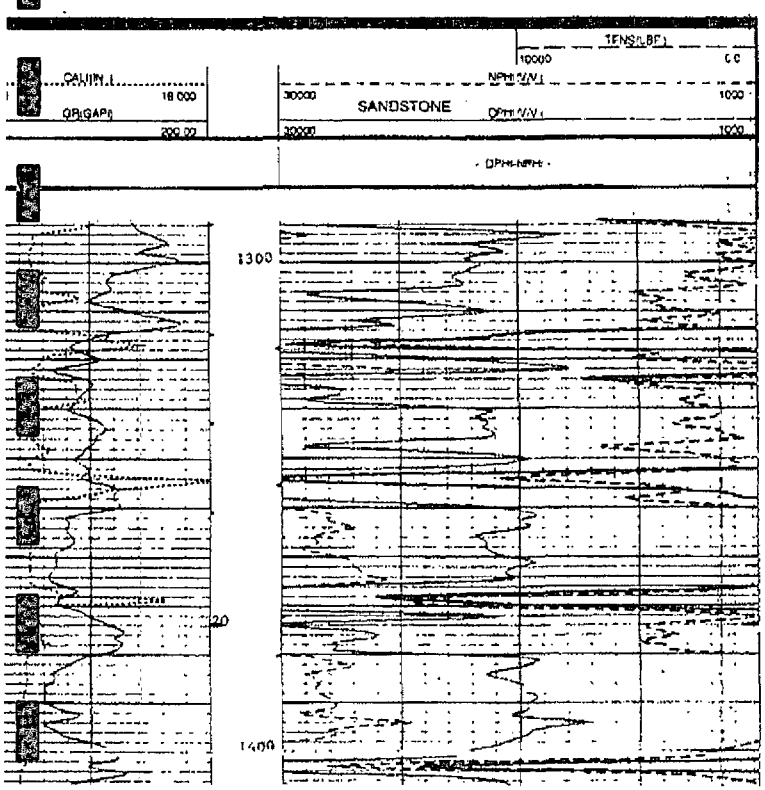


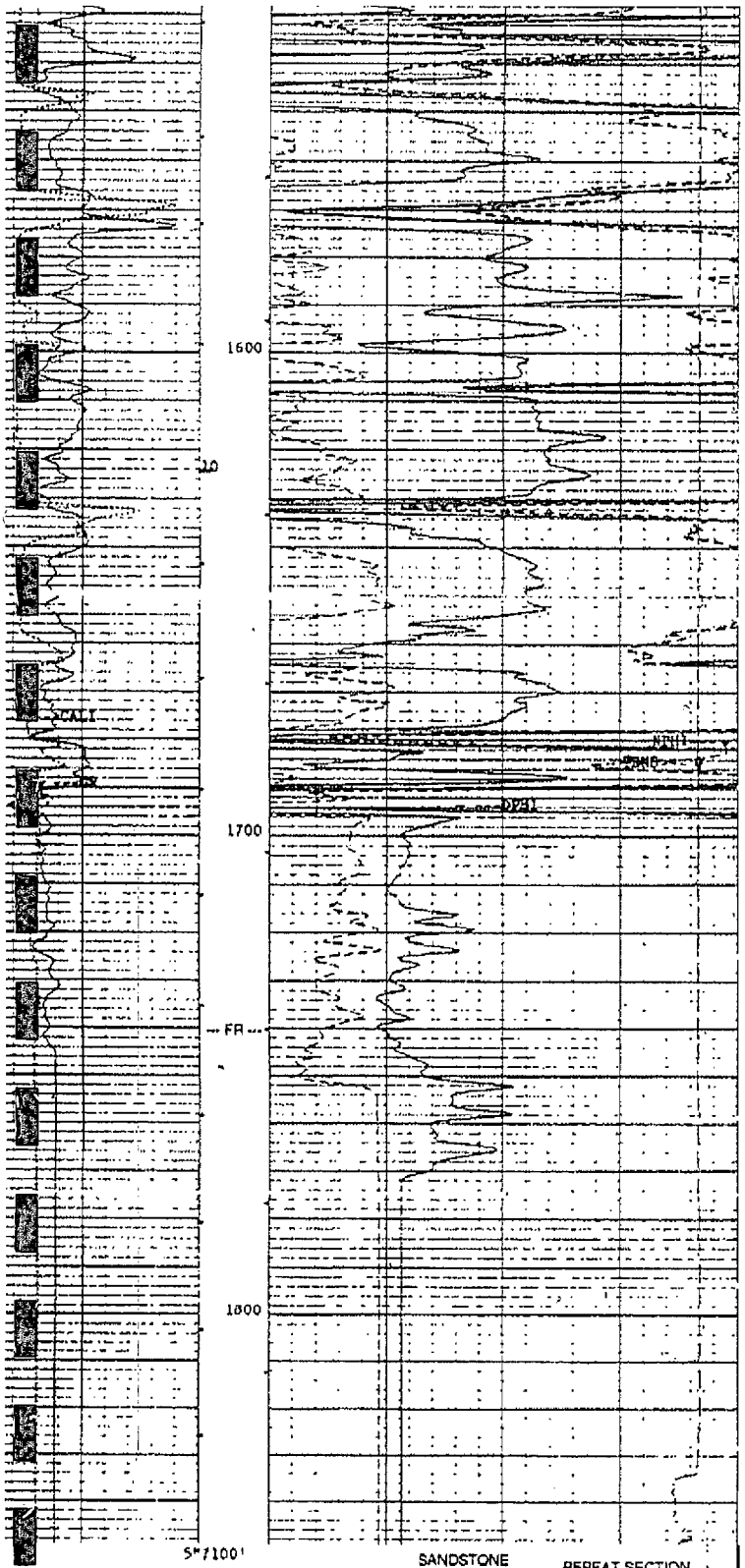
SENSOR MEASURE POINT TO TOOL ZERO

GR	60.5	FEET	SP	10.3	FEET
IRM	6.0	FEET	IXM	6.0	FEET
ITEM	6.5	FEET	IXD	9.5	FEET
SFH	6.5	FEET	SPA	10.3	FEET
SFV	6.5	FEET	SFC	6.5	FEET
CFTC	51.5	FEET	IRD	9.5	FEET
LITH	33.9	FEET	CNTC	51.0	FEET
LS	33.9	FEET	LL	33.9	FEET
PARI	33.4	FEET	LU	33.9	FEET
SS2	33.4	FEET	SS1	33.4	FEET
TENS	-44.0	FEET	CALI	34.0	FEET
TNRA	52.0	FEET			

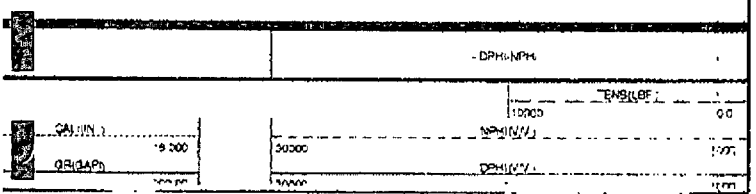
PARAMETERS

NAME	VALUE	UNIT	NAME	VALUE	UNIT
PP	NORM		DO	0.0	F
WMUD	8.00000	LB/G	TD	3600.00	F
FCD	5.50000	IN	DHC	CALI	
BFM	LIQU		MDEN	2.65000	G/C3
ED	1.00000	G/C3	DPFM	SIAN	
MATR	SAND		HC	CALI	
NFDC	0		HSCD	YES	
SOCO	NO		MCCO	NO	
BSCO	NO		FSCD	NO	
MWCO	NO		PTCO	NO	
CCCO	NO		SDAT	SOCN	
MCOR	NATU		SOCN	.500000	IN
FSAL	-50000.0	PPM	ANCL	0.0	DEG
GGRD	.0100000	DF/F	BHYL	WATE	
IFRS	20	KHZ	SBR	1.00000	OHMM
MXE2	13.4210	MM/M	DXE2	98.67B1	MM/M
MRE2	7.93488	MM/M	DRE2	14.5594	MM/M
MPH2	-.865799	DEG	DPH2	-.061766	DEG
MCF2	1.02359		DGF2	1.00535	
DESP	DISA		SFLE	ALLO	
DCAS	856.000	F	ITEN	ALLO	
DEVI	0.0	DEG	DSES	SING	
IPRO	PHAS		IPHA	NORM	
CNPS	NPHI		CDSE	RHOB	
MCJT	GSBY		GTSE	TEMP	
SHT	80.0000	DEGF	BHT	119.000	DEGF
SPAE	ALLO		TDL	3600.00	F
MRT	119.000	DEGF	DFD	9.50000	LB/G
RMFS	2.89000	OHMM	RMS	5.09000	OHMM
MST	82.0000	DEGF	MFST	82.0000	DEGF
BS	7.87500	IN	BHS	OPEN	





CP 32.6 FILE 9 23-DEC-1993 14:57 (UP)



SENSOR MEASURE POINT TO TOOL ZERO

GR	60.5	FEET	SP	10.3	FEET
IRM	6.0	FEET	IXM	6.0	FEET
ITEM	6.5	FEET	IXD	9.5	FEET
SFB	6.5	FEET	SPA	10.3	FEET
SFV	6.5	FEET	SFC	6.5	FEET
CFTC	51.5	FEET	IRD	9.5	FEET
LITH	33.9	FEET	CNTC	51.0	FEET
LS	33.9	FEET	LL	33.9	FEET
PARI	33.4	FEET	LU	33.9	FEET
SS2	33.4	FEET	SS1	33.4	FEET
TENS	-44.0	FEET	CALI	34.0	FEET

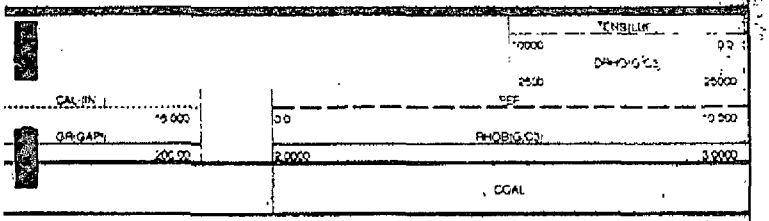
FILES SPLICED	SPLICE DEPTH
6 TO 8	3349.0 F
8 TO 9	1399.0 F

CUMULATED INTEGRATION VALUES SUMMARY:

tegrated Hole Volume:	1014.71 F3	FROM 3600.00 F	TO 1250.00 F
ted Cement Volume:	626.972 F3	FROM 3600.00 F	TO 1250.00 F
(ASSUMING 5.50000 IN O.D. CASING)			

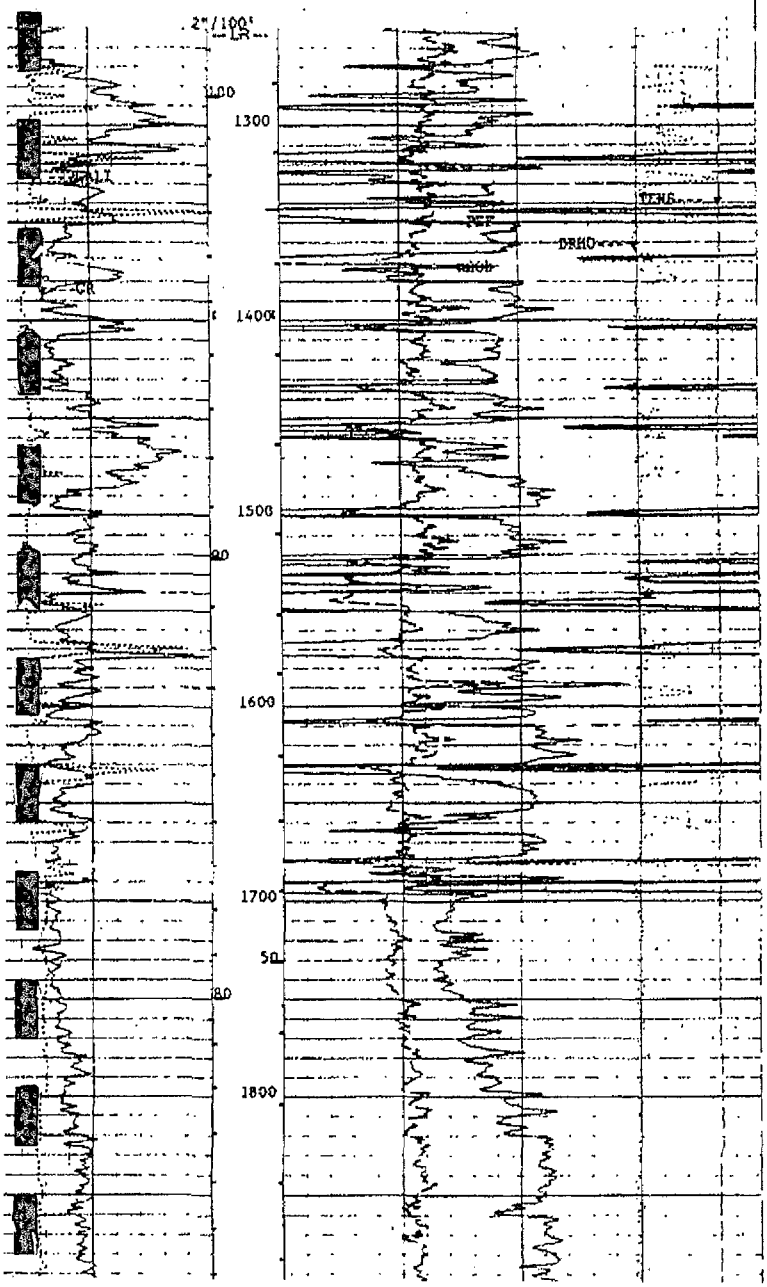
ENT MARK SUMMARY:

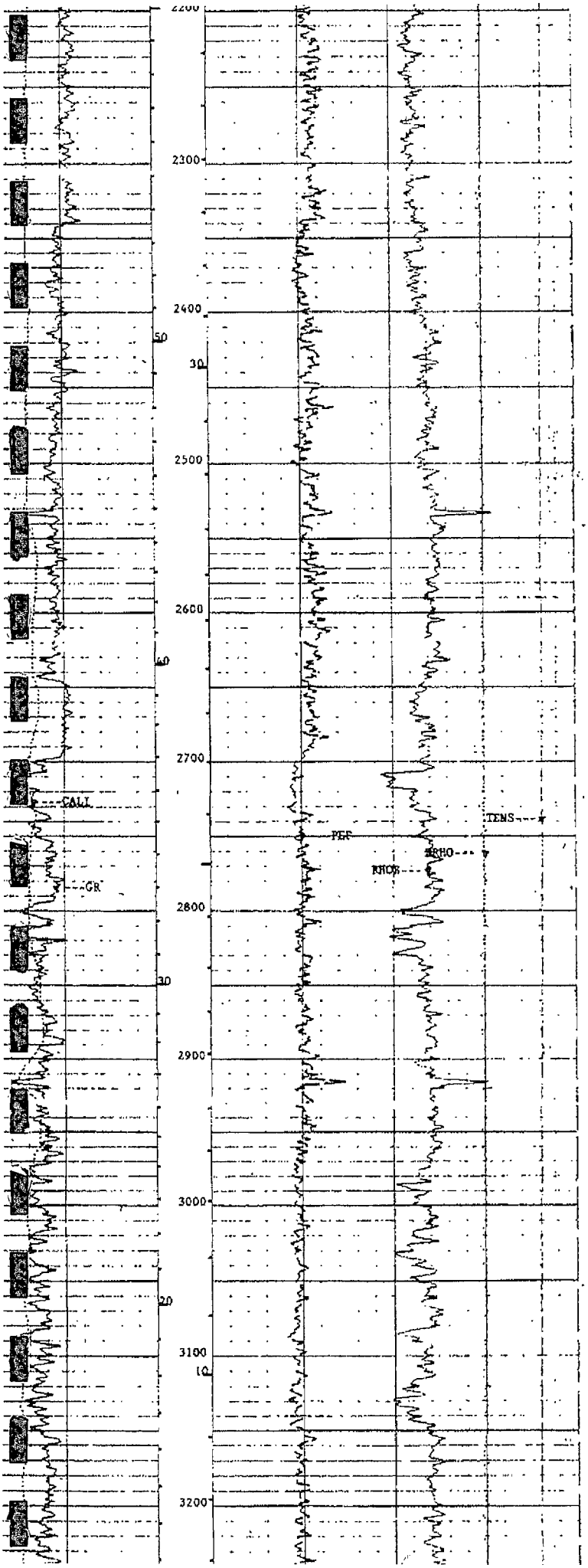
	INTERVAL BETWEEN PIPS	DEPTH TRACK EDGE
tegrated Hole Volume	10.0000 F3	LEFT EDGE
tegrated [illegible]	10.0000 F3	RIGHT EDGE

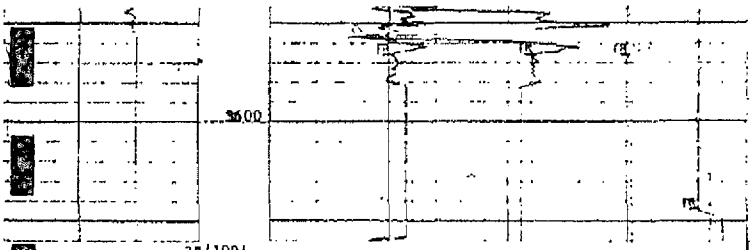


32.6 FILE 6 23-DEC-1993 15:53

INPUT FILE(S)	CREATION DATE
9	23-DEC-1993 10:56

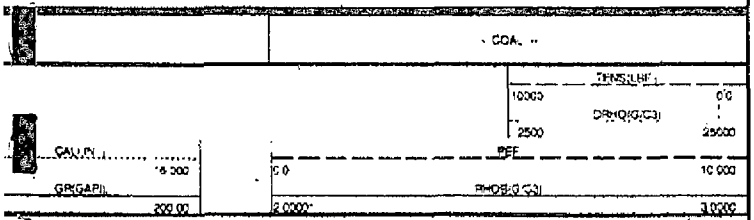



2200
2300
2400
50
30
2500
2600
60
2700
CALI
PEF
TENS
RHO
RHOB
GR
2800
30
2900
3000
20
3100
10
3200



32.6 FILE 6 23-DEC-1993 15:42

INPUT FILE(S) CREATION DATE
6 23-DEC-1993 09:03

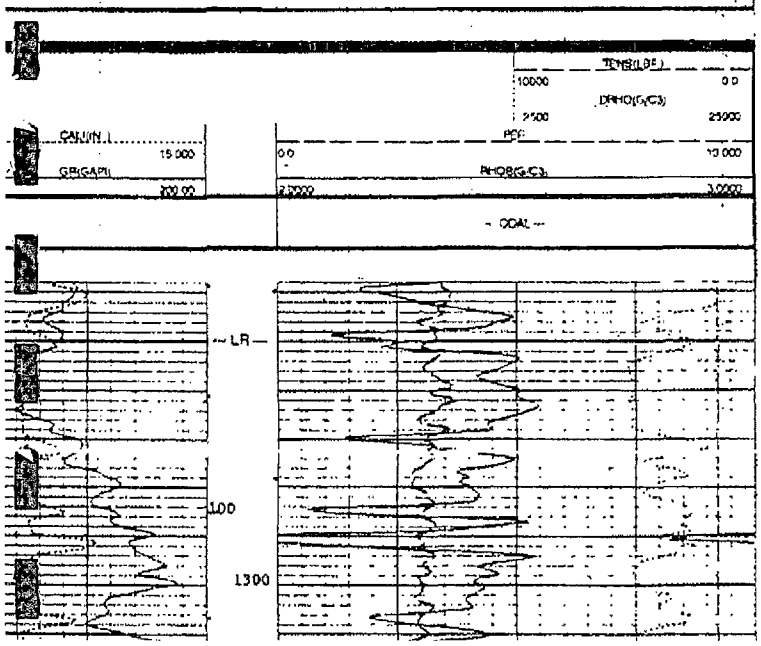


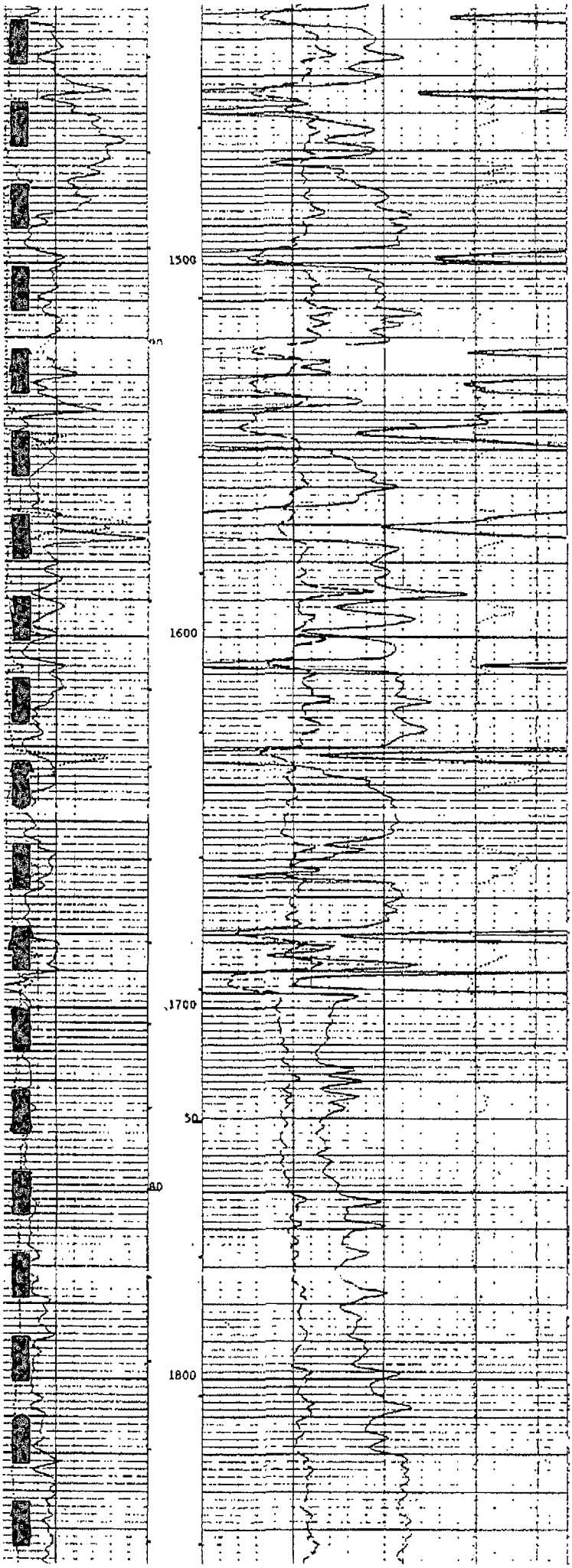
SENSOR MEASURE POINT TO TOOL ZERO

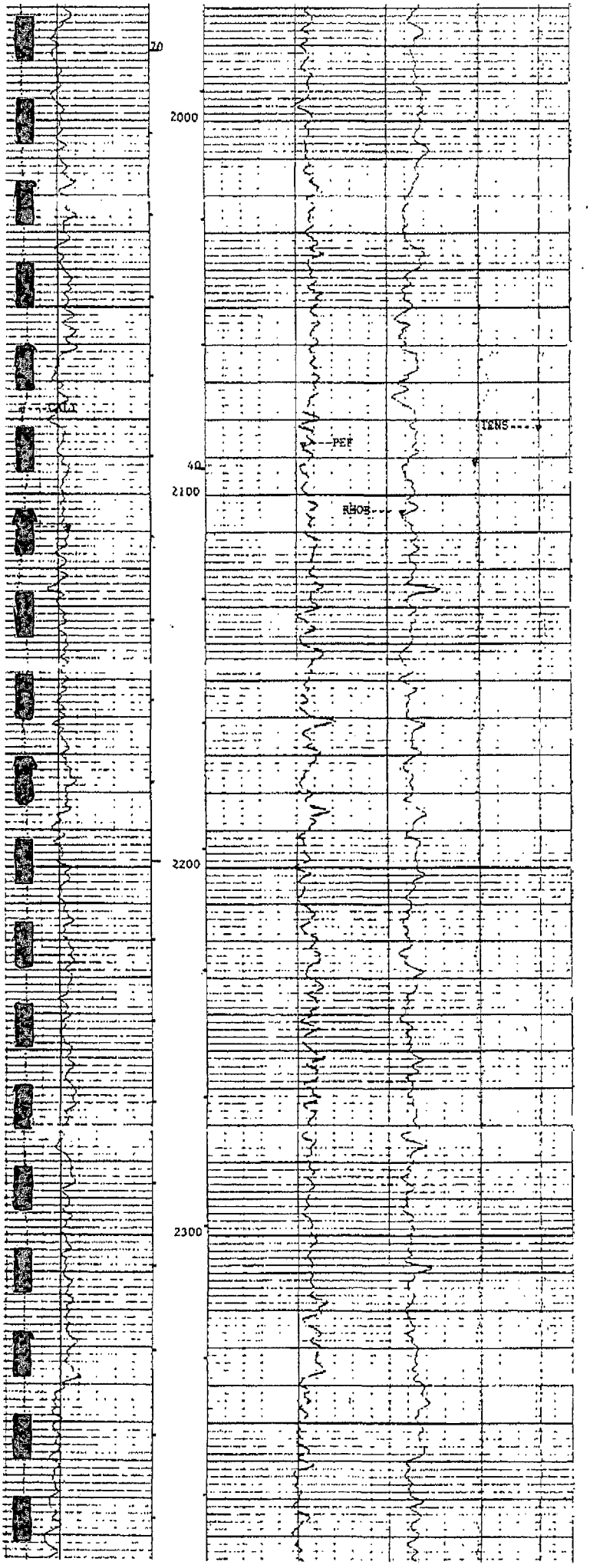
GR	60.5	FEET	SP	10.3	FEET
TRM	6.0	FEET	IXH	6.0	FEET
ITEM	6.5	FEET	IXD	9.5	FEET
SFB	6.5	FEET	SPA	10.3	FEET
SFV	6.5	FEET	SFC	6.5	FEET
CFTC	51.5	FEET	IRD	9.5	FEET
LITH	33.9	FEET	CNTC	51.0	FEET
LS	33.9	FEET	LL	33.9	FEET
PARI	33.4	FEET	LU	33.9	FEET
SS2	33.4	FEET	SS1	33.4	FEET
TENS	-44.0	FEET	CALI	34.0	FEET
TNRA	52.0	FEET			

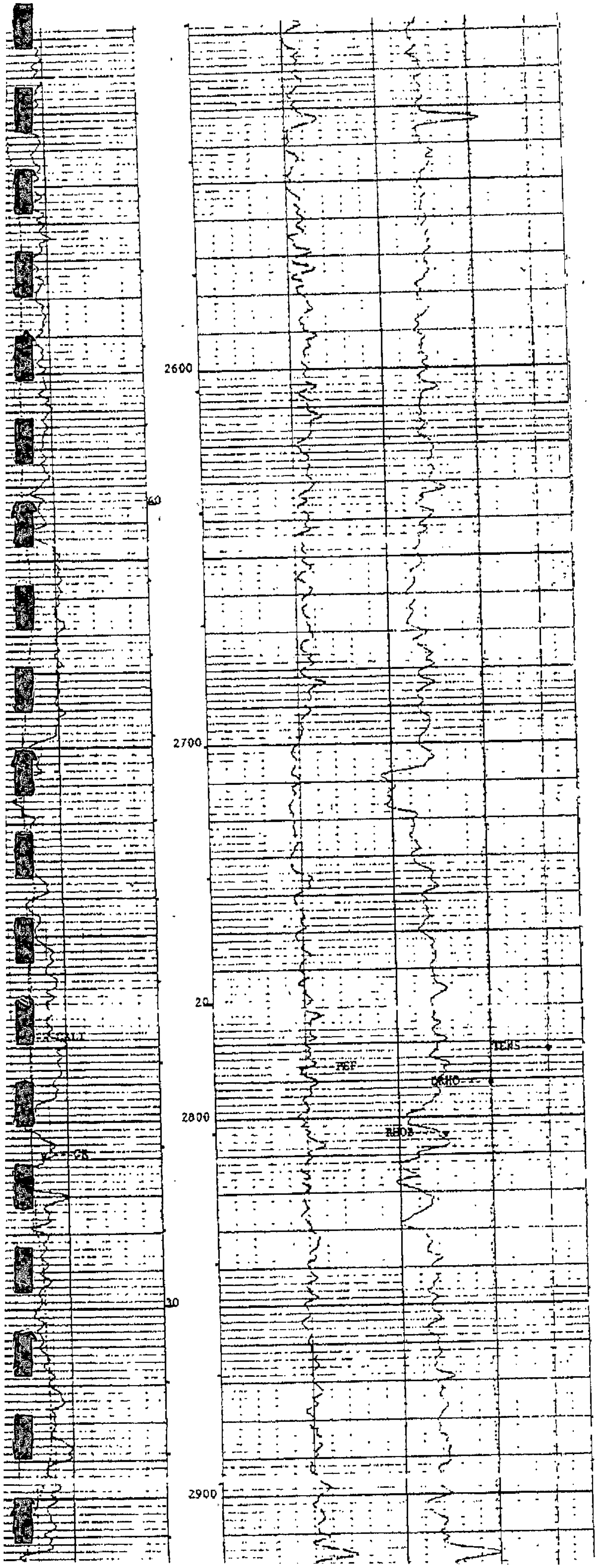
PARAMETERS

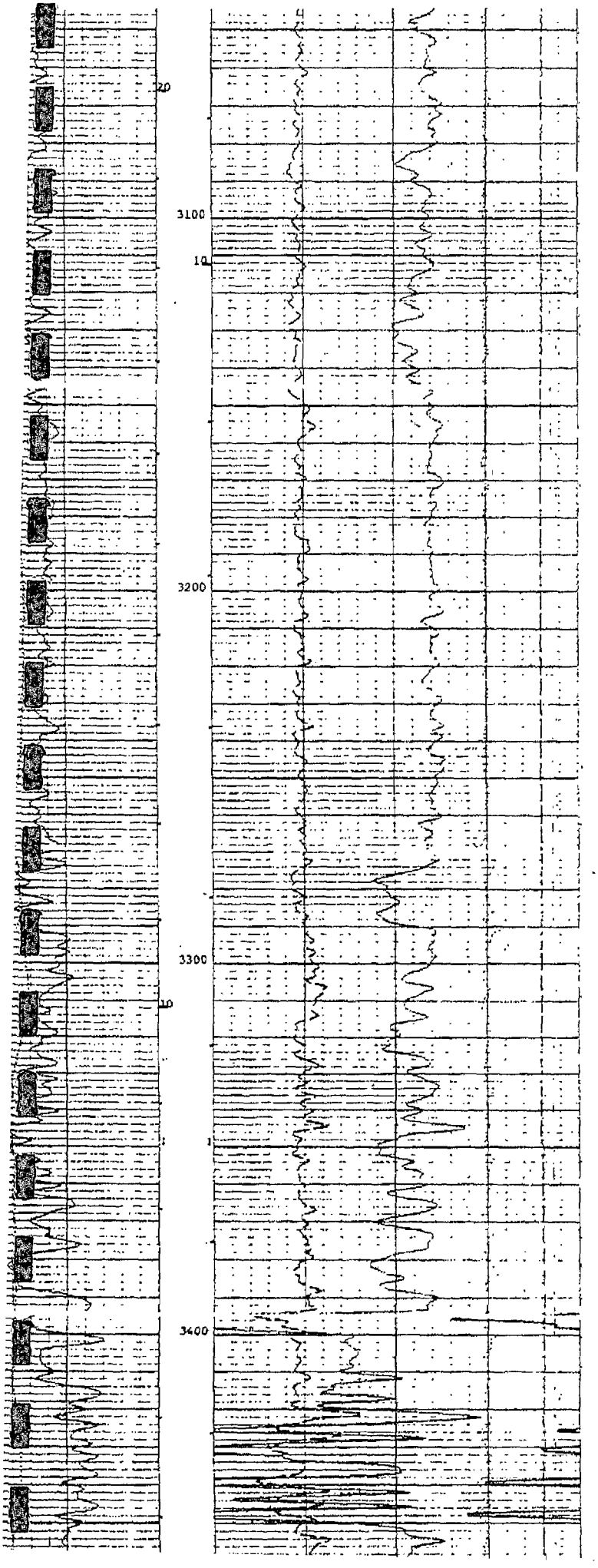
NAME	VALUE	UNIT	NAME	VALUE	UNIT
PP	NORM		DO	0.0	F
MMUD	8.00000	LB/G	TD	3600.00	F
FCD	5.50000	IN	DHC	CALI	
BFM	LIQU		MDEN	2.65000	G/C3
FD	1.00000	G/C3	DPFM	STAN	
MATR	SAND		HC	CALI	
MPDC	0		HSCO	YES	
SOCO	NO		MCCO	NO	
BSCO	NO		PSCO	NO	
MWCO	NO		PTCO	NO	
CCCO	NO		SDAT	SOCN	
MCOR	NATU		SOCN	.500000	IN
FSAL	-50000.0	PPM	ANGL	0.0	DEG
CCRD	.0100000	DF/F	BHFL	WATE	
IFRS	20	KHZ	SBR	1.00000	OHMM
MXE2	13.4210	MH/M	DXE2	98.6781	MH/M
MRE2	7.93488	MH/M	DRE2	14.5594	MH/M
MPH2	-.865799	DEG	DPH2	-.061766	DEG
MGP2	1.02359		DGF2	1.00535	
DESP	DISA		SFLE	ALLO	
DCAS	856.000	F	ITEN	ALLO	
IPRO	FHAS		IPHA	NORM	
CNPS	SPRI		CDSE	RHOB	
MCJT	GSRY		GTSE	TEMP	
SHT	80.0000	DEGF	BHT	119.000	DEGF
SPAE	ALLO		TDL	3600.00	F
MRT	119.000	DEGF	DFD	9.50000	LB/G
RMFS	2.89000	OHMM	RMS	5.09000	OHMM
MST	82.0000	DEGF	MFST	82.0000	DEGF
BS	7.87500	IN	BHS	OPEN	

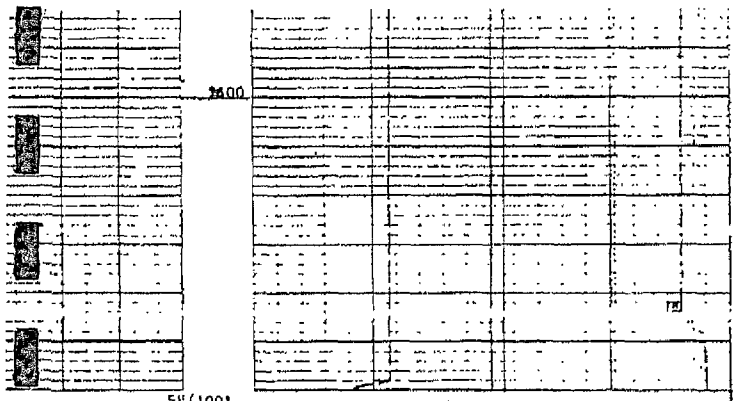



1500
1600
1700
1800


20
2000
PEF
TENS
40
2100
RHOB
2200
2300

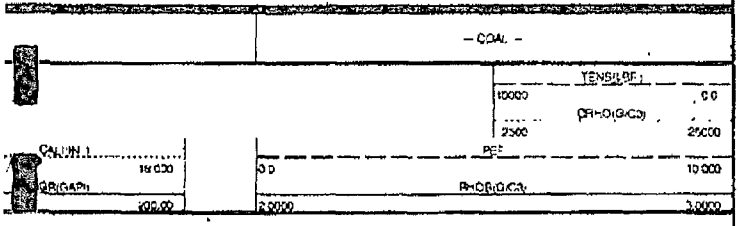

2600
2700
2800
2900
CALI
GR
PEF
TENS
DRHO
RHOB


20
3100
10
3200
3300
10
1
3400



FILE 3 23-DEC-1993 14:33

INPUT FILE(S) CREATION DATE
6 23-DEC-1993 09:03

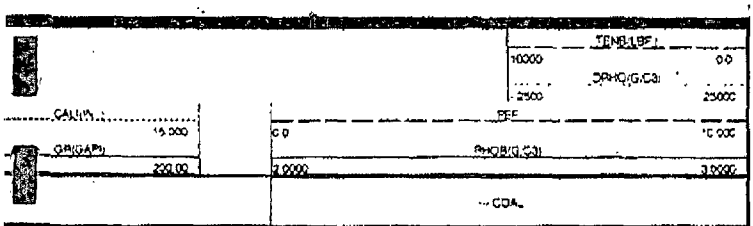


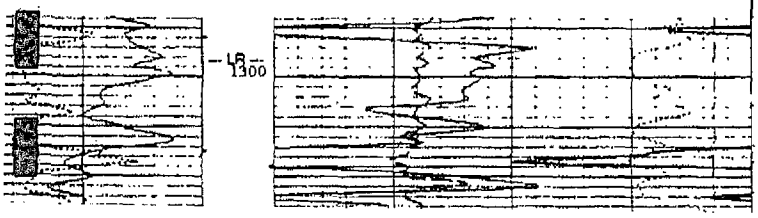
SENSOR MEASURE POINT TO TOOL ZERO

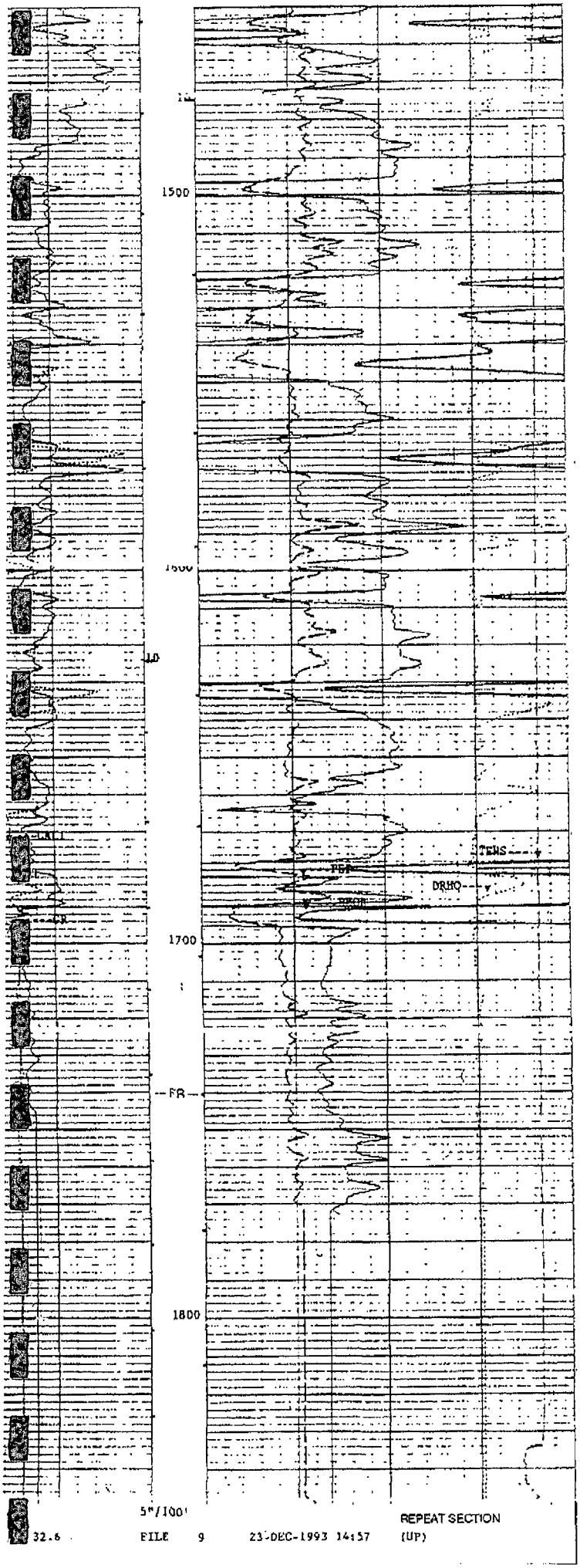
GR	60.5	FEET	SP	10.3	FEET
IRM	6.0	FEET	IXM	6.0	FEET
ITEM	6.5	FEET	IXD	9.5	FEET
SFB	6.5	FEET	SPA	10.3	FEET
SFV	6.5	FEET	SFC	6.5	FEET
CFTC	51.5	FEET	IRD	9.5	FEET
LITH	33.9	FEET	CNTC	51.0	FEET
LS	33.9	FEET	LL	33.9	FEET
PARI	33.4	FEET	LU	33.9	FEET
SS2	33.4	FEET	SS1	33.4	FEET
TENS	-44.0	FEET	CAL1	34.0	FEET
TNRA	52.0	FEET			

PARAMETERS

NAME	VALUE	UNIT	NAME	VALUE	UNIT
PP	NORM		DO	0.0	F
MSUD	8.00000	LB/G	TD	3600.00	F
TCD	5.50000	IN	DHC	CALI	
BFM	LIQU		MDEN	2.65000	G/C3
FD	1.00000	G/C3	DPHM	STAN	
MATR	SAND		HC	CALI	
MPDC	0		HSCO	YES	
SOCO	NO		MCCO	NO	
BSCO	NO		FSCO	NO	
MWCO	NO		FTCO	NO	
CCCO	NO		SDAT	SOCN	
MCOR	NATU		SOCN	.500000	IN
FSAL	-50000.0	PPM	ANGL	0.0	DEG
GGRD	.0100000	DF/F	BHFL	WATE	
IFRS	20	KHZ	SBR	1.00000	OHMM
MXE2	13.4210	MN/M	DXE2	98.6781	MN/M
MRE2	7.93488	MN/M	DRE2	14.5594	MN/M
MPH2	-.865799	DEG	DPH2	-.061766	DEG
MGF2	1.02359		DGF2	1.00535	
DESP	DISA		SFLE	ALLO	
DCAS	856.000	F	ITEN	ALLO	
DEVI	0.0	DEG	BSES	SING	
IPRO	PHAS		IPHA	NORM	
CNPS	NPHI		CDSE	RHOB	
MCJT	GSRV		GTSE	TEMP	
SHT	80.0000	DEGF	BHT	119.000	DEGF
SPAE	ALLO		TDL	3600.00	F
MRT	119.000	DEGF	DFD	9.50000	LB/G
RMFS	2.69000	OHMM	RMS	5.09000	OHMM
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
BS	7.87500	IN	BHS	OPEN	






1500
1600
1700
1800
TENS
DRHO
FR
5"/100'
REPEAT SECTION
32.6
FILE 9
23-DEC-1993 14:57
(UP)

	1.00000	G/C3		DPFM	STAN
TK	SAND			HC	CALI
OC	0			HSCO	YES
CO	NO			MCCO	NO
BSCO	NO			ESCO	NO
MWCO	NO			PTCO	NO
CCCO	NO			SDAT	SOCN
OR	NATU			SOCN	.500000	IN
AL	-30000.0	PPM		ANGL	0.0	DEG
RD	.01000000	DF/F		BHFL	WATE
IFRS	20	KHZ		SBR	1.00000	OHMM
MXE2	13.4210	MM/M		DXE2	98.6781	MM/M
MRE2	7.93488	MM/M		DRE2	14.5594	MM/M
HZ	-.865799	DEG		DPH2	-.061766	DEG
F2	1.02359			DGF2	1.00535	
SP	DISA			SFLE	ALLO	
AS	856.000	F		1TEN	ALLO	
DEV1	0.0	DEG		DSES	SING	
IPRO	PHAS			1PHA	NORM	
CNPS	NPHI			CDSE	RHOB	
JT	CSRY			GTSE	TEMP	
T	80.0000	DEGF		BHT	119.000	DEGF
AE	ALLO			DFD	9.50000	LB/G
RFS	2.89000	OHMM		RMS	5.09000	OHMM
MST	82.0000	DEGF		MFST	82.0000	DEGF
BS	7.87500	IN		BHS	OPEN	

AFTER SURVEY TOOL CHECK SUMMARY

RMED: 23-DEC-1993 16:15
M FILE: TOHED (VERSION 32.6 00/00/00 91/08/23)

TOOL CHECK

RIAL NUMBER: 489
E SERIAL NUMBER: 485

6	DEPTH INTERVAL:	3660.0 -	3230.0	F
7		3657.5 -	3506.5	F
8		3509.5 -	1382.0	F
9		1849.0 -	796.0	F

MEAN CALIBRATION CHANGE

ABSOLUTE CHANGE FOR RESISTIVITY > 27 OHM-M		PERCENT CHANGE FOR RESISTIVITY < 27 OHM-M		SPL ABS. CHANGE FOR RESISTIVITY < 1 OHM-M	
CHANGE (MM/M)	TOLERANCE (MM/M)	CHANGE (%)	TOLERANCE (%)	CHANGE (OHMM)	TOLERANCE (OHMM)
.05	< 0.75	.06	< 2.0	N/A	
.06	< 0.75	.06	< 2.0	N/A	
.01	< 0.75	.03	< 2.0	0.0	< 0.02

og quality flags in depth track indicate when electronic calibration is out of tolerance. Flagged values ARE now included in this table.

TOOL CHECK

DENSITY RESISTIVITY SONDE NUMBER	: 3718
NUCLEAR SERVICE CARTRIDGE NUMBER	: 2999
POWERED DETECTOR HOUSING NUMBER	: 2782
POWERED GAMMA-GAMMA DETECTOR NUMBER	: 2781
LDT LOGGING SOURCE NUMBER	: 1836
LDT CALIBRATION MODE	: WATE

	MEASURED BACKGROUND BEFORE	AFTER	UNITS	TOLERANCE ON BEFORE-AFTER
LL	16.0	16.2	CPS	+/- 1.0
LU	61.6	62.4	CPS	+/- 1.0
LS	46.8	47.4	CPS	+/- 1.0
TH	4.5	4.6	CPS	+/- 0.3
1	13.0	12.9	CPS	+/- 0.5
2	8.7	8.8	CPS	+/- 0.5

HV SETTINGS	DETECTOR RESOLUTIONS
HV LS: 1311.3 V	LS: 8.8 %
HV SS: 1398.3 V	SS: 8.2 %

BKGD
E SURVEY: 22-DEC-1993 09:13 AFTER SURVEY: 23-DEC-1993 16:08

H TOOL CHECK

INPUT	BEFORE JIG	AFTER JIG
CNTC	2974.38	2944.30
CFTC	1281.56	1254.69

E IN THERMAL POROSITY AT 20 PU IS .377 PU

E SURVEY: BACK: 22-DEC-1993 09:13 JIG: 22-DEC-1993 09:32
SURVEY CHECK: BACK: 23-DEC-1993 16:08 JIG: 23-DEC-1993 16:14

32.6 FILE 11 23-DEC-1993 16:15

BEFORE SURVEY CALIBRATION SUMMARY

ORMED: 23-DEC-1993 13:15
PROGRAM FILE: TOHED (VERSION 32.6 00/00/00 91/08/23)

DETECTOR CALIBRATION SUMMARY

	MEASURED BKGD	JIG	CALIBRATED	UNITS
GR	49	211	160	GAPI

	MEASURED BKGD	SHOP VALUES AL+FE	AL	UNITS
LL	16.0	90.1	96.6	CPS
LU	61.6	135.6	145.5	CPS
LS	46.8	158.0	169.3	CPS
LITH	4.5	40.5	60.0	CPS
SS1	13.0	167.3	178.6	CPS
SS2	8.7	259.5	276.6	CPS

HV SETTINGS
HV LS: 1310.1 V
HV SS: 1402.0 V

DETECTOR RESOLUTIONS
LS: 8.7 %
SS: 8.6 %

22-DEC-1993 09:13

DETECTOR CALIBRATION SUMMARY

NEUTRON COMPENSATED CARTRIDGE NUMBER: 376
NEUTRON SOURCE SERIAL NUMBER : 2352
THERMAL HOUSING NUMBER : 420
THERMAL CALIBRATED NEUTRON BOX : 4259

INPUT	PLUS REFERENCE COUNTS	SHOP TANK COUNTS	SHOP JIG COUNTS	BEFORE JIG COUNTS	GAIN
CNTC	6031.00	5799.00	2952.00	2974.38	1.040
CFTC	2793.00	2433.00	1256.00	1281.56	1.148
RATIO	2.159	2.383	2.350	2.321	

22-DEC-1993 09:13 JIG: 22-DEC-1993 09:32 COMP: 23-DEC-1993 10:08

CALIPER CALIBRATION SUMMARY

MEASURED SMALL	MEASURED LARGE	CALIBRATED SMALL	CALIBRATED LARGE	UNITS
8.48	12.60	8.45	12.45	IN

2-DEC-1993 09:09 LARGE: 22-DEC-1993 09:25 COMP: 22-DEC-1993 09:27

32.6 FILE 5 23-DEC-1993 13:14

SHOP SUMMARY

ERFORMED: 13-DEC-1993 15:34
OGRAM FILE: CCSHOP (VERSION 32.6 91/08/23 91/08/23)

DETECTOR CALIBRATION SUMMARY

EUTRON COMPENSATED CARTRIDGE NUMBER: 376
NEUTRON SOURCE SERIAL NUMBER : 2352
THERMAL HOUSING NUMBER : 420
THERMAL CALIBRATED NEUTRON BOX : 4259

INPUT	PLUS REFERENCE COUNTS	SHOP TANK COUNTS	SHOP JIG COUNTS	GAIN
CNTC	6031.00	5799.71	2952.29	1.040
CFTC	2793.00	2433.05	1256.24	1.148
RATIO	2.159	2.384	2.350	

SHOP COUNTS TEMPERATURE AND HOUSING SIZE CORRECTED

3-DEC-1993 15:10 TANK: 13-DEC-1993 15:19 COMP: 13-DEC-1993 15:19

2.6 FILE 1 13-DEC-1993 15:34

SHOP SUMMARY

RMED: 12-DEC-1993 07:54
AM FILE: CCSHOP (VERSION 32.6 91/08/23 91/08/23)

DETECTOR CALIBRATION SUMMARY

DENSITY RESISTIVITY SONDE NUMBER : 3718
NUCLEAR SERVICE CARTRIDGE NUMBER : 2999
POWERED DETECTOR HOUSING NUMBER : 2782
POWERED GAMMA-GAMMA DETECTOR NUMBER : 2781
LDT LOGGING SOURCE NUMBER : 1836
LDT CALIBRATION MODE : WATE

	MASTER CALIBRATED BKGD	AL+FE	AL	UNITS
LL	15.9	90.1	96.6	CPS
LU	61.7	135.6	145.5	CPS
LS	46.7	158.0	169.3	CPS
LITH	4.6	40.5	60.0	CPS
SS1	13.1	167.3	178.6	CPS
SS2	8.7	259.5	276.6	CPS

HV SETTINGS
HV LS: 1307.7 V
HV SS: 1389.3 V

DETECTOR RESOLUTIONS
LS: 8.7 %
SS: 8.7 %

SPECTRUM QUALITY RATIOS

	COMPUTED VALUE	NOMINAL VALUE	TOLERANCE
S	.664	0.65	+/- 0.05
QRSS	.646	0.72	+/- 0.10
QRLI	.354	0.35	+/- 0.06
QLTR	1.381	1.35	+/- 0.06
	1.004	1.00	+/- 0.02

12-DEC-1993 07:34 AL: 12-DEC-1993 07:50 AL+FE: 12-DEC-1993 07:44

CP 32.6 FILE 1 12-DEC-1993 07:53

BLOOMFIELD REFINING CO

BLOOMFIELD REFINING WD #1

BCHL FR 3666.0 F
BCHL TD 3600.0 F
DRLR TD 3601.0 F
Elev. KB 6843.0 F

NW - 410860

27-29N-11W

FINAL PRINT

SCHLUMBERGER

DUAL INDUCTION SFL

COMPANY BLOOMFIELD REFINING CO

WELL BLOOMFIELD REFINING WD #1

FIELD BLANCO MESA VERDE

COUNTY SAN JUAN STATE NEW MEXICO

API SERIAL NO. N/A

LOCATION 1250.4' FEL & 2442.3' FSL

SECT 27 TWP 29 N RANGE 11 W

Other Services: DITE GR CNL LDT-GR

Permanent Datum: GROUND LEVEL Elev. 5500.0 ft above Perm. Datum

Log Measured From: KELLY BUSHING 15.01 ft above Perm. Datum

Drilling Measured From: KELLY BUSHING

Elev.: K.B. 5515.0 ft D.F. 5514.0 ft G.L. 5500.0 ft

Date	23-DEC-1993
Run No.	ONE
Depth Driller	3600.0 ft
Depth Logger	3600.0 ft
Bottom Log Interval	3598.0 ft
Top Log Interval	2000.0 ft
Casing Driller	9.625 in @ 266.0 ft
Casing Logger	266.0 ft
Bit Size	7.875 in
Type Fluid in Hole	GEL CHEM
Density / Viscosity	9.50 LB/G 39.0 S
PH / Fluid Loss	9.5 10.0 C3
Source of Sample	FLOWLINE
Rm @ Meas. Temp.	2.800 OHMM @ 64 DEGF
Rmf @ Meas. Temp.	3.080 OHMM @ 64 DEGF
Rmc @ Meas. Temp.	3.110 OHMM @ 64 DEGF
Source Rmf / Rmc	MEASURED CALCULATED
Rm @ BHT	3.305 OHMM @ 119 DEGF
Time Since Circulation	08:15 23-DEC-1993
Time on Location	23-DEC-1993

The well name, location and borehole reference data were furnished by the customer.

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful 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, agents or employees. These interpretations are also subject to Clause 4 of our General Terms and Conditions as set forth in our current Price Schedule.

Run No.	ONE
Depth Driller	3600.0
Depth Logger	3598.0
Bottom Log Interval	3598.0
Top Log Interval	2000.0
Casing Driller	9.625 in @ 266.0
Casing Logger	266.0
Bit Size	7.875
Type Fluid in Hole	GEL CHEM
Density / Viscosity	9.50 LB/G 39.0 S
PH / Fluid Loss	9.5 10.0 C3
Source of Sample	FLOWLINE
Rm @ Meas. Temp.	2.800 OHMM @ 64 DEGF
Rmf @ Meas. Temp.	3.080 OHMM @ 64 DEGF
Rmc @ Meas. Temp.	3.110 OHMM @ 64 DEGF
Source Rmf / Rmc	MEASURED CALCULATED
Rm @ BHT	3.305 OHMM @ 119 DEGF
Time Since Circulation	08:15 23-DEC-1993
Time on Location	23-DEC-1993

Run No.	ONE
Depth Driller	3600.0
Bottom Log Interval	603586
Top Log Interval	GOF
Casing Driller	
Bit Size	2.041 OHMM @ 119 DEGF
Type Fluid in Hole	5.022 OHMM @ 119 DEGF
Density / Viscosity	1800.0 PSIG
PH / Fluid Loss	
Source of Sample	
Rm @ Meas. Temp.	
Rmf @ Meas. Temp.	
Rmc @ Meas. Temp.	
Source Rmf / Rmc	
Rm @ BHT	
Time Since Circulation	
Time on Location	

TOOL DATA

Number 1	DRS 3718
Number 2	MSG 2999
Number 3	PGD 3787
Number 4	CNC 376
Number 5	DIC 489
Number 6	DIS 485
Number 7	SGT 8209
Number 8	TCCB 8206
Number 9	TCM 1272
Number 10	
Number 11	
Number 12	

REMARKS:

LOG RUN ON SAND MATRIX (2.65 G/CC)

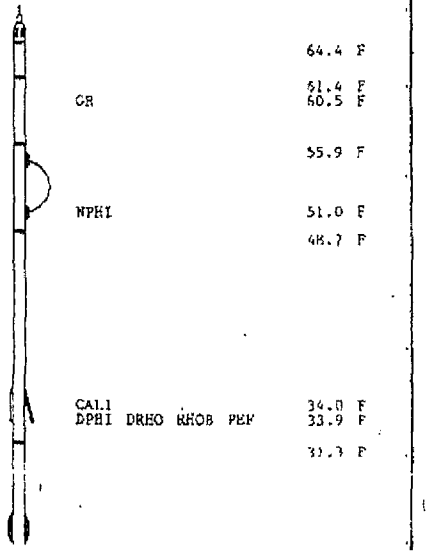
CNL BOWSPRING RUN FOR ECCENTRALIZER

1.5" STANDOFFS USED ON DITE

GP SHIFT AT 3350'

CREW: ANNON & REID

LOGGING TOOL-STRING SKETCH



CB 64.4 F

TL 61.4 F

GR 60.5 F

TH 55.9 F

NPHI 51.0 F

ID 48.7 F

CALI 34.0 F

DPHI DRHO RHOB PEF 33.9 F

DITE 33.3 F

ULATED INTEGRATION VALUES SUMMARY:

tegrated Hole Volume: 1182.12 F3 FROM 3600.00 F TO 856.000 F
tegrated Cement Volume: 729.378 F3 FROM 3600.00 F TO 856.000 F
(ASSUMING 5.50000 IN O.D. CASING)

MARK SUMMARY:

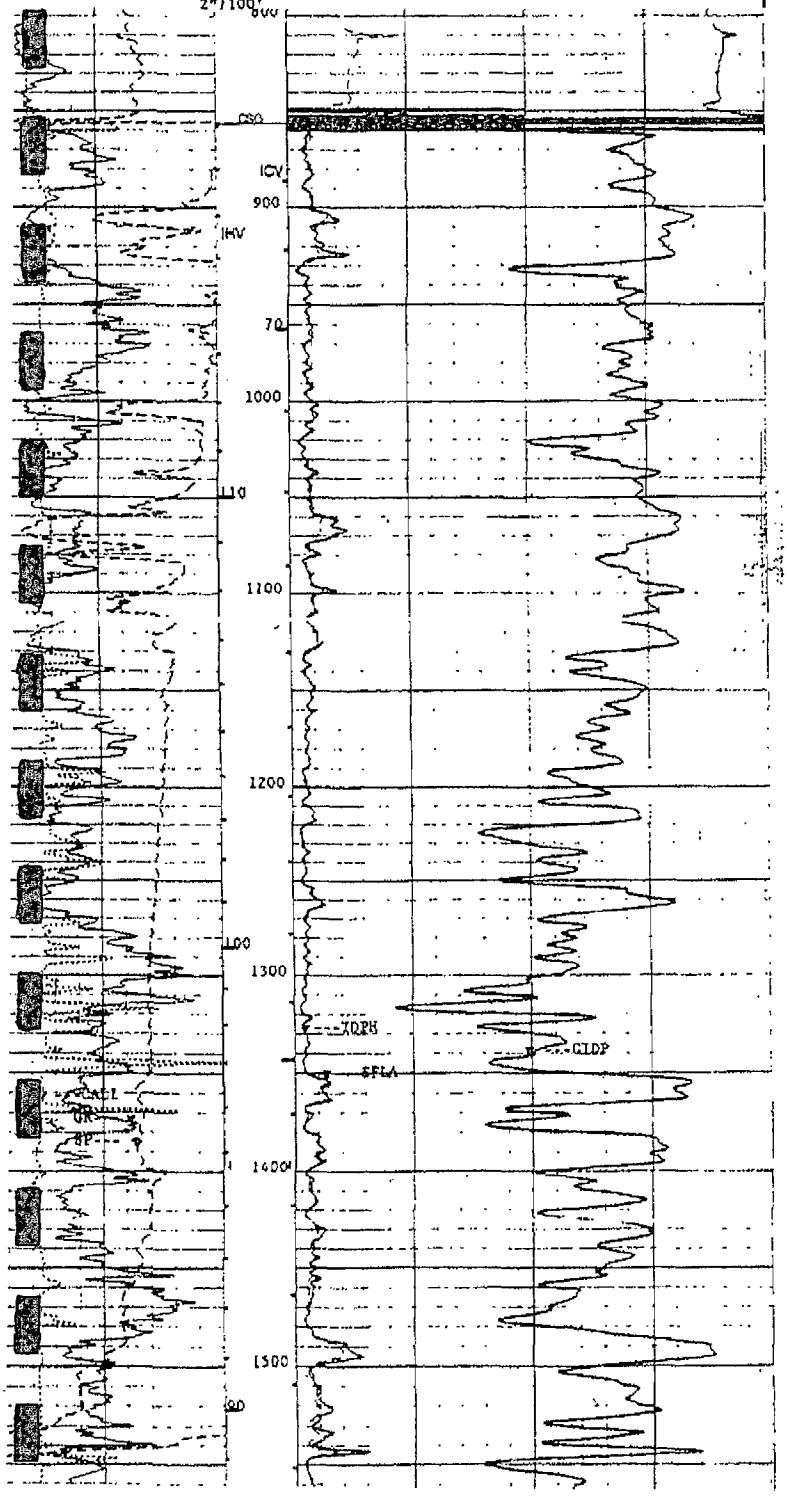
TPUT	INTERVAL BETWEEN PIPS	DEPTH TRACK EDGE
rated Hole Volume	10.0000 F3	LEFT EDGE
rated Cement Volume	10.0000 F3	RIGHT EDGE

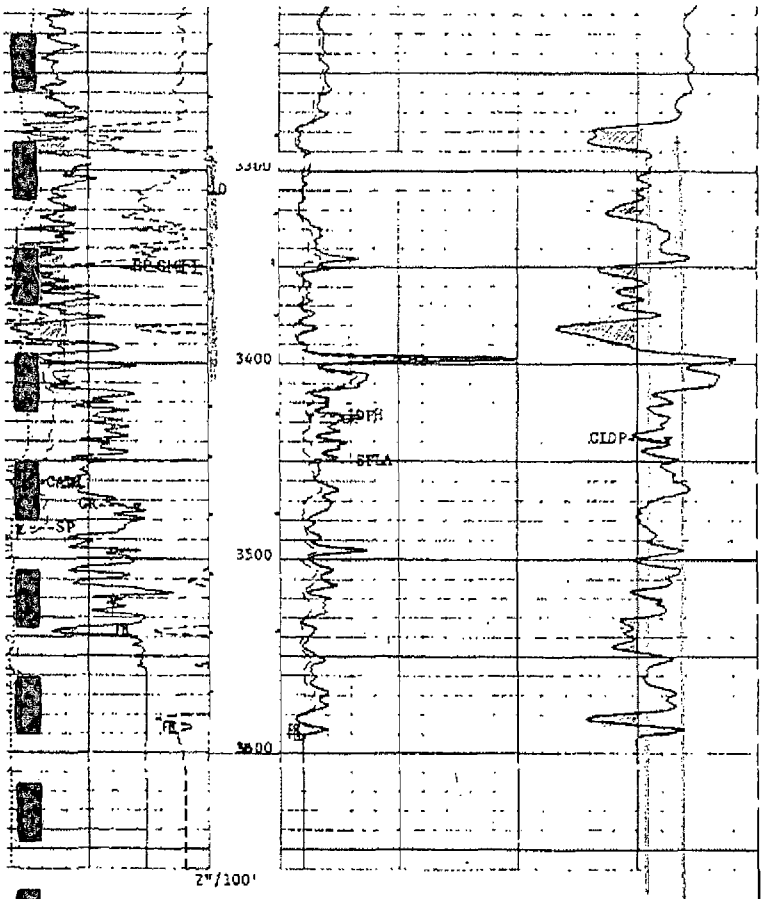
CALI(IN) 16.000
GR(GAPI) 200.00
SP(MV) 20.000
IDPH(OHMM) 0.0 100.00
SFLA(OHMM) 0.0 100.00
CILD(MMHO) 500.00 0.0

32.6 FILE 3 23-DEC-1993 15:32

INPUT FILE(S): CREATION DATE
9 23-DEC-1993 10:39

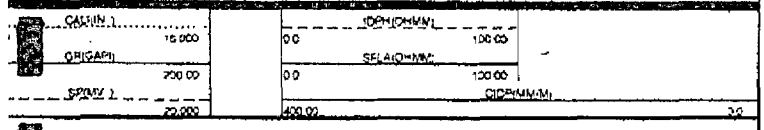
2"/100'





32.6 FILE 3 23-DEC-1993 14:33

INPUT FILE(S) CREATION DATE
6 23-DEC-1993 09:03



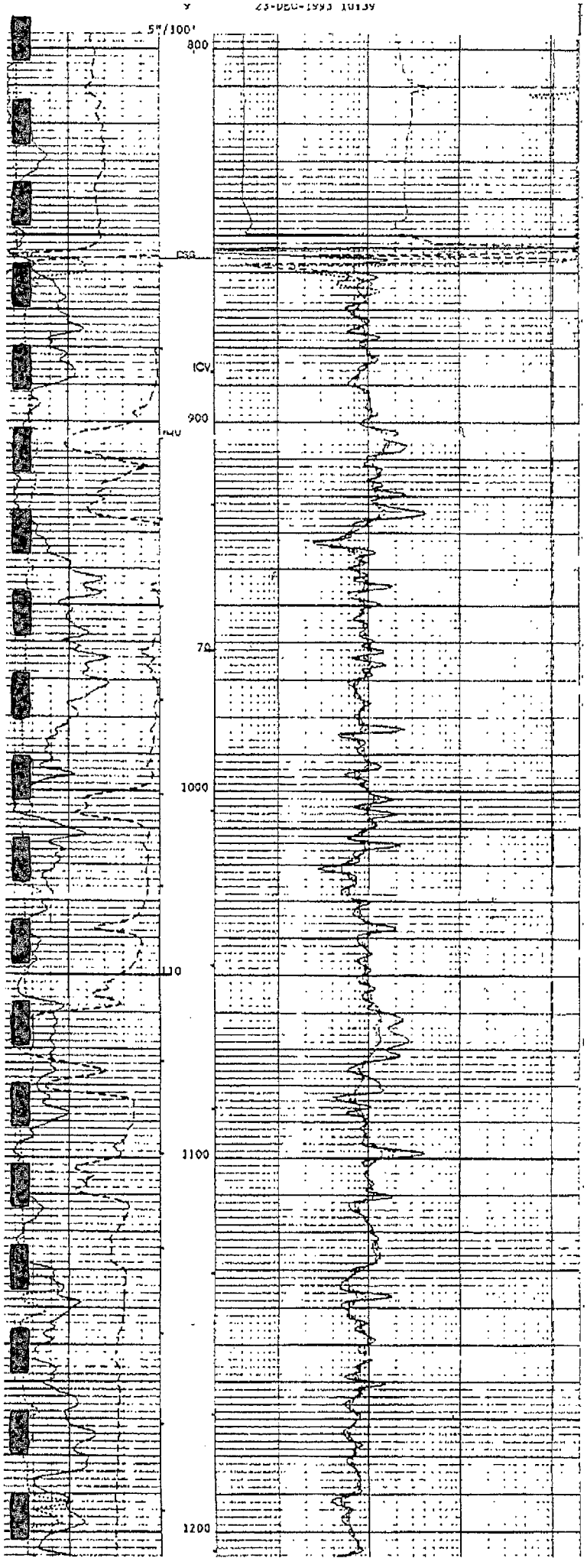
SENSOR MEASURE POINT TO TOOL ZERO

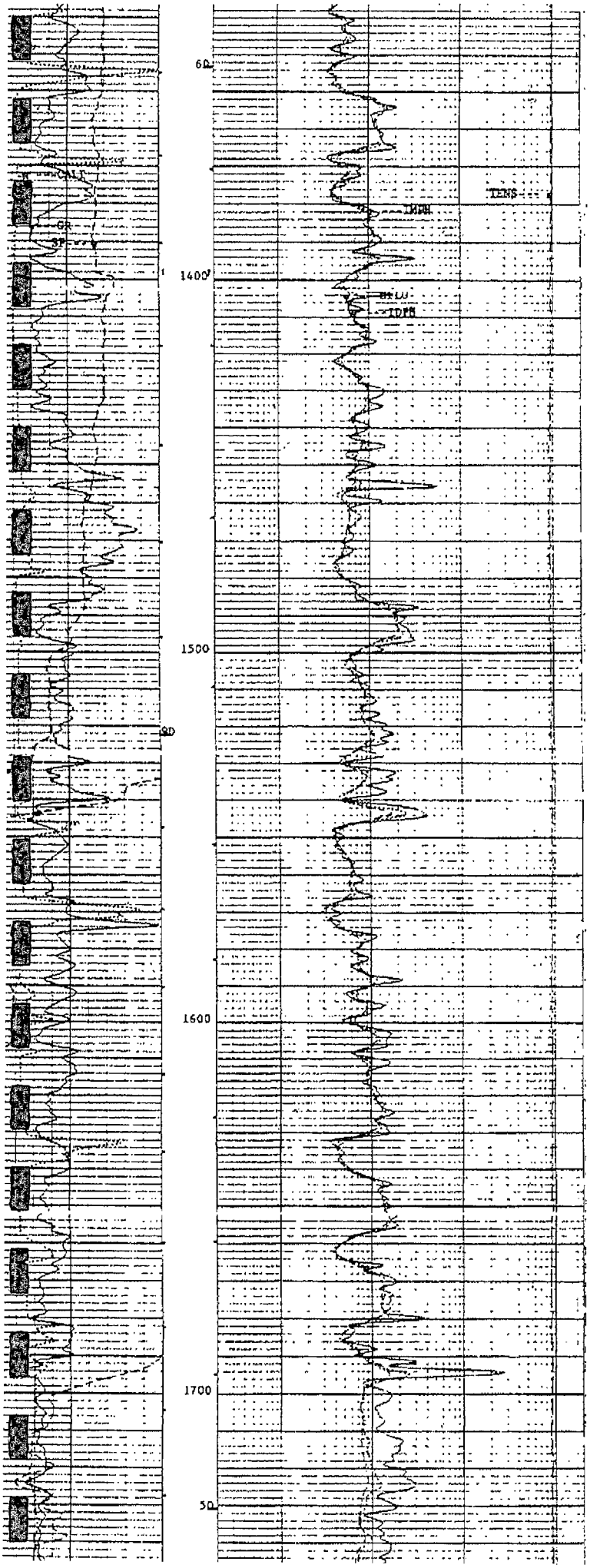
GR	60.5	FEET	SP	10.3	FEET
IRM	6.0	FEET	IXH	6.0	FEET
ITEM	6.5	FEET	IXD	9.5	FEET
SFH	6.5	FEET	SFA	10.3	FEET
SFV	6.5	FEET	SFC	6.5	FEET
CFTC	51.5	FEET	IRD	9.5	FEET
LITH	33.9	FEET	CNTC	51.0	FEET
LS	33.9	FEET	LL	33.9	FEET
PART	33.4	FEET	LU	33.9	FEET
SS2	33.4	FEET	SS1	33.4	FEET
TENS	-44.0	FEET	CALI	34.0	FEET
TNRA	52.0	FEET			

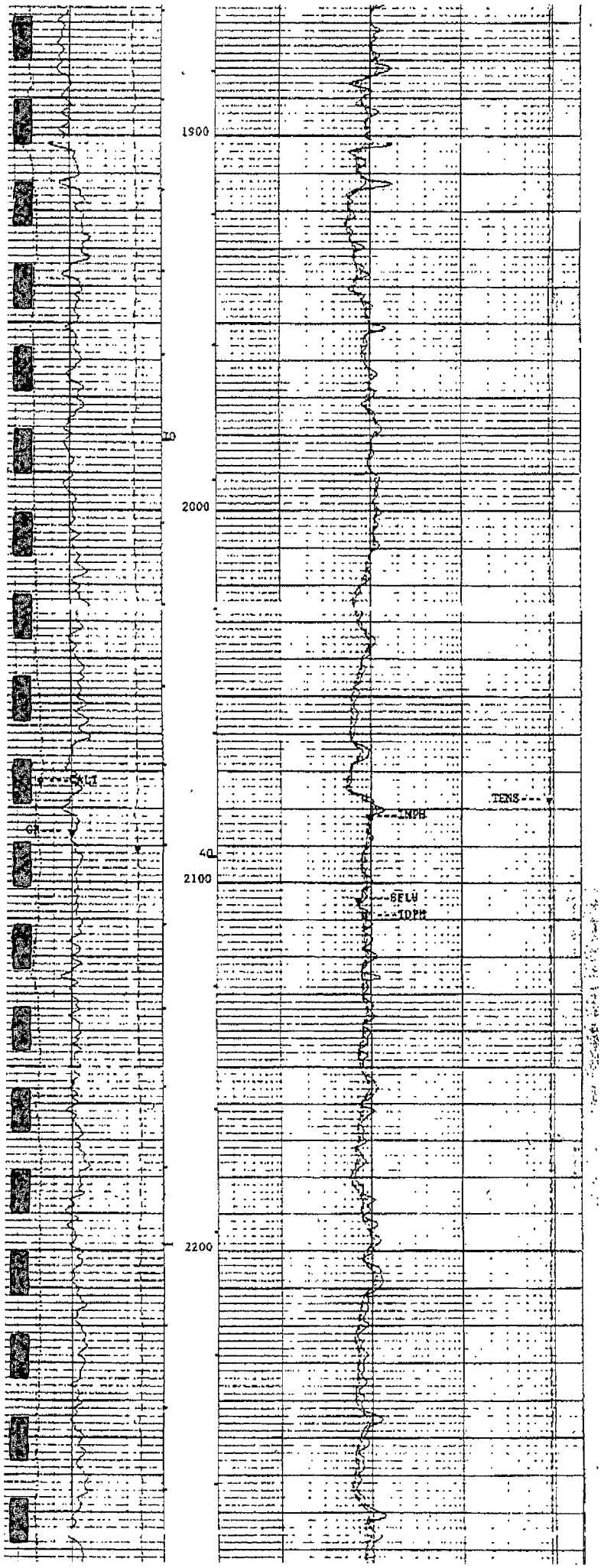
PARAMETERS

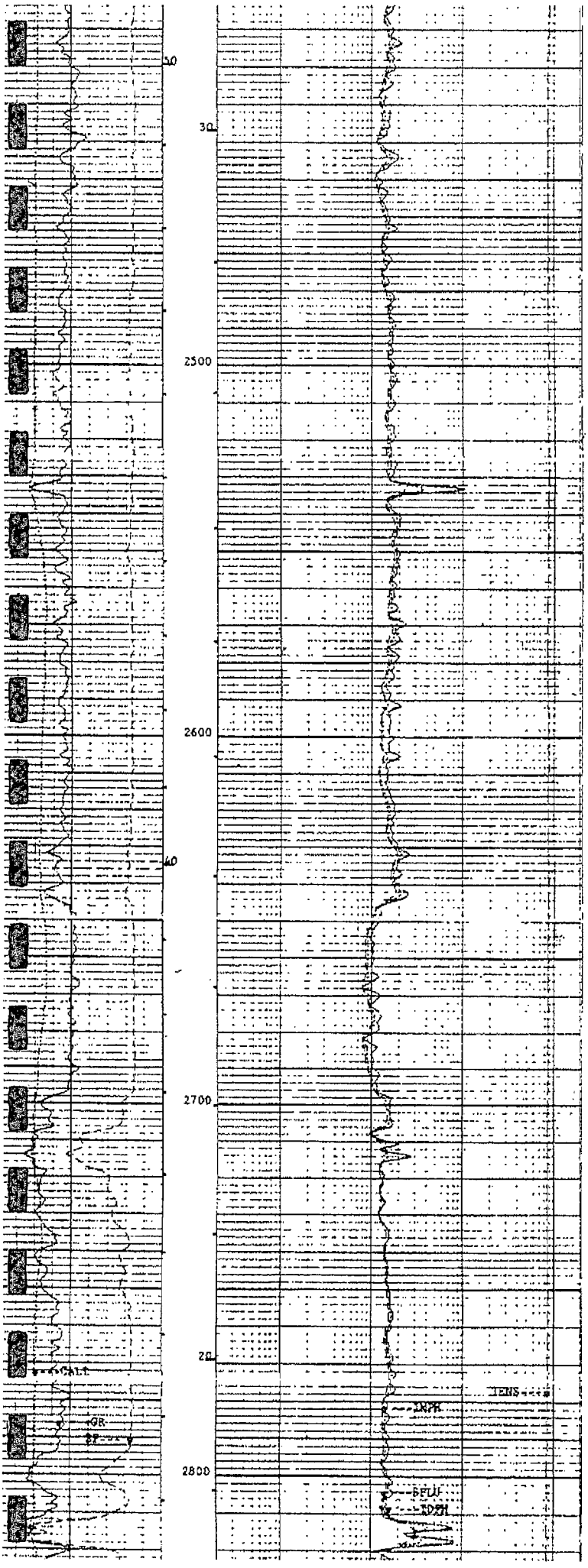
NAME	VALUE	UNIT	NAME	VALUE	UNIT
PP	NORM		DO	0.0	F
WMUD	8.00000	LB/G	TD	3600.00	F
PCD	5.50000	IN	DHC	CALI	
BFM	LIQU		MDEN	2.65000	G/C3
FD	1.00000	G/C3	DPPM	STAN	
MATR	SAND		HC	CALI	
NPDC	0		HSCO	YES	
SOCO	NO		MCCO	NO	
BSCO	NO		FSCO	NO	
MWCO	NO		PTCO	NO	
CCCO	NO		SDAT	SOCN	
MCOR	NATU		SOCN	.500000	IN
FSAL	-50000.0	PPM	ANGL	0.0	DEG
GGRD	.0100000	DF/F	BHFL	WATE	
IFRS	20	KHZ	SBR	1.00000	OHMM
MXE2	13.4210	MM/M	DXE2	98.6781	MM/M
MRE2	7.93488	MM/M	DRE2	14.5594	MM/M
MPH2	-.865799	DEG	DPH2	-.061746	DEG
MGF2	1.02359		DGF2	1.00535	
DESP	DISA		SFLE	ALLO	
DCAS	856.000	F	XIEN	ALLO	
DEVI	0.0	DEG	DSES	SING	
IPRO	PHAS		IPHA	NORM	
CNPS	NPHI		CDSE	RHOB	
NCJT	CSRY		CTSE	TEMP	
SHT	80.0000	DEGF	BHT	119.000	DEGF
SPAZ	ALLO		TDL	3600.00	F
MRT	119.000	DEGF	DFD	9.50000	LB/G
RMFS	2.89000	OHMM	RMS	5.09000	OHMM
MST	82.0000	DEGF	MFST	82.0000	DEGF
BS	7.87500	IN	BHS	OPEN	

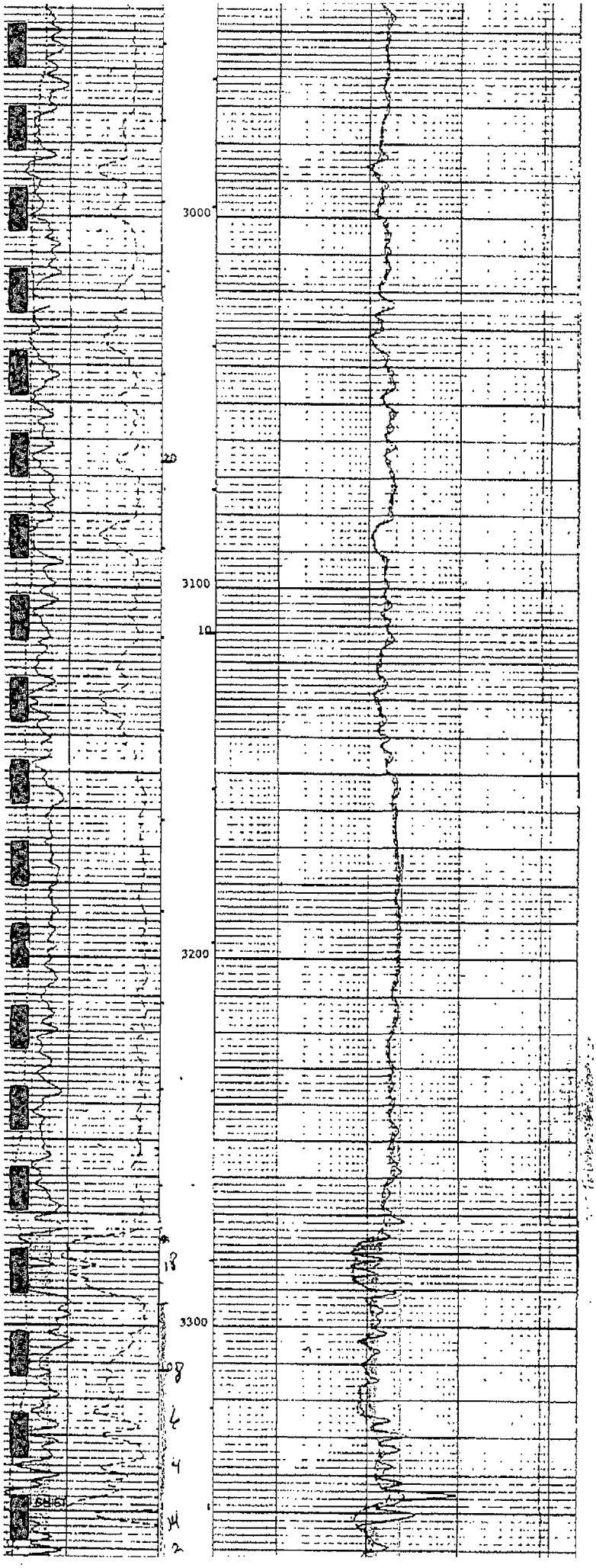
FILES SPLICED	SPLICE DEPTH
6 TO 8	3240.0 F

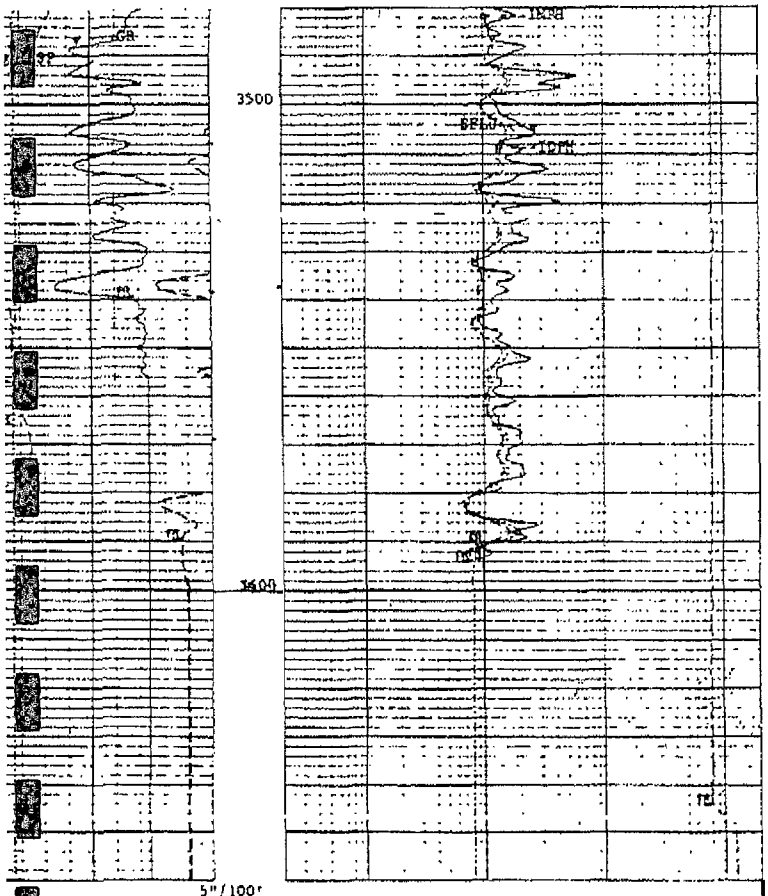

5"/100'
800
DSG
ICV
900
1000
1100
1200


CALI
GR
SP
TENS
IMPH
ILD
IDPH
SD
600
1400
1500
1600
1700
50


1900
2000
2100
2200
TENS
1MPH
6FLW
10PH

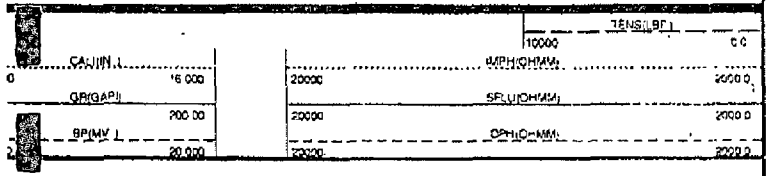

50
30
2500
2600
40
2700
20
2800
CALI
GR
TENS
SFLU
IDPH


3000
3100
10
3200
3300



F 32.6 FILE 3 23-DEC-1993 14:33

INPUT FILE(S) CREATION DATE
6 23-DEC-1993 09:03

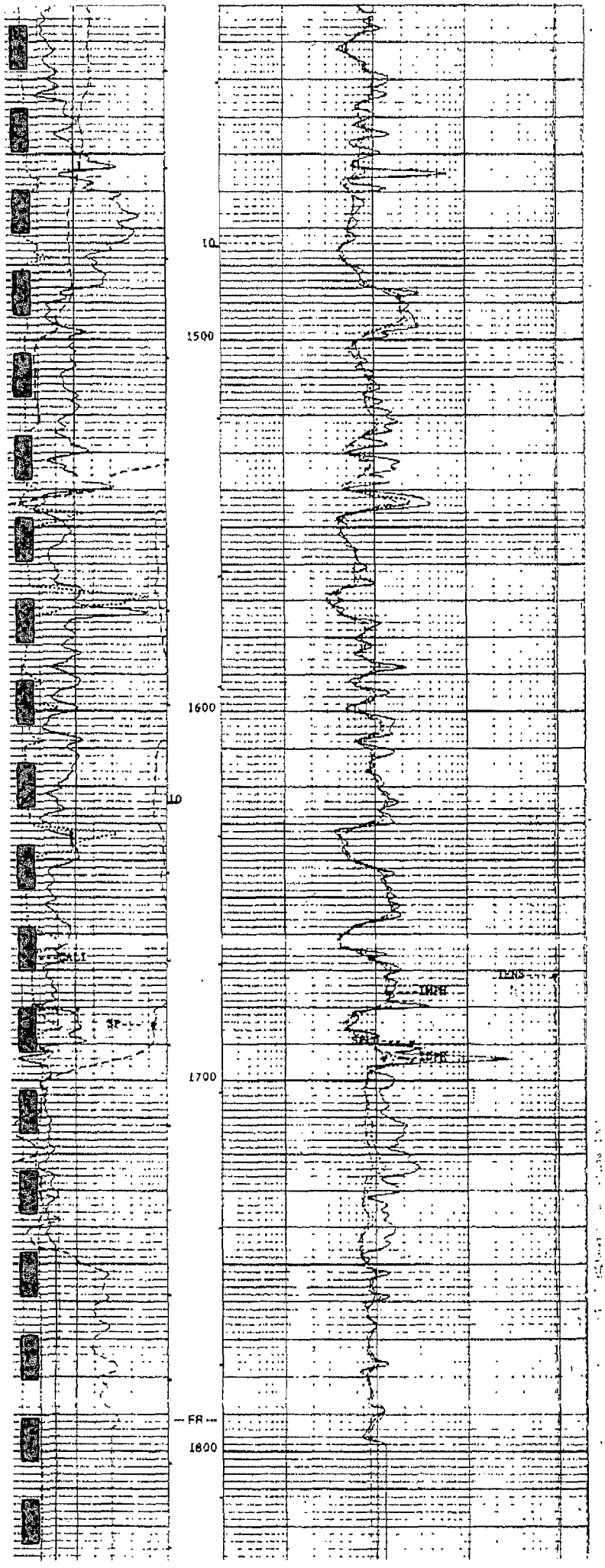


SENSOR MEASURE POINT TO TOOL ZERO

GR	60.5	FEET	SP	10.3	FEET
IRM	5.0	FEET	IXM	6.0	FEET
ITEM	6.5	FEET	IXD	9.5	FEET
SF5	6.5	FEET	SPA	10.3	FEET
SFV	6.5	FEET	SFC	6.5	FEET
CFTC	51.5	FEET	IRD	9.5	FEET
LITH	33.9	FEET	CNTC	51.0	FEET
LS	33.9	FEET	LL	33.9	FEET
PARI	33.4	FEET	LU	33.9	FEET
SSZ	33.4	FEET	SSI	33.4	FEET
TENS	-44.0	FEET	CALI	34.0	FEET
TNRA	52.0	FEET			

PARAMETERS

NAME	VALUE	UNIT	NAME	VALUE	UNIT
PP	NORM		DO	0.0	F
WMUD	8.00000	LB/G	TD	3600.00	F
FCD	5.50000	IN	DBC	CALI	
BFM	LIQU		MDEN	2.65000	G/C3
FD	1.00000	G/C3	DPPM	STAN	
MATR	SAND		BC	CALI	
NPDC	0		HSCO	YES	
SOCO	NO		MCOO	NO	
BSCO	NO		FSCO	NO	
MWCO	NO		FTCO	NO	
CCCO	NO		SDAT	SOCN	
MCOR	NATU		SOCN	.500000	IN
FSAL	-50000.0	PPM	ANGL	0.0	DEG
GCRD	.0100000	DF/F	BHFL	WATE	
IFRS	20	KHZ	SBR	1.00000	OHMM
MXE2	13.4210	MM/M	DXE2	98.6781	MM/M
MRE2	7.93488	MM/M	DRE2	14.5594	MM/M
MPH2	-.865799	DEC	DPH2	-.061786	DEC
MCF2	1.02359		DCF2	1.00533	
DESP	DISA		SFLE	ALLO	
DCAS	856.000	F	ITEN	ALLO	
DEV1	0.0	DEG	DSES	SING	
IPRO	PHAS		IPHA	NORM	
CNPS	NPHI		CDSE	RHOB	
NCJT	GSRY		GTSE	TEMP	
SHT	80.0000	DEGF	BHT	119.000	DEGF
SPAE	ALLO		TDL	3600.00	F
MRT	119.000	DEGF	DFD	9.50000	LB/G
RMFS	2.89000	OHMM	RMS	5.09000	OHMM
MST	82.0000	DEGF	MTST	82.0000	DEGF
BS	7.87500	IN	BHS	OPEN	


1500
1600
1700
1800

PARAMETERS

NAME	VALUE	UNIT	NAME	VALUE	UNIT
WMUD	9.50000	LB/G	TD	3600.00	F
FCD	5.50000	IN	DHC	CALI	
BFM	LIQU		MDEN	2.65000	G/C3
FD	1.00000	G/C3	DFFM	STAN	
MATR	SAND		HC	CALI	
NPDC	0		HSCO	YES	
SOCO	NO		MCCO	NO	
BSCO	NO		FSCO	NO	
MWCO	NO		PTCO	NO	
CCCO	NO		SDAT	SOCN	
MCOR	NATU		SOCN	.500000	IN
FSAL	-50000.0	PPM	ANGL	0.0	DEG
GCRD	.0100000	DF/F	BBFL	WATE	
IFRS	20	KHZ	SBR	1.00000	OHMM
MXE2	13.4210	MM/M	DXE2	98.6781	MM/M
MRE2	7.93488	MM/M	DRE2	14.5594	MM/M
MPH2	-.865799	DEG	DPH2	-.061766	DEG
MGF2	1.02359		DGF2	1.00535	
DESP	DISA		SFLE	ALLO	
DCAS	856.000	F	ITEN	ALLO	
DITY	7.0	DEC	DSEC	SYMC	
IPRO	PHAS		IPHA	NORM	
CSPS	MPHI		CDSZ	REOB	
NCJT	GSRY		GTSE	TEMP	
SBT	80.0000	DEGF	BHT	119.000	DEGF
SPAE	ALLO		DFD	9.50000	LB/G
RMFS	2.89000	OHMM	RMS	5.09000	OHMM
MST	82.0000	DEGF	MFST	82.0000	DEGF
BS	7.87500	IN	BHS	OPEN	

AFTER SURVEY TOOL CHECK SUMMARY

PERFORMED: 23-DEC-1993 15:34
PROGRAM FILE: TOHED (VERSION 32.6 00/00/00 91/08/23)

DITE TOOL CHECK

SONDE SERIAL NUMBER: 489
CARTRIDGE SERIAL NUMBER: 485
FILE: 6 DEPTH INTERVAL: 3660.0 - 3230.0 F
7 3657.5 - 3506.5 F
8 3509.5 - 1382.0 F
9 1849.0 - 796.0 F

MEAN CALIBRATION CHANGE

	ABSOLUTE CHANGE FOR RESISTIVITY > 27 OHM-M		PERCENT CHANGE FOR RESISTIVITY < 27 OHM-M		SEL ABS. CHANGE FOR RESISTIVITY < 1 OHM-M	
	CHANGE (MM/M)	TOLERANCE (MM/M)	CHANGE (%)	TOLERANCE (%)	CHANGE (OHMM)	TOLERANCE (OHMM)
DEEP	.05	< 0.75	.06	< 2.0	N/A	
MEDIUM	.06	< 0.75	.06	< 2.0	N/A	
SFL	.01	< 0.75	.03	< 2.0	0.0	< 0.02

NOTE: Log quality flags in depth track indicate when electronic calibration is out of tolerance. Flagged values ARE now included in this table.

GP 32.6 FILE 11 23-DEC-1993 15:34

BEFORE SURVEY CALIBRATION SUMMARY

PERFORMED: 23-DEC-1993 13:15
PROGRAM FILE: TOHED (VERSION 32.6 00/00/00 91/08/23)

SGTL DETECTOR CALIBRATION SUMMARY

	MEASURED 8KGD	JIG	CALIBRATED	UNITS
SGR	49	211	160	GAPI

BACK: 22-DEC-1993 09:13 JIG: 22-DEC-1993 09:32 COMP: 22-DEC-1993 09:33

DITE ELECTRONICS CALIBRATION SUMMARY

SONDE SERIAL NUMBER: 489
CARTRIDGE SERIAL NUMBER: 485
INDUCTION FREQUENCY: 20 KHZ

INDUCTION ELECTRONICS:

	OFFSET (MS/M)	VALID RANGE (MM/M)	GAIN (---)	VALID RANGE (---)	PHASE (DEG.)	VALID RANGE (DEG.)
IRD	23.6	-101. => 149.	1.014	.86 => 1.22		
IXD	.6	-124. => 126.	.967	.82 => 1.16	6.86	-7.96 => 22.04
IRM	10.6	-214. => 236.	.931	.79 => 1.12		
IXM	5.3	-219. => 231.	.939	.80 => 1.13	6.74	-8.09 => 21.91

SFL ELECTRONICS:

	OFFSET	VALID RANGE	UNITS	GAIN	VALID RANGE
SFV	.3	-14.6 => 15.4	MV	1.00	.85 => 1.21
SFC	-.0	-.6 => .6	MA	1.00	.85 => 1.20

LDID DETECTOR CALIBRATION SUMMARY

DENSITY RESISTIVITY SONDE NUMBER	3718
NUCLEAR SERVICE CARTRIDGE NUMBER	2999
POWERED DETECTOR HOUSING NUMBER	2782
POWERED GAMMA-GAMMA DETECTOR NUMBER	2781
LOT LOGGING SOURCE NUMBER	1836
LOT CALIBRATION MODE	WATE

CALIPER CALIBRATION SUMMARY

	MEASURED SMALL	MEASURED LARGE	CALIBRATED SMALL	CALIBRATED LARGE	UNITS
CALI	8.48	12.80	8.45	12.45	IN

SMALL: 22-DEC-1993 09:09 LARGE: 22-DEC-1993 09:25 COMP: 22-DEC-1993 09:27

CP 32.6 FILE 3 23-DEC-1993 13:14

SHOP SUMMARY

ERFORMED: 25-OCT-1993 12:31
OGRAM FILE: CCSHOP (VERSION 32.6 91/08/23 91/08/23)

DITE CALIBRATION SUMMARY

DE SERIAL NUMBER: 489
IRIDGE SERIAL NUMBER: 485

SHOP CONSTANTS

T LOOP CALIBRATION: CALIBRATION OF INTERNAL REFERENCE TO TEST LOOP STANDARD

	CONS.	GAIN (---)	VALID RANGE (---)	CONS.	PHASE (DEG)	VALID RANGE (DEG)
10KHZ:						
ILD:	DGF1	.995	.900 => 1.100	DPH1	.02	-1.50 => 1.50
ILM:	MGF1	1.015	.900 => 1.100	MPH1	-.26	-1.50 => 1.50
20KHZ:						
ILD:	DGF2	1.005	.900 => 1.100	DPH2	-.06	-2.00 => 2.00
ILM:	MGF2	1.024	.900 => 1.100	MPH2	-.87	-3.00 => 1.00
HZ:						
LD:	DGF4	1.020	.900 => 1.100	DPH4	-1.17	-4.00 => 2.00
ILM:	MGF4	1.053	.900 => 1.100	MPH4	-2.29	-5.00 => 1.00

DE ERROR CORRECTIONS: CORRECTION FOR SONDE RESPONSE IN ZERO CONDUCTIVITY ENVIRONMENT

	CONS.	SONDE ERROR CORRECTION (MMHO)	VALID RANGE (MMHO)
HZ:			
RD SEC:	DRE1	43.29	-50.0 => 125.0
XD SEC:	DXE1	171.83	-250.0 => 350.0
RM SEC:	MRE1	27.92	-50.0 => 140.0
XM SEC:	MXE1	-12.09	-1300.0 =>1300.0
HZ:			
RD SEC:	DRE2	14.56	-30.0 => 30.0
XD SEC:	DXE2	98.68	-125.0 => 200.0
RM SEC:	MRE2	7.93	-50.0 => 50.0
XM SEC:	MXE2	13.42	-650.0 => 650.0
40KHZ:			
RD SEC:	DRE4	4.50	-15.0 => 15.0
XD SEC:	DXE4	66.07	-75.0 => 125.0
RM SEC:	MRE4	-1.80	-30.0 => 30.0
XM SEC:	MXE4	36.56	-350.0 => 350.0

NOTE: ALL SONDE ERROR CORRECTIONS HAVE BEEN NORMALIZED TO 25 DEGC.

SHOP ELECTRONIC CALIBRATION SUMMARY

ELECTRONIC CALIBRATION: CALIBRATION OF SYSTEM ELECTRONICS USING THE INTERNAL REFERENCE

UCTION ELECTRONICS:

	OFFSET (MM/M)	VALID RANGE (MM/M)	GAIN (---)	VALID RANGE (---)	PHASE (DEG.)	VALID RANGE (DEG.)
10 KHZ:						
IRD	59.4	-375. => 375.	.989	.75 => 1.25		
IXD	2.7	-375. => 375.	.943	.75 => 1.25	10.21	-5.00 => 20.00
IRM	77.9	-900. => 900.	.917	.75 => 1.25		
IXM	14.3	-900. => 900.	.925	.75 => 1.25	7.52	-5.00 => 20.00
20 KHZ:						
IRD	23.8	-150. => 150.	1.013	.75 => 1.25		
IXD	1.0	-150. => 150.	.966	.75 => 1.25	7.04	-5.00 => 20.00
IRM	11.0	-350. => 350.	.930	.75 => 1.25		
IXM	5.7	-350. => 350.	.938	.75 => 1.25	6.91	-5.00 => 20.00
40 KHZ:						
IRD	15.7	-100. => 100.	.998	.75 => 1.25		
IXD	.6	-100. => 100.	.950	.75 => 1.25	21.51	-10.00 => 35.00
IRM	7.1	-200. => 200.	.934	.75 => 1.25		
IXM	3.8	-200. => 200.	.941	.75 => 1.25	73.71	-10.00 => 35.00

L ELECTRONICS:

	OFFSET	VALID RANGE	UNITS	GAIN	VALID RANGE
SFV	.4	-16.0 => 16.0	MV	1.005	.75 => 1.25
SFC	-.0	-.7 => .7	MA	1.000	.75 => 1.25

CP 32.6 FILE 4 25-OCT-1993 12:30

OMPANY	BLOOMFIELD REFINING CO.	SCHL FR	3564.0 F
		SCHL TD	3600.0 F
	BLOOMFIELD REFINING WD #1	SBLR TD	3601.0 F
IELD	BLANCO MESA VERDE	Elev: KB	5545.0 F
		DF	5544.0 F
OUNTY	SAN JUAN STATE NEW MEXICO	GL	5530.0 F

DUAL INDUCTION-SFL

APPENDIX E

BHP • BU • PI • DD • GWT • RFS • GOR • FL • TS

EFTELLER, INC.
reservoir engineering

FARMINGTON, NEW MEXICO/
GRAND JUNCTION, COLORADO

P. O. Box 1198
Farmington, New Mexico 87499
(505) 325-1731
Fax (505) 325-1148

2332 Interstate Ave.
Grand Junction, CO 81505
(970) 241-0403
Fax (970) 241-7634

WESTERN REFINING SOUTHWEST, INC.

BLOOMFIELD REFINERY

WESTERN REFINING WASTE DISPOSAL WELL NO. 1

AUGUST 30 - SEPTEMBER 9, 2010

File Reference F115909.RS1

Customer	WESTERN REFINING SOUTHWEST, INC.
Street	BLOOMFIELD REFINERY; P.O. BOX 159
City/State	BLOOMFIELD, NM 87413
Country	USA
Service Company	TEFTELLER, INC.
Well Name	WESTERN REFINING DISPOSAL WELL NO. 1
Well Location	SAN JUAN COUNTY, NM
Field / Pool	MESA VERDE FORMATION
Status (Oil, Gas, Other)	DISPOSAL
Test Type	PRESSURE FALL-OFF TEST
Date of Test	8-30-10
Producing Interval	3276' - 3408'; 3435' - 3460'
Recorder Depth	3250'
Recorder Position	3250'
Shut In Date Start:	8-30-2010
Stop:	9-9-2010
Duration:	240 HRS. TANDEM ELEC. MEMORY INST. TIME
Bottom Hole Temperature	83 DEGREES @ 3250'

Gauge Identification

Gauge Manufacturer	MICRO-SMART SYSTEMS
Serial Number	115
Model Number	SP2000
Pressure Range	
Battery Type	
Calibration I.D.	
Last Calibration	1/19/10

Gauge Setup Parameters

Probe Set Up Time	8/30/10 9:19: 0
Time Delay to First Reading	
Test Type Selection	PRESSURE FALL-OFF TEST
Test Duration Selection	240 HRS. TANDEM ELEC. MEMORY INST. TIME

EVENT SUMMARY

COMPANY : WESTERN REFINING SOUTHWEST, INC.

PAGE : B1

WELL NAME : WESTERN REFINING DISPOSAL WELL NO. 1

DATE : 09/16/10

WELL LOCATION : SAN JUAN COUNTY, NM

FILE REF: F115909.RS1

Date MM/DD	Time hh:mm:ss	Test Time mmmmmm.mmmm	Key Event	Pressure Psig	Temp Deg F
08/30	09:47:00	28.0000	WELL INJECTING/STABLIZED FOR 24 HRS.	.92	70.45
08/30	09:49:00	30.0000	PRESSURED UP LUBRICATOR	35.27	70.53
08/30	09:57:30	38.5000	TANDEM ELEC. MEMORY INST. @ 3250'	2296.67	78.20
08/30	10:10:00	51.0000	CONTINUED INJECTION	2297.19	81.21
09/01	10:09:00	2930.0000	SHUT DOWN INJECTION	2291.95	84.50
09/09	08:37:00	14358.0000	TANDEM INST. OFF BOTTOM (@ 3250')	2281.36	83.45
09/09	08:49:30	14370.5000	STOP @ 3000'	2173.23	80.37
09/09	09:03:00	14384.0000	STOP @ 2000'	1740.98	87.27
09/09	09:17:30	14398.5000	STOP @ 1000'	1309.23	74.57
09/09	09:30:30	14411.5000	SURFACE STOP	869.56	70.05

COMPANY: WESTERN REFINING SOUTHWEST, INC. PAGE 1 OF 9

WELL NAME : WESTERN REFINING DISPOSAL WELL NO. 1 DATE : 09/16/10

WELL LOCATION : SAN JUAN COUNTY, NM FILE REF: F115909.RS1

Date MM/DD	Time hh:mm:ss	Test Time mmmmmm.mmmm	Pressure Psig	Temp Deg F	deltaP Psi	Comment Ga. Press Ref. to 14.7 Psi Atm.
08/30	09:19:00	.0000	1.00	72.38		
08/30	09:47:00	28.0000	.92	70.45	-.07	WELL INJECTING/STABLIZED FOR 24 HRS.
08/30	09:49:00	30.0000	35.27	70.53	34.35	PRESSURED UP LUBRICATOR
08/30	09:49:30	30.5000	970.55	70.68	935.29	
08/30	09:50:00	31.0000	945.24	71.24	-25.31	
08/30	09:50:30	31.5000	940.15	71.80	-5.09	
08/30	09:51:00	32.0000	1024.74	72.36	84.59	
08/30	09:51:30	32.5000	1122.95	72.92	98.21	
08/30	09:52:00	33.0000	1191.17	73.48	68.21	
08/30	09:52:30	33.5000	1293.34	74.05	102.18	
08/30	09:53:00	34.0000	1420.37	74.61	127.03	
08/30	09:53:30	34.5000	1502.02	75.16	81.65	
08/30	09:54:00	35.0000	1606.26	75.73	104.24	
08/30	09:54:30	35.5000	1712.61	76.29	106.35	
08/30	09:55:00	36.0000	1815.33	76.85	102.72	
08/30	09:55:30	36.5000	1944.23	77.15	128.90	
08/30	09:56:00	37.0000	2047.05	77.41	102.82	
08/30	09:56:30	37.5000	2149.60	77.67	102.55	
08/30	09:57:00	38.0000	2252.96	77.93	103.35	
08/30	09:57:30	38.5000	2296.67	78.20	43.71	TANDEM ELEC. MEMORY INST. @ 3250'
08/30	10:10:00	51.0000	2297.19	81.21	.52	CONTINUED INJECTION
08/30	10:39:00	80.0000	2297.21	81.53	.02	
08/30	11:09:00	110.0000	2297.10	81.66	-.11	
08/30	11:39:00	140.0000	2297.01	81.77	-.09	
08/30	12:09:00	170.0000	2296.92	81.89	-.09	
08/30	12:39:00	200.0000	2296.74	82.01	-.18	
08/30	13:09:00	230.0000	2296.72	82.09	-.03	
08/30	13:39:00	260.0000	2296.64	82.16	-.07	
08/30	14:09:00	290.0000	2296.54	82.22	-.10	
08/30	14:39:00	320.0000	2296.49	82.26	-.05	
08/30	15:09:00	350.0000	2296.39	82.31	-.10	
08/30	15:39:00	380.0000	2296.31	82.37	-.07	
08/30	16:09:00	410.0000	2296.23	82.43	-.08	
08/30	16:39:00	440.0000	2296.15	82.47	-.08	
08/30	17:09:00	470.0000	2296.10	82.53	-.05	
08/30	17:39:00	500.0000	2296.04	82.58	-.06	
08/30	18:09:00	530.0000	2296.02	82.62	-.02	
08/30	18:39:00	560.0000	2295.97	82.68	-.05	
08/30	19:09:00	590.0000	2295.91	82.73	-.06	
08/30	19:39:00	620.0000	2295.87	82.78	-.04	
08/30	20:09:00	650.0000	2295.84	82.84	-.03	
08/30	20:39:00	680.0000	2295.79	82.92	-.05	
08/30	21:09:00	710.0000	2295.73	82.98	-.06	
08/30	21:39:00	740.0000	2295.70	83.05	-.03	
08/30	22:09:00	770.0000	2295.65	83.11	-.04	
08/30	22:39:00	800.0000	2295.61	83.16	-.04	
08/30	23:09:00	830.0000	2295.56	83.21	-.05	
08/30	23:39:00	860.0000	2295.48	83.25	-.09	
08/31	00:09:00	890.0000	2295.45	83.28	-.03	
08/31	00:39:00	920.0000	2295.40	83.31	-.06	
08/31	01:09:00	950.0000	2295.32	83.34	-.08	
08/31	01:39:00	980.0000	2295.21	83.36	-.10	
08/31	02:09:00	1010.0000	2295.13	83.39	-.08	
08/31	02:39:00	1040.0000	2295.05	83.41	-.08	
08/31	03:09:00	1070.0000	2295.00	83.44	-.05	
08/31	03:39:00	1100.0000	2294.90	83.46	-.10	
08/31	04:09:00	1130.0000	2294.86	83.48	-.04	
08/31	04:39:00	1160.0000	2294.79	83.49	-.07	
08/31	05:09:00	1190.0000	2294.77	83.51	-.02	
08/31	05:39:00	1220.0000	2294.72	83.52	-.05	
08/31	06:09:00	1250.0000	2294.66	83.52	-.06	
08/31	06:39:00	1280.0000	2294.61	83.53	-.04	
08/31	07:09:00	1310.0000	2294.66	83.53	.04	
08/31	07:39:00	1340.0000	2294.59	83.53	-.06	
08/31	08:09:00	1370.0000	2294.53	83.55	-.06	

Date MM/DD	Time hh:mm:ss	Test Time mmmmmm.mmmm	Pressure Psig	Temp Deg F	deltaP Psi	Comment Ga. Press Ref. to 14.7 Psi Atm.
08/31	08:39:00	1400.0000	2294.50	83.55	-.03	
08/31	09:09:00	1430.0000	2294.49	83.55	-.01	
08/31	09:39:00	1460.0000	2294.42	83.56	-.07	
08/31	10:09:00	1490.0000	2294.39	83.56	-.02	
08/31	10:39:00	1520.0000	2294.36	83.57	-.03	
08/31	11:09:00	1550.0000	2294.27	83.58	-.09	
08/31	11:39:00	1580.0000	2294.25	83.58	-.02	
08/31	12:09:00	1610.0000	2294.21	83.60	-.04	
08/31	12:39:00	1640.0000	2294.18	83.60	-.03	
08/31	13:09:00	1670.0000	2294.13	83.62	-.05	
08/31	13:39:00	1700.0000	2294.11	83.63	-.01	
08/31	14:09:00	1730.0000	2294.00	83.66	-.11	
08/31	14:39:00	1760.0000	2293.96	83.68	-.05	
08/31	15:09:00	1790.0000	2293.93	83.71	-.02	
08/31	15:39:00	1820.0000	2293.91	83.74	-.03	
08/31	16:09:00	1850.0000	2293.88	83.77	-.03	
08/31	16:39:00	1880.0000	2293.80	83.80	-.07	
08/31	17:09:00	1910.0000	2293.77	83.83	-.03	
08/31	17:39:00	1940.0000	2293.71	83.86	-.06	
08/31	18:09:00	1970.0000	2293.71	83.89	.00	
08/31	18:39:00	2000.0000	2293.65	83.92	-.06	
08/31	19:09:00	2030.0000	2293.63	83.95	-.02	
08/31	19:39:00	2060.0000	2293.59	83.98	-.04	
08/31	20:09:00	2090.0000	2293.53	84.02	-.06	
08/31	20:39:00	2120.0000	2293.48	84.04	-.06	
08/31	21:09:00	2150.0000	2293.48	84.09	.00	
08/31	21:39:00	2180.0000	2293.44	84.12	-.04	
08/31	22:09:00	2210.0000	2293.38	84.17	-.06	
08/31	22:39:00	2240.0000	2293.36	84.22	-.02	
08/31	23:09:00	2270.0000	2293.30	84.25	-.06	
08/31	23:39:00	2300.0000	2293.29	84.29	-.01	
09/01	00:09:00	2330.0000	2293.19	84.33	-.10	
09/01	00:39:00	2360.0000	2293.19	84.35	.00	
09/01	01:09:00	2390.0000	2293.11	84.38	-.08	
09/01	01:39:00	2420.0000	2293.08	84.41	-.03	
09/01	02:09:00	2450.0000	2293.01	84.43	-.07	
09/01	02:39:00	2480.0000	2292.91	84.44	-.10	
09/01	03:09:00	2510.0000	2292.94	84.47	.03	
09/01	03:39:00	2540.0000	2292.88	84.47	-.06	
09/01	04:09:00	2570.0000	2292.80	84.49	-.08	
09/01	04:39:00	2600.0000	2292.74	84.49	-.06	
09/01	05:09:00	2630.0000	2292.67	84.49	-.06	
09/01	05:39:00	2660.0000	2292.60	84.50	-.07	
09/01	06:09:00	2690.0000	2292.57	84.51	-.03	
09/01	06:39:00	2720.0000	2292.52	84.50	-.05	
09/01	07:09:00	2750.0000	2292.49	84.51	-.03	
09/01	07:39:00	2780.0000	2292.46	84.52	-.03	
09/01	08:09:00	2810.0000	2292.44	84.54	-.02	
09/01	08:39:00	2840.0000	2292.42	84.53	-.02	
09/01	09:09:00	2870.0000	2292.37	84.54	-.05	
09/01	09:39:00	2900.0000	2292.34	84.54	-.03	
09/01	10:09:00	2930.0000	2291.95	84.50	-.39	SHUT DOWN INJECTION
09/01	10:39:00	2960.0000	2291.58	84.21	-.36	
09/01	11:09:00	2990.0000	2291.42	84.12	-.17	
09/01	11:39:00	3020.0000	2291.26	84.05	-.15	
09/01	12:09:00	3050.0000	2291.19	84.00	-.08	
09/01	12:39:00	3080.0000	2291.08	83.93	-.11	
09/01	13:09:00	3110.0000	2290.98	83.87	-.10	
09/01	13:39:00	3140.0000	2290.92	83.83	-.06	
09/01	14:09:00	3170.0000	2290.89	83.80	-.03	
09/01	14:39:00	3200.0000	2290.81	83.77	-.07	
09/01	15:09:00	3230.0000	2290.77	83.74	-.04	
09/01	15:39:00	3260.0000	2290.67	83.72	-.10	
09/01	16:09:00	3290.0000	2290.62	83.70	-.05	
09/01	16:39:00	3320.0000	2290.56	83.67	-.05	

Date MM/DD	Time hh:mm:ss	Test Time mmmmmm.mmmm	Pressure Psig	Temp Deg F	deltaP Psi	Comment Ga. Press Ref. to 14.7 Psi Atm.
09/01	17:09:00	3350.0000	2290.49	83.65	-.08	
09/01	17:39:00	3380.0000	2290.45	83.63	-.04	
09/01	18:09:00	3410.0000	2290.34	83.63	-.11	
09/01	18:39:00	3440.0000	2290.36	83.62	.02	
09/01	19:09:00	3470.0000	2290.26	83.60	-.10	
09/01	19:39:00	3500.0000	2290.21	83.58	-.05	
09/01	20:09:00	3530.0000	2290.18	83.58	-.03	
09/01	20:39:00	3560.0000	2290.14	83.56	-.05	
09/01	21:09:00	3590.0000	2290.02	83.55	-.12	
09/01	21:39:00	3620.0000	2290.02	83.54	.00	
09/01	22:09:00	3650.0000	2290.00	83.53	-.02	
09/01	22:39:00	3680.0000	2289.94	83.53	-.06	
09/01	23:09:00	3710.0000	2289.92	83.52	-.02	
09/01	23:39:00	3740.0000	2289.87	83.51	-.05	
09/02	00:09:00	3770.0000	2289.81	83.50	-.06	
09/02	00:39:00	3800.0000	2289.74	83.49	-.07	
09/02	01:09:00	3830.0000	2289.74	83.49	.00	
09/02	01:39:00	3860.0000	2289.69	83.48	-.05	
09/02	02:09:00	3890.0000	2289.59	83.47	-.10	
09/02	02:39:00	3920.0000	2289.55	83.45	-.04	
09/02	03:09:00	3950.0000	2289.47	83.46	-.08	
09/02	03:39:00	3980.0000	2289.44	83.45	-.03	
09/02	04:09:00	4010.0000	2289.35	83.44	-.09	
09/02	04:39:00	4040.0000	2289.26	83.43	-.09	
09/02	05:09:00	4070.0000	2289.24	83.41	-.02	
09/02	05:39:00	4100.0000	2289.18	83.41	-.06	
09/02	06:09:00	4130.0000	2289.11	83.41	-.06	
09/02	06:39:00	4160.0000	2289.06	83.40	-.05	
09/02	07:09:00	4190.0000	2288.96	83.38	-.10	
09/02	07:39:00	4220.0000	2288.96	83.38	.00	
09/02	08:09:00	4250.0000	2288.89	83.38	-.07	
09/02	08:39:00	4280.0000	2288.86	83.37	-.03	
09/02	09:09:00	4310.0000	2288.81	83.37	-.05	
09/02	09:39:00	4340.0000	2288.81	83.36	.00	
09/02	10:09:00	4370.0000	2288.75	83.36	-.06	
09/02	10:39:00	4400.0000	2288.71	83.36	-.05	
09/02	11:09:00	4430.0000	2288.70	83.35	-.01	
09/02	11:39:00	4460.0000	2288.68	83.35	-.02	
09/02	12:09:00	4490.0000	2288.62	83.35	-.05	
09/02	12:39:00	4520.0000	2288.57	83.34	-.06	
09/02	13:09:00	4550.0000	2288.60	83.34	.03	
09/02	13:39:00	4580.0000	2288.54	83.34	-.06	
09/02	14:09:00	4610.0000	2288.54	83.34	.00	
09/02	14:39:00	4640.0000	2288.48	83.33	-.06	
09/02	15:09:00	4670.0000	2288.46	83.34	-.02	
09/02	15:39:00	4700.0000	2288.43	83.35	-.03	
09/02	16:09:00	4730.0000	2288.41	83.34	-.03	
09/02	16:39:00	4760.0000	2288.39	83.33	-.02	
09/02	17:09:00	4790.0000	2288.35	83.34	-.04	
09/02	17:39:00	4820.0000	2288.31	83.33	-.03	
09/02	18:09:00	4850.0000	2288.24	83.33	-.08	
09/02	18:39:00	4880.0000	2288.21	83.33	-.03	
09/02	19:09:00	4910.0000	2288.17	83.34	-.04	
09/02	19:39:00	4940.0000	2288.16	83.33	-.01	
09/02	20:09:00	4970.0000	2288.09	83.32	-.07	
09/02	20:39:00	5000.0000	2288.09	83.33	.01	
09/02	21:09:00	5030.0000	2288.01	83.31	-.09	
09/02	21:39:00	5060.0000	2288.02	83.32	.02	
09/02	22:09:00	5090.0000	2287.96	83.31	-.06	
09/02	22:39:00	5120.0000	2287.99	83.32	.02	
09/02	23:09:00	5150.0000	2287.94	83.32	-.05	
09/02	23:39:00	5180.0000	2287.91	83.32	-.03	
09/03	00:09:00	5210.0000	2287.88	83.33	-.03	
09/03	00:39:00	5240.0000	2287.83	83.32	-.05	
09/03	01:09:00	5270.0000	2287.84	83.31	.02	

Date MM/DD	Time hh:mm:ss	Test Time mmmmmm.mmmm	Pressure Psig	Temp Deg F	deltaP Psi	Comment Ga. Press Ref. to 14.7 Psi Atm.
09/03	01:39:00	5300.0000	2287.82	83.32	-.02	
09/03	02:09:00	5330.0000	2287.78	83.30	-.04	
09/03	02:39:00	5360.0000	2287.74	83.31	-.04	
09/03	03:09:00	5390.0000	2287.70	83.31	-.04	
09/03	03:39:00	5420.0000	2287.67	83.31	-.03	
09/03	04:09:00	5450.0000	2287.61	83.32	-.06	
09/03	04:39:00	5480.0000	2287.58	83.32	-.02	
09/03	05:09:00	5510.0000	2287.53	83.32	-.05	
09/03	05:39:00	5540.0000	2287.49	83.30	-.04	
09/03	06:09:00	5570.0000	2287.45	83.29	-.04	
09/03	06:39:00	5600.0000	2287.40	83.30	-.05	
09/03	07:09:00	5630.0000	2287.33	83.30	-.06	
09/03	07:39:00	5660.0000	2287.26	83.31	-.08	
09/03	08:09:00	5690.0000	2287.24	83.30	-.02	
09/03	08:39:00	5720.0000	2287.19	83.29	-.05	
09/03	09:09:00	5750.0000	2287.15	83.29	-.04	
09/03	09:39:00	5780.0000	2287.14	83.30	-.01	
09/03	10:09:00	5810.0000	2287.07	83.29	-.06	
09/03	10:39:00	5840.0000	2287.07	83.29	.00	
09/03	11:09:00	5870.0000	2287.05	83.29	-.02	
09/03	11:39:00	5900.0000	2287.02	83.32	-.03	
09/03	12:09:00	5930.0000	2287.02	83.32	.00	
09/03	12:39:00	5960.0000	2286.97	83.30	-.05	
09/03	13:09:00	5990.0000	2286.98	83.31	.02	
09/03	13:39:00	6020.0000	2286.98	83.29	.00	
09/03	14:09:00	6050.0000	2286.97	83.31	-.02	
09/03	14:39:00	6080.0000	2286.94	83.31	-.02	
09/03	15:09:00	6110.0000	2286.92	83.31	-.02	
09/03	15:39:00	6140.0000	2286.93	83.29	.02	
09/03	16:09:00	6170.0000	2286.93	83.29	-.01	
09/03	16:39:00	6200.0000	2286.87	83.31	-.05	
09/03	17:09:00	6230.0000	2286.88	83.29	.01	
09/03	17:39:00	6260.0000	2286.86	83.30	-.02	
09/03	18:09:00	6290.0000	2286.82	83.29	-.04	
09/03	18:39:00	6320.0000	2286.78	83.29	-.04	
09/03	19:09:00	6350.0000	2286.71	83.29	-.07	
09/03	19:39:00	6380.0000	2286.69	83.31	-.02	
09/03	20:09:00	6410.0000	2286.68	83.29	-.01	
09/03	20:39:00	6440.0000	2286.64	83.29	-.04	
09/03	21:09:00	6470.0000	2286.60	83.31	-.04	
09/03	21:39:00	6500.0000	2286.59	83.29	-.02	
09/03	22:09:00	6530.0000	2286.56	83.31	-.03	
09/03	22:39:00	6560.0000	2286.54	83.30	-.01	
09/03	23:09:00	6590.0000	2286.48	83.29	-.06	
09/03	23:39:00	6620.0000	2286.50	83.29	.02	
09/04	00:09:00	6650.0000	2286.46	83.28	-.05	
09/04	00:39:00	6680.0000	2286.43	83.27	-.02	
09/04	01:09:00	6710.0000	2286.49	83.31	.06	
09/04	01:39:00	6740.0000	2286.41	83.28	-.08	
09/04	02:09:00	6770.0000	2286.41	83.28	.00	
09/04	02:39:00	6800.0000	2286.41	83.29	.00	
09/04	03:09:00	6830.0000	2286.39	83.28	-.02	
09/04	03:39:00	6860.0000	2286.38	83.29	-.02	
09/04	04:09:00	6890.0000	2286.34	83.28	-.04	
09/04	04:39:00	6920.0000	2286.32	83.29	-.02	
09/04	05:09:00	6950.0000	2286.27	83.30	-.05	
09/04	05:39:00	6980.0000	2286.22	83.29	-.05	
09/04	06:09:00	7010.0000	2286.17	83.27	-.05	
09/04	06:39:00	7040.0000	2286.13	83.28	-.03	
09/04	07:09:00	7070.0000	2286.08	83.29	-.05	
09/04	07:39:00	7100.0000	2286.01	83.27	-.08	
09/04	08:09:00	7130.0000	2285.97	83.27	-.04	
09/04	08:39:00	7160.0000	2285.95	83.28	-.02	
09/04	09:09:00	7190.0000	2285.87	83.30	-.08	
09/04	09:39:00	7220.0000	2285.82	83.28	-.05	

Date MM/DD	Time hh:mm:ss	Test Time mmmmmm.mmmm	Pressure Psig	Temp Deg F	deltaP Psi	Comment Ga. Press Ref. to 14.7 Psi Atm.
09/04	10:09:00	7250.0000	2285.80	83.29	-.02	
09/04	10:39:00	7280.0000	2285.79	83.29	-.01	
09/04	11:09:00	7310.0000	2285.73	83.28	-.06	
09/04	11:39:00	7340.0000	2285.73	83.30	.00	
09/04	12:09:00	7370.0000	2285.71	83.28	-.02	
09/04	12:39:00	7400.0000	2285.73	83.30	.02	
09/04	13:09:00	7430.0000	2285.69	83.29	-.04	
09/04	13:39:00	7460.0000	2285.65	83.30	-.03	
09/04	14:09:00	7490.0000	2285.69	83.28	.03	
09/04	14:39:00	7520.0000	2285.66	83.28	-.02	
09/04	15:09:00	7550.0000	2285.69	83.30	.02	
09/04	15:39:00	7580.0000	2285.67	83.29	-.02	
09/04	16:09:00	7610.0000	2285.70	83.29	.03	
09/04	16:39:00	7640.0000	2285.69	83.31	-.01	
09/04	17:09:00	7670.0000	2285.68	83.32	.00	
09/04	17:39:00	7700.0000	2285.61	83.30	-.07	
09/04	18:09:00	7730.0000	2285.61	83.29	-.01	
09/04	18:39:00	7760.0000	2285.57	83.30	-.04	
09/04	19:09:00	7790.0000	2285.57	83.28	.01	
09/04	19:39:00	7820.0000	2285.51	83.29	-.06	
09/04	20:09:00	7850.0000	2285.47	83.29	-.04	
09/04	20:39:00	7880.0000	2285.47	83.29	.00	
09/04	21:09:00	7910.0000	2285.44	83.31	-.03	
09/04	21:39:00	7940.0000	2285.36	83.31	-.08	
09/04	22:09:00	7970.0000	2285.34	83.30	-.02	
09/04	22:39:00	8000.0000	2285.30	83.31	-.04	
09/04	23:09:00	8030.0000	2285.28	83.32	-.02	
09/04	23:39:00	8060.0000	2285.23	83.30	-.05	
09/05	00:09:00	8090.0000	2285.25	83.31	.02	
09/05	00:39:00	8120.0000	2285.23	83.31	-.02	
09/05	01:09:00	8150.0000	2285.28	83.29	.05	
09/05	01:39:00	8180.0000	2285.24	83.30	-.03	
09/05	02:09:00	8210.0000	2285.21	83.31	-.03	
09/05	02:39:00	8240.0000	2285.21	83.30	-.01	
09/05	03:09:00	8270.0000	2285.21	83.32	.00	
09/05	03:39:00	8300.0000	2285.21	83.32	.00	
09/05	04:09:00	8330.0000	2285.20	83.32	-.01	
09/05	04:39:00	8360.0000	2285.17	83.29	-.03	
09/05	05:09:00	8390.0000	2285.19	83.31	.02	
09/05	05:39:00	8420.0000	2285.12	83.32	-.07	
09/05	06:09:00	8450.0000	2285.07	83.33	-.05	
09/05	06:39:00	8480.0000	2285.06	83.29	-.02	
09/05	07:09:00	8510.0000	2284.99	83.32	-.07	
09/05	07:39:00	8540.0000	2284.94	83.31	-.05	
09/05	08:09:00	8570.0000	2284.86	83.32	-.08	
09/05	08:39:00	8600.0000	2284.86	83.29	.00	
09/05	09:09:00	8630.0000	2284.79	83.31	-.07	
09/05	09:39:00	8660.0000	2284.76	83.32	-.03	
09/05	10:09:00	8690.0000	2284.67	83.32	-.09	
09/05	10:39:00	8720.0000	2284.66	83.32	-.01	
09/05	11:09:00	8750.0000	2284.59	83.30	-.07	
09/05	11:39:00	8780.0000	2284.61	83.34	.02	
09/05	12:09:00	8810.0000	2284.54	83.32	-.08	
09/05	12:39:00	8840.0000	2284.54	83.32	.00	
09/05	13:09:00	8870.0000	2284.52	83.30	-.01	
09/05	13:39:00	8900.0000	2284.51	83.32	-.01	
09/05	14:09:00	8930.0000	2284.51	83.32	.00	
09/05	14:39:00	8960.0000	2284.53	83.31	.02	
09/05	15:09:00	8990.0000	2284.53	83.31	.00	
09/05	15:39:00	9020.0000	2284.54	83.32	.01	
09/05	16:09:00	9050.0000	2284.55	83.32	.02	
09/05	16:39:00	9080.0000	2284.54	83.33	-.02	
09/05	17:09:00	9110.0000	2284.54	83.32	.00	
09/05	17:39:00	9140.0000	2284.54	83.32	.00	
09/05	18:09:00	9170.0000	2284.54	83.32	.00	

Date MM/DD	Time hh:mm:ss	Test Time mmmmm.mmmm	Pressure Psig	Temp Deg F	deltaP Psi	Comment Ga. Press Ref. to 14.7 Psi Atm.
09/05	18:39:00	9200.0000	2284.47	83.31	-.07	
09/05	19:09:00	9230.0000	2284.47	83.32	.01	
09/05	19:39:00	9260.0000	2284.40	83.33	-.07	
09/05	20:09:00	9290.0000	2284.40	83.32	.00	
09/05	20:39:00	9320.0000	2284.36	83.32	-.05	
09/05	21:09:00	9350.0000	2284.32	83.32	-.04	
09/05	21:39:00	9380.0000	2284.31	83.32	-.01	
09/05	22:09:00	9410.0000	2284.22	83.32	-.09	
09/05	22:39:00	9440.0000	2284.20	83.34	-.02	
09/05	23:09:00	9470.0000	2284.17	83.33	-.03	
09/05	23:39:00	9500.0000	2284.14	83.33	-.03	
09/06	00:09:00	9530.0000	2284.14	83.34	.00	
09/06	00:39:00	9560.0000	2284.07	83.33	-.06	
09/06	01:09:00	9590.0000	2284.13	83.34	.05	
09/06	01:39:00	9620.0000	2284.13	83.34	.00	
09/06	02:09:00	9650.0000	2284.13	83.34	.00	
09/06	02:39:00	9680.0000	2284.09	83.33	-.04	
09/06	03:09:00	9710.0000	2284.13	83.35	.04	
09/06	03:39:00	9740.0000	2284.11	83.35	-.02	
09/06	04:09:00	9770.0000	2284.13	83.34	.02	
09/06	04:39:00	9800.0000	2284.12	83.33	-.01	
09/06	05:09:00	9830.0000	2284.13	83.35	.01	
09/06	05:39:00	9860.0000	2284.11	83.34	-.02	
09/06	06:09:00	9890.0000	2284.10	83.34	-.01	
09/06	06:39:00	9920.0000	2284.06	83.34	-.05	
09/06	07:09:00	9950.0000	2284.02	83.32	-.04	
09/06	07:39:00	9980.0000	2283.97	83.34	-.05	
09/06	08:09:00	10010.0000	2283.91	83.34	-.06	
09/06	08:39:00	10040.0000	2283.87	83.34	-.04	
09/06	09:09:00	10070.0000	2283.83	83.36	-.04	
09/06	09:39:00	10100.0000	2283.76	83.34	-.07	
09/06	10:09:00	10130.0000	2283.70	83.35	-.06	
09/06	10:39:00	10160.0000	2283.67	83.35	-.02	
09/06	11:09:00	10190.0000	2283.60	83.35	-.07	
09/06	11:39:00	10220.0000	2283.56	83.35	-.04	
09/06	12:09:00	10250.0000	2283.57	83.35	.01	
09/06	12:39:00	10280.0000	2283.47	83.35	-.10	
09/06	13:09:00	10310.0000	2283.49	83.36	.02	
09/06	13:39:00	10340.0000	2283.53	83.36	.04	
09/06	14:09:00	10370.0000	2283.50	83.36	-.03	
09/06	14:39:00	10400.0000	2283.51	83.36	.01	
09/06	15:09:00	10430.0000	2283.53	83.36	.02	
09/06	15:39:00	10460.0000	2283.54	83.35	.01	
09/06	16:09:00	10490.0000	2283.58	83.35	.04	
09/06	16:39:00	10520.0000	2283.58	83.36	.00	
09/06	17:09:00	10550.0000	2283.58	83.36	.00	
09/06	17:39:00	10580.0000	2283.58	83.36	.01	
09/06	18:09:00	10610.0000	2283.53	83.36	-.05	
09/06	18:39:00	10640.0000	2283.55	83.36	.02	
09/06	19:09:00	10670.0000	2283.55	83.34	-.01	
09/06	19:39:00	10700.0000	2283.52	83.34	-.02	
09/06	20:09:00	10730.0000	2283.51	83.34	-.01	
09/06	20:39:00	10760.0000	2283.42	83.36	-.09	
09/06	21:09:00	10790.0000	2283.40	83.36	-.02	
09/06	21:39:00	10820.0000	2283.34	83.36	-.06	
09/06	22:09:00	10850.0000	2283.29	83.37	-.05	
09/06	22:39:00	10880.0000	2283.27	83.39	-.02	
09/06	23:09:00	10910.0000	2283.21	83.36	-.06	
09/06	23:39:00	10940.0000	2283.18	83.36	-.02	
09/07	00:09:00	10970.0000	2283.18	83.36	.00	
09/07	00:39:00	11000.0000	2283.15	83.36	-.03	
09/07	01:09:00	11030.0000	2283.14	83.36	-.01	
09/07	01:39:00	11060.0000	2283.12	83.36	-.02	
09/07	02:09:00	11090.0000	2283.09	83.35	-.03	
09/07	02:39:00	11120.0000	2283.12	83.35	.03	

Date MM/DD	Time hh:mm:ss	Test Time mmmmm.mmm	Pressure Psig	Temp Deg F	deltaP Psi	Comment Ga. Press Ref. to 14.7 Psi Atm.
09/07	03:09:00	11150.0000	2283.15	83.38	.03	
09/07	03:39:00	11180.0000	2283.15	83.37	.00	
09/07	04:09:00	11210.0000	2283.17	83.38	.01	
09/07	04:39:00	11240.0000	2283.18	83.35	.01	
09/07	05:09:00	11270.0000	2283.19	83.36	.02	
09/07	05:39:00	11300.0000	2283.19	83.36	.00	
09/07	06:09:00	11330.0000	2283.17	83.35	-.02	
09/07	06:39:00	11360.0000	2283.15	83.38	-.01	
09/07	07:09:00	11390.0000	2283.14	83.37	-.02	
09/07	07:39:00	11420.0000	2283.10	83.37	-.04	
09/07	08:09:00	11450.0000	2283.06	83.38	-.03	
09/07	08:39:00	11480.0000	2282.95	83.39	-.12	
09/07	09:09:00	11510.0000	2282.93	83.38	-.02	
09/07	09:39:00	11540.0000	2282.92	83.40	-.02	
09/07	10:09:00	11570.0000	2282.84	83.39	-.07	
09/07	10:39:00	11600.0000	2282.80	83.40	-.05	
09/07	11:09:00	11630.0000	2282.73	83.37	-.07	
09/07	11:39:00	11660.0000	2282.70	83.38	-.02	
09/07	12:09:00	11690.0000	2282.65	83.39	-.06	
09/07	12:39:00	11720.0000	2282.65	83.37	.00	
09/07	13:09:00	11750.0000	2282.57	83.41	-.08	
09/07	13:39:00	11780.0000	2282.55	83.39	-.02	
09/07	14:09:00	11810.0000	2282.55	83.39	.01	
09/07	14:39:00	11840.0000	2282.59	83.41	.04	
09/07	15:09:00	11870.0000	2282.58	83.37	-.02	
09/07	15:39:00	11900.0000	2282.55	83.39	-.02	
09/07	16:09:00	11930.0000	2282.61	83.39	.05	
09/07	16:39:00	11960.0000	2282.66	83.41	.05	
09/07	17:09:00	11990.0000	2282.66	83.41	.00	
09/07	17:39:00	12020.0000	2282.66	83.38	.00	
09/07	18:09:00	12050.0000	2282.66	83.40	.01	
09/07	18:39:00	12080.0000	2282.66	83.39	.00	
09/07	19:09:00	12110.0000	2282.66	83.37	.00	
09/07	19:39:00	12140.0000	2282.65	83.40	-.02	
09/07	20:09:00	12170.0000	2282.64	83.39	-.01	
09/07	20:39:00	12200.0000	2282.56	83.39	-.08	
09/07	21:09:00	12230.0000	2282.53	83.38	-.03	
09/07	21:39:00	12260.0000	2282.51	83.40	-.02	
09/07	22:09:00	12290.0000	2282.42	83.39	-.09	
09/07	22:39:00	12320.0000	2282.37	83.40	-.05	
09/07	23:09:00	12350.0000	2282.32	83.41	-.06	
09/07	23:39:00	12380.0000	2282.28	83.41	-.04	
09/08	00:09:00	12410.0000	2282.26	83.39	-.02	
09/08	00:39:00	12440.0000	2282.21	83.40	-.05	
09/08	01:09:00	12470.0000	2282.22	83.40	.02	
09/08	01:39:00	12500.0000	2282.15	83.41	-.07	
09/08	02:09:00	12530.0000	2282.18	83.41	.03	
09/08	02:39:00	12560.0000	2282.15	83.43	-.03	
09/08	03:09:00	12590.0000	2282.18	83.41	.02	
09/08	03:39:00	12620.0000	2282.18	83.40	.01	
09/08	04:09:00	12650.0000	2282.22	83.41	.03	
09/08	04:39:00	12680.0000	2282.23	83.41	.02	
09/08	05:09:00	12710.0000	2282.25	83.39	.02	
09/08	05:39:00	12740.0000	2282.25	83.42	.00	
09/08	06:09:00	12770.0000	2282.25	83.41	.00	
09/08	06:39:00	12800.0000	2282.26	83.43	.01	
09/08	07:09:00	12830.0000	2282.26	83.42	.00	
09/08	07:39:00	12860.0000	2282.25	83.43	-.01	
09/08	08:09:00	12890.0000	2282.23	83.41	-.02	
09/08	08:39:00	12920.0000	2282.18	83.41	-.05	
09/08	09:09:00	12950.0000	2282.13	83.42	-.06	
09/08	09:39:00	12980.0000	2282.07	83.42	-.05	
09/08	10:09:00	13010.0000	2282.01	83.43	-.06	
09/08	10:39:00	13040.0000	2281.99	83.41	-.02	
09/08	11:09:00	13070.0000	2281.93	83.43	-.06	

Date MM/DD	Time hh:mm:ss	Test Time mmmmm.mmmm	Pressure Psig	Temp Deg F	deltaP Psi	Comment Ga. Press Ref. to 14.7 Psi Atm.
09/08	11:39:00	13100.0000	2281.92	83.42	-.02	
09/08	12:09:00	13130.0000	2281.81	83.42	-.10	
09/08	12:39:00	13160.0000	2281.79	83.43	-.02	
09/08	13:09:00	13190.0000	2281.78	83.43	-.01	
09/08	13:39:00	13220.0000	2281.74	83.42	-.04	
09/08	14:09:00	13250.0000	2281.73	83.41	-.02	
09/08	14:39:00	13280.0000	2281.73	83.42	.00	
09/08	15:09:00	13310.0000	2281.71	83.41	-.02	
09/08	15:39:00	13340.0000	2281.72	83.44	.01	
09/08	16:09:00	13370.0000	2281.74	83.43	.02	
09/08	16:39:00	13400.0000	2281.74	83.43	.00	
09/08	17:09:00	13430.0000	2281.75	83.42	.02	
09/08	17:39:00	13460.0000	2281.74	83.45	-.01	
09/08	18:09:00	13490.0000	2281.79	83.43	.05	
09/08	18:39:00	13520.0000	2281.84	83.43	.05	
09/08	19:09:00	13550.0000	2281.79	83.42	-.05	
09/08	19:39:00	13580.0000	2281.73	83.43	-.06	
09/08	20:09:00	13610.0000	2281.77	83.43	.05	
09/08	20:39:00	13640.0000	2281.77	83.42	.00	
09/08	21:09:00	13670.0000	2281.72	83.44	-.06	
09/08	21:39:00	13700.0000	2281.69	83.41	-.03	
09/08	22:09:00	13730.0000	2281.59	83.44	-.10	
09/08	22:39:00	13760.0000	2281.58	83.44	-.01	
09/08	23:09:00	13790.0000	2281.53	83.41	-.05	
09/08	23:39:00	13820.0000	2281.46	83.43	-.07	
09/09	00:09:00	13850.0000	2281.41	83.43	-.05	
09/09	00:39:00	13880.0000	2281.39	83.44	-.02	
09/09	01:09:00	13910.0000	2281.35	83.44	-.04	
09/09	01:39:00	13940.0000	2281.33	83.43	-.02	
09/09	02:09:00	13970.0000	2281.32	83.43	-.01	
09/09	02:39:00	14000.0000	2281.28	83.45	-.04	
09/09	03:09:00	14030.0000	2281.26	83.45	-.02	
09/09	03:39:00	14060.0000	2281.29	83.46	.02	
09/09	04:09:00	14090.0000	2281.30	83.43	.02	
09/09	04:39:00	14120.0000	2281.33	83.43	.02	
09/09	05:09:00	14150.0000	2281.33	83.42	.00	
09/09	05:39:00	14180.0000	2281.37	83.43	.04	
09/09	06:09:00	14210.0000	2281.44	83.44	.08	
09/09	06:39:00	14240.0000	2281.42	83.43	-.02	
09/09	07:09:00	14270.0000	2281.42	83.44	.00	
09/09	07:39:00	14300.0000	2281.43	83.43	.01	
09/09	08:09:00	14330.0000	2281.38	83.46	-.05	
09/09	08:37:00	14358.0000	2281.36	83.45	-.03	TANDEM INST. OFF BOTTOM (@ 3250')
09/09	08:39:00	14360.0000	2201.06	83.39	-80.30	
09/09	08:39:30	14360.5000	2173.15	83.26	-27.91	
09/09	08:49:30	14370.5000	2173.23	80.37	.08	STOP @ 3000'
09/09	08:50:00	14371.0000	2159.85	80.30	-13.38	
09/09	08:50:30	14371.5000	2120.43	80.24	-39.42	
09/09	08:51:00	14372.0000	2076.86	80.17	-43.56	
09/09	08:51:30	14372.5000	2029.56	80.49	-47.30	
09/09	08:52:00	14373.0000	1973.72	81.10	-55.84	
09/09	08:52:30	14373.5000	1914.30	81.70	-59.43	
09/09	08:53:00	14374.0000	1854.76	82.30	-59.54	
09/09	08:53:30	14374.5000	1794.97	82.90	-59.79	
09/09	08:54:00	14375.0000	1743.74	83.50	-51.23	
09/09	08:56:30	14377.5000	1740.60	86.52	-3.14	
09/09	09:03:00	14384.0000	1740.98	87.27	.38	STOP @ 2000'
09/09	09:05:00	14386.0000	1645.71	87.15	-95.27	
09/09	09:05:30	14386.5000	1592.07	86.99	-53.64	
09/09	09:06:00	14387.0000	1536.63	86.32	-55.44	
09/09	09:06:30	14387.5000	1480.90	85.64	-55.72	
09/09	09:07:00	14388.0000	1423.03	84.96	-57.88	
09/09	09:07:30	14388.5000	1366.20	84.28	-56.83	
09/09	09:08:00	14389.0000	1314.03	83.60	-52.17	
09/09	09:10:30	14391.5000	1310.47	80.20	-3.56	

WELL NAME : WESTERN REFINING DISPOSAL WELL NO. 1 DATE : 09/16/10

WELL LOCATION : SAN JUAN COUNTY, NM FILE REF: F115909.RS1

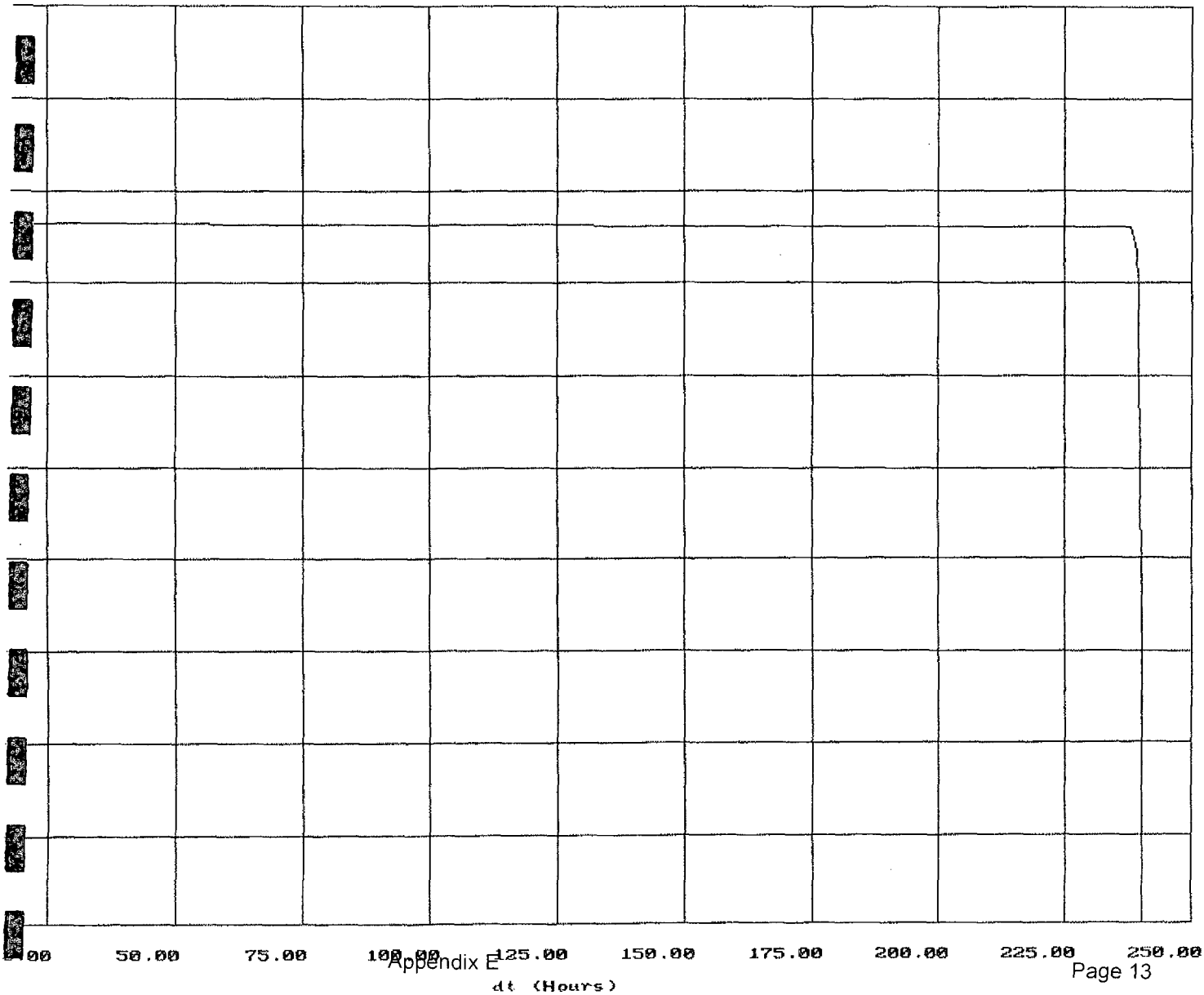
Date MM/DD	Time hh:mm:ss	Test Time mmmmmm.mmmm	Pressure Psig	Temp Deg F	deltaP Psi	Comment Ga. Press Ref. to 14.7 Psi Atm.
09/09	09:14:00	14395.0000	1309.93	76.99	-.54	
09/09	09:17:30	14398.5000	1309.23	74.67	-.69	STOP @ 1000'
09/09	09:18:00	14399.0000	1277.85	74.19	-31.39	
09/09	09:18:30	14399.5000	1234.17	73.82	-43.67	
09/09	09:19:00	14400.0000	1177.24	73.43	-56.93	
09/09	09:19:30	14400.5000	1117.76	73.06	-59.48	
09/09	09:20:00	14401.0000	1058.27	72.68	-59.49	
09/09	09:20:30	14401.5000	996.89	72.29	-61.38	
09/09	09:21:00	14402.0000	934.96	71.92	-61.93	
09/09	09:21:30	14402.5000	890.02	71.54	-44.94	
09/09	09:22:00	14403.0000	877.34	71.16	-12.68	
09/09	09:30:30	14411.5000	869.56	70.05	-7.77	SURFACE STOP
09/09	09:31:00	14412.0000	784.68	70.17	-84.89	
09/09	09:31:30	14412.5000	546.27	70.29	-238.41	
09/09	09:32:00	14413.0000	397.17	70.41	-149.10	
09/09	09:32:30	14413.5000	29.77	70.53	-367.40	
09/09	09:33:00	14414.0000	.01	70.65	-29.76	

WESTERN REFINING SOUTHWEST INC.

Pressure vs dt

REFINING DISPOSAL WELL NO. 1
SAN JUAN COUNTY, NM
F115909.RS1

TEFTELLER, INC.
8-30-10
PRESSURE FALL-OFF TEST



Company: WESTERN REFINING SOUTHWEST, INC.
Well: WASTE DISPOSAL WELL NO. 1 County: SAN JUAN
Field: (BLOOMFIELD REFINERY) State: NEW MEXICO
Engineer: NEIL TEFTELLER Date: 09/09/2010
Gauge Type: ELECTRONIC MEMORY Well Type:
Gauge Range: 0 - 5000 Test Type: GRADIENT
Gauge Depth: 3250 ft Status: SHUT IN
Serial No.: 115 File Name: 62272

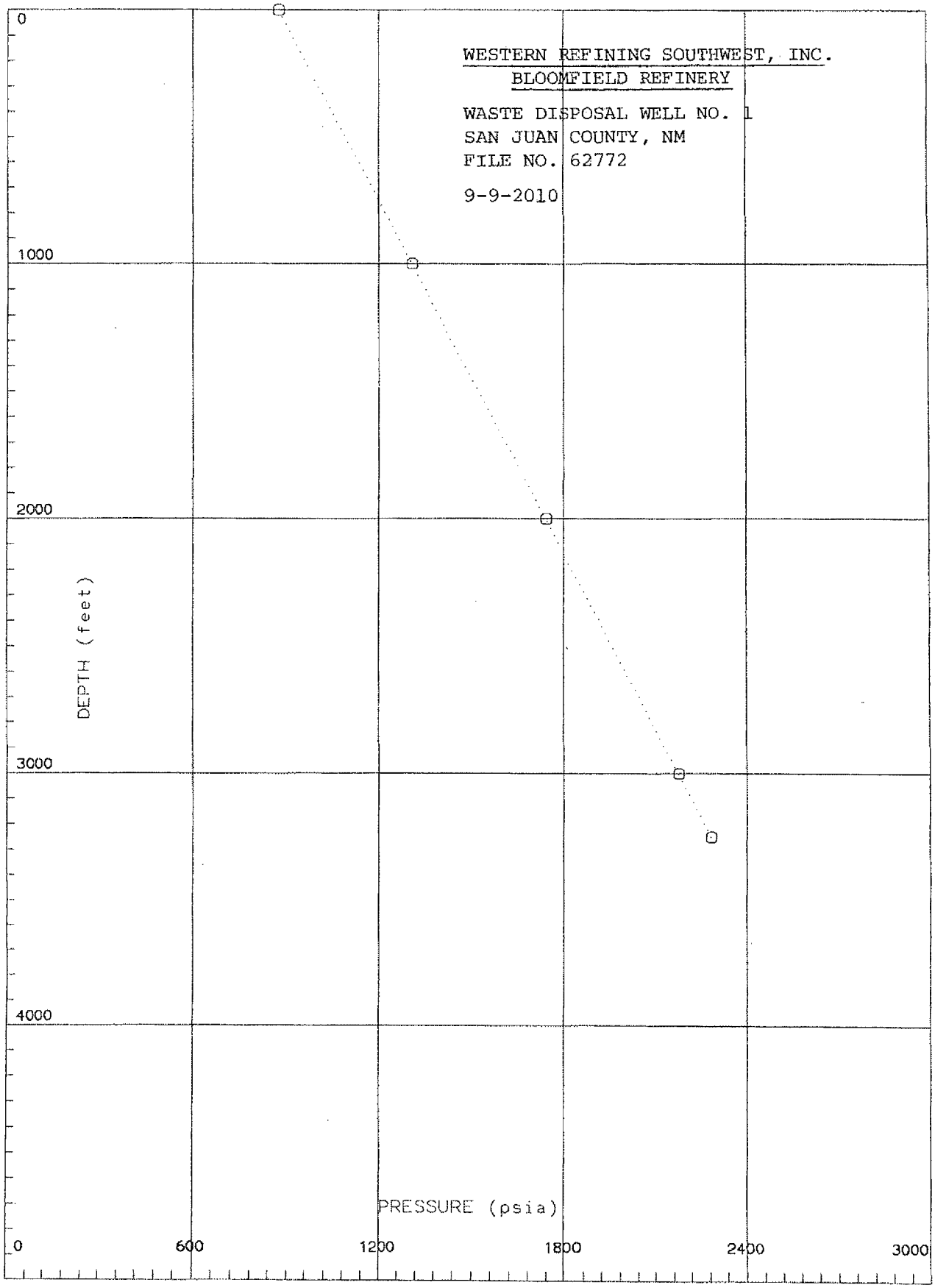
Tubing: 2-7/8" TO 3221' Packer Depth 3221 ft
Tubing: TO
Casing: 5-1/2" TO 3600' Oil Level
Perfs.: 3276' - 3408' H2O Level
Perfs.: 3435' - 3460'
Shut-in Time 191 hrs

Shut-in BHP 2281 @ 3250 ft Shut-in BHT 83 F @ 3250 ft
Shut-in WHP 873 Shut-in WHT 0 F
Casing CSGP 120

[Tefteller Incorporated]

#	MD	TVD	PRESSURE	PSI/ft
1	0	0	873.00	
2	1000	1000	1309.00	0.436
3	2000	2000	1741.00	0.432
4	3000	3000	2173.00	0.432
5	3250	3250	2281.00	0.432

TAGGED FILL @ 3474'
WATER LEVEL @ SURFACE
R.B.P. @ 3250'


WESTERN REFINING SOUTHWEST, INC.
BLOOMFIELD REFINERY
WASTE DISPOSAL WELL NO. 1
SAN JUAN COUNTY, NM
FILE NO. 62772
9-9-2010
0
1000
2000
3000
4000
DEPTH (feet)
PRESSURE (psia)
0
600
1200
1800
2400
3000

APPENDIX F

ACCURACY VERIFICATION

8-February-2010

Gauge Model	SP-2000	Pressure Range	5K
Gauge S/N	115	Accuracy 0.05%	Full Scale

Applied Pressure psig	Recorded Pressure psig	Difference psi	Difference Percent (%)
0.01	0.58	0.57	0.0113%
774.08	774.26	0.18	0.0036%
1498.24	1497.74	-0.50	-0.0100%
2222.36	2221.86	-0.51	-0.0101%
2946.53	2946.20	-0.33	-0.0065%
3670.66	3670.40	-0.26	-0.0052%
4394.87	4394.68	-0.19	-0.0038%
5119.00	5119.27	0.27	0.0054%
4394.87	4395.55	0.68	0.0137%
3670.66	3671.89	1.23	0.0246%
2946.53	2947.93	1.40	0.0280%
2222.36	2223.76	1.40	0.0280%
1498.24	1499.05	0.81	0.0161%
774.08	775.24	1.15	0.0231%
0.01	1.10	1.09	0.0218%

Oven Temperature: **180.6** °F Probe Temperature: **179.9** °F

Smart Gauge Calibration accuracy is confirmed.

Calibrated with RUSKA Pressure Standard. model # 2451-
Serial #24577, Mass Set Serial #24395
Compensated to local acceleration due to gravity

Verified by: CM

Micro-Smart Systems Inc. - Houston, Texas 77053 - 713-433-2277 - info@micro-smart.com

ACCURACY VERIFICATION

8-February-2010

Gauge Model	[illegible]	Pressure Range	[illegible]
Gauge S/N	[illegible]	Accuracy 0.05%	Full Scale

Applied Pressure psig	Recorded Pressure psig	Difference psi	Difference Percent (%)
0.01	0.30	0.29	0.0057%
774.08	774.20	0.12	0.0023%
1498.24	1497.80	-0.44	-0.0089%
2222.36	2222.06	-0.31	-0.0061%
2946.53	2946.34	-0.19	-0.0038%
3670.66	3670.54	-0.12	-0.0023%
4394.87	4394.89	0.02	0.0005%
5119.00	5119.59	0.59	0.0118%
4394.87	4395.68	0.81	0.0162%
3670.66	3671.97	1.31	0.0262%
2946.53	2948.04	1.51	0.0302%
2222.36	2223.60	1.24	0.0249%
1498.24	1499.18	0.94	0.0188%
774.08	775.38	1.29	0.0259%
0.01	1.54	1.53	0.0305%

Oven Temperature: **255.1** °F Probe Temperature: **254.4** °F

Smart Gauge Calibration accuracy is confirmed.

Calibrated with RUSKA Pressure Standard, model # 2451-
Serial #24577, Mass Set Serial #24395
Compensated to local acceleration due to gravity

Verified by: CM

Micro-Smart Systems Inc. - Houston, Texas 77053 - 713-433-2277 - info@micro-smart.com

APPENDIX G

Submit 3 Copies To Appropriate District Office
District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Ave., Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
May 27, 2004

WELL API NO.
30-045-29002-00

5. Indicate Type of Lease
STATE ☐ FEE X☐

6. State Oil & Gas Lease No.
N/A

SUNDRY NOTICES AND REPORTS ON WELLS
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)

7. Lease Name or Unit Agreement Name
Disposal

1. Type of Well: Oil Well ☐ Gas Well ☐ OtherX (Disposal)

8. Well Number #001

2. Name of Operator
Western Refining Southwest, Inc. – Bloomfeld Refinery

9. OGRID Number
037218

3. Address of Operator
#50 Road 4990 Bloomfield, NM 87413

10. Pool name or Wildcat
Blanco/Mesa Verde

4. Well Location
Unit Letter__I_: 2442___feet from the___South_____ line and __1250_feet from the __East_____line
Section 27 Township 29 Range 11 NMPM County San Juan

11. Elevation *(Show whether DR, RKB, RT, GR, etc.)*

Pit or Below-grade Tank Application ☐ or Closure ☐

Pit type_____Depth to Groundwater_____Distance from nearest fresh water well_____ Distance from nearest surface water_____

Pit Liner Thickness: _____ mil Below-Grade Tank: Volume _____ bbls; Construction Material _____

12. Check Appropriate Box to Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:		SUBSEQUENT REPORT OF:	
PERFORM REMEDIAL WORK ☐	PLUG AND ABANDON ☐	REMEDIAL WORK ☐	ALTERING CASING ☐
TEMPORARILY ABANDON ☐	CHANGE PLANS ☐	COMMENCE DRILLING OPNS.☐	P AND A ☐
PULL OR ALTER CASING ☐	MULTIPLE COMPL ☐	CASING/CEMENT JOB ☐	
OTHER: ☐		OTHER: MIT/BradenheadTest X☐	

13. Describe proposed or completed operations. (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work). SEE RULE 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

Bloomfield Refinery performed the annual High Pressure Shutdown Test, Bradenhead Test, and Mechanical Integrity Test on May 19, 2010. All tests were witnessed by Monica Kuehling of NMOCD-Aztec. The MIT held at 580 psi for 30 minutes.

I hereby certify that the information above is true and complete to the best of my knowledge and belief. **I further certify that any pit or below-grade tank has been/will be constructed or closed according to NMOCD guidelines ☐, a general permit ☐ or an (attached) alternative OCD-approved plan ☐.**

SIGNATURE Cindy Hurtado TITLE Environmental Coordinator DATE 5/19/2010

Type or print name Cindy Hurtado E-mail address: cindy.hurtado@wnr.com Telephone No. (505)632-4161

For State Use Only

APPROVED BY:_____TITLE_____DATE_____

Conditions of Approval (if any):

NEW MEXICO ENERGY, MINERALS & NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
AZTEC DISTRICT OFFICE
1000 RIO BRAZOS ROAD
AZTEC NM 87410
(505) 334-6178 FAX: (505) 334-6170
http://emnrd.state.nm.us/ocd/District III/3distric.htm

BRADENHEAD TEST REPORT

(submit 1 copy to above address)

Date of Test 5-19-10 Operator ~~San Juan Refining Co~~ API #30-0 45 29002

Property Name Disposal Well No. 1 Location: Unit I Section 27 Township 29 Range 11

Well Status(Shut-In or Producing) Initial PSI: Tubing 918 Intermediate N/A Casing 164 Bradenhead 0

OPEN BRADENHEAD AND INTERMEDIATE TO ATMOSPHERE INDIVIDUALLY FOR 15 MINUTES EACH

Testing	PRESSURE Bradenhead BH	Bradenhead Int	Bradenhead Csg	INTERM Int	INTERM Csg
TIME 5 min					
10 min					
15 min					
20 min					
25 min					
30 min					

FLOW CHARACTERISTICS	BRADENHEAD	INTERMEDIATE
Steady Flow		
Surges		
Down to Nothing	✓	
Nothing		
Gas		
Gas & Water		
Water		

If bradenhead flowed water, check all of the descriptions that apply below:

CLEAR_____ FRESH_____ SALTY_____ SULFUR_____ BLACK_____

5 MINUTE SHUT-IN PRESSURE BRADENHEAD 0 INTERMEDIATE N/A

REMARKS: Puff when opened.

By Cindy Hurtado

Environmental Coordinator
(Position)

Witness M Monica Kuehling

E-mail address _____

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

MECHANICAL INTEGRITY TEST REPORT

(TA OR UIC)

Date of Test 5-19-10 Operator San Juan Refining Co. API # 30-0 45-29002

Property Name Disposal Well # 1 Location: Unit I Sec 27 Twn 29 Rge 11

Land Type:

- State______
- Federal______
- Private ✓
- Indian______

Well Type:

- Water Injection______
- Salt Water Disposal ✓
- Gas Injection______
- Producing Oil/Gas______
- Pressure obervation______

Temporarily Abandoned Well (Y/N):______ TA Expires:______

Casing Pres. 0
Bradenhead Pres. 0
Tubing Pres. 918
Int. Casing Pres. N/A

Tbg. SI Pres. ______
Tbg. Inj. Pres. ______

Max. Inj. Pres. ______

Pressured annulus up to 580 psi. for 30 mins. Test passed/failed

REMARKS:

Packer set at 3221
Top Perf at 3276

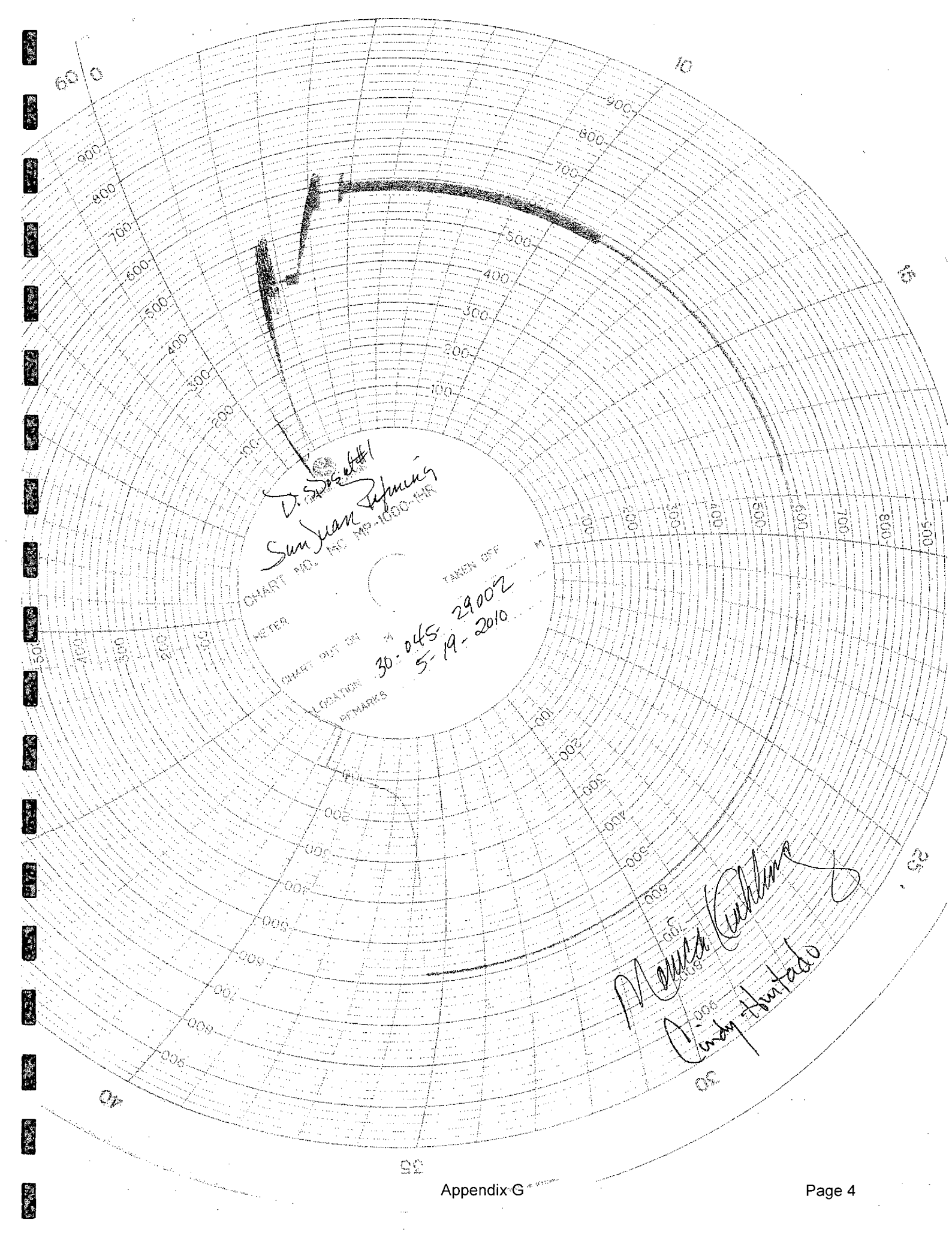
Performed Kill check Passed
Can view Kill setting on Panel through Menu

By Cindy Hurtado
(Operator Representative)

Witness Monica Kuehling
(NMOCD)

Environmental Coordinator
(Position)

Revised 02-11-02


D. Spoon #1
San Juan 29-7 #1
CHART NO. MP-1000-HR
METER
TAKEN OFF
M
LOCATION
REMARKS
30-045-29002
5-19-2010
Cindy Hurtado

APPENDIX H

RA TRACER LOG

FINAL PRINT

Company	Western Refining Company
Well	Western Refining SWD #1
Field	Blanco Mesaverde
County	San Juan
State	New Mexico

Company Western Refining Company

Well Western Refining SWD #1

Field Blanco Mesaverde

County San Juan State New Mexico

Location: API # :

1250.4' FEL & 2442.3' FSL

SEC 27 TWP 29N RGE 11W

Other Services

Permanent Datum: Ground Level — Elevation 5530'

Log Measured From: RKB 15'

Drilling Measured From: Rig Kelly Bushings

Elevation: K.B. 5545' D.F. 5544' G.L. 5530'

Date	September-23-2009		
Run Number	ONE		
Depth Driller	3520'		
Depth Logger	3506'		
Bottom Logged Interval	3506'		
Top Log Interval	Surface		
Open Hole Size			
Type Fluid	H2o		
Density / Viscosity			
Max. Recorded Temp.			
Estimated Cement Top			
Time Well Ready	12:00		
Time Logger on Bottom	13:20		
Equipment Number	D-6 WAR GR11		
Location	Farmington NM		
Recorded By	B.Mckee		
Witnessed By	Mr.Paul Thompson		

Borehole Record				Tubing Record			
Run Number	Bit	From	To	Size	Weight	From	To

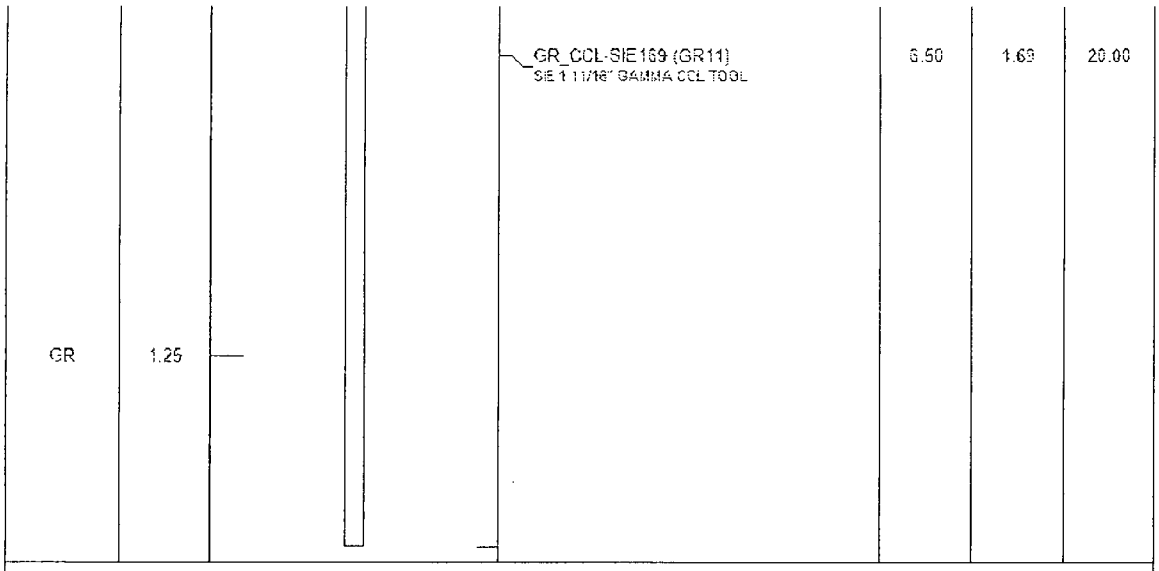
Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String				
Prot. String	5 1/2"	15#	Surface	3600'
Production String	2 7/8"	7.55#	Surface	3221'
Liner				

<<< Fold Here >>>

All interpretations are opinions 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 willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

Comments

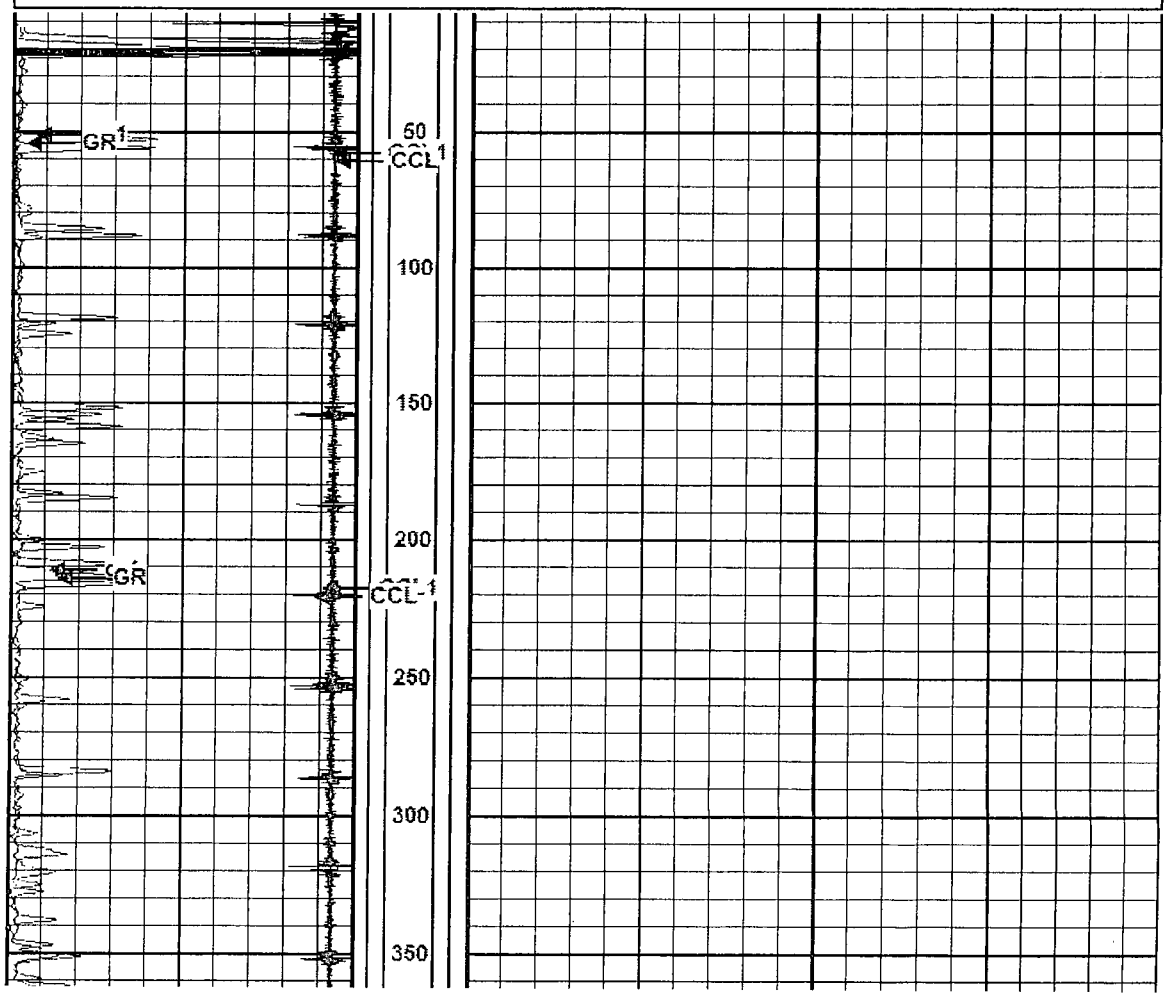
Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
CCL	5.83					
			GR_CCL-SIE169 (GR11) SIE 1 11/16" GAMMA CCL TOOL	6.50	1.69	20.00

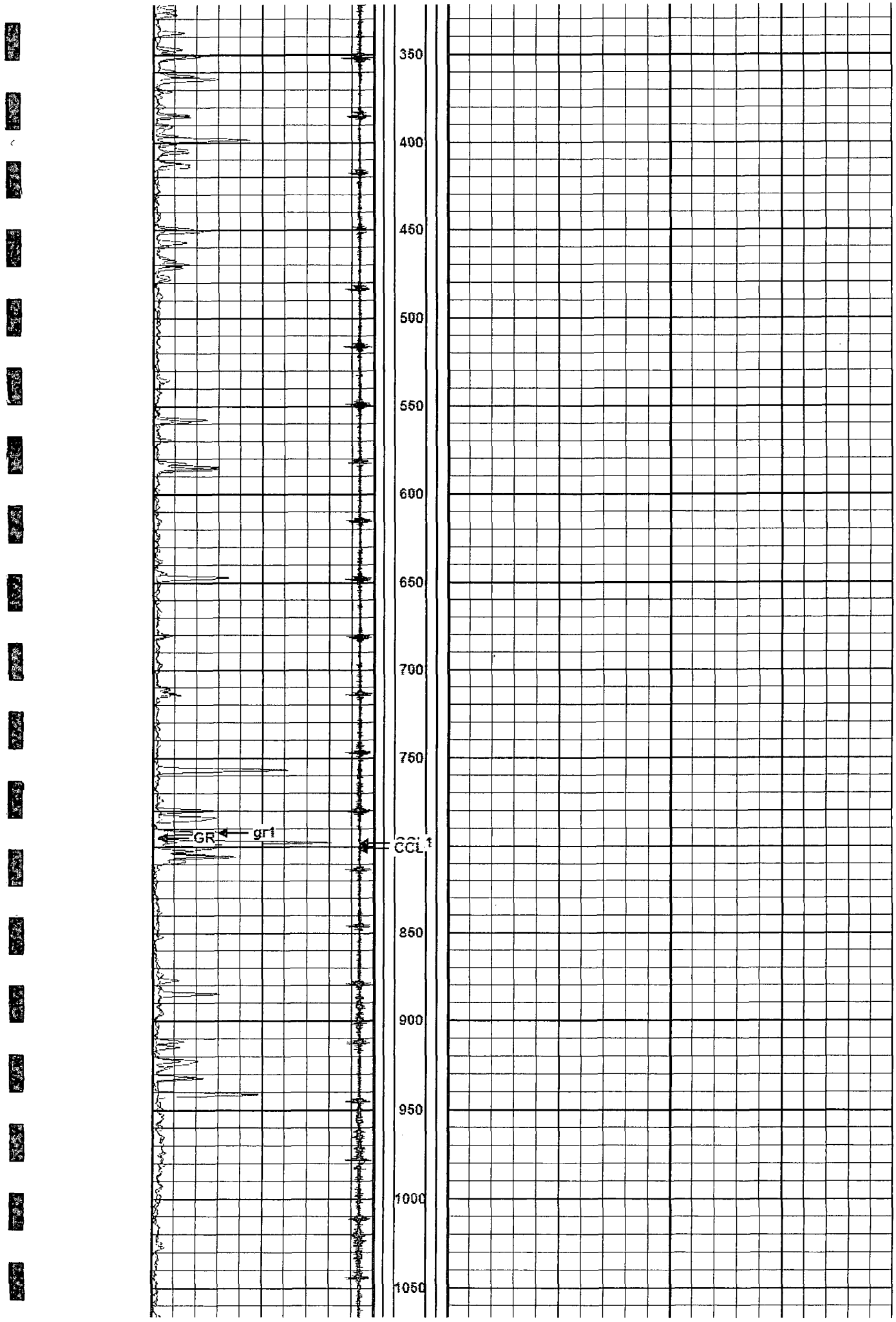


Dataset:	westerntracerwd1.db, mesaverde/westernre/run1/pass4
Total Length:	6.50 ft
Total Weight:	20.00 lb
O.D	1.69 in

Database File:	**westerntracerwd1.db**
Dataset Pathname:	**mesaverde/westernre/run1/pass4.1**
Presentation Format:	**gr-ccl**
Dataset Creation:	**Mon Sep 28 11:29:27 2009**
Charted by:	**Depth in Feet scaled 1:600**

-15	CCL	1
0	GR	1000
-15	CCL1	1
0	gr1	1000




350
400
450
500
550
600
650
700
750
GR
gr1
CCL
850
900
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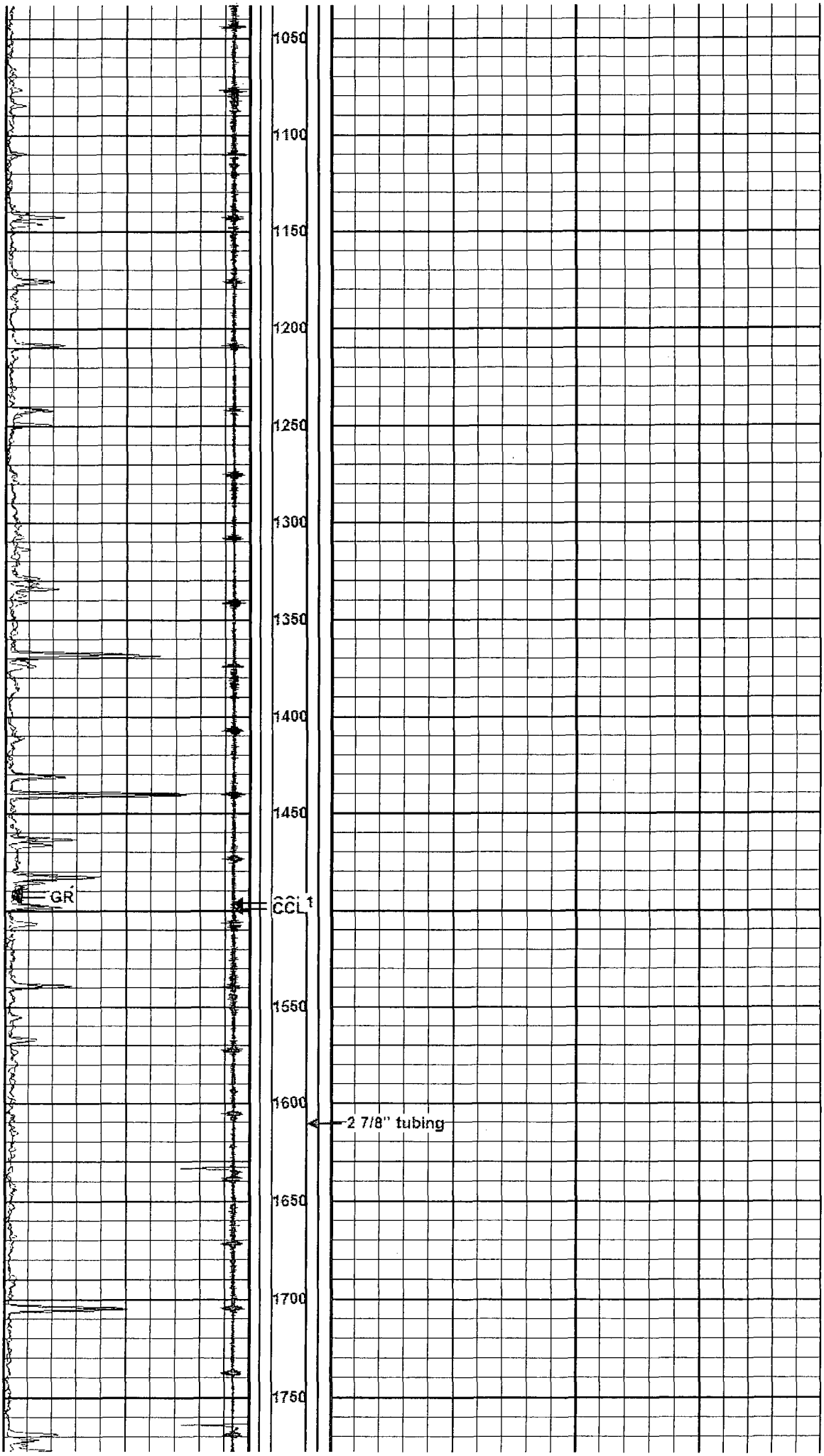
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GR
CCL
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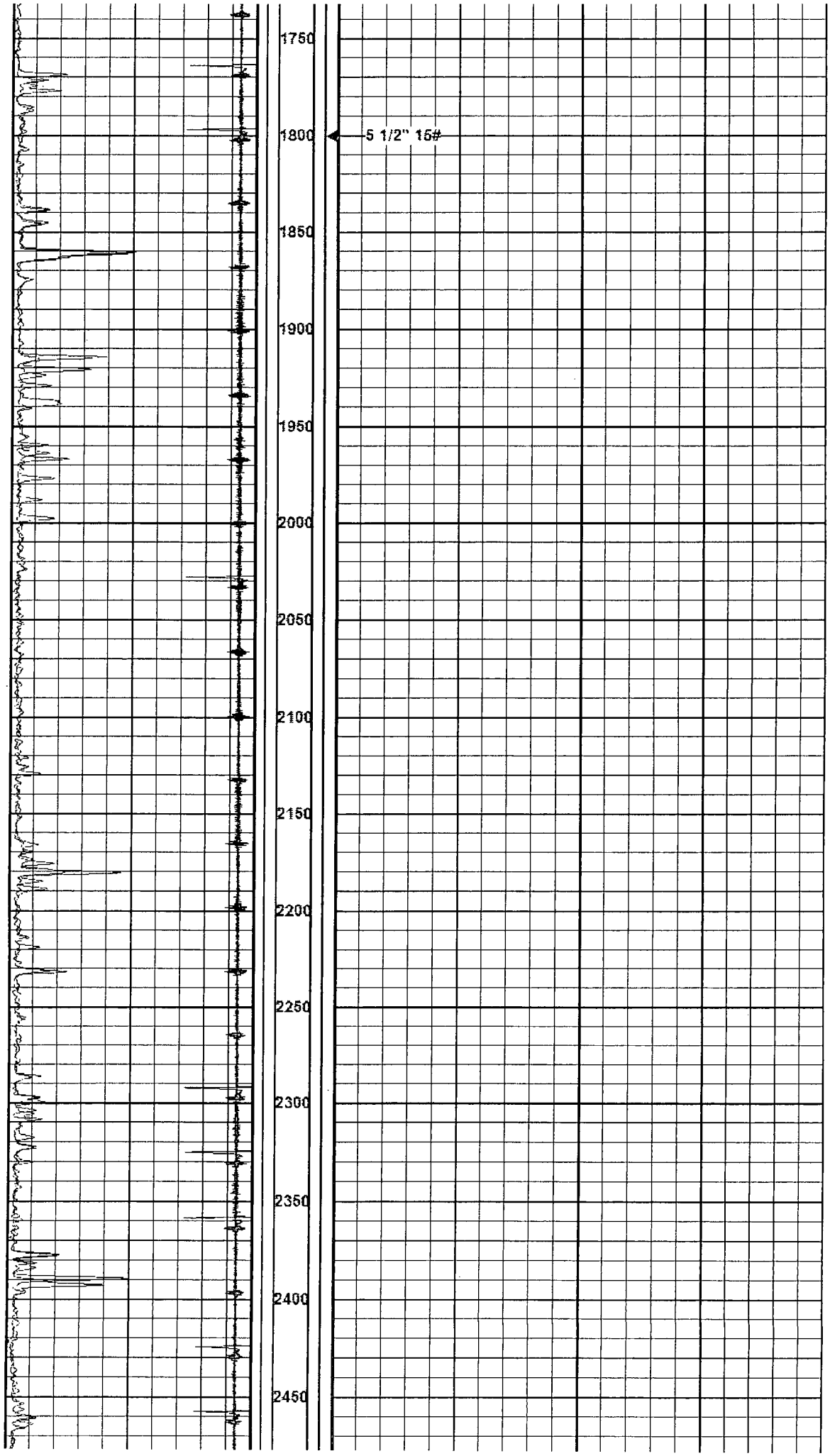
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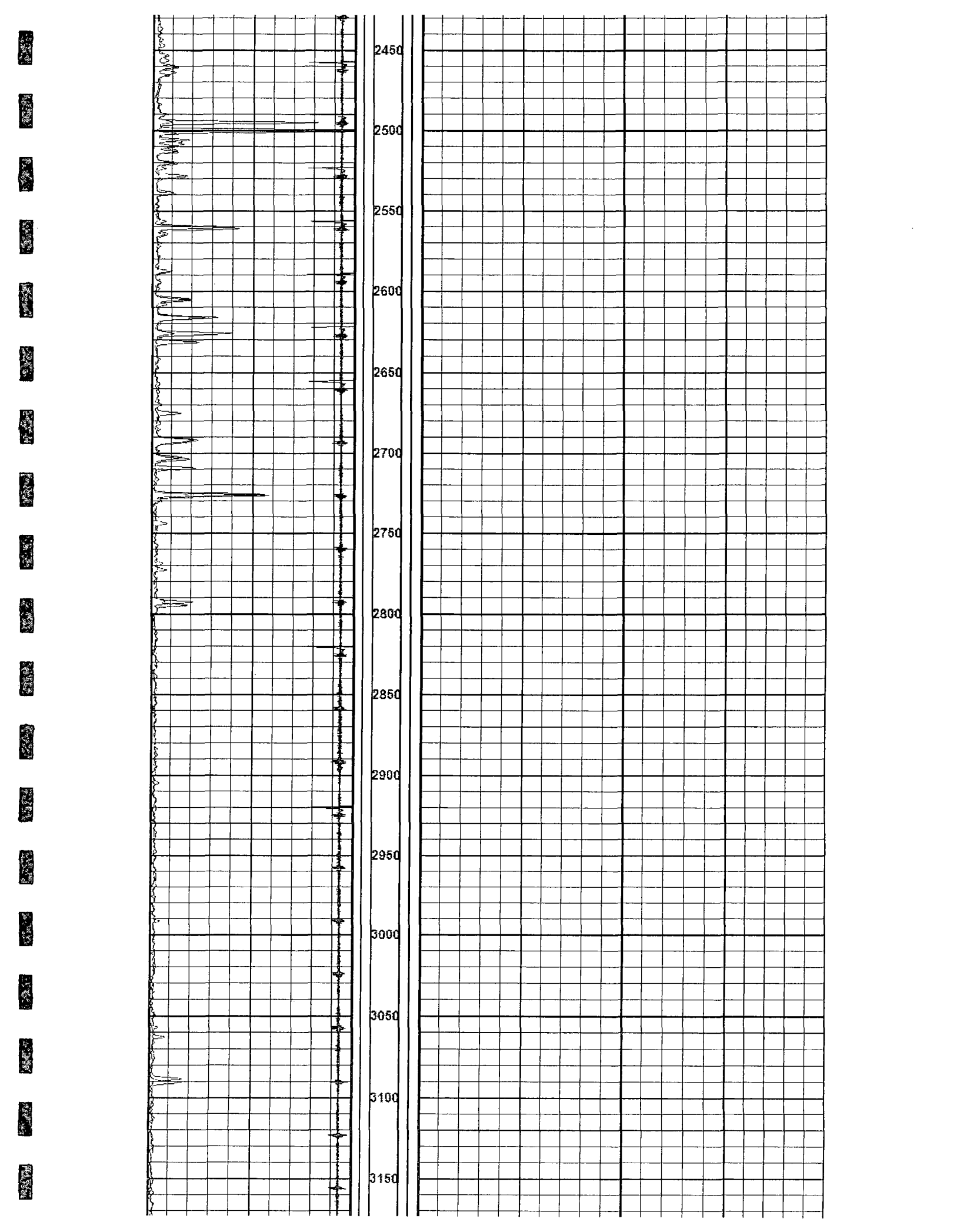
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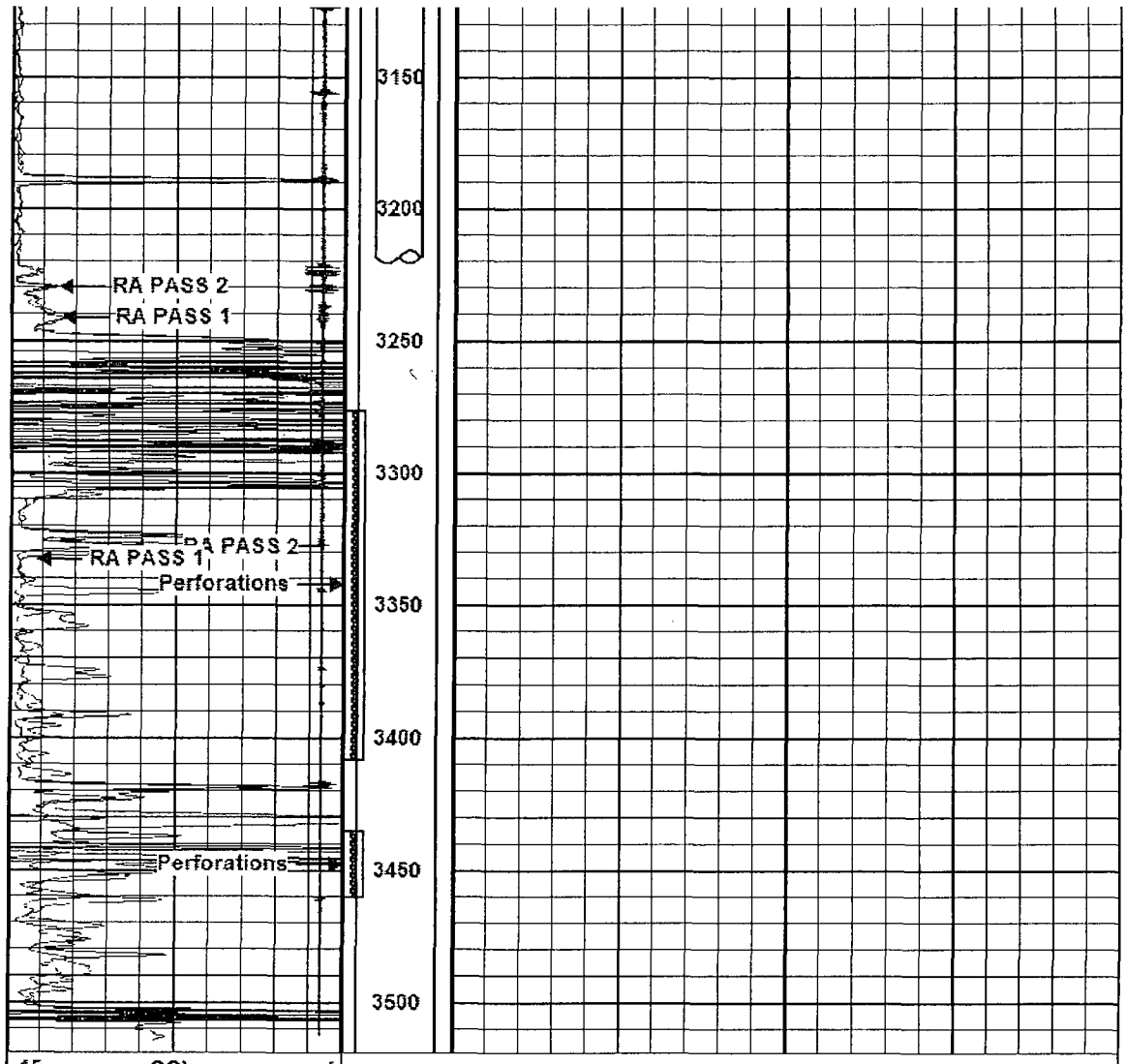

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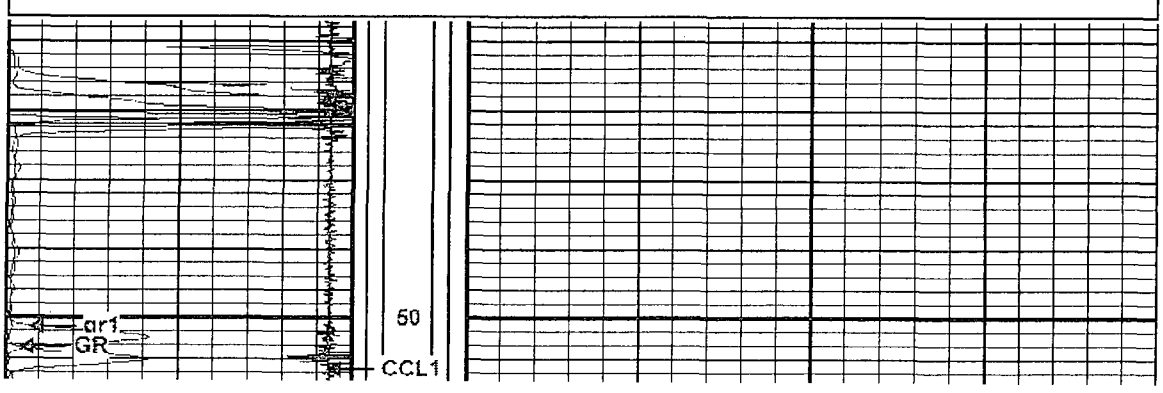

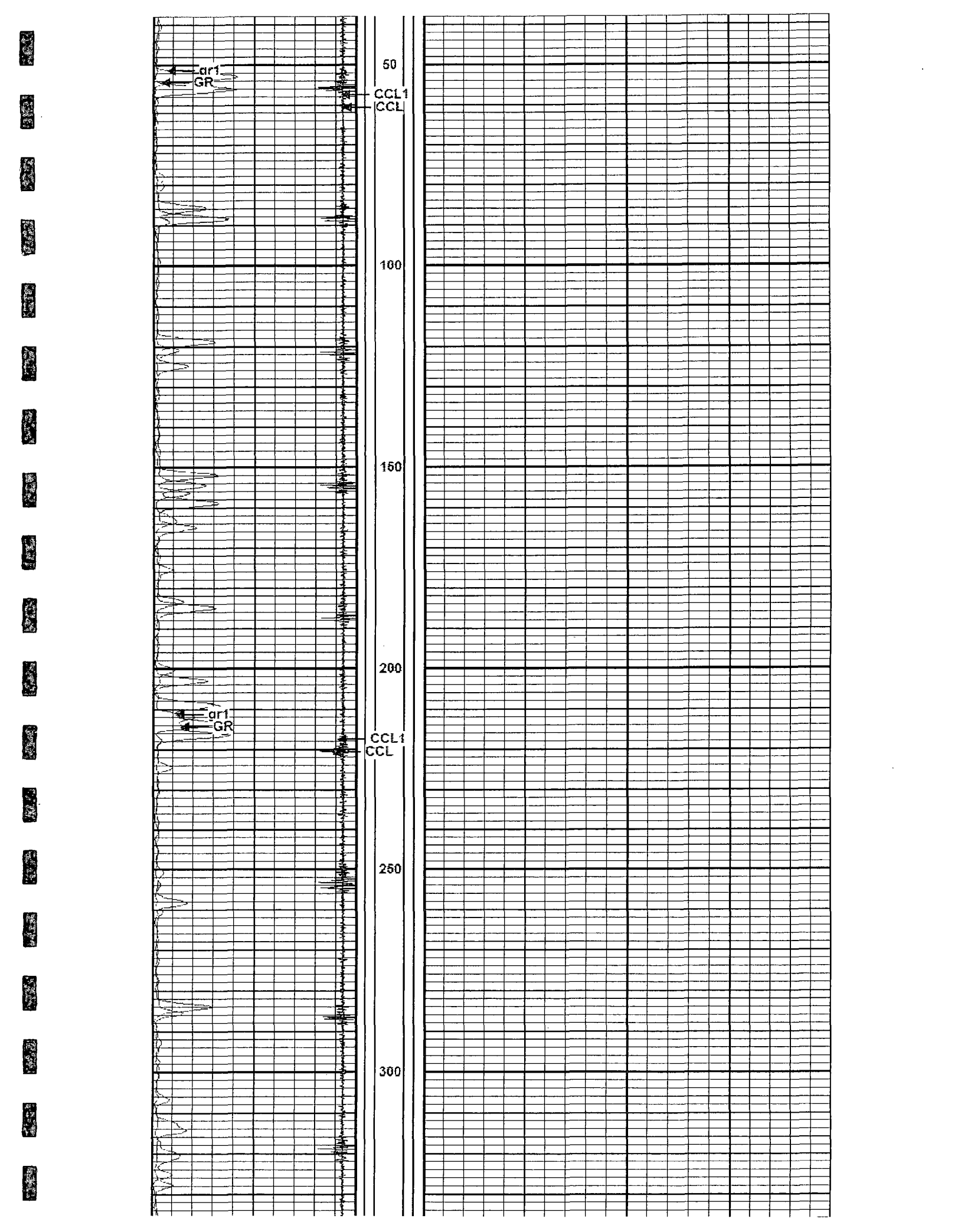
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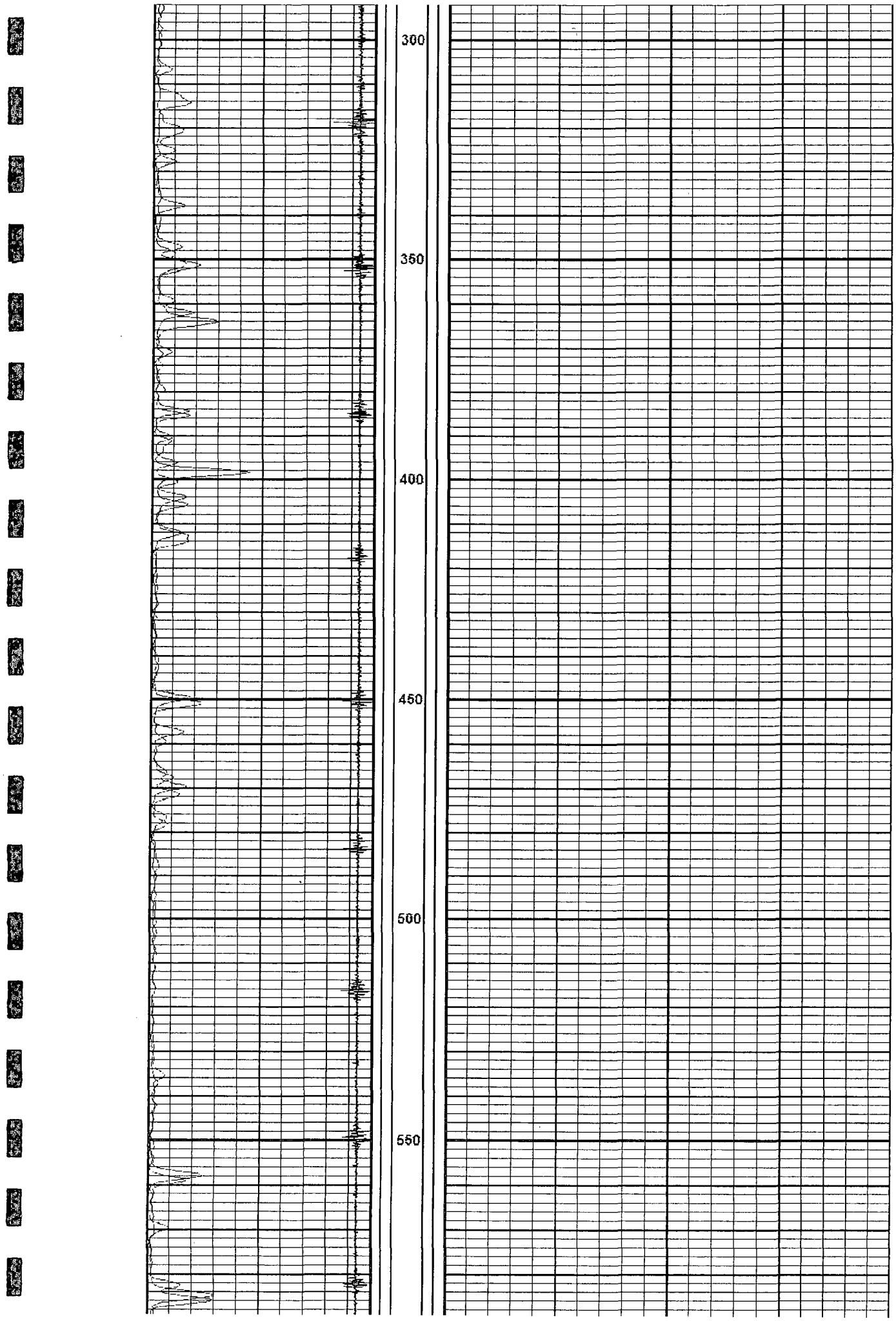
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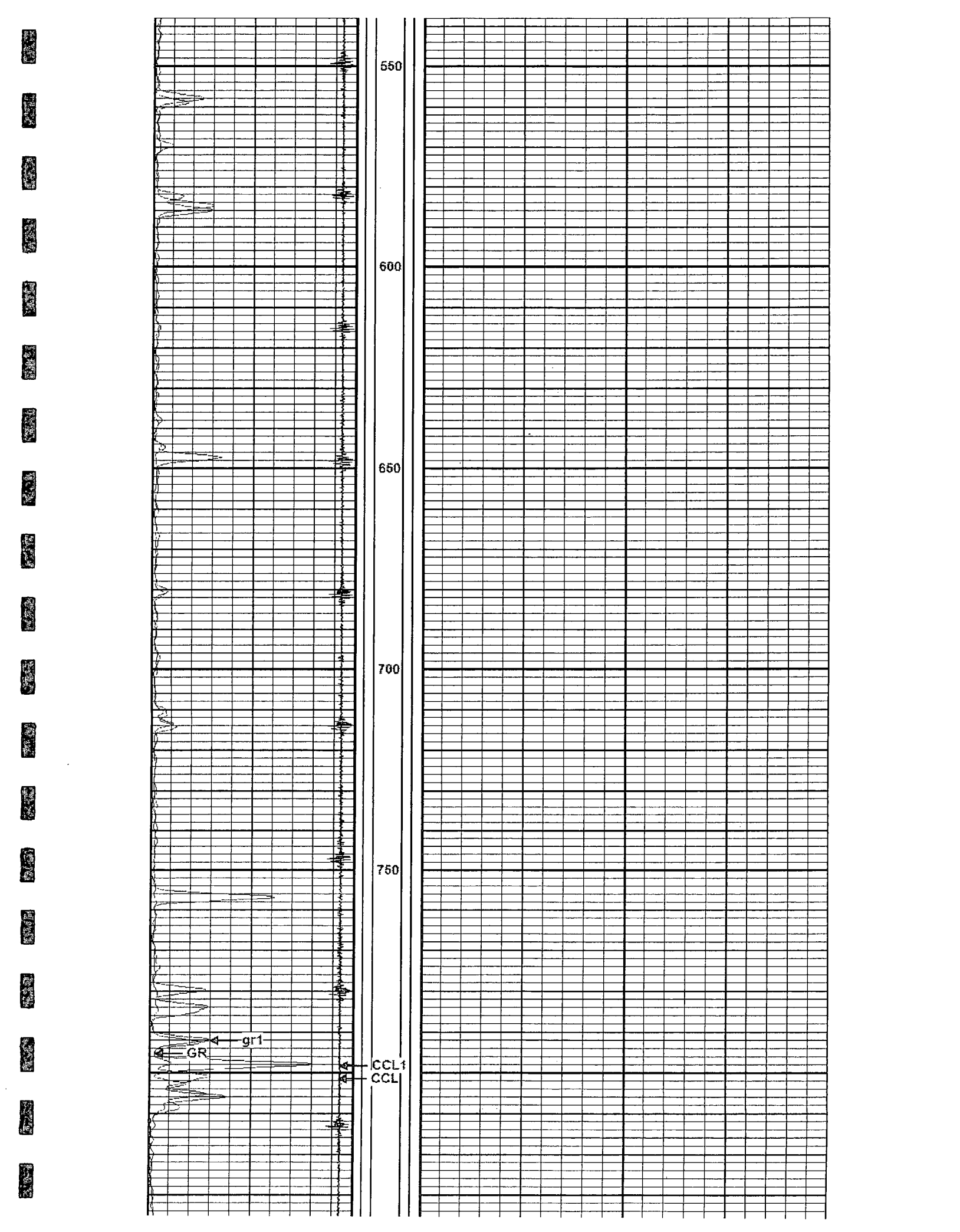
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gr1
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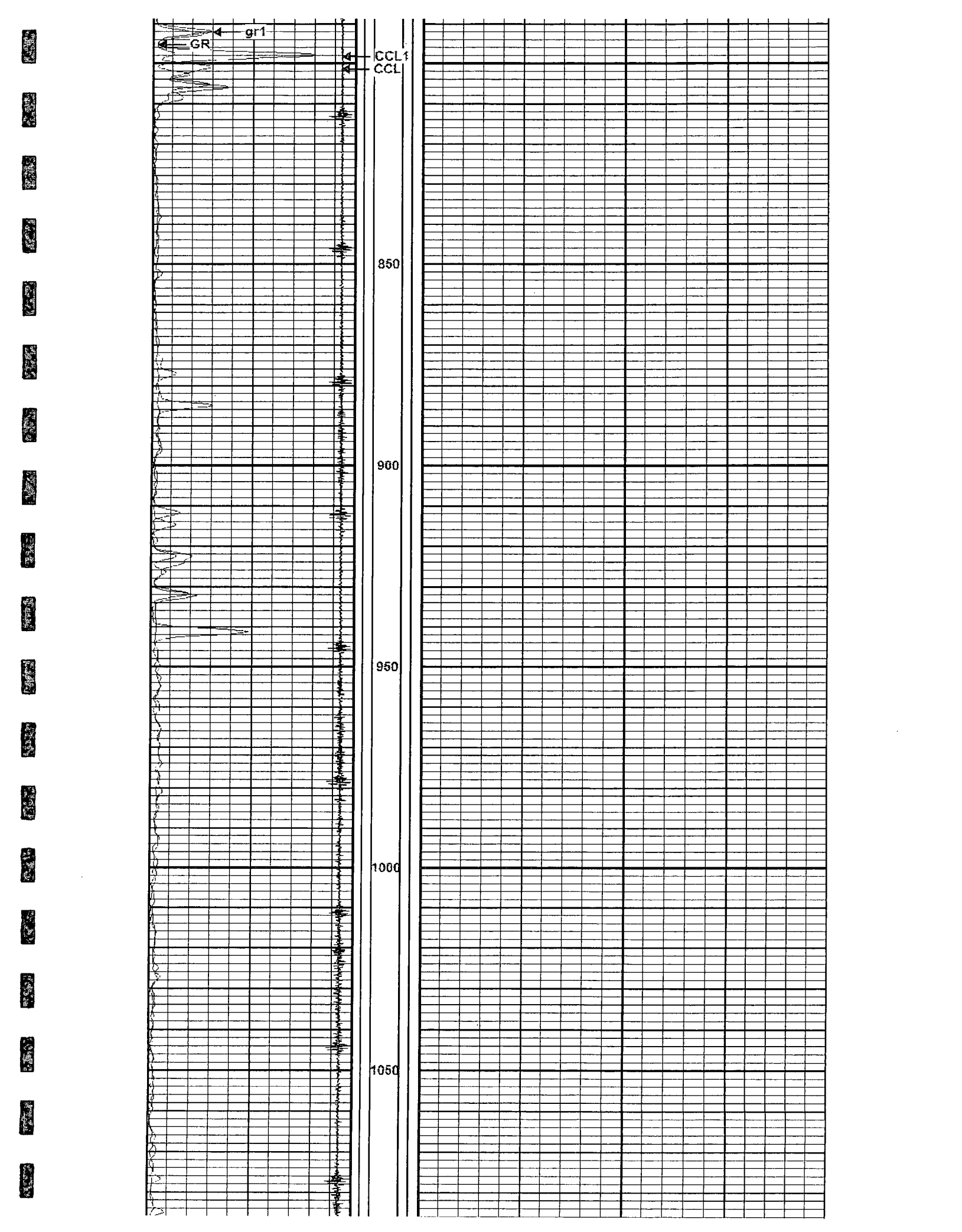
CCL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CCL1
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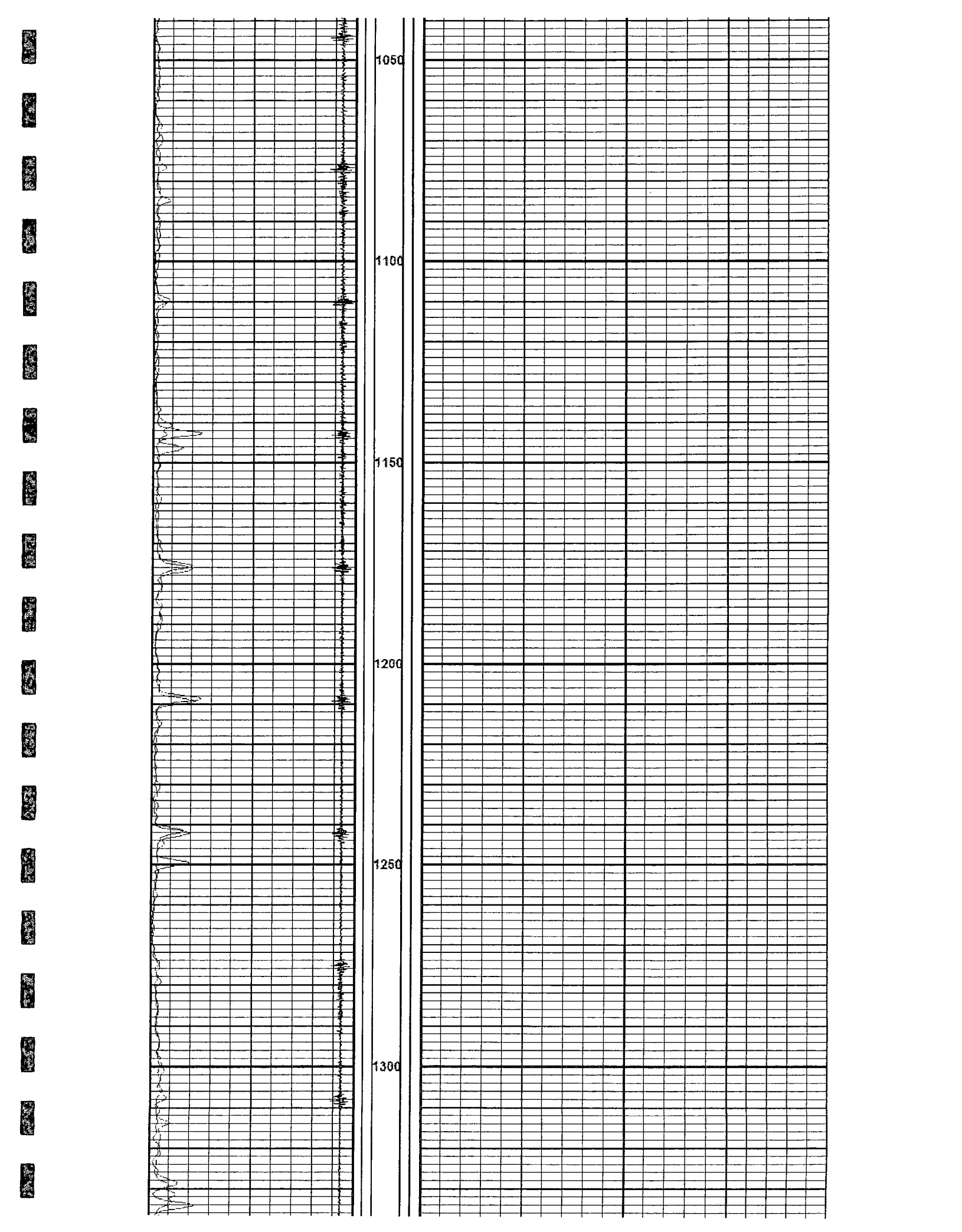
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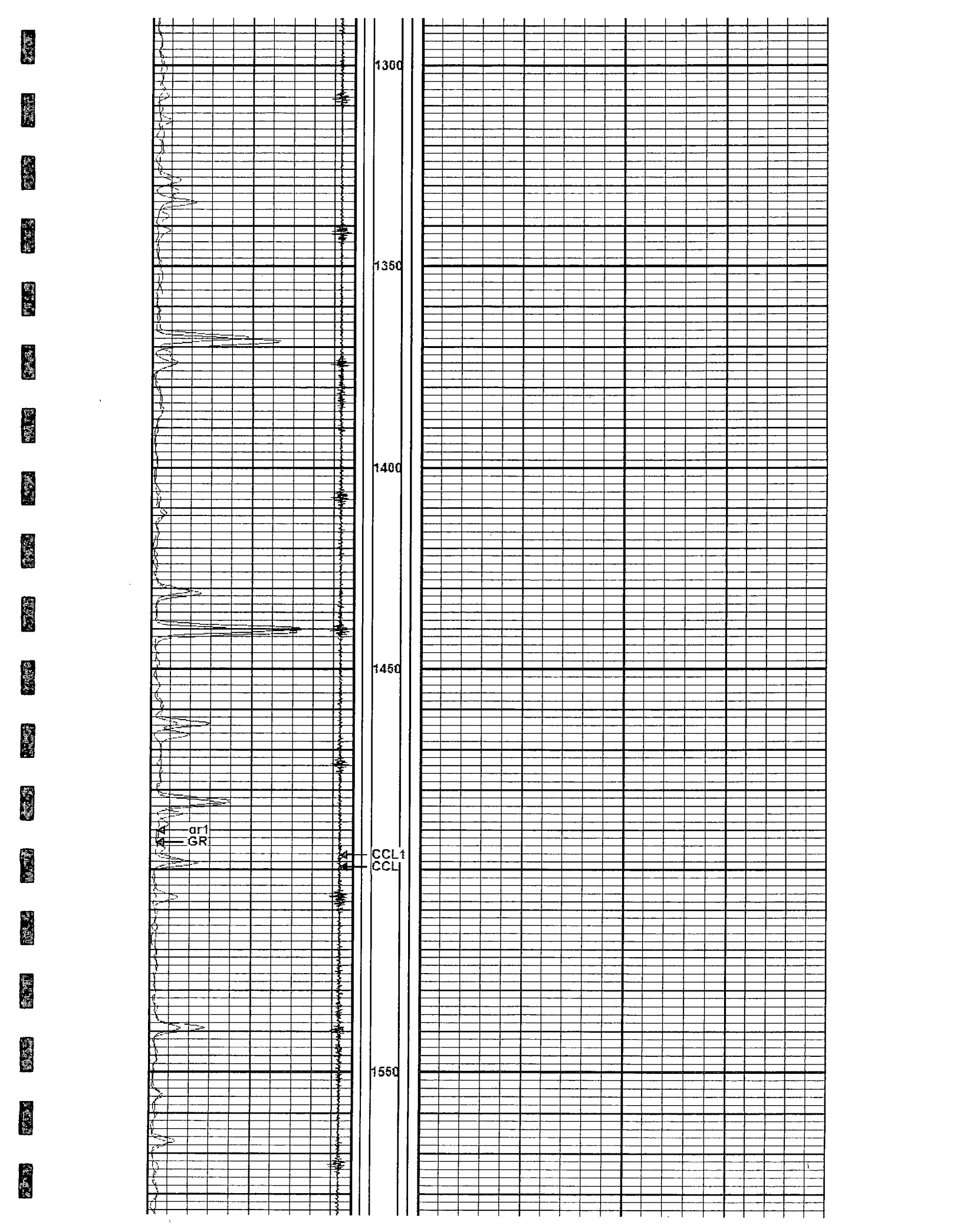
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ar1
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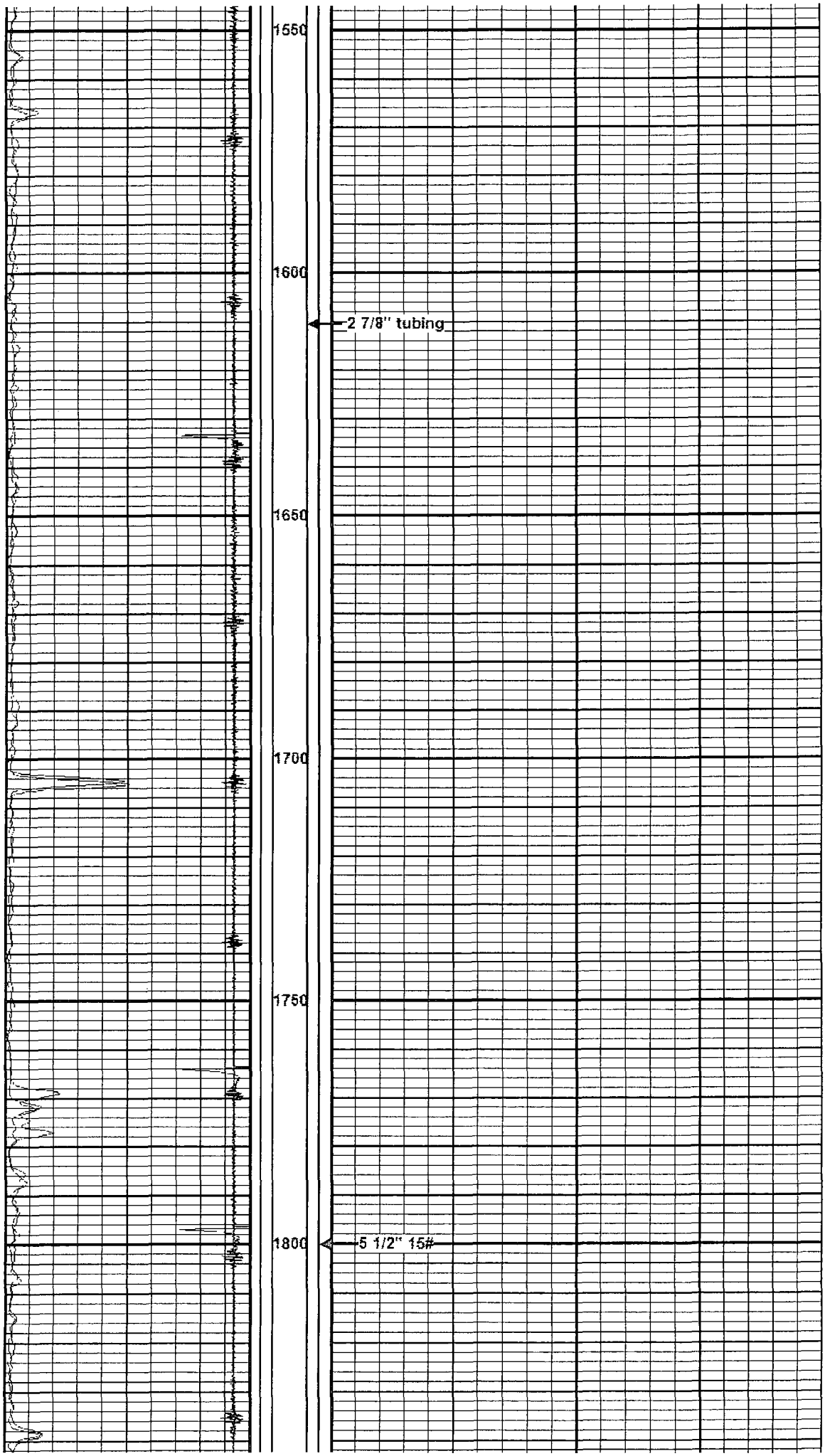
CCL1
CCL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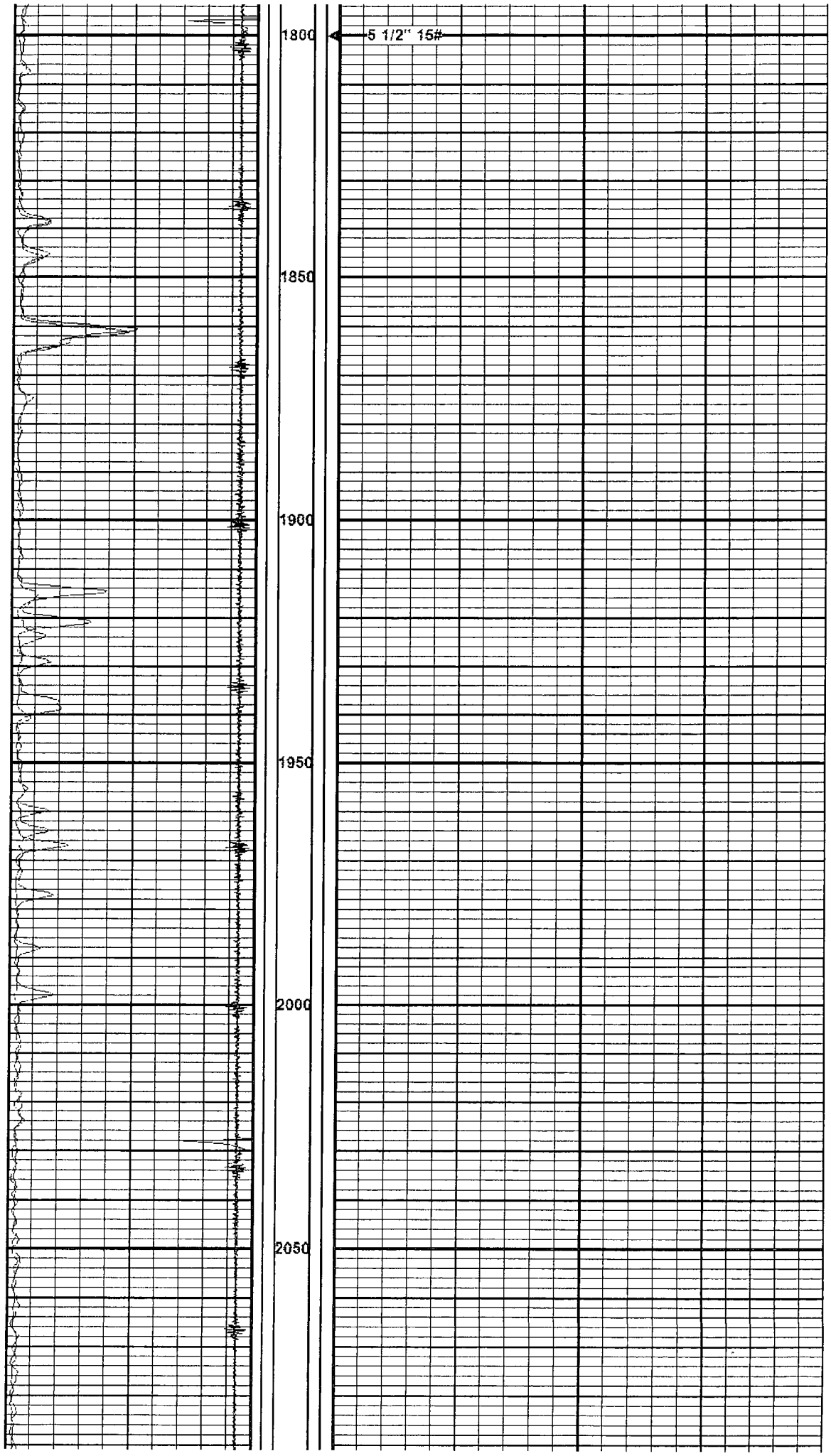
5 1/2" 15#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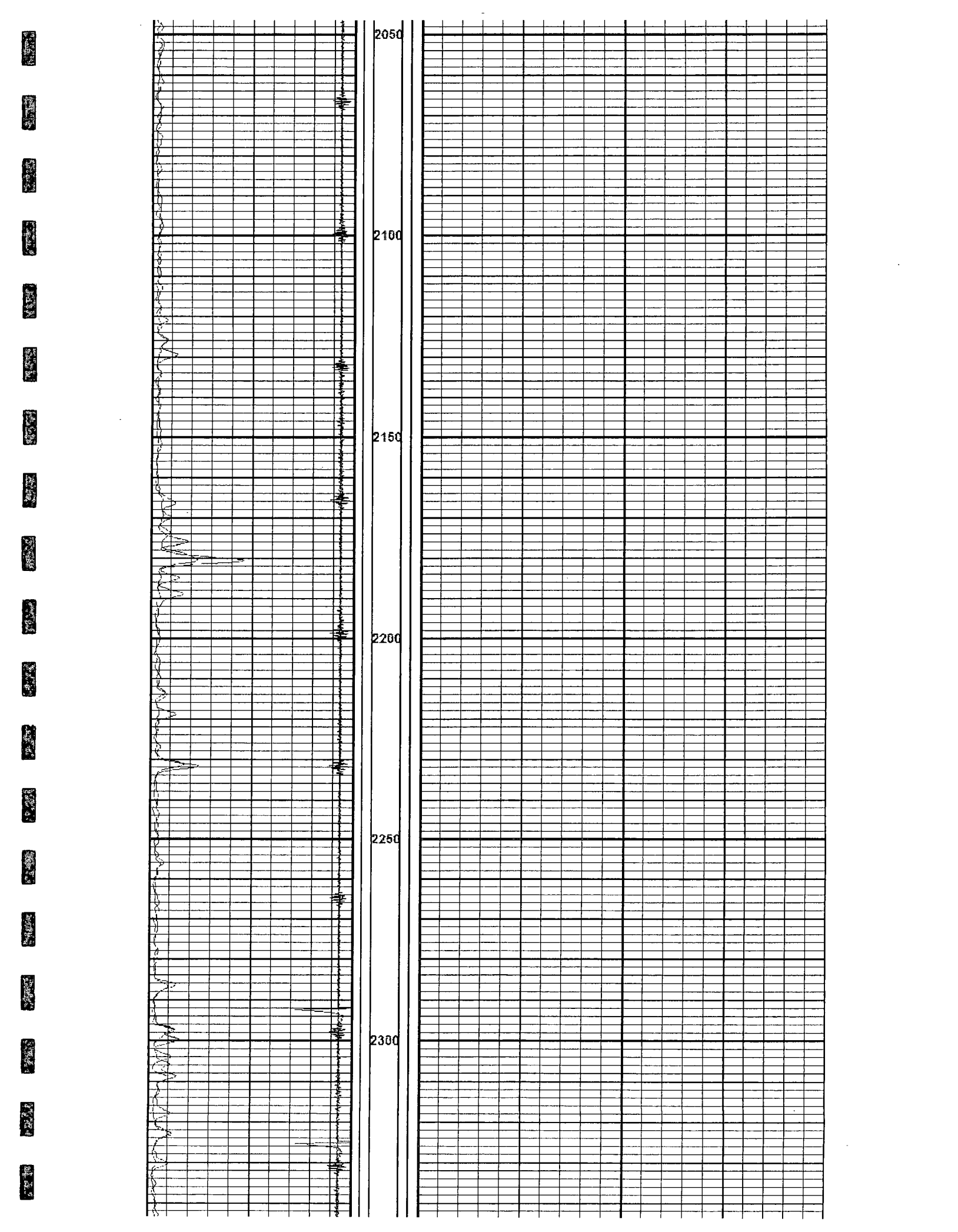
5 1/2" 15#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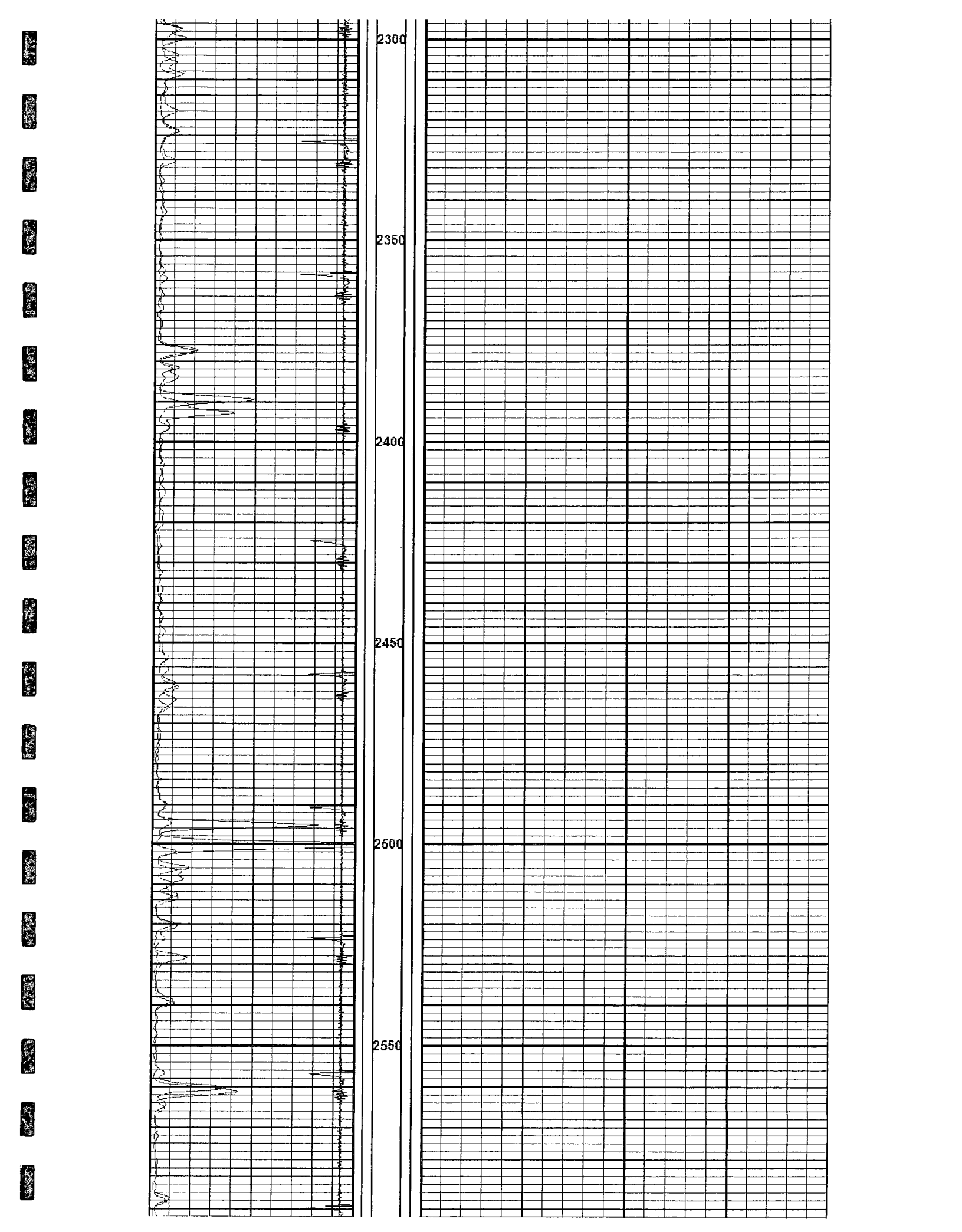
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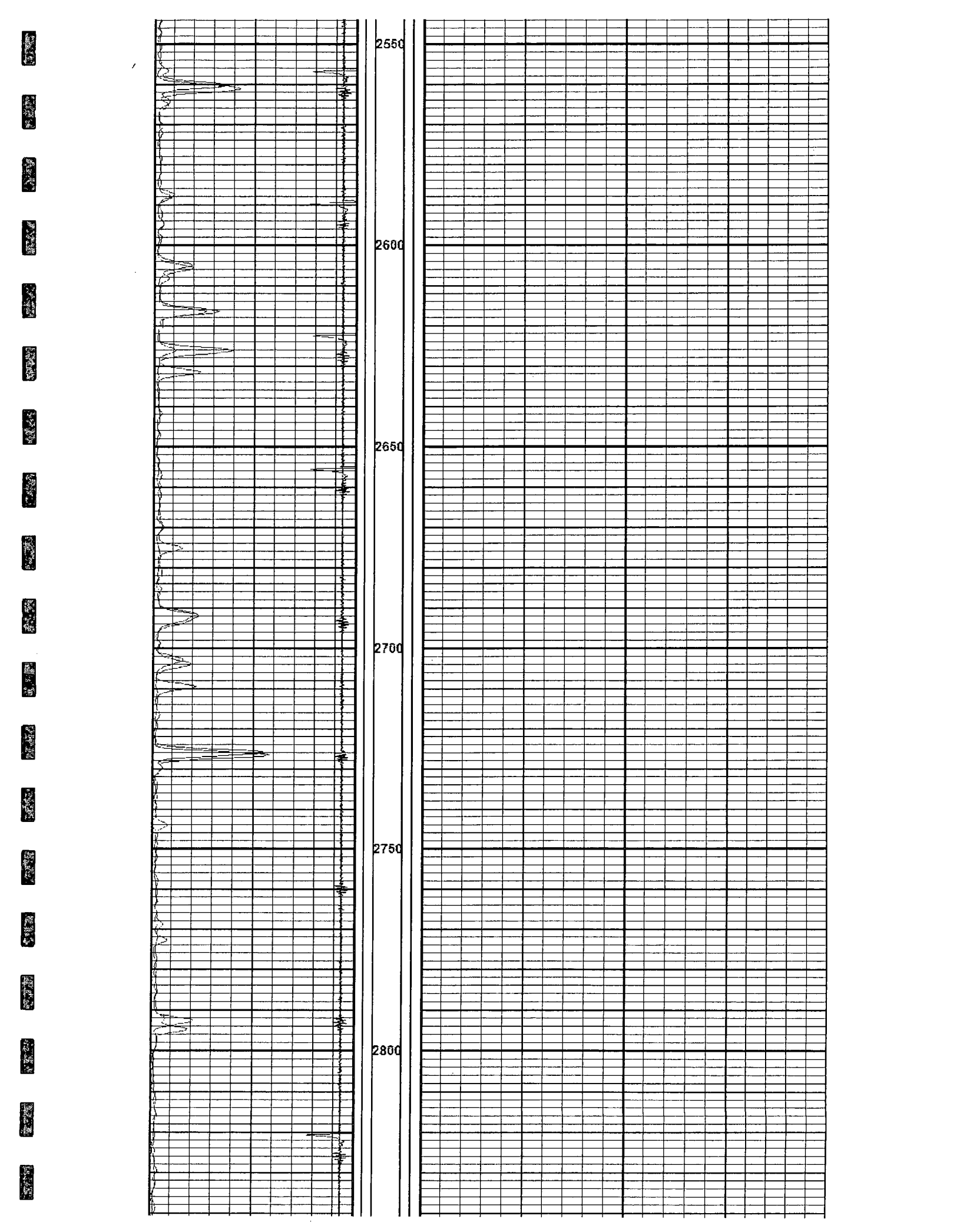
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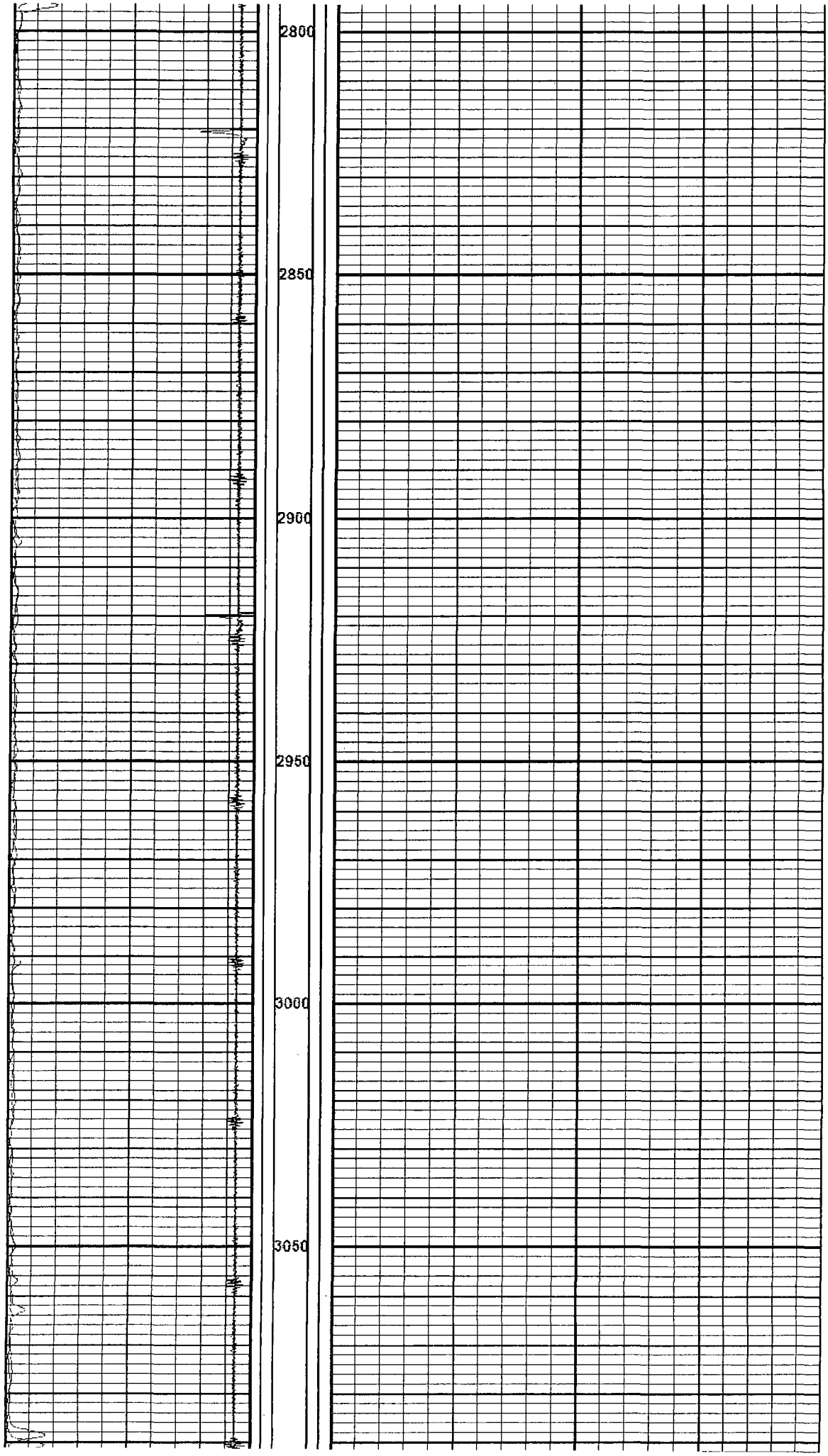
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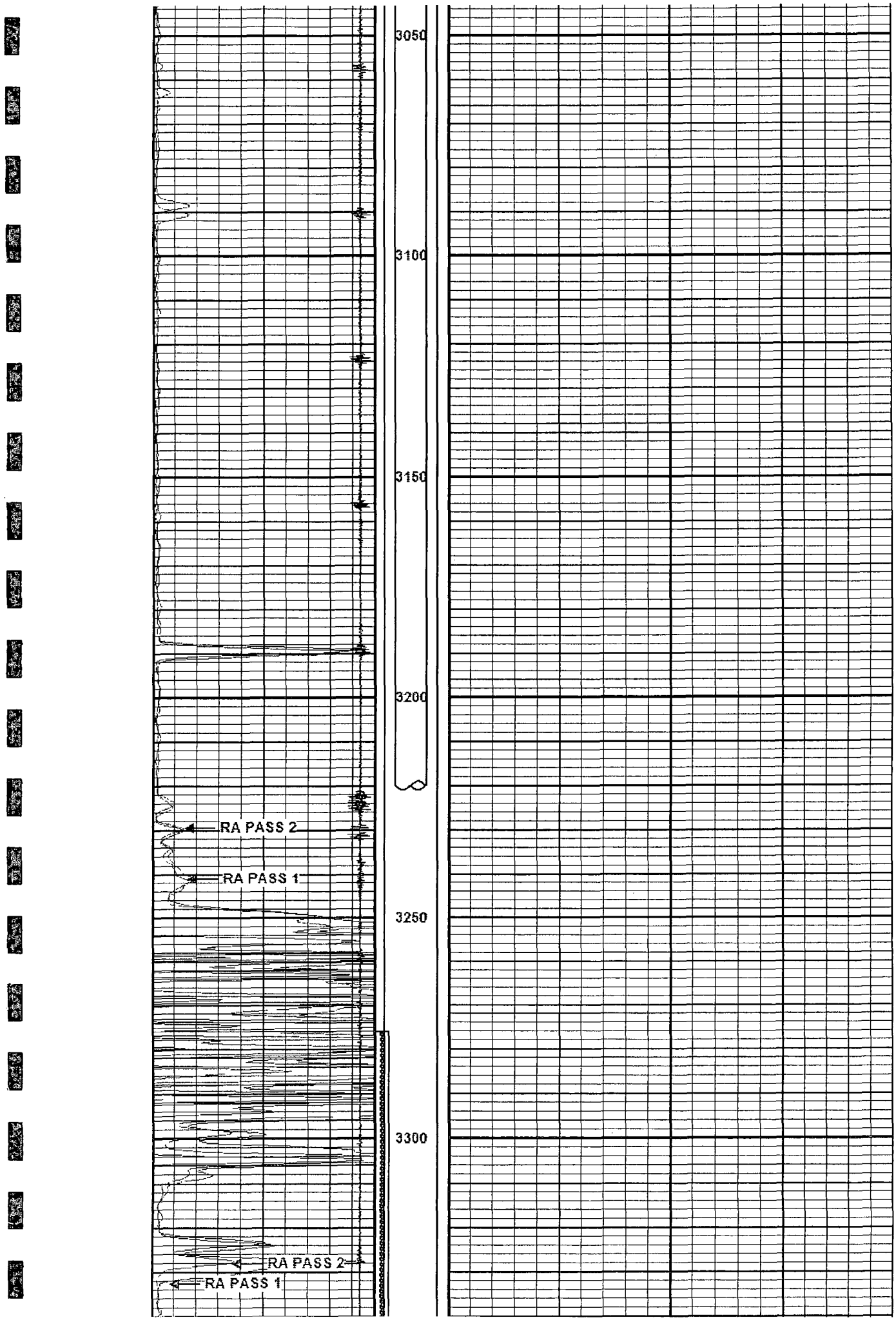
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RA PASS 1
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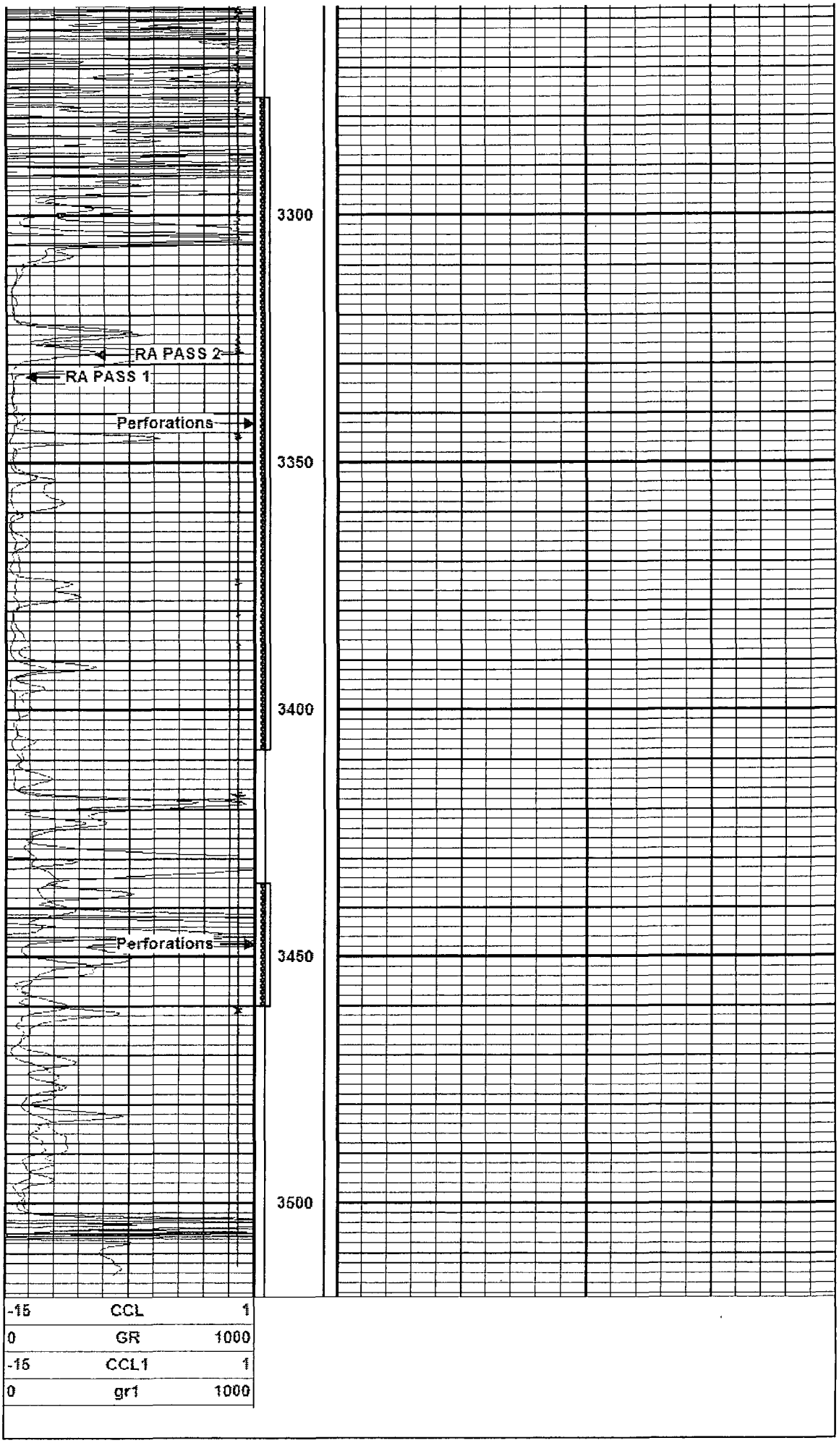
RA PASS 2
RA PASS 1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RA PASS 2
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Perforations
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Perforations
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APPENDIX I

Map Seq.	Miles to DW1	WELLNAME	#	APINO	Perf Top	Perf Bottom	Total Depth	P&A Date	ULSTR	OPERATOR	RESERVOIR	Status	Pen. Inj. Zone
1	0.00	DISPOSAL	1	30-045-29002	3276	3514	3514		I-27-29N-11W	WESTERN REFINING	MESAVERDE	INJ	Yes
2	0.11	DAVIS GAS COM F	1	30-045-07825	6157	6298	6298	19-Jan-94	I-27-29N-11W	BP AMERICA	DAKOTA	P&A	Yes
3	0.12	DAVIS GAS COM G	1	30-045-23554	2827	2839	2839		I-27-29N-11W	XTO ENERGY, INC	CHACRA	Shallow	No
4	0.15	DAVIS GAS COM F	1R	30-045-30833	5314	5646	6177		I-27-29N-11W	XTO ENERGY, INC	GALLUP	Deep	Yes
5	0.16	Davis Pooled Unit	1	30-045-07812			1717	18-Oct-82	I-27-29N-11W	Pre-Ongard	PICTURED CLIFFS	P&A	No
6	0.18	JACQUE	1	30-045-34463	1543	1714	1714		I-27-29N-11W	HOLCOMB O&G	FRUITLAND COAL	CBM	No
7	0.23	JACQUE	2	30-045-34409	1483	1689	1689		H-27-29N-11W	HOLCOMB O&G	FRUITLAND COAL	CBM	No
8	0.23	Davis PU/FB Umbarger	2	30-045-07883			1800	18-Aug-55	H-27-29N-11W	Pre-Ongard		P&A	No
9	0.24	DAVIS GAS COM F	1E	30-045-24084	2701	2810	6262		H-27-29N-11W	XTO ENERGY, INC	CHACRA	Shallow	Yes
10	0.41	CONGRESS	18	30-045-25673	1680	1770	5808		K-27-29N-11W	Burlington	PICTURED CLIFFS	Shallow	Yes
11	0.49	LAUREN KELLY	1	30-045-27361	1326	1354	1354		F-27-29N-11W	MANANA GAS INC	FRUITLAND SAND	Shallow	No
12	0.49	MANGUM	1E	30-045-24673	6024	6160	6160		F-27-29N-11W	Burlington	DAKOTA	Deep	Yes
13	0.51	CALVIN	1	30-045-12003	6176	6348	6348		M-26-29N-11W	Burlington	DAKOTA	Deep	Yes
14	0.52	MARIAN S	1	30-045-27365	2578	2710	2710		F-27-29N-11W	MANANA GAS INC	CHACRA	Shallow	No
15	0.55	MANGUM	1	30-045-07835	1388	1661	6214		L-27-29N-11W	Burlington	FRUITLAND COAL	CBM	Yes
16	0.56	Black Diamond	1	30-045-07896			800	09-Nov-78	C-27-29N-11W	Pre-Ongard		P&A	No
17	0.57	DAVIS GAS COM J	1	30-045-25329	1462	1645	4030		F-26-29N-11W	HOLCOMB O&G	FRUITLAND COAL	CBM	Yes
18	0.58	SULLIVAN GAS COM D	1E	30-045-24083	6086	6242	6242		F-26-29N-11W	XTO ENERGY, INC	DAKOTA	Deep	Yes
19	0.60	CONGRESS	16	30-045-25657	6086	6148	6148		A-34-29N-11W	Burlington	GALLUP	Deep	Yes
20	0.64	CALVIN	100	30-045-31118	1468	1760	1760		N-26-29N-11W	Burlington	FRUITLAND COAL	CBM	No
21	0.64	SUMMIT	9	30-045-24574	2747	2857	2857		A-34-29N-11W	Burlington	CHACRA	Shallow	No
22	0.64	CONGRESS	9	30-045-24572	2746	2869	2869		N-26-29N-11W	ENERGEN	CHACRA	Shallow	No
23	0.64	Garland "B"	1	30-045-07903	1664	1747	1747	27-Jun-75	M-27-29N-11W	Pre-Ongard	PICTURED CLIFFS	P&A	No
24	0.65	SUMMIT	15	30-045-25707	5326	5970	5970		C-34-29N-11W	ENERGEN	GALLUP	Deep	Yes

Map Seq.	Miles to DW1	WELLNAME	#	APINO	Perf Top	Perf Bottom	Total Depth	P&A Date	ULSTR	OPERATOR	RESERVOIR	Status	Pen. Inj. Zone
25	0.65	GARLAND	3	30-045-24573	2668	2790	2790		M-27-29N-11W	ENERGEN	CHACRA	Shallow	No
26	0.67	CALVIN	3	30-045-25612	5295	5870	5870		K-26-29N-11W	Burlington	GALLUP	Deep	Yes
27	0.68	GARLAND B	1R	30-045-21732	1648	1678	1678		M-27-29N-11W	Burlington	PICTURED CLIFFS	Shallow	No
28	0.70	NANCY HARTMAN	2	30-045-26721	2627	2754	2754		P-22-29N-11W	MANANA GAS INC	CHACRA	Shallow	No
29	0.71	GRACE PEARCE	1	30-045-07959	1380	1466	1466	02-Mar-00	O-22-29N-11W	JOHN C PICKETT	FRUITLAND SAND	P&A	No
30	0.72	HARTMAN	1	30-045-07961	6072	6274	6274	14-Jun-99	P-22-29N-11W	MANANA GAS INC	DAKOTA	P&A	Yes
31	0.73	Davis	1	30-045-07776			1917	11-Nov-58	M-26-29N-11W	Pre-Ongard	(N/A)	P&A	No
32	0.75	MARY JANE	1	30-045-26731	2622	2732	2732		N-22-29N-11W	MANANA GAS INC	CHACRA	Shallow	No
33	0.76	ROYAL FLUSH	1	30-045-34312	1440	1608	1608		N-22-29N-11W	MANANA GAS INC	FRUITLAND COAL	CBM	No
34	0.79	COOK	1	30-045-07940	6052	6226	6226		N-22-29N-11W	MANANA GAS INC	DAKOTA	Deep	Yes
35	0.79	COOK	2	30-045-13089	1390	1410	1410		N-22-29N-11W	MANANA GAS INC	FRUITLAND SAND	Shallow	No
36	0.82	SHELLY	2	30-045-20755	1726	1736	1736		G-34-29N-11W	CHAPARRAL O&G	PICTURED CLIFFS	Shallow	No
37	0.82	HARE	3	30-545-02123			2335		M-23-29N-11W	Pre-Ongard	FARMINGTON	DRY	No
38	0.84	CALVIN	1F	30-045-33093	6172	6430	6430		J-26-29N-11W	Burlington	DAKOTA	Deep	Yes
39	0.85	SULLIVAN GAS COM D	1	30-045-07733	6047	6160	6160		B-26-29N-11W	XTO ENERGY, INC	DAKOTA	Deep	Yes
40	0.85	ELLEDGE FEDERAL 34	11	30-045-24834	1060	1064	1525		D-34-29N-11W	MCELVAIN O&G	FARMINGTON,NORTH	Shallow	No
41	0.89	CONGRESS	7E	30-045-24835	6202	6347	6347		F-34-29N-11W	Burlington	DAKOTA	Deep	Yes
42	0.90	HARE	4	30-545-02124			2015		O-23-29N-11W	Pre-Ongard	FARMINGTON	DRY	No
43	0.90	CONGRESS	4E	30-045-24837	2784	2906	6328		E-35-29N-11W	Burlington	CHACRA	Shallow	Yes
44	0.90	CONGRESS	15	30-045-25675	5369	5943	5943		C-35-29N-11W	Burlington	GALLUP	Deep	Yes
45	0.90	ASHCROFT SWD	1	30-045-30788	6952	7070	7382		B-26-29N-11W	XTO ENERGY, INC	MORRISON BLUFF EN	INJ	Yes
46	0.90	LEA ANN	1	30-045-20752	1776	1790	1790	18-Dec-99	E-35-29N-11W	CHAPARRAL O&G	PICTURED CLIFFS	P&A	No
47	0.94	CONGRESS	5	30-045-07672	6171	6340	6340		G-34-29N-11W	Burlington	DAKOTA	Deep	Yes
48	0.94	Viles EE	1	30-045-07751			870		P-28-29N-11W	Pre-Ongard		DRY	No

Map Seq.	Miles to DW1	WELLNAME	#	APINO	Perf Top	Perf Bottom	Total Depth	P&A Date	ULSTR	OPERATOR	RESERVOIR	Status	Pen. Inj. Zone
49	0.95	Sullivan	1X	30-045-29107			900	23-Jun-55	G-26-29N-11W	Pre-Ongard	PICTURED CLIFFS	P&A	No
50	0.97	Madsen Selby Pooled Unit	2	30-045-07895			1600	05-May-78	A-28-29N-11W	Pre-Ongard	PICTURED CLIFFS	P&A	No
51	0.97	Masden-Selby	3	30-045-07762			600	05-Jun-78	A-28-29N-11W	Pre-Ongard		P&A	No
52	0.97	MASDEN GAS COM	1	30-045-07894	6023	6125	6125		A-28-29N-11W	XTO ENERGY, INC	DAKOTA	Deep	Yes
53	0.97	Sullivan	1	30-045-07870			1420	31-Aug-53	G-26-29N-11W	Pre-Ongard	PICTURED CLIFFS	P&A	No
54	0.98	CONGRESS	1	30-045-07674			PC	30-Oct-53	J-34-29N-11W	Pre-Ongard	PICTURED CLIFFS	P&A	No
55	0.98	EARL B SULLIVAN	1	30-045-23163	2750	2761	2761		B-26-29N-11W	XTO ENERGY, INC	CHACRA	Shallow	No
56	0.99	STATE GAS COM BS	1	30-045-23550	1470	1648	2761		K-23-29N-11W	HOLCOMB O&G	FRUITLAND COAL	CBM	No
57	0.99	PEARCE GAS COM	1	30-045-07985	6154	6182	6182	10-Mar-97	K-23-29N-11W	BP AMERICA	DAKOTA	P&A	Yes
58	0.99	CHAPARRAL	1	30-045-20609	1712	1731	1731		E-34-29N-11W	CHAPARRAL O&G	PICTURED CLIFFS	Shallow	No
59	0.99	CONGRESS	2	30-545-02151			Frtlnd		-34-29N-11W	Pre-Ongard	FRUITLAND SAND	DRY	No

Status	Total Wells	Pen Inj. Zone	
		Yes	No
P&A	15	3	12
Dry	4	0	4
INJ	2	2	0
CBM	7	2	5
Shallow	17	3	14
Deep	14	14	0
Total	59	24	35

APPENDIX J

HISTORICAL INJECTION DATA
WESTERN REFINING DISPOSAL WELL 1

Date	Cal. Days	Up Hours (hrs)	Cumulative Up (hrs)	Cumulative Calendar Days	Average Injection Pressure (psig)	Average Rate (gpm)	Total Injected Volume (gal)	Cumulative Injected Volume (gal)	Cumulative Injected Volume (bbls)	Total Flow Up Hours Rate	Total Flow Calendar Day Rate	BWPD (up hours rate)
Jan-95	31	0	-	-	-	-	-	-	0		0.0	-
Feb-95	28	600	600	25	706	79.0	2,291,200	2,291,200	54,552	63.6	56.8	2,182
Mar-95	31	716	1,316	56	870	128.0	4,383,100	6,674,300	158,912	102.0	98.2	3,498
Apr-95	30	51	1,367	86	807	110.0	289,400	6,963,700	165,802	94.6	6.7	3,243
May-95	31	531	1,898	117	870	134.0	3,619,800	10,583,500	251,988	113.6	81.1	3,895
Jun-95	30	519	2,417	147	869	134.0	3,707,300	14,290,800	340,257	119.1	85.8	4,082
Jul-95	31	708	3,125	178	860	115.0	3,959,000	18,249,800	434,519	93.2	88.7	3,195
Aug-95	31	144	3,269	209	807	92.0	633,100	18,882,900	449,593	73.3	14.2	2,512
Sep-95	30	0	3,269	239	650		-	18,882,900	449,593		0.0	-
Oct-95	31	0	3,269	270	650		-	18,882,900	449,593		0.0	-
Nov-95	30	300	3,569	300	735	97.0	1,271,600	20,154,500	479,869	70.6	29.4	2,422
Dec-95	31	576	4,145	331	811	105.0	2,478,000	22,632,500	538,869	71.7	55.5	2,458
Jan-96	31	216	4,361	362	886	108.8	2,784,200	25,416,700	605,160	214.8	62.4	7,366
Feb-96	29	624	4,985	391	915	116.8	3,908,900	29,325,600	698,229	104.4	93.6	3,580
Mar-96	31	716	5,701	422	976	150.4	4,329,400	33,655,000	801,310	100.8	97.0	3,455
Apr-96	30	510	6,211	452	955	127.0	4,464,100	38,119,100	907,598	145.9	103.3	5,002
May-96	31	531	6,742	483	952	108.6	4,535,554	42,654,654	1,015,587	142.4	101.6	4,881
Jun-96	30	519	7,261	513	952	127.0	5,089,759	47,744,413	1,136,772	163.4	117.8	5,604
Jul-96	31	708	7,969	544	950	137.8	440,000	48,184,413	1,147,248	10.4	9.9	355
Aug-96	31	144	8,113	575	983	144.4	1,393,200	49,577,613	1,180,419	161.3	31.2	5,529
Sep-96	30	0	8,113	605	1,014	153.7	6,464,622	56,042,235	1,334,339		149.6	-
Oct-96	31	0	8,113	636	1,049	156.0	3,418,100	59,460,335	1,415,722		76.6	-
Nov-96	30	300	8,413	666	966	108.3	3,899,160	63,359,495	1,508,559	216.6	90.3	7,427
Dec-96	31	576	8,989	697	963	115.8	27,310	63,386,805	1,509,210	0.8	0.6	27
Jan-97	31	264	9,253	728	950	145.2	2,137,100	65,523,905	1,560,093	134.9	47.9	4,626
Feb-97	28	672	9,925	756	981	144.2	4,770,100	70,294,005	1,673,667	118.3	118.3	4,056
Mar-97	31	644	10,569	787	989	143.8	4,634,300	74,928,305	1,784,007	119.9	103.8	4,112
Apr-97	30	600	11,169	817	986	127.4	3,686,500	78,614,805	1,871,781	102.4	85.3	3,511
May-97	31	744	11,913	848	973	137.1	4,970,600	83,585,405	1,990,129	111.3	111.3	3,818
Jun-97	30	720	12,633	878	980	148.2	4,496,900	88,082,305	2,097,198	104.1	104.1	3,569
Jul-97	31	744	13,377	909	975	149.3	5,621,500	93,703,805	2,231,043	125.9	125.9	4,318
Aug-97	31	740	14,117	940	967	139.0	4,984,700	98,688,505	2,349,726	112.3	111.7	3,849

HISTORICAL INJECTION DATA
WESTERN REFINING DISPOSAL WELL 1

Date	Cal. Days	Up Hours (hrs)	Cumulative Up (hrs)	Cumulative Calendar Days	Average Injection Pressure (psig)	Average Rate (gpm)	Total Injected Volume (gal)	Cumulative Injected Volume (gal)	Cumulative Injected Volume (bbls)	Total Flow Up Hours Rate	Total Flow Calendar Day Rate	BWPD (up hours rate)
Sep-97	30	720	14,837	970	988	119.9	3,987,800	102,676,305	2,444,674	92.3	92.3	3,165
Oct-97	31	588	15,425	1,001	995	137.6	3,860,500	106,536,805	2,536,591	109.4	86.5	3,752
Nov-97	30	566	15,991	1,031	985	142.0	3,929,300	110,466,105	2,630,145	115.7	91.0	3,967
Dec-97	31	739	16,730	1,062	988	136.3	4,756,200	115,222,305	2,743,388	107.3	106.5	3,678
Jan-98	31	672	17,402	1,093	981	135.2	3,744,600	118,966,905	2,832,545	92.9	83.9	3,184
Feb-98	28	672	18,074	1,121	995	133.3	4,318,400	123,285,305	2,935,364	107.1	107.1	3,672
Mar-98	31	744	18,818	1,152	989	112.8	4,187,300	127,472,605	3,035,062	93.8	93.8	3,216
Apr-98	30	720	19,538	1,182	988	126.2	4,395,000	131,867,605	3,139,705	101.7	101.7	3,488
May-98	31	740	20,278	1,213	930	105.2	3,861,700	135,729,305	3,231,650	87.0	86.5	2,982
Jun-98	30	712	20,990	1,243	807	58.0	1,991,000	137,720,305	3,279,055	46.6	46.1	1,598
Jul-98	31	730	21,720	1,274	841	64.5	549,300	138,269,605	3,292,133	12.5	12.3	430
Aug-98	31	742	22,462	1,305	979	120.2	4,388,000	142,657,605	3,396,610	98.6	98.3	3,379
Sep-98	30	720	23,182	1,335	828	65.7	2,018,700	144,676,305	3,444,674	46.7	46.7	1,602
Oct-98	31	144	23,326	1,366	1,023	137.3	877,400	145,553,705	3,465,564	101.6	19.7	3,482
Nov-98	30	0	23,326	1,396	830		-	145,553,705	3,465,564		0.0	-
Dec-98	31	504	23,830	1,427	963	140.6	3,001,300	148,555,005	3,537,024	99.2	67.2	3,403
Jan-99	31	708	24,538	1,458	989	118.7	3,648,700	152,203,705	3,623,898	85.9	81.7	2,945
Feb-99	28	648	25,186	1,486	990	116.7	4,705,344	156,909,049	3,735,930	121.0	116.7	4,149
Mar-99	31	636	25,822	1,517	1,040	133.5	4,168,800	161,077,849	3,835,187	109.2	93.4	3,746
Apr-99	30	604	26,426	1,547	981	109.9	3,097,300	164,175,149	3,908,932	85.5	71.7	2,930
May-99	31	504	26,930	1,578	970	116.3	2,568,000	166,743,149	3,970,075	84.9	57.5	2,912
Jun-99	30	576	27,506	1,608	938	103.6	2,691,900	169,435,049	4,034,168	77.9	62.3	2,671
Jul-99	31	696	28,202	1,639	1,010	121.7	4,169,900	173,604,949	4,133,451	99.9	93.4	3,424
Aug-99	31	744	28,946	1,670	1,010	127.0	4,659,300	178,264,249	4,244,387	104.4	104.4	3,579
Sep-99	30	660	29,606	1,700	983	123.7	3,159,700	181,423,949	4,319,618	79.8	73.1	2,736
Oct-99	31	636	30,242	1,731	978	121.0	3,659,900	185,083,849	4,406,758	95.9	82.0	3,288
Nov-99	30	720	30,962	1,761	1,041	127.0	4,474,000	189,557,849	4,513,282	103.6	103.6	3,551
Dec-99	31	696	31,658	1,792	1,011	121.0	3,911,100	193,468,949	4,606,404	93.7	87.6	3,211
Jan-00	31	696	32,354	1,823	995	120.0	4,000,100	197,469,049	4,701,644	95.8	89.6	3,284
Feb-00	29	696	33,050	1,852	979	116.9	4,055,700	201,524,749	4,798,208	97.1	97.1	3,330
Mar-00	31	576	33,626	1,883	845	117.0	3,838,400	205,363,149	4,889,599	111.1	86.0	3,808
Apr-00	30	720	34,346	1,913	970	114.0	3,285,000	208,648,149	4,967,813	76.0	76.0	2,607

HISTORICAL INJECTION DATA
WESTERN REFINING DISPOSAL WELL 1

Date	Cal. Days	Up Hours (hrs)	Cumulative Up (hrs)	Cumulative Calendar Days	Average Injection Pressure (psig)	Average Rate (gpm)	Total Injected Volume (gal)	Cumulative Injected Volume (gal)	Cumulative Injected Volume (bbls)	Total Flow Up Hours Rate	Total Flow Calendar Day Rate	BWPD (up hours rate)
May-00	31	740	35,086	1,944	840	78.0	2,932,000	211,580,149	5,037,623	66.0	65.7	2,264
Jun-00	30	0	35,086	1,974	800		-	211,580,149	5,037,623		0.0	-
Jul-00	31	336	35,422	2,005	998	115.0	2,332,000	213,912,149	5,093,146	115.7	52.2	3,966
Aug-00	31	480	35,902	2,036	991	99.0	2,332,000	216,244,149	5,148,670	81.0	52.2	2,776
Sep-00	30	0	35,902	2,066	850		-	216,244,149	5,148,670		0.0	-
Oct-00	31	0	35,902	2,097	850		-	216,244,149	5,148,670		0.0	-
Nov-00	30	686	36,588	2,127	1,008	111.0	2,573,000	218,817,149	5,209,932	62.5	59.6	2,143
Dec-00	31	744	37,332	2,158	956	93.0	2,681,000	221,498,149	5,273,765	60.1	60.1	2,059
Jan-01	31	614	37,946	2,189	935	95.0	2,840,000	224,338,149	5,341,385	77.1	63.6	2,643
Feb-01	28	528	38,474	2,217	797	61.0	2,758,000	227,096,149	5,407,051	87.1	68.4	2,985
Mar-01	31	720	39,194	2,248	972	93.0	2,947,000	230,043,149	5,477,218	68.2	66.0	2,339
Apr-01	30	672	39,866	2,278	914	80.0	3,456,000	233,499,149	5,559,504	85.7	80.0	2,939
May-01	31	708	40,574	2,309	940	70.0	2,451,000	235,950,149	5,617,861	57.7	54.9	1,978
Jun-01	30	0	40,574	2,339	850		-	235,950,149	5,617,861		0.0	-
Jul-01	31	0	40,574	2,370	850		-	235,950,149	5,617,861		0.0	-
Aug-01	31	432	41,006	2,401	951	91.5	2,347,000	238,297,149	5,673,742	90.5	52.6	3,104
Sep-01	30	720	41,726	2,431	845	77.0	2,745,000	241,042,149	5,739,099	63.5	63.5	2,179
Oct-01	31	24	41,750	2,462	906	70.0	100,800	241,142,949	5,741,499	70.0	2.3	2,400
Nov-01	30	528	42,278	2,492	934	116.0	3,137,000	244,279,949	5,816,189	99.0	72.6	3,395
Dec-01	31	384	42,662	2,523	934	116.0	3,235,000	247,514,949	5,893,213	140.4	72.5	4,814
Jan-02	31	496	43,158	2,554	956	119.0	3,095,000	250,609,949	5,966,904	104.0	69.3	3,566
Feb-02	28	600	43,758	2,582	1,046	91.0	2,734,000	253,343,949	6,031,999	75.9	67.8	2,604
Mar-02	31	724.5	44,483	2,613	1,014	97.0	3,479,000	256,822,949	6,114,832	80.0	77.9	2,744
Apr-02	30	672	45,155	2,643	974	95.0	3,060,000	259,882,949	6,187,689	75.9	70.8	2,602
May-02	31	729	45,884	2,674	902	92.0	3,185,000	263,067,949	6,263,523	72.8	71.3	2,497
Jun-02	30	216	46,100	2,704	833	41.0	744,000	263,811,949	6,281,237	57.4	17.2	1,968
Jul-02	31	336	46,436	2,735	981	93.0	1,730,400	265,542,349	6,322,437	85.8	38.8	2,943
Aug-02	31	740	47,176	2,766	934	77.0	3,384,200	268,926,549	6,403,013	76.2	75.8	2,613
Sep-02	30	720	47,896	2,796	995	97.0	4,152,800	273,079,349	6,501,889	96.1	96.1	3,296
Oct-02	31	744	48,640	2,827	963	93.0	3,974,100	277,053,449	6,596,511	89.0	89.0	3,052
Nov-02	30	600	49,240	2,857	986	88.0	3,116,900	280,170,349	6,670,723	86.6	72.2	2,968
Dec-02	31	648	49,888	2,888	1,013	93.0	3,493,800	283,664,149	6,753,908	89.9	78.3	3,081

HISTORICAL INJECTION DATA
WESTERN REFINING DISPOSAL WELL 1

Date	Cal. Days	Up Hours (hrs)	Cumulative Up (hrs)	Cumulative Calendar Days	Average Injection Pressure (psig)	Average Rate (gpm)	Total Injected Volume (gal)	Cumulative Injected Volume (gal)	Cumulative Injected Volume (bbls)	Total Flow Up Hours Rate	Total Flow Calendar Day Rate	BWPD (up hours rate)
Jan-03	31	564	50,452	2,919	1,043	98.0	3,314,000	286,978,149	6,832,813	97.9	74.2	3,358
Feb-03	28	636	51,088	2,947	1,041	100.0	3,656,600	290,634,749	6,919,875	95.8	90.7	3,285
Mar-03	31	672	51,760	2,978	1,059	118.0	4,627,700	295,262,449	7,030,058	114.8	103.7	3,935
Apr-03	30	612	52,372	3,008	1,008	101.0	3,552,500	298,814,949	7,114,642	96.7	82.2	3,317
May-03	31	732	53,104	3,039	886	54.0	2,344,800	301,159,749	7,170,470	53.4	52.5	1,830
Jun-03	30	660	53,764	3,069	915	71.0	2,555,800	303,715,549	7,231,323	64.5	59.2	2,213
Jul-03	31	744	54,508	3,100	919	63.0	2,837,400	306,552,949	7,298,880	63.6	63.6	2,179
Aug-03	31	732	55,240	3,131	927	93.0	3,359,100	309,912,049	7,378,858	76.5	75.2	2,622
Sep-03	30	720	55,960	3,161	1,057	98.0	3,945,600	313,857,649	7,472,801	91.3	91.3	3,131
Oct-03	31	744	56,704	3,192	1,066	95.0	4,263,700	318,121,349	7,574,318	95.5	95.5	3,275
Nov-03	30	300	57,004	3,222	1,057	88.0	1,567,500	319,688,849	7,611,639	87.1	36.3	2,986
Dec-03	31	480	57,484	3,253	985	83.0	1,934,900	321,623,749	7,657,708	67.2	43.3	2,303
Jan-04	31	360	57,844	3,284	1,004	84.0	1,736,800	323,360,549	7,699,061	80.4	38.9	2,757
Feb-04	29	576	58,420	3,313	1,099	112.0	3,670,200	327,030,749	7,786,446	106.2	87.9	3,641
Mar-04	31	744	59,164	3,344	1,088	107.0	4,965,300	331,996,049	7,904,668	111.2	111.2	3,814
Apr-04	30	720	59,884	3,374	1,054	111.0	4,105,200	336,101,249	8,002,411	95.0	95.0	3,258
May-04	31	720	60,604	3,405	972	83.0	3,487,900	339,589,149	8,085,456	80.7	78.1	2,768
Jun-04	30	720	61,324	3,435	990	86.0	3,018,500	342,607,649	8,157,325	69.9	69.9	2,396
Jul-04	31	720	62,044	3,466	962	66.0	2,767,000	345,374,649	8,223,206	64.1	62.0	2,196
Aug-04	31	737	62,781	3,497	978	70.0	3,013,600	348,388,249	8,294,958	68.2	67.5	2,337
Sep-04	30	720	63,501	3,527	1,035	87.0	3,601,000	351,989,249	8,380,696	83.4	83.4	2,858
Oct-04	31	744	64,245	3,558	1,018	77.0	2,619,700	354,608,949	8,443,070	58.7	58.7	2,012
Nov-04	30	696	64,941	3,588	987	75.0	3,160,100	357,769,049	8,518,311	75.7	73.2	2,594
Dec-04	31	648	65,589	3,619	1,038	86.0	3,895,400	361,664,449	8,611,058	100.2	87.3	3,435
Jan-05	31	660	66,249	3,650	1,077	119.0	4,227,600	365,892,049	8,711,715	106.8	94.7	3,660
Feb-05	28	672	66,921	3,678	1,092	119.0	4,021,920	369,913,969	8,807,475	99.8	99.8	3,420
Mar-05	31	744	67,665	3,709	1,110	119.0	4,856,832	374,770,801	8,923,114	108.8	108.8	3,730
Apr-05	30	720	68,385	3,739	1,114	116.5	3,221,778	377,992,579	8,999,823	74.6	74.6	2,557
May-05	31	744	69,129	3,770	1,088	87.0	3,865,048	381,857,627	9,091,848	86.6	86.6	2,969
Jun-05	30	648	69,777	3,800	1,050	70.0	2,871,217	384,728,844	9,160,211	73.8	66.5	2,532
Jul-05	31	720	70,497	3,831	1,080	73.0	3,002,368	387,731,212	9,231,696	69.5	67.3	2,383
Aug-05	31	732	71,229	3,862	1,113	79.0	3,412,387	391,143,599	9,312,943	77.7	76.4	2,664

HISTORICAL INJECTION DATA
WESTERN REFINING DISPOSAL WELL 1

Date	Cal. Days	Up Hours (hrs)	Cumulative Up (hrs)	Cumulative Calendar Days	Average Injection Pressure (psig)	Average Rate (gpm)	Total Injected Volume (gal)	Cumulative Injected Volume (gal)	Cumulative Injected Volume (bbls)	Total Flow Up Hours Rate	Total Flow Calendar Day Rate	BWPD (up hours rate)
Sep-05	30	720	71,949	3,892	1,057	71.0	3,092,418	394,236,017	9,386,572	71.6	71.6	2,454
Oct-05	31	744	72,693	3,923	1,109	73.0	3,255,525	397,491,542	9,464,084	72.9	72.9	2,500
Nov-05	30	720	73,413	3,953	1,115	75.0	3,254,356	400,745,898	9,541,569	75.3	75.3	2,583
Dec-05	31	744	74,157	3,984	1,108	76.0	3,221,690	403,967,588	9,618,276	72.2	72.2	2,474
Jan-06	31	744	74,901	4,015	1,124	73.0	3,263,599	407,231,187	9,695,981	73.1	73.1	2,507
Feb-06	28	648	75,549	4,043	1,094	69.0	2,662,296	409,893,483	9,759,369	68.5	66.0	2,348
Mar-06	31	396	75,945	4,074	1,097	73.0	1,867,571	411,761,054	9,803,835	78.6	41.8	2,695
Apr-06	30	696	76,641	4,104	1,133	92.0	3,816,473	415,577,527	9,894,703	91.4	88.3	3,133
May-06	31	744	77,385	4,135	1,138	102.0	4,590,501	420,168,028	10,004,001	102.8	102.8	3,526
Jun-06	30	720	78,105	4,165	1,108	92.0	4,107,489	424,275,517	10,101,798	95.1	95.1	3,260
Jul-06	31	540	78,645	4,196	1,074	81.0	2,713,597	426,989,114	10,166,407	83.8	60.8	2,872
Aug-06	31	720	79,365	4,227	1,087	83.0	3,594,140	430,583,254	10,251,982	83.2	80.5	2,852
Sep-06	30	720	80,085	4,257	1,054	82.0	3,726,744	434,309,998	10,340,714	86.3	86.3	2,958
Oct-06	31	744	80,829	4,288	1,086	84.0	3,759,617	438,069,615	10,430,229	84.2	84.2	2,888
Nov-06	30	720	81,549	4,318	1,123	90.0	3,904,557	441,974,172	10,523,195	90.4	90.4	3,099
Dec-06	31	744	82,293	4,349	1,098	75.0	3,695,694	445,669,866	10,611,187	82.8	82.8	2,838
Jan-07	31	648	82,941	4,380	1,118	96.0	4,223,734	449,893,600	10,711,752	108.6	94.6	3,725
Feb-07	28	587	83,528	4,408	1,115	85.0	3,905,540	453,799,140	10,804,741	110.9	96.9	3,802
Mar-07	31	655	84,183	4,439	1,122	89.0	3,669,923	457,469,063	10,892,121	93.4	82.2	3,202
Apr-07	30	633	84,816	4,469	1,115	87.0	3,894,183	461,363,246	10,984,839	102.5	90.1	3,515
May-07	31	636	85,452	4,500	1,120	108.0	4,415,935	465,779,181	11,089,981	115.7	98.9	3,968
Jun-07	30	644	86,096	4,530	1,060	76.0	2,441,856	468,221,037	11,148,120	63.2	56.5	2,167
Jul-07	31	681	86,777	4,561	1,039	63.0	1,761,505	469,982,542	11,190,061	43.1	39.5	1,478
Aug-07	31	664	87,441	4,592	1,112	80.0	3,727,340	473,709,882	11,278,807	93.6	83.5	3,208
Sep-07	30	603	88,044	4,622	1,117	117.0	2,068,151	475,778,033	11,328,048	57.2	47.9	1,960
Oct-07	31	638	88,682	4,653	1,100	106.0	5,042,722	480,820,755	11,448,113	131.7	113.0	4,517
Nov-07	30	631	89,313	4,683	1,051	89.0	3,819,870	484,640,625	11,539,063	100.9	88.4	3,459
Dec-07	31	651	89,964	4,714	1,028	93.0	4,150,817	488,791,442	11,637,891	106.3	93.0	3,643
Jan-08	31	636	90,600	4,745	1,109	108.0	4,377,000	493,168,442	11,742,106	114.7	98.1	3,933
Feb-08	29	589	91,189	4,774	1,113	107.0	4,624,287	497,792,729	11,852,208	130.9	110.7	4,486
Mar-08	31	631	91,820	4,805	1,107	113.0	4,798,825	502,591,554	11,966,466	126.8	107.5	4,346
Apr-08	30	623	92,443	4,835	1,116	97.0	4,016,645	506,608,199	12,062,100	107.5	93.0	3,684

HISTORICAL INJECTION DATA
WESTERN REFINING DISPOSAL WELL 1

Date	Cal. Days	Up Hours (hrs)	Cumulative Up (hrs)	Cumulative Calendar Days	Average Injection Pressure (psig)	Average Rate (gpm)	Total Injected Volume (gal)	Cumulative Injected Volume (gal)	Cumulative Injected Volume (bbls)	Total Flow Up Hours Rate	Total Flow Calendar Day Rate	BWPD (up hours rate)
May-08	31	656	93,099	4,866	1,112	88.0	4,112,945	510,721,144	12,160,027	104.5	92.1	3,583
Jun-08	30	649	93,748	4,896	1,095	71.0	2,852,563	513,573,707	12,227,945	73.3	66.0	2,512
Jul-08	31	679	94,427	4,927	1,079	65.0	1,951,163	515,524,870	12,274,402	47.9	43.7	1,642
Aug-08	24	679	95,106	4,951	1,109	65.0	1,306,016	516,830,886	12,305,497	32.1	37.8	1,099
Sep-08	30	684	95,790	4,988	1,100	73.0	1,535,180	518,366,066	12,342,049	37.4	35.5	1,283
Oct-08	31	744	96,534	5,019	1,116	84.0	3,642,625	522,008,691	12,428,778	81.6	81.6	2,798
Nov-08	30	720	97,254	5,049	1,087	74.0	3,138,673	525,147,364	12,503,509	72.7	72.7	2,491
Dec-08	31	624	97,878	5,080	1,029	62.0	2,317,162	527,464,526	12,558,679	61.9	51.9	2,122
Jan-09	31	744	98,622	5,111	1,111	81.0	3,571,904	531,036,430	12,643,725	80.0	80.0	2,743
Feb-09	28	672	99,294	5,139	1,119	71.0	3,221,260	534,257,690	12,720,421	79.9	79.9	2,739
Mar-09	31	744	100,038	5,170	1,108	67.0	2,984,184	537,241,874	12,791,473	66.9	66.9	2,292
Apr-09	30	684	100,758	5,200	1,117	62.0	2,534,774	539,776,648	12,851,825	61.8	58.7	2,118
May-09	31	744	101,502	5,231	1,129	82.0	3,669,236	543,445,884	12,939,188	82.2	82.2	2,818
Jun-09	30	720	102,222	5,261	1,119	69.0	3,063,006	546,508,890	13,012,116	70.9	70.9	2,431
Jul-09	31	732	102,966	5,292	1,120	86.0	2,899,690	549,408,580	13,081,157	66.0	65.0	2,264
Aug-09	31	744	103,710	5,323	1,097	78.0	3,255,566	552,664,146	13,158,670	72.9	72.9	2,500
Sep-09	30	708	104,430	5,353	1,058	75.0	3,225,841	555,889,987	13,235,476	75.9	74.7	2,604
Oct-09	31	458	104,888	5,384	1,075	43.8	2,047,955	557,937,942	13,284,237	74.5	45.9	2,555
Nov-09	30	612	105,500	5,414	1,025	62.7	2,405,228	560,343,170	13,341,504	65.5	55.7	2,246
Dec-09	31	564	106,064	5,445	957	15.4	1,163,711	561,506,881	13,369,211	34.4	26.1	1,179
Jan-10	31	744	106,808	5,476	1,066	57.6	2,373,484	563,880,365	13,425,723	53.2	53.2	1,823
Feb-10	28	672	107,480	5,504	1,126	80.3	2,566,818	566,447,183	13,486,838	63.7	63.7	2,183
Mar-10	31	744	108,224	5,535	1,117	78.9	2,815,393	569,262,576	13,553,871	63.1	63.1	2,162
Apr-10	30	684	108,908	5,565	1,093	53.0	2,196,140	571,458,716	13,606,160	53.5	50.8	1,835
May-10	31	600	109,508	5,596	990	16.8	1,220,962	572,679,678	13,635,230	33.9	27.4	1,163
Jun-10	30	720	110,228	5,626	1,066	33.3	1,709,684	574,389,362	13,675,937	39.6	39.6	1,357
Jul-10	31	744	110,972	5,657	972	23.9	1,477,024	575,866,386	13,711,104	33.1	33.1	1,134
Aug-10	31	504	111,476	5,688	991	35.0	1,058,400	576,924,786	13,736,304	35.0	23.7	1,200

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Tuesday, July 13, 2010 11:25 AM
To: Schmaltz, Randy
Cc: Kuehling, Monica, EMNRD
Subject: Annual Fall-Off Test Scheduling & Test to be Completed by 9/30/2010

Randy:

Good morning. OCD records show that Western Refining SW, Inc. (Western)- Bloomfield has completed it annual MIT w/ Bradenhead and the test was successful.

OCD record also indicate that Western has not scheduled it's Annual Fall-Off Test with the OCD. Please advise or clarify the date and time that Western is planning to conduct the test. A C-103 must be submitted to document this.

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")

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Tuesday, July 14, 2009 2:44 PM
To: Perrin, Charlie, EMNRD
Cc: 'Schmaltz, Randy'
Subject: FW: XTO Well Site Environmental Activity on Refinery Property (GW-001)

Charlie:

I think Randy would like to know more about the well mentioned below on the refinery property. 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")

From: Chavez, Carl J, EMNRD
Sent: Tuesday, July 14, 2009 2:28 PM
To: 'Schmaltz, Randy'; Monzeglio, Hope, NMENV
Cc: Doyle, Todd
Subject: RE: XTO Well Site Environmental Activity on Refinery Property (GW-001)

Randy, et al.:

I believe this is the well that was identified within the 1-mile AOR for the refinery's UIC Class I Well during the Fall-Off Test.

I am copying the OCD Aztec District Office in this matter in the event there is a discovery of contamination in ground water that may affect the monitoring and cleanup program at the refinery. I presume the refinery would like to kept apprised of any information related to the contamination and any corrective action on its property.

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: Schmaltz, Randy [mailto:Randy.Schmaltz@wnr.com]
Sent: Tuesday, July 14, 2009 2:16 PM
To: Chavez, Carl J, EMNRD; Monzeglio, Hope, NMENV
Cc: Doyle, Todd
Subject: XTO Well Site Environmental Activity

Carl,

This email is intended as a follow-up to our phone conversation this afternoon, and notification to OCD and NMED of environmental activities on Western Refining Southwest Inc. – Bloomfield refinery property the activities are outside of the refinery's control.

XTO Energy owns and operates a gas well "Davis Gas Com, API# 30-045-24084" which is located on property owned by Western. Western has no control over the operation of the gas well, XTO owns the mineral rights and is therefore entitle to operate the well.

The refinery discovered that XTO was in the process of doing some environmental investigation activities at the well. I contacted XTO Energy representative Kim Champlin, who informed me that the well activities were being done under an OCD approved work plan. This is all that is known at this time.

Thanks

Randy Schmaltz
Western Refining Southwest, Inc.
Bloomfield Refinery

Main (505) 632-8013
Direct (505) 632-4171
email: randy.schmaltz@wnr.com

WELL BUILDUP/FALLOFF TEST PLAN
WESTERN REFINERY
BLOOMFIELD, NM
WASTE DISPOSAL WELL NO. 1

General Test Operational Consideration

The falloff testing for Western's Waste Disposal Well No. 1 (WDW-1) will be conducted with tandem bottom hole pressure memory gauges. After 72 hours of stable injection the bottom hole pressure memory gauges will be lowered into the well (two memory gauges) and allowed to stabilize for one hour. The well will be shut-in for 72 hours and the affect of any offset wells will be considered. Before performing the fall-off testing a one mile area of review (AOR) will be conducted to determine the status of any offset wells that may be injecting into or producing from the WDW-1 injection interval. If any are found arrangements will be made with the owners of the wells to monitor those wells during the build-up/fall-off procedure. At the end of the fall-off test, the bottom hole pressure gauges will be pulled from the well making gradient stops every 1000 feet.

The injection buildup period will consist of no less than 72 hours at a constant rate and the pressure fall-off will be maintained for no less than 72 hours. The 72 hour build-up/fall-off period was established when a fall-off test procedure was performed in July, 2006 and is backed by historical data. WDW-1 injects into the Menefee and Cliff House formations. In April, 2006 a build-up/fall-off test was performed after a well cleanout and acid stimulation. The buildup/falloff test produced measurable results with all flow regimes present. The permeability was estimated at 1392 md, with a formation height of 69 feet estimated from spinner logs. The viscosity of the formation fluid was estimated at 0.63cp. The skin value was estimated at -6.72.

The WDW-1 is in a confined low permeability sand interval and historically is not capable of producing a bottom hole 100 psi differential pressure drop between the final injection and shut-in pressures. This can also be seen in the class II wells in the area (Basin and XTO). The Basin well is located 4.5-miles north of the Western WDW-1 and the XTO well is located 1 mile northwest of the Western well. **The XTO well is injecting in to the Entrada and Morrison formations.** The logs included in Appendix 1 and Appendix 2 show tight low porosity shale sand and lime stone injection interval that contains no commercial hydrocarbons. Historical records show that WDW-1 was hydraulically fractured after it was drilled but no evidence of a hydraulic fracture shows up in the 2006 build-up/fall-off testing analysis. The hydraulic induced fracture has most likely closed up and the placed support sand has mostly been crushed.

The memory gauges that will be used are quartz or sapphire gauges that will have a resolution of 0.0002% (FS) or 0.0003% (FS) respectively. The pressure range of the gauges will be from 0 – 10,000 psi minimum. These are bottom hole memory gauges with the best accuracy available. The gauges will be lowered to the top of the injection

interval at 3250 feet. The recording period will be set to record pressures at a minimum of every 10 seconds.

The fluid that will be used for the injection test is the refinery's brine waste water (effluent). A current waste analysis of the fluid will be included in the final report. A summary of the brine waste water is in Table 2.

A crown valve has been installed on WDW-1. The lubricator will be installed onto the crown valve before running into the wellbore with the memory gauges. The well will be shut-in through two inline gate valves, one located at the wellhead and another located in the pump house. **The pump house is located about 30 feet from the wellhead**.

Background Information

All background information will be included in the final report encompassing a log of the events (Chronology of Field Activity), a over view of the Geology, a current area of review (AOR) update, fall-off analysis including previous injection data (rate and volume history), gauge calibration certificates, bottom hole pressure analysis, well schematic, electric logs, reservoir fluid description, and injection fluid analysis. The procedure to do the fall-off test will also be included in the final report. If necessary an AOR update will be included prior to the build-up/fall-off testing to ascertain the offset injection wells current condition. Historically there has not been any production or injection in the current injection interval within a one mile radius of WDW-1. All though a pre-job AOR will need to be conducted as a result of pressure interference which appeared on the 2006 build-up/fall-off test analysis.

Western Refining (formally Giant Refining) conducted a falloff test on WDW-1 using quartz crystal bottom hole memory gauges. The tests followed EPA guidelines and were performed to comply with OCD directives for UIC non-hazardous Class I injection wells. In July of 2006 a build-up/fall-off test was conducted after the well stimulation. The 72 hour build-up portion of the testing was done at a constant injection rate of 70 gallons per minute. The fall-off portion of the testing was terminated after 84 hours. The WDW-1 had a permeability of 1,392 md (height of 69 ft, reservoir viscosity 0.63 cp) for a radius of investigation of 11,678 ft and a skin of -6.67. Table 4 is a summary of the pressure falloff results from July 2006 using the refinery's brine waste stream.

Attachment 1 is the well schematic for WDW-1. Table 1 is a summary of the injection intervals for the well. Table 2 is a summary of the injection fluid analysis. Table 3 is a summary of the formation fluid analysis. A connate water analysis prior to injection was not found in any of the records, therefore the original formation water properties will have to be estimated from offset wells. Attachment 2 is a Dual Induction log and Attachment 3 is.a Neutron Density log. The majority of the background information

can also be found in the permit application that was submitted to the State of New Mexico Oil Conservation Division for the well on September 10, 1992.

Conduct Annulus Pressure Testing

Utilizing the Western monitoring system, an Annulus Pressure Test (APT) will be run at 300 psi, for a minimum of 30 minutes. Record data and document it in this report.

Conducting the Fall-off Testing

This is the procedure that will be used to perform the fall-off test at Western Refining facility in Bloomfield, NM.

First Three Days

1. Plant to establish a stabilized injection rate (80 gallons per minute) for a period of three days with plant pumps.

Day Four

2. Move in and rig up (MIRU) a slickline unit and run in hole (RIH) with a gauge ring and tag bottom to determine the top of any fill.
3. Pull out of the hole (POOH) with gauge ring and RIH with tandem memory gauges to 3250 feet.
4. Continue injection into the well for one hour to allow the tandem memory gauges to stabilize.
5. Shut down injection and isolate the well by closing wing valve on the wellhead and in pump room.
6. Monitor the bottom hole pressure fall-off for three days.

Day Seven

7. After three days, POOH with surface memory tool, making five minute gradient stops at 3250 ft, 3000 ft, 2000 ft, 1000 ft.
8. Rig down slick line unit.
9. Return well to Western Refining.

Evaluation of the Test Results

The fall-off and other analysis will be completed by a geologist and/or qualified engineer. The Reservoir Engineer will utilize the PAN System analysis program and the results will be reviewed for accuracy by a licensed professional engineer (PE). The fall-off analysis will include the following;

- A log-log plot with a derivative diagnostic plot used to identify flow regimes.
- A wellbore storage portion and infinite acting portion of the plot.
- A semi-log plot with wellbore storage, P*, and slope.
- An expanded portion of the semi-log plot showing the infinite acting pressure portion (radial flow).
- The height of the injection interval used for the calculations will be included analysis section based on historical data.
- The viscosity of the formation used for the calculations will be included analysis section based on historical data.
- A summary of all the equations used for the analysis.
- An explanation of any temperature or pressure anomalous.

The injection records one year prior to the testing will be included in the analysis.

Well Data Table 1

	WDW – 1
Tubing	2.875", 7.55 lb/ft, Fluoroline Cement Lined, 3221'
Packer	5.5"x 2.875", Guiberson Tools, Uni-6, ID 1.87", 3221'
Perforations	Top of the Cliff House at 3276' 3276' – 3408', 4SPF 0.5 EHD Top of the Menefee at 3400' 3435' – 3460', 4SPF 0.5 EHD
Protection Casing	5.5", 15.5 lb/ft, 3600'
Cement Top Protection Casing	Surface
PBTD / TD	RBP at 3520', Fill Tagged on 4/20/06 at 3325' & cleaned out
Formation	Cliff House / Menefee

Injected Brine Waste Water Table 2

Chemical Date	Refinery Waste Water March 10, 1998	Refinery Waste Water Sept 27, 2005
Arsenic (mg/L)	0.014	-
Calcium (mg/L)	120	68
Magnesium (mg/L)	39	33
Potassium (mg/L)	27	-
Sodium (mg/L)	920	1659
Chloride (mg/L)	1200	2200
Sulfate (mg/L)	400	708
Alkalinity (CaCO3) (mg/L)	330	100
pH (s.u.)	7.7	8.0
Specific Gravity (g/L)	1.00 – 1.01	1.00 – 1.01

Formation Brine Waste Water Table 3

Chemical Date	Formation Water May 22, 1995
Arsenic (mg/L)	0.023
Cadmium (mg/L)	0.003
Calcium (mg/L)	375
Lead (mg/L)	0.063
Magnesium (mg/L)	99
Potassium (mg/L)	69
Selenium (mg/L)	0.006
Sodium (mg/L)	3610
Chloride (mg/L)	5370
Sulfate (mg/L)	1620
Alkalinity (CaCO3) (mg/L)	306
pH (s.u.)	8.5
Specific Gravity (g/L)	-

Summary of Pressure Falloff Test Results Table 4

Test No.	Test Date	$P_{static\ 2006}$ (psia)	kh/μ (md-ft/cp)	$V_{well\ avg}$ (10^3 bbl/month)	$V_{total\ end\ of\ 2005}$ (10^3 gal)
WDW-1					
1	07/28/06	2306.21	152,433	380.351	3628.800

WESTERN REFINING DISPOSAL WELL #1

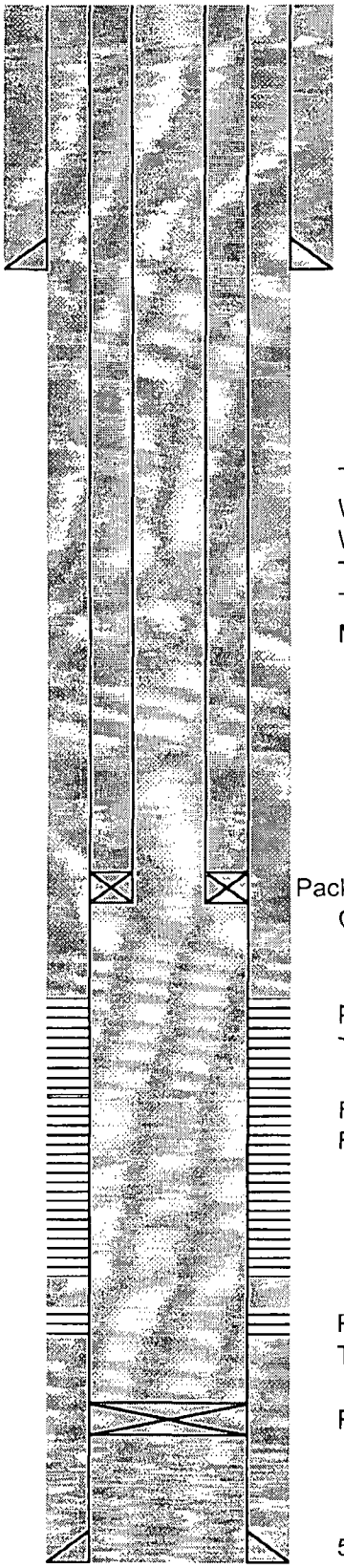
NW, SW SECTION 26, T29N, R11W

API NO.: 30-045-29002

SUBSURFACE
HOUSTON, TX
SOUTH BEND, IN
BATON ROUGE, LA

ATTACHMENT 1
DISPOSAL WELL #1 WELL SCHEMATIC
Western Refining Inc.
Bloomfield, NM

Date:	4/26/2006	Approved By:	rls	Job No.:	70F5830
Drawn By:	rls	Checked By:		Scale:	N/A



8-5/8", 48#/ft, Surface Casing @ 830'
TOC: Surface
Hole Size: 11.0"

Tubing: 2-7/8", Acid Resistant Fluoroline Cement Lined
Wt of Tubing: 6.5 #/ft
Wt of Tubing Lined: 7.55 #/ft
Tubing ID: 2.128"
Tubing Drift ID: 2.000"
Minimum ID @ Packer: ~1.87" estimated

Packer: Unknown Packer Type @ 3221'
Could be a Guiberson or similar model Uni-6

Perforations: 3276' - 3408' 4JSPF 0.5 EHD
Top of the Cliff House Formation: 3276'

Fill was cleaned out of well on 4/20/06
Fill was orginally tagged at 3325'

Perforations: 3435' - 3460' 4JSPF 0.5 EHD
Top of the Menefee Formation: 3400'

RBP: 3520'

5-1/2", 15.5#/ft, Production Casing @3600'
TOC: Surface
Hole Size: 7-7/8"

BLOOMFIELD REFINING DISPOSAL WELL #1

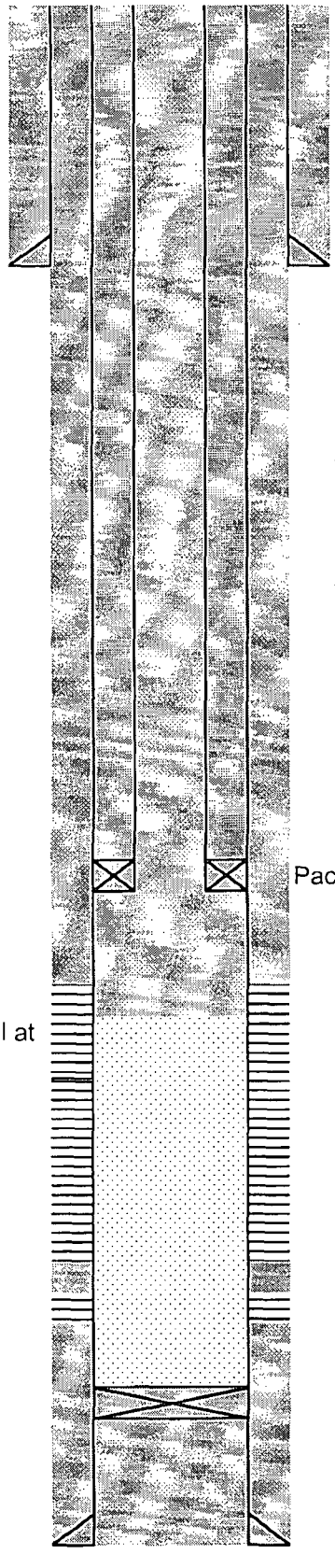
NW, SW SECTION 26, T29N, R11W

API NO.: 30-045-29002

SUBSURFACE — HOUSTON, TX; SOUTH BEND, IN; BATON ROUGE, LA

FIGURE 7
DISPOSAL WELL #1 WELL SCHEMATIC
Giant Refining Inc.
Bloomfield, NM

Date:	3/30/2006	Approved By:	rls	Job No.:	70F5830
Drawn By:	rls	Checked By:		Scale:	N/A



8-5/8", 48#/ft, Surface Casing @ 830'
TOC: Surface
Hole Size: 11.0"

Tubing: 2-7/8", Acid Resistant Fluoroline Cement Lined
Wt of Tubing: 6.5 #/ft
Wt of Tubing Lined: 7.55 #/ft
Tubing ID: 2.128"
Tubing Drift ID: 2.000"
Minimum ID @ Packer: ~1.87" estimated

Packer: Unknown Packer Type @ 3221'
Could be a Guiberson or similar model Uni-6

Perforations: 3276' - 3408' 4JSPF 0.5 EHD
Top of the Cliff House Formation: 3276'

Top of Fill at 3325'

Fill was cleaned out of well on 4/20/06
Fill was orginally tagged at 3325'

Perforations: 3435' - 3460' 4JSPF 0.5 EHD
Top of the Menefee Formation: 3400'

RBP: 3520'

5-1/2", 15.5#/ft, Production Casing @3600'
TOC: Surface
Hole Size: 7-7/8"