

State of New Mexico
Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

David Martin
Cabinet Secretary

Tony Delfin
Deputy Cabinet Secretary


David R. Catanach, Division Director
Oil Conservation Division



MEMORANDUM

Date: January 27, 2016

To: David Catanach, Director, OCD

From: Phillip Goetze, Engineering and Geological Services Bureau, OCD 

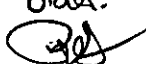
**RE: Summary of Analysis for Existing Order IPI-406 and Pending IPI Application
Belco Well No. 2 (API 30-015-25433); Basic Energy Services, LP**

Basic Energy Services, LP (the "operator") submitted an application for approval of an injection pressure increase for the referenced well. The application included a step rate test (SRT) conducted by a vendor on December 15, 2015. As part of the assessment of the new SRT results, I reviewed the previous SRT conducted on August 11, 2011, that was used in the approval of IPI-406. Order IPI-406 approved an increase in the maximum surface injection pressure (MSIP) from 508 pounds per square inch (psi) (authorized in order SWD-1292) to 1056 psi.

Review and re-analysis of the SRT conducted on August 11, 2011, provide the following details:

1. The vendor improperly plotted the test results (data points and graph scales) that obtained the approved pressure increase to 1056 psi (see Attachment 1). The y-scale (pressure) on the left side of the graph should have been used for both plotting the bottom hole pressures and the extracted surface pressure corresponding to the formation parting pressure (FPP) used for the order and not the right scale that resulted in a FPP at a surface pressure of 1106 psi.
2. Replotting of the data showed a FPP of approximately 930 psi (see Attachment 2). This can also be confirmed by the vendor's graph when the proper left scale is used.

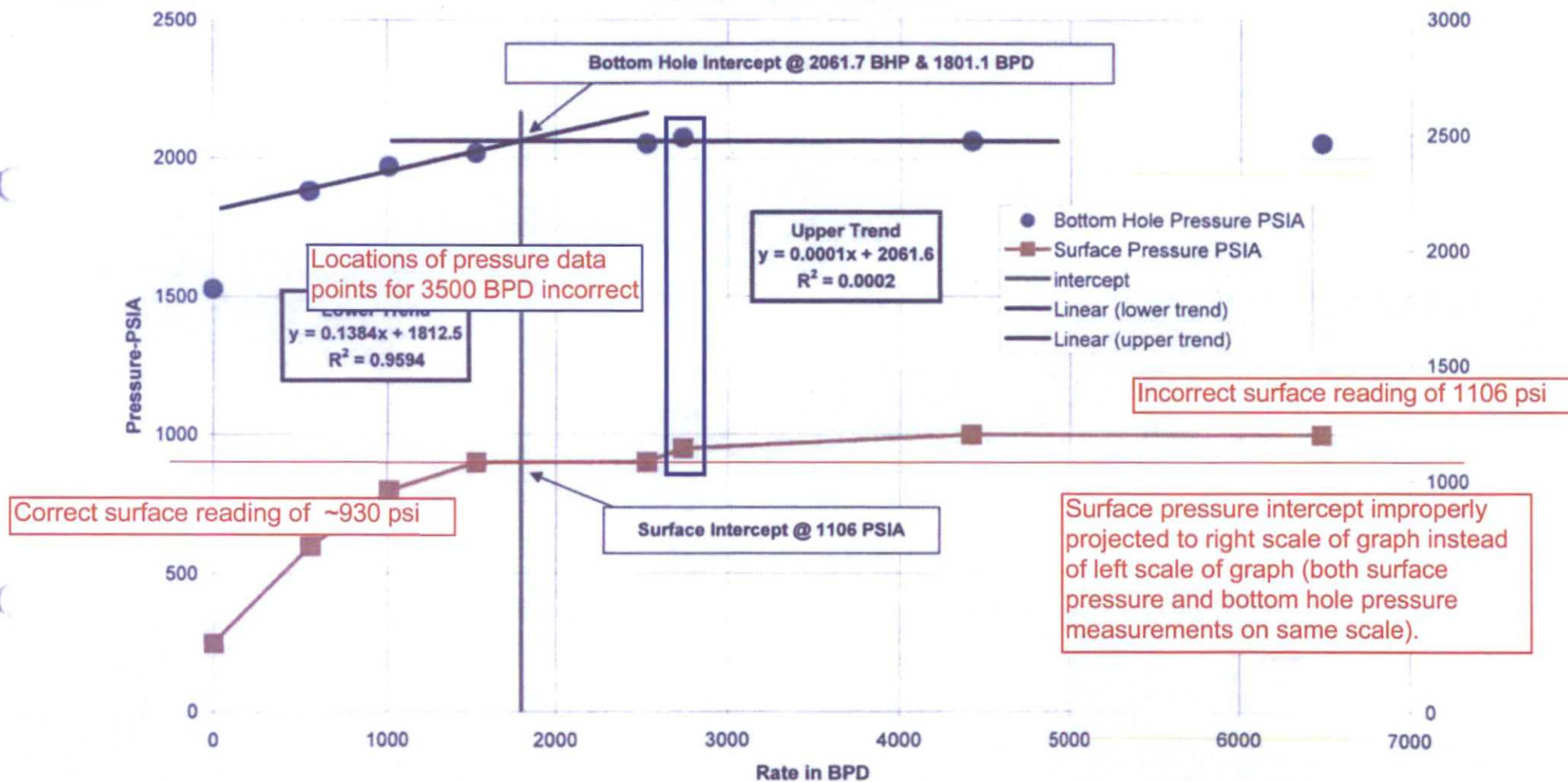
Since the approved pressure in IPI-406 exceeded the FPP, I recommended the correction of the MSIP to 880 psi and the cancellation of IPI-406. This is addressed in proposed order IPI-503. *IPI-406-A*

Additionally, this created issues with the validity of the results obtained in the SRT conducted on December 15, 2015. Plotting of the second SRT results shows an initial pressure that does not include the lower pressure ranges where the FPP was initially characterized (see Attachment 3). The second SRT report also failed to provide information such as the depth to the bottom-hole gauge and injection fluid density, while the steps for the test are inconsistent and are not representative of an injection range similar to the IPI for other disposal wells in this area. Therefore, I recommend that the application dated January 7, 2016, for the IPI based on the second SRT be denied and the operator be required to conduct a new SRT. *Director requested amended order.* 

Attachments:

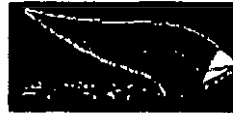
1. Comments on graph by vendor plotting pressure versus injection rate for SRT conducted August 2011 with data summary sheet
2. Graph plotting pressure versus injection rate for SRT conducted August 2011
3. Graph plotting pressure versus injection rate for SRT conducted December 2015

Basic Energy Services, LLC
Belco State No. 2
Step Rate Chart 15-Aug-11



Step Rate Test
15-Aug-11

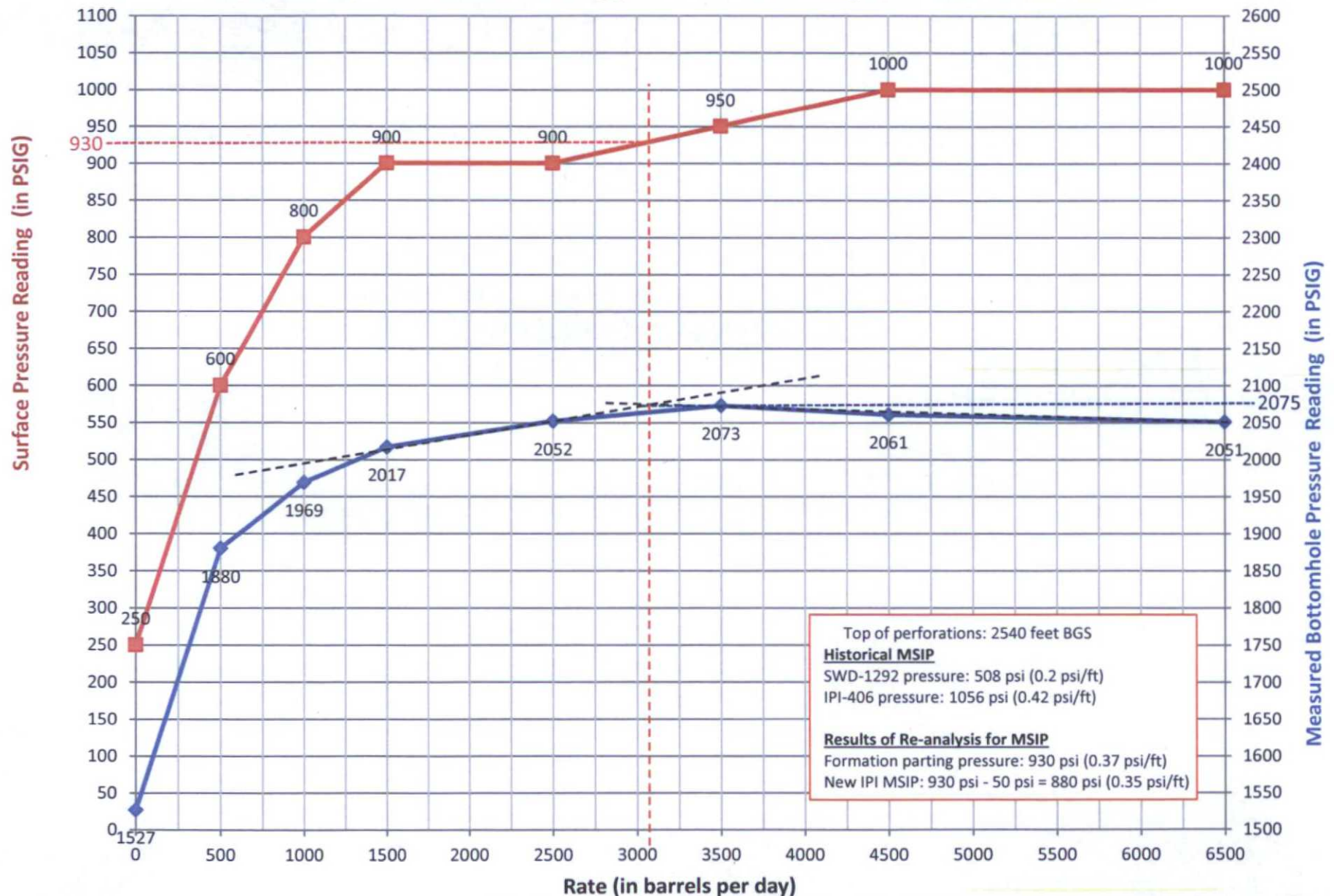
Basic Energy Services, LLC
Well: Belco State No. 2
Field:
Location: Eddy County, NM



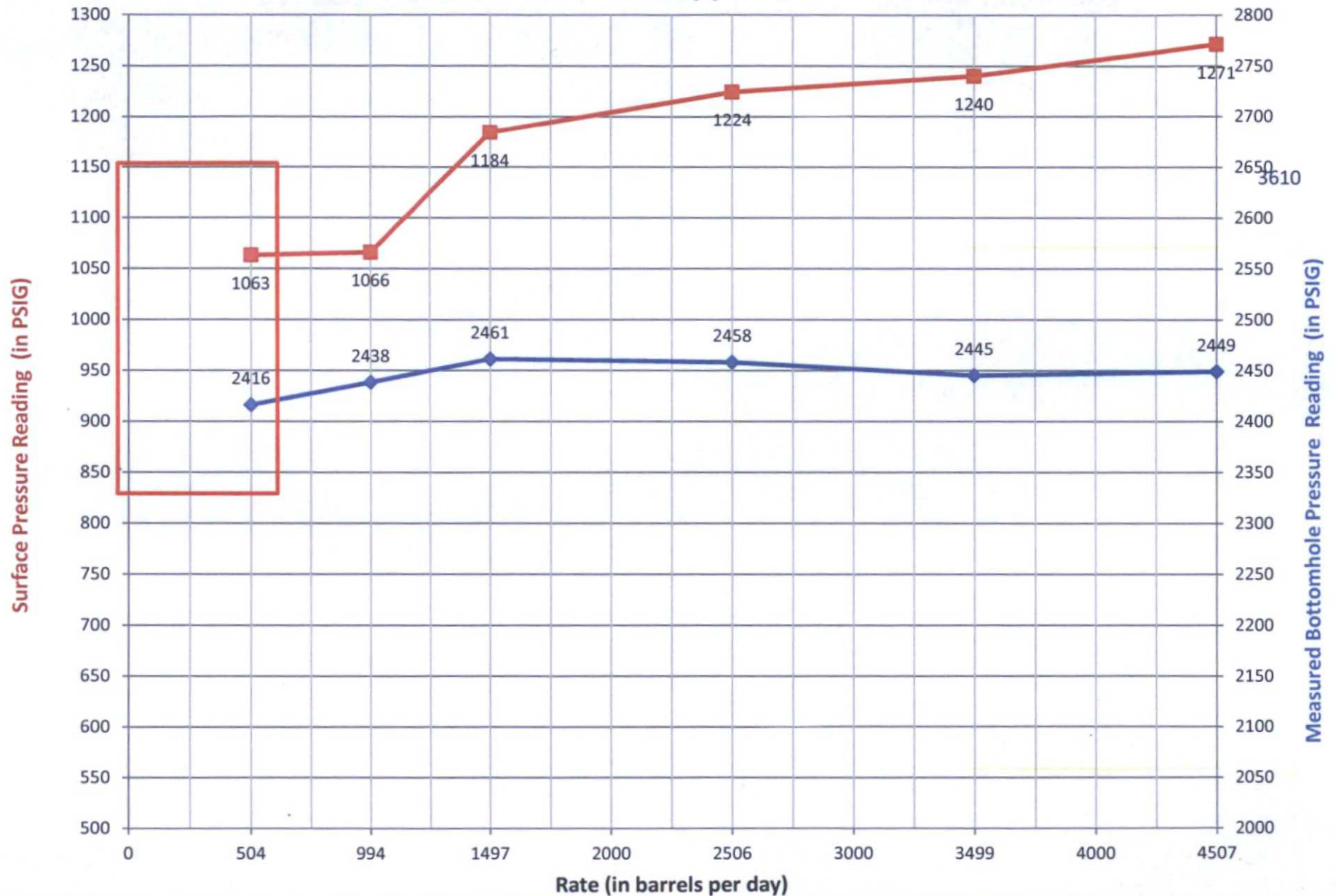
	S Time	E Time	D Time Min	Last Rate BPD	Step BPD	BHP PSIA	Surf PSIA	Cum BBL	Delta BBL	Avg. BPD	Lower Trend	Upper Trend
1.	9:41 AM	10:30 AM	49	0	0	1527.1	250	0	0	0		
2	10:30 AM	11:00 AM	30	500	500	1880.4	600	11.5	11.5	552	552	
3	11:00 AM	11:30 AM	30	1000	500	1968.8	800	32.6	21.1	1013	1012.8	
4	11:30 AM	12:00 PM	30	1500	500	2016.9	900	64.5	31.9	1531	1531.2	
5	12:00 PM	12:30 PM	30	2500	1000	2051.9	900	117.2	52.7	2530		2530
6	12:30 PM	1:00 PM	30	3500	1000	2073.2	950	174.3	57.1	2741		2741
7	1:00 PM	1:30 PM	30	4500	1000	2060.9	1000	266.3	92	4416		4416
8	1:30 PM	2:00 PM	30	6500	2000	2051.6	1000	401.1	134.8	6470		
9	2:16 PM	2:31 PM	15	0		2035	850	401.1	0	0		
10												
11												
12												
13												
14												
15												
16												

0.1384 1812.5
0.0001 2061.6
Intersect 1801.15691 BPD
BHP PSI 2061.78012 PSIA

SWD-1292 / Belco No. 2 - IPI Application - Re-analysis of SRT 2011 Results



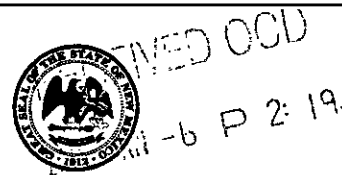
SWD-1292 / Belco No. 2 - IPI Application - SRT 2015 Results



1-6-2016 DATE IN	SUSPENSE	ENGINEER <i>PAG</i>	1-07-2016 LOGGED IN	IPZ TYPE	P MAM/600736396 APP NO.
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ABOVE THIS LINE FOR DIVISION USE ONLY

NEW MEXICO OIL CONSERVATION DIVISION
- Engineering Bureau -
1220 South St. Francis Drive, Santa Fe, NM 87505



ADMINISTRATIVE APPLICATION CHECKLIST

THIS CHECKLIST IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGULATIONS WHICH REQUIRE PROCESSING AT THE DIVISION LEVEL IN SANTA FE.

Application Acronyms:

[NSL-Non-Standard Location] [NSP-Non-Standard Proration Unit] [SD-Simultaneous Dedication]
[DHC-Downhole Commingling] [CTB-Lease Commingling] [PLC-Pool/Lease Commingling]
[PC-Pool Commingling] [OLS - Off-Lease Storage] [OLM-Off-Lease Measurement]
[WFX-Waterflood Expansion] [PMX-Pressure Maintenance Expansion]
[SWD-Salt Water Disposal] [IPI-Injection Pressure Increase]
[EOR-Qualified Enhanced Oil Recovery Certification] [PPR-Positive Production Response]

[1] TYPE OF APPLICATION - Check Those Which Apply for [A]

- [A] Location - Spacing Unit - Simultaneous Dedication
☐ NSL ☐ NSP ☐ SD

Check One Only for [B] or [C]

- [B] Commingling - Storage - Measurement
☐ DHC ☐ CTB ☐ PLC ☐ PC ☐ OLS ☐ OLM

- [C] Injection - Disposal - Pressure Increase - Enhanced Oil Recovery
☐ WFX ☐ PMX ☐ SWD ☒ IPI ☐ EOR ☐ PPR

- [D] Other: Specify _____

[2] NOTIFICATION REQUIRED TO: - Check Those Which Apply, or ☐ Does Not Apply

- [A] ☐ Working, Royalty or Overriding Royalty Interest Owners
- [B] ☐ Offset Operators, Leaseholders or Surface Owner
- [C] ☐ Application is One Which Requires Published Legal Notice
- [D] ☐ Notification and/or Concurrent Approval by BLM or SLO
U.S. Bureau of Land Management - Commissioner of Public Lands, State Land Office
- [E] ☐ For all of the above, Proof of Notification or Publication is Attached, and/or,
- [F] ☐ Waivers are Attached

[3] SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION INDICATED ABOVE.

[4] CERTIFICATION: I hereby certify that the information submitted with this application for administrative approval is **accurate** and **complete** to the best of my knowledge. I also understand that **no action** will be taken on this application until the required information and notifications are submitted to the Division.

Note: Statement must be completed by an individual with managerial and/or supervisory capacity.

David H. Alvarado

SENM Fluid District Mgr. 12-23-2015

Print or Type Name

Signature

Title
david.alvarado@basicenergyservices.com

e-mail Address

- IPI
- Basic Energy Services LP
246 368
WEL
- BELCO #2
30-015-2543)
POU
- SWD, Delaware
96100

Basic Energy Services L.P.

801 Cherry Street

Ft Worth, TX 76102

December 23, 2015

New Mexico Oil Conservation Division

Engineering Bureau

1220 South St. Frances Dr.

Santa Fe, New Mexico 87505

Attn: Terry G. Warnell EMNRD

Re: **Request for Increase in Maximum Allowable Surface Injection Pressure**

Belco St. # 2

2310 FNL 1980 FWL

Unit Letter "F", Section 20, T23S, R28E

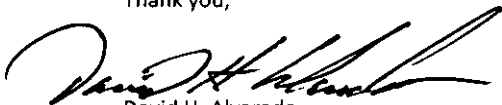
Basic Energy Services L.P. respectfully requests approval to increase the Maximum allowable surface injection pressure on its Belco St. # 2 SWD well.

Attached please find the following:

- 1) Step-rate test analysis
- 2) Current water disposal permit SWD-1292, IPI-406
- 3) Log section covering the injection interval
- 4) Current Wellbore schematic
- 5) Form C-103 request for increase in allowable surface injection pressure

As shown with the attached analysis, it has been determined that the fracture extension pressure at surface is 1,230 PSI. Applying a safety factor of 20 psi, Basic Energy Services L.P. respectfully request approval to increase the maximum allowable surface injection pressure to 1,210 PSI from the current maximum allowable pressure of 1,056 PSI.

Thank you,



David H. Alvarado

Basic Energy Services L.P.

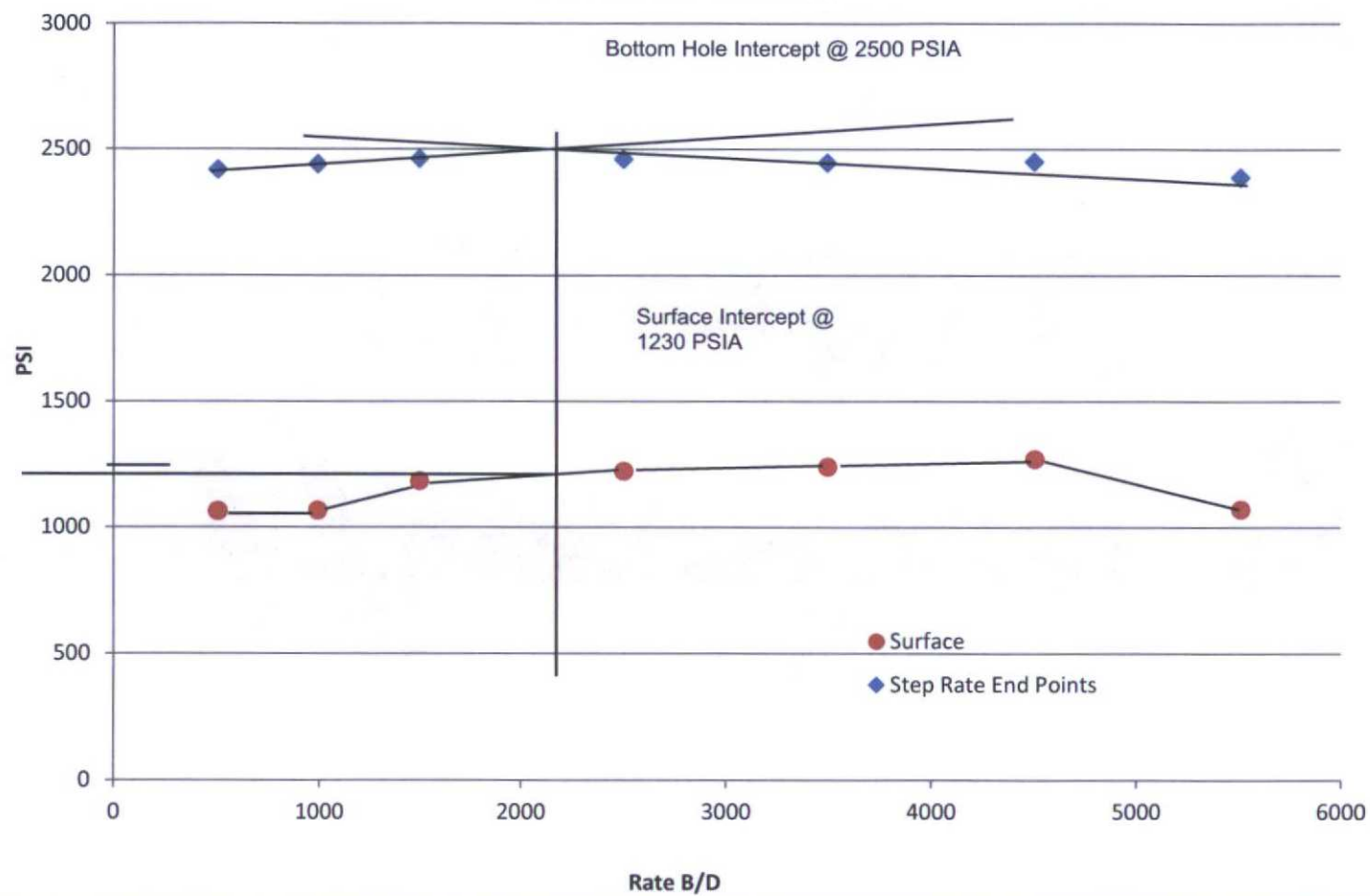
SENM District Fluids Manager




STEP RATE TEST

	RATE B/D	Date	Time	BH PRESS	SURF. PRESS	Comments
Step 1	504	12/15/2015	9:59 AM	2416.46	1063.64	
Step 2	993.6	12/15/2015	5:32 AM	2438.31	1066.72	
Step 3	1497.6	12/15/2015	11:03 AM	2460.71	1183.22	
Step 4	2505.6	12/15/2015	11:37 AM	2458.8	1223.53	
Step 5	3499.2	12/15/2015	12:10 PM	2445.04	1240.05	
Step 6	4507.2	12/15/2015	12:43 PM	2449.11	1271.82	
Fall Off		12/15/2015	1:14 PM	2387.17	1071.03	
	Company:	Basic Energy Services			Recorded By:	M. Flores
	Well:	Belco State #2				
	Field:	Belco State			Truck Number:	95
	County:	Eddy			District:	Levelland
	State:	New Mexico				
					Test Type:	STEP RATE TESTS
	Tubing Size:	2 7/8"				
	Seat Nipple Depth:	N/A				
	Perforations:					
	Plug Back Depth	N/A				

Pressure vs Rate





New Mexico Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

John H. Bemis
Cabinet Secretary-Designate

Brett F. Woods, Ph.D.
Deputy Cabinet Secretary

Jami Bailey
Division Director
Oil Conservation Division



Administrative Order SWD-1292
July 5, 2011

ADMINISTRATIVE ORDER OF THE OIL CONSERVATION DIVISION

Under the provisions of 19.15.26.8B NMAC, Basic Energy Services, LP seeks an administrative order to utilize its Belco Well No. 2 (API 30-015-25433) located 2310 feet from the North line and 1980 feet from the West line, Unit Letter F of Section 20, Township 23 South, Range 28 East, NMPM, Eddy County, New Mexico, for produced water disposal purposes.

THE DIVISION DIRECTOR FINDS THAT:

The application has been duly filed under the provisions of 19.15.26.8B NMAC and satisfactory information has been provided that affected parties as defined in said rule have been notified and no objections have been received within the prescribed waiting period. The applicant has presented satisfactory evidence that all requirements prescribed in 19.15.26.8 NMAC have been met and the operator is in compliance with 19.15.5.9 NMAC.

IT IS THEREFORE ORDERED THAT:

The applicant, Basic Energy Services, LP, is hereby authorized to utilize its Belco Well No. 2 (API 30-015-25433) located 2310 feet from the North line and 1980 feet from the West line, Unit Letter F of Section 20, Township 23 South, Range 28 East, NMPM, Eddy County, New Mexico, for disposal of oil field produced water (UIC Class II only) into the Delaware Mountain Group through perforations from 2540 feet to 3680 feet through lined tubing and a packer set within 100 feet of the permitted disposal interval.

Prior to commencing disposal, the well shall be plugged back with cast iron bridge plug and cement to within 200 feet below the lowermost permitted disposal interval.

IT IS FURTHER ORDERED THAT:

The operator shall take all steps necessary to ensure that the disposed water enters only the proposed disposal interval and is not permitted to escape to other formations or onto the



surface.

After installing tubing, the casing-tubing annulus shall be loaded with an inert fluid and equipped with a pressure gauge or an approved leak detection device in order to determine leakage in the casing, tubing, or packer. The casing shall be pressure tested from the surface to the packer setting depth to assure casing integrity.

The well shall pass an initial mechanical integrity test ("MIT") prior to initially commencing disposal and prior to resuming disposal each time the disposal packer is unseated. All MIT testing procedures and schedules shall follow the requirements in Division Rule 19.15.26.11A. NMAC.

The wellhead injection pressure on the well shall be limited to no more than 508 psi. In addition, the disposal well or system shall be equipped with a pressure limiting device in workable condition which shall, at all times, limit surface tubing pressure to the maximum allowable pressure for this well.

The Director of the Division may authorize an increase in tubing pressure upon a proper showing by the operator of said well that such higher pressure will not result in migration of the disposed fluid from the target formation. Such proper showing shall be demonstrated by sufficient evidence including but not limited to an acceptable Step-Rate-Test.

The operator shall notify the supervisor of the Division's district office of the date and time of the installation of disposal equipment and of any MIT test so that the same may be inspected and witnessed. The operator shall provide written notice of the date of commencement of disposal to the Division's district office. The operator shall submit monthly reports of the disposal operations on Division Form C-115, in accordance with Division Rules 19.15.26.13 and 19.15.7.24 NMAC.

Without limitation on the duties of the operator as provided in Division Rules 19.15.29 and 19.15.30 NMAC, or otherwise, the operator shall immediately notify the Division's district office of any failure of the tubing, casing or packer in the well, or of any leakage or release of water, oil or gas from around any produced or plugged and abandoned well in the area, and shall take such measures as may be timely and necessary to correct such failure or leakage.

The injection authority granted under this order is not transferable except upon division approval. The division may require the operator to demonstrate mechanical integrity of any injection well that will be transferred prior to approving transfer of authority to inject.


The division may revoke this injection permit after notice and hearing if the operator is in violation of 19.15.5.9 NMAC.

The disposal authority granted herein shall terminate two years after the effective date of this order if the operator has not commenced injection operations into the subject well. One year after the last date of reported disposal into this well, the Division shall consider the well abandoned, and the authority to dispose will terminate *ipso facto*. The Division, upon written

request mailed by the operator prior to the termination date, may grant an extension thereof for good cause.

Compliance with this order does not relieve the operator of the obligation to comply with other applicable federal, state or local laws or rules, or to exercise due care for the protection of fresh water, public health and safety and the environment.

Jurisdiction is retained by the Division for the entry of such further orders as may be necessary for the prevention of waste and/or protection of correlative rights or upon failure of the operator to conduct operations (1) to protect fresh or protectable waters or (2) consistent with the requirements in this order, whereupon the Division may, after notice and hearing, terminate the disposal authority granted herein.


JAMI BAILEY
Director

JB/wvjj

cc: Oil Conservation Division - Artesia



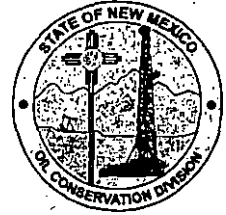
New Mexico Energy, Minerals and Natural Resources Department

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Cabinet Secretary-Designate

Brett F. Woods, Ph.D.
Deputy Cabinet Secretary

Jami Bailey
Division Director
Oil Conservation Division



September 19, 2011

Administrative Order IPI-406
Application No. pTGW1123748737

Basic Energy Services LP
500 W. Illinois, Suite 100
Midland, TX 70702

Attention: David Alvarado

RE: Injection Pressure Increase
Belco State Well No. 2, Unit Letter F
Section 20, T23 South, R28 East
Eddy County, New Mexico

Dear Mr. Alvarado:

Reference is made to your request on behalf of Basic Energy Services LP (OGRID: 246368) received by the Division on August 25, 2011 to increase the surface injection pressure on the Belco State Well No. 2.

This well was approved by the Division for injection into the Delaware Mountain Group Formation from approximately 2,540 feet to 3,680 feet with SWD-1292 and given a maximum surface injection pressure of 508 psi.

It is our understanding that this well will not take a sufficient volume of water at this pressure limit and a higher pressure limit is needed. It is also understood that an increase will not result in the fracturing of the injection formation and confining strata.

Based on a step rate injection test for this well run by Cardinal Surveys on August 15, 2011 we feel it does support an increase to 1056 psi. Any future requested increase beyond 1056 psi will require resubmission of additional data and a new step-rate test.



You are hereby authorized to increase the surface injection pressure on the following well located in Eddy County, New Mexico:

Well Number	Delaware Mountain Group Perforations	Surface Injection Pressure
Belco State Well No. 2 API No. 30-015-25433, Unit F, Section 20, Township 23 South, Range 28 East	2540'-3680'	1056 PSI

This approval is based on a provision that the tubing size, packer setting depth and perforation depths do not change. You are prohibited from injecting at pressures that would induce fracturing.

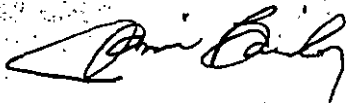
The operator is responsible for ensuring injected waters do not migrate upward inside or outside of this casing and enter formations above the permitted injection interval.

This approval is subject to your being in compliance with all other Division rules, including but not limited to Division Rule 19.15.5.9 NMAC.

The Division Director may rescind this injection pressure increase if it becomes apparent that the injected fluid is not being confined to the injection zone or is endangering any fresh water aquifers.

The injection authority granted herein shall terminate two years after the effective date of this order if the operator has not commenced injection operations into the subject wells, provided however, the Division, upon written request by the operator, may grant an extension thereof for good cause shown.

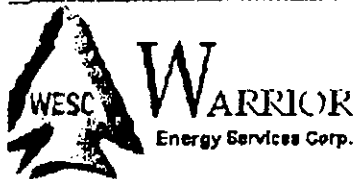
Sincerely,



Jami Bailey
Director

JB/tw

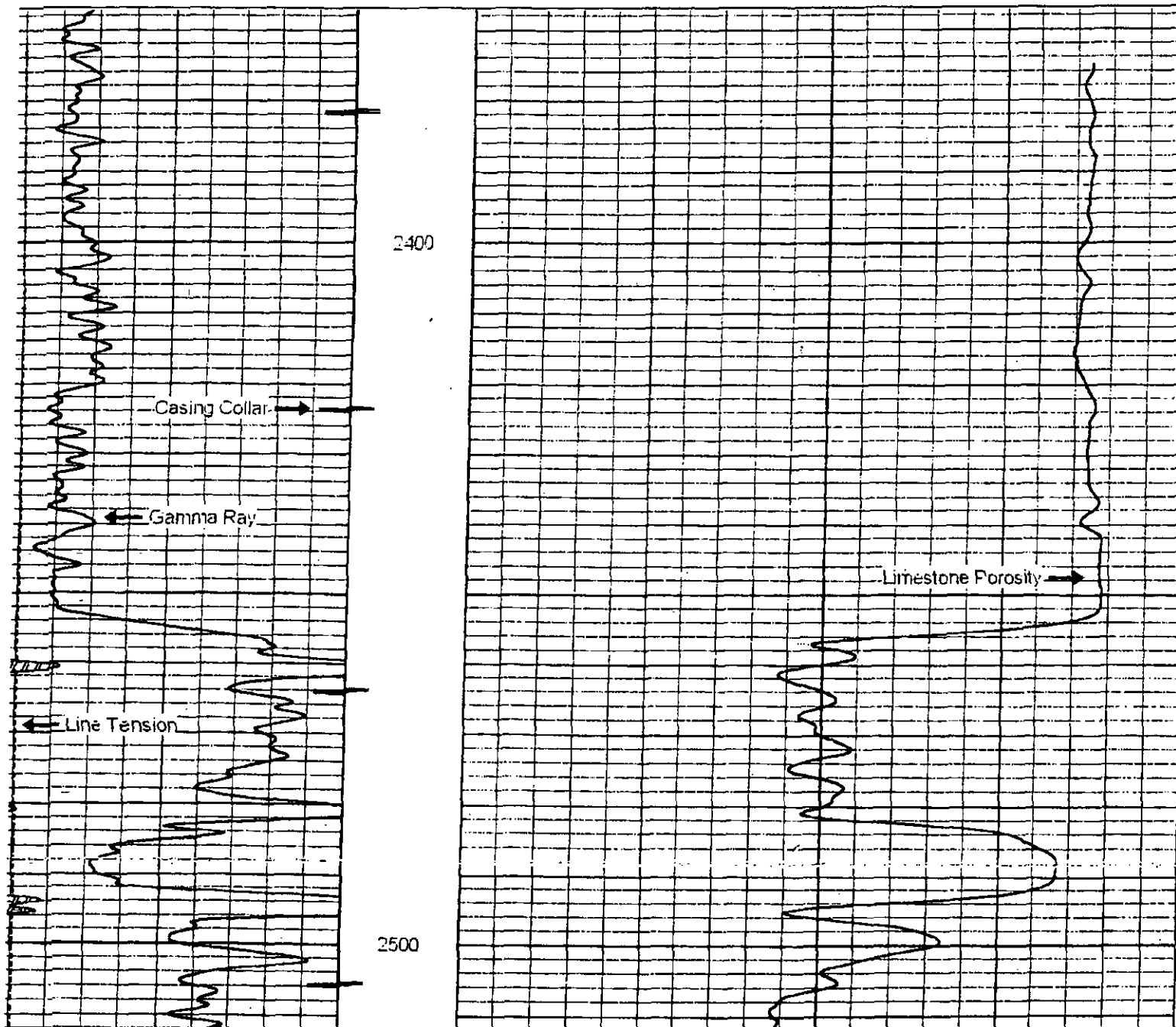
cc: Oil Conservation Division – Artesia

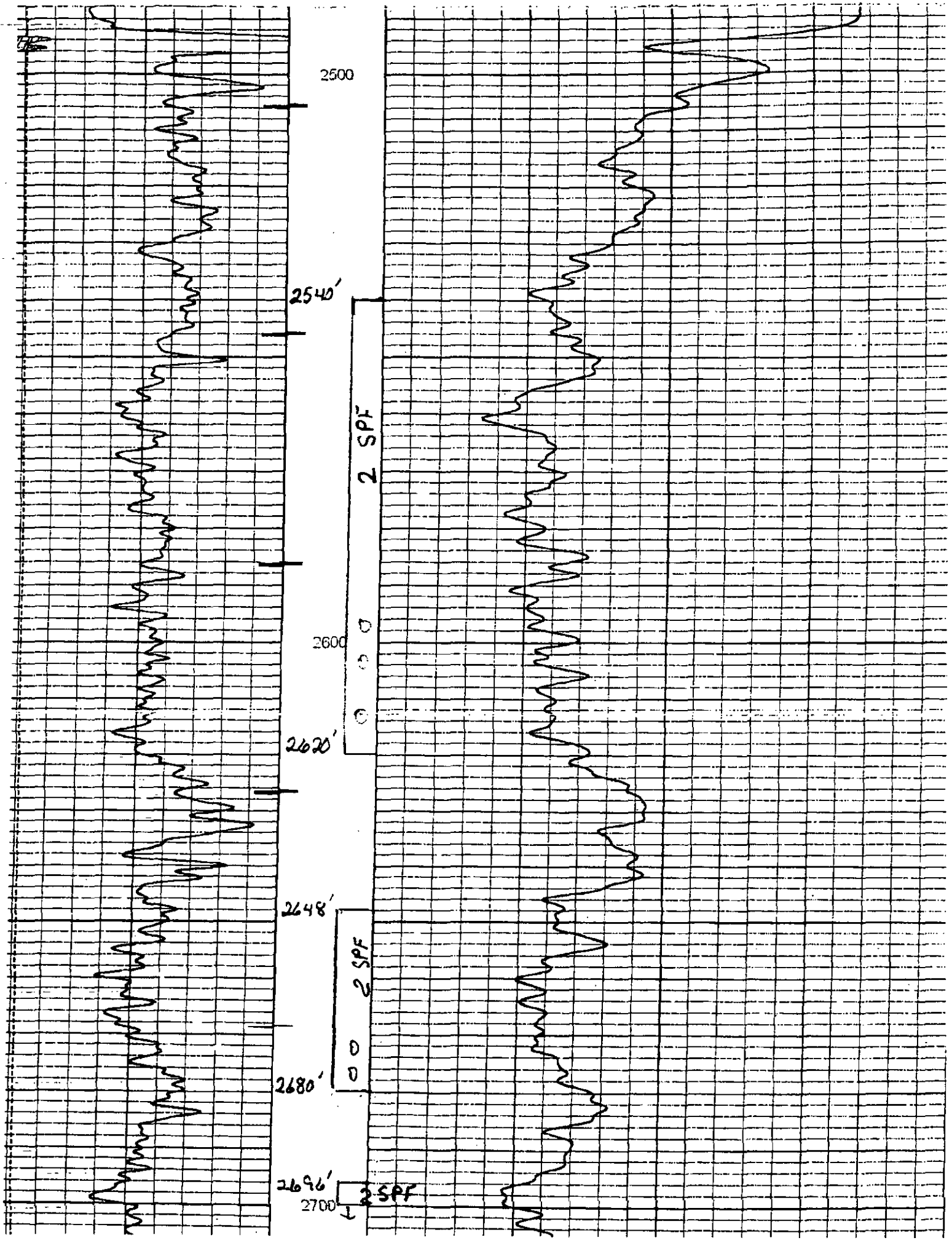


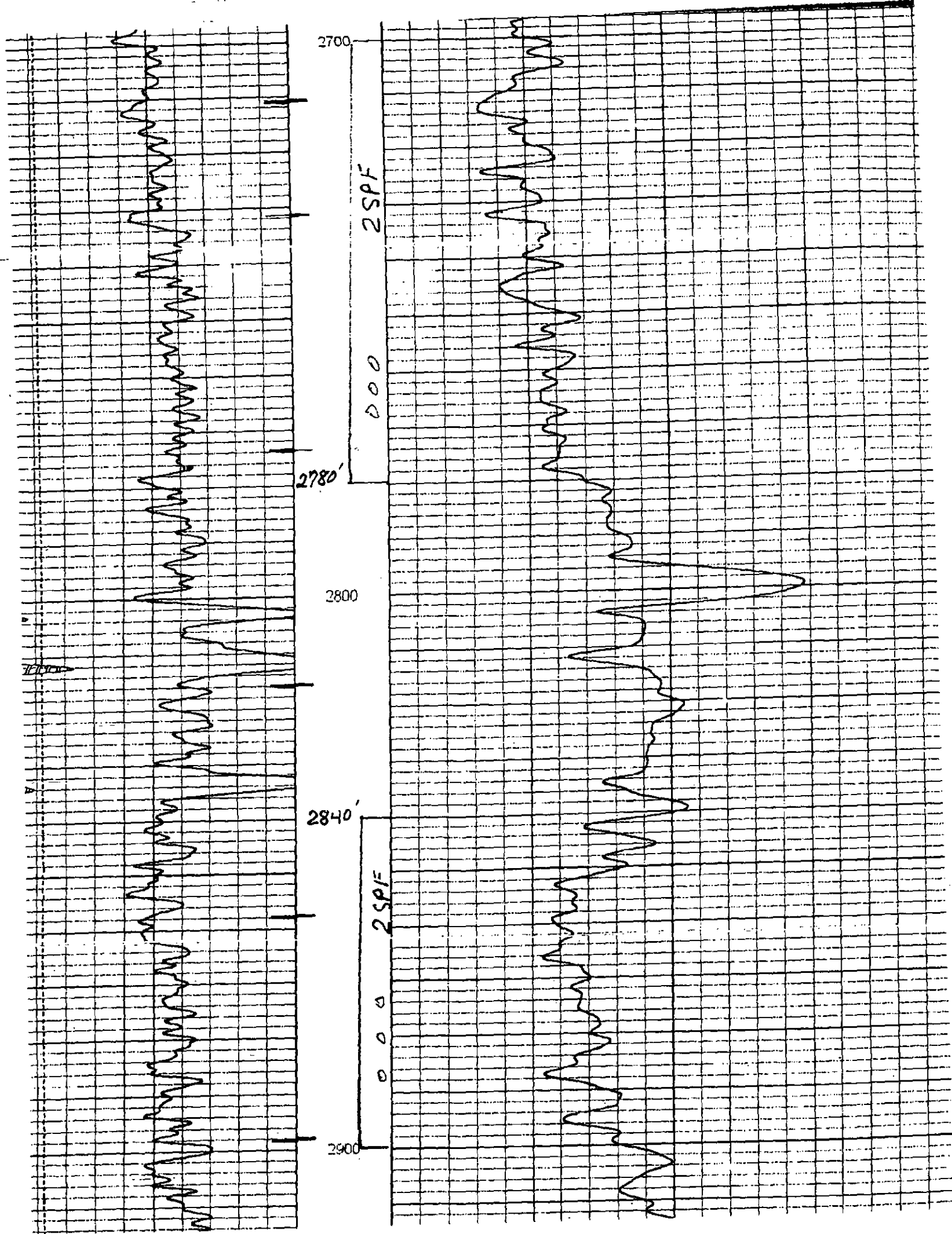
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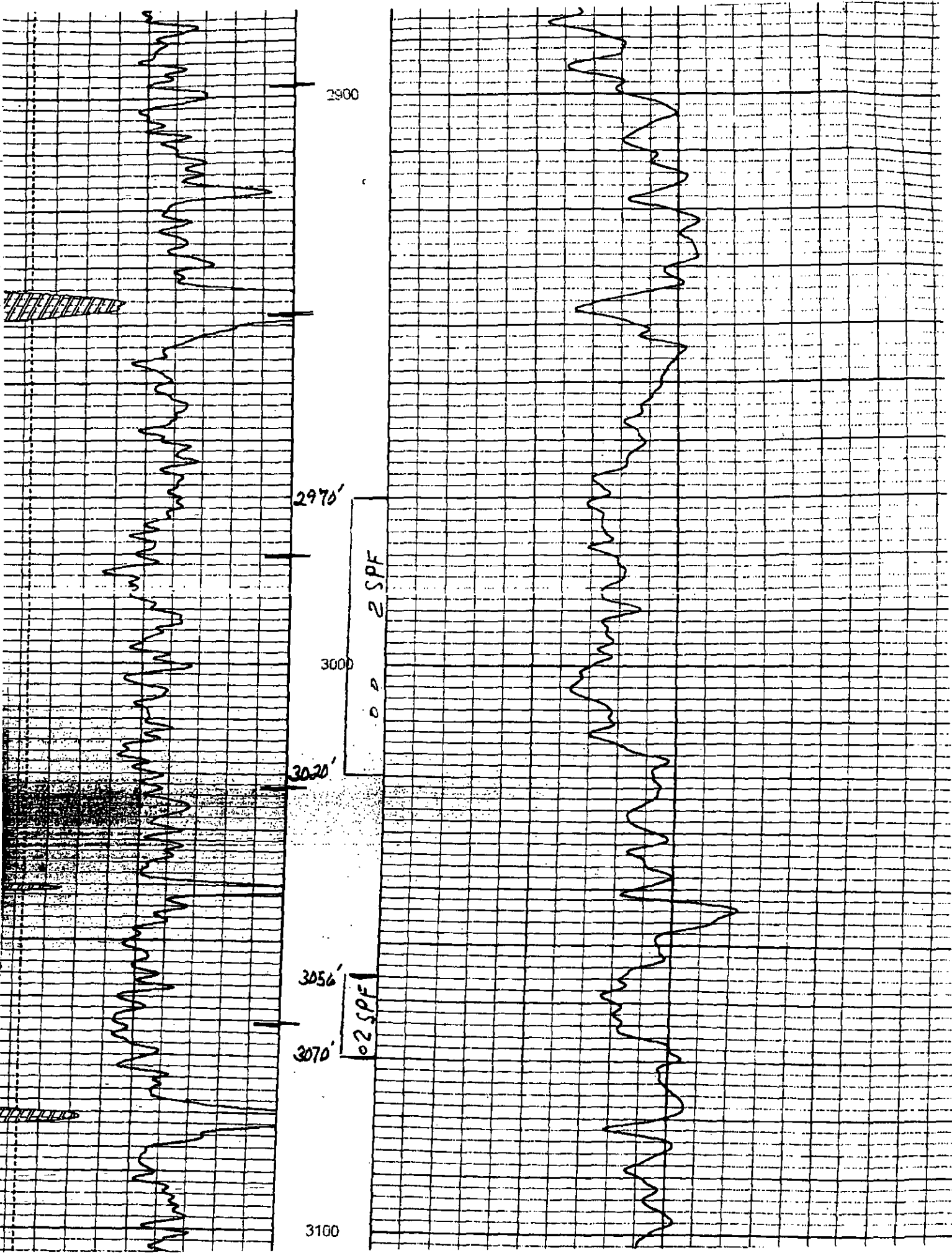
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 Dataset Pathname: belco/fed_2_swd/run1/pass4.101
 Presentation Format: cnt
 Dataset Creation: Wed Jul 20 11:03:39 2011
 Charted by: Depth in Feet scaled 1:240

Gamma Ray (GAPI)	100	0	CCL	5	30	Limestone Porosity (pu)	-10
BU Gamma Ray (GAPI)	200				70	Backup Limestone Porosity (pu)	30
Collar Locator	0						
Line Tension (lb)	4000						









3100

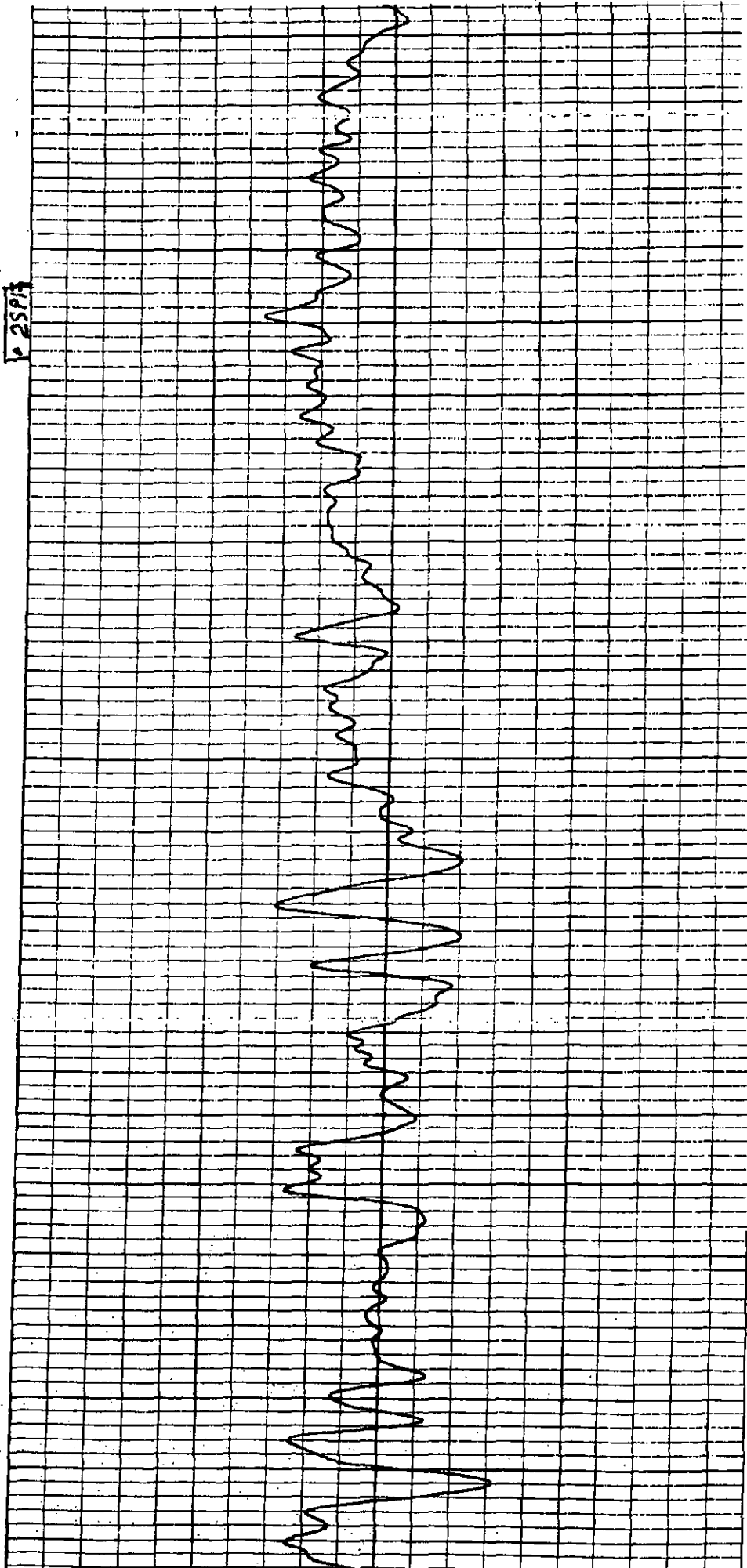
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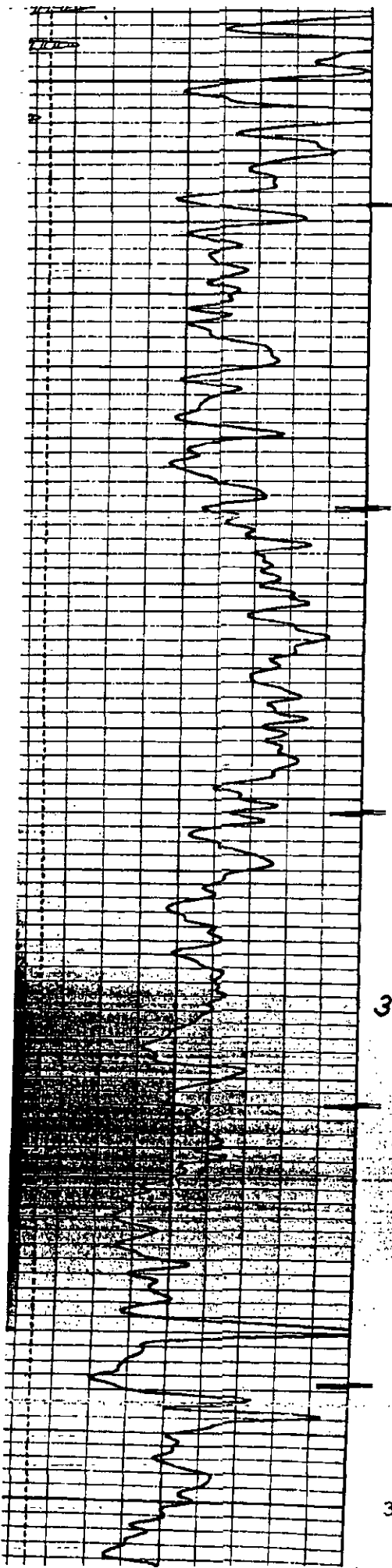
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25014

3200

3300





3300

3354'

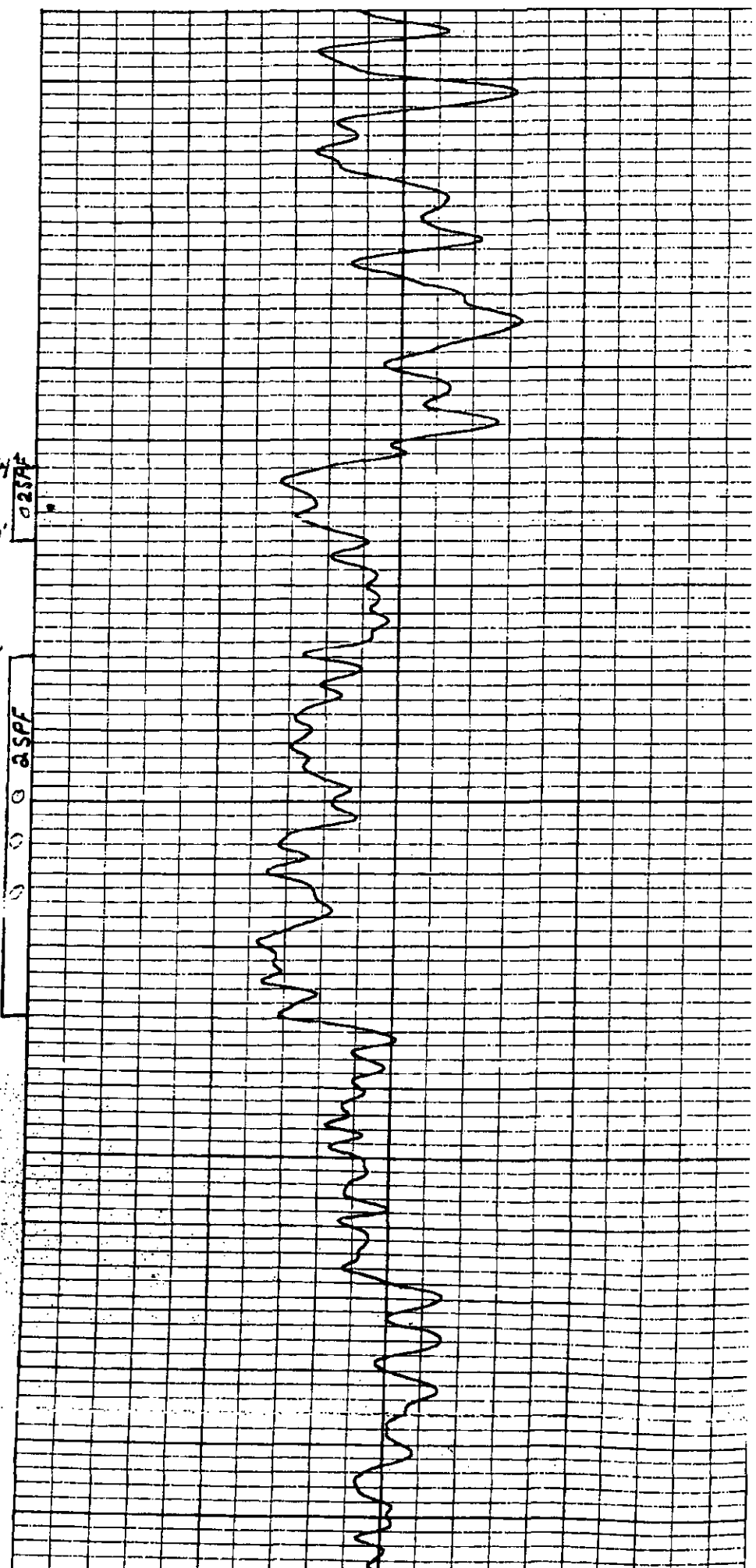
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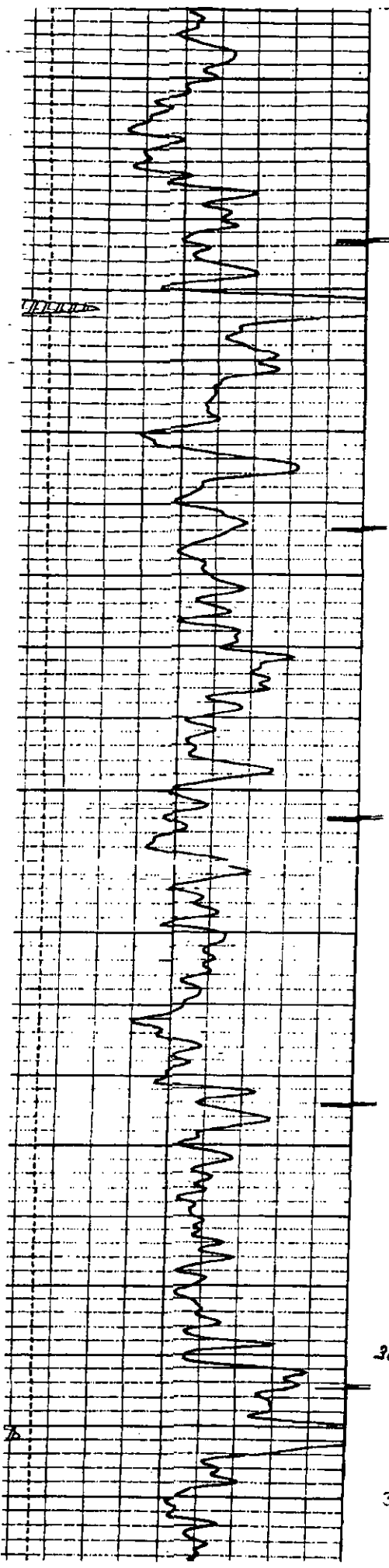
3380'

3400

3430'

3500





3500

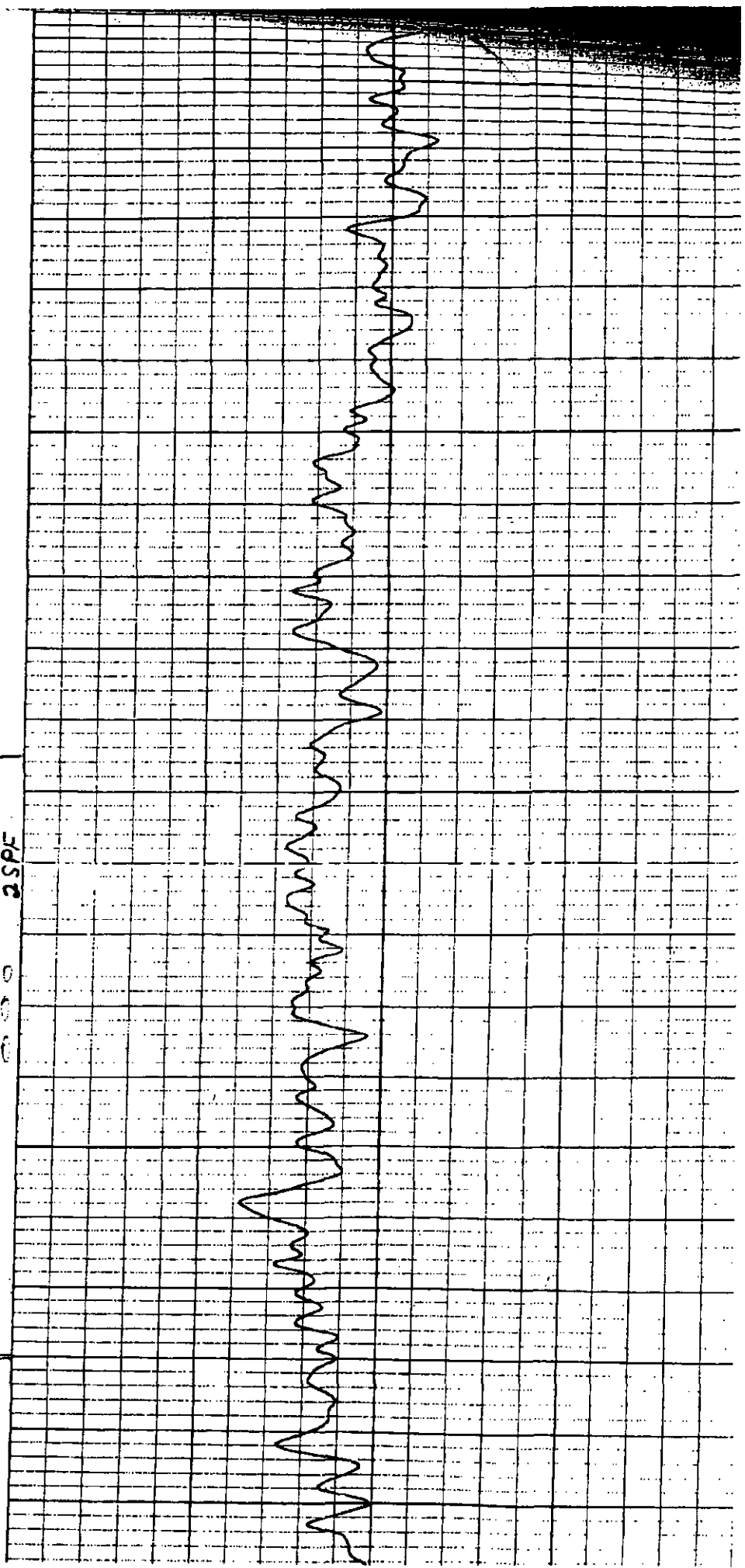
3595'
3600

2 SP5

0 0 0 0

3680'

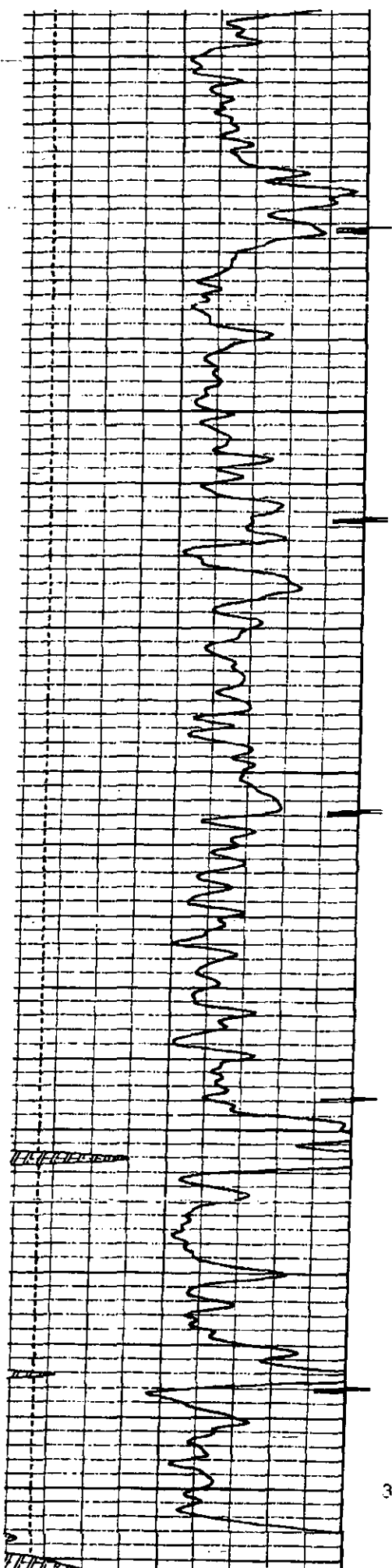
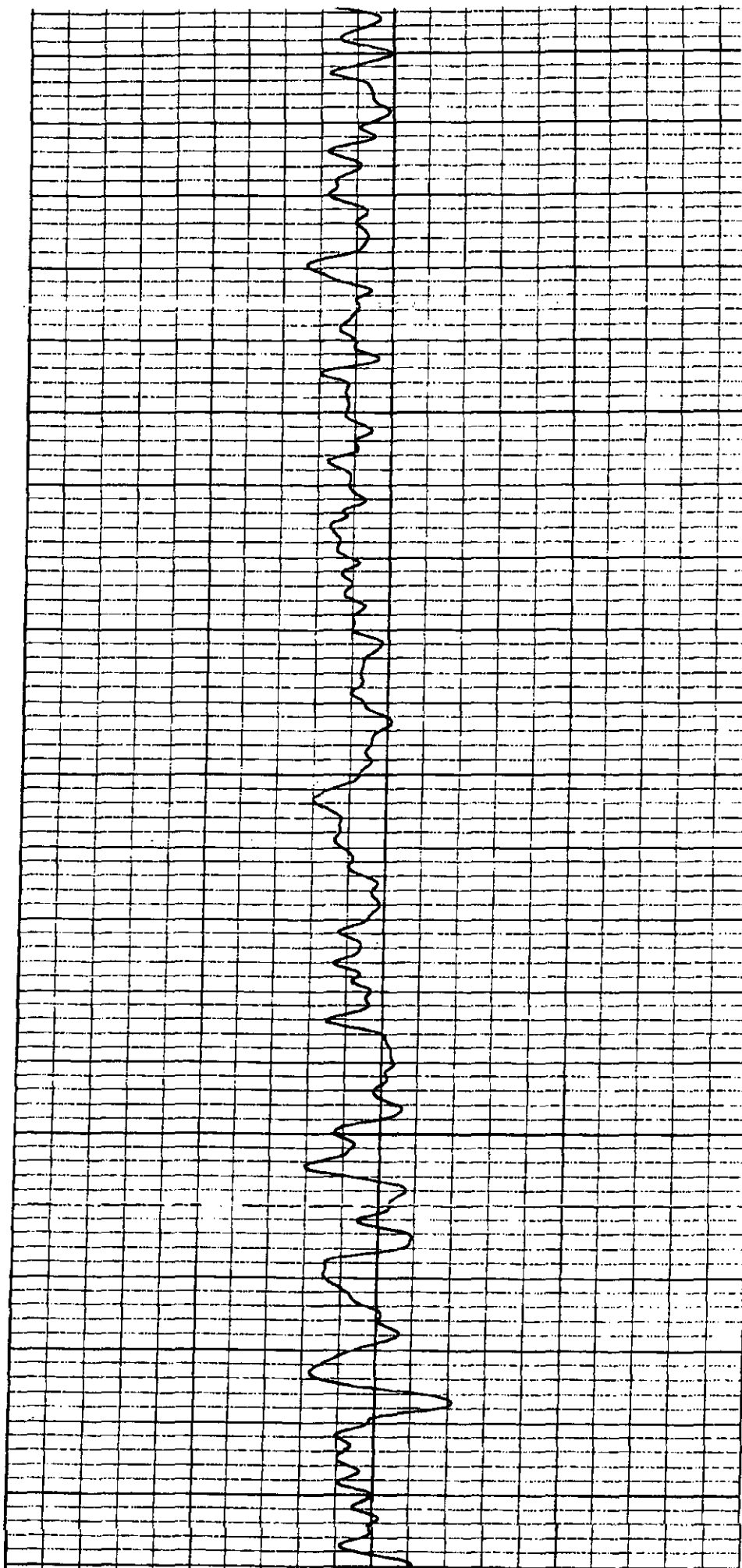
3700



3700

3800

3900



TD @ 5930'

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

Form C-103
Revised July 18, 2013

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

WELL API NO. 30-015-25433
5. Indicate Type of Lease STATE <input type="checkbox"/> FEE <input checked="" type="checkbox"/>
6. State Oil & Gas Lease No.
7. Lease Name or Unit Agreement Name Belco State
8. Well Number # 2
9. OGRID Number 246368
10. Pool name or Wildcat Delaware Mountain Group
11. Elevation (Show whether DR, RKB, RT, GR, etc.)

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.)

1. Type of Well: Oil Well ☐ Gas Well ☒ Other SWD

2. Name of Operator
Basic Energy Services L.P.

3. Address of Operator
801 Cherry Street Ft Worth, TX 76102

4. Well Location
Unit Letter F : 2310 feet from the North line and 1980 feet from the West line
Section 20 Township 23S Range 28E NMPM County Eddy

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

NOTICE OF INTENTION TO:

PERFORM REMEDIAL WORK ☐ PLUG AND ABANDON ☐
TEMPORARILY ABANDON ☐ CHANGE PLANS ☐
PULL OR ALTER CASING ☐ MULTIPLE COMPL ☐
DOWNHOLE COMMINGLE ☐
CLOSED-LOOP SYSTEM ☐
OTHER: ☐

SUBSEQUENT REPORT OF:

REMEDIAL WORK ☐ ALTERING CASING ☐
COMMENCE DRILLING OPNS. ☐ P AND A ☐
CASING/CEMENT JOB ☐
OTHER: Request increase in allowable surface injection PSIA ☒

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.

Accompanying this form are the results of a step-rate injection test performed on 12/15/2015. The purpose of this test was to Support a request for an increase in the maximum allowable surface injection pressure.

It has been determined that the fracture extension is 1,230 PSIA. Applying a safety factor of 20 PSIA, Basic Energy Services L.P. respectfully request approval to increase the maximum allowable surface injection pressure to 1210 PSIA

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 David H. Alvarado TITLE SENM District Fluids Mgr. DATE 12/23/2015

Type or print name David H. Alvarado E-mail address: david.alvarado@basicenergyservices.com PHONE: 575-746-2072

For State Use Only

APPROVED BY: _____ TITLE _____ DATE _____

Conditions of Approval (if any): _____