

tiffany gas co.

2901 EAST TWENTIETH STREET

P. O. DRAWER 50

FARMINGTON, NEW MEXICO 87499

PHONE (505) 325-1701

November 5, 1993

CERTIFIED MAIL #P 081 441 849

Doris Betuel, Chief
Groundwater Pollution Control Section
United States Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105-3901

RECEIVED
DEC 14 1995
OIL CON. DIV.
DIST. 3

Re: Application for Class II Salt
Water Disposal Well Permit
Well No. 18-43, Hogback Field,
San Juan County, New Mexico

Dear Ms. Betuel:

We received your letter dated October 27, 1993 with regard to the above referenced application in which you outlined four items which were incomplete.

1. Plugging records for #18-13, #18-21, #18-1, #18-2, and #7-2.
These records are enclosed and marked as Item #1.
2. Well Completion report for #18-43 Well.
Report enclosed and marked as Item #2.
3. Signatory on application form. Affidavit of Joel B. Burr, Jr., General Partner of Tiffany Gas Co.
enclosed and marked as Item #3.
4. Demonstration of Financial responsibility. Letter of Credit No. 2197 from Citizens Bank, Farmington, New Mexico in your favor and two (2) originals of Stand By Trust Agreement enclosed and marked as Item #4.

Page 2
November 5, 1993
Doris Betuel, Chief
Groundwater Pollution Control Section
United States Environmental Protection Agency

If anything further is required please advise.

Very truly yours,

TIFFANY GAS CO.

Micki Maben
Secretary

Enc.

cc: James Walker
Shiprock AML
P. O. Box 3605
Shiprock, N.M. 87420

tiffany gas co.

2901 EAST TWENTIETH STREET

P. O. DRAWER 50

FARMINGTON, NEW MEXICO 87499

PHONE (505) 325-1701

September 21, 1993

N.M. Oil Conservation Division
1000 Rio Brazos Road
Aztec, New Mexico 87410

RECEIVED
DEC 14 1993

OIL CON. DIV.
DIST. 3

Re: EPA UIC Permit Application
Class II Type D
USG 18-43
Sec. 18, T29N, R16W
San Juan County, N.M.

Gentlemen:

For your information, enclosed herewith is a copy of the above referenced application, the original of which has been mailed to U.S. Environmental Protection Agency, Underground Injection Control Section, San Francisco, California.

Very truly yours,

TIFFANY GAS CO.

Micki Maben
Secretary

Enc.

ITEM #1

ITEM #2

3160-4
(November 1983)
(formerly 9-330)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUBMIT IN DUPLICATE

Form approved.
Budget Bureau No. 1004-0137
Expires August 31, 1985

WELL COMPLETION OR RECOMPLETION REPORT AND LOG *

1a. TYPE OF WELL: OIL WELL ☒ GAS WELL ☐ DRY ☐ Other ☐

b. TYPE OF COMPLETION: NEW WELL ☒ WORK OVER ☐ DEEP-EN ☐ PLUG BACK ☐ DIFF. RESER. ☐ Other ☐

2. NAME OF OPERATOR

Amoco Production Company

3. ADDRESS OF OPERATOR

501 Airport Drive Farmington, NM 87401

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements)*

At surface 1500' FNL X 1760' FWL

At top prod. interval reported below

At total depth Same

RECEIVED

SEP 19 1985

14. PERMIT NO. DATE ISSUED
BUREAU OF LAND MANAGEMENT
FARMINGTON RESOURCE AREA

5. LEASE DESIGNATION AND SERIAL NO.

1-89-IND-58

6. IF INDIAN, ALLOTTEE OR TRIBE NAME

Navajo Tribe

7. UNIT AGREEMENT NAME

8. FARM OR LEASE NAME

USG Section 18

9. WELL NO.

43

10. FIELD AND POOL, OR WILDCAT

Hogback Penn

11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA

SE/NW Sec 18, T29N, R16W

12. COUNTY OR PARISH

San Juan

13. STATE

NM

15. DATE SPUDDED 7-18-85 16. DATE T.D. REACHED 8-18-85 17. DATE COMPL. (Ready to prod.) 9-16-85 18. ELEVATIONS TO H&B, RT, GR, ETC.* 5189' KB 19. ELEV. CASINGHEAD 5176' GR

20. TOTAL DEPTH, MD & TVD 7283' 21. PLUG, BACK T.D., MD & TVD 7271' 22. IF MULTIPLE COMPL., HOW MANY* Single 23. INTERVALS DRILLED BY 0-TD ROTARY TOOLS CABLE TOOLS

24. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)* 25. WAS DIRECTIONAL SURVEY MADE

6573'-6656' Penn

Yes

26. TYPE ELECTRIC AND OTHER LOGS RUN

FDC-CNL; DIL-GR-SP-CAL; Dipmeter

27. WAS WELL CORED

NO

28. CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT, LB./FT.	DEPTH SET (MD)	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13-3/8"	48#, H40	313'	17-1/2"	472 cf Class B Portland	
9-5/8"	36#, K55	2260'	12-1/4"	1665 cf 65:35 Pozzolanic, A Ideal	319 cf Class
7"	23#, 26#, K55	7282'	8-3/4"	236 cf Class B Portland,	271 cf Class B

29. LINER RECORD

SIZE	TOP (MD)	BOTTOM (MD)	SACKS CEMENT*	SCREEN (MD)	SIZE	DEPTH SET (MD)	PACKER SET (MD)
Flowing	through 7"	casing			Cast Iron Bridgeplug	6745'	
					Retrievable bridgeplug	6690'	

31. PERFORATION RECORD (Interval, size and number)

6573'-6582', 6610'-6616', 6646'-6656',
4 jspf, .50", 100 holes
6700'-6710', 4 jspf, .50", 40 holes

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED
7122'-7260'	59 cf Class B cement
6880'-6888'	59 cf Class B neat
6760'-6772'	5000 gal 15% HCL
6700'-6710'	5000 gal 15% HCL

33.* PRODUCTION

DATE FIRST PRODUCTION		PRODUCTION METHOD (Flowing, gas lift, pumping—size and type of pump)				WELL STATUS (Producing or shut-in)	
9-16-85		Flowing				Shut-in	
DATE OF TEST	HOURS TESTED	CHOKE SIZE	PROD'N. FOR TEST PERIOD	OIL—BBL.	GAS—MCF	WATER—BBL.	GAS-OIL RATIO
9-17-85	24 hrs.	32/64	→	448	2913	0	6502
FLOW. TUBING PRESS.	CASING PRESSURE	CALCULATED 24-HOUR RATE	OIL—BBL.	GAS—MCF	WATER—BBL.	OIL GRAVITY-API (CORR.)	
No tubing	760 psig	→	448	2913	0	45°	

34. DISPOSITION OF GAS (Sold, used for fuel, vented, etc.)

To be vented

TEST WITNESSED BY

ACCEPTED FOR RECORD

35. LIST OF ATTACHMENTS

None

36. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records 1985

SIGNED

BDS Shaw

TITLE Admin. Supervisor

DATE 9-18-85

*(See Instructions and Spaces for Additional Data on Reverse Side)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUBMIT IN TRIPLICATE
(Other instructions on
reverse side)

Budget Bureau No. 1004-0135
Expires August 31, 1985

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—" for such proposals.)

1. OIL WELL ☒ GAS WELL ☐ OTHER ☐

2. NAME OF OPERATOR
Amoco Production Co.

3. ADDRESS OF OPERATOR
501 Airport Drive, Farmington, N.M. 87401

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.
See also space 17 below.)
At surface
1500' FNL x 1760' FWL

14. PERMIT NO.

15. ELEVATIONS (Show whether on RT or LK, etc.)
5176' GR

BUREAU OF LAND MANAGEMENT
FARMINGTON RESOURCE AREA

5. LEASE DESIGNATION AND SERIAL NO.
I-89-IND-58

6. IF INDIAN, ALLOTTEE OR TRIBE NAME
Navajo Tribe

7. UNIT AGREEMENT NAME

8. FARM OR LEASE NAME
USG Section 18

9. WELL NO.
43

10. FIELD AND POOL, OR WILDCAT
Hogback Penn/Leadville

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
Wildcat
SE/NW Sec 18, T29N, R16W

12. COUNTY OR PARISH
San Juan

13. STATE
NM

RECEIVED

AUG 27 1985

Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:		SUBSEQUENT REPORT OF:	
TEST WATER SHUT-OFF	☐	WATER SHUT-OFF	☐
FRAC TREAT	☐	FRAC TREATMENT	☐
SHOOT OR ACIDIZE	☐	SHOOTING OR ACIDIZING	☐
REPAIR WELL	☐	(Other) Spud & Set Casing	☒
(Other)	☐		

7. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)

Spud a 17-1/4" hole at 1100 hrs on 7-18-85. Drilled to 313'. Set 13-3/8", 48#, H40 casing at 313' and cemented with 472 cu. ft. Class B Portland. Circulated cement to surface. Pressure tested casing to 1000 psi for 30 minutes. Drilled a 12-1/4" hole to 2260'. Set 9-5/8", 36#, K55 casing at 2260'. Cemented with 1665 cu. ft. Pozzolanic 65:35 poz and tailed in with 319 cu. ft. Class A Ideal. Circulated cement to surface. Drilled an 8-3/4" hole to a TD of 7283' on 8-18-85. Set 7", 23# and 26#, K55 production casing at 7282'. Stage 1: cemented with 236 cu. ft. Class B Portland and tailed in with 271 cu. ft. Class B Portland. Stage 2: cemented with 814 cu. ft. Class B Portland. Ran a temperature survey (attached) which indicated the top of cement to be at 300'. The DV tool was set at 5019' and the rig was released on 8-19-85.

I hereby certify that the foregoing is true and correct

SIGNED B. Shaw

TITLE: Adm. Supervisor

DATE: 8-23-85

(This space for Federal or State office use)

APPROVED BY
CONDITIONS OF APPROVAL, IF ANY:

TITLE

DATE

FARMINGTON DISTRICT
AUG 29 1985

WJH	
DDL	
D88	
GOM	
TWE	
DBB	
SMH	
B. G.	
TLG	
SWF	

ACCEPTED FOR RECORD

AUG 29 1985

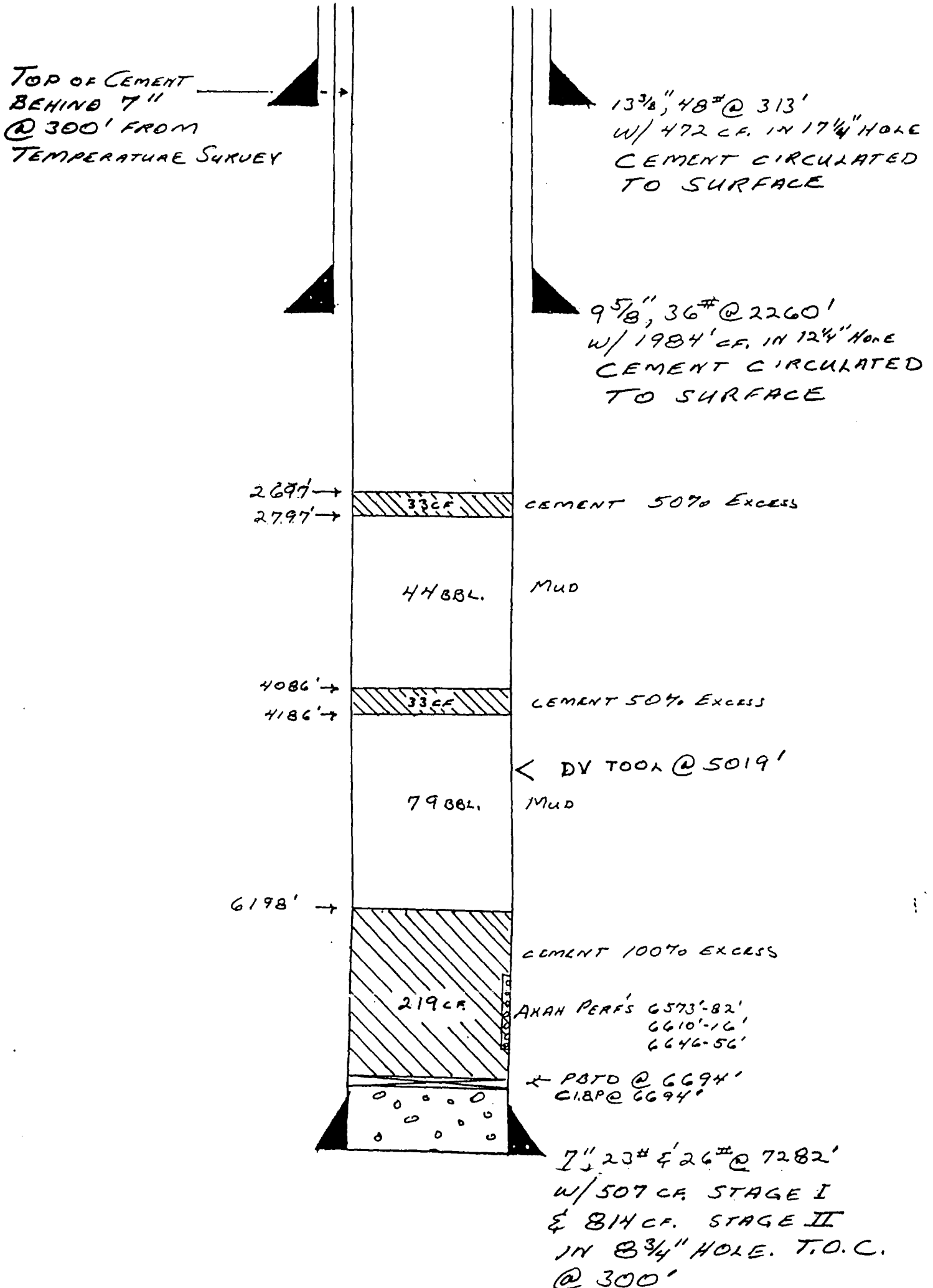
FARMINGTON RESOURCE AREA

BY

*See Instructions on Reverse Side

OPERATOR

TIFFANY GAS CO.
 USG SEC. 18 #43
 1500' FNL & 1760' FWL
 SEC 18-T29N-R16W
 SAN JUAN COUNTY, NM
 LSC # I-89-IND-5B
 5189' KB, 5176' GR



WILSON

FORM 432-2

SERVICE COMPANY

TEMPERATURE SURVEY

COMPANY...AMOCO Production.....

WELL...43.....LEASE...USG Section 18.....

COUNTY...San Juan.....STATE...New Mexico.....

SEC...18.....TWP...29N.....RGE...16W.....

APPROX. TOP CEMENT...300'.....

Survey Begins at...100'.....Ft. Ends at...5018'.....Ft.

Approx. Fill-Up.....Max. Temp.....

Log Measured From KB.....Run No. 1.....

Casing Size	Casing Depth	Diam of Hole	Depth
7" from	to	from 8 3/4"	to
from	to	from	to

Date of Cementing...8/19/85.....Time...2:00 am.....

Date of Survey...8/19/85.....Time...3:30 pm.....

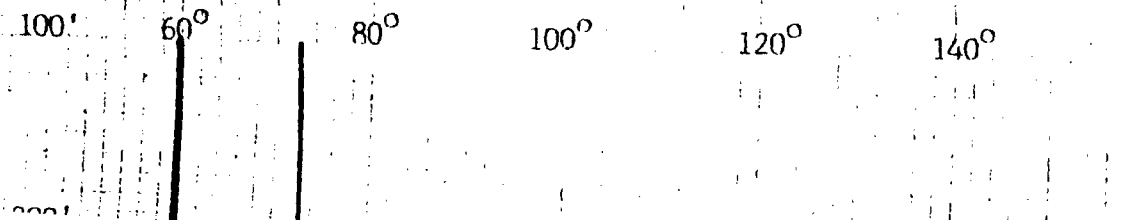
Amount of Cement...As Per Report.....

Recorded by...Hodnett.....Witnessed by.....

REMARKS OR OTHER DATA

DV Tool 5018'.....

TEMPERATURE IN DEGREES FAHRENHEIT



ITEM #3

tiffany gas co.

2901 EAST TWENTIETH STREET

P. O. DRAWER 50

FARMINGTON, NEW MEXICO 87499

PHONE (505) 325-1701

December 13, 1995

Mr. Frank Chavez
State of New Mexico
Oil Conservation Division
1000 Rio Brazos Road
Aztec, NM 87410

RECEIVED
DEC 14 1995
OIL CON. DIV.
RM 3

RE: Application to Inject
USG 18-43
Sec. 18, T29N, R16W
San Juan County, NM

Dear Mr. Chavez:

In response to our phone conversation of yesterday, you will find enclosed one Application to Inject (Form C-108) with appropriate attachments as per your directives.

Please contact our office should you have any questions or need additional information.

Yours truly,



Deanna Gosnell
Revenue Accounting

/d
enc

RECEIVED
DEC 14 1995

APPLICATION FOR AUTHORIZATION TO INJECT

OIL CON. DIV.

- I. PURPOSE: Secondary Recovery Pressure Maintenance
Application qualifies for administrative approval? Yes No ☒ Disposal 3 Storage
- II. OPERATOR: Tiffany Gas Co.
ADDRESS: PO Box 50, Farmington, NM 87499
CONTACT PARTY: Sean Burr PHONE: 325-1701
- III. WELL DATA: Complete the data required on the reverse side of this form for each well processed for injection. Additional sheets may be attached if necessary.
- IV. Is this an expansion of an existing project: Yes No
If yes, give the Division order number authorizing the project _____
- V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.
- VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.
- VII. Attach data on the proposed operation, including:
1. Proposed average and maximum daily rate and volume of fluids to be injected;
 2. Whether the system is open or closed;
 3. Proposed average and maximum injection pressure;
 4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and
 5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).
- *VIII. Attach appropriate geological data on the injection zone including appropriate lithologic detail, geological name, thickness and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such sources known to be immediately underlying the injection interval.
- IX. Describe the proposed stimulation program, if any.
- * X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division, they need not be resubmitted.)
- * XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.
- XII. Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground source of drinking water.
- XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.
- XIV. Certification: I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.
- NAME: SEAN C. BURR TITLE: AGENT
SIGNATURE: Sean C. Burr DATE: 12/13/95
- * If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be resubmitted. Please show the date and circumstance of the earlier submittal. _____

tiffany gas co.

2901 EAST TWENTIETH STREET

P. O. DRAWER 50

FARMINGTON, NEW MEXICO 87499

PHONE (505) 325-1701

September 9, 1993

Anna Marie Cook
Underground Injection Control Section
United States Environmental Protection Agency
75 Hawthorne Street
Mail Code W-6-2
San Francisco, California 94105

Re: EPA UIC Permit Application
Class II Type D
USG 18-43
1500' FNL 1760' FWL
Sec. 18, T29N, R16W
San Juan County, New Mexico

Dear Ms. Cook:

Submitted herewith please find EPA UIC Form 4 as application for underground injection in the subject well. Included are the appropriate attachments in numbered order as provided on the Permit Application Checklist. Also included are other pertinent data and information which may be helpful in evaluation of the Application.

BACKGROUND

The proposed injection well is contained within the limits of the Hogback Field, located on the Navajo Indian Reservation. The field was discovered in 1922 with the drilling of the Midwest Refining No. 1 Navajo Well. This well was completed in the Dakota Formation at an approximate depth of 800'. The underlying Pennsylvanian and Mississippian Fields were discovered in the early 1950's with the drilling of the USG Section 19 No. 13 well. Geological summaries of these fields are contained herein.

The USG 18 No. 43 Well was drilled in 1985 by Amoco Production Co. and completed in the Pennsylvanian Akah Interval (6573'-6656'). It is proposed that the Akah Interval be abandoned and well be converted to water injection in the Entrada Interval (2128'-2188'). The injection fluid will consist of produced water from the Dakota Formation. The total dissolved solids (TDS) content of this water is less than 3,000 parts per million (PPM).

1

P 144 972 141



**Receipt for
Certified Mail**

No Insurance Coverage Provided
Do not use for International Mail
(See Reverse)

Sent to Anna Marie Cook	
US EPA	
76 Hawthorne St.	
Mail Code W-6-2	
San Francisco, CA 94105	
Postage	\$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, and Addressee's Address	
TOTAL Postage & Fees	\$
Postmark or Date	
9/21/93	

PS Form 3800, June 1991

Page 2
September 9, 1993

Tiffany proposes to complete this well with a packer set approximately 50 feet above the Entrada perforations. Estimated injection rate and pressure limitations will be 1000 BWIPD and 600 PSI respectively. Injection pressure control and flow rate metering will be affected at the wellhead.

Tiffany Gas has notified all interested parties within the half mile area of review, including the Navajo Nation Environmental Protection Agency; Bureau of Land Management, Albuquerque District; and the New Mexico Oil & Gas Conservation Division, of the proposed injection well. Tiffany has placed a legal advertisement in the Farmington (N.M.) Daily Times regarding the permit application. In addition, there are no surface tenants, allottees, or permanent dwellings within the half-mile radius of review.

Should you have any questions or require further information please contact me at 505-324-0766.

Very truly yours,

TIFFANY GAS CO.

A handwritten signature in cursive script that reads "Bradley W. Salzman".

Bradley W. Salzman
Agent

4



UNDERGROUND INJECTION CONTROL PERMIT APPLICATION

(Collected under the authority of the Safe Drinking
Water Act, Sections 1421, 1422, 40 CFR 144)

UIC

READ ATTACHED INSTRUCTIONS BEFORE STARTING
FOR OFFICIAL USE ONLY

Application approved mo day year	Date Received mo day year	Permit/Well Number	Comments

II. FACILITY NAME AND ADDRESS			III. OWNER/OPERATOR AND ADDRESS		
Facility Name Tiffany Gas, Co. USG 18-43			Owner/Operator Name Tiffany Gas Co.		
Street Address Hogback Field			Street Address 2901 E. 20th St.		
City San Juan	State NM	ZIP Code	City Farmington	State NM	ZIP Code 87402

IV. OWNERSHIP STATUS (Mark 'x')		V. SIC CODES	
☐ A. Federal	☐ B. State	☐ C. Private	
☐ D. Public	☒ E. Other (Explain) Navajo		

VI. WELL STATUS (Mark 'x')	
☐ A. Operating	☒ B. Modification/Conversion
Date Started mo day year	☐ C. Proposed
	Convert existing producer to injection

VII. TYPE OF PERMIT REQUESTED (Mark 'x' and specify if required)			
☒ A. Individual	☐ B. Area	Number of Existing wells	Number of Proposed wells
			1
		Name(s) of field(s) or project(s) Hogback - Produced Water Injection	

VIII. CLASS AND TYPE OF WELL (see reverse)			
A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x', explain	D. Number of wells per type (if area permit)
II	D		

IX. LOCATION OF WELL(S) OR APPROXIMATE CENTER OF FIELD OR PROJECT										X. INDIAN LANDS (Mark 'x')	
A. Latitude		B. Longitude		Township and Range							
Deg	Min	Sec	Deg	Min	Sec	Twp	Range	Sec	1/4 Sec	Feet from	Line
						29N	16W	18	SE	1500	N
										Feet from	Line
										1760	W
										☒ Yes	☐ No

XI. ATTACHMENTS

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

FOR CLASSES I, II, III (and other classes) complete and submit on separate sheet(s) Attachments A — U (pp 2-6) as appropriate. Attach maps where required. List attachments by letter which are applicable and are included with your application:

XII. CERTIFICATION

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

A. Name and Title (Type or Print)	B. Phone No. (Area Code and No.)
Bradley W. Salzman (Agent)	505-324-0766
C. Signature	D. Date Signed
<i>Bradley W Salzman</i>	

LIST OF ATTACHMENTS

EPA UIC PERMIT APPLICATION
USG 18-43
1500' FNL 1760' FWL
SEC. 18, T29N, R16W
SAN JUAN COUNTY, NEW MEXICO

1. a) BLM Sundry Notice, Form 3160-5 Proposed Procedure
 b) Cost estimate
2. Location Maps
 a) Topographic Map - Farmington, New Mexico
 b) Hogback Field Map
3. Wellbore Schematic Diagram Proposed Water Injection Well
 USG 18-43
4. Offset Well Data
 a) Drilled & Abandoned
 Navajo 7A-1
 Navajo 7-4
 Navajo 18-13
 Navajo 18-21
 b) Produced & Abandoned
 Navajo 7-2
 Navajo 18-1
 Navajo 18-2
 Navajo 18-5
 Navajo 18-10
 c) Producing Wells
 USG 18-55
 USG 18-57
 Navajo 18A-1
 Navajo 18-3
 Navajo 18-4
 Navajo 18-6
 Navajo 18-7
 Navajo 18-8
 Navajo 18-9
 Navajo 18-11
 Navajo 18-12

5. a) Proposed Injection Well Operating Data
 b) Step Rate Testing Procedure and Analysis
6. Geologic Data
 - a) Hogback Field Summaries
 - b) USG 18-43 Water Quality - Confining Zones Study
 - c) Entrada TDS Study
 - d) Injection Water Analyses (Dakota)
7. USG 18-43
 - a) Electric Log
 - b) Mud Log
8. Proof of Public Notice
9. USG 18-43
 P & A Wellbore Schematic
10. Proof of Financial Responsibility

ATTACHMENT 1 A

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
Budget Bureau No. 1004-0135
Expires: March 31, 1993

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to deepen or reentry to a different reservoir.
Use "APPLICATION FOR PERMIT—" for such proposals

SUBMIT IN TRIPLICATE

1. Type of Well ☒ Oil Well ☐ Gas Well ☐ Other	5. Lease Designation and Serial No. I-89-IND-58
2. Name of Operator TIFFANY GAS COMPANY	6. If Indian, Allottee or Tribe Name NAVAJO
3. Address and Telephone No. P.O. Drawer 3307, Farmington, NM 87499 505-327-4902	7. If Unit or CA, Agreement Designation
4. Location of Well (Footage, Sec., T., R., M., or Survey Description) 1500' FNL & 1760' FWL Sec. 18-T29N-R16W 5189' KB & 5176' GR	8. Well Name and No. USG Section 18 #43
	9. API Well No. 30-045-26420
	10. Field and Pool, or Exploratory Area Hogback Pennsylvanian
	11. County or Parish, State San Juan Co., NM

12. **CHECK APPROPRIATE BOX(s) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA**

TYPE OF SUBMISSION	TYPE OF ACTION
☒ Notice of Intent	☐ Abandonment
☐ Subsequent Report	☐ Recompletion
☐ Final Abandonment Notice	☒ Plugging Back
	☐ Casing Repair
	☐ Altering Casing
	☐ Other _____
	☐ Change of Plans
	☐ New Construction
	☐ Non-Routine Fracturing
	☐ Water Shut-Off
	☒ Conversion to Injection
	☒ Dispose Water

(Note: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

13. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

This sundry notice is being submitted as part of the EPA permitting process for Class II, Type I produced water disposal wells as required by the United States Environmental Protection Agency Region IX, 75 Hawthorne Street, San Francisco, CA 94105-3901.

Tiffany Gas Co. proposes to plug back subject well & convert it to a water disposal well. Water to be disposed of is produced from the Hogback Dakota Formation from wells operated solely by Tiffany Gas Co.

1. Spot cement inside 7" casing from 6694' to 6198'. Tag TOC. Top of Akah @ 6450', Top of Desert Creek @ 6377', & Top of Ismay @ 6248'.

2. Spot cement inside 7" casing from 4186'-4086'. Top of Cutler @ 4136'.

3. Spot cement inside 7" casing from 2912'-2812'. Top of Chinle @ 2862'.

NOTE: Mud will be spotted between all cement plugs.

4. Perforate Entrada Disposal Zone from 2130'-2190'.

5. Set Baker Model 'D' Permanent Packer @ 2080' w/2 3/8" plastic coated tubing. Acidize perforations w/1000 gals. 15% HCL. Corrosion inhibited packer fluid will be spotted in 2 3/8" tubing & 7" casing annulus.

14. I hereby certify that the foregoing is true and correct

Signed Joel B. Berry Jr. Title General Partner Date 8/21/93 9/9/93

(This space for Federal or State office use)

Approved by _____ Title _____ Date _____
Conditions of approval, if any:

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

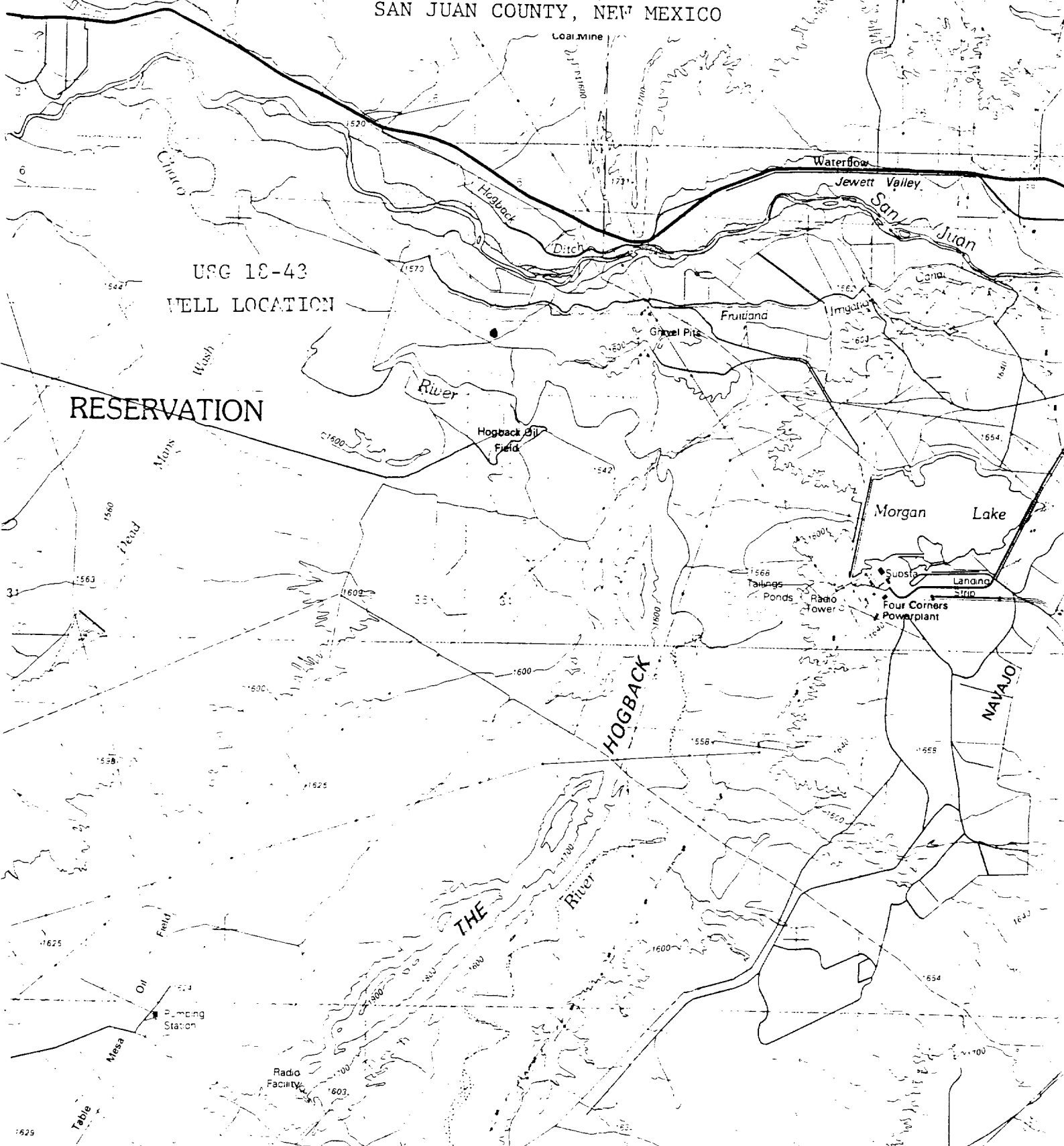
/

ATTACHMENT 1 B

LIST OF ATTACHMENTS
EPA UIC PERMIT APPLICATION
USG 18-43
1500' FNL 1760' FVL
SEC. 13, T29N, R16W
SAN JUAN COUNTY, NEW MEXICO

rock

HOGBACK



RESERVATION

USG 18-43
WELL LOCATION

FARMINGTON, NEW MEXICO-COLORADO
N3630-W10800/30x60

SCALE 1:100 000

1 CENTIMETER ON THE MAP REPRESENTS 1 KILOMETER ON THE GROUND
CONTOUR INTERVAL 20 METERS

1980

ATTACHMENT 2 B

NAVAJO — INDIAN — RESE

HOGBACK FIELD
T29N, R16W
San Juan Co., NM

T.D. 500' 1
'66

1
✱ Kd D.A'57

	8 serv 23		
Kd # D.A. 73 Service # 33		10,500' 1 66	
31 Kd # D.A. 73	Kd # D.A. 57		

KN1 PA 63 V

NAVAJO — INDIAN — RESE

1
Kg18 D.A.63

19' 1-4

74

79

1
KdD.A.67

P.A. 89

SI Kd/D.A. 69

HOGBACK FIELD

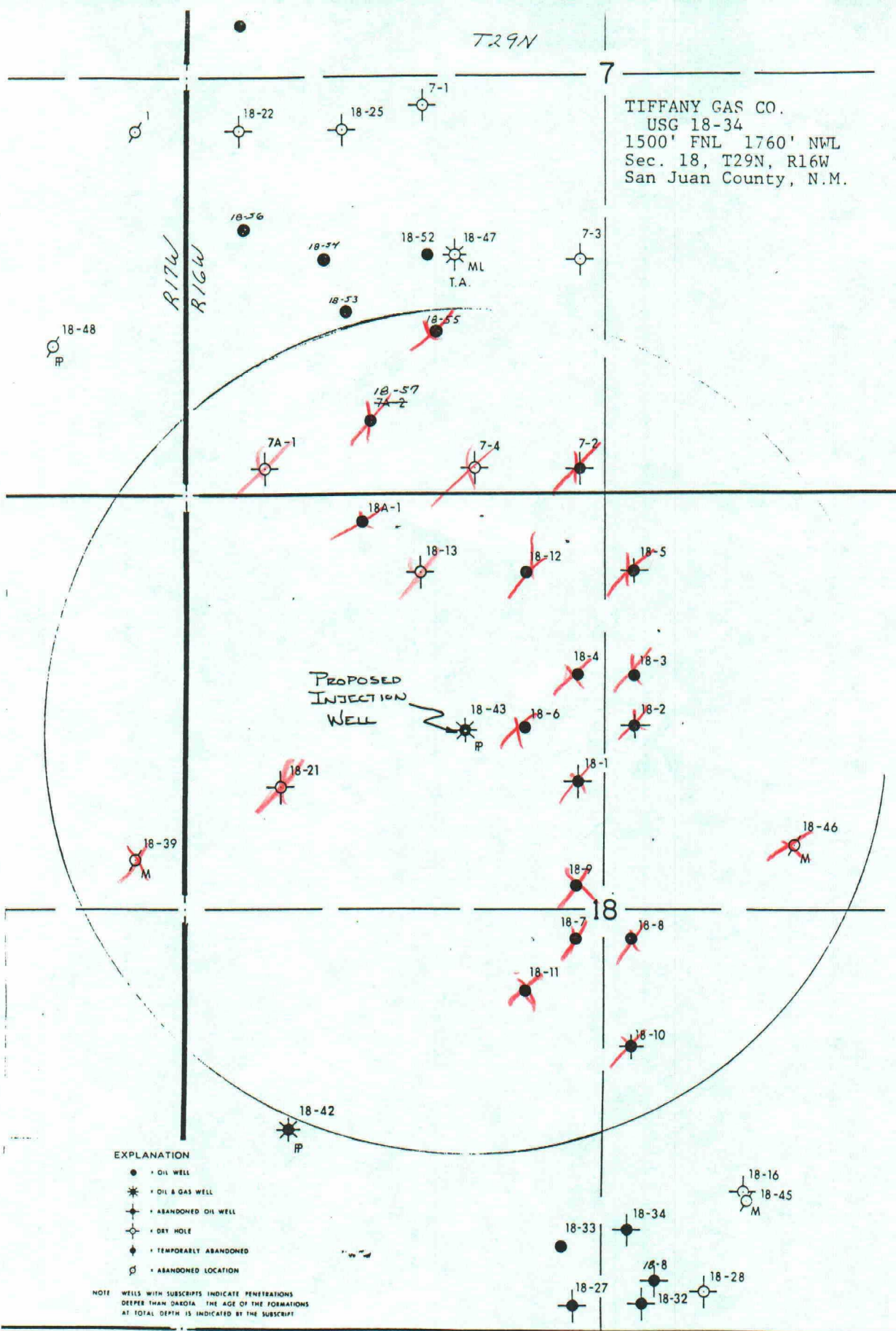
T29N, R16W
San Juan Co., NM

T 29 N

T29N

7

TIFFANY GAS CO.
USG 18-34
1500' FNL 1760' NWL
Sec. 18, T29N, R16W
San Juan County, N.M.



A

ATTACHMENT 4 A

WELLS DRILLED
AS DRYHOLES

Navajo 7A-1

Navajo 7-4

Navajo 18-13

Navajo 18-21

REMARKS

No Completion Report, Only
Sundry to P & A

No Completion Report,
Only Sundry to P & A

No P & A Report, Only
Sundry of Intent

No P & A Report

ATTACHMENT 5 A

EPA UIC PERMIT APPLICATION
USG 18-43
1500' FNL 1760' FWL
SEC. 18, T29N, R16W
SAN JUAN COUNTY, NEW MEXICO

INJECTION WELL OPERATING DATA

- A. Average water injection rate -/+ 600 BWIPD.
Maximum injection rate will be based on subsequent step rate testing. (See Attachment 5B).
- B. Initial injection pressure will be limited to 600 PSI. NMOC rules require a step rate during the first six (6) months of operation. Injection pressure limits will be determined at that time.
- C. Fracture pressure of the Entrada Sandstone in this well is estimated to be 1460 PSI. (See Attachment 6B).
- D. The injected fluid will consist of produced water from existing Dakota wells. All producers are connected to the central gathering and pumping facility. The water will then be pumped to the USG 18-43. Injection pressure control and volume metering will be affected at the injection wellhead.
- E. Produced water analyses are shown on Attachment 6 D.

ATTACHMENT 5 B

TIFFANY GAS COMPANY

USG Section 18 No. 43
1500' FNL & 1760' FWL
Section 18-T29N-R16W
San Juan County, New Mexico

GEOLOGIC DATA ON INJECTION AND CONFINING ZONES (CLASS II)

The proposed injection zone is the perforated interval 2130'-2190' KBM of the Entrada Sandstone. The Entrada Sandstone is composed of gray and tan-gray, fine-to-medium-grained, well-sorted, slightly calcareous sandstone beds of eolian origin with thin, dark gray-brown siltstone interbeds of inland sabkha and interdune origin. The thickness of the Entrada Sandstone is 64' with the top at 2128' KBM and the base at 2192' KBM. Fracture pressure of the Entrada Sandstone in this well is estimated to be 1460 psi.

The upper confining zone of the Entrada Sandstone is the Todilto Limestone. The Todilto Limestone is composed of brown, very fine-crystalline, dense limestone. Thickness of the Todilto Limestone is estimated 29' with the top at 2099' KBM.

The lower confining zone of the Entrada Sandstone is the Carmel Formation. The Carmel Formation is composed of a chocolate and red-brown, partly sandy shale. Thickness of the Carmel Formation is estimated 22' with the top at 2192' KBM.

Page two
TDS Entrada Ss.

USG Section 19 No. 17

SP Analysis for Entrada TDS

Measured Mud Data

Rm: 1.70 Ω @ 91° F
Depth of measured Rm: 2155'
Mud density: 13.8 lbs./gal.
Mean surface temperature: 60° F
Depth of analysis: 2050'
SP deflection: -25mv

Calculation

- 1) Temperature @ 2050': 89° F
(Chart Gen-2b)
- 2) Rm @ 89° F: 1.75 Ω
(Chart Gen-5)
- 3) Rmf @ 89° F: 0.79 Ω
(Chart Gen-3)
- 4) Rw @ 89° F: 0.35 Ω
(Chart SP-4)
- 5) TDS (NaCl) @ Rw 0.35 Ω @ 89° F: 15,250 ppm
(Chart Gen-5)

The average TDS number from SP analysis is 15,000 ppm. The TDS number of 7359 ppm reported in Tiffany Gas Company's initial application for injection was arrived at by averaging the data around the Hogback Field published in the New Mexico Bureau of Mines, Hydrologic Report No. 6. There are no Entrada Ss. water analysis data published, or available from well files for the Hogback Field.

The above calculations provide the best data available for the original water quality of the Entrada Ss. in the Hogback Field as they are derived from the logs of the initial wells penetrating that interval.

TIFFANY GAS COMPANY

Total Dissolved Solids Injection Interval (Entrada Ss.)

USG Section 18 No. 43 SWD
1500' FNL, 1760' FWL, Sec. 18-29N-16W
San Juan County, New Mexico

and

USG Section 19 No. 17 SWD
1850' FSL, 0790' FEL, Sec. 19-29N-16W
San Juan County, New Mexico

The total dissolved solids (TDS) in parts per million (NaCl) for the Entrada Sandstone have been calculated for the Hogback Field area using the spontaneous potential (SP) log analysis method.

Only two wells have SP logs across the Entrada Ss. within the field. They are the USG Section 19 No. 13 (SWNE 19-29N-16W) and the USG Section 19 No. 17 (NESE 19-29N-16W). Both were used in the analysis, and as expected, they calculated almost the same TDS. The following are the calculations using the SP of the USG Section 19 No. 13 and the USG Section 19 No. 17. Also attached are copies of the logs and all log analysis charts used.

USG Section 19 No. 13

SP Analysis for Entrada Ss. TDS

Measured Mud Data

Rm: 0.96Ω @ 128° F
Depth of measured Rm: 5337'
Mud density: 13.3 lbs./gal.
Mean surface temperature: 60° F
Depth of analysis: 1980'
SP deflection: -20mv

Calculation

- 1) Temperature @ 1980': 86° F
(Chart Gen-2b)
- 2) Rm @ 86° F: 1.42Ω
(Chart Gen-5)
- 3) Rmf @ 86° F: 0.70Ω
(Chart Gen-3)
- 4) Rw @ 86° F: 0.38Ω
(Chart SP-4)
- 5) TDS (NaCl) @ Rw 0.38Ω @ 86° F: 14,750 ppm
(Chart Gen-5)

TIFFANY GAS COMPANY

USG Section 18 No. 43 SWD

1500' FNL & 1760' FWL
Section 18-T29N-R16W
San Juan County, New Mexico

EPA ID

E. NAME AND DEPTH OF USDW's (CLASS II)

INJECTION WELL

The injection well (USG Section 18 No. 43) is located in the northwest quarter of Section 18, Township 29 North, Range 16 West, San Juan County, New Mexico. The following table lists the pertinent location data for the injection well.

<u>Well #</u>	<u>EPA #</u>	<u>Footage Locn.</u>	<u>GL Elev.</u>	<u>TD</u>	<u>Surface Fm.</u>
43	_____	1500'FNL & 1760'FWL	5176'	7283'	Mancos Shale

POTENTIAL AQUIFERS

The nearest well with a mechanical log available over the proposed injection interval is the USG Section 19 No. 17 (NESE 19-29N-16W). The log from this well has been marked with all potential aquifers and is included with this summary. The depths of these aquifers in the proposed injection well were projected from the USG Section 19 No. 17 and are listed below. The injection interval is marked with an asterisk (*).

USG Section 18 No. 43

<u>Aquifer</u>	<u>Top</u>	<u>Bottom</u>
Gallup Ss.	369'	419'
Dakota Ss.	835'	1042'
Morrison Fm.	1042'	1656'
Bluff Ss.	1656'	1979'
Entrada Ss.*	2128'	2188'

WATER QUALITY

Water quality for each of the above potential aquifers was determined from specific conductance maps published in the New Mexico Bureau of Mines and Technology, Hydrologic Report 6, dated 1983, and entitled "Hydrogeology and water resources of San Juan Basin, New Mexico" by W.J. Stone, F.P. Lyford, P.F. Frenzel, N.H. Mizell, and E.T. Padgett.

Photocopies of these maps are included with this summary.

No specific conductance map was published for the Bluff Ss. because of limited data. The water quality of the Bluff Ss. likely falls somewhere between that of the overlying Morrison Fm. and the underlying Entrada Ss. Within the area covered by this hydrologic report, no wells are known to derive their water exclusively from the Bluff Ss. The wells completed in the Bluff Ss. are also completed in either the Morrison Fm. or the Entrada Ss.

Total dissolved solids (TDS) in mg/L may be approximated by multiplying the specific conductance by 0.7. The following is a list of the aquifers in the area with their specific conductances (mhos/cm @ 25 C) and their calculated TDS (mg/L).

<u>Aquifer</u>	<u>Range Spec. Cond.</u>	<u>Ave. Spec. Cond.</u>	<u>TDS</u>
Gallup Ss.	3020 - 5220	4183	2928
Dakota Ss.	4280 - 4280	4280	2996
Morrison Fm.	5000 - 5000	5000	3500
Entrada Ss.	2220 - 20,000	10,513	7359

The total dissolved solids of each of the above aquifers is much higher than the desired amount for drinking water which is less than 500 mg/L. Therefore, none of the above aquifers may provide a source of drinking water in this area.

G. GEOLOGIC DATA ON INJECTION AND CONFINING ZONES (CLASS II)

The proposed injection zone is the interval from 2128' KBM to 2188' KBM of the Entrada Sandstone. The Entrada Sandstone is composed of gray and tan-gray, fine-to medium-grained, well-sorted, slightly calcareous sandstone beds of eolian origin with thin, dark gray-brown siltstone interbeds of inland sabkha and interdune origin. The thickness of the Entrada Sandstone is 60' with the top at 2128' KBM and the base at 2188' KBM. Fracture pressure of the Entrada Sandstone in this well is estimated to be 1460 psi.

The upper confining zone of the Entrada Sandstone is the Todilto Limestone. The Todilto Limestone is composed of brown, very fine-crystalline, dense limestone. Thickness of the Todilto Limestone is 33' with the top at 2095' KBM. Fracture pressure of the Todilto Limestone in this well is estimated to be 1430 psi.

The lower confining zone of the Entrada Sandstone is the Carmel Formation. The Carmel Formation is composed of a chocolate and red-brown, partly sandy shale. Thickness of

ATTACHMENT 6 D

UNICHEM INTERNATIONAL
P.O. BOX 1499 707 NORTH LEECH STREET
HOBBBS, NEW MEXICO 88240

Tiffany Oil & Gas
Drawer 3307
Farmington, NM 87499

Report Date: April 23, 1992
Lab In Date: April 16, 1992
Sample Date: April 10, 1992

Dear Jim Hicks

Listed below please find our water analysis report from Navaio Lease

~~1741~~ 18-57

Specific Gravity: 1.001
Total Dissolved Solids: 737
PH: 8.10
Ionic Strength: .014

CATIONS:

		mg/liter
Calcium:	(Ca++)	6
Magnesium:	(Mg++)	2
Sodium:	(Na+)	247
Iron (Total)	(Fe++)	0.00
Barium	(Ba++)	.80
Manganese:	(Mn++)	0.00
Resistivity:		

ANIONS:

Bicarbonate:	(HCO3-)	73
Carbonate:	(CO3--)	0
Hydroxide:	(OH-)	0
Sulfate:	(SO4--)	209
Chloride:	(Cl-)	200

GASES:

Carbon Dioxide:	(CO2)	0.0
Oxygen:	(O2)	*****
Hydrogen Sulfide:	(H2S)	1020.0

SCALE INDEX (Positive Value Indicates Scale Tendency) * indicates tests were not run.

Temperature	CaCO3 SI	CaSO4 SI
86F 30.0C	-.70	-21.43
104F 40.0C	-.41	-21.51
122F 50.0C	-.29	-21.51
140F 60.0C	-.11	-21.43
158F 70.0C	.04	-20.48
176F 80.0C	.21	-19.41

If you have any questions or require further information, please contact us.

Sincerely,



Sharon Wright
Laboratory Technician

cc:

cc: Don Bamert
Tom Moore

UNICHEM INTERNATIONAL
P.O. BOX 1499 707 NORTH LEECH STREET
HOBBS, NEW MEXICO 88240

Tiffany Oil & Gas
Drawer 3307
Farmington, NM 87499

Report Date: April 23, 1992
Lab In Date: April 16, 1992
Sample Date: April 10, 1992

Dear Jim Hicks

Listed below please find our water analysis report from Navaio Lease, #18-09 :

Specific Gravity: 1.001
Total Dissolved Solids: 1226
PH: 8.10
Ionic Strength: .023

CATIONS:

		mg/liter
Calcium:	(Ca++)	8
Magnesium:	(Mg++)	2
Sodium:	(Na+)	417
Iron (Total)	(Fe++)	0.00
Barium	(Ba++)	.30
Manganese:	(Mn++)	0.00
Resistivity:		

ANIONS:

Bicarbonate:	(HCO3-)	98
Carbonate:	(CO3--)	0
Hydroxide:	(OH-)	0
Sulfate:	(SO4--)	362
Chloride:	(Cl-)	340

GASES:

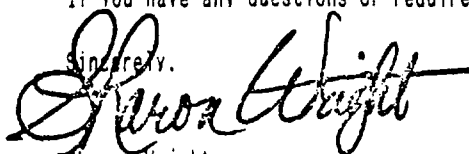
Carbon Dioxide:	(CO2)	0.0
Oxygen:	(O2)	*****
Hydrogen Sulfide:	(H2S)	510.0

SCALE INDEX (Positive Value Indicates Scale Tendency) * indicates tests were not run.

Temperature	CaCO3 SI	CaSO4 SI
86F 30.0C	-.47	-21.59
104F 40.0C	-.19	-21.74
122F 50.0C	-.05	-21.74
140F 60.0C	.11	-21.59
168F 70.0C	.29	-20.63
176F 80.0C	.46	-19.46

If you have any questions or require further information, please contact us.

Sincerely,



Sharon Wright
Laboratory Technician

cc:

cc: Don Bamert
Tom Moore

UNICHEM INTERNATIONAL
P.O. BOX 1499 707 NORTH LEECH STREET
HOBBS, NEW MEXICO 88240

Tiffany Oil & Gas
Drawer 3307
Farmington, NM 87499

Report Date: April 23, 1992
Lab In Date: April 16, 1992
Sample Date: April 10, 1992

Dear Jim Hicks

Listed below please find our water analysis report from Navaio Lease, #18-07:

Specific Gravity: 1.001
Total Dissolved Solids: 819
PH: 8.20
Ionic Strength: .015

=====

CATIONS:

		mg/liter
Calcium:	(Ca++)	7
Magnesium:	(Mg++)	2
Sodium:	(Na+)	272
Iron (Total)	(Fe++)	0.00
Barium	(Ba++)	.40
Manganese:	(Mn++)	0.00
Resistivity:		

ANIONS:

Bicarbonate:	(HCO3-)	73
Carbonate:	(CO3--)	0
Hydroxide:	(OH-)	0
Sulfate:	(SO4--)	265
Chloride:	(Cl-)	200

=====

GASES:

Carbon Dioxide:	(CO2)	0.0
Oxygen:	(O2)	*****
Hydrogen Sulfide:	(H2S)	476.0

=====

SCALE INDEX (Positive Value Indicates Scale Tendency) * indicates tests were not run.

Temperature		CaCO3 SI	CaSO4 SI
86F	30.0C	-.56	-22.50
104F	40.0C	-.27	-22.66
122F	50.0C	-.14	-22.66
140F	60.0C	.02	-22.50
168F	70.0C	.20	-21.54
176F	80.0C	.37	-20.37

If you have any questions or require further information, please contact us.

Sincerely,


Sharon Wright
Laboratory Technician

cc:

bc: Don Bamert
Tom Moore

UNICHEM INTERNATIONAL
P.O. BOX 1499 707 NORTH LEECH STREET
HOBBS, NEW MEXICO 88240

Tiffany Oil & Gas
Drawer 3307
Farmington, NM 87499

Report Date: April 23, 1992
Lab In Date: April 16, 1992
Sample Date: April 10, 1992

Dear Jim Hicks

Listed below please find our water analysis report from Navaio Lease #18-3

Specific Gravity: 1.001
Total Dissolved Solids: 1238
PH: 8.10
Ionic Strength: .024

CATIONS:

		mg/liter
Calcium:	(Ca++)	9
Magnesium:	(Mg++)	3
Sodium:	(Na+)	408
Iron (Total)	(Fe++)	0.00
Barium	(Ba++)	.10
Manganese:	(Mn++)	0.00
Resistivity:		

ANIONS:

Bicarbonate:	(HCO3-)	98
Carbonate:	(CO3--)	0
Hydroxide:	(OH-)	0
Sulfate:	(SO4--)	459
Chloride:	(Cl-)	260

GASES:

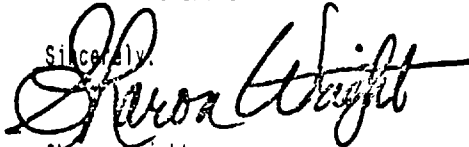
Carbon Dioxide:	(CO2)	0.0
Oxygen:	(O2)	*****
Hydrogen Sulfide:	(H2S)	476.0

SCALE INDEX (Positive Value Indicates Scale Tendency) * indicates tests were not run.

Temperature	CaCO3 SI	CaSO4 SI
86F 30.0C	-.41	-20.70
104F 40.0C	-.12	-20.85
122F 50.0C	.01	-20.85
140F 60.0C	.17	-20.70
168F 70.0C	.35	-19.75
176F 80.0C	.52	-18.59

If you have any questions or require further information, please contact us.

Sincerely,



Sharon Wright
Laboratory Technician

cc:

bc: Don Bamert
Tom Moore

P.O. BOX 1499 UNICHEM INTERNATIONAL 707 NORTH LEECH STREET
HOBBS, NEW MEXICO 88240

Tiffany Oil & Gas
Drawer 3307
Farmington, NM 87499

Report Date: April 23, 1992
Lab In Date: April 16, 1992
Sample Date: April 10, 1992

Dear Jim Hicks

Listed below please find our water analysis report from Navaio Lease #18-11 :

Specific Gravity: 1.001
Total Dissolved Solids: 962
PH: 8.30
Ionic Strength: .018

CATIONS:

		mg/liter
Calcium:	(Ca++)	10
Magnesium:	(Mg++)	3
Sodium:	(Na+)	329
Iron (Total)	(Fe++)	0.00
Barium	(Ba++)	.20
Manganese:	(Mn++)	0.00
Resistivity:		

ANIONS:

Bicarbonate:	(HCO3-)	49
Carbonate:	(CO3--)	0
Hydroxide:	(OH-)	0
Sulfate:	(SO4--)	251
Chloride:	(Cl-)	320

GASES:

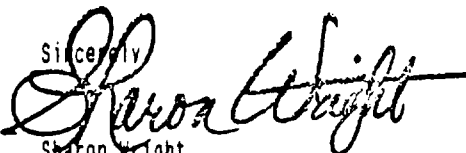
Carbon Dioxide:	(CO2)	0.0
Oxygen:	(O2)	*****
Hydrogen Sulfide:	(H2S)	408.0

SCALE INDEX (Positive Value Indicates Scale Tendency) * indicates tests were not run.

Temperature	CaCO3 SI	CaSO4 SI
86F 30.0C	-.50	-22.56
104F 40.0C	-.21	-22.72
122F 50.0C	-.07	-22.72
140F 60.0C	.09	-22.56
168F 70.0C	.26	-21.60
176F 80.0C	.44	-20.42

If you have any questions or require further information, please contact us.

Sincerely,



Sharon Wright
Laboratory Technician

cc:

bc: Don Bamert
Tom Moore

UNICHEM INTERNATIONAL
P.O. BOX 1499 707 NORTH LEECH STREET
HOBBS, NEW MEXICO 88240

Tiffany Oil & Gas
Drawer 3307
Farmington, NM 87499

Report Date: April 23, 1992
Lab In Date: April 16, 1992
Sample Date: April 10, 1992

Dear Jim Hicks

Listed below please find our water analysis report from Navaio Lease, #18-6

Specific Gravity: 1.001
Total Dissolved Solids: 1385
PH: 8.10
Ionic Strength: .027

CATIONS:

		mg/liter
Calcium:	(Ca++)	9
Magnesium:	(Mg++)	3
Sodium:	(Na+)	455
Iron (Total)	(Fe++)	0.00
Barium	(Ba++)	0.00
Manganese:	(Mn++)	0.00
Resistivity:		

ANIONS:

Bicarbonate:	(HCO3-)	98
Carbonate:	(CO3--)	0
Hydroxide:	(OH-)	0
Sulfate:	(SO4--)	570
Chloride:	(Cl-)	250

GASES:

Carbon Dioxide:	(CO2)	0.0
Oxygen:	(O2)	*****
Hydrogen Sulfide:	(H2S)	510.0

SCALE INDEX (Positive Value Indicates Scale Tendency) * indicates tests were not run.

Temperature		CaCO3 SI	CaSO4 SI
86F	30.0C	-.44	-21.27
104F	40.0C	-.15	-21.48
122F	50.0C	-.01	-21.48
140F	60.0C	.13	-21.27
168F	70.0C	.34	-20.30
176F	80.0C	.52	-19.06

If you have any questions or require further information, please contact us.

Respectfully,


Sharon Wright
Laboratory Technician

cc:

bc: Don Bamert
Tom Moore

UNICHEM INTERNATIONAL
P.O. BOX 1499 707 NORTH LEECH STREET
HOBBBS. NEW MEXICO 88240

Tiffany Oil & Gas
Drawer 3307
Farmington . NM 87499

Report Date: April 23, 1992
Lab In Date: April 16, 1992
Sample Date: April 10, 1992

Dear Jim Hicks

Listed below please find our water analysis report from Navaio Lease . #18-4 :

Specific Gravity: 1.000
Total Dissolved Solids: 605
PH: 8.00
Ionic Strength: .011

=====

CATIONS:

		mg/liter
Calcium:	(Ca++)	12
Magnesium:	(Mg++)	3
Sodium:	(Na+)	194
Iron (Total)	(Fe++)	1.30
Barium	(Ba++)	1.10
Manganese:	(Mn++)	0.00
Resistivity:		

ANIONS:

Bicarbonate:	(HCO3-)	73
Carbonate:	(CO3--)	0
Hydroxide:	(OH-)	0
Sulfate:	(SO4--)	140
Chloride:	(Cl-)	183

=====

GASES:

Carbon Dioxide:	(CO2)	0.0
Oxygen:	(O2)	*****
Hydrogen Sulfide:	(H2S)	578.0

=====

SCALE INDEX (Positive Value Indicates Scale Tendency) * indicates tests were not run.

Temperature		CaCO3 SI	CaSO4 SI
86F	30.0C	-.49	-21.94
104F	40.0C	-.21	-22.03
122F	50.0C	-.08	-22.03
140F	60.0C	.10	-21.94
168F	70.0C	.25	-20.99
176F	80.0C	.42	-19.91

If you have any questions or require further information, please contact us.

Sincerely,


Sharon Wright
Laboratory Technician

cc:

bc: Don Bamert
Tom Moore

UNICHEM INTERNATIONAL
P.O. BOX 1499 707 NORTH LEECH STREET
HOBBS, NEW MEXICO 88240

Tiffany Oil & Gas
Drawer 3307
Farmington, NM 87499

Report Date: April 23, 1992
Lab In Date: April 16, 1992
Sample Date: April 10, 1992

Dear Jim Hicks

Listed below please find our water analysis report from Navaio Lease, #18A-1

Specific Gravity: 1.000
Total Dissolved Solids: 599
PH: 8.10
Ionic Strength: .010

CATIONS:

		mg/liter
Calcium:	(Ca++)	8
Magnesium:	(Mg++)	2
Sodium:	(Na+)	198
Iron (Total)	(Fe++)	14.60
Barium	(Ba++)	.70
Manganese:	(Mn++)	0.00
Resistivity:		

ANIONS:

Bicarbonate:	(HCO3-)	98
Carbonate:	(CO3--)	0
Hydroxide:	(OH-)	0
Sulfate:	(SO4--)	93
Chloride:	(Cl-)	200

GASES:

Carbon Dioxide:	(CO2)	0.0
Oxygen:	(O2)	*****
Hydrogen Sulfide:	(H2S)	442.0

SCALE INDEX (Positive Value Indicates Scale Tendency) * indicates tests were not run.

Temperature		CaCO3 SI	CaSO4 SI
86F	30.0C	-.45	-22.51
104F	40.0C	-.17	-22.60
122F	50.0C	-.04	-22.60
140F	60.0C	.14	-22.51
168F	70.0C	.29	-21.57
176F	80.0C	.46	-20.48

If you have any questions or require further information, please contact us.

Sincerely,


Sharon Wright
Laboratory Technician

cc:

cc: Don Bamert
Tom Moore

UNICHEM INTERNATIONAL
P.O. BOX 1499 707 NORTH LEECH STREET
HOBBS, NEW MEXICO 88240

Tiffany Oil & Gas
Drawer 3307
Farminaton , NM 87499

Report Date: April 23, 1992
Lab In Date: April 16, 1992
Sample Date: April 10, 1992

Dear Jim Hicks

Listed below please find our water analysis report from Navaio Lease , #18-12 :

Specific Gravity: 1.001
Total Dissolved Solids: 928
PH: 8.40
Ionic Strength: .018

CATIONS:

		mg/liter
Calcium:	(Ca++)	7
Magnesium:	(Mg++)	2
Sodium:	(Na+)	304
Iron (Total)	(Fe++)	0.00
Barium	(Ba++)	.30
Manganese:	(Mn++)	0.00
Resistivity:		

ANIONS:

Bicarbonate:	(HCO3-)	73
Carbonate:	(CO3--)	0
Hydroxide:	(OH-)	0
Sulfate:	(SO4--)	376
Chloride:	(Cl-)	167

GASES:

Carbon Dioxide:	(CO2)	0.0
Oxygen:	(O2)	*****
Hydrogen Sulfide:	(H2S)	510.0

SCALE INDEX (Positive Value Indicates Scale Tendency) * indicates tests were not run.

Temperature	CaCO3 SI	CaSO4 SI
86F 30.0C	-.38	-21.50
104F 40.0C	-.09	-21.66
122F 50.0C	.04	-21.66
140F 60.0C	.20	-21.50
168F 70.0C	.38	-20.54
176F 80.0C	.55	-19.38

If you have any questions or require further information, please contact us.

Sincerely

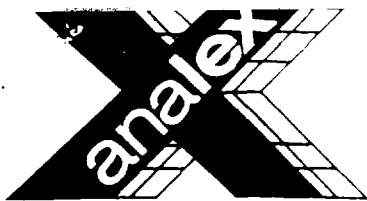

Sharon Wright
Laboratory Technician

cc:

cc: Don Bamert
Tom Moore

ATTACHMENT 7 A

ATTACHMENT 7 B



DIVISION OF XCO

Well File.

303/863-0014
DENVER, COLORADO

COMPANY

Well Name USG SECTION 18 #43 Job # 85373
Location SEC 18 T29N R16W SAN JUAN Co. NEW MEXICO St
Elevation GL 5176' KB 5190' Spud 7/18/85 Finish _____
Total Depth _____ Interval Logged _____
Pump Stroke-Length-Pump #1 8" Pump #2 14"
Pump Liner-Diameter-Pump #1 6 1/2" Pump #2 5 1/2"

LOGGING GEOLOGISTS

DORAN ADAMS

JOHN EVANS

COMPANY AND RIG PERSONNEL

Company Geologist: TERRI OLSONCompany Foreman: TONY ZAREMBADrilling Company: AZTEC WELL SERVICING #222Tool Pusher: DON LOCKHARTType of Mud: DISPERSED-WEIGHTED

SERVICES PERFORMED

CONVENTIONAL LOGGING UNIT WITH CONTINUOUS SAMPLINGFID TOTAL HYDROCARBON ANALYZER AND FID GAS CHROMATOGRAPH

HOLE SIZE

DEPTH

12 1/2"

312'

12 1/2"

CASING RECORD

Depth

Size

Date

311'

13.5/8"

7/20/85

SYMBOLS



ANHYDRITE



CALCITE



CHERT



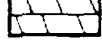
CONGLOMERATE



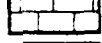
COAL



DOLOMITE



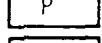
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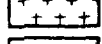
LIMESTONE



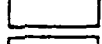
MARLSTONE



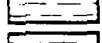
PYRITE



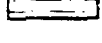
SALT



SANDSTONE



SHALE



SILTSTONE



BENTONITIC



CALCAREOUS



CARBONACEOUS



CAVINGS



DOLOMITIC



FOSSILS



GLAUCONITIC



GAS SAMPLES



GROUTS



SLUDGE



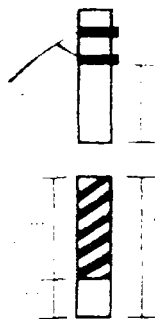
VERY POOR SAMPLES



STRINGERS

ABBREVIATIONS

CG - Connection Gas
CGR - Casing Gas
DST - Downhole Survey
DST - Downhole Test
A - Air
W - Water
M - Mud
G - Gas
S - Solids
P - Pressure
T - Temperature
M - Moisture
C - Clay
S - Sand
G - Gravel
L - Limestone
D - Dolomite
C - Chert
A - Anhydrite
Ca - Calcite
Mg - Magnesium
Fe - Iron
Cu - Copper
Zn - Zinc
Pb - Lead
Ni - Nickel
Co - Cobalt
Mn - Manganese
K - Potassium
Na - Sodium
Cl - Chlorine
Br - Bromine
I - Iodine
F - Fluorine
O - Oxygen
H - Hydrogen
N - Nitrogen
C - Carbon



Gas

Chromatograph

(Attenuation scale is 100X)
(1%) (1%) (10%)C1 - Methane
C2 - Ethane
C3 - Propane
IC4 - Isobutane
nC4 - Normal Butane

SHOW

Continuous Mud Gas

(Attenuation scale is X100)

1% by vol C1 in air = 100 units

10 UNITS 100 UNITS 1000 UNITS

1% 1% 10%

X-X-Cuttings Gas-X-X

Lithology

Descriptions,

Remarks

and

Observations

Lithology

DST INTERVAL
DEPTH
INTERVAL CORDED

Rate of Penetration

min/ft x ft/hr





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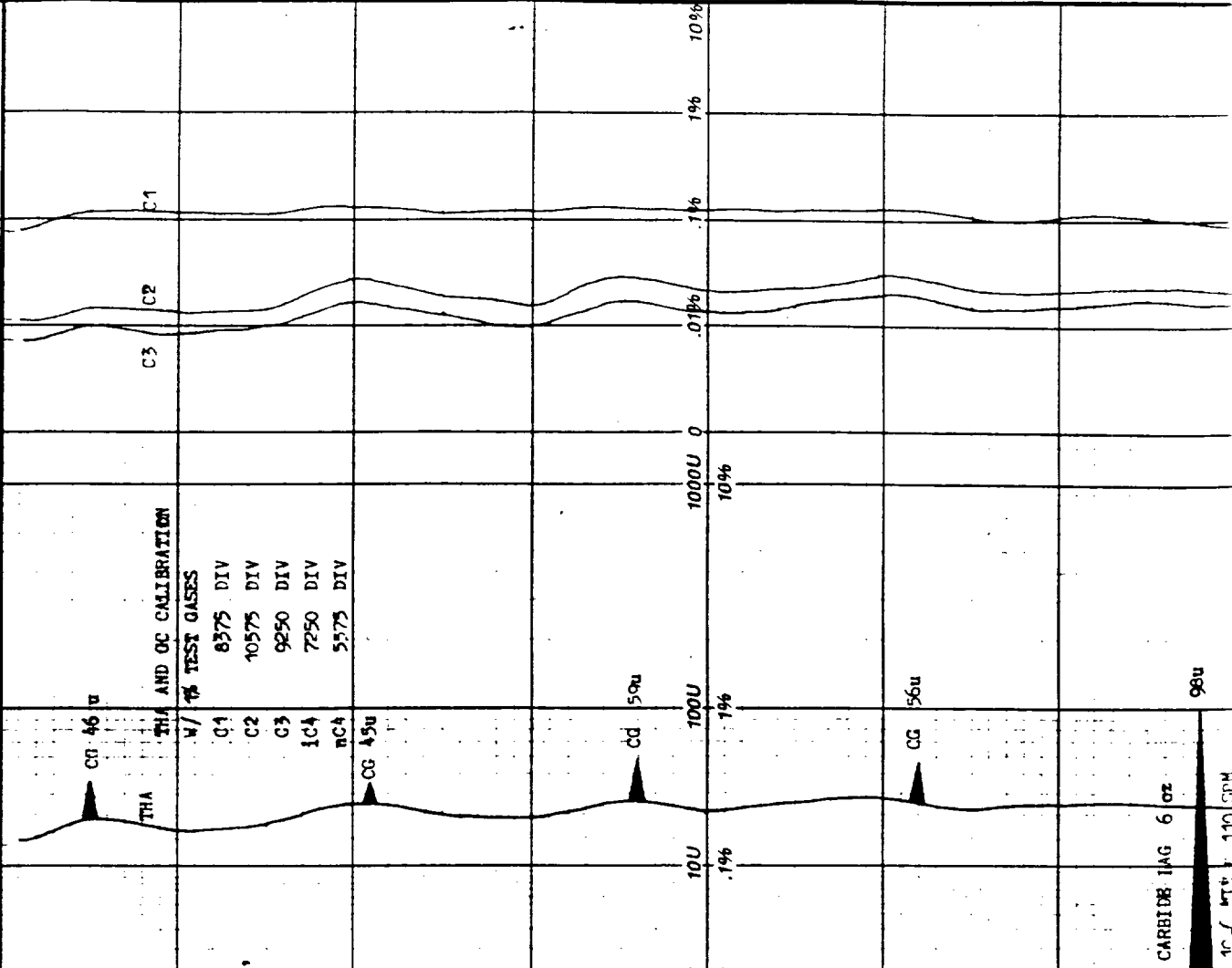
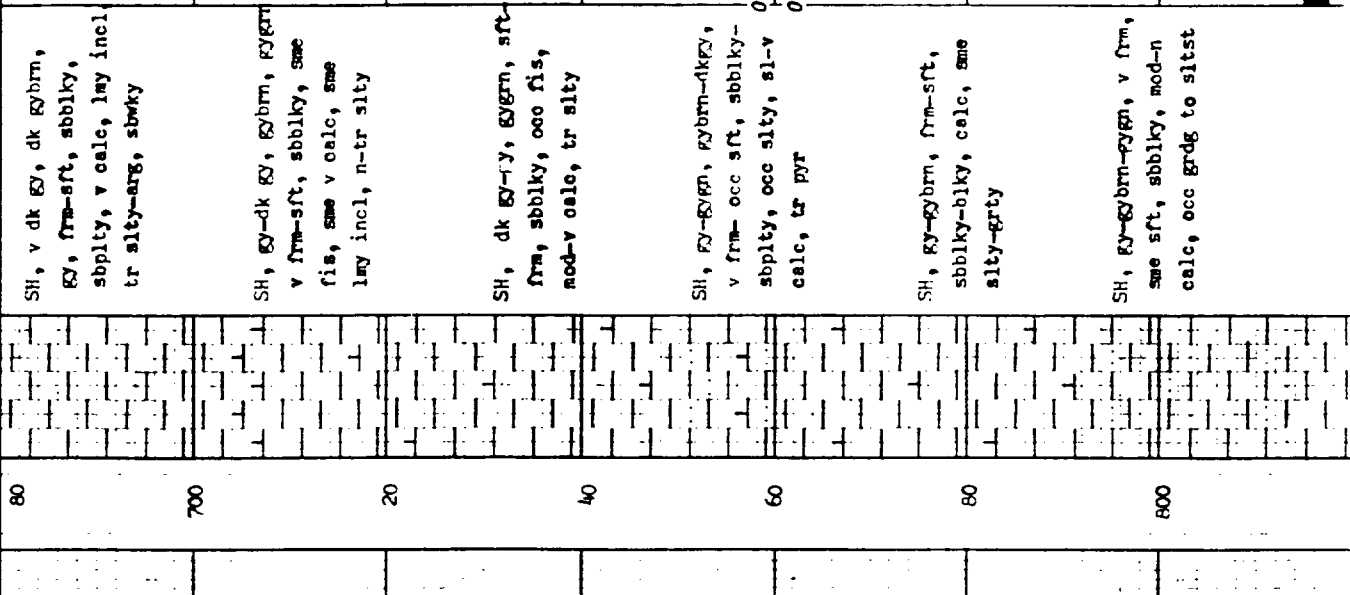
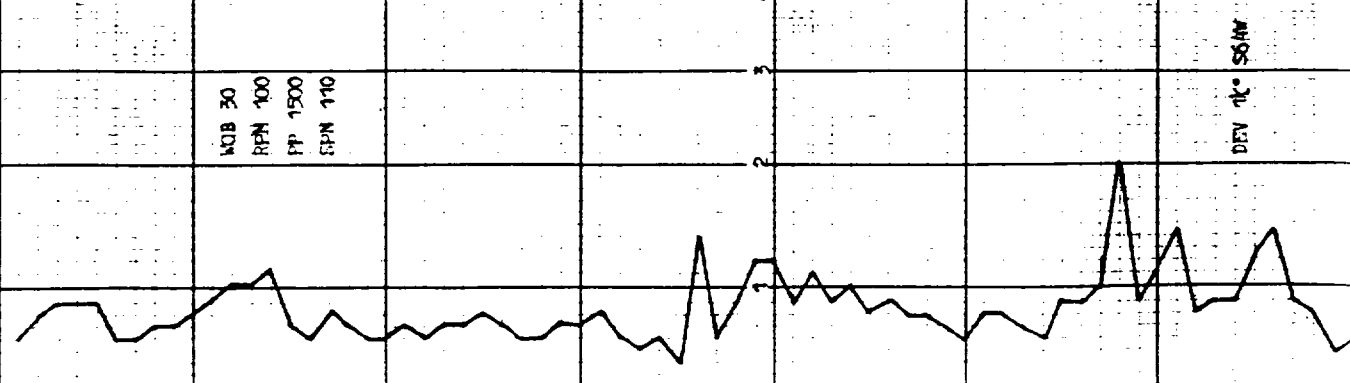
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RATE OF PENETRATION
m/f ☒ f/hr ☐D E P T T H
DSTGRAPHIC
LITHOLITHOLOGY
DESCRIPTION
AND REMARKSCONTINUOUS MUD GAS (back up scale X100)
10 UNITS 100 UNITS 1000 UNITS
1% 1% 1%
-X-X-X-X- CUTTING GAS -X-X-X-X-X-X-X-
S H O W I F GGAS CHROMATOGRAPH
METHANE-C1
ETHANE-C2
PROPANE-C3 .01
ISO-BUTANE-IC4
N-BUTANE-NC4
1.0 10

DEV 12-50/HR

CARBIDE TAG 6 oz

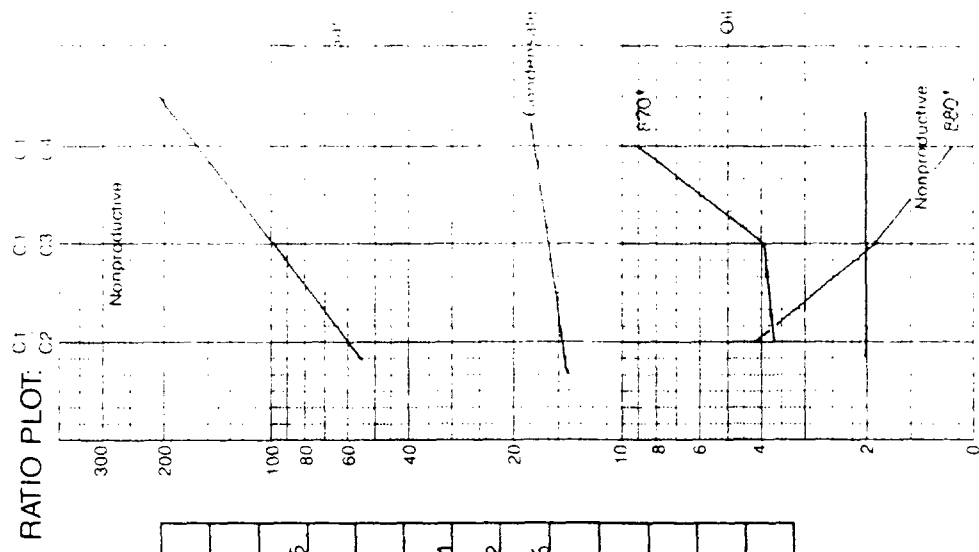
100 1000 10000 100000

SHOW REPORT# 1 Formation DAKOTA Time 2 AM Date 7/20/85 RATIO PLOT: C1 C2 C3 C4

Depth Interval from 868' to 890' with x liberated x produced gas

Gross Ft	22	Net Ft	16
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C. F. P.	DEPTH	MIN/FT	TOTAL GAS		GAS CHROMATOGRAPHY %				SHOW GAS MINUS BACKGROUND				
			UNITS	% M.E.	C1	C2	C3	Σ C3, C4	C1 C2	C1 C3	C1 C4		
	BACKGROUND	.8	30	.30	.081	.023	.017	—					
	870	1.2	100	1.00	.074	.02	.012	.000			3.7	3.9	9.25
	874	.7	375	1.75	.095	.022	.06	.005			4.1	1.6	.3
	878	.6	800	8.00	.2	.049	.128	.005			4.1	1.5	.3
	880	.6	700	7.00	.17	.04	.093	.054			4.25	1.8	.31
	884	.6	350	3.50	.077	.02	.04	.024			3.85	1.9	.32
	890	.8	265	2.65	.072	.016	.036	.02			3.78	2	.36
	BACKGROUND	.6	100	1.00	.047	.012	.027	.158					



Analyst, author and does not guarantee the accuracy or correctness of this data and interpretation. Analyst shall not be held liable or responsible for any loss, cost, damage or expense resulting or sustained by customer resulting from the use of this information in determining the use of any of its agents, servants or employees.

GAS RATIO EVALUATION											
	oil	gas	cond	life	wet						
LITHOLOGY TYPE	SS	SH	SLIST	LS	DOL	Other					
ψ_0 ()	(100)	()	()	()	()	()					
Color	wh-trasl		Gran/Xtal Size	f-m	Shape	stang-sbrd					
POROSITY	n	p	m	g	m-n	intrag	intra				
STAIN	Color	blk (dd)	even	X	spotted	pinpoint					
FLUORESCENCE	Color	none	even		spotted	pinpoint					
CHLOROTRHENE CUT	Color	none	Development			Residual					
CUT FLUORESCENCE	Color	none	Development			Residual					
MUD PROPERTIES	WI	9.4	FV	4.5	fil	B.O	%Oil	Q	Cl	300	ph 10.5
REMARKS	BACKGROUND GAS WAS NOT SUBTRACTED OUT IN CALCULATING THE SHOW GAS										
	THE LOW SHOW VALUES OF C1, C2 AND C3.										



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RATE OF PENETRATION
m/f ☒ 1/hr ☐

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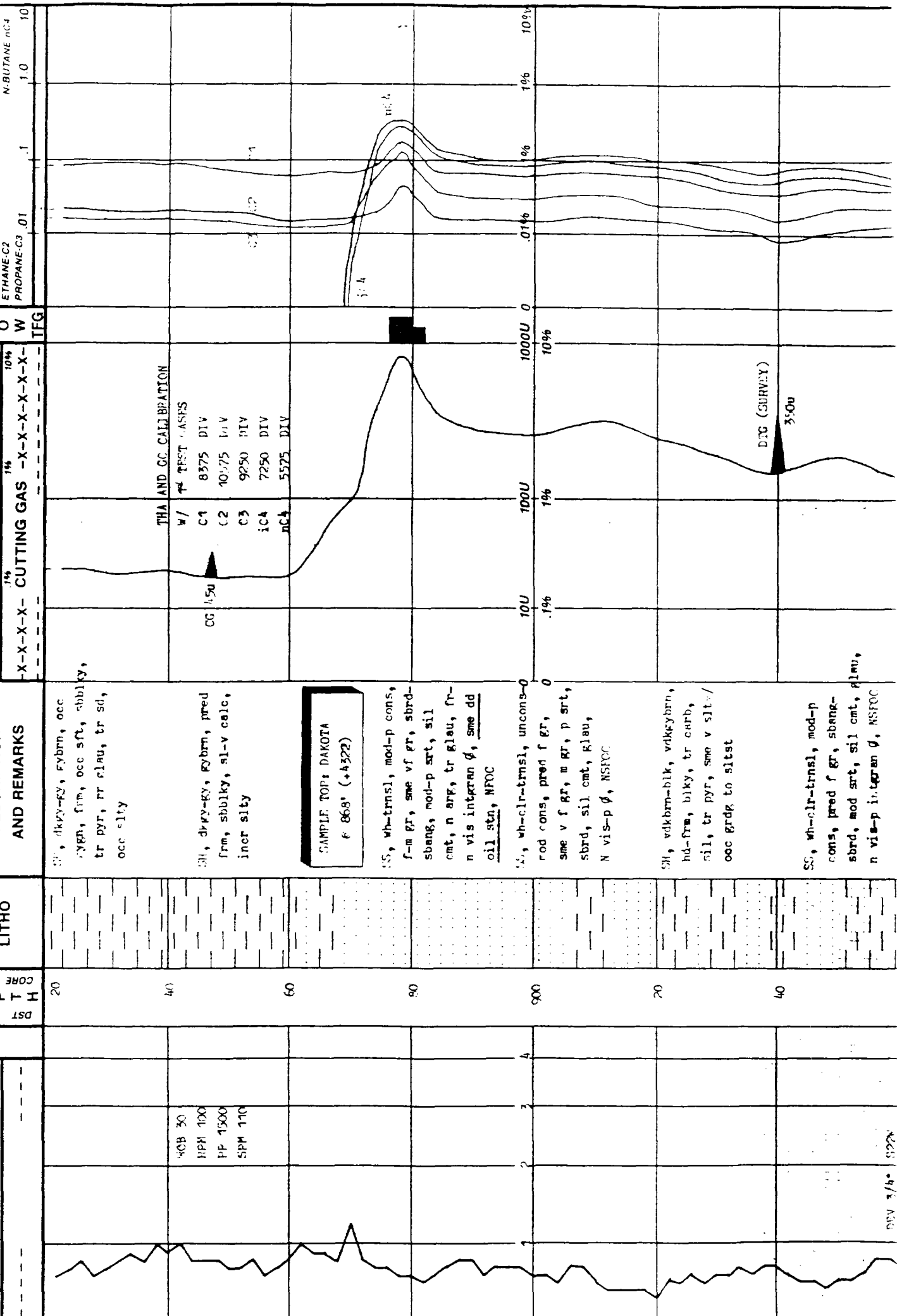
GRAPHIC LITHO

LITHOLOGY DESCRIPTION AND REMARKS

CONTINUOUS MUD GAS (back up scale X100)
100 UNITS 1% 10%
-X-X-X-X- CUTTING GAS -X-X-X-X-X-X-X-
100 UNITS 1% 10%
1000 UNITS 1% 10%
10% 1000 UNITS 1% 10%

S H O W T F G

GAS CHROMATOGRAPH
METHANE-C1
ETHANE-C2
PROPANE-C3
ISO BUTANE iC4
N-BUTANE nC4





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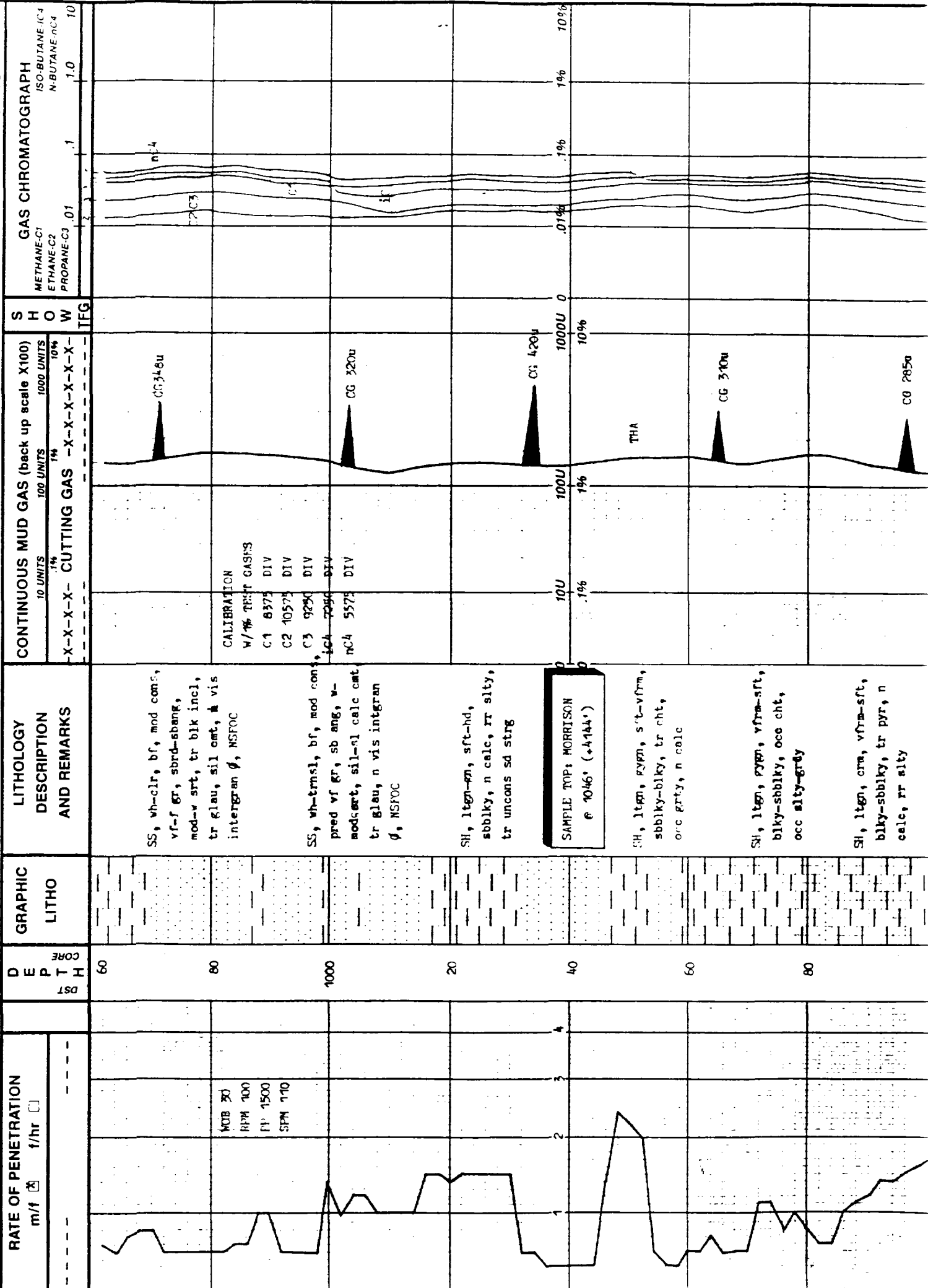
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RATE OF PENETRATION
m/f ☒ f/hr ☐

DEV 3/4" 56W

WOB 30

RPM 100

PP 1500

SPM 110

ST
T
H

1100

20

40

60

80

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GRAPHIC
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DESCRIPTION
AND REMARKS

CONTINUOUS MUD GAS (back up scale X100)

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GAS CHROMATOGRAPH

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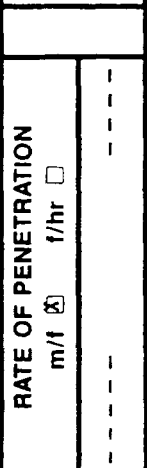
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DEV 1* S34W
NOB 30
RPM 100
PP 1500
SPM 110

D E P
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C O R E

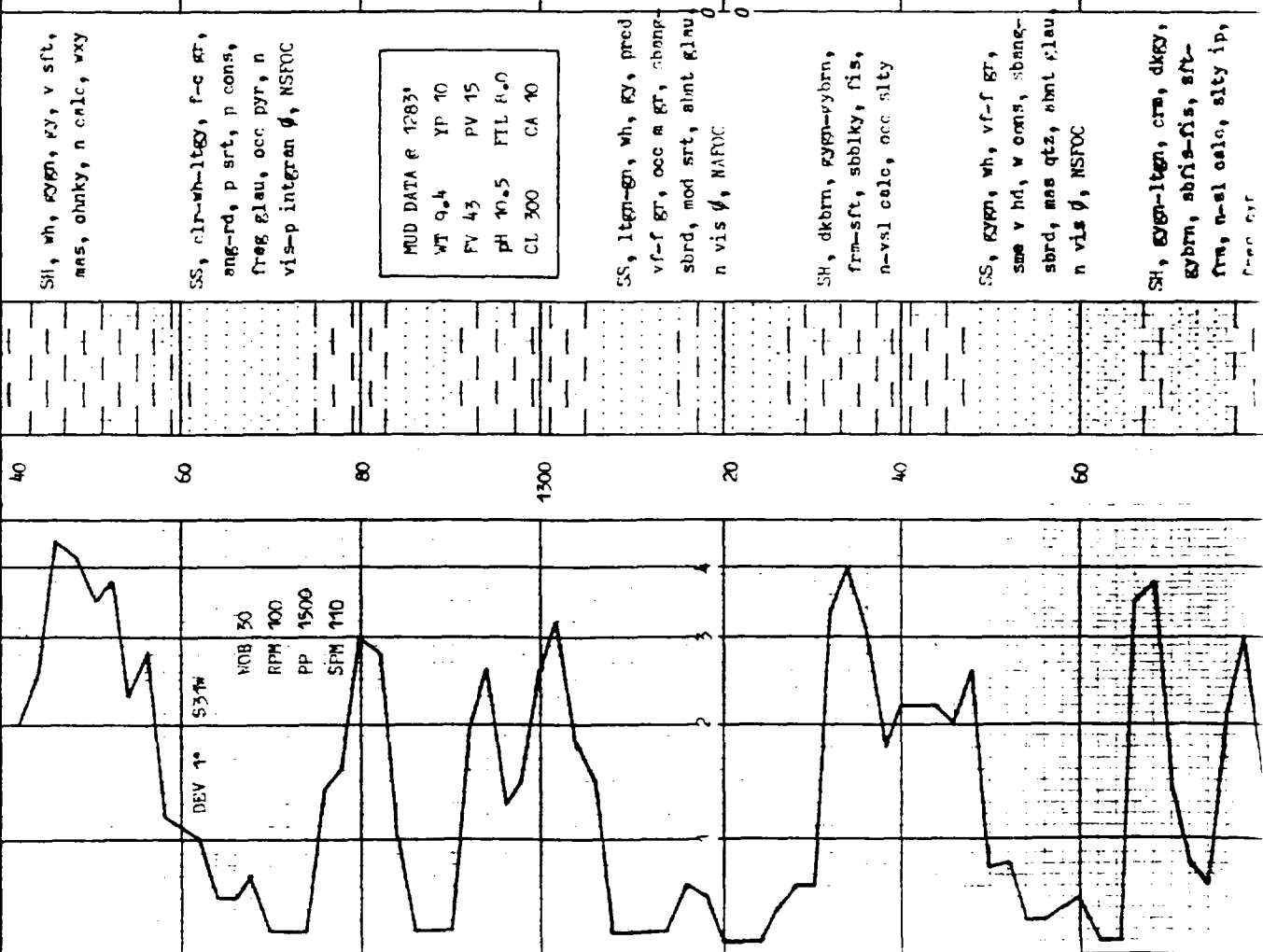
GRAPHIC
LITHO

LITHOLOGY
DESCRIPTION
AND REMARKS

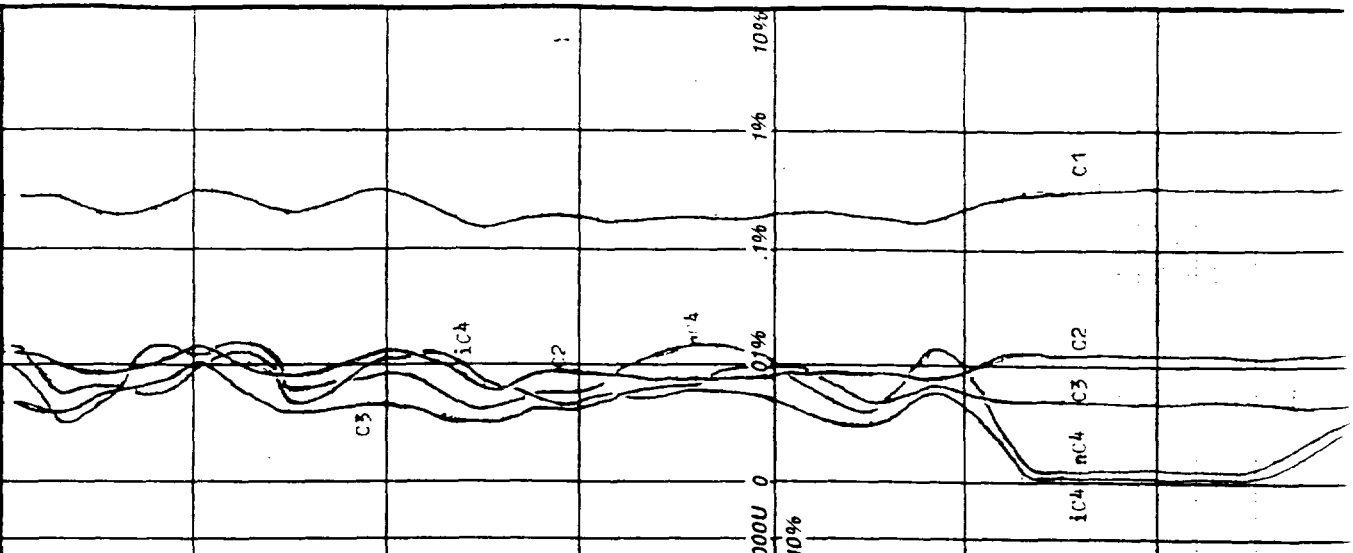
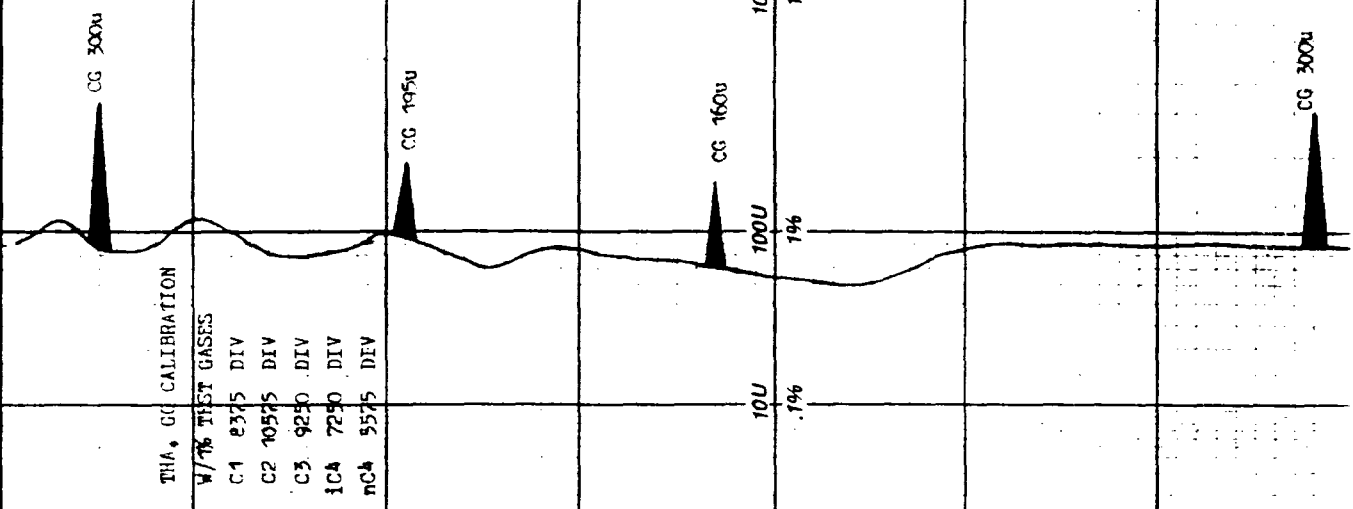
CONTINUOUS MUD GAS (back up scale X100)
10 UNITS 100 UNITS 1000 UNITS
1% 1% 1%
-X-X-X-X- CUTTING GAS -X-X-X-X-X-X-X-
THA, GC CALIBRATION
W/1% TEST GASES
C1 2375 DIV
C2 10575 DIV
C3 9250 DIV
ICA 7250 DIV
nC4 5575 DIV

S H O W
I F G

GAS CHROMATOGRAPH
METHANE-C1
ETHANE-C2
PROPANE-C3
ISO-BUTANE-IC4
N-BUTANE-nC4
1.0
0.1
0.01



SH, wh, spon, py, v sft, mas, chunky, n calc, wxy
SS, clr-wh-ltgy, f-c gr, ang-rd, p srt, p cons, frog glau, occ pyr, n vis-p integran ϕ , NSFOC
MUD DATA @ 1283'
WT 9.4 YP 10
PV 43 PV 15
pH 10.5 FTL 8.0
CL 300 CA 10
SS, ltgr-gr, wh, gy, pred vf-f gr, occ m gr, shang-sbrd, mod srt, abnt glau, n vis ϕ , NAROC
SH, dkbrn, spon-sybrn, frm-sft, sbblky, fls, n-val calc, occ slty
SS, spon, wh, vf-f gr, spon v hd, w cons, shang-sbrd, mas qtz, abnt glau, n vis ϕ , NSFOC
SH, spon-ltgr, ora, dkgy, spon, sbbls-fls, sft-frm, n-val calc, slty ip, n vis ϕ





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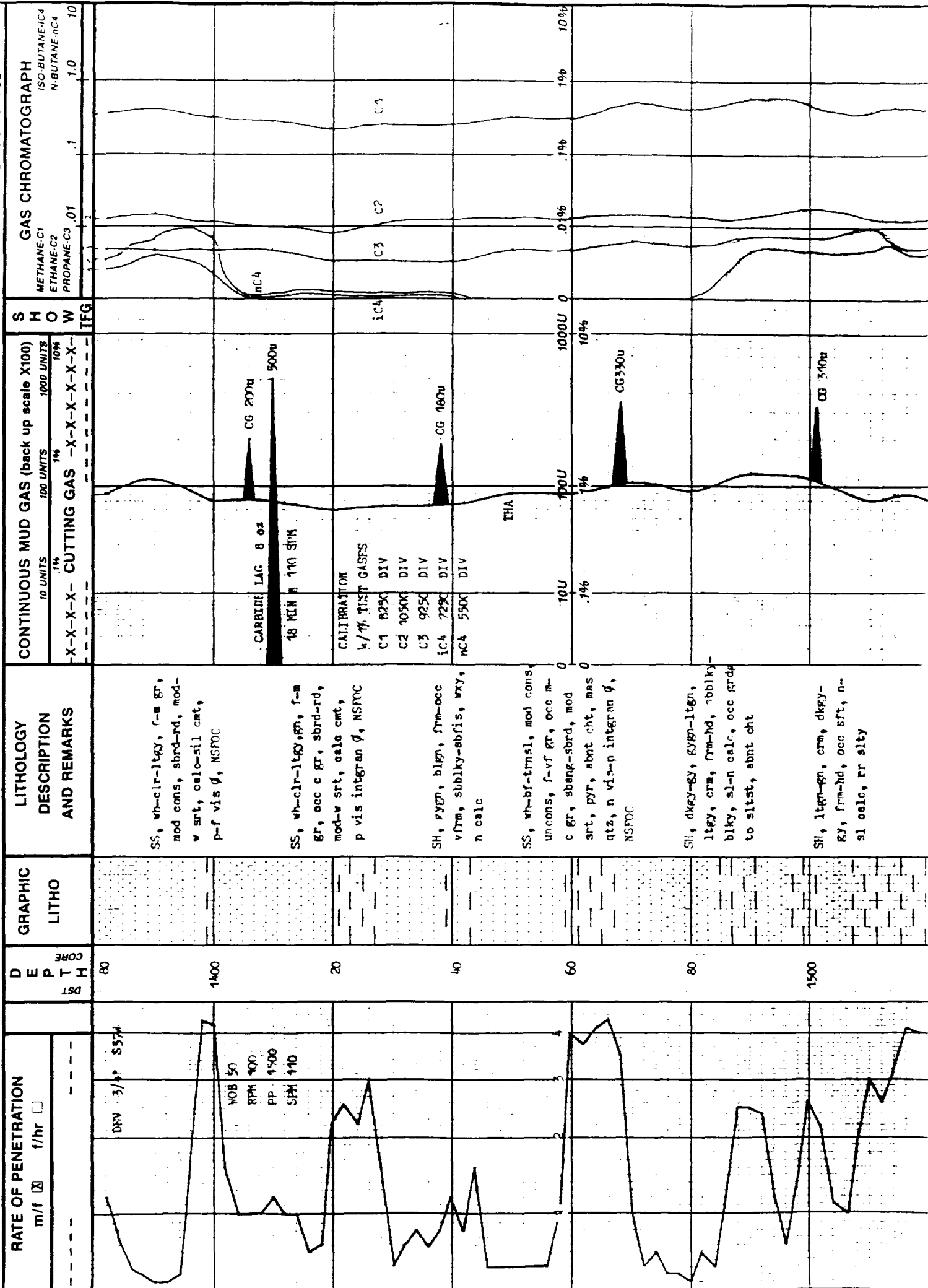
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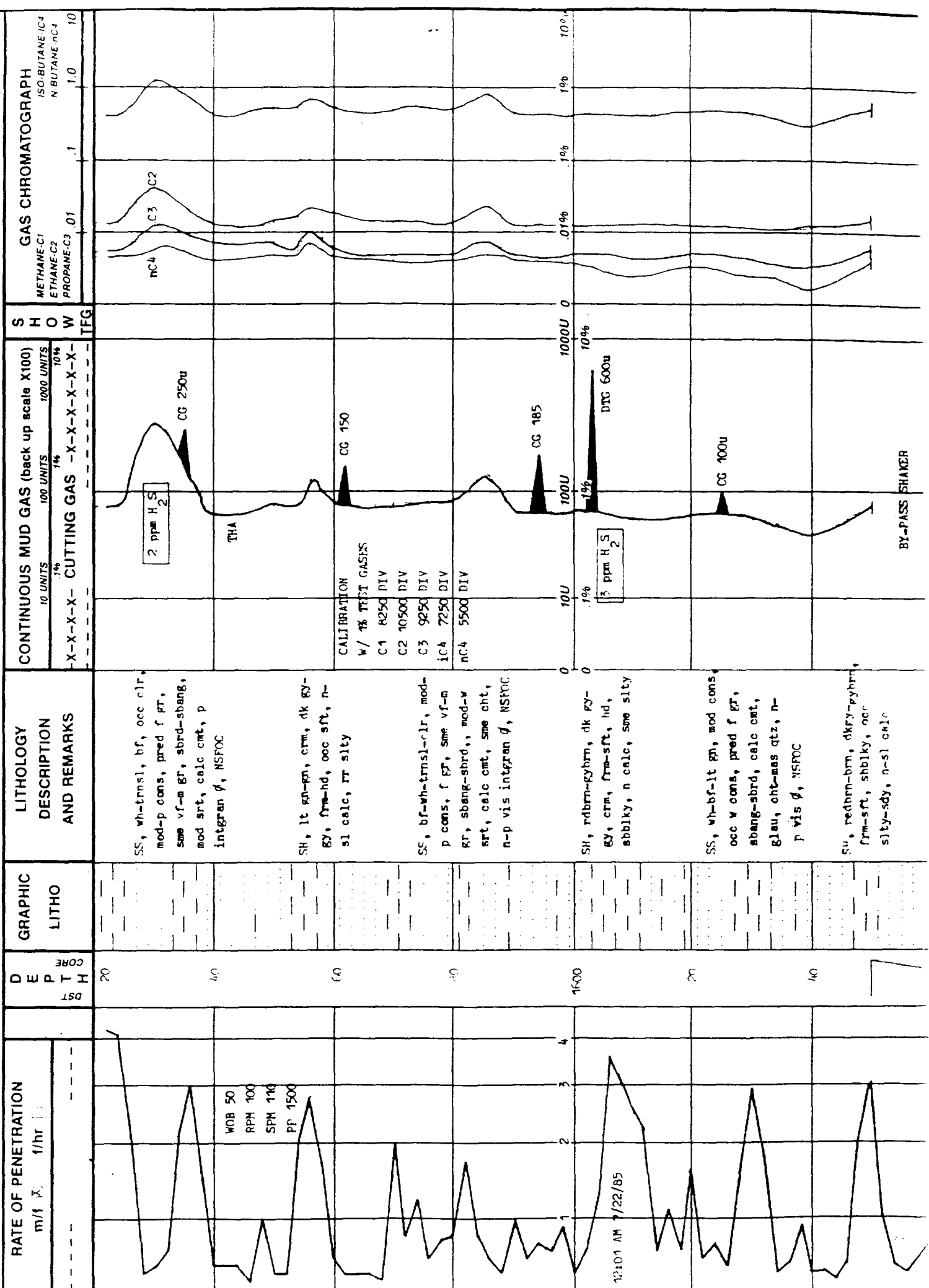


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REFINITION
WELL

DATE

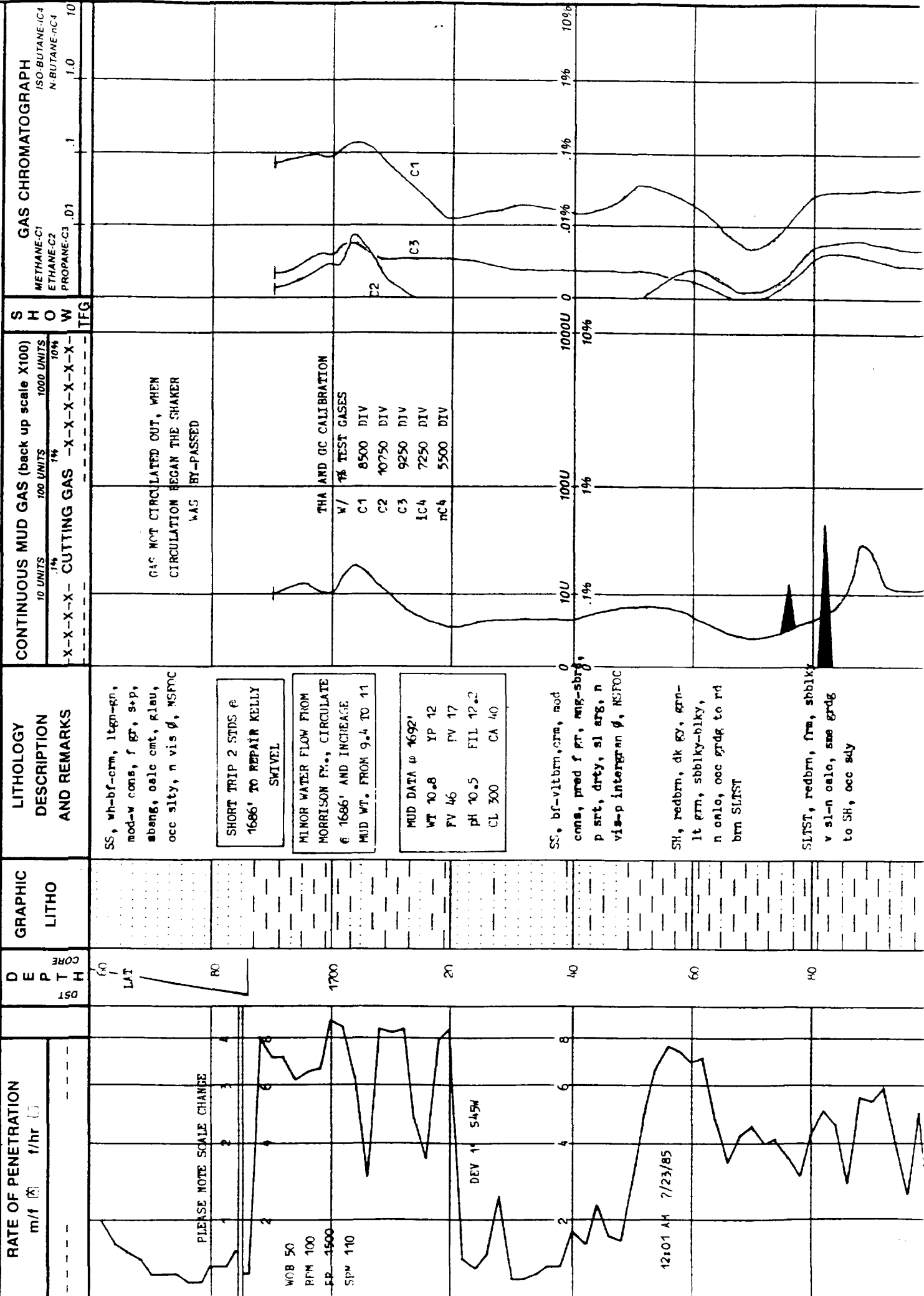
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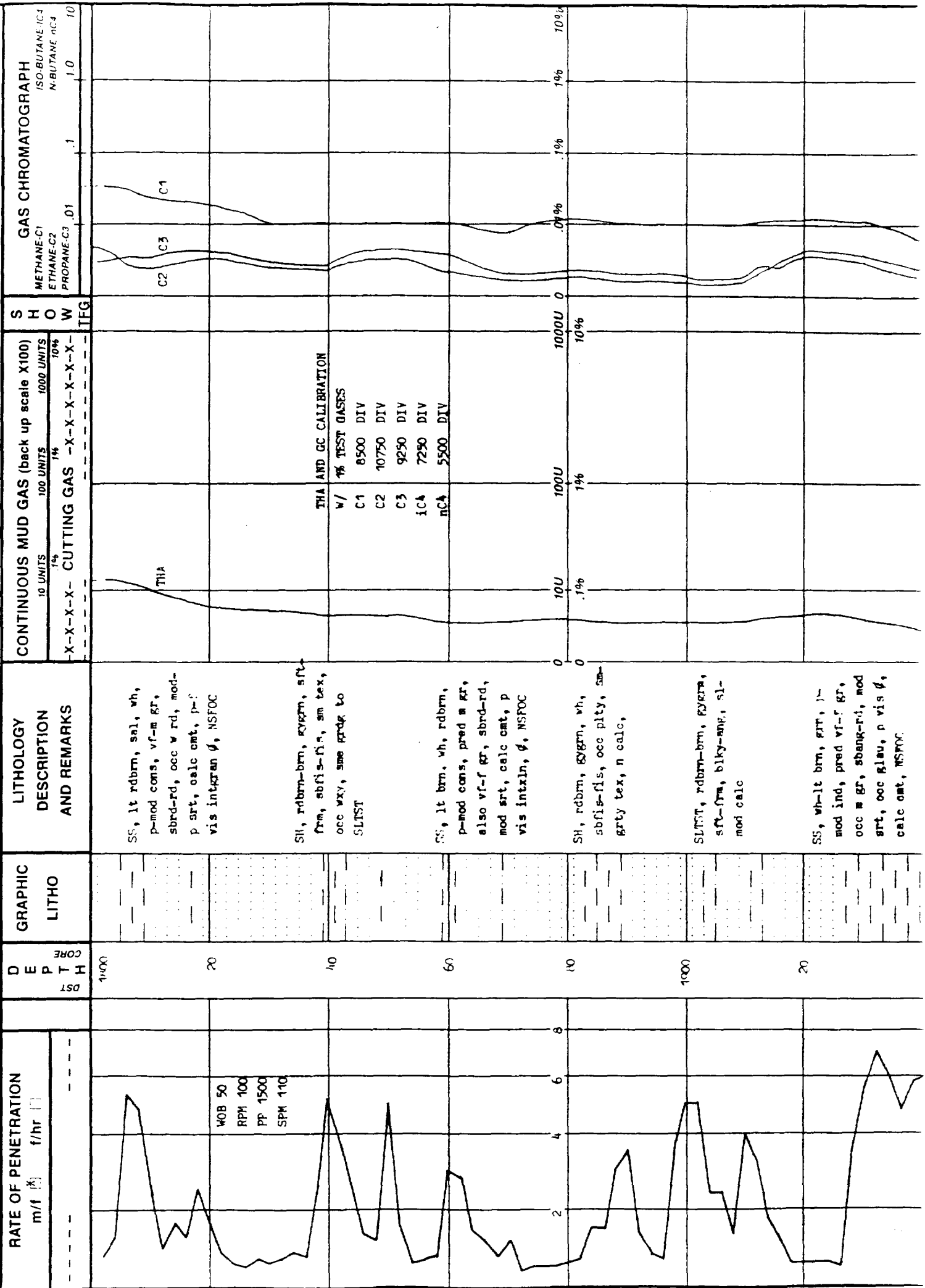
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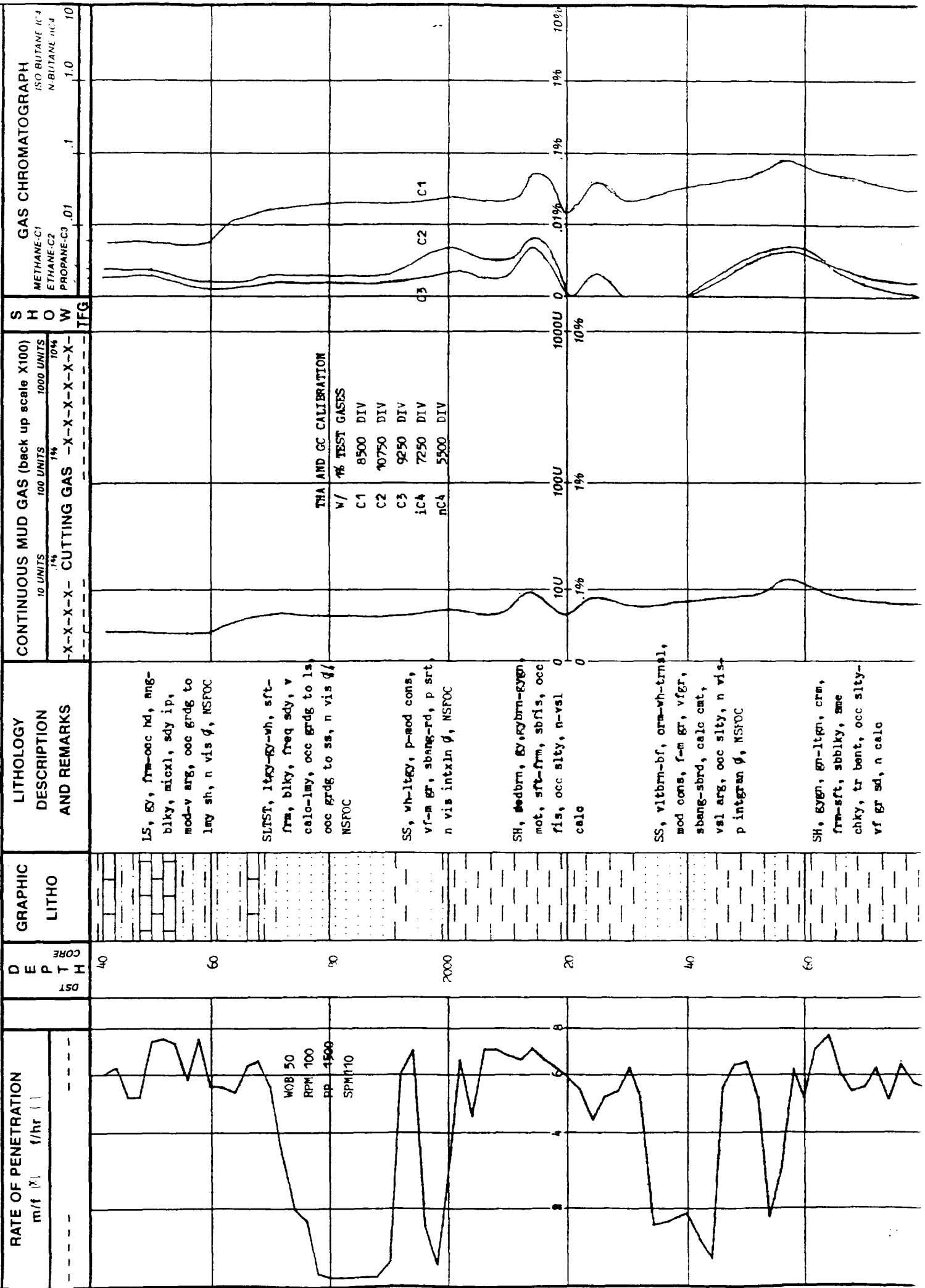
LOG

JOB#

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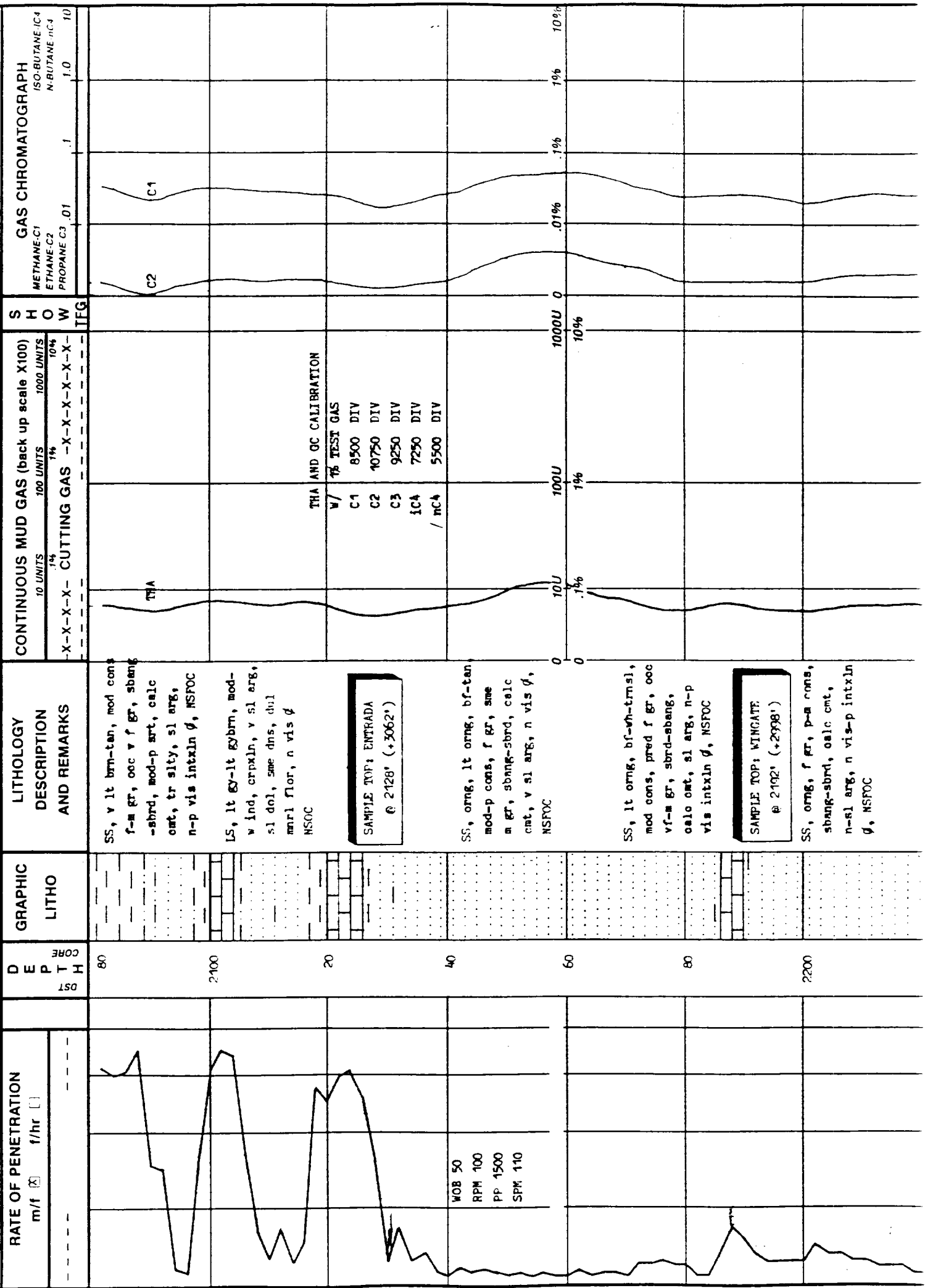
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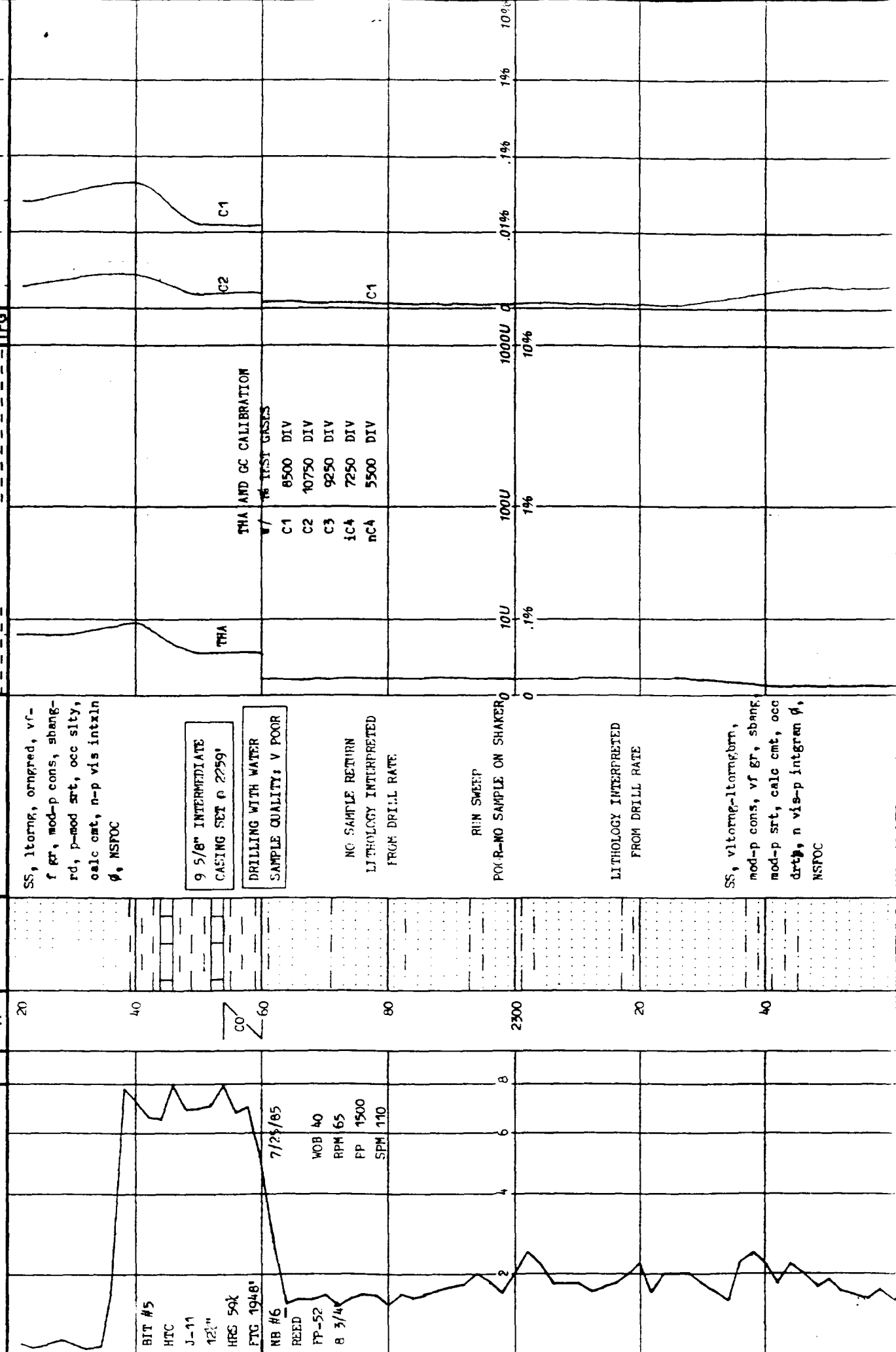
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RATE OF PENETRATION		LITHO		LITHOLOGY DESCRIPTION AND REMARKS		CONTINUOUS MUD GAS (back up scale X100)		GAS CHROMATOGRAPH	
m/1	f/hr	DST	DEPTH			10 UNITS	100 UNITS	METHANE-C1	ETHANE-C2
								ISO-BUTANE-IC4	N-BUTANE-NC4





OPERATOR

WELL

AMOCO

USG SEC 18 #43

LOC.

JOB#

SEC 18 T20N R16W

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RATE OF PENETRATION
m/f (X) f/hr (X)

DEPTH
FEET

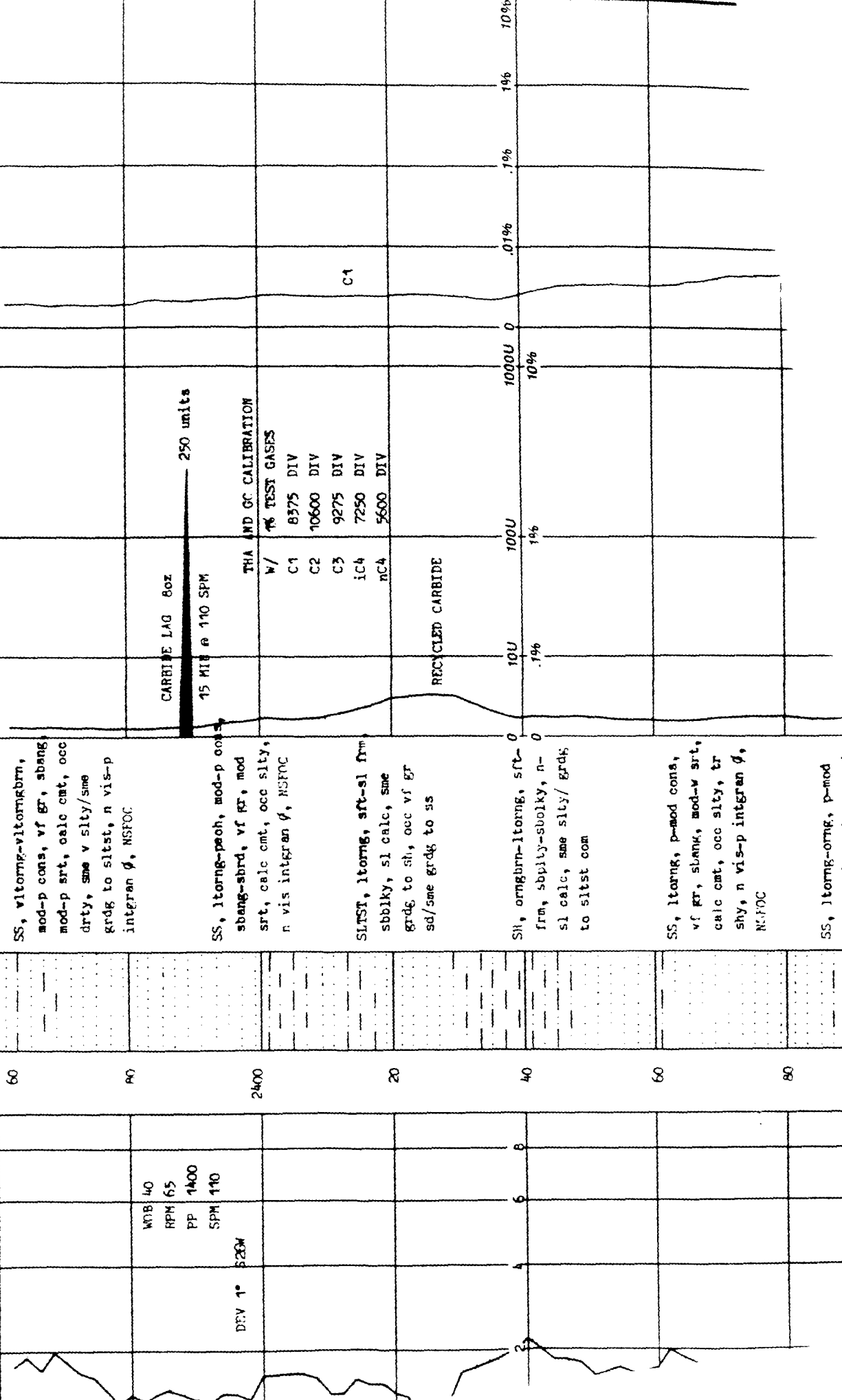
GRAPHIC
LITHO

LITHOLOGY
DESCRIPTION
AND REMARKS

CONTINUOUS MUD GAS (back up scale X100)
10 UNITS 100 UNITS 1000 UNITS
14 14 14
-X-X-X-X- CUTTING GAS -X-X-X-X-X-X-X-
14 14 14

S H O W TFG

GAS CHROMATOGRAPH
METHANE-C1
ETHANE-C2
PROPANE-C3
ISO-BUTANE-IC4
N-BUTANE-NC4
1 1.0 10





OPERATION

WELL

ANALOG

USG SEC 18 #43

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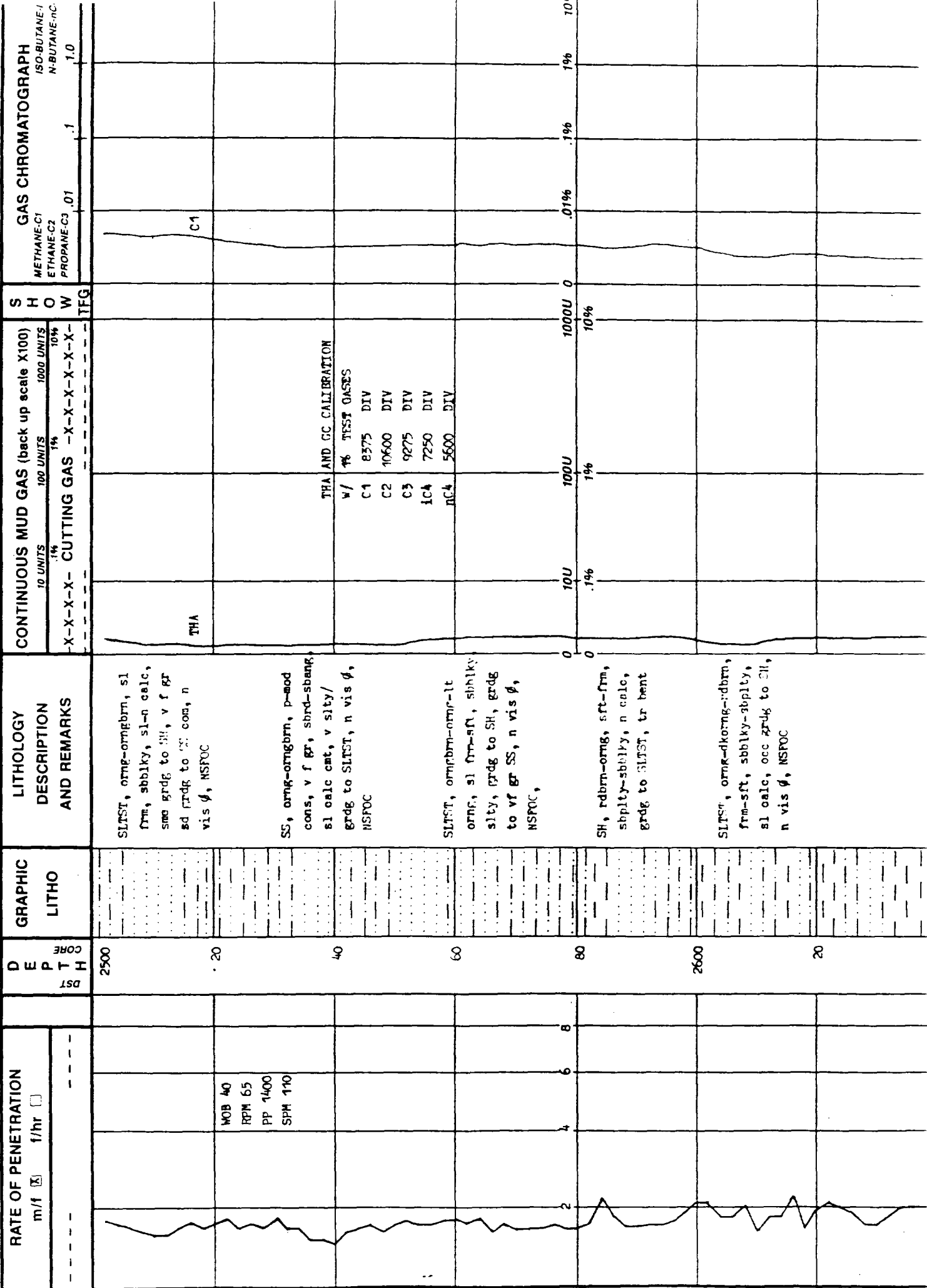
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DATE 10 12 59 RTM

analex

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OPERATION
WELL

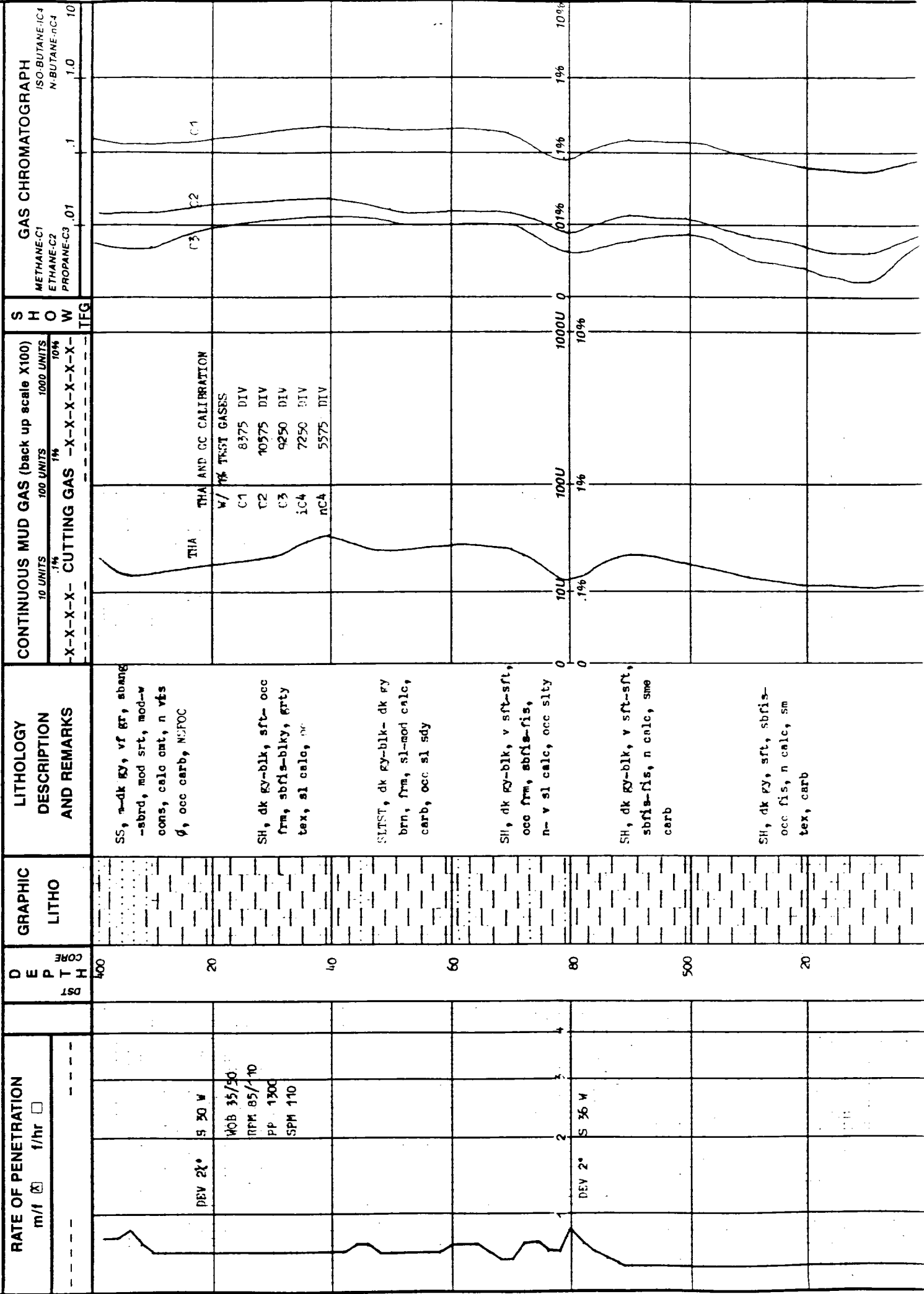
AMC
USG SEC 18 #43

LOG
JOB#

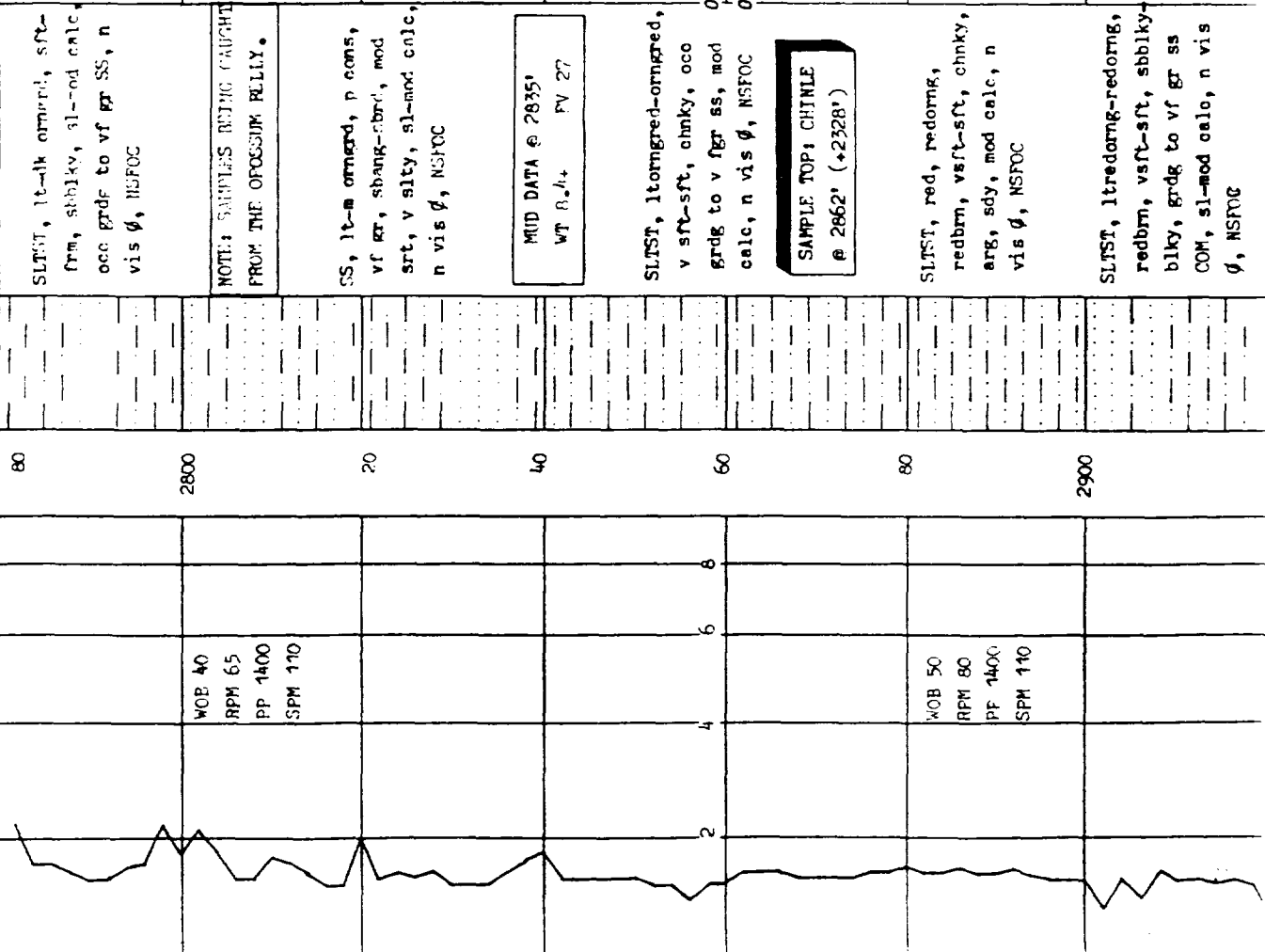
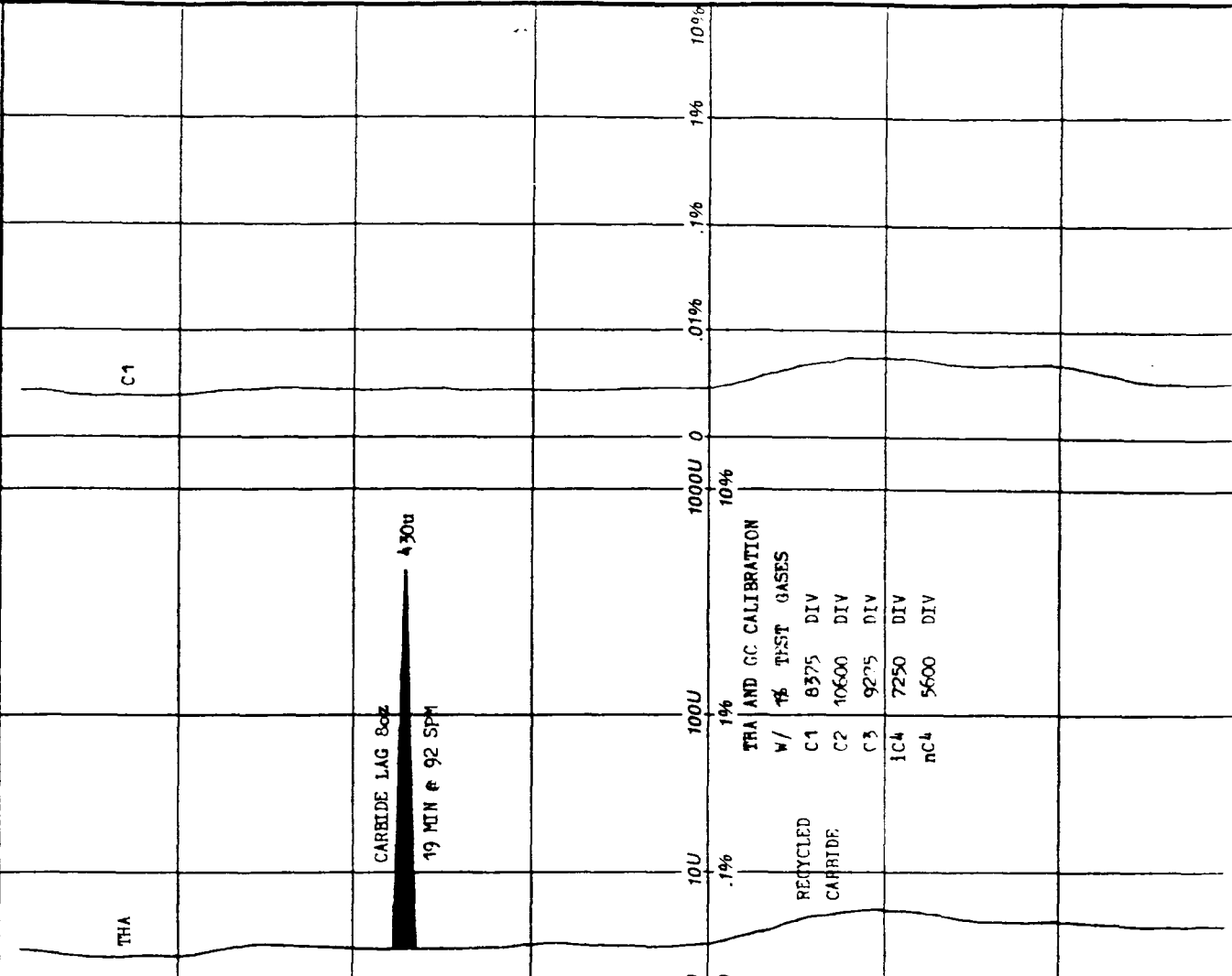
SEC 18 #43

SAN JUAN CO., NEW MEXICO

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DIVISION OF XCO



RATE OF PENETRATION		D E P T H C O R E	GRAPHIC LITHO	LITHOLOGY DESCRIPTION AND REMARKS	CONTINUOUS MUD GAS (back up scale X100)		S H O W T F G	GAS CHROMATOGRAPH	
m/f	f/hr				10 UNITS 1% -X-X-X-X- CUTTING GAS	100 UNITS 1% -X-X-X-X-X-X-X-		METHANE-C1 ETHANE-C2 PROPANE-C3	ISO-BUTANE-IC4 N-BUTANE-NC4
		80		SLTST, lt-bk ornrd, sft-frm, sbblky, sl-mod calc, occ grdg to vf gr ss, n vis ϕ , NSFOC					
		2800		NOTE: SAMPLES BEING CAUGHT FROM THE OCEANUM RELLY.					
		20		SS, lt-m ornrd, p coms, vf gr, shang-ornrd, mod srt, v slty, sl-mod calc, n vis ϕ , NSFOC					
		40		MUD DATA @ 2835' WT 0.44 PV 27					
		60		SLTST, ltornrd-ornrd, v sft-sft, chnky, occ grdg to v gr ss, mod calc, n vis ϕ , NSFOC					
		80		SAMPLE TOP: CHINLE @ 2862' (+2328')					
		2900		SLTST, red, redornk, redbrn, vsft-sft, chnky, arg, sdy, mod calc, n vis ϕ , NSFOC					
				SLTST, ltredornrd-ornrd, redbrn, vsft-sft, sbblky, blk, grdg to vf gr ss COM, sl-mod calc, n vis ϕ , NSFOC					





WELL

USG SPEC 18 #43

JOB#

85373

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RATE OF PENETRATION		D E P T H	GRAPHIC LITHO	LITHOLOGY DESCRIPTION AND REMARKS	CONTINUOUS MUD GAS (back up scale X100)		GAS CHROMATOGRAPH	
m/f	1/hr				10 UNITS 1% -X-X-X-X- CUTTING GAS	100 UNITS 1% -X-X-X-X-X-X-X-	METHANE-C1 ETHANE-C2 PROPANE-C3	ISO-BUTANE-IC4 N-BUTANE-NC4
		60		SLTST, redormg, red, sft, sbblky, mod calc, mod-v arg, ooc sdy, n vis ϕ , NSFOC				1.0 10
		80		SS, ltormg-red-clr, p cons, vf gr, sbang-rd, mod srt, mod-occ v arg, calc cnt, n vis ϕ , NSFOC				
		3100		SLTST, redormg-redbrn, sft-fm, ang-blky, mod- v calc, mod-v arg, sdy, n vis ϕ , NSFOC				
		20		SH, redormg-ormg, redbrn, sft, sbblky-sbply, n calc, ooc slty/sme grdg to sltst				
		40		SLTST, redbrn-ormg, sl fm-sft, blky-sbblky, occ shy, ooc vf gr sl, n-val calc, n vis ϕ , NSFOC				
		60		SS, ormng-ormgrn, mod cons, pred vf gr, sbang, mod- v srt, sl calc cnt, ooc arg, grdg to sltst com, n vis integran ϕ , NSFOC				
		80						

SEC 26 1041 R124

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JOB #

SEC 18 15th R16m

85323

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RATE OF PENETRATION		D E P T T H DST	GRAPHIC LITHO	LITHOLOGY DESCRIPTION AND REMARKS	CONTINUOUS MUD GAS (back up scale X100)		GAS CHROMATOGRAPH	
m/1	1/hr				10 UNITS	100 UNITS	METHANE-C1	ETHANE-C2
---		80	---	SH, redbrn, orgbrn, hrn sl frm-sft, sbblky, occ sbply, occ sl calc, tr silty, grty	10 UNITS	100 UNITS	ETHANE-C2	N-BUTANE nC4
---		3500	---	SH, dkorg-brn-org, redbrn, frm-sft, sbblky, sl-n calc, rr grdy to sltst	10 UNITS	100 UNITS	PROPANE-C3	1.0
---		20	---	SH, org-brn-org-brn-hrn- redbrn, frm-sft, sbblky, sl-n calc, sl prty	10 UNITS	100 UNITS	1.0	10
---		40	---	SH, dkorg-brn-org-brn, redbrn, sft-sl frm, sl-n calc, occ prty, tr chky, tr silty	10 UNITS	100 UNITS	1.0	10
---		60	---	SH, redbrn-hrn, orgbrn- org, sft-sl frm, pred sbblky, vsi-n calc, sl silty ip	10 UNITS	100 UNITS	1.0	10
---		80	---	SH, brn-redbrn, orgbrn, sft-sl frm, sbblky, occ sbply, n-vsl calc, tr silty ip	10 UNITS	100 UNITS	1.0	10
---		3600	---	SH, brn-redbrn, orgbrn, sft-sl frm, sbblky, occ sbply, n-vsl calc, tr silty ip	10 UNITS	100 UNITS	1.0	10

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USG SEC 18 #43

JOB#

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RATE OF PENETRATION

m/f ☒ f/hr ☐D E P
T T H
C O R EGRAPHIC
LITHOLITHOLOGY
DESCRIPTION
AND REMARKS

CONTINUOUS MUD GAS (back up scale X100)

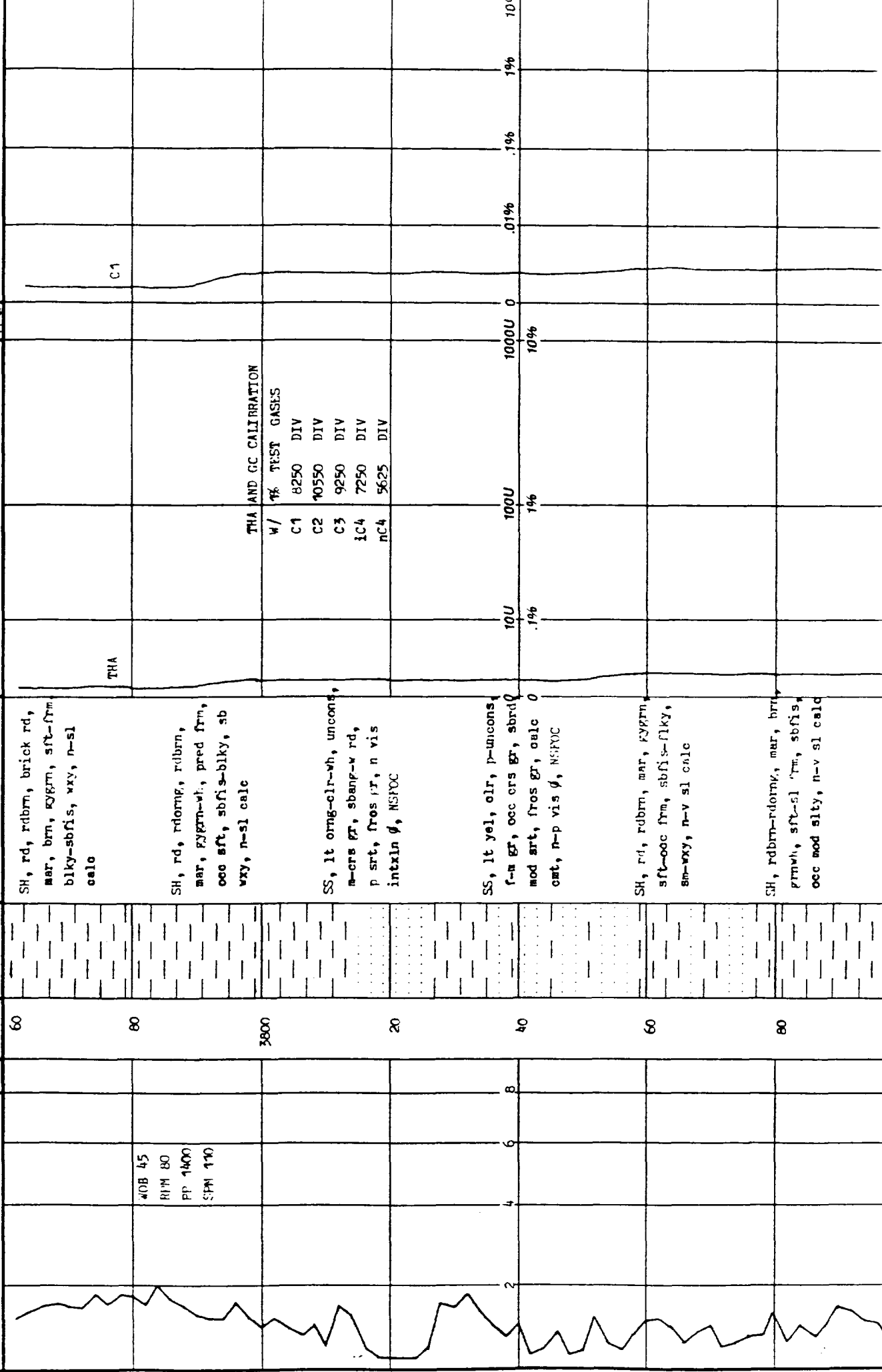
10 UNITS 100 UNITS 1000 UNITS

.1% 1% 10%

-X-X-X-X- CUTTING GAS -X-X-X-X-X-X-

S H O W T F G

GAS CHROMATOGRAPH

METHANE-C1
ETHANE-C2
PROPANE-C3 .01 .1 1.0 100



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JOB #

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RATE OF PENETRATION

m/f ☒ f/hr ☐

DST

D E P T H

CORE

3900

20

40

60

80

4000

20

WOB 45

RPM 80

PP 1400

SPN 170

WOB 35/48

RPM 80

PP 1400

SPN 170

LITHOLOGY

DESCRIPTION

AND REMARKS

SS, lt orgng-yel, transl-
clr, vf-m gr, unconfs,
ang-sbrd, p srt, cln,
calo omt, n vis ϕ , NSPOC

MUD DATA @ 3930'
WT 8.44 PV 27

SS, lt orgng-lt yel, clr,
vf-f gr, ang-sbrd, p-
mod srt, calc omt, n
vis ϕ , NSPOC

SH, rdbrn, rd, brn, mar,
wh, gygrn, sft-fra, blk-
ooc flky, rr sdy, ooc
slty, n-sl calc

SS, lt orgng-yel, clr, pred
vf-f gr, unconfs, ang-sb
rd, p srt, calo omt, n
vis ϕ , NSPOC

SS, lt orgng-yel, clr, pred
vf-f gr, ooc m gr, ang-
rd, p srt, cln, calc omt,
n vis intxn ϕ , NSPOC

CONTINUOUS MUD GAS (back up scale X100)

10 UNITS .1% 100 UNITS 1% 1000 UNITS 10% 10000 UNITS 100%

-X-X-X-X- CUTTING GAS -X-X-X-X-X-X-X-

THA

C1

THA AND GC CALIBRATION

W/ 1% TEST GASES

C1 8250 DIV

C2 10550 DIV

C3 9250 DIV

IC4 7250 DIV

nC4 5625 DIV

10U .1%

100U 1%

1000U 10%

10000U 100%

1% .01%

.1% .1%

1% 1%

10% 10%

100% 100%

1000% 1000%

10000% 10000%

100000% 100000%

1000000% 1000000%

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OPERATOR

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LOC.

SEC 14 T29N R16W

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USG SEC 14 #43

JOB#

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RATE OF PENETRATION
m/f ☒ f/hr ☐DST
DEPTH
COREGRAPHIC
LITHOLITHOLOGY
DESCRIPTION
AND REMARKS

CONTINUOUS MUD GAS (back up scale X100)

S
H
O
W
TFGGAS CHROMATOGRAPH
METHANE-C1
ETHANE-C2
PROPANE-C3 .01
ISO-BUTANE-IC
N-BUTANE-NC4
1.0WOB 35/38
RPM 80
PP 1400
SPM 140

40

SS, lt org-yel, trmsl-
clr, vf-m gr, unconcs,
ang-sbrd, p srt, cln,
calc ent, n vis intxn
q, NSPOC

THA

10 UNITS 100 UNITS 1000 UNITS 10% 10% 10%
-X-X-X-X- CUTTING GAS -X-X-X-X-X-X-X-X-X-X-

C1

SS, lt org-rd-yel, clr,
vf-f gr, ooc m fr, unconcs
ang-rd, p srt, calc ent,
cln, NSPOCTHA AND GC CALIBRATION
w/ % TEST GASES
C1 8250 DIV
C2 10550 DIV
C3 9250 DIV
IC4 7250 DIV
NC4 5625 DIVSS, lt yel-rd-org, clr,
vf-f gr, ooc m fr, ang-
sbrd, unconcs, p srt, cln
calc ent, NSPOC

400

WOB 45

20

SAMPLE TOP: CUTLER
@ 4136' (+1054')Sl, rd, rdorg-rdbrn, mar,
occ mot wh, sft-sl frm,
blky-sbply, sm tex,
n-v sl calc

40

DTC 424

RATE OF PENETRATION	
m/f	X ₁ f/hr

I - 1000
 CORE
 DST

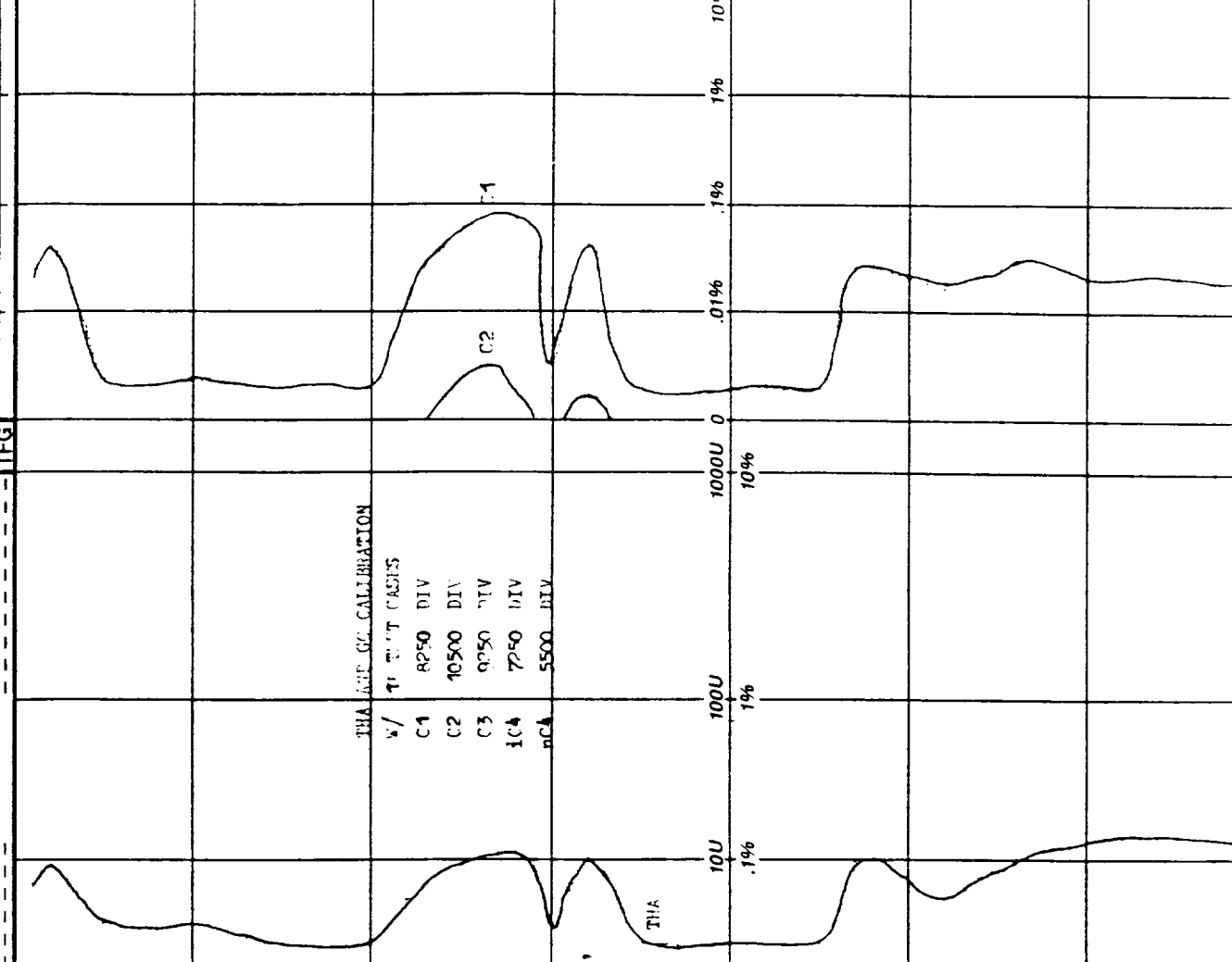
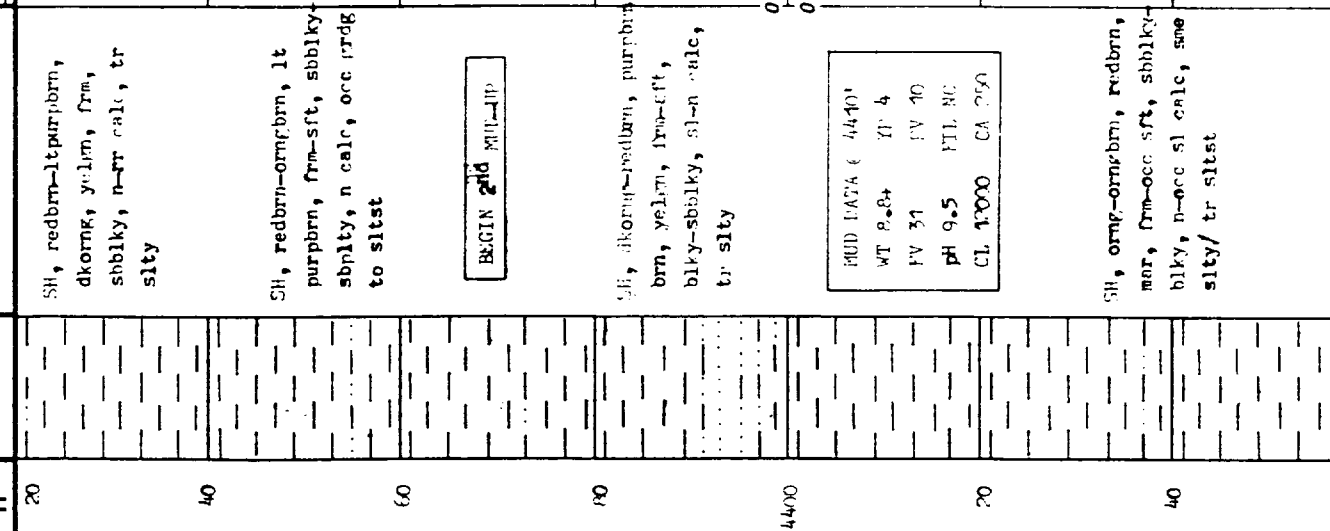
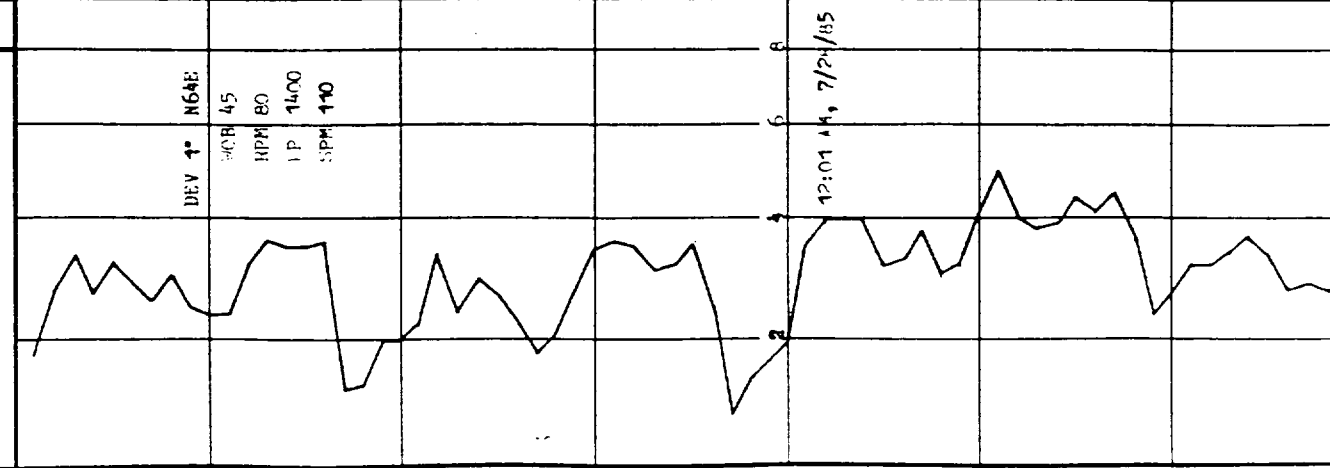
GRAPHIC
LITHO

LITHOLOGY
DESCRIPTION
AND REMARKS

CONTINUOUS MUD GAS (back up scale X100)

GAS CHROMATOGRAPH

	ISO-BUTANE- <i>i</i> C ₄	N-BUTANE- <i>n</i> C ₄
METHANE-C ₁		
ETHANE-C ₂		
PROPANE-C ₃	01	1
		10





CORPORATION

AMOCO

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5-1-16 1230 R16

WELL

USG S/C 18 #43

JOB#

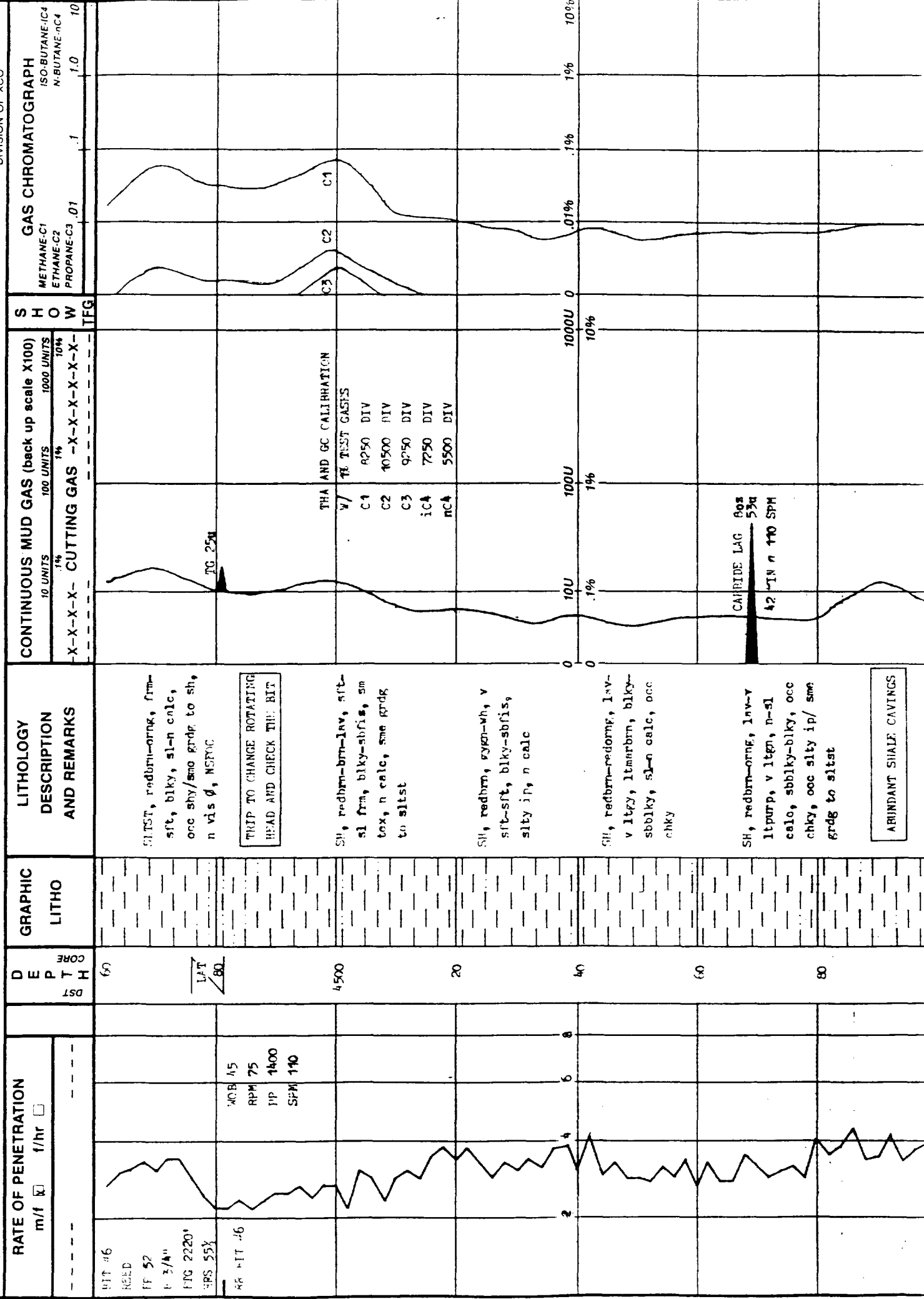
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LOC.

SVC. 1P 1200 P 140

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USG DEC 18 1943

JOB#

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RATE OF PENETRATION
m/f ☒ 1/hr ☐

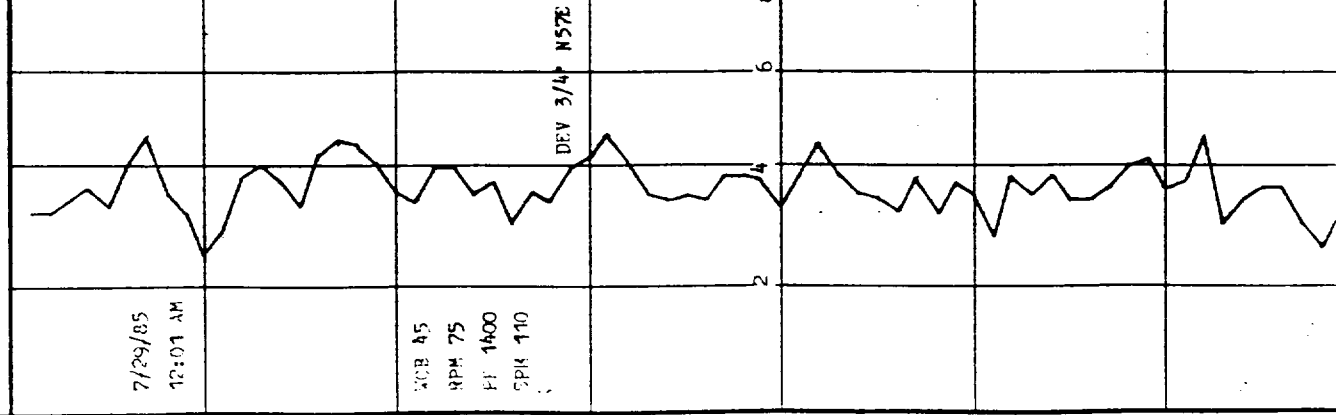
D E P T H
C O R E
D I S T

GRAPHIC
L I T H O

LITHOLOGY
DESCRIPTION
AND REMARKS

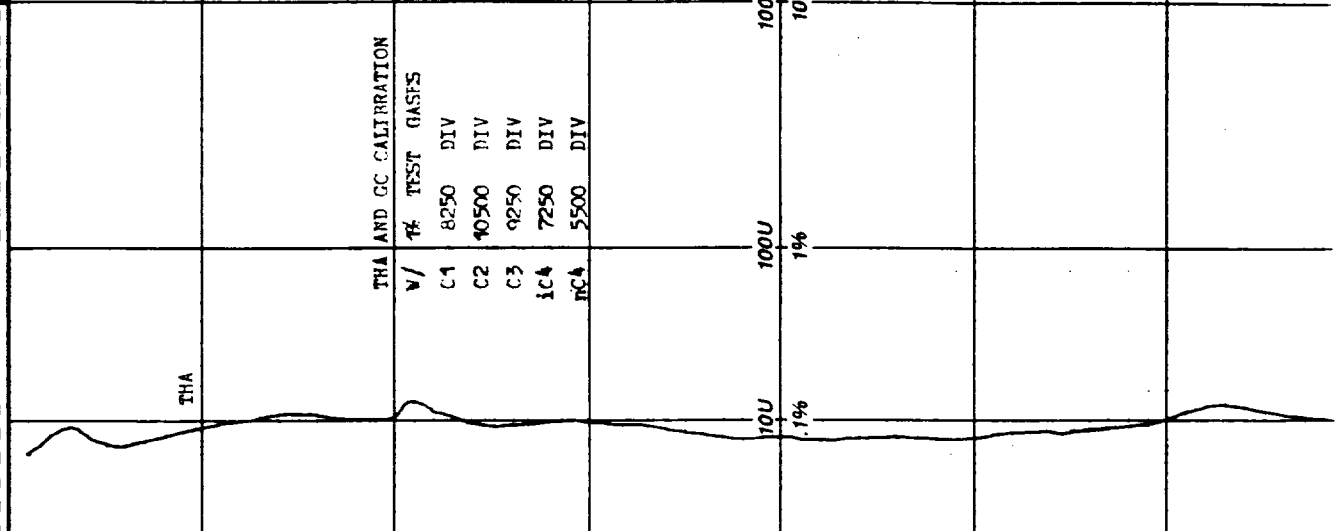
CONTINUOUS MUD GAS (back up scale X100)
100 UNITS 1% 1000 UNITS 10%
-X-X-X-X- CUTTING GAS -X-X-X-X-X-X-X-
1% 10% 1000 UNITS 10%
S H O W T F G

GAS CHROMATOGRAPH
METHANE-C1
ETHANE-C2
PROPANE-C3
ISO-BUTANE-IC
N-BUTANE-NC4
1.0
0.1
0.01



4600
20
40
60
80
4700
20

SH, redbrn-dkarnng-orngrn, sbblky-blky, n-sl calc, grty-occ sl slty
SLTST, orngr-orngrn, frm, sl calc, sbblky-blky, sme grdg to SH, n vis p ϕ , NSFOC
SH, redbrn-brn, orngrn, sbblky-blky, n-rr calc, tr calc frac fil, occ slty ip, sme grty
SH, redbrn-orngr, lt purp, brn, frm, sbblky-blky, sl-n calc, grty
NOTE: ABUNDANT SHALE CAVINGS
SH, redbrn, brick red, sft-frm, hd, ang-sbblky, slty ip, sme v calc-lmy,
SLTST, orngrd-orngr, orngr-brn, sft-frm, ang-sbblky, slty, sl-mod calc, n vis ϕ , NSFOC



THA AND GC CALIBRATION
V/ % TEST GASES
C1 8250 DIV
C2 10500 DIV
C3 9250 DIV
C4 7250 DIV
NC4 5500 DIV



OPERATOR

A-1000

LOC.

SEC 18 T2N R16E

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USG SEC 18 T2N R16E

JOB#

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CO., NEW MEXICO

RATE OF PENETRATION

m/f

1/hr

1/hr

D E P H

GRAPHIC LITHO

LITHOLOGY DESCRIPTION AND REMARKS

CONTINUOUS MUD GAS (back up scale X100)

GAS CHROMATOGRAPH

METHANE-C1

ETHANE-C2

PROPANE-C3

ISOBUTANE-iC4

N-BUTANE-nC4

PENTANE-C5

HEXANE-C6

HEPTANE-C7

OCTANE-C8

NONANE-C9

DECANE-C10

UNIDENTIFIED

TOTAL

PERCENT

VOLUME

PERCENT

WEIGHT

PERCENT

MOL FRACTION

MOL FRACTION

MOL FRACTION

MOL FRACTION

MOL FRACTION

MOL FRACTION

MOL FRACTION

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XOR 45
REF 75
PC 1400
SPR 110

RPM 100



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LOC.

SPL 18 TXX RT6A

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WELL

USG SEC 18 #43

JOB#

SAN JUAN

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DIVISION OF XCO

RATE OF PENETRATION

m/1 1/1 hr ()

D E P
T H
COREGRAPHIC
LITHOLITHOLOGY
DESCRIPTION
AND REMARKS

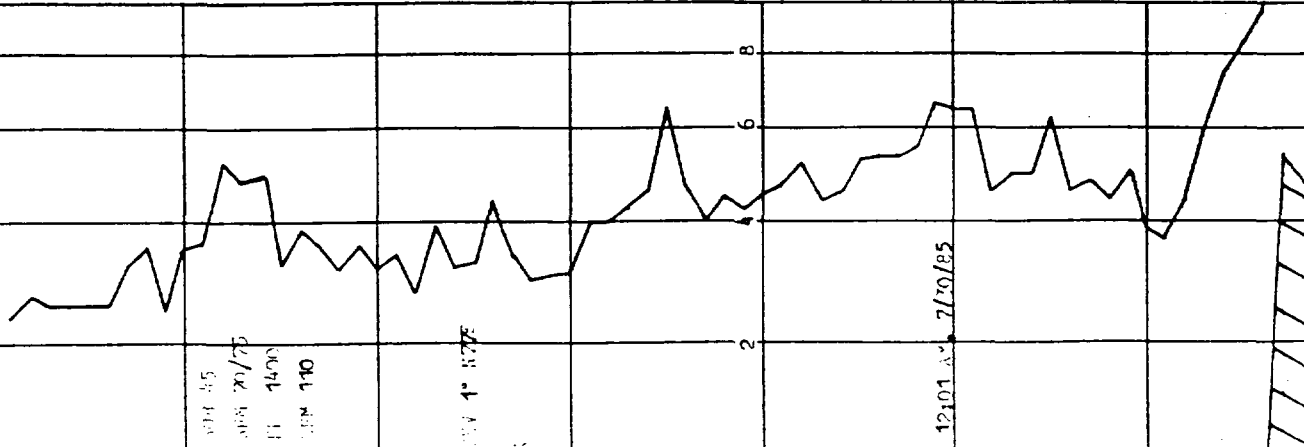
CONTINUOUS MUD GAS (back up scale X100)

10 UNITS 100 UNITS 1000 UNITS 10000 UNITS

-X-X-X-X- CUTTING GAS -X-X-X-X-X-X-X-

S H O W TFG

GAS CHROMATOGRAPH

METHANE-C1
ETHANE-C2
PROPANE-C3 .01
ISO-BUTANE nC4
N-BUTANE nC4
1.0
1.0
1.0

MUD DATA 4-10-77
WT 9.0+ YF 6
PV 31 PV 10
pH 10 FILL NC
CL 10800 CA 450

SH, redbrn-orm-brn,
frm-occ sft, sbblky-
blky, sl calc, silty ip

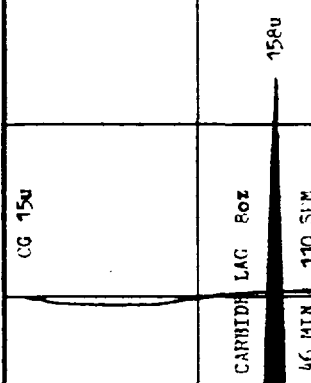
SH, redbrn-orm, lky,
vfrm-sft, blky-sbblky,
n-mod calc, (pty)-silty ip

SH, redbrn-orm, brn,
frm, blky-sbblky, occ
mod calc, sme pty

SH, redbrn-orm-brn-orm,
brn, frm, blky-sbblky,
tr calc, occ clay ip,
tr LS, lky-dkry, mod-
v ind, crpxl, sl-n ary,
n vis 0, NS-OC

METHYLENE BLUE CAPACITY:
3 lb/bbl

WEIGHT UP MUD TO KILL
WATER FLOW OCCURRING
UP HOLE



THA AND GC CALIBRATION
W/ TEST GASES
C1 8375 DIV
C2 10150 DIV
C3 9500 DIV
C4 7500 DIV
nC4 5750 DIV

RECYCLED
CARBIDE

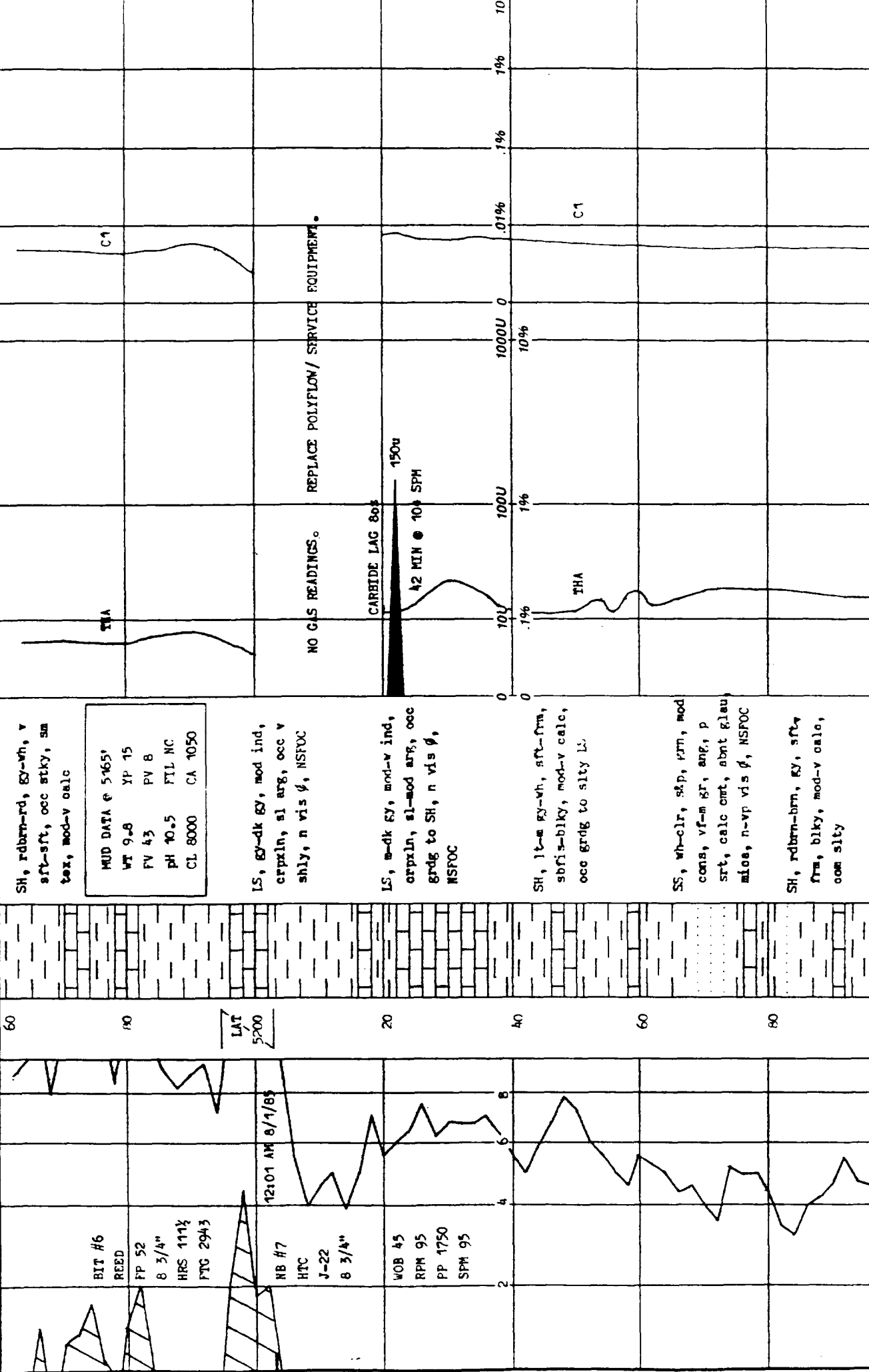


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WELL

LOC.
JOB#

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RATE OF PENETRATION m/f ☒ t/hr ☐	D E P T H COR DST	GRAPHIC LITHO	LITHOLOGY DESCRIPTION AND REMARKS	CONTINUOUS MUD GAS (back up scale X100)				GAS CHROMATOGRAPH			
				100 UNITS	1000 UNITS	10000 UNITS	100000 UNITS	METHANE-C1	ETHANE-C2	PROPANE-C3	ISO-BUTANE-IC
				100	1000	10000	100000				
				-X-X-X-X- CUTTING GAS -X-X-X-X-X-X-X-							





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USG SEC 14 R43

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SAN JUAN

CO.,

NEX MEXICO

RATE OF PENETRATION

m/f ☒ f/hr ☐

DEPTH

500

20

40

60

80

100

120

140

160

180

200

220

240

260

280

300

320

340

360

380

400

420

440

460

480

500

520

540

560

580

600

620

640

660

680

700

720

740

760

780

800

820

840

860

880

900

920

940

960

980

1000

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1040

1060

1080

1100

1120

1140

1160

1180

1200

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1980

2000

2020

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6820



OPERATOR
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AMOCO
USG SEC 16 #43

LOC.
JOB #

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analex
DIVISION OF XCO

RATE OF PENETRATION		DEPTH		GRAPHIC LITHO		LITHOLOGY DESCRIPTION AND REMARKS		CONTINUOUS MUD GAS (back up scale X100)		GAS CHROMATOGRAPH	
m/f	1/hr	DST	DEPTH					10 UNITS 100 UNITS 1000 UNITS		METHANE-C1 ETHANE-C2 PROPANE-C3	
DEV 2 1/2	S142	40				MUD DATA @ 5425' WT 10.4 YI 8 FV 36 PV 17 pH 10.0 FIL 14.8 C1 6800 CA 120		-X-X-X-X- CUTTING GAS -X-X-X-X-X-X-X-		ISO-BUTANE iC N-BUTANE nC4	
WOB 8/12 RPM 350 PP 1000 SPM 110 DEV 4 1/2 S132		60				LS, ltgy-gy, wh-bf-crm, p-occ mod ind, crpxl-occ micxl, sbblky, sl arg, sme v chky, tr slty ip, n vis ϕ , NSFOC		THA AND QC CALIBRATION V/ % TEST GASES C1 8250 DIV C2 10625 DIV C3 9375 DIV ic4 7500 DIV nC4 5750 DIV		1.0	
DEV 5 1/2 S122		80				SLTST, dkbrn, silt-frm, sbblky, sdy ip, v calc-lay, n vis ϕ , NSFOC				.1	
BIT #9 REED HP 13 J S-1/4 HRS 12 1/2 FTG 98'		5500				SAMPLE TOP: HERMOSA @ 5523' (-333')				.01	
DEV 6 1/2 S132		20				RESUME CONVENTIONAL ROTARY DRILLING @ 5528'				1000U 10% 1% .01% 1% 10	
WOB 45 RPM 55 PP 1400 SPM 110 12:01 AM, 8/4/85		40				LS, wh-crm-bf, ltgy-gy, mod-p ind, pxd crpxl, sl arg, ooc dns, ooc dul marl flar, n vis ϕ , NSOC					
DEV 6 1/2 S132		60				LS, ltgy-gy-dkgy, wh-crm, sme brn, mod ind, crpxl-micxl, sl arg ip, tr bent, ooc slty ip, n vis ϕ , NSFOC					



OPERATOR
WELL

USG SEC 18 #43

JOB#

58373

SAN JUAN

CO.,

NEW MEXICO

analex
DIVISION OF XCO

RATE OF PENETRATION
m/l ☒ f/hr ☐

D
E
P
T
H
CORE

GRAPHIC
LITHO

LITHOLOGY
DESCRIPTION
AND REMARKS

CONTINUOUS MUD GAS (back up scale X100)
10 UNITS 14
100 UNITS 14
1000 UNITS 104
10% 104
-X-X-X-X- CUTTING GAS -X-X-X-X-X-X-

S
H
O
W
I
F
G

GAS CHROMATOGRAPH
METHANE-C1
ETHANE-C2
PROPANE-C3
ISO-BUTANE-IC4
N-BUTANE-NC4
1.0
10

DR-V 5% S13E

40
60
1700
5PM 95

5900

80

5 10 15 20

80

DR-V 5% S13E

TIA AND GC CALIBRATION

1/1
C1 8250 LTV
C2 40625 DIV
C3 9425 DIV
C4 7475 DIV
NC4 5825 DIV

CALIBRATION LAG 130u

55 MIN 95 CPM

10U 100U 1000U 10000U

0.1% 1% 1% 10%

C1



DIVISION OF XCO

OPERATOR
WELLANOCO
USG SEC 18 #43

LOC.

SEC 18 T29N R16W

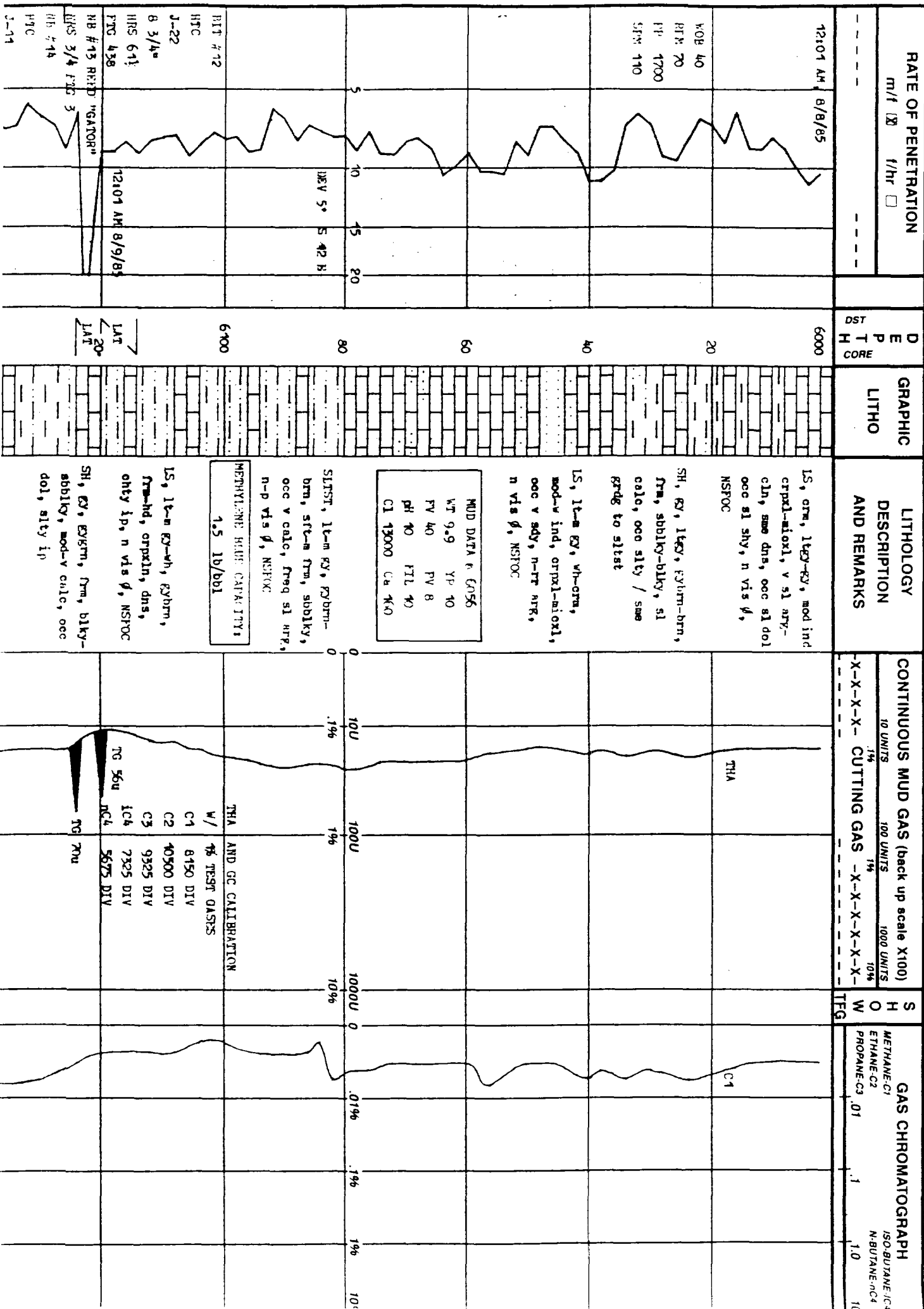
SAN JUAN

CO.,

NEW MEXICO

analex

DIVISION OF XCO





OPERATOR
WELL

ANCOO
USG SEC 18 #43

LOC.
JOB#

SEC 18 T29N R16W
58373

SAN JUAN

CO.,

NEW MEXICO

analex
DIVISION OF XCO

RATE OF PENETRATION

m/f ☒ f/hr ☐

D
E
P
T
H
CORE

GRAPHIC
LITHO

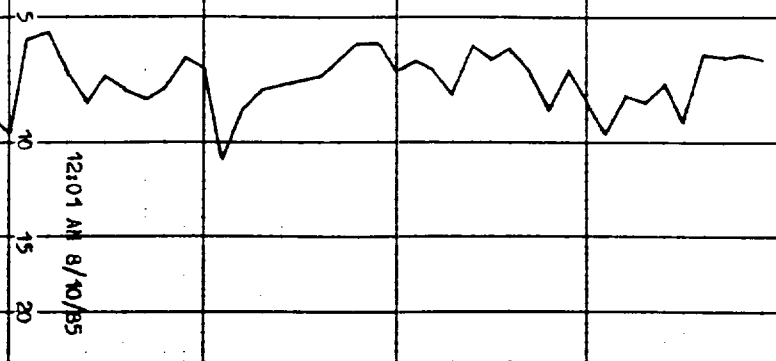
LITHOLOGY
DESCRIPTION
AND REMARKS

CONTINUOUS MUD GAS (back up scale X100)
10 UNITS 100 UNITS 1000 UNITS
1% 1% 10%
X-X-X-X- CUTTING GAS -X-X-X-X-X-X-

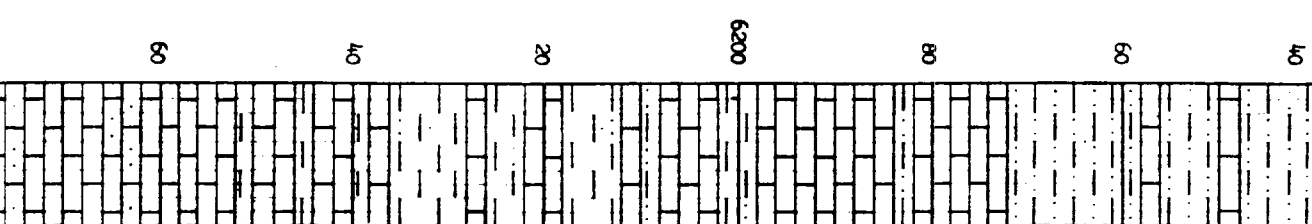
S
H
O
W
T
F
G

GAS CHROMATOGRAPH
METHANE C1
ETHANE C2
PROPANE C3
ISO-BUTANE iC4
N-BUTANE nC4
0.1 1 1.0 1

408 40
408 75
PP 1700
SPM 108



12:01 AM 8/40/85



SLIST, EY, EYerm, EYbrn,
sft-mod frm, sbulky, mod-
v oale, ooc sl arg

MUD DATA @ 6123'
WT 9.8 YP 4
PV 36 PV 8
PH 9 FTL 12
CI 12000 Ca 120

LS, crm, lt-m EY, hd-w
ind, crp-mexln, n arg,
ang freg, sue, rr slty,
n vis ϕ , NSFOC

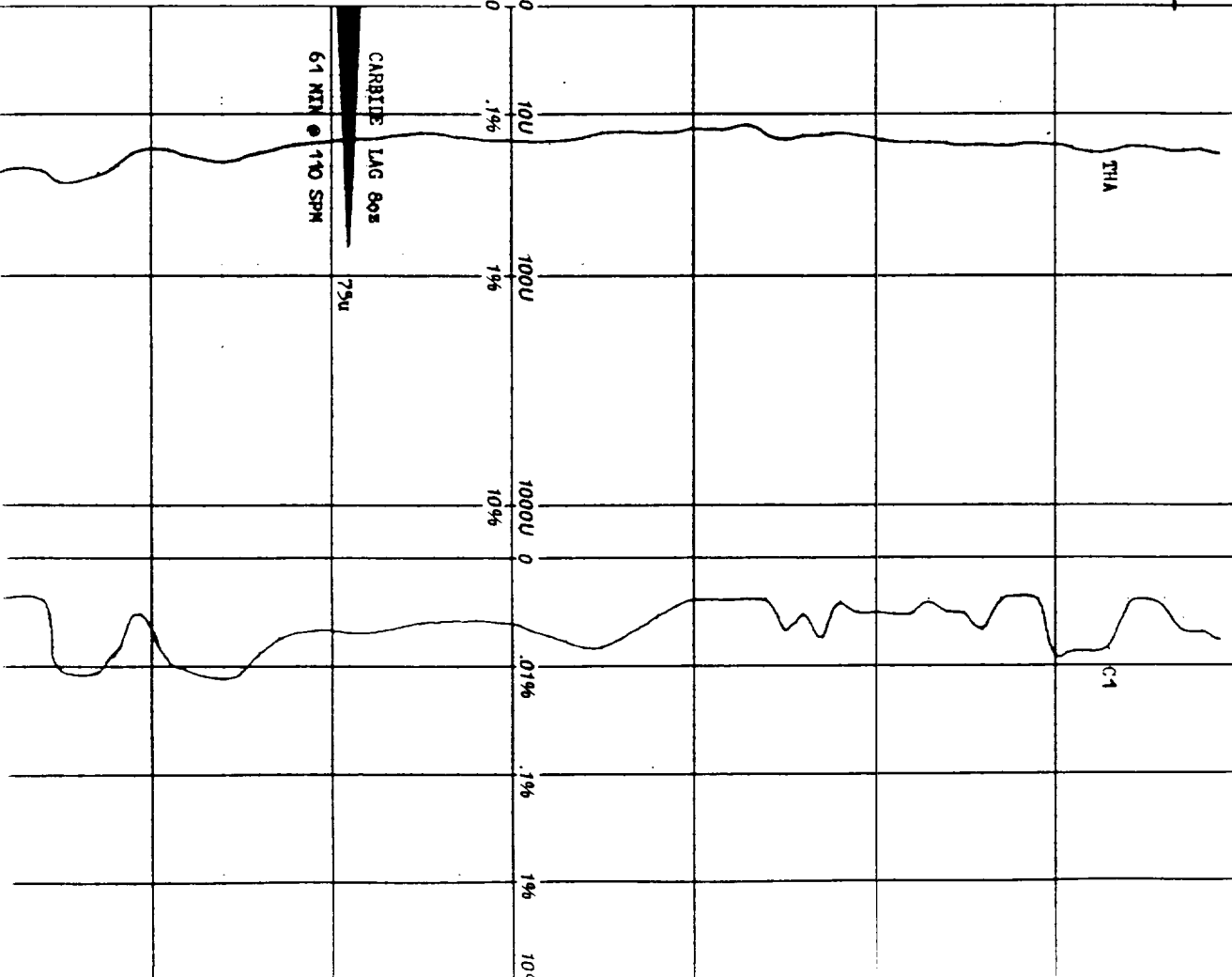
SAMPLE TOP: ISMAY
@ 6200' (-10'0')

LS, EY, lt-dk EY, w-mod
ind, pred crpxln, oln-
oco sl arg, tr EY sh
stng, sme dns, dol, n-
p vis ϕ , NSFOC

SH, dkgy-EY, ooc EYbrn,
hd-frm, sbulky, dol, ooc
ls stng, ooc slty

LS, dk EY-lt EY, tan-bf,
w-mod ind, crp-mexln,
dns, sme dol, shy, sme
slty, n vis ϕ , NSFOC

LS, lt-m-dk EY, EYbrn,
mod-w ind, crp-mexln,
sdy & slty ip, n vis ϕ
NSFOC





OPERATOR
WELL

AWOC
USG SEC 18 #43

LOC.

SEC 18 T29 R16W
JOB# 85373

SAN JUAN

CO.,

NEW MEXICO

analex
DIVISION OF XCO

RATE OF PENETRATION

m/l ☐ f/hr ☐

D
E
P
T
H
CORE

GRAPHIC
LITHO

LITHOLOGY
DESCRIPTION
AND REMARKS

CONTINUOUS MUD GAS (back up scale X100)

10 UNITS 100 UNITS 1000 UNITS 10% 10% 10% 10%

X-X-X-X- CUTTING GAS -X-X-X-X-X-X-

S
H
O
W

GAS CHROMATOGRAPH

METHANE-C1
ETHANE-C2
PROpane-C3 .01 .1 1.0 10.0

ISO-BUTANE-IC4
N-BUTANE-NC4

LOG 40
RPM 75
PP 1700
SPM 106

ELT #14

RHC

J-11

C 3/4"

RHC 3/4"

FIG 2131

NB #15

SEC

\$ 82 F

12:01 A, 8/11/85

WOB 40
RPM 60/65
PP 1700
SPM 108

DrV 4" 59E

6400

80

60

40

20
LAT

6300

80

LS, kybrn, mod-v ind, crpx
n-sl ary, tr ht, n vis
φ, NSFOC

LS, ky-brn, mod-v ind, crpx
ind, pred crpxl, sme
micxl, chy ip, sme slt,
n vis-vp φ, NSFOC

SAMPLE TOP
DISPER CHICK
63281 (-1138')

LS, lkey-ky, dkey-occ blk,
lbrn-brn, v-mod ind,
crpxl-micxl, occ arg/sme
grdg to blk lmy sh, sme
grdg to dns dol, slty-sly
lp, n vis-p φ, NSFOC

LS, wh, crm, bf, mod ind,
crpxl-occ micxl, sme suo,
occ vuk φ, pos molitic φ,
yelgn flor/tr p slo stax
yel cut, n-val o stn, mt
yel resid ring

SAMPLE TOP, AKAH
6392* (-1202')

LS, wh-crm, ngy, mod-v
ind, micxl-suc, tr ary,
occ fr-r vuk φ, bri yelgn
o flor, fr-occ E stng cut,
occ brn o str, bri yel

THA AND GC CALIBRATION

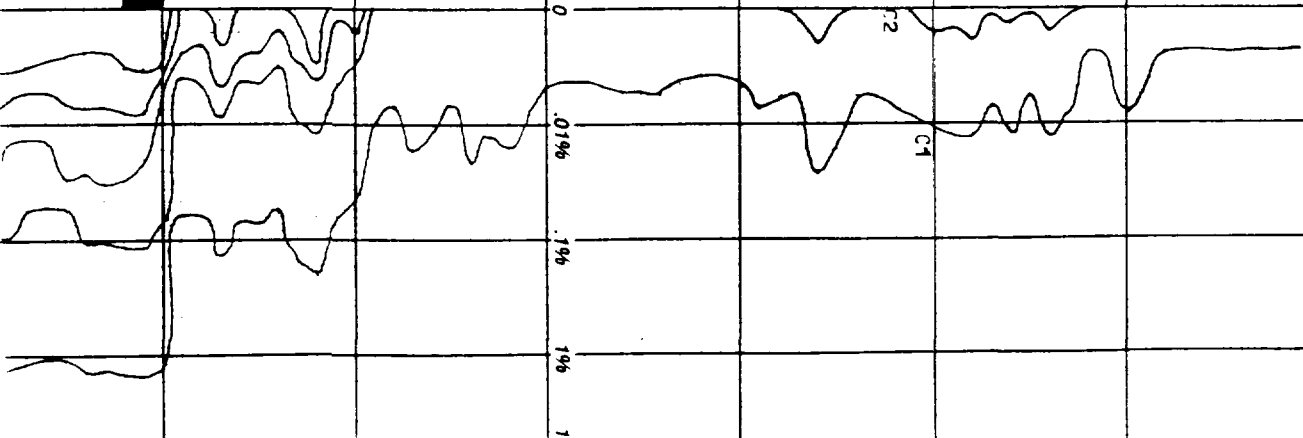
W/
C1 8075 DIV
C2 10475 DIV
C3 9300 DIV
IC4 7350 DIV
nC4 5675 DIV

TO 466

100 1000 10000 0

MUD DATA # 6366
WT 9.9 YP 14
PV 40 PV 8
PH 9 FTL 10
CL 46000 CA 110

CO 3400





OPERATOR

AMOCO

LOC.

SEC 18 T 29 N R 16 W

WELL

USC SEC 18 #43

JOB#

85373

SAN JUAN

CO., NEW MEXICO

analex

DIVISION OF XCO

RATE OF PENETRATION

m/f ☐ f/hr ☐D
E
P
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H
COREGRAPHIC
LITHOLITHOLOGY
DESCRIPTION
AND REMARKSCONTINUOUS MUD GAS (back up scale X100)
10 UNITS 100 UNITS 1000 UNITS 10%
-X-X-X-X- CUTTING GAS -X-X-X-X-X-X-X-S
H
O
W
T
F
G

GAS CHROMATOGRAPH

METHANE-C1
ETHANE-C2
PROPANE-C3 .01
ISO-BUTANE-IC4
N-BUTANE-NC4
1.0
10MOB 40
REF: 60/65
PI 1700
SPM 108

12:01 AM 8/12/85

5 10 15 20

6500

80

60

40

REV 3 3/4" 5408

20

40

LS, wh, crm, m-dk gy,
mod ind, micxn, rr
vug ϕ , tr brn ϕ stn,
wk yel florLS, wh-crm, mod-w ind,
pred crpxln, occ micxn,
chiky, sme grdg to DOI,
n vis ϕ , NSFOCLS, crm-bf-wh, gy-lt gy,
brn, mod-w ind, pred
crpxln, sl arg, sme sl
anhy, sme dol, n vis ϕ ,
occ dul mri flor, NSOCLS, crm-bf, gy, prk, mod-
w ind, crpxln, occ sl
arg, chiky com, tr anhy,
n vis ϕ , dul purp mri
flor, NSOCLS, lt gybrn-bf-crm, wh,
mod-w ind, crpxln-occ
micxn, chiky ip, n-
v p vis ϕ , NSFOCLS, wh-crm, p-mod ind,
micxn, v p vis ϕ , dl-
bri yel O flor, wk slo
yel cut, n vis O stn,
nt yel resid mg

CARBIDE VAC 802

CG 100

124 u

63 MIN @ 108 SPM

DTG 186u

C3
C2
C1

C4



OPERATOR
WELL

AMOCO
USG SEC 18 #43

LOC.
JOB#

CHC 18 129N R16A
85772

SAN JUAN CO., NEW MEXICO

analex
DIVISION OF XCO

RATE OF PENETRATION
m/f (K) f/hr ()

D
E
P
T
H
CORE

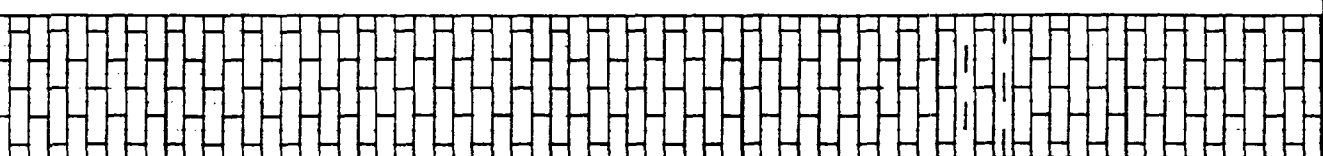
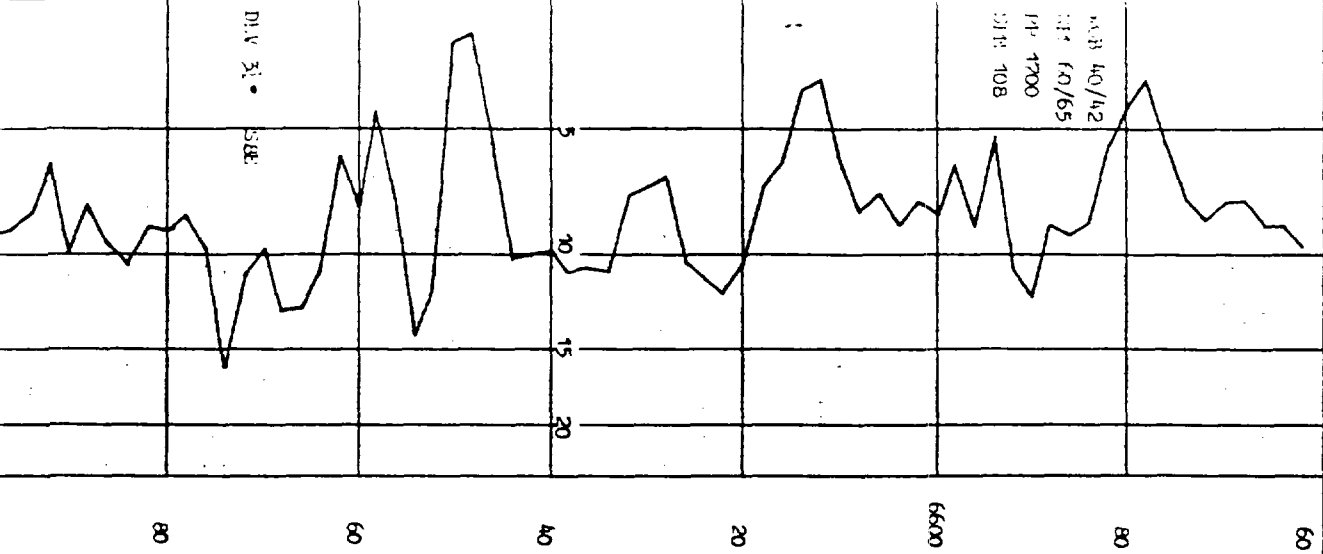
GRAPHIC
LITHO

LITHOLOGY
DESCRIPTION
AND REMARKS

CONTINUOUS MUD GAS (back up scale X100)
10 UNITS 1% 100 UNITS 1% 1000 UNITS 10%
X-X-X-X-X- CUTTING GAS -X-X-X-X-X-X-

GAS CHROMATOGRAPH
S H O W
METHANE-C1
ETHANE-C2
PROPANE-C3 .01
ISO-BUTANE-IC4
N-BUTANE-NC4
1 10 100

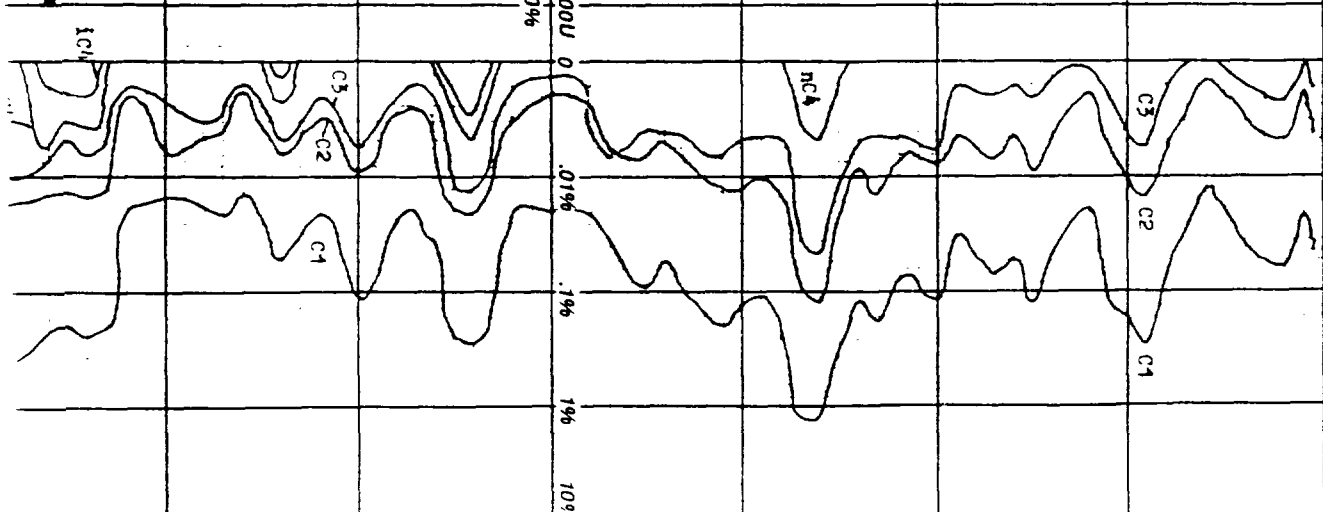
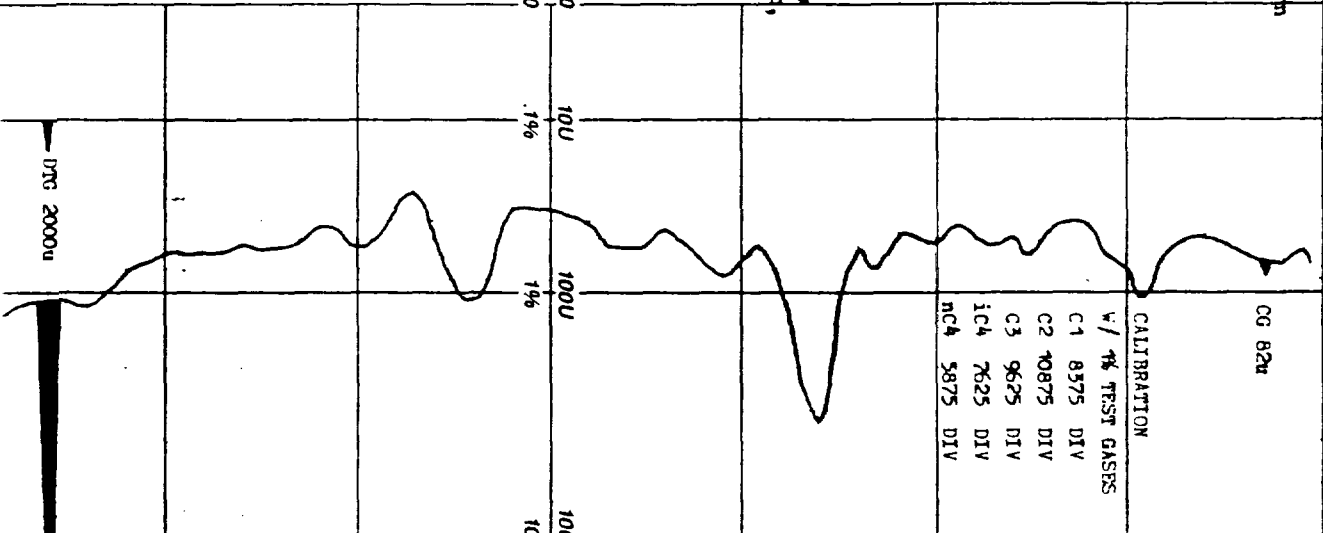
66911 40/42
66912 40/65
66913 40/65
66914 40/65
66915 40/65
66916 40/65
66917 40/65
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66919 40/65
66920 40/65
66921 40/65
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66993 40/65
66994 40/65
66995 40/65
66996 40/65
66997 40/65
66998 40/65
66999 40/65
67000 40/65



L5, ore-bf, lt gy-lt gybrn
mod ind, orpnl-micxln,
cln-v sl arg, sme chky,
tr vug ϕ , n-p vis-
intxln ϕ , rr brn o stn,
scat yelgrn mrl flor,
rr wk aio cut
SH, dk gy-gy-gybrn, rr
blk, frm, sdbky, tr
sly, mod-sl calc
L5, gybrn-lt brn, lt gy-
orm, mod ind, micxln-
orpnl, sme sue, sl arg,
tr carb sh, tr pily cald,
scat mrl flor, occ vug
 ϕ , n-p vis intxln ϕ ,
NSOC
L5, lt gy-not gybrn, mod
ind, micxln, sl arg,
chky-dns, tr vug ϕ ,
n vis-p intxln ϕ , NSOC

SAMPLE TOP
BARKER CREEK
6664* (474*)

MUD DATA # 66911
WT 40.1 VP 12
PV 36 PV R
PH 10.5 FIL 70
C1 15000 Ca 100





OPERATOR
WELL

APCO
USG SIC 48 #43

LOC.
JOB#

SIC 48 7301 R36

SAN JUAN

CO.,

MEX MEXICO

analex
DIVISION OF XCO

RATE OF PENETRATION

m/ ☒ f/hr ☐

D
E
P
T
H
CORE

GRAPHIC
LITHO

LITHOLOGY
DESCRIPTION
AND REMARKS

CONTINUOUS MUD GAS (back up scale X100)

10 UNITS 100 UNITS 1000 UNITS 10% 10%

X-X-X-X-X- CUTTING GAS -X-X-X-X-X-X-

S
H
O
W

GAS CHROMATOGRAPH

METHANE-C1
ETHANE-C2
PROpane-C3
ISO-BUTANE-IC
N-BUTANE-NC4

0.01 0.1 1.0 10

SAMPLE TO:
PINKERTON TRAIL HHR.
6800' (-1610')

MUD DATA # 18421
WT 10.0+ YP 12
FV 4.1 PV 12
pH 10.5 ILL 10.4
CL 16000 CA 100

WOB 40
RPM 60/65
IF 1700
SPM 108

12101 AM, 8/15/85

SH, ry-dkry-occ blk, frm-
sft, n calc, tr silty,
sme shvry

LS, ltprk-crm, tan-brn,
mod ind, crpxl, cln,
dnc-chky, occ dol, fr
cht, n vis ϕ , NSFOC

SLTST, ry-dkry, tr blk,
frm, sblky-blky, n calc

LS, ltbrn-rybrn, crm-bl,
mod ind, crpxl, sl rpy-
cln, dns, occ dol, occ
intbd ry sh/sme silty,
n vis-p ϕ , NSFOC

LS, ltgy-ry, crm-tun, w
ind, crpxl-micxl, sl rpy-
cln, sme sh strk, tr sd,
n vis ϕ , NSFOC

SAMPLE TRIP: MOI AG

CARBIDE LAG 8 oz
118 u
10 MIN - 84 SPM

0 100 1000 10000 0 0.01% 0.1% 1% 10%

C3
C2
C1



OPERATOR
WELL

AMOCO
USG SEC 18 #43

LOC.
JOB#

SIC 10 1 20 1 16 1
R5373 SAN JUAN

CO., NEW MEXICO

analex
DIVISION OF XCO

RATE OF PENETRATION

m/f ☐ f/hr ☐

D
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P
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CORE

GRAPHIC
LITHO

LITHOLOGY
DESCRIPTION
AND REMARKS

CONTINUOUS MUD GAS (back up scale X100)

10 UNITS 100 UNITS 1000 UNITS

X-X-X-X- CUTTING GAS -X-X-X-X-X-X-

S
H
O
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TFG

GAS CHROMATOGRAPH

METHANE-C1
ETHANE-C2
PROPANE-C3
ISO-BUTANE-C4
N-BUTANE-NC4

.01 .1 1.0 10

HIT #15

FTC 8271

WTC 1118 3/4

WTC 1118 3/4

WTC 1118 3/4

WTC 1118 3/4

WTC 1118 3/4

WTC 1118 3/4

WTC 1118 3/4

WTC 1118 3/4

WTC 1118 3/4

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WTC 1118 3/4

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760

780

800

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80

100

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280

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320

340

360

380

400

420

440

460

480

500

520

540

560

580

600

620

640

660

680

700

720

740

760

780

800

20

40

60

80

100

120

140

160

180

200

220

240

260

280

300

320

340

360

380

400

420

440

460

480

500

520

540

560

580

600

620

640

660

680

700

720

740

760

780

800

20

40

6



OPERATOR
WELL

AMOCO
USG SEC 18 #43

LOC.
JOB#

SAN JUAN CO., N.M. MEXICO

CO., N.M. MEXICO

analex
DIVISION OF XCO

RATE OF PENETRATION
m/f ☒ f/hr ☐

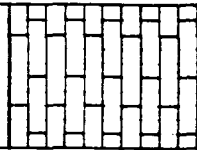
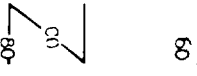
D
E
P
T
H
CORE

GRAPHIC
LITHO

LITHOLOGY
DESCRIPTION
AND REMARKS

CONTINUOUS MUD GAS (back up scale X100)
10 UNITS 1%
100 UNITS 1%
1000 UNITS 10%
10%
-X-X-X-X- CUTTING GAS -X-X-X-X-X-X-
TFG

GAS CHROMATOGRAPH
METHANE-C1
ETHANE-C2
PROPANE-C3
ISO-BUTANE-IC4
N-BUTANE-NC4
0.1 .1 1.0 10



LS, blk-grm, bf, mod ind,
micx1-oxpx1, clin-v sl
arg, n vis y, NS-FBC
TOTAL DEPTH 7240'
4:20 AM, 8/17/85

THANK YOU FOR SELECTING

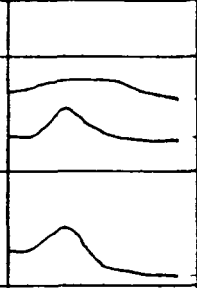
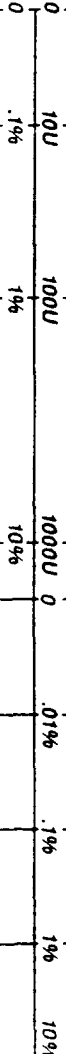
ANALEX!

Doran Adams

DORAN ADAMS

John P. Evans

JOHN EVANS





OPERATOR AMOCO
WELL USG SEC 18 #43

SEC 18 TWP 29 N
JOB# 85373 SAN JUAN
CO., NEW MEXICO

analex
DIVISION OF XCO

SHOW REPORT # 2 Formation AKAH

Time 12:01 PM
Date 8/11/85

RATIO PLOT: C1 C1 C1
C2 C3 C4

Depth Interval from 6378' to 6386' with X liberated produced gas

Gross Ft 8 Net Ft 6

DEPTH	MIN/FT	TOTAL GAS		C1	GAS CHROMATOGRAPHY %			SHOW GAS			
		UNITS	% M E		C2	C3	Σ C4	MINUS BACKGROUND			
BACKGROUND	10	60	.6	.02				C1	C2	C3	C4
6378-80	6.6	74	.74	.043	.0024	.001		9.6	23		
6380-82	8	70	.7	.07	.0043	.0005		11.6	100		
6382-84	5.6	100	1.0	.25	.014	.004	.003	16	58	76	
6384-86	6.6	82	.82	.198	.01	.0027	.0008	17.8	66	222	
BACKGROUND	10	84	.84	.057	.0028	.001					

SHOW EVALUATION

GAS RATIO EVALUATION: oil X gas cond. tile well

LITHOLOGY TYPE: SS SH SLTST LS DOL Other

Color white-buff Grain/Size csp-siloxln Shape

Sorting Cmt & Mix Acc

POROSITY: n p m i g Ingran Intln 20% moldic frac 80% vuggy other

STAIN: Color none even spotted pinpoint bleeding % in total cuttings 5 % mml 60

FLUORESCENCE: Color yellow/green X even spotted pinpoint % in total cuttings 5 % mml 60

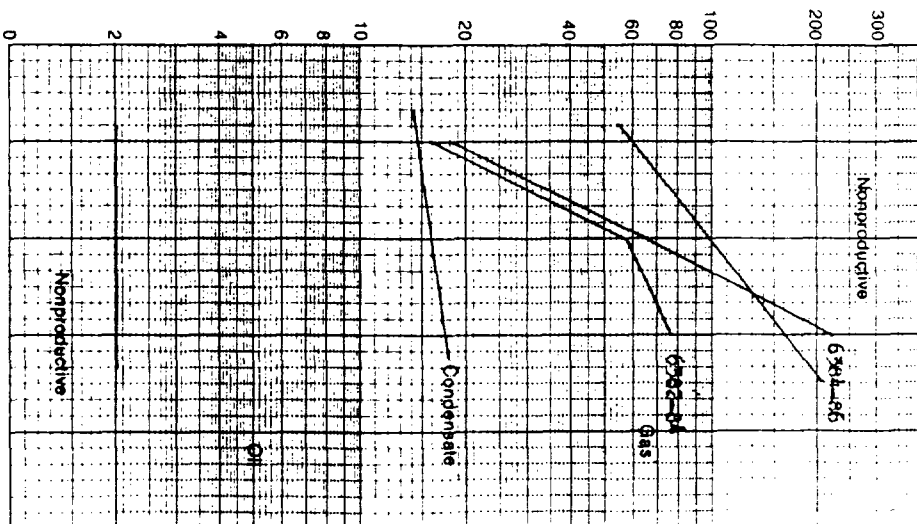
CHLOROTHENE CUT: Color clear Development Residual

CUT FLUORESCENCE: Color yellow Development glow Residual faint

MUD PROPERTIES: W 9.9 FV 40 Fil 70 %Oil 0 Cl 16000 pH 9 WOB 40 RPM 60/65 SPM 108 PP 1700

REMARKS: BACKGROUND GAS DUE TO DIESEL IN THE MUD

Bit Type SEC SRTF Hrs 8 Footage 52



Analex cannot and does not guarantee the accuracy or correctness of this data and interpretation. Analox shall not be held liable or responsible for any loss, cost, damage or expense incurred or sustained by customer resulting from the use of this information or later proven to be faulty in any of its agents, subsidiaries or employees.

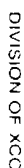


RATIO PLOT: $\frac{C_1}{C_2}$ $\frac{C_1}{C_3}$ $\frac{C_1}{C_4}$

Net Ft 10

REMARKS	Bill Type	Hrs	Footage
	S 82 F		741

Analtek cannot and does not guarantee the accuracy or correctness of this data and interpretation. Analtek shall not be held liable or responsible for any loss, cost, damage or expense incurred or sustained by customer resulting from the use of this information or interpretation thereof by any of its agents, servants or employees.



C1/C3	C1/C4
C2/C3	C2/C4

Net F1 47

GAS RATIO EVALUATION

LITHOLOGY TYPE SS SH SLTST LS DOL Other % () () () () () ()

COLOR Color librn-grm Grain/Xtal Size mixal-enc Shape Sorting Cntl & Mix Acc

POROSITY n p m i g Ingran psd intxin moldic frac pos vuggy other

STAIN Color blk even X spotted pinpoint bleeding % in total cuttings

FLUORESCENCE Color ye1 even X spotted pinpoint % in total cuttings 7 % mmf 4

CHLOROTHENE CUT Color Development Residual

CUT FLUORESCENCE Color ye1 Development slv stage Residual brt ye1 ring

MUD PROPERTIES wt % oil FV FB Fil TO % Oil Cl 15000 pH 7.5 WOB 40 RPM 65 SPM 108 PP 1700

REMARKS:

Blt Type SRC Hrs 57 Footage 774'

Anales cannot and does not purport
the accuracy or correctness of this
interpretation, which shall remain
entirely confidential to the requester.
cost, damage or expense incurred
sustained by customer resulting from
the use of this information or its
presentation thereof by any of its agents,
servants or employees.

Nonproductive

ATTACHMENT 8

tiffany gas co.

2901 EAST TWENTIETH STREET

P. O. DRAWER 50

FARMINGTON, NEW MEXICO 87499

PHONE (505) 325-1701

August 27, 1993

Farmington Daily Times
201 North Allen
Farmington, New Mexico 87401

Attn: Classifieds

Gentlemen:

Enclosed herewith please find copy of legal advertisement to be published in your newspaper one (1) time. Please publish upon receipt and please furnish us with proof of publication.

It is our understanding that you will invoice us for the publication charge.

If anything further is required please advise.

Very truly yours,

TIFFANY GAS CO.

Micki Maben
Secretary

Enc.

AFFIDAVIT OF PUBLICATION

COPY OF PUBLICATI

STATE OF NEW MEXICO,
County of San Juan:

No. 32242A

C.J. SALAZAR being duly
sworn, says: "That she is the
CLASSIFIED MANAGER of
The Farmington Daily Times, a daily
newspaper of general circulation
published in English in Farmington,
said county and state, and that the
hereto attached LEGAL NOTICE

was published in a regular and entire
issue of the said Farmington Daily
Times, a daily newspaper duly quali-
fied for the purpose within the
meaning of Chapter 167 of the 1937
Session Laws of the State of New
Mexico for ONE consecutive
(days) (//////) on the same day as
follows:

First Publication THURSDAY, SEPTEMBER 2, 1993

Second Publication _____

Third Publication _____

Fourth Publication _____

and the cost of publication was \$ 35.66

On 9/14/93 C.J. Salazar
appeared before me, whom I know personally to be
the person who signed the above document.

Notary Public, San Juan County,
New Mexico

My Comm expires: July 5, 1994

PUBLIC NOTICE

TO WHOM IT MAY CONCERN:

Please be advised that Tiffany Gas Co., a New Mexico Limited Partnership of
2901 East 20th Street, Farmington, New Mexico 87402, Attn: Joel B. Burr, Jr.,
General Partner, telephone number (505) 325-1701, has filed application with the
Environmental Protection Agency, San Francisco, California for authority to inject
water in the following named well:

USG Section 18-43, 1500' FNL & 1760' FWL,
Section 18-T29-N, R-16-W, San Juan County,
New Mexico Lease #1-89-IND-58. Injection
will be into the Entrada perforated interval
from 2130' - 2190'. Maximum injection rate
is expected to be 300 BW7D at less than 500 PSI.

Interested parties must file objections or request for hearing with the United States
Environmental Protection Agency, Region IX, 75 Hawthorne Street, San Francisco,
California 94105-3901 within 15 days.

Legal No. 32242 published in the Farmington Daily Times, Farmington, New
Mexico on September 2, 1993.

ATTACHMENT 9



PLUGGING AND ABANDONMENT PLAN

NAME AND ADDRESS OF FACILITY

USG SECTION 18 #43
Hogback

NAME AND ADDRESS OF OWNER/OPERATOR

Tiffany Gas Company
P.O. Box 50
Farmington, NM 87499

LOCATE WELL AND OUTLINE UNIT ON
SECTION PLAT — 640 ACRES

STATE

NM

COUNTY

San Juan

PERMIT NUMBER

SURFACE LOCATION DESCRIPTION

NE ¼ OF SW ¼ OF NE ¼ SECTION 18 TOWNSHIP 29N RANGE 16W

LOCATE WELL IN TWO DIRECTIONS FROM NEAREST LINES OF QUARTER SECTION AND DRILLING UNIT

Surface Location 1500 ft. from (N/S) N Line of quarter section
and 1760 ft. from (E/W) W Line of quarter section

TYPE OF AUTHORIZATION

- ☒ Individual Permit
☐ Area Permit
☐ Rul.

Number of Wells 1

WELL ACTIVITY

- ☐ CLASS I
☒ CLASS II
☒ Brine Disposal
☐ Enhanced Recovery
☐ Hydrocarbon Storage
☐ CLASS III

Lease Name USG Section 18

Well Number 43

CASING AND TUBING RECORD AFTER PLUGGING

SIZE	WT(LB/FT)	TO BE PUT IN WELL (FT)	TO BE LEFT IN WELL (FT)	HOLE SIZE
13 3/8"	48#	-	313'	17 1/2"
9 5/8"	36#	-	2260'	12 1/4"
7"	23# & 26#	-	7282'	8 3/4"

METHOD OF EMPLACEMENT OF CEMENT PLUGS

- ☒ The Balance Method
☐ The Dump Bailer Method
☐ The Two-Plug Method
☐ Other

CEMENTING TO PLUG AND ABANDON DATA

	PLUG #1	PLUG #2	PLUG #3	PLUG #4	PLUG #5	PLUG #6	PLUG #7
Size of Hole or Pipe in which Plug Will Be Placed (inches)	7"	7"	7"				
Depth to Bottom of Tubing or Drill Pipe (ft.)	2310'	918'	363'				
Sacks of Cement To Be Used (each plug)	86.4	28	67.8				
Slurry Volume To Be Pumped (cu. ft.)	102	33	80				
Calculated Top of Plug (ft.)	1962'	768'	Surface				
Measured Top of Plug (if tagged ft.)			Surface				
Slurry Wt. (Lb./Gal.)	15.6	15.6	15.6				
Type Cement or Other Material (Class III)	Class B	Class B	Class B				

LIST ALL OPEN HOLE AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED (If any)

From	To	From	To
Perf's 2130'	2190'		

Estimated Cost to Plug Wells

\$20,000.00

CERTIFICATION

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

NAME AND OFFICIAL TITLE (Please type or print)

Joel B. Burr Jr., General Partner

SIGNATURE

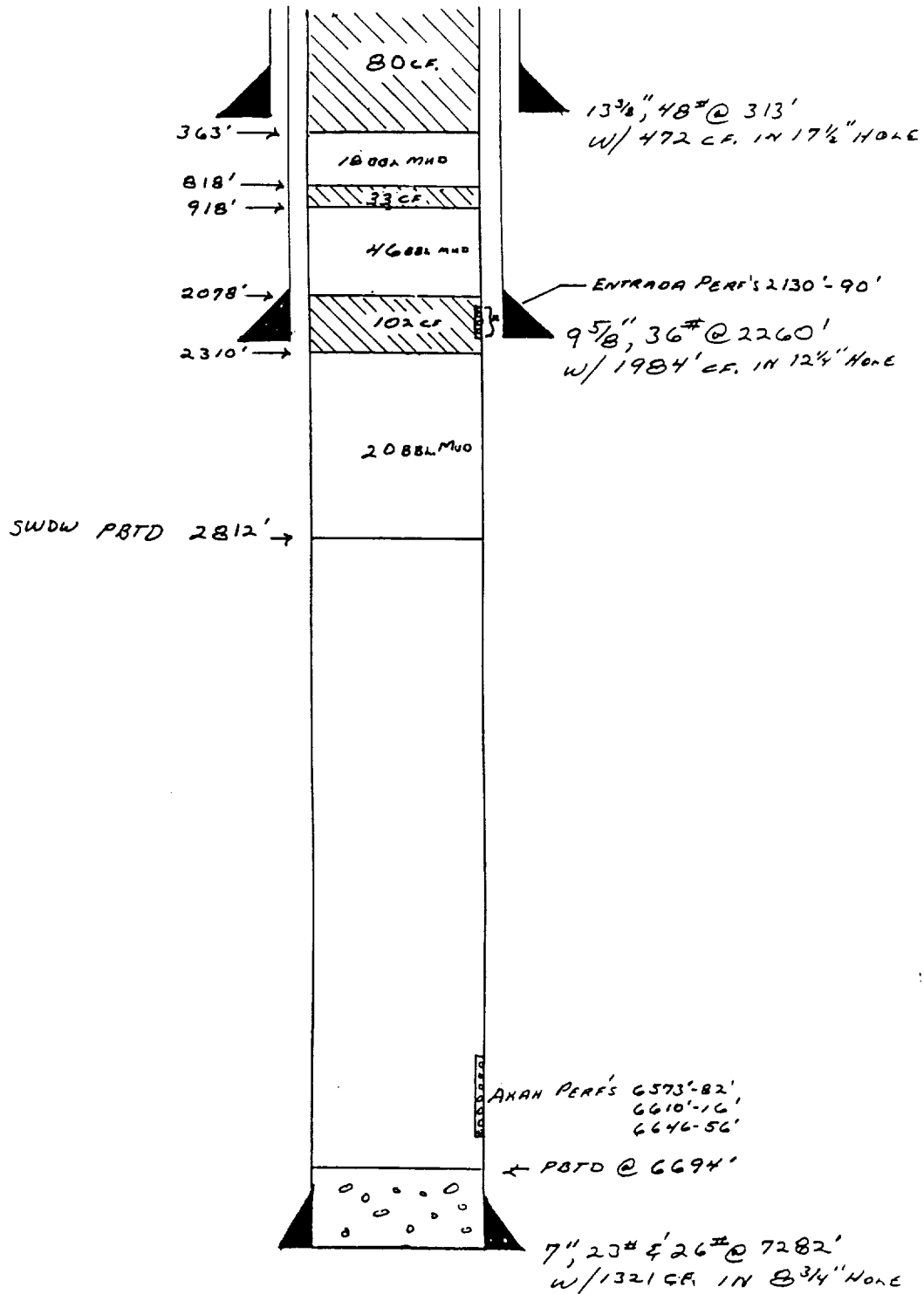
DATE SIGNED

2-9-93

TIFFANY GAS CO.
 USG SEC. 18 #43
 1500' ENL & 1760' FWL
 SEC 18-T29N-R16W
 SAN JUAN COUNTY, NM
 LSC # I-89-IND-SB
 5189' KB, 5176' GR

P x A WELLBORE SCHEMATIC

ESTIMATED PLUGGING COST - \$20,000



ATTACHMENT 10

ATTACHMENT R.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

COLLECTIVE BOND

CR71409-82
(2001)

KNOW ALL MEN BY THESE PRESENTS, That we, Tiffany Gas Co., a New Mexico
Limited Partnership of 2901 E. 20th, Farmington, New Mexico, as principal,
and Commercial Union

of Boston, Mass., as surety, are held and firmly bound unto the United States of America in the sum of SIXTY THOUSAND DOLLARS, lawful money of the United States, for the payment of which, well and truly to be made, we bind ourselves and each of us, our and each of our heirs, successors, executors, administrators, and assigns, jointly and severally, firmly by these presents.

Sealed with our seals and dated this 11th day of February, 1988

The condition of this obligation is such that whereas the said principal, as lessee, has heretofore or may hereafter enter into or otherwise acquire an interest in oil and gas mining leases and n/a prospecting permits on the Navajo Indian Reservation in the State of New Mexico of various dates and periods of duration, covering lands or interests in lands held by the United States in trust for individual Indians, or bands or tribes of Indians, or subject to restrictions against alienation without the consent of the Secretary of the Interior, or his authorized representative, which leases and permits have been or may hereafter be granted or approved by the Secretary of the Interior, or his authorized representative, and the identification of which herein is expressly waived by both principal and surety hereto.

WHEREAS the principal and surety agree that the coverage of this bond shall extend to and include all extensions and renewals of the leases and permits covered by this bond, such coverage to continue without any interruption due to the expiration of the term set forth therein.

WHEREAS the surety hereby waive any right to notice of any modification of any such lease or permit, or obligation thereunder whether effected by extension of time for performance, by commitment of such lease to unit, cooperative, or communitization agreement, by waiver, suspension, or change in rental, except an increase thereof, by minimum royalty payment, except an increase thereof, by compensatory royalty payment, or otherwise, this bond to remain in full force and effect notwithstanding.

WHEREAS the principal and surety agree that the neglect or forbearance of any obligee under this bond in enforcing the payment of any rental or royalty or the performance of any other covenant, condition, or agreement of any such lease or permit shall not in any way release the principal and surety, or either of them, from any liability under this bond; and

WHEREAS the principal and surety agree that in the event of any default under any such lease or permit, the obligee may prosecute any claim, suit, action, or other proceeding against the principal and surety, or either of them, without the necessity of joining the other.

ATTACHMENT R.

DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

APPROVED:

_____, 19____

Area Director.

ATTACHMENT R.
POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS, that the COMMERCIAL UNION INSURANCE COMPANY, a corporation duly organized and existing under the laws of the Commonwealth of Massachusetts, and having its principal office in the City of Boston, Massachusetts, hath made, constituted and appointed, and does by these presents make and constitute and appoint **ED G. ARMSTRONG** of Farmington, New Mexico

~~XXXXXX~~ its true and lawful Attorney-in-Fact, to make, execute, seal and deliver for and on its behalf as surety any and all bonds or undertakings

and the execution of such bonds or undertakings in pursuance of these presents, shall be binding upon said Company as fully and amply, to all intents and purposes, as if such bonds were signed by the President, sealed with the corporate seal of the Company, and duly attested by its Secretary, hereby ratifying and confirming all the acts of said Attorney-in-Fact pursuant to the power herein given. This Power of Attorney is made and executed pursuant to and by authority of the following resolutions adopted by the Board of Directors of the COMMERCIAL UNION INSURANCE COMPANY at a meeting duly called and held on the twenty-seventh day of July, 1972.

Resolved That the President, or any Vice-President, or any Assistant Vice-President, may execute for and in behalf of the company any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, the same to be attested when necessary and the seal of the company affixed thereto by the Secretary, or any Assistant Secretary; and that the President, or any Vice-President, or Assistant Vice-President, may appoint and authorize, or Attorney-in-Fact to execute on behalf of the company any and all such instruments and to affix the seal of the company thereto; and that the President, or any Vice-President, or any Assistant Vice-President, may at any time remove, any such Attorney-in-Fact and revoke all power and authority given to any such Attorney-in-Fact.

Resolved That Attorneys-in-Fact may be given full power and authority to execute for and in the name and on behalf of the company any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, and any such instrument executed by any such Attorney-in-Fact shall be as binding upon the company as if signed by the President and sealed and attested by the Secretary, and, further, Attorneys-in-Fact are hereby authorized to verify any affidavit required to be attached to bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, and are also authorized and empowered to certify to a copy of any of the by-laws of the company as well as any resolution of the Directors having to do with the execution of bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, and to certify copies of the Power of Attorney or with regard to the powers of any of the officers of the company or of Attorneys-in-Fact.

This power of attorney is signed and sealed by facsimile under the authority of the following Resolution adopted by the Directors of the COMMERCIAL UNION INSURANCE COMPANY at a meeting duly called and held on the twenty-seventh day of July, 1972.

Resolved, That the signature of the President, or any Vice-President, or any Assistant Vice-President, and the signature of the Secretary or any Assistant Secretary and the Company Seal may be affixed by facsimile to any power of attorney or to any certificate relating therein appointing Attorneys-in-Fact for purposes only of executing and attesting any bond, undertaking, recognizance or other written obligation in the nature thereof, and any such signature and seal where so used, being hereby adopted by the company as the original signature of such officer and the original seal of the company, to be valid and binding upon the company with the same force and effect as though manually affixed.

IN WITNESS WHEREOF, the COMMERCIAL UNION INSURANCE COMPANY, has caused these presents to be signed by its Assistant Vice President and its corporate seal to be hereto affixed, duly attested by its Secretary on this 22nd day of October 19 87



Attest

Dennis R. Smith

Dennis R. Smith Secretary

By

Robert J. Spencer

Robert J. Spencer Assistant Vice-President

COMMONWEALTH OF MASSACHUSETTS
COUNTY OF SUFFOLK SS

On this 22nd day of October 19 87, before me personally came Robert J. Spencer, Assistant Vice-President, and Dennis R. Smith, Secretary of the COMMERCIAL UNION INSURANCE COMPANY, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and they acknowledged the execution of the same, and being by me duly sworn, severally and each for himself depose and sayeth, that they are the said officers of the Company aforesaid, and that the seal affixed to the preceding instrument is the corporate seal of said Company and that the said corporate seal and their signatures as such officers were duly affixed and subscribed to the said instrument by the authority and direction of the said Company.



Edward W. Shay
Edward W. Shay Notary Public
(My Commission expires August 10, 1990)

CERTIFICATE

I, the undersigned, Assistant Secretary of the COMMERCIAL UNION INSURANCE COMPANY, a Massachusetts Corporation, do hereby certify that the foregoing power of attorney is in full force and has not been revoked, and furthermore, that the Resolutions of the Board of Directors set forth in the power of attorney are now in force.

Signed and sealed at the City of Boston Dated this 11th day of February 1988



Daniel A. B. L.

HOGANSTADT PIPELINE CORPORATION
 4515 1407, ONE PARK CENTRAL
 DENVER, COLORADO 80202

WELL LOG ELECTRICAL LOG		COUNTY: DENVER 4818 TBL OR SW NE LOCATION: 18-20N-16W WELL: U.S.G. #13	
COMPANY: STANDARD OIL & GAS CO. WELL: U.S.G. #13 FIELD: WILSON LOCATION: 18-20N-16W COUNTY: DENVER STATE: NEW MEXICO PLUG NO.		COMPANY: STANDARD O & G	
Location of Well 		REMARKS Run one mud from flow line Mud level 10' Run two mud from flow line. Run three mud from Mud R/L. Run four mud from Magcobat. Run five mud from Magcobat.	
Spontaneous Potential millivolts		Resistivity ohm m'/m.	
0 100 1000		Normal 100 1000	
0 100 1000		Long Normal 100	

ILLEGIBLE

Schlumberger

CYBERLOOK

CSU Field Log

COMPANY: AMOCO PRODUCTION COMPANY

WELL: USG SECTION 18-43

FIELD: HOGBACK PENN - LEADVILLE

COUNTY: SAN JUAN

STATE: NEW MEXICO

NATION: U.S.A.

LOCATION: 1500 FNL & 1760 FNL

SEC: 18 TWP: 29N RGE: 16W

PERMANENT DATUM: GROUND LEVEL ELEVATIONS -
ELEV. OF PERM. DATUM: 5188.0 F KB: 5189.0 F
LOG MEASURED FROM: KELLY BUSH. DF: 5188.0 F
14.0 F ABOVE PERM. DATUM GL: 5175.0 F
DRLG. MEASURED FROM: KELLY BUSHING

DATE: 17 AUG 85
RUN NO: 1

DEPTH-DRILLER: 7280.0 F
DEPTH-LOGGER: 7283.0 F
BTL. LOG INTERVAL: 7281.0 F
TOP LOG INTERVAL: 2259.0 F

CASING-DRILLER: 307 F 2259 F
CASING-LOGGER: 2259 F
CASING: 13 3/8" 12 1/4" 7"
WEIGHT: 48.00 LB/F 36.00 LB/F 8 3/4"
BIT SIZE: 12 1/2" 8 3/4"

OTHER SERVICES:
DIL
FDC
CNL
DIPMETER

PROGRAM
TAPE NO:
26.2
SERVICE
ORDER NO:
465416

CHAMBERGER WELL SURVEYING CORPORATION

Electrical Log

[illegible][illegible]

1990

WILSON

SERVICE COMPANY

TEMPERATURE SURVEY

COMPANY ~~AMOCO Production~~WELL ~~43~~ LEASE ~~USG Section 18~~COUNTY ~~San Juan~~ STATE ~~New Mexico~~SEC. ~~18~~ TWP. ~~29N~~ RGE. ~~16W~~APPROX. TOP CEMENT ~~300'~~Survey Begins at ~~100'~~ Ft. Ends at ~~5018'~~ Ft.Approx. Fill-Up ~~Max. Temp.~~Log Measured From ~~KB~~ Run No. ~~1~~

Casing Size	Casing Depth	Diam of Hole	Depth
7" from	to	from 8 3/4"	to
from	to	from	to

Date of Cementing ~~8/19/85~~ Time ~~2:00~~ amDate of Survey ~~8/19/85~~ Time ~~3:30~~ pmAmount of Cement ~~As. Per. Report~~Recorded by ~~Hodnett~~ Witnessed by

REMARKS OR OTHER DATA

DV Tool 5018'