New Mexico Bureau of Mines and Mineral Resources
Open File Report No. OF-349

CRUDE OIL ANALYSES OF THE MERRION OIL AND GAS CORP. NO. 1 POT MESA WELL (MENEFEE), McKINLEY COUNTY, AND NO. 321 CANYON LARGO UNIT WELL (GALLUP), RIO ARRIBA COUNTY, NEW MEXICO

by

D. Kirk Cromer
Core Laboratories, Inc.
Dallas, Texas

October 15, 1985

7501 STEMMONS FREEWAY, BOX 47547, DALLAS, TEXAS 75247 • 214/631-8270

CORE LABORATORIES, INC.

October 15, 1985

Geochemical
Services

Mr. Doug Endsley
Merrion Oil and Gas Corporation
P.O. Box 1017 840
Farmington, New Mexico 87499

Subject: Crude Oil Characterization
Menefee and Gallup Oils

File No.: SBE 85061

Dear Doug:

30-031-20882 Mkwk POT MESA #1 MENEFEE – Sec 10-T20N-R6W
30-039-25139 Rulo CLU 321 - GALLUP – Sec 24-T25N-R6W

This final report presents the results of our geochemical crude oil characterization of two oils from the southern San Juan Basin, one from the Cretaceous Menefee Formation and one from the Cretaceous Gallup Formation. This crude oil characterization consisted only of analysis of the $C_{10}+$ saturated hydrocarbon fraction of these oils by capillary gas chromatography (GC).

Based on the results of this analysis only, the Menefee and Gallup oils appear to be very similar. This can be seen in the GC pattern ("fingerprint") of the two oils in Figures 1 and 2. Another way of comparing these two oils is to plot the normal paraffin distributicn (Table 1), which is shown in Figure 3. This further shows the similarity of these two oils.

Specific biomarker compounds that occur in oils, which can be thought of as biological fossils of the original organic matter in the source rock of an oil, are very useful in correlating crude oils. The isoprenoid hydrocarbons are one type of biomarker compound that can be evaluated by gas chromatography of the C_{10+} saturated hydrocarbon fraction. Caution must be exercised, however, as the lower molecular weight isoprenoids are subject to alteration due to their low boiling points. The distribution of the isoprenoid hydrocarbons in these oils, shown in Figure 4, confirm their similarity.

As previously suggested in earlier conversations, both of these oils appear to have been generated from a source rock containing a mixture of terrestrial and marine organic matter. The pristane/phytane ratics of near 2.00 and the high concentrations of n-C_{24+} paraffins suggests a significant terrestrial organic matter input to a relatively well-oxygenated depositional environment. The source rock of these oils was apparently thermally mature at the time of expulsion of these oils, probably well into the oil generation window. This is based on CPI values (Table 1) near 1.00, relatively high n-C_{17}/Pristane, n-C_{18}/Phytane ratios and the general pattern of the GC's. One of the only discernable differences in these oils based on this analysis is that the Gallup oil appears to be slightly more mature than the Menefee oil. This could easily be accounted for by post-pooling maturation in the reservoir.

Other detailed analyses, such as carbon isotope composition or gas chromatography/mass spectrometry, could confirm or refute the suggested correlation of these two oils. Direct comparison to suspected source rocks could also assist in correlation of these oils and provide a crude oil/source rock correlation.

We appreciate the opportunity to be of assistance to Merrion Oil and Gas Corp. in their hydrocarbon exploration program. Should you have any questions on this report, or need additional services in future, please contact us at (214) 631-8270.

Sincerely,

CORE LABORATORIES, INC.

D Kirk Cromer

D. Kirk Cromer
Senior Geochemist
Geochemical Services

DKC/ckp

Figure 1

C10+ SATURATED HYDROCARBON FRACTION
MENEFEE OIL SAMPLE

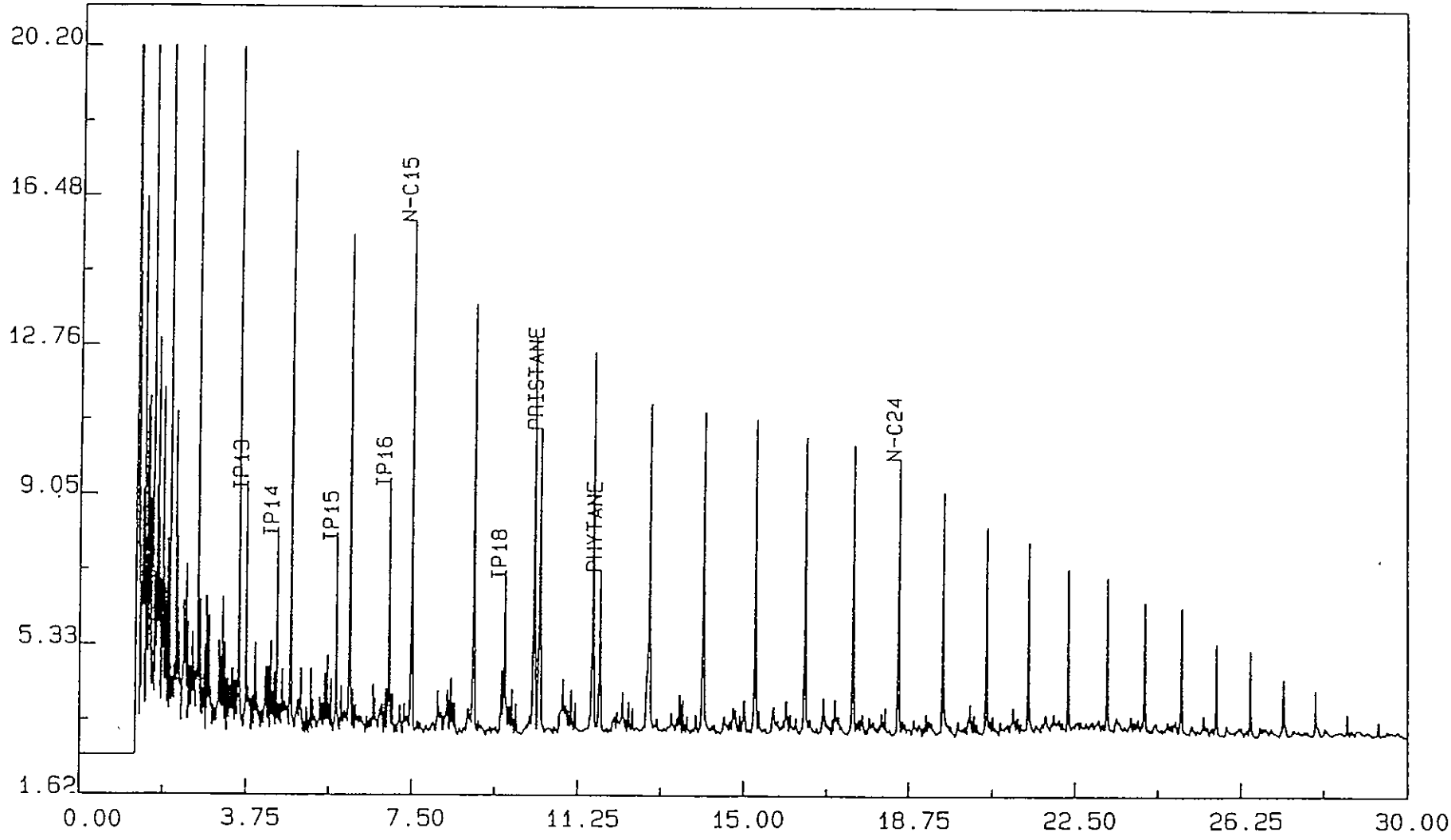

Figure 2

C10+ SATURATED HYDROCARBON FRACTION
CRETACEOUS GALLUP OIL

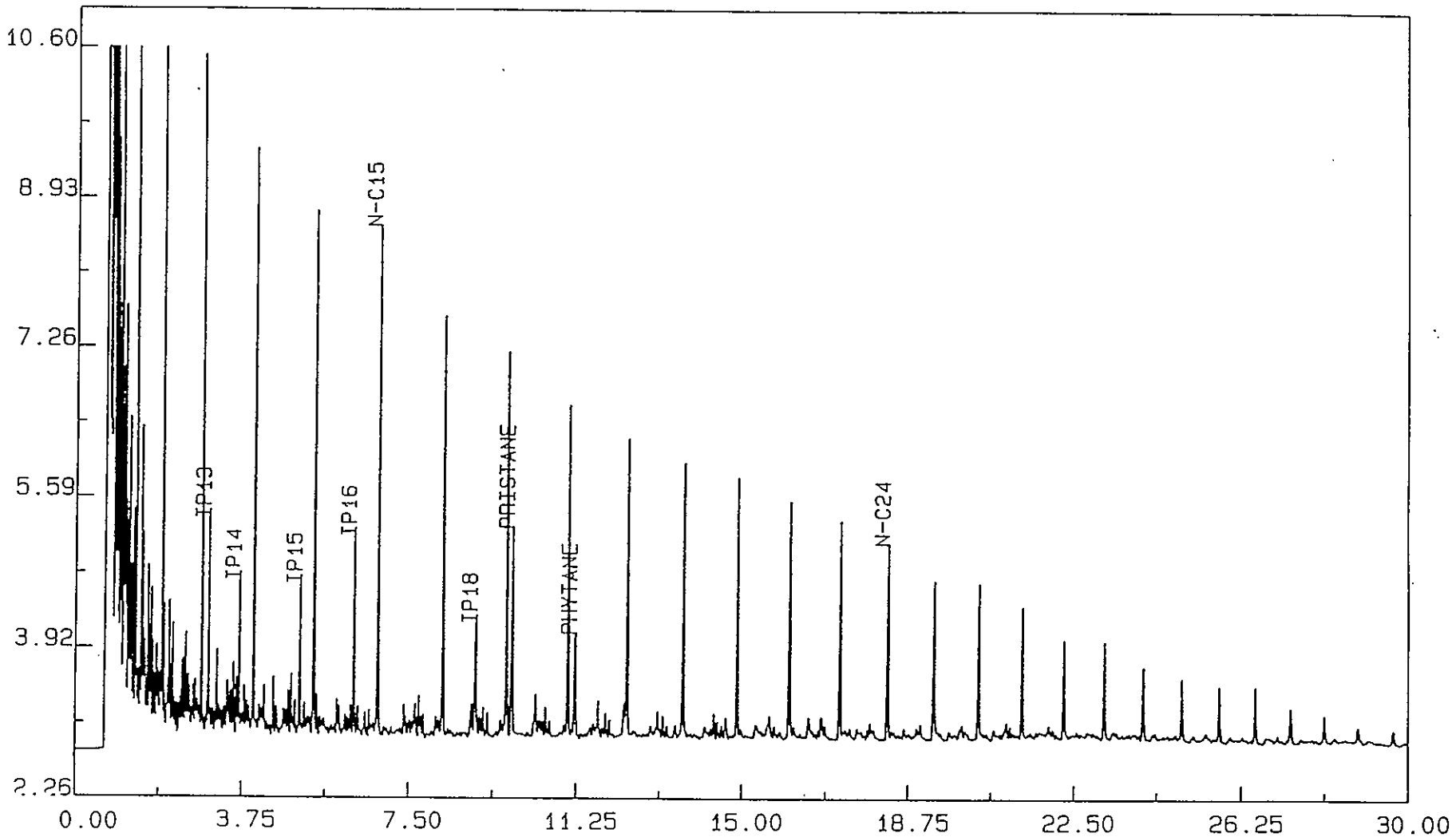

Figure 3

MERRION OIL & GAS CORPORATION

MENEFEE & GALLUP CRUDE OILS

NORMAL PARAFFIN DISTRIBUTION

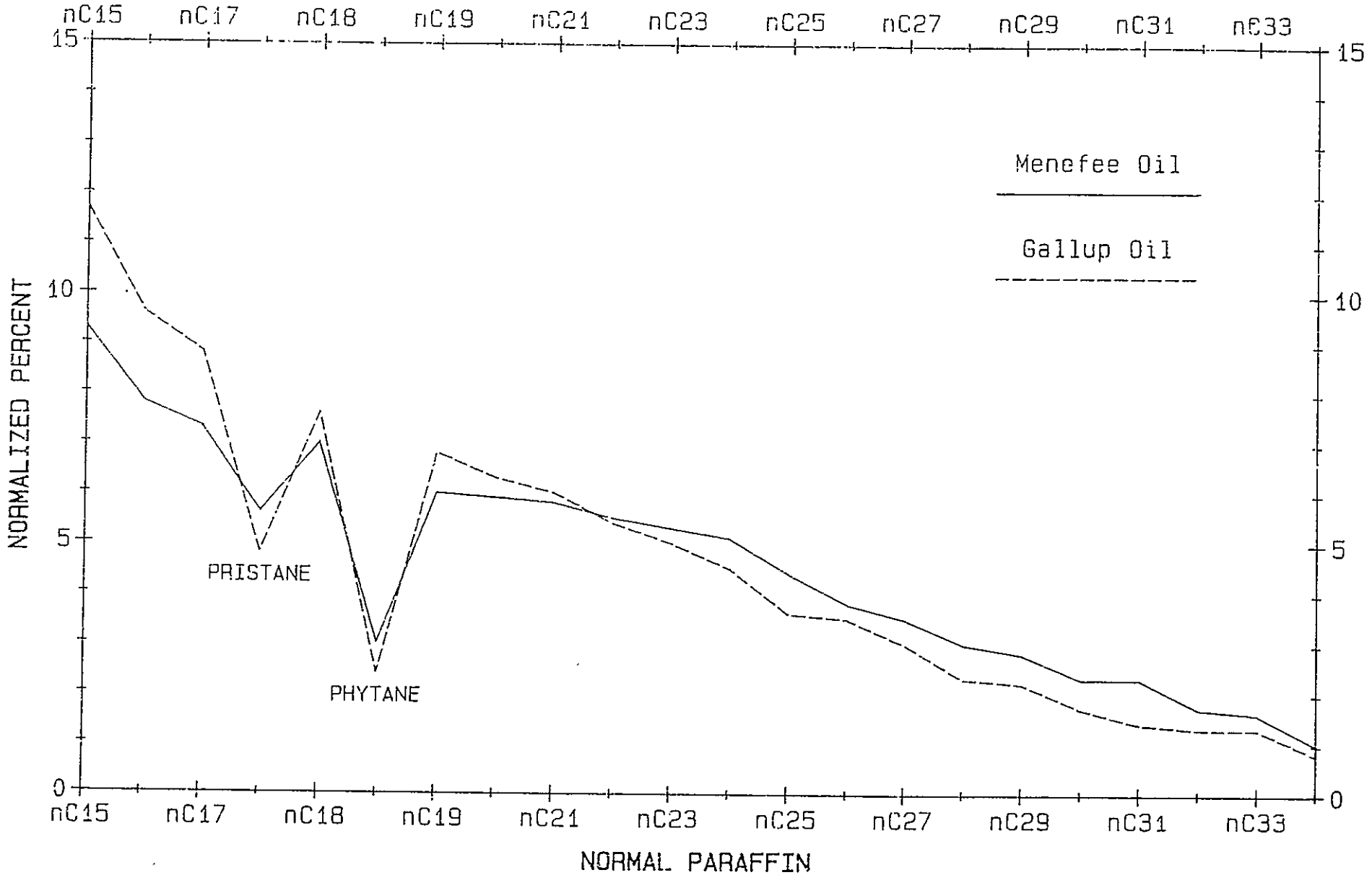

Figure 4

MERRION OIL & GAS CORPORATION

MENEFEE & GALLUP CRUDE OILS

ISOPRENOID HYDROCARBON DISTRIBUTION

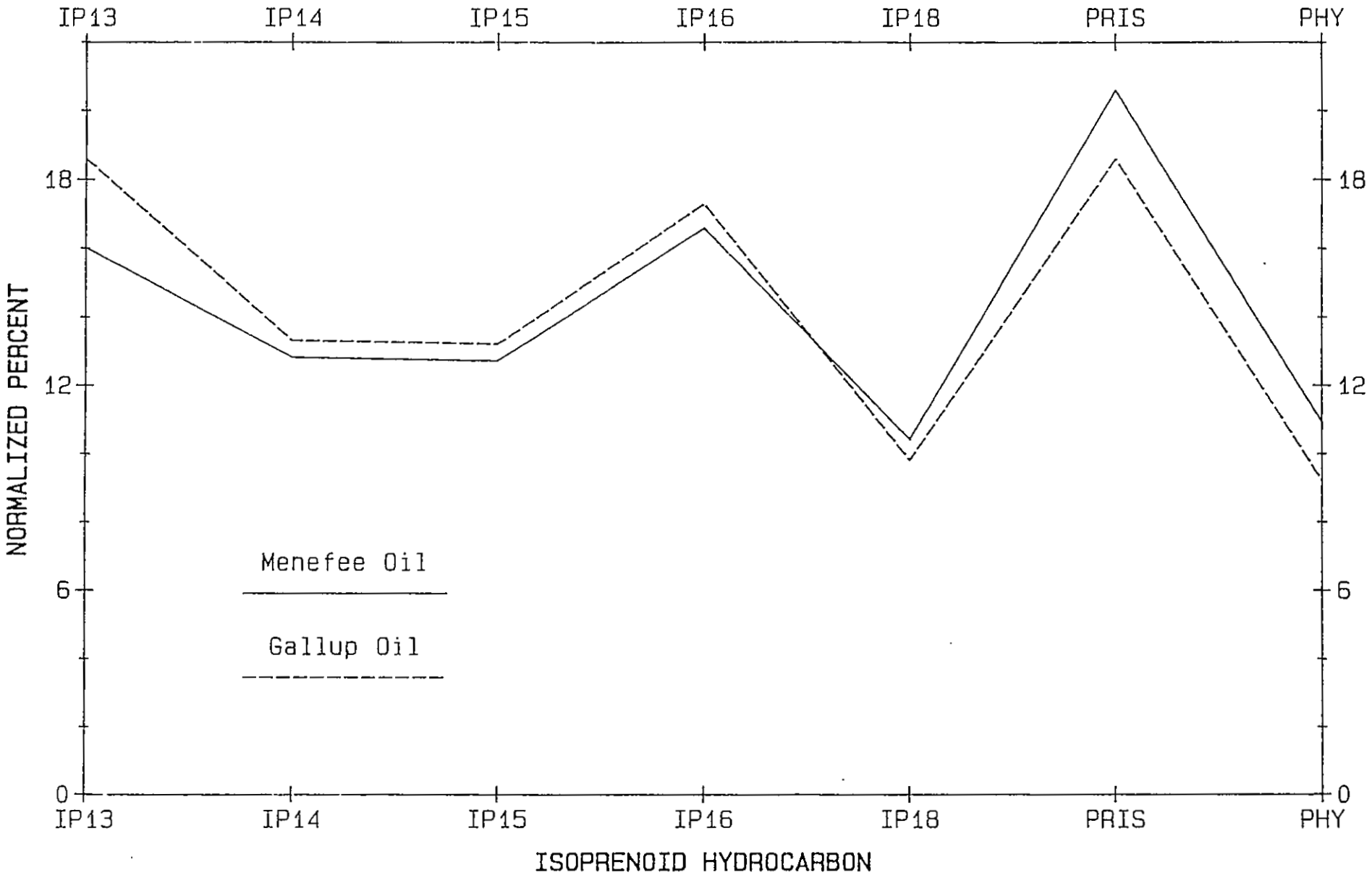

Table 1

Normalized Percent Distribution
Normal Paraffins & Isoprenoids

Sample Number

	GALLUP	MENEFEE
nC15	11.7	9.3
nC16	9.6	7.8
nC17	8.8	7.3
Pristane	4.8	5.6
nC18	7.6	7.0
Phytane	2.4	3.0
nC19	6.8	6.0
nC20	6.3	5.9
nC21	6.0	5.8
nC22	5.4	5.5
nC23	5.0	5.3
nC24	4.5	5.1
nC25	3.6	4.4
nC26	3.5	3.8
nC27	3.0	3.5
nC28	2.3	3.0
nC29	2.2	2.8
nC30	1.7	2.3
nC31	1.4	2.3
nC32	1.3	1.7
nC33	1.3	1.6
nC34	0.8	1.0
CPI	1.03	1.08

Isoprenoids

Ip13	18.6	16.0
Ip14	13.3	12.8
Ip15	13.2	12.7
Ip16	17.3	16.6
Ip18	9.8	10.4
Pristane	18.6	20.6
Phytane	9.2	10.9
Pris/Phy	2.00	1.89
nC17/Pris	1.83	1.30
nC18/Phy	3.15	2.34

30-031-20882

Form 3160-3
(November 1983)
(formerly 9-331C)

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Form approved.
Budget Bureau No. 1004-0136
Expires August 31, 1985

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

5. LEASE DESIGNATION AND SERIAL NO.: NM 24964

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

1a. TYPE OF WORK: DRILL [X] DEEPEN [ ] PLUG BACK [ ]

b. TYPE OF WELL: OIL WELL [X] GAS WELL [ ] OTHER SINGLE ZONE [X] MULTIPLE ZONE [ ]

7. UNIT AGREEMENT NAME:

8. FARM OR LEASE NAME: Pot Mesa

2. NAME OF OPERATOR: Merrion Oil & Gas Corporation

9. WELL NO.: 1

3. ADDRESS OF OPERATOR: P. O. Box 1017, Farmington, New Mexico 87499

10. FIELD AND POOL, OR WILDCAT: WC Gallup

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.*)
At surface: 660' FNL and 1980' FEL
At proposed prod. zone: Same

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: B Sec. 10, T20N, R6W

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*: 3 miles SW of Ojo Encino

12. COUNTY OR PARISH: McKinley

13. STATE: New Mexico

15. DISTANCE FROM PROPOSED* LOCATION TO NEAREST PROPERTY OR LEASE LINE, FT. (Also to nearest drlg. unit line, if any): 660'

16. NO. OF ACRES IN LEASE: 2160

17. NO. OF ACRES ASSIGNED TO THIS WELL: 40

18. DISTANCE FROM PROPOSED LOCATION* TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR, ON THIS LEASE, FT.: 2-1/2 mi.

19. PROPOSED DEPTH: 4430' KB

20. ROTARY OR CABLE TOOLS: Rotary

21. ELEVATIONS (Show whether DF, RT, GR, etc.): 6891' GL

22. APPROX. DATE WORK WILL START*: Summer/1985

RECEIVED
APR 10 1985
BUREAU OF LAND MANAGEMENT
FARMINGTON RESOURCE AREA

DRILLING OPERATIONS AUTHORIZED ARE SUBJECT TO COMPLIANCE WITH ATTACHED "GENERAL REQUIREMENTS"

This action is subject to administrative appeal pursuant to 30 CFR 290.

23. PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	QUANTITY OF CEMENT
12-1/4"	9-5/8"	32 #/ft, J-55	100 ft.	50 sx (59 cu. ft.)
8-3/4"	7"	23 #/ft., J-55	3950 ft.	350 sx
6-1/4"	4-1/2"	10.5 #/ft., J-55	4430 ft.	See Att.

Will drill 12-1/4" hole to 100 ft. and set 100 ft. of 9-5/8", 32 #/ft surface casing with 50 sx Class B, 2% CaCl2. Wait on cement 10 hours. Nipple up BOPs, pressure test to 600 PSI. Drill 8-3/4" hole to 3950 ft. with fresh water, gel, starch, low solids, non-dispersed mud. If deemed necessary, will run open hole logs. Will set 7", 23 #/ft J-55 casing @ 3950' with 250 sx Class B 2% D-79 (515 cu. ft.) followed by 100 sx Class H 2% gel (122 cu. ft.) estimated top @ surface. Wait on cement, drill out shoe with 6-1/4" bit with water. Dry up hole and air drill 6-1/4" hole to 4430 ft. Run open hole logs Set 4-1/2" liner from 4430 ft. to 3900' with 75 sx Class H 2% gel. (92 cu. ft.). Perforate and stimulate as necessary to test Gallup

Pressure control will be double ram BOPs with minimum pressure rating of 2000 PSI. A rotating head will be used during air drilling operations.

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: If proposal is to deepen or plug back, give data on present productive zone and proposed new productive zone. If proposal is to drill or deepen directionally, give pertinent data on subsurface locations and measured and true vertical depths. Give blowout preventer program, if any.

24.

SIGNED: [signature] TITLE: Operations Manager DATE: 4/9/85

(This space for Federal or State office use)

PERMIT NO. _____ APPROVAL DATE _____

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

RECEIVED
APR 26 1985
OIL CON. DIV.
DIST. 3
NMOCC

APPROVED AS AMENDED
APR 24 1985
/s/ J. Stan McKee
for M. MILLENBACH
AREA MANAGER

*See Instructions On Reverse Side

Title 18 U.S.C. Section 1001, mak[illegible] any person knowingly and will[illegible] to make to any department or agency of the United States [illegible] fictitious

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LAND OFFICE		
OPERATOR		

NEW MEXICO OIL CONSERVATION COMMISSION

RECEIVED
JAN 24 1983
OIL CONSERVATION DIVISION
SANTA FE

30-039-23139

Form C-101
Revised 1-1-65

5A. Indicate Type of Lease STATE [XX] FEE [ ]

5. State Oil & Gas Lease No. E 29137

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

1a. Type of Work
DRILL [XX] DEEPEN [ ] PLUG BACK [ ]

b. Type of Well
OIL WELL [X] GAS WELL [ ] OTHER SINGLE ZONE [X] MULTIPLE ZONE [ ]

7. Unit Agreement Name

8. Farm or Lease Name: Canyon Largo Unit

2. Name of Operator: Merrion Oil & Gas Corporation

9. Well No.: 321

3. Address of Operator: P. O. Box 1017, Farmington, New Mexico 87499

10. Field and Pool, or Wildcat: Devils Fork Gallup Ass

4. Location of Well UNIT LETTER A LOCATED 790 FEET FROM THE North LINE AND 790 FEET FROM THE East LINE OF SEC. 32 TWP. 25N RGE. 6W NMPM

160

12. County: Rio Arriba

19. Proposed Depth	19A. Formation	20. Rotary or C.T.
6375' KB	Gallup	Rotary

21. Elevations (Show whether DF, RT, etc.)	21A. Kind & Status Plug. Bond	21B. Drilling Contractor	22. Approx. Date Work will start
6788' GL		Bayless Drilling	Early 1983

23.

PROPOSED CASING AND CEMENT PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	SACKS OF CEMENT	EST. TOP
12-1/4"	8-5/8"	20 #/ft	200'	175 sx	
7-7/8"	4-1/2"	11.6 #/ft.	6375'	875 sx	

Propose to drill 12-1/4" hole to 200 ft., set 200 ft. of 8-5/8", 20 #/ft, new surface casing with 175 sx Class 'B' 2% $CACL_2$. Will drill 7-7/8" hole to TD and run open hole logs. If logs appear productive, will run 4-1/2", K-55, 10.5 #/ft. new casing to TD and 2 stage cement. 1st stage 175 sx Class 'H' 2% gel to cover Gallup. Stage tool below Point Lookout @ 5050' KB est. 2nd stage 600 sx Class 'B' w/2% D-79 followed by 100 sx Class 'H' 2% gel. Will bring cement above Ojo Alamo. Drilling mud will be low water loss gel, fresh water, starch. Will perforate and frac as necessary. Blow-out prevention equipment will be 10" 900 series double ram.

ESTIMATED TOPS

Ojo Alamo	1900'
Pictured Cliffs	2580'
Mesa Verde	4100'
Gallup	5951'

APPROVAL EXPIRES 7/13/83 UNLESS DRILLING IS COMMENCED. PUD NOTICE MUST BE SUBMITTED WITHIN 10 DAYS.

RECEIVED
JAN 13 1983
OIL CON. D
DIST. 3

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: IF PROPOSAL IS TO DEEPEN OR PLUG BACK, GIVE DATA ON PRESENT PRODUCTIVE ZONE AND PROPOSED NEW PRODUCTIVE ZONE. GIVE BLOWOUT PREVENTER PROGRAM, IF ANY.

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

Signed [signature] Title Operations Manager Date 1/4/83

(This space for State Use)

APPROVED BY [signature] TITLE SUPERVISOR DISTRICT # 3 DATE JAN 13 1983

CONDITIONS OF APPROVAL, IF ANY:

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

February 24, 1988

Mr. Doug Endsley
Merrion Oil and Gas Company
P. O. Box 840
Farmington, New Mexico 87499

RE: New Mexico Hydrocarbon Source Rock Data Base Geochemical Reports

Dear Mr. Endsley:

As we discussed on the phone today, I am enclosing a waiver of confidentiality for you to sign. This waiver will apply to the Core Lab and Geochem Lab reports for the Merrion Pot Mesa No. 1, CLU No. 321, and Arena Blanca Wells.

Thank you very much for your contribution to the Source Rock Data Base. If you have any questions concerning the waiver, please contact Roy Johnson or me at this office.

Sincerely,

Jami Bailey
Geologist

JB:sl

cc: Roy Johnson

WAIVER OF CONFIDENTIALITY

I hereby release the information contained in the Core Laboratories, Inc. and the Geochem Laboratories, Inc. reports on the Merrion Pot Mesa No. 1, CLU No. 321, and Arena Blanca No. 1 Wells. I understand that the information in the reports will be incorporated in the New Mexico Bureau of Mines open file system.

Signed: Douglas Merrion

Title: PRESIDENT

Date: 2/29/88