NEW MEXICO OIL CONSERVATION COMMISSION

Form C-122
Revised 12-1-55

MULTI-POINT BACK PRESSURE TEST FOR GAS WELLS

Pool Undesignated Yates Formation Yates County Lea

Initial X Annual ____ Special ____ Date of Test 10-19-60

Company Western Natural Gas Company Lease State McDonald Ac/2 Well No. 21

Unit A Sec. 24 Twp. 22-S Rge. 36-E Purchaser None

Casing 4 1/2 Wt. 9.5 I.D. ____ Set at 3474 Perf. 2720 To 3290

Tubing 2 3/8 Wt. 4.7 I.D. ____ Set at 2675 Perf. ____ To ____

Gas Pay: From 2720 To 3290 L 2675 xG * 0.650 -GL 1739 Bar.Press. 13.2

Producing Thru: Casing ____ Tubing X Type Well Single

Date of ~~Completion~~ Re-completion 10-2-60 Packer 2643 Single-Bradenhead-G. G. or G.O. Dual Reservoir Temp. -

OBSERVED DATA

Tested Through (Prover) (Choke) (~~Meter~~) Type Taps -

No.	Flow Data (Prover) (~~Line~~) Size	Flow Data (Choke) (~~Orifice~~) Size	Flow Data Press. psig	Flow Data Diff. h_w	Flow Data Temp. °F.	Tubing Data Press. psig	Tubing Data Temp. °F.	Casing Data Press. psig	Casing Data Temp. °F.	Duration of Flow Hr.
SI						1269		Pkr		72 SI
1.	2" x 1/8"		961	-	64	961		"		3
2.	2" x 3/16		881	-	65	881		"		3
3.		2 x 6 x 1/4	696	-	60	696		"		3
4.		2 x 6 x 5/16	511	-	61	511		"		3
5.										

FLOW CALCULATIONS

No.	Coefficient (24-Hour)	$\sqrt{h_w p_f}$	Pressure psia	Flow Temp. Factor F_t	Gravity Factor * F_g	Compress. Factor F_{pv}	Rate of Flow Q-MCFPD @ 15.025 psia
1.	0.3418	-	974.2	0.9962	0.9608	1.111	354.1
2.	0.7851	-	894.2	0.9952	0.9608	1.093	733.7
3.	1.4382	-	709.2	1.0000	0.9608	1.078	1056.4
4.	2.3674	-	524.2	0.9990	0.9608	1.055	1256.7
5.							

PRESSURE CALCULATIONS

Gas Liquid Hydrocarbon Ratio not measured cf/bbl.
Gravity of Liquid Hydrocarbons ____ deg.
P_c 9.936 $(1-e^{-s})$ 0.113

Specific Gravity Separator Gas ____
Specific Gravity Flowing Fluid ____
P_c 1282.2 P_c^2 1644.0

No.	~~P_w~~ P_t (psia)	P_t^2	F_cQ	$(F_cQ)^2$	$\frac{(F_cQ)^2}{(1-e^{-s})}$	P_w^2	$P_c^2-P_w^2$	Cal. P_w	$\frac{P_w}{P_c}$
1.	974.2	949.1	3.518	12.376	1.4	950.5	693.5	974.9	0.7603
2.	894.2	799.6	7.290	53.144	6.0	805.6	838.4	897.5	0.6999
3.	709.2	502.9	10.496	110.166	12.4	515.3	1128.7	717.8	0.5598
4.	524.2	274.8	12.486	155.900	17.6	292.4	1351.6	540.7	0.4217
5.									

Absolute Potential: 1550 MCFPD; n 1.088

COMPANY WESTERN NATURAL GAS COMPANY
ADDRESS 823 Midland Tower, Midland, Texas
AGENT and TITLE W. B. Scott, Petroleum Engineer
WITNESSED J. B. Murray
COMPANY El Paso Natural Gas Company

REMARKS

*NOTE: Gas Gravity was assumed.

INSTRUCTIONS

This form is to be used for reporting multi-point back pressure tests on gas wells in the State, except those on which special orders are applicable. Three copies of this form and the back pressure curve shall be filed with the Commission at Box 871, Santa Fe.

The log log paper used for plotting the back pressure curve shall be of at least three inch cycles.

NOMENCLATURE

Q = Actual rate of flow at end of flow period at W. H. working pressure (P_w). MCF/da. @ 15.025 psia and 60° F.

P_c = 72 hour wellhead shut-in casing (or tubing) pressure whichever is greater. psia

P_w = Static wellhead working pressure as determined at the end of flow period. (Casing if flowing thru tubing, tubing if flowing thru casing.) psia

P_t = Flowing wellhead pressure (tubing if flowing through tubing, casing if flowing through casing.) psia

P_f = Meter pressure, psia.

h_w = Differential meter pressure, inches water.

F_g = Gravity correction factor.

F_t = Flowing temperature correction factor.

F_{pv} = Supercompressability factor.

n = Slope of back pressure curve.

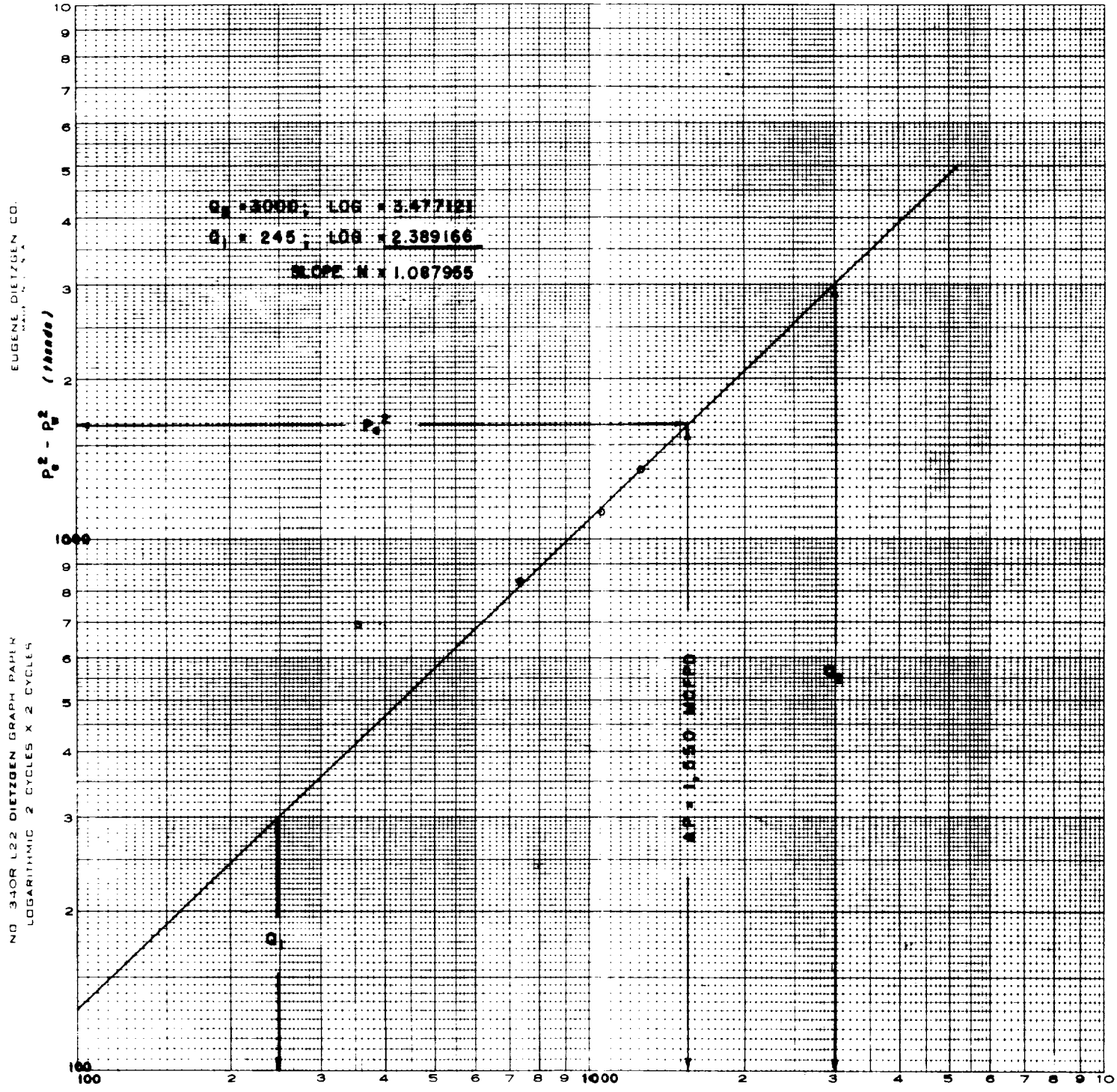
Note: If P_w cannot be taken because of manner of completion or condition of well, then P_w must be calculated by adding the pressure drop due to friction within the flow string to P_t.

WESTERN NATURAL GAS COMPANY

STATE-McDONALD A/C 2 NO.21

UNIT A, SEC 24, T-22-S, R-36-E

OCTOBER 19, 1960

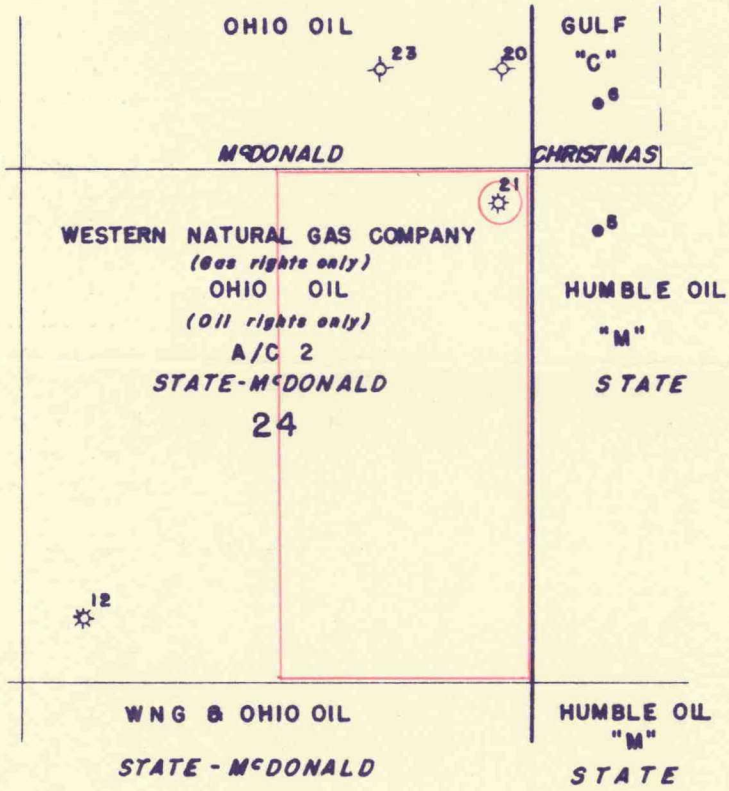


Q IN MCFPD AT 15.025 & 60°F

WESTERN NATURAL GAS COMPANY
ACREAGE DEDICATION FOR STATE McDONALD #21

24-22-36
Lea County, New Mexico
Scale 1" = 2000'

Plat Accompanying Application for
320-Acre Non-Standard Gas Unit
and Unorthodox Location
(Yates Undesignated)



Case 2114

NEW MEXICO OIL CONSERVATION COMMISSION

Form C-122
Revised 12-1-55

MULTI-POINT BACK PRESSURE TEST FOR GAS WELLS

Pool Undesignated Yates Formation Yates County Lea

Initial X Annual ____ Special ____ Date of Test 10-19-60

Company Western Natural Gas Company Lease State McDonald Ac/2 Well No. 21

Unit A Sec. 24 Twp. 22-S Rge. 36-E Purchaser None

Casing 4 1/2 Wt. 9.5 I.D. ____ Set at 3474 Perf. 2720 To 3290

Tubing 2 3/8 Wt. 4.7 I.D. ____ Set at 2675 Perf. ____ To ____

Gas Pay: From 2720 To 3290 L 2675 xG * 0.650 -GL 1739 Bar.Press. 13.2

Producing Thru: Casing ____ Tubing X Type Well Single

Date of ~~Completion~~ Re-completion 10-2-60 Packer 2643 Single-Bradenhead-G. G. or G.O. Dual Reservoir Temp. -

OBSERVED DATA

Tested Through (Prover) (Choke) (~~Meter~~) Type Taps -

No.	Flow Data (Prover) (~~Line~~) Size	Flow Data (Choke) (~~Orifice~~) Size	Flow Data Press. psig	Flow Data Diff. h_w	Flow Data Temp. °F.	Tubing Data Press. psig	Tubing Data Temp. °F.	Casing Data Press. psig	Casing Data Temp. °F.	Duration of Flow Hr.
SI						1269		Pkr		72 SI
1.	2" x 1/8"		961	-	64	961		"		3
2.	2" x 3/16		881	-	65	881		"		3
3.		2 x 6 x 1/4	696	-	60	696		"		3
4.		2 x 6 x 5/16	511	-	61	511		"		3
5.										

FLOW CALCULATIONS

No.	Coefficient (24-Hour)	$\sqrt{h_w p_f}$	Pressure psia	Flow Temp. Factor F_t	Gravity Factor * F_g	Compress. Factor F_{pv}	Rate of Flow Q-MCFPD @ 15.025 psia
1.	0.3418	-	974.2	0.9962	0.9608	1.111	354.1
2.	0.7851	-	894.2	0.9952	0.9608	1.093	733.7
3.	1.4382	-	709.2	1.0000	0.9608	1.078	1056.4
4.	2.3674	-	524.2	0.9990	0.9608	1.055	1256.7
5.							

PRESSURE CALCULATIONS

Gas Liquid Hydrocarbon Ratio not measured cf/bbl.
Gravity of Liquid Hydrocarbons ____ deg.
P_c 9.936 $(1-e^{-s})$ 0.113

Specific Gravity Separator Gas ____
Specific Gravity Flowing Fluid ____
P_c 1282.2 P_c^2 1644.0

No.	~~P_w~~ P_t (psia)	P_t^2	F_cQ	$(F_cQ)^2$	$\frac{(F_cQ)^2}{(1-e^{-s})}$	P_w^2	$P_c^2-P_w^2$	Cal. P_w	$\frac{P_w}{P_c}$
1.	974.2	949.1	3.518	12.376	1.4	950.5	693.5	974.9	0.7603
2.	894.2	799.6	7.290	53.144	6.0	805.6	838.4	897.5	0.6999
3.	709.2	502.9	10.496	110.166	12.4	515.3	1128.7	717.8	0.5598
4.	524.2	274.8	12.486	155.900	17.6	292.4	1351.6	540.7	0.4217
5.									

Absolute Potential: 1550 MCFPD; n 1.088

COMPANY WESTERN NATURAL GAS COMPANY
ADDRESS 823 Midland Tower, Midland, Texas
AGENT and TITLE W. B. Scott, Petroleum Engineer
WITNESSED J. B. Murray
COMPANY El Paso Natural Gas Company

REMARKS

*NOTE: Gas Gravity was assumed.

INSTRUCTIONS

This form is to be used for reporting multi-point back pressure tests on gas wells in the State, except those on which special orders are applicable. Three copies of this form and the back pressure curve shall be filed with the Commission at Box 871, Santa Fe.

The log log paper used for plotting the back pressure curve shall be of at least three inch cycles.

NOMENCLATURE

Q = Actual rate of flow at end of flow period at W. H. working pressure (P_w). MCF/da. @ 15.025 psia and 60° F.

P_c = 72 hour wellhead shut-in casing (or tubing) pressure whichever is greater. psia

P_w = Static wellhead working pressure as determined at the end of flow period. (Casing if flowing thru tubing, tubing if flowing thru casing.) psia

P_t = Flowing wellhead pressure (tubing if flowing through tubing, casing if flowing through casing.) psia

P_f = Meter pressure, psia.

h_w = Differential meter pressure, inches water.

F_g = Gravity correction factor.

F_t = Flowing temperature correction factor.

F_{pv} = Supercompressability factor.

n = Slope of back pressure curve.

Note: If P_w cannot be taken because of manner of completion or condition of well, then P_w must be calculated by adding the pressure drop due to friction within the flow string to P_t.

W A I V E R

WE HAVE BEEN advised of an application of the Western Natural Gas Company for a 320-acre non-standard gas proration unit, consisting of the E/2 of Section 24, T-22-S, R-36-E, Lea County, New Mexico, and an unorthodox location for the State McDonald Ac 21 well, an undesignated Yates well, 330' FN and E lines of the Section. This is to indicate that we have no objection to this application

Company: Humble Oil & Refining Co.

Date: [illegible]

ltr By: H P Hensley

1

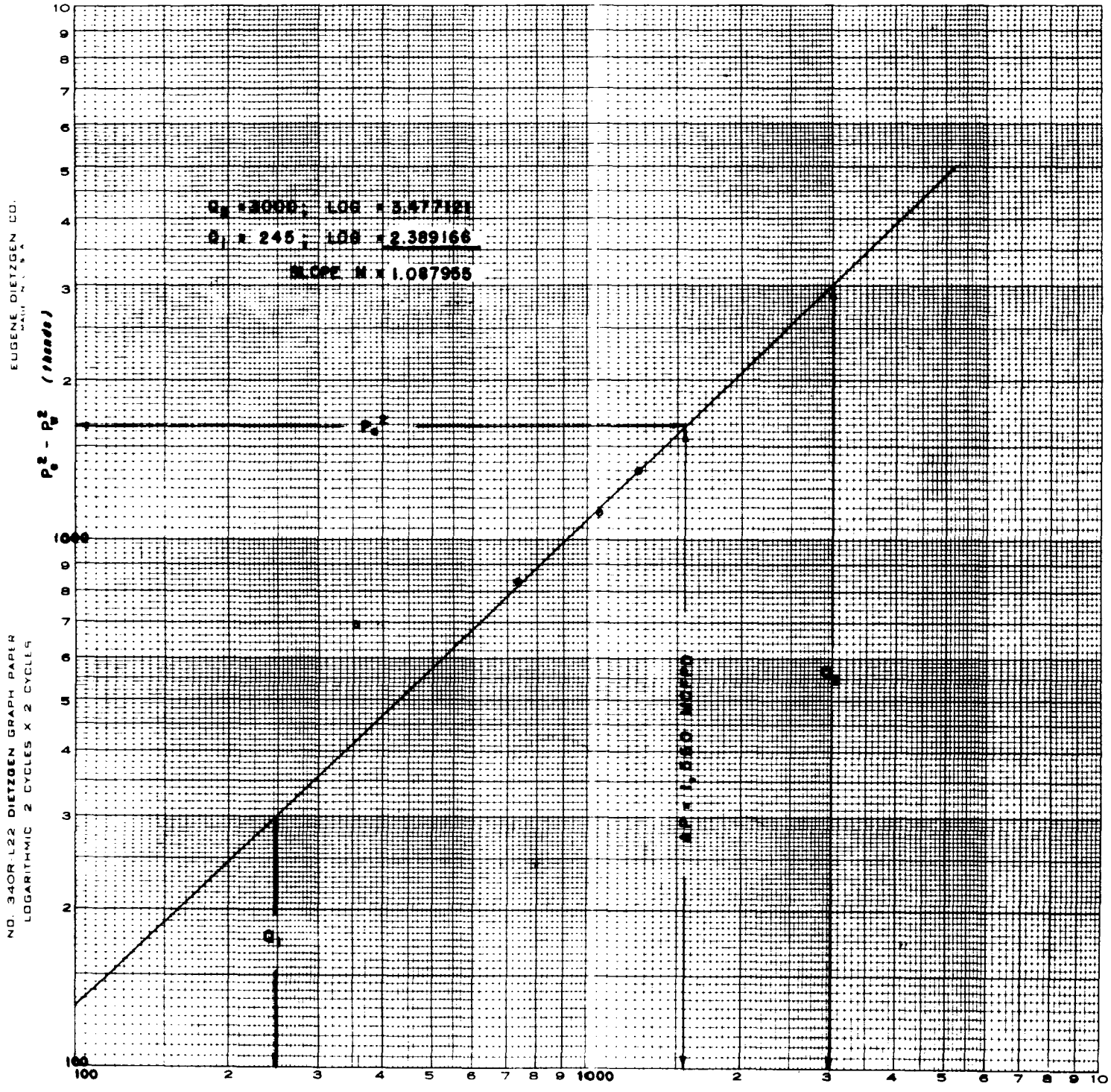
BEFORE EXAMINER UTZ
OIL CONSERVATION
EXHIBIT
CASE

WESTERN NATURAL GAS COMPANY

STATE-MSDONALD A/C 2 NO.21

UNIT A, SEC 24, T-22-S, R-36-E

OCTOBER 19, 1960



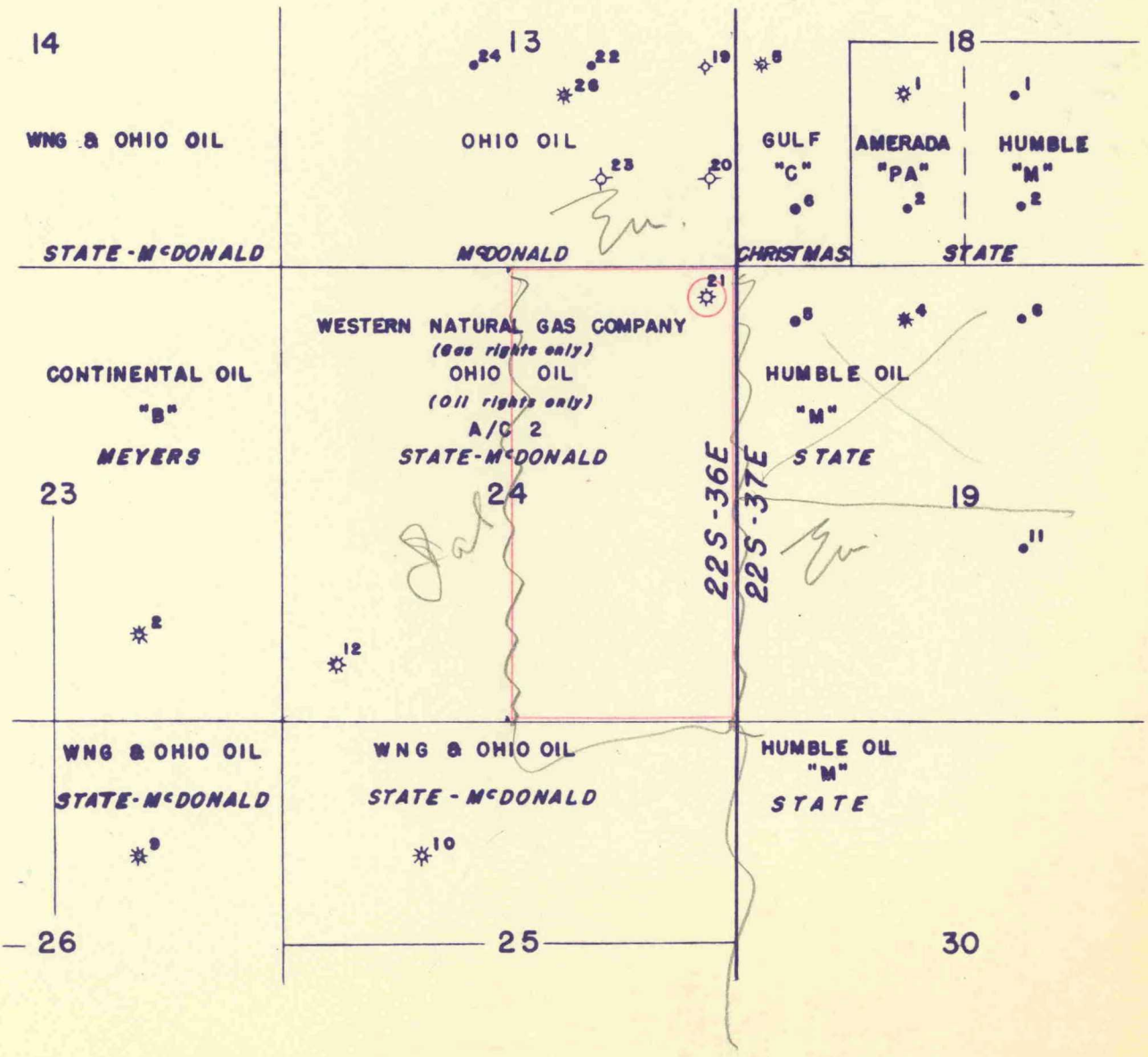
Q IN MCFPD AT 15.025 & 60°F

WESTERN NATURAL GAS COMPANY
ACREAGE DEDICATION FOR STATE McDONALD #21

24-22-36
Lea County, New Mexico
Scale 1" = 2000'

Plat Accompanying Application for
320-Acre Non-Standard Gas Unit
and Unorthodox Location
(Yates Undesignated)

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
Western Nat. EXHIBIT NO. 1
CASE NO. 2114



The Ohio Oil Co.

P. O. BOX 552
MIDLAND, TEXAS

October 21, 1960

Mr. R. H. McKoy
Western Natural Gas Company
823 Midland Tower Building
Midland, Texas

Dear Sir:

We have received a copy of your application to the New Mexico Oil Conservation Commission for a 320-acre non-standard gas proration unit and unorthodox location for your State McDonald A/C No. 21 well in Section 24 of Township-22-South, Range-36-East. You are asking that said well be designated as a Jalmat gas well.

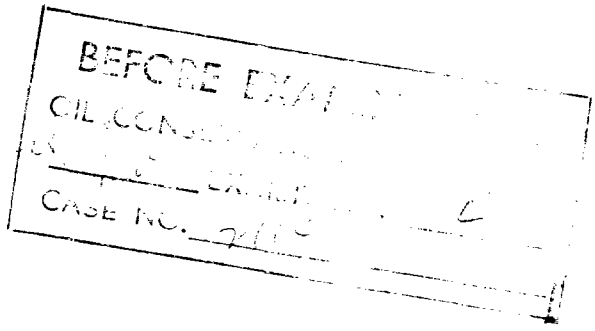
The Ohio Oil Company has reviewed your application and has no objection.

Yours very truly,

Coe S. Mills

Coe S. Mills
District Manager

MR



Case No.

2114

Large Exhibits

LANE WELLS COMPANY — Gamma Ray - Neutron

FILE NO.

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
CASE NO.

COMPANY WESTERN NATURAL GAS COMPANY

WELL STATE MC DONALD NO. 21

FIELD EUMONT

COUNTY LEA STATE NEW MEXICO

LOCATION: 2 1/330' FN & EL'S of

SEC 24 TWP 22 S RGE 36 E

Other Services
B/P & K/P

Permanent Datum C. H. F. Elev. 3436
Log Measured from C. H. F. 0 Ft. Above Permanent Datum
Drilling Measured from

Elevations:
KB
DF
GL 3436

Date	9-20-60	9-20-60
Run No.	ONE O. H.	ONE O. H.
Type Log	GAMMA RAY	NEUTRON
Depth-Driller	3716	3716
Depth-Logger	3501	3501
Bottom Logged Interval	3488	3500
Top Logged Interval	SURFACE	SURFACE
Type Fluid in Hole	OIL	OIL
Salinity Ppm Cl.	-	-
Density Lb./Gal.	-	-
Level	-	-
Max. Rec. Temp. Deg. F	-	-
Opr. Rig Time	2 1/2 HRS.	2 1/2 HRS.
Recorded By	DAVIS	DAVIS
Witnessed By	MR. ARMSTRONG	& MR. COOK

Run No.	Bore Hole Record Bit	From	To	Casing Record Size	Wgt.	From	To
1	6 3/4"		3514	4 1/2"	9.5	SURFACE	3514
1	3 7/8"	3514	3716				

LANE WELLS COMPANY — Gamma Ray Neutron

FILE NO.

COMPANY WESTERN NATURAL GAS COMPANY

WELL STATE MC DONALD NO. 21

FIELD EUMONT

COUNTY LEA STATE NEW MEXICO

LOCATION: 330' FN & EL' S of Top of

SEC 24 TWP 22 S RGE 36 E

Other Services
B/P & K/P

Permanent Datum C. H. F. Elev. 3436
Log Measured from C. H. F. 0 Ft. Above Permanent Datum
Drilling Measured from

Elevations:
KB
DF
GL 3436

Date	9-20-60	9-20-60	
Run No.	ONE O. W.	ONE O. W.	
Type Log	GAMMA RAY	NEUTRON	
Depth-Driller	3716	3716	
Depth-Logger	3501	3501	
Bottom Logged Interval	3488	3500	
Top Logged Interval	SURFACE	SURFACE	
Type Fluid in Hole	OIL	OIL	
Salinity Ppm Cl.	-	-	
Density Lb./Gal.	-	-	
Level	-	-	
Max. Rec. Temp. Deg. F	-	-	
Opr. Rig Time	2 1/2 HRS.	2 1/2 HRS.	
Recorded By	DAVIS	DAVIS	
Witnessed By	MR. ARMSTRONG	& MR. COOK	

Run No.	Bore Hole Record Bit	From	To	Casing Record Size	Wgt.	From	To
1	6 3/4"		3514	4 1/2"	9.5	SURFACE	3514
1	3 7/8"	3514	3716				

LANE WELLS COMPANY — Gamma Ray - Neutron

FILE NO.

COMPANY WESTERN NATURAL GAS COMPANY

WELL STATE MC DONALD NO. 21

FIELD EUMONT

COUNTY LEA STATE NEW MEXICO

LOCATION: 330' FN & EL'S of

SEC 24 TWP 22 S RGE 36 E

Other Services: B/P & K/P

Permanent Datum C. H. F. Elev. 3436

Log Measured from C. H. F. 0 Ft. Above Permanent Datum

Drilling Measured from

Elevations: KB — DF — GL 3436

Date	9-20-60	9-20-60
Run No.	ONE O. W.	ONE O. W.
Type Log	GAMMA RAY	NEUTRON
Depth-Driller	3716	3716
Depth-Logger	3501	3501
Bottom Logged Interval	3488	3500
Top Logged Interval	SURFACE	SURFACE
Type Fluid in Hole	OIL	OIL
Salinity Ppm Cl.	-	-
Density Lb./Gal.	-	-
Level	-	-
Max. Rec. Temp. Deg. F	-	-
Opr. Rig Time	2 1/2 HRS.	2 1/2 HRS.
Recorded By	DAVIS	DAVIS
Witnessed By	MR. ARMSTRONG	& MR. COOK

Run No.	Bore Hole Record Bit	From	To	Casing Record Size	Wgt.	From	To
1	6 3/4"		3514	4 1/2"	9.5	SURFACE	3514
1	3 7/8"	3514	3716				