

00235023

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DEC 20 1977
COLO. OIL & GAS CONS. COMM.

W E L L R E P O R T

Burlington Northern Incorporated

NO. 33-32 STATE

NW SE Section 32, T-8-N R-51-W

Logan County, Colorado

James K. Price
Geologist

DVR	
FJP	✓
HHM	✓
JAM	✓
JJD	✓
RLS	
CGM	

X

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COLO. OIL & GAS CONS. COMM.

WELL: No. 33-32 State.
OPERATOR: Burlington Northern Incorporated.
CONTRACTOR: Exeter Drilling Co., Rig No. 14.
Toolpusher: Bob Flinn.
LOCATION: 1980' FSL, 1980' FEL, Section 32, Township
8 North, Range 51 West.
COUNTY: Logan.
STATE: Colorado.
ELEVATION: 4181' G.L. 4190' K.B.
COMMENCED: December 12, 1977 (3:00 P.M.)
CASING: Ran four joints 8-5/8" 23# casing. Set at
169.38' K.B. Cemented with 170 sacks of
regular cement, 3% CaCl. Plug down at 5:15 PM,
December 12, 1977.
CORES: None.
DRILLSTEM TESTS: DST No. 1, 4590'-4596'. ("J" sandstone)
LOGS: Dual Induction-Laterolog and Compensated
Neutron-Formation Density (Schlumberger).
COMPLETED DRILLING: December 15, 1977.
✓ STATUS: Completing as an oil well.

FORMATION TOPS (LOGS)

<u>FORMATION</u>	<u>DEPTH</u>	<u>ELEVATION</u>
Niobrara	3590	+600
Carlile	4015	+175
Greenhorn	4184	+6
Bentonite Marker	4362	-172
"D" sandstone	4456	-265
"J" sandstone	4555	-365
TOTAL DEPTH	4705 (logger)	4700 (driller)

8

Well Report
No. 33-32 State

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32-8N-S1W

BIT RECORD

<u>No.</u>	<u>Make</u>	<u>Size</u>	<u>Type</u>	<u>Depth Out</u>	<u>Feet</u>	<u>Hours</u>
1	Security	7-7/8	S3J	3101	2926	18-1/4
2	Hughes	7-7/8	OSC3J	4485	1384	16-1/4
3	Hughes	7-7/8	OSC1GJ	4648	163	18
4	Smith	7-7/8	DT-J	4700	52	8

DEVIATION RECORD

1-1/2° @ 3101', 1° @ 4485', 1° @ 4648'

DRILLSTEM TESTS

Open 30 minutes, shut-in 30 minutes, open 60 minutes, shut-in 60 minutes. Opened with a strong blow with gas to the surface in 4-1/2 minutes, oil to the surface in 30 minutes.

Recoveries: Gas (IFP) 10min: 319 MCFPD
15min: 353 MCFPD
20min: 385 MCFPD
25min: 415 MCFPD
30min: 472 MCFPD

Pipe: 433' oil and gas remaining
in pipe after reversing out.

Sampler: 650 cc. oil (32.8 gravity)
50 cc. OCM
2.4 cu. ft. gas

Well Report
No. 33-32 State

32-8N-S/W

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COLO. OIL & GAS CONS. COMM.

DRILLSTEM TESTS (CONT.)

Pressures: Initial hydrostatic	2418
Initial flow	375-569
Initial shut-in	1068
Final flow	586-663
Final shut-in	1076
Final hydrostatic	2327

Bottom hole temperature: 130° F

SAMPLE DESCRIPTION

<u>DEPTH</u>	<u>LITHOLOGY</u>
4390-4420	SHALE, medium to dark grey; SILTSTONE, light grey, argillaceous, slightly calcareous; fragments of <u>INOCERAMUS</u> ; LIMESTONE-SHALE, white-grey speckled (Niobrara cvgs).
4420-4470	SHALE, mixed light grey to black, as above. (Fine to medium sand contamination from the surface. Fort Hays cavings, white chalky limestone.) Trace of pyrite.
4470-4480	Sample, as above, with trace SANDSTONE, white to light grey, fine to ver--fine grained, tight. ("D" SANDSTONE)
4480-4485	SANDSTONE, very-fine grained to fine grained, much silt sized, white to grey, argillaceous, carbonaceous, mostly tight; SHALE, black, as above.
4485-4500	SANDSTONE, as above, trace of which has dull yellow fluorescence, spotty very light staining, fair cut; SHALE, as above.
4500-4510	SANDSTONE, decreasing in amount, increasingly argillaceous, no shows; SHALE, as above.
4510-4567	SHALE, as above.

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SAMPLE DESCRIPTION (CONT.)

4567-4575	SANDSTONE, fine to medium grained, some coarse grained, poorly sorted, white to light grey, medium to coarse grained shale fragments, coarse sand grains with crystal-line overgrowths, some fair to good porosity, no shows. ("J" SANDSTONE)
4575-4590	SANDSTONE, mostly fine to very-fine grained, slightly carbonaceous, some clay-filled, mostly tight, some porosity, no shows.
4590-4600	SANDSTONE, as above, decreasing, trace (one chip) with light yellow fluorescence and fair cut.
4600-4620	SANDSTONE, as above, with small trace fine grained sandstone with light oil staining, mottled yellow fluorescence, light cut.
4648 circ. spl.	SANDSTONE, as above, decreasing, no shows; SHALE, black to dark grey, as above.
4648-4670	SANDSTONE and SHALE, as above, no shows.
4670-4675	SANDSTONE, light grey, dense, siliceous, tight, no shows.
4675-4695	SANDSTONE, as above, dense, siliceous, decreasing; SHALE, black to dark grey, as above.
4695-4700	SHALE, as above; SANDSTONE, decreasing.
4700 TD circ 2 spls, 1 hr	Sample, as above.

Contractor Exeter Drlg. Northern Top Choke 1"
 Rig No. 14 Bottom Choke 9/16"
 Spot NW-SE Size Hole 7 7/8"
 Sec. 32 Size Rat Hole --
 Twp. 8 N Size & Wt. D. P. 4 1/2" 13.75
 Rng. 51 W Size Wt. Pipe 4 1/2" 330'
 Field Wildcat I. D. of D. C. 2 1/4"
 County Logan Length of D. C. 259'
 State Colorado Total Depth 4705'
 Elevation 4182' "Ground" Interval Tested 4590-4596'
 Formation "J" Sand Type of Test Conventional
Straddle

Flow No. 1 30 Min.
 Shut-in No. 1 30 Min.
 Flow No. 2 60 Min.
 Shut-in No. 2 60 Min.
 Flow No. 3 -- Min.
 Shut-in No. 3 -- Min.

Bottom Hole Temp. 130° F
 Mud Weight 9.9
 Gravity 32.8 @ 60° F
 Viscosity 80

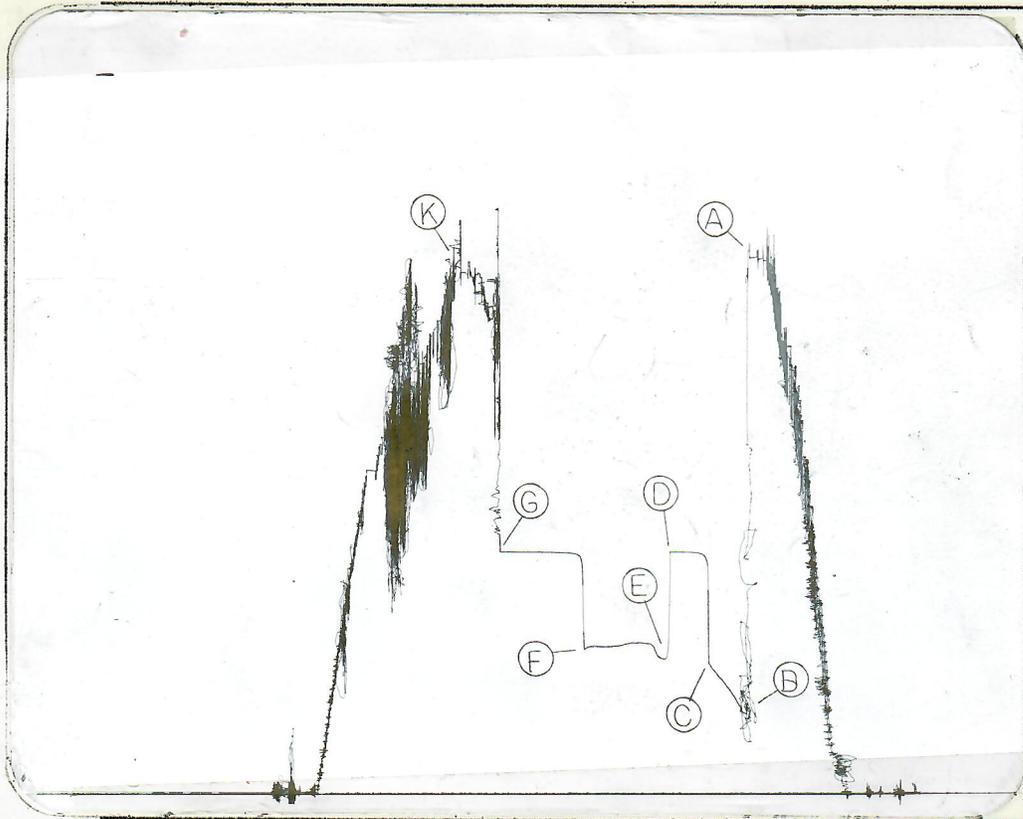
Tool opened @ 6:45 AM.

Inside Recorder

PRD Make Kuster AK-1
 No. 1818 Cap. 3450 @ 4569'

	Press	Corrected
Initial Hydrostatic	A	2408
Final Hydrostatic	K	2375
Initial Flow	B	345
Final Initial Flow	C	563
Initial Shut-in	D	1065
Second Initial Flow	E	587
Second Final Flow	F	628
Second Shut-in	G	1066
Third Initial Flow	H	--
Third Final Flow	I	--
Third Shut-in	J	--

Lynes Dist.: Sterling, Co.
 Our Tester: D. Custer
 Witnessed By: J. Price



Did Well Flow - Gas Yes Oil No Water No

RECOVERY IN PIPE: Test was reverse circulated.

1st Flow - Tool opened with a strong blow, increased to bottom of bucket immediately. Gas to surface in 4 1/2 minutes.
 - See gas volume report.
 2nd Flow - Tool opened with a weak blow, increased to a strong blow in 10 minutes with oil spray throughout flow period.

REMARKS:

Operator Burlington Northern, Inc.
 Address Box 1855
 Billings, Montana 59103
 Well Name and No. State # 33-32
 Ticket No. 9907
 Date 12-17-77
 No. Final Copies 5
 DST No. 1

file

32-8N-51W

LYNES, INC.

Fluid Sample Report

Date 12-17-77 Ticket No. 9907
 Company Burlington Northern, Inc. DST No. 1
 Well Name & No. State #33-32 State Colorado
 County Logan Test Interval 4590-4596'

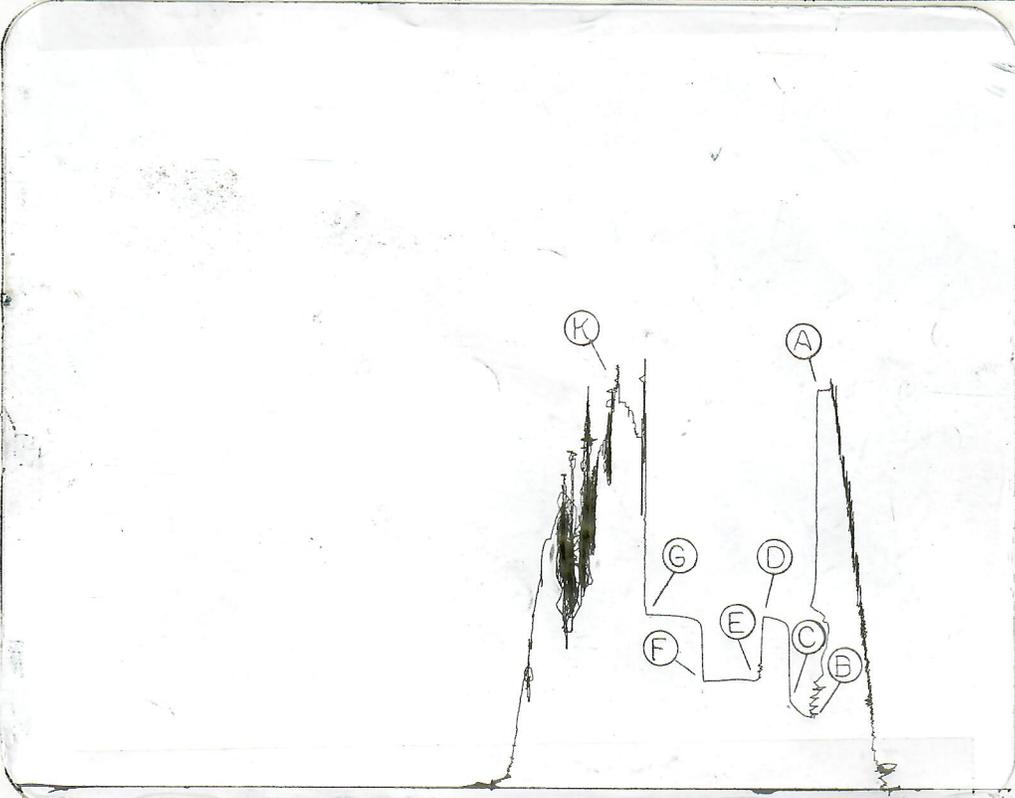
Pressure in Sampler 550 PSIG BHT 130 °F

Total Volume of Sampler:	<u>2150</u>	cc.
Total Volume of Sample:	<u>700</u>	cc.
Oil:	<u>650</u>	cc.
Water:	<u>None</u>	cc.
Mud:	<u>50 Oil cut mud</u>	cc.
Gas:	<u>2.4</u>	cu. ft.
Other:	<u>None</u>	
<u>R.W. 2.2 @ 56°F = 3300 ppm. chl.</u>		
Resistivity		
Make Up Water	<u>5.0</u> @ <u>50°F</u>	of Chloride Content <u>1350</u> ppm.
Mud Pit Sample	<u>3.2</u> @ <u>70°F</u>	of Chloride Content <u>1700</u> ppm.
Gas/Oil Ratio	<u>550-1</u>	Gravity <u>32.8</u> °API @ <u>66</u> °F
Where was sample drained <u>On location.</u>		
Remarks: _____		

32-8N-51W

LYNES, INC.

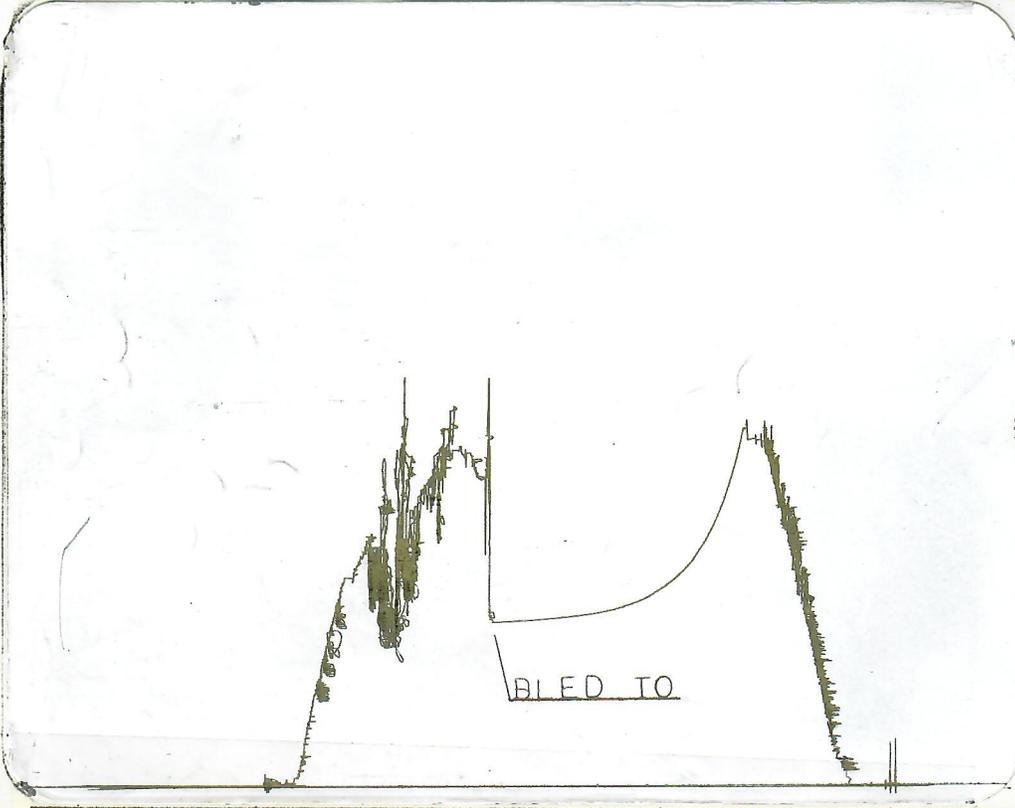
Operator Burlington Northern, Inc. Lease & No. State #33-32 DST No. 1



Inside Recorder

PRD Make Kuster AK-1
 No. 988 Cap. 4700 @ 4574'

Press	Corrected
Initial Hydrostatic A	2427
Final Hydrostatic K	2384
Initial Flow B	453
Final Initial Flow C	554
Initial Shut-in D	1075
Second Initial Flow E	681
Second Final Flow F	677
Second Shut-in G	1079
Third Initial Flow H	--
Third Final Flow I	--
Third Shut-in J	--
Pressure Below Bottom Packer Bled To	



Outside Recorder

PRD Make Kuster AK-1
 No. 1819 Cap. 5500 @ 4607'

Press	Corrected
Initial Hydrostatic A	
Final Hydrostatic K	
Initial Flow B	
Final Initial Flow C	
Initial Shut-in D	
Second Initial Flow E	
Second Final Flow F	
Second Shut-in G	
Third Initial Flow H	
Third Final Flow I	
Third Shut-in J	
Pressure Below Bottom Packer Bled To	1163

LYNES INC.

REPORT # 20

WELL NAME - STATE 33-32

WELL OPERATOR - BURLINGTON NORTHERN, INC

DST NUMBER - 1

RECORDER NUMBER - 1818

FIRST SHUT IN PRESSURE

TIME(MIN) PHI -----	(T+PHI) /PHI -----	PSIG -----
.0	.0000	563
3.0	11.0000	1045
6.0	6.0000	1057
9.0	4.3333	1061
12.0	3.5000	1062
15.0	3.0000	1063
18.0	2.6667	1064
21.0	2.4286	1065
24.0	2.2500	1065
27.0	2.1111	1065
30.0	2.0000	1065

EXTRAPLN OF FIRST SHUT IN = 1066.06

LYNES INC.

REPORT # 20

WELL NAME - STATE 33-32

WELL OPERATOR - BURLINGTON NORTHERN, INC

DST NUMBER - 1

RECORDER NUMBER - 1818

SECOND SHUT IN PRESSURE

TIME (MIN)	(T+PHI)	PSIG
PHI	/PHI	
.0	.0000	628
6.0	16.0000	1053
12.0	8.5000	1058
18.0	6.0000	1060
24.0	4.7500	1062
30.0	4.0000	1063
36.0	3.5000	1064
42.0	3.1429	1065
48.0	2.8750	1066
54.0	2.6667	1066
60.0	2.5000	1066

FITTED LINE: $\text{LOG}((T+\text{PHI})/\text{PHI}) = -.08171 \text{ PSIG} + 87.50194$

EXTRAPLN OF SECOND SHUT IN = 1070.87 M = 12.24

RESERVOIR PARAMETERS:

COLLAR RECDV	589.000	PIPE RECOVERY	1099.000	INIT FLO TIM	30.000
FINL FLO TIM	60.000	MUD EXPANSN	1.000	BOTTM HOL TM	130.000
API GRAVITY	32.800	SPEC GRAVITY	.860	VISCOSITY	4.000
PAY THICKNES	6.000	SUBSEA DEPTH	-387.000	WATER GRADNT	.433

LYNES, INC.

Operator Burlington Northern, Inc. Lease & No. State #33-32 DST No. 1

Comments relative to the analysis of the pressure chart from DST #1, Interval: 4590-4596', which was run in the captioned well located in the NW SE Section 32, T8N-R51W, Logan County, Colorado:

In spite of a significant volume-rate of gas flow that occurred during this test, this analysis has been made on the basis of the liquid recovery only and the Horner equations applicable to liquid recovery tests.

For purposes of this analysis, the following reservoir and fluid properties and test parameters have been used:

BHT = 130° F, μ = 4.0 cps., h = 6 feet, t = 90 minutes,
m = 12.24 psi/log cycle.

1. Extrapolation of the Initial Shut-in pressure build-up curve indicates a maximum reservoir pressure of 1066 psi at the recorder depth of 4569 feet. Extrapolation of the Final Shut-in pressure build-up curve indicates a maximum reservoir pressure of 1071 psi. The difference between the extrapolated Initial and Final Shut-in pressures (5 psi) is considered insignificant.

The indicated maximum reservoir pressure is reasonably consistent with original reservoir pressures which were found in the J-Sand at comparable depths and earlier dates in the general area of this formation test.

2. Because the liquid which was recovered in this test was reversed out and the volume was not measured, it has been necessary to calculate the volume of recovered liquid on the basis of the Final Flow pressure being representative of the weight of the liquid in the drill pipe. For this calculation the following fluid properties have been used:

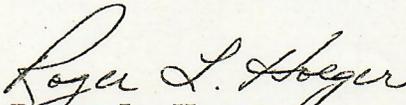
Oil Gravity = 32.8° API at 60° F, BHT = 130° F, Gas/Oil Ratio = 550/1,
Reservoir Pressure = 1071 psi.

On the basis of the above fluid and reservoir properties, the oleostatic pressure gradient is .335 psi/ft. The reciprocal of this gradient, 2.99 ft./psi, has been used to convert the Final Flow pressure, 628 psi, to a calculated 1875 feet of oil recovery. On the basis of this calculated gross recovery volume, the Average Production Rate is indicated to be 372.0 BPD.

Burlington Northern, Inc., State #33-32
Interval: 4590-4596' (DST #1)

Comments - Page 2

3. The calculated Damage Ratio of 6.6 indicates that significant well-bore damage was present at the time of this formation test. The Damage Ratio implies that the production rate should have been 6.6 times greater than that which occurred (or 2455. BPD) if well-bore damage had not been present. It should be noted, however, in view of the magnitude of oil and gas which were recovered during this test, and the fact that a two-phase recovery was obtained, the indicated well-bore damage may be due to the choke effect of the tool rather than formation damage.
4. The calculated Effective Transmissibility of 4942.5 md.-ft./cp. indicates an Average Permeability to oil of 3295 md. for the total 6 feet of interval tested.
5. The evaluation criteria used in the Drill-Stem-Test Analysis System indicate that the results obtained in this analysis should be reliable within reasonable limits relative to the assumptions which have been made.


Roger L. Hoeger
Consultant for Lynes, Inc.

LYNES INC.

REPORT # 20

WELL NAME - STATE 33-32

WELL OPERATOR - BURLINGTON NORTHERN, INC

DST NUMBER - 1

RECORDER NUMBER - 1818

CALCULATIONS: SECOND SHUT IN

EXTRAPOLATED RESERVOIR PRESS.(PSIG)	1070.9
NO. OF POINTS ENTERED.....	11.0
NO. OF POINTS USED IN EXTRAPOLATION	7.0
ROOT MEAN SQUARE DEVIATION OF BEST FIT LINE(PSI) .	.039
TOTAL FLOW TIME(MIN)	90.0
AVERAGE PRODUCTION RATE DURING TEST(BBLS/DAY)	372.0
TRANSMISSIBILITY(MD-FT/CP)	4942.5
IN SITU CAPACITY(MD-FT)	19769.9
AVERAGE EFFECTIVE PERMEABILITY(MD)	3294.98
PRODUCTIVITY INDEX(BBLS/DAY-PSI)840
DAMAGE RATIO	6.6
PRODUCTIVITY INDEX WITH DAMAGE REMOVED(BBLS/DAY-PSI) ...	5.563
RADIUS OF INVESTIGATION(FT)	544.6
DRAWDOWN FACTOR(%)0
POTENTIOMETRIC SURFACE(FT)	2086.1

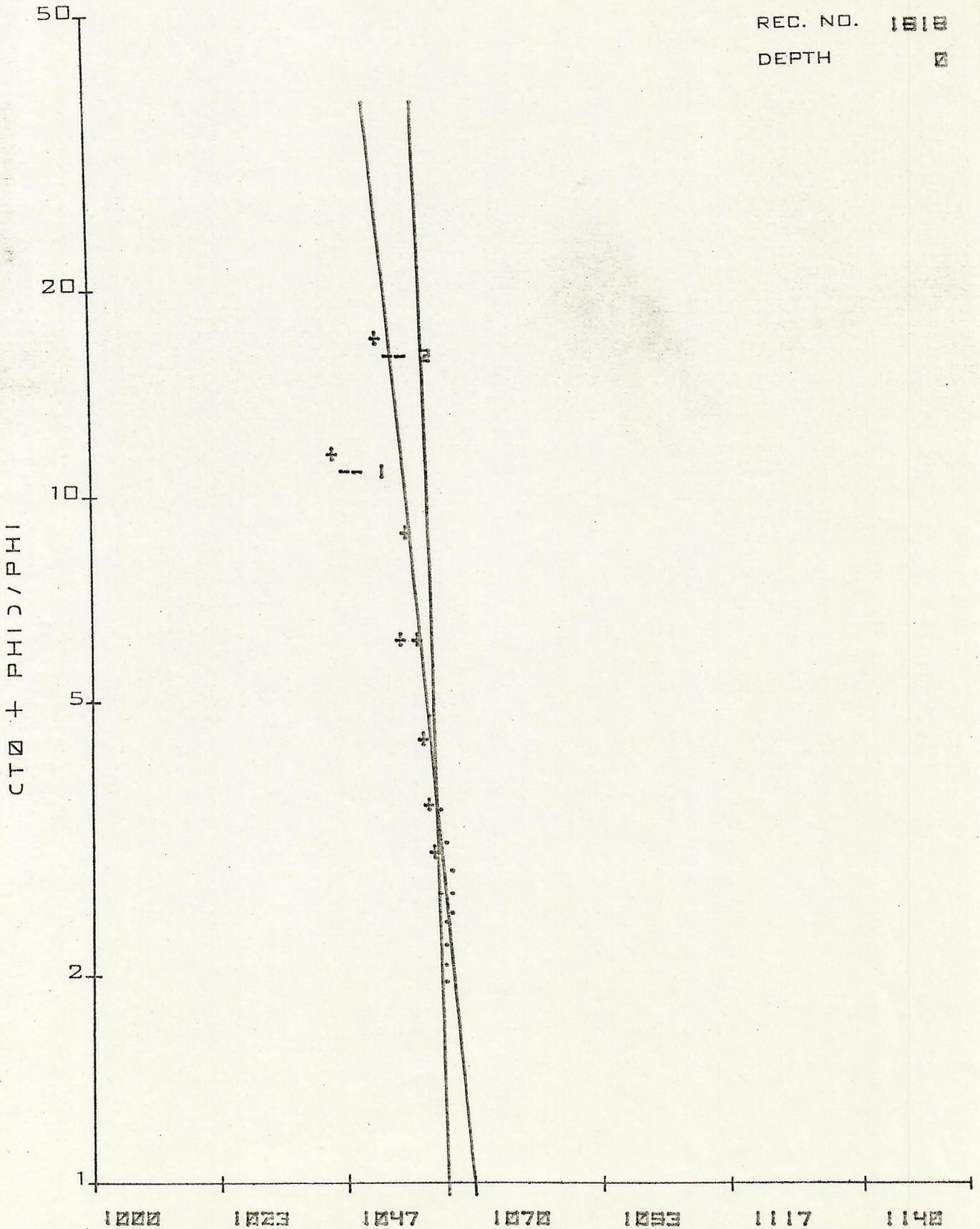
LYNES, INC.

WELL: THERN INC

STATE 033-32 BURLINGTON NORTHE LOCN: INC

DATE: 12-17-77

DST NO. 1
REC. NO. 1818
DEPTH 0



PSIG (OIL OR WATER)
PRESSURE EXTRAPOLATION PLOT

RECEIVED

NOV 17 1977



DRILLING PLAN

COLORADO OIL & GAS CONS. COMM.

PROSPECT / # STAMPEDE COUNTY Logan STATE CO
 OWNERS BN
 WELL NO. 33-32 LEASE _____ State _____
 LOCATION NWSE 32-T8N-R51W
 EST. T.D. 4700 OR 50' into Ksc GROUND ELEV. 4182

PROGNOSIS:			LOGS:
Marker	Depth	Remarks	
Bentonite	4335		DIL TD to shoe
D Sand	4425		FDC/CNL/GR/Ca1 TD to 4400
J Sand	4525		
Ksc	4650		

DEVIATION:
 Max: 7° Max. change: 1 1/2/100
 Surveys: each new bit

DST'S:
 and/or as req'd by wellsite geologist

CORES:
 None

SAMPLES:
 Each 30 Ft. from 4000 to 4400
 Each 10 Ft. from 4400 to TD
 and/or as req'd by wellsite geologist

SURFACE FORMATION:
 MAX. ANTICIPATED BHP: _____ psi.

MUD: TYPE _____ WT _____ VIS _____ WL _____ Remarks _____

Chem-gel water system typical for area; mud wt not to exceed 9.4 ppg.

CASING:	SIZE	HOLE	DEPTH	CEMENT	WOC	REMARKS
SURFACE	8-5/8	12-1/4	300	to surface	8	Reg cmt + 3% CaCl
PRODUCTION	4-1/2	7-7/8	TD	50 Lite + 50 Poz	-	Set slips when plug is down.

PROBABLE PLUGS, IF REQ'D

OTHER:

DRILLING TIME LOG

BURLINGTON NORTHERN INC

NO. 33-32 STATE
NW SE Section 32, T-8-N R-51-W
Logan County, Colorado

Strap correction 5'

1 min/ft 10min/ft

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LOGO OF S. G. ANDERSON CO.

4450

60

"D" SANDSTONE

70

80

80

90

4500

10

20

30

40

4550

60

"J" SANDSTONE

70

80

90

4600

10

20

30

40

50

60

70

80

90

4700

8

DRILLING TIME LOG

BURLINGTON NORTHERN INC

NO. 33-32 STATE
NW SE Section 32, T-8-N R-51-W
Logan County, Colorado

Strap correction 5'

1 min/ft 10min/ft

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OFFICE OF OIL & GAS CONSERVATION

4450

60

"D" SANDSTONE

70

80

80

90

4500

10

20

30

40

4550

60

"J" SANDSTONE

70

80

90

4600

10

20

30

40

50

60

70

80

90

4700

cc

DRILLING TIME LOG

BURLINGTON NORTHERN INC

NO. 33-32 STATE
NW SE Section 32, T-8-N R-51-W
Logan County, Colorado

Strap correction 5'

RECEIVED
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MINI-MAX PACIFIC CORP.

4450

60

"D" SANDSTONE

70

80

80

90

4500

10

20

30

40

4550

60

"J" SANDSTONE

70

80

90

4600

10

20

30

40

50

60

70

80

90

4700

1 min/ft 10 min/ft

