

BEFORE THE INDUSTRIAL COMMISSION

OF THE STATE OF NORTH DAKOTA

CASE NO. 3686

ORDER NO. 4206

CORRECTED DECEMBER 11, 1985

IN THE MATTER OF A HEARING CALLED ON A MOTION OF THE COMMISSION TO CONSIDER THE TEMPORARY SPACING FOR THE DEVELOPMENT OF AN OIL AND/OR GAS POOL DISCOVERED BY THE LOUISIANA LAND & EXPLORATION COMPANY #1 HEUER 41-20 WELL, LOCATED IN THE NE NE OF SECTION 20, T.161N., R.95W., DIVIDE COUNTY, NORTH DAKOTA, DEFINE THE LIMITS OF THE FIELD, AND ENACT SUCH SPECIAL FIELD RULES AS MAY BE NECESSARY.

TEMPORARY ORDER OF THE COMMISSION

BY THE COMMISSION:

Pursuant to legal notice this cause came on for hearing at 9:00 a.m. on the 19 day of November, 1985, in Bismarck, North Dakota, before an examiner appointed by the Industrial Commission of North Dakota, hereinafter referred to as the "Commission."

NOW, on this 25th day of November, 1985, the Commission a quorum being present having considered the testimony adduced and the exhibits received at said hearing, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That geological and engineering evidence presented to the Commission relative to the matter of well spacing indicates that the Sadler-Madison Pool, as classified and defined in this order, should be developed on a pattern of one well to 160 acres in order to drain efficiently the recoverable oil from said pool, assure rapid development, avoid the drilling of unnecessary wells, and prevent waste in a manner that will protect correlative rights.

(3) That temporary 160-acre spacing in the Madison Pool in this field will result in the efficient and economical development of the field as a whole and will operate so as to prevent waste and provide maximum ultimate recovery, will avoid the drilling of unnecessary wells, and will protect correlative rights.

(4) That the unrestricted flaring of gas produced from the Sadler-Madison Pool could be considered waste, and in order to minimize such, production from the pool should be restricted until the wells producing therefrom are connected to a gas gathering and processing facility.

(5) That certain special field rules are necessary to prevent waste and protect against the contamination and pollution of surface lands and fresh waters.

IT IS THEREFORE ORDERED:

(1) That the following described tracts of land in Divide County, North Dakota, be, and the same are hereby designated the Sadler Field:

TOWNSHIP 161 NORTH, RANGE 95 WEST, 5TH PM
THE SW/4** OF SECTION 16, THE S/2 OF SECTION 17, THE NE/4 OF SECTION 20, AND THE NW/4 OF SECTION 21.

together with those additional quarter sections or governmental lots corresponding thereto as may be proven productive by wells drilled on lands within one mile of the boundaries of the field as set forth above, provided further that such extensions of the field boundaries shall include only sufficient acreage to form a spacing unit for such wells, and any intervening lands.

(2) That the Sadler-Madison Pool be, and the same is hereby defined as that accumulation of oil and gas found below the base of the Last Charles Salt and above the top of the Lodgepole Formation within the limits of the field as set forth above.

(3) That effective this date, the temporary spacing for the development of the Sadler-Madison Pool be, and the same is hereby set at one well to 160 acres.

(4) That all wells hereafter drilled to said pool shall be located not less than 500 feet from a spacing unit boundary nor closer than 1650 feet to a well permitted to or producing from the pool. Wells presently permitted to or producing from the pool that do not conform to this spacing pattern shall be considered exceptions.

(5) That spacing units for the Sadler-Madison Pool shall consist of a governmental quarter section, or governmental lots corresponding thereto, as determined by governmental survey.

(6) That no well shall be drilled hereafter in the Sadler-Madison Pool except in conformity with the regulations above without special order of the Commission after due notice and hearing.

(7) That the following rules concerning the casing, tubing and equipping of the wells shall apply to the subsequent drilling and operation of wells in the Sadler-Madison Pool;

(a) The surface casing shall consist of new or reconditioned pipe that has been previously tested to 1000 pounds per square inch. The casing shall be set and cemented at a point not less than 50 feet below the base of the Fox Hills Formation. Sufficient cement shall be used to fill the annular space outside the pipe to the surface of the ground, or the bottom of the cellar, and sufficient scratchers and centralizers shall be used to assure a good cement job. Cement shall be allowed to stand a minimum of 12 hours before drilling the plug or initiating tests.

(b) The producing or oil string shall consist of new or reconditioned pipe that has been previously tested to 2000 pounds per square inch. Casing shall be set and cemented at a point not higher than the top of the producing formation. Sufficient cement shall be used and applied in such manner as to adequately protect and isolate all formations containing oil and/or gas, protect the pipe through salt sections encountered, and to isolate the Dakota-Lakota Series. The cement shall be allowed to stand a minimum of 24 hours before drilling the plug or initiating tests. After cementing, the casing shall be tested by application of pump pressure of at least 2000 pounds per square inch. If, at the end of

30 minutes this pressure shall have dropped 150 pounds per square inch or more, the casing shall be repaired. Thereafter, the casing shall again be tested in the same manner. Further work shall not proceed until a satisfactory test has been obtained.

- (c) All well-head fittings and connections shall have a working pressure in excess of that to which they are expected to be subjected.
- (d) All wells shall be equipped with tubing; all tubing shall be of sufficient internal diameter to allow the passage of a bottom-hole pressure gauge for the purpose of obtaining bottom-hole pressure measurements.

(8) That the gas-oil ratio of each well shall be measured during the months of May and November, and the reservoir pressure of flowing wells shall be measured in the months of May and November, and in pumping wells when the rods are pulled but at least once annually and reported to the Commission within 15 days following the end of the month in which they are determined. Pressure measurements shall be made at or adjusted to a subsea datum of 5065 feet after the well has been shut in for 48 hours. All gas-oil ratios and reservoir pressure determinations shall be made under the supervision of and by methods approved by the Enforcement Officer. The Enforcement Officer is authorized to waive these requirements if the necessity therefor can be demonstrated to his satisfaction.

(9) That no salt water shall be stored in pits in this field, except in an emergency, and approved by the Enforcement Officer.

(10) That for the purposes of division of production to owners of interests in spacing units established by this order, and proven productive prior to the date hereof, this order shall be retroactive to the date of first production.

(11) That all wells in the Sadler-Madison Pool shall be allowed to produce at an unrestricted rate for a period of 60 days commencing on the first day oil is produced through well-head equipment into tanks from the ultimate producing interval after casing has been run; after that, oil production from such wells shall not exceed an average of 200 barrels per day for a period of 60 days; after that, oil production from such wells shall not exceed an average of 150 barrels per day for a period of 60 days, thereafter, oil production from such wells shall not exceed an average of 100 barrels of oil per day; if and when such wells are connected to a gas gathering and processing facility the foregoing restrictions shall be removed, and the wells shall be allowed to produce at a maximum efficient rate.

(12) That the flaring of gas produced with crude oil from the Sadler-Madison Pool allowed herein, shall be in strict accordance with any rule, order, or recommendation of the State Health Department. And further, if such flaring causes, or threatens to cause, degradation of ambient air quality, production from the pool shall be further restricted.

(13) That this order shall cover all of the Sadler-Madison Pool, common source of supply of crude oil and/or natural gas as herein defined, and shall continue in full force and effect until the 1 day of June, 1987. That the proper spacing for the pool will be considered by the Commission on or before the regularly scheduled meeting in May, 1987.

Dated this 25th day of November, 1985.

STATE OF NORTH DAKOTA

/s/ George A. Sinner _
George A. Sinner, Governor

/s/ Nicholas J. Spaeth _
Nicholas J. Spaeth, Attorney General

/s/ Kent Jones _
Kent Jones, Commissioner of Agriculture

** Was listed as the SE/4 of Section 16 in error.

STATE OF NORTH DAKOTA
COUNTY OF BURLEIGH

AFFIDAVIT OF
MAILING

I, F.E. Wilborn, being duly sworn upon oath, depose and say: That on the 3rd day of December, 1985, I enclosed in separate envelopes true and correct copies of the attached Order No. 4206 of the North Dakota Industrial Commission, and deposited the same with the United States Postal Service in Bismarck, North Dakota, with postage thereon fully paid, directed to the following persons, all of whom appeared at the hearing of the Industrial Commission in Case No. 3686:

(mailed corrected order December 12, 1985)

Dois D. Dallas
450 Sun Way
Fairbanks, Alaska 99709

Bill Burson
1560 Broadway #1200
Denver, CO 80202

F. E. Wilborn

F. E. Wilborn
Deputy Enforcement Officer
Oil & Gas Division

On this 4th day of December, 1985, before me personally appeared F. E. Wilborn to me known as the person described in and who executed the foregoing instrument and acknowledged that (s)he executed the same as his/her free act and deed.

Karen Butenkunst

Notary Public

State of ND County of Burleigh
My Commission expires 5-13-88

NORTH DAKOTA INDUSTRIAL COMMISSION

CASE NUMBER: 3686

NOVEMBER 19, 1985

EXHIBIT 1

ENGINEERING DATA

**LAKES PROSPECT - RATCLIFFE POOL
DIVIDE COUNTY, NORTH DAKOTA**

HEARING DATA: November 19, 1985

CASE NUMBER: 3686

WELL DATA

WELL NAME	No. 1 Heuer 41-20
LOCATION	660'FNL, 660'FEL, Sec. 20-T161N-R95W
K.B. ELEVATION	2379'
TOTAL DEPTH DRILLED	10,632'
DATA COMPLETED	October 10, 1984
PERFORATION INTERVALS	7428'-31', 7437'-40' 7443'-47', 7455'-64' 7486'-89', 7501'-14'
I.P. RATE	Pumping 52 BOPD, 221 BWPD, 00 MCFPD
CURRENT STATUS	Pumping

RESERVOIR DATA

TYPE RESERVOIR	Oil
ROCK TYPE	Limestone & Dolomite
RESERVOIR TEMPERATURE	198 Deg. F Estimated
STOCK TANK OIL GRAVITY	35.4 Deg. API
H2S CONTENT IN SEPARATOR GAS	0
AVERAGE POROSITY	14.3%
NET PAY THICKNESS	35'
INITIAL WATER SATURATION	70%
ECONOMIC LIMIT	10 BOPD
DECLINE RATE (ANNUAL)	50% 1st Year, 30% to Economic Limit
INITIAL GAS-OIL RATIO	1155 SCF/BO
INITIAL RESERVOIR PRESSURE	3295 PSIG
INITIAL FORMATION VOLUME FACTOR	1.2 RB/STB
RESERVOIR PRODUCING MECHANISM	Solution Gas Drive

ESTIMATED ULTIMATE RECOVERY

The recoverable reserves are given by the equation: $N_p = \frac{(Q-Q_{e1}) \times 365}{-\ln(1-D)}$ Where

Q = 60 BOPD

Q_{e1} = 10 BOPD

D1 = 50% (1st year)

D2 = 30% to economic limit

For a two stage decline with production declining 50% for the 1st year and 30% to the economic limit the reserves would be:

$$N_p = \frac{(60-30) \times 365}{.6931} + \frac{(30-10) \times 365}{.3567}$$
$$= 36264 \text{ STB}$$

ECONOMICS

\$510,000 Drill and Complete Well

\$150,000 Surface Equipment

\$660,000 Total

\$ 48,000 Annual Operating Expense

DISPOSITION OF PRODUCED FLUIDS

Stock tank oil is sold to Amoco.

Separator gas is flared.

Water is hauled to disposal well.

WELL SPACING

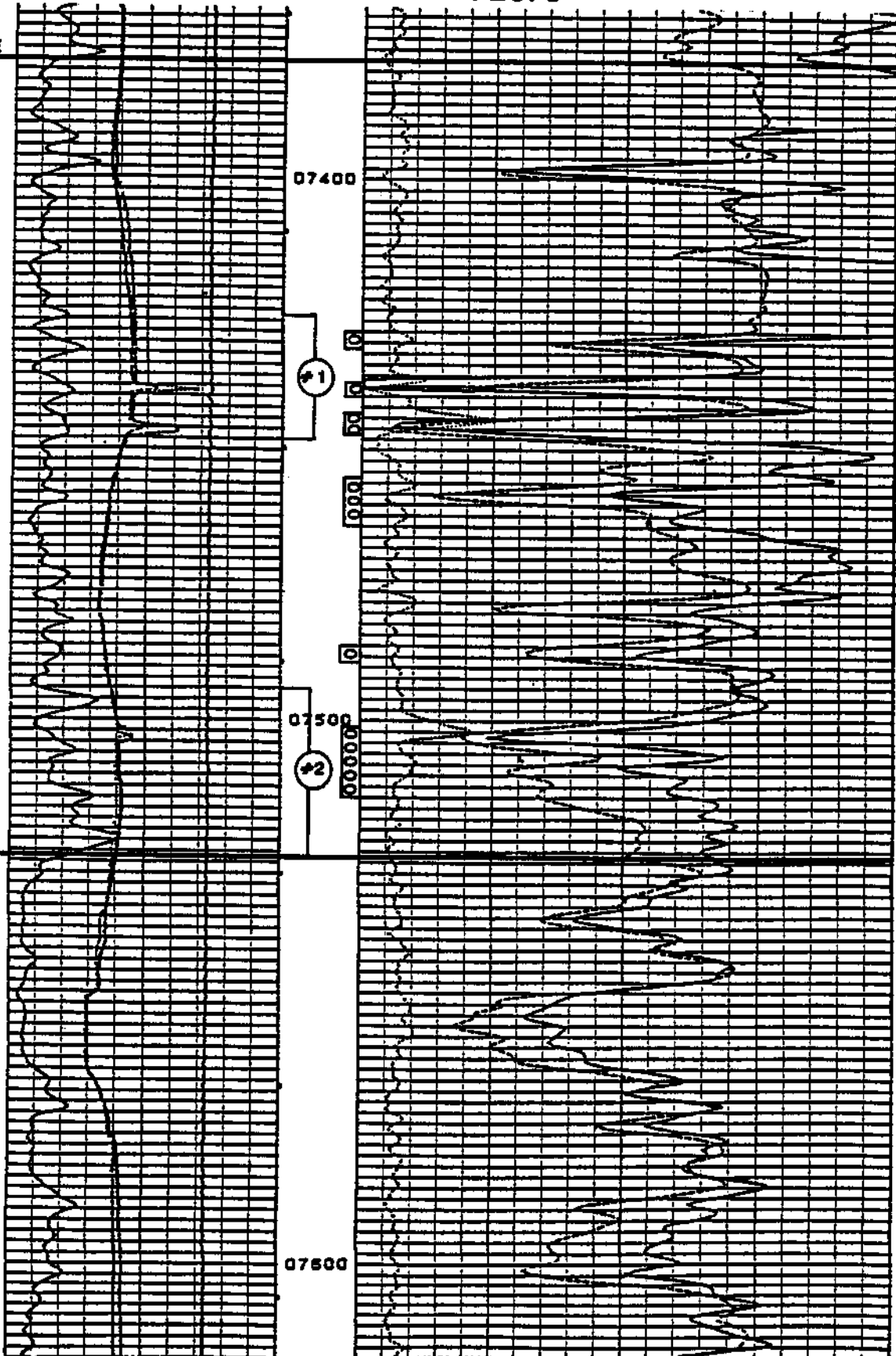
Based on performance of the well, it appears that 160 acre spacing units will adequately drain this reservoir.

LL&E #1 HEUER 41 - 20

nene, 20 - 161n - 95w

KB: 2379

RATCLIFFE



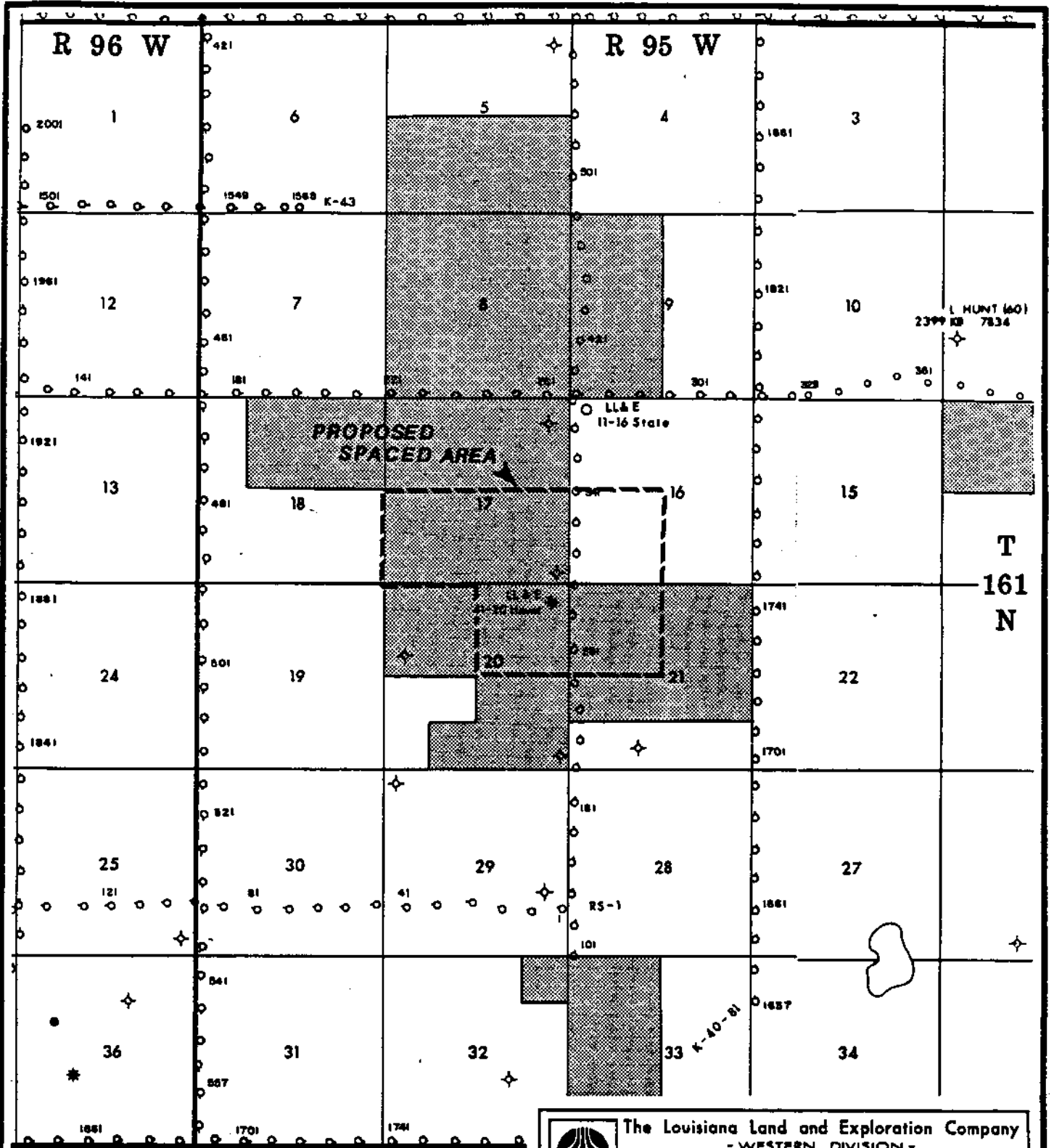
DST# 1:7425-7448
DPR:1.3 BO
SCR:1900cc OIL
0.3 cu.ft. GAS
HP:4021-4010
FP:70-82
82-131
SP:830-3000

PERF:7428-31
7437-40
7443-47
7455-64
7488-89
7501-14

DST# 2:7494-7525
DPR:1 BO
0.45 B Br.W
0.45 BM
SCR:1000cc OIL
4.25 cu.ft. GAS
HP:4086-4088
FP:65-77
77-187
SP:3178-3181

MISSION CANYON

07500



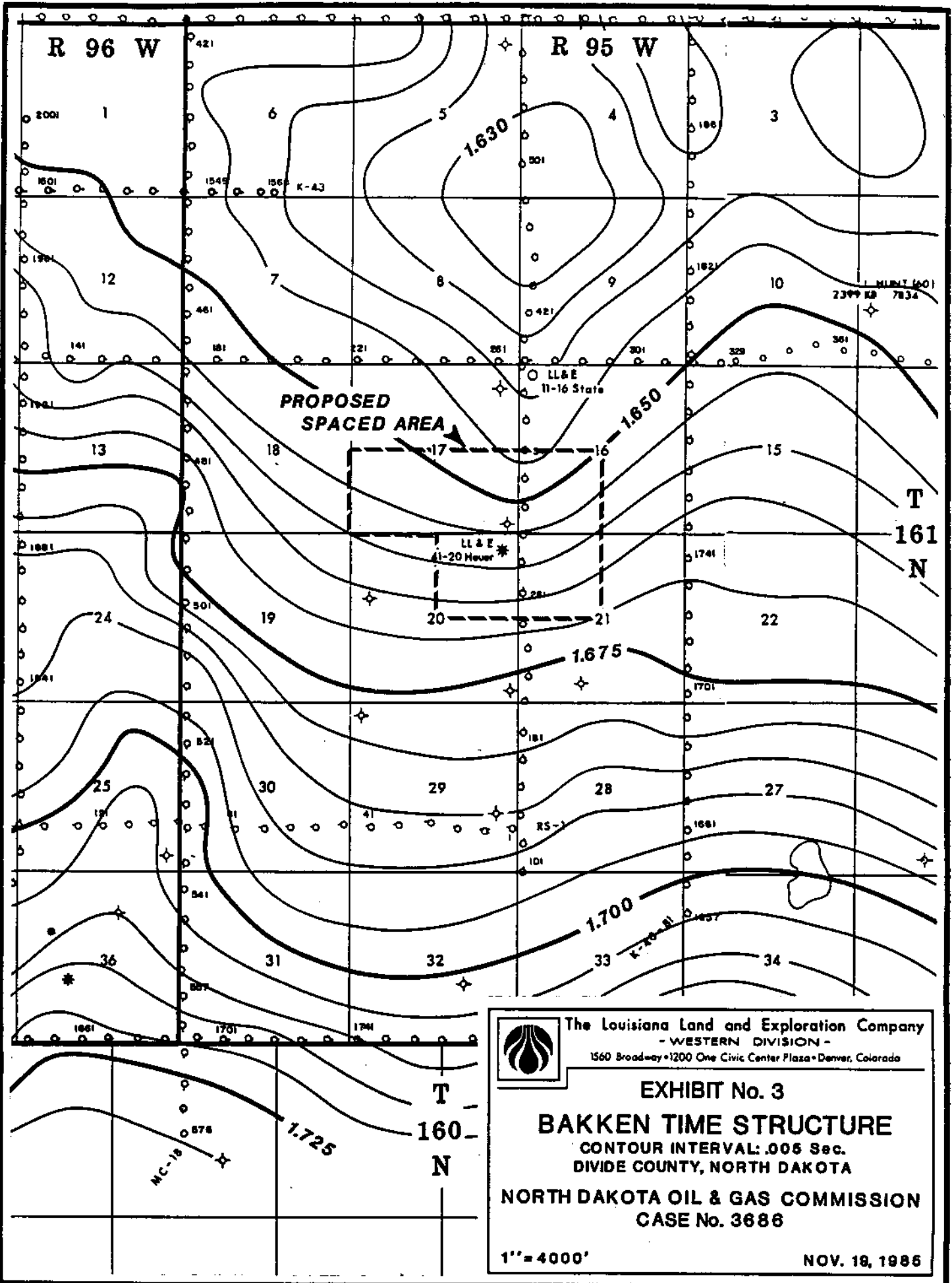

The Louisiana Land and Exploration Company
 - WESTERN DIVISION -
 1560 Broadway • 1200 One Civic Center Plaza • Denver, Colorado

EXHIBIT No. 2
LAND MAP
 DIVIDE COUNTY, NORTH DAKOTA
 NORTH DAKOTA OIL & GAS COMMISSION
 CASE No. 3686

1" = 4000'

NOV. 19, 1985

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160
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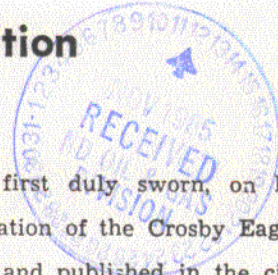


The Louisiana Land and Exploration Company
 - WESTERN DIVISION -
 1560 Broadway • 1200 One Civic Center Plaza • Denver, Colorado

EXHIBIT No. 3
BAKKEN TIME STRUCTURE
 CONTOUR INTERVAL: .005 Sec.
 DIVIDE COUNTY, NORTH DAKOTA
 NORTH DAKOTA OIL & GAS COMMISSION
 CASE No. 3686

1" = 4000'
 NOV. 18, 1985

Affidavit of Publication



State of North Dakota, County of Divide, SS.

JOHN M. ANDRIST, of said County and State, being first duly sworn, on his oath says: That The Divide County Journal, a continuation of the Crosby Eagle, is a weekly newspaper of general circulation, printed and published in the city of Crosby, in said county and state, by John M. Andrist, Editor, and has been such newspaper during the times hereinafter mentioned; and that I, JOHN M. ANDRIST, the editor, during all such times have been the editor of said newspaper, and have personal knowledge of all the facts stated in this affidavit; and that the advertisement headed Hearing set to consider

proper spacing

a printed copy of which is hereunto attached, was printed and published in said newspaper for a period of 1 consecutive weeks, to wit:

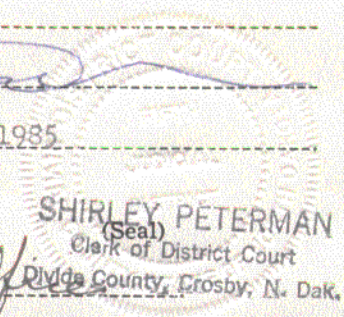
November 6, 1985

PAID

[Handwritten signature]

Subscribed and sworn to before me November 8, 1985

[Handwritten signature: Shirley Peterman]
Notary Public, Divide County, N. D.



My Commission Expires Term of Office

Hearing set to consider proper spacing

NOTICE OF PUBLICATION
NORTH DAKOTA

INDUSTRIAL COMMISSION
BISMARCK, NORTH DAKOTA

The State of North Dakota by its Industrial Commission hereby gives notice pursuant to law and the rules and regulations of said Commission promulgated thereunder of the following public hearing to be held at 9:00 a.m. on November 19, 1985, Pioneer Room, State Capitol Building, Bismarck, North Dakota. For the purpose of this hearing, the Commission, any member thereof acting as Examiner, or an Examiner appointed by the Commission will receive testimony and exhibits.

STATE OF NORTH DAKOTA TO:

All named parties and persons having any right, title, interest, or claim in the following cases and notices to the public. CASE NO. 3686: ON A MOTION OF THE COMMISSION TO CONSIDER THE TEMPORARY SPACING FOR THE DEVELOPMENT OF AN OIL/OR GAS POOL DISCOVERED BY THE LOUISIANA LAND & EXPLORATION COMPANY NO. 1 HEUER 41-20 WELL LOCATED IN THE NE NE OF SECTION 20, T.161N., R.95W., DIVIDE COUNTY, NORTH DAKOTA, DEFINE THE LIMITS OF THE FIELD, AND ENACT SUCH SPECIAL FIELD RULES AS MAY BE NECESSARY.

Signed by,
George A. Sinner,
Governor
Chairman,
ND Industrial Commission
(November 6, 1985)