

BEFORE THE INDUSTRIAL COMMISSION

OF THE STATE OF NORTH DAKOTA

IN THE MATTER OF A HEARING CALLED ON A MOTION OF THE
COMMISSION TO CONSIDER THE APPLICATION OF CONTINENTAL
OIL COMPANY FOR AN ORDER PERMITTING THE DRILLING OF
CERTAIN INJECTION WELLS ALONG THE DICKINSON HEATH SAND
UNIT BOUNDARY IN STARK COUNTY, NORTH DAKOTA.

CASE NO. 1283
ORDER NO. 1386

ORDER OF THE COMMISSION

BY THE COMMISSION:

Pursuant to legal notice this cause came on for hearing at 9:30 a.m. on the 14th day of October, 1975, in Bismarck, North Dakota, before the Industrial Commission of North Dakota, hereinafter referred to as the "Commission."

NOW, on this 13th day of November, 1975, 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 the applicant is the Unit Operator for the Dickinson Heath Sand Unit, Stark County, North Dakota, a statutory type Unit established by Commission Order No. 1202 on March 13, 1975.

(3) That due to a lack of information all of the Heath Sand reservoir was not included in the Dickinson Heath Sand Unit. Present information indicates the oil saturated Heath Sand extends beyond the Dickinson Heath Sand Unit boundaries to the north and west of Section 33, Township 140 North, Range 97 West, Stark County, North Dakota, into what has been designated the South Heart-Heath Pool.

(4) That the Dickinson Heath Sand Unit might be expanded to include said lands containing oil saturated Heath Sand reservoir but by using the existing Dickinson Unit unitization formula, the lands outside the Unit Area might not receive their equitable share of Unit participation.

(5) That because of secondary recovery operations through water flooding and the possible resulting increase in reservoir pressures, oil might, in time, migrate off unitized lands onto the lands outside the unit area mentioned in (3) above.

(6) That in order to halt the possible migration of oil from the Dickinson Heath Sand Unit to wells in the South Heart Field, the applicant

requests permission to drill two lease line injection wells, one located 400 feet from the west line and 10 feet from the north line, and the other 3640 feet from the west line and 10 feet from the north line of Section 33, Township 140 North, Range 97 West, Stark County, North Dakota.

(7) That in December, 1975, wells in the Dickinson Heath Sand Unit will have produced all of the primary reserves from the Heath Pool within said unit.

(8) That wells in the South Heart Field adjacent to the boundary of the Dickinson Heath Sand Unit have produced a year or less and have not recovered the primary reserves from that portion of the Heath Pool.

(9) That injection of water into the Heath Pool through the wells at the locations proposed in (6) above might cause the "watering out" and premature abandonment of wells in the South Heart Field and would not protect the correlative rights of the owners of interest in the wells in the South Heart Field.

(10) That the injection of water into the Heath Pool through the wells at the locations proposed in (6) above should not be permitted at this time; however, the proposed operation might increase the ultimate recovery of oil from the Heath Pool and may be reconsidered after June, 1976.

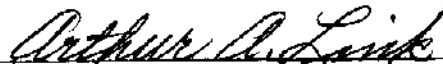
IT IS THEREFORE ORDERED:

(1) That this application for permission to drill two injection wells, one located 400 feet from the west line and 10 feet from the north line and the other 3640 feet from the west line and 10 feet from the north line of Section 33, Township 140 North, Range 97 West, Stark County, North Dakota, be, and the same is hereby denied.

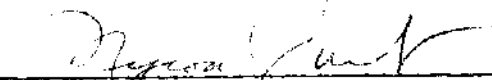
(2) That this order shall continue in full force and effect until further order of the Commission.

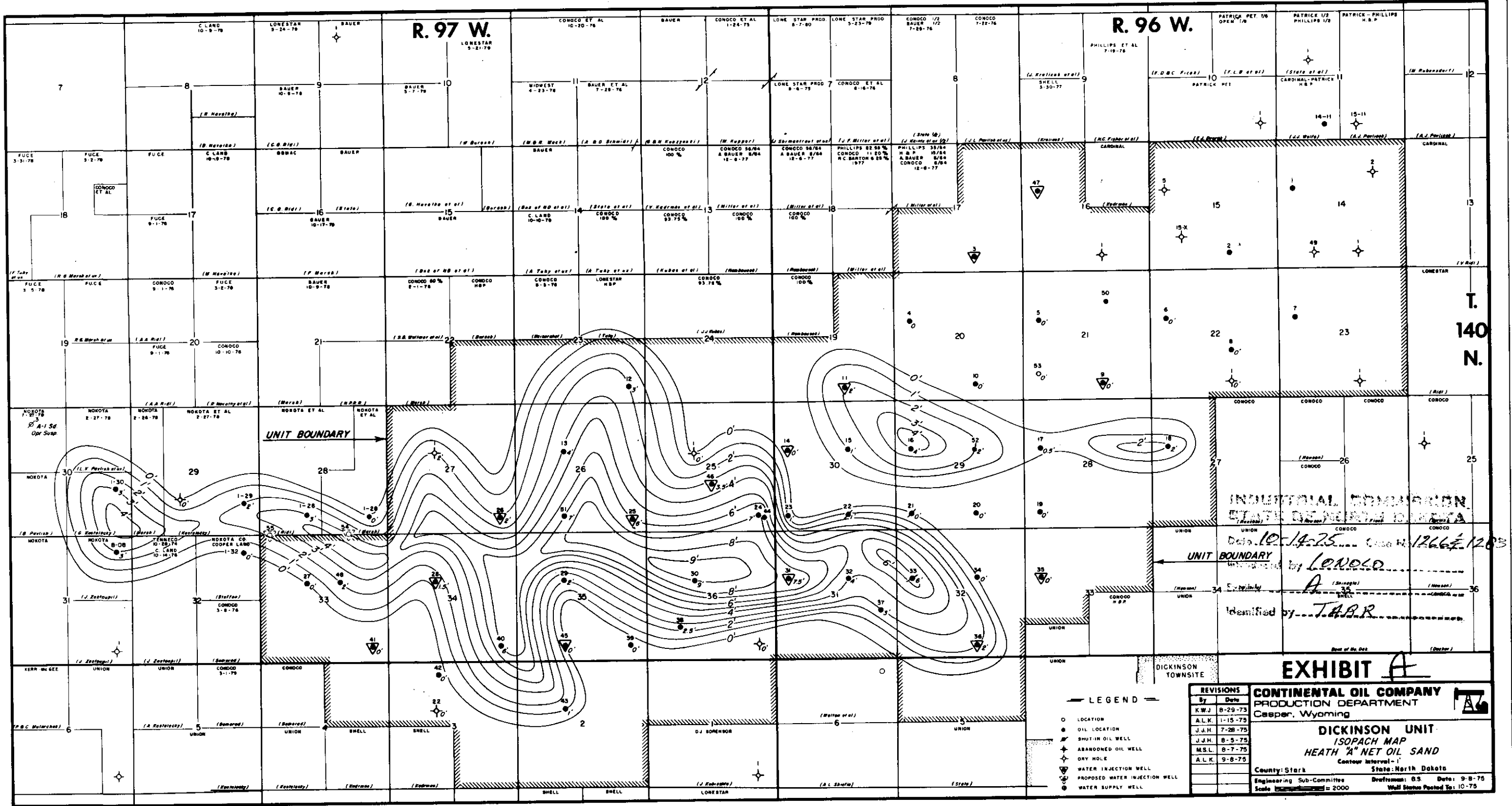
DONE, in Bismarck, North Dakota, this 13th day of November, 1975.

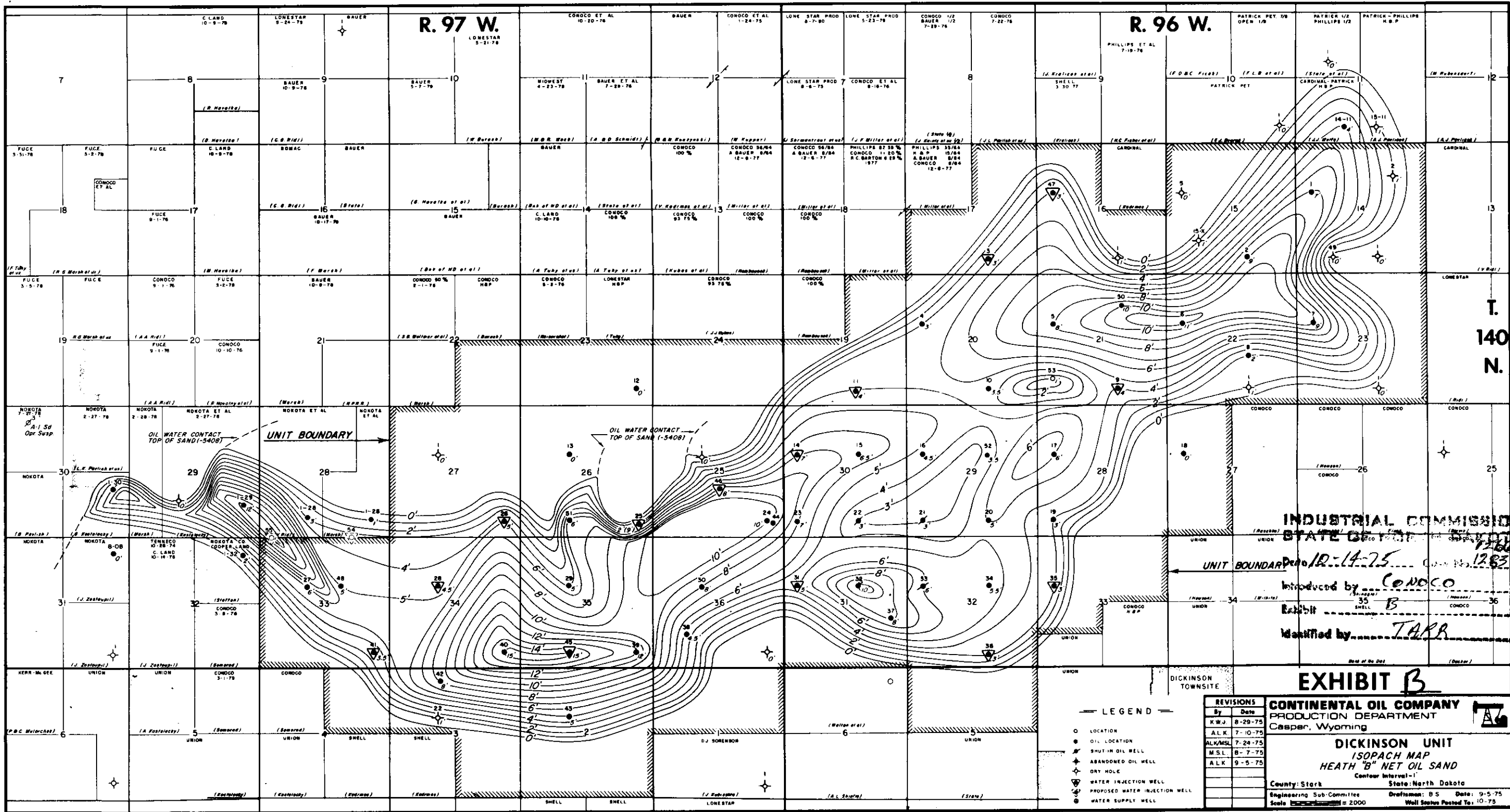
THE NORTH DAKOTA INDUSTRIAL COMMISSION

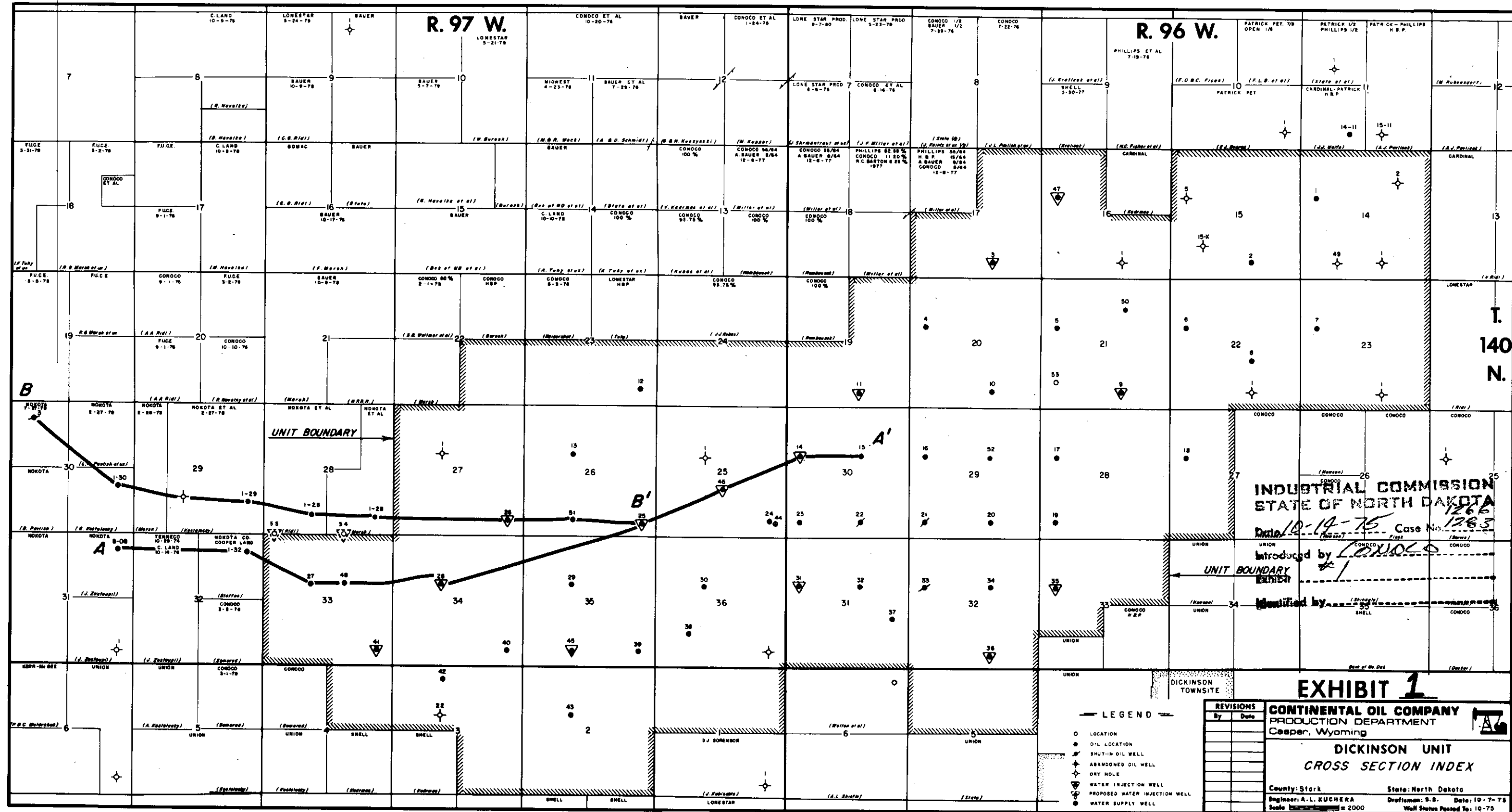

Arthur A. Link, Governor


Allen I. Olson, Attorney General


Myron Just, Commissioner of Agriculture

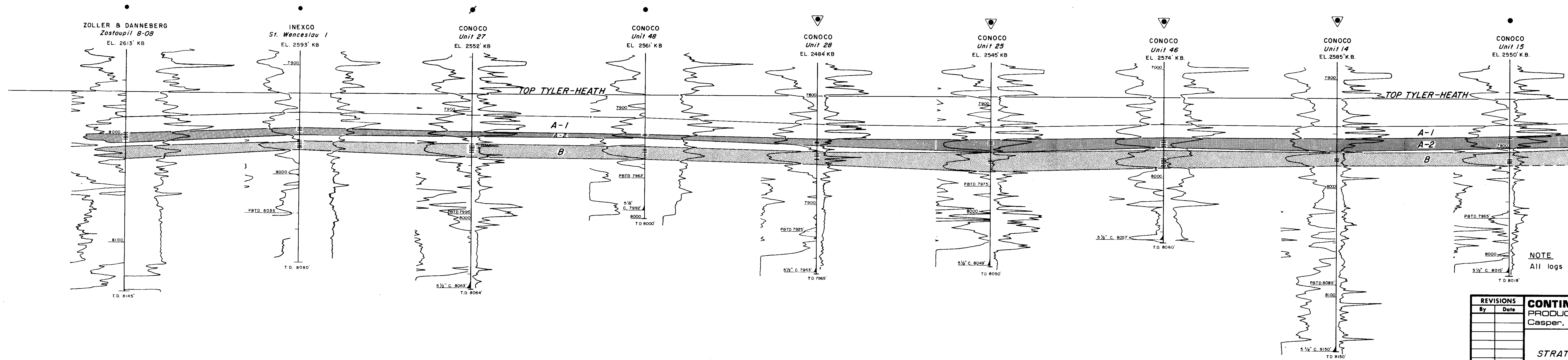






A
SW

A'
NE



INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
Date 10-14-75 Case No. 7383
Introduced by Conoco
Exhibit #2
Identified by

NOTE
All logs are resistivity logs

EXHIBIT 2

REVISIONS	
By	Date

CONTINENTAL OIL COMPANY
PRODUCTION DEPARTMENT
Casper, Wyoming

DICKINSON UNIT
STRATIGRAPHIC CROSS SECTION A-A'

County: Stark State: North Dakota
Engineer: A. L. Kuchera Draftsman: B.S. Date: 1-21-75
Scale: Vert. 1" = 40', Horiz. No Scale

REVISIONS		CONTINENTAL OIL COMPANY	
By	Date	PRODUCTION DEPARTMENT	
		DICKINSON UNIT <i>STRATIGRAPHIC CROSS SECTION B-B'</i>	
		County: Stark	State: Wyoming
		Engineer: A. L. Kuchera	Draftsman: B. S. Date: 1-21-75
		Scale: Vert. 1" = 40', Horiz. No Scale	

WATERFLOOD PERFORMANCE PROJECTION

EXISTING WELLS ONLY

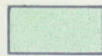
T
140
N

R 97 W

DICKINSON HEATH SAND
UNIT BOUNDARY

SOUTH HEART FIELD

"A" SAND
RESERVOIR BOUNDARY

- | | | | |
|--|--|---|----------------------|
|  | Reservoir Area Drained
By Unit Wells |  | Location |
|  | Estimated Limits Of
Present Waterflood
Front |  | Oil Well |
|  | Oil swept out of unit when
last producing well WOR=30 |  | Dry Hole |
| | |  | Water Injection Well |

CONTINENTAL OIL COMPANY
PRODUCTION DEPARTMENT
Casper, Wyoming

DICKINSON HEATH SAND UNIT

EXHIBIT 4—"A" SAND

County: Stark

State: North Dakota

Engineer: A.L. Kuchera

Draftsman: B.S.

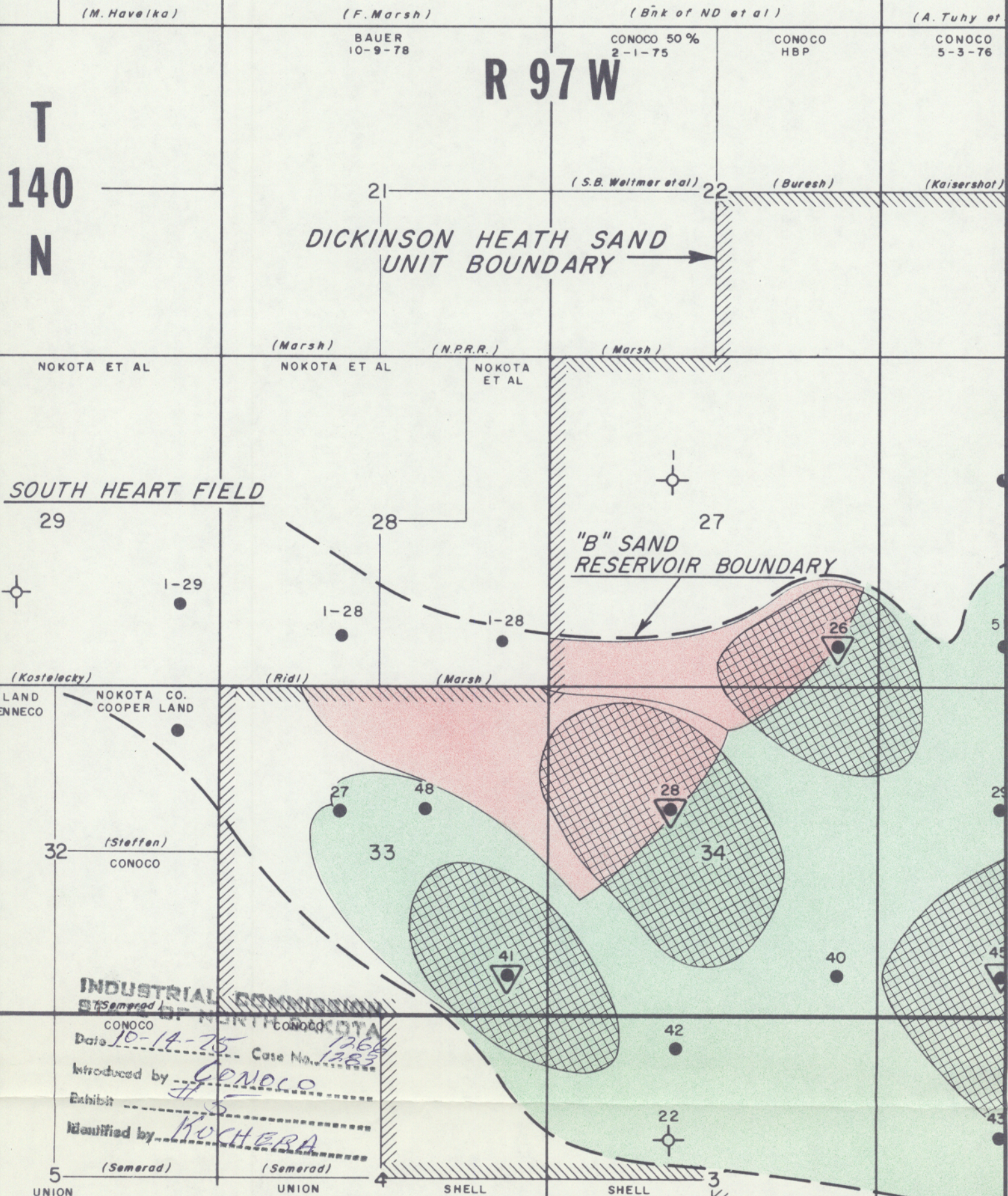
Date: 10-10-75

Scale = 2000'

Well Status Posted To: 10-75

WATERFLOOD PERFORMANCE PROJECTION

EXISTING WELLS ONLY



- LEGEND**
- Reservoir Area Drained By Unit Wells
 - Estimated Limits of Present Waterflood Front
 - Oil swept out of unit when last producing well WOR = 30
 - Location
 - Oil Well
 - Dry Hole
 - Water Injection Well

CONTINENTAL OIL COMPANY
 PRODUCTION DEPARTMENT
 Casper, Wyoming

DICKINSON HEATH SAND UNIT

EXHIBIT 5—"B" SAND

County: Stark State: North Dakota

Engineer: A.L. Kuchera Draftsman: B.S. Date: 10-10-75

Scale = 2000' Well Status Posted To: 10-75

WATERFLOOD PERFORMANCE PROJECTION

DHSU WELLS 54 & 55 ARE DRILLED
AS PRODUCERS

T
140
N

R 97 W

DICKINSON HEATH SAND
UNIT BOUNDARY

SOUTH HEART FIELD

"A" SAND
RESERVOIR BOUNDARY

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA

Date: _____ Case No. _____
Introduced by _____
Exhibit _____
Identified by _____
(Semrad) (Semrad)

LEGEND

-  Reservoir Area Drained By Unit Wells
-  Estimated Limits Of Present Waterflood Front
-  Oil swept out of unit when last producing well WOR = 30
-  Location
-  Oil Well
-  Dry Hole
-  Water Injection Well

CONTINENTAL OIL COMPANY
PRODUCTION DEPARTMENT
Casper, Wyoming



DICKINSON HEATH SAND UNIT

EXHIBIT *b* — "A" SAND

County: Stark

State: North Dakota

Engineer: A.L. Kuchera

Draftsman: B.S.

Date: 10-10-75

Scale  = 2000'

Well Status Posted To: 10-75

WATERFLOOD PERFORMANCE PROJECTION

DHSU WELLS 54 & 55 ARE DRILLED
AS PRODUCERS

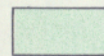
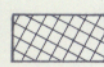
T
140
N

R 97 W

DICKINSON HEATH SAND
UNIT BOUNDARY

SOUTH HEART FIELD

"B" SAND
RESERVOIR BOUNDARY

-  Reservoir Area Drained By Unit Wells
-  Estimated Limits of Present Waterflood Front
-  Oil swept out of unit when last producing well WOR = 30
-  Location
-  Oil Well
-  Dry Hole
-  Water Injection Well

CONTINENTAL OIL COMPANY
PRODUCTION DEPARTMENT
Casper, Wyoming

DICKINSON HEATH SAND UNIT

EXHIBIT 7—"B" SAND

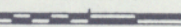
County: Stark

State: North Dakota

Engineer: A.L. Kuchera

Draftsman: B.S.

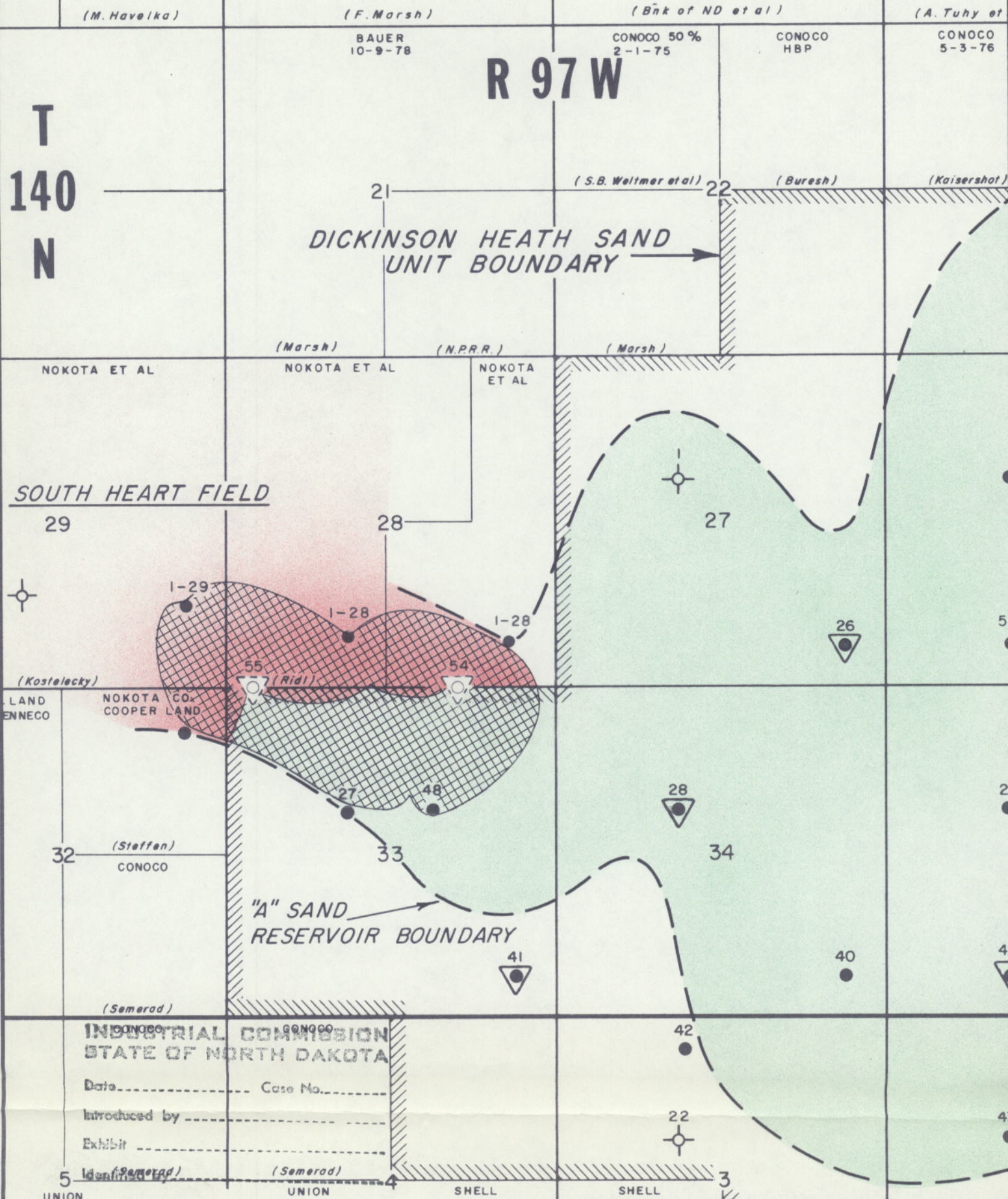
Date: 10-10-75

Scale  = 2000'

Well Status Posted To: 10-75

WATERFLOOD PERFORMANCE PROJECTION

DHSU WELLS 54 & 55 ARE DRILLED AS LINE
WATER INJECTION WELLS.



INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA

Date..... Case No.....
Introduced by.....
Exhibit.....
Identified by.....

LEGEND

- Reservoir Area Drained By Unit Wells
- Estimated Limits Of Waterflood Front When Last Well WOR Is 30
- Reservoir Area Drained By South Heart Field
- Location
- Oil Well
- Dry Hole
- Water Injection Well

CONTINENTAL OIL COMPANY
PRODUCTION DEPARTMENT
Casper, Wyoming

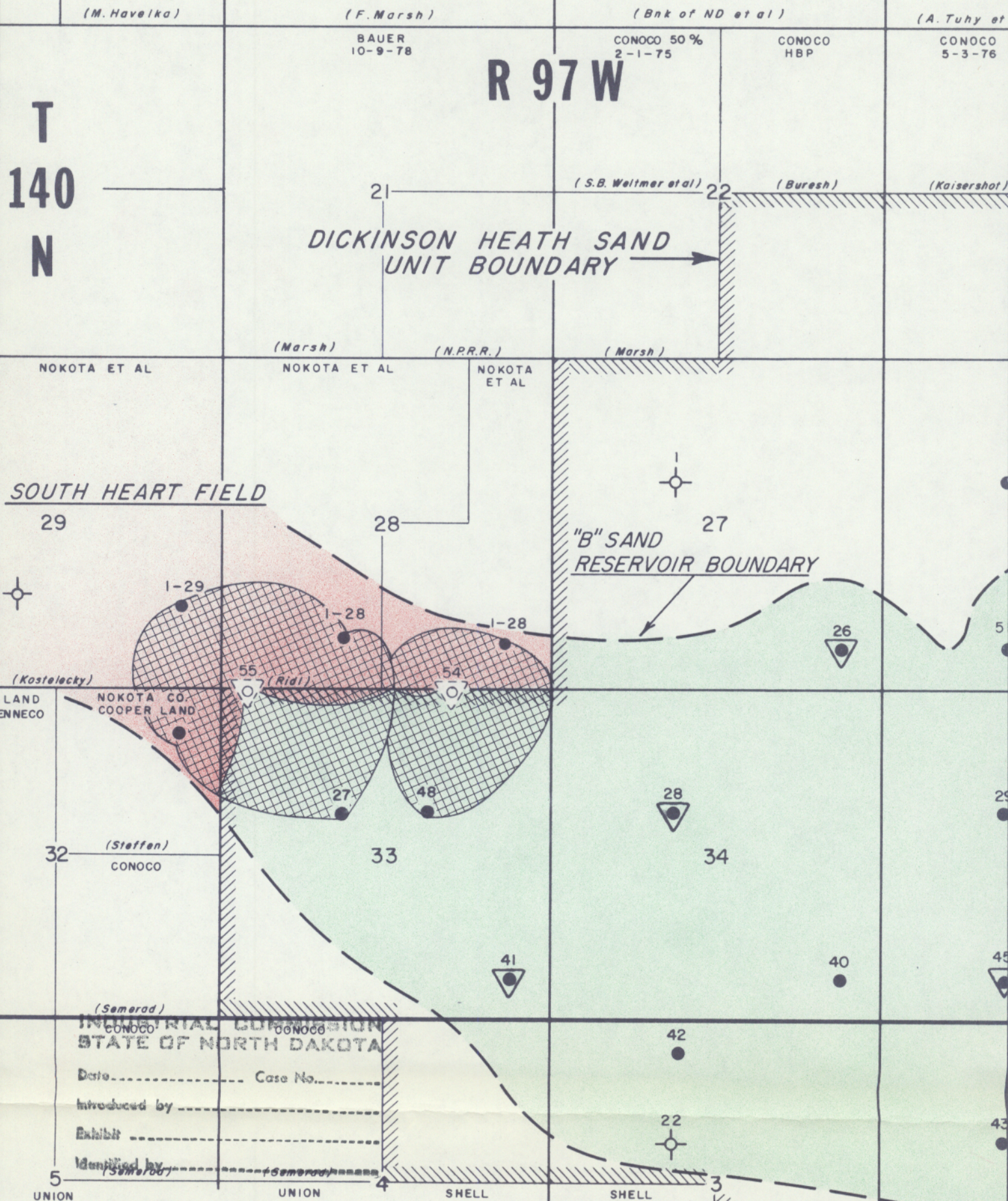
DICKINSON HEATH SAND UNIT

EXHIBIT 8 — "A" SAND

County: Stark State: North Dakota
Engineer: A.L. Kuchera Draftsman: B.S. Date: 10-10-75
Scale = 2000' Well Status Posted To: 10-75

WATERFLOOD PERFORMANCE PROJECTION

DHSU WELLS 54 & 55 ARE DRILLED AS LINE
WATER INJECTION WELLS.



LEGEND

- Reservoir Area Drained By Unit Wells
- Estimated Limits Of Waterflood Front When Last Prod. Well WOR Is 30
- Reservoir Area Drained By South Heart Field
- Location
- Oil Well
- Dry Hole
- Water Injection Well

CONTINENTAL OIL COMPANY
PRODUCTION DEPARTMENT
Casper, Wyoming

DICKINSON HEATH SAND UNIT

EXHIBIT 9 — "B" SAND

County: Stark

State: North Dakota

Engineer: A.L. Kuchera

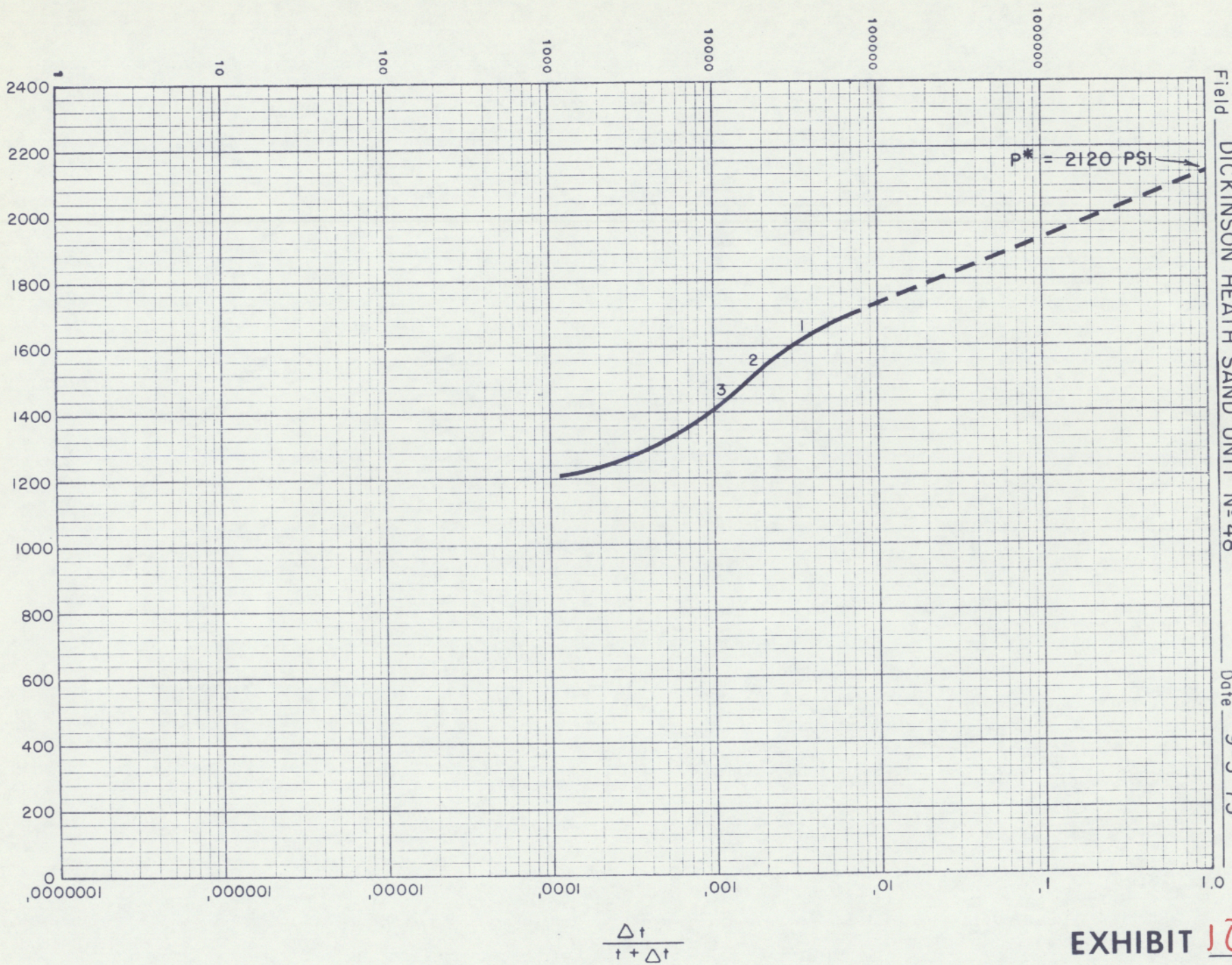
Draftsman: B.S.

Date: 10-10-75

Scale = 2000'

Well Status Posted To: 10-75

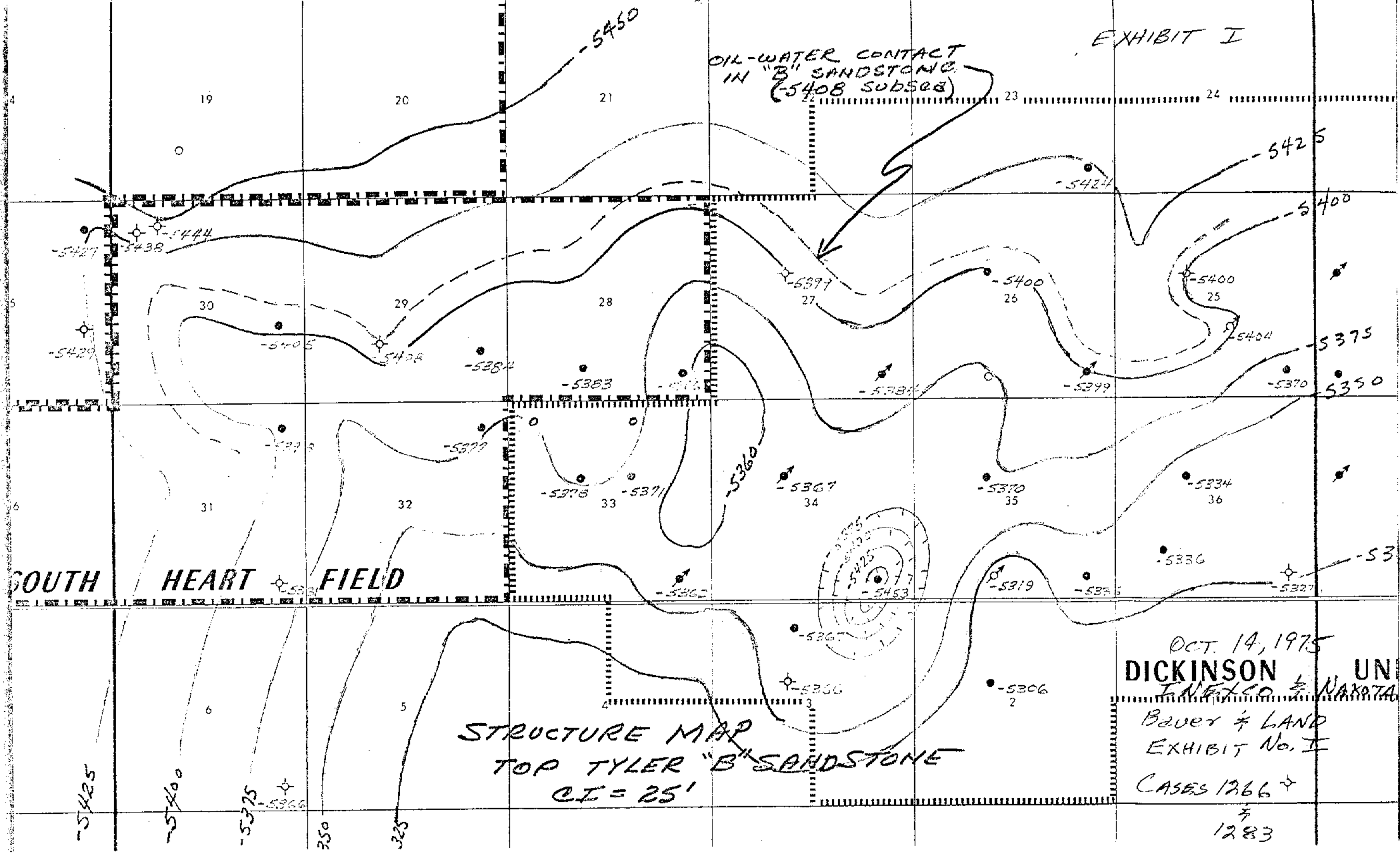
Field DICKINSON HEATH SAND UNIT № 48 Date 9-3-75



BOTTOM HOLE PRESSURE, PSIG

EXHIBIT I

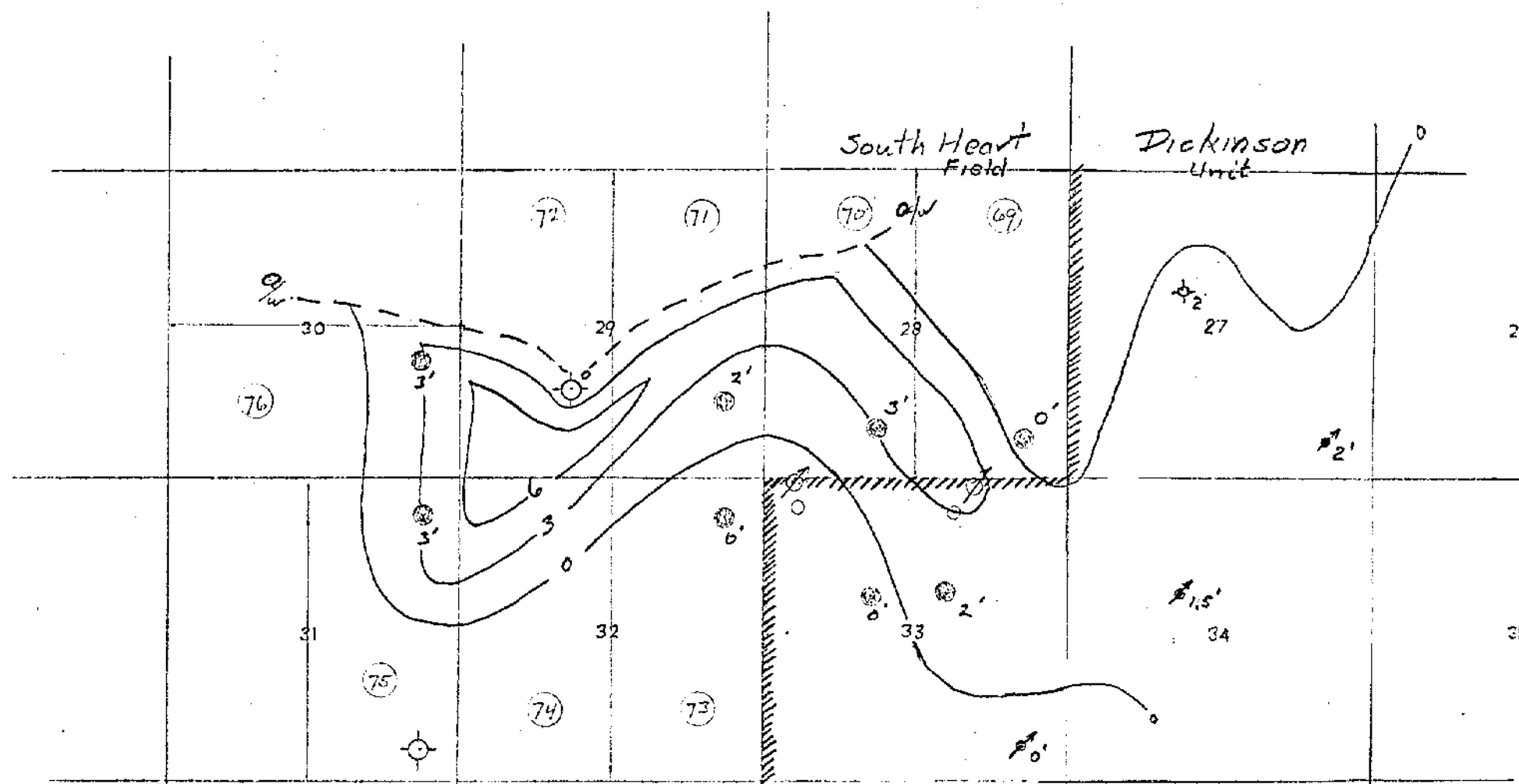
OIL-WATER CONTACT
IN "B" SANDSTONE
(-5408 SUBSOL)



SOUTH HEART FIELD

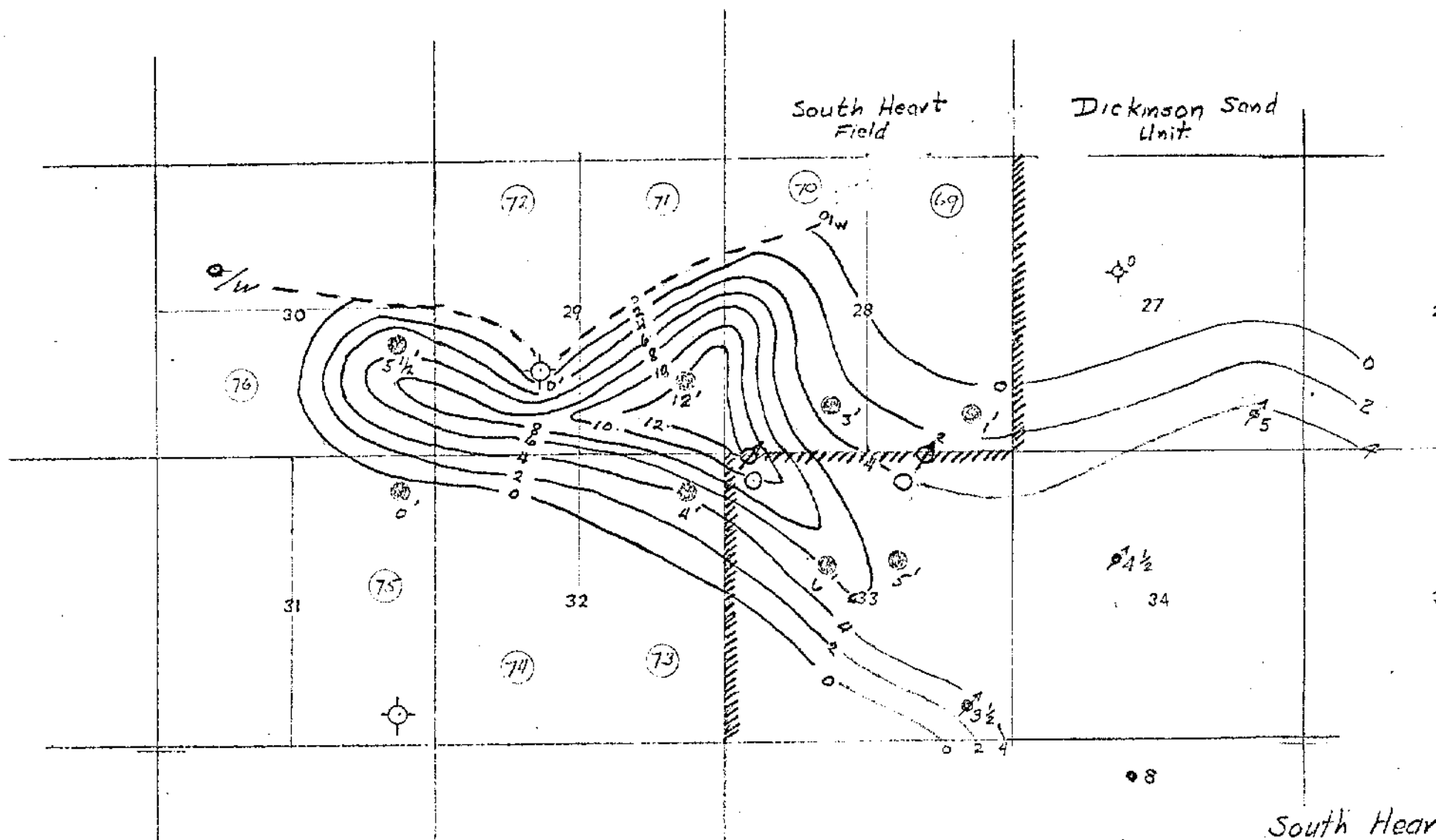
STRUCTURE MAP
TOP TYLER "B" SANDSTONE
CI = 25'

OCT. 14, 1975
DICKINSON UN
IN EXCO & NAKOTA
Bauer & LAND
EXHIBIT No. I
CASES 1266
1283



South Heart
Isopach
Net "A" sand Pay
CI=3' 1"=1 mile

OCT 14, 1975
INEXCO & NAKOTA
BAUER & LAND
CASES #1266 & 1283



South Heart
ISOPACH
Net "B" Sand Pay
Bever $\frac{1}{2}$ Land CI = 2'
CASES #1266 $\frac{1}{2}$ 9/23/75
1283
OCT. 14, 1975

LEASE PRODUCTION HISTORY

DHSU # 48
SWNE 33-140-97

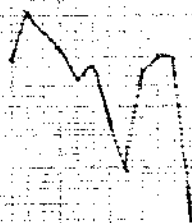
10,000

GROSS MONTHLY PRODUCTION

TO 100,000 TO 10,000 BARRELS

1000

Oil



Negligible Water Production

100

1973 1974 1975

LEASE # 100,000 GROSS PROD - 10,000

AMOUNT

PER BAR

ACCUMULATED PRODUCTION - 10,000

GROSS

PER ACRE

ESTIMATED OIL RESERVES - 10,000

GROSS FUTURE

GROSS ULTIMATE

NET FUTURE

BAUER & LAND

EXHIBIT IV

CASES 1266 & 1283

Oct 14, 1975

LEASE PRODUCTION HISTORY

DHSU # 27
SE NW 33-140-97

10,000

GROSS MONTHLY PRODUCTION

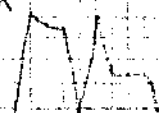
10,000 1,000 0.000 BARRELS

1000

OIL



WATER



100

1973

1974

1975

LEASE PRODUCTION HISTORY

AMOUNT

PER BBL

ACCUMULATED PRODUCTION

GROSS

PER ACFT

ESTIMATED OIL PRODUCTION

GROSS
FUTURE

GROSS
ULTIMATE

NET
FUTURE

10,000

1000

00000000000000000000000000000000

14

1970	1971	1972	1973	1974	1975
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RELEASE UNDER E.O. 14176 OF 05-08-2013

ADOLPH

143 651

ACQUISITION INSTRUCTIONS - PART 1

6502

VER ACCE

ESTIMATED ON-LINE CHARGES--PAID BY AS OF

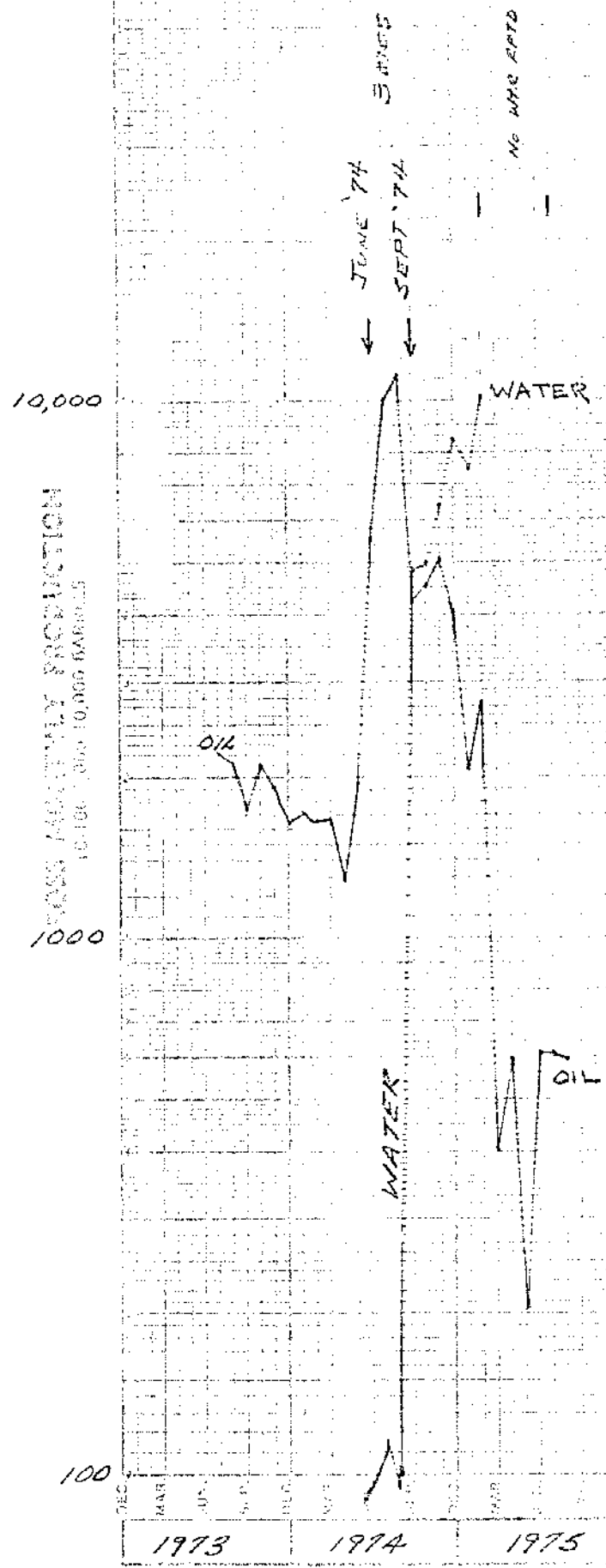
ERG-55
FUTURE

GPOSS
ULTIMATE

THE FUTURE

LEASE PRODUCTION HISTORY

DHSU # 15
SW NE 30-140-96



LEASE PRIME 140-96 CORRELATION

Pr.

AMOUNT	
PER DEL	
LOG/WATER PRODUCTION MONTH	
GROSS	
PER ACRE	
ESTIMATE 140-96 CORRELATION	
GROSS FUTURE	
GROSS ULTIMATE	
FUTURE	

LEASE PRODUCTION HISTORY

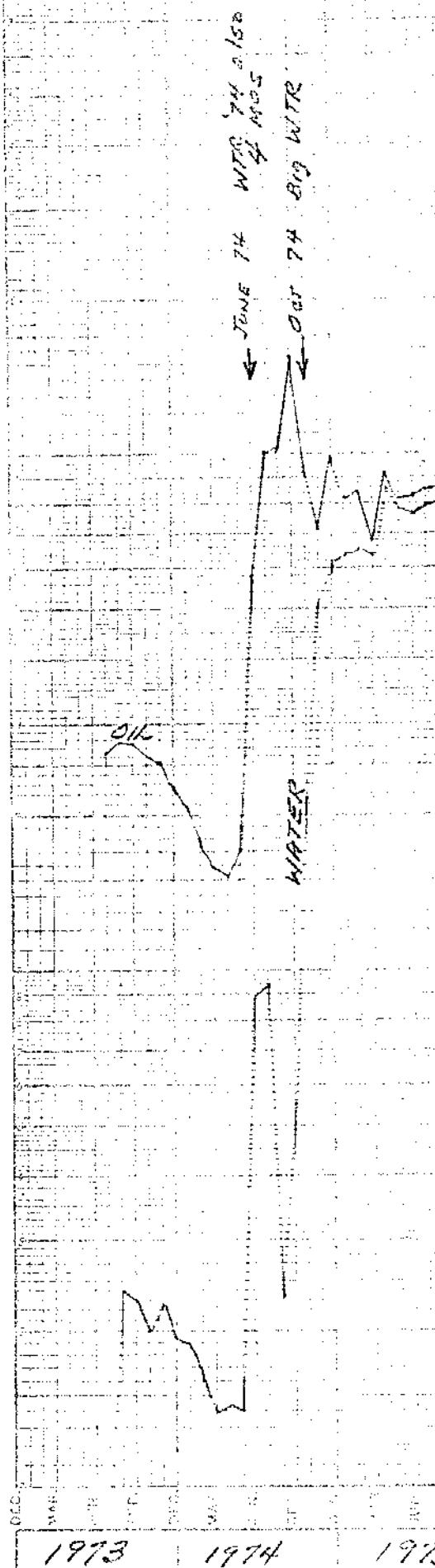
DHSU #23
SW 30-140-96

10,000

GROSS MONTHLY PRODUCTION
10-100-1,000-10,000 BARRELS

1000

100



1973 1974 1975

LEASE FROM 10-140-96-23

AMOUNT

PER BBL

ACQUAVALQUE PRODUCTION

GROSS

PER ACRE

ESTIMATED OIL RESERVE - 1000000

GROSS

FUTURE

GROSS

ULTIMATE

NET

FUTURE

LEASE FROM JUDITH AUSTIN

10,000

10-150 1,000-10,000 DAPI'S

1000

100

Jul 19 '74 ← Jul 19 '74 WTR

WATER

✓
014

072

WATER

[illegible]

GRADE POINT AVERAGE: 3.00

CONTENTS

PER 591

ACCOMPLISH: ACHIEVEMENT, ACCOMPLISHMENT, ACCOMPLISHED

68055

PL2 ACFE

ESTIMATED COST: \$1,000,000.00.

GROSS
FUTURE

G.C.F.S.
DATE

304
FUTURE

LEASE PRODUCTION HISTORY

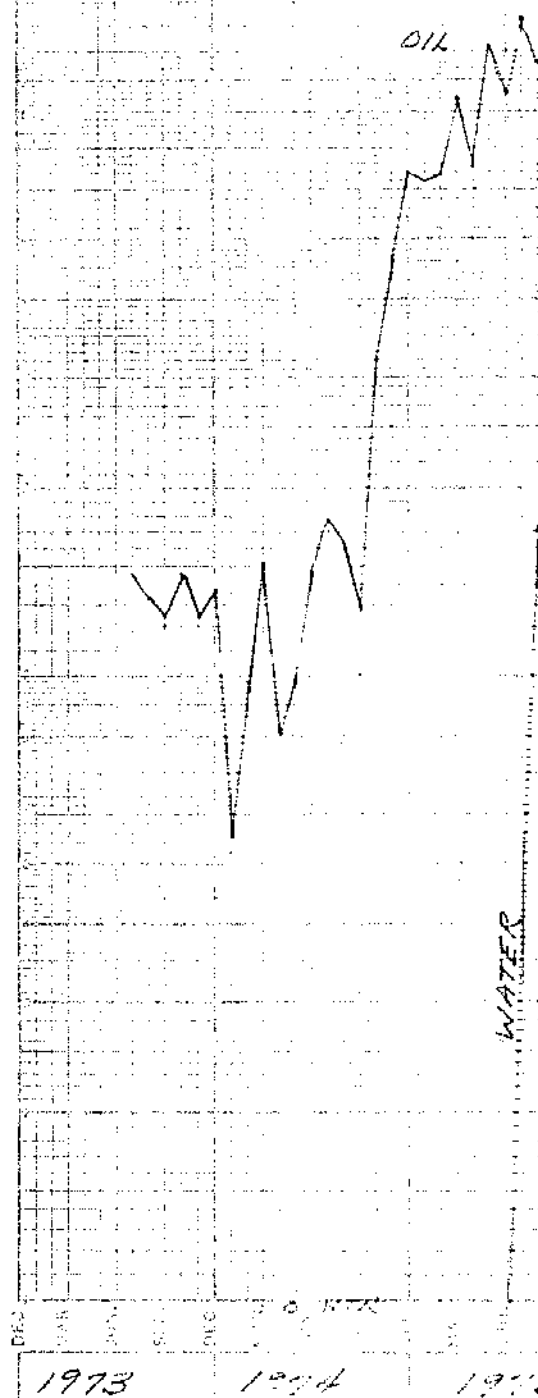
DHSU #29
SE NW 35-140-37

10,000

ROSS MONTHLY PRODUCTION
10 100 1,000 10,000 BARRELS

1000

100



1973 1974 1975

AMOUNT

PER BARREL

ACQUAINTANCE

CHARGE

PER ACRE

ESTIMATED

GROSS
FUTURE

GROSS
ULTIMATE

NET
FUTURE

PRODUCING
WELLS

LEASE PRODUCTION HISTORY

DHSU #38
C 500 36-140-97

10,000

GROSS MONTHLY PRODUCTION
10,000 1,000 100,000 BARRELS

10,000

OIL

11 MMS

JUNE '74

APRIL '75 WTR

WATER

100

DEC

JAN

FEB

MAR

APR

MAY

JUN

JUL

AUG

SEP

OCT

NOV

DEC

JAN

FEB

MAR

APR

MAY

JUN

JUL

AUG

SEP

OCT

NOV

DEC

1973

1974

1975

LEASE PERIOD 12/1/73 TO 11/30/75

ANNUITY

PER ACRE

ACCUMULATED PRODUCTION PER ACRE

GROSS

PER ACRE

ESTIMATE OF PRODUCTION PER ACRE

GROSS
FUTURE

GROSS
ULTIMATE

NET
FUTURE

LEASE PRODUCTION HISTORY

DHSU #39
SE SE 35-140-97

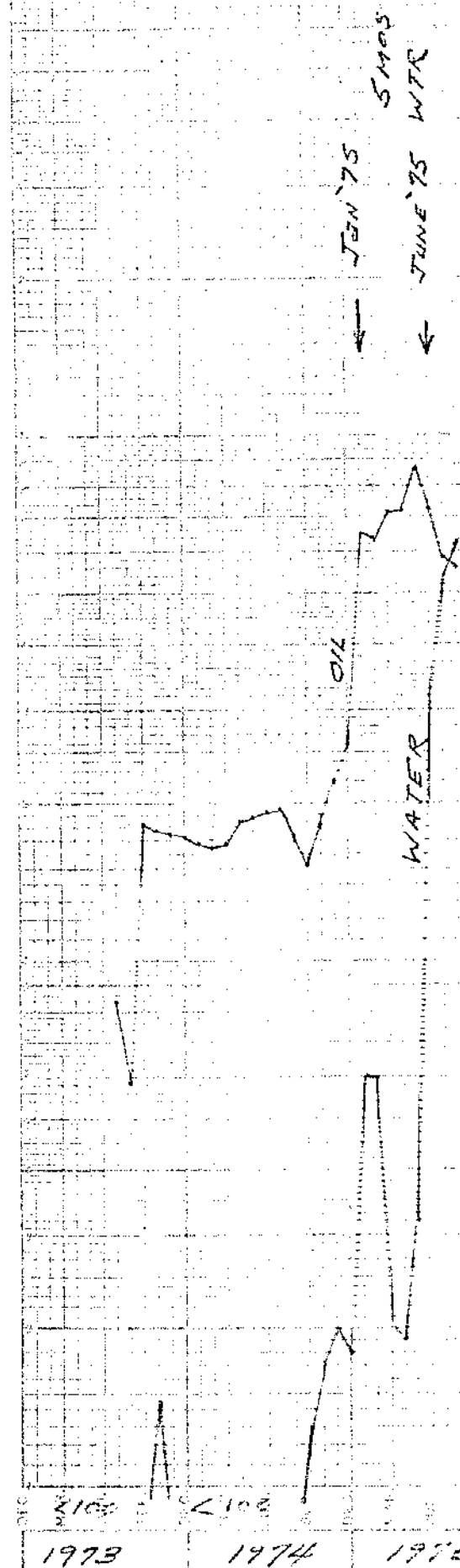
10,000

LESS MONTHLY PRODUCTION

0 100 1000 10,000 BARRELS

1,000

100



LEASE PRODUCTION HISTORY

DH3U #40
SE SE 34-140-97

10,000

HOSE MONTHLY PRODUCTION
OF 100 1,000 10,000 BARRELS

1,000

MARCH 1975

100

D WTS

1973

1974

1975

SE/SE UNITS OF 10,000 BARRELS

AMOUNT

PER BBL

ACCUMULATED PRODUCTION

GROSS

DEP ACPL

ESTIMATED PRODUCTION

GROSS
FUTURE

GROSS
ESTIMATE

NET
FUTURE

1283

LAW OFFICES OF
FLECK, MATHER, STRUTZ & MAYER, LTD.
SUITE 200 PROFESSIONAL BUILDING
P. O. BOX 1436
BISMARCK, NORTH DAKOTA 58501

ERNEST R. FLECK
RUSSELL R. MATHER
WILLIAM A. STRUTZ
THOMAS A. MAYER
WARREN H. ALBRECHT, JR.

TELEPHONE
701-223-6585

September 22, 1975

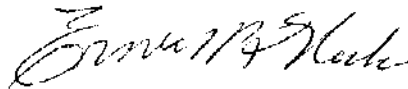
Mr. Gerald VandeWalle
First Assistant Attorney General
State Capitol Building
Bismarck, North Dakota 58505

Dear Mr. VandeWalle:

In re Continental Oil Company
Our File No. 11818

We enclose herewith Application for the above captioned company.
We trust that the matter can be set for hearing before the
Industrial Commission.

Very truly yours,



ERNEST R. FLECK

bs

Enclosure

cc Dr. A. E. Noble w/Enclosure

BEFORE THE INDUSTRIAL COMMISSION
OF THE STATE OF NORTH DAKOTA

IN THE MATTER OF THE APPLICATION)
OF CONTINENTAL OIL COMPANY FOR)
AN ORDER PERMITTING THE DRILLING)
OF CERTAIN INJECTION WELLS ALONG)
THE DICKINSON HEATH SAND UNIT)
BOUNDARY IN STARK COUNTY, NORTH)
DAKOTA.)

A P P L I C A T I O N

COMES NOW the Applicant, Continental Oil Company, and
respectfully alleges:

I.

That Continental Oil Company, a Delaware corporation, authorized to do business in the State of North Dakota, is the Unit Operator for the Dickinson Heath Sand Unit, Stark County, North Dakota.

II.

That Commission Order 1202 approved a statutory type Unit and established administrative procedures and special operating rules for the Dickinson Heath Sand Unit lands on March 13, 1973.

III.

That the unitized lands are being waterflooded successfully. The injected water increases the pressure in the reservoir sands and forces oil to move to low pressure points in the reservoir which are the producing wells.

IV.

That on the west end of the Unit the reservoir pressure has increased at Well No. 27 because of water injection. In time this increased pressure will force oil to migrate further to the west and off of the unitized lands.

V.

That the entire Heath Sand reservoir was not included in the Dickinson Heath Sand Unit as a result of lack of information. Present

1
2 information indicates the oil saturated Heath sands extended beyond the
3 areas mapped by the Dickinson Heath Sand Unit Engineering Committee.

4
5 VI.

6 That Article I, Paragraph 1.7 of Part II of the Plan of Uni-
7 tization for the Dickinson Heath Sand Unit and the stated and implied
8 covenants of the underlying leases require the Unit Operator to pro-
9 tect the Unit Area from drainage by offset operators.

10 VII.

11 That because of the secondary recovery operations through
12 waterflooding and the resulting increase in reservoir pressures, oil
13 cannot migrate onto the unitized lands but, in fact, can only migrate
14 off of unitized lands.

15 VIII.

16 That lands immediately outside the Dickinson Heath Sand Unit
17 have been, or are, subject to Commission Orders 1218, 1224, 1260, 1262,
18 1264, 1301, 1302, and perhaps others.

19 IX.

20 That by Commission Order 1365, Continental Oil Company, the
21 Unit Operator, was prevented from drilling a well inside the Unit
22 boundary, as authorized by Order 1202, which well was located to pro-
23 tect the Unit from drainage by wells directly offsetting the Unit
24 boundary.

25 X.

26 That subsequent to issuance of Commission Order 1365, two
27 meetings between representatives of the Unit Operator and the working
28 interest owners of leases to the west of the Unit were held in
29 Denver on August 19 and September 10, 1975. At the meetings there
30 were discussions concerning expansion of the Unit Area or methods
31 of protecting the Unit Area from migration of oil from the unitized
32 lands.

33 XI.

34 That at the two meetings of the working interest owners,
35 information was exchanged on the reservoir volumes, reserves, current
36

1
2 rates of production and other items. The information exchanged in-
3 dicated that by using the existing Dickinson Heath Sand Unit unitiza-
4 tion formula, the lands outside the Unit Area might not receive their
5 equitable share of Unit participation. Hence, an immediate Unit
6 expansion to the west does not appear to be a solution to the current
7 problem of oil migration.

8 XII.

9 At the second meeting it was tentatively agreed that two
10 injection wells should be located along the north boundary of the
11 Unit in Section 33, Township 140 North, Range 97 West. The wells
12 would be located approximately 400 feet from the west line and 10 feet
13 from the north line; and 3640 feet from the west line and 10 feet from
14 the north line of Section 33, Township 140 North, Range 97 West. The
15 two wells would effectively halt migration of oil from the Unit Area.
16 They will be beneficial in recovering oil by waterflooding which would
17 otherwise remain unrecoverable on the lands outside the Unit boundary.

18 XIII.

19 That the major working interest owners outside the western
20 part of the Unit Area will consider forming a new Unit (South Hart
21 Unit) to include the productive lands outside the Dickinson Heath Sand
22 Unit Area and joining in the drilling of the above two injection wells.
23 In return, Unit Operator will attempt to negotiate a lease line
24 injection agreement, a water sales agreement for pressured water to be
25 injected on other parts of South Hart Unit, and attempt to negotiate
26 a produced water disposal agreement whereby the Dickinson Heath Sand
27 Unit would dispose of produced South Hart Unit water. The above agree-
28 ments will be dependent upon the approval of the working interest
29 owners in the two areas.

30 XIV.

31 Wherefore, to avoid subsurface waste, and to maximize the
32 efficient recovery of oil from the two producing areas, Continental
33 Oil Company, as Unit Operator of the Dickinson Heath Sand Unit, re-
34 spectfully requests that the North Dakota Industrial Commission
35
36

1 authorize the State Geologist to issue permits for two line injection
2 wells at the approximate location stated above. The water injection
3 rates into the two wells will be at rates agreed to by the Operators
4 as conditions require, but initially will not exceed the combined pro-
5 duction rates from wells presently located in Sections 27, 28, 32, and
6 33, Township 140 North, Range 97 West, Stark County, North Dakota.
7

8 Dated this 22nd day of September, 1975.

9 CONTINENTAL OIL COMPANY

10 FLECK, MATHER, STRUTZ & MAYER, Ltd.
11 Attorneys for the Applicant
12 Suite 200, Professional Bldg.
13 P.O. Box 1436
14 Bismarck, ND 58501

Ernest R. Fleck

14 STATE OF NORTH DAKOTA)
15) ss
16 COUNTY OF BURLEIGH)

17 ERNEST R. FLECK, being first duly sworn on oath, deposes and
18 says that he is the attorney for the Applicant herein named, that he
19 has read the above and foregoing Application, knows the contents
20 thereof and is within the knowledge of the affiant, and that the same
21 is true to the best of his knowledge, information and belief.

22 *Ernest R. Fleck*
23 ERNEST R. FLECK

24
25 Subscribed and sworn to before me this 22nd day of September, 1975.

26
27 *Carol Solberg*
28 Carol Solberg, Notary Public
29 Burleigh County, North Dakota
30 My Commission Expires: 6-25-81
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