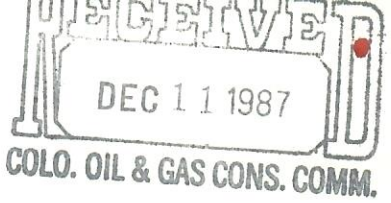


BEFORE THE OIL AND GAS CONSERVATION COMMISSION
OF THE STATE OF COLORADO

APPLICATION OF LOGAN COUNTY WATER DISPOSAL COMPANY PURSUANT TO RULE 324 B. OF THE COMMISSION TO DESIGNATE AS AN EXEMPT AQUIFER THE CRETACEOUS "O" SAND FORMATION WITHIN THE N/2 SECTION 7, TOWNSHIP 9 NORTH, RANGE 52 WEST, LOGAN COUNTY, COLORADO	))))))

Logan County Water Disposal Company, 1700 Broadway, Suite 2308, Denver, Colorado 80290, a Colorado Corporation, does herewith make this application to the Oil and Gas Conservation Commission of the State of Colorado under Rule 324 B. of the Commission in conjunction with the Consolidated Permits Regulations 40 C.F.R. 146.04 and 144.7. This application is in connection with filings of application pursuant to rule 326 seeking approval for "J" water disposal injection into the Cretaceous "O" Sand formation of both the DuBois #2 well in the SE NE NW and Arthur Sindt #7 well in the SE NE of Section 7, T9N-R52W, Logan County, Colorado.

I

This application is in connection with the plan to establish additional water disposal injection facilities needed to replace current 600 BWPD surface pit water disposal located within S/2 SW/4 SE/4 Section 6, T9N-R52W at the wellsite of the Arco-Sindt #6-15 well operated by Lewis & Clark Exploration Company. This well is within the Padroni West field which produces oil with large volumes of water from both Cretaceous "J" and "O" sand formations. Additional gathering and disposal of water from other field operators is contemplated. The proposed injection of waters into the currently produced "O" sand will moderate the decline of pressure in this producing reservoir and may provide economic benefit to field owners.

II

Pursuant to the criteria requirements of Rule 324 B., applicant submits the following:

1. The "O" sand formation does not currently serve as a source of drinking water and

2. The "O" sand formation cannot now and will not in the future serve as a source of drinking water because a) it is a commercially productive oil reservoir in this region, and b) it is located at a subsurface depth of approximately 5000 feet making the recovery of water for drinking water economically impractical;

3. The total dissolved solids content of the ground water is in excess of 5900 milligrams per liter and is therefore not reasonably expected to supply a public water system.

III

In support of the required criteria, applicant submits the following:

1. Exhibit "A" Plat Map, showing boundary of proposed exempted area, all water wells of record within the area of the proposed exempted aquifer and wells which have produced oil from the "O" sand reservoir in the region of the proposed exempted area.

2. Exhibits "B" and "C", which are photocopies of analyses of "O" sand formation waters within the proposed exempted area. These analyses indicate total dissolved solids content of the waters to be 5926 and 5979 milligrams per lier respectively.

3. Exhibit "D" is a 1:24,000 scale topographic map of the region showing the boundary of the proposed exempted area.

4. Exhibit "E" summarizes the water wells of record within the proposed exempted area and adjacent areas.

5. Exhibit "F" is a core analysis and description of the "O" sand within the Proposed Exempted Area.

6. The Proposed Exempt Aquifer is described as follows:

Name of formation of aquifer is the "O" sand of oil industry terminology also referred to as the Lytle formation. The "O" sand is of Cretaceous age and a member of the Dakota Group of formations.

The "O" sand lithology is described from a core taken in the #2 DuBois Well (SE NE NW Sec 7) of the 54 ft interval 4996-5040 ft as a clean grey fine-grain sandstone with typical

porosity ranging from 18 to 22% and permability of 150 to 600 millidarcies (see attached Exhibit "F").

ithin the Proposed Exempted Area, being the N/2 Section 7, T9N-R52W consisting of 320 acres, the "O" sand is 40 to 50 ft thick occuring at subsurface depths between 4950 and 5100 ft. Total reservoir volume of "O" sand within the Proposed Exempted Area using an estimated acerage sand thickness of 45 ft is approximately 14,400 acre feet.

Over 3000 ft of impermeable Cretaceous Pierre shale separate and confine the formation waters of the "O" sand from the surface ground water aquifers of the drinking water sources of this area.

7. Exhibit "G" is a resistivity log of the DuBois #2 well from the base of surface casing to the total depth which penetrates the "O" sand formation. This well is located within the Proposed Exempted Area and is representive of the subsurface geologic formations and conditions of the area.

WHEREFORE, Applicant respectfully requests that the Commission grant its application for designation of the "O" sand as an exempt aquifer within the Proposed Exempt Area.

Respectfully submitted,

LOGAN COUNTY WATER DISPOSAL COMPANY

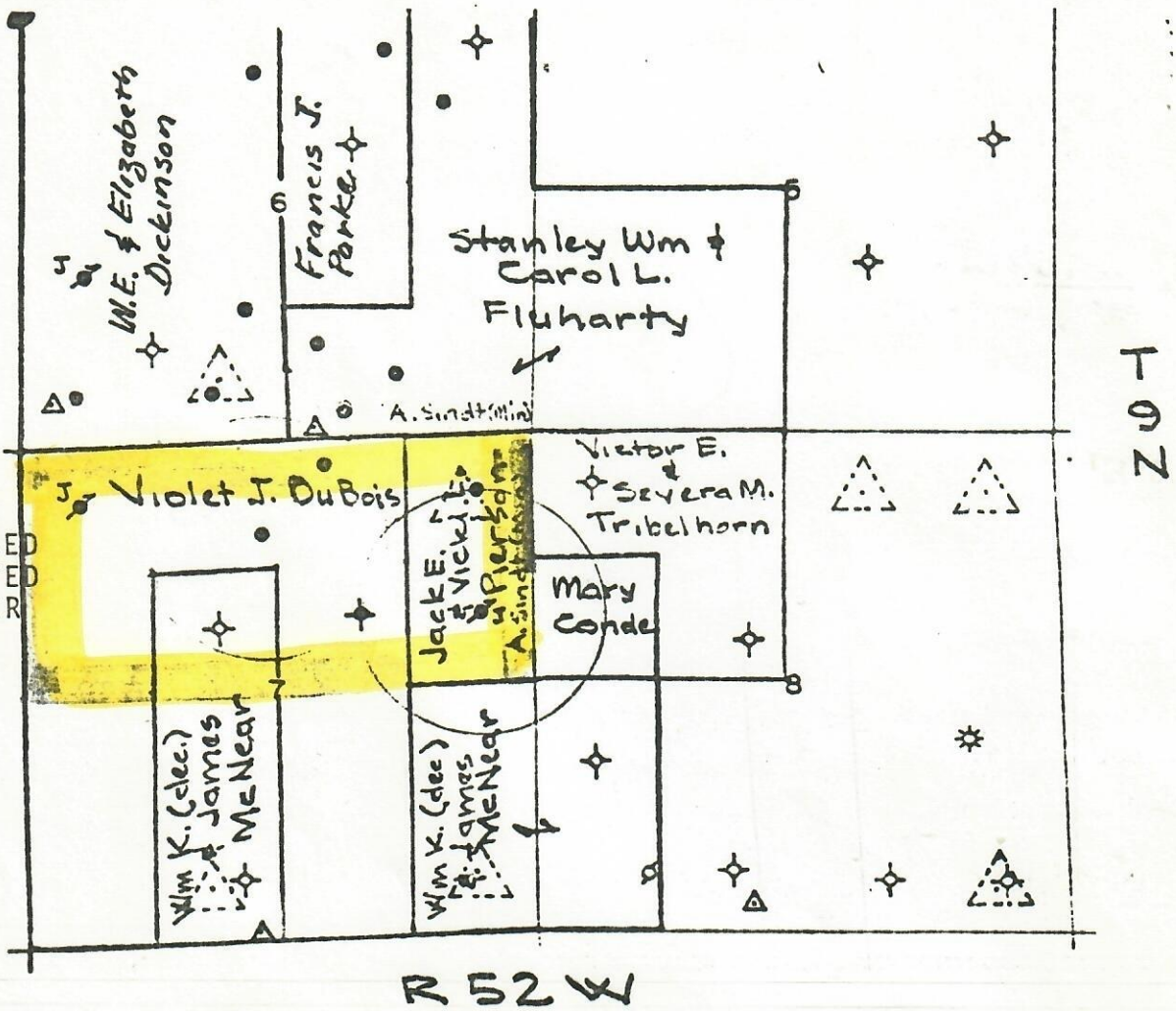
By: William M. Griffith

William M. Griffith
President
1700 Broadway, Suite 2308
Denver, Colorado 80290
(303) 861-7055

MD-08 041A

EXHIBIT "A"

Plat Showing Disposal Wells, Oil & Gas Wells,
Water Wells and Ownership
With Proposed Exempted Aquifer Area



Legend:

Water Wells
- Specific location
- General location

Oil & Gas Wells
- Oil
- Gas
- Dry Hole
- abnd

Disposal Wells showing zone

WEST PADRONI FIELD AREA
LOGAN COUNTY, COLORADO

Map Scale 1:24,000

SINCLAIR RESEARCH LABORATORIES, INC
TULSA OKLAHOMA

CODE NO 8869801 8869802 8869803 8869804 8869805 8869806 8869807 8869808

Company SINCLAIR OIL GAS COMPANY
Well No. 7
Lease Name ARTHUR SINDT
Field WEST PADRONI
County LOGAN
State COLORADO
Description of Sample SAMPLED 3-27-61.

Date 04-10-61 Report No S 8698
Location SEC 7-9N-52W
Formation DAKOTA /0/ SAND
Depths 5012 FT
Type of Sample PRODUCED WATER
Analyst SRLI JMK

FILE NO. P61-108

St. No. 5 5 5 5 5 5 5 5

	CONSTITUENTS	MPL	MEQ	%MEQ	% TS
8869811	ALKALIES				
8869812	Potassium	N.A.			
8869813	Sodium	2017	87.71	49.28	34.04
8869814	Lithium	N.A.			
8869815		N.A.			
8869816		N.A.			
8869817					
8869818	ALKALINE EARTHS				
8869819	Calcium	19	.95	.53	32
8869820	Magnesium	4	.33	.19	07
8869821	Barium	N.A.			
8869822	Strontium	N.A.			
8869823	Manganese	N.A.			
8869824	Iron	N.A.			
8869825	Aluminum	N.A.			
8869826	Boron	N.A.			
8869827		N.A.			
8869828					
8869829	WEAK ACIDS				
8869830	Carbonate				
8869831	Bicarbonate	1576	25.83	14.51	26 59
8869832	Hydroxide				
8869833		N.A.			
8869834		N.A.			
8869835	STRONG ACIDS				
8869836	Sulphate	271	5.66	3.18	4 57
8869837	Chloride	2039	57.50	32.31	34 41
8869838	Bromide	N.A.			
8869839	Iodide	N.A.			
8869840	Flouride	N.A.			
8869841	Phosphate	N.A.			
8869842		N.A.			
8869843	TOTAL SOLIDS	5926			
8869844					
8869845	Sodium Chloride Equivalent	4644			
8869846	Chloride Salinity as NaCl	3361			
8869847					

PROPERTIES of REACTION in Percent

Primary Salinity	70.980
Secondary Salinity	.
Primary Alkalinity	27.580
Secondary Alkalinity	1.440
Chloride Salinity	91.040
Sulphate Salinity	8.960
Tertiary Salinity	.

HYPOTHETICAL COMBINATION

	MPL
$Mg(OH)_2$	.
$Ca(OH)_2$	.
NaOH	.
$MgCO_3$	.
$CaCO_3$	.
$Mg(HCO_3)_2$	24.072
$Ca(HCO_3)_2$	76.851
$MgSO_4$	.
$CaSO_4$	.
Na_2SO_4	400.749
Na_2CO_3	.
$NaHCO_3$	2062.687
$MgCl_2$	.
$CaCl_2$	.
NaCl	3361.475

pH	7.400
Resistivity: Ohm-meters at °F	76. 955
Resistivity: Ohm-meters at °F	.
Resistivity: Calculated	1.227
Specific Gravity at °F	1.007 60.
$\frac{Ca^{++}+Mg^{++}}{Na^{+}+K^{+}}$	.011

WATER ANALYSIS PATTERN

SEMILOGARITHMIC PLOT OF MEQ VALUES

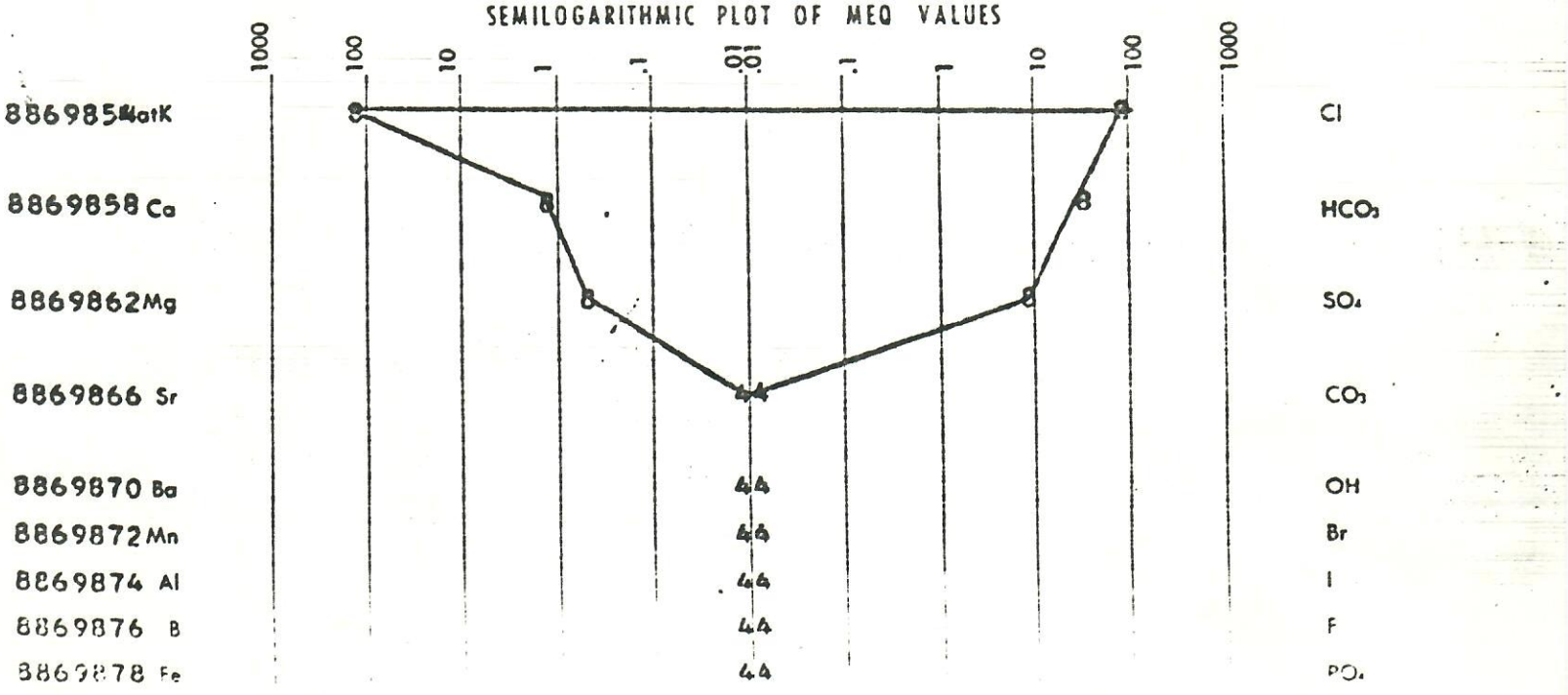


EXHIBIT C

DENVER DIVISION LAB
HALLIBURTON SERVICES
BOX 1510
EVANSVILLE, WY 82636

DATE: MAY 7,1986

TO: BOB FIELDING
- HALLIBURTON SERVICES
- DENVER, CO

REPORT NO: W86-0254

COMPANY: ANDERMAN-SMITH OPERATING

DATE REC'D: MAY 6,1986

WELL NO: DUBOIS UNIT

FORMATION: [redacted]
O Sand

LOCATION: SEC7-9N-52W
LOGAN CO,CO

SPECIFIC GRAVITY	1.002		REMARKS:
PH	7.8		OIL GRAV: 15.8 API @ 60 F.
IRON (FE)	5	MPL	
POTASSIUM (K)	13	"	
SODIUM (NA)	1935	"	
CALCIUM (CA)	10	"	
MAGNESIUM (MG)	7	"	
CHLORIDES (CL)	1706	"	
SULFATES (SO4)	<10	"	
CARBONATES (CO3)	NIL	"	
BICARBONATES (HCO3)	2303	"	
TDS	5979	"	
RESISTIVITY	1.8		OHMS AT 66 DEGREES F

CC: FILE
RANDY YEAGER

RESPECTFULLY SUBMITTED,

BY: A.A. KERNS

EXHIBIT D

Topographic Map Showing Boundary of

Proposed Exempted Aquifer Area

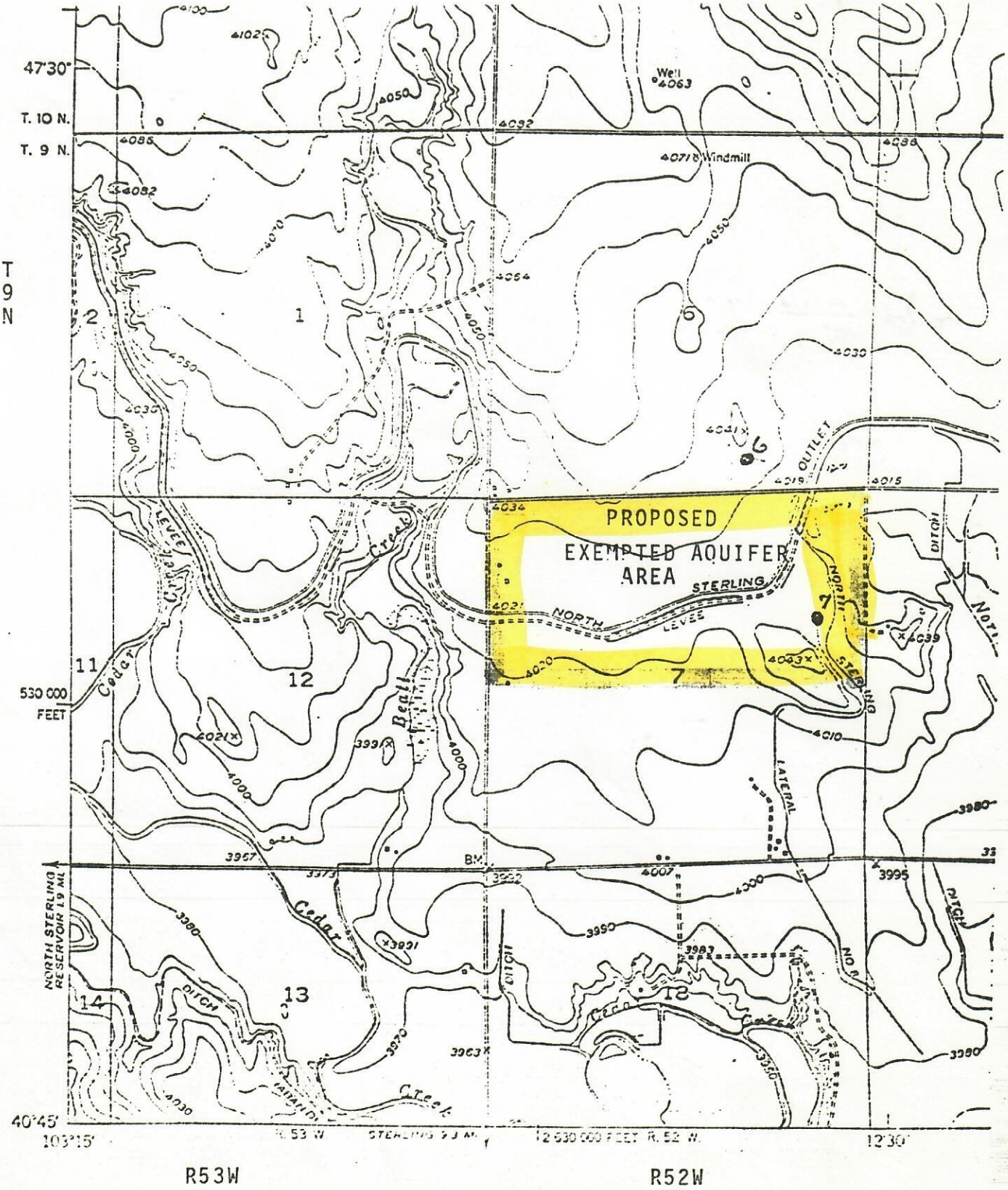


EXHIBIT "E"

Summary of Water Wells of Record
Within Sections 6, 7 and 8 of T9N-R52W
Logan County, Colorado

Well Location	Well Depth	Tested Rate	Owner	Date
Section 6:				
a) SE SW	250'	15 gal/min	Dickinson	1967
b) 502 ft. fsl and 370 ft. fwl	41'	15 gal/min	Dickinson	1976
c) 150 ft. fsl and 2222 ft. fel	320'	10 gal/min	Fluharty	1983
Section 7:				
d) SE SW	215'	10 gal/min	McNear	1958
e) SE SE	266'	7 gal/min	McNear	1964
*f) NE NE	245'	7 gal/min	Sindt	1965
g) 100 ft. fsl and 2500 ft. fwl	50'	30 gal/min	McNear	1983
Section 8:				
h) SE SE	310'	30 gal/min	Tennant	1964
i) NE NE	40'	3 gal/min	Rieke	1964
j) NW NE	60'	1 gal/min	Rieke	1967
k) 300 ft. fsl and 2240 ft. fwl	250'	10 gal/min	Gillham	1976

*Well located within Proposed Exempted Area

MD-08 042A

EXHIBIT F
Page 1 of 2

CORE LABORATORIES INC
Petroleum Reservoir Engineering
DALLAS, TEXAS

Company W. C. MC BRIDE, INC. Formation "O" SAND Page 1 of 2
Well # 2 DUBOIS Cores DIAMOND CONVENTIONAL File RP-2-2388
Field WEST PADRONI Drilling Fluid SOAP OIL EMULSION Date Report 8/17/60
County LOGAN State COLORADO Elevation 4035' KB Analysts DOUG INNES
Location SE NE NW 7-9N-52W Remarks SERVICE NO. 8

CORE ANALYSIS RESULTS

(Figures in parentheses refer to footnote remarks)

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYS HORIZONTAL	PERMEABILITY MILLIDARCYS VERTICAL	POROSITY PERCENT	RESIDUAL SATURATION OIL % VOLUME	RESIDUAL SATURATION OIL % PORE	RESIDUAL SATURATION TOTAL WATER % PORE	PROBABLE PRODUCTION	REMARKS
1	4996-97	247	44	20.5		32.2	39.0	(2)	Sandstone, gray, fine grain, shale.
2	4997-98	495	480	18.5		29.8	41.0	(2)	Sandstone, gray, fine grain, clean.
3	4998-99	540	525	19.5		29.8	39.0	(2)	Sandstone, gray, fine grain, clean.
4	4999-5000	279	252	18.8		30.8	40.5	(2)	Sandstone, gray, fine grain, clean.
5	5000-01	240	263	18.5		29.2	50.2	(2)	Sandstone, gray, fine grain, clean.
6	5001-02	419	388	19.4		27.8	48.0	(2)	Sandstone, gray, fine grain, clean.
7	5002-03	341	323	20.2		27.8	39.6	(2)	Sandstone, gra , fine grain, clean.
8	5003-04	211	162	20.9		32.0	47.8	(2)	Sandstone, gray, fine grain, clean.
9	5004-05	386	329	18.4		30.4	38.6	(2)	Sandstone, gray, fine grain, clean.
10	5005-06	148	73	18.6		31.8	38.7	(2)	Sandstone, gray, fine grain, shale.
11	5006-07	327	296	15.9		23.3	30.2	(2)	Sandstone, gray, fine grain, clean.
12	5007-08	96	73	11.9		23.5	21.8	(2)	Sandstone, gray, fine grain, shale, Vertical Fracture.
13	5008-09	22	13	14.6		25.3	22.6	(2)	Sandstone, gray, fine grain, shale.
14	5009-10	93	96	11.5		22.6	21.8	(2)	Sandstone, gray, fine grain, clean, Vertical Fracture.
15	5010-11	112	36	17.8		20.2	41.5	(2)	Sandstone, gray, fine grain, shale.
16	5011-12	155	143	15.6		23.9	27.8	(2)	Sandstone, gray, fine grain, clean.
17	5012-13	370	352	20.1		30.8	32.4	(2)	Sandstone, gray, fine grain, clean.
18	5013-14	383	341	20.1		32.3	34.4	(2)	Sandstone, gray, fine grain, clean.
19	5014-15	383	320	20.5		30.2	31.6	(2)	Sandstone, gray, fine grain, clean.
20	5015-16	234	126	17.4		32.2	28.7	(2)	Sandstone, gray, fine grain, slightl shaly.
21	5016-17	85	69	17.1		36.8	28.0	(2)	Sandstone, gray, fine grain, clean.
22	5017-18	157	124	18.1		31.5	31.0	(2)	Sandstone, gray, fine grain, clean.
23	5018-19	298	276	19.7		30.0	27.4	(2)	Sandstone, gray, fine grain, clean.
24	5019-20	291	252	20.8		31.2	29.8	(2)	Sandstone, gray, fine grain, clean.
25	5020-21	234	191	21.4		29.9	31.3	(2)	Sandstone, gray, fine grain, clean.
26	5021-22	184	146	18.6		30.1	33.4	(2)	Sandstone, gray, fine grain, clean.
27	5022-23	182	148	18.3		30.1	30.1	(2)	Sandstone, gray, fine grain, clean.
28	5023-24	227	173	18.9		32.8	32.8	(2)	Sandstone, gray, fine grain, clean.
29	5024-25	415	363	17.9		25.2	32.4	(2)	Sandstone, gray, fine grain, clean.
30	5025-26	435	425	18.9		29.6	30.1	(2)	Sandstone, gray, fine grain, clean.
31	5026-27	205	187	18.6		32.8	37.6	(2)	Sandstone, gray, fine grain, clean.
32	5027-28	274	238	17.9		32.9	39.1	(2)	Sandstone, gray, fine grain, clean.
33	5028-29	261	211	20.1		27.9	45.8	(2)	Sandstone, gray, fine grain, clean.
34	5029-30	298	280	17.8		27.0	52.8	(2)	Sandstone, gray, fine grain, clean.
35	5030-31	419	318	22.5		24.9	55.2	(2)	Sandstone, gray, fine grain, clean.
36	5031-32	560	575	20.1		18.9	57.1	(2)	Sandstone, gray, fine grain, clean.

NOTE
(1) REFER TO ATTACHED LETTER.
(2) [illegible] COMPLETE CORE RECOVERY - INTERPRETATION RESERVED
(3) [illegible] OFF LOCATION ANALYSES AND INTERPRETATION OF REE[illegible]

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Company W. C. MC BRIDE, INC. Formation "O" SAND Page 2 of 2
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CORE ANALYSIS RESULTS

(Figures in parentheses refer to footnote remarks)

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYS HORIZONTAL	PERMEABILITY MILLIDARCYS VERTICAL	POROSITY PERCENT	RESIDUAL SATURATION OIL % VOLUME	RESIDUAL SATURATION OIL % PORE	RESIDUAL SATURATION TOTAL WATER % PORE	PROBABLE PRODUCTION	REMARKS
37	5032-33	187	108	21.3	18.8	55.0		(2)	Sandstone, gray, fine grain, clean, Vertical Fracture.
38	5033-34	660	419	17.8	21.9	44.4		(2)	Sandstone, gray, fine grain, clean, Vertical Fracture.
39	5034-35	510	480	13.8	18.9	58.0		(2)	Sandstone, gray, fine grain, clean.
40	5035-36	760	780	17.2	15.2	65.3		(2)	Sandstone, gray, fine grain, clean.
41	5036-37	169	74	16.8	22.0	46.5		(2)	Sandstone, gray, fine grain, clean.
42	5037-38	216	189	22.0	17.3	44.6		(2)	Sandstone, gray, fine grain, clean.
43	5038-39	510	532	21.8	11.5	47.8		(2)	Sandstone, gray, fine grain, clean.
44	5039-40	630	546	16.4	9.8	47.7		(2)	Sandstone, gray, fine grain, clean.

NOTE
(*) REFER TO ATTACHED LETTER. (2) OFF LOCATION ANALYSES—NO INTERPRETATION OF RESULTS
(1) INCOMPLETE CORE RECOVERY—NO INTERPRETATION RESERVED

EXHIBIT G

A COPY OF DUBOIS #2 WELL
RESISTIVITY LOG
TO BE ATTACHED TO
FINAL APPLICATION