1R - 164

REPORTS

DATE:

3 - 10 - 1980

CASE - 4336

QUAIL RIDGE FIELD

N.M.O.C.C. - HOBBS, N.M.
APRIL 1970 — J.W.R.
+ ADDITION 8/12/76

Docket No. 10-70

DOCKET: REGULAR HEARING - WEDNESDAY - APRIL 15, 1970

OIL CONSERVATION COMMISSION - 9 A.M. - THE HOLIDAY INN, 200 SOUTH LINAM, HOBBS, NEW MEXICO

CASE 4336: Application of Byron McKinight for an exception to Order No. R-3221, as amended, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an exception to Order No. R-3221, as amended, which order prohibits the disposal of water produced in conjunction with the production of oil or gas on the surface of the ground in Lea, Eddy, Chaves, and Roosevelt Counties. Said exception would be for applicant's lease comprising all of Section 19, W/2 Section 20, NW/4 Section 29, and NW/4 Section 30, Township 19 South, Range 34 East, undesignated Yates-Seven Rivers gas pool, Lea County, New Mexico. Applicant seeks authority to dispose of salt water produced by wells on said leases in unlined surface pits on the leases.

RECOMMENDATIONS

I, personally, strongly recommend that Case 4336 be denied due to the following:

1) Three fresh water aquafers exist immediately west, south and east of the area of requested exception.

2) All three aquafers are fresh and usable for household or domestic purposes.

3) The upper and lower aquafers probably extend under the area of requested exception.

4) The recharge area of the upper aquafer is from the sand dune areas, partly from the same area in which the produced water would be put into open pits.

5) There is no indication (in drilling records) of any impervious zones which would prevent produced waters from going into the upper water aquafer or migrating to this aquafer.

6) With the completion of the gas pipeline additional drilling is planned for the area. Additional areas of exception will probably be requested if the present requested exception is granted.

7) There are several P & A wells in the immediate area which can be converted to SWD wells and there is a SWD well nearby.

8) The possible contamination of the upper aquafer by granting the exception could cause a great hardship on the rancher, Mr. Smith.

Respectfully submitted,

John W. Runyan
Geologist, District I
New Mexico Oil Conservation Commission

JWR:fd

GEOLOGY OF AREA

The area in and around the boundary of application for exception to the No-Pit Order, in Township 19 South, Range 34 East, consists of large sand dunes with the exception of the area just south and west (refer to map) of Mr. Mark Smith's house which is a flat area having no sand dunes.

The sand dunes of this area rest directly upon the Triassic-red beds, and there isn't any impervious zones near the surface (indicated by drilling records), such as the caliche beds on top of the caprock or clay layers. The flat area consists of a very sandy/clay soil resting directly on the red beds.

The Triassic formation dips gently to the south-southeast in this area, which is normal regional dip. There are no surface structural highs in this area (except for dunes).

The Triassic formation is composed of a sandy/clay - red bed, very porous. The upper water aquafer is probably recharged from the sand dunes which catch and prevent water run-off during rainy periods.

GROUND WATER

In referring to the map, there are three separate water sands in the immediate area of the Quail Ridge Field, with their known locations being west, south, southeast and east of the area of application for exemption of the no-pit order. It is very possible that the upper and lower fresh water sands extend under the area of application.

The upper water sand is of good enough quality for household use, and Mr. Mark Smith does use it. The other two water zones are good enough for cattle and perhaps for some domestic use.

Again, the probable recharge area for the upper water zone is through the sand dunes, the same sand dunes in which McKnight proposes to dispose of his produced water.

Listed below are the wells which encountered or produced from the water aquafers.

1. Upper water sand/aquafer:

   a). Windmill, Mr. Smith's house - Unit H, Section 26, T19S, R33E - household and domestic use. TD 98 feet, water level 91 feet, chlorides 298 PPM, specific conductance 2560.

   b) Windmill - Unit B, Section 31, T19S, R34E - TD 120 feet, chlorides 289 PPM, specific conductance 2290.

   c) Windmill - Unit E, Section 31, T19S, R34E - TD 66 feet, water level 58 feet, chlorides 717 PPM, specific conductance 4420.
   This mill is abandoned due to rods and pump in hole, due to broken rod.

   d) Windmill - Unit P, Section 4, T20S, R34E - used for cattle, shallow well, chlorides 1450 PPM, specific conductance 9890.

2. Middle water sand/aquafer:

   a) Fresh water well - drilled for rig water, Unit M, Section 16, T19S, R34E - TD 408 feet, water level 360 feet, reported by Gulf Oil to be fresh.

   b) Water sand encountered in P & A well, when drilled, Unit O, Section 33, T19S, R34E. Water sand at 280 - 290 feet. Reported on C-105.

3. Lower water sand - Santa Rosa:

   a) Encountered in P & A well, when drilled, Unit F, Section 28, T19S, R34E. Depth 808 - 860 feet. Reported on C-105.

   b) Encountered in P & A well, when drilled, Unit N, Section 28, T19S, R34E. Depth 830 to 850 feet. Reported on C-105.

   c) Encountered in P & A well, when drilled, Unit L, Section 30, T19S, R34E. Depth 785 to 810 feet. Reported on C-105.

PRODUCED WATER

The amount of produced water as reported on four of the six wells inside of the area of application is 289 barrels of water per day. Most of these wells are presently shut-in awaiting completion of a gas pipeline now under construction.

Outside the application area there are six wells capable of producing. Their reported water production is 194 BWPD, most of which is being disposed of in Atlantic Richfield's SWD well located in Unit B, Section 28, Township 19 South, Range 34 East.

The amounts of reported water are very low because these are original completion tests and not actual production figures.

It is reported that many more Yates gas wells will be drilled in the area (particularly by Me-Tex) when the gas line is complete.

The nature of the Yates gas wells are such that they load up with water and condensate and a pump jack is necessary to keep the gas wells producing.

The chloride content of the produced water of the Yates gas wells is unknown because they have all been shut-in awaiting the pipeline, and no sample has been available.

COMMUNICATION

Personal contact with the rancher, Mr. Mark Smith, brought out the following information.

1. The shallow surface, fresh water sand is not a large aquafer of unlimited supply, such as the Ogallala, but does cover the area in question.

2. If this upper water becomes contaminated, he (Mr. Smith) would be practically ruined. He would have to haul in water or pipeline it from the caprock or drill to the Santa Rosa water aquafer and pump it for his personal use and cattle. Any method would be very expensive for an individual.

ADDITION

Aug. 12, 1976

MEMO TO: Mr. Dan S. Nutter
Oil Conservation Commission
Santa Fe, New Mexico

FROM: John W. Runayn
Oil Conservation Commission
Hobbs, New Mexico

DATE: August 11, 1976

SUBJECT: MARK SMITH RANCH

I took two water samples from Mr. Smith's windmill at ranch house and one from Pennsoil's lease. One sample was sent to United Chemical of Hobbs for complete analysis and I ran one sample from windmill and the sample from Pennsoil's lease. Results are attached.

In an interview with Mr. Smith and his wife, he stated that the water from the windmill at the house is used for both stock and house use. They do bring in water for drinking, but the windmill water is used for all other household uses, such as washing, dishes, bathing, etc.

He also stated that in the past he has drilled for water in all directions from the ranch house for additional outlying water for his cattle but has met with negative results.

He stated that if the water at his house becomes contaminated where his cattle can not drink it, and they can not use it, he would be practically ruined. The only source of water would be to run a pipe line to the caprock, six miles to the northeast in order to get good water, and this would be extremely expensive, a prohibitive cost to him.

In April 1970, a report was made by me for Case No. 4336 and the results of this report has not changed appreciably.

(1) The water at the ranch house is a "perched water" situation.
(2) The local geologic structure of the area as noted from "The Ground Water and Geology of Lea County - Bulletin 6" shows that the near surface formations tilt down to the west due to the slumping that created Laguna Plata and Gatuna. Water that is put into a pit on the Pennzoil lease would move in the direction of Mr. Smith's house, instead of the normal southeast direction (regional dip).
(3) Also, note there is a SWD well located in Section 28, T19S, R34E, less than 2 miles from Pennzoil lease, east. There are now several P&A wells in the area located much closer to the Pennzoil lease that might have SWD possibilities.

I feel that any water put into pit(s) northeast of the ranch house could possibly cause eventual contamination of the local "perched water" in the area. The sand dune area around Mr. Smith's house is the main source recharge to the local water source during periods of rainfall.

Respectfully submitted,

John W. Runyan, Geologist District I

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UNITED CHEMICAL CORPORATION

OF NEW MEXICO

601 NORTH LEECH
P.O. BOX 1499
HOBBS, NEW MEXICO
88240

PHONE
(505)
393-7751

TO: New Mexico Oil Conservation

DATE 8-11-76

PLANT Mark Smith Ranch

REMARKS AND RECOMMENDATIONS

Windmill at house

SAMPLE SOURCE							
pH	7.8						
Total Hardness as $CaCO_3$ (PPM)	624						
Calcium as $CaCO_3$ (PPM)	332						
Magnesium as $CaCO_3$ (PPM)	292						
Total Phosphate as PO_4 (PPM)	0						
Orthophosphate as PO_4 (PPM)	0						
Polyphosphate as PO_4 (PPM)							
M Alkalinity as $CaCO_3$ (PPM)	212						
P Alkalinity as $CaCO_3$ (PPM)	0						
Chloride as Cl (PPM)	286						
Total Dissolved Solids (PPM)	2,095						
Sulfate as SO_4 (PPM)	800						
Sulfite as SO_3 (PPM)							
Iron as Fe (PPM)	0.06						
Silica as SiO_2 (PPM)	75						
Carbon Dioxide as CO_2 (PPM)							
Chromate as CrO_4 (PPM)	0						
Specific Conductance (mmhos)							
Concentrations Chloride							
Concentrations Hardness							
Specific Gravity	1.002						

NEW MEXICO OIL CONSERVATION COMMISSION
Hobbs, New Mexico

WATER ANALYSIS

Well Ownership: Mr. Mark Smith Well No. #1

Land Status: ☐ State ☐ Federal ☒ Fee

Well Location: Unit I, Section 26, T 19 S - R 33 E Lea County

(NE of NE of SE Sec. 26 -- Smith Ranch House)

Type Well: Windmill * Depth: 101 feet.

Well Use: Stock and house use

Sample Number: #2 Date Taken: Aug. 11, 1976 (John W. Runyan)

Specific Conductance: 2200 m/

Total dissolved Solids: 2024 PPM.

Chlorides: 284.0 PPM.

Sulfates: _____ PPM.

Ortho-phosphates: ☐ V. low ☐ Low ☐ Med. ☐ High

Sulfides: ☒ None ☐ Low ☐ Med. ☐ High

_____ : _____

Date Analized: August 11, 1976 By: John W. Runyan N.M.O.C.C.

Remarks: * Windmill also has submergible pump as secondary back up -- depth to water 93 feet.

50 ml sample = 71.0 factor x 4.0 ml titration = 284.0 ppm cl.

NEW MEXICO OIL CONSERVATION COMMISSION
Hobbs, New Mexico

WATER ANALYSIS

Well Ownership: Penzoil Oil Company Well No. #1

Land Status: [X] State [ ] Federal [ ] Fee

Well Location: Unit M, Section 20, T 19 S - R 34 E Lea County

Quail Ridge Unit #1

Type Well: Oil Well Depth: ____ feet.

Well Use: Sample taken from salt water storage tank

Sample Number: #3 Date Taken: August 11, 1976
John W. Runyan

Specific Conductance: _____ m/

Total dissolved Solids: _____ PPM.

Chlorides: 20,732.0 PPM.

Sulfates: _____ PPM.

Ortho-phosphates: [ ] V. low [ ] Low [ ] Med. [ ] High

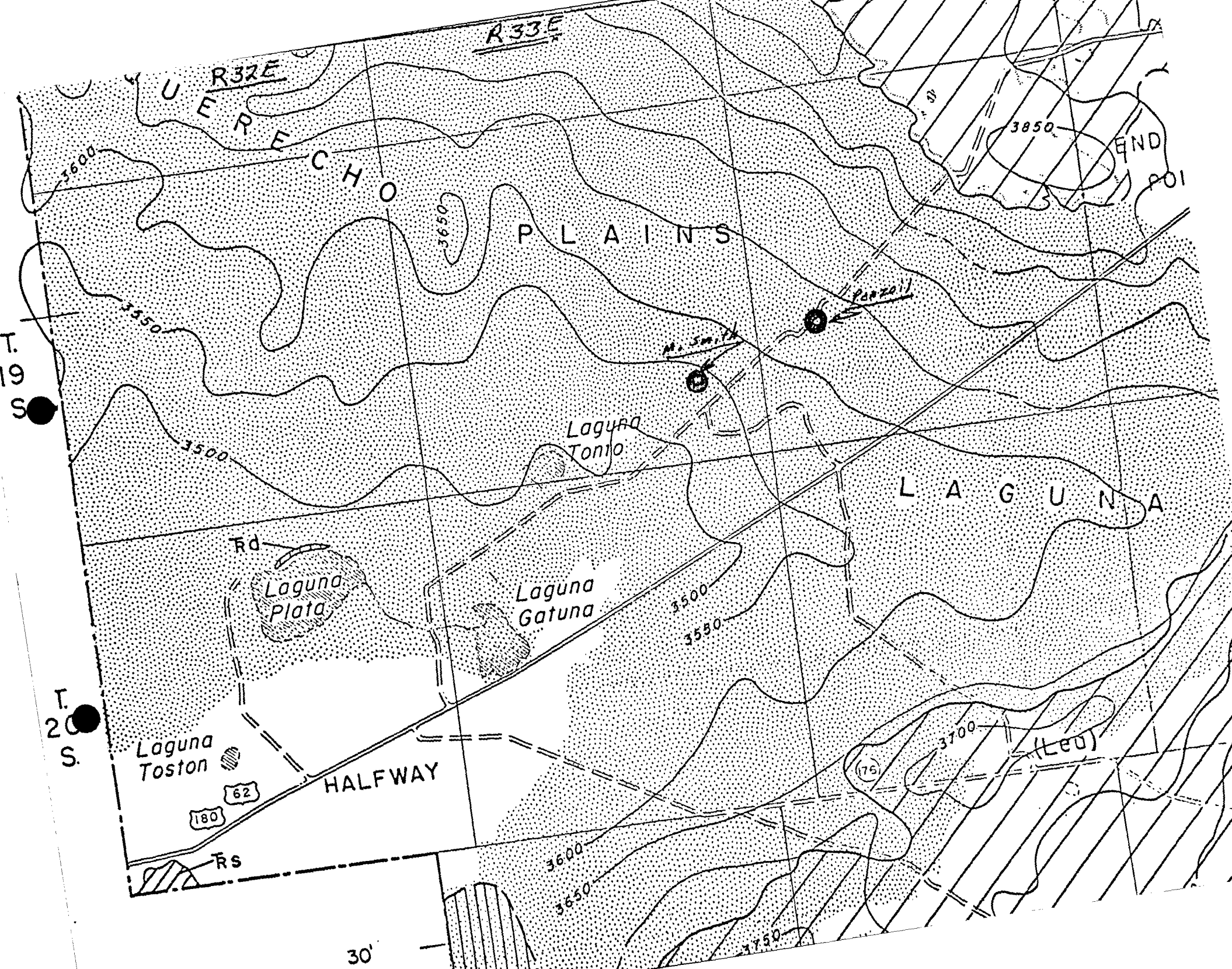
Sulfides: [X] None [ ] Low [ ] Med. [ ] High

_____ : _____

Date Analized: August 11, 1976 By: John W. Runyan
N.M.O.C.C.

Remarks: Couldn't get the rate of produced water. Took water sample from valve at bottom of produced salt water holding tank at battery.

5.0 ml sample = 710.0 factor x 29.2 ml titration = 20,732 ppm cl.


R32E
R33E
U E R E C H O
P L A I N S
3600
3650
3550
3500
3850
END
POI
Panzoil
M. Sm. Pk
Laguna Tonto
L A G U N A
Rd
Laguna Plata
Laguna Gatuna
3500
3550
T. 19 S.
T. 20 S.
Laguna Toston
62
180
HALFWAY
Rs
3700
(Leu)
175
3600
3650
3750
30'

R33E

R 34E

T 19 S

T 20 S

NOTE:
ENTIRE AREA Covered with large sand dunes - From Mark Smith's house to Caprock, From northern to southern part of map

CAPROCK

W.M. abd.

FRESH
Water Supply Well
For Drilling.
T.D. = 408'
WL = 360'
GULF
B.S.

B.S. 20,164 ppm cl Prod. water

AREA OF APPLICATION FOR EXCEPTION TO R-3221

Me Tex 1 Y
Me Tex 2 Y
McKnight 2 Y
Me Tex Y
Trainer Y
Penzoil M.
Y.

Sand Dunes

M. SMITH
W.M.
State Eng.
98' TD
91' WL
298 PPM-CL
2560 SC.
O.C.C. 4-10-70
270 PPM-CL
2000 SC.

OPEN FLAT - NO DUNES
Old Lake Bed.

C-105
Water Sand
785-810'

Atl. Rich. S.W.D.

C-105
Water Sand
808-860'

C-105
Water Sand
830-850'

State Eng.
TD-120'
WL- UNKN.
289 PPM-CL
2290 SC.

W.M. abd.
66' T.D.
58' WL.
717 PPM-CL
4420 SC.
State Eng.

Water Sd.
280-290'
C-105

180

1880 ppm cl

R33E R 34E

LEGEND:

- ▲ = WIND MILL (W.M.)
- ☼ = SHUT-IN GAS WELL.
- Y. = YATES PROD. B.S. = BONE SPRINGS PROD.
- M. = MORROW PROD.
- CL = CHLORIDES - P.P.M.
- S.C. = SPECIFIC CONDUCTANCE.
- W.L = WATER LEVEL.
- T.D. = TOTAL DEPTH.

3 - TRIASSIC WATER SANDS

- ▲ = UPPER - NEAR SURFACE - FRESH
- ▲ = MIDDLE - FRESH
- ▲ = LOWER - SANTA ROSA - USEABLE

N.

N. M. OIL CONSERVATION COMMISSION
HOBBS, NEW MEXICO

QUAIL RIDGE FIELD

FRESH WATER STATUS MAP

CASE - 4336

SCALE: 1" = 2000'

GEOLOGIST: JOHN W. RUNYAN DATE: APRIL 13, 1970