CASE 6703: EL PASO NATURAL GAS COMPANY FOR UNDERGROUND GAS STORAGE, EDDY COUNTY, NEW MEXICO

CASE NO.

6703

APPLICATION,
TRANSCRIPTS,
SMALL EXHIBITS,

ETC.

WASHINGTON RANCH GAS STORAGE PROJECT

Availability @ WHFP - 850 Psia

(Based On Effective Pressure And Withdrawal Rates Versus Gas Inventory Curve)

Gas Inventory (Bcf)	Availability (MMcf/D @ 14.73 Psia & 60° F)
20	100
25	210
30	315
35	435
40	560
44	680

WASHINGTON RANCH GAS STORAGE PROJECT

INITIAL OPERATIONAL REPORT

SEPTEMBER 2, 1983

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Introduction:

On March 19, 1979, an application was made to the Federal Energy Regulatory Commission (FERC) for authority to construct and operate the Washington Ranch Gas Storage field. In the application, El Paso proposed to covert 6 of the 10 existing producible wells and drill and complete 17 additional wells in the field for injection and withdrawal purposes. The 4 remaining producible wells were to be utilized for observation purposes. The project was approved by FERC on March 26, 1981 which resulted in the drilling of the 17 new injection/withdrawal wells, in converting 6 producing wells to injection/withdrawal operations, in converting 4 producing wells to observation wells, and the drilling of an additional observation well. The location of the injection/withdrawal and observation wells are delineated on the map behind Tab B.

The Washington Ranch field was discovered in June, 1971 by the completion of the Black River Corporation - Cities Federal #1 well which had an open flow potential of 42,596 Mcf/D through perforation in the Morrow Formation from 6,795 to 6,844 feet. Cumulative production from the field as of May 1, 1981 was 58.0 Bcf. This production was obtained from 13 wells that were completed and produced in the field. During the production phase, the field exhibited a depletion drive mechanism with the original gas-in-place estimated at 68.6 Bcf. Gas storage rights were obtained from the various land owners in the area and the aerial extent, together with the depths of rights are also shown on the map behind Tab B.

Geology:

The structure on which the Washington Ranch field is located is a north-south trending anticline nosing somewhat to the west and south. The subsurface closure is approximately 500 feet with the feature abutting on the north into the high angle Huapache fault. This fault is a regional tectonic feature and in the subsurface, exhibits up to 4,000 feet of displacement. A structure map - Top of Lower Morrow Sand is located behind Tab C, Isopachous Maps are behind Tab D and Morrow Reservoir cross-sections are behind Tab E.

The storage portion of the Morrow Formation in the Washington Ranch field is composed of 3 sands separated by shales and silts in the lower clastic zone of the formation. The thickness of this clastic portion ranges from 200 to 250 feet. The lower sand is much better developed and exhibits superior porosity and permeability characteristics. During the depletion phase of the field, production was obtained from all 3 sand members; however, the upper 2 sands are not as consistent in aerial extent as the lower sand and the productive characterstics are of a lesser magnitude. Due to the type of deposition, either in fluvial channels or at the marine - non-marine interface as a series of deltaic lobes, the upper sand bodies capable of gas production are of limited areal extent and have widely varying porosities and permeabilities. This is borne out by comparing the porosities and permeabilities of the sands determined from core analyses.

Development:

After receiving approval to develop the Washington Ranch Gas Storage field, a 17 well development program commenced on September 5, 1981 with the last well being drilled and completed on May 1, 1982. A schematic diagram of a typical new injection/withdrawal well is behind Tab F. Upon completion of each individual well, a 4 point back pressure test was conducted to determine that well's production capabilities. During the development phase, five of the new wells were cored and the reservoir rock was analyzed. From this information, various well locations were redetermined in order to maximize the completion of wells in the most permeable and productive section of the Morrow storage zone. After all of the new injection/withdrawal wells were drilled and completed, production tests were run and productivity estimates were made.

Testing:

Upon completion of the wells, 17.4 Bcf of gas that was then stored in the Clay Basin area was transferred to Washington Ranch. Injection commenced in Washington Ranch on March 6, 1982 and completed on February 28, 1983. After transfer of the gas from Clay Basin, a productivity test was conducted on the reservoir on January 13-15, 1983, at which time all wells were opened up into a gathering system of approximating 850 pounds. The combined deliverability from the Washington

Ranch Gas Storage Project was 299 MMcf/D; the gas-in-place at this time was 27.9 Bcf. This was a 24 hour productivity test of all the wells conducted in two stages over a 3 day period. The withdrawal volume during this test was approximately 0.4 Bcf and was reinjected into the reservoir after completion of the test.

As further confirmation of the production characteristics of the Washington Ranch Storage Project, an extended flow test was conducted during the period August 10-17, 1983. The initial rate of 235 MMcf/D from 23 withdrawal wells was limited by the dehydration capacity in the field. Final deliverability out of the field amounted to 160 MMcf/D with all the wells producing at maximum capability against a gathering system of approximately 862 psia. The results of the test information available to date are shown behind Tab G which is a composite back pressure curve test for the Washington Ranch Gas field as presently constituted. It can be noted from this curve that when the original wellhead pressure of 2,593 psia is reached, the productivity of the wells would be 720 MMcf/D against zero back pressure and would produce 680 MMcf/D against a gathering system pressure of 850 psia. The productivity of the wells in Washington Ranch is substantially greater than the expectations that were perceived at the time of the FERC application. The expected maximum withdrawal rate for the FERC application was 491 MMcf/D against a gathering system pressure of 850 psia.

During the development of the new 17 injection/withdrawal wells, all Morrow sands exhibiting porosity characteristics of 5% or greater were perforated in all 3 sand members. As mentioned earlier under the Geology section, the upper sand members have lesser sand quality characteristics, are tighter and have less porosity and, therefore, their contribution to the storage project is not substantial. Based upon the analysis of core and log data, confirmed by the productivity tests that have been conducted to date, the effective gas storage reservoir volume has been estimated for immediate injection and withdrawal volumes and pressures. It has been determined that the effective gas-in-place is 44.1 Bcf as shown in the graph behind Tab H of Effective Pressure and Withdrawal Rates versus Gas Inventory. This means that maximum withdrawal pressures will be reached before the 68.6 Bcf of gas-in-place materializes and that initial reservoir pressures will be reached in the effective area when total gas-in-place volumes reach 44.1 Bcf, at which time a maximum withdrawl of 680 MMcf/D, against a 850 psia gathering system can be obtained at this gas inventory level immediately after this level is reached. Behind Tab I is a table showing the project availability at various gas inventory levels.

El Paso
Natural Gas Company

P. O. BOX 1492
EL PASO, TEXAS 79978
PHONE: 915-541-2600

March 6, 1984

New Mexico Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico 87501

Gentlemen:

Re: El Paso Natural Gas Company's
Washington Ranch Morrow Gas
Storage Field

In accordance with the Commission Order R-6175 ¶6, please be advised that the El Paso Natural Gas #1 Susco 32 State Com. well was completed on January 18, 1982 as a "dry hole". By "dry hole", we mean that it was incapable of producing gas in commercial quantities, however, the Morrow sands were present and saturated with water. This well then was completed with perforations from 7,191 - 7,394 feet in the Morrow Gas Storage reservoir on said date and is being utilized by El Paso as an observation well for its Washington Ranch Morrow Gas Storage field.

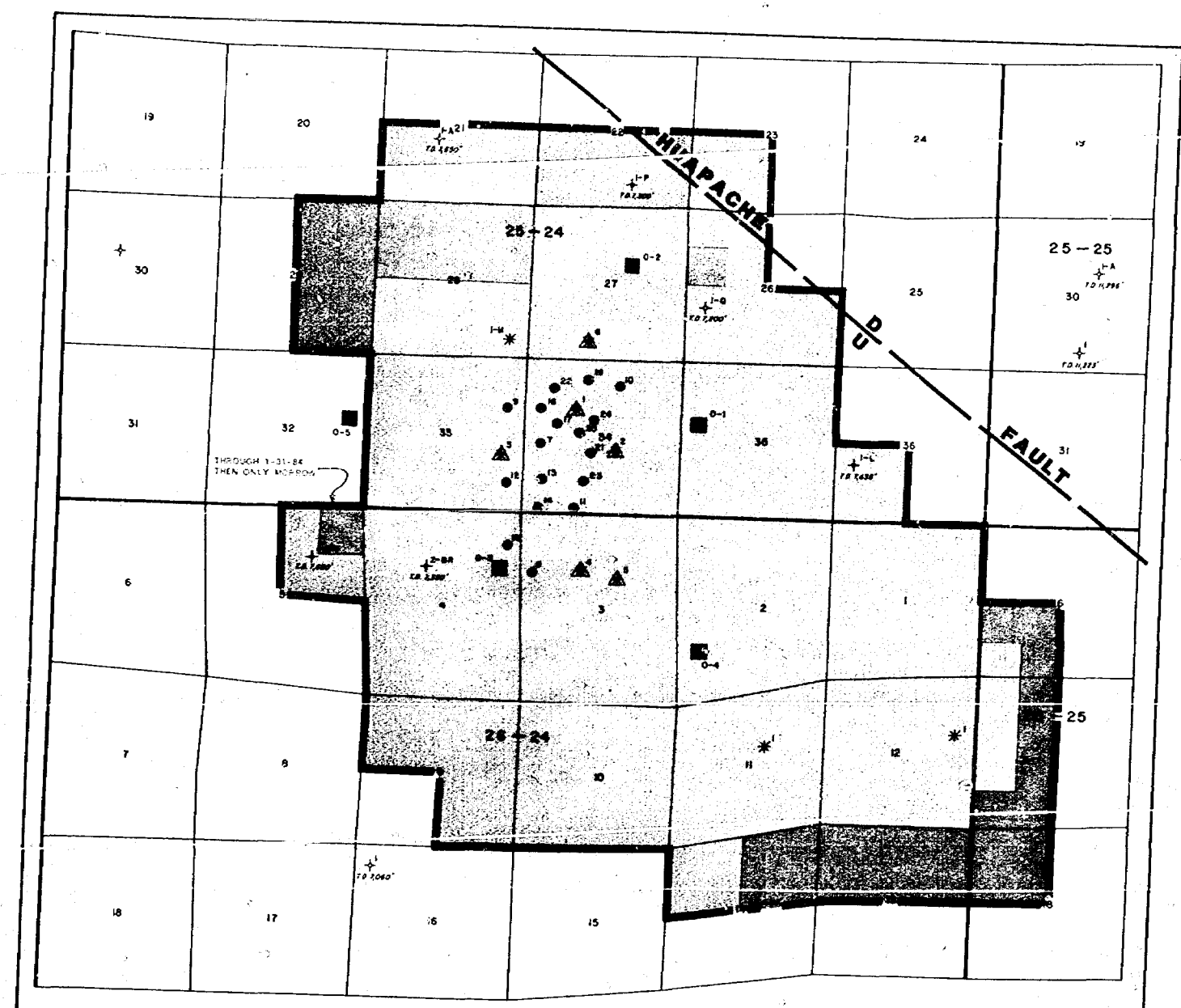
Attached herewith is a map showing the location and status of each well in El Paso's Washington Ranch Morrow Gas Storage field.

Respectfully submitted,

D. E. Adams, Director
Reservoir Engineering Dept.

DEA:cc

Attachment



LEGEND

- OLD WELL, INJECTION-WITHDRAWAL
- NEW WELL, INJECTION-WITHDRAWAL
- OBSERVATION WELL
- ABANDONED MORROW WELL
- DRY HOLE
- GAS STORAGE AREA OUTLINE
- ALL DEPTHS
- MORROW ONLY

El Paso Natural Gas Company

WASHINGTON RANCH MORROW GAS STORAGE FIELD

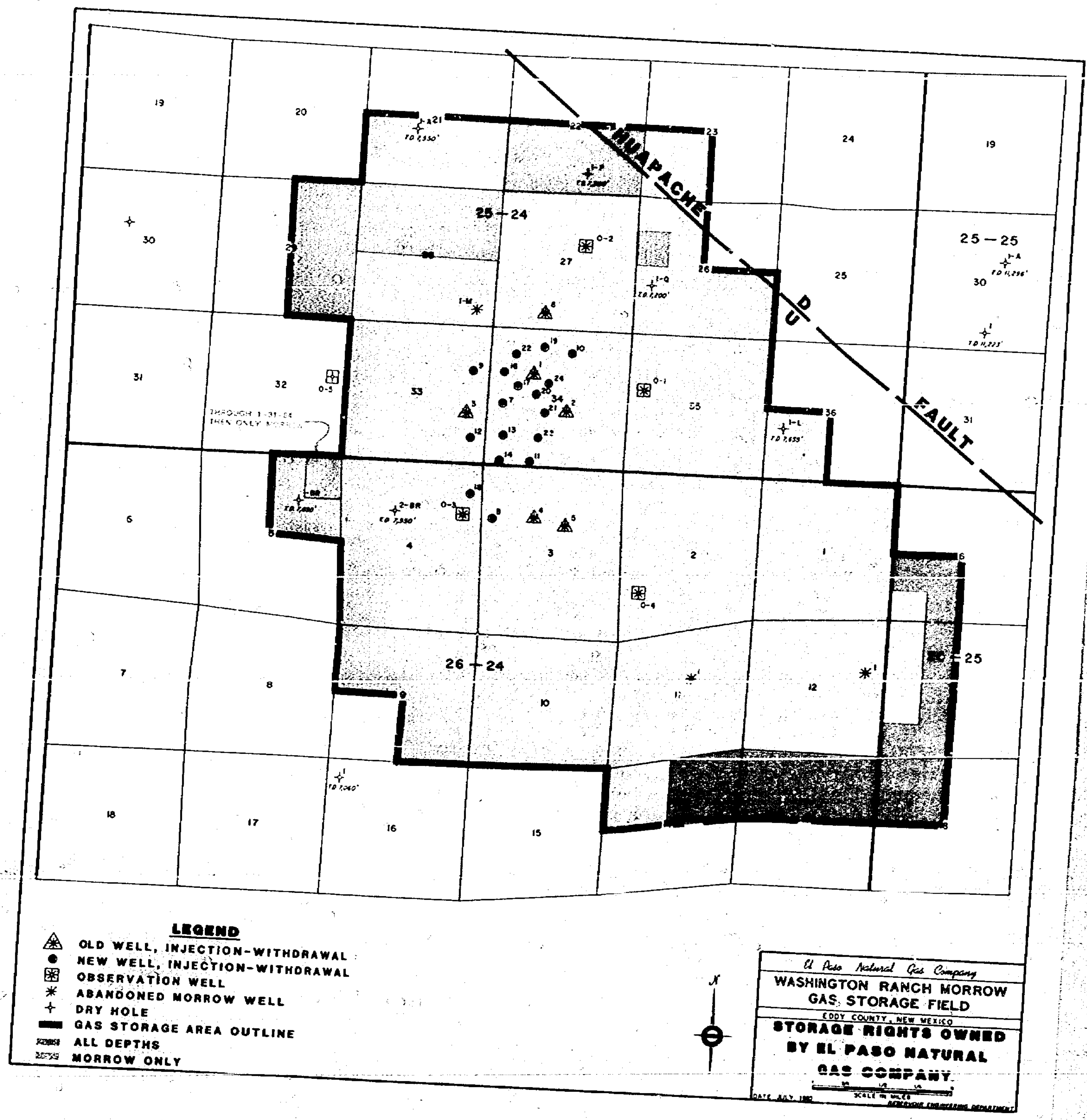
EDDY COUNTY, NEW MEXICO

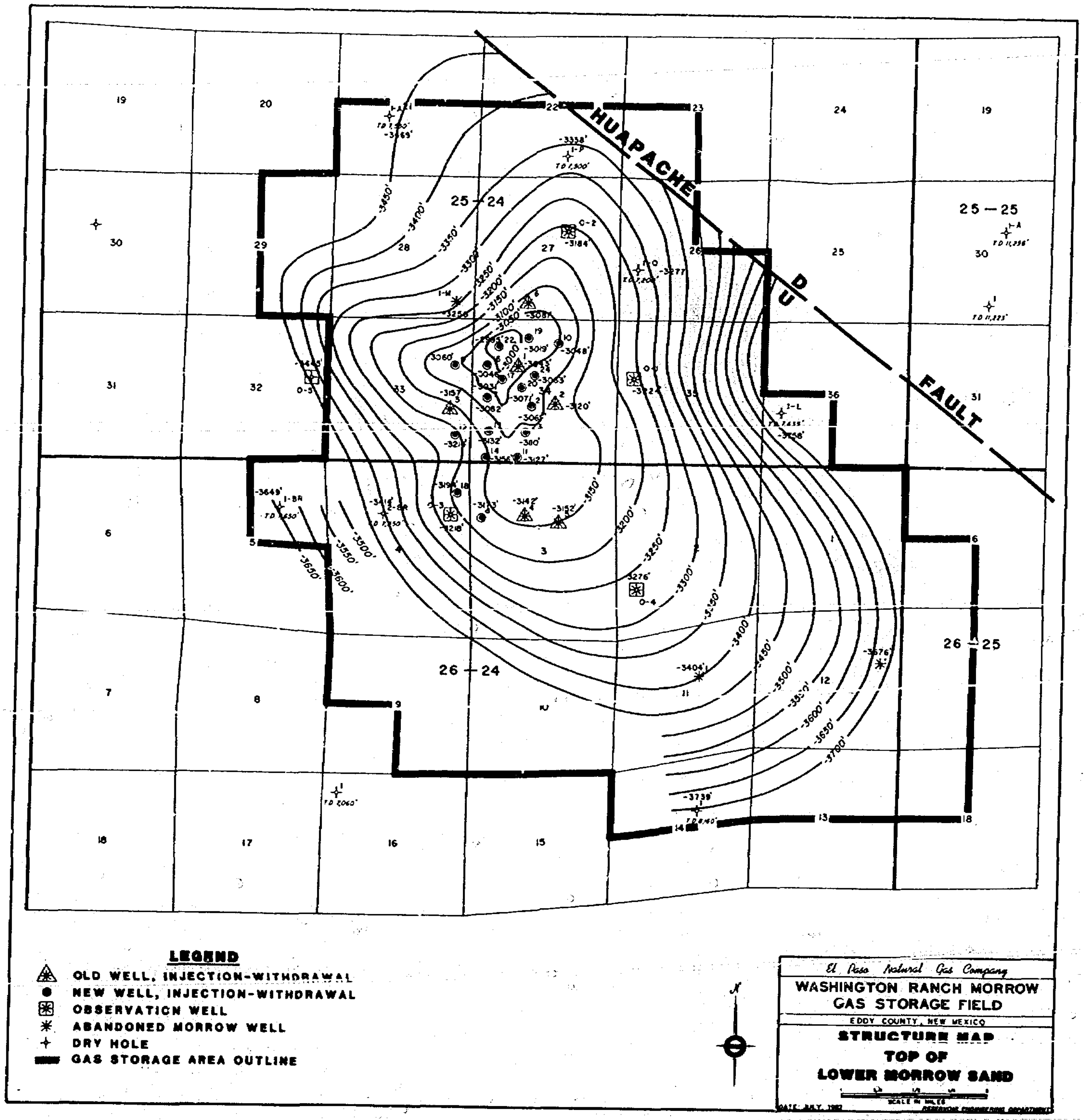
STORAGE RIGHTS OWNED BY EL PASO NATURAL GAS COMPANY

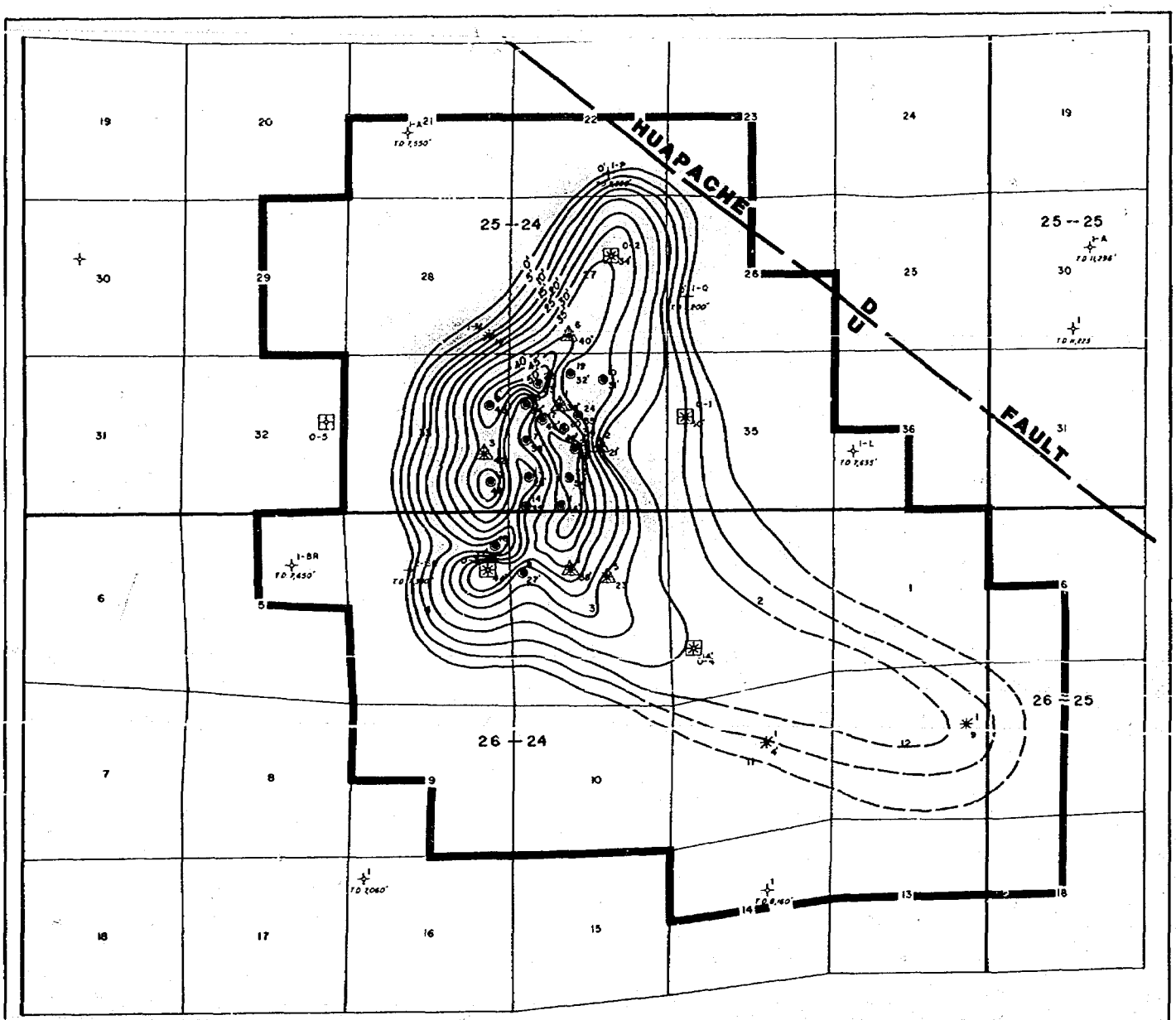
SCALE IN MILES

DATE: JULY, 1982

RESERVOIR ENGINEERING DEPARTMENT


HUAPACHE
D
U
FAULT
25 — 24
25 — 25
26 — 24
26 — 25
LEGEND
OLD WELL, INJECTION-WITHDRAWAL
NEW WELL, INJECTION-WITHDRAWAL
OBSERVATION WELL
ABANDONED MORROW WELL
DRY HOLE
GAS STORAGE AREA OUTLINE
ALL DEPTHS
MORROW ONLY
N
El Paso Natural Gas Company
WASHINGTON RANCH MORROW
GAS STORAGE FIELD
EDDY COUNTY, NEW MEXICO
STORAGE RIGHTS OWNED
BY EL PASO NATURAL
GAS COMPANY
SCALE IN MILES
RESERVOIR ENGINEERING DEPARTMENT


HUAPACHE
D
U
FAULT
25 — 24
25 — 25
26 — 24
26 — 25
LEGEND
OLD WELL, INJECTION-WITHDRAWAL
NEW WELL, INJECTION-WITHDRAWAL
OBSERVATION WELL
ABANDONED MORROW WELL
DRY HOLE
GAS STORAGE AREA OUTLINE
N
El Paso Natural Gas Company
WASHINGTON RANCH MORROW
GAS STORAGE FIELD
EDDY COUNTY, NEW MEXICO
STRUCTURE MAP
TOP OF
LOWER MORROW SAND
SCALE IN MILES



LEGEND

- OLD WELL, INJECTION-WITHDRAWAL
- NEW WELL, INJECTION-WITHDRAWAL
- OBSERVATION WELL
- ABANDONED MORROW WELL
- DRY HOLE
- GAS STORAGE AREA OUTLINE

N

El Paso Natural Gas Company

WASHINGTON RANCH MORROW GAS STORAGE FIELD

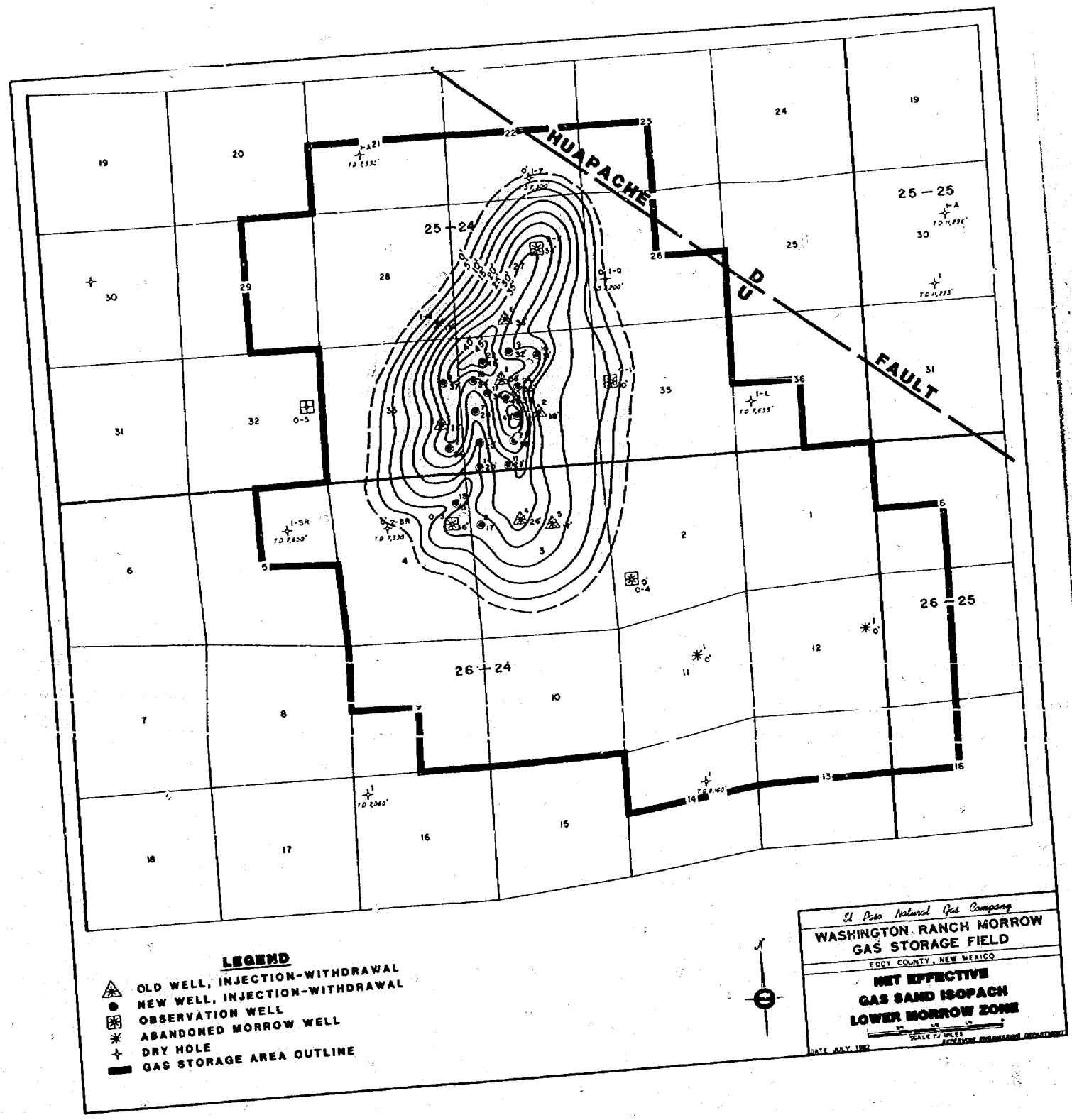
EDDY COUNTY, NEW MEXICO

ISOPACHOUS MAP

TOTAL NET GAS SAND

SCALE IN MILES

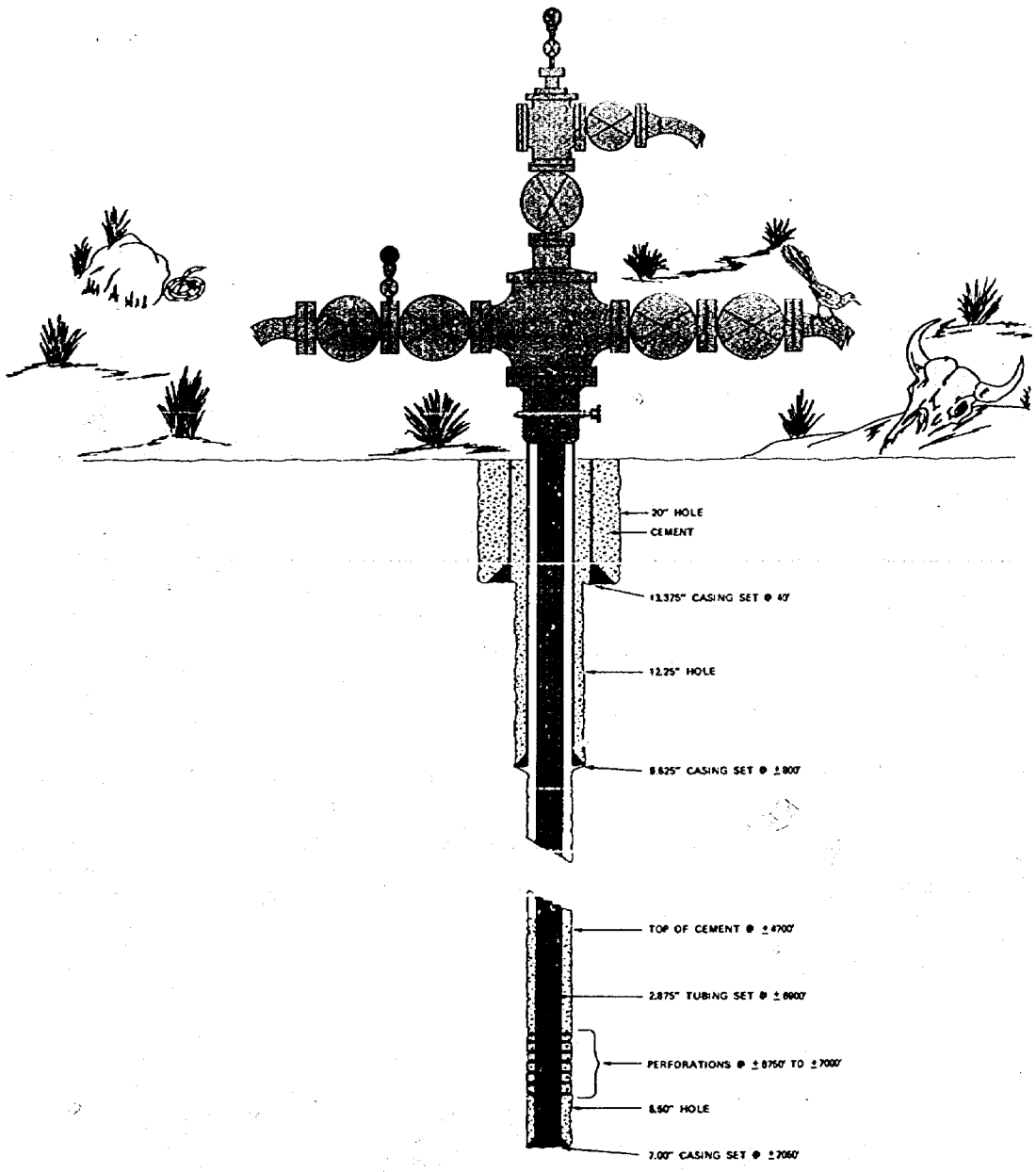
DATE: JULY, 1962


HUAPACHE
D
U
FAULT
25 — 25
25 — 24
26 — 25
26 — 24
T.D. 11,896'
T.D. 11,225'
T.D. 7,635'
T.D. 7,650'
T.D. 7,330'
T.D. 2060'
T.D. 7,160'
LEGEND
OLD WELL, INJECTION-WITHDRAWAL
NEW WELL, INJECTION-WITHDRAWAL
OBSERVATION WELL
ABANDONED MORROW WELL
DRY HOLE
GAS STORAGE AREA OUTLINE
El Paso Natural Gas Company
WASHINGTON RANCH MORROW
GAS STORAGE FIELD
EDDY COUNTY, NEW MEXICO
NET EFFECTIVE
GAS SAND ISOPACH
LOWER MORROW ZONE
SCALE IN MILES
RESERVOIR ENGINEERING DEPARTMENT
DATE: MAY, 1967

WASHINGTON RANCH MORROW GAS STORAGE FIELD

EDDY COUNTY, NEW MEXICO

SCHEMATIC DIAGRAM OF TYPICAL NEW INJECTION/WITHDRAWAL WELL

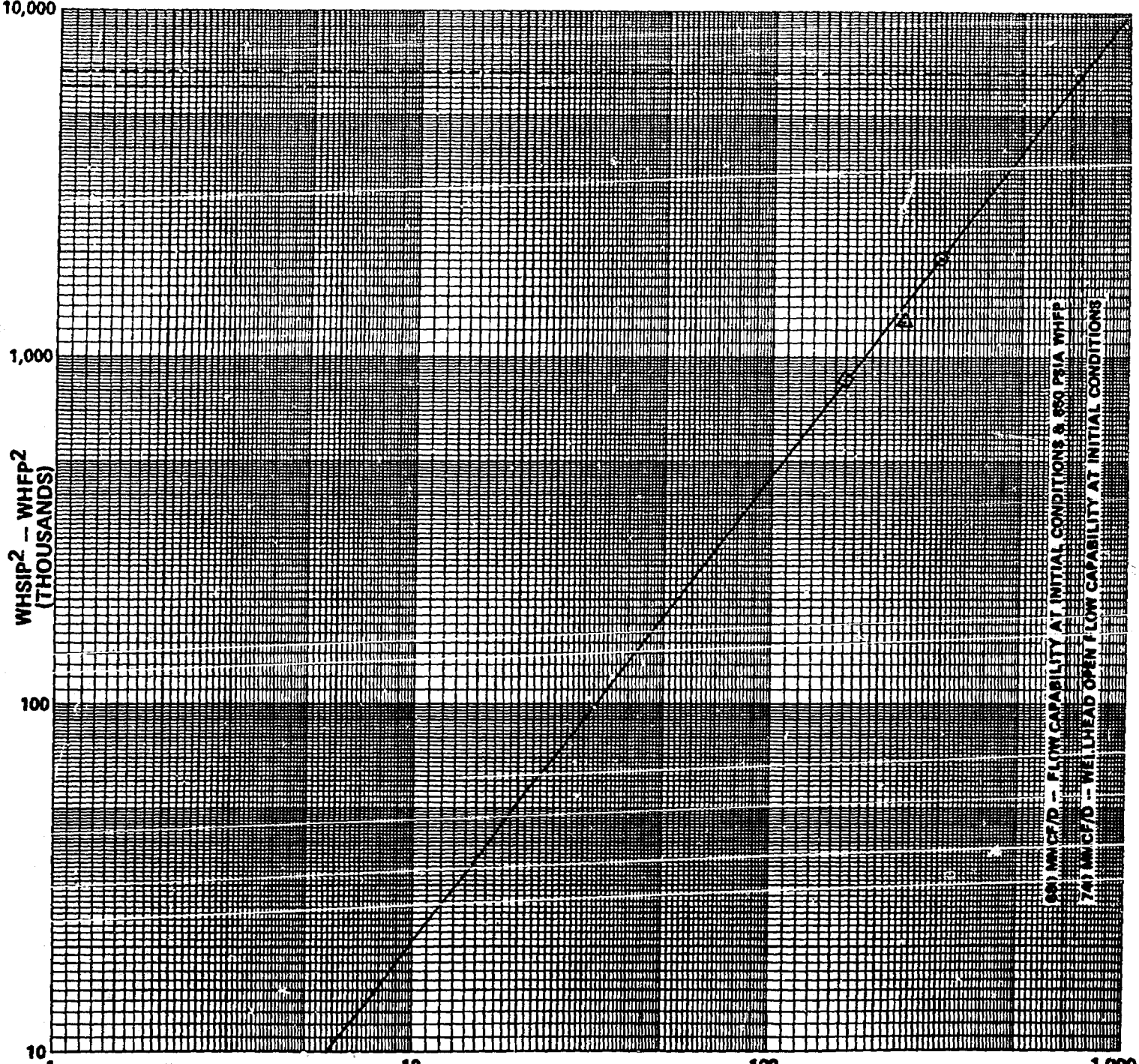


El Paso NATURAL GAS COMPANY

RESERVOIR ENGINEERING DEPARTMENT

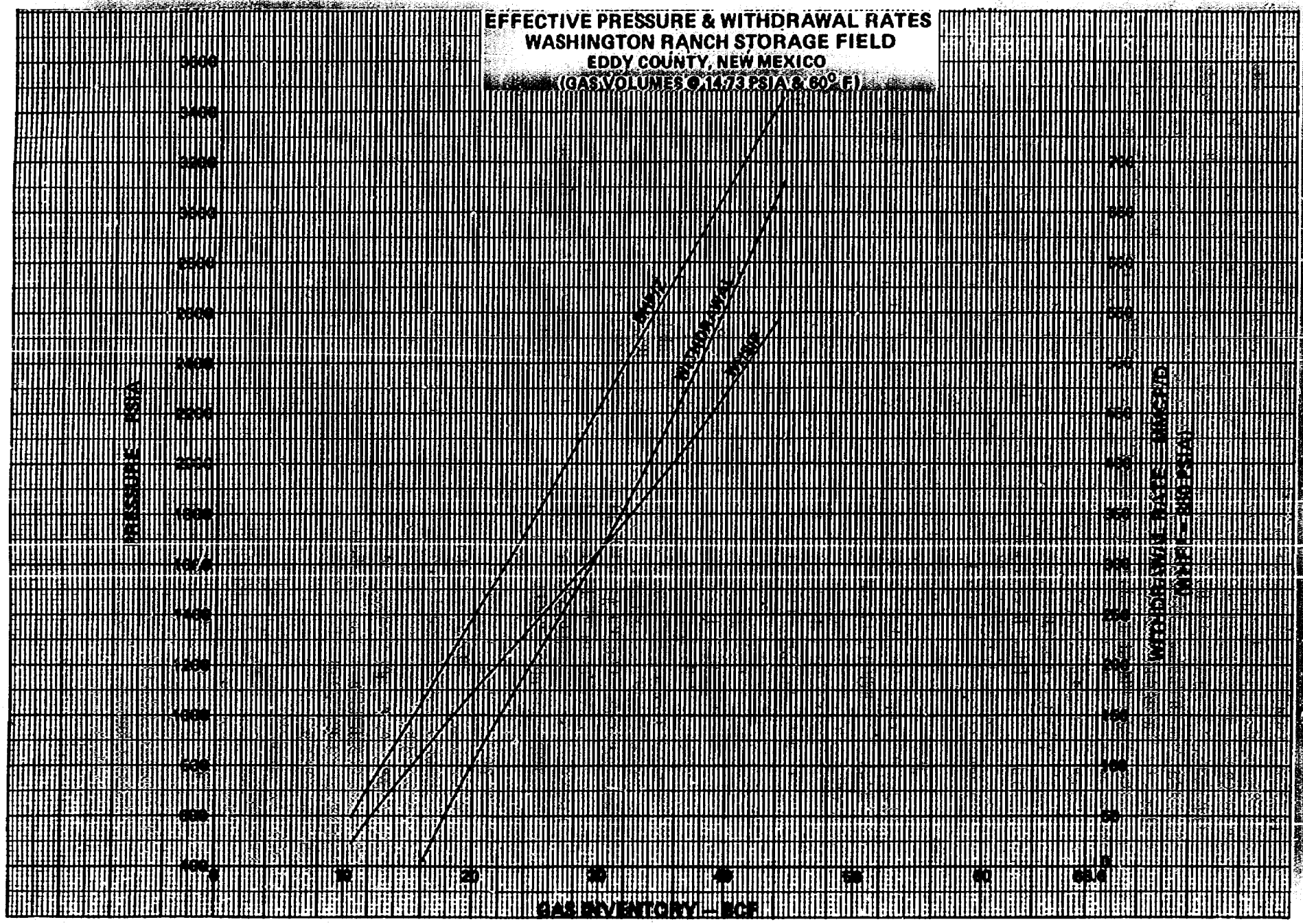
JULY, 1982

TOTAL FIELD BACK PRESSURE CURVE
WASHINGTON RANCH STORAGE PROJECT
EDDY COUNTY, NEW MEXICO



	Q – MMCF/D @ 14.73 PSIA & 60° F	WHSIP PSIA	WHFP PSIA	DATE
⊙	284	1571	748	JANUARY, 1982
△	235	1466	936	AUGUST 10, 1983
⊡	180	1259	862	AUGUST 17, 1983

EFFECTIVE PRESSURE & WITHDRAWAL RATES
WASHINGTON RANCH STORAGE FIELD
EDDY COUNTY, NEW MEXICO
(GAS VOLUMES @ 14.73 PSIA & 60° F)



STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

June 23, 1980

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

Mark K. Adams, Esq.
Rodey, Dickason, Sloan,
Akin & Robb, P.A.
P. O. Box 1888
Albuquerque, New Mexico 87103

Re: Southern Union Exploration Company
Washington Ranch Gas Storage
Project; Case 6703, Order No. R-6175

Dear Mark:

This letter responds to your letter dated April 22, 1980.

After review of the case file and the order issued by the Division in Case No. 6703, I am of the opinion that the order does not impair Southern Union Exploration's ability to drill and produce its state leases located in Section 32, Township 25 South, Range 34 East.

Insofar as the special casing program required by the Order is concerned, the Division is empowered to regulate the method and devices used for natural gas storage. In approving a gas storage project, such as the one involved here, the Division's paramount obligation to prevent waste must be observed through appropriate casing requirements to safeguard the integrity of the storage area. I feel that the Division's exercise of its authority in implementing special casing requirements is a valid exercise of that authority.

Please let me know if you have any questions.

Very truly yours,

ERNEST L. PADILLA
General Counsel

ELP/dr

cc: Ray Graham
Wallace Sutherland
Richard B. Isaacks
Dave Burleson

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
State Land Office Building
Santa Fe, New Mexico
17 October, 1979

EXAMINER HEARING

IN THE MATTER OF:

Application of El Paso Natural Gas Company for underground gas storage, Eddy County, New Mexico.

CASE 6703

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For El Paso Natural Gas Company: David Burleson, Esq.
EL PASO NATURAL GAS COMPANY
El Paso, Texas 79978

For the Oil Conservation Division: Ernest L. Padilla, Esq.
Legal Counsel for the Division
State Land Office Building
Santa Fe, New Mexico 87503

For El Paso Natural Gas Company: Owen Lopez, Esq.
MONTGOMERY LAW FIRM
Paseo de Peralta
Santa Fe, New Mexico 87501

I N D E X

E X H I B I T S

MR. NUTTER: We'll call now Case 6703.

MR. LOPEZ: Owen M. Lopez, with the Montgomery Law Firm, Santa Fe, New Mexico, appearing on behalf of the applicant, and associated with me in the case is Mr. David P. Burleson of the office of general counsel, El Paso Natural Gas Company, El Paso, Texas, who will present the witnesses.

MR. NUTTER: And before you get started, we'll take a fifteen minute recess.

(Thereupon a recess was taken.)

MR. NUTTER: The hearing will come to order, please. I believe the record will show we had called Case Number 6703 and David Burleson and Owen Lopez have made appearances in this case.

Would you proceed, please?

MR. BURLESON: Yes, sir, we have three witnesses who should be sworn.

(Witnesses sworn.)

MR. BURLESON: I have a brief opening statement, please.

El Paso Natural Gas Company proposes in this application to construct and operate certain gas injection and withdrawal facilites so as to convert the Morrow formation underlying the Washington Ranch Morrow Gas Field in Eddy County, New Mexico, to a gas storage reservoir.

This storage reservoir is proposed to be utilized to store gas volumes which would otherwise be available to El Paso's low priority east of California customers.

This gas would then be used to protect the requirements of El Paso's high priority east of California customers during periods of peak demand.

Assuming required authorizations are timely obtained, it is anticipated injections could occur in the summer of 1981 and withdrawals could occur during the winter heating season of 1981-1982.

El Paso's application specifically seeks Commission approval pursuant to its authority under Section 65-3-11 of the Oil and Gas Act of El Paso's proposed storage operations and activities.

Secondly, El Paso seeks an express finding that its proposed well completion program, to be hereinafter described by one of the witnesses, will protect aquifers in the area of the proposed storage project.

Thirdly, El Paso seeks the adoption of appropriate field rules consistent with the operation of the

proposed gas storage project.

That concludes the opening statement and now we will turn to Mr. Isaacks.

RICHARD B. ISAACKS

being called as a witness and having been duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. BURLESON:

Q. Would you please state your record -- your name for the record, please?

A. My name is Richard Isaacks. I'm a staff landman with the El Paso Exploration Company in El Paso, Texas.

Q. Where do you reside, please?

A. El Paso, Texas.

Q. By whom are you -- you said you were employed by El Paso Natural Gas.

A. El Paso Exploration Company.

Q. El Paso Exploration, okay. What is the relationship between El Paso Exploration and El Paso Natural Gas Company?

A. El Paso Exploration Company is a wholly owned subsidiary of the El Paso Natural Gas Company.

Q. Have you previously testified before the Division and had your credentials as a petroleum landman made a matter of record?

A. Yes, I have.

MR. BURLESON: Mr. Examiner, are Mr. Isaacks' qualifications as a petroleum landman acceptable?

MR. NUTTER: Yes, they are. Please proceed.

Q. What general catefories of land are included in the proposed Washington Ranch Gas Storage Area?

A. There's a total of 12,158 acres in the storage area. The State of New Mexico lands comprise approximately 1082 acres, or 8.9 percent. The Federal lands comprise 85.93 -- 8593 acres, or approximately 70.67 percent, and the fee lands comprise 2483 acres, or 20.43 percent.

Q. Have you prepared an exhibit which shows the boundary of the proposed storage area and indicates which lands are fee, state, or federally owned?

A. Yes, I have. It is Exhibit Number One.

Q. Are those lands indicated as State Lands presently subject to oil and gas leases, storage, or other agreements?

A. As of this date all of the State lands are subject to existing oil and gas leases. Of the 1082 State acres, El Paso either owns or controls 602 acres. El Paso has made application to the Commissioner of Public Lands for

a gas storage easement covering all the State lands within the storage area, and the rights that will be granted to El Paso under the easement will be subject to the existing oil and gas leases, which cover the 480 acres that we don't own but El Paso will be unable to enjoy our full rights under the leased lands until those leases are expired.

Q. Is there any production on the State of New Mexico lands? Currently?

A. Yes. At this time there is one well in the Washington Ranch Morrow Field which has production allocated to a State Oil and Gas Lease, and that's the Black River Miller No. 2 Well in the southwest quarter of Section 2. And that's holding one State Oil and Gas Lease.

The lands that El Paso does not own the oil and gas leases on are non-producing and they're located out on the edge of the storage area. They're located on the edge of the structure as we have it mapped, and they're included in the storage area as a buffer.

Q. Would you describe those lands that you are alluding to?

A. Okay. The -- all of these lands are in Township 25 South, Range 24 East; the east half of Section 32 is owned by Southern Union Exploration Company. Also, we don't own or control the southwest quarter of Section 36, which I believe the record shows that's owned by Sterling J.

Talley.

Q. You mentioned the Miller No. 1 Well a moment ago and said it was producing from State lands, and I think you indicated that that was owned by Cities Service, Black River, and Arapahoe. Do we have any arrangement with those companies?

A. Yes. El Paso has entered into an option with the owners of the production from the Washington Ranch Morrow Field, which are Cities Service Company, Black River Corporation, and Arapahoe Gas, Limited. We have the option to purchase all of their rights within the gas storage area upon El Paso getting approval of regulatory bodies.

Q. What's the status of the Federal lands within the boundary of the unit, proposed unit?

A. El Paso has made an application to the Department of Interior through the United States Geological Survey, for a gas storage agreement, which will grant El Paso the right to inject, store, and draw gas under Federal lands. The agreement is in the hands of the USGS Roswell Office at this time. It's my understanding that when they approve that agreement it will be sent to their Regional Office in Denver and then sent to Washington.

Q. Do you have an estimated date by which this approval might be obtained from the USGS?

A. No.

Q. Do you have any reason to believe that there -- that you will be unable to negotiate an agreement with the USGS?

A. No.

Q. What about the State of New Mexico, the Commissioner of Public Lands? Do you believe that you will be successful in reaching agreement with the State?

A. Yes. I haven't been given any reason by the Commissioner of Public Lands why they would not grant us a storage unit.

Q. What's the status of the fee lands within the boundary of the proposed project area?

A. El Paso has entered into gas storage lease agreements with substantially all of the fee owners in the storage area. We've taken storage leases from both the surface and mineral owners that will allow us to have effective control of the Morrow formation under the entire unit area.

Q. What's the total overall control by El Paso of all acreage within the storage area?

A. Okay. At the present time, and upon approval of the agreements that I've just mentioned with the United States Geological Survey and the -- with the Commissioner of Public Lands, El Paso will own or control 55 percent of the State lands, 90 percent of the Federal lands,

and about 99 percent of the fee lands. These percentages include Federal lands that we don't own but which are unleased and will be subject to the gas storage agreement.

Overall, El Paso will own or control 89 percent of the total storage area.

Q. Was Exhibit Number One prepared by you or under your direction or supervision?

A. Yes.

MR. BURLESON: Mr. Examiner, I move the admission into evidence of Exhibit Number One.

MR. NUTTER: Exhibit One will be admitted in evidence.

MR. BURLESON: This concludes our direct examination of Mr. Isaacks and we tender him for any questions you might have.

CROSS EXAMINATION

BY MR. NUTTER:

Q. Mr. Isaacks, you mentioned of the State leases that El Paso controlled -- owned or controlled how many acres?

A. 602 acres.

Q. Out of 1082?

A. Yes.

Q. Okay. You mentioned the two leases in

Sections 32 and 36 that belonged to Southern Union and Talley. Are those the only two State Leases you don't own or control?

A. At this time that is correct.

Q. So you do control all of the State lands in Section 2 and 4 and 5?

A. That's correct.

Q. Okay. Now, you mentioned that you own or control 90 percent of the Federal lands. Where would the Federal lands be that you don't own or control?

A. Okay. Let me talk about that other ten percent, if you will. We are negotiating to purchase that other 10 percent. We have been told that those lands are going to be made available to us, but we just haven't completed the paperwork on it.

The lands are located in Township 26 South, Range 24 East, the southern part of Section -- south part of Section 12, and then they extend over into -- I take that back.

They are the north half of Section 13 and 14, and over in Township 26 South, Range 25 East, the southwest quarter of Section 6, and the northwest quarter of Section 18.

Q. Wait a minute, 6 --

A. Yes, it's over --

Q. Okay.

A. Right.

Q. And where, the northwest of 18?

A. The northwest of 18, the southwest of 6.

Q. And the north half of 13 and 14?

A. Yes, that's correct.

Q. So again, these are all edge leases that are not on the structure itself and would be part of that buffer zone that you mentioned previously.

A. Yes, that's correct, but we anticipate acquiring those leases within the next 30 days.

Q. Now you mentioned that you owned or controlled 99 percent of the fee lands. Do you have a 1 percent tract some place that --

A. Well, it's approximately 99.32 percent. There is a 5-acre surface tract in Section 34 that I don't have a signed agreement on. I've been told by the owner that he will sign our lease but he hasn't given it to us yet.

Q. 34?

A. Yes.

Q. That's shown here as being Federal.

A. He owns surface. Some of this land that is shown on here as being Federal has the surface rights been severed.

Q. I see, and so you have the mineral rights under your control in Section 34 but there's a 5-acre surface

tract that you don't.

A. That's correct.

Q. I see.

MR. NUTTER: Are there any further questions of Mr. Isaacks? He may be excused.

MR. BURLESON: El Paso now calls Mr. Lester E. Ludwick.

LESTER E. LUDWICK

being called as a witness and having been duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. BURLESON:

Q. Please state your name and where you reside.

A. My name is Lester E. Ludwick and I reside in El Paso, Texas.

Q. By whom are you employed and in what capacity?

A. I'm employed by El Paso Natural Gas Company as Manager of Reservoir Geology in the Reservoir Engineering Department.

Q. Have you previously testified before this Commission and had your credentials as a reservoir geologist

made a matter of record?

A. Yes, I have.

Q. Are you familiar with El Paso's application in this case, Case 6703, and are you aware of what El Paso is seeking?

A. Yes, sir.

MR. BURLESON: Are Mr. Ludwick's qualifications acceptable as a reservoir geologist?

MR. NUTTER: Yes, they are. Please proceed.

Q. Mr. Ludwick, please explain briefly what El Paso's plans are concerning this Case Number 6703, with respect to the operation of the storage area.

A. Well, El Paso plans to use the presently existing Washington Ranch Morrow Gas Pool as a gas storage area by storing gas in the reservoir through summer injections when such gas becomes available, and to withdraw the stored gas during the winter heating season that is needed in order to meet east of California priority one and two requirements as their needs may arise.

Q. Generally speaking, where is this pool located?

A. The Washington Ranch Morrow Gas Pool is in Townships 25 and 26 South, Ranges 24 and 25 East, in Eddy County, about eight miles southwest of White's City.

Q. And the bounds are shown on Exhibit Number

One, which was presented by Mr. Isaacks, is that correct?

A. Right, yes, sir.

Q. Is gas presently being produced from wells in this pool?

A. Yes, it is. There's ten wells that are currently producing. September, 1979 production was 210MMCF; year to date production to 10-1-79 has been 1.8 billion cubic feet. This field has produced to 10-1-79, 54.8 billion cubic feet of gas.

The estimated original recovery reserves here are 63 billion, and 54.8 billion cubic feet have been produced and this field is now substantially depleted, having produced about 87 percent of this original recoverable reserve.

Q. Would you give us a brief outline, please, of the history of this pool?

A. Right. The pool was discovered in 1971 by the drilling and completion of Black River Corporation-Cities Federal No. 1, which is located in the northwest quarter of Section 34, Township 25 South, Range 24 East.

Subsequently, twelve additional wells were completed as gas wells in the Pennsylvanian-Morrow formation in this pool, and there were also 7 wells drilled into the Morrow and abandoned, whose data was also used in establishing the limits of this Morrow reservoir.

Q. What criteria was utilized in selecting the unit area, the proposed area, that's shown on Exhibit Number One?

A. We examined all of the geological and engineering data that had been made available over the years and then initiated discussion with the USGS and subsequently requested approval by the USGS of a storage unit outline that would protect El Paso and its customers' stored gas from migration or exploitation from offsetting acreage.

Q. Would you please refer to Exhibit Number Two.

A. All right.

Q. And please explain for the Examiner what that depicts.

A. This is the copy of the log from the Black River Corporation-Cities Federal No. 1 Well, which illustrates the producing interval we wish to use for the storage area.

MR. NUTTER: Now, this was the discovery well, right?

A. Yes, sir, this is it.

Q. And you have the interval indicated on there, is that correct?

A. That is correct. The Washington Ranch Morrow Gas Pool produces from the Morrow Sands that are found

within the Morrow producing interval as illustrated by this borehole compensated sonic gamma ray caliper log.

The top of the Morrow Clastics interval is indicated to be at 6628, 2887 feet subsea, and it extends downward to 6864 feet, 3123 feet subsea, to the base of the Morrow Clastics interval.

MR. NUTTER: What were those intervals again?

A. The top, Mr. Nutter, was --

MR. NUTTER: No, I got the top but those two figures for the bottom.

A. The bottom was 6864, which is a -3123.

MR. NUTTER: Thank you.

A. Yes, sir.

And El Paso requests that this vertical interval be expanded to include 100 feet of section above and 100 feet of section below the Morrow Clastics interval, as described by this log.

Q. For what reason to you propose to include this 100 foot interval above and below the Morrow Clastics interval?

A. We would like to include this 100 feet above and below to protect the gas within the unit area in the case the interval is not as well defined in other wells as it is in this base type well.

Q. Would you expect that the top and the bottom of this zone would be such as to prevent the loss of gas which may be injected into the storage area?

A. Yes, I would.

Q. Please, would you explain what you mean by that?

A. Well, the Morrow Clastics zone consists of a series of sand benches that are separated by shale lenses, or beds.

The top of the Morrow Clastics zone is a shale bed which seals off the top of this first Morrow Sand bench from an overlying dense limestone formation.

The bottom of the Morrow Clastic zone is delineated by the underlying shale zone, which is dense and impervious.

The shale zones above and below the Morrow Sand benches prevent any vertical migration of gas, and our requesting an additional 100 feet of section above the top and the bottom of this Morrow Clastics interval, as described in the discovery well, is simply a precautionary measure in the unlikely event that the overlying or underlying shale beds thin within the unit area outline.

Q. Do you have an exhibit which indicates the horizontal limits of the pool as you have mapped it?

A. Yes, I do. If you would refer to Exhibit

Numbers Three and Four.

Exhibit Three is a subsurface structure map contoured on top of the Morrow Clastics interval and Exhibit Number Four is an Isopachous map of the net sand, reflecting the effective gas pay of the Morrow formation at Washington Ranch.

Q. How were the horizontal limits determined?

A. Presently the Washington Ranch Morrow Gas Pool contains approximately seven sections of land, and as you can see, it is associated with the north-south trending anticlinal feature, as illustrated by Exhibit Three. This structural feature plus sand quality deterioration, especially to the south and southeast, control the accumulation of gas here. In other words, gas accumulation is structurally and stratigraphically controlled.

Q. Is there a well defined gas-water contact associated with the gas accumulation in this pool?

A. There is not a well defined fixed gas-water contact in the Washington Ranch Gas Pool. There does not appear to be an active water drive associated with this relatively salty edgewater, and production history from wells in the pool indicates this to be a gas expansion reservoir.

To the north, east, and west of the main field area the sand quality holds up and water in some

quantity will occur down-dip. I'm speaking here of this area in Section 33, 28, 21, 22, 26, and 35, of Township 25 South, Range 24 East.

To the south and southeast the sand quality deteriorates and water is not found structurally as high as those areas previously mentioned. In this direction sand quality becomes poor and net effective gas pay decreases because of this stratigraphic condition, and I'm talking about -- speaking of wells that are located in Sections 11, 12, 14, of Township 26 South, Range 24 East.

Q. Then as I understand your testimony, your outline was not determined by a fixed subsea control interval, is that correct?

A. That is correct. We examined each completed well and each dry hole drilled into the Morrow formation in this area, and considered all of this information in determining the proposed unit boundary.

Exhibit Four, the Isopachous map, shows the net effective gas pay for the Morrow formation, determines the limit of Morrow gas production at the zero contour interval.

Gas in place of 69 billion cubic feet was volumetrically estimated by using the acre feet volume as determined from this Isopachous map, and it compares favorably to the in place gas of 68.6 that was estimated by

performance.

We included in our proposed gas storage unit outline acreage from one-half to one mile out from this estimated zero Isopach interval, or estimated fill-up limit of the Morrow formation expected at initial reservoir conditions.

MR. NUTTER: Now, Mr. Ludwick, those figures you just gave, the 69 billion and the 68.6 billion, those are original gas in place, not recoverable gas?

A. Yes, sir, that's the in place gas, yes, sir.

MR. NUTTER: Now, that other figure you gave awhile ago of original -- estimated original of reserves at 63 billion, that's recoverable gas.

A. Yes, sir, that's correct.

MR. NUTTER: Okay.

A. Uh-huh.

Q. Have you or others with El Paso Natural Gas Company discussed the limits of this proposed project area with other agencies of the State or Federal government?

A. Yes, we have. This has been thoroughly discussed with staff personnel of USGS and the State Land Office, and their recommendations, they've been included in our proposal.

Q. In your opinion would there be any migra-

tion of gas from the storage area into the wellbore of any well drilled outside the unit outline or the fault zone shown on the north side of the structure?

A. No, I don't believe there would be.

Q. Please elaborate on that.

A. Well, as I said previously, it is believed that the zero contour interval that is shown by the Isopachous map and included under Exhibit Four, is the limit of net effective gas pay at original reservoir conditions, and it will be so when this reservoir is repressured to original reservoir condition, and therefore, the unit outline that we request, which is located from one-half to one mile outward from that zero Isopach interval will contain any stored gas at Washington Ranch Field and should preclude any horizontal migration outside this unit boundary.

Q. How many injection-withdrawal wells does El Paso propose to drill in this -- in Washington Ranch project area?

A. Well, there are presently ten wells producing at Washington Ranch and El Paso intends to use six of these existing wells for injection-withdrawal purposes. We will utilize four of the remaining wells as observation wells and drill seventeen additional injection-withdrawal wells, all of which are shown on Exhibits Three and Four, and they are more fully described by Exhibit Five, which

identifies each well by its unit designation under its section and township and range order.

Q. Now the well locations which are shown on Exhibit Five are tentative locations, is that correct?

A. That is correct.

Q. In the event there are topographic or geologic conditions which should be present that would render any location shown on this exhibit to be less adviseable than some alternative location, or should we desire to drill additional injection-withdrawal or observation wells, would you recommend that we be permitted to change a well location or add a well location by notification of the Secretary-Director of the Commission by letter with a copy thereof to the appropriate district office of the Commission and the Albuquerque office of the USGS?

A. Yes, I would.

Q. How many wells does El Paso intend to core while drilling these seventeen injection-withdrawal wells?

A. El Paso intends to core three wells while in the process of drilling seventeen injection-withdrawal wells. And the wells which are proposed for coring are listed and the type analysis which are intended to be conducted on the cores are more fully explained by Exhibit Six.

Q. What type of wireline or electrical logs surveys does El Paso intend to run on these seventeen wells

which we -- which are proposed to be drilled?

A. The electrical log program is also detailed and outlined by our Exhibit Six of this proceeding. The coring program that we recommend, like I say, it does show on this Exhibit Six. We intend to have full diameter cores that will cover the entire Morrow producing interval, including 100 feet above and below this clastics interval that we're suggesting here, and we would suggest -- we would like and intend to run the conventional porosity, permeability, and residual fluid saturation determinations on these cores.

The electrical logs that we would run here would be Schlumberger Dual Injection Spherically Focused Log, which would include an SP and gamma ray curve; a Schlumberger Formation Density - Compensated Neutron Log, and also a Schlumberger Sonic Log.

That would be the core and the logs that we intend to run.

Q. I believe you've prepared one additional exhibit, have you not, for presentation in the case?

A. Yes, sir. This is Exhibit Seven, and it's a cross section that graphically illustrates the structure relief of the field and the relative position of the storage zone to the top and bottom of the Morrow Clastics producing interval. This -- it shows the direction -- this cross

section takes on the cross section; it runs basically from north to southeast there.

MR. NUTTER: Now the discovery well is on here, isn't it?

A. Yes, sir, I believe it is. It's the third well from the left, Mr. Nutter.

MR. NUTTER: Okay, so the red area there that's outlined on this cross section, would be what area on Exhibit Two, your log of the well?

A. Okay, that would be -- that would cover the interval from approximately 6784 to the bottom, to the bottom of the Morrow Clastics, as indicated on this exhibit.

MR. NUTTER: So you would be actually storing in the discovery well in the lower one-third of the Morrow producing interval.

A. That is correct, yes, sir. It would be, yes, sir.

MR. NUTTER: Okay.

Q. I note that only a portion of the Morrow [illegible]olored red. Would you indicate the significance of that? [illegible]rea that's colored red as contrasted as contrasted with [illegible]mainder of the Morrow interval?

A. Well, this is the main -- in other words, [illegible]area that is included in this red band, is where the [illegible]ffective gas pay is depicted on this Isopach map. This

is the main gas producing benches, or bench, on this field.

Q. But we propose that 100 feet below the top of the Morrow and 100 feet below the bottom of the Morrow, all that interval intervening would be the storage area.

A. That's right, we would request that the entire top and -- the entire Morrow interval be included in our storage project, and that would include, Mr. Examiner, 100 feet above the top, as we show it there on this cross section, and 100 feet below, or downward, from the base of this thing.

Q. With respect to the operation of the storage project, what's the proposed maximum storage capacity of the project?

A. Well, the maximum capacity, like when we fill it back up, would be 68.6 billion and 47.6 billion cubic feet of this would be working gas, and 21 billion cubic feet would be cushion gas.

Q. Based on proposed injection-withdrawal wells and taking into account the facilities which we propose to install, what would be the maximum capacity injection and maximum capacity withdrawal rate?

A. Initially a maximum injection capacity will be approximately 505 million cubic feet per day into these 23 injection wells, injection-withdrawal wells. And the maximum withdrawal rate at initial conditions there,

would be approximately 400 million cubic feet per day; however, dehydration and facilities would limit this withdrawal rate to about 400 MMCF per day.

Q. Let's see, you said the maximum withdrawal rate, did you mean to say that it would be 491 million cubic feet per day?

A. Yes, sir, I thought that's what I said.

MR. NUTTER: No, you said 400 million withdrawal.

A. Well, it's 491, I beg your pardon.

MR. NUTTER: 491 withdrawal --

A. Yes, sir.

MR. NUTTER: And after dehydration and shrinkage, it would be down to 400 million.

A. 400, yes, sir, I'm sorry I made that --

Q. What is the date by which El Paso hopes to have the project in service?

A. Well, given timely regulatory approvals, it is planned that the field will be available for withdrawals during the '81-'82 winter heating seaseon, 1981-1982.

Q. Does El Paso propose to meter gas injected and withdrawn?

A. Yes. We would meter this gas, and this would be done on an individual well -- by an individual well

basis, and would include injected volumes and volumes withdrawn.

Q. And you would propose, of course, that El Paso would file the reports as required by the rules of the Commission --

A. Yes, sir.

Q. -- with respect to those quantities?

A. That's correct.

Q. Mr. Ludwick, in your opinion would the granting of El Paso's application in this cause result in waste or the violation of correlative rights?

A. No, it surely would not.

Q. Were Exhibits Two through Seven prepared by you or under your supervision or direction?

A. Yes, they were.

MR. BURLESON: Mr. Examiner, I move the receipt into evidence of Exhibits Two through Seven.

MR. NUTTER: El Paso Exhibits Two through Seven will be admitted in evidence.

CROSS EXAMINATION

BY MR. NUTTER:

Q. Mr. Ludwick, you said that you would repressure the reservoir to achieve what total cubic feet of gas in place?

A. We'd take it back to original conditions, and that would put 68.6 billion cubic feet.

Q. And of that 46.6 would be working gas and 21 billion would be a cushion?

A. Yes, sir, 47.6 would be working gas.

Q. 47.

A. 21 would be cushion gas, yes, sir.

Q. Now, are all of these wells in this reservoir completed within the Morrow interval that is the equivalent to your red section on cross section Seven?

A. Most of them are. There have been one or two that did perforate outside of the interval, Mr. Nutter.

Q. Will those intervals be squeezed?

A. Yes, sir, we would do any work of that nature to insure that we have this zone open.

Q. And only this zone?

A. Yes, sir, we would go into that zone.

Q. Uh-huh. Now, of these wells on Exhibit Number Four, Mr. Ludwick, the triangular wells, the notation is they are proposed injection-withdrawal wells, but those are all existing wells, is that correct?

A. Yes, sir, the wells that are shown by the triangles, they are at this time producing gas, yes, sir. And those are the wells, those are the six wells that we would convert -- by the triangles, they are at this time producing

gas, yes, sir.

And those are the wells, those are the six wells that we would convert or use as injection-withdrawal wells.

Q. And then your observation wells would be four wells that are existing wells and they are shown to be located in the north half of 27, the west half of 35, the west half of Section 2, and then that existing well in the east half of Section 4, is that correct?

A. That is correct, yes, sir.

Q. And all those other wells that are dots with circles around them, are wells that you will drill?

A. That is correct, yes, sir.

Q. Okay.

MR. NUTTER: Are there any further questions of Mr. Ludwick? He may be excused.

MR. BURLESON: El Paso calls John A. Disch.

JOHN H. DISCH

being called as a witness and having been duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. BURLESON:

Q. Would you please state your name and where

you reside?

A. My name is John A. Disch. I reside in El Paso, Texas.

Q. By whom are you employed and in what capacity?

A. I'm employed by El Paso Exploration Company, which is a subsidiary of El Paso Natural Gas Company, and I am the Supervisor Drilling Engineer.

Q. Have you previously testified before the Division at a previous hearing as a petroleum engineer?

A. Yes, sir. The last time was in May, 1977.

Q. Are you aware of El Paso's application in this -- in this case?

A. Yes, I am.

Q. Were you qualified as an expert witness in the field of petroleum engineering the last time you testified?

A. Yes, sir.

MR. BURLESON: Mr. Examiner, are the witness' qualifications acceptable?

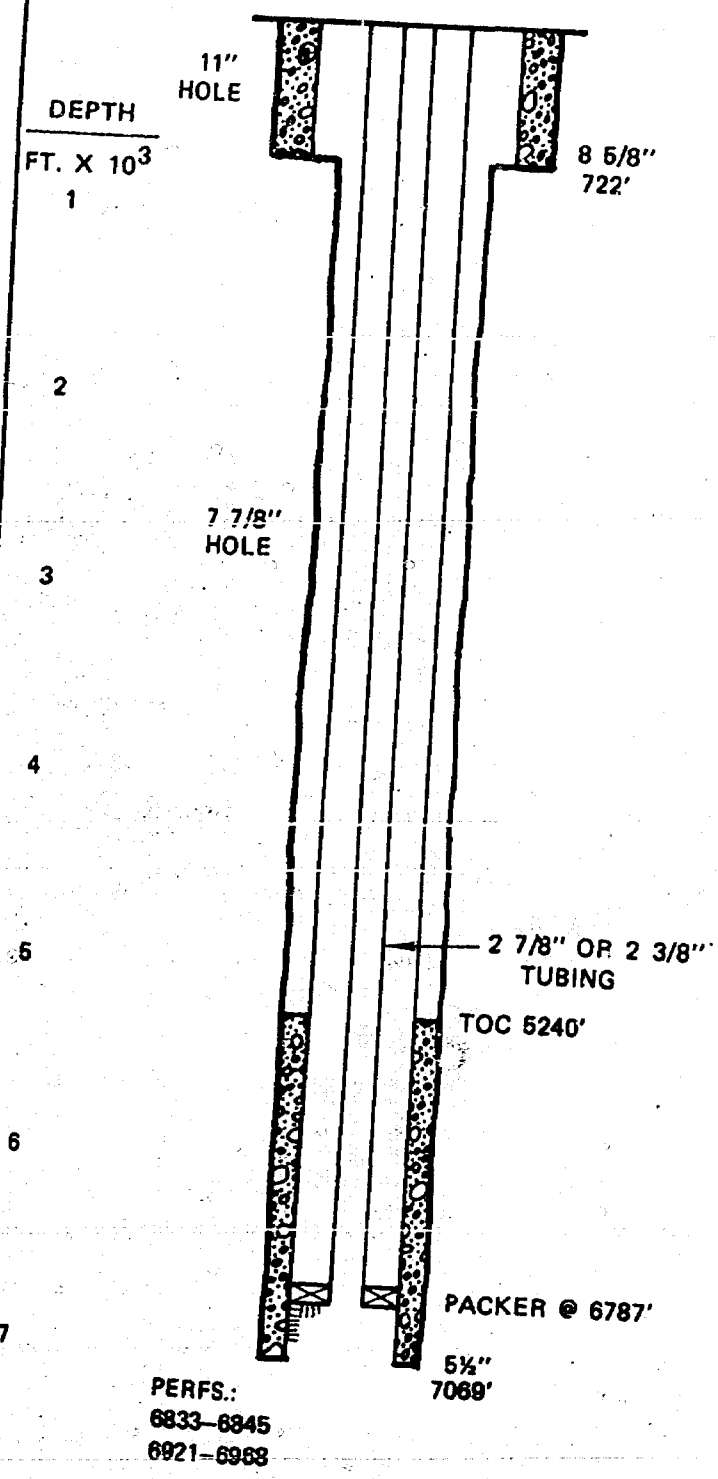
MR. NUTTER: Yes, sir, they are.

Q. Will you generally describe what drilling operations El Paso proposes to conduct in its Washington Ranch Storage Project?

A. We propose drilling 17 new withdrawal-

WASHINGTON RANCH
TYPICAL EXISTING
PRODUCING WELL

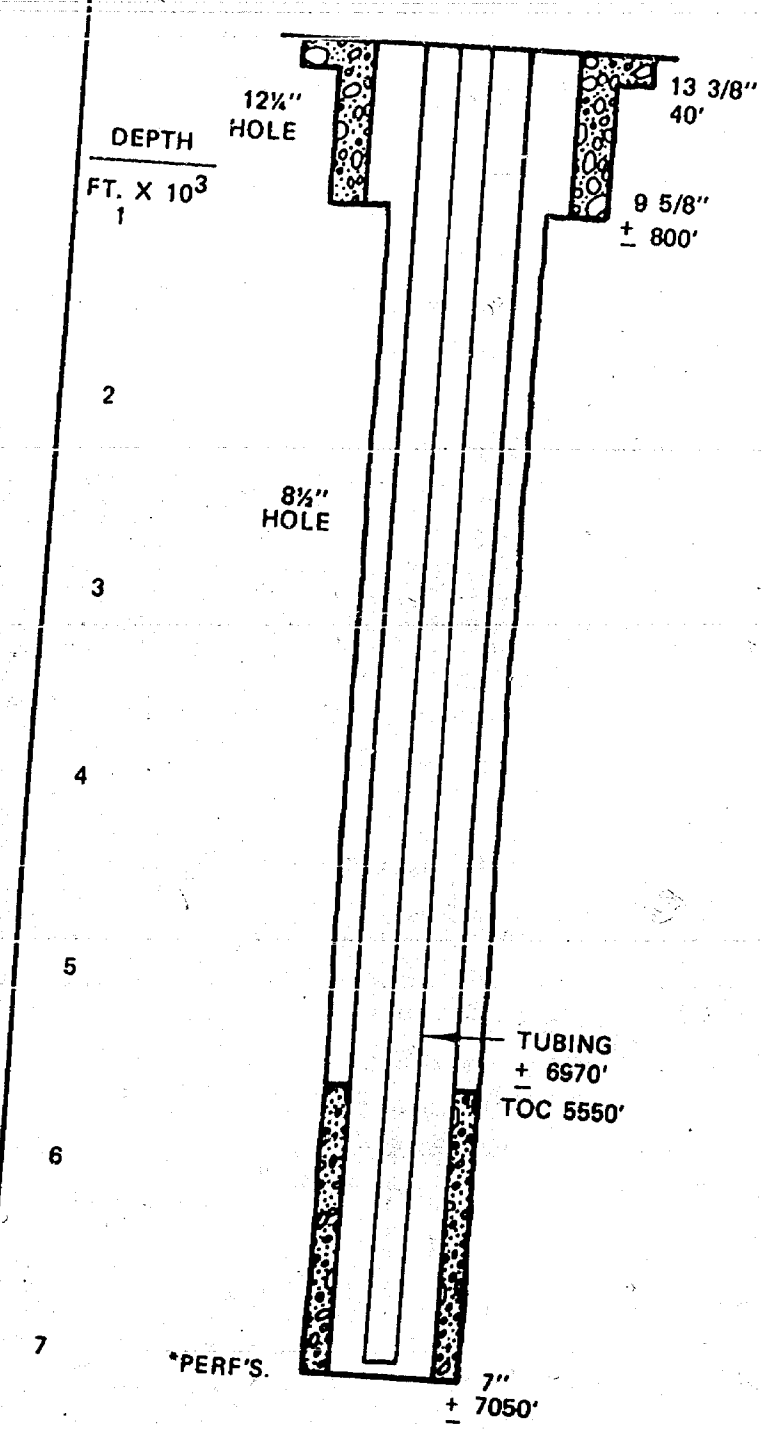
BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
El Paso EXHIBIT NO. 9
CASE NO. 6703



SIZE	GRADE	WT	BURST	COLLAPSE	DRIFT ID
8 5/8"	---	24	---	---	---
5 1/2"	---	14	---	---	---
5 1/2"	---	15.5	---	---	---
2 3/8"	J-[illegible]	---	---	---	---
or	or				
2 7/8"	N-80	---	---	---	---

WASHINGTON RANCH
PROPOSED NEW I–W WELL

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
El Paso EXHIBIT NO. 8
CASE NO. 6703



SIZE	GRADE	WT	BURST	COLLAPSE	DRIFT ID
13 3/8"	USED				
9 5/8"	H–40	32.3	2270	1400	8.845
7"	K–55	23	4360	3270	6.241
	J–55	6.5	7260	7680	2.441

*AVG. MID. PERF. 6970'

injection wells. In addition, we propose using 6 of the existing 10 wells as withdrawal-injection wells, and the other 4 as observation wells.

Q. Have you prepared, or caused to be prepared, a diagram depicting the proposed casing and drilling plan for the proposed withdrawal-injection wells?

A. Yes, I have.

Q. What have you used in the preparation of this exhibit?

A. This is my own well design based on the geology of the area and applicable rules and regulations of the New Mexico Oil Conservation Division.

Q. Now this exhibit is labeled Exhibit Number Eight, is that correct?

A. Yes.

Q. Would you please explain this exhibit for the Examiner?

A. As the exhibit shows, the withdrawal-injection wells will be fluid drilled to the surface shoe depth; 9-5/8ths surface pipe would be set at approximately 800 feet through all fresh water bearing formations, and 300 feet into the Upper Delaware Mountain Group and cemented to surface.

This surface casing shoe is approximately 300 feet below the lowest fresh water sand.

The production casing hole will be fluid drilled to total depth and 7-inch casing will be run and set at total depth of approximately 7050 feet, and cemented with a cement top approximately 1500 feet above the shoe.

The Morrow zone will then be jet perforated and tubing landed in min-perforations.

Q. Now, Exhibit Number Eight shows the average withdrawal-injection well, that's correct, is it not?

A. Yes, sir.

Q. I notice that it's labeled proposed new 1-W Well, which I assume means 1 withdrawal well, but you're saying it also represents an injection well that would be used for both purposes?

A. Withdrawal-injection or injection-withdrawal.

Q. I notice that your proposed well does not include a packer, is this correct?

A. In my opinion, a packer can serve no useful purpose. We do not expect any corrosion. The gas is pipeline quality gas. All fresh water zones are well protected by casing and cement. Using annular flow along with tubing flow, we can operate the well more efficiently. Also there is cost to consider. Larger tubing and a packer to handle our gas volumes would increase the cost per well as much as $18,000.

Q. Mr. Disch, you indicated that you plan to

use annular withdrawal-injection operation. Would you please explain that?

A. The annular withdrawal and injection will utilize the annulus between the 7-inch casing and the tubing. Flow through the tubing will also be used at the same time.

Q. Will you have an annulus between the production casing and the surface casing, which can be used to monitor for leaks?

A. Yes, this annulus would be an excellent way to monitor for leaks.

Q. In your opinion would annular injection-withdrawal endanger fresh water sources?

A. No, sir. Because of the casing designs and cementing program, the ground waters are more than adequately protected.

Q. Is the production casing you propose sufficient to withstand any pressures which you would expect to encounter?

A. Yes. The production casing is 7-inch K-55 23 pound, with a burst pressure of 4360 pounds per square inch. With a maximum injection pressure of approximately 3000 pounds per square inch, this gives us a safety factor of 1.45.

Q. In your opinion would operations in this pressure range preclude the possibility of fracturing the

confining strata?

A. Yes.

Q. In your opinion will your cementing program assure that there is no migration of injected gas above or below the injection zone?

A. Yes.

Q. Have you reviewed data relating to the existing wells drilled through the Morrow formation within this unit area to determine if remedial work should be done with respect to these wells?

A. Yes, I have.

Q. Is it your opinion that remedial work should be done?

A. No, the well records indicate that the wells are in adequate condition for our proposed operation, so we do not anticipate any workovers at this time.

MR. NUTTER: Now, are you referring to the wells that you're going to be using as well as all the other wells in this area?

A. Yes, sir.

MR. NUTTER: You've looked at all of them, including these old wells that are P&A, and they all look good to you?

A. Yes, sir. I reviewed all of them. I've also discussed with each individual operator.

MR. NUTTER: Well now, Mr. Disch, I notice on this Exhibit Number Four, I've marked my observation wells here, looks like all of the existing wells that are in there now, will either be used for injection-withdrawal or observation with the exeption of that well that's in the southeast quarter of Section 28. What would be the status of it, or has this been plugged?

A. That's a -- one moment, let me get my reference map here.

That well has been plugged and abandoned. It was the Cities Service Government M No. 1.

MR. NUTTER: And then these two wells down here in 11 and 12 used to produce; they've both been P&Ad also, haven't they?

A. Yes, sir. The one in 11 was the J. M. Huber Corporation - Superior Oil Company USA No. 1. The one in 12 is the Superior Oil Government 134 No. 1.

MR. NUTTER: So every well that hasn't been plugged is going to be utilized by you in some manner.

A. Yes, sir.

MR. NUTTER: Plus the 17 that you'll be drilling.

A. Yes, sir.

MR. NUTTER: Okay. Go ahead.

Q. Do you propose to run cement bond logs on

any or all of your withdrawal-injection wells which will be drilled?

A. We will run a cement bond log on all the new wells and on any well that will be reworked.

Q. Has your casing program been designed to comply with the proposed EPA rules that were published in the Federal Register on -- in March of 1979?

A. Yes.

Q. In your opinion do your proposed casing designs fully protect any ground water which may exist in the Washington Ranch area?

A. Yes. As I previously testified, the surface casing will be set well below any fresh water bearing formation and cemented to surface.

In my opinion, this will adequately protect any fresh water formations.

Q. As to any observation wells that may be drilled, would they have the same program as that indicated in your Exhibit Eight?

A. Any new observation wells to be drilled, yes, would be the same as in this Exhibit Eight.

Q. But you don't currently propose to drill any new observation wells?

A. Not at this time.

Q. You have prepared another exhibit, have

you not, Mr. Disch?

A. Yes, sir.

Q. Would you please turn to that exhibit and indicate what it -- what it shows?

A. This is Exhibit Number Nine and it depicts a typical completion of an existing producing well.

8-5/8ths-inch casing was set in an 11-inch hole at 772 feet and cemented to surface.

A 7-7/8ths-inch hole was drilled to 7070 feet and 5-1/2-inch casing was set at 7069 feet.

Casing was cemented with 350 sacks with the cement top at 5240 feet by temperature survey. The casing was perforated from 6833 feet to 6843 feet and from 6921 feet to 6968 feet. 2-3/8ths-inch tubing was run and the packer was set at 6787 feet.

Q. In the event another hydrocarbon-bearing formation were encountered, would your casing program protect that formation?

A. Yes.

Q. Do the two exhibits which you have presented represent the program for which El Paso seeks Commission approval today?

A. Yes, sir. El Paso would like Commission approval for this proposed program and an express Commission finding that this proposed program will adequately protect

any aquifers in the area against contamination.

Q. What plugging operations do you propose with regard to any existing plugged well in the area?

A. As stated previously, I have reviewed all the well records of all plugged wells in the area. I have also contacted each operator who had a plugged well in the area. After interviewing the operators and searching the well records, it appears that the wells are properly plugged and abandoned and we have no plans to re-enter any of the wells at this time.

Q. Do you have anything further you would like to present in this case?

A. Yes, I do.

First, I propose that if any operator drills to a formation deeper than our storage zone within the unit boundary, that the operator be required to set a separate or an extra string of casing to a point of 100 feet below our storage zone and cement that string with enough cement to bring the cement top 1500 feet above the casing shoe.

Second, I propose we name the wells as follows: As an example, Washington Ranch WI No. 8, meaning withdrawal-injection well No. 8, and Washington Ranch O No. 2, meaning observation well No. 2.

Q. Do you have any recommendation with respect

to the effect of present rules and regulations of the New Mexico Oil Conservation Division pertaining to gas well locations, acreage dedication, and normal gas production practices?

A. It is my recommendation that the rules and regulations of the New Mexico Oil Conservation Division pertaining to gas well locations, acreage dedication, and normal gas production practices, shall have no application to acreage dedicated to or activities upon acreage dedicated to, so long as waste does not result from the inapplication of these rules and regulations.

Q. That is, that all of those regulations would have no application to dedicated land, land dedicated to this storage area, so long as waste wouldn't result from any such inapplication of those rules?

A. That's correct.

Q. Mr. Disch, were Exhibits Eight and Nine prepared by you or under your supervision and direction?

A. Yes, they were.

MR. BURLESON: Mr. Examiner, this concludes our direct examination of this witness.

CROSS EXAMINATION

BY MR. NUTTER:

Q. Mr. Disch, have you prepared any written

proposed rules for operation of this project or for drilling and the casing of wells in it?

A. Yes, sir. I do not have it with me, but we do have a drilling program, and that is more of an in-house information, but there's nothing privileged about it and we'll be certainly glad to send you a copy.

Q. Well, I don't think that's exactly what I was talking about. I'm talking about proposed rules regarding acreage dedication and well locations, casing and cementing of wells that are -- that may be drilled by other operators to below the storage zone, et cetera.

You haven't prepared written rules?

A. No, sir, we have not.

MR. NUTTER: Mr. Burleson, can you prepare written rules that we might incorporate in any order that could be issued here on operating this project?

MR. BURLESON: Yes, sir, we'd be happy to do that.

MR. NUTTER: Okay, thank you.

MR. BURLESON: What time frame would you like it?

MR. NUTTER: Well, it depends on how fast you want your order. You can take your time, if you want to.

MR. BURLESON: We'll get that to you as soon as possible.

MR. NUTTER: Are there any other questions of Mr. Disch?

Oh, Mr. Disch, you mentioned that withdrawals would be made through the annulus and through the tubing. Would injection also be made simultaneously through the tubing and the annulus?

A. Yes, sir.

Q. What then is the purpose of running the tubing?

A. We feel there are several reasons. For example, if we ever have to kill one of the wells, the Morrow formation being a very fluid, sensitive formation, if you have tubing in the hole you have much less pump time against the formation if you pump fluid down the tubing or through the annulus and bled it through the casing.

That's the main purpose.

Another purpose will be, we'll be periodically running a bottom hole pressure bombs, that type of thing, and it's a lot easier to fish out a bomb in 2-3/8ths or 2-7/8ths tubing than it is out of 7-inch.

Q. So this is -- the purpose of the tubing is just strictly for mechanical operation.

A. Yes, sir.

Q. And other than withdrawal and injection times?

A. Yes, sir.

Q. Okay.

MR. NUTTER: Are there any other questions of Mr. Disch? He may be excused.

Do you have anything further, Mr. Burleson?

MR. BURLESON: No, sir.

MR. NUTTER: Does anyone have anything they wish to offer in Case Number 6703?

We'll take the case under advisement.

(Hearing concluded.)

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
3010 Plaza Blanca (505) 471-2462
Santa Fe, New Mexico 87501

REPORTER'S CERTIFICATE

I, SALLY W. BOYD, a Court Reporter, DO HEREBY CERTIFY that the foregoing and attached Transcript of the Hearing before the Oil Conservation Division was reported by me; that said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability, from my notes taken at the time of the hearing.

Sally W. Boyd C.S.R.

Sally W. Boyd, C. S. R.

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Memo

From

PRENTISS CHILDS
Planner

To

Send to.

El Paso Natural Gas Co.

P.O. Box 1492

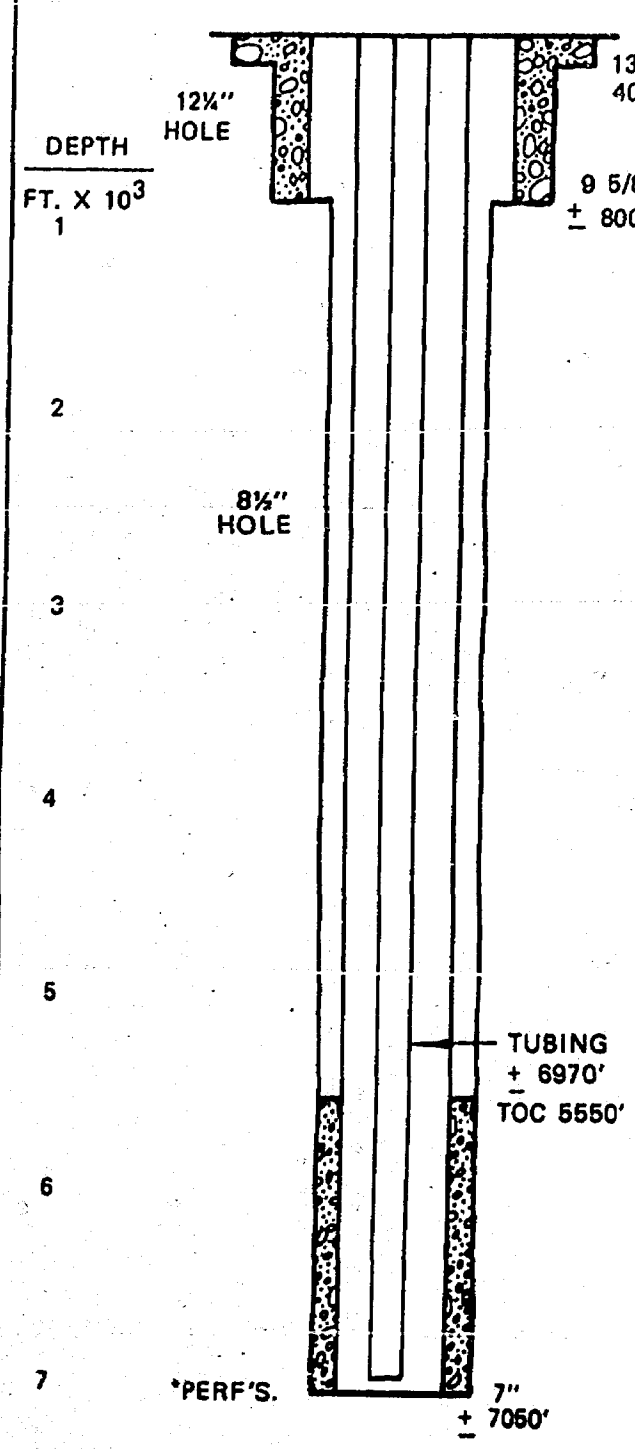
El Paso Texas 79978

att Forest Sperstes

Oil Conservation **Santa Fe, New Mexico**

WASHINGTON RANCH
PROPOSED NEW I–W WELL

BEFORE EXAMINER UTTER
OIL CONSERVATION DIVISION
El Paso EXHIBIT NO. 8
CASE NO. 6703

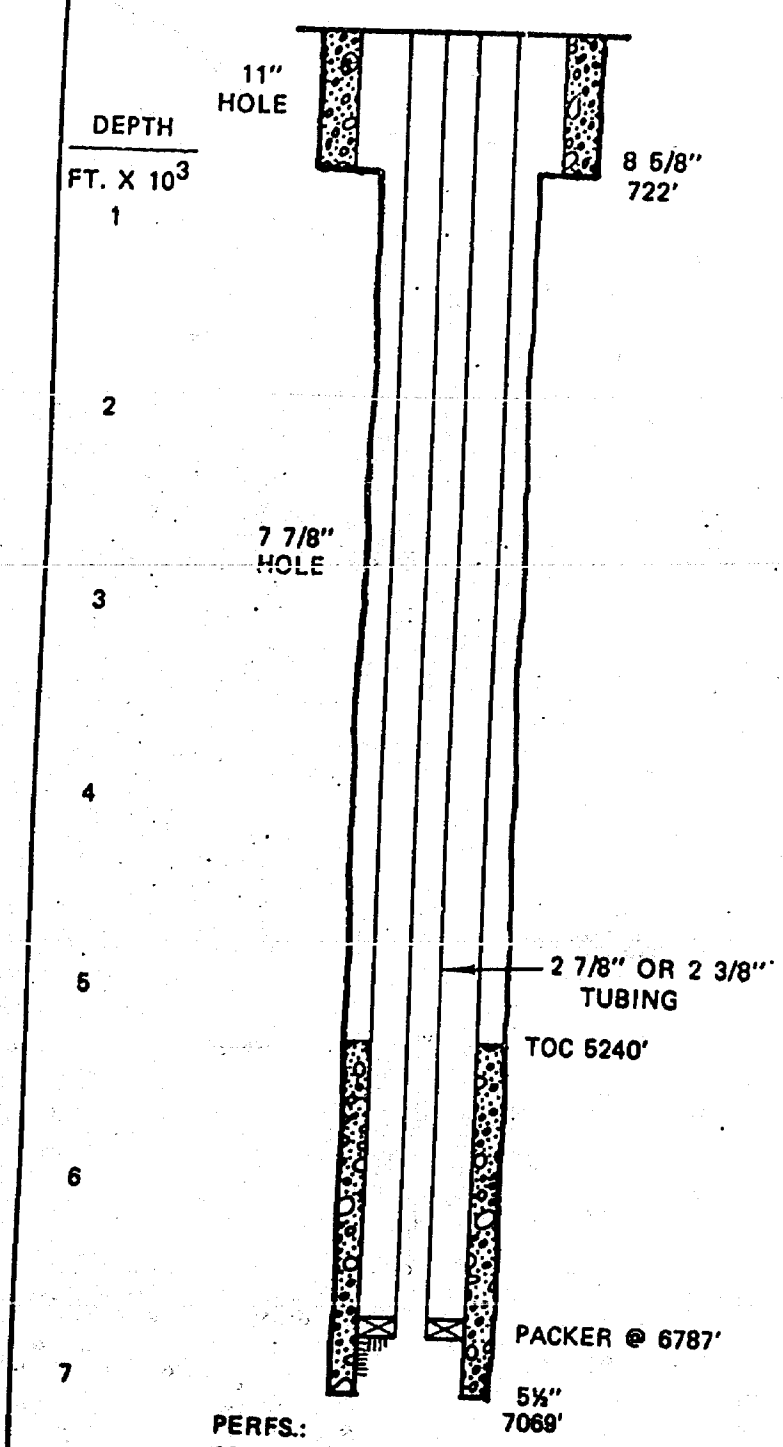


SIZE	GRADE	WT	BURST	COLLAPSE	DRIFT ID
13 3/8"	USED				
9 5/8"	H–40	32.3	2270	1400	8.845
7"	K–55	23	4360	3270	6.241
	J–55	8.5	7260	7680	2.441

*AVG. MID. PERF. 6970'

WASHINGTON RANCH
TYPICAL EXISTING
PRODUCING WELL

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
El Paso EXHIBIT NO. 9
CASE NO. 6703



SIZE	GRADE	WT	BURST	COLLAPSE	DRIFT ID
8 5/8"	---	24	---	---	---
5 1/2"	---	14	---	---	---
5 1/2"	---	15.5	---	---	---
2 3/8" or 2 7/8"	J–55 or N–80	---	---	---	---

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
DIVISION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 6703
Order No. R-6175

APPLICATION OF EL PASO NATURAL
GAS COMPANY FOR UNDERGROUND GAS
STORAGE, EDDY COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on October 17, 1979, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 2nd day of November, 1979, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

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

(2) That the applicant, El Paso Natural Gas Company, proposes the establishment of an underground gas storage project in Eddy County, New Mexico, to be known as the Washington Ranch Gas Storage Project.

(3) That the applicant has conducted geological and engineering studies to confirm the existence and areal extent of a geological structure underlying all or portions of Sections 21, 22, 23, 26, 27, 28, 29, 32, 33, 34, 35 and 36, Township 25 South, Range 24 East, NMPM, and all or portions of Sections 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, and 14, Township 26 South, Range 24 East, NMPM, and all or portions of Sections 6, 7, and 18, Township 26 South, Range 25 East, NMPM, Eddy County, New Mexico, and to determine the suitability of said structure for the underground storage of natural gas.

(4) That gas storage within said structure would be in the Pennsylvanian Morrow formation and contained within the

Morrow Clastics interval.

(5) That the aforesaid vertical interval of the Morrow formation beneath the following described lands:

EDDY COUNTY, NEW MEXICO

TOWNSHIP 25 SOUTH, RANGE 24 EAST, NMPM

Section 27: All
Section 28: S/2
Section 33: E/2
Section 34: All
Section 35: W/2

TOWNSHIP 26 SOUTH, RANGE 24 EAST, NMPM

Section 2: W/2
Section 3: All
Section 4: E/2
Section 11: All
Section 12: N/2

is a gas reservoir in New Mexico, having been created and defined by the Division as the Washington Ranch-Morrow Gas Pool by Division Order No. R-4279, effective April 1, 1972, and subsequently extended by Orders Nos. R-4377, R-4437, R-4734, and R-4782, the last dated June 1, 1974.

(6) That said Washington Ranch-Morrow Gas Pool is essentially depleted of native natural gas.

(7) That the applicant proposes to convert some 4 presently producing wells into observation wells on the outer flanks of the gas storage structure to permit the detection of any migration away from the project of gas placed in storage.

(8) That the applicant proposes to convert 6 presently producing wells into injection/withdrawal wells.

(9) That the applicant proposes to drill and complete some 17 injection/withdrawal wells in the proposed gas storage project.

(10) That the location of the injection/withdrawal wells to be drilled is proposed as follows:

TOWNSHIP 25 SOUTH, RANGE 24 EAST, NMPM

Unit M	Section 27
Unit O	Section 27
Unit A	Section 33
Unit P	Section 33
Unit B	Section 34
Unit D	Section 34
Unit E	Section 34
Unit G	Section 34
Unit L	Section 34
Unit M	Section 34
Unit N	Section 34

TOWNSHIP 26 SOUTH, RANGE 24 EAST, NMPM

Unit A	Section 4
Unit C	Section 3
Unit D	Section 3
Unit E	Section 3
Unit K	Section 3
Unit L	Section 3

(11) That the applicant proposes to drill and complete the aforesaid injection/withdrawal wells as follows:

(A) Set 9 5/8-inch surface casing approximately 300 feet into the Upper Mountain Delaware Group at a depth of approximately 800 feet and circulate cement to the surface;

(B) Drill to total depth of approximately 7,050 feet and set 7-inch casing and cement to approximately 1,500 feet above the casing shoe.

(C) Perforate the casing opposite the Morrow zone.

(D) Land 2 7/8-inch tubing at approximately 6,970 feet.

(12) That the above casing and cementing programs are adequate and should afford ample protection against loss of gas while being injected, withdrawn, or held in storage, and will provide good and sufficient protection against contamination of ground waters.

(13) That the proposed El Paso Natural Gas Company Washington Ranch Gas Storage Project is in the interest of conservation, will not cause waste, and will not impair correlative rights and should be approved, provided:

(A) The following described area would be known as the Washington Ranch Gas Storage Project Area:

TOWNSHIP 25 SOUTH, RANGE 24 EAST, NMPM
Section 21: S/2
Section 22: S/2
Section 23: SW/4
Section 26: W/2 and S[illegible]/4
Sections 27 and 28:
Section 29: E/2
Section 32: E/2
Sections 33, 34, and 35: All
Section 36: SW/4

TOWNSHIP 26 SOUTH, RANGE 24 EAST, NMPM
Sections 1 through 4: All
Section 5: NE/4
Section 9: N/2 and SE/4
Sections 10, 11, and 12: All
Section 13: N/2
Section 14: N/2

TOWNSHIP 26 SOUTH, RANGE 25 EAST, NMPM
Section 6: SW/4
Section 7: W/2
Section 18: NW/4

(B) The following described area would be known as the Active Area of the Washington Ranch Gas Storage Project:

TOWNSHIP 25 SOUTH, RANGE 24 EAST, NMPM
Section 21: S/2
Section 22: S/2
Section 23: SW/4
Section 26: W/2 and SE/4
Sections 27 and 28: All
Sections 33, 34, and 35: All

TOWNSHIP 26 SOUTH, RANGE 24 EAST, NMPM
Sections 1 through 4: All
Section 9: N/2 and SE/4
Sections 10, 11, and 12: All

(C) That the Division's rules and regulations governing well locations, acreage dedication, and the production of natural gas from gas reservoirs should not be applicable to wells located within the Active Area of the Washington Ranch Gas Storage Project as described in (12) (B) above;

(D) That an administrative procedure for approval of amended locations for injection/withdrawal wells and observation wells or for the drilling of additional wells at locations within the Active Area of the Washington Ranch Gas Storage Project as described in (12) (B) above should be established;

(E) That any well drilled within the Washington Ranch Gas Storage Project Area as described in (12) (A) above but outside the Active Area of the Washington Ranch Gas Storage Project as described in (12) (B) above

((1)) Would be located according to the General Rules of the Division, and

((2)) Would be cased and cemented in such a manner as to protect the Morrow gas storage zone.

(F) That the applicant should file injection/withdrawal reports monthly with the Division.

IT IS THEREFORE ORDERED:

(1) That the applicant herein, El Paso Natural Gas Company, is hereby authorized to establish its Washington Ranch Gas Storage Project by the injection into and withdrawal from the Morrow formation of natural gas in the following described area in Eddy County, New Mexico:

TOWNSHIP 25 SOUTH, RANGE 24 EAST, NMPM
Section 21: S/2
Section 22: S/2
Section 23: SW/4
Section 26: W/2 and SE/4
Sections 27 and 28: All
Section 29: E/2
Section 32: E/2
Sections 33, 34, and 35: All
Section 36: SW/4

TOWNSHIP 26 SOUTH, RANGE 24 EAST, NMPM
Sections 1 through 4: All
Section 5: NE/4
Section 9: N/2 and SE/4
Sections 10, 11, and 12: All
Section 13: N/2
Section 14: N/2

TOWNSHIP 26 SOUTH, RANGE 25 EAST, NMPM
Section 6: SW/4
Section 7: W/2
Section 18: NW/4

(2) That said area shall be known as the El Paso Natural Gas Company Washington Ranch Gas Storage Project.

(3) That the applicant is hereby authorized to drill, complete, and operate gas storage injection/withdrawal wells at the following locations:

TOWNSHIP 25 SOUTH, RANGE 24 EAST, NMPM

Unit M	Section 27
Unit O	Section 27
Unit A	Section 33
Unit P	Section 33
Unit B	Section 34
Unit D	Section 34
Unit E	Section 34
Unit G	Section 34
Unit L	Section 34
Unit M	Section 34
Unit N	Section 34

TOWNSHIP 26 SOUTH, RANGE 24 EAST, NMPM

Unit A	Section 4
Unit C	Section 3
Unit D	Section 3
Unit E	Section 3
Unit K	Section 3
Unit L	Section 3

(4) That the applicant is hereby authorized to utilize the following presently existing Morrow gas wells as gas storage injection/withdrawal wells:

TOWNSHIP 25 SOUTH, RANGE 24 EAST, NMPM

Cities Service Gov't. M #2, Unit N, Section 27
Black River Cities Fed. #3, Unit I, Section 33
Black River Cities Fed. #1, Unit F, Section 34
Black River Cities Fed. #2, Unit J, Section 34

TOWNSHIP 26 SOUTH, RANGE 24 EAST, NMPM

Black River Cities 3 Fed. #1, Unit F, Section 3
Black River Cities 3 Fed. #2, Unit G, Section 3

(5) That the applicant is hereby authorized to utilize the following existing Morrow gas wells as gas storage observation wells:

TOWNSHIP 25 SOUTH, RANGE 24 EAST, NMPM

Cities Service Gov't. M #3, Unit G, Section 27
Black River Cities E Fed. #1, Unit E, Section 35

TOWNSHIP 26 SOUTH, RANGE 24 EAST, NMPM

Black River Miller Com #1, Unit L, Section 2
Black River BR4 Fed. #1, Unit H, Section 4

(6) That should topographic or geologic conditions render any well location described in Orders Nos. (3), (4), and (5) above less advisable than an alternative location, or if any additional injection/withdrawal well or observation well is deemed necessary, the applicant shall notify the Division Director of such fact by letter, and shall by copies thereof also notify the Artesia District Office of the Division and the Roswell, New Mexico, Office of the United States Geological Survey.

(7) That the applicant shall file monthly Division Form C-131, Monthly Gas Storage Report, covering operations of the subject gas storage project.

(8) That the applicant shall notify the Division immediately of any evidence of leakage of gas from the gas storage project, or of any evidence of contamination of ground waters as the result of operations in the gas storage project.

(9) That should any operator drill a well to a formation deeper than the Morrow storage zone within the boundary of the Washington Ranch Gas Storage Project as described in Order

No. (1) above, the following special drilling and casing requirements shall be observed:

(A) Either water or drilling mud shall be utilized as the circulating medium while drilling through the Morrow formation;

(B) A separate, or extra, casing string shall be set at a point one hundred (100) feet below the base of the Morrow Clastics as found at a log depth of 6864 feet on the Schlumberger Gamma Ray-Sonic log of the Black River Cities Federal Well No. 1 located in Unit F of Section 34, Township 25 South, Range 24 East, NMPM, Eddy County, New Mexico;

(C) The casing shall be cemented with enough cement to cause cement to be placed behind the pipe from the casing shoe to a point 1,500 feet above the casing shoe.

(10) That the following described area shall be known as the Active Area of the Washington Ranch Storage Project:

TOWNSHIP 25 SOUTH, RANGE 24 EAST, NMPM
Section 21: S/2
Section 22: S/2
Section 23: SW/4
Section 26: W/2 and SE/4
Sections 27 and 28: All
Sections 33, 34, and 35: All

TOWNSHIP 26 SOUTH, RANGE 24 EAST, NMPM
Sections 1 through 4: All
Section 9: N/2 and SE/4
Sections 10, 11, and 12: All

(11) That the Rules and Regulations of the Division pertaining to gas well locations, acreage dedication, and normal gas production practices shall not apply to the subject active gas storage project as described in Order No. (10) above so long as waste does not result from such inapplication.

(12) Any well to be drilled within the Washington Ranch Gas Storage Project Area as described in Order No. (1) above but at a location not included in the Active Area of the Washington Ranch Gas Storage Project as described in Order No. (10) shall be located according to the General Rules and Regulations of the Division.

(13) That jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year herein-above designated.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
Director

S E A L

fd/

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

November 6, 1979

Re: CASE NO. 6703
ORDER NO. R-6175

Mr. David Burleson
Attorney
El Paso Natural Gas Company
P. O. Box 1492
El Paso, Texas 79978

Applicant:

El Paso Natural Gas Company

Dear Sir:

Enclosed herewith are two copies of the above-referenced Division order recently entered in the subject case.

Yours very truly,

JOE D. RAMEY
Director

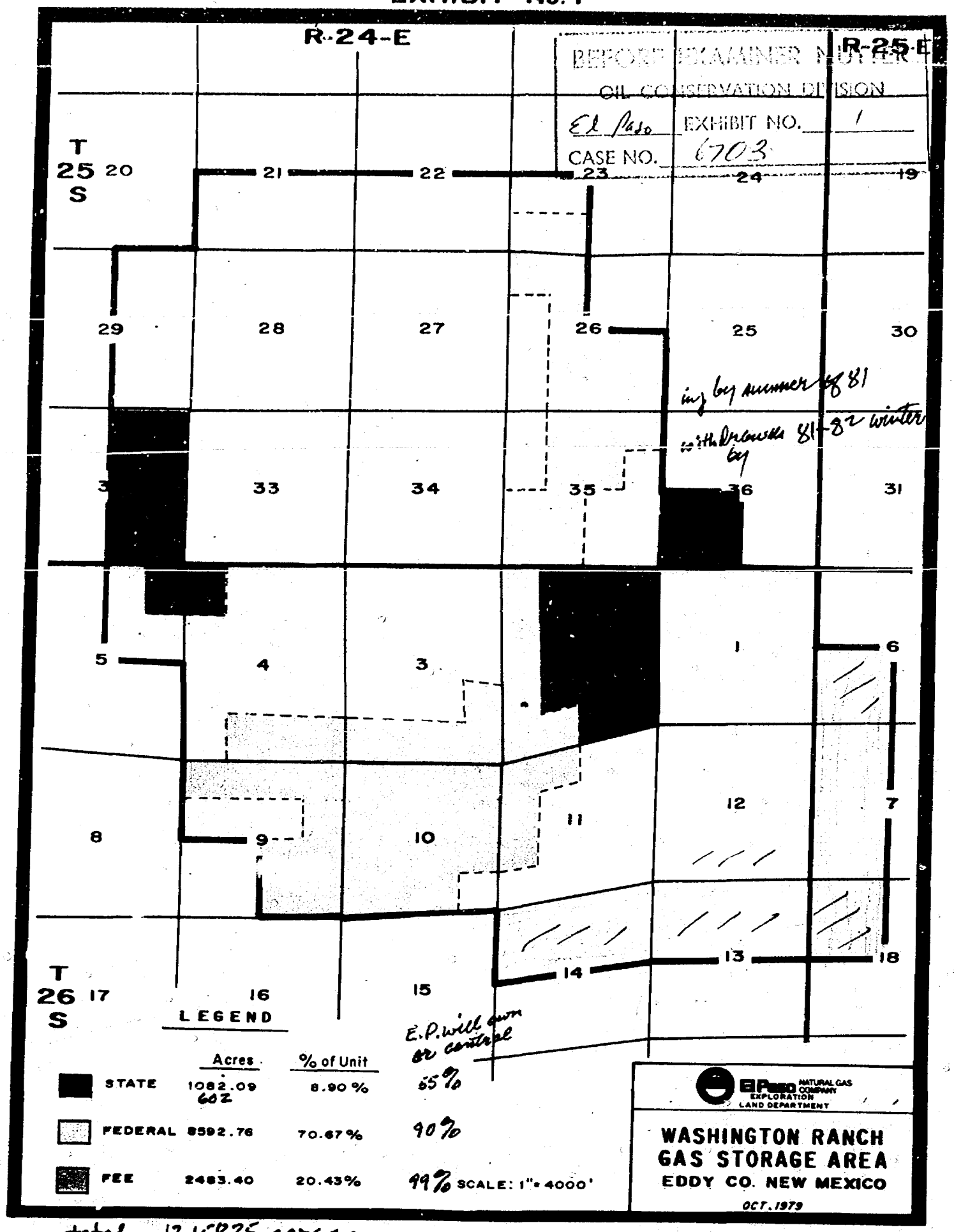
JDR/fd

Copy of order also sent to:

Hobbs OCD x
Artesia OCD x
Aztec OCD

Other Owen Lopez

TESTIMONY OF RICHARD B. ISAACKS
EXHIBIT No. 1



total 12158.25 acres

SCHLUMBERGER

COMPANY BLACK RIVER CORPORATION

WELL CITIES FEDERAL #1

FIELD WILDCAT

COUNTY EDDY STATE NEW MEXICO

LOCATION 1650' FNL & 1650' FWL

Sec. 34 Twp. 25-S Rge. 24-E

Other Services: DIL, ML, HDT

COUNTY EDDY
FIELD or LOCATION WILDCAT
WELL CITIES FEDERAL #1
COMPANY BLACK RIVER CORP.

Permanent Datum: G.L., Elev. 3725
Log Measured From K.B., 16 Ft. Above Perm. Datum
Drilling Measured From K.B.

Elev.: K.B. 3741
D.F. 3740
G.L. 3725

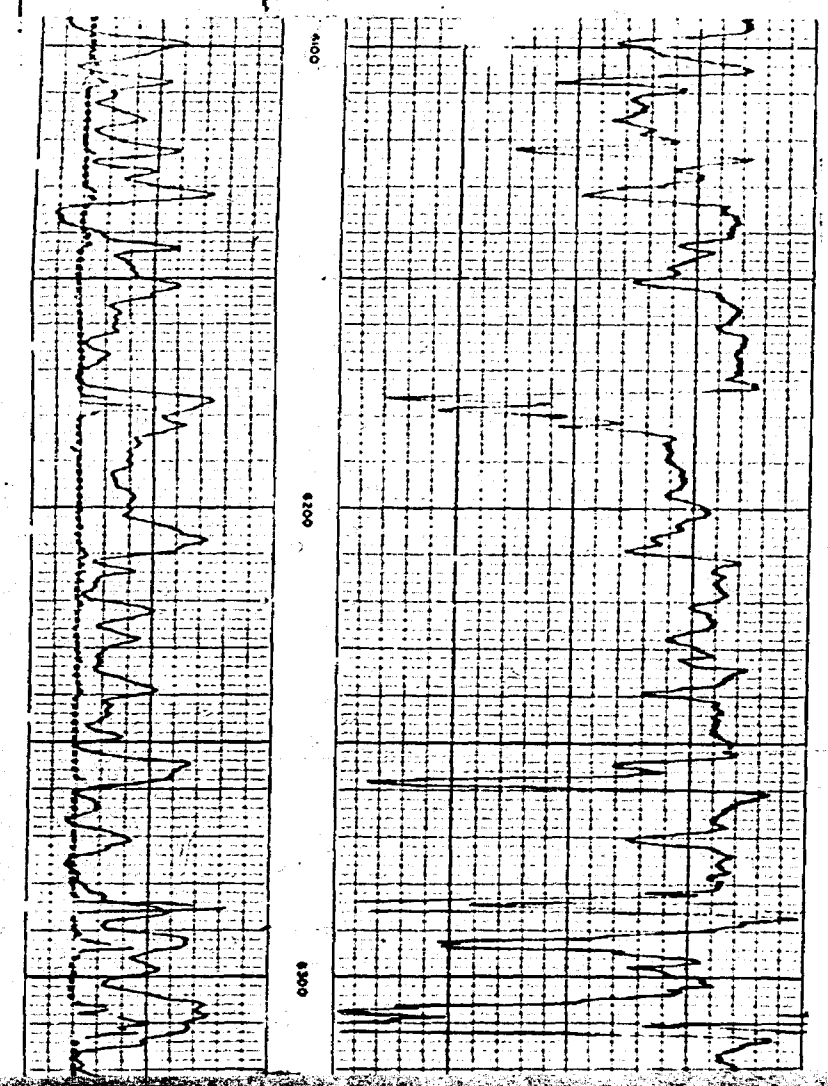
Date	6-1-71			
Run No.	ONE			
Depth—Driller	7015			
Depth—Logger	7036			
Btm. Log Interval	7034			
Top Log Interval	50			
Casing—Driller	8 5/8@1005	@	@	
Casing—Logger	1005			
Bit Size	7 7/8			
Type Fluid in Hole	FRESH WATER GEL. CHEM			
Dens. / Visc.	9 / 38			
pH / Fluid Loss	11 / 6 ml	ml	ml	ml
Source of Sample	PIT			
R_m @ Meas. Temp.	.93 @ 63 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	1.09 @ 63 °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	1.23 @ 63 °F	@ °F	@ °F	@ °F
Source: R_{mf} R_{mc}	M / M			
R_m @ BHT	.60 @ 136 °F	@ °F	@ °F	@ °F
Time Since Circ.	4 HOURS			
Max. Rec. Temp.	136 °F	°F	°F	°F
Equip. / Location	7627 / HOBBS			
Recorded By	BIRKHEAD, STONE			
Witnessed By	MILLER			

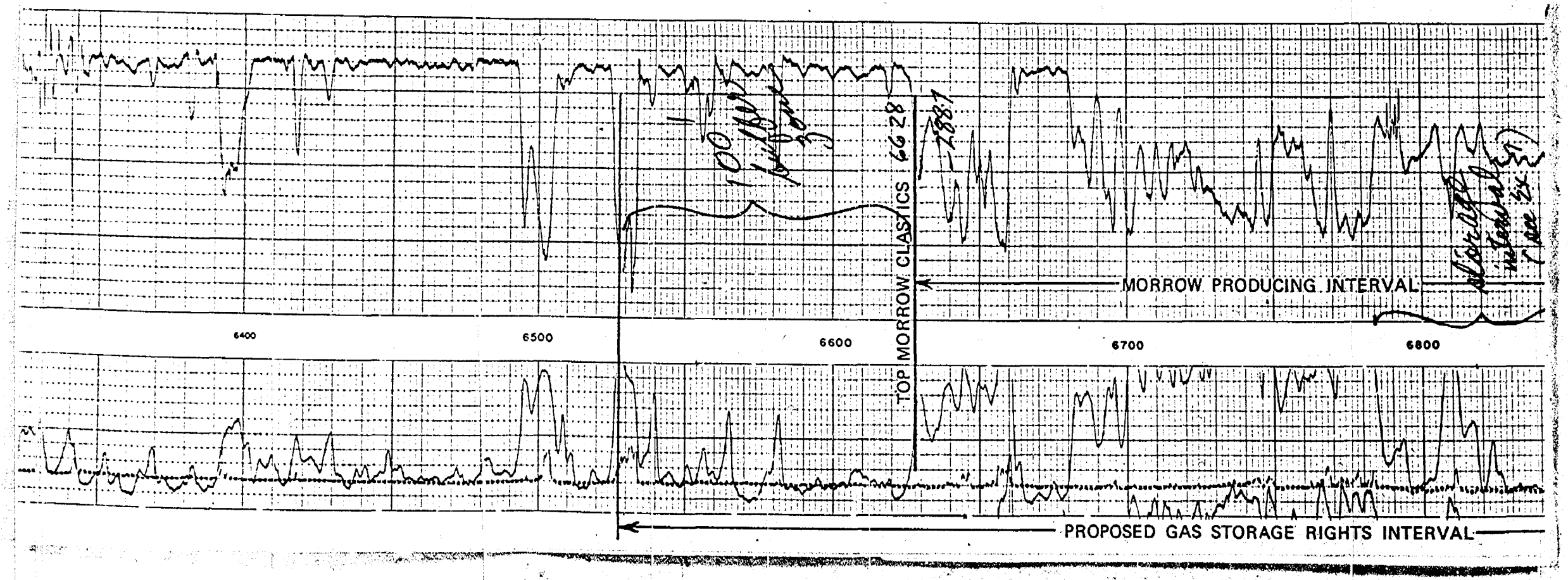
BEFORE EXAMINER UTTER
OIL CONSERVATION DIVISION
EL Paso EXHIBIT NO. 2
CASE NO. 4703

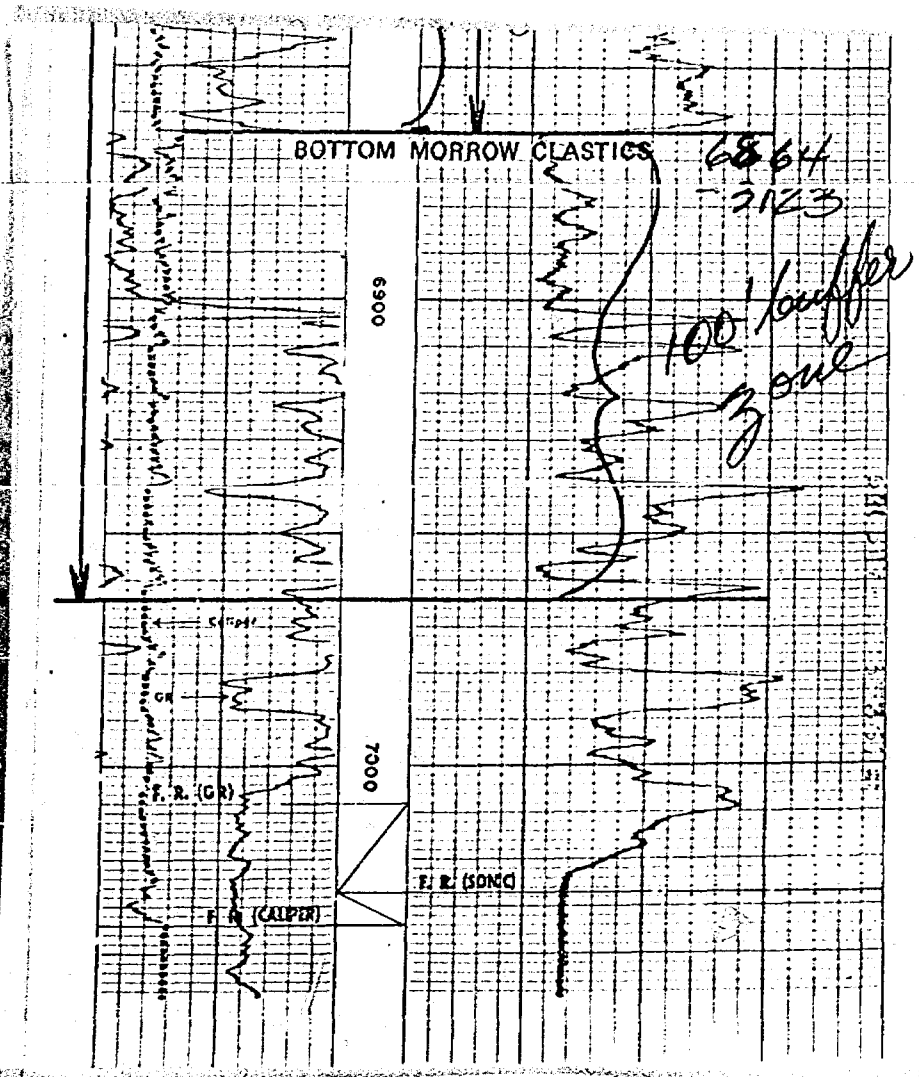
Reproduced By
Electrical Log Services
Midland, Texas 79701

REFERENCE W 6205F

COMPLETION RECORD




6400
6500
6600
6700
6800
TOP MORROW CLASTICS 6628
MORROW PRODUCING INTERVAL
PROPOSED GAS STORAGE RIGHTS INTERVAL

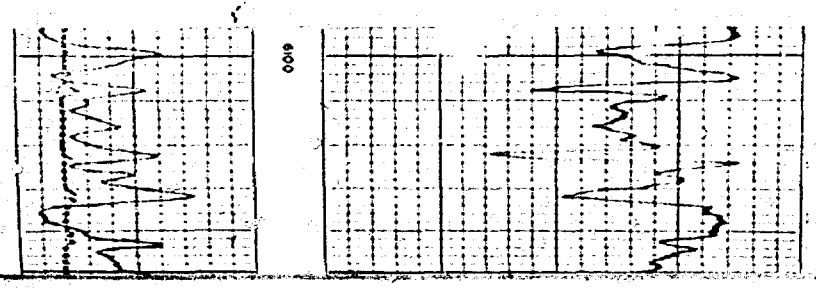


Reproduced by
Electrical Log Services
Midland, Texas 79701

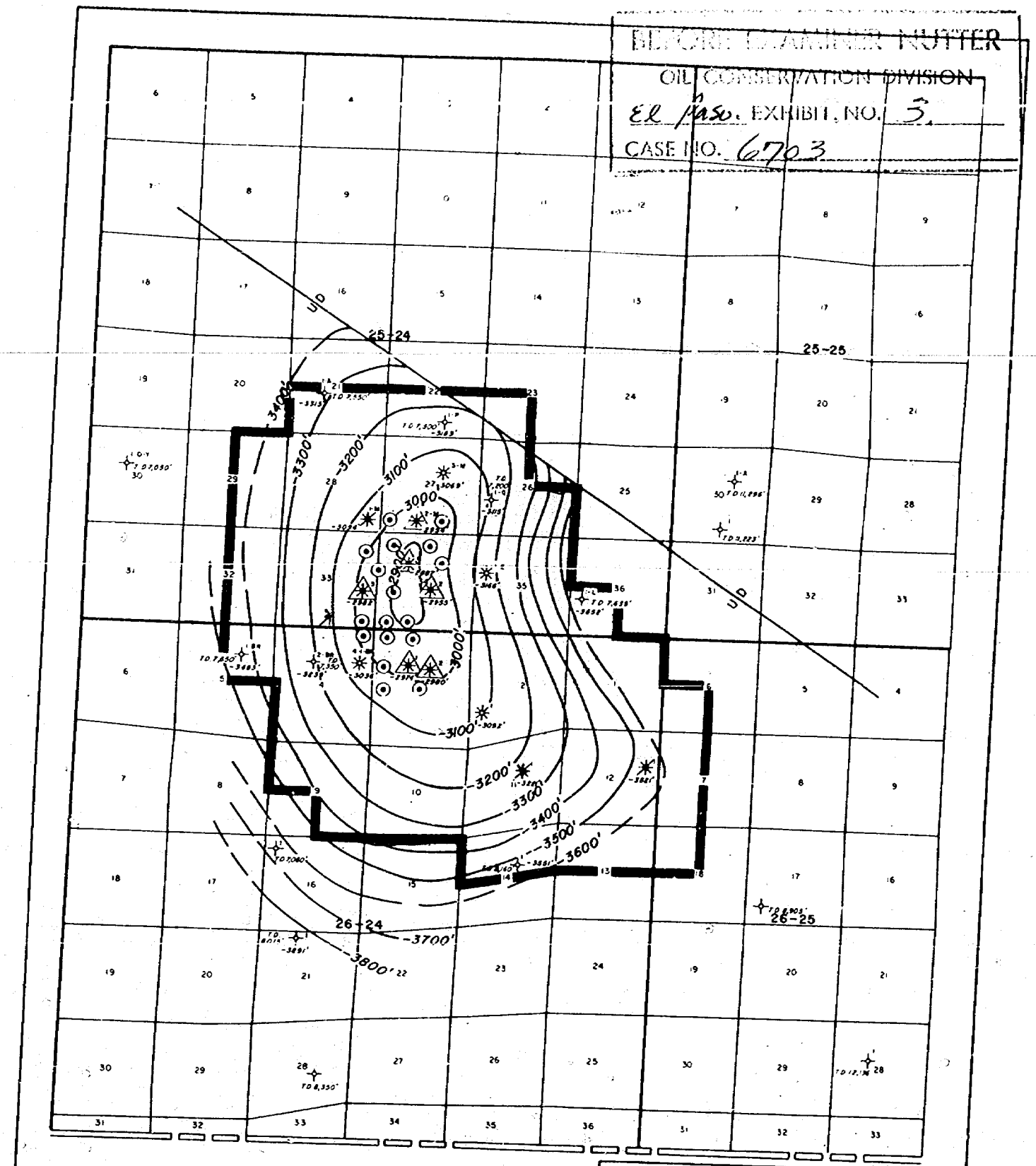
REFERENCE W 6205F

ELSI

COMPLETION RECORD



BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
El Paso EXHIBIT NO. 5
CASE NO. 6703



LEGEND

- PROPOSED INJECTION-WITHDRAWAL WELL
- PROPOSED LOCATION, INJECTION-WITHDRAWAL WELL
- OBSERVATION WELL
- ABANDONED MORROW WELL
- DRY HOLE
- PROPOSED GAS STORAGE AREA OUTLINE

N

El Paso Natural Gas Company

WASHINGTON RANCH MORROW GAS STORAGE PROJECT

EDDY COUNTY, NEW MEXICO

STRUCTURE MAP

TOP OF MORROW CLASTICS

CONTOUR INTERVAL = 100 FEET

SCALE IN MILES

DATE 8-79

El Paso 3
6703

UD

25-24

25-25

3400'
3300'
3200'
3100'
3000'

26-24
-3700'
-3800'

26-25

- Outline Washington Ranch-Morrow Gas Pool
- Washington Ranch Gas Storage Project Area
- Not included in W.R.G.S.P. "ACTIVE AREA"

LEGEND

PROPOSED INJECTION-WITHDRAWAL WELL

PROPOSED LOCATION, INJECTION-WITHDRAWAL WELL

OBSERVATION WELL

BORROW WELL

STORAGE AREA OUTLINE

N

El Paso Natural Gas Company

WASHINGTON RANCH MORROW GAS STORAGE PROJECT

EDDY COUNTY, NEW MEXICO

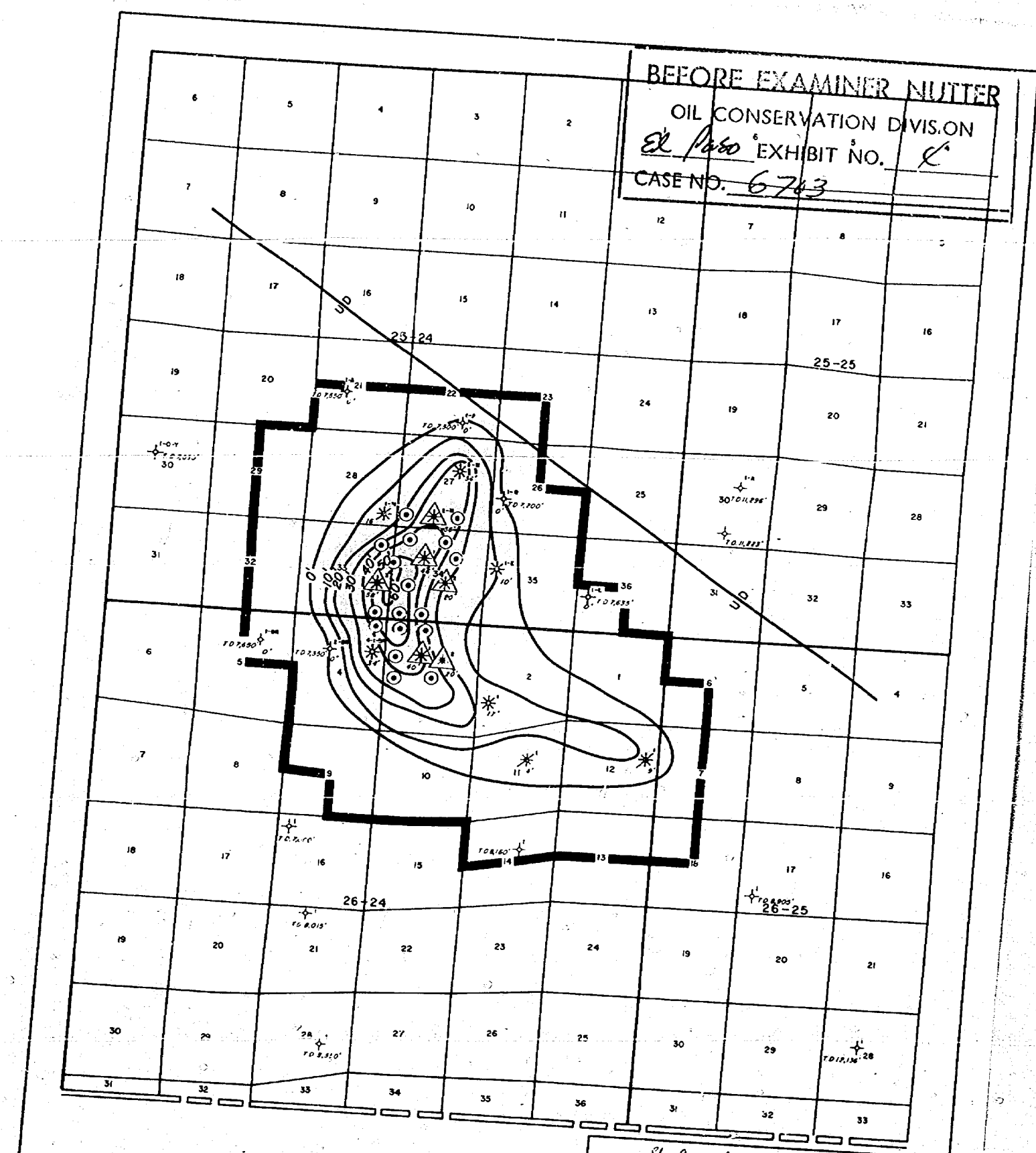
STRUCTURE MAP

TOP OF MORROW CLASTICS

CONTOUR INTERVAL = 100 FEET

DATE 8-79

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
El Paso EXHIBIT NO. 6
CASE NO. 6763



LEGEND

- PROPOSED INJECTION-WITHDRAWAL WELL
- PROPOSED LOCATION, INJECTION-WITHDRAWAL WELL
- OBSERVATION WELL
- ABANDONED MORROW WELL
- DRY HOLE
- PROPOSED GAS STORAGE AREA OUTLINE

N

El Paso Natural Gas Company

WASHINGTON RANCH MORROW GAS STORAGE PROJECT

EDDY COUNTY, NEW MEXICO

NET SAND ISOPACH MAP

MORROW RESERVOIR
CONTOUR INTERVAL = 10 FEET

DATE: 8-79

SCALE IN MILES

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
El Paso EXHIBIT NO. 5
CASE NO. 6703

NMOCC Case 6703
Exhibit 5

Washington Ranch Morrow Gas Storage Project,
Showing Location of Wells Currently Producing, their Future
Producing Status, and Wells Proposed to be Drilled
and Completed for Gas Injection-Withdrawal Purposes

Presently Producing (10)

	Unit	Section	Code
T-25-S R-24-E	G	27	2
	N	27	1
	I	33	1
	F	34	1
	J	34	1
	E	35	2
T-26-S R-24-E	H	4	2
	F	3	1
	G	3	1
	M	2	2

CODE: 1. Well will be utilized as an injection-withdrawal well.

2. Well will be used as an observation well.

Location of Wells to be Drilled (17)

	Unit	Section
T-25-S R-24-E	M	27
	O	27
	A	33
	P	33
	B	34
	D	34
	E	34
	G	34
	L	34
	M	34
	N	34
T-26-S R-24-E	A	4
	C	3
	D	3
	E	3
	K	3
	L	3

BEFORE EXAMINER MUTTER
OIL CONSERVATION DIVISION
EXHIBIT NO. 6
CASE NO. 6703

NMOCC Case 6703
Exhibit 6

Proposed Coring and Electrical Log Program

For

Washington Ranch Gas Storage Project

Coring Program

It is recommended that 3 wells be cored in the process of drilling and completion of 17 injection-withdrawal wells.

These will be full diameter cores, and cover the entire Morrow producing interval, including 100 feet of section above and below the Morrow Clastics interval, as more fully described in El Paso's proposed Washington Ranch "Gas Storage Interval."

Analyses suggested to be run on these cores would include conventional porosity, permeability and residual fluid saturation determinations.

The location of wells which are recommended for coring are:

Unit	Sec	TWP	Range
O	27	25	24
L	34	25	24
K	3	26	24

Electrical Logging Program

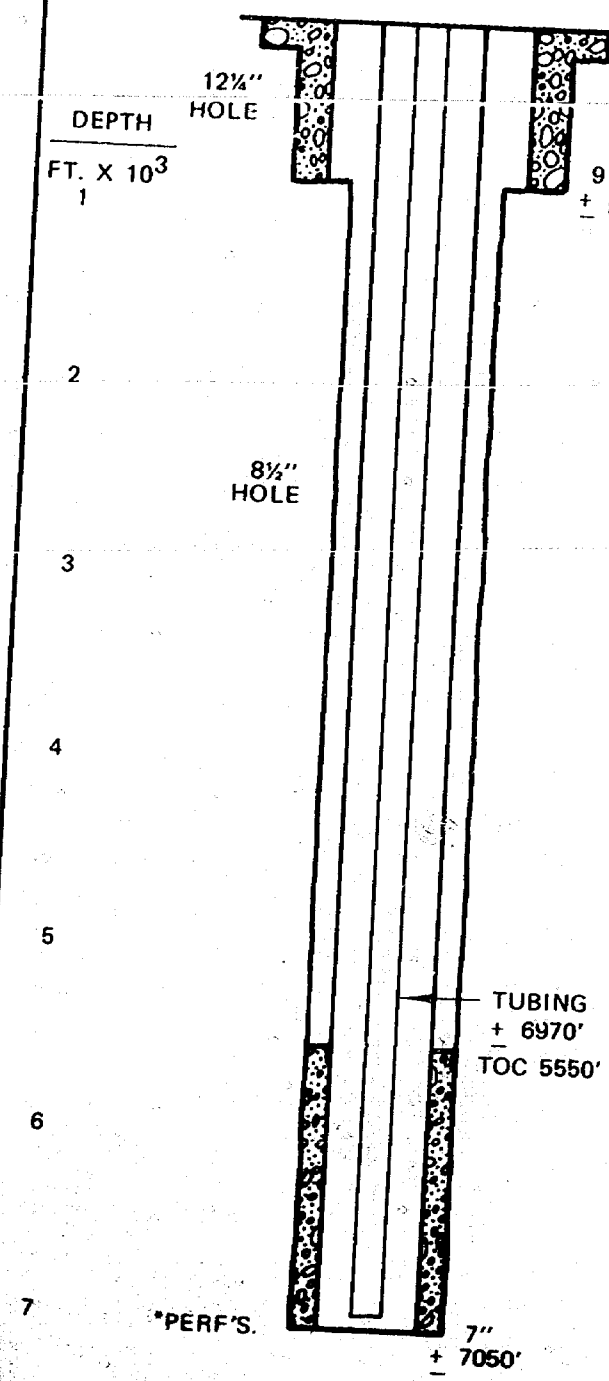
Each well drilled will have the following electrical surveys run:

(1) Schlumberger Dual Induction Spherically Focused Log with Spontaneous Potential (SP) and Gamma Ray curves.

(2) Schlumberger Formation Density - Compensated Neutron Log (FDC - CNL).

(3) Schlumberger Sonic Log (BHC).

WASHINGTON RANCH
PROPOSED NEW I–W WELL



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*AVG. MID. PERF. 6970'

WASHINGTON RANCH
TYPICAL EXISTING
PRODUCING WELL

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El Paso EXHIBIT NO. 9
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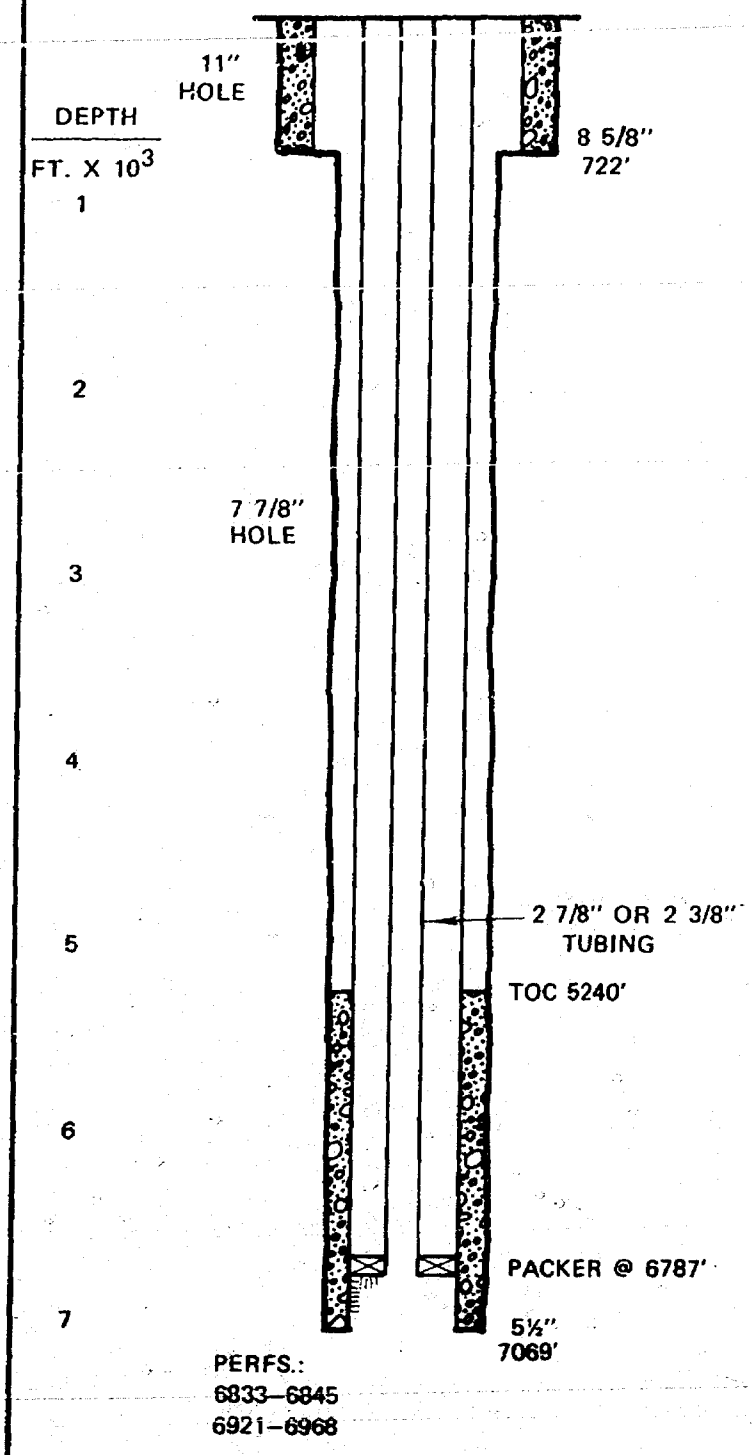

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5 1/2"	---	14	---	---	---
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2 3/8" or 2 7/8"	J–55 or N–80	---	---	---	---

12-3-81

Oscar

Farrest

Sprusker

El Paso Natural

Gas

915-541-6138

El Paso NATURAL GAS COMPANY

P. O. BOX 1492
EL PASO, TEXAS 79978
PHONE: 915-543-2600

DAVID T. BURLESON PRINCIPAL COUNSEL

October 30, 1979

File Case 6703

State of New Mexico
Energy and Minerals Department
Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87501

Attention: Mr. Daniel S. Nutter

Re: Application of El Paso Natural Gas Company ("El Paso") for Underground Gas Storage, Eddy County, New Mexico: Washington Ranch Gas Storage Project

Dear Mr. Nutter:

At the hearing held on October 17, 1979, related to El Paso's Washington Ranch Gas Storage Project, you requested that El Paso send to you its proposed field rules for the project area. Pursuant to that request, El Paso proposes that the following special rules be implemented in the Washington Ranch Gas Storage Project area by incorporating said rules into the Division's order in this case:

1. Should topographic or geologic conditions render any injection/ withdrawal well or observation well location less advisable than an alternative location, or if any additional injection/ withdrawal well or observation well is deemed necessary, El Paso shall notify the Division-Director of such fact by letter, and shall by copies thereof also notify the Artesia District Office of the Division and the Roswell, New Mexico, Office of the United States Geological Survey.

2. That any operator who drills a well to a formation deeper than the Morrow Storage Interval within the boundary of the Washington Ranch Gas Storage Project Area should be subject to the following special drilling and casing requirements:

A. Either water or drilling mud should be required as the circulating medium while drilling through the Morrow Storage Interval; and

B. A separate, or extra, casing string should be set at a point one hundred (100) feet below the Morrow Storage Interval; and

C. The casing should be cemented with enough cement to cause cement to be placed behind the pipe from the casing shoe to a point 1,500 feet above the casing shoe.

3. That the following described area shall be known as the Active Area of the Washington Ranch Gas Storage Project:

TOWNSHIP 25 SOUTH, RANGE 24 EAST, NMPM

Section 21: S/2
Section 22: S/2
Section 23: SW/4
Section 26: W/2 and SE/4
Section 27: All
Section 28: All
Section 33: All
Section 34: All
Section 35: All

TOWNSHIP 26 SOUTH, RANGE 24 EAST, NMPM

Section 1: All
Section 2: All
Section 3: All
Section 4: All
Section 9: N/2 and SE/4
Section 10: All
Section 11: All
Section 12: All

4. That the Rules and Regulations of the Division pertaining to gas well locations, acreage dedication, and normal gas production practices shall not apply to the Active Area of the Washington Ranch Gas Storage Project as described above so long as waste does not result from such inapplication.

5. Any well to be drilled within the Washington Ranch Gas Storage Project area but at a location not included in the Active Area of the Washington Ranch Gas Storage Project shall be located according to the General Rules and Regulations of the Division.

Very truly yours

David J. Burleson

RECEIVED
NOV 5 - 1979
OIL CONSERVATION DIVISION
SANTA FE

sr

October 17, 1979

CASE 6703

NSP: SF
Artesia

Application of El Paso Natural Gas Company for ~~a~~ underground gas storage, ~~project~~, Eddy County, New Mexico.

Applicant, in the above-styled cause, seeks authority to institute a gas storage project in the Morrow formation underlying ~~on~~ its Washington Ranch Morrow Unit Area in Townships 25 and 26 South, Ranges 24 and 25 East, Washington Ranch Morrow Gas Pool. ~~to be used for the injection and withdrawal of gas.~~ Applicant further seeks ~~administra~~ the promulgation of rules governing the drilling and completion of wells going thru the Morrow formation into deeper formations, and the establishment of an administrative procedure for the consideration of exceptions to the Division's well spacing ~~casing and tubing requirements~~ in the unit area and casing and tubing requirements for its injection and withdrawal wells.

and the first 100 feet immediately above said formation underlying

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
State Land Office Building
Santa Fe, New Mexico
17 October, 1979

EXAMINER HEARING

IN THE MATTER OF:

Application of El Paso Natural Gas Company for underground gas storage, Eddy County, New Mexico.

CASE 6703

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For El Paso Natural Gas Company: David Burleson, Esq.
EL PASO NATURAL GAS COMPANY
El Paso, Texas 79978

For the Oil Conservation Division: Ernest L. Padilla, Esq.
Legal Counsel for the Division
State Land Office Building
Santa Fe, New Mexico 87503

For El Paso Natural Gas Company: Owen Lopez, Esq.
MONTGOMERY LAW FIRM
Paseo de Peralta
Santa Fe, New Mexico 87501

I N D E X

E X H I B I T S

MR. NUTTER: We'll call now Case 6703.

MR. LOPEZ: Owen M. Lopez, with the Montgomery Law Firm, Santa Fe, New Mexico, appearing on behalf of the applicant, and associated with me in the case is Mr. David P. Burleson of the office of general counsel, El Paso Natural Gas Company, El Paso, Texas, who will present the witnesses.

MR. NUTTER: And before you get started, we'll take a fifteen minute recess.

(Thereupon a recess was taken.)

MR. NUTTER: The hearing will come to order, please. I believe the record will show we had called Case Number 6703 and David Burleson and Owen Lopez have made appearances in this case.

Would you proceed, please?

MR. BURLESON: Yes, sir, we have three witnesses who should be sworn.

(Witnesses sworn.)

MR. BURLESON: I have a brief opening statement, please.

El Paso Natural Gas Company proposes in this application to construct and operate certain gas injection and withdrawal facilites so as to convert the Morrow formation underlying the Washington Ranch Morrow Gas Field in Eddy County, New Mexico, to a gas storage reservoir.

This storage reservoir is proposed to be utilized to store gas volumes which would otherwise be available to El Paso's low priority east of California customers.

This gas would then be used to protect the requirements of El Paso's high priority east of California customers during periods of peak demand.

Assuming required authorizations are timely obtained, it is anticipated injections could occur in the summer of 1981 and withdrawals could occur during the winter heating season of 1981-1982.

El Paso's application specifically seeks Commission approval pursuant to its authority under Section 65-3-11 of the Oil and Gas Act of El Paso's proposed storage operations and activities.

Secondly, El Paso seeks an express finding that its proposed well completion program, to be hereinafter described by one of the witnesses, will protect aquifers in the area of the proposed storage project.

Thirdly, El Paso seeks the adoption of appropriate field rules consistent with the operation of the

proposed gas storage project.

That concludes the opening statement and now we will turn to Mr. Isaacks.

RICHARD B. ISAACKS

being called as a witness and having been duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. BURLESON:

Q. Would you please state your record -- your name for the record, please?

A. My name is Richard Isaacks. I'm a staff landman with the El Paso Exploration Company in El Paso, Texas.

Q. Where do you reside, please?

A. El Paso, Texas.

Q. By whom are you -- you said you were employed by El Paso Natural Gas.

A. El Paso Exploration Company.

Q. El Paso Exploration, okay. What is the relationship between El Paso Exploration and El Paso Natural Gas Company?

A. El Paso Exploration Company is a wholly owned subsidiary of the El Paso Natural Gas Company.

Q. Have you previously testified before the Division and had your credentials as a petroleum landman made a matter of record?

A. Yes, I have.

MR. BURLESON: Mr. Examiner, are Mr. Isaacks' qualifications as a petroleum landman acceptable?

MR. NUTTER: Yes, they are. Please proceed.

Q. What general catefories of land are included in the proposed Washington Ranch Gas Storage Area?

A. There's a total of 12,158 acres in the storage area. The State of New Mexico lands comprise approximately 1082 acres, or 8.9 percent. The Federal lands comprise 85.93 -- 8593 acres, or approximately 70.67 percent, and the fee lands comprise 2483 acres, or 20.43 percent.

Q. Have you prepared an exhibit which shows the boundary of the proposed storage area and indicates which lands are fee, state, or federally owned?

A. Yes, I have. It is Exhibit Number One.

Q. Are those lands indicated as State Lands presently subject to oil and gas leases, storage, or other agreements?

A. As of this date all of the State lands are subject to existing oil and gas leases. Of the 1082 State acres, El Paso either owns or controls 602 acres. El Paso has made application to the Commissioner of Public Lands for

a gas storage easement covering all the State lands within the storage area, and the rights that will be granted to El Paso under the easement will be subject to the existing oil and gas leases, which cover the 480 acres that we don't own but El Paso will be unable to enjoy our full rights under the leased lands until those leases are expired.

Q. Is there any production on the State of New Mexico lands? Currently?

A. Yes. At this time there is one well in the Washington Ranch Morrow Field which has production allocated to a State Oil and Gas Lease, and that's the Black River Miller No. 2 Well in the southwest quarter of Section 2 And that's holding one State Oil and Gas Lease.

The lands that El Paso does not own the oil and gas leases on are non-producing and they're located out on the edge of the storage area. They're located on the edge of the structure as we have it mapped, and they're included in the storage area as a buffer.

Q. Would you describe those lands that you are alluding to?

A. Okay. The -- all of these lands are in Township 25 South, Range 24 East; the east half of Section 32 is owned by Southern Union Exploration Company. Also, we don't own or control the southwest quarter of Section 36, which I believe the record shows that's owned by Sterling J.

Talley.

Q. You mentioned the Miller No. 1 Well a moment ago and said it was producing from State lands, and I think you indicated that that was owned by Cities Service, Black River, and Arapahoe. Do we have any arrangement with those companies?

A. Yes. El Paso has entered into an option with the owners of the production from the Washington Ranch Morrow Field, which are Cities Service Company, Black River Corporation, and Arapahoe Gas, Limited. We have the option to purchase all of their rights within the gas storage area upon El Paso getting approval of regulatory bodies.

Q. What's the status of the Federal lands within the boundary of the unit, proposed unit?

A. El Paso has made an application to the Department of Interior through the United States Geological Survey, for a gas storage agreement, which will grant El Paso the right to inject, store, and draw gas under Federal lands. The agreement is in the hands of the USGS Roswell Office at this time. It's my understanding that when they approve that agreement it will be sent to their Regional Office in Denver and then sent to Washington.

Q. Do you have an estimated date by which this approval might be obtained from the USGS?

A. No.

Q. Do you have any reason to believe that there -- that you will be unable to negotiate an agreement with the USGS?

A. No.

Q. What about the State of New Mexico, the Commissioner of Public Lands? Do you believe that you will be successful in reaching agreement with the State?

A. Yes. I haven't been given any reason by the Commissioner of Public Lands why they would not grant us a storage unit.

Q. What's the status of the fee lands within the boundary of the proposed project area?

A. El Paso has entered into gas storage lease agreements with substantially all of the fee owners in the storage area. We've taken storage leases from both the surface and mineral owners that will allow us to have effective control of the Morrow formation under the entire unit area.

Q. What's the total overall control by El Paso of all acreage within the storage area?

A. Okay. At the present time, and upon approval of the agreements that I've just mentioned with the United States Geological Survey and the -- with the Commissioner of Public Lands, El Paso will own or control 55 percent of the State lands, 90 percent of the Federal lands,

and about 99 percent of the fee lands. These percentages include Federal lands that we don't own but which are unleased and will be subject to the gas storage agreement.

Overall, El Paso will own or control 89 percent of the total storage area.

Q. Was Exhibit Number One prepared by you or under your direction or supervision?

A. Yes.

MR. BURLESON: Mr. Examiner, I move the admission into evidence of Exhibit Number One.

MR. NUTTER: Exhibit One will be admitted in evidence.

MR. BURLESON: This concludes our direct examination of Mr. Isaacks and we tender him for any questions you might have.

CROSS EXAMINATION

BY MR. NUTTER:

Q. Mr. Isaacks, you mentioned of the State leases that El Paso controlled -- owned or controlled how many acres?

A. 602 acres.

Q. Out of 1082?

A. Yes.

Q. Okay. You mentioned the two leases in

Sections 32 and 36 that belonged to Southern Union and Talley. Are those the only two State leases you don't own or control?

A. At this time that is correct.

Q. So you do control all of the State lands in Section 2 and 4 and 5?

A. That's correct.

Q. Okay. Now, you mentioned that you own or control 90 percent of the Federal lands. Where would the Federal lands be that you don't own or control?

A. Okay. Let me talk about that other ten percent, if you will. We are negotiating to purchase that other 10 percent. We have been told that those lands are going to be made available to us, but we just haven't completed the paperwork on it.

The lands are located in Township 26 South, Range 24 East, the southern part of Section -- south part of Section 12, and then they extend over into -- I take that back.

They are the north half of Section 13 and 14, and over in Township 26 South, Range 25 East, the southwest quarter of Section 6, and the northwest quarter of Section 18.

Q. Wait a minute, 6 --

A. Yes, it's over --

Q. Okay.

A. Right.

Q. And where, the northwest of 18?

A. The northwest of 18, the southwest of 6.

Q. And the north half of 13 and 14?

A. Yes, that's correct.

Q. So again, these are all edge leases that are not on the structure itself and would be part of that buffer zone that you mentioned previously.

A. Yes, that's correct, but we anticipate acquiring those leases within the next 30 days.

Q. Now you mentioned that you owned or controlled 99 percent of the fee lands. Do you have a 1 percent tract some place that --

A. Well, it's approximately 99.32 percent. There is a 5-acre surface tract in Section 34 that I don't have a signed agreement on. I've been told by the owner that he will sign our lease but he hasn't given it to us yet.

Q. 34?

A. Yes.

Q. That's shown here as being Federal.

A. He owns surface. Some of this land that is shown on here as being Federal has the surface rights been severed.

Q. I see, and so you have the mineral rights under your control in Section 34 but there's a 5-acre surface

tract that you don't.

A. That's correct.

Q. I see.

MR. NUTTER: Are there any further questions of Mr. Isaacks? He may be excused.

MR. BURLESON: El Paso now calls Mr. Lester E. Ludwick.

LESTER E. LUDWICK

being called as a witness and having been duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. BURLESON:

Q. Please state your name and where you reside.

A. My name is Lester E. Ludwick and I reside in El Paso, Texas.

Q. By whom are you employed and in what capacity?

A. I'm employed by El Paso Natural Gas Company as Manager of Reservoir Geology in the Reservoir Engineering Department.

Q. Have you previously testified before this Commission and had your credentials as a reservoir geologist

made a matter of record?

A. Yes, I have.

Q. Are you familiar with El Paso's application in this case, Case 6703, and are you aware of what El Paso is seeking?

A. Yes, sir.

MR. BURLESON: Are Mr. Ludwick's qualifications acceptable as a reservoir geologist?

MR. NUTTER: Yes, they are. Please proceed.

Q. Mr. Ludwick, please explain briefly what El Paso's plans are concerning this Case Number 6703, with respect to the operation of the storage area.

A. Well, El Paso plans to use the presently existing Washington Ranch Morrow Gas Pool as a gas storage area by storing gas in the reservoir through summer injections when such gas becomes available, and to withdraw the stored gas during the winter heating season that is needed in order to meet east of California priority one and two requirements as their needs may arise.

Q. Generally speaking, where is this pool located?

A. The Washington Ranch Morrow Gas Pool is in Townships 25 and 26 South, Ranges 24 and 25 East, in Eddy County, about eight miles southwest of White's City.

Q. And the bounds are shown on Exhibit Number

One, which was presented by Mr. Isaacks, is that correct?

A. Right, yes, sir.

Q. Is gas presently being produced from wells in this pool?

A. Yes, it is. There's ten wells that are currently producing. September, 1979 production was 210MMCF; year to date production to 10-1-79 has been 1.8 billion cubic feet. This field has produced to 10-1-79, 54.8 billion cubic feet of gas.

The estimated original recovery reserves here are 63 billion, and 54.8 billion cubic feet have been produced and this field is now substantially depleted, having produced about 87 percent of this original recoverable reserve.

Q. Would you give us a brief outline, please, of the history of this pool?

A. Right. The pool was discovered in 1971 by the drilling and completion of Black River Corporation-Cities Federal No. 1, which is located in the northwest quarter of Section 34, Township 25 South, Range 24 East.

Subsequently, twelve additional wells were completed as gas wells in the Pennsylvanian-Morrow formation in this pool, and there were also 7 wells drilled into the Morrow and abandoned, whose data was also used in establishing the limits of this Morrow reservoir.

Q. What criteria was utilized in selecting the unit area, the proposed area, that's shown on Exhibit Number One?

A. We examined all of the geological and engineering data that had been made available over the years and then initiated discussion with the USGS and subsequently requested approval by the USGS of a storage unit outline that would protect El Paso and its customers' stored gas from migration or exploitation from offsetting acreage.

Q. Would you please refer to Exhibit Number Two.

A. All right.

Q. And please explain for the Examiner what that depicts.

A. This is the copy of the log from the Black River Corporation-Cities Federal No. 1 Well, which illustrates the producing interval we wish to use for the storage area.

MR. NUTTER: Now, this was the discovery well, right?

A. Yes, sir, this is it.

Q. And you have the interval indicated on there, is that correct?

A. That is correct. The Washington Ranch Morrow Gas Pool produces from the Morrow Sands that are found

within the Morrow producing interval as illustrated by this borehole compensated sonic gamma ray caliper log.

The top of the Morrow Clastics interval is indicated to be at 6628, 2887 feet subsea, and it extends downward to 6864 feet, 3123 feet subsea, to the base of the Morrow Clastics interval.

MR. NUTTER: What were those intervals again?

A. The top, Mr. Nutter, was --

MR. NUTTER: No, I got the top but those two figures for the bottom.

A. The bottom was 6864, which is a -3123.

MR. NUTTER: Thank you.

A. Yes, sir.

And El Paso requests that this vertical interval be expanded to include 100 feet of section above and 100 feet of section below the Morrow Clastics interval, as described by this log.

Q. For what reason to you propose to include this 100 foot interval above and below the Morrow Clastics interval?

A. We would like to include this 100 feet above and below to protect the gas within the unit area in the case the interval is not as well defined in other wells as it is in this base type well.

Q. Would you expect that the top and the bottom of this zone would be such as to prevent the loss of gas which may be injected into the storage area?

A. Yes, I would.

Q. Please, would you explain what you mean by that?

A. Well, the Morrow Clastics zone consists of a series of sand benches that are separated by shale lenses, or beds.

The top of the Morrow Clastics zone is a shale bed which seals off the top of this first Morrow Sand bench from an overlying dense limestone formation.

The bottom of the Morrow Clastic zone is delineated by the underlying shale zone, which is dense and impervious.

The shale zones above and below the Morrow Sand benches prevent any vertical migration of gas, and our requesting an additional 100 feet of section above the top and the bottom of this Morrow Clastics interval, as described in the discovery well, is simply a precautionary measure in the unlikely event that the overlying or underlying shale beds thin within the unit area outline.

Q. Do you have an exhibit which indicates the horizontal limits of the pool as you have mapped it?

A. Yes, I do. If you would refer to Exhibit

Numbers Three and Four.

Exhibit Three is a subsurface structure map contoured on top of the Morrow Clastics interval and Exhibit Number Four is an Isopachous map of the net sand, reflecting the effective gas pay of the Morrow formation at Washington Ranch.

Q. How were the horizontal limits determined?

A. Presently the Washington Ranch Morrow Gas Pool contains approximately seven sections of land, and as you can see, it is associated with the north-south trending anticlinal feature, as illustrated by Exhibit Three. This structural feature plus sand quality deterioration, especially to the south and southeast, control the accumulation of gas here. In other words, gas accumulation is structurally and stratigraphically controlled.

Q. Is there a well defined gas-water contact associated with the gas accumulation in this pool?

A. There is not a well defined fixed gas-water contact in the Washington Ranch Gas Pool. There does not appear to be an active water drive associated with this relatively salty edgewater, and production history from wells in the pool indicates this to be a gas expansion reservoir.

To the north, east, and west of the main field area the sand quality holds up and water in some

quantity will occur down-dip. I'm speaking here of this area in Section 33, 28, 21, 22, 26, and 35, of Township 25 South, Range 24 East.

To the south and southeast the sand quality deteriorates and water is not found structurally as high as those areas previously mentioned. In this direction sand quality becomes poor and net effective gas pay decreases because of this stratigraphic condition, and I'm talking about -- speaking of wells that are located in Sections 11, 12, 14, of Township 26 South, Range 24 East.

Q. Then as I understand your testimony, your outline was not determined by a fixed subsea control interval, is that correct?

A. That is correct. We examined each completed well and each dry hole drilled into the Morrow formation in this area, and considered all of this information in determining the proposed unit boundary.

Exhibit Four, the Isopachous map, shows the net effective gas pay for the Morrow formation, determines the limit of Morrow gas production at the zero contour interval.

Gas in place of 69 billion cubic feet was volumetrically estimated by using the acre feet volume as determined from this Isopachous map, and it compares favorably to the in place gas of 68.6 that was estimated by

performance.

We included in our proposed gas storage unit outline acreage from one-half to one mile out from this estimated zero Isopach interval, or estimated fill-up limit of the Morrow formation expected at initial reservoir conditions.

MR. NUTTER: Now, Mr. Ludwick, those figures you just gave, the 69 billion and the 68.6 billion, those are original gas in place, not recoverable gas?

A. Yes, sir, that's the in place gas, yes, sir.

MR. NUTTER: Now, that other figure you gave awhile ago of original -- estimated original of reserves at 63 billion, that's recoverable gas.

A. Yes, sir, that's correct.

MR. NUTTER: Okay.

A. Uh-huh.

Q. Have you or others with El Paso Natural Gas Company discussed the limits of this proposed project area with other agencies of the State or Federal government?

A. Yes, we have. This has been thoroughly discussed with staff personnel of USGS and the State Land Office, and their recommendations, they've been included in our proposal.

Q. In your opinion would there be any migra-

tion of gas from the storage area into the wellbore of any well drilled outside the unit outline or the fault zone shown on the north side of the structure?

A. No, I don't believe there would be.

Q. Please elaborate on that.

A. Well, as I said previously, it is believed that the zero contour interval that is shown by the Isopachous map and included under Exhibit Four, is the limit of net effective gas pay at original reservoir conditions, and it will be so when this reservoir is repressured to original reservoir condition, and therefore, the unit outline that we request, which is located from one-half to one mile outward from that zero Isopach interval will contain any stored gas at Washington Ranch Field and should preclude any horizontal migration outside this unit boundary.

Q. How many injection-withdrawal wells does El Paso propose to drill in this -- in Washington Ranch project area?

A. Well, there are presently ten wells producing at Washington Ranch and El Paso intends to use six of these existing wells for injection-withdrawal purposes. We will utilize four of the remaining wells as observation wells and drill seventeen additional injection-withdrawal wells, all of which are shown on Exhibits Three and Four, and they are more fully described by Exhibit Five, which

identifies each well by its unit designation under its section and township and range order.

Q. Now the well locations which are shown on Exhibit Five are tentative locations, is that correct?

A. That is correct.

Q. In the event there are topographic or geologic conditions which should be present that would render any location shown on this exhibit to be less adviseable than some alternative location, or should we desire to drill additional injection-withdrawal or observation wells, would you recommend that we be permitted to change a well location or add a well location by notification of the Secretary-Director of the Commission by Jetter with a copy thereof to the appropriate district office of the Commission and the Albuquerque office of the USGS?

A. Yes, I would.

Q. How many wells does El Paso intend to core while drilling these seventeen injection-withdrawal wells?

A. El Paso intends to core three wells while in the process of drilling seventeen injection-withdrawal wells. And the wells which are proposed for coring are listed and the type analysis which are intended to be conducted on the cores are more fully explained by Exhibit Six.

Q. What type of wireline or electrical logs surveys does El Paso intend to run on these seventeen wells

which we -- which are proposed to be drilled?

A. The electrical log program is also detailed and outlined by our Exhibit Six of this proceeding. The coring program that we recommend, like I say, it does show on this Exhibit Six. We intend to have full diameter cores that will cover the entire Morrow producing interval, including 100 feet above and below this clastics interval that we're suggesting here, and we would suggest -- we would like and intend to run the conventional porosity, permeability, and residual fluid saturation determinations on these cores.

The electrical logs that we would run here would be Schlumberger Dual Injection Spherically Focused Log, which would include an SP and gamma ray curve; a Schlumberger Formation Density - Compensated Neutron Log, and also a Schlumberger Sonic Log.

That would be the core and the logs that we intend to run.

Q. I believe you've prepared one additional exhibit, have you not, for presentation in the case?

A. Yes, sir. This is Exhibit Seven, and it's a cross section that graphically illustrates the structure relief of the field and the relative position of the storage zone to the top and bottom of the Morrow Clastics producing interval. This -- it shows the direction -- this cross

section takes on the cross section; it runs basically from north to south to southeast there.

MR. NUTTER: Now the discovery well is on here, isn't it?

A Yes, sir, I believe it is. It's the third well from the left, Mr. Nutter.

MR. NUTTER: Okay, so the red area there that's outlined on this cross section, would be what area on Exhibit Two, your log of the well?

A Okay, that would be -- that would cover the interval from approximately 6784 to the bottom, to the bottom of the Morrow Clastics, as indicated on this exhibit.

MR. NUTTER: So you would be actually storing in the discovery well in the lower one-third of the Morrow producing interval.

A That is correct, yes, sir. It would be, yes, sir.

MR. NUTTER: Okay.

Q I note that only a portion of the Morrow is colored red. Would you indicate the significance of that? The area that's colored red as contrasted as contrasted with the remainder of the Morrow interval?

A Well, this is the main -- in other words, this area that is included in this red band, is where the net effective gas pay is depicted on this Isopach map. This

is the main gas producing benches, or bench, on this field.

Q. But we propose that 100 feet below the top of the Morrow and 100 feet below the bottom of the Morrow, all that interval intervening would be the storage area.

A. That's right, we would request that the entire top and -- the entire Morrow interval be included in our storage project, and that would include, Mr. Examiner, 100 feet above the top, as we show it there on this cross section, and 100 feet below, or downward, from the base of this thing.

Q. With respect to the operation of the storage project, what's the proposed maximum storage capacity of the project?

A. Well, the maximum capacity, like when we fill it back up, would be 68.6 billion and 47.6 billion cubic feet of this would be working gas, and 21 billion cubic feet would be cushion gas.

Q. Based on proposed injection-withdrawal wells and taking into account the facilities which we propose to install, what would be the maximum capacity injection and maximum capacity withdrawal rate?

A. Initially a maximum injection capacity will be approximately 505 million cubic feet per day into these 23 injection wells, injection-withdrawal wells. And the maximum withdrawal rate at initial conditions there,

would be approximately 400 million cubic feet per day; however, dehydration and facilities would limit this withdrawal rate to about 400 MMCF per day.

Q. Let's see, you said the maximum withdrawal rate, did you mean to say that it would be 491 million cubic feet per day?

A. Yes, sir, I thought that's what I said.

MR. NUTTER: No, you said 400 million withdrawal.

A. Well, it's 491, I beg your pardon.

MR. NUTTER: 491 withdrawal --

A. Yes, sir.

MR. NUTTER: And after dehydration and shrinkage, it would be down to 400 million.

A. 400, yes, sir, I'm sorry I made that --

Q. What is the date by which El Paso hopes to have the project in service?

A. Well, given timely regulatory approvals, it is planned that the field will be available for withdrawals during the '81-'82 winter heating seaseon, 1981-1982.

Q. Does El Paso propose to meter gas injected and withdrawn?

A. Yes. We would meter this gas, and this would be done on an individual well -- by an individual well

basis, and would include injected volumes and volumes withdrawn.

Q. And you would propose, of course, that El Paso would file the reports as required by the rules of the Commission --

A. Yes, sir.

Q. -- with respect to those quantities?

A. That's correct.

Q. Mr. Ludwick, in your opinion would the granting of El Paso's application in this cause result in waste or the violation of correlative rights?

A. No, it surely would not.

Q. Were Exhibits Two through Seven prepared by you or under your supervision or direction?

A. Yes, they were.

MR. BURLESON: Mr. Examiner, I move the receipt into evidence of Exhibits Two through Seven.

MR. NUTTER: El Paso Exhibits Two through Seven will be admitted in evidence.

CROSS EXAMINATION

BY MR. NUTTER:

Q. Mr. Ludwick, you said that you would repressure the reservoir to achieve what total cubic feet of gas in place?

A. We'd take it back to original conditions, and that would put 68.6 billion cubic feet.

Q. And of that 46.6 would be working gas and 21 billion would be a cushion?

A. Yes, sir, 47.6 would be working gas.

Q. 47.

A. 21 would be cushion gas, yes, sir.

Q. Now, are all of these wells in this reservoir completed within the Morrow interval that is the equivalent to your red section on cross section Seven?

A. Most of them are. There have been one or two that did perforate outside of the interval, Mr. Nutter.

Q. Will those intervals be squeezed?

A. Yes, sir, we would do any work of that nature to insure that we have this zone open.

Q. And only this zone?

A. Yes sir, we would go into that zone.

Q. Uh-huh. Now, of these wells on Exhibit Number Four, Mr. Ludwick, the triangular wells, the notation is they are proposed injection-withdrawal wells, but those are all existing wells, is that correct?

A. Yes, sir, the wells that are shown by the triangles, they are at this time producing gas, yes, sir. And those are the wells, those are the six wells that we would convert -- by the triangles, they are at this time producing

gas, yes, sir.

And those are the wells, those are the six wells that we would convert or use as injection-withdrawal wells.

Q. And then your observation wells would be four wells that are existing wells and they are shown to be located in the north half of 27, the west half of 35, the west half of Section 2, and then that existing well in the east half of Section 4, is that correct?

A. That is correct, yes, sir.

Q. And all those other wells that are dots with circles around them, are wells that you will drill?

A. That is correct, yes, sir.

Q. Okay.

MR. NUTTER: Are there any further questions of Mr. Ludwick? He may be excused.

MR. BURLESON: El Paso calls John A. Disch.

JOHN H. DISCH

being called as a witness and having been duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. BURLESON:

Q. Would you please state your name and where

you reside?

A. My name is John A. Disch. I reside in El Paso, Texas.

Q. By whom are you employed and in what capacity?

A. I'm employed by El Paso Exploration Company, which is a subsidiary of El Paso Natural Gas Company, and I am the Supervisor Drilling Engineer.

Q. Have you previously testified before the Division at a previous hearing as a petroleum engineer?

A. Yes, sir. The last time was in May, 1977.

Q. Are you aware of El Paso's application in this -- in this case?

A. Yes, I am.

Q. Were you qualified as an expert witness in the field of petroleum engineering the last time you testified?

A. Yes, sir.

MR. BURLESON: Mr. Examiner, are the witness' qualifications acceptable?

MR. NUTTER: Yes, sir, they are.

Q. Will you generally describe what drilling operations El Paso proposes to conduct in its Washington Ranch Storage Project?

A. We propose drilling 17 new withdrawal-

injection wells. In addition, we propose using 6 of the existing 10 wells as withdrawal-injection wells, and the other 4 as observation wells.

Q. Have you prepared, or caused to be prepared, a diagram depicting the proposed casing and drilling plan for the proposed withdrawal-injection wells?

A. Yes, I have.

Q. What have you used in the preparation of this exhibit?

A. This is my own well design based on the geology of the area and applicable rules and regulations of the New Mexico Oil Conservation Division.

Q. Now this exhibit is labeled Exhibit Number Eight, is that correct?

A. Yes.

Q. Would you please explain this exhibit for the Examiner?

A. As the exhibit shows, the withdrawal-injection wells will be fluid drilled to the surface shoe depth; 9-5/8ths surface pipe would be set at approximately 800 feet through all fresh water bearing formations, and 300 feet into the Upper Delaware Mountain Group and cemented to surface.

This surface casing shoe is approximately 300 feet below the lowest fresh water sand.

The production casing hole will be fluid drilled to total depth and 7-inch casing will be run and set at total depth of approximately 7050 feet, and cemented with a cement top approximately 1500 feet above the shoe.

The Morrow zone will then be jet perforated and tubing landed in min-perforations.

Q. Now, Exhibit Number Eight shows the average withdrawal-injection well, that's correct, is it not?

A. Yes, sir.

Q. I notice that it's labeled proposed new 1-W Well, which I assume means 1 withdrawal well, but you're saying it also represents an injection well that would be used for both purposes?

A. Withdrawal-injection or injection-withdrawal.

Q. I notice that your proposed well does not include a packer, is this correct?

A. In my opinion, a packer can serve no useful purpose. We do not expect any corrosion. The gas is pipeline quality gas. All fresh water zones are well protected by casing and cement. Using annular flow along with tubing flow, we can operate the well more efficiently. Also there is cost to consider. Larger tubing and a packer to handle our gas volumes would increase the cost per well as much as $18,000.

Q. Mr. Disch, you indicated that you plan to

use annular withdrawal-injection operation. Would you please explain that?

A. The annular withdrawal and injection will utilize the annulus between the 7-inch casing and the tubing. Flow through the tubing will also be used at the same time.

Q. Will you have an annulus between the production casing and the surface casing, which can be used to monitor for leaks?

A. Yes, this annulus would be an excellent way to monitor for leaks.

Q. In your opinion would annular injection-withdrawal endanger fresh water sources?

A. No, sir. Because of the casing designs and cementing program, the ground waters are more than adequately protected.

Q. Is the production casing you propose sufficient to withstand any pressures which you would expect to encounter?

A. Yes. The production casing is 7-inch K-55, 23 pound, with a burst pressure of 4360 pounds per square inch. With a maximum injection pressure of approximately 3000 pounds per square inch, this gives us a safety factor of 1.45.

Q. In your opinion would operations in this pressure range preclude the possibility of fracturing the

confining strata?

A. Yes.

Q. In your opinion will your cementing program assure that there is no migration of injected gas above or below the injection zone?

A. Yes.

Q. Have you reviewed data relating to the existing wells drilled through the Morrow formation within this unit area to determine if remedial work should be done with respect to these wells?

A. Yes, I have.

Q. Is it your opinion that remedial work should be done?

A. No, the well records indicate that the wells are in adequate condition for our proposed operation, so we do not anticipate any workovers at this time.

MR. NUTTER: Now, are you referring to the wells that you're going to be using as well as all the other wells in this area?

A. Yes, sir.

MR. NUTTER: You've looked at all of them, including these old wells that are P&A, and they all look good to you?

A. Yes, sir. I reviewed all of them. I've also discussed with each individual operator.

MR. NUTTER: Well now, Mr. Disch, I notice on this Exhibit Number Four, I've marked my observation wells here, looks like all of the existing wells that are in there now, will either be used for injection-withdrawal or observation with the exeption of that well that's in the southeast quarter of Section 28. What would be the status of it, or has this been plugged?

A. That's a -- one moment, let me get my reference map here.

That well has been plugged and abandoned. It was the Cities Service Government M No. 1.

MR. NUTTER: And then these two wells down here in 11 and 12 used to produce; they've both been P&Ad also, haven't they?

A. Yes, sir. The one in 11 was the J. M. Huber Corporation - Superior Oil Company USA No. 1. The one in 12 is the Superior Oil Government 134 No. 1.

MR. NUTTER: So every well that hasn't been plugged is going to be utilized by you in some manner.

A. Yes, sir.

MR. NUTTER: Plus the 17 that you'll be drilling.

A. Yes, sir.

MR NUTTER: Okay. Go ahead.

Q. Do you propose tc run cement bond logs on

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A. Yes, sir.

MR. NUTTER: Plus the 17 that you'll be drilling.

A. Yes, sir.

MR NUTTER: Okay. Go ahead.

Q. Do you propose to run cement bond logs on

any or all of your withdrawal-injection wells which will be drilled?

A. We will run a cement bond log on all the new wells and on any well that will be reworked.

Q. Has your casing program been designed to comply with the proposed EPA rules that were published in the Federal Register on -- in March of 1979?

A. Yes.

Q. In your opinion do your proposed casing designs fully protect any ground water which may exist in the Washington Ranch area?

A. Yes. As I previously testified, the surface casing will be set well below any fresh water bearing formation and cemented to surface.

In my opinion, this will adequately protect any fresh water formations.

Q. As to any observation wells that may be drilled, would they have the same program as that indicated in your Exhibit Eight?

A. Any new observation wells to be drilled, yes, would be the same as in this Exhibit Eight.

Q. But you don't currently propose to drill any new observation wells?

A. Not at this time.

Q. You have prepared another exhibit, have

you not, Mr. Disch?

A. Yes, sir.

Q. Would you please turn to that exhibit and indicate what it -- what it shows?

A. This is Exhibit Number Nine and it depicts a typical completion of an existing producing well.

8-5/8ths-inch casing was set in an 11-inch hole at 772 feet and cemented to surface.

A 7-7/8ths-inch hole was drilled to 7070 feet and 5-1/2-inch casing was set at 7069 feet.

Casing was cemented with 350 sacks with the cement top at 5240 feet by temperature survey. The casing was perforated from 6833 feet to 6843 feet and from 6921 feet to 6968 feet. 2-3/8ths-inch tubing was run and the packer was set at 6787 feet.

Q. In the event another hydrocarbon-bearing formation were encountered, would your casing program protect that formation?

A. Yes.

Q. Do the two exhibits which you have presented represent the program for which El Paso seeks Commission approval today?

A. Yes, sir. El Paso would like Commission approval for this proposed program and an express Commission finding that this proposed program will adequately protect

any aquifers in the area against contamination.

Q. What plugging operations do you propose with regard to any existing plugged well in the area?

A. As stated previously, I have reviewed all the well records of all plugged wells in the area. I have also contacted each operator who had a plugged well in the area. After interviewing the operators and searching the well records, it appears that the wells are properly plugged and abandoned and we have no plans to re-enter any of the wells at this time.

Q. Do you have anything further you would like to present in this case?

A. Yes, I do.

First, I propose that if any operator drills to a formation deeper than our storage zone within the unit boundary, that the operator be required to set a separate or an extra string of casing to a point of 100 feet below our storage zone and cement that string with enough cement to bring the cement top 1500 feet above the casing shoe.

Second, I propose we name the wells as follows: As an example, Washington Ranch WI No. 8, meaning withdrawal-injection well No. 8, and Washington Ranch O No. 2, meaning observation well No. 2.

Q. Do you have any recommendation with respect

to the effect of present rules and regulations of the New Mexico Oil Conservation Division pertaining to gas well locations, acreage dedication, and normal gas production practices?

A. It is my recommendation that the rules and regulations of the New Mexico Oil Conservation Division pertaining to gas well locations, acreage dedication, and normal gas production practices, shall have no application to acreage dedicated to or activities upon acreage dedicated to, so long as waste does not result from the inapplication of these rules and regulations.

Q. That is, that all of those regulations would have no application to dedicated land, land dedicated to this storage area, so long as waste wouldn't result from any such inapplication of those rules?

A. That's correct.

Q. Mr. Disch, were Exhibits Eight and Nine prepared by you or under your supervision and direction?

A. Yes, they were.

MR. BURLESON: Mr. Examiner, this concludes our direct examination of this witness.

CROSS EXAMINATION

BY MR. NUTTER:

Q. Mr. Disch, have you prepared any written

proposed rules for operation of this project or for drilling and the casing of wells in it?

A. Yes, sir. I do not have it with me, but we do have a drilling program, and that is more of an in-house information, but there's nothing privileged about it and we'll be certainly glad to send you a copy.

Q. Well, I don't think that's exactly what I was talking about. I'm talking about proposed rules regarding acreage dedication and well locations, casing and cementing of wells that are -- that may be drilled by other operators to below the storage zone, et cetera.

You haven't prepared written rules?

A. No, sir, we have not.

MR. NUTTER: Mr. Burleson, can you prepare written rules that we might incorporate in any order that could be issued here on operating this project?

MR. BURLESON: Yes, sir, we'd be happy to do that.

MR. NUTTER: Okay, thank you.

MR. BURLESON: What time frame would you like it?

MR. NUTTER: Well, it depends on how fast you want your order. You can take your time, if you want to.

MR. BURLESON: We'll get that to you as [illegible] possible.

MR. NUTTER: Are there any other questions of Mr. Disch?

Oh, Mr. Disch, you mentioned that withdrawals would be made through the annulus and through the tubing. Would injection also be made simultaneously through the tubing and the annulus?

A. Yes, sir.

Q. What then is the purpose of running the tubing?

A. We feel there are several reasons. For example, if we ever have to kill one of the wells, the Morrow formation being a very fluid, sensitive formation, if you have tubing in the hole you have much less pump time against the formation if you pump fluid down the tubing or through the annulus and bled it through the casing.

That's the main purpose.

Another purpose will be, we'll be periodically running a bottom hole pressure bombs, that type of thing, and it's a lot easier to fish out a bomb in 2-3/8ths or 2-7/8ths tubing than it is out of 7-inch.

Q. So this is -- the purpose of the tubing is just strictly for mechanical operation.

A. Yes, sir.

Q. And other than withdrawal and injection times?

A. Yes, sir.

Q. Okay.

MR. NUTTER: Are there any other questions of Mr. Disch? He may be excused.

Do you have anything further, Mr. Burleson?

MR. BURLESON: No, sir.

MR. NUTTER: Does anyone have anything they wish to offer in Case Number 6703?

We'll take the case under advisement.

(Hearing concluded.)

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
3016 Plaza Blanca (505) 471-2462
Santa Fe, New Mexico 87501

REPORTER'S CERTIFICATE

I, SALLY W. BOYD, a Court Reporter, DO HEREBY CERTIFY that the foregoing and attached Transcript of the Hearing before the Oil Conservation Division was reported by me; that said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability, from my notes taken at the time of the hearing.

- - - - - - - - - - -

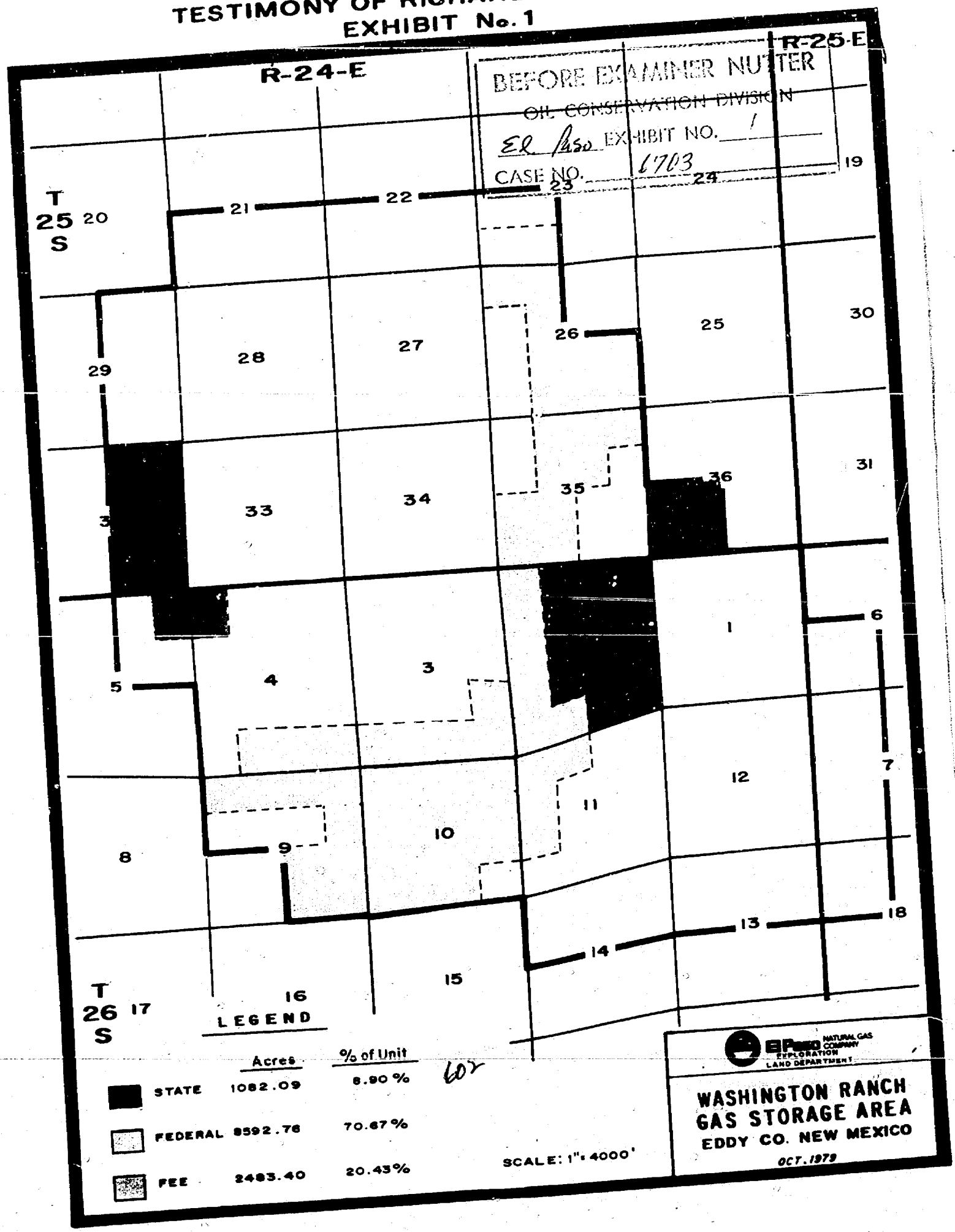
Sally W. Boyd, C.S.R.

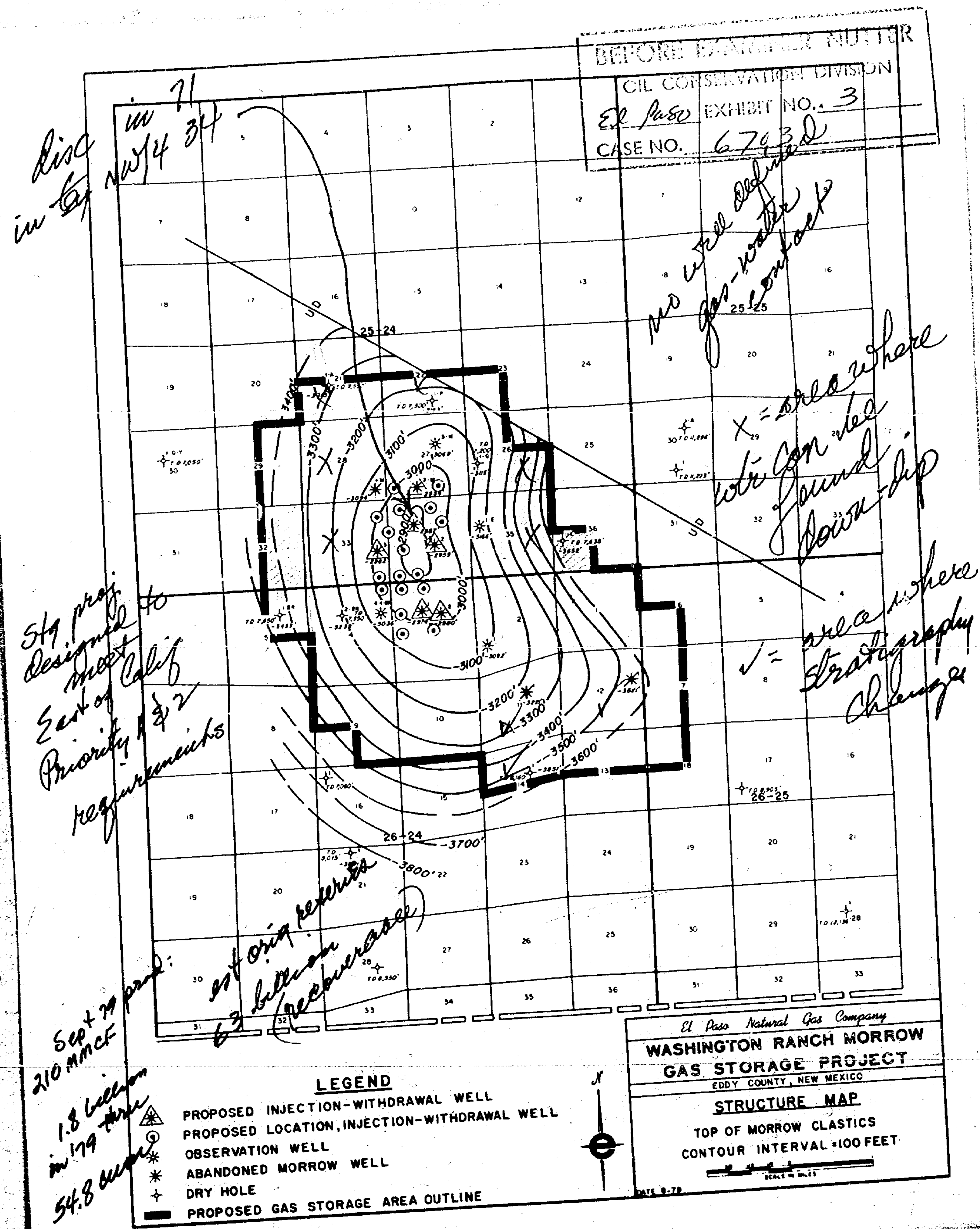
I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 6703 heard by me on 10/17 19 79.

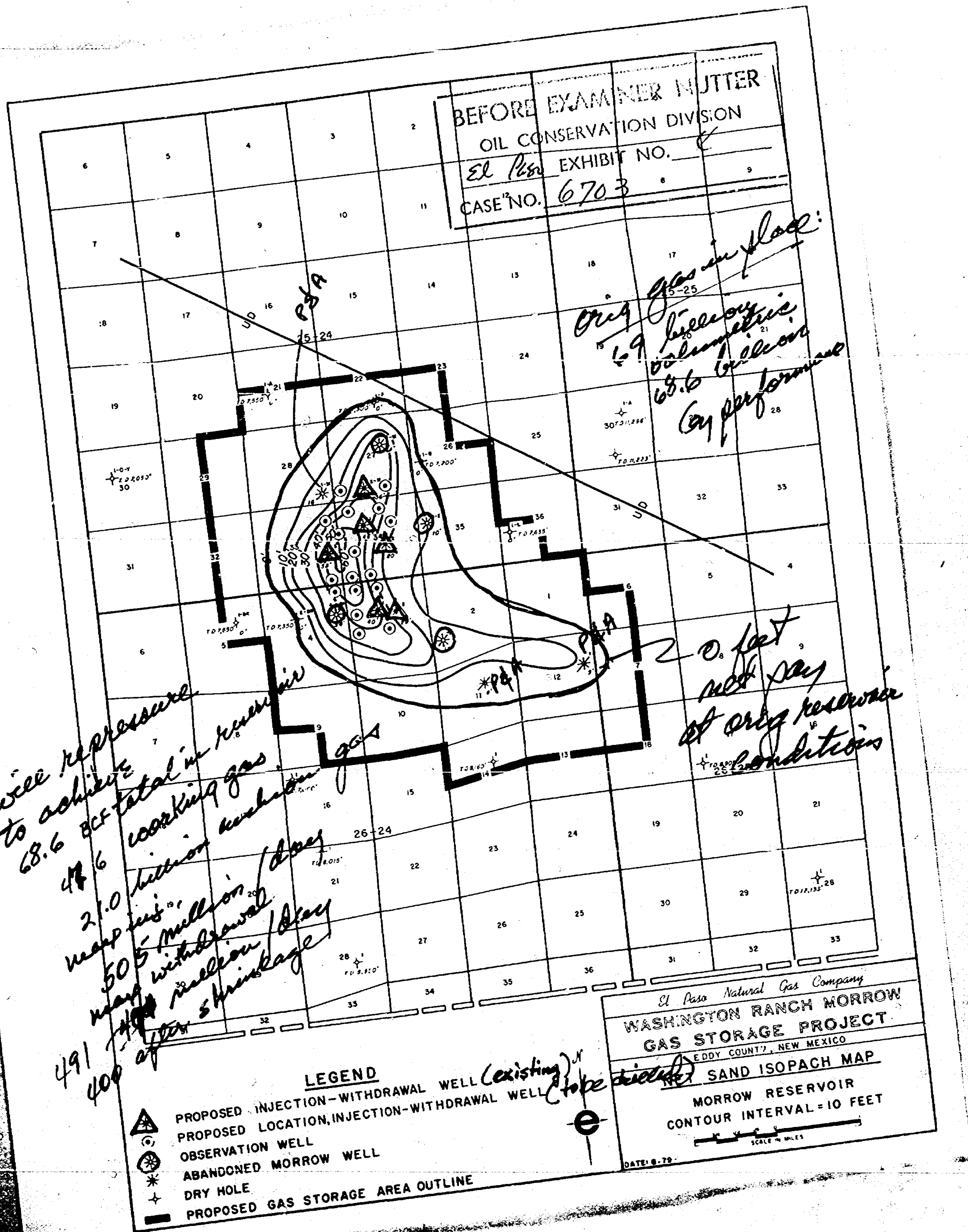
_____, Examiner
Oil Conservation Division

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
1010 Plaza Blanca (505) 471-2463
Santa Fe, New Mexico 87501

TESTIMONY OF RICHARD B. ISAACKS
EXHIBIT No. 1




BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
El Paso EXHIBIT NO. 3
CASE NO. 6793
El Paso Natural Gas Company
WASHINGTON RANCH MORROW
GAS STORAGE PROJECT
EDDY COUNTY, NEW MEXICO
STRUCTURE MAP
TOP OF MORROW CLASTICS
CONTOUR INTERVAL =100 FEET
LEGEND
PROPOSED INJECTION-WITHDRAWAL WELL
PROPOSED LOCATION, INJECTION-WITHDRAWAL WELL
OBSERVATION WELL
ABANDONED MORROW WELL
DRY HOLE
PROPOSED GAS STORAGE AREA OUTLINE
25-24
26-24
26-25
25-25
-3000
-3100'
-3200'
-3300
-3400'
-3500'
-3600'
-3700'
-3800'
Disc in 71 in Ctr NW/4 34
no well defined gas-water contact
X = area where water found down-dip
✓ = area where Stratigraphy Changes
Stg proj designed to meet East of Calif Priority 1 & 2 requirements
est orig reserves 63 billion (recoverable)
Sept 79 prod: 210 MMCF
1.8 billion in '79 thru 54.8 cum


BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
El Paso EXHIBIT NO.
CASE NO. 6703
Orig gas in place:
69 billion volumetric
68.6 billion by performance
20 feet net pay at orig reservoir conditions
will repressure to achieve
68.6 BCF total in reservoir
21.0 billion cushion gas
after shrinkage
El Paso Natural Gas Company
WASHINGTON RANCH MORROW
GAS STORAGE PROJECT
EDDY COUNTY, NEW MEXICO
SAND ISOPACH MAP
MORROW RESERVOIR
CONTOUR INTERVAL = 10 FEET
SCALE IN MILES
LEGEND
PROPOSED INJECTION-WITHDRAWAL WELL (existing)
PROPOSED LOCATION, INJECTION-WITHDRAWAL WELL
OBSERVATION WELL
ABANDONED MORROW WELL
DRY HOLE
PROPOSED GAS STORAGE AREA OUTLINE

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
El Paso EXHIBIT NO. 5
CASE NO. 6703

NMOCC Case 6703
Exhibit 5

Washington Ranch Morrow Gas Storage Project,
Showing Location of Wells Currently Producing, their Future
Producing Status, and Wells Proposed to be Drilled
and Completed for Gas Injection-Withdrawal Purposes

Presently Producing (10)

T-25-S R-24-E

Unit	Section	Code
G	27	2
N	27	1
I	33	1
P	34	1
J	34	1
E	35	2

T-26-S R-24-E

H	4	2
F	3	1
G	3	1
M	2	2

CODE: 1. Well will be utilized as an injection-withdrawal well.

2. Well will be used as an observation well.

Location of Wells to be Drilled (17)

T-25-S R-24-E

Unit	Section
M	27
O ✓	27
A	33
P	33
B	34
D	34
E	34
G	34
L ✓	34
M	34
N	34

T-26-S R-24-E

A	4
C	3
D	3
E	3
K ✓	3
L	3

✓ = wells which would be cored

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
El Paso EXHIBIT NO. 6
CASE NO. 6703

NMOCC Case 6703
Exhibit 6

Proposed Coring and Electrical Log Program

For

Washington Ranch Gas Storage Project

Coring Program

It is recommended that 3 wells be cored in the process of drilling and completion of 17 injection-withdrawal wells.

These will be full diameter cores, and cover the entire Morrow producing interval, including 100 feet of section above and below the Morrow Clastics interval, as more fully described in El Paso's proposed Washington Ranch "Gas Storage Interval."

Analyses suggested to be run on these cores would include conventional porosity, permeability and residual fluid saturation determinations.

The location of wells which are recommended for coring are:

Unit	Sec	TWP	Range
O	27	25	24
L	34	25	24
K	3	26	24

Electrical Logging Program

Each well drilled will have the following electrical surveys run:

(1) Schlumberger Dual Induction Spherically Focused Log with Spontaneous Potential (SP) and Gamma Ray curves.

(2) Schlumberger Formation Density - Compensated Neutron Log (FDC - CNL).

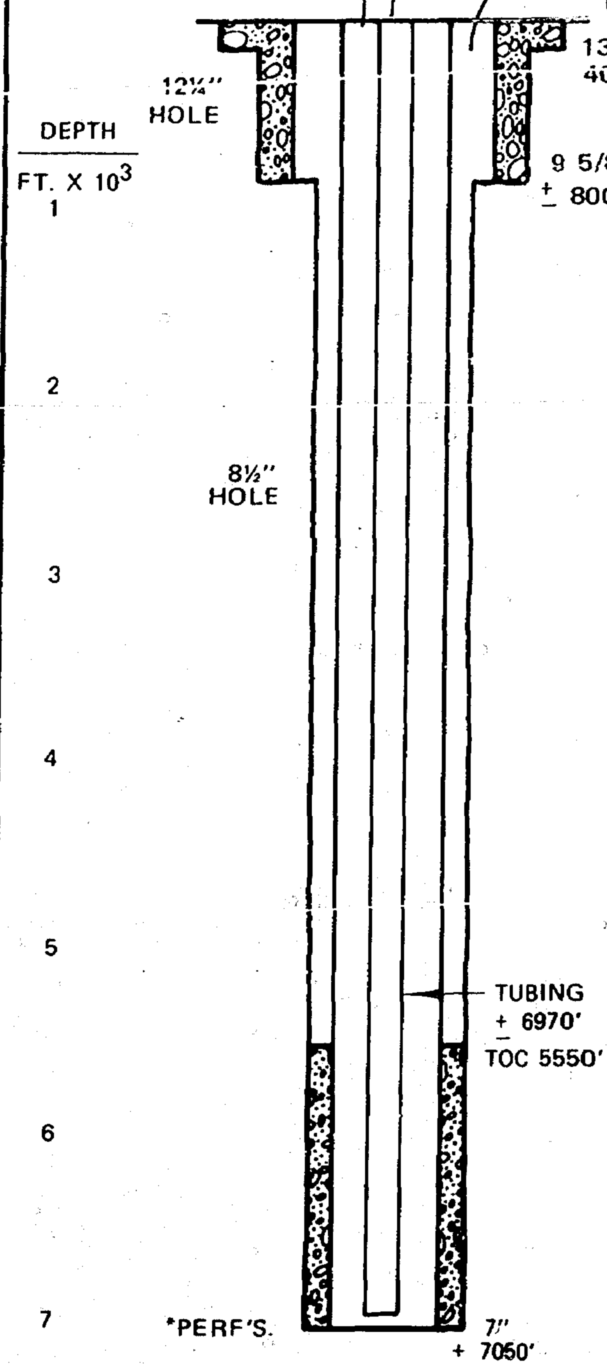
(3) Schlumberger Sonic Log (BHC).

WASHINGTON RANCH
PROPOSED NEW WELL

will use of annulus & tubing for inj. withdrawal

this 7" x 9 5/8" annulus will be monitored for leaks

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
El Paso EXHIBIT NO. 8
CASE NO. 6703



300' below lowest fresh water sand

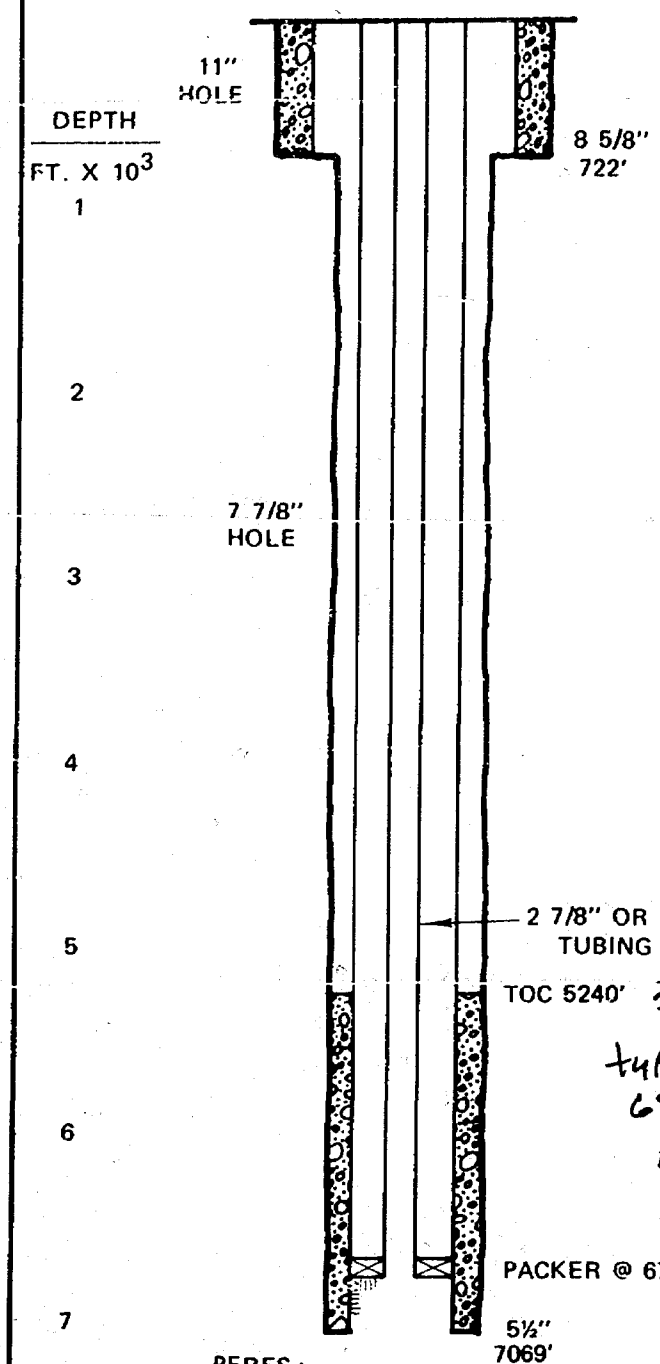
SIZE	GRADE	WT	BURST	COLLAPSE	DRIFT ID
13 3/8"	USED				
9 5/8"	H–40	32.3	2270	1400	8.845
7"	K–55	23	4360	3270	6.241
	J–55	6.5	7260	7680	2.441

csg & cmt g complies w/ Fed Reg rules of Mar 79

*AVG. MID. PERF. 6970'

WASHINGTON RANCH
TYPICAL EXISTING
PRODUCING WELL

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
El Paso EXHIBIT NO. 9
CASE NO. 6703



350 sx
typical perfs
6833 6844
6921 6968

SIZE	GRADE	WT	BURST	COLLAPSE	DRIFT ID
8 5/8"	---	24	---	---	---
5 1/2"	---	14	---	---	---
5 1/2"	---	15.5	---	---	---
2 3/8" or 2 7/8"	J–55 or N–80	---	---	---	---

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

CASE NO. 6703
ORDER NO. R-6125

APPLICATION OF EL PASO NATURAL GAS COMPANY FOR UNDERGROUND GAS STORAGE, EDDY COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on October 17, 1979, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this ___ day of October, 1979, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

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

(2) That the applicant, El Paso Natural Gas Company, proposes the establishment of an underground gas storage project in Eddy County, New Mexico, to be known as the Washington Ranch Gas Storage Project.

(3) That the applicant has conducted geological and engineering studies to confirm the existence and areal extent of a geological structure underlying all or portions of Sections 21, 22, 23, 26, 27, 28, 29, 32, 33, 34, 35 and 36, Township 25 South, Range 24 East, NMPM, and all or portions of Sections 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, and 14, Township 26 South, Range 24 East, NMPM, and all or portions of Sections 6, 7, and 18, Township 26 South, Range 25 East, NMPM, Eddy County, New Mexico, and to determine the suitability of said structure for the underground storage of natural gas.

(4) That gas storage within said structure would be in the Pennsylvanian Morrow formation and contained within the Morrow Clastics interval.

(5) That the aforesaid vertical interval of the Morrow formation beneath the following described lands:

EDDY COUNTY, NEW MEXICO
TOWNSHIP 25 SOUTH, RANGE 24 EAST, NMPM

Section 27: All
Section 28: S/2
Section 33: E/2
Section 34: All
Section 35: W/2

TOWNSHIP 26 SOUTH, RANGE 24 EAST, NMPM

Section 2: W/2
Section 3: All
Section 4: E/2
Section 11: All
Section 12: N/2

is a gas reservoir in New Mexico, having been ~~designated~~ created and defined by the Division as the Washington Ranch-Morrow Gas Pool by Division Order Nos. R-4279, R-4377, R-4437, R-4734, and R-4782, the last dated June 1, 1974. effective April 1, 1972, and subsequently extended by orders Nos.

(6) That the applicant proposes to convert some 4 presently producing wells into observation wells on the outer flanks of the gas storage structure to permit the detection of any migration away from the project of gas placed in storage.

(7) That the applicant proposes to convert 6 presently producing wells into injection/withdrawal wells.

(8) That the applicant proposes to drill and complete some 17 injection/withdrawal wells in the proposed gas storage project.

(9) That the location of the injection/withdrawal wells to be drilled is proposed as follows:

(6) That said Washington Ranch-Morrow Gas Pool is essentially depleted of native natural gas.

TOWNSHIP 25 SOUTH, RANGE 24 EAST, NMPM

Unit	M	Section	27
Unit	O	Section	27
Unit	A	Section	33
Unit	P	Section	33
Unit	B	Section	34
Unit	D	Section	34
Unit	E	Section	34
Unit	G	Section	34
Unit	L	Section	34
Unit	M	Section	34
Unit	N	Section	34

TOWNSHIP 26 SOUTH, RANGE 24 EAST, NMPM

Unit	A	Section	4
Unit	C	Section	3
Unit	D	Section	3
Unit	E	Section	3
Unit	K	Section	3
Unit	L	Section	3

(10) That the applicant proposes to drill and complete the aforesaid injection/withdrawal wells as follows:

(A) Set 9 5/8 inch surface casing approximately 300 feet into the Upper Mountain Delaware Group at a depth of approximately 800 feet and circulate cement to the surface;

(B) Drill to total depth of approximately 7,050 feet and set 7 inch casing and cement to approximately 1,500 feet above the casing shoe.

(C) Perforate the casing opposite the Morrow zone.

(D) Land 2 7/8 inch tubing at approximately 6,970 feet.

(12) That the above casing and cementing programs are adequate and should afford ample protection against loss of gas while being injected, withdrawn, or held in storage, and will provide good and sufficient protection against contamination of ground waters.

(15) That the proposed El Paso Natural Gas Company Washington Ranch Gas Storage Project is in the interest of conservation, will not cause waste, and will not impair correlative rights and should be approved, provided:

(A) The following described area ~~shall~~ would be known as the Washington Ranch Gas Storage Project Area:

TOWNSHIP 25 SOUTH, RANGE 24 EAST, NMPM

Section 21: S/2
Section 22: S/2
Section 23: SW/4
Section 26: W/2 and SE/4
Sections 27 and 28: All
~~Section 28: All~~
Section 29: E/2
Section 32: E/2
Sections 33, 34, and 35: All
~~Section 34: All~~
~~Section 35: All~~
Section 36: SW/4

TOWNSHIP 26 SOUTH, RANGE 24 EAST, NMPM

Sections 1 through 4: All
~~Section 2: All~~
~~Section 3: All~~
~~Section 4: All~~
Section 5: NE/4
Section 9: N/2 and SE/4
Sections 10, 11, and 12: All
~~Section 11: All~~
~~Section 12: All~~
Section 13: N/2
Section 14: N/2

TOWNSHIP 26 SOUTH, RANGE 25 EAST, NMPM

Section 6: SW/4
Section 7: W/2
Section 18: NW/4

(B) The following described area ~~shall~~ would be known as the Active Area of the Washington Ranch Gas Storage Project:

TOWNSHIP 25 SOUTH, RANGE 24 EAST, NMPM

Section 21: S/2
Section 22: S/2
Section 23: SW/4
Section 26: W/2 and SE/4
Sections 27 and 28: All
~~Section 28: All~~
Sections 33, 34, and 35: All
~~Section 34: All~~
~~Section 35: All~~

TOWNSHIP 26 SOUTH, RANGE 24 EAST, NMPM

Sections 1 through 4: All
~~Section 2: All~~
~~Section 3: All~~
~~Section 4: All~~
Section 9: N/2 and SE/4
Sections 10, 11, and 12: All
~~Section 11: All~~
~~Section 12: All~~

(C) That the Division's rules and regulations governing well locations, acreage dedication, and the production of natural gas from gas reservoirs should not be applicable to wells located within the Active Area of the Washington Ranch Gas Storage Project as described in (12) (B) above;

(D) That an administrative procedure for approval of amended locations for injection/withdrawal wells and observation wells or for the drilling of additional wells at locations within the Active Area of the Washington Ranch Gas Storage Project as described in (12) (B) above should be established;

(E) That any well drilled within the Washington Ranch Gas Storage Project Area as described in (12) (A) above but outside the Active Area of the Washington Ranch Gas Storage Project as described in (12) (B) above

((1)) ~~Shall~~ would be located according to the General Rules of the Division, and

((2)) ~~Shall~~ would be cased and cemented in such a manner as to protect the Morrow gas storage zone.

(F) That the applicant should file injection/withdrawal reports monthly with the Division.

(13) That said Washington Ranch-Morrow Gas Pool is essentially depleted of native natural gas.

IT IS THEREFORE ORDERED:

(1) That the applicant herein, El Paso Natural Gas Company, is hereby authorized to establish its Washington Ranch Gas Storage Project by the injection into and withdrawal from the Morrow formation of natural gas in the following described area in Eddy County, New Mexico:

TOWNSHIP 25 SOUTH, RANGE 24 EAST, NMPM

Section 21: S/2
Section 22: S/2
Section 23: SW/4
Section 26: W/2 and SE/4
Sections 27 and 28: All
~~Section 28: All~~
Section 29: E/2
Section 32: E/2
Sections 33, 34, and 35: All
~~Section 34: All~~
~~Section 35: All~~
Section 36: SW/4

TOWNSHIP 26 SOUTH, RANGE 24 EAST, NMPM

Sections 1 through 4: All
~~Section 2: All~~
~~Section 3: All~~
~~Section 4: All~~
Section 5: NE/4
Section 9: N/2 and SE/4
Sections 10, 11, and 12: All
~~Section 11: All~~
~~Section 12: All~~
Section 13: N/2
Section 14: N/2

TOWNSHIP 26 SOUTH, RANGE 25 EAST, NMPM

Section 6: SW/4
Section 7: W/2
Section 18: NW/4

(2) That said area shall be known as the El Paso Natural Gas Company Washington Ranch Gas Storage Project.

(3) That the applicant is hereby authorized to drill, complete, and operate ~~the following described wells as~~ gas storage injection/withdrawal wells at the following locations:

TOWNSHIP 25 SOUTH, RANGE 24 EAST

Unit	M	Section	27
Unit	O	Section	27
Unit	A	Section	33
Unit	P	Section	33
Unit	B	Section	34
Unit	D	Section	34
Unit	E	Section	34
Unit	G	Section	34
Unit	L	Section	34
Unit	M	Section	34
Unit	N	Section	34

TOWNSHIP 26 SOUTH, RANGE 24 EAST

Unit	A	Section	4
Unit	C	Section	3
Unit	D	Section	3
Unit	E	Section	3
Unit	K	Section	3
Unit	L	Section	3

(4) That the ~~operator~~ applicant is hereby authorized to utilize the following presently existing Morrow gas wells as gas storage injection/withdrawal wells: ~~or as observation wells as follows~~:

~~LOCATION OF INJECTION/WITHDRAWAL WELLS~~

TOWNSHIP 25 SOUTH, RANGE 24 EAST, NMPM

Cities Service Gov't. M #2	Unit	N	Section 27
Black River Cities Fed # 3	Unit	I	Section 33
Black River Cities Fed # 1	Unit	F	Section 34
Black River Cities Fed # 2	Unit	J	Section 34

TOWNSHIP 26 SOUTH, RANGE 24 EAST, NMPM

Black River Cities 3 Fed # 1	Unit	F	Section 3
Black River Cities 3 Fed # 2	Unit	G	Section 3

(5) That the applicant is hereby authorized to utilize the following existing Morrow gas wells as gas storage observation wells:

~~LOCATION OF OBSERVATION WELLS~~
TOWNSHIP 25 SOUTH, RANGE 24 EAST, NMPM

Cities Service Govt. M # 3 Unit G Section 27
Black River Cities E Fed # 1 Unit E Section 35

TOWNSHIP 26 SOUTH, RANGE 24 EAST, NMPM

Black River Miller Com # 1 Unit ~~M~~ L Section 2
Black River BR 4 Fed # 1 Unit H Section 4

(6) That should topographic or geologic conditions render any well location described in Orders Nos. (3), ~~and~~ (4), above unless less advisable than an alternative location, or if any additional injection/withdrawal well or observation well is deemed necessary, the applicant shall notify the Division Director of such fact by letter, and shall by copies thereof also notify the Artesia District Office of the Division and the Roswell, New Mexico, Office of the United States Geological Survey.

(7) That the applicant shall file monthly Division Form C-131, Monthly Gas Storage Report, covering operations of the subject gas storage project, ~~such report to be on a form prescribed by the Division and filed in duplicate by the 20th day of each month and detailing the operations of the project during the preceding month. One copy of the report shall be filed with the Santa Fe office of the Division and one copy with the Artesia office.~~

(8) That the applicant shall notify the Division immediately of any evidence of leakage of gas from the gas storage project, or of any evidence of contamination of ground waters as the result of operations in the gas storage project.

(9) That should any operator drill a well to a formation deeper than the Morrow storage zone within the boundary of the Washington Ranch Gas Storage Project as described in Order No. (1) above, special drilling and casing requirements ~~are ordered as follows:~~ the following shall be observed:

(A) Either water or drilling mud ~~will be required~~ shall be utilized as the circulating medium while drilling through the Morrow formation; ~~and~~

(B) A separate, or extra, casing string shall be set at a point one hundred (100) feet below the Morrow Clastics ~~sand~~ base of the as found at a log depth of 6864 feet on the Schlumberger Gamma Ray-Sonic Log of the Black River Cities Federal Well No. 1 located in Unit F of Section 34, Township 25 South, Range 24 East, NMPM, Eddy County, New Mexico

(C) The casing shall be cemented with enough cement to cause cement to be placed behind the pipe from the casing shoe to a point 1,500 feet above the casing shoe.

10
~~(9.)~~ That the following described area shall be known as the Active Area of the Washington Ranch Storage Project:

TOWNSHIP 25 SOUTH, RANGE 24 EAST, NMPM

Section 21: S/2
Section 22: S/2
Section 23: SW/4
Section 26: W/2 and SE/4
Sections 27 and 28: All
~~Section 28: All~~
Sections 33, 34, and 35: All
~~Section 34: All~~
~~Section 35: All~~

TOWNSHIP 26 SOUTH, RANGE 24 EAST, NMPM

Sections 1 through 4: All
~~Section 2: All~~
~~Section 3: All~~
~~Section 4: All~~
Section 9: N/2 and SE/4
Sections 10, 11, and 12: All
~~Section 11: All~~
~~Section 12: All~~

11
~~(10)~~ That the Rules and Regulations of the Division pertaining to gas well locations, acreage dedication, and normal gas production practices shall not apply to the subject active gas storage project as described in Order No. ~~(9)~~ 10 above so long as waste does not result from such inapplication.

12
~~(11)~~ Any well to be drilled within the Washington Ranch Gas Storage Project area as described in Order No. (1) above but at a location not included in the Active Area of the Washington Ranch Gas Storage Project as described in Order No. ~~(9)~~ 10, shall be located according to the General Rules and Regulations of the Division.

13
~~(12)~~ That jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
DIRECTOR

S E A L

El Paso NATURAL GAS COMPANY

P. O. BOX 1492
EL PASO, TEXAS 79978
PHONE: 915-543-2600

September 13, 1979

New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Case 6703

Gentlemen:

El Paso Natural Gas Company respectfully requests that a hearing be set before the Commission or its designated examiner on October 17, 1979.

El Paso seeks approval to establish and operate a gas storage project in which the Pennsylvanian Morrow Formation underlying certain lands in Eddy County, New Mexico, will be converted into a gas storage reservoir to be used for the injection and withdrawal of gas, said project being known as the Washington Ranch Gas Storage Project.

This project is expected to encompass approximately 12,158.25 acres of Federal, State and Fee land all of which is located in Eddy County, New Mexico and is described as follows:

Township 25 South, Range 24 East:

S/2 Sec. 21; S/2 Sec. 22; SW/4 Sec. 23; W/2, SE/4 Sec. 26; Sec. 27; Sec. 28; E/2 Sec. 29; E/2 Sec. 32; Sec. 33; Sec. 34; Sec. 35; SW/4 Sec. 36.

Township 26 South, Range 24 East:

Sec. 1; Sec. 2; Sec. 3; Sec. 4; NE/4 Sec. 5; N/2, SE/4 Sec. 9; Sec. 10; Sec. 11; Sec. 12; N/2 Sec. 13; N/2 Sec. 14.

Township 26 South, Range 25 East:

SW/4 Sec. 6; W/2 Sec. 7; NW/4 Sec. 18.

The Morrow Formation stratigraphically occurs beneath said lands at depths from 6628' (-2887' subsea) to 6864' (-3123' subsea) below the surface of the earth as described by the Borehole Compensated Sonic-Gamma Ray Electrical Log run on June 1, 1971, in the Black River Corporation-Cities Federal No. 1 Well, 1650' FNL and 1650' FWL of Section 34, Township 25 South, Range 24 East, Eddy County, New Mexico. Applicant would desire that this interval be vertically expanded in this "type" well 100' above and below the Morrow Producing Interval or to 6528' (-2787' subsea) to 6964' (-3223' subsea).

El Paso further proposes additional rules for drilling of wells into formations deeper than the Morrow Formation in this designated area, and, also proposes that the Division Director may grant administrative approval for exceptions to the well spacing requirements as set out in Rule 104, and casing and tubing requirements as set out in Rule 107 of the Rules & Regulations of the Oil Conservation Division of the Energy and Minerals Department.

El Paso's plans may involve the plugging and abandonment of certain existing wells, and will involve the drilling and completion of certain injection-withdrawal wells and observation wells, all as will be more particularly described in the hearing which El Paso requests.

Very truly yours,

E. R. Manning

E. R. Manning

ERM:je

El Paso NATURAL GAS COMPANY

P. O. BOX 1492
EL PASO, TEXAS 79978
PHONE: 915-543-2600

September 13, 1979

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Township 25 South, Range 24 East:

S/2 Sec. 21; S/2 Sec. 22; SW/4 Sec. 23; W/2, SE/4 Sec. 26; Sec. 27; Sec. 28; E/2 Sec. 29; E/2 Sec. 32; Sec. 33; Sec. 34; Sec. 35; SW/4 Sec. 36.

Township 26 South, Range 24 East:

Sec. 1; Sec. 2; Sec. 3; Sec. 4; NE/4 Sec. 5; N/2, SE/4 Sec. 9; Sec. 10; Sec. 11; Sec. 12; N/2 Sec. 13; N/2 Sec. 14.

Township 26 South, Range 25 East:

SW/4 Sec. 6; W/2 Sec. 7; NW/4 Sec. 18.

The Morrow Formation stratigraphically occurs beneath said lands at depths from 6628' (-2887' subsea) to 6864' (-3123' subsea) below the surface of the earth as described by the Borehole Compensated Sonic-Gamma Ray Electrical Log run on June 1, 1971, in the Black River Corporation-Cities Federal No. 1 Well, 1650' FNL and 1650' FWL of Section 34, Township 25 South, Range 24 East, Eddy County, New Mexico. Applicant would desire that this interval be vertically expanded in this "type" well 100' above and below the Morrow Producing Interval or to 6528' (-2787' subsea) to 6964' (-3223' subsea).

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El Paso's plans may involve the plugging and abandonment of certain existing wells, and will involve the drilling and completion of certain injection-withdrawal wells and observation wells, all as will be more particularly described in the hearing which El Paso requests.

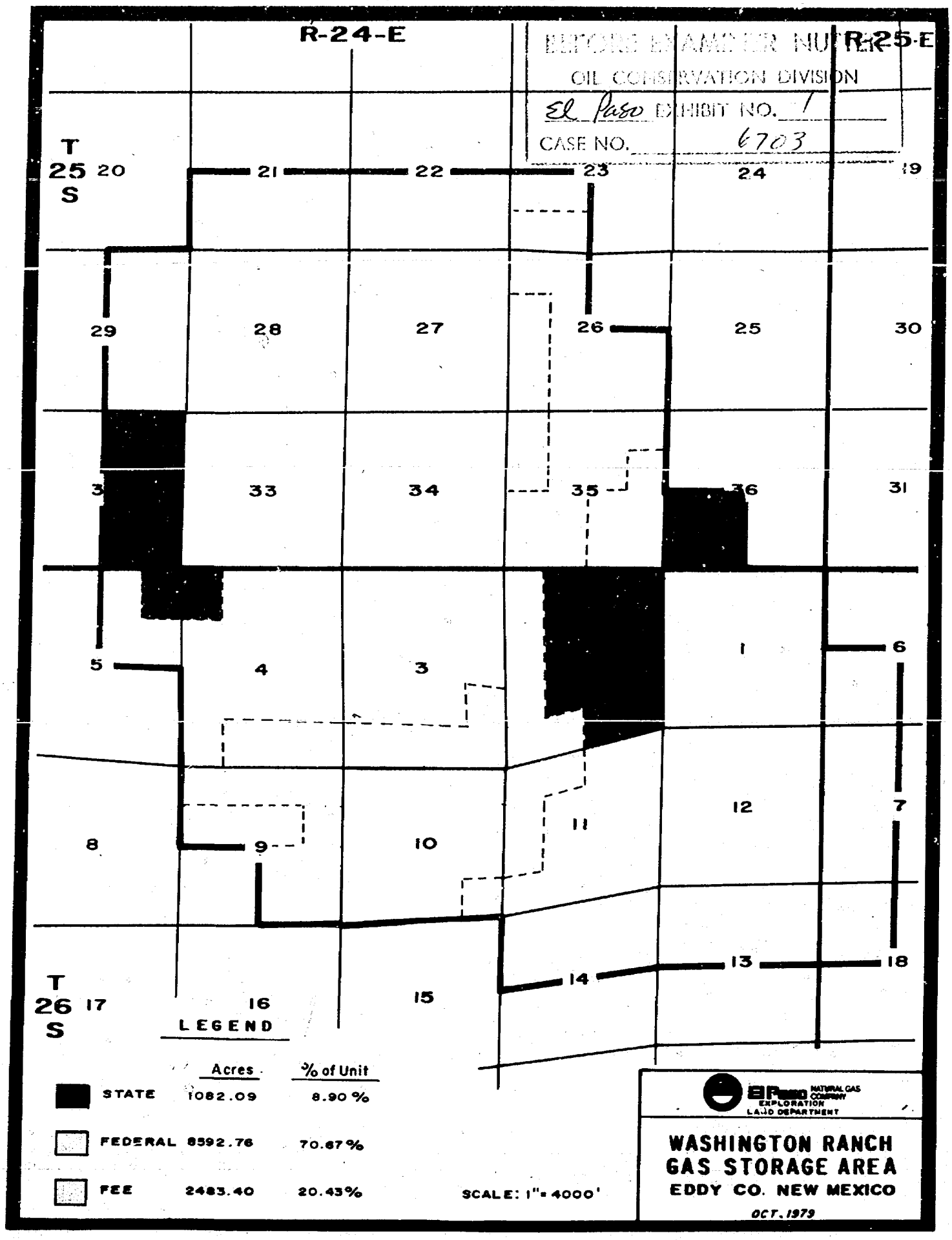
Very truly yours,

E. R. Manning

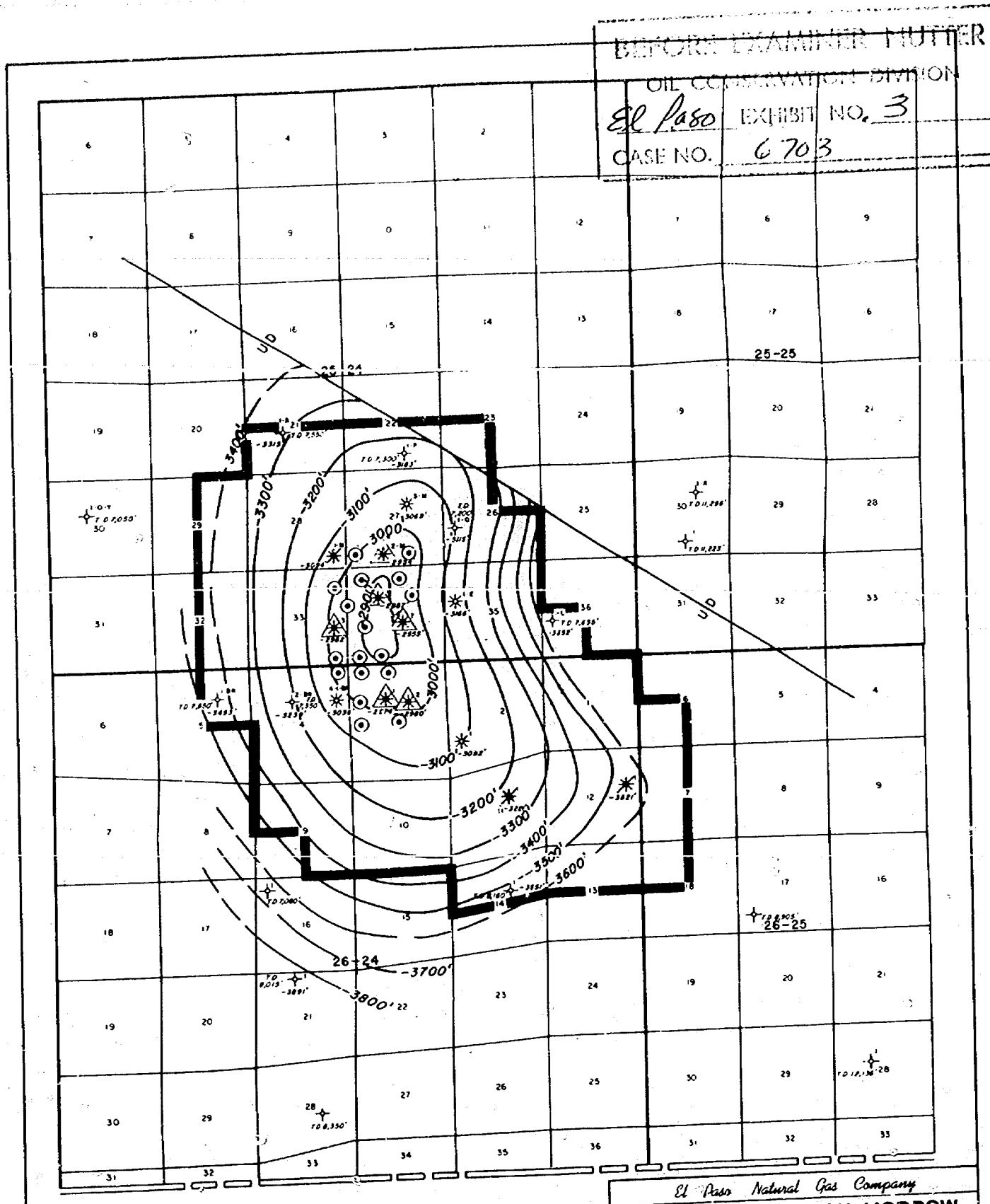
E. R. Manning

ERM:je

TESTIMONY OF RICHARD B. ISAACKS
EXHIBIT No. 1



BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
El Paso EXHIBIT NO. 3
CASE NO. 6703



LEGEND

- PROPOSED INJECTION-WITHDRAWAL WELL
- PROPOSED LOCATION, INJECTION-WITHDRAWAL WELL
- OBSERVATION WELL
- ABANDONED MORROW WELL
- DRY HOLE
- PROPOSED GAS STORAGE AREA OUTLINE

N

El Paso Natural Gas Company

WASHINGTON RANCH MORROW GAS STORAGE PROJECT

EDDY COUNTY, NEW MEXICO

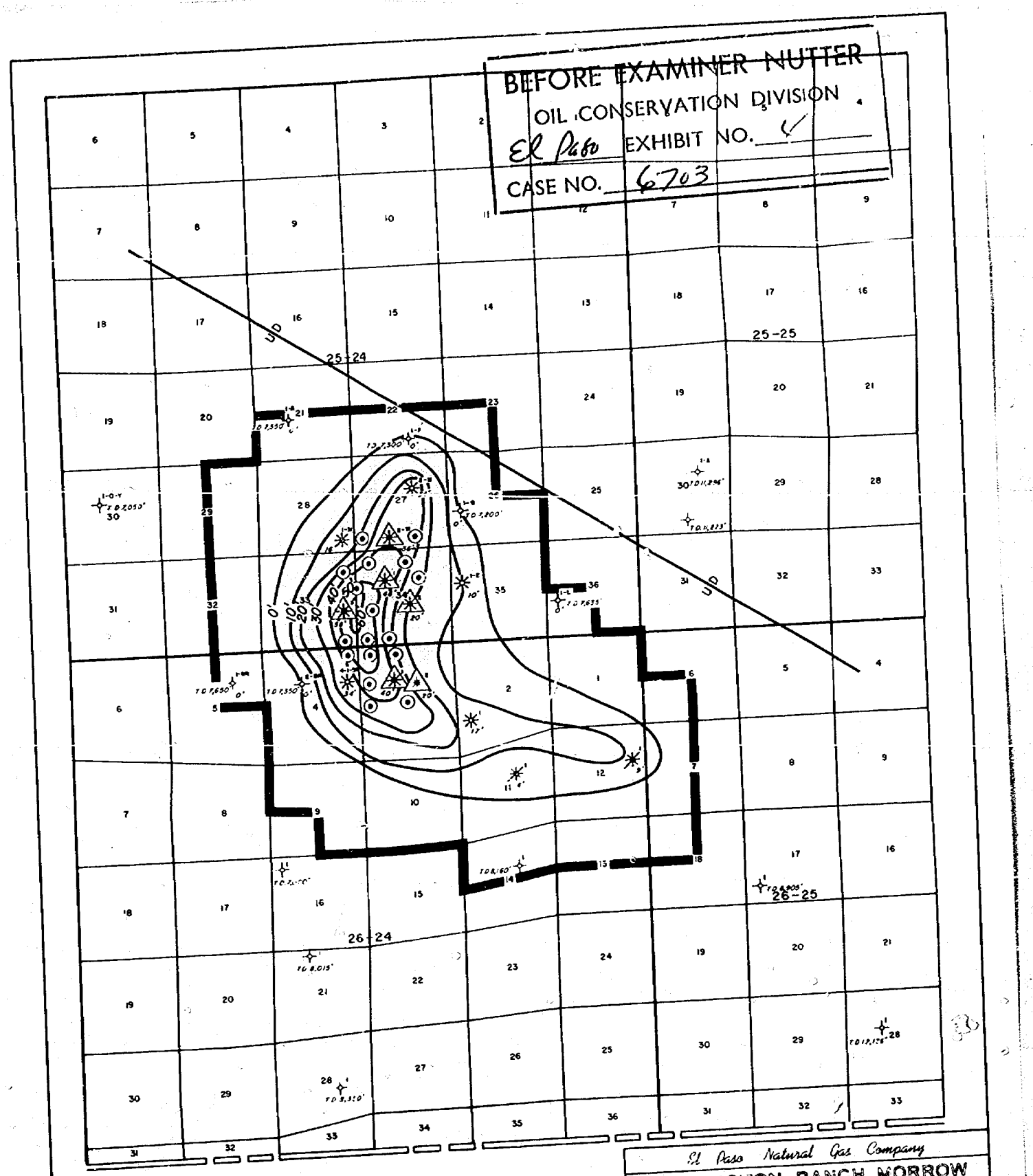
STRUCTURE MAP

TOP OF MORROW CLASTICS
CONTOUR INTERVAL = 100 FEET

SCALE IN MILES

DATE 8-79

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
El Paso EXHIBIT NO. 4
CASE NO. 6703



LEGEND

- PROPOSED INJECTION-WITHDRAWAL WELL
- PROPOSED LOCATION, INJECTION-WITHDRAWAL WELL
- OBSERVATION WELL
- ABANDONED MORROW WELL
- DRY HOLE
- PROPOSED GAS STORAGE AREA OUTLINE

N

El Paso Natural Gas Company

WASHINGTON RANCH MORROW GAS STORAGE PROJECT

EDDY COUNTY, NEW MEXICO

NET SAND ISOPACH MAP

MORROW RESERVOIR

CONTOUR INTERVAL = 10 FEET

SCALE IN MILES

DATE: 8-79

NMOCC Case 6703
Exhibit 5

Washington Ranch Morrow Gas Storage Project,
Showing Location of Wells Currently Producing, their Future
Producing Status, and Wells Proposed to be Drilled
and Completed for Gas Injection-Withdrawal Purposes

Presently Producing (10)

T-25-S R-24-E

Unit	Section	Code
G	27	2
N	27	1
I	33	1
F	34	1
J	34	1
E	35	2

T-26-S R-24-E

H	4	2
F	3	1
G	3	1
M	2	2

CODE: 1. Well will be utilized as an injection-withdrawal well.

2. Well will be used as an observation well.

Location of Wells to be Drilled (17)

T-25-S R-24-E

Unit	Section
M	27
O	27
A	33
P	33
B	34
D	34
E	34
G	34
L	34
M	34
N	34

T-26-S R-24-E

A	4
C	3
D	3
E	3
K	3
L	3

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
El Paso EXHIBIT NO. 6
CASE NO. 6703

NMOCC Case 6703
Exhibit 6

Proposed Coring and Electrical Log Program

For

Washington Ranch Gas Storage Project

Coring Program

It is recommended that 3 wells be cored in the process of drilling and completion of 17 injection-withdrawal wells.

These will be full diameter cores, and cover the entire Morrow producing interval, including 100 feet of section above and below the Morrow Clastics interval, as more fully described in El Paso's proposed Washington Ranch "Gas Storage Interval."

Analyses suggested to be run on these cores would include conventional porosity, permeability and residual fluid saturation determinations.

The location of wells which are recommended for coring are:

Unit	Sec	TWP	Range
O	27	25	24
L	34	25	24
K	3	26	24

Electrical Logging Program

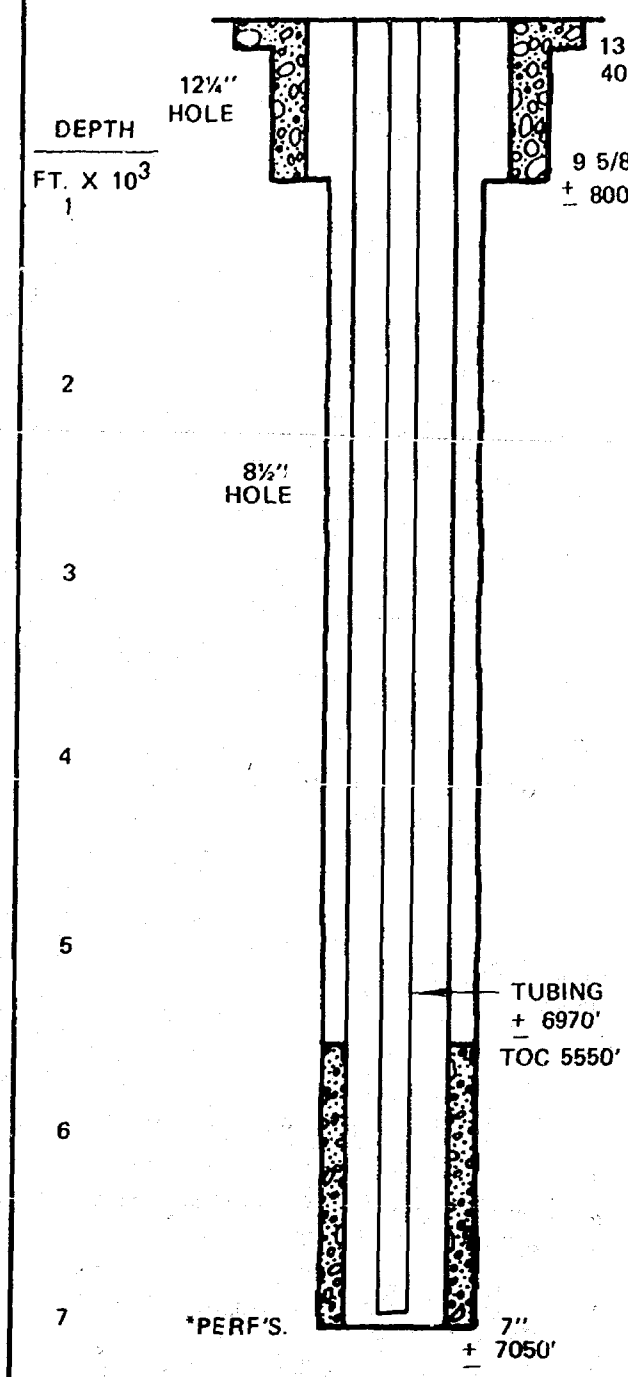
Each well drilled will have the following electrical surveys run:

(1) Schlumberger Dual Induction Spherically Focused Log with Spontaneous Potential (SP) and Gamma Ray curves.

(2) Schlumberger Formation Density - Compensated Neutron Log (FDC - CNL).

(3) Schlumberger Sonic Log (BHC).

WASHINGTON RANCH
PROPOSED NEW I–W WELL

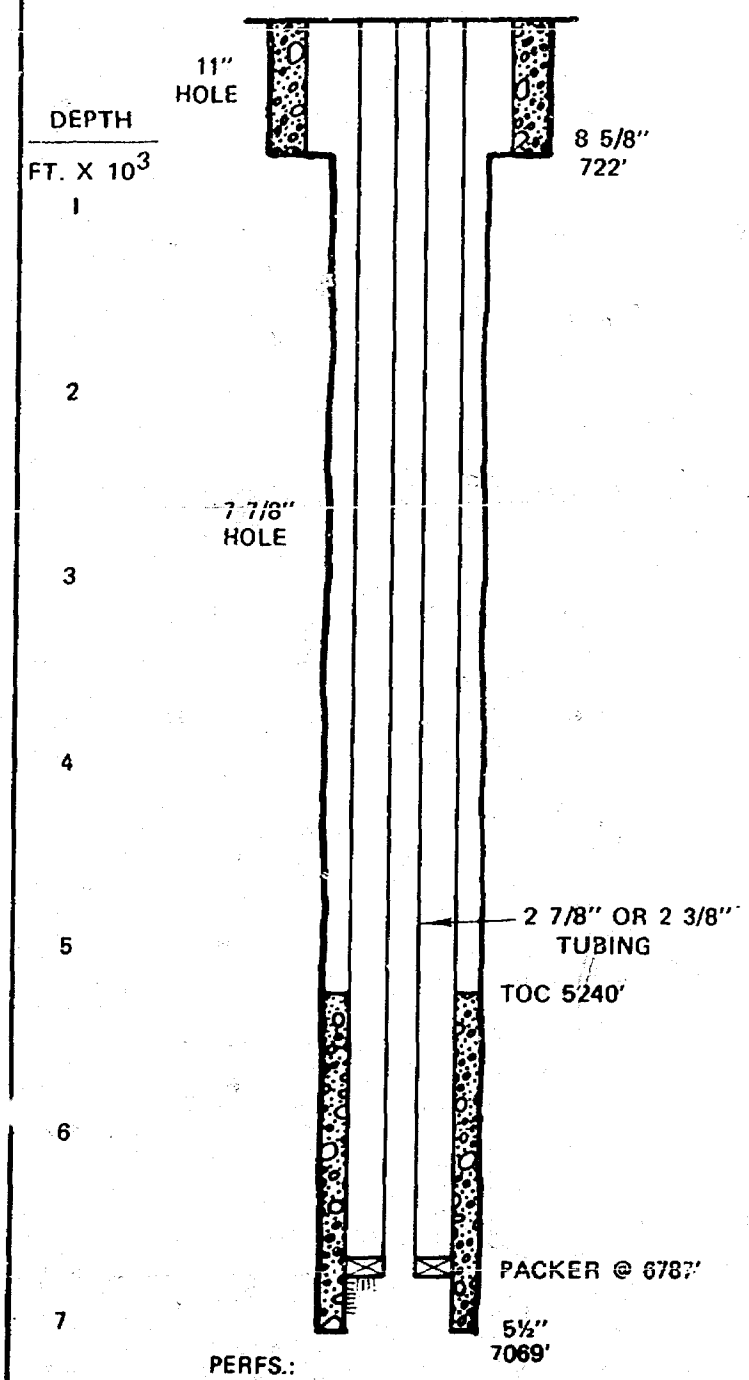


SIZE	GRADE	WT	BURST	COLLAPSE	DRIFT ID
13 3/8"	USED				
9 5/8"	H–40	32.3	2270	1400	8.845
7"	K–55	23	4360	3270	6.241
	J–55	6.5	7260	7680	2.441

*AVG. MID. PERF. 6970'

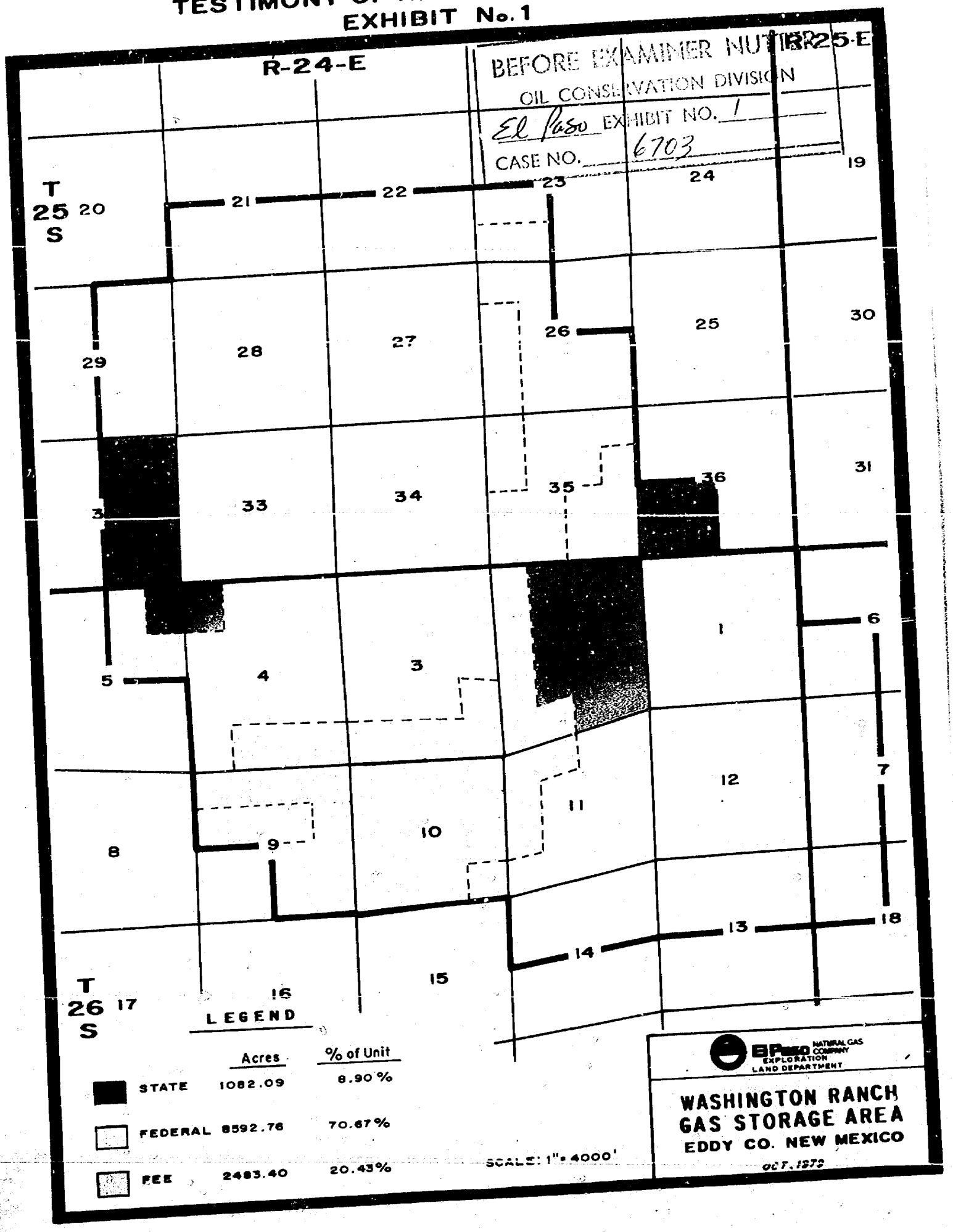
WASHINGTON RANCH
TYPICAL EXISTING
PRODUCING WELL

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
El Paso EXHIBIT NO. 9
CASE NO. 6703

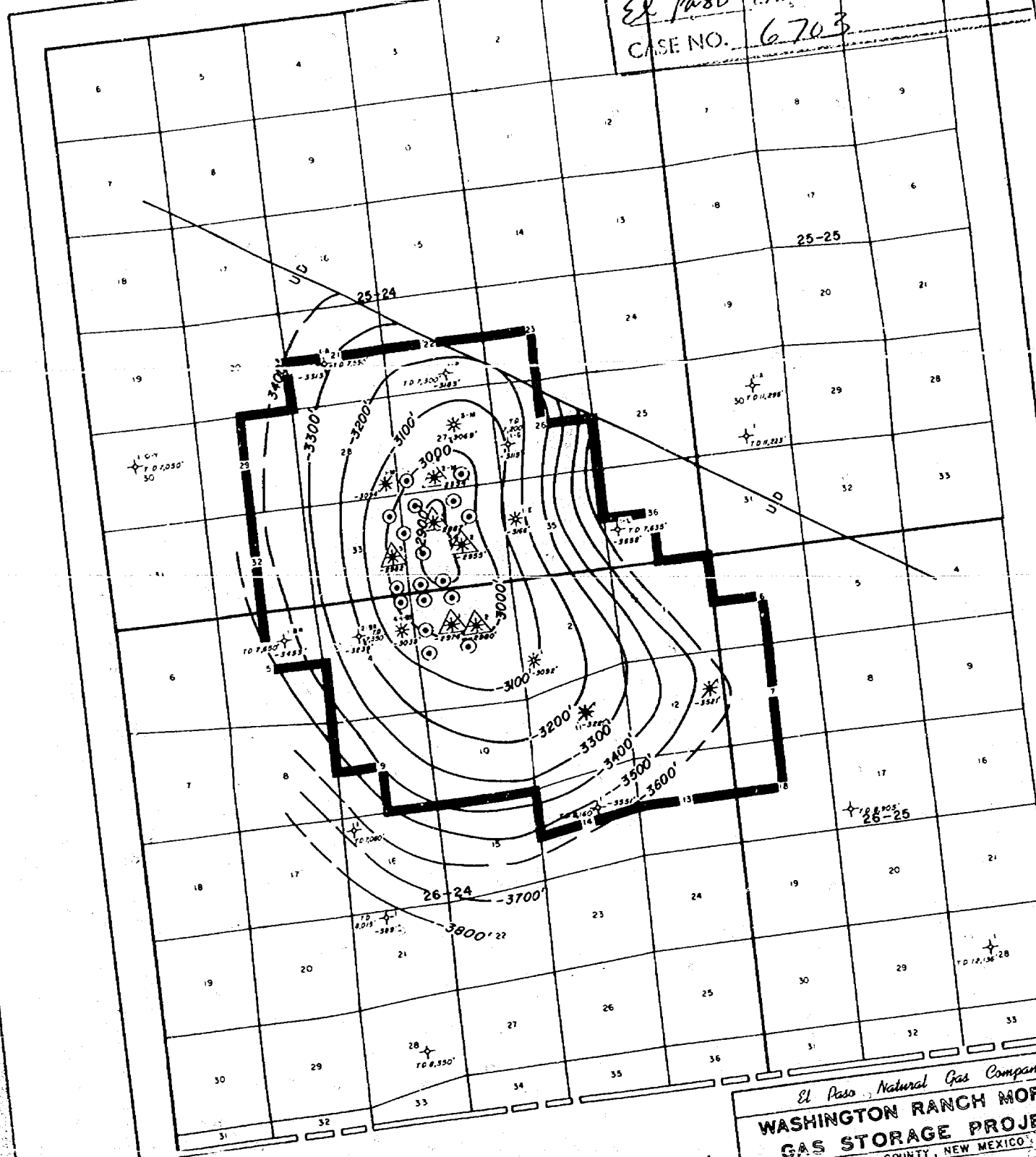


SIZE	GRADE	WT	BURST	COLLAPSE	DRIFT ID
8 5/8"	---	24	---	---	---
5 1/2"	---	14	---	---	---
5 1/2"	---	15.5	---	---	---
2 3/8" or 2 7/8"	J–55 or N–80	---	---	---	---

TESTIMONY OF RICHARD B. ISAACKS
EXHIBIT No. 1



BEFORE EXAMINER ANDERSON
OIL CONSERVATION DIVISION
El Paso EXHIBIT NO. 3
CASE NO. 6703



LEGEND

- PROPOSED INJECTION-WITHDRAWAL WELL
- PROPOSED LOCATION, INJECTION-WITHDRAWAL WELL
- OBSERVATION WELL
- ABANDONED MORROW WELL
- DRY HOLE
- PROPOSED GAS STORAGE AREA OUTLINE

N

El Paso Natural Gas Company

WASHINGTON RANCH MORROW GAS STORAGE PROJECT

EDDY COUNTY, NEW MEXICO

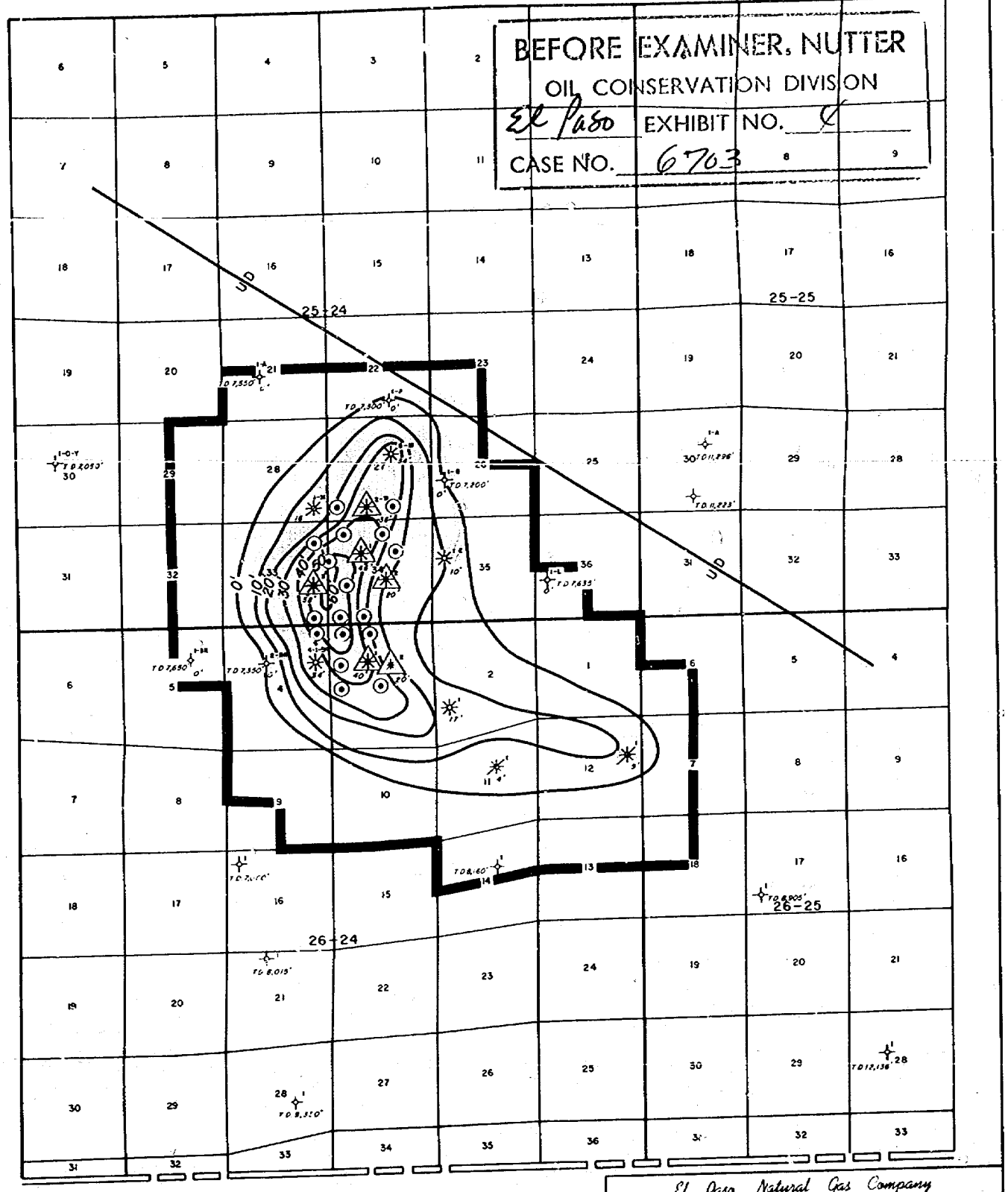
STRUCTURE MAP

TOP OF MORROW CLASTICS
CONTOUR INTERVAL = 100 FEET

SCALE IN MILES

DATE 8-79

BEFORE EXAMINER, NUTTER
OIL CONSERVATION DIVISION
El Paso EXHIBIT NO. 4
CASE NO. 6703



LEGEND

- PROPOSED INJECTION-WITHDRAWAL WELL
- PROPOSED LOCATION, INJECTION-WITHDRAWAL WELL
- OBSERVATION WELL
- ABANDONED MORROW WELL
- DRY HOLE
- PROPOSED GAS STORAGE AREA OUTLINE

N

El Paso Natural Gas Company

WASHINGTON RANCH MORROW GAS STORAGE PROJECT

EDDY COUNTY, NEW MEXICO

NET SAND ISOPACH MAP

MORROW RESERVOIR
CONTOUR INTERVAL = 10 FEET

SCALE IN MILES

DATE: 8-79

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
El Paso EXHIBIT NO. 5
CASE NO. 6703

NMOCC Case 6703
Exhibit 5

Washington Ranch Morrow Gas Storage Project,
Showing Location of Wells Currently Producing, their Future Producing Status, and Wells Proposed to be Drilled and Completed for Gas Injection-Withdrawal Purposes

Presently Producing (10)

	Unit	Section	Code
T-25-S R-24-E	G	27	2
	N	27	1
	I	33	1
	F	34	1
	J	34	1
	E	35	2
T-26-S R-24-E	H	4	2
	F	3	1
	G	3	1
	M	2	2

CODE: 1. Well will be utilized as an injection-withdrawal well.

2. Well will be used as an observation well.

Location of Wells to be Drilled (17)

	Unit	Section
T-25-S R-24-E	M	27
	O	27
	A	33
	P	33
	B	34
	D	34
	E	34
	G	34
	L	34
	M	34
	N	34
T-26-S R-24-E	A	4
	C	3
	D	3
	E	3
	K	3
	L	3

BEFORE EXAMINER HUTTER
OIL CONSERVATION DIVISION
El Paso EXHIBIT NO. 6
CASE NO. 6703

NMOCC Case 5703
Exhibit 6

Proposed Coring and Electrical Log Program

For

Washington Ranch Gas Storage Project

Coring Program

It is recommended that 3 wells be cored in the process of drilling and completion of 17 injection-withdrawal wells.

These will be full diameter cores, and cover the entire Morrow producing interval, including 100 feet of section above and below the Morrow Clastics interval, as more fully described in El Paso's proposed Washington Ranch "Gas Storage Interval."

Analyses suggested to be run on these cores would include conventional porosity, permeability and residual fluid saturation determinations.

The location of wells which are recommended for coring are:

Unit	Sec	TWP	Range
O	27	25	24
L	34	25	24
K	3	26	24

Electrical Logging Program

Each well drilled will have the following electrical surveys run:

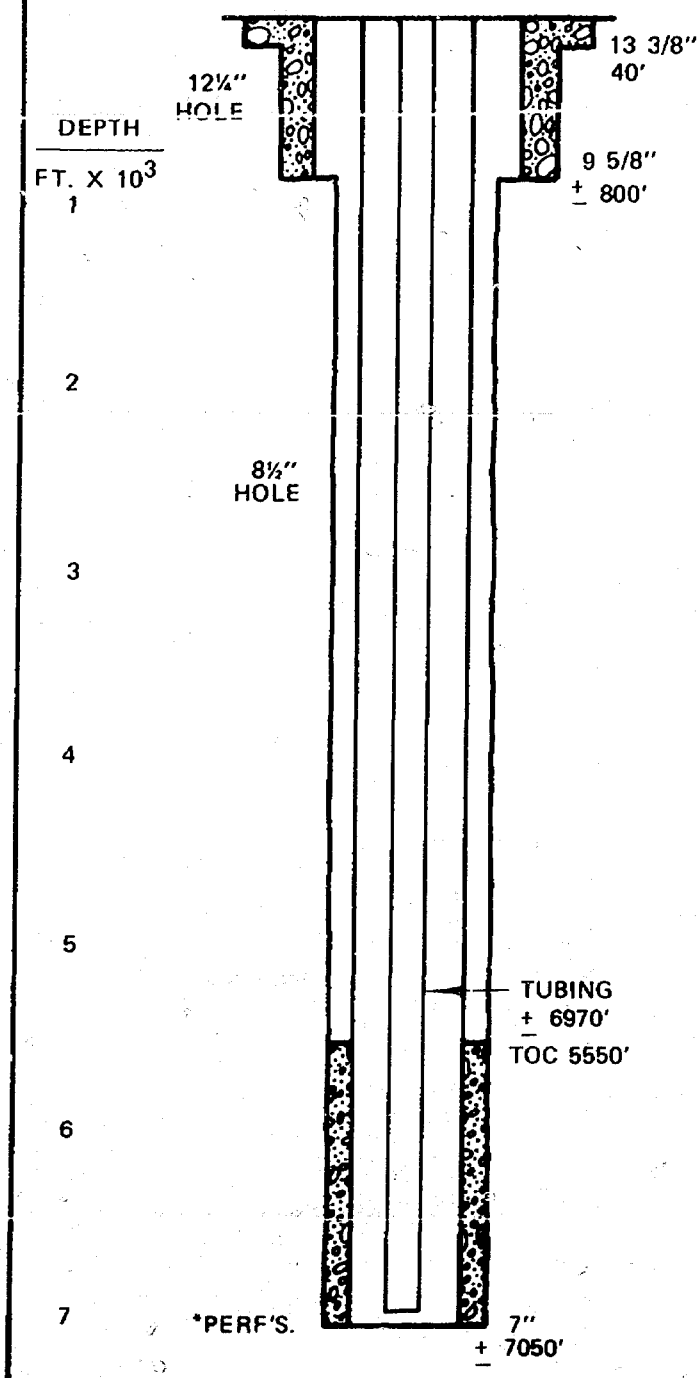
(1) Schlumberger Dual Induction Spherically Focused Log with Spontaneous Potential (SP) and Gamma Ray curves.

(2) Schlumberger Formation Density - Compensated Neutron Log (FDC - CNL).

(3) Schlumberger Sonic Log (BHC).

WASHINGTON RANCH
PROPOSED NEW I–W WELL

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
El Paso EXHIBIT NO. 8
CASE NO. 6703

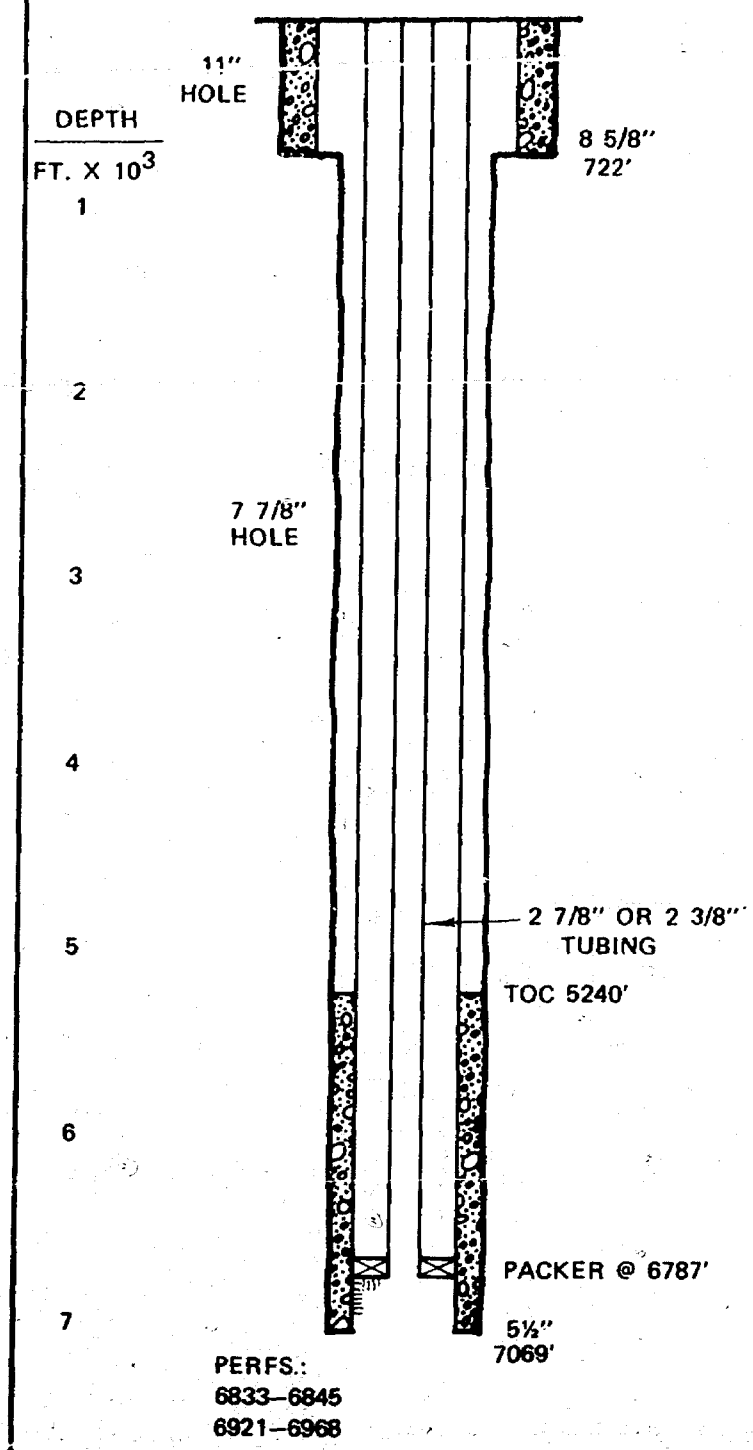


SIZE	GRADE	WT	BURST	COLLAPSE	DRIFT ID
13 3/8"	USED				
9 5/8"	H–40	32.3	2270	1400	8.845
7"	K–55	23	4360	3270	6.241
	J–55	6.5	7260	7680	2.441

*AVG. MID. PERF. 6970'

WASHINGTON RANCH
TYPICAL EXISTING
PRODUCING WELL

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
El Paso EXHIBIT NO. 9
CASE NO. 6703



SIZE	GRADE	WT	BURST	COLLAPSE	DRIFT ID
8 5/8"	---	24	---	---	---
5 1/2"	---	14	---	---	---
5 1/2"	---	15.5	---	---	---
2 3/8" or 2 7/8"	J–55 or N–80	---	---	---	---

MONTGOMERY, ANDREWS & HANNAHS
PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW
325 PASEO DE PERALTA
POST OFFICE BOX 2307
SANTA FE, NEW MEXICO 87501

TELEPHONE 505-982-3873

TELECOPY 505-982-4289

October 17, 1979

New Mexico Energy and
Minerals Department
Oil Conservation Division
Land Office Building
Santa Fe, New Mexico 87503

Re: NMOCD Case No. 6703 - Application of El Paso Natural Gas Company for underground gas storage, Eddy County, New Mexico.

Gentlemen:

Please be advised that David T. Burleson of the office of General Counsel of El Paso Natural Gas Company, El Paso, Texas, is associated with our firm for the presentation of evidence and argument in the above-referenced case.

Sincerely,

Owen M. Lopez

OML:ju

CASE 6704: ARCO OIL AND GAS COMPANY FOR THE AMENDMENT OF ORDER NO. R-6044, EDDY COUNTY, NEW MEXICO