



STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION
AZTEC DISTRICT OFFICE

1000 RIO BRAZOS ROAD
AZTEC, NEW MEXICO 87410
(505) 334-6178

OIL CONSERVATION DIVISION
BOX 2088
SANTA FE, NEW MEXICO 87501

DATE 3-29-83

RE: Proposed MC _____
Proposed DHC _____
Proposed NSL _____
Proposed SWD ☒ _____
Proposed WFX _____
Proposed PMX _____

Gentlemen:

I have examined the application dated 3-28-83
for the Doms Petro Corp Santa Fe 2002 F-2C-21N-BW
Operator Lease and Well No. Unit, S-T-R

and my recommendations are as follows:

Approve for both Morrison + Entrada zones

Yours truly,

John A. Elmer
JAE



DOME PETROLEUM CORP.

2900 DOME TOWER
1625 BROADWAY
DENVER, COLORADO 80202

TELEPHONE
(303) 620-3000

March 24, 1984

RECEIVED

Mr. Joe D. Ramey
Secretary Director
New Mexico Oil Conservation Commission
P.O. Box 2088
Sante Fe, New Mexico 87501

OIL CONSERVATION
DISTRICT

Re: Amendment for Salt Water
Disposal at Snake Eyes Entrada Pool
Sec. 20, T21N, R8W
San Juan County, New Mexico

Gentlemen:

Dome Petroleum Corp. hereby re-submits a request for administrative approval to permit disposal of salt water in the Sante Fe 20#2 well into two zones via a single string of tubing. The two zones are the Morrison and Entrada which were previously approved for salt water disposal by order numbers SWD-188 and R-6220 respectively. We are re-submitting this request with the added condition that we will perform an annual test to confirm the volume of water which is entering each zone.

Upon the suggestion of your office we investigated the feasibility of segregating the disposal into the two zones by running two strings of tubing. This is not a feasible alternative because of the friction pressure drops that would result at the relatively high flow rates. The largest combination of tubing that could be run in 7" casing is a dual string consisting of 3 1/2" and 2 3/8" flush joint. In order to meet our disposal requirements the 2 3/8" tubing would have to handle approximately 3000 BWPD. The friction pressure drop at this rate would be 417 psi which is 43% of our maximum allowable surface disposal pressure for the Morrison zone.

We then investigated methods of determining individual flowrates downhole. When disposing down a single string of tubing into two or more zones it is possible to accurately determine the volume of water entering each zone by the use of a fullbore - spinner flowmeter. This tool is run on wireline using a standard computerized logging truck and is widely used. The tool is a spinner velocimeter which records revolutions per second of the spinner blades as fluid is passed through them. Readings are taken in the casing between the different zones and the velocity loss due to fluid leaving the casing is determined from the decrease in

revolutions per second. Knowing the cross sectional area of the casing, flowrates into the different zones are then calculated. A monophasic fluid such as is present in our disposal system is ideally suited to this type of technique. Further discussion of the full bore-spinner flowmeter is contained in the attached SPE paper.

The injectivity of the Entrada zone is well established by our past disposal history. Once the tubing is perforated across from the Morrison zone it will readily be apparent as to the volume of water entering this zone. To confirm the volumes entering the Morrison and Entrada zones we propose using the fullbore-spinner flowmeter survey on an annual basis.

A proposed procedure is attached for commingled salt water disposal in the Entrada and Morrison zones. When it is confirmed that commingled disposal will be sufficient to handle our requirements of approximately 9000 BWPD we will change out the 3 1/2" tubing to 4 1/2" in order to lower the friction pressure drop.

If there are any questions or if additional information is required please contact me at (303) 620-3136.

Very truly yours,
DOME PETROLEUM CORP.
Robert S. Kelley
Robert S. Kelley
Production Engineer

cc: Mr. Frank Chavez
Supervisor-District #3
1000 Rio Brazos Rd.
Aztec, New Mexico 87401

H.D. Hollingsworth
L. Jenkins

**Procedure to Simultaneously Dispose
into Entrada and Morrison Zones
Snake Eyes Entrada Pool
Sante Fe 20#2 Disposal Well**

1. Perforate 3 1/2" tubing to communicate with Morrison perforations.
2. Monitor disposal pressures and rates to confirm that simultaneous disposal into Morrison and Entrada is sufficient to handle 9000 BWPD.
3. Pull packers prviously used to isolate Morrison perforations.
4. Change out 3 1/2" tubing to 4 1/2" tubing and set packer at 4700' placing inert fluid in annulus.
5. After two weeks of disposal run fullbore-spinner flowmeter survey and use results to report water disposal volumes.
6. Run fullbore-spinner flowmeter survey annually and adjust reported water disposal volumes accordingly.

THIS IS A PREPRINT — SUBJECT TO CORRECTION

THE FULL BORE FLOWMETER

By

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Discussion of this paper is invited. Three copies of any discussion should be sent to the Society of Petroleum Engineers office. Such discussions may be presented at the above meeting and, with the paper, may be considered for publication in one of the two SPE magazines.

ABSTRACT

The Full Bore Flowmeter is a spinner-type velocimeter designed to be lowered through production tubing in order to measure flow rates in the casing below. The tool provides continuous fluid-velocity measurements at lower production rates than was possible with earlier Continuous Flowmeter equipment. In polyphasic flow it provides measurements that are more accurate and less affected by fluid-viscosity changes than those from the earlier Continuous Flowmeter.

The tool has a 1 11/16-in. diameter. The spinner-and-protective-cage assembly is run in the hole while collapsed to the 1 11/16-in. size. When the tool is below the tubing, it opens and the spinner blades are exposed to a large cross section of the flow in the casing. A considerably larger portion of the total well production is metered through the spinner section than with the Continuous Flowmeter tool. The full-

bore exposure of the spinner increases its sensitivity for use in low flow rates, and decreases the effect of changes in viscosity in polyphasic flow. The spinner suspension system has been designed to minimize the effects of friction. The tool is collapsed as it is pulled back into the tubing, and is held in the collapsed position while being retrieved to the surface.

The Full Bore Flowmeter may be run by itself or in combination with the Gradiomanometer, Thermometer, Manometer, and thru-tubing Caliper. A Casing-Collar Locator run in combination with the Flowmeter provides positive depth control.

Several field examples are presented showing downhole flow profiles and production profiles where problems exist, such as crossflow, plugged perforations, and changes in contributions to production.