

HALLIBURTON ENERGY SERVICES

DUNCAN TECHNOLOGY CENTER - DUNCAN, OKLAHOMA
A HALLIBURTON COMPANY

ROSE

PRODUCTION ENHANCEMENT PRODUCTS & PROCESSES PROJECT REPORT

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To: Reid Willson
Halliburton Energy Services
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SAA-A067-97

November 20, 1997

Title: **Core Analysis**

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WELL DATA

Well Name: WMSU No. 1105 and 1602
Location: Sec. 32 & 33-34S-41W, Morton Co., Kansas
Formation: Morrow
Depth: 4841-4874 feet and 4838 - 4881 feet
Date Received: 10-28-97

PURPOSE

The formation cores were submitted for the following tests and examinations:
horizontal and vertical permeability

CONCLUSION

The horizontal and vertical permeability for many of the submitted cores are presented in the data section of this report. Some samples were too friable to obtain an acceptable sample for testing and therefore were not used.

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Data Cont'dPermeability Analyses

Purpose: To measure the permeability and porosity of a porous media.

Procedure: A test plug 1 inch in diameter by 2.0 inches long is obtained from the submitted core sample so the longitudinal axis of the plug is normal to the depth. The plug is then oven dried and allowed to cool to room temperature.

Permeability is determined by placing the plug securely in a Hassler Sleeve of the Permeameter. Dry nitrogen gas is then flowed through the plug. Measurements of flow rate and pressure drop across the plug are then obtained.

Results:

$$\text{Permeability (md)} = \frac{2000BQ\mu L}{A\{(P1 + B)^2 - (P2 + B)^2\}}$$

B is the barometric pressure (Atms).

Q is the flow rate in cubic centimeters per second (cc/sec).

m is the viscosity of the nitrogen gas (cp).

L is the plug's longitudinal length in centimeters (cm).

A is the area of the plug in square centimeters (cm²).

P1 is the upstream pressure (Atms).

P2 is the downstream pressure (Atms).

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Data (Cont'd)

Permeability Analyses (Cont'd)

Well No. 1105

<u>Sample No.</u>	<u>Depth (feet)</u>	<u>Air Permeability (md)</u>
1	4841-H	100.5
1	4841-V	76.9
2	4863-H	33.1
2	4863-V	6.8
3	4874-H	85.3 *

* Attempted to obtain a vertical plug from sample number 3 at 4874 feet, but the sample crumbled during the coring process. This sample was extremely friable.

H -- Horizontal

V -- Vertical

Well No. 1602

<u>Sample No.</u>	<u>Depth (feet)</u>	<u>Air Permeability (md)</u>
1	4855-H	165.8 *
2	4864-H	177.2
2	4864-V	23.4
3	4872-H	158.7
3	4872-V	104.5
4	4881-H	186.9 **
4	4881-V	0.58

* Attempted to obtain a vertical plug from sample number 1 at 4855 feet, but the sample crumbled during coring process. This sample was extremely friable, as was samples at 4838 and 4847 feet. No attempts were made to obtain plugs from these two samples; either horizontal or vertical.

** Sample number 4 at 4881 feet horizontal plug had one large natural fracture running lengthwise through the core.

H -- Horizontal

V -- Vertical

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REMARKS

The data or portions of the data in this report were given to Ralph Voss by Greg Tanaka by phone on November 6, 1997.

Core Sample Disposition

The remaining samples were returned to the Kansas Geological Survey Library.

DATA BOOK REFERENCE

The data presented in this report are recorded in:

<u>SECTION</u>	<u>BOOK NO.</u>	<u>PAGE NO.(S)</u>
Production Enhancement Products & Processes	8078	33, 36

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Respectfully submitted,

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By *Robert E. Rose*
 Robert E. Rose

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