

**CHECK SHEET**

Date: 9/22/01 API Number: 105-21442  
Company: Fidelity Exploration & Production Co.  
Well Name: Fee 1137  
County: Valley  
Field: Bowdoin & Area  
Surf. Location: 1385 FNL 1204 FWL SW NW Lot: Sec: 3 Twp: 31 N Rng: 34 E

Permit Number: 17662 Drilling Fee: \_\_\_\_\_  
Intention to Drill: 9/21/01 Expiration Date: 3/21/02  
Mineral Ownership:  Private  State  Federal  Indian  
Well Type: Vertical  Multiple Laterals  
Proposed Depth/Formation: MD: 800 TVD: Niobrara Formation  
Drilling Unit 160 Acres Description: NW/4  
Samples Required:  Received: Core Chips 535' to 564' 2-22-02

**COMPLETION INFORMATION**

Completion Date: 11-13-01 TD: 930 PBTD: 888  
Completed As: Gas Well IP / Formation: 21 mcf Niobrara

Geological Well Report: \_\_\_\_\_ Mud Log: \_\_\_\_\_

Sundry Notices: Intent Re-comp Bowdoin & Comm w/ Niobrara 6-21-02  
Subseq. Re-comp Bowdoin & Comm w/ Niobrara 7-10-02  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Subsequent Report of Abandonment: Received: \_\_\_\_\_ Approved: \_\_\_\_\_

Electric Logs: Platform Express CW Three Detector Density / Pulsed Neutron Decay /  
Array Ind / BHCS Bowdoin Overlay / GR Sector Bond / 1-3-02

Miscellaneous: Core Analysis 5-29-02  
\_\_\_\_\_  
\_\_\_\_\_

SWNW ✓

X			

TO  
BOARD OF OIL AND GAS CONSERVATION  
OF THE STATE OF MONTANA  
2535 ST. JOHNS AVENUE BILLINGS, MONTANA 59102



**COMPLETION REPORT**

Company Fidelity Exploration & Production Company Lease Private Well No. 1137  
 Address P.O. Box 1010, Glendive, MT 59330-1010 Field (or Area) Bowdoin Dome  
 The well is located 1385' FNL and 1204' FWL of Sec. 3  
 Sec. 3; T. T31N; R. R34E; County Valley; Elevation 2225' GL  
 (D.F., R.B., or G.L.)  
 Commenced drilling 09/23/01; Completed 11/13/01

Write the API# or the well name of another well on this lease if one exists N/A

The information given herewith is a complete and correct record of the well. The summary on this page is for the condition of the well at the above date.  
 Completed as Gas Well Signed Judy Schmitt Judy Schmitt  
 (oil well, gas well, dry hole) Title Operations Technician  
 API # 25-105-21442 Date December 28, 2001

(Bottom Hole Coordinates from Section Line)

**IMPORTANT ZONES OF POROSITY**

(denote oil by O, gas by G, water by W; state formation if known)

Niobrara "G" From 528' - 589' to 528' - 589'  
 Bowdoin "G" From 730' - 820' to 730' - 820'

**CASING RECORD**

Size Casing	Weight Per Ft.	Grade	Thread	Casing Set	From	To	Sack of Cement	Cut and Pulled from
7"	17#	H - 40	8 Rd	172'	0	162'	125	--
4.5"	10.5#	J - 55	8 Rd	915'	0	905'	100	--

**TUBING RECORD**

Size Tubing	Weight Per Ft.	Grade	Thread	Amount	Perforations
1.25"	2.3#	A-25	11 1/2 V	572'	Open End

**COMPLETION RECORD**

Rotary tools were used from 0' to 930  
 Cable tools were used from --- to ---  
 Total depth 930 ft.; Plugged back to 888 T.D.; Open hole from --- to ---

PERFORATIONS			ACIDIZED, SHOT SAND FRACED, CEMENTED			
INTERVAL		Number and Size and Type	INTERVAL		Amounts of Material Used	Pressure
From	To		From	To		
540'	550'	4 spf	540'	550'	40,700# 12/20	1025#

(If P&A show plugs above)

**INITIAL PRODUCTION**

Well is producing from Niobrara (pool) formation.  
 I.P. --- barrels of oil per --- hours ---  
 (pumping or flowing)  
21 Mcf of gas per 24 hours.  
--- barrels of water per --- hours, or --- % W.C.  
 (OVER)

INITIAL PRODUCTION-(Continued)

Initial 10-day average production \_\_\_\_\_ (bbl./day) (if taken)  
 Pressures (if measured): Tubing \_\_\_\_\_ psi flowing; \_\_\_\_\_ psi shut-in  
 Casing \_\_\_\_\_ psi flowing; 224.2 psi shut-in  
 Gravity \_\_\_\_\_ ° API (corrected to 60° F.)  
 Formation Volume Factor \_\_\_\_\_ Porosity \_\_\_\_\_ % Average Connate Water \_\_\_\_\_ %  
 Type of Trap \_\_\_\_\_  
 Producing mechanism \_\_\_\_\_

DRILL STEM TESTS

D.S.T. No.	From	To	Tool Open (Min.)	Shut-in	F.P.	S.I.P.	Recovery	Cushion
--	--	--	--	--	--	--	--	--

CORES

No.	Interval	Recovered
1	535' - 565'	30'

LOG RUNS

Type	From	To
PND	200'	831'
CBL/GR	0	838'
AIL	172'	923'
BHC	172'	881'
CNL	172'	913'

FORMATION RECORD

(Need no be filled out if Geologist sample description filed with Commission)

TOP / BOTTOM	SAMPLE AND CORE NO. AND DESCRIPTION	Top of Formation
528' - 589'	Niobrara	528'
730' - 820'	Bowdoin	730'

(Use additional sheets where needed to complete description)

FORM NO. 22-R7/99	SUBMIT IN QUADRUPPLICATE TO:	ARM 36.22.307 ARM 36.22.601	Lease Name: Fee
<b>MONTANA BOARD OF OIL AND GAS CONSERVATION</b> <b>2535 ST. JOHNS AVENUE, BILLINGS, MONTANA 59102</b>			Lease Type (Private/State/Federal): Private
<b>Application for Permit</b>			Well Number: 1137
To: Drill <input checked="" type="checkbox"/> Oil <input type="checkbox"/>	Deepen <input type="checkbox"/> Gas <input checked="" type="checkbox"/>	Re-enter <input type="checkbox"/> Other <input type="checkbox"/>	Unit Agreement Name: Bowdoin
Operator: FIDELITY EXPLORATION & PRODUCTION COMPANY			Field Name or Wildcat: Bowdoin Dome
Address: Box 1010			Objective Formation (s): Niobrara
City: Glendive State: MT Zip: 59330-1010			Section, Township, and Range: Sec. 3, T31N, R34E
Telephone Number: 406-359-7360			County: Valley
Surface Location of Well (quarter-quarter section and footage measurements) SW, NW, Sec 3, T31N, R34E 1385' FNL, 1204' FWL <small>(If directionally drilled, show both surface and bottom hole locations above)</small>			Elevation (indicate GL or KB) 2225' GL
Proposed total depth 800'	Formation at total depth Niobrara	Anticipated spud date September 2001	
Size and description of drilling/spacing unit 160	API number of another well on this lease (if any) None		



Hole size	Casing size	Weight/foot	Grade (API)	Depth	Sacks of Cement	Type of Cement
9.875"	7"	17 #	H-40/8 RND	156'	80	Class G
6.25"	4.5"	10.5 #	J-55	770'	100	Class G

**Describe Proposed Operations:**  
Describe or attach labeled diagram of blowout preventer equipment. Indicate if air drilled or describe mud program.

**Plan to drill a 9.875" surface hole and set and cement to surface 156' of 7", 17 lb/ft surface casing. Install and test BOP equipment. Then drill a 6.25" hole to TD and set and cement to surface 4.5", 10.5lb/ft production casing. The well will then be completed in the Niobrara formation and fracture stimulated. A wellhead assembly will then be installed and 1-1/4" tubing will be run to below the perforations. The well will be connected, metered and placed on production. Unlined pits will be used with fresh water mud. Upon completion of the drilling activity the drilling mud will be hauled to a private reservoir or left to dry in the pits.**

<b>BOARD USE ONLY</b>		The undersigned hereby certifies that the information contained on this application is true and correct:  Signed (Agent) <u>Judy Schmitt</u> Title <u>Operations Technician</u>  Date <u>September 10, 2001</u>
Approved (date) <u>SEP 21 2001</u>	Permit Fee <u>\$2500</u>	
By <u>[Signature]</u>	Check Number <u>560285 (WBI)</u>	
Title <u>[Signature]</u>	Permit Expires <u>3-21-02</u>	
RE-PERMIT <input type="checkbox"/>	Permit Number <u>17662</u>	
<b>THIS PERMIT IS SUBJECT TO THE CONDITIONS OF APPROVAL STATED ON THE BACK</b> API Number 25 - <u>105 - 21442</u>		

Samples Required: NONE  ALL  From \_\_\_\_\_ feet to \_\_\_\_\_ feet  
 Core chips to address below, full cores to USGS, Core Laboratory, Arvada, CO. Required samples must be washed, dried and delivered prepaid to:  
**Montana Board of Oil and Gas Conservation**  
 2535 St. Johns Avenue  
 Billings, MT 59102

Only freshwater based fluid may be used when drilling surface hole Rule 36.22.1001(5)

Saltwater Pits Shall Be Impermeable

**SUPPLEMENTAL INFORMATION**

Note: Additional information or attachments may be required by Rule or by special request.

1. Attach a survey plat certified by a registered surveyor. The survey plat must show the location of the well with reference to the nearest lines of an established public survey.
2. Attach an 8½ x 11" photocopy of that portion of a topographic map showing the well location, the access route from county or other established roads, residences, and water wells within a 1/2 mile radius of the well.
3. Attach a sketch of the well site showing the dimensions and orientation of the site, the size and location of pits, topsoil stockpile, and the estimated cut/fill at the corners and centerstake. (Note: the diagram need not be done by an engineer or surveyor). Attach a sketch of a top view and two side views of the reserve pit(s), if utilized. The reserve pit sketch must show the length, width, depth, cut and fill amount of freeboard, area of topsoil stockpile, and the height and width of berms.
4. Describe the type and amount of material or liner, if any, to be used to seal the reserve pit. If a synthetic liner is used, indicated the liner thickness (mils), bursting strength, tensile strength, tear strength, puncture resistance, hydrostatic resistance, or attach the manufacturer's specifications.
5. Describe the proposed plan for the treatment and/or the disposal of reserve pit fluids and solids after the well is drilled. If the operator intends to dispose of or treat the reserve pit contents off-site, specify the location and the method of waste treatment and disposal. (Note: The operator must comply with all applicable federal, state, county, and local laws and regulations with regard to the handling, transportation, treatment, and disposal of solid wastes.)
6. Does construction of the access road or location, or some other aspect of the drilling operation require additional federal, state, or local permits or authorizations? If yes, indicate the type of permit or authorization required:
  - No additional permits needed
  - Stream crossing permit (apply through county conservation district)
  - Air quality permit (apply through Montana Department of Environmental Quality)
  - Water discharge permit (apply through Montana Department of Environmental Quality)
  - Water use permit (apply through Montana Department of Natural Resources and Conservation)
  - Solid waste disposal permit (apply through Montana Department of Environmental Quality)
  - State lands drilling authorization (apply through Montana Department Natural Resources and Conservation)
  - Federal drilling permit
  - Other federal, state, county, or local permit or authorization: (specify type)

**NOTICES:**

1. Date and time of spudding must be reported to the Board verbally or in writing within 72 hours after the commencement of drilling operations.
2. The operator must give notice of drilling operations to the surface owner as required by Section 82-10-503, MCA, before the commencement of any surface activity.

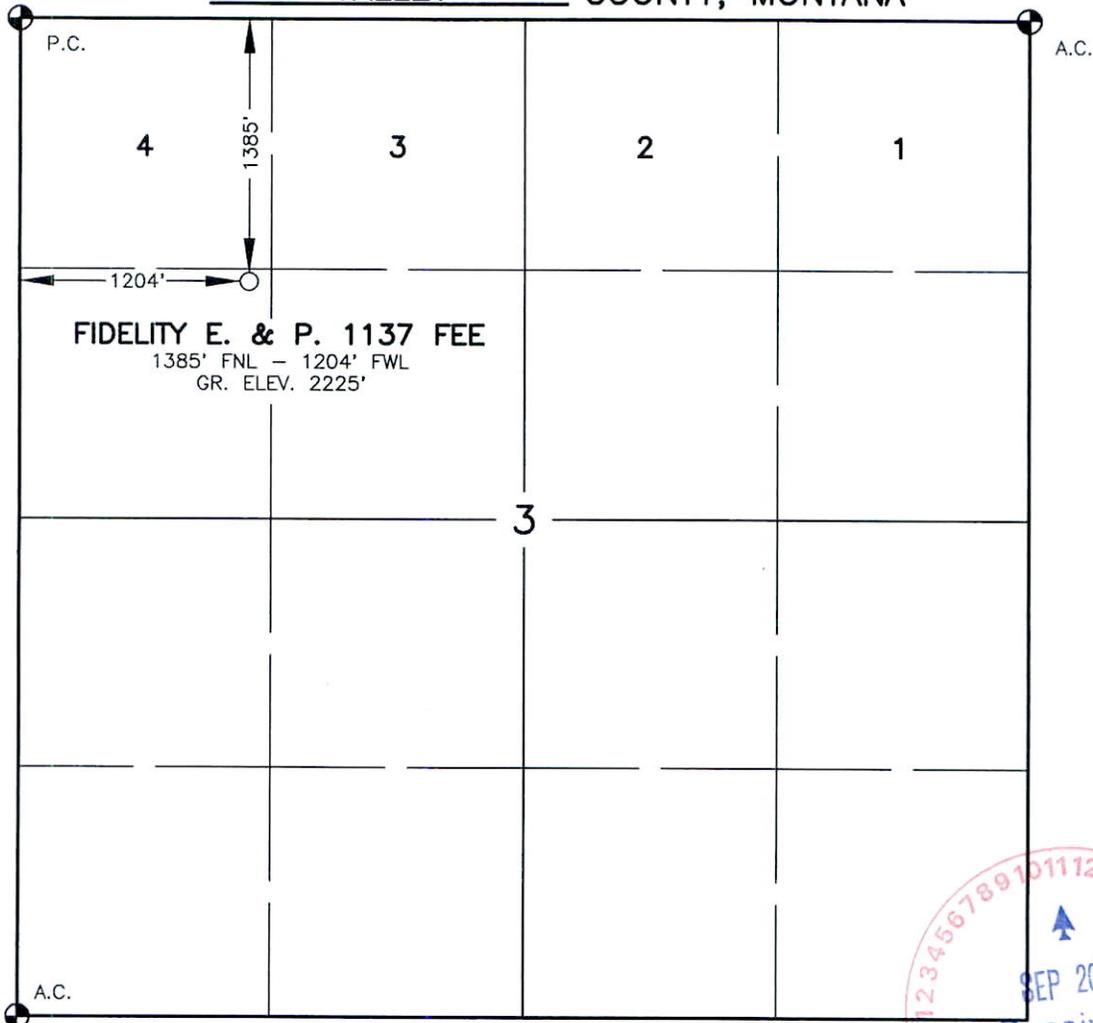
**BOARD USE ONLY**

**CONDITIONS OF APPROVAL**

The operator must comply with the following condition(s) of approval:

**WARNING:** Failure to comply with conditions of approval may void this permit.

**WELL LOCATION PLAT**  
**FIDELITY EXPLORATION & PRODUCTION COMPANY**  
 SW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub>, SECTION 3, TWP. 31 N. - RGE. 34 E., P.M.M.  
VALLEY COUNTY, MONTANA



**FIDELITY E. & P. 1137 FEE**  
 1385' FNL - 1204' FWL  
 GR. ELEV. 2225'



I, Charles M. Madler certify that this plat correctly represents work performed by me or under my responsible charge, and is true and correct to the best of my knowledge and belief.

EXHIBIT NO. 1

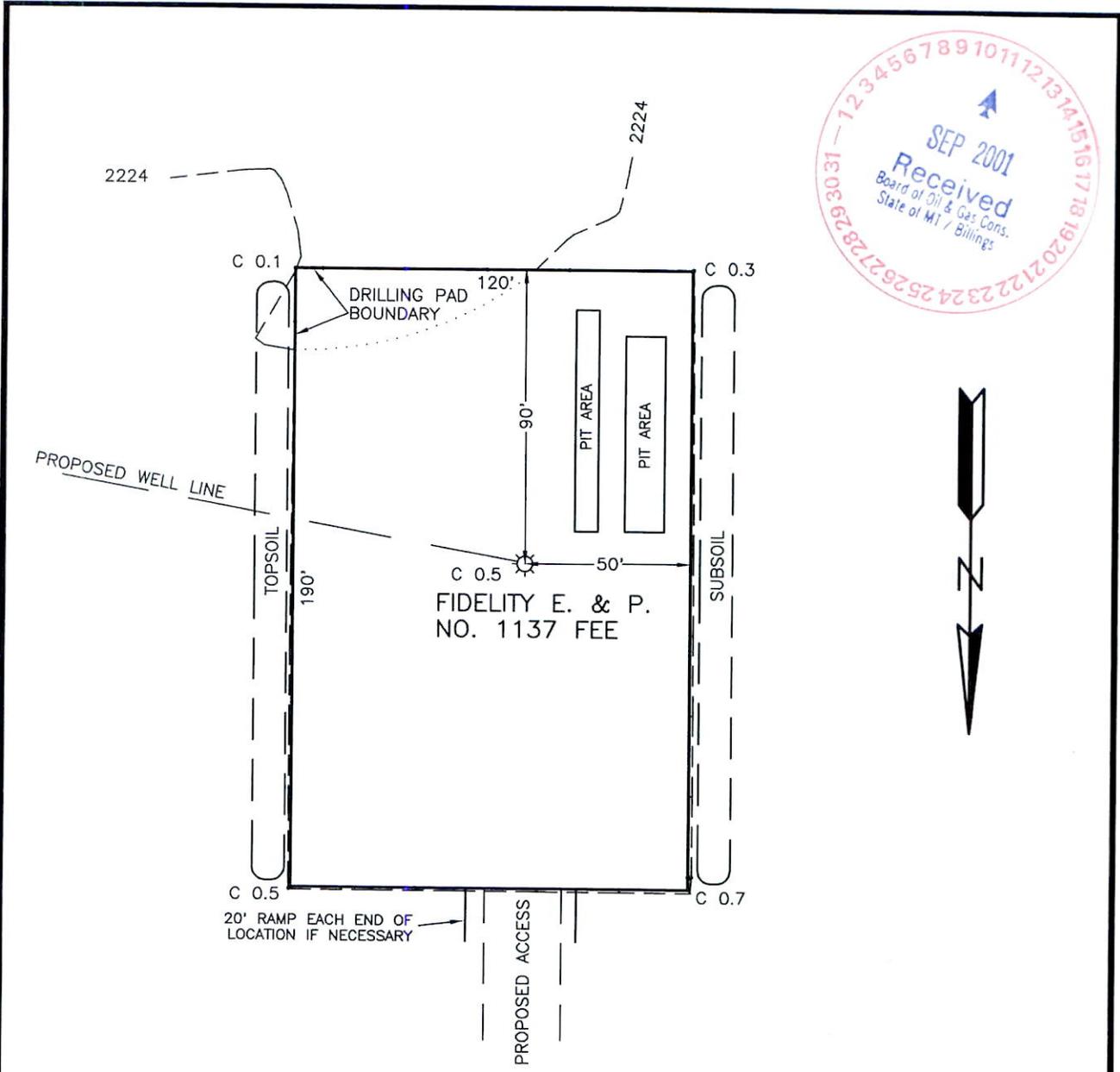
*Charles M. Madler*  
 CHARLES M. MADLER  
 P.L.S. NO. 7327S  
 REGISTERED PROFESSIONAL LAND SURVEYOR

FRANK & BARBARA A. WHITE  
 SURFACE OWNER

DATE STAKED 5-16-01

BASIS OF VERTICAL DATUM: U.S.G.S. QUAD. MAP

NO	DATE	BY	REVISION	
 <b>FIDELITY</b> EXPLORATION & PRODUCTION COMPANY <small>A Subsidiary of MDU Resources Group, Inc.</small>				
<b>FIDELITY E. &amp; P. NO. 1137 FEE</b> <b>WELL LOCATION</b> <b>BOWDOIN FIELD</b>				
DATE	DRAWN BY	SCALE	COMP. NO.	DRAWING NO.
5-31-01	T.A.S.	1" = 1000'	1137LOC	A-5-2920



**ESTIMATED EARTHWORK**

TOPSOIL (6" DEPTH).....	422 C.Y.
EXCAVATION.....	000 C.Y.
FILL (W/10% SHRINKAGE).....	000 C.Y.
WASTE MATERIAL.....	000 C.Y.
TOTAL EXCAVATION.....	*422 C.Y.
ACCESS ROAD - APPROX. 1300'	

\* PIT EXCAVATION NOT INCLUDED  
 FILL 3:1 SLOPES  
 CUT 1.5:1 SLOPES

EXISTING WELL ELEV. 2225.4'  
 GRADED WELL ELEV. 2224.9'

CONTOUR INTERVAL 1.0'

**EXHIBIT NO. 2**

NO	DATE	BY	REVISION



**FIDELITY**  
 Exploration & Production Company

**FIDELITY E. & P.**  
**NO. 1137 FEE WELL**  
**DRILLING SITE LAYOUT**

DATE	DRAWN BY	SCALE	COMP. NO.	DRAWING NO.
9-05-01	C.M.	1" = 50'	1137DSL	A-9-2982

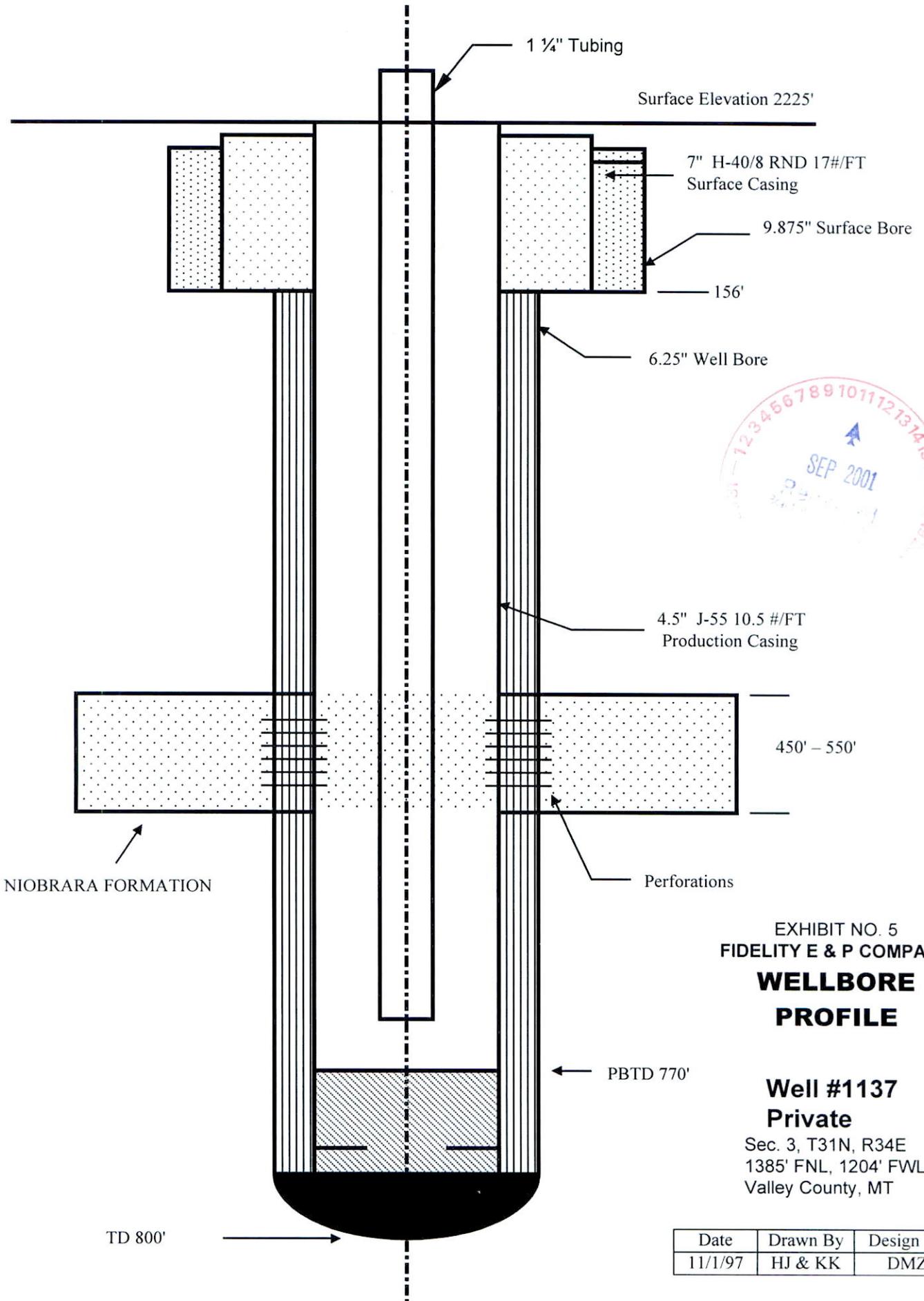


EXHIBIT NO. 5  
 FIDELITY E & P COMPANY  
**WELLBORE  
 PROFILE**

**Well #1137  
 Private**

Sec. 3, T31N, R34E  
 1385' FNL, 1204' FWL  
 Valley County, MT

Date	Drawn By	Design By
11/1/97	HJ & KK	DMZ

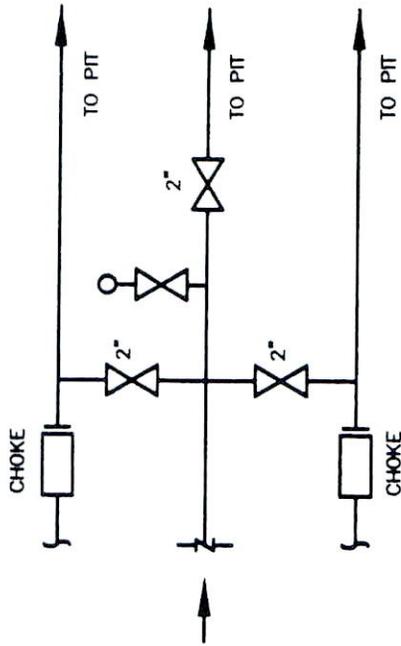
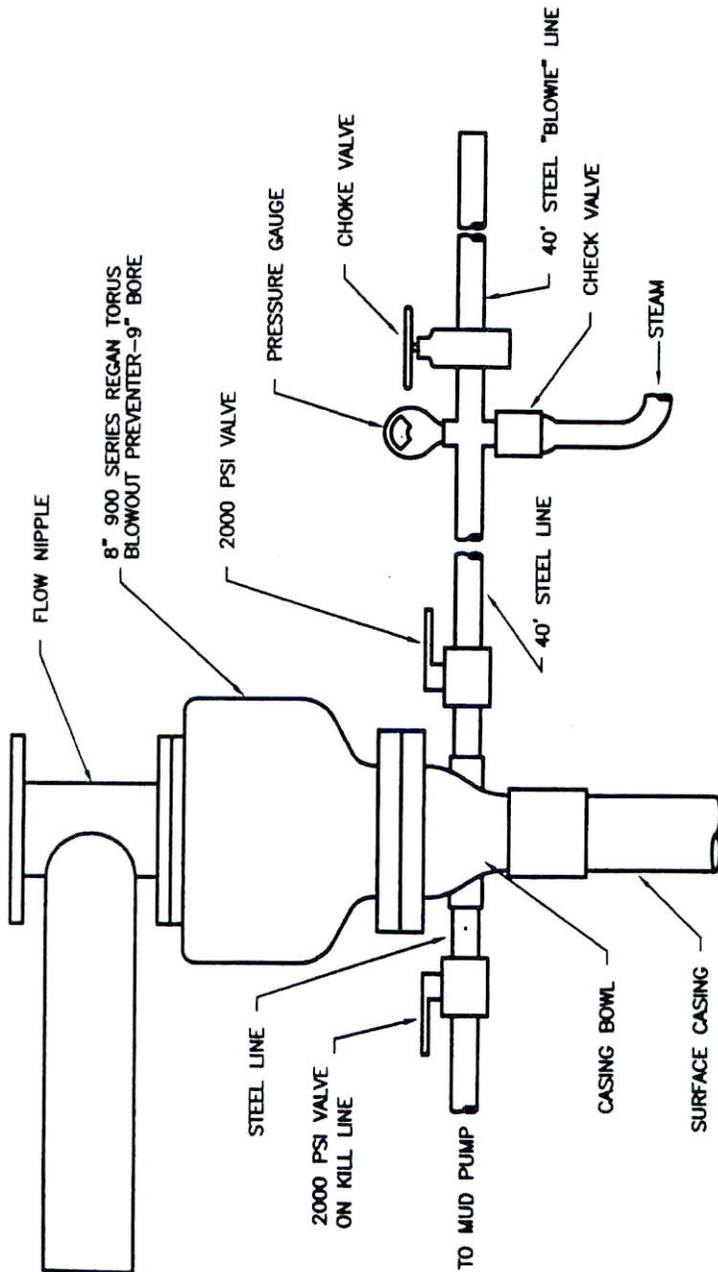


EXHIBIT 6

NO.	DATE	BY	DESIGN BY	REVISION	
 <b>FIDELITY</b> EXPLORATION & PRODUCTION COMPANY A Subsidiary of WEI Holdings, Inc.					
<b>B.O.P. LAYOUT &amp; SCHEMATIC</b>					
DATE	DRAWN BY	DESIGN BY	SCALE	COMP. NO.	DWG/SHEET NO.
2-22-86	T.A.S.	D.B.	NONE	A1580	A-9-1580



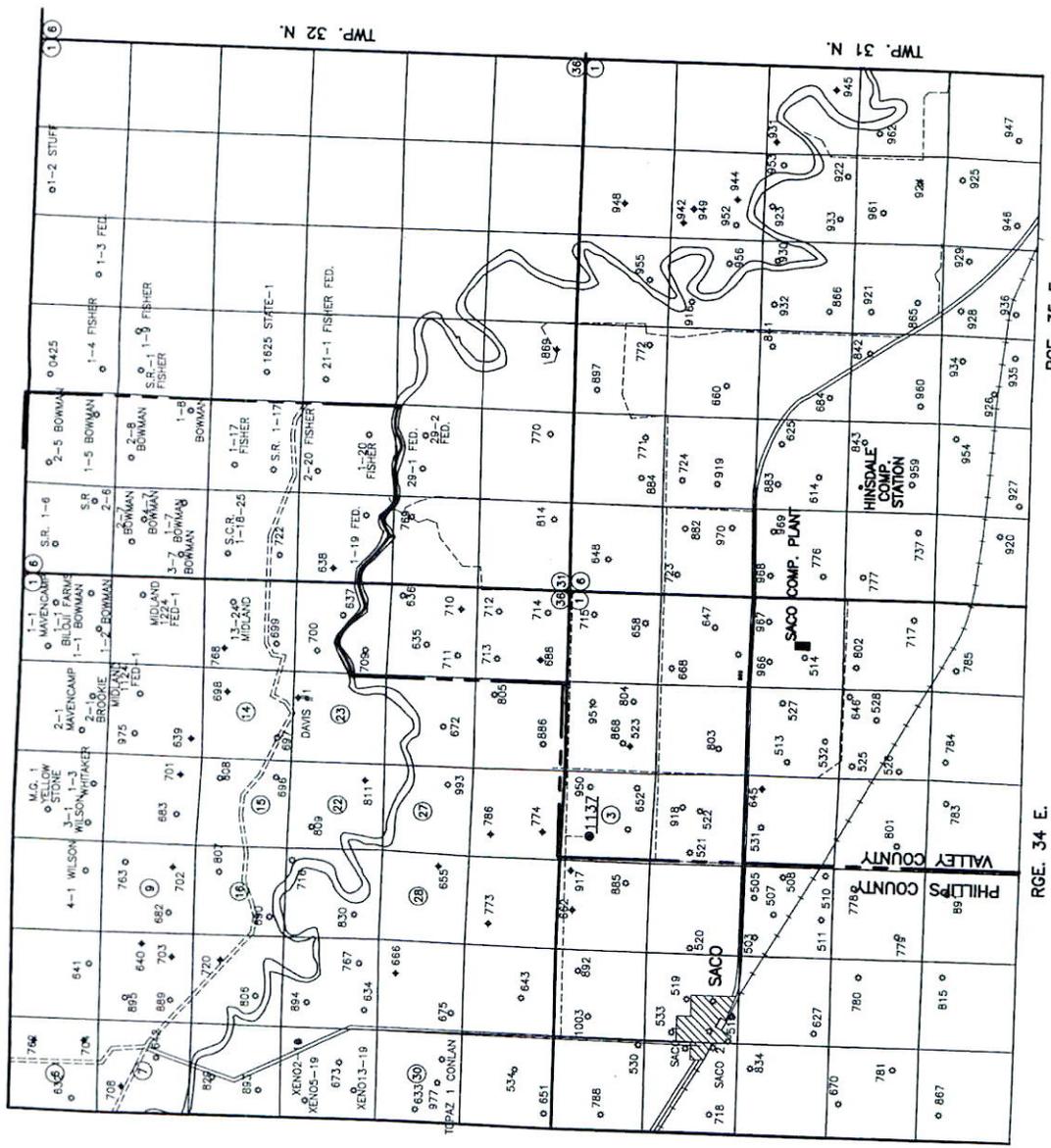


GROUP SEVEN CONSISTS OF:  
1137 FEE

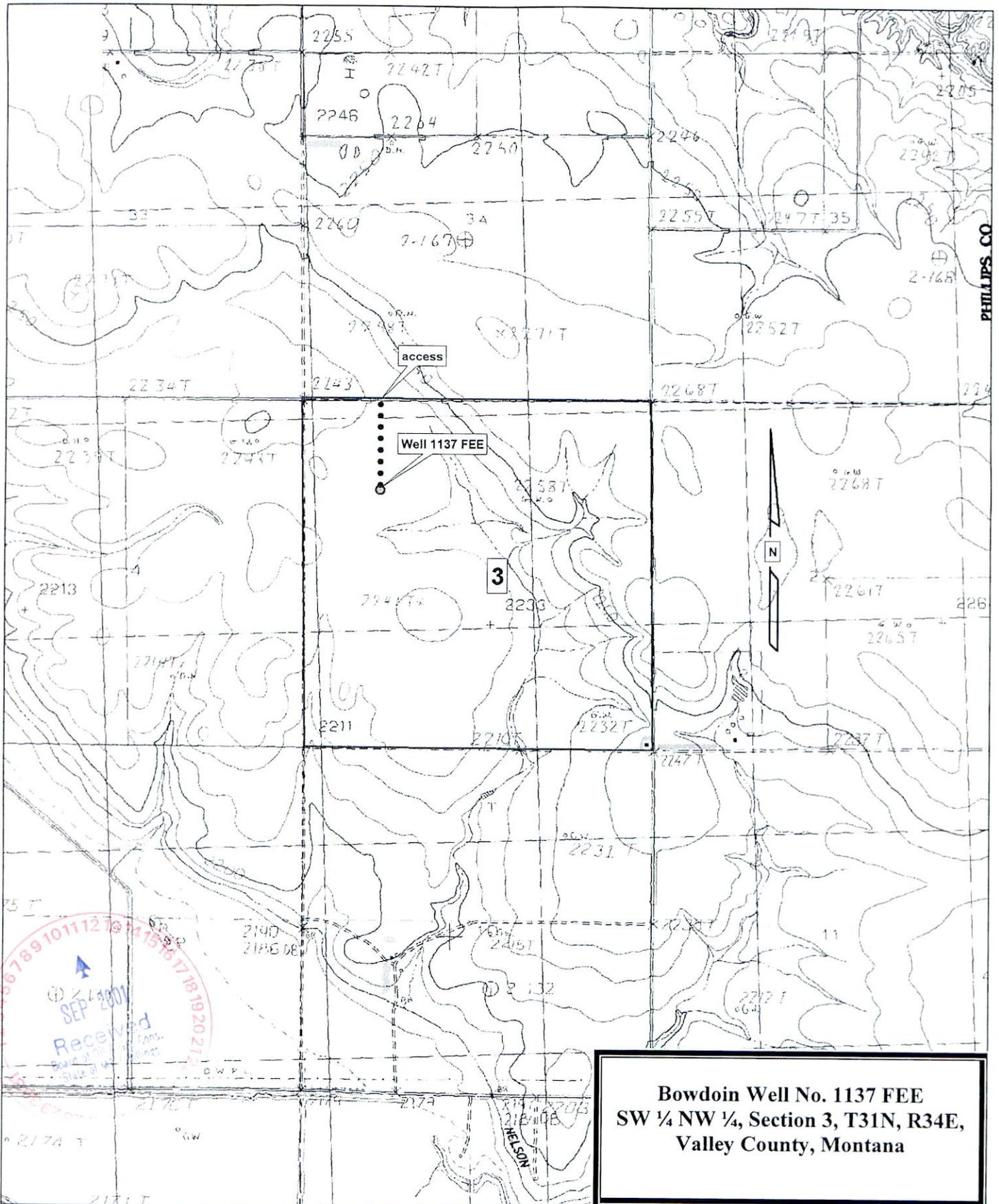
NO.	DATE	BY	REVISION

<b>WILLISTON BASIN</b> INTERSTATE PIPELINE COMPANY <small>A Subsidiary of MOU Resources Group, Inc.</small>	
<b>ORIENTATION MAP - GROUP 7</b> <b>2001 DRILLING PROGRAM</b> <b>BOWDOIN FIELD</b>	
DATE	9-07-01
DRAWN BY	C.M.
SCALE	.75" = 1 MI.
COMP. NO.	BOP072
DRAWING NO.	6-7-272-7



RGE. 34 E.      RGE. 35 E.



Scale: 1 : 24,000

Datum: NAD27

2000 ft

Submit In Quadruplicate To:  
**MONTANA BOARD OF OIL AND GAS CONSERVATION**  
2535 ST. JOHNS AVENUE  
BILLINGS, MONTANA 59102

**SUNDRY NOTICES AND REPORT OF WELLS**



Operator <b>Fidelity Exploration &amp; Production Company</b>		Lease Name: <b>Fee</b>
Address <b>P.O. Box 1010</b>		Lease Type (Private/State/Federal): <b>Private</b>
City <b>Glendive</b>	State <b>MT</b>	Zip Code <b>59330-1010</b>
Telephone Number <b>(406) 359-7360</b>		Fax Number <b>(406) 359-7273</b>
Location of well (1/4-1/4 section and footage measurements): <b>SW-NW, 1385' FNL, 1204' FWL</b>		Well Number: <b>1137</b>
If directionally or horizontally drilled, show both surface and bottom hole locations.		Unit Agreement Name: <b>Bowdoin - Saco</b>
API Number: <b>25-105-21442</b>		Field Name or Wildcat: <b>Bowdoin Dome</b>
Well Type (oil, gas, injection, other): <b>Gas</b>		Section, Township, and Range: <b>Sec. 3, T31N, R34E</b>
County: <b>Valley</b>		

Indicate below with an X the nature of this notice, report, or other data:

Notice of Intention to Change Plans <input type="checkbox"/>	Subsequent Report of Mechanical Integrity Test <input type="checkbox"/>
Notice of Intention to Run Mechanical Integrity Test <input type="checkbox"/>	Subsequent Report of Stimulation or Chemical Treatment <input checked="" type="checkbox"/>
Notice of Intention to Stimulate or to Chemically Treat <input type="checkbox"/>	Subsequent Report of Perforation or Cementing <input checked="" type="checkbox"/>
Notice of Intention to Perforate or to Cement <input type="checkbox"/>	Subsequent Report of Well Abandonment <input type="checkbox"/>
Notice of Intention to Abandon Well <input type="checkbox"/>	Subsequent Report of Pulled or Altered Casing <input type="checkbox"/>
Notice of Intention to Pull or Alter Casing <input type="checkbox"/>	Subsequent Report of Drilling Waste Disposal <input type="checkbox"/>
Notice of Intention to Change Well Status <input type="checkbox"/>	Subsequent Report of Production Waste Disposal <input type="checkbox"/>
Supplemental Well History <input type="checkbox"/>	Subsequent Report of Change in Well Status <input type="checkbox"/>
Other (specify) _____ <input type="checkbox"/>	Subsequent Report of Gas Analysis (ARM 36.22.1222) <input type="checkbox"/>

**Describe Proposed or Completed Operations:**

Describe planned or completed work in detail. Attach maps, well-bore configuration diagrams, analyses, or other information as necessary. Indicate the intended starting date for proposed operations or the completion date for completed operations.

**06/25/02 – Perforated the Bowdoin formation from 795' to 805' at 4 SPF.**  
**06/26/02 – N<sup>2</sup> foam frac'd Bowdoin formation with 50,000# of 12-20 sand.**  
**06/28/02 – Well back on production and commingled with existing Niobrara perforations.**  
**First ten days of production – Average 13 Mcfd at 93.7 psig.**

**BOARD USE ONLY**

Approved JUL 15 2002  
Date  
Steven P. Sash  
Name **CHIEF FIELD INSPECTOR**  
Title

The undersigned hereby certifies that the information contained on this application is true and correct:

July 8, 2002  
Date  
Harlan Jirges  
Signed (Agent)  
**Harlan Jirges**  
Associate Operations Engineer  
Print Name & Title

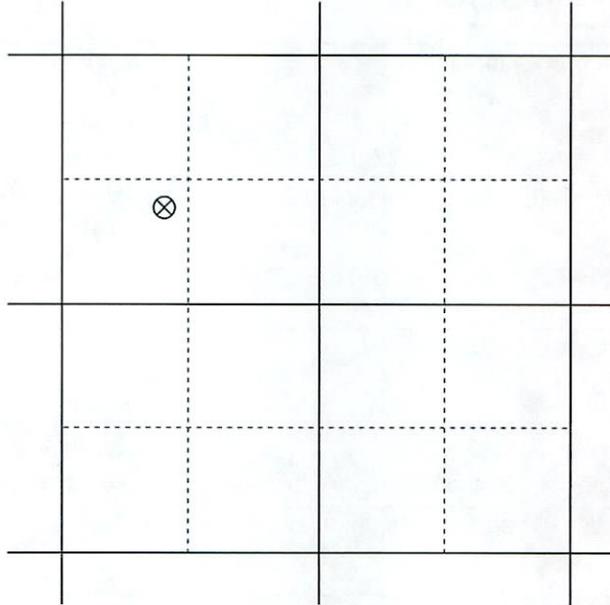
**SUPPLEMENTAL INFORMATION**

NOTE: Additional information or attachments may be required by Rule or by special request. Plot the location of the well or site that is the subject of this notice or report.

Section 3

Range R34E

Township T31N



Scale: 1 inch = 2,000 feet

**BOARD USE ONLY**

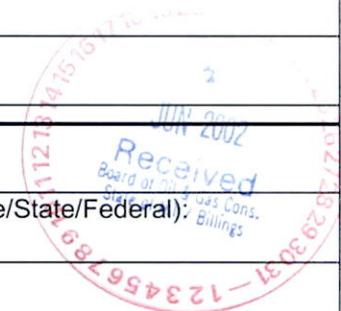
**CONDITIONS OF APPROVAL**

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**Failure to comply with the conditions of approval may void this permit.**

Submit In Quadruplicate To:  
**MONTANA BOARD OF OIL AND GAS CONSERVATION**  
**2535 ST. JOHNS AVENUE**  
**BILLINGS, MONTANA 59102**

**SUNDRY NOTICES AND REPORT OF WELLS**



Operator <b>Fidelity Exploration &amp; Production Company</b>		Lease Name: <b>Fee</b>
Address <b>P.O. Box 1010</b>		Lease Type (Private/State/Federal): <b>Private</b>
City <b>Glendive</b> State <b>MT</b> Zip Code <b>59330-1010</b>	Well Number: <b>1137</b>	
Telephone Number <b>(406) 359-7360</b> Fax Number <b>(406) 359-7273</b>	Unit Agreement Name: <b>Bowdoin - Saco</b>	
Location of well (1/4-1/4 section and footage measurements): <b>SW-NW, 1385' FNL, 1204' FWL</b>		Field Name or Wildcat: <b>Bowdoin Dome</b>
If directionally or horizontally drilled, show both surface and bottom hole locations.		Section, Township, and Range: <b>Sec. 3, T31N, R34E</b>
API Number: <b>25-105-21442</b> <small>State County Well</small>	Well Type (oil, gas, injection, other): <b>Gas</b>	County: <b>Valley</b>

Indicate below with an X the nature of this notice, report, or other data:

Notice of Intention to Change Plans <input type="checkbox"/> Notice of Intention to Run Mechanical Integrity Test <input type="checkbox"/> Notice of Intention to Stimulate or to Chemically Treat <input checked="" type="checkbox"/> Notice of Intention to Perforate or to Cement <input checked="" type="checkbox"/> Notice of Intention to Abandon Well <input type="checkbox"/> Notice of Intention to Pull or Alter Casing <input type="checkbox"/> Notice of Intention to Change Well Status <input type="checkbox"/> Supplemental Well History <input type="checkbox"/> Other (specify) _____ <input type="checkbox"/>	Subsequent Report of Mechanical Integrity Test <input type="checkbox"/> Subsequent Report of Stimulation or Chemical Treatment <input type="checkbox"/> Subsequent Report of Perforation or Cementing <input type="checkbox"/> Subsequent Report of Well Abandonment <input type="checkbox"/> Subsequent Report of Pulled or Altered Casing <input type="checkbox"/> Subsequent Report of Drilling Waste Disposal <input type="checkbox"/> Subsequent Report of Production Waste Disposal <input type="checkbox"/> Subsequent Report of Change in Well Status <input type="checkbox"/> Subsequent Report of Gas Analysis (ARM 36.22.1222) <input type="checkbox"/>
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**Describe Proposed or Completed Operations:**

Describe planned or completed work in detail. Attach maps, well-bore configuration diagrams, analyses, or other information as necessary. Indicate the intended starting date for proposed operations or the completion date for completed operations.

**June 24<sup>th</sup> – Plan to perforate the Bowdoin formation from 795' to 805' at 4 SPF.**  
**June 25<sup>th</sup> – Plan to N2 Foam frac above perforations with 50,000# of 12-20 sand.**  
**The well will then be put into production and commingled with the Niobrara formation.**

<b>BOARD USE ONLY</b>		The undersigned hereby certifies that the information contained on this application is true and correct:	
Approved <b>JUN 24 2002</b>		<b>June 19, 2002</b>	
	<b>CHIEF FIELD INSPECTOR</b>	Date	Signed (Agent)
Name	Title	<b>Harlan Jirges</b>	<b>Associate Operations Engineer</b>
		Print Name & Title	

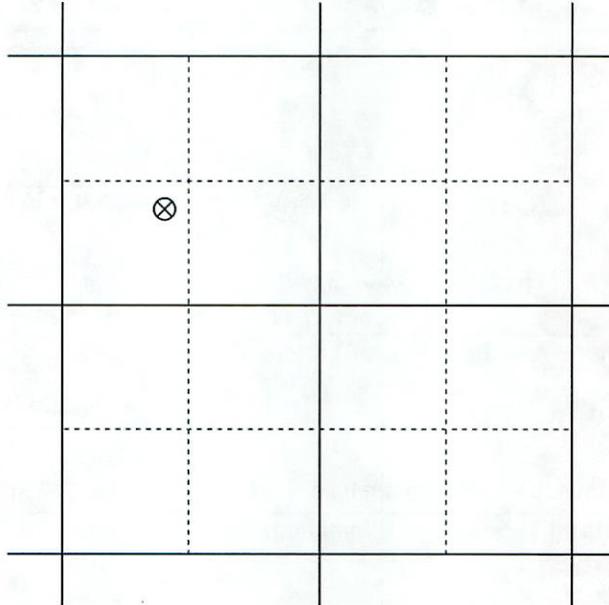
**SUPPLEMENTAL INFORMATION**

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Section 3

Range R34E

Township T31N



Scale: 1 inch = 2,000 feet

**BOARD USE ONLY**

**CONDITIONS OF APPROVAL**

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**Failure to comply with the conditions of approval may void this permit.**

SPUD INFORMATION



WELL NAME: 1137

API #: 105-21442

LOCATION: SWNW - 3-31N-34E

SPUD TIME: 7:30 pm Tentative

Actual

DATE: 9-23-01

DRILLING COMPANY: Elenburg

RIG #: 10

CALLER'S NAME: Jeff Murre

COMPANY NAME: Fidelity

OTHER: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Montana Board of Oil and Gas Conservation  
Environmental Assessment

Operator: Fidelity Exploration & Production Co.  
Well Name/Number: #1137  
Location: SW NW 3 T31N T34E  
County: Valley, MT; Field (or Wildcat) Bowdoin

Air Quality

(possible concerns)

Long drilling time no  
Unusually deep drilling (high horsepower rig) no  
Possible H2S gas production no  
In/near Class I air quality area no  
Air quality permit for flaring/venting (if productive) no

Mitigation:

Air quality permit (AQB review)  
 Gas plants/pipelines available for sour gas  
 Special equipment/procedures requirements  
 Other: \_\_\_\_\_

Comments: No special concerns

Water Quality

(possible concerns)

Salt/oil based mud no  
High water table no  
Surface drainage leads to live water no  
Water well contamination no  
Porous/permeable soils no  
Class I stream drainage no

Mitigation:

Lined reserve pit  
 Adequate surface casing  
 Berms/dykes, re-routed drainage  
 Closed mud system  
 Off-site disposal of solids/liquids (in approved facility)  
 Other: \_\_\_\_\_

Comments: Fresh water mud - surface casing OK.

Soils/Vegetation/Land Use

(possible concerns)

Stream crossings no  
High erosion potential no  
Loss of soil productivity no  
Unusually large wellsite no  
Damage to improvements no  
Conflict with existing land use/values no

Mitigation

Avoid improvements (topographic tolerance)  
 Exception location requested  
 Stockpile topsoil  
 Stream Crossing Permit (other agency review)  
 Reclaim unused part of wellsite if productive  
 Special construction methods to enhance reclamation  
 Other: \_\_\_\_\_

Comments: no special concerns

Health Hazards/Noise

(possible concerns)

Proximity to public facilities/residences >0.5 miles  
Possibility of H2S no  
Size of rig/length of drilling time

Mitigation:

Proper BOP equipment  
 Topographic sound barriers  
 H2S contingency and/or evacuation plan  
 Special equipment/procedures requirements  
 Other: \_\_\_\_\_  
Comments: no special concerns

**Wildlife/recreation**

(possible concerns)  
Proximity to sensitive wildlife areas (DFWP identified) none  
Proximity to recreation sites none  
Creation of new access to wildlife habitat no  
Conflict with game range/refuge management no  
Threatened or endangered Species no

Mitigation:  
 Avoidance (topographic tolerance/exception)  
 Other agency review (DFWP, federal agencies, DSL)  
 Screening/fencing of pits, drillsite  
 Other: \_\_\_\_\_  
Comments: no special concerns

**Historical/Cultural/Paleontological**

(possible concerns)  
Proximity to known sites none in area  
Mitigation  
 avoidance (topographic tolerance, location exception)  
 other agency review (SHPO, DSL, federal agencies)  
 Other: \_\_\_\_\_  
Comments: private surface - none identified

**Social/Economic**

(possible concerns)  
 Substantial effect on tax base  
 Create demand for new governmental services  
 Population increase or relocation  
Comments: no concerns

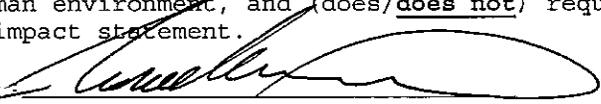
**Remarks or Special Concerns for this site**

Well is an 800' Niobrara well in Bowdoin Dome Field

**Summary: Evaluation of Impacts and Cumulative effects**

Impacts are minor and short term.

I conclude that the approval of the subject Notice of Intent to Drill (does/does not) constitute a major action of state government significantly affecting the quality of the human environment, and (does/does not) require the preparation of an environmental impact statement.

Prepared by (BOGC)   
(title:) Administrator  
Date: September 21, 2001

Other Persons Contacted:  
\_\_\_\_\_  
(Name and Agency)  
\_\_\_\_\_  
(subject discussed)  
\_\_\_\_\_  
(date)

If location was inspected before permit approval:



DEPARTMENT OF NATURAL  
RESOURCES AND CONSERVATION  
OIL AND GAS CONSERVATION DIVISION

STATE OF MONTANA

2535 ST. JOHNS AVENUE  
BILLINGS, MONTANA 59102-4693

# RECEIPT

## Well Cuttings & Core Samples

COMPANY Fidelity Exploration & Production Co.

WELL NAME Lee 1137

LOCATION 31N-34E-3 SWNW

SAMPLE INTERVAL  
DITCH

SAMPLE INTERVAL	DITCH	SAMPLE INTERVAL	DITCH
		<u>535 to 564</u>	

RECEIVED FROM TerraTek, Inc.

BY K Maddaus

DATE 2-22-02

**Core Analysis Program  
Fidelity #11-37 Well  
Valley County, Montana**



31N-34E-3: SWNW

*Prepared for:*

Fidelity Exploration & Production Company  
1700 Lincoln, Suite 4600  
Denver, Colorado 80203

Attn: Mr. Barron Gimza

*Prepared by:*

TerraTek, Inc.  
University Research Park  
400 Wakara Way  
Salt Lake City, Utah 84108

TR01-500251  
May 2002

105-21442

# UNCONVENTIONAL CORE ANALYSIS

## 1 INTRODUCTION

This report presents the results of unconventional and advanced rock properties tests performed on plug samples taken from the Niobrara Formation from the #11-37 well in Valley County, Montana. TerraTek personnel were at the wellsite to receive the Niobrara core. The single coring run was successful with an actual core recovery of 98%. At the TerraTek laboratories, bulk density, grain density, total (altered) porosity, and fluid saturation were measured on 30 plug samples.

Pulse decay permeability measurements were conducted on permeability samples 1 through 10, in order to determine matrix representative permeability at "as received" saturation conditions at or near net overburden conditions. These tests were conducted on selected samples covering both reservoir and non-reservoir intervals. After careful examination of the core, a breakdown of the core-represented lithofacies was developed with the idea in mind that these facies should also be distinguishable on the wireline logs. Plug sample data (1 through 30) were used to represent the porosity and fluid saturations, whereas ten samples were selected to represent the mineralogical characteristics (XRD) and matrix permeability of the core. Samples used for porosity and saturation data were plugged, weighed, and immersed bulk volumes determined prior to analysis. The gas-filled porosity values were determined from the measured water saturation and total (altered) porosity.

## 2 PROCEDURES

### 2.1 Wellsite

TerraTek personnel were at the wellsite to receive the single Niobrara core. Overall recovery of the conventional core was 98%. Best-fit depths were marked and reported.

### 2.2 Core Processing

Cores were initially laid out in depth order on the core racks by core number. Most of the core could be extracted from the inner core barrel by using a push rod, although some sections required clam-shelling the inner core barrel (clam-shelling is a process of cutting the inner core barrel into to halves prior to removing the core). Next, the cores were fitted together piece by piece. The cores were then marked for orientation (red and black strips, red on right for uphole).

Plug sample sites were drilled based on depths selected by the client (Tables C1 and C2). One-inch diameter plug samples were drilled using tap water. The plugs were then surface dried with a dry soft rag and wrapped circumferentially with Teflon tape prior to trimming to  $\frac{3}{4}$  to 1-inch lengths. Once the samples were trimmed, they were washed of fines on the end surfaces, dried with a soft rag, and wrapped with Mylar film prior to placing in marked Ziploc bags. Plug endtrims were preserved in Ziploc bags for XRD analysis. Whole core sections



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were then wrapped in 3-4 layers of Mylar film and marked for depth and orientation.

After plugging and wrapping, the cores were slabbed, marked again on the surface of the slabs for depth, and boxed. The butt sections were re-wrapped with Mylar and re-marked, as necessary, prior to boxing. Cores were approximately 1/3 slabbed (1 inch slab thickness) and as a permanent record, the slabs were digitally imaged. Results of XRD analysis are presented in another report section, and digital images are included on the Report CD-R.

## 2.3 Testing

Bulk volume determinations were made on client-specified plug samples by de-ionized water immersion; Teflon tape insured sample integrity during bulk volume testing. The plug samples were then placed in a humidity oven in order to dry the samples without damaging the clays. We dried the samples at 140° F and 45% relative humidity—traditionally used for shaly samples—until stable weight conditions were attained.

Water saturations were determined gravimetrically using the initial weights and the final humidity dried weights. Dry weights with and without the Teflon wrap were recorded. Initial and final weights were corrected for Teflon weight. Initial Bulk Volumes were also corrected for Teflon volume. Grain Volumes were then measured using a Boyle's Law gas pycnometer on the humidity-dried plugs. Final saturation and (altered) porosity data are reported in Table C3. Air permeability was also measured and reported on the dried, altered plugs.

## 2.4 Advanced Testing

The ten pulse-decay permeability plugs, which were selected to represent the non-reservoir and reservoir intervals, were each prepared for pulse-decay measurements by adding pre-weighed 18 mesh screens for gas distribution over the endfaces of the samples. The samples were then weighed with Teflon and screens. After loading each sample in a hydrostatic coreholder, the samples were then allowed to reach net overburden and pore pressure equilibrium. Equilibrium conditions initially required 15 minutes to one hour prior to each test because of the slightly plastic behavior of the samples in their "as received" saturation state. Sample permeabilities were then measured by the pulse-decay method. After the initial saturation tests were complete, the samples were re-weighed, placed in small Ziploc bags and placed where they could receive low level heating (approximately 100-120° F) for approximately 24 hours. The samples were then removed carefully and re-weighed prior to testing again. Each sample was tested three times at successively lower water saturations, in order to calculate the matrix permeability at "as received" water saturations<sup>1</sup>. Permeability to nitrogen gas (Kg) was measured at a net overburden pressure of 700 psi (the minimum system overburden necessary to assure no bypass). As indicated in Table C4, measured permeabilities likely reflect substantial sand or silt within the shale/mudstone matrix.

Visual indications of fracture development in the plugs were also noted. Based on the three lithologic zones interpreted in this well, all zones were represented in the plug samples. Table

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<sup>1</sup>The pulse-decay permeability method is described in a paper, SPE 28450.



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C5 presents general facies descriptions and depth intervals.

### 3 RESULTS

The unconventional rock properties measurements are summarized in Table C3. As illustrated in Tables C3 and C4, we cannot easily subdivide the Niobrara reservoir into similar petrologic facies: apparently, subtle differences in matrix structure and composition have a minor impact on storage capacity and a major impact on matrix permeability and therefore productivity.

Figure C1 presents a plot of gas-filled porosity, a function of bulk volume, versus water saturation. The data indicate a good correlation between the gas-filled porosity and water saturation in the non-reservoir rock.

Figure C2 is a plot of the gas-filled porosity versus pulse-decay permeability data reported in Table C4. It is apparent from the plot that the non-reservoir and reservoir samples acted differently as the water saturation was altered. The exponential growth in permeability to gas for the reservoir sample suggests a matrix structure or composition (likely increasing sand content) not present in the non-reservoir samples.

In Table C3, the total porosity is presented as a value representing the current sample conditions (i.e., humidity dried). A schematic diagram of the porosity system of the Niobrara Formation (Mudstone/Siltstone Facies) is offered in Figure C3. The total measured porosity value is an altered value and, according to corresponding XRD data, the samples contain 2.4-14.9% expandable mixed-layer illite/smectite clay with a 25%-85% hydrous expandability. These samples also contain 0.0-6.1% of 100% expandable smectite clay. These expandable clays do de-water during the humidity drying process. For example, if a sample contained 14.9% expandable mixed clay with a hydrous expandability of 80% and 1.5% of 100% expandable smectite, then 13.42% of the clay bulk volume could contain water. Since the clay bulk volume represents 53% of the total rock volume, then 7.11% of the total rock volume could contain water that would likely be removed during the humidity drying process. Also important is the matrix permeability, which likely controls how much water is introduced to the expandable clays in the drilling/coring process.

It is important to understand that the "total" porosity is not the same as effective porosity (or porosity present downhole in the reservoir). Because of the presence of the expandable clays, the "total" porosity should be viewed as a **dilated** porosity. These expandable clays could contain water bound to the clays after drilling/coring. Shrinkage in bulk volumes between 0.61% and 3.34% were measured from the samples after the humidity drying process.

The effective *in situ* porosity can be approximated for the reservoir and non-reservoir rock where the alteration to the bulk volume is entirely due to the addition of free water on the expandable clays. It is likely that the expandable clays collected free water during the drilling/coring operations. This conclusion is supported by the fact that the 3.5-inch diameter core visibly swelled in the inner core barrel making it often difficult to remove. For the example above, alterations of bulk volume from "original" (after coring) to "current" (after humidity drying) were measured at 2.13% of bulk volume. This means that the clay-corrected porosity is approximately 28.3% instead of the measured altered porosity of 30.5%.



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Figure C4 is a histogram illustrating the volume changes inferred from porosity; saturation, XRD data, and shrinkage data to account for the drilling/coring induced volume changes. Changes in bulk volume are presented in Table C6, along with predicted effective porosities based on bulk volume changes.

For this well, the reservoir and non-reservoir rock can only be separated by lithofacies type and gas-filled porosity. Even gas-filled porosity is not a consistent indicator and perhaps depends on plug sample location. Thinly bedded sandstone laminae largely control the gas storage and productivity.



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**Table C1. Core Inventory**

Core Number	Cored Interval (ft)	Recovered Interval (ft)	Recovery (%)
1	30	535-565	98

**Table C2. Sample Inventory**

Sample Number	Plug Depth (feet)	Number & Depth of Pulse-Decay Samples (ft)
1	535.1	
2	536.1	
3	537.1	
4	538.1	
5	539.1	
6	540.1	
7	541.6	(1) 541.1
8	542.4	(2) 542.6
9	543.1	
10	544.1	(3) 543.7
11	545.7	
12	546.1	
13	547.1	
14	548.5	(4) 548.4
15	549.6	
16	550.1	
17	551.1	
18	552.1	(5) 553.1
19	553.7	(6) 553.3
20	554.1	(7) 554.5
21	555.2	
22	556.1	
23	557.1	
23B	557.5	(8) 557.7
24	558.4	(9) 558.8
25	559.4	
26	560.5	
27	561.4	(10) 561.8
28	562.2	
29	563.2	
30	564.1	



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**Table C3. Unconventional Core Analysis Test Results**

Sample Number	Sample Depth (ft)	Total Porosity (%)	Dry Bulk Density (g/cc)	As Received Bulk Density (g/cc)	Grain Density (g/cc)	Saturation Water (%)	Gas-Filled Porosity (%)
1	535.1	28.00	1.842	2.116	2.558	98.91	0.30
2	536.1	28.45	1.831	2.115	2.559	98.99	0.29
3	537.1	30.21	1.781	2.086	2.552	99.10	0.27
4	538.1	29.21	1.797	2.093	2.538	100.00	0.00
5	539.1	29.81	1.793	2.099	2.555	100.00	0.00
6	540.1	26.98	1.854	2.123	2.539	99.83	0.04
7	541.6	30.99	1.748	2.058	2.533	100.00	0.00
8	542.4	31.93	1.740	2.072	2.556	100.00	0.00
9	543.1	30.63	1.769	2.075	2.550	100.00	0.00
10	544.1	24.95	1.931	2.184	2.573	100.00	0.00
11	545.7	22.18	2.036	2.252	2.617	97.15	0.63
12	546.1	19.50	2.144	2.344	2.664	100.00	0.00
13	547.1	28.63	1.843	2.128	2.582	99.67	0.10
14	548.5	26.98	1.889	2.162	2.588	100.00	0.00
15	549.6	28.86	1.855	2.149	2.608	100.00	0.00
16	550.1	31.95	1.757	2.092	2.582	100.00	0.00
17	551.1	34.09	1.725	2.071	2.618	100.00	0.00
18	552.1	31.94	1.784	2.102	2.621	100.00	0.00
19	553.7	35.90	1.671	2.030	2.607	100.00	0.00
20	554.1	35.42	1.667	2.017	2.582	98.77	0.44
21	555.2	31.22	1.791	2.109	2.603	100.00	0.00
22	556.1	30.89	1.819	2.132	2.632	100.00	0.00
23	557.1	33.61	1.732	2.068	2.609	100.00	0.00



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**Table C3. Unconventional Core Analysis Test Results**

Sample Number	Sample Depth (ft)	Total Porosity (%)	Dry Bulk Density (g/cc)	As Received Bulk Density (g/cc)	Grain Density (g/cc)	Saturation Water (%)	Gas-Filled Porosity (%)
23B	557.5	28.10	1.883	2.165	2.620	100.00	0.00
24	558.4	31.58	1.805	2.118	2.638	100.00	0.00
25	559.4	31.16	1.770	2.082	2.572	100.00	0.00
26	560.5	28.51	1.881	2.164	2.632	100.00	0.00
27	561.4	29.52	1.845	2.140	2.617	100.00	0.00
28	562.2	30.56	1.797	2.108	2.588	100.00	0.00
29	563.2	31.99	1.770	2.092	2.602	100.00	0.00
30	564.1	33.37	1.744	2.079	2.617	100.00	0.00
14	548.5	26.98	1.889	2.162	2.588	100.00	0.00
15	549.6	28.86	1.855	2.149	2.608	100.00	0.00



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**Table C4. Advanced Unconventional Core Analysis Test Results**

Sample ID	Sample Depth (ft)	NOB Pressure (psi)	Sample Length (in)	Sample Diameter (in)	Gas-Filled Porosity (%)	Bulk Density (g/cc)	Grain Density (g/cc)	Pulse Decay Permeability (md)	Saturation Water (%)
1orig	541.1		0.959	1.514	0.00	2.049	2.531		100.00
1.0		700			9.33	1.956		0.000409	71.03
1.1		700			12.26	1.927		0.015688	61.94
1.2		700			15.08	1.899		0.087965	53.17
1dry			0.941	1.449	32.20	1.727			0.00
2orig	542.6		0.658	1.459	0.00	2.111	2.519		100.00
2.0		700			2.93	2.082		0.000021	89.67
2.1		700			8.59	2.026		0.000708	69.77
2.2		700			12.51	1.986		0.012211	55.95
2dry			0.643	1.430	28.40	1.827			0.00
3orig	543.7		0.682	1.470	0.00	2.130	2.534		100.00
3.0		700			5.89	2.071		0.021062	77.95
3.1		700			8.93	2.041		0.128698	66.60
3.2		700			12.44	2.006		0.518007	53.45
31dry			0.678	1.452	26.72	1.863			0.00
4orig	548.4		0.715	1.511	3.24	2.251	2.632		85.00
4.0		700			9.42	2.189		5.981581	56.35
4.1		700			12.31	2.160		6.344682	43.00
4.2		700			14.42	2.139		7.440314	33.20
4dry					21.59	2.067			0.00
5orig	553.1		0.840	1.482	0.00	2.157	2.579		100.00
5.0		700			2.51	2.132		0.000203	91.11
5.1		700			6.85	2.088		0.000232	75.72
5.2		700			11.27	2.044		0.150965	60.02
5dry			0.826	1.445	28.20	1.875			0.00



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**Table C4. Advanced Unconventional Core Analysis Test Results**

Sample ID	Sample Depth (ft)	NOB Pressure (psi)	Sample Length (in)	Sample Diameter (in)	Gas-Filled Porosity (%)	Bulk Density (g/cc)	Grain Density (g/cc)	Pulse Decay Permeability (md)	Saturation Water (%)
6orig	553.3		0.727	1.483	0.00	2.105	2.575		100.00
6.0		700			4.26	2.062		0.000097	86.47
6.1		700			12.67	1.978		0.099697	59.78
6.2		700			16.36	1.941		0.154849	48.07
6dry			0.710	1.434	31.50	1.790			0.00
7orig	554.5		0.941	1.492	0.10	2.103	2.570		98.77
7.0		700			9.22	2.014		0.000319	69.73
7.1		700			12.92	1.977		0.137449	57.56
7.2		700			15.55	1.951		0.474137	48.95
7dry			0.927	1.443	30.45	1.802			0.00
8orig	557.7		1.006	1.493	0.00	2.151	2.582		100.00
8.0		700			6.90	2.082		0.000087	75.50
8.1		700			10.71	2.043		0.040522	61.96
8.2		700			13.20	2.019		0.146455	53.15
8dry			0.991	1.445	28.17	1.869			0.00
9orig	558.8		0.968	1.482	0.00	2.139	2.563		100.00
9.0		700			7.88	2.060		0.086842	71.51
9.1		700			10.17	2.037		0.210344	63.22
9.2		700			12.60	2.013		0.681332	54.41
9dry			0.961	1.447	27.65	1.862			0.00
10orig	561.8		0.994	1.503	0.00	0.000	2.564		100.00
10.0		700			16.71	16.712		0.007181	50.83
10.1		700			20.48	20.483		2.179014	39.74
10.2		700			22.96	22.962		2.582905	32.44
10dry			0.942	1.452	33.99	33.990			0.00

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**Table C5. Niobrara Formation - Facies Identification**

Facies No.	Description
1	Shale/Mudstone
2	Shale/Mudstone interbedded with thin siltstone/sandstone laminae
3	Interbedded Sandstone/Siltstone/Shale/Mudstone. Generally less distinct bedding and more sandy in character. Homogenized in places, likely bioturbated.
4	Interbedded Shale/Mudstone with thinly bedded light gray Sandstone/Siltstone. Well cemented.
<b>#11-37 Well</b>	
Lithology / Facies	Depth Interval (ft)
Facies 1	535.0-542.2 / 549.0-550.2 / 553.8-564.4
Facies 2	542.2-544.3 / 550.2-553.8
Facies 3	
Facies 4	544.3-549.0

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**Table C6. Drilling/Coring Induced Bulk Volume Changes**

Sample Number	Sample Depth (ft)	Total Porosity (%)	Smectite Content (%)	Smectite Expandability (%)	Illite/Smectite Content (%)	Illite/Smectite Expandability (%)	Expandable Clay Volume (%)	Change in Bulk Volume (%)	Corrected Effective Porosity (%)	Facies
1	541.1	32.2	0.0	100	2.4	85	2.04	2.84	29.4	1
2	542.6	28.4	0.0	100	9.5	80	7.60	1.09	27.3	2
3	543.7	26.7	0.0	100	2.8	80	2.24	0.61	26.1	2
4	548.4	21.6	0.0	100	7.6	80	6.08	0.91	20.7	4
5	553.1	28.2	0.0	100	12.6	25	3.15	1.53	26.7	2
6	553.3	31.5	0.7	100	13.3	80	11.34	1.78	29.7	2
7	554.5	30.5	1.5	100	14.9	80	13.42	2.13	28.3	1
8	557.7	28.2	0.0	100	8.2	50	4.10	2.24	25.9	1
9	558.8	27.7	2.4	100	8.8	50	6.80	1.47	26.2	1
10	561.8	34.0	6.1	100	6.9	50	9.55	3.34	30.6	1

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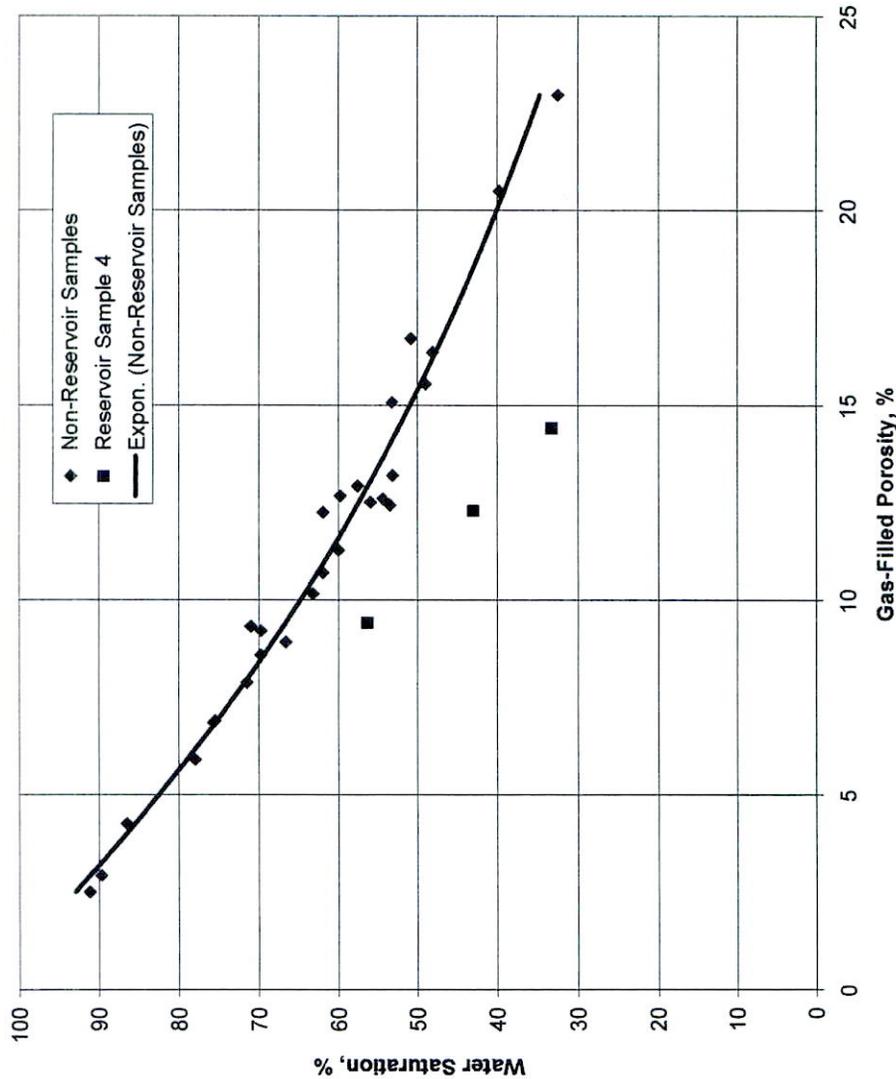


Figure C1. Plot of Gas-Filled Porosity versus Total Porosity

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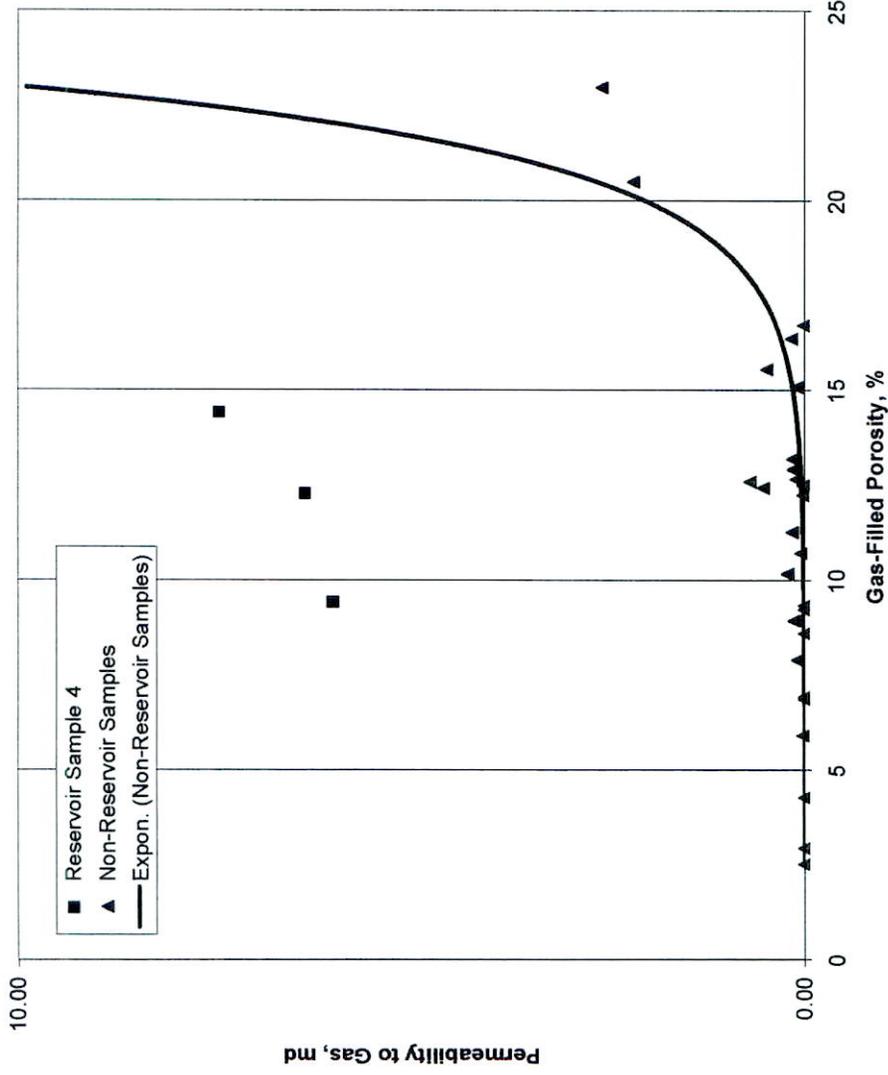


Figure C2. Plot of Gas-Filled Porosity versus Pulse Decay Permeability

105-2142

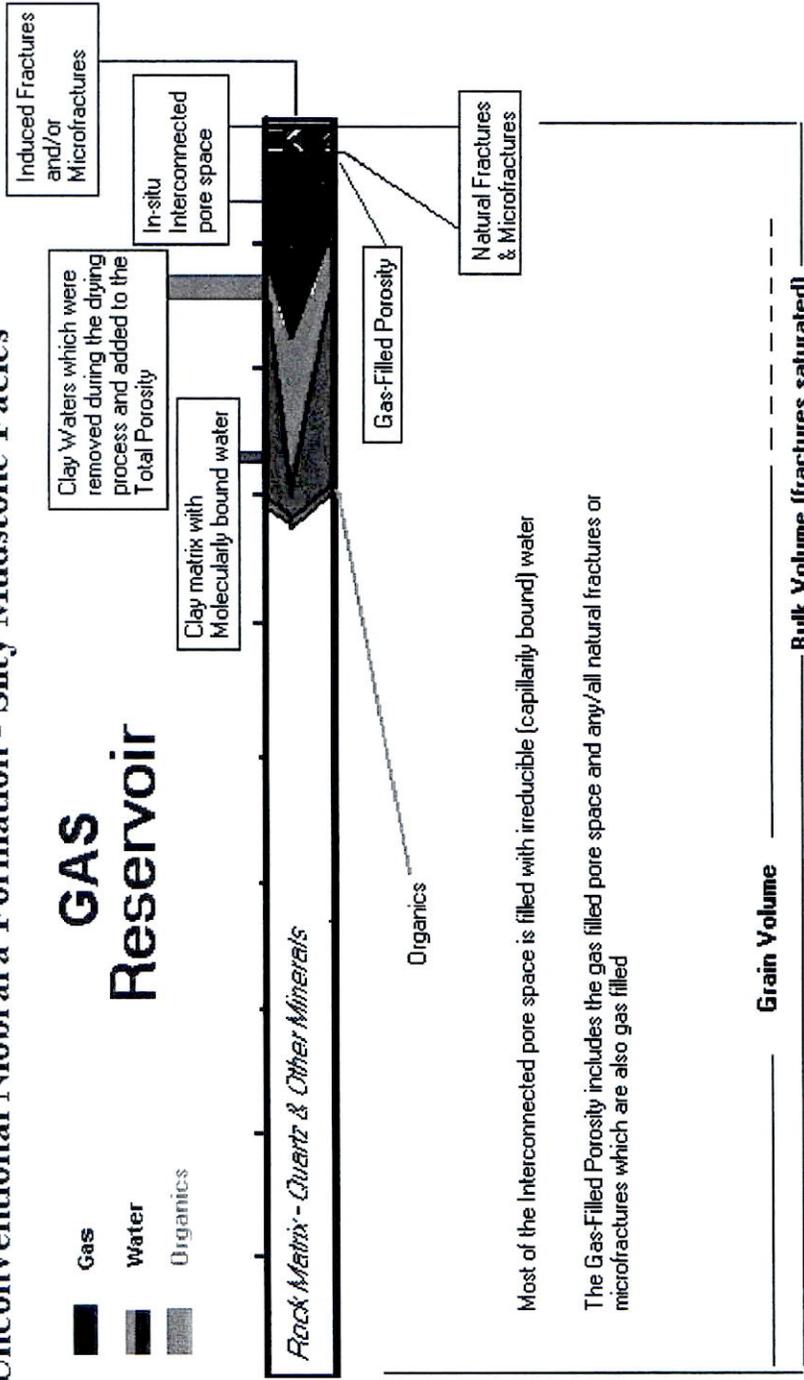


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### Unconventional Niobrara Formation - Silty Mudstone Facies

## GAS Reservoir

-  Gas
-  Water
-  Organics

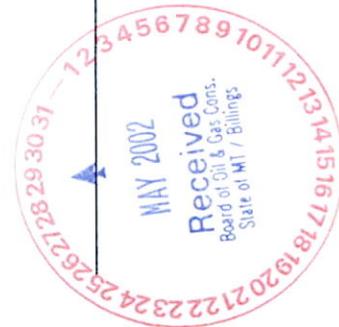


Most of the Interconnected pore space is filled with irreducible (capillary bound) water

The Gas-Filled Porosity includes the gas filled pore space and any/all natural fractures or microfractures which are also gas filled

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Figure C3. Schematic of Niobrara Porosity System



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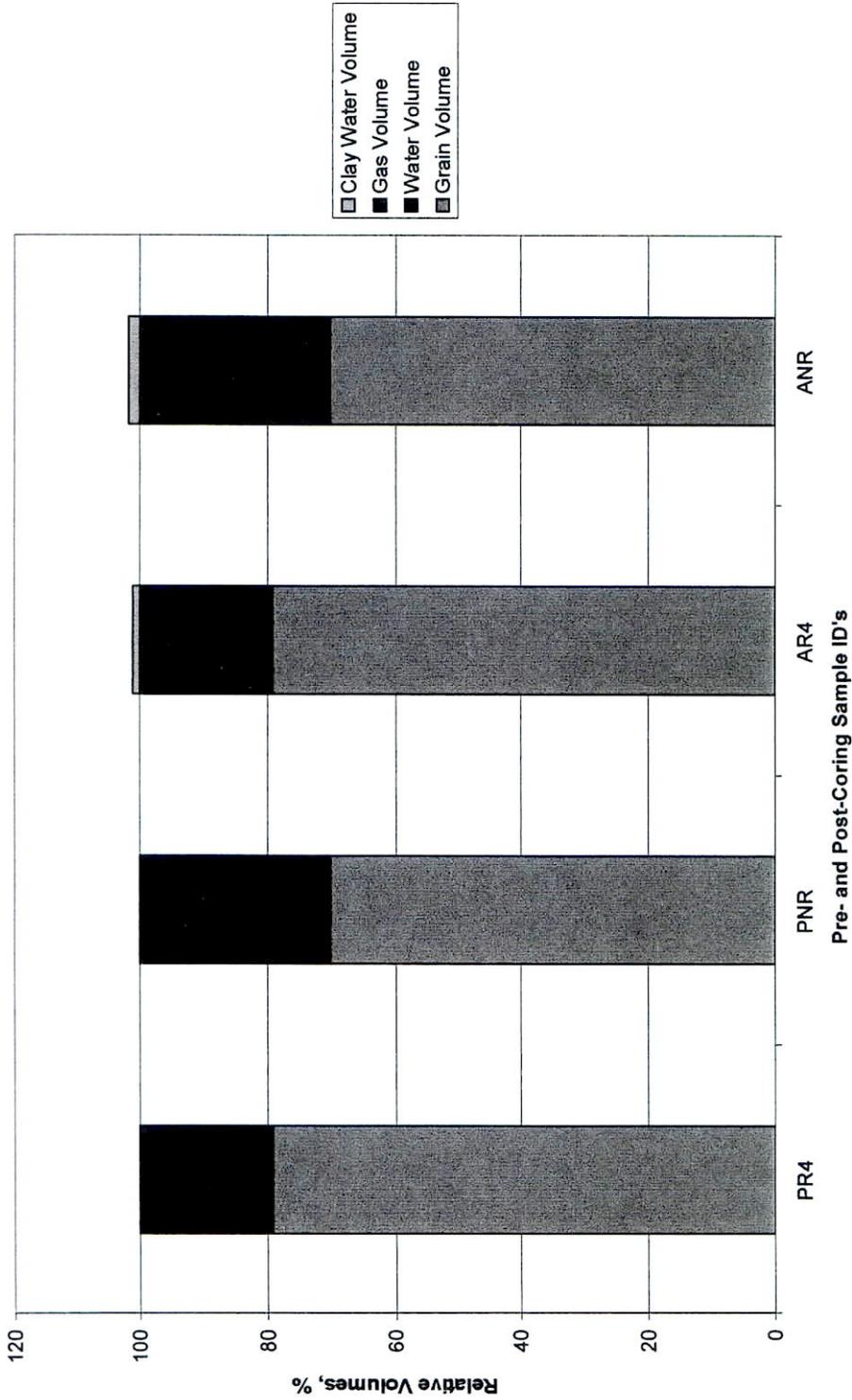


Figure C4. Histogram of Drilling/Coring-Induced Volume Change



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# CANISTER DESORPTION STUDY

## 1 INTRODUCTION

At the request of Barron Gimza with Fidelity Exploration & Production Company, a shale gas analysis program was attempted on shale samples recovered from the #11-37 well located in Valley Co., Montana.

The testing program consisted of canister desorption measurements on selected samples at wellsite and in the laboratory.

## 2 TEST PROCEDURES

Five whole core samples were placed in desorption canisters at wellsite. The canisters were maintained at a reservoir temperature of approximately 30° C. Desorption data were collected from the samples for a period of time on location. The canisters, containing the samples were then transported to TerraTek, Inc. in Salt Lake City for continued desorption.

Upon arrival at TerraTek, the canisters were brought to temperature and underwent continued long-term desorption.

## 3 RESULTS

Unfortunately it was determined that the formation was not suitable for canister desorption techniques. Once the samples were placed in the canisters, most "evolved" gas measurements were negative values, thus, no desorption data were obtained. Table D1 summarizes the desorption sample depths.

## 4 REFERENCES

Diamond, W.P. and Levine, J.R.: *USBM*, RI 8515, "Direct Method Determination of the Gas Content of Coal," (1981) 36.

McLennan, J.D., Schafer, P.S., and Pratt, T.J.: *A Guide to Determining Coalbed Gas Content*, Gas Research Institute, Chicago, IL, (1995).

Mavor, M.J., "Measurement and Evaluation of Coal Sorption Isotherm Data", Society of Petroleum Engineers, SPE 20728, pp.157-169.



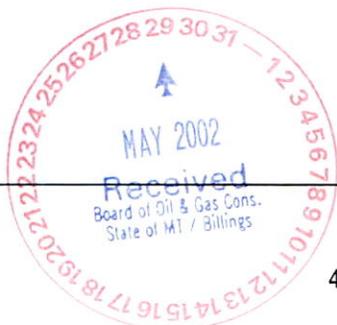
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**Table D1. Summary of Attempted Desorption Samples**

Canistered Sample No.	Depth (feet)
1	540-541
2	545-546
3	550-551
4	555-556
5	560-561



---

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WHOLE ROCK MINERALOGY

SAMPLE DEPTH (ft)	541.1	542.6	543.7	548.4	553.1	553.3	554.5	557.7	558.8	561.8
QUARTZ	24.5%	22.8%	24.9%	36.0%	39.6%	31.0%	31.4%	39.4%	33.5%	29.0%
POTASSIUM FELDSPAR	1.0%	0.8%	1.0%	2.0%	2.1%	1.6%	1.3%	1.4%	1.5%	0.9%
PLAGIOCLASE	1.6%	1.1%	1.1%	2.0%	2.5%	1.8%	1.9%	2.1%	1.8%	1.3%
CALCITE	44.5%	42.5%	42.1%	26.5%	15.7%	24.9%	24.7%	16.7%	18.0%	22.7%
Fe-DOLOMITE	0.0%	0.0%	5.0%	6.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
DOLOMITE	5.3%	4.2%	0.0%	5.3%	10.2%	7.0%	6.4%	6.3%	5.9%	4.9%
SIDERITE	0.6%	0.4%	0.4%	0.3%	0.3%	0.4%	0.5%	0.3%	0.7%	0.6%
PYRITE	3.5%	3.2%	3.4%	2.6%	4.2%	3.2%	3.5%	3.3%	4.2%	3.7%
GYPSUM	0.0%	0.2%	0.6%	0.2%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%
<b>TOTAL NON_CLAY</b>	<b>80.9%</b>	<b>75.2%</b>	<b>78.5%</b>	<b>81.5%</b>	<b>74.9%</b>	<b>69.8%</b>	<b>69.8%</b>	<b>69.4%</b>	<b>65.6%</b>	<b>63.1%</b>
SMECTITE	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.8%	0.0%	1.2%	3.5%
ILLITE/SMECTITE (I/S)	1.4%	5.5%	1.5%	3.0%	5.8%	7.2%	8.0%	3.4%	4.5%	3.9%
ILLITE	8.9%	9.4%	10.0%	6.8%	8.6%	11.7%	9.8%	13.1%	14.4%	17.0%
KAOLINITE	5.1%	5.6%	5.6%	5.9%	5.4%	5.9%	7.2%	7.8%	7.7%	7.6%
CHLORITE	3.7%	4.2%	4.3%	2.8%	5.2%	5.1%	4.5%	6.2%	6.6%	4.8%
<b>TOTAL CLAY</b>	<b>19.1%</b>	<b>24.8%</b>	<b>21.5%</b>	<b>18.5%</b>	<b>25.1%</b>	<b>30.2%</b>	<b>30.2%</b>	<b>30.6%</b>	<b>34.4%</b>	<b>36.9%</b>
<b>GRAND TOTAL</b>	<b>100.0%</b>									

RELATIVE CLAY ABUNDANCE

I/S % Expandability	85-90	80-85	80-85	80-85	25	80	80	50	50	50
SMECTITE	0%	0%	0%	0%	0%	1%	3%	0%	4%	10%
ILLITE/SMECTITE (I/S)	7%	22%	7%	16%	23%	24%	26%	11%	13%	11%
ILLITE/MICA	46%	38%	47%	37%	34%	39%	33%	43%	42%	46%
KAOLINITE	27%	23%	26%	32%	21%	19%	24%	26%	22%	21%
CHLORITE	20%	17%	20%	15%	21%	17%	15%	20%	19%	13%
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



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**X-RAY DIFFRACTION DATA - SIZE ANALYSIS**  
 Fidelity Exploration & Production Company - Well #11-37 - Niobrara Shale  
 TerraTek Project No. 500251 22-May-02



**CLAYS/MINERALS < 4 MICRONS**

SAMPLE DEPTH (ft)	541.1	542.6	543.7	548.4	553.1	553.3	554.5	557.7	558.8	561.8
WEIGHT PERCENT	59	58	54	40	46	54	53	41	51	57
I/S % Expandability	85-90	80-85	80-85	80-85	25	80	80	50	50	50
SMECTITE	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	1.5%	0.0%	2.4%	6.1%
ILLITE/SMECTITE (I/S)	2.4%	9.5%	2.8%	7.6%	12.6%	13.3%	14.9%	8.2%	8.8%	6.9%
ILLITE/MICA	12.0%	11.4%	13.8%	9.6%	13.6%	16.9%	12.0%	24.1%	22.6%	24.8%
KAOLINITE	7.0%	5.9%	7.1%	10.2%	9.0%	8.6%	10.3%	14.6%	12.3%	10.2%
CHLORITE	4.7%	4.4%	6.0%	4.8%	8.4%	6.7%	5.4%	9.6%	9.1%	6.3%
QUARTZ	13.4%	11.6%	13.2%	10.8%	15.3%	10.6%	13.8%	10.8%	12.4%	9.9%
POTASSIUM FELDSPAR	0.9%	0.8%	1.1%	1.2%	1.8%	1.4%	1.4%	1.1%	1.2%	0.6%
PLAGIOCLASE	1.4%	0.5%	0.8%	1.1%	1.0%	0.7%	1.3%	0.8%	1.0%	0.5%
CALCITE	50.8%	51.5%	49.9%	42.1%	25.3%	34.6%	33.2%	27.0%	23.8%	29.7%
Fe-DOLOMITE	0.0%	0.0%	3.1%	9.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
DOLOMITE	4.7%	2.7%	0.0%	0.0%	9.5%	4.2%	3.8%	2.1%	3.4%	2.8%
SIDERITE	0.8%	0.5%	0.4%	0.3%	0.4%	0.5%	0.8%	0.4%	1.1%	0.8%
PYRITE	2.1%	1.3%	1.8%	2.7%	3.0%	1.7%	1.6%	1.3%	1.8%	1.4%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

**MINERALS > 4 MICRONS**

WEIGHT PERCENT	41	42	46	60	54	46	47	59	49	43
QUARTZ	40.2%	38.4%	38.8%	52.7%	60.6%	55.1%	51.7%	59.6%	55.1%	54.7%
POTASSIUM FELDSPAR	1.1%	0.9%	0.9%	2.5%	2.4%	1.7%	1.3%	1.7%	1.9%	1.3%
PLAGIOCLASE	2.0%	2.1%	1.5%	2.7%	3.7%	3.0%	2.5%	3.0%	2.5%	2.3%
CALCITE	35.5%	29.8%	33.0%	16.1%	7.5%	13.3%	15.0%	9.4%	12.1%	13.3%
FE-DOLOMITE	0.0%	0.0%	7.3%	4.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
DOLOMITE	6.1%	6.4%	0.0%	8.9%	10.9%	10.2%	9.3%	9.2%	8.4%	7.7%
SIDERITE	0.3%	0.2%	0.4%	0.3%	0.3%	0.3%	0.2%	0.2%	0.3%	0.4%
PYRITE	5.4%	5.9%	5.3%	2.6%	5.1%	5.0%	5.7%	4.7%	6.6%	6.9%
GYPSUM	0.0%	0.5%	1.2%	0.3%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%
ILLITE/MICA	4.4%	6.6%	5.5%	5.0%	4.3%	5.4%	7.3%	5.4%	5.9%	6.5%
KAOLINITE	2.5%	5.3%	3.8%	3.0%	2.2%	2.7%	3.6%	3.0%	3.1%	4.1%
CHLORITE	2.4%	3.9%	2.4%	1.4%	2.5%	3.2%	3.4%	3.8%	4.1%	2.9%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

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TerraTek

Fidelity E & P Co.

Well No. 11-37

May 22, 2002

TerraTek No: 500251

# COMPONENT CORE GAMMA LOG

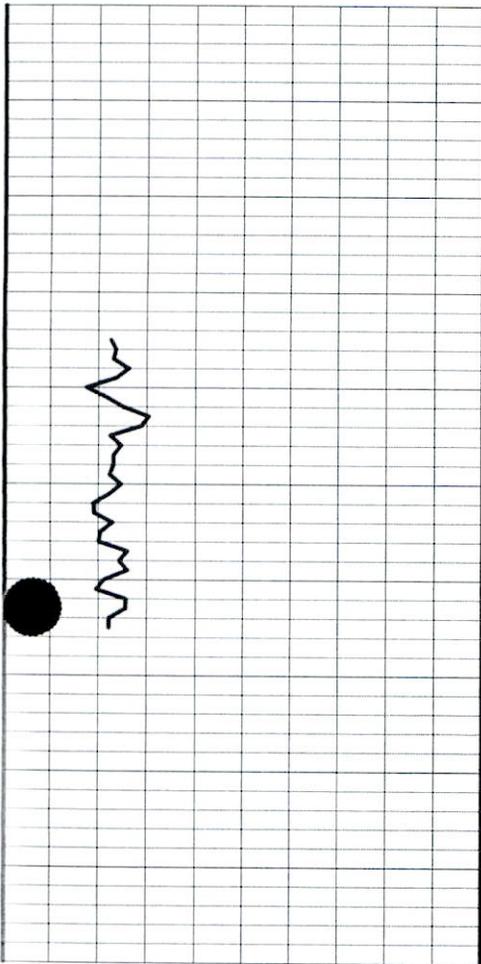
**Total Counts**  
GR CPM 0.0 1000.0

**Potassium**  
% 0.0 3.0

**Uranium**  
ppm 0.0 24.0

**Thorium**  
ppm 0.0 40.0

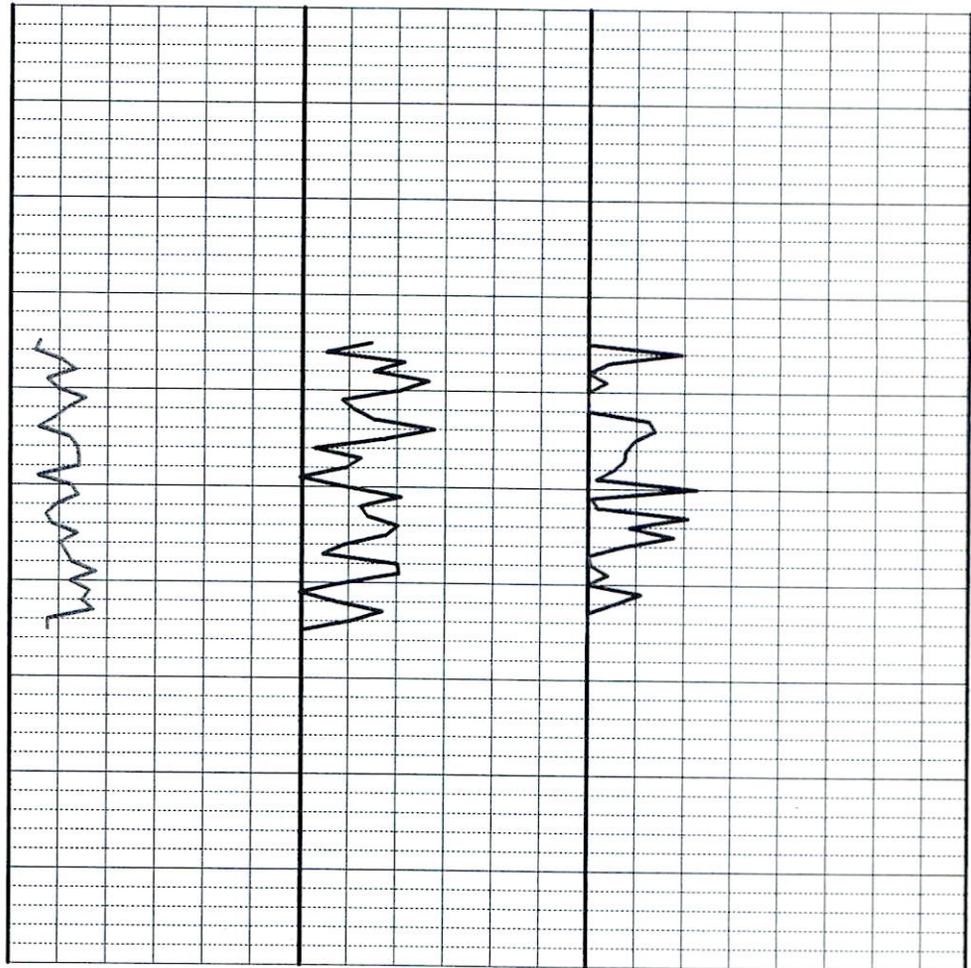
Depth



500

550

600



105-21442



# JOB SUMMARY

SAP #/TICKET #	1578	TICKET DATE	Sept. 23, 01
BDA / STATE	Montana	COUNTY	Valley
PSL DEPARTMENT	Cementing Services		
CUSTOMER REP / PHONE	Jeff Merkel	406-350-1257	
API/UWI #			
SAP BOMB NUMBER	10	Description	Surface Casing

REGION	NORTH AMERICA LAND	NWA / COUNTRY	WESTERN
MBU ID / EMPL #	122102	H.E.S. EMPLOYEE NAME	Doug Kessel
LOCATION	Williston, N.D.	COMPANY	Fidelity E&P
TICKET AMOUNT	\$3,737.31	WELL TYPE	02
WELL LOCATION	Bowdoin Dome	DEPARTMENT	CEMENTING SERVICES 10003
LEASE NAME	Fee Private	Well No.	1137
		SEC / TWP / RNG	3-31N-34E

H.E.S. EMP NAME / EMP # / (EXPOSURE HOURS)	HRS	HRS	HRS	HRS
D. Kessel / 122102	11.0			
J. Jones / 213675	11.0			
C. Marottek / 233390	11.0			

H.E.S. UNIT #S / (R / T MILES)	R / T MILES			
Pickup / 421908	20			
Tractor / 10251389	20			
Tractor / 52809	100			
660 / 7500	100			

Form. Name \_\_\_\_\_ Type: \_\_\_\_\_  
 Form. Thickness \_\_\_\_\_ From \_\_\_\_\_ To \_\_\_\_\_  
 Packer Type \_\_\_\_\_ Set At \_\_\_\_\_  
 Bottom Hole Temp. \_\_\_\_\_ Pressure \_\_\_\_\_  
 Retainer Depth \_\_\_\_\_ Total Depth \_\_\_\_\_

Date	Called Out	On Location	Job Started	Job Completed
	09-23-01	09-23-01	09/24/2001	09/24/2001
Time	18:00	18:45	04:25	04:48

Tools and Accessories

Type and Size	Qty	Make
Float Shoe Reg. 7	1	Halliburton
Float Collar		
Centralizers 7x9.875	3	Halliburton
Limit Clamp		
Top Plug 7	1	Halliburton
Bottom Plug		
Weld - A	1 lb.	Halliburton
DV Tool		
Other Cement Head	1	A2360

Well Data

New/Used	Weight	Size	Grade	From	To	Max. Allow
Casing New	17.0	7	H-40	Surface	162.26 ft.	
Casing Liner						
Tubing						
Drill Pipe						
Drill Pipe						
Open Hole		9.875		Surface	175	Shots/Ft.
Perforations						
Perforations						

Materials

Mud: Type \_\_\_\_\_ Density \_\_\_\_\_ lb/gal

Spacers / Flushs Ahead:

5	bbl	Fresh Water
	bbl	Mud Flush
	bbl	Super Flush
	bbl	Mod Dual Spacer
	bbl	Other _____

Density: 8.33 lb/gal Water Req: 26.3 gal/bbl

Displacement: Type Fresh Water Density 8.33 lb/gal

Hours On Location		Operating Hours		Description of Job
Date	Hours	Date	Hours	
09-23-01	5.5	9/24	0.5	See Job Log
9/24	5.5			
Total	11.0	Total	0.5	

Ordered	Equipment Ordered Avail.	Used
Lead Slurry	Average Rates in BPM	Displacement
Feet 30.00	Tail Slurry	
	Cement Left in Pipe	
	Reason	Shoe Joint

Cement Data

Stage	Sacks	Cement	Bulk/Sks	Additives	W/Rq.	Yield	Lbs/Gal
1	125	Premium G	Bulk	3% Calcium Chloride, .125#/sk. Poly-E-Flake	4.97	1.16	15.8
			BULK				
			BULK				
			BULK				
			BULK				

Summary

Calculated Pressure to land Plug _____	Spacer / Flush (bbl)	5 bbls. Fresh Water
Actual Pressure to Land Plug _____	Calculated Displacement (bbl)	6.5 bbls
Cement Returned _____	Actual Displacement (bbl)	6.5 bbls.
Yes <input type="checkbox"/> Lost Returns <input checked="" type="checkbox"/> No	Cement Slurry:	25.8 bbls.
Calculated Top of Cement _____	Total Volume:	37.3 bbls.
Actual Top of Cement _____		

Thank You, Doug Kessel Halliburton Energy Services - Williston Cementing Services

THE INFORMATION STATED HEREIN IS CORRECT  
 CUSTOMER REPRESENTATIVE Jeff Merkel SIGNATURE







# JOB SUMMARY

SAP #/TICKET  
150779TICKET DATE  
Sept. 25,

REGION  
NORTH AMERICA LAND

MBU ID / EMPL #  
122102

LOCATION  
Williston, N.D.

TICKET AMOUNT  
\$3,543.03

WELL LOCATION  
Bowdoin Dome

LEASE NAME  
Fee Private

NWA / COUNTRY  
WESTERN

H.E.S. EMPLOYEE NAME  
Doug Kessel

COMPANY  
Fidelity E&P

WELL TYPE  
02

DEPARTMENT  
CEMENTING SERVICES 10003

SEC / TWP / RNG  
3-31N-34E

BDA / STATE  
Montana

COUNTY  
Valley

PSL DEPARTMENT  
Cementing Services

CUSTOMER REP / PHONE  
Jeff Merkel 406-350-125

API/UWI #

SAP BOMB NUMBER  
35

Description  
Production Casing

H.E.S. EMP NAME / EMP # / (EXPOSURE HOURS)	HRS	HRS	HRS	HRS
D. Kessel / 122102	4.5			
J. Jones / 213675	4.5			
C. Marottek / 233390	4.5			

H.E.S. UNIT #S / (R / T MILES)	R / T MILES			
Pickup / 421908	20			
Tractor / 10251389	20			
Tractor / 52809	100			
660 / 7500	100			

Form. Name \_\_\_\_\_ Type: \_\_\_\_\_  
 Form. Thickness \_\_\_\_\_ From \_\_\_\_\_ To \_\_\_\_\_  
 Packer Type \_\_\_\_\_ Set At \_\_\_\_\_  
 Bottom Hole Temp. \_\_\_\_\_ Pressure \_\_\_\_\_  
 Retainer Depth \_\_\_\_\_ Total Depth \_\_\_\_\_

Date	Called Out	On Location	Job Started	Job Completed
	09-25-01	09-25-01	09/25/2001	09/25/2001
Time	02:50	09:30	12:37	13:08

Tools and Accessories

Type and Size	Qty	Make
Float Shoe SSII 4.5in.	1	Halliburton
Float Collar LD 4.5in.	1	Halliburton
Centralizers 4.5x6.25	10	Halliburton
Limit Clamp 4.5in.	1	Halliburton
Top Plug LD 4.5in.	1	Halliburton
Bottom Plug		
Weld - A	1 lb.	Halliburton
DV Tool		
Other Cement Head	1	A2971

Well Data

New/Used	Weight	Size	Grade	From	To	Max. Allow
Casing New	10.5	4.5	J-55	Surface	905.44 ft.	
Casing						
Liner						
Tubing						
Drill Pipe						
Drill Pipe						
Open Hole		6.25		BOS	930	Shots/Ft.
Perforations						
Perforations						

Materials

Mud: Type \_\_\_\_\_ Density \_\_\_\_\_ lb/gal

Spacers / Flushs Ahead:

10	bbl	Fresh Water
10	bbl	Mud Flush
	bbl	Super Flush
	bbl	Mod Dual Spacer
	bbl	Other

Density: 8.33 lb/gal Water Req: 48.9 gal/bbl

Hours On Location		Operating Hours		Description of Job
Date	Hours	Date	Hours	
09-25-01	4.5	9/25	0.8	See Job Log
Total	4.5	Total	0.8	

Displacement:

Type Fresh Water Density 8.33 lb/gal

Ordered	Equipment Ordered Avail.	Used
Lead Slurry	Average Rates in BPM	Displacement
Feet 27.78	Tail Slurry	
	Cement Left in Pipe	Shoe Joint
	Reason	

Cement Data

Stage	Sacks	Cement	Bulk/Sks	Additives	W/Rq.	Yield	Lbs/Gal
1	20	Halco Lite	Bulk	6% Gel, 3% Calcium Chloride, .125#/sk. Poly-E-Flake	11.20	2.04	12.5
2	80	Premium G	BULK	3% Calcium Chloride, .125#/sk. Poly-E-Flake	4.97	1.16	15.8
			BULK				
			BULK				
			BULK				

Summary

Calculated Pressure to land Plug	Spacer / Flush (bbl)	10 bbls. Mud Flush
Actual Pressure to Land Plug		10 bbls. Fresh Water
Cement Returned	Calculated Displacement (bbl)	14.1 bbls.
Yes <input type="checkbox"/> Lost Returns <input checked="" type="checkbox"/> No	Actual Displacement (bbl)	14.1 bbls.
Calculated Top of Cement	Cement Slurry:	23.8 bbls.
Actual Top of Cement	Total Volume:	57.9 bbls.

Thank You, Doug Kessel Halliburton Energy Services - Williston Cementing Services

THE INFORMATION STATED HEREIN IS CORRECT  
 CUSTOMER REPRESENTATIVE \_\_\_\_\_  
 SIGNATURE Jeff Merkel





**Executive Summary**
**General**

<i>Customer:</i>	Fidelity E&P	<i>Job Date:</i>	October 15, 2001
<i>Lease:</i>	Private	<i>Customer Rep.:</i>	JD Benson
<i>Well Number:</i>	1137	<i>Sales Order(s) Frac:</i>	1571420 <b>N2:</b> 1571430
<i>Well Stage:</i>	Bowdoin	<i>Halliburton Rep.:</i>	Fabian Kjorstad
<i>Job Type:</i>	N2 Foam Frac	<i>Halliburton Svc Area:</i>	Rockies
<i>Fluid System:</i>	Waterfrac WG-18	<i>Halliburton Facility:</i>	Williston, ND

**Well**

<i>API Number:</i>		<i>Well Type:</i>	02 Gas
<i>Country:</i>	United States of America	<i>Wellbore Type:</i>	Vertical
<i>State:</i>	Mt.	<i>Primary Production:</i>	Gas
<i>County:</i>	Valley		
<i>Legal Description:</i>	Sec3, T31N R34E		
<i>Field:</i>	Bowdoin		

**Wellbore Configuration**

Injection Path	Length (ft)	True Vertical Depth	Open Hole Diameter	Casing Grade	Casing OD (in)	Casing Weight (lb/ft)	Casing Internal Yield (psi)	Tubing Grade	Tubing Weight (lb/ft)	Tubing OD (lb/ft)	Tubing Internal Yield (psi)
Casing	930	930		J-55	4.5	10.5	4790				

**Perforated Intervals**

Top (ft)	Bottom (ft)	Number of Perfs	Perf Density (spf)	Interval Net Height (ft)	Perf Phasing (Deg)	Perf Diameter (in)	Total Number Perfs
540	550	41	4	10	90	0.31	41

**Packers**

Packer Type	Measured Depth
0	800
0	0

**Zones of Interest**

<i>Top Measured Depth (ft):</i>	540	<i>Formation Lithology:</i>	Sandstone/Shale
<i>Bottom Measured Depth (ft):</i>	550	<i>Permeability, (md):</i>	
<i>Gross Height (ft):</i>	10	<i>Porosity, (%):</i>	
<i>Zone Net Height (ft):</i>	10	<i>BH Pressure (psi):</i>	
<i>Perf Midpoint (ft):</i>	545	<i>BH Temperature, (deg F):</i>	75
<i>Zone of Treatment:</i>	Bowdoin		

*Initial Wellhead Pressure Before Treatment, (psi):* 137

**Notes:**


Customer: Fidelity  
Well Desc: Private 1137  
Formation: Bowdoin

Date: 15-Oct-200  
Ticket #: 1571420  
Job Type: Foam Frac

OPERATOR LOG

Chart	Time	FoamSf Rate (bpm)	Clean Stage Volume (gal)	Casing Press. (psi)	Remark
Event #1	15:01:00	0.00	0	0	START JOB
Event #2	15:01:06	0.00	0	188	SAFETY MEETING
Event #3	15:01:08	0.00	0	188	TEST LINES
Event #4	15:01:52	0.00	0	137	ISIP Casing Press 137 (psi)
Stage #1	15:01:58	0.00	1162	137	1200 Gal Pad with Slug
Event #5	15:03:12	21.50	0	1386	BREAK FORMATION Casing Press 1386 (psi) Foam Rate/Surf 92.5
Stage #2	15:05:35	25.98	1012	1323	1000 Gal 5.2-11.7# 65%
Stage #3	15:08:15	27.26	2303	1184	2250 Gal 11.7-15.2#
Stage #4	15:14:17	18.64	394	490	START FLUSH
Stage #5	15:14:58	0.21	65	334	ISIP Casing Press 334 (psi)
Event #6	15:20:00	0.00	0	209	5 MIN SHUTIN PRES. Casing Pr ess 209 (psi)
Event #7	15:20:15	0.00	0	200	END JOB



DATE 10/4/01 SALES / STN NO. 20647/3321  
 SERVICE ORDER NUMBER 49766  
 PAGE 1 OF 1  
 SERVICES ORDERED:  
PND/CBL/GR  
03

# COMPUTALOG

Wellbore knowledge and solutions

COMPUTALOG WIRELINE SERVICES  
 HOME OFFICE: 500 WINSOTT RD.  
 FT. WORTH, TEXAS 76126  
 PHONE 817-249-7200 FAX 817-249-7275

ENGINEER Kenneth C 20646  
 CREW Moev Gummer 21168  
 CREW  
 CREW  
 SALESMAN Martin O'Neil  
 PRICE SCHEDULE Land

The undersigned, hereinafter referred to as "Customer", agrees to pay to Computalog Wireline Services ("Computalog") for the service(s) specified below (including leased equipment) and any additional service(s) requested, in the currency of the United States of America, at the offices of Computalog at 500 Winscott Rd., Ft. Worth, Texas 76126, in accordance with the applicable provisions of Computalog's current price schedule. In consideration of the prices set out in Computalog's current price schedule, Customer elects to be bound by the terms and conditions set out on the reverse side hereof, including the assumption by Customer of the liabilities and responsibilities contained in the Indemnity, hold harmless and exculpatory clauses, rather than enter into a separate contract and furnish Computalog with insurance coverage against the liabilities herein assumed by customer. If this document is executed by an agent on behalf of customer, said agent represents that he has full authority from his principal, the Customer, to execute the same. In the absence of such authority, the party executing this document agrees that he shall be obligated hereunder as Customer. All amounts are subject to final Accounts Receivable Computer System verification.

CUSTOMER AUTHORIZATION

COMPANY Fidelity F&P CUSTOMER # 20277  
 BILL TO (IF OTHER THAN ABOVE) \_\_\_\_\_  
 ADDRESS \_\_\_\_\_  
 CITY Greenville STATE Arkansas ZIP CODE 59330  
 P.O. # 1010 AFE # \_\_\_\_\_ CONTRACT # \_\_\_\_\_

WELL INFORMATION  
 WELL NAME WBI 1137 Sec 3-31N-34E FIELD Bardeen Dome  
 COUNTY/PARISH V-KEY STATE Arkansas RIG NAME Mkt Unit PRICE ZONE Land

LOG MEASURED FROM Kelly Bushing 10.0' FEET ABOVE PERMANENT DATUM

UNIT NUMBER 4841 STATION NAME/NO Billings MA/3221 ACTUAL ROUND TRIP DISTANCE FROM STATION 35 MILES DISTANCE CHARGED MILES FROM

RUN NO	DATE	TIME	TIME ELAPSED	LOST TIME /GROUP	SERVICE	CODE	DESCRIPTION	QTY	BOOK UNIT PRICE	FIELD AMOUNT
	10/4					1000.10	Service Charge	841'		
		2:15				1000.10	Mkt Unit	1		
						1021.21	PND Bulk Inelastic	Depth	min	
						1021.22	Operation	min		
	2:30	1/4				1021.23	Flat Charge	1		
	2:30					1000.20	License Fee	1		
	2:45	1/4				1302.11	PND Porosity Computations Set-up	1		
1	2:45				PND	1302.12	Operation	1		
	4:30	13/4				1040.11	Cement Boreal Log w/col	Depth	min	
2	4:30				CBL	1040.12	Operation	min		
	5:00	1/2				1038.11	S. Gamma Ray w/col	Depth	min	
3						1038.12	Operation	min		
4						1444.4				
5						1003.02	Mileage	35		
6										
7										
8										
9										
	5:00									
	5:15	1/4								
	5:15									
	6:00	3/4								

COPY



TYPE OF WELL  NEW  WORKOVER  PRODUCTION

SUB TO

STATE TAX COUNTY / PARISH TAX

TOTAL ESTIMATED CHARGE  
 ADDITIONAL CHARGES MAY APPLY

TOTAL FIELD HRS /CREW	<u>3 3/4 hrs</u>	TOTAL STANDBY HRS		WITNESSED BY (PRINT)	<u>Tim Ree</u>
TOTAL FIELD HRS /EQUIP	<u>3 3/4 hrs</u>	TOTAL LOST TIME		DISTRICT MANAGER (INITIALS)	
TOTAL OPR. HRS	<u>3 3/4 hrs</u>	TOTAL TRAVEL TIME	<u>1 hr</u>	ACCT (INITIALS)	
PRINTS		FILM		FLUID LEVEL	<u>Full</u>
FIELD PRINTS	<u>10</u>	TAPES		DEVIATION	<u>NA</u>
RECIPIENTS INITIALS	<u>10</u>	PRINTS		SURF PRESS	<u>0</u>
RECEIVED AT WELL				BHT	<u>75 Est</u>
				NO TRIPS	<u>2</u>
				GUN SIZE AND TYPE	
				NO. OF GUNS	
				TOTAL SHOTS FIRED	
				RUN NO.	
				LENGTH	
				INTER PERFORATED	
				SHOTS PER FT	
				SHOTS FIRED	

THE SERVICE(S) AND/OR EQUIPMENT COVERED BY THIS SERVICE ORDER HAVE BEEN PERFORMED OR RECEIVED

Signature of Customer or Authorized Representative \_\_\_\_\_ Signature of Computalog Engineer \_\_\_\_\_



DATE 6/25/02 SALES / STN NO. 20647/3321  
 SERVICE ORDER NUMBER 49650  
 PAGE 1 OF 1  
 SERVICES ORDERED:  
Perforate  
01

# COMPUTALOG

Wellbore knowledge and solutions

COMPUTALOG WIRELINE SERVICES  
 HOME OFFICE: 500 WINSOOTT RD.  
 FT. WORTH, TEXAS 76126  
 PHONE 817-249-7200 FAX 817-249-7275

ENGINEER Karen Hance 20646  
 CREW Jimmy Baker 38680  
 CREW Mary Gummer 21168  
 CREW  
 SALESMAN Martin O'Neil  
 PRICE SCHEDULE Lead

The undersigned, hereinafter referred to as "Customer", agrees to pay to Computalog Wireline Services ("Computalog") for the service(s) specified below (including leased equipment) and any additional service(s) requested, in the currency of the United States of America, at the offices of Computalog at 500 Winscott Rd., Ft. Worth, Texas 76126, in accordance with the applicable provisions of Computalog's current price schedule. In consideration of the prices set out in Computalog's current price schedule, Customer elects to be bound by the terms and conditions set out on the reverse side hereof, including the assumption by Customer of the liabilities and responsibilities contained in the indemnity, hold harmless and exculpatory clauses, rather than enter into a separate contract and furnish Computalog with insurance coverage against the liabilities herein assumed by customer. In the absence of such authority, the party executing this document agrees that he shall said agent represents that he has full authority from his principal, the Customer, to execute the same. In the absence of such authority, the party executing this document agrees that he shall be obligated hereunder as Customer. All amounts are subject to final Accounts Receivable Computer System verification.  
 CUSTOMER AUTHORIZATION

COMPANY Fidelity E&P CUSTOMER # 20277  
 BILL TO (IF OTHER THAN ABOVE)  
 ADDRESS P.O. Box 1010  
 CITY Gardiner STATE Montana ZIP CODE 59120  
 P.O. # 1010 AFE # \_\_\_\_\_ CONTRACT # \_\_\_\_\_

WELL INFORMATION  
 WELL NAME W81 1137 SOC 3-3111-34E FIELD Bowdoin Dome  
 COUNTY/PARISH Valley STATE Montana RIG NAME West Unit PRICE ZONE Lead  
 LOG MEASURED FROM 16 1/4 Bushing 100' FEET ABOVE PERMANENT DATUM

UNIT NUMBER 4541 STATION NAME/NO. \_\_\_\_\_ ACTUAL ROUND TRIP DISTANCE FROM STATION \_\_\_\_\_ MILES \_\_\_\_\_ DISTANCE CHANGED MILES FROM \_\_\_\_\_

DRIN NO.	DATE	TIME	TIME ELAPSED	LOST TIME (GROUP)	SERVICE	CODE	DESCRIPTION	QTY	BOOK UNIT PRICE	FIELD AMOUNT
	6/25					1000.10	Service Charge	400'		
		5:30				1006.13	West Unit	1		
						1011.01	Standard PullOff	1		
		10:00	4 1/2			1231.01	Depth Charge	M.A.		
		10:20				1231.01	As-shot	40		
		11:15	1 1/4			4414				
1		11:15			Perforate					
		11:45								
2						1003.01	HSE	1		
						1003.02	Mileage	240		
3										
4										
5										
6										
7										
8										
9										
		11:45								
		12:00	4 1/4							
		12:00								
		12:30	1/2							

COPY



TOTAL ESTIMATED CHARGE  
 ADDITIONAL CHARGES MAY APPLY

TOTAL FIELD HRS / CREW	<u>7 1/2</u>	TOTAL STANDBY HRS.		WITNESSED BY (PRINT)	<u>Harker Jirges</u>
TOTAL FIELD HRS / EQUIP.	<u>7 1/2</u>	TOTAL LOST TIME		DISTRICT MANAGER (INITIALS)	<u>BAB</u>
TOTAL OPR HRS	<u>2 1/2</u>	TOTAL TRAVEL TIME	<u>5 1/2</u>	ACCT. (INITIALS)	
PRINTS	<u>10</u>	FILM		FLUID LEVEL	<u>Dry</u>
RECEIVED AT WELL	<u>10</u>	TAPES		DEVIATION	<u>NA</u>
TOTAL TIME		CHG. TIME		SURF PRESS	<u>NR</u>
OPCR TIME				BHT	<u>NA</u>
ALLOW. TIME				NO TRIPS	<u>1</u>
				GUN SIZE AND TYPE	<u>3.125 HSC</u>
				NO. OF GUNS	<u>1</u>
				TOTAL SHOTS FIRED	<u>40</u>
				RUN NO.	<u>1</u>
				LENGTH	<u>10'</u>
				INTER PERFORATED	<u>775-925</u>
				SHOTS PER FT	<u>4/H</u>
				SHOTS FIELD	<u>40</u>

Signature of Customer or Authorized Representative: Michael Lybman  
 Signature of Computalog Engineer: [Signature]  
 REV 11/95

USA) Inc.  
 5th Avenue SW  
 Alberta, T2P 0M6  
 Phone: (403) 269-1420



**SERVICE TICKET**  
**9105348**

*This service ticket is not an invoice; pricing is subject to review and change without notice.*

Client Name <b>Fidelity EdP</b>			Well Name <b>Well 1137</b>			Job Date <b>6-25-02</b>		
Address <b>P.O. Box 131</b>			Location <b>SWNW sec.3-T31N-R34E</b>			Service Point <b>Williston</b>		
City <b>Glendive</b>			Province/State <b>Mont.</b>			Postal/Zip Code <b>59330</b>		
Client Representative <b>HARLAN Jirges</b>			Pricing Area <b>1</b>			State <b>N.D.</b>		
Job Type <b>C/O-SCRAPER</b>			State <b>Mont.</b>			County <b>Valley</b>		
AFE/PO #								

District	Service, Equipment & Material Type	17	Code	Quantity	Unit Price	Amount
	MPCTU TRAVEL time			2	120 <sup>00</sup>	240 <sup>00</sup>
	MPCTU OPERATING Time			2.5	315 <sup>00</sup>	787 <sup>50</sup>
	Permits: Mont. & N.D.			2	40 <sup>00</sup>	80 <sup>00</sup>
	shear sub			1	150 <sup>00</sup> DAY	150 <sup>00</sup>
<b>FIELD ESTIMATE</b>						<b>1257<sup>50</sup></b>

**Well Data:**

Multipurpose Coiled Tubing Service Report	Casing		Tubing		Fluid Pumped (bbl)	Fluid Returns (bbl)	Sand Returns (bbl)	Coil Cycled (ft)	Soap (gal)	Unit Travel Hours	Unit Location Hours	Crew Travel Hours
	Size (in)	Pressure (psi)	Size (in)	Pressure (psi)								
	4 1/2							872	10	2	2.5	

**Tool and Treatment Summary:** Meet in Saco yard, Drive to location, spot unit & Rig-up, C/O to 872' soap clean, Rig down do next well. / spot MPCTU, Rig-up, m/v Bit & SCRAPER, Run in hole, work perf @ 540-550 thoroughly No drag or restriction, work down to 20 ft off TD, soap clean POH, Rig down / second set of perfs @ 795-805 good &

**Personnel and Equipment:**

Employees	<b>DAVID Nickoloff</b>	Units	<b>2228</b>	MATERIAL
	<b>DEAN Ingebritson</b>		<b>7707</b>	TRANSFER
Service Comments:				
	NUMBERS			
Arrival Time:	<b>0800</b>	Departure Time:	<b>1030</b>	

<p><b>HARLAN Jirges</b></p> <p><u>ATTN:</u></p> <p><i>JK</i></p> <p>This space is reserved for the Client Coding Stamp.</p>	<b>FIELD ESTIMATE</b>	
	<input type="checkbox"/> Cementing - Prim.	<input type="checkbox"/> Cementing - Rem.
	<input type="checkbox"/> Coiled Tubing	<input type="checkbox"/> Nitrogen
	<input type="checkbox"/> Stimulation	<input type="checkbox"/> Fracturing
<input checked="" type="checkbox"/> MPCTU	<input type="checkbox"/> Other	
Field	Sales 1	Sales 2
<b>DV</b>	<b>(12)</b>	<b>KB</b>
Comments		This signature confirms that I have read and comply with the terms and conditions as noted on the reverse of this document.
		<i>Dean Ingebritson</i>

JUL 18 2002

**Coiled Tubing  
Service Report**



**SERVICE TICKET**

**#9103990**

Client Name Fidelity Explor. & Prod. Co.	Well Name WBI 1137	Job Date June 26, 2002
Client Representative	Well Location -- W 3-31N-34E	Job Type

Well Data										
Description	Size (mm)	Weight (kg/m)	Grade	Max. Pres. (Mpa)	True Measured Depth		Deviation (degrees)	Capacity (m <sup>3</sup> )	Packers and Workover Tools	
					Start (m)	End (m)			Type	TMD (m)
Casing	114.3	23.10	J-55	32.5						
Tubing	73.0	11.80		70.0		900.0		2.80		
Perforations					239.3	245.4				
Hole volume								2.30		
Minimum ID	Size:		(mm)	Depth:		(m)	H <sub>2</sub> S:		(ppm)	

Formation Data								
Name	Type	Well Type	Temp (°C)	Pressure (Mpa)	Height (m)		Permeability (mD)	Porosity (%)
					Gross	Net		
BOWDOIN, PHILLIPS	GAS		15.0	1.0				





**Fracturing  
Service Report**



**SERVICE TICKET**

# 9103990

Client Name <b>Fidelity E &amp; P Co.</b>	Well Name <b>WBI 1137</b>	Job Date <b>June 26, 2002</b>
Client Representative <b>Harlan Jirges</b>	Location <b>3 - 31N - 34E</b>	Job Type <b>N2 FOAMjel (Coil Frac)</b>

Well Data:						Treatment Data		
	O.D. (in)	Weight (lb/ft)	Depth (ft)	Volume (bbbls)	Max. Pres. (psi)			
Tubing	2.875	5.395	2953.0	17.9	12730.0	Flush Fluid Density	0.433	psi/ft
Casing	4.5	10.5	785.0	0.08	4790.0	Estimated Sand Top	771.0	ft
Perforations	From (ft)	To (ft)	Formation			Fracture Gradient	0.78	psi/ft
Intervals	785	805	Bowdoin			Breakdown Pressure	1357.0	Psi
						ISIP	301.0	Psi
						5 min. Shut-in Pres.	274.0	Psi
								Psi
			Minimum		Maximum	Average		
Pressure	psi		1476.0		2954.0	2201.0		
Rate	bbbls/min		15.0		15.0	15.0		
Horsepower	HP		543		1086	809		
Available HP	HP		2000		2000	2000		

Chemical Adds for Treating Fluids:					
Fluid Volume (bbbls)	Treating Materials Batch Mixed	Chemical	Treating Materials Mixed On The Fly	Concentration (per bbl)	Acid Spearhead (bbl)
160.1			WG-3ZL	6.0 <input type="checkbox"/> kg <input checked="" type="checkbox"/> gal	
160.1			Buffer-2Z	6.0 <input type="checkbox"/> lb <input checked="" type="checkbox"/> gal	
160.1			FA-1	5.0 <input type="checkbox"/> lb <input checked="" type="checkbox"/> gal	
160.1			SCC-1L	5.0 <input type="checkbox"/> lb <input checked="" type="checkbox"/> gal	
160.1			Breaker-1ZL (1%)	1.0 <input type="checkbox"/> lb <input checked="" type="checkbox"/> gal	
160.1	B-1			0.3 <input checked="" type="checkbox"/> lb <input type="checkbox"/> gal	
Fluid Temperature:	73	On Location:	6:30	Off Location:	12:30

Proppant Data:					
Type	Mesh	Pumped (lbs)	Start Concentration (PPG)	End Concentration (PPG)	In Formation (lbs)
	12/20	50,000	3.3	15.4	49,876

Maximum Concentration at Formation: 9.7 lbs/gal      Total Proppant in Formation: 49,876 lbs

Time (hh:mm:ss)	PRESSURE		FLUIDS				PROPPANT		CO2/N2 TREATMENTS					Remarks	
	Tubing (Psi)	Casing (Psi)	Clean per Stage (bbbls)	Slurry per Stage (bbbls)	Slurry Cur. (bbbls)	Slurry Rate (bbbls/min)	Blender Conc. (lbs/gal)	Total Mass lbs/gal	Volume (scf)	CO2 or N2 (%)	Ratio (scf/bbl)	W.H. Slurry Rate Cum. (bbbls)	W.H. Rate (bbbls/min)		W.H. Prop. (lbs/gal)
10:00:02	56.0		33.4	33.4		3.8			24034	75.0	720.0		15.0		Start Pumping
10:31:37	1357.0												15.0		Breakdown
10:11:26	1476.0		17.9	20.5	33.4	5.0	3.3	2,475	10008	70.0	487	133.5	15.0	1.0	Start Sand
10:15:39	1570.0		17.9	22.5	53.9	6.1	5.7	6,750	7955	65.0	354	195.8	15.0	2.0	Increase Concentration
10:19:22	1768.0		23.8	34.6	76.4	7.4	10.0	16,750	8575	60.0	248	251.4	15.0	4.0	Increase Concentration
10:24:00	2168.0		35.7	57.3	111.0	8.5	13.3	36,700	10477	55.0	183	321.7	15.0	6.0	Increase Concentration
10:30:50	2565.0		9.2	15.2	168.3	10.0	14.5	42,300	1799	45.0	118	422.6	15.0	8.0	Increase Concentration
10:32:20	2954.0		5.5	12.1	183.5	11.4	15.4	50,000	1534	34.0	76	445.3	15.0	10.0	Increase Concentration
10:33:08	2910.0		16.7	16.7	195.6	15.0			0			467.7	15.0		Start Flush
10:34:21	3751.0				212.3							484.4			Shut Down
10:34:28	301.0														ISIP
10:39:28	274.0														5 min

Fluid Totals and Pressure Limits:				
Total Fluid On Location	305.0 bbls	Pressure Test Surface Lines To	5000.0 Psi	MATERIAL
Fluid Pumped	265.0 bbls	Annulus Relief Valve	N/A Psi	TRANSFER
Fluid In Formation	142.7 bbls	Maximum Treating Pressure	5000.0 Psi	NUMBERS
Fluid Left After Job	40.0 bbls	Hold Annulus at	N/A Psi	

Personnel and Equipment:					
Employee	Unit#	Employee	Unit#	Employee	Unit#
R. Schimetz / B. Patterson		S. Lokos/J. Gustus		JC Smith/J. Rossol	
A. Shearer/R. Dodd/A. Freed		A. Nicholson/W. Nicholson		T. Overlie/P. Lowery	
M. Newell/P. Wolfson/G. Craig		J. Davidson/K. Laramore		R. Fleeger/P. Jeffers	
W. Thompson/ S. Glanville		C. Buffington/P. Nephin		T. Hurr/J. Austill	
R. Allport/S. Phipps		B. Goetz/J. Smith		J. Weishoff/C. Mawer	

(USA) Inc.  
 622 - 5th Avenue SW  
 Calgary, Alberta, T2P 0M6  
 Telephone: (403) 269-1420



**SERVICE TICKET**  
**9105504**

This service ticket is not an invoice; pricing is subject to review and change without notice.

Client Name <b>Fidelity E&amp;P</b>		Well Name <b>Well 1137</b>		Job Date <b>6-27-02</b>		
Address <b>P.O. Box 131</b>		Location <b>SW NW sec. 3 T31N - R34E</b>		Service Point <b>Williston</b>		
City <b>Glendive</b>		Client Representative <b>HARLAN Jirges</b>		Pricing Area <b>1</b>	State <b>N.D.</b>	
Province/State <b>Mont.</b>	Postal/Zip Code <b>59330</b>	Job Type <b>FRAC %</b>	State <b>Mont.</b>	County <b>Valley</b>	AFE/PO #	
District <b>41</b>	Service, Equipment & Material Type		Code	Quantity	Unit Price	Amount
	<b>Crew transportation</b>		<b>1404</b>	<b>1</b>	<b>75<sup>00</sup></b>	<b>75<sup>00</sup></b>
	<b>MPCTU Operating time</b>		<b>2000</b>	<b>1</b>	<b>315<sup>00</sup></b>	<b>315<sup>00</sup></b>
					FIELD ESTIMATE	<b>390<sup>00</sup></b>

**Well Data:**

Casing	Tubing		Fluid Pumped (bbl)	Fluid Returns (bbl)	Sand Returns (bbl)	Coil Cycled (ft)	Soap (gal)	Unit Travel Hours	Unit Location Hours	Crew Travel Hours
	Size (in)	Pressure (psi)								
<b>4 1/2</b>						<b>873'</b>	<b>5</b>		<b>1</b>	<b>1</b>

**Multipurpose Coiled Tubing Service Report**

**Tool and Treatment Summary:** Drive to location, spot MPCTU, Rig-up, M/U injector, Run in hole % to 873, soap clean, POH, Rig down move to next location.

**Personnel and Equipment:**

Employees <b>DAVID Nicholoff</b> <b>DEAN Ingebritson</b>	Units <b>2228</b> <b>7707</b>	MATERIAL TRANSFER NUMBERS
--	-------------------------------------	---------------------------

**Service Comments:**

Arrival Time: **06:30 Am**      Departure Time: **08:00 Am**

**ATTN:**  
**H. Jirges**

*[Handwritten initials]*

FIELD ESTIMATE	
<input type="checkbox"/> Cementing - Prim.	<input type="checkbox"/> Cementing - Rem.
<input type="checkbox"/> Coiled Tubing	<input type="checkbox"/> Nitrogen
<input type="checkbox"/> Stimulation	<input type="checkbox"/> Fracturing
<input checked="" type="checkbox"/> MPCTU	<input type="checkbox"/> Other
Field <b>D.V.</b>	Sales 1 <b>[Signature]</b>
Sales 2 <b>[Signature]</b>	

This space is reserved for the Client Coding Stamp.

This signature confirms that I have read and comply with the terms and conditions as noted on the reverse of this document.

**Comments:** *[Handwritten signature]*

**Received**  
 AUG 2002  
 Board of Oil & Gas Cons.  
 State of N.D. / Billings

**Sanjel (USA) Inc.**  
 200, 505 - 2nd Street SW  
 Calgary, Alberta, T2P 1N8  
 Telephone: (403) 269-1420



**SERVICE TICKET**  
**9125810**

*This service ticket is not an invoice; pricing is subject to review and change without notice.*

NOV 28 2006

Client Name <b>Fidelity E&amp;P</b>			Well Name <b># 1137</b>			Job Date <b>11-17-06</b>		
Address <b>P.O. Box 1010</b>			Location <b>Sec 3 -T31N -R34E</b>			Service Point <b>Williston</b>		
City <b>Glendive</b>			Client Representative <b>Bill Tooznah</b>			Pricing Area <b>1</b>	State <b>N.P.</b>	
Province/State <b>MT</b>	Postal/Zip Code <b>59330</b>	Job Type <b>MPCT Clean out</b>	State <b>MT</b>	County <b>Phillips</b>	AFE/PO # <b>Glendive</b>			
District <b>41</b>	Service, Equipment & Material Type		<b>17</b>	Code	Quantity	Unit Price	Amount	
<b>41</b>	<b>CTU Field</b>							
		<b>tubing Joiner</b>		<b>2192</b>	<b>1</b>	<b>36/each</b>		<b>36 00 ✓</b>
		<b>tubing Plug</b>		<b>6037</b>	<b>1</b>	<b>45/each</b>		<b>45 00 ✓</b>
		<b>Fuel surcharge</b>						<b>21 11 ✓</b>
								FIELD ESTIMATE <b>#724 61</b>

Well Data:

Multipurpose Coiled Tubing Service Report	Casing		Tubing		Fluid Pumped (bbl)	Fluid Returns (bbl)	Sand Returns (bbl)	Coil Cycled (ft)	Soap (gal)	Unit Travel Hours	Unit Location Hours	Crew Travel Hours
	Size (in)	Pressure (psi)	Size (in)	Pressure (psi)								
	<b>4 1/2</b>		<b>1 1/4</b>					<b>888</b>	<b>6</b>		<b>1 1/2</b>	

Tool and Treatment Summary:

**RIG UP CTU Run in hole to 888' worked PerFS & Scaped on bottom POOH Load & run 770' OF 1 1/4" X-6 POLY in well blew out plug Rld & move**

Personnel and Equipment:

Employees	<b>Dennis Voiz</b>	Units	<b>2544</b>	MATERIAL
	<b>Dean Ingebritson</b>		<b>3009</b>	TRANSFER
Service Comments:				NUMBERS
Arrival Time:	<b>1430</b>	Departure Time:	<b>1600</b>	

RECEIVED

<p><i>[Signature]</i></p> <p><b>Harlan Jirges</b></p> <p>This space is reserved for the Client Coding Stamp.</p>	<b>AFB</b>		<b>FIELD ESTIMATE</b>		<p style="color: red; font-weight: bold;">DEC - 7 2006</p> <p style="color: red; font-weight: bold;">MONTANA OIL &amp; GAS COMMISSION BILLING</p>
	<input type="checkbox"/> Cementing - Prim.	<input type="checkbox"/> Cementing - Rem.			
	<input type="checkbox"/> Coiled Tubing	<input type="checkbox"/> Nitrogen			
	<input type="checkbox"/> Stimulation	<input type="checkbox"/> Fracturing			
<input checked="" type="checkbox"/> MPCTU	<input type="checkbox"/> Other				
Field <i>[Signature]</i>	Sales 1 <i>[Signature]</i>	Sales 2			
Comments					<p>This signature confirms that I have read and comply with the terms and conditions as noted on the reverse of this document.</p> <p>x <i>[Signature]</i></p>