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W. THOMAS KELLAHIN*
*NEW MEXICO BOARD OF LEGAL SPECIALIZATION RECOGNIZED SPECIALIST IN THE AREA OF NATURAL RESOURCES-OIL AND GAS LAW

JASON KELLAHIN (RETIRED 1991)

TELEPHONE (505) 982-4285
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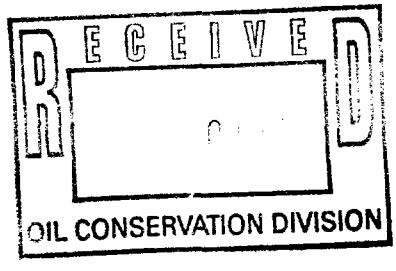
August 30, 1994



HAND DELIVERED

Mr. David R. Catanach
Hearing Examiner
Oil Conservation Division
310 Old Santa Fe Trail
Santa Fe, New Mexico 87501

Re: NMOCD Case 11067
Application of Meridian Oil Inc.
for Approval of its Allison Unit
CO2 Injection Pilot Project,
San Juan County, New Mexico

Dear David:

At the hearing held on August 18, 1994, you requested that Meridian supplement its tabulation of "area of review" wellbore data to include calculated and measured cement tops. In addition, you requested additional data to support Meridian's request for a 2000 psi surface limitation for CO2 injection. In response to your requests, Mr. Craig McCracken, (505) 326-9706, the petroleum engineering witness who testified before you, has provided me with the following:

(1) tabulation of area review wells with coal tops, cements tops, and source of cement top data. Mr. McCracken advises that while all coal wells in the area of review are open in the coal, 7" casing is set just above the top coal and cemented back to the surface. Also included is a cement bond log from the Allison Unit #131, one of the few Allison Unit coal wells cemented through the coal. This well is located immediately west of the area of review and Mr. McCracken says the log shows adequate cement bonding and is typical of the few cement bond logs available in the unit.

(2) Also enclosed are the treatment reports from the only three coal wells in the Allison Unit which were fractured-treated. Mr. McCracken further advises that unfortunately these wells were not "broken down" before being fractured, so the breakdown pressure is difficult to see. On each pressure plot, he has indicated what he believes to be the breakdown pressure point. Also included is a portion of a Smith Energy Services Measurement While Fracturing Report which indicates a fracture gradient very close to the one he has calculated and testified to.

Please call me or Mr. McCracken if you need anything further.

Very truly yours,

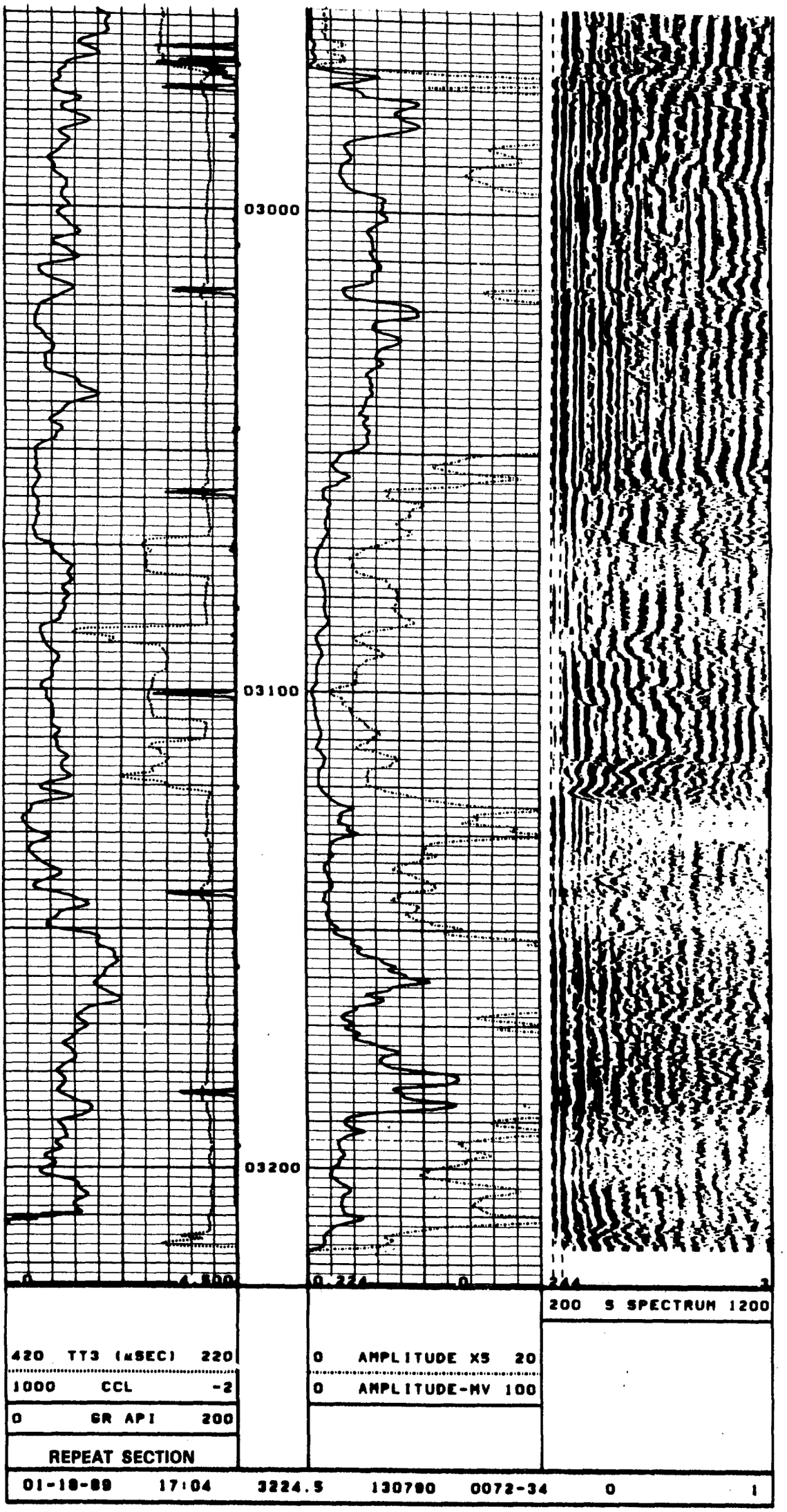
W. Thomas Kellahin

Enclosure:
cc: Alan Alexander
Meridian Oil Inc. (Farmington)

Well Name	Number	Location	Formation	Coal Top	Cement Top	Top From;
Allison Unit	18	B-25-32-7	Dakota	3103	2900	TS
Allison Unit	113	M-19-32-6	Fruitland Coal	3049	Surface	TR
Allison Unit	114	I-19-32-6	Fruitland Coal	3088	Surface	TR
Allison Unit	120	A-30-32-6	Fruitland Coal	3019	Surface	TR
Allison Unit	121	L-30-32-6	Fruitland Coal	3252	Surface	TR
Allison Unit	130	G-24-32-7	Fruitland Coal	3031	Surface	TR
Allison Unit	131	M-24-32-7	Fruitland Coal	3142	Surface	TR
Allison Unit	132	H-25-32-7	Fruitland Coal	3129	Surface	TR
Burnt Mesa	101	N-25-32-7	Fruitland Coal	3273	Surface	TR
Allison Unit	44	L-30-32-6	Mesaverde	3249	1450	TS
Allison Unit	22A	F-25-32-7	Mesaverde	3147	1900	TS
Allison Unit	22	B-25-32-7	Mesaverde	3116	2050	TS
Allison Unit	10A	L-20-32-6	Mesaverde	3080	2600	TS
Allison Unit	41A	D-29-32-6	Mesaverde	3061	1800	TS
Burnt Mesa	4	M-25-32-7	Mesaverde	3309	1300	TS
Burnt Mesa	1A	J-25-32-7	Mesaverde	3220	2100	TS
Burnt Mesa	1	K-25-32-7	Mesaverde	3279	1560	Calc.
Allison Unit	23X	M-19-32-6	MV/Dk	3063	1250	TS
Allison Unit	27	A-30-32-6	MV/Dk	3023	1850	TS
Allison Unit	40	A-19-32-6	MV/Dk	3083	2700	TS
Allison Unit	17	K-24-32-7	MV/Dk	3121	2650	TS

TS=Temperature Survey
TR=Tour Report
Calc.=Calculated (100% excess)

Allison Unit #131 Cement Bond Log



SMITH ENERGY SERVICES

MWF[R] COMPUTER REPORT

Measurement While Fracturing

MERIDIAN OIL

ALLISON UNIT #131

SAN JUAN COUNTY

NEW MEXICO

JANUARY 19, 1989

SMITH ENERGY SERVICES

MERIDIAN OIL
ALLISON UNIT #131

"Notice, this MWF® computer van report is based on sound engineering practices, but because of variable well conditions and other information which must be relied upon, **Smith Energy Services** makes no waranty, express or implied, as to the accuracy of the data or of any calculations or opinions expressed herein. You agree that **Smith Energy Services** shall not be liable for any loss or damage, whether due to negligence or otherwise, arising out of or in connection with such data, calculations or opinions."

JANUARY 19, 1989

SMITH ENERGY SERVICES

MERIDIAN OIL
ALLISON UNIT #131

SUMMARY DATA

ESTIMATED BOTTOM HOLE TEMPERATURE	125	(deg. F)
ESTIMATED RESERVOIR PRESSURE	1000	(psi)
ESTIMATED FRACTURE GRADIENT	0.77	
ESTIMATED CLOSURE STRESS	1500	(psi)
PERFORATION INTERVAL	3123-3150	(feet)
PERFORATION INTERVAL	3190-3203	(feet)
PERFORATION DIAMETERS	0.48	(inches)
NUMBER OF PERFORATIONS	80	
FLUSH	FRESH WATER	
FLUSH CAPACITY	124	(bbls)
PROPPANT	SAND	
PROPPANT MESH SIZE	20/40	
PROPANT SPECIFIC GRAVITY	22.08	(ppg)

JANUARY 19, 1989

SMITH ENERGY SERVICES
A DIVISION OF ALLIED PRODUCTS CORPORATION

TREATMENT REPORT

Date 1-18-89 Field Rec. No. 00796 New Well X
Operator Meridian Oil, Inc. Old Well
Well Name Allison #131 Lease
Field Undes. Fruitland Sec. 24 TWP 32N RGE 7
County San Juan State NM District Farmington

FORMATION DATA

Form 1 Fruitland Coal Perf Dia .48 in. Perfs. 3123 - 3203 (80 holes)
Form 2 Perf Dia in. Perfs.
New Zones 1 Oil Gas X Injection Disposal Other (specify)
Treatment History: Vol Gal Fluid Remarks

PIPE DATA

	SHT P	BHP PSI	Por %	Perm md
Form 1.				
Form 2.				
Form 3.				
Form 4.				
Source:				

Treating Cond.: Casing X Tubing X Annulus Manifold
Cond. Cap. gal: Casing 5213 Tubing 521 Annulus Hole
Tubing O.D. 2-3/8 in Wt. 4.7 lb/ft Grade J-55 Run to 3205
Casing O.D. 7 in Wt. 20 lb/ft Grade K-55 Set at 3111
Casing O.D./Liner O.D. 4½ in Wt. 10.5 lb/ft Grade K-55 Set From 2963 to 3240
Packer set at Packer type Packer string: ID in. O.D. in. PB/TD 3223 Hole Dia at pay 4½ in.

TREATMENT DATA (At Blender)

Pad Fluid	30# borate	Pad Vol	25,000 gal	KCL %	Aux Mtrls CMG-2/BW-5/CX-13/WCB-Lt/WCB-1
Frac Fluid 1	30# borate	Fluid 1 Vol	75,350 gal	KCL %	Aux Mtrls
Frac Fluid 2		Fluid 2 Vol	gal	KCL %	Aux Mtrls
Frac Fluid 3		Fluid 3 Vol	gal	KCL %	Aux Mtrls
Frac Fluid 4		Fluid 4 Vol	gal	KCL %	Aux Mtrls
Flush	H20	Flush Vol	2058 gal	KCL %	Flush Aux Mtrls
Acid	HCl	Acid Vol	600 gal	strength 15 %	Acid Aux Mtrls CIA-1
Acid Flush	H20	Acid Flush Vol	462 gal	KCL %	Acidizer via tubing

Ball Sealer Dia in. Type Stg 1 Stg 2 Stg 3 Stg 4 Stg 5 Stg 6 Stg 7
Other Hole loaded with H20

Recommended Procedure: Circ & spot 600 gl 15% - P.T. - frac as follows:
25000 gl pad - 16,000 gl 1# 40-70 - 22,000 gl 1# 20-40 -
12,500 gl 2# 20-40 - 10,000 gl 3# 20-40 - 6,250 gl 4# -
4000 gl 5# - 2500 gl 6# - flush to otp perf.

	Prop Type	Mesh	Wt (lbs)
1	sand	40-70	16,000
2	sand	20-40	137,000
3			
4	152,000 20-40 & 16,000 40-70		

Max Prop 5.8 avg lb/gal Tot 168,000 lbs.

Source Meridian prog

Treating Press (PSI): Max 3500 Avg 3350 Operator's Max 3500 ISDP N/A Final 2380 in 5 Min
Ave. Inj. Rate 50 Total load to recover 2437 BBL 2130 10
2100 15

TREATMENT PROCEDURE

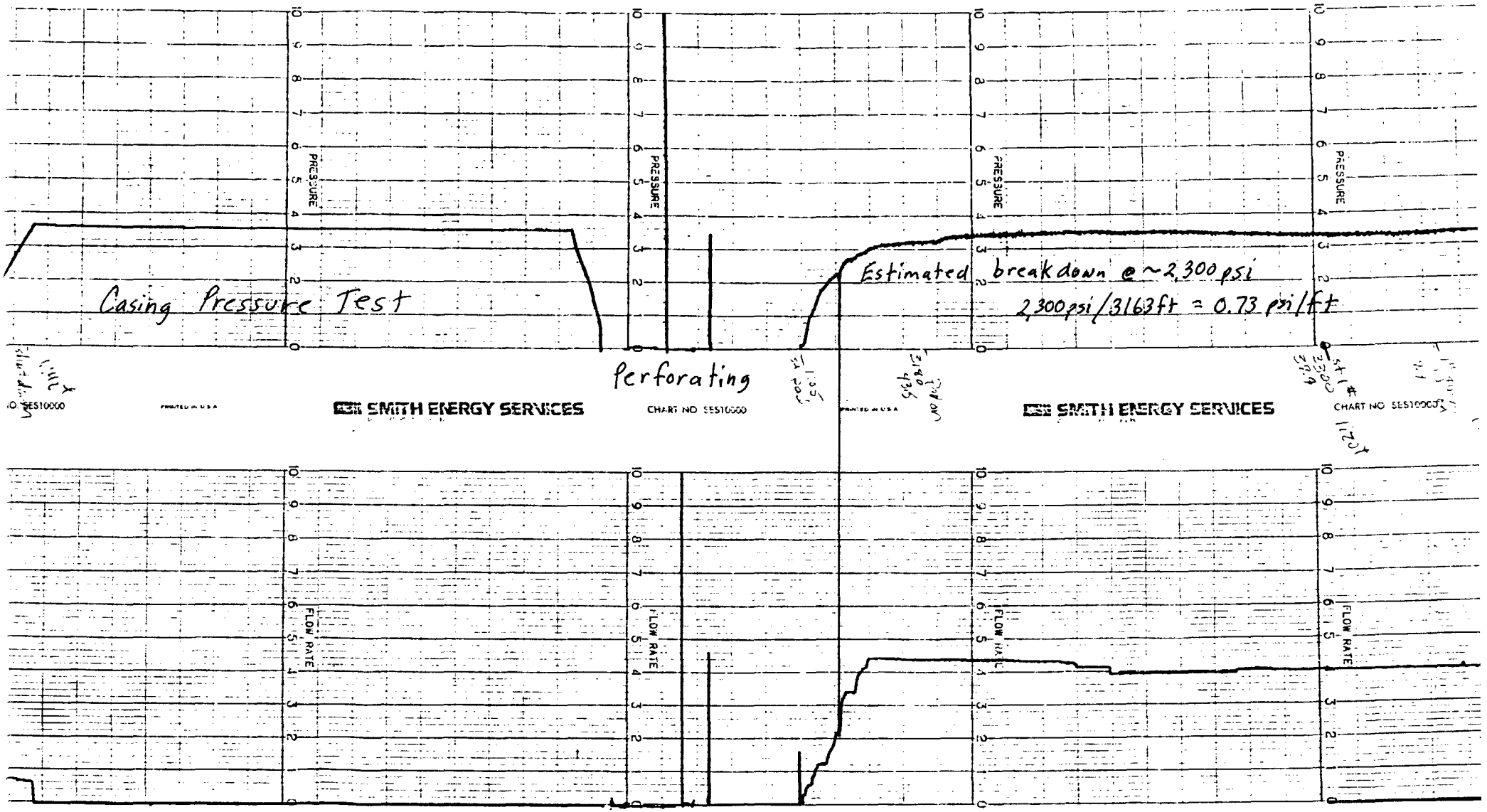
Time AM/PM	Treating Press. (PSI) Tubing	CSG/ANN	Inj. Rate BPM	Prop Conc # Gal	Total BBLS Pumped	Safety Meeting Remarks / Test Lines
3:00	0	0	0		0	st pumping to spot acid
3:01+	50	50	1.1		8	st acid
3:13+			1.1		14.8	st flush
3:19+			1.8		25.7	shut down
5:35		0	0		0	st pumping to hold psi for log
5:43+		350	2.8 - 0		19.4	shut down
5:50		0	0		19.4	resume pumping
6:27+		990	0		22.3	bleed psi off
6:40		0	0		0	st pumping to P.T.
6:42+		3500	.8 - 0		1.7	shut down - P.T. good

SMITH ENERGY Rep Henry Valdez Customer Rep Barry Wieland
DISTRIBUTION Meridian Oil, Inc., P.O. Box 4289, Farmington, NM 87499
883 770-8-88-1

1/19/89

TREATMENT PROCEDURE

Time AM PM	Treating Press. (PSI) Tubing	CSG/ANN	Inj. Rate BPM	Prop Conc #Gal	Total BBLS Pumped	Remarks
1:05		0	0		0	st pad
1:08+		3180	43.5		122	pad on
1:20+		3300	39.9	1	595	st 1# 40-70
1:23+		3300	39.9	1	717	1# on
1:29+		3350	49.4	1	993	st 1# 20-40
1:31+		3290	49.5	1	1115	1# 20-40 on
1:40+		3260	52.5	2	1541	st 2#
1:42+		3280	52.5	2	1663	2# on
1:46+		3200	52.8	3	1866	st 3#
1:48+		3150	52.8	3	1988	3# on
1:51+		3120	52.4	4	2136	st 4#
1:53+		3130	52.8	4	2258	4# on
1:54+		3130	52.6	5+	2312	st 5#
1:59+		3450	44	0	2570	st flush
2:01+		3500	12 - 0	0	2619	shut down
						1 - 120 BPM blender
						1 - CMG blender
						4 - pumps/3/1600's - 1/1300
						1 - acid pump
						1 - iron truck
						1 - 250,000 lb. sand master


Casing Pressure Test
Perforating
Estimated breakdown @ ~2,300 psi
2,300 psi / 3163 ft = 0.73 psi/ft
PRESSURE
FLOW RATE
SMITH ENERGY SERVICES
CHART NO SES10000

The Western Company
of North America
TREATMENT REPORT

Date 07/26/89 Western District Farmington F. Receipt 9487
Operator Meridian
Lease Allison Unit Well No. 10
Field Basin Fruitland Location Sec 17 T32N R6W
County Rio Arriba State New Mexico
Stage Number 1 This Zone ☐ This Well ☒

WELL DATA: OG ☐ NG ☒ NO ☐ OO ☐ WD ☐ IW ☐ Misc. ☐ Depth TD/PB 3104 Formation Fruitland Coal
Size Tubing 2 3/8 Tubing Perf. Type Packer Set At
Size Casing 7 Wt. 23 Set From Surface To 2989 Size Liner 4½ Wt. 10.5
Liner Set From 2838 To 3108 Open Hole: Size From To
Casing Perforations: Size .49 Holes Per Foot 3 Intervals 3002-3022, 2098-3096, 64 holes

Previous Treatment N. Prior Production N.

TREATMENT DATA: Pad Used: Yes ☒ No ☐ Pad Type F.F.
Treating Fluid Type: Oil ☐ Water ☒ Acid ☐ Misc. ☐ Foam ☐ Emulsion ☐
Treating Fluid Volume Gals. 118566 Fluid Description 30# J20L, 1# B-5 & B-11, 1½ gals CL-3, all per 1000 gals
Total Prop Quantity 181,400 Lbs. Prop Type: Sand ☒ Beads ☐ Special ☐ None ☐
Prop Mesh Sizes, Types and Quantities 180,000 #40/70 AZ sand, 162,200# 20/40 AZ sand
Hole Loaded With Water Treat Via: Tubing ☐ Casing ☒ Anul ☐ Tubing & Anul. ☐
Ball Sealers: In Stages of
Types and Number of Pumps Used 6 Bodyload 1000s
Auxiliary Materials 200 gals 15% HCl, ½ gal I-17, 854 gals J20L, 130# B-5 & B-11 189 gals CL-3
Procedure P.T. to 3000 roll hole & spot 200 gals 15% HCl, Frac via casing w/a 5000 gal fresh water pre pad 34000 gal gel pad 15000 gal 1 to 2 # 40770 33,500 gals @ 2#, 11380 gals @ 3#, 924 gals 4#, 1260 gals 5#, 2646 gals 6 to 7#, flu with 4802 gals.

FLUID PUMPED AN CAPACITIES IN BBL

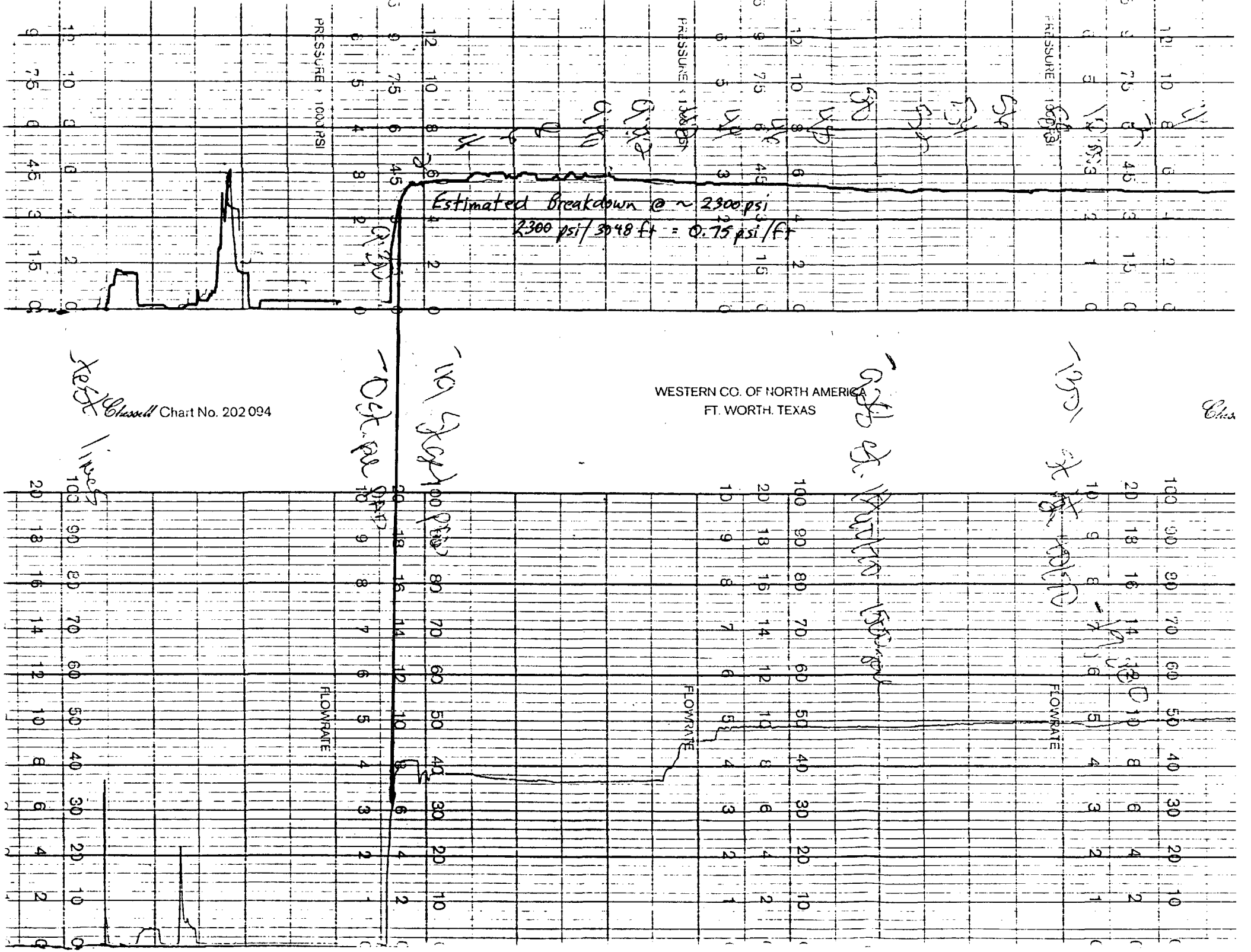
Tubing Cap.	11.9
Casing Cap.	114
Annular Cap.	88
Open Hole Cap.	
Fluid to Load	
Pad Volume	928
Treating Fluid	1895
Flush	114
Overflush	
Total to Recover	2937

Time AM/PM	Treating Pressure-Psi Tubing	Treating Pressure-Psi Casing	Barrels Fluid Pumped	Inj. Rate B P M	REMARKS
9:30		0	0	20	St. pre pad
9:33		2900	119	38	St. gel pad
9:50		2660	428	48	St. 1# 40/70
9:59		2050	1301	48	ST 2# 20/40
10:17		2600	2202	49	St. 3#
10:24		2600	2508	48	St. 4#
10:27		2600	2553	48	St. 5
10:28		2600	2730	48	St. 6 to 7
10:30		2600	2825	48	Start flush
10:32		2800	2937	48	Shutdown
					2736 clean bbls

Treating Pressure: Min. 2600 Max. 2950 Avg. 2700
Inj. Rate on Treating Fluid 48 Rate on Flush 48
Avg. Inj. Rate 49 I.S.D.P. 2300 Flush Dens. lb/gal 8.34
Final Shut-in Pressure 1950 in 15 Minutes.
Operator's Maximum Pressure 3000

Customer Representative Steve Nelson
Western Representative Harry Mitchell
Distribution

Job Number 884743
5-2140
10-2000


Estimated Breakdown @ ~ 2300 psi
2300 psi / 3048 ft = 0.75 psi/ft
PRESSURE 1000 PSI
FLOWRATE
WESTERN CO. OF NORTH AMERICA
FT. WORTH, TEXAS
Chessell Chart No. 202 094

SMITH ENERGY SERVICES
A DIVISION OF ALLIED PRODUCTS CORPORATION

TREATMENT REPORT

Date 1/8/89 Field Rec. No 00795 New Well X
Operator Meridian Oil, Inc. Old Well
Well Name Allison Unit #136 Lease
Field Undes. Fruitland Sec 19 TWP 32N RGE 6W
County La Plata State Colorado District Farmington

FORMATION DATA

Form 1 Fruitland Perf Dia .48 in Perfs 3130 - 3270 (42 holes)
Form 2 Perf Dia in Perfs
New Zones 1 Oil Gas X Injection Disposal Other (specify)
Treatment History Vol Gal Fluid Remarks

PIPE DATA

Treating Cond.: Casing Tubing Annulus Manifold
Cond. Csg. gal: Casing Tubing Annulus Hole
Tubing O.D. 2-3/8 in Wt 4.6 lb/ft Grade J55 Run to 3283
Casing O.D. 7 in Wt 20 lb/ft Grade K55 Set at 3117
Casing O.D./Liner O.D. 4½ in Wt 10.5 lb/ft Grade K55 Set From 2989 to
Packer set at Packer type Packer string: ID in. O.D. in. PB/TD Hole Dia at pay 4¼ in.

	BHT F	BHP PSI	Por %	Perm md
Form 1.				
Form 2.				
Form 3.				
Form 4.				

Source:

TREATMENT DATA (AI Blender)

Pad Fluid	30# Borate	Pad Vol		gal KCL	%	Aux Mtrls	CMG-2/CX-13/BW-5/WCB-1/WCB-LT
Frac Fluid 1	30# Borate	Fluid 1 Vol		gal KCL	%	Aux Mtrls	
Frac Fluid 2		Fluid 2 Vol		gal KCL	%	Aux Mtrls	
Frac Fluid 3		Fluid 3 Vol		gal KCL	%	Aux Mtrls	
Frac Fluid 4		Fluid 4 Vol		gal KCL	%	Aux Mtrls	
Flush	H2O	Flush Vol	600	gal KCL	15 %	Flush Aux Mtrls	CIA-1
Acid	HCl	Acid Vol	420	gal strength	%	Acid Aux Mtrls	tubing
Acid Flush		Acid Flush Vol		gal KCL	%	Acidize via	

Ball Sealer Dia in. Type Stg 1 Stg 2 Stg 3 Stg 4 Stg 5 Stg 6 Stg 7
Other Hole loaded with H2O

Recommended Procedure: Break circulation to spot 600 gl 15% HCl - p.t. to 3500 - frac as follows: 17,500 gl pad - 10,000 gl 1# 40-70 - 14,000 gl 1# 20-40 - 11,000 gl 2# - 6,000 gl 3# - 5,000 gl 4# - flush to top perf.

	Prop Type	Mesh	Wt (lbs)
1.	sand	40-70	10,000
2.	sand	20-40	74,000
3.			
4.			

Max Prop 4 lb/gal Tot 84,000 lbs.

Source: Meridian prog

Treating Press (PSI): Max 3500 Avg. 3450 Operator's Max 3500 ISDP 2800 Final in Min
Avg. Inj. Rate 15 Total load to recover 1635 BBL

5 min 2550, 10 min 2400, 15 min 2340

TREATMENT PROCEDURE

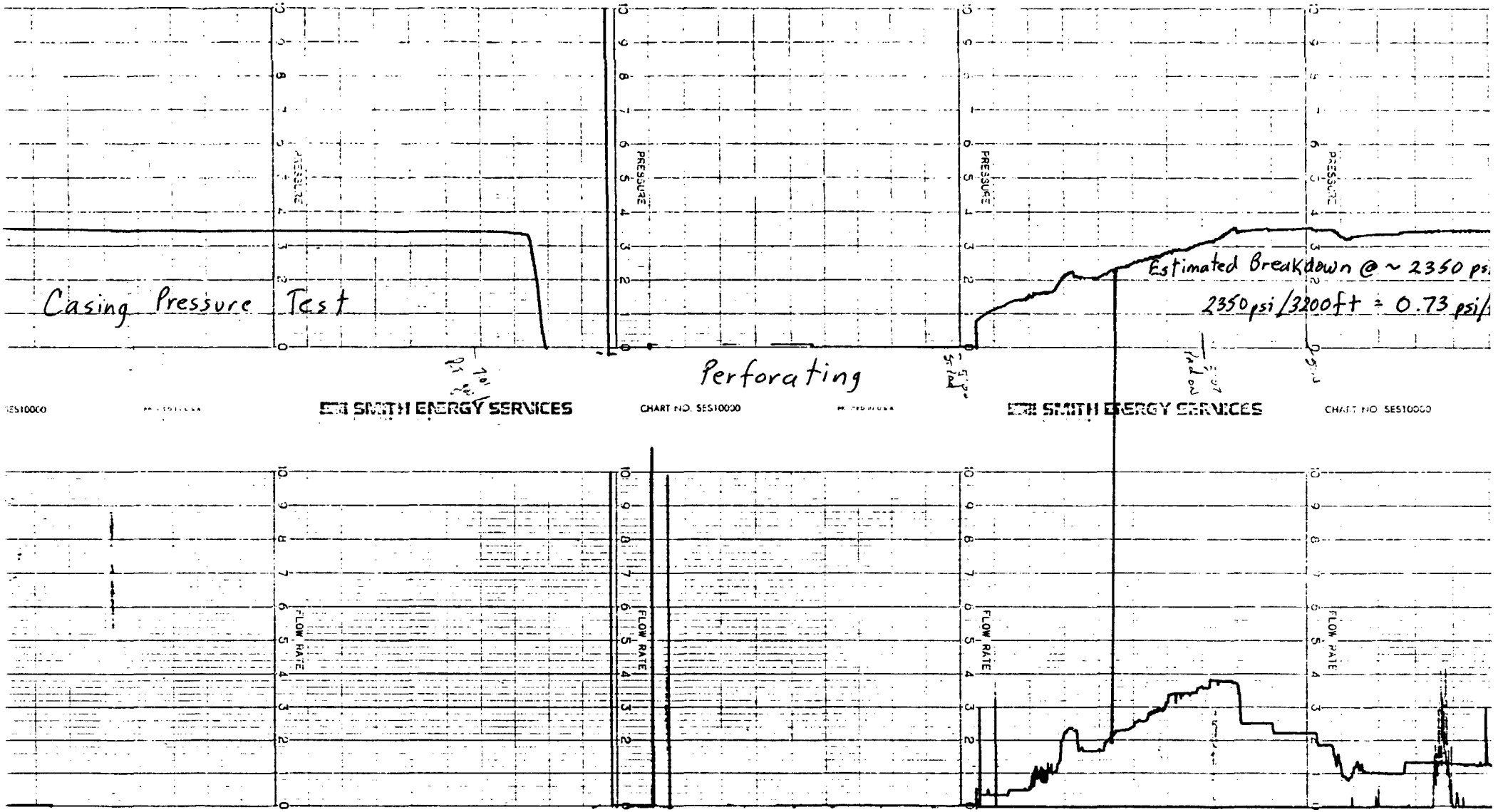
Time AM/PM	Treating Press (PSI) Tubing	Treating Press (PSI) CSG/ANN	Inj. Rate BPM	Prop Conc # Gal	Total BBLS Pumped	Safety Meeting Remarks Test Lines
1:45		0	0		0	st pumping to break circulation
1:46+		300	2.3		3.8	st acid
					17.8	st flush
1:55+					27.8	shut down
6:30		0	0		0	start pressure test
7:01		3500	2		8	pressure test complete
			(continued)			

SMITH ENERGY Rep Henry Valdez/Mark Byars Customer Rep Barry Weiland
DISTRIBUTION Meridian Oil, Inc., P.O. Box 4289, Farmington, NM 87499
SES 770-9-88-1

Time AM/PM	Treating Press (PSI) Tubing	Treating Press (PSI) CSG/ANN	Inj. Rate BPM	Prop Conc #Gal	Total BBLS Pumped	Remarks
5:00		0	0	0	0	start pad
5:07		3100	38	0	123	pad on
5:26		3400	14	1	417	st 1# 40-60
5:34		3400	15	1	535	1# on
5:42		3400	15	1	655	st 1# 20-40
5:50		3500	14	1	773	1# on formation
6:07		3500	16	2	988	st 2#
6:14		3400	16	2	1101	2# on
6:23		3400	21	3	1250	st 3#
6:28		3400	26	3	1358	3# on
6:29		3400	30	4	1393	st 4#
6:33		3200	27	4	1497	4# on
6:34		2600	17		1512	start flush
6:40		3300	18		1635	all flush

2340
15 min

SES10/K3


Casing Pressure Test
Perforating
Estimated Breakdown @ ~ 2350 psi
2350psi/3200ft = 0.73 psi/
SMITH ENERGY SERVICES
CHART NO. SES10000
PRESSURE
FLOW RATE